DEPARTMENT OF THE ARMY

U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
DIRECT SUPPORT ACTIVITY-WEST
U.S. ARMY GARRISON, FITZSIMONS
AURORA, COLORADO 80045-5001

REPLY TO
ATTENTION OF

MCHB-AW-EH (40-5f)

9 October 1998

MEMORANDUM FOR Chief, National Guard Bureau, ATTN: NGB-ILE-EPR,
Building E-4430, Aberdeen Proving Ground, MD 21010-5420

SUBJECT: Site Inspection No. 38-EH-6745-97, Narrative Report, Camp Johnson Training Area (Wood Dump), Colchester, Vermont, 15-26 September 1997

Eight copies of Report are at Enclosure. The point of contact is undersigned at DSN 943-8100 or Commercial (303) 361-8100.

FOR THE COMMANDER:

8 Enclosures
as stated

MICHAEL J. DELL'ORCO, P.E.
MAJ, MS
Chief, Environmental Health Engineering
Division

CF:
HQDA (DAIM-ED)
CDR, MEDCOM, ATTN: MCHO-CL-W
CDR, North Atlantic RMC
CDR, West Point, ATTN: PVNTMED Svc
CDR, USAEC, ATTN: SFIM-AEC-EQ/SFIM-AEC-ER
CDR, USACHPPM, ATTN: MCHB-TS-EGW (Program 38/Mr. Bauer)
State of Vermont - Adjutant General (MAJ Bouchard), Camp Johnson,
Colchester, VT 05446-3004

DEPARTMENT OF THE ARMY

U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
DIRECT SUPPORT ACTIVITY-WEST
U.S. ARMY GARRISON, FITZSIMONS
AURORA, COLORADO 80045-5001

REPLY TO
ATTENTION OF

EXECUTIVE SUMMARY
SITE INSPECTION NO. 38-EH-6745-97
NARRATIVE REPORT
CAMP JOHNSON TRAINING AREA (WOOD DUMP)
COLCHESTER, VERMONT
15-26 SEPTEMBER 1997

1. PURPOSE. In accordance with U.S. Environmental Protection Agency (EPA) guidance for performing site inspections under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986, the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) conducted a site inspection (SI) at the wood dump in the Camp Johnson Training Area, Colchester, VT. This study investigated the possibility of contamination of soil by petroleum hydrocarbons, solvents, and metals, which could lead to contamination of the surface water and ground water. The scope of the investigation included sampling ground water, surface water, soil, and sediment samples in the area surrounding and downstream from the wood dump.

2. CONCLUSIONS.

a. The only contaminants detected in the surface or ground water samples were arsenic, barium, and nickel. Contaminant levels detected were well below the Maximum Contaminant Levels (MCLs) for barium, and the VT Ground Water Enforcement Standard for Nickel of 100 μg/L for nickel (Reference 27). The level of arsenic is below the MCL in all but one ground water sample. The ground water in this area is not used for drinking water.

b. None of the soil samples are above the industrial soil Preliminary Remediation Goals (PRGs) or the Risk Based Concentrations (RBCs) for any of the compounds listed. The barium level in one sample and the chromium level in all of the soil samples were above the Soil Screening Levels (SSLs) for ground water migration. Ground water in the area is not used for drinking water.

3. RECOMMENDATIONS. To protect public health and comply with environmental regulations, the following recommendations are made:

a. Remove all empty containers and drums, tires, and other non-construction debris from the edge of the wood dump area. Dispose of all items IAW applicable Federal, State, and local regulations.

b. Resample both the ground water in well JWD-GW6 to confirm the arsenic level and the soils in vicinity of sample JWD-GW5 to confirm barium levels.

Site Inspection No. 38-EH-6745-97, Narrative Report, Camp Johnson Training Area (Wood Dump), Colchester, VT, 15-26 Sep 97

TABLE OF CONTENTS

Paragraph	Page
1. INTRODUCTION	1
References	1
Authority	1
Purpose	1
Project Personnel	1
2. SITE DESCRIPTION	2
Site Physiography	2
Wood Dump Description	2
Accessibility	2
Adjacent Land Use	2
3. OPERATIONAL HISTORY AND WASTE CHARACTERISTICS	2
Site History	2
Potential Contaminants	3
4. SAMPLING RATIONALE	3
Objectives	3
Analytical Data	6
Analyses	6
Action Levels	6
Deviations From Sample Plan	6
5. GROUND WATER PATHWAY	8
Regional and Local Geology	8
Targets	9
Sample Locations	9
Analytical Results	9
Conclusions	11
6. SURFACE WATER PATHWAY	11
Hydrology	11
Targets	11
Sample Locations	12
Analytical Results	12
Conclusions	12

Paragraph | Page

7. SOIL EXPOSURE AND AIR PATHWAYS 12
Soil Exposure Pathway 12
Releases Impacting Air 13
Soil and Air Targets 13
Soil Sampling Locations 13
Air Monitoring 14
Analytical Results 14
Conclusions 15

8. CONCLUSIONS 15

9. RECOMMENDATIONS 16

TABLES
Table 1. Samples Collected 3
Table 2. Results of Ground Water Sampling 10
Table 3. Results of Surface Water Sampling 13
Table 4. Results of Soil Sampling 14
Table 5. Comparison Between SSLs, Region 9 PRGs, and Region 3 RBCs for Industrial Soil 15

FIGURES
Figure 1. Camp Johnson Location Map 4
Figure 2. Camp Johnson Installation Map 5
Figure 3. Location of Sample Points and Flow Direction 7

APPENDICES
A - REFERENCES A-1
B - SAMPLE PLAN B-1
C - MONITORING WELL LOGS C-1
D – EPA REGION 9 PRELIMINARY REMEDIATION GOALS D-1
E – EPA REGION 3 RISK-BASED CONCENTRATIONS E-1

DEPARTMENT OF THE ARMY

U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
DIRECT SUPPORT ACTIVITY-WEST
U.S. ARMY GARRISON, FITZSIMONS
AURORA, COLORADO 80045-5001

REPLY TO
ATTENTION OF

MCHB-AW-EH (40-5f) 9 October 1998

SITE INSPECTION NO. 38-EH-6745-97
NARRATIVE REPORT
CAMP JOHNSON TRAINING AREA (WOOD DUMP)
COLCHESTER, VERMONT
15-26 SEPTEMBER 1997

1. INTRODUCTION.

a. References. See Appendix A for a list of references.

b. Authority. Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA).

c. Purpose. In accordance with U.S. Environmental Protection Agency (EPA) guidance for performing site inspections under CERCLA and the SARA, the U.S. Army Center for Health Promotion and Preventive Medicine-West (USACHPPM-W) conducted a site inspection at the wood dump in the Camp Johnson Training Area, Colchester, VT. This study investigated the possibility of contamination of soil by petroleum hydrocarbons, solvents, and metals, which could lead to contamination of the surface water and ground water. The scope of the investigation included sampling ground water, surface water, soil, and sediment samples in the area surrounding and downstream from the Wood Dump.

d. Project Personnel. The following personnel conducted the Site Inspection:

(1) CPT Christopher Gellasch, Environmental Science Officer, USACHPPM-W, Environmental Health Engineering Division (EHED), Project Manager.

(2) Mr. Thomas Meckelnburg, Geohydrologist, USACHPPM, Ground Water and Solid Waste Program (GWSWP), Site Safety and Health Supervisor.

(3) Mr. Mark Farro, Engineering Technician, USACHPPM, GWSWP.

(4) Mr. Mark Pippen, Engineering Technician, USACHPPM, GWSWP.

(5) Ms. Ginger Perkins, Environmental Protection Specialist, USACHPPM-W, EHED.

(6) SSG Shawn Healy, Preventive Medicine Health Physics NCO, 520th Theater Area Medical Laboratory.

2. SITE DESCRIPTION.

a. Site Physiography (References 1, 2, and 3). The Camp Johnson Training Area lies within the Town of Colchester, Chittenden County, VT (address: Building 5, Camp Johnson, Colchester, VT 05446-3004). The Camp Johnson Training Area is in the central portion of a slightly hummocky plateau 200 feet above Lake Champlain (Figure 1). This plateau gently slopes north toward Lake Champlain, and is truncated south and west by the Winooski River floodplain. The northern portion of the site is dissected by streams into north-northwest and north trending flat ridges with gullies up to 100 feet deep.

b. Wood Dump Description. The Wood Dump is in the central portion of the Camp Johnson Training Area between the northern elliptical tank trail and a tributary of Sunderland Brook (Figure 2). The site is at least 190 feet long by 150 feet wide and 50 feet deep, based on field measurements of visible debris. Air photo data from 1974 suggest that the Wood Dump's aerial extent may be as large as 700 feet long by 200 feet wide.

c. Accessibility. The southern and western portions of the Camp Johnson Training Area are fenced. Routine vehicle traffic is limited to either the Cantonment Area's main gate on State Highway 15 to the south, or the back gate near US Highway 2/7 to the west. The northern portion of the Camp Johnson Training Area is accessible to foot traffic over hilly terrain. Mountain and dirt bikes can access the training area by only one power line access road that crosses Sunderland Brook.

d. Adjacent Land Use. U.S. Highway 2/7 and several transportation and service-related industrial parks comprise the Camp Johnson Training Area's western boundary. To the north are residential areas interspersed with wooded regions. The western boundary abuts old Fort Ethan Allen, which is now a mixture of townhouses, apartments, some light commercial industry, and a Vermont Agency of Transportation (VAOT) maintenance shop complex.

3. OPERATIONAL HISTORY AND WASTE CHARACTERISTICS.

a. Site History. According to air photo data, the site was in use as early as 1942 and likely received wastes from Fort Ethan Allen. The site is labeled as "Clearing, Base Dump" on a 1952 map of the Lily Pad Pond Area (Reference 4). Interviews with Installation personnel indicate that debris was thrown into a gully or nearby pit and burned once or twice per year. The burn site was

then covered with dirt. From about 1978 to about 1990, only wood debris was allowed in the site. After about 1990, Camp Johnson initiated wood recycling and the site became inactive. Several Installation personnel stated that prior to 1990, small amounts of excess and waste petroleum products were disposed in the Wood Dump. The long operational history of this site suggests it may have been known as the Fort Ethan Allen Landfill before being called the Wood Dump.

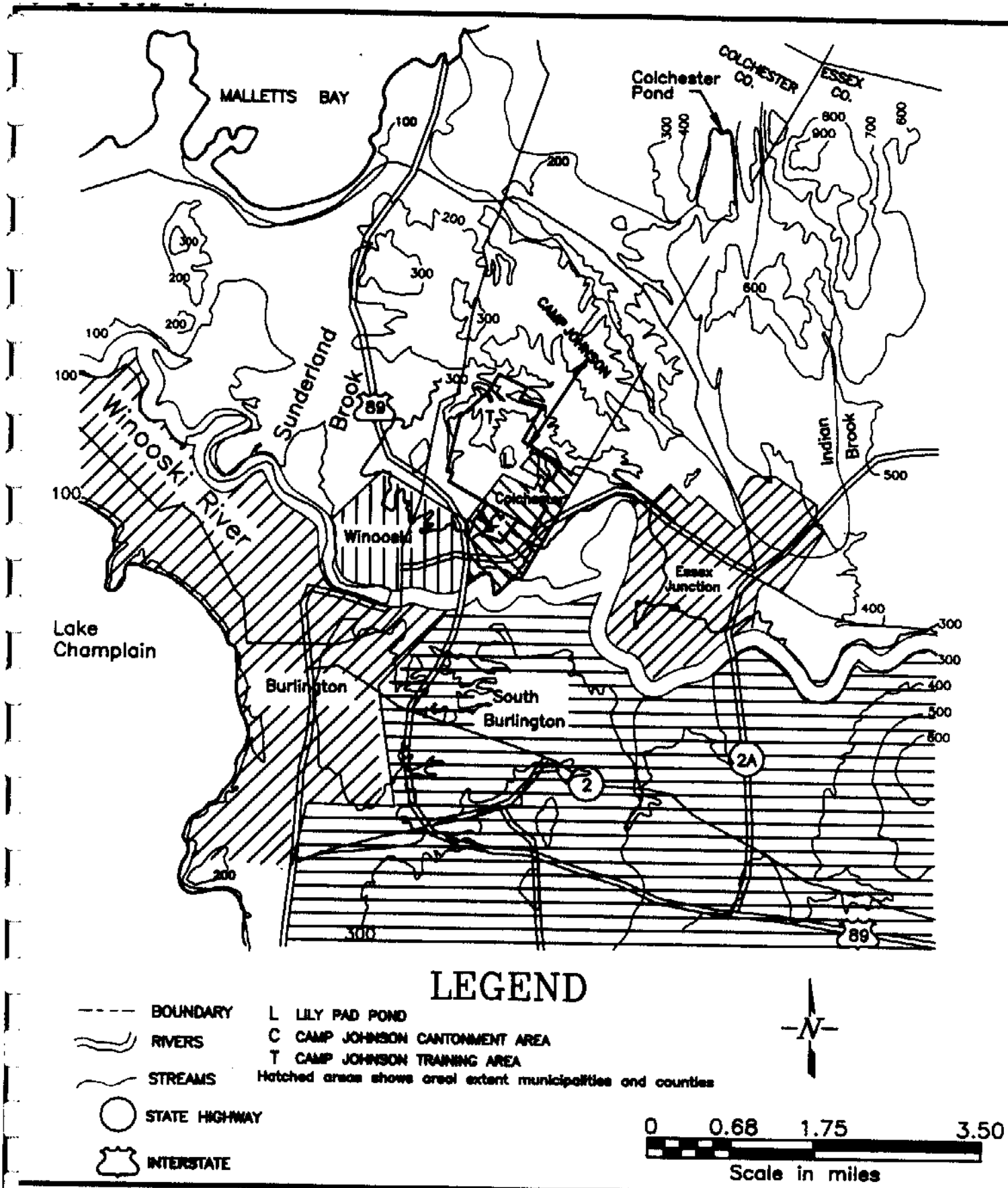
b. Potential Contaminants. Combustion of pressure- or oil-treated wood can produce trace levels of dioxins, low levels of furans, and heavy metal-rich ash. Partially combusted accelerants, such as diesel or other off-specification fuel, used to burn landfill wastes may also remain. Small amounts of pesticides, metals, petroleum hydrocarbons related to items disposed of into the Wood Dump area also possible. The volume of liquids disposed of at this site, and the degree of soil and ground water contamination is unknown. The quantities and types of waste from Fort Ethan Allen are also unknown.

4. SAMPLING RATIONALE.

a. Objectives. The objectives of this focused Site Inspection are to determine whether any hazardous substances or petroleum hydrocarbons related to past practices remain the soil and ground water at the Wood Dump or in the surface water of the stream located at the base of the site. The second objective is to determine whether these contaminants, if found, pose a threat to human health or the environment. The samples collected are summarized in Table 1, and the sample locations are shown on Figure 3.

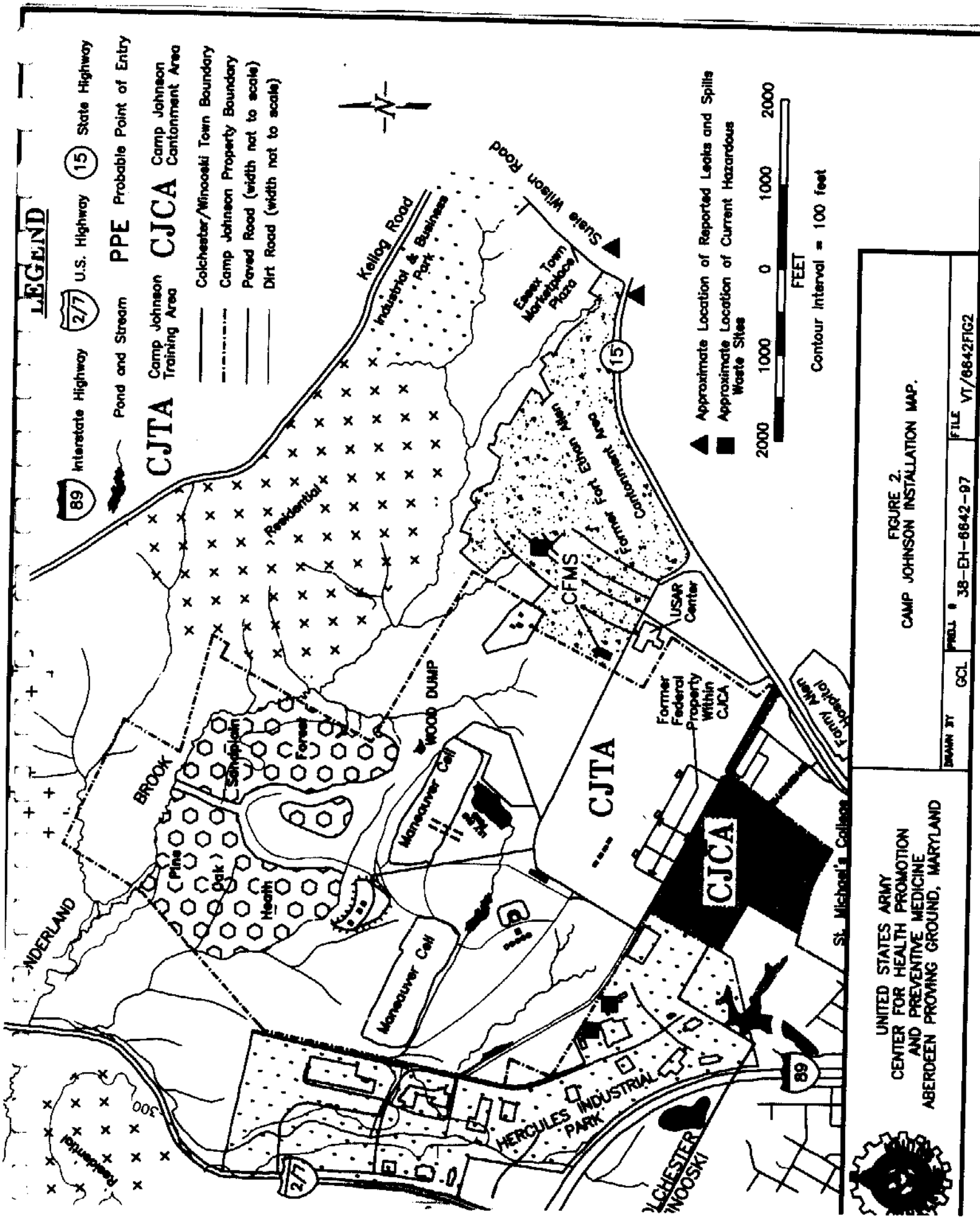
Table 1. Samples Collected.

Sample ID	Location	Matrix	Sampling Method	Date
JWD-SS1	Stream Sample in Ravine	Surface Water	Direct Sampling	21 SEP 97
JWD-SS2	Stream Sample in Ravine	Surface Water	Direct Sampling	21 SEP 97
JWD-SS3	Stream Sample in Ravine	Surface Water	Direct Sampling	21 SEP 97
JWD-GW1	Cross Gradient Well next to Wood Dump (WD)	Ground water Soil	Disposable Bailer Split Spoon (10')	24 SEP 97 21 SEP 97
JWD-GW2	Up Gradient Well at WD (Background)	Ground water Soil	Disposable Bailer Split Spoon (10')	24 SEP 97 21 SEP 97
JWD-GW3	Cross Gradient Well next to WD	Ground water Soil	Disposable Bailer Split Spoon (5' to 15')	24 SEP 97 21 SEP 97
JWD-GW5	Down Gradient Well at base of WD	Ground water Soil	Disposable Bailer Hand Auger (0.5' to 1')	24 SEP 97 22 SEP 97
JWD-GW6	Down Gradient Well downstream from WD	Ground water Soil	Disposable Bailer Hand Auger (0.5' to 1')	24 SEP 97 21 SEP 97



UNITED STATES ARMY
CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

Figure 1. Camp Johnson Location Map.


LEGEND
89 Interstate Highway
2/7 U.S. Highway
15 State Highway
Pond and Stream
PPE Probable Point of Entry
CJTA Camp Johnson Training Area
CJCA Camp Johnson Cantonment Area
Colchester/Winooski Town Boundary
Camp Johnson Property Boundary
Paved Road (width not to scale)
Dirt Road (width not to scale)
Approximate Location of Reported Leaks and Spills
Approximate Location of Current Hazardous Waste Sites
2000 1000 0 1000 2000
FEET
Contour Interval = 100 feet
Kellog Road
Industrial & Business Park
Susie Wilson Road
Essex Town Marketplace Plaza
Cantonment Area
Former Fort Ethan Allen
Residential
CFMS
USAR Center
WOOD DUMP
Former Federal Property Within CJCA
Army Alum Hospital
St. Michael's College
CJTA
CJCA
Maneuver Cell
Maneuver Cell
Forest
Sandplain
Pine
Oak
Heath
BROOK
NDERLAND
HERCULES INDUSTRIAL PARK
COLCHESTER
WINOOSKI
Residential
300
FIGURE 2.
CAMP JOHNSON INSTALLATION MAP.
DRAWN BY GCL
FIELD # 38-EH-6842-97
FILE VT/6842FIG2
UNITED STATES ARMY
CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

b. Analytical Data. Complete laboratory analytical results, including laboratory quality control data, for ground water, surface water, and soil samples were quite voluminous and can be obtained from this Command upon request.

c. Analyses.

(1) Soil Samples. All soil samples were analyzed for Semi-Volatile Organic Compounds (SVOCs) (EPA Method 8270B); Pesticides and Polychlorinated Biphenyls (PCBs) (EPA Method 608); Total Petroleum Hydrocarbons (TPH) (EPA Method 418.1); and Metals. The metals were analyzed using EPA Methods 6010A (Arsenic, Barium, Cadmium, Chromium, and Silver); 7421 (Lead); 7471A (Mercury); and 7740 (Selenium).

(2) Water Samples. All surface water samples were analyzed for SVOCs (EPA Method 8270B); Pesticides and PCBs (EPA Method 608); TPH (EPA Method 418.1); and Metals. The metals were analyzed using EPA Methods 6010A (Barium, Cadmium, Chromium, Cobalt, Copper, Silver and Zinc); 6020 (Arsenic, Beryllium, Nickel, and Thallium); 7421 (Lead); 7041 (Antimony); 7470A (Mercury); and 7740 (Selenium). Ground water samples were analyzed for the same parameters as surface water plus Volatile Organic Compounds (VOCs) (EPA Method 8260). Ground water samples were filtered prior to analysis for dissolved metals, while surface water samples were analyzed for total metals.

d. Action Levels. Ground water and surface water analytical results were compared to Maximum Contaminant Levels (MCLs) listed in the Safe Drinking Water Act and to the VT Ground water Enforcement Standards. Three references were used for comparison of soil samples to determine if any of the measured analytes were above generally acceptable levels. These references were the EPA's Region 9 Preliminary Remedial Goals (PRGs) and Region 3 Risk-Based Concentrations (RBCs) for industrial soil (References 5 and 28), which were used to evaluate levels of contamination in the soil alone. In addition, the approach delineated in the EPA's Soil Screening Guidance (Reference 6) for determining Generic Soil Screening Levels (SSLs), which was used to discern the potential impacts on ground water. The SSLs used here are for a dilution-attenuation factor of 1 (DAF 1) due to the shallow water table. However, it is vital to realize that ground water in this area is not used as a source of drinking water. Table 5 provides a direct comparison between industrial soil PRGs, RBCs, and SSLs used. In addition, Appendixes D and E contain complete industrial soil PRG and RBC tables. TPH levels were compared to the State Vermont Action Level of 1,000 mg/Kg (Reference 7). Soil and water samples with analytes greater than three times the background level were also considered above acceptable levels.

e. Deviations from Sample Plan (Appendix B). Only one soil sample at 10 feet below ground surface (bgs) was collected from site JWD-GW2 because the soil was saturated at 20 feet bgs and

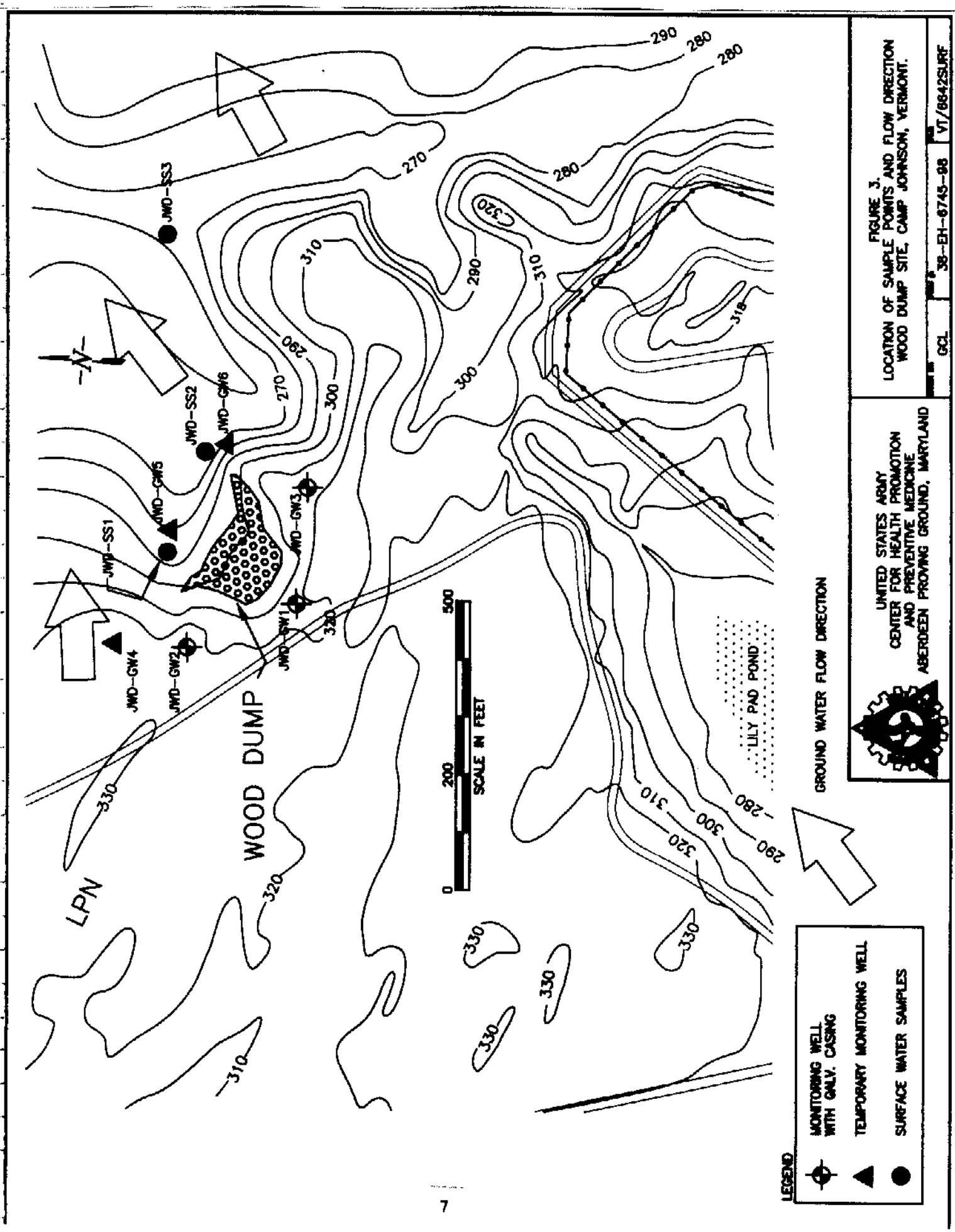


FIGURE 3.
LOCATION OF SAMPLE POINTS AND FLOW DIRECTION
WOOD DUMP SITE, CAMP JOHNSON, VERMONT.
GCL
38-EH-6745-98
VT/6642SURF
UNITED STATES ARMY
CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND
GROUND WATER FLOW DIRECTION
LILY PAD POND
SCALE IN FEET
0
200
500
WOOD DUMP
LPN
JWD-SS1
JWD-SS2
JWD-SS3
JWD-GW1
JWD-GW2
JWD-GW3
JWD-GW4
JWD-GW5
JWD-GW6
N
LEGEND
MONITORING WELL WITH GALV. CASING
TEMPORARY MONITORING WELL
SURFACE WATER SAMPLES

the split spoon would not hold a sample. Soil samples at sites JWD-GW1 and JWD-GW3 were collected at 5 and 15 feet bgs to avoid this problem. Problems recovering samples with split spoons prevented soil sampling at 30 feet bgs for any of the sites. Only three surface water samples were collected in the ravine instead of the originally planned six samples. After inspecting the ravine, it was decided that three samples (adjacent to and below the WD) would be sufficient to characterize the surface water at the site. There was no surface water present up slope from the site which prevented surface water samples from being collected in that area.

5. GROUND WATER PATHWAY.

a. Regional and Local Geology.

(1) Bedrock Geology. Late pre-Cambrian through early Paleozoic rocks metamorphosed by at least three subsequent orogenies (Reference 8) dominates northwest Vermont. The resulting folds and faults yield a north-south trending structural fabric that strongly influences all drainage basins and mountains. The western limb of the south-plunging Hinesburg Syncline underlies Camp Johnson. Units comprising the syncline are the middle Cambrian Winooski Formation, Upper(?) Cambrian Danby and Clarendon Springs Formations, and the Ordovician Shelburne Formation, respectively (Reference 9). The Winooski Formation consists of dolomite with some fracture-scale solution features, whereas the Danby and Clarendon Springs Formations are composed of sandy dolomite. The Shelburne Formation contains mostly marble (metamorphosed limestone) containing irregular lenses of dolomite. Off-post outcrops contain no karst features beyond scattered local solution features along fractures. All other units underlying Camp Johnson are covered by Holocene, fluvio-lacustrine sand, and silt of the Lake Champlain Lowlands (References 10 and 11).

(2) Glacio-Lacustrine Geology. During the Pleistocene, advancing and retreating glaciers repeatedly covered the region. The last retreat, about 15,000 years ago, created the Sea of Vermont (Reference 12) or Lake Vermont (Reference 12) in what is now the Lake Champlain Basin. As the level of the lake decreased, an extensive sequence of beaches and river deltas were deposited, some of which are more than 500 feet above the present level of Lake Champlain. Camp Johnson is on an Upper Marine (Reference 12) delta deposited by the paleo-Winooski River. This ancient Winooski River delta is composed of well to poorly sorted sand sequences with scarce gravel stringers. These sequences thicken from about 30 feet near Highway 15 to 100 feet where Sunderland Brook intersects US 2/7.

(3) Hydrogeology. Camp Johnson is underlain by a Holocene paleo-Winooski River delta forming a large plateau. Lower Paleozoic metamorphosed carbonates and quartzites deformed by north-south trending folds and faults underlie the glacial sediments. Little is known about the

hydrogeologic properties of the unconsolidated or bedrock aquifers underlying the Camp Johnson Training Area. The aquifers and confining units described below do not have formal or informal names.

(4) Bedrock Aquifers. The low yield from wells completed within the dolomitic units underlying the Camp Johnson Training Area and vicinity and a site reconnaissance conducted during this study support the conclusion that there is no significantly developed karst region underlying the site. It is believed that strong connectivity exists between the bedrock and the overlying surficial aquifers. The north-south structural fabric likely controls flow within the bedrock aquifers.

(5) Surficial Aquifers. Most wells within the vicinity of the Camp Johnson Training Area are completed within the glacial outwash sediments overlying the Paleozoic bedrock (Reference 14). The high elevation of Lily Pad Pond, ground water encountered in a borrow pit, and ground water monitoring wells indicate the uppermost aquifer is as little as 3 feet below ground surface (References 13, 14, and 15). Topography, stream drainage direction, and the north-northwest thickening of the paleo-Winooski River delta sediments suggest that ground water may flow north and south from Camp Johnson. Outcrops on the site's northwest boundary suggest the presence of a second semi-confined, 6-foot-thick, gravelly sand aquifer about 80 feet below the Camp Johnson Training Area. The aquifer is overlain by about four feet of clay, and underlain by a thin (less than 1 foot) clay layer, about 8 feet of sand, and dolomitic bedrock, respectively. Its areal extent is unknown.

b. Targets. Chittenden County receives the majority of its drinking water from Lake Champlain via the Champlain Water District, not from production wells. More than 75 wells exist within 4 miles of Camp Johnson. It is unknown if the wells near Camp Johnson are used for light industrial, commercial, or rare private use. Due to the lack of local hydrogeologic information, it is unknown if any of these wells are down gradient from Camp Johnson. The shortest distance between a known or suspected site in the Camp Johnson Training Area and an off-post well is 0.25 miles.

c. Sample Locations. Ground water samples were collected up gradient (JWD-GW2) and laterally (JWD-GW1 and GW3) to the WD. These samples were collected in 2-inch-diameter PVC wells drilled with hollow stem auger to approximately 30 feet below ground surface. Three down gradient 2-inch-diameter PVC wells were installed in the ravine with a hand auger (wells JWD-GW4, 5, and 6). These wells were hand dug to a depth of approximately 12-14 feet below ground surface. Disposable bailers were used to remove water from the wells. Logs for each monitoring well are provided in Appendix C of this Report.

d. Analytical Results. Pertinent laboratory results for ground water samples are summarized in Table 2. Ground water metal analyses are for dissolved metals.

Table 2. Results of Ground Water Sampling.

Analyte (units)	Sample Number					
	JWD-GW1	JWD-GW2	JWD-GW3	JWD-GW4	JWD-GW5	JWD-GW6
Dissolved Metals:						
Antimony (µg/L)	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Arsenic (µg/L)	5.7	6.7	< 2.0	< 2.0	8.0	51.0
Barium (µg/L)	< 10	250	< 10	< 10	19	23
Beryllium (µg/L)	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Cadmium (µg/L)	< 10	< 10	< 10	< 10	< 10	< 10
Chromium (µg/L)	< 20	< 20	< 20	< 20	< 20	< 20
Cobalt (µg/L)	< 50	< 50	< 50	< 50	< 50	< 50
Copper (µg/L)	< 10	< 10	< 10	< 10	< 10	< 10
Lead (µg/L)	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Mercury (µg/L)	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Nickel (µg/L)	2.5	11	4.1	5.9	8.6	9.6
Selenium (µg/L)	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Silver (µg/L)	< 10	< 10	< 10	< 10	< 10	< 10
Thallium (µg/L)	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Zinc (µg/L)	< 20	< 20	< 20	< 20	< 20	< 20
VOCs (µg/L):						
cis-1,2-dichloroethene	< 2.0	< 2.0	< 2.0	< 2.0	0.97	< 2.0
SVOCs (µg/L):						
bis(2-Ethylhexyl)phthalate	< 10	< 10	< 10	< 10	< 10	15
TPH (µg/L)	< 200	< 200	< 200	< 200	< 200	< 200

VOCs = Volatile Organic Compounds SVOCs = Semi-Volatile Organic Compounds
TPH = Total Petroleum Hydrocarbons

(1) Dissolved Metals. The proposed MCL for arsenic is listed as 50 µg/L and sample JWD-GW6 contains 51 µg/L of arsenic. Barium was detected in three samples (JWD-GW2, 5, and 6) and ranged from 19 to 250 µg/L but is well below the MCL of 2000 µg/L. Nickel was detected in all samples, and ranged from 2.5 to 11 µg/L. The highest nickel level was detected in the background sample (JWD-GW2). The VT Ground water Enforcement Standard for Nickel is 100 µg/L (Reference 27). The nickel MCL established by the EPA in 1992, which was remanded and vacated in 1995, was 100 µg/L (References 16 and 17). The nickel levels found at the WD are consistent with background levels found within the Camp Johnson Cantonment Area (Reference 18).

(2) VOCs. The MCL for cis-1,2-dichloroethene is listed as 70 µg/L and sample JWD-GW5 contained 0.97 µg/L of cis- 1,2-dichloroethene.

(3) SVOCs. An SVOC [bis(2-Ethylhexyl)phthalate] was detected in sample JWD-GW6 at 15 µg/L. The MCL for this compound is 6 µg/L. This compound is a plasticizer, a common laboratory contaminant, and does not appear to be indicative of SVOC contamination at the site.

e. Conclusions. The only well to have compounds above the MCL is JWD-GW6. Both arsenic and bis(2-Ethylhexyl)phthalate are found at low levels near the MCL (proposed MCL for arsenic) and the ground water in this area is not used as drinking water. The ground water in well JWD-GW6 should be resampled to confirm the arsenic level.

6. SURFACE WATER PATHWAY.

a. Hydrology. The soils underlying the surface water pathway are moderately to very permeable loamy sands to sandy loams. The region receives more than 40 net inches of precipitation every year, keeping the streams draining Camp Johnson flowing year round. The 2-year, 24-hour rainfall amount was not determined. Sunderland Brook and its tributaries drain the facility.

(1) Streams and Ponds. Lily Pad Pond is fed primarily by ground water and minor surface runoff. The Pond's out fall flows north and is thought to move underground towards Sunderland Brook. Sunderland Brook is a perennial stream, as are most of its tributaries. The Sunderland Brook stream system drains all of the Camp Johnson Training Area and the industrial parks and businesses that border the site. The area drained is about 5.3 square miles with a mean annual flow of about 7.4 cubic feet per second (cfs). A Sunderland Brook tributary flows 0.6 miles from Lily Pad Pond west-northwest through Palustrine wetlands to the Camp Johnson Installation Boundary. The brook then flows west and south before intersecting the perennial Winooski River northeast of Burlington, and flowing into Lake Champlain. The Camp Johnson Training Area lies above the 500-year flood plain (References 19 and 20).

(2) Lake Champlain. Circulation patterns within Lake Champlain are clockwise, which carries water from the Winooski River south past Burlington along dominantly lacustrine and scattered riverine wetlands (References 21, 22, and 23). Lake Champlain covers 270 square miles, is more than 400 feet deep, and is the most popular outdoor recreation area in the region for boating and fishing, serving about 400,000 people per year (Reference 23).

b. Targets.

(1) The surface water pathway flows through Palustrine and Riverine wetlands with several subtypes.

(2) Wetland frontages for each pathway segment are:

(a) Wetlands Within Camp Johnson - 0.47 miles.
(b) Wetlands Within Wooded Area Outside Camp Johnson - 0.72 miles.
(c) Winooski River Floodplain - 0.55 miles.
(d) Winooski River - 5.15 miles.
(e) Lake Champlain Shoreline - at least 25 miles.

(3) Pine-Oak-Heath Sandplain Forest. Sunderland Brook forms the northern boundary of the Pine-Oak-Heath Sandplain Forest management area, with more than 0.64 miles of forest frontage.

(4) Lake Champlain Drinking Water Intakes. The primary and secondary Lake Champlain surface water intakes provide drinking water to more than 92,000 people in Chittenden County, VT.

c. Sampling Locations. Sampling site JWD-SS1 was located at base of the WD, site JWD-SS2 downstream from the WD near well JWD-GW6, and site JWD-SS3 is the farthest downstream sample near a beaver dam. No upstream samples were collected due to a lack of surface water upstream from the WD.

d. Analytical Results. Pertinent results for surface water samples are summarized in Table 3. Surface water metal analyses are for total metals.

e. Conclusions. The only compounds or metals detected in the surface water samples were arsenic, barium, and nickel. The metals levels were well below the proposed and existing MCLs for arsenic and barium. As previously stated, the VT Ground water Enforcement Standard for Nickel is 100 µg/L and the surface water in this creek is not used for drinking water (Reference 27). Therefore, no additional action is required.

7. SOIL AND AIR PATHWAYS.

a. Soil Exposure Pathway. The Adams and Windsor soil series cover much of the Installation and are loamy sands. The Hartland and Farmington series are also present in the lower drainages and some heavily wooded areas and are fine sandy loams. Upper drainages contain Agawan fine sandy loam soils. The Au Gres and Duane-Deerfield sandy loam soils occupy flat areas west of Lily Pad Pond, and generally retain more moisture than other soil types present. The moderate to very high permeability of the soils underlying the site and the region=s more than 40 net inches of precipitation each year suggest rapid transport of contaminants down the soil column (References 24 and 25).

Table 3. Results of Surface Water Sampling.

Analyte (units)	Sample Number		
	JWD-SS1	JWD-SS2	JWD-SS3
Total Metals:			
Antimony (µg/L)	< 4.4	< 4.4	< 4.4
Arsenic (µg/L)	< 4.4	17	5.8
Barium (µg/L)	< 22	27	< 22
Beryllium (µg/L)	< 4.4	< 4.4	< 4.4
Cadmium (µg/L)	< 22	< 22	< 22
Chromium (µg/L)	< 44	< 44	< 44
Cobalt (µg/L)	< 110	< 110	< 110
Copper (µg/L)	< 22	< 22	< 22
Lead (µg/L)	< 5.5	< 4.4	< 4.4
Mercury (µg/L)	< 0.20	< 0.20	< 0.20
Nickel (µg/L)	6.0	< 4.4	< 4.4
Selenium (µg/L)	< 4.4	< 4.4	< 4.4
Silver (µg/L)	< 22	< 22	< 22
Thallium (µg/L)	< 4.4	< 4.4	< 4.4
Zinc (µg/L)	< 44	< 44	< 44
SVOCs (µg/L)	ND	ND	ND
TPH (µg/L)	< 200	< 200	< 200

VOCs = Volatile Organic Compounds SVOCs = Semi-Volatile Organic Compounds
TPH = Total Petroleum Hydrocarbons ND = Not Detected

b. Releases Impacting Air. Interviews with Installation personnel show open burning took place at the WD every 4-6 months from the 1950s to 1980. The site is currently covered with soil, grass, and pallets.

c. Soil and Air Targets. There were no soil targets identified in the Preliminary Assessment. No air targets were identified within ½-mile from the site (Reference 26).

d. Soil Sampling Locations. A total of eight soil samples were collected from the WD. During drilling to install monitoring wells, soil samples were taken at 5 and 15 feet below ground surface (bgs) from holes JWD-GW1 and -GW3. The samples taken at 5 feet bgs are labeled BSA while the samples taken at 15 feet bgs are labeled BS2. Only one sample was collected at 10 feet bgs from JWD-GW2 (the background sample) because of difficulty recovering a sample at greater depth. Soil samples from JWD-GW4, -GW5, and -GW6 were collected from 6-12 inches bgs with stainless steel scoops. Soil samples were homogenized in stainless steel bowls before being placed in sampling containers. Soil descriptions for each borehole are provided in Appendix C of this Report.

e. Air Monitoring. No air monitoring was planned or conducted during this Site Inspection.

f. Analytical Results. Pertinent results for soil samples are summarized in Table 4.

Table 4. Results of Soil Sampling.

Analyte (units)	Sample Number							
	JWD-GW1-S1	JWD-GW1-S2	JWD-GW2-S1	JWD-GW3-S1	JWD-GW3-S2	JWD-GW4-S1	JWD-GW5-S1	JWD-GW6-S1
Total Metals:								
Arsenic (mg/Kg)	< 40	< 49	< 48	< 43	< 47	< 68	< 89	< 53
Barium (mg/Kg)	12	6.0	24	8.4	10	18	87	14
Cadmium (mg/Kg)	< 2.0	< 2.5	< 2.4	< 2.2	< 2.3	< 3.4	< 4.4	< 2.7
Chromium (mg/Kg)	11	6.3	11	6.9	9.9	36	18	11
Lead (mg/Kg)	4.9	3.1	4.8	3.2	4.1	5.3	22	11
Mercury (mg/Kg)	< 0.10	<0.12	< 0.11	< 0.10	< 0.10	< 0.18	< 0.23	< 0.13
Selenium (mg/Kg))	< 1.1	<1.0	< 1.2	< 1.0	< 1.1	< 2.0	< 1.9	< 1.3
Silver (mg/Kg)	< 2.0	< 2.5	< 2.4	< 2.2	< 2.3	< 3.4	< 4.4	< 2.7
Pesticides/PCBs	ND	ND	ND	ND	ND	ND	ND	ND
SVOCs (µg/Kg):								
bis(2-Ethylhexyl)phthalate	910	490	710	440	690	350	1500	3400
TPH (mg/Kg)	< 11	< 13	< 12	< 11	< 13	34	33	26

PCBs = Polychlorinated Biphenyls SVOCs = Semi-Volatile Organic Compounds
TPH = Total Petroleum Hydrocarbons

(1) Total Metals. All soil samples contained barium, chromium, and lead in detectable quantities. The industrial soil PRG for barium is 100,000 mg/kg and the SSL (DAF 1) is 82 mg/kg. One sample (JWD-GW5-S1) was above the SSL but well below the industrial soil PRG. This sample was also greater than three times the background level of 24 mg/kg. The industrial soil PRG for chromium III is 450 mg/kg and the SSL (DAF 1) is 2 mg/kg. All samples are below the industrial soil PRG but above the SSL for chromium. The industrial soil PRG for lead in industrial soils is 1,000 mg/kg. There are no set SSLs for lead (Pb); the default value is 400 mg/kg which is RMC for Residential soils. All lead samples were below both the Industrial and Residential soil PRGs. For arsenic, the analytical detection limit for EPA Method 6010A ranged between approximately 40 and 90 mg/kg; detection limits are corrected for the exact amount of soil used in the digestion and the percent solids of the soil, which causes them to be higher than the listed detection limit. The listed detection limit for arsenic using EPA Method 6010A is 40 mg/kg.

(2) SVOCs. All soil samples contained bis(2-Ethylhexyl)phthalate in measurable quantities. The industrial soil PRG for this compound is 140,000 µg/Kg and the highest level detected (JWD-GW6) was 3,400 µg/Kg. The bis(2-Ethylhexyl)phthalate level found in JWD-GW6 is greater than

three times the level found in the background sample (JWD-GW2). This compound is a plasticizer, a common laboratory contaminant, and does not appear to be indicative of SVOC contamination at the site.

(3) TPH. Samples JWD-GW4-S1, JWD-GW5-S1, and JWD-GW6-S1 detected low levels of TPH, ranging from 26-34 mg/Kg. This is well below the Action Level of 1,000 mg/Kg for TPH set by the State of Vermont (Reference 7).

g. Conclusions. All of the soil samples are well below applicable industrial soil PRGs for the compounds listed. The barium level in JWD-GW5-S1 and all of the chromium samples exceed the SSL for ground water migration; however, ground water in the area is not used for drinking water. Therefore, no additional action is recommended.

Table 5. Comparison Between SSLs, Region 9 PRGs , and Region 3 RBCs for Industrial Soil.

	Industrial Soil		SSLs	
Contaminant	**Region 9 PRGs**	**Region 3 RBCs**	**DAF 20**	**DAF 1**
Arsenic	2.4 mg/kg	3.8 mg/kg	2.9 mg/kg	1.0 mg/kg
Barium	100,000 mg/kg	14,000 mg/kg	1,600 mg/kg	82 mg/kg
Cadmium	850 mg/kg	Water 1,000 mg/kg Food 2,000 mg/kg	8.0 mg/kg	4.0 mg/kg
Chromium	III – 450 mg/kg VI – 64 mg/kg	III – 2,000,000 mg/kg VI – 10,000 mg/kg	VI - 38 mg/kg	VI - 2.0 mg/kg
Lead	1,000 mg/kg	N/A	N/A	N/A
Mercury	68 mg/kg	N/A	N/A	N/A
Selenium	8,500 mg/kg	10,000 mg/kg	5.0 mg/Kg	0.3 mg/Kg
Silver	8,500 mg/kg	10,000 mg/kg	34 mg/Kg	2.0 mg/Kg

8. CONCLUSIONS.

a. The only contaminants detected in the surface or ground water samples were arsenic, barium, and nickel. Contaminant levels detected were well below the MCLs for barium, and the

VT Ground Water Enforcement Standard for Nickel of 100 μg/L for nickel (Reference 27). The level of arsenic is below the MCL in all but one ground water sample. The ground water in this area is not used for drinking water.

b. None of the soil samples are above the industrial soil PRGs or the RBCs for any of the compounds listed. The barium level in one sample and the chromium level in all of the soil samples were above the SSLs for ground water migration. Ground water in the area is not used for drinking water.

3. RECOMMENDATIONS. To protect public health and comply with environmental regulations, the following recommendations are made:

a. Remove all empty containers and drums, tires, and other non-construction debris from the edge of the wood dump area. Dispose of all items IAW applicable Federal, State, and local regulations.

b. Resample the ground water in well JWD-GW6 to confirm the arsenic level and the soils in vicinity of sample JWD-GW5 to confirm barium levels.

for CHRISTOPHER A. GELLASCH
CPT, MS
Environmental Science Officer

REVIEWED AND APPROVED BY:

MICHAEL J. DELL'ORCO, P.E.
MAJ, MS
Chief, Environmental Health Engineering Division

APPENDIX A

REFERENCES

1. Burlington and Colchester, Vermont, U.S. Geological Survey 7.5 minute Quadrangles, 1987.

2. Colchester, Vermont 1:25,000 Map, Defense Mapping Agency, Topographic Center, 1974.

3. Restoration of Pine-Oak-Heath Sandplain Forest at Camp Johnson, Colchester, Vermont, Brett Engstrom, 3 November 1993.

4. Missile Facility (FY 58-59) Ethan Allen Air Force Base, Winooski, Vermont, Survey Record, Area AB@, Drafted by Webster-Martin, Inc., for the New England Division, U.S. Army Corps of Engineers, 1958.

5. U.S. Environmental Protection Agency (EPA), Region IX, Region IX Preliminary Remediation Goals, 1996 Annual Update, 1 August 1996.

6. EPA, Soil Screening Guidance: User=s Guide. EPA/540/R-96/018. Office of Emergency and Remedial Response, 1996.

7. Personal Communication with Mr. Chuck Schwer, Site Section Supervisor, Vermont Department of Environmental Conservation, 21 May 1998.

8. Regional Stratigraphy of North America, William J. Frazier and David R. Schwimmer, Plenum Press, New York, 1987.

9. The Geology of the Milton Quadrangle, Vermont, Solon W. Stone and John G. Dennis, Vermont Geological Survey Bulletin No. 26, 1964.

10. Geology for Environmental Planning in the Milton-St. Albans Region, Vermont, David P. Stewart, Water Resources Department Environmental Geology No. 5, 1974.

11. Geology for Environmental Planning in the Burlington-Middlebury Region, Vermont, David P. Stewart, Water Resources Department Environmental Geology No. 3, 1973.
Late Glacial and Post-Glacial History of the Champlain Valley, Donald H. Chapman, American Journal of Science, Vol 34, No. 200, p. 89-123, 1937.

12. Introduction to the Environmental Geology of the Lake Champlain and Shoreland Areas,

Site Inspection No. 38-EH-6745-97, Narrative Report, Camp Johnson Training Area (Wood Dump), Colchester, VT, 15-26 Sep 97

R. Montgomery Fischer, in Vermont Geology - Geology of Lake Champlain & Vicinity, Proceedings of a Symposium, Vermont Geological Society, Inc., Jeane C. Detenback Ed., Vol. 1, 1980.

13. Report on the Investigation of Subsurface Petroleum Contamination Camp Johnson, Colchester, Vermont, Griffin International, 11 May 1990.

14. Investigation of Ground water and Soil in the Vicinity of an Aboveground Storage Tank at Camp Johnson, Colchester, Vermont, REWAI Project 93618, Webster-Martin Engineers Inc., 1995.

15. Camp Johnson/Ethan Allen Air Force Base Training Site Historical Outline.

16. Pontius, F.W., New Horizons in Federal Regulation, Journal of American Waterworks Association, Volume 90, No. 3 (March 1998), pp 38-50.

17. Pontius, F.W., Federal Drinking Water Regulation Update, Journal of American Waterworks Association, Volume 85, No. 2 (Feb 1993), pp 42-51.

18. Geohydrologic Study No. 38-EH-6642-97, Narrative Report, Camp Johnson Cantonment Area, Colchester, Vermont, 15-26 September 1997, USACHPPM-West, 26 May 1998.

19. Flood Plain Information - Winooski River, Town of Colchester, Cities of Burlington and Winooski, Vermont, prepared for the Department of Water Resources, State of Vermont, by the Department of the Army, New York District, Corps of Engineers, April 1973.

20. Flood Plain Information - Winooski River, Towns of Essex and Williston, Vermont, prepared for the Department of Water Resources, State of Vermont, by the Department of the Army, New York District, Corps of Engineers, June 1973.

21. Wetlands Overlay, Colchester, Vermont, U.S. Geological Survey 7.5 minute Quadrangle, 1987.

22. A Guide to Using National Wetland Inventory Maps in Vermont, State of Vermont, Department of Environmental Conservation, Water Quality Division, Wetland Office.

23. Lake Champlain Fishing Guide, Vermont Fish and Game Department.

Site Inspection No. 38-EH-6745-97, Narrative Report, Camp Johnson Training Area (Wood Dump), Colchester, VT, 15-26 Sep 97

24. Soil Survey of Chittenden County, Vermont, U.S. Department of Agriculture Soil Conservation Service in Cooperation with the Vermont Agricultural Experimental Station and Vermont Department of Forests and Parks, 1974.

25. Final Environmental Assessment - Fielding of M1 Tanks at Vermont National Guard Primary Locations, February 1995.

26. Preliminary Assessment No. 38-EH-2652-96, Vermont Army National Guard, Camp Johnson Training Area, Federal Portion Only, Colchester, Vermont, 24-28 April 1995, USACHPPM, 24 September 1996.

27. Vermont Department of Environmental Conservation, Agency of Natural Resources, Chapter 12, Ground water Protection Rule, 15 November 1997.

28. U. S. Environmental Protection Agency (EPA), Region III, Risk-Based Concentration Table, April 1998.

APPENDIX B

SAMPLE PLAN FOR WOOD DUMP

DEPARTMENT OF THE ARMY
U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
5158 BLACKHAWK ROAD
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

REPLY TO
ATTENTION OF

MCHB-DC-EGW

4 JUN 1997

MEMORANDUM FOR Chief, National Guard Bureau, ATTN: NGB-ILE-EPR,
Building E-4430, Aberdeen Proving Ground, MD 21010-5420

SUBJECT: Draft, Site Inspection Sample Plan No. 38-EH-6745-97, Vermont Army National Guard, Camp Johnson Training Area (Wood Dump), Colchester, Vermont

1. Three copies of the subject plan are enclosed for your review.

2. Your point of contact is Mr. Wayne Fox. He can be reached at DSN 584-5199 or commercial (410) 671-5199.

FOR THE COMMANDER:

JOHN W. BAUER
Program Manager
Ground Water and Solid Waste

USACHPPM

U.S. Army Center for Health Promotion and Preventive Medicine

DRAFT
SITE INSPECTION SAMPLE PLAN NO. 38-EH-6745-97
VERMONT ARMY NATIONAL GUARD
CAMP JOHNSON TRAINING AREA (WOOD DUMP)
COLCHESTER, VERMONT

Readiness Thru Health

Site Inspection Sample Plan No. 38-EH-6745-97

CONTENTS

Paragraph	Page
1. INTRODUCTION	1
a. Authority	1
b. Purpose	1
c. Objectives	1
2. SITE DESCRIPTION AND HISTORY	1
a. Site Physiography	1
b. Accessability	1
c. Adjacent Land Use	3
d. Surface Water	3
e. Major Soil Series	3
f. Regional and Local Geology	3
g. Regional and Local Hydrogeology	5
h. Wood Dump Site Description and History	8
3. SAMPLING DESCRIPTION	14
4. PROJECT MANAGEMENT	14

Appendices

A - REFERENCES	A-1
B - FIELD SAMPLING PROCEDURES - SEDIMENT AND SOIL	B-1
C - FIELD SAMPLING PROCEDURES - GROUND WATER	C-1
D - CHEMICAL ANALYSES PLAN AND QUALITY ASSURANCE	D-1
E - SAFETY AND HEALTH PLAN	E-1

DEPARTMENT OF THE ARMY
U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
5158 BLACKHAWK ROAD
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

REPLY TO
ATTENTION OF

MCHB-DC-EGW

DRAFT
SITE INSPECTION SAMPLE PLAN NO. 38-EH-6745-97
VERMONT ARMY NATIONAL GUARD
CAMP JOHNSON TRAINING AREA (WOOD DUMP)
COLCHESTER, VERMONT

1. INTRODUCTION

a. Authority. Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA).

b. Purpose. The purpose of this site inspection (SI) is to investigation the impact of the Wood Dump at the Camp Johnson Training Area on human health and the environment.

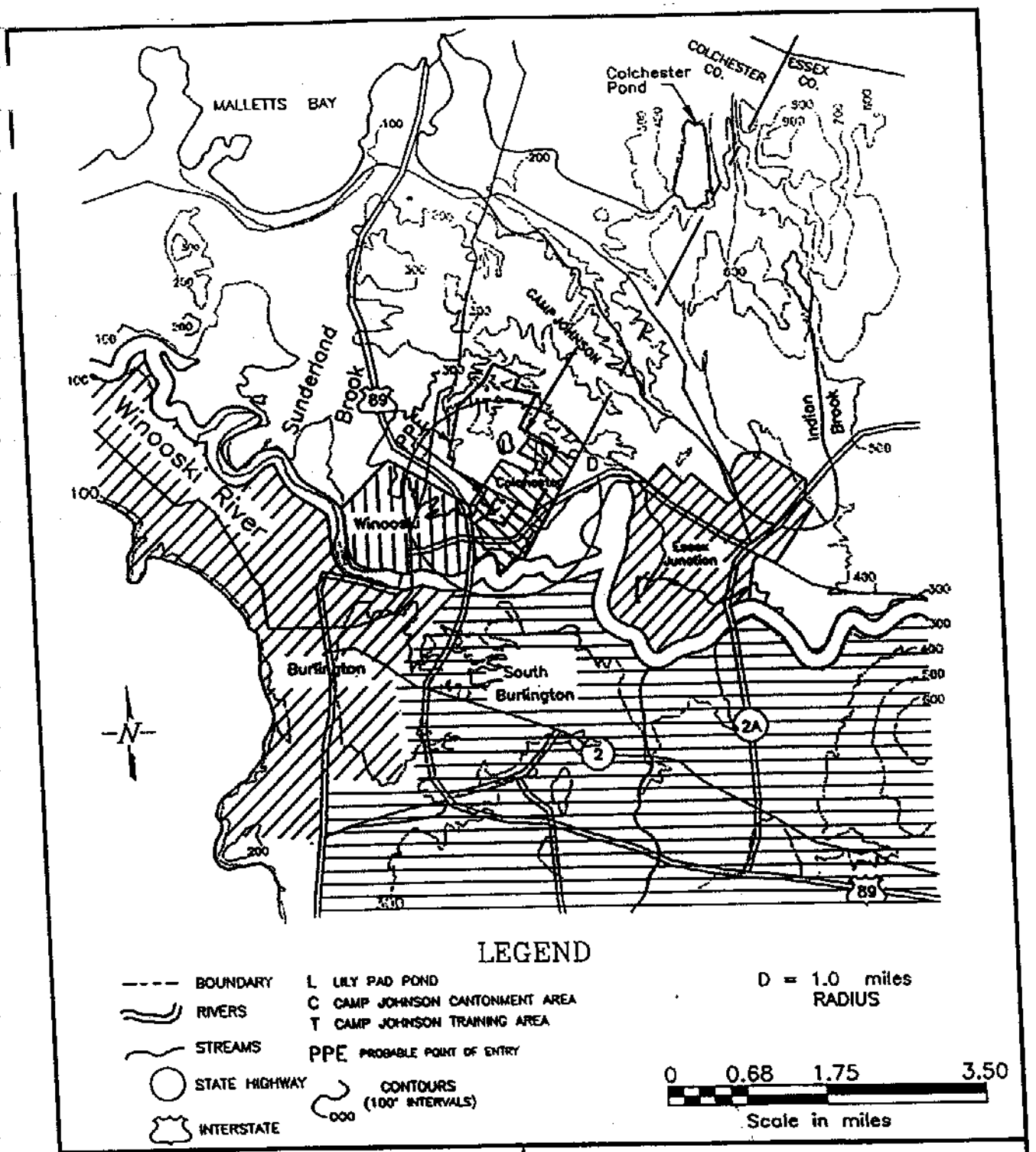
c. Objectives. Soil, sediment, surface water, and ground-water samples will be taken at the Wood Dump to determine the concentrations and extent of hazardous substances potentially migrating from this site.

2. SITE DESCRIPTION AND HISTORY.

a. Site Physiography. The Camp Johnson Training Area lies within the Town of Colchester, Chittenden County, Vermont (address: Building 5, Camp Johnson, Colchester, Vermont 05461). The Camp Johnson Training Area is in the central portion of a slightly hummocky plateau 200 feet above Lake Champlain (Figure 1). This plateau gently slopes north toward Lake Champlain, and is truncated south and west by the Winooski River floodplain. The northern portion of the site is dissected by streams into north-northwest and north trending flat ridges with gullies up to 100 feet deep.

b. Accessability. The southern and western portions of the Camp Johnson Training Area are fenced. Routine vehicle traffic is limited to either the Cantonment Area's main gate on State Highway 15 to the south, or the back gate near US Highway 2/7 to the west. The northern portion of the Camp Johnson Training Area is accessible to foot traffic over hilly terrain. Mountain and dirt bikes can access the training area by only one natural gas line access road that crosses Sunderland Brook, other old roads and walking trails.

Site Inspection Sample Plan No. 38-EH-6745-97



UNITED STATES ARMY
CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

Figure 1.
CAMP JOHNSON INDEX MAP (REFERENCES 1 AND 2)

DRAWN BY DJB | PROJECT NO 38-26-2652-95 | FILE VT\2652INDX

c. Adjacent Land Use. US Highway 2/7 and several transportation and service-related industrial parks comprise the Camp Johnson Training Area's western boundary. To the north are residential areas interspersed with wooded regions. The eastern boundary abuts old Fort Ethan Allen, which is now a mixture of townhouses, apartments, some light commercial industry, and a Vermont Agency of Transportation (VAOT) maintenance shop complex.

d. Surface Water.

(1) Streams and River Systems. Lily Pad Pond is fed by ground water and surface runoff. The pond's outfall is to the north. Sunderland Brook and its tributaries drain all of the Camp Johnson Training Area and nearby facilities - a drainage area covering about 5.3 square miles. Sunderland Brook flows west-northwest through the Camp Johnson Training Area before exiting near US Highway 2/7. The brook continues west and south before intersecting the Winooski River northeast of Burlington, and flowing into Lake Champlain. The Camp Johnson Training Area is above the Winooski River's 500 year flood plain (references 5 and 6).

(2) Lake Champlain. Circulation patterns within Lake Champlain rotate clockwise, which carries water from the Winooski River south past Burlington along dominantly lacustrine and scattered riverain wetlands (references 7, 8, and 9). Lake Champlain has an area covering 270 square miles, is more than 400 feet deep (reference 9), and is the most popular outdoor recreation area in the region for boating and fishing [serves about 400,000 people/year (reference 9)].

e. Major Soils Series. The loamy sand Adams and Windsor soil series cover much of the installation. The Hartland and Farmington series are also present in the lower drainages and some heavily wooded areas (reference 10) and are fine sandy loams. Upper drainages contain Agawan fine sandy loam soils (references 10 and 11). The Au Gres and Duane-Deerfield sandy loam soils occupy flat areas west of Lily Pad Pond, and generally retain more moisture than other soil types present. All soils are moderate to very permeable.

f. Regional and Local Geology.

(1) Bedrock Geology. Northwest Vermont is dominated by late pre-Cambrian through early Paleozoic rocks metamorphosed by at least three subsequent orogenies (reference 12). The resulting folds and faults yield a north-south trending structural fabric that strongly influences all drainage basins and mountains. The Camp Johnson Training Area is underlain by the western limb of the south-plunging Hinesburg Syncline (Figure 2). Units comprising the syncline are the middle Cambrian Winooski Formation, upper Cambrian Danby and Clarendon Springs formations, and the Ordovician Shelburne Formation, respectively

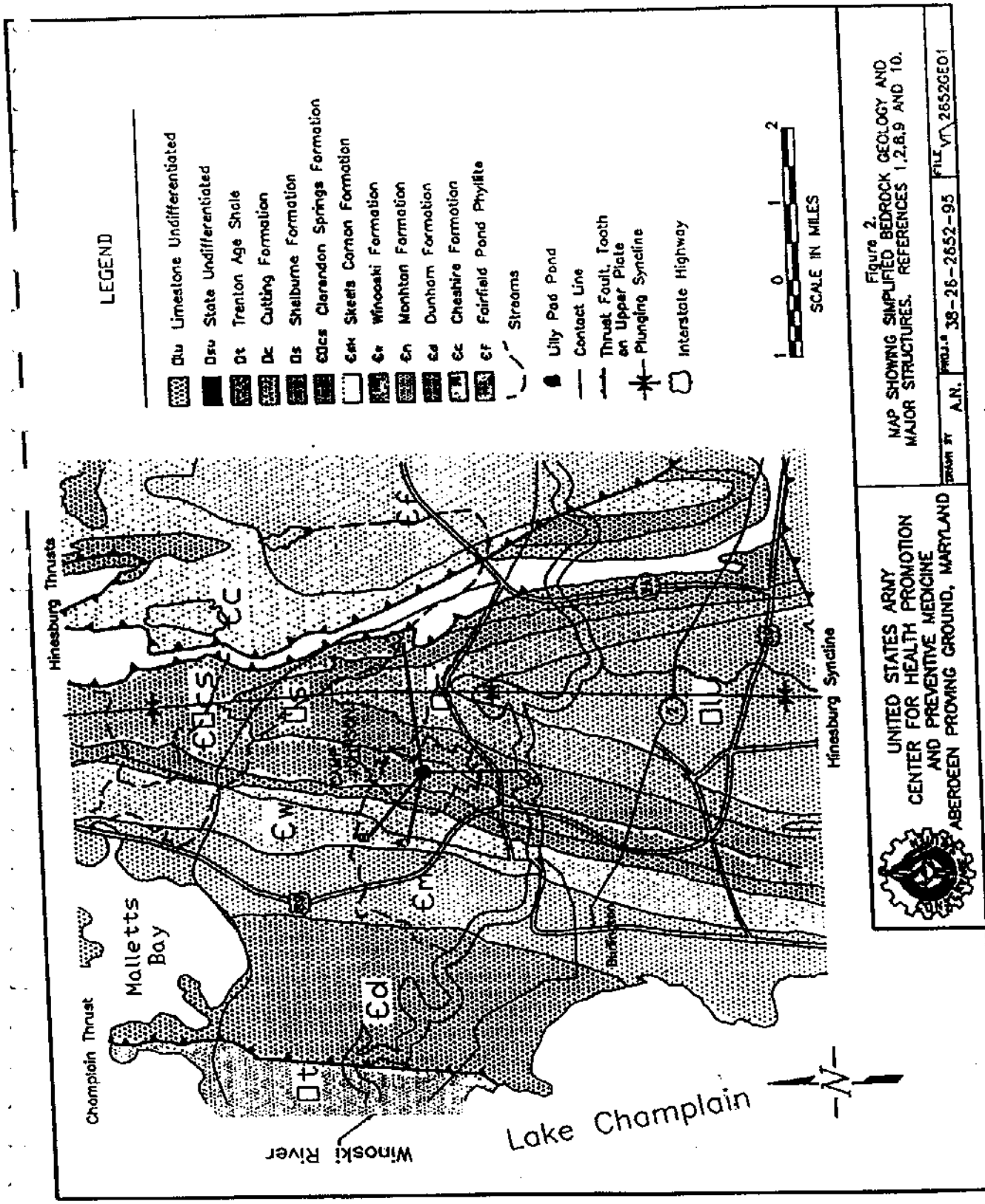


Figure 2.
MAP SHOWING SIMPLIFIED BEDROCK GEOLOGY AND MAJOR STRUCTURES. REFERENCES 1,2,8,9 AND 10.

UNITED STATES ARMY
CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

DRAWN BY A.N. PROJ.# 38-26-2652-95 FILE VT\2652GE01

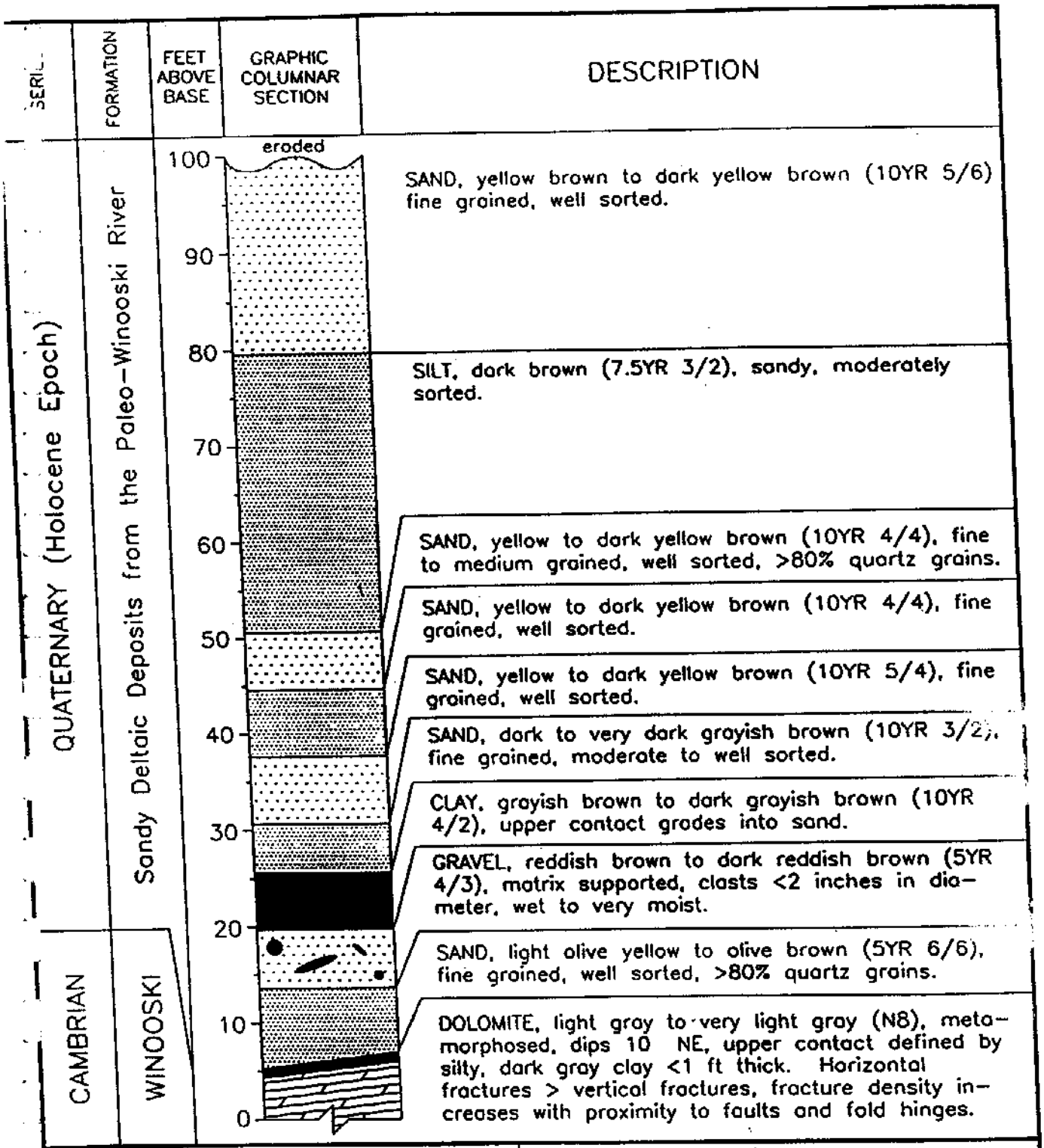
(reference 13). The Winooski Formation consists of dolomite ± fracture-scale solutioning features, whereas the Danby and Clarendon Springs formations are composed of sandy dolomite. The Shelburne Formation contains mostly marble (metamorphosed limestone) containing irregular lenses of dolomite. Only the Winooski Formation is exposed in the Camp Johnson Training Area, where Sunderland Brook intersects US Highway 2/7 (Figures 3 and 4). Offpost outcrops contain no karst features beyond scattered local solution features along fractures. All other units underlying the Camp Johnson Training Area are covered by Holocene fluvio-lacustrine sand and silt (Figures 3 and 4) of the Lake Champlain Lowlands (references 14 and 15).

(2) Glacio-Lacustrine Geology. During the Pleistocene, the region was repeatedly covered by advancing and retreating glaciers. The last retreat, about 15,000 years ago, created the Sea of Vermont (reference 16) or Lake Vermont (reference 17) in what is now the Lake Champlain Basin. As the level of the lake decreased, an extensive sequence of beaches and river deltas were deposited, some of which are more than 500 feet above the present level of Lake Champlain. The Camp Johnson Training Area is on an Upper Marine (reference 17) delta deposited by the paleo-Winooski River. This ancient Winooski River delta is composed of a well to poorly sorted sand sequences with scarce gravel stringers. These sequences thicken from about 30 feet near Highway 15 to 100 feet (Figure 3) where Sunderland Brook intersects US 2/7 in the northwest corner of the Camp Johnson Training Area (Figures 3 and 4).

g. Regional and Local Hydrogeology. Little is known about the hydrogeol[illegible] or properties of the geologic units underlying the Camp Johnson Training Area, because [illegible] of domestic and municipal (including Camp Johnson) water comes from surface [illegible] Lake Champlain since the 1940s. Currently active wells near the Camp Johnson [illegible] Area are used for light industrial or rare private use. No formal or informal names are known for the aquifers and confining units described below.

(1) Bedrock Aquifers. The low yield from most of wells completed with[illegible] dolomitic units underlying the Camp Johnson Training Area and vicinity (refere[illegible] support the hypothesis that there is no significantly developed karst region underlying the site. It is believed that strong connectivity exists between the bedrock and the overlying surficial aquifers. A large number of the wells completed near and north of Camp Johnson are within the bedrock aquifer system(s).

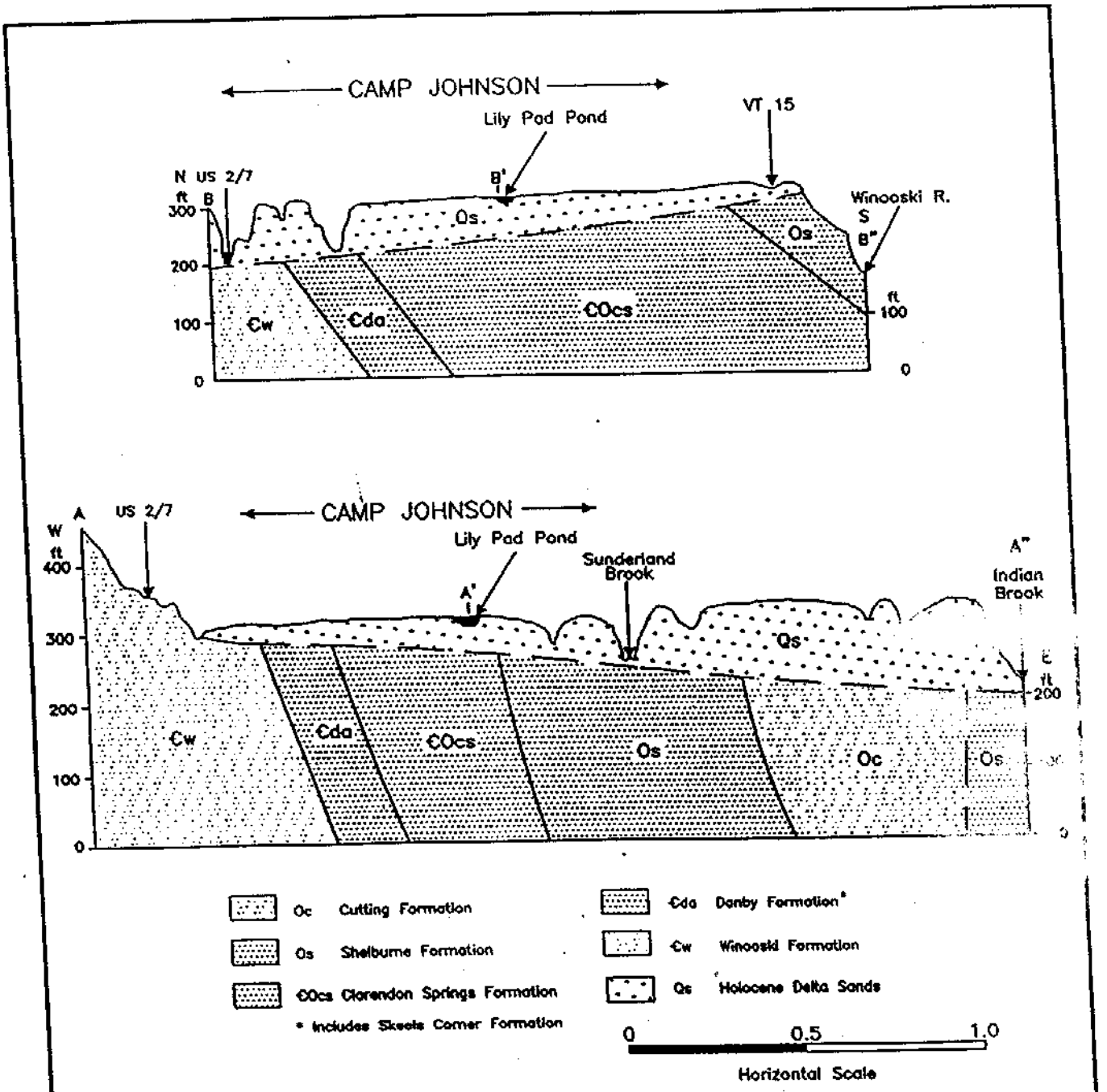
(2) Surficial Aquifers. Several wells within the vicinity of the Camp Johnson Training Area are completed within the glacial outwash sediments overlying the Paleozoic bedrock (reference 18). The high elevation of Lily Pad Pond, ground water encountered in a borrow pit, and ground-water monitoring wells indicate the uppermost aquifer is as little as 3 feet



UNITED STATES ARMY
CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

Figure 3.
STRATIGRAPHIC COLUMN SHOWING MAXIMUM THICKNESSES OF SEDIMENTARY UNITS UNDERLYING THE NORTHWEST PORTION OF THE CAMP JOHNSON TRAINING AREA

DRAWN BY	PROJECT NO	FILE
DMC	38-26-2652-95	VT\2652STRT



UNITED STATES ARMY
CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

Figure 4.
SIMPLIFIED GEOLOGIC CROSS SECTIONS THROUGH CAMP JOHNSON (REFERENCE 1 AND 13).

DRAWN BY	PROJECT NO	FILE
DMC	38-26-2652-95	VT\2652XSEC

below ground surface (references 18, 19, and 20). Topography, stream drainage direction, and the north-northwest thickening of the paleo-Winooski River delta suggest the ground water may flow north and south from Camp Johnson. Outcrops on the site's northwest boundary (Figure 3) contain a second semi-confined, 6 foot-thick, gravelly sand aquifer about 80 feet below the Camp Johnson Training Area. The aquifer is overlain by about 4 feet of clay, and underlain a thin (less than 1 foot) clay layer, about 8 feet of sand, and dolomitic bedrock, respectively. Its aerial extent is unknown.

h. Wood Dump Site Description and History. The Wood Dump is in the central portion of the Camp Johnson Training Area between the northern elliptical tank track and a tributary of Sunderland Brook (Figures 5, 6, and 7). The site is at least 190 feet long by 150 feet wide and 50 feet deep at the toe, based on field measurements of visible debris. Air photo data from 1974 suggest that the Wood Dump's aerial extent may be as large as 700 feet long by 200 feet wide. Visible debris consists of more than 95% wood pallets, and 3 to 5% metal construction debris (Figure 8). Two empty 55-gallon drums and assorted containers are also present. The toe of the debris (Figure 9) extends to the stream bed below the site. Modeling the Wood Dump as a 3-dimensional right triangle and the equation below yields an estimated volume of 26,390 to 129,630 yards^3 of debris.

$$Volume = (0.5 Width * Depth) * Length$$

(1) Site History. The site was in use as early as 1942 (Appendix C) and likely received wastes from Fort Ethan Allen. The site is labeled as "Clearing, Base Dump" on a 1952 map of the Lily Pad Pond Area (reference 4). Interviews with installation personnel indicate that debris was thrown into a gully or nearby pit and burned once or twice per year. The burn site was then covered with dirt. From about 1978 to about 1990, only wood debris was allowed in the site. After about 1990, Camp Johnson initiated wood recycling and the site became inactive. Several installation personnel stated that up to 1990, small amounts of excess and waste petroleum products were disposed of in the Wood Dump. The long operational history of this site suggests it may have begun as the suspected Fort Ethan Allen Landfill before being called the Wood Dump.

(2) Potential Contaminants. Combustion of pressure- or oil-treated wood can produce trace levels of dioxins, low levels of furrans, and heavy metal-rich ash. Partially combusted accelerants, such as diesel or other off-specification fuel, used to burn landfill wastes may also remain. Small amounts of pesticides, metals, petroleum hydrocarbons related to items disposed of into the Wood Dump are also possible. The volume of liquids disposed of at this site, and the degree of soil and ground-water contamination is unknown. The quantities and types of waste from Fort Ethan Allen are also unknown.

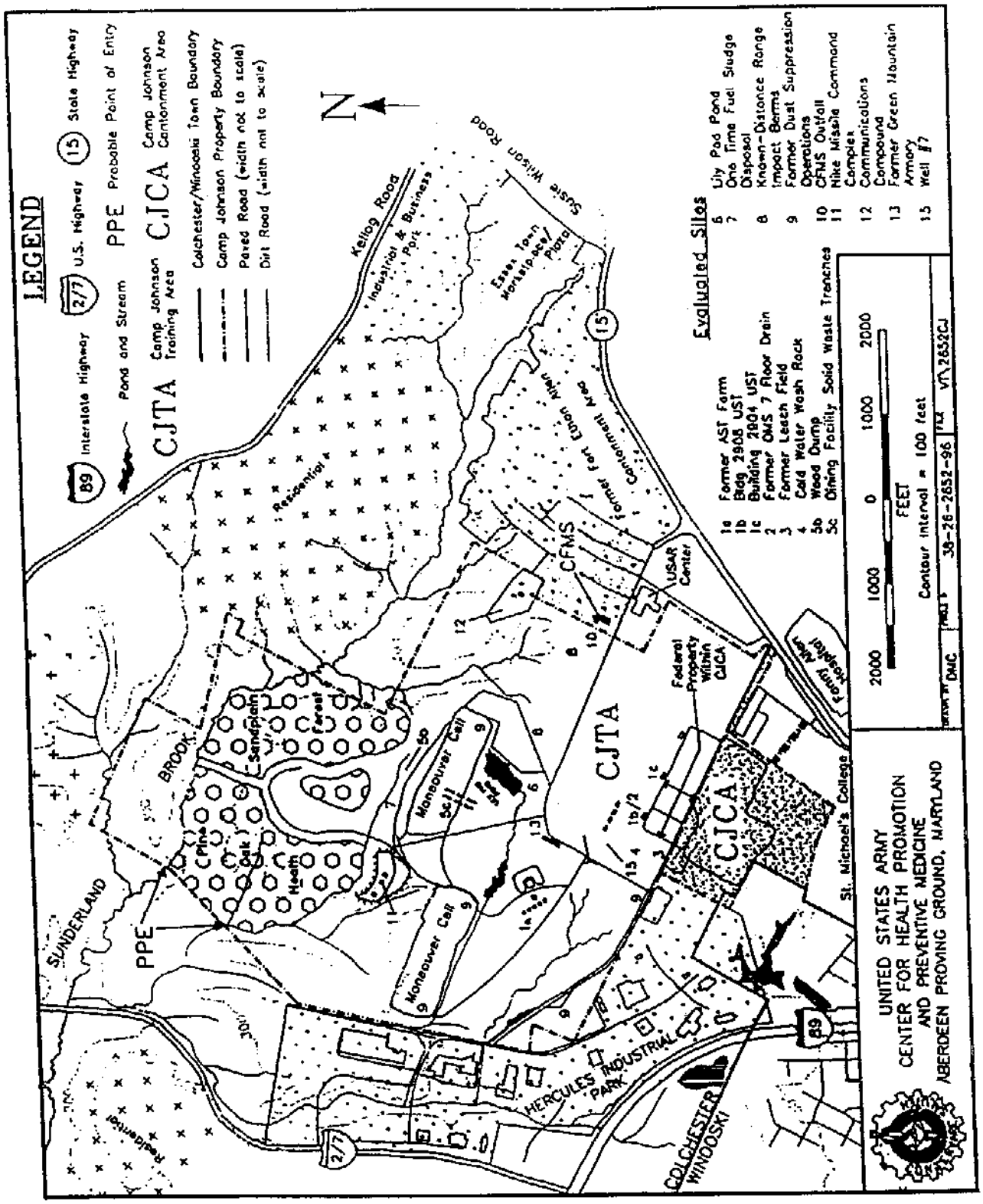


Figure 5. CAMP JOHNSON INSTALLATION INDEX MAP

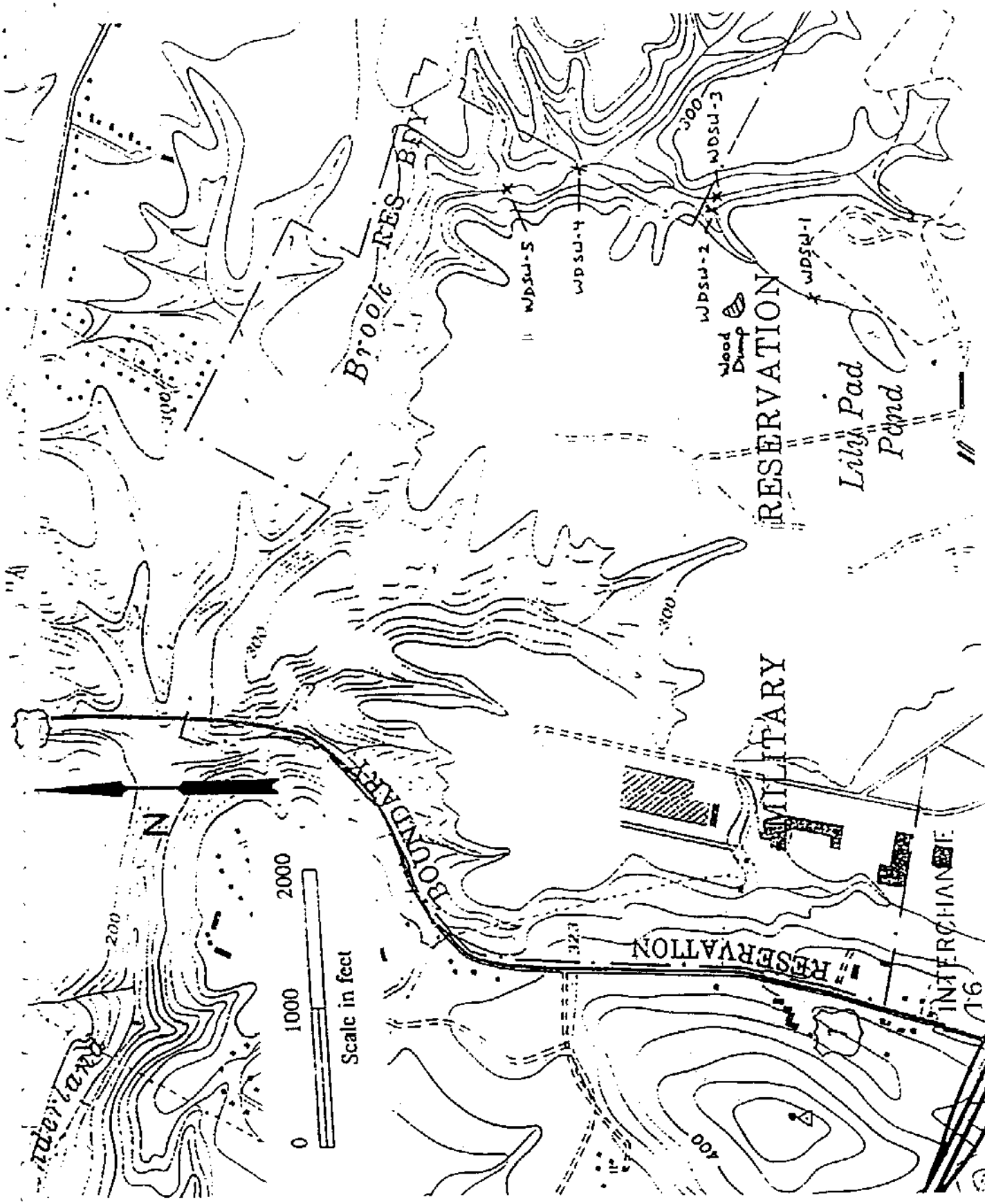
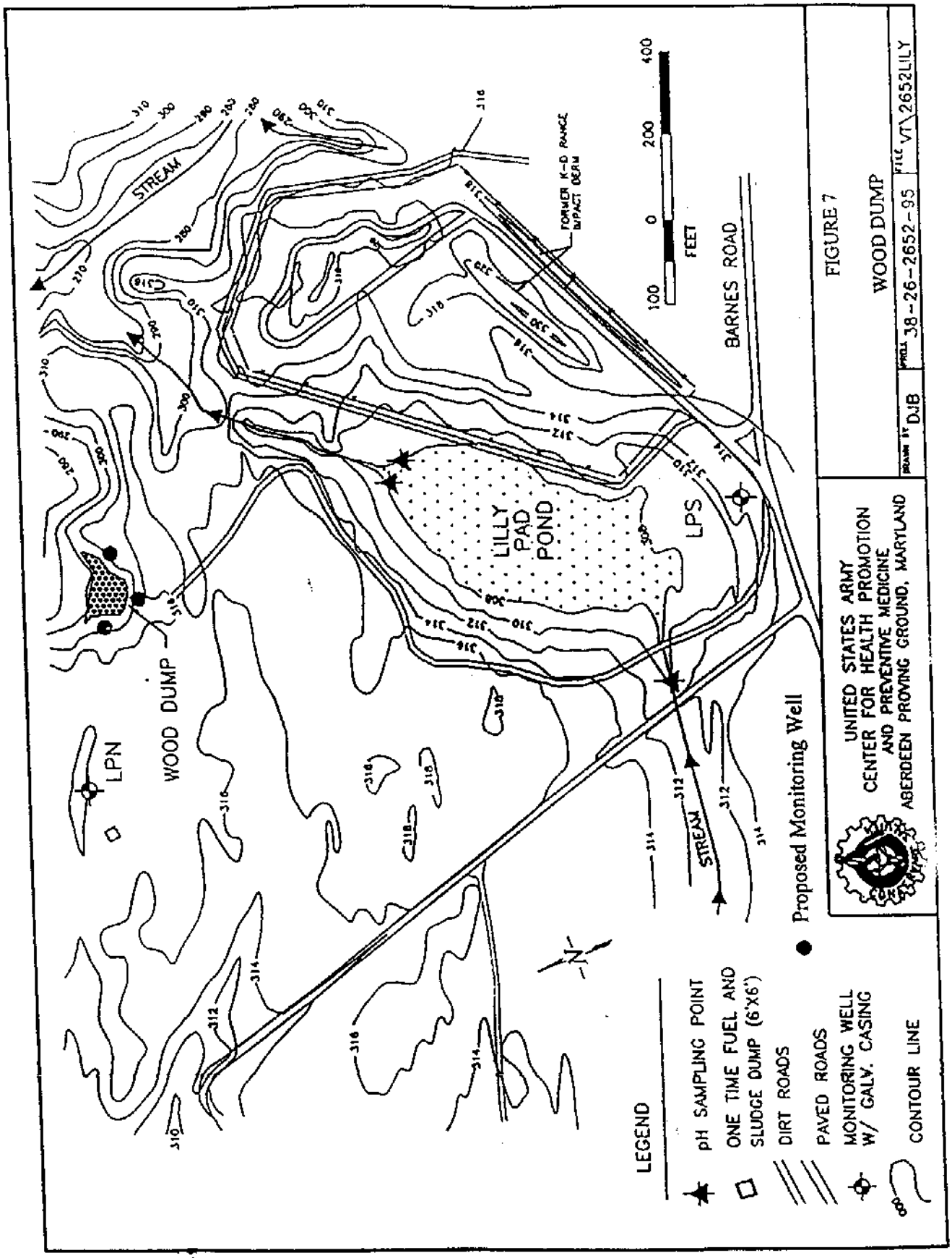


Figure 6. SURFACE WATER AND SEDIMENT SAMPLE POINTS.


STREAM
LPN
WOOD DUMP
LILLY PAD POND
LPS
BARNES ROAD
FORMER K-9 RANGE IMPACT BERM
100 0 200 400
FEET
LEGEND
pH SAMPLING POINT
ONE TIME FUEL AND SLUDGE DUMP (6'X6')
DIRT ROADS
PAVED ROADS
MONITORING WELL W/ GALV. CASING
CONTOUR LINE
Proposed Monitoring Well
UNITED STATES ARMY
CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND
FIGURE 7
WOOD DUMP
DRAWN BY DJB
PROJ. 38-26-2652-95
FILE VT\2652LILY

3. SAMPLING DESCRIPTION. The Table describes the sample type, approach, and rationale for soil, surface water, sediment, and ground-water sampling at the site. Sampling locations are shown on Figures 6 and 7. Field sampling procedures are provided in Appendices C and D. Appendix E contains the chemical analyses plan and quality assurance. The project Health and Safety Plan is provided in Appendix F.

TABLE 1. SAMPLING STRATEGY.

Sample Type/Number	Approach	Rationale
Surface Water and Sediment WDSW-1	Sample surface water and sediment upstream from site and discharging from Lily Pad Pond	Define upstream surface water and sediment quality
Surface Water and Sediment WDSW-2,3,4,5	Sample surface water and sediment downstream from site	Define downstream surface water and sediment quality
Ground Water WDMW-1	Sample ground water upgradient from the site	Define background ground-water quality
Ground Water WDMW-2,3	Sample ground water cross-gradient from the site	Define cross gradient ground-water quality
Soil WDMW-2,3	Sample soil near site at depths of 10, 20 and 30 feet	Define soil contamination near the site

4. PROJECT MANAGEMENT. The following USACHPPM personnel will be conducting the Site Inspection.

a. CPT Christopher Gellasch
Project Manager
U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), Direct Support Activity, West
Has the authority and responsibility to direct this project.

b. Mr. Thomas Meckelnburg
Site Safety and Health Supervisor
(USACHPPM)

Has the authority and responsibility to develop and implement this site specific safety and health plan.

c. Mr. Rocky Hoover
Engineering Technician
USACHPPM
Is responsible for the field supervision of drilling crew.

d. Mr. Mark Pippen
Engineering Technician
USACHPPM

e. MAJ Raymond Bouchard
Environmental Protection Manager
Camp Johnson
Is responsible for on site coordination.

WAYNE A. FOX, P.G.
Geologist
Ground Water and Solid Waste Program

APPROVED:

JOHN W. BAUER, P.G.
Program Manager
Ground Water and Solid Waste

APPENDIX A

REFERENCES

1. Burlington and Colchester, Vermont, U.S. Geological Survey 7.5 minute Quadrangles, 1987.

2. Colchester Vermont 1:25,000 Map, Defense Mapping Agency, Topographic Center, 1974.

3. Restoration of Pine-Oak-Heath Sandplain Forest at Camp Johnson, Colchester, Vermont, Brett Engstrom, 3 November 1993.

4. Missile Facility (FY 58-59) Ethan Allen Air Force Base, Winooski, Vermont, Survey Record, Area "B", Drafted by Webster-Martin, Inc., for the New England Division, U.S. Army Corps of Engineers, 1958.

5. Flood Plain Information - Winooski River, Town of Colchester, Cities of Burlington and Winooski, Vermont, Prepared for the Department of Water Resources, State of Vermont, by the Department of the Army, New York District, Corps of Engineers, April 1973.

6. Flood Plain Information - Winooski River, Towns of Essex and Williston, Vermont, Prepared for the Department of Water Resources, State of Vermont, by the Department of the Army, New York District, Corps of Engineers, June, 1973.

7. Wetlands Overlay, Colchester, Vermont, U.S. Geological Survey 7.5 minute Quadrangle, 1987.

8. A Guide to Using National Wetland Inventory Maps in Vermont, State of Vermont, Department of Environmental Conservation, Water Quality Division, Wetland Office.

9. Lake Champlain Fishing Guide, Vermont Fish and Game Department.

10. Soil Survey of Chittenden County, Vermont, U.S. Department of Agriculture Soil Conservation Service in Cooperation with the Vermont Agricultural Experimental Station and Vermont Department of Forests and Parks, 1974.

11. Final Environmental Assessment - Fielding of M1 Tanks at Vermont National Guard Primary Locations, February 1995.

12. Regional Stratigraphy of North America, William J. Frazier and David R. Schwimmer, Plenum Press, New York, 1987.

13. The Geology of the Milton Quadrangle, Vermont, Solon W. Stone and John G. Dennis, Vermont Geological Survey Bulletin No. 26, 1964.

14. Geology for Environmental Planning in the Milton-St. Albans Region, Vermont, David P. Stewart, Water Resources Department Environmental Geology No. 5, 1974.

15. Geology for Environmental Planning in the Burlington-Middlebury Region, Vermont, David P. Stewart, Water Resources Department Environmental Geology No. 3, 1973.

16. Late Glacial and Post-Glacial History of the Champlain Valley, Donald H. Chapman, American Journal of Science, Vol 34, No. 200, pp 89-123, 1937.

17. Introduction to the Environmental Geology of the Lake Champlain and Shoreland Areas, R. Montgomery Fischer, *in* Vermont Geology - Geology of Lake Champlain & Vicinity, Proceedings of a Symposium, Vermont Geological Society, Inc., Jeane C. Detenback Ed., Vol. 1, 1980.

18. Summary Well Data for portions of Burlington, South Burlington, Colchester, Essex Junction, Williston, and Winooski Within 4 Miles of Camp Johnson, Compliance and Licensing Section, Water Supply Division, Department of Environmental Conservation, Agency of Natural Resources, State of Vermont.

19. Report on the Investigation of Subsurface Petroleum Contamination Camp Johnson, Colchester, Vermont, Griffin International, 11 May 1990.

20. Investigation of Ground water and Soil in the Vicinity of an Aboveground Storage Tank at Camp Johnson, Colchester, Vermont, REWAI Project 93618, Webster-Martin Engineers Inc., 1995.

APPENDIX B

FIELD SAMPLING PROCEDURES - SEDIMENT AND SOIL

1. SOIL SAMPLE COLLECTION METHODOLOGY.

a. Soil Logs. The following data is collected for all soil samples:

(1) Site identification
(2) Sample point location
(3) Soil composition and texture
(4) Lithology of soil and clasts
(5) Depth of soil horizon boundaries and bedding
(6) Depth to ground water if encountered
(7) Presence and type of potential or actual contamination

b. Hand Scoops. For sampling soils potentially containing high viscosity contaminants (oils or creosote) and sites with restricted vehicle access, samples will be collected using a combination of hand/bucket augers and stainless steel scoops. Sample depth will not exceed two feet (reference 2). Except for volatile organic compounds (VOCs), recovered soil is placed in a large, aluminum foil-lined, stainless steel bowl. Vegetation and pebbles are removed and the sample quickly mixed prior to filling wide-mouth sample jars. All sample processing is done using disposable or cleaned equipment. Personnel processing samples wear disposable plastic gloves replaced before processing each new sample. Each sample bottle and lid are marked with indelible marker to identify the sample number, sample location, date and time of collection. This same information and all field data is recorded into a field log book. All samples will be placed into coolers and iced to an approximate temperature of 4 °C.

c. Geoprobe™. For sampling sites overlying soils containing little or no glacial till or gravel, samples will be collected using the Geoprobe™. The Geoprobe™ hydraulically presses an acetate-lined core sampler (Annex B-1) to the depth specified for each site. The core sampler is equipped with a stop pin/push rod assembly, which can be disengaged at the desired sampling depth. Once disengaged, the sampler is pushed another 18 inches into undisturbed soil, compressing a core sample in the acetate tubing. The sample is then pulled back to the surface and the soil removed by cutting the liner away. Except for VOCs, recovered samples are then processed exactly the same as surface soil samples.

d. Drill Rig. (Annex B-2). For those sites requiring monitor well installation, a drill rig split spoon is used to collect samples in accordance with standard methods. Except for VOCs, recovered samples are then processed exactly the same as surface soil samples. All drill rig equipment is steam cleaned prior to beginning field activities.

2. SEDIMENT SAMPLING PROCEDURES.

a. Sediment Sample Collection. Sediment samples are collected using a combination of hand/bucket augers and stainless steel scoops. Sample depth will not exceed sediment deposited in the stream channel. Recovered soil is placed in a large, aluminum foil-lined, stainless steel bowl. Vegetation and pebbles are removed and the sample quickly mixed prior to filling wide-mouth sample jars. Each sample bottle and lid are marked with indelible marker to identify the sample number, sample location, date and time of collection. This same information and all field data is recorded into a field log book. All samples will be placed into coolers and stored at approximately 4 °C. The following data is collected for all sediment samples:

(1) Site identification
(2) Sample point location
(3) Name of source and receiving water body
(4) Sediment composition and texture
(5) Sediment color
(6) Lithology of sediment and clasts
(7) Depth of sediment horizon boundaries and bedding
(8) Presence and type of potential or actual contamination

3. DECONTAMINATION AND INVESTIGATION-DERIVED WASTES.

a. Personnel. Personnel wear disposable latex gloves which are changed between each sampling location. Between each site, gloves and other disposable field garments are collected in a sealable 5-gallon solid waste bucket for disposal.

b. Sampling Equipment

(1) Reusable Equipment. Items reused on site, such as scoops, Geoprobe™ tools (samplers and drive rods) and stainless steel bowls, are cleaned by scrubbing with a brush in an Alconox™[1] soap solution. The reusable tools are then rinsed with tap water followed by a

[1] Alconox is a registered trademark of Alconox Incorporated, New York, New York.

ıal rinsing with distilled water. All cleaned equipment is then wrapped in baked aluminum .oil. All fluids used in the decontamination process are containerized in sealable 5-gallon buckets. The bucket is labeled with the date sealed, type of waste contained, sites where waste as generated, USACHPPM Point of Contact and phone number.

(2) Disposable Equipment and Excess Soil/Sediment. Disposable field sampling ɟuipment (used aluminum foil, acetate core tubes, PCB screening supplies) is collected in a sealable 5-gallon solid waste bucket. The bucket is labeled with the date sealed, type of waste -ontained, sites where waste was generated, USACHPPM Point of Contact and phone number.

c. Investigation Derived Waste (IDW).

(1) Solid IDW. At the end of field work each day, the bucket is taken for disposal.

(2) Liquid IDW. At the end of field work each day, the labeled liquid waste bucket is .aken for disposal.

APPENDIX C

MONITORING WELL LOGS

U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
GROUND WATER & SOLID WASTE PROGRAM DRILLING LOG

BORE HOLE JWD-GW1
PROJECT NUMBER 38-EH-6745-97
LOCATION West of Wood Dump
Notes Cross-Gradient Well

INSTALLATION Camp Johnson
DATE 22 September 1997
GEOLOGIST CPT Gellasch/ Mr. Meckelnburg
DRILLERS Farro, Pippen, Perkins, Healy
DRILL RIG B-80 w/6@ OD hollow-stem auger

DEPTH (feet)	DESCRIPTION	REMARKS
0	Silty sand, organic rich very dark brown 2/2	
		Soil sample S1 taken
5	sandy silt to silty sand light brownish gray 6/2 to dark yellowish 3/6	from 3-5 feet
10		Wet at 10 feet
15		Soil sample S2 taken from 13-15 feet
20		

DRILLING LOG (Continued)

BORE HOLE JWD-GW1
PROJECT NUMBER 38-EH-6745-97
LOCATION West of Wood Dump
Notes Cross-Gradient Well

INSTALLATION Camp Johnson
DATE 22 September 1997
GEOLOGIST CPT Gellasch/ Mr. Meckelnburg
DRILLERS Farro, Pippen, Perkins, Healy
DRILL RIG B-80 w/6@ OD hollow-stem auger

DEPTH (feet)	DESCRIPTION	REMARKS
20		
25		
	silty clay, very wet and flowing gray 5/1	Physical character sample taken
30	----------bottom of hole----------	
35		
40		

DRILLING LOG (Continued)

BORE HOLE JWD-GW2
PROJECT NUMBER 38-EH-6745-97
LOCATION South of Wood Dump
Notes Up-Gradient Well

INSTALLATION Camp Johnson
DATE 21 September 1997
GEOLOGIST CPT Gellasch/ Mr. Meckelnburg
DRILLERS Farro, Pippen, Perkins, Healy
DRILL RIG B-80 w/6@ OD hollow-stem auger

DEPTH (feet)	DESCRIPTION		REMARKS
0	Fine grained sand	brown 5/3	
	Some silt		
5			
	Fine grained silty sand	brown 5/3	
10			
	sandy silt, holds together in core	brown 5/3	Wet at 10 feet Soil sample S1 taken from 10-13 feet
15			
			Water at 18 feet Attempted soil sample
20			

DRILLING LOG (Continued)

BORE HOLE JWD-GW2
PROJECT NUMBER 38-EH-6745-97
LOCATION South of Wood Dump
Notes Up-Gradient Well

INSTALLATION Camp Johnson
DATE 21 September 1997
GEOLOGIST CPT Gellasch/ Mr. Meckelnburg
DRILLERS Farro, Pippen, Perkins, Healy
DRILL RIG B-80 w/6@ OD hollow-stem auger

DEPTH (feet)	DESCRIPTION	REMARKS
20		
25	silty clay, wet and flowing grayish brown 5/2 to gray N/5	
30	----------bottom of hole----------	
35		
40		

DRILLING LOG (Continued)

BORE HOLE JWD-GW3
PROJECT NUMBER 38-EH-6745-97
LOCATION East of Wood Dump
Notes Cross-Gradient Well

INSTALLATION Camp Johnson
DATE 21 September 1997
GEOLOGIST CPT Gellasch/ Mr. Meckelnburg
DRILLERS Farro, Pippen, Perkins, Healy
DRILL RIG B-80 w/6@ OD hollow-stem auger

DEPTH (feet)	DESCRIPTION		REMARKS
0	Fine silty sand	light yellowish brown 6/4	
5			Soil sample S1 taken from 3-5 feet
10			
	clayey silt, some fine sand	brown 5/3	Wet at 11 feet
	silty clay, wet and soft	gray 5/1	
	clayey silt	brown 5/3	Soil sample S2 taken from 13-15 feet
15			
	silty clay	gray 5/1	
20			

DRILLING LOG (Continued)

BORE HOLE JWD-GW3
PROJECT NUMBER 38-EH-6745-97
LOCATION East of Wood Dump
Notes Cross-Gradient Well

INSTALLATION Camp Johnson
DATE 22 September 1997
GEOLOGIST CPT Gellasch/ Mr. Meckelnburg
DRILLERS Farro, Pippen, Perkins, Healy
DRILL RIG B-80 w/6¼ OD hollow-stem auger

DEPTH (feet)	DESCRIPTION	REMARKS
20		
25	silty clay, wet and flowing grayish brown 5/2 to gray N/5	
30	----------bottom of hole----------	
35		
40		

DRILLING LOG (Continued)

BORE HOLE JWD-GW4
PROJECT NUMBER 38-EH-6745-97
LOCATION West of Wood Dump
Notes Upstream in the ravine, hand dug temporary well

INSTALLATION Camp Johnson
DATE 22 September 1997
GEOLOGIST CPT Gellasch/ Mr. Meckelnburg
DRILLERS Farro, Pippen, Perkins, Healy
DRILL RIG Hand auger

DEPTH (feet)	DESCRIPTION		REMARKS
0	Silty fine sand	olive brown 4/3	
		to yellowish red 4/6	
	sand becomes coarser		
	silty clay	greenish gray 5/1	
5			Wet at 4 feet
10			
	----------bottom of hole----------		
15			
20			

DRILLING LOG (Continued)

BORE HOLE JWD-GW5
PROJECT NUMBER 38-EH-6745-97
LOCATION Base of Wood Dump
Notes Hand dug temporary well

INSTALLATION Camp Johnson
DATE 22 September 1997
GEOLOGIST CPT Gellasch/ Mr. Meckelnburg
DRILLERS Farro, Pippen, Perkins, Healy
DRILL RIG hand auger

DEPTH (feet)	DESCRIPTION		REMARKS
0	Silty clay with some fine sand	dark brown 3/3	
	clayey silt with some sand	olive gray 4/2	
5		dark gray 4/4	Wet at 4 feet
10			
	----------bottom of hole----------		
15			
20			

DRILLING LOG (Continued)

BORE HOLE JWD-GW6
PROJECT NUMBER 38-EH-6745-97
LOCATION East of Wood Dump
Notes Downstream in ravine, hand dug temporary well

INSTALLATION Camp Johnson
DATE 22 September 1997
GEOLOGIST CPT Gellasch/ Mr. Meckelnburg
DRILLERS Farro, Pippen, Perkins, Healy
DRILL RIG hand auger

DEPTH (feet)	DESCRIPTION	REMARKS
0	Fine sandy silty clay dark yellowish brown :	
	Less sand, more clay olive brown 4/3	
		Wet at 2.5 feet
5		
10		
	----------bottom of hole----------	
15		
20		

APPENDIX D

EPA REGION 9 PRELIMINARY REMEDIATION GOALS

August 1, 1996

Subject: Region 9 Preliminary Remediation Goals (PRGs) 1996

From: Stanford J. Smucker, Ph.D.
Regional Toxicologist (H-9-3)
Technical Support Team

To: PRG Table Mailing List

Please find the annual update to the Region 9 PRG table. The table has been revised to reflect the most current EPA toxicological and risk assessment information. Updates to EPA toxicity values were obtained from IRIS through July 1996, HEAST through May 1995, and EPA's National Center for Environmental Assessment (NCEA, formerly ECAO).

Region 9 PRGs are "evergreen" and have evolved as new methodologies and parameters have been developed. In several cases the models, equations, and assumptions presented in RAGS HHEM, *Part B, Development of Risk-Based Preliminary Remediation Goals* (1991) have been replaced with new information that is consistent with the document, *Soil Screening Guidance*, recently issued by the Office of Solid Waste and Emergency Response (OSWER), dated April 1996.

The updated PRG table also contains soil screening levels (SSLs) for protection of groundwater. The SSLs were obtained directly from EPA/OSWER's *Soil Screening Guidance* document which is available from NTIS as EPA/540/R-96/018 and EPA/540/R-95/128. Please note that because R 9 PRGs currently evaluate intermedia transfer of volatile organic chemicals (VOCs) and heavy metals from soil to air, the PRG table does not include a separate list of SSLs for the air pathway.

To help users rapidly identify substances with new PRGs, these contaminants are printed in boldface type. Changes in PRG values are either due to new toxicity constants or new physico-chemical information. This version of the table contains revised toxicity values for acetaldehyde, chlorine cyanide, 1,3-dichlorobenzene, 2-dichloroethane, endosulfan, manganese, phosphoric acid, and 1,1,1-trichloroethane. Also, 23 additional VOCs have been identified and evaluated for inhalation exposures resulting from intermedia transfer from soil and water to air.

EPA Region 9 has established a homepage on the World Wide Web which you can find at http://www.epa.gov/region 9/. Our homepage will soon include the PRG table in downloadable form. The electronic table contains additional information not presented in the printed table (e.g. physico-chemical constants, non-cancer PRGs for carcinogens, pathway-specific PRGs, and volatilization factors for VOCs). Meanwhile, we still provide the electronic PRG table (PRG96.zip) on California Regional Water Board's BBS (510.286.0404) for those of you who have a modem.

Before relying on any number in the table, it is recommended that the user verify the numbers with an agency toxicologist or risk assessor because the toxicity / exposure information in the table may contain errors or default assumptions that need to be refined based on further evaluation. If you find an error please send me a note via email at Smucker.Stan@epamail.epa.gov or fax at 415.744.1916.

DISCLAIMER

Preliminary remediation goals (PRGs) focus on common exposure pathways and may not consider all exposure pathways encountered at CERCLA / RCRA sites (Exhibit 1-1). PRGs do not consider impact to groundwater or address ecological concerns. PRGs are specifically not intended as a (1) stand-alone decision-making tool, (2) as a substitute for EPA guidance for preparing baseline risk assessments, or (3) a rule to determine if a waste is hazardous under RCRA.

The guidance set out in this document is not final Agency action. It is not intended, nor can it be relied upon to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided herein, or act at variance with the guidance, based on an analysis of specific circumstances. The Agency also reserves the right to change this guidance at any time without public notice.

1.0 INTRODUCTION

The Region 9 PRG table combines current EPA toxicity values with "standard" exposure factors to estimate contaminant concentrations in environmental media (soil, air, and water) that are protective of humans, including sensitive groups, over a lifetime. Chemical concentrations above these levels would not automatically designate a site as "dirty" or trigger a response action. However, exceeding a PRG suggests that further evaluation of the potential risks that may be posed by site contaminants is appropriate. Further evaluation may include additional sampling, consideration of ambient levels in the environment, or a reassessment of the assumptions contained in these screening-level estimates (e.g. appropriateness of route-to-route extrapolations).

The PRG concentrations presented in the table can be used to screen pollutants in environmental media, trigger further investigation, and provide an initial cleanup goal if applicable. When considering PRGs as preliminary goals, residential concentrations should be used for maximum beneficial uses of a property. Industrial concentrations are included in the table as an alternative cleanup goal for soils, but it is not recommended that industrial concentrations be used for screening sites.

Before applying PRGs as screening tools or initial goals, the user of the table should consider whether the exposure pathways and exposure scenarios at the site are fully accounted for in the PRG calculation. Region 9 PRG concentrations are based on exposure pathways for which generally accepted methods, models, and assumptions have been developed (i.e. ingestion, dermal contact, and inhalation) for specific land-use conditions and do not consider impact to groundwater or ecological receptors (see Developing a Conceptual Site Model below).

EXHIBIT 1-1
TYPICAL EXPOSURE PATHWAYS BY MEDIUM
FOR RESIDENTIAL AND INDUSTRIAL LAND USES[a]

EXPOSURE PATHWAYS, ASSUMING:		
MEDIUM	RESIDENTIAL LAND USE	INDUSTRIAL LAND USE
Ground Water	***Ingestion from drinking***	Ingestion from drinking
	Inhalation of volatiles	Inhalation of volatiles
	Dermal absorption from bathing	Dermal absorption
Surface Water	***Ingestion from drinking***	Ingestion from drinking
	Inhalation of volatiles	Inhalation of volatiles
	Dermal absorption from bathing	Dermal absorption
	Ingestion during swimming	
	Ingestion of contaminated fish	
Soil	***Ingestion***	***Ingestion***
	Inhalation of particulates	***Inhalation of particulates***
	Inhalation of volatiles	***Inhalation of volatiles***
	Exposure to indoor air from soil gas	Exposure to indoor air from soil gas
	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***

Footnote: [a]Exposure pathways considered in the PRG calculations are indicated in boldface italics.

2.0 READING THE PRG TABLE

2.1 General Considerations

With the exceptions described below, PRGs are chemical concentrations that correspond to fixed levels of risk (i.e.either a one-in-one million [10^{-6}] cancer risk or a noncarcinogenic 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 noncancer or systemic effects, the 10^{-6} cancer risk will result in a more stringent criteria and consequently this value is presented in the table. PRG concentrations based on cancer risk are indicated by "ca". PRG concentrations based on noncarcinogenic health threats are indicated by "nc".

If the risk-based concentrations are to be used to screen sites, it is recommended that both cancer and noncancer-based PRGs be obtained even though the printed list contains only the more restrictive of the two values. To obtain additional values (e.g. noncancer PRGs for a carcinogenic substance), the user has the following options:

- download an electronic copy of the PRG table from EPA Region 9's homepage at http://www.epa.gov/region 9/
- download the file (PRG96.zip) from California Regional Water Board's BBS at 510.286.0404
- use the equations presented in Section 4.0 to calculate additional PRG values

It has come to my attention that some users have been multiplying the cancer PRG concentrations by 10 or 100 to set "action levels" for triggering remediation or to set less stringent cleanup levels for a specific site after considering non-risk-based factors such as (ambient levels, detection limits, or technological feasibility). This practice recognizes that there may be a range of values that may be "acceptable" for carcinogenic risk (EPA's cancer risk range is from 10^{-6} to 10^{-4}). However, this practice could lead one to overlook serious noncancer health threats and it is strongly recommended that the user consult with a toxicologist or Regional risk assessor before doing this. For carcinogens, I have indicated by asterisk ("ca*") in the PRG table where the noncancer PRGs would be exceeded if the cancer value that is listed is multiplied by 100. Two stars ("ca**") indicate that the noncancer values would be exceeded if the cancer PRG were multiplied by 10. There is no range of "acceptable" noncarcinogenic "risk" so that under no circumstances should noncancer PRGs be multiplied by 10 or 100, when setting final cleanup criteria.

In general, PRG concentrations in the table are risk-based but for soil there are two important exceptions: (1) for several volatile chemicals, PRGs are based on the soil saturation equation ("sat") and (2) for relatively less toxic inorganic and semivolatile contaminants, a non-risk based "ceiling limit" concentration is given as 10^{+5} mg/kg ("max"). PRG concentrations that are not risk-based (i.e. either "sat" or "max") should be segregated before screening multiple pollutant

risks.

In addition to Region 9 PRGs, the PRG table also includes California EPA PRGs ("CAL-Modified PRGs") for specific chemicals where CAL-EPA values may be more restrictive than the federal values; and, soil screening levels (SSLs) for protection of groundwater (see Section 2.3 below).

2.2 Toxicity Values

EPA toxicity values, known as noncarcinogenic reference doses (RfD) and carcinogenic slope factors (SF) were obtained from IRIS through July 1996, HEAST through May 1995, and EPA's National Center for Environmental Assessment (NCEA, formerly ECAO). The priority among sources of toxicological constants used are as follows: (1) IRIS (indicated by "i"), (2) HEAST ("h"), (3) NCEA ("n"), and (4) withdrawn from IRIS or HEAST and under review ("x").

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. Inhalation slope factors ("SFi") and inhalation reference doses ("RfDi") were used for both inhaled and oral exposures for organic compounds lacking oral values. 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.**

To help users rapidly identify substances with new PRGs, these contaminants are printed in boldface type. This version of the table contains revised toxicity values for acetaldehyde, chlorine cyanide, 1,3-dichlorobenzene, 2-dichloroethane, endosulfan, manganese, phosphoric acid, and 1,1,1-trichloroethane.

2.3 Soil Screening Levels

Generic soil screening levels (SSLs) for the protection of groundwater have been included in the PRG table for 100 of the most common contaminants at Superfund sites. Generic SSLs are derived using default values in standardized equations presented in *Soil Screening Guidance* (available from NTIS as document numbers PB96-963502 and PB96-963505 or EPA/540/R-95/128 and EPA/540/R-96/018).

The SSLs were developed using a default dilution-attenuation factor (DAF) of 20 to account for natural processes that reduce contaminant concentrations in the subsurface. Also included are generic SSLs that assume no dilution or attenuation between the source and the receptor well (i.e., a DAF of 1). These values can be used at sites where little or no dilution or attenuation of soil leachate concentrations is expected at a site (e.g., sites with shallow water tables, fractured media, karst topography, or source size greater than 30 acres).

Generally, if an SSL is not exceeded for the migration to groundwater pathway, the user may eliminate this pathway from further investigation.

2.4 Miscellaneous

Volatile organic chemicals (VOCs) are indicated by "1" in the VOC column of the table and are defined as those chemicals having a Henry's Law constant greater than 10^{-5} (atm-m^3/mol) and a molecular weight less than 200 g/mole). These contaminants are evaluated for potential volatilization from soil / water to air using volatilization factors (see Section 4.1). Since the 1995 PRG table, 23 additional VOCs have been identified and evaluated for inhalation exposures resulting from intermedia transfer from soil and water to air. These are indicated in boldface type.

Chemical-specific dermal absorption values for contaminants in soil and dust are presented for arsenic, cadmium, pentachlorophenol, PCBs, and dioxin as recommended by EPA's Office of Research and Development (USEPA 1992a). Otherwise, default skin absorption fractions are assumed to be 0.01 and 0.10, for inorganics and organics, respectively.

3.0 USING THE PRG TABLE

The decision to use PRGs at a site will be driven by the potential benefits of having generic risk-based concentrations in the absence of site-specific risk assessments. The original intended use of PRGs was to provide initial cleanup goals for individual chemicals given specific medium and land-use combinations (see RAGS Part B, 1991), however risk-based PRGs actually have several uses in addition to providing initial goals. These include:

- Screening sites to determine further evaluation
- Prioritizing areas of concern at megasites (e.g. federal facilities)
- Calculating risks associated with multiple contaminants

A few basic procedures are recommended for using PRGs properly. These are briefly described below. Potential problems with the use of PRGs are also identified.

3.1 Developing a Conceptual Site Model

The primary condition for use of PRGs is that exposure pathways of concern and conditions at the site match those taken into account by the PRG framework. 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 PRGs at the site and the need for additional information. For those pathways not covered by PRGs, a risk assessment specific to these additional pathways may be necessary. Nonetheless, the PRG lookup values will still be useful in such situations for focusing further investigative efforts on the exposure pathways not addressed.

To develop a site-specific CSM, perform an extensive records search and compile existing data (e.g. available site sampling data, historical records, aerial photographs, and hydrogeologic information). Once this information is obtained, CSM worksheets such as those provided in ASTM's *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* (1995) can be used to tailor the generic worksheet model to a site-specific CSM. The final CSM diagram represents linkages among contaminant sources, release mechanisms, exposure pathways and routes and receptors. It summarizes our 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 PRGs (that is, residential and industrial)?
- Are there other likely human exposure pathways that were not considered in development of the PRGs (e.g. impact to groundwater, local fish consumption; 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)?

If any of these four conditions exist, the PRG may need to be adjusted to reflect this new information. Suggested references for evaluating pathways not currently evaluated by Region 9 PRG's are presented in Exhibit 3-1.

EXHIBIT 3-1
SUGGESTED READINGS FOR EVALUATING SOIL CONTAMINANT PATHWAYS NOT CURRENTLY ADDRESSED BY REGION 9 PRGs

EXPOSURE PATHWAY	REFERENCE
Migration of contaminants to an underlying potable aquifer	*Soil Screening Guidance: User's Guide and Technical Background Document* (USEPA 1996a,b)
Ingestion via plant uptake	*Technical Support Document for Land Application of Sewage Sludge (USEPA 1992a)*
Ingestion via meat or dairy products	*Estimating Exposure to Dioxin-Like Compounds - Review Draft* (1994a)
Inhalation of volatiles that have migrated into basements	*Soil Screening Guidance: User's Guide and Technical Background Document* (USEPA 1996a,b)
Terrestrial environmental pathways	*Role of the Ecological Risk Assessment in the Baseline Risk Assessment* (USEPA 1994b)

3.2 Background Levels Evaluation

A necessary step in determining the usefulness of Region 9 PRGs is the consideration of background contaminant concentrations. EPA may be concerned with two types of background at sites: naturally occurring and anthropogenic. Natural background is usually limited to metals whereas anthropogenic (i.e. human-made) background includes both organic and inorganic contaminants. Before embarking on an extensive sampling and analysis program to determine local background concentrations in the area, one should first compile existing data on the subject. Far too often there is pertinent information in the literature that gets ignored, resulting in needless expenditures of time and money.

Generally EPA does not clean up below natural background. If natural background concentrations are higher than the PRGs, the generic PRGs may not be the best tool for site decisionmaking. Or, an adjustment of the PRG may be needed. For example, naturally occurring arsenic frequently is higher than the soil PRG set equal to a one-in-one-million cancer risk (the point of departure), thus an alternative PRG for arsenic is provided in the lookup tables based on non-cancer endpoints that is still protective of cancer risks as well (i.e. falls within EPA's "acceptable" risk range). Because of the problems associated with adjusting PRGs to an alternate risk level, this procedure is not recommended without first consulting a staff toxicologist at state and / or federal regulatory agencies.

Where anthropogenic background levels exceed PRGs and EPA has determined that a response action is necessary and feasible, EPA's goal will be to develop a comprehensive response to the widespread contamination. This will often require coordination with different authorities that have jurisdiction over the sources of contamination in the area.

3.3 Risk Screening

A suggested stepwise approach for screening sites with PRGs is as follows:

- Perform an extensive records search and compile existing data.

- Identify site contaminants in the PRG Table. Record the PRG concentrations for various media and note whether PRG is based on cancer risk (indicated by "ca") or noncancer hazard (indicated by "nc"). Segregate cancer PRGs from non-cancer PRGs and exclude (but don't eliminate) non-risk based PRGs ("sat" or "max").

- For cancer risk estimates, take the site-specific concentration (maximum or 95 UCL) and divide by the PRG concentrations that are designated for cancer evaluation ("ca"). Multiply this ratio by 10^{-6} to estimate chemical-specific risk. For multiple pollutants, simply add the risk for each chemical :

$$Risk = \left[\left(\frac{conc_x}{PRG_x}\right) + \left(\frac{conc_y}{PRG_y}\right) + \left(\frac{conc_z}{PRG_z}\right)\right] \times 10^{-6}$$

- For non-cancer hazard estimates. Divide concentration term by its respective non-cancer PRG designated as "nc" and sum the ratios for multiple contaminants. [Note that carcinogens may also have an associated non-cancer PRG that is not listed in the printed copy of the table and these will also need to be obtained in order to complete the non-cancer evaluation.] The non-cancer ratio represents a hazard index (HI). A hazard index of 1 or less is generally considered safe . A ratio greater than 1 suggests further evaluation:

$$Hazard\ Index = \left[\left(\frac{conc_x}{PRG_x}\right) + \left(\frac{conc_y}{PRG_y}\right) + \left(\frac{conc_z}{PRG_z}\right)\right]$$

For more information on screening site risks, the reader should contact EPA Region 9's Technical Support Team.

3. 4 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 Region 9 PRGs. In order to prevent misuse of PRGs, the following should be avoided:

- Applying PRGs to a site without adequately developing a conceptual site model that identifies relevant exposure pathways and exposure scenarios,
- Not considering background concentrations when choosing PRGs as cleanup goals,
- Use of PRGs as cleanup levels without the nine-criteria analysis specified in the National Contingency Plan (or, comparable analysis for programs outside of Superfund),
- Use of PRGs as cleanup levels without verifying numbers with a toxicologist,
- Use of antiquated PRG tables that have been superseded by more recent publications,
- Not considering the effects of additivity when screening multiple chemicals, and
- Adjusting PRGs upward by factors of 10 or 100 without consulting a toxicologist.

4.0 TECHNICAL SUPPORT DOCUMENTATION

Region 9 PRGs consider human exposure hazards to chemicals from contact with contaminated soils, air, and water. The emphasis of the PRG equations and technical discussion are aimed at developing initial goals for soils, since this is an area where few standards exist. For air and water, additional reference concentrations or standards are available for many chemicals (e.g. non-zero MCLGs, AWQC, and NAAQS) and consequently the discussion of these media are brief.

4.1 Inhalation of Volatiles and Fugitive Dusts

Agency toxicity criteria indicate that risks from exposure to some chemicals via inhalation far outweigh the risk via ingestion; therefore soil PRGs have been designed to address this pathway as well. The models used to calculate PRGs for inhalation of volatiles / particulates are updates of risk assessment methods presented in RAGS Part B (USEPA 1991a) and are consistent with the *Soil Screening Guidance: User's Guide and Technical Background Document* (USEPA 1996a,b).

To address the soil-to-air pathways the PRG calculations incorporate volatilization factors (VF_s) for volatile contaminants and particulate emission factors (PEF) for nonvolatile contaminants.

These factors relate soil contaminant concentrations to air contaminant concentrations that may be inhaled on-site. The VF_s and PEF equations can be broken into two separate models: an emission model to estimate emissions of the contaminant from the soil and a dispersion model to simulate the dispersion of the contaminant in the atmosphere.

It should be noted that the box model in RAGS Part B has been replaced with a dispersion term (Q/C) derived from a modeling exercise using meteorological data from 29 locations across the United States because the box model may not be applicable to a broad range of site types and meteorology and does not utilize state-of-the-art techniques developed for regulatory dispersion modeling. The dispersion model for both volatiles and particulates is the AREA-ST, an updated version of the Office of Air Quality Planning and Standards, Industrial Source Complex Model, ISC2. However, different Q/C terms are used in the VF and PEF equations. Los Angeles was selected as the 90th percentile data set for volatiles and Minneapolis was selected as the 90th percentile data set for fugitive dusts (USEPA 1996 a,b). A default source size of 0.5 acres was chosen for the PRG calculations. This is consistent with the default exposure area over which Region 9 typically averages contaminant concentrations in soils. If unusual site conditions exist such that the area source is substantially larger than the default source size assumed here, an alternative Q/C could be applied (see USEPA 1996a,b).

Volatilization Factor for Soils

Volatile chemicals, defined as those chemicals having a Henry's Law constant greater than 10^{-5} (atm-m^3/mol) and a molecular weight less than 200 g/mole, were screened for inhalation exposures using a volatilization factor for soils (VF_s). Please note that VF_s's are available in the electronic version of the PRG table.

The emission terms used in the VF_s are chemical-specific and were calculated from physical-chemical information obtained from a number of sources including *Superfund Exposure Assessment Manual* (SEAM, EPA 1988), *Subsurface Contamination Reference Guide* (EPA 1990a), *Fate and Exposure Data* (Howard 1991), and *Superfund Chemical Data Matrix* (USEPA 1994c). In those cases where Diffusivity Coefficients (Di) were not provided in existing literature, Di's were calculated using Fuller's Method described in SEAM. A surrogate term was required for some chemicals that lacked physico-chemical information. In these cases, a proxy chemical of similar structure was used that may over- or under-estimate the PRG for soils. Physico-chemical information is available in the electronic version of the PRG table. To access this information, the user should display the hidden columns in the table.

Equation 4-9 forms the basis for deriving generic soil PRGs for the inhalation pathway. The following parameters in the standardized equation can be replaced with specific site data to develop a simple site-specific PRG

- Source area
- Average soil moisture content
- Average fraction organic carbon content

- Dry soil bulk density

The basic principle of the VF_s model is applicable only if the soil contaminant concentration is at or below soil saturation. Above this level, the model cannot predict an accurate VF_s. If the PRG calculated using VF_s was greater than the calculated "sat" (Equation 4-10), the PRG was set equal to "sat" in accordance with *Soil Screening Guidance* (USEPA 1996 a,b).

Volatilization Factor for Tap Water

For tap water, an upperbound 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). Note: the range of transfer efficiencies extends from 30% for toilets to 90% for dishwashers.

Particulate Emission Factor for Soils

Inhalation of chemicals adsorbed to respirable particles (PM_{10}) were assessed using 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 in Equation 4-11, 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.

The impact of the PEF on the resultant PRG concentration (that combines soil exposure pathways for ingestion, skin contact, and inhalation) can be assessed by downloading the PRG tables and displaying the hidden columns. With the exception of specific heavy metals, the PEF does not appear to significantly affect most soil PRGs. Equation 4-11 forms the basis for deriving a generic PEF for the inhalation pathway. 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.

4.2 Dermal Contact with Contaminants in Soil

Much uncertainty surrounds the determination of hazards associated with skin contact with soils. One important data gap is the lack of EPA verified toxicity values for the dermal route. For screening purposes it is assumed that dermal toxicity values can be route-to-route extrapolated from oral values but this may not always be an appropriate assumption and should be checked.

Thus far, chemical-specific absorption values for skin have been recommended for only five chemicals (arsenic, cadmium, pentachlorophenol, PCBs, and dioxin) by EPA's Office of Research and Development. For all other chemicals, default absorption values for inorganics and organics are assumed to be 1 and 10 percent, respectively. At 10 % skin absorption, the dermal dose is estimated to equal an ingestion dose for adults, using the best estimate default values in *Dermal Exposure Assessment: Principles and Applications* (EPA 1992). At 1 % absorption, the dermal dose is estimated to be 10% of the oral dose (i.e. based on an adult ingestion rate of 100 mg per day). Note: worker and children intake rates (50 and 200 mg per day, respectively) yield somewhat different results.

dermal dose = ingestion dose

$$C_{SOIL} \times ABS \times AF \times SA = C_{SOIL} \times IR$$

$$ABS = \frac{(100 mg/day)}{[(0.2 mg/cm^2\text{-}day)(5000 cm^2)]} = 0.10$$

4.3 SSLs for the Migration to Groundwater Pathway

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 backcalculated from acceptable ground water concentrations (i.e. nonzero MCLGs, MCLs, or risk-based PRGs). 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 SSL methodology was designed for use during the early stages of a site evaluation when information about subsurface conditions may be limited. Because of this constraint, the methodology is based on conservative, simplifying assumptions about the release and transport of contaminants in the subsurface. For more on SSLs, and how to calculate site-specific SSLs versus generic SSLs presented in the PRG table, the reader is referred to the *Soil Screening Guidance* document (USEPA 1996a,b).

4.4 Exposure Factors

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, U.S. EPA's Office of Research and Development, and California EPA's Department of Toxic Substances Control (see Exhibit 4-1).

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 (see derivations next page).

For soils only, noncarcinogenic contaminants are evaluated in children separately from adults. No age-adjustment factor is used in this case. The focus on children is considered protective of the higher daily intake rates of soil by children and their lower body weight. For maintaining consistency when evaluating soils, dermal and inhalation exposures are also based on childhood contact rates.

(1) ingestion([mg•yr]/[kg•d]:

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

(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]):

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

4.5 PRG Equations

The equations used to calculate the PRGs for carcinogenic and noncarcinogenic contaminants are presented in Equations 4-1 through 4-8. The PRG equations update RAGS Part B equations. Briefly, PRGs are risk assessments run in reverse. The methodology backcalculates a soil, air, or water concentration level from a target risk (for carcinogens) or hazard quotient (for noncarcinogens). For completeness, the soil equations combine risks from ingestion, skin contact, and inhalation simultaneously. Note: the electronic version of the table also includes pathway-specific PRGs, should the user decide against combining specific exposure pathways; or, the user wants to identify the relative contribution of each pathway to exposure.

To calculate PRGs for volatile chemicals in soil, a chemical-specific volatilization factor is calculated per Equation 4-9. Because of its reliance on Henry's law, the VF_s model is applicable only when the contaminant concentration in soil is at or below saturation (i.e. there is no free-phase contaminant present). Soil saturation ("sat") corresponds to the contaminant concentration in soil at which the adsorptive limits of the soil particles and the solubility limits of the available soil moisture have been reached. Above this point, pure liquid-phase contaminant is expected in the soil. If the PRG calculated using VF_s was greater than the calculated sat, the PRG was set equal to sat, in accordance with *Soil Screening Guidance* (USEPA 1996 a,b). The updated equation for deriving sat is presented in Equation 4-10.

EXHIBIT 4-1
STANDARD DEFAULT FACTORS

Symbol	Definition (units)	Default	Reference
CSFo	Cancer slope factor oral (mg/kg-d)-1	--	IRIS, HEAST, or NCEA
CSFi	Cancer slope factor inhaled (mg/kg-d)-1	--	IRIS, HEAST, or NCEA
RfDo	Reference dose oral (mg/kg-d)	--	IRIS, HEAST, or NCEA

RfDi	Reference dose inhaled (mg/kg-d)	--	IRIS, HEAST, or NCEA
TR	Target cancer risk	10^{-6}	--
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	

$$C(mg/kg) = \frac{TR \times AT_c}{EF_r \left[\left(\frac{IFS_{adj} \times CSF_o}{10^6 mg/kg} \right) + \left(\frac{SFS_{adj} \times ABS \times CSF_o}{10^6 mg/kg} \right) + \left(\frac{InhF_{adj} \times CSF_i}{VF_s^a} \right) \right]}$$

SAa	25% Surface area, adult (cm^2/day)	5000	Dermal Assessment, EPA 1992 (EPA/600/8-91/011B)
SAc	25% Surface area, child (cm^2/day)	2000	Dermal Assessment, EPA 1992 (EPA/ 600/8-9/011B)
AF	Adherence factor (mg/cm^2)	0.2	Dermal Assessment, EPA 1992 (EPA/ 600/8-9/011B)
ABS	Skin absorption (unitless):		
	-- organics	0.1	PEA, Cal-EPA (DTSC, 1994)
	--Inorganics	0.01	PEA, Cal-EPA (DTSC, 1994)
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	PEA, Cal-EPA (DTSC, 1994)
IRSa	Soil ingestion - adult (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 - occupational (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)
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])	503	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)	See below	Soil Screening Guidance (EPA 1996a,b)
VFs	Volatilization factor for soil (m^3/kg)	See below	Soil Screening Guidance (EPA 1996a,b)
sat	Soil saturation concentration (mg/kg)	See below	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) .

PRG EQUATIONS

Equation 4-1: Combined Exposures to Carcinogenic Contaminants in Residential Soil

Soil Equations: For soils, equations were based on three exposure routes (ingestion, skin contact, and inhalation).

Equation 4-2: Combined Exposures to Noncarcinogenic Contaminants in Residential Soil

$$C(mg/kg) = \frac{THQ \times BW_c \times AT_n}{EF_r \times ED_c \left[\left(\frac{1}{RfD_o} \times \frac{IRS_c}{10^6 mg/kg} \right) + \left(\frac{1}{RfD_o} \times \frac{SA_c \times AF \times ABS}{10^6 mg/kg} \right) + \left(\frac{1}{RfD_i} \times \frac{IRA_c}{VF_s^a} \right) \right]}$$

Equation 4-3: Combined Exposures to Carcinogenic Contaminants in Industrial Soil

$$C(mg/kg) = \frac{TR \times BW_a \times AT_c}{EF_o \times ED_o \left[\left(\frac{IRS_o \times CSF_o}{10^6 mg/kg} \right) + \left(\frac{SA_a \times AF \times ABS \times CSF_o}{10^6 mg/kg} \right) + \left(\frac{IRA_a \times CSF_i}{VF_s^a} \right) \right]}$$

Equation 4-4: Combined Exposures to Noncarcinogenic Contaminants in Industrial Soil

$$C(mg/kg) = \frac{THQ \times BW_a \times AT_n}{EF_o \times ED_o \left[\left(\frac{1}{RfD_o} \times \frac{IRS_o}{10^6 mg/kg} \right) + \left(\frac{1}{RfD_o} \times \frac{SA_a \times AF \times ABS}{10^6 mg/kg} \right) + \left(\frac{1}{RfD_i} \times \frac{IRA_a}{VF_s^a} \right) \right]}$$

Footnote:
[a]Use VF_s for volatile chemicals (defined as having a Henry's Law Constant [atm-m^3/mol] greater than 10^{-5} and a molecular weight less than 200 grams/mol) or PEF for non-volatile chemicals.

Tap Water Equations:

Equation 4-5: Ingestion and Inhalation Exposures to Carcinogenic Contaminants in Water

$$C(ug/L) = \frac{TR \times AT_c \times 1000ug/mg}{EF_r\ [(IFW_{adj} \times CSF_o) + (VF_w \times InhF_{adj} \times CSF_i)]}$$

Equation 4-6: Ingestion and Inhalation Exposures to Noncarcinogenic Contaminants in Water

$$C(ug/L) = \frac{THQ \times BW_a \times AT_n \times 1000ug/mg}{EF_r \times ED_r\ [(\frac{IRW_a}{RfD_o}) + (\frac{VF_w \times IRA_a}{RfD_i})]}$$

<u>Air Equations</u>:

Equation 4-7: Inhalation Exposures to Carcinogenic Contaminants in Air

$$C(ug/m^3) = \frac{TR \times AT_c \times 1000ug/mg}{EF_r \times InhF_{adj} \times CSF_i}$$

Equation 4-8: Inhalation Exposures to Noncarcinogenic Contaminants in Air

$$C(ug/m^3) = \frac{THQ \times RfD_i \times BW_a \times AT_n \times 1000ug/mg}{EF_r \times ED_r \times IRA_a}$$

SOIL-TO-AIR VOLATILIZATION FACTOR (VF_s)

Equation 4-9: Derivation of the Volatilization Factor

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

where:

$$D_A = \frac{[(\Theta_a^{10/3} D_i H' + \Theta_w^{10/3} D_w)/n^2]}{\rho_B K_d + \Theta_w + \Theta_a H'}$$

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
ρ_b	Dry soil bulk density (g/cm^3)	1.5
Θ_a	Air filled soil porosity (L_{air}/L_{soil})	0.28 or n-Θ_w
n	Total soil porosity (L_{pore}/L_{soil})	0.43 or 1 - (ρ_b/ρ_s)
Θ_w	Water-filled soil porosity (L_{water}/L_{soil})	0.15
ρ_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 CONCENTRATION (sat)

Equation 4-10: Derivation of the Soil Saturation Limit

$$sat = \frac{S}{\rho_b} \left(K_d \rho_b + \Theta_w + H' \Theta_a \right)$$

Parameter	Definition (units)	Default
sat	Soil saturation concentration (mg/kg)	--
S	Solubility in water (mg/L-water)	Chemical-specific
ρ_b	Dry soil bulk density (kg/L)	1.5
n	Total soil porosity (L_{pore}/L_{soil})	0.43 or 1 - (ρ_b/ρ_s)
ρ_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
Θ_w	Water-filled soil porosity (L_{water}/L_{soil})	0.15
Θ_a	Air filled soil porosity (L_{air}/L_{soil})	0.28 or n-Θ_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

SOIL-TO-AIR PARTICULATE EMISSION FACTOR (PEF)

Equation 4-11: Derivation of the Particulate Emission Factor

$$PEF(m^3/kg) = Q/C \times \frac{3600 s/h}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$$

Parameter	Definition (units)	Default
PEF	Particulate emission factor (m^3/kg)	1.316×10^9
Q/C	Inverse of the mean concentration at the center of a 0.5-acre-square source (g/m^2-s per kg/m^3)	90.80
V	Fraction of vegetative cover (unitless)	0.5
U_m	Mean annual windspeed (m/s)	4.69
U_t	Equivalent threshold value of windspeed at 7 m (m/s)	11.32
F(x)	Function dependent on U_m/U_t derived using Cowherd (1985) (unitless)	0.194

REFERENCES

ASTM. 1995. *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites.* Designation E 1739 - 95. Philadelphia, Pennsylvania.

California EPA. 1994. *Preliminary Endangerment Assessment Guidance Manual.* Department of Toxic Substances Control, Sacramento, California.

Cowherd, C., G. Muleski, P. Engelhart, and D. Gillette. 1985. *Rapid Assessment of Exposure to Particulate Emission from Surface Contamination.* EPA/600/8-85/002. Prepared for Office of Health and Environmental Assessment, U.S. Environmental Protection Agency, Washington, DC. NTIS PB85-192219 7AS.

Howard, P.H. 1990. *Handbook of Environmental Fate and Exposure Data for Organic Chemicals.* Lewis Publishers, Chelsea Michigan.

U.S. EPA. 1988. *Superfund Exposure Assessment Manual.* EPA/540/1-88/001. Office of Emergency and Remedial Response, Washington, DC.

U.S. EPA. 1990a. *Subsurface Contamination Reference Guide.* EPA/540/2-90/011. Office of Emergency and Remedial Response, Washington, DC.

U.S. EPA 1990b. *Exposure Factors Handbook.* EPA/600/8089/043. Office of Health and Environmental Assessment, Washington, DC.

U.S. EPA. 1991a. *Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals).* Publication 9285.7-01B. Office of Emergency and Remedial Response, Washington, DC. NTIS PB92-963333.

U.S. EPA. 1991b. *Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors.* Publication 9285.6-03. Office of Emergency and Remedial Response, Washington, DC. NTIS PB91-921314.

U.S. EPA. 1992a *Technical Support Document for Land Application of Sewage Sludge; Volumes I and II.* Office of Water, Washington, DC. 822/R-93-001a,b.

U.S. EPA. 1992b *Dermal Exposure Assessment: Principles and Applications.* EPA/600/8-91/011B. Office of Health and Environmental Assessment, Washington, DC.

U.S. EPA 1994a. *Estimating Exposure to Dioxin-Like Compounds.* U.S. EPA Office of Research and Development, EPA/600/6-88/005B.

U.S. EPA 1994b. *Role of Ecological Assessment in the Baseline Risk Assessment.* OSWER Directive No. 9285.7-17. Office of Solid Waste and Emergency Response, Washington, DC.

U.S. EPA 1994c. *Superfund Chemical Data Matrix.* EPA/540/R-94/009. Office of Solid Waste and Emergency Response, Washington, DC. PB94-963506.

U.S. EPA. 1995. *Health Effects Assessment Summary Tables* (HEAST): Annual Update, FY 1994. Environmental Criteria Assessment Office, Office of Health and Environmental Assessment, Office of Research and Development, Cincinnati, OH.

U.S. EPA. 1996a. *Soil Screening Guidance: Technical Background Document.* EPA/540/R-95/128. Office of Emergency and Remedial Response, Washington, DC. PB96-963502.

U.S. EPA. 1996b. *Soil Screening Guidance: User's Guide.* EPA/540/R-96/018. Office of Emergency and Remedial Response, Washington, DC. PB96-963505.

U.S. EPA. 1996c. *Integrated Risk Information System* (IRIS). Duluth, MN.

Key : i=IRIS h=HEAST n=NCEA x=WITHDRAWN r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION								CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.			Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
8.7E-03 i	4.0E-03 i	8.7E-03 r	4.0E-03 r	0	0.10	30560-19-1		Acephate	5.1E+01 ca**	2.2E+02 ca*	7.7E-01 ca*	7.7E+00 ca*		
7.7E-03 r	2.6E-03 r	7.7E-03 i	2.6E-03 i	1	0.10	75-07-0		**Acetaldehyde**	9.2E+00 ca**	2.1E+01 ca**	8.7E-01 ca*	1.5E+00 ca*		
	2.0E-02 i		2.0E-02 r	0	0.10	34256-82-1		Acetochlor	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		
	1.0E-01 i		1.0E-01 r	1	0.10	67-64-1		Acetone	2.1E+03 nc	8.8E+03 nc	3.7E+02 nc	6.1E+02 nc	1.6E+01	8.0E-01
	5.0E-04 h		2.9E-03 x	0	0.10	75-86-5		Acetone cyanohydrin	5.2E+01 nc	5.5E+02 nc	1.0E+01 nc	2.9E+01 nc		
	6.0E-03 i		1.4E-02 h	1	0.10	75-05-8		**Acetonitrile**	2.2E+02 nc	1.2E+03 nc	5.2E+01 nc	7.1E+01 nc		
	1.0E-01 i		5.7E-06 x	1	0.10	98-86-2		**Acetophenone**	4.9E-01 nc	1.6E+00 nc	2.1E-02 nc	4.2E-02 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	50594-66-6		Acifluorfen	8.5E+02 nc	8.9E+03 nc	4.7E+01 nc	4.7E+02 nc		
	2.0E-02 h		5.7E-06 i	1	0.10	107-02-8		**Acrolein**	1.0E-01 nc	3.4E-01 nc	2.1E-02 nc	4.2E-02 nc		
4.6E+00 i	2.0E-04 i	4.6E+00 i	2.0E-04 r	0	0.10	79-06-1		Acrylamide	9.8E-02 ca*	4.2E-01 ca	1.5E-03 ca	1.5E-02 ca		
	5.0E-01 i		2.9E-04 i	0	0.10	79-10-7		**Acrylic acid**	3.1E+04 nc	2.9E+05 nc	1.0E+00 nc	1.8E+04 nc		
5.4E-01 i	1.0E-03 h	2.4E-01 i	5.7E-04 i	1	0.10	107-13-1		Acrylonitrile	1.9E-01 ca*	4.7E-01 ca*	2.8E-02 ca*	3.7E+00 ca*		
8.1E-02 h	1.0E-02 i	8.0E-02 r	1.0E-02 r	0	0.10	15972-60-8		Alachlor	5.5E+00 ca*	2.4E+01 ca	8.4E-02 ca	8.4E-01 ca		
	1.5E-01 i		1.5E-01 r	0	0.10	1596-84-5		Alar	9.8E+03 nc	1.0E+05 nc	5.5E+02 nc	5.5E+03 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	116-06-3		Aldicarb	6.5E+01 nc	6.8E+02 nc	3.7E+00 nc	3.7E+01 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	1646-88-4		Aldicarb sulfone	6.5E+01 nc	6.8E+02 nc	3.7E+00 nc	3.7E+01 nc		
1.7E+01 i	3.0E-05 i	1.7E+01 i	3.0E-05 r	0	0.10	309-00-2		Aldrin	2.6E-02 ca*	1.1E-01 ca	3.9E-04 ca	4.0E-03 ca	1.2E+04	5.9E+02
	2.5E-01 i		2.5E-01 r	0	0.10	5585-64-8		Ally	1.6E+04 nc	1.0E+05 max	9.1E+02 nc	9.1E+03 nc		
	5.0E-03 x		5.0E-03 r	0	0.10	107-18-6		Allyl alcohol	3.3E+02 nc	3.4E+03 nc	1.8E+01 nc	1.8E+02 nc		
	5.0E-02 h		2.9E-04 i	0	0.10	107-05-1		Allyl chloride	3.2E+03 nc	3.3E+04 nc	1.0E+00 nc	1.8E+03 nc		
	1.0E+00 n			0	0.01	7429-90-5		Aluminum	7.7E+04 nc	1.0E+05 max		3.7E+04 nc		
	4.0E-04 i			0	0.01	20859-73-8		Aluminum phosphide	3.1E+01 nc	6.8E+02 nc		1.5E+01 nc		
	3.0E-04 i		3.0E-04 r	0	0.10	67485-29-4		Amdro	2.0E+01 nc	2.0E+02 nc	1.1E+00 nc	1.1E+01 nc		
	9.0E-03 i		9.0E-03 r	0	0.10	834-12-8		Ametryn	5.9E+02 nc	6.1E+03 nc	3.3E+01 nc	3.3E+02 nc		
	7.0E-02 h		7.0E-02 r	0	0.10	591-27-5		m-Aminophenol	4.6E+03 nc	4.8E+04 nc	2.6E+02 nc	2.6E+03 nc		
	2.0E-05 h		2.0E-05 r	0	0.10	504-24-5		4-Aminopyridine	1.3E+00 nc	1.4E+01 nc	7.3E-02 nc	7.3E-01 nc		
	2.5E-03 i		2.5E-03 r	0	0.10	33089-61-1		Amitraz	1.6E+02 nc	1.7E+03 nc	9.1E+00 nc	9.1E+01 nc		
			2.9E-02 i	n/a	n/a	7664-41-7		Ammonia			1.0E+02 nc			
	2.0E-01 i			0	0.10	7773-06-0		Ammonium sulfamate	1.3E+04 nc	1.0E+05 max		7.3E+03 nc		
5.7E-03 i	2.9E-04 r	5.7E-03 r	2.9E-04 i	0	0.10	62-53-3		Aniline	1.9E+01 nc	2.0E+02 nc	1.0E+00 nc	1.1E+01 nc		
	4.0E-04 i			0	0.01	7440-36-0		Antimony and compounds	3.1E+01 nc	6.8E+02 nc		1.5E+01 nc	5.0E+00	3.0E-01
	6.0E-04 h			0	0.01	1314-60-9		Antimony pentoxide	3.8E+01 nc	8.5E+02 nc		1.8E+01 nc		
	9.0E-04 h			0	0.01	28300-74-5		Antimony potassium tartrate	6.9E+01 nc	1.5E+03 nc		3.3E+01 nc		
	4.0E-04 h			0	0.01	1332-81-6		Antimony tetroxide	3.1E+01 nc	6.8E+02 nc		1.5E+01 nc		
	4.0E-04 h			0	0.01	1309-64-4		Antimony trioxide	3.1E+01 nc	6.8E+02 nc		1.5E+01 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	74115-24-5		Apollo	8.5E+02 nc	8.9E+03 nc	4.7E+01 nc	4.7E+02 nc		
2.5E-02 i	5.0E-02 h	2.5E-02 i	5.0E-02 r	0	0.10	140-57-8		Aramite	1.8E+01 ca*	7.6E+01 ca	2.7E-01 ca	2.7E+00 ca		
	3.0E-04 i			0	0.03	7440-38-2		Arsenic (noncancer endpoint)	2.2E+01 nc					
1.5E+00 i	3.0E-04 i	1.5E+01 i		0	0.03	7440-38-2		Arsenic (cancer endpoint)	3.8E-01 ca*	2.4E+00 ca	4.5E-04 ca	4.5E-02 ca	2.9E+01	1.0E+00
			1.4E-05 i	n/a	n/a	7784-42-1		Arsine			5.2E-02 nc			
	9.0E-03 i		9.0E-03 r	0	0.10	76578-12-6		Assure	5.9E+02 nc	6.1E+03 nc	3.3E+01 nc	3.3E+02 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	3337-71-1		Asulam	3.3E+03 nc	3.4E+04 nc	1.8E+02 nc	1.8E+03 nc		
2.2E-01 h	3.5E-02 h	2.2E-01 r	3.5E-02 h	0	0.10	1912-24-9		Atrazine	2.0E+00 ca	8.6E+00 ca	3.1E-02 ca	3.0E-01 ca		
	4.0E-04 i		4.0E-04 r	0	0.10	71751-41-2		Avermectin B1	2.6E+01 nc	2.7E+02 nc	1.5E+00 nc	1.5E+01 nc		
1.1E-01 i		1.1E-01 i		0	0.10	103-33-3		Azobenzene	4.0E+00 ca	1.7E+01 ca	6.2E-02 ca	6.1E-01 ca		
	7.0E-02 i		1.4E-04 h	0	0.01	7440-39-3		Barium and compounds	5.3E+03 nc	1.0E+05 max	5.2E-01 nc	2.6E+03 nc	1.6E+03	8.2E+01
	4.0E-03 i		4.0E-03 r	0	0.10	114-26-1		Baygon	2.6E+02 nc	2.7E+03 nc	1.5E+01 nc	1.5E+02 nc		
	3.0E-02 i		3.0E-02 r	0	0.10	43121-43-3		Bayleton	2.0E+03 nc	2.0E+04 nc	1.1E+02 nc	1.1E+03 nc		

Key: i=IRIS h=HEAST n=NCEA x=WITHDRAWN r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION							CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
												Migration to Ground Water	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	DAF 20 (mg/kg)	DAF 1 (mg/kg)
	2.5E-02 i		2.5E-02 r	0	0.10	68359-37-5	Baythroid	1.6E+03 nc	1.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
	3.0E-01 i		3.0E-01 r	0	0.10	1861-40-1	Benefin	2.0E+04 nc	1.0E+05 max	1.1E+03 nc	1.1E+04 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	17804-35-2	Benomyl	3.3E+03 nc	3.4E+04 nc	1.8E+02 nc	1.8E+03 nc		
	2.5E-03 i		2.5E+03 r	0	0.10	25057-89-0	Bentazon	1.6E+02 nc	1.7E+03 nc	9.1E+00 nc	9.1E+01 nc		
	1.0E-01 i		1.0E-01 r	0	0.10	100-52-7	Benzaldehyde	6.5E+03 nc	6.8E+04 nc	3.7E+02 nc	3.7E+03 nc		
2.9E-02 i	1.7E-03 r	2.9E-02 i	1.7E-03 n	1	0.10	71-43-2	Benzene	6.3E-01 ca*	1.4E+00 ca*	2.3E-01 ca*	3.9E-01 ca*	3.0E-02	2.0E-03
2.3E+02 i	3.0E-03 i	2.3E+02 i	3.0E-03 r	0	0.10	92-87-5	Benzidine	1.9E-03 ca	8.3E-03 ca	2.9E-05 ca	2.9E-04 ca		
	4.0E+00 i		4.0E+00 i	0	0.10	65-85-0	Benzoic acid	1.0E+05 max	1.0E+05 max	1.5E+04 nc	1.5E+05 nc	4.0E+02	2.0E+01
1.3E+01 i		1.3E+01 r		0	0.10	98-07-7	Benzotrichloride	3.4E-02 ca	1.5E-01 ca	5.2E-04 ca	5.2E-03 ca		
	3.0E-01 h		3.0E-01 r	0	0.10	100-51-6	Benzyl alcohol	2.0E+04 nc	1.0E+05 max	1.1E+03 nc	1.1E+04 nc		
1.7E-01 i		1.7E-01 r		1	0.10	100-44-7	Benzyl chloride	8.1E-01 ca	2.0E+00 ca	4.0E-02 ca	6.6E-02 ca		
4.3E+00 i	5.0E-03 i	8.4E+00 i		0	0.01	7440-41-7	Beryllium and compounds	1.4E-01 ca	1.1E+00 ca	8.0E-04 ca	1.6E-02 ca	6.3E+01	3.0E+00
	1.0E-04 i		1.0E-04 r	0	0.10	141-66-2	Bidrin	6.5E+00 nc	6.8E+01 nc	3.7E-01 nc	3.7E+00 nc		
	1.5E-02 i		1.5E-02 r	0	0.10	82657-04-3	Biphenthrin (Talstar)	9.8E+02 nc	1.0E+04 nc	5.5E+01 nc	5.5E+02 nc		
	5.0E-02 i		5.0E-02 r	1	0.10	92-52-4	1,1-Biphenyl	3.5E+02 sat	3.5E+02 sat	1.6E+02 nc	3.0E+02 nc		
1.1E+00 i		1.2E+00 i		1	0.10	111-44-4	Bis(2-chloroethyl)ether	4.3E-02 ca	9.7E-02 ca	5.8E-03 ca	9.8E-03 ca	4.0E-04	2.0E-05
7.0E-02 h	4.0E-02 i	3.5E-02 h	4.0E-02 r	1	0.10	39638-32-9	Bis(2-chloroisopropyl)ether	2.5E+00 ca	6.7E+00 ca	1.9E-01 ca	2.7E-01 ca		
2.2E+02 i		2.2E+02 i		1	0.10	542-88-1	Bis(chloromethyl)ether	1.9E-04 ca	4.2E-04 ca	3.1E-05 ca	5.2E-05 ca		
7.0E-02 x		7.0E-02 x		0	0.10	108-60-1	Bis(2-chloro-1-methylethyl)ether	6.3E+00 ca	2.7E+01 ca	9.6E-02 ca	9.6E-01 ca		
1.4E-02 i	2.0E-02 i	1.4E-02 r	2.2E-02 r	0	0.10	117-81-7	Bis(2-ethylhexyl)phthalate (DEHP)	3.2E+01 ca*	1.4E+02 ca	4.8E-01 ca	4.8E+00 ca		
	5.0E-02 i		5.0E-02 r	0	0.10	80-05-7	Bisphenol A	3.3E+03 nc	3.4E+04 nc	1.8E+02 nc	1.8E+03 nc		
	9.0E-02 i		5.7E-03 h	0	0.10	7440-42-8	Boron	5.9E+03 nc	6.1E+04 nc	2.1E+01 nc	3.3E+03 nc		
			2.0E-04 h	0	0.10	7637-07-2	Boron trifluoride			7.3E-01 nc			
6.2E-02 i	2.0E-02 i	6.2E-02 r	2.0E-02 r	1	0.10	75-27-4	Bromodichloromethane	6.3E-01 ca	1.4E+00 ca	1.1E-01 ca	1.8E-01 ca	6.0E-01	3.0E-02
7.9E-03 i	2.0E-02 i	3.9E-03 i	2.0E-02 r	0	0.10	75-25-2	Bromoform (tribromomethane)	5.6E+01 ca**	2.4E+02 ca*	1.7E+00 ca*	8.5E+00 ca*	8.0E-01	4.0E-02
	1.4E-03		1.4E-03 i	1	0.10	74-83-9	Bromomethane	6.8E+00 nc	2.3E+01 nc	5.2E+00 nc	8.7E+00 nc	2.0E-01	1.0E-02
				0	0.10	101-55-3	4-Bromophenyl phenyl ether						
	5.0E-03 h		5.0E-03 r	0	0.10	2104-96-3	Bromophos	3.3E+02 nc	3.4E+03 nc	1.8E+01 nc	1.8E+02 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	1689-84-5	Bromoxynil	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	1.8E+02 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	1689-99-2	Bromoxynil octanoate	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		
9.9E-01 r		9.8E-01 i		1	0.10	106-99-0	1,3-Butadiene	6.5E-03 ca	1.4E-02 ca	6.9E-03 ca	1.1E-02 ca		
	1.0E-01 i		1.0E-01 r	0	0.10	71-36-3	1-Butanol	6.5E+03 nc	6.8E+04 nc	3.7E+02 nc	3.7E+03 nc	1.7E+01	9.0E-01
	5.0E-02 i		5.0E-02 r	0	0.10	2008-41-5	Butylate	3.3E+03 nc	3.4E+04 nc	1.8E+02 nc	1.8E+03 nc		
	2.0E-01 i		2.0E-01 r	0	0.10	85-68-7	Butyl benzyl phthalate	9.3E+02 sat	9.3E+02 sat	7.3E+02 nc	7.3E+03 nc	9.3E+02	8.1E+02
	1.0E+00 i		1.0E+00 r	0	0.10	85-70-1	Butylphthalyl butylglycolate	6.5E+04 nc	1.0E+05 max	3.7E+03 nc	3.7E+04 nc		
	3.0E-03 h		3.0E-03 i	0	0.10	75-60-5	Cacodylic acid	2.0E+02 nc	2.0E+03 nc	1.1E+01 nc	1.1E+02 nc		
	5.0E-04 i	6.3E+00 i	5.7E-05 x	0	0.01	7440-43-9	Cadmium and compounds	3.8E+01 nc	8.5E+02 nc	1.1E-03 ca	1.8E+01 nc	8.0E+00	4.0E-01
							"CAL-Modified PRG" (PEA, 1994)	9.0E+00					
	5.0E-01 i		5.0E-01 r	0	0.10	105-60-2	Caprolactam	3.3E+04 nc	1.0E+05 max	1.8E+03 nc	1.8E+04 nc		
8.6E-03 h	2.0E-03 i	8.6E-03 r	2.0E-03 r	0	0.10	2425-06-1	Captafol	5.2E+01 ca**	2.2E+02 ca*	7.8E-01 ca*	7.8E+00 ca*		
3.5E-03 h	1.3E-01 i	3.5E-03 i	1.3E-01 r	0	0.10	133-06-2	Captan	1.3E+02 ca*	5.5E+02 ca	1.9E+00 ca	1.9E+01 ca		
	1.0E-01 i		1.1E-01 r	0	0.10	63-25-2	Carbaryl	6.5E+03 nc	6.8E+04 nc	4.0E+02 nc	3.7E+03 nc		
2.0E-02 h		2.0E-02 r		0	0.10	86-74-8	Carbazole	2.2E+01 ca	9.5E+01 ca	3.4E-01 ca	3.4E+00 ca	6.0E-01	3.0E-02
	5.0E-03 i		5.0E-03 r	0	0.10	1563-66-2	Carbofuran	3.3E+02 nc	3.4E+03 nc	1.8E+01 nc	1.8E+02 nc		
	1.0E-01 i		2.9E-03 h	1	0.10	75-15-0	Carbon disulfide	7.5E+00 nc	2.4E+01 nc	1.0E+01 nc	2.1E+01 nc	3.2E+01	2.0E+00
1.3E-01 i	7.0E-04 i	5.3E-02 i	5.7E-04 h	1	0.10	56-23-5	Carbon tetrachloride	2.3E-01 ca*	5.0E-01 ca*	1.3E-01 ca*	1.7E-01 ca*	7.0E-02	3.0E-03
	1.0E-02 i		1.0E-02 r	0	0.10	55285-14-8	Carbosulfan	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
	1.0E-01 i		1.0E-01 r	0	0.10	5234-68-4	Carboxin	6.5E+03 nc	6.8E+04 nc	3.7E+02 nc	3.7E+03 nc		

Key : i=IRIS h=HEAST n=NCEA x=WITHDRAWN r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION							CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
				V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)										
	2.0E-03 i		2.0E-03 r	0	0.10	302-17-0	Chloral	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
	1.5E-02 i		1.5E-02 r	0	0.10	133-90-4	Chloramben	9.8E+02 nc	1.0E+04 nc	5.5E+01 nc	5.5E+02 nc		
4.0E-01 h		4.0E-01 r		0	0.10	118-75-2	Chloranil	1.1E+00 ca	4.7E+00 ca	1.7E-02 ca	1.7E-01 ca		
1.3E+00 i	6.0E-05 i	1.3E+00 i	6.0E-05 r	0	0.10	57-74-9	Chlordane	3.4E-01 ca**	1.5E+00 ca*	5.2E-03 ca*	5.2E-02 ca*	1.0E+01	5.0E-01
	2.0E-02 i		2.0E-02 r	0	0.10	90982-32-4	Chlorimuron-ethyl	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		
	1.0E-01 i			0	0.01	7782-50-5	Chlorine	7.7E+03 nc	1.7E+05 nc		3.7E+03 nc		
			5.7E-05 i	n/a	n/a	10049-04-4	Chlorine dioxide			2.1E-01 nc			
				1	0.10	107-20-0	Chloroacetaldehyde						
	2.0E-03 h		2.0E-03 r	0	0.10	79-11-8	Chloroacetic acid	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
	8.6E-06 r		8.6E-06 i	1	0.10	532-27-4	2-Chloroacetophenone	3.2E-02 nc	1.1E-01 nc	3.1E-02 nc	5.2E-02 nc		
	4.0E-03 i		4.0E-03 r	0	0.10	106-47-8	4-Chloroaniline	2.6E+02 nc	2.7E+03 nc	1.5E+01 nc	1.5E+02 nc	7.0E-01	3.0E-02
	2.0E-02 i		5.7E-03 h	1	0.10	108-90-7	Chlorobenzene	6.5E+01 nc	2.2E+02 nc	2.1E+01 nc	3.9E+01 nc	1.0E+00	7.0E-02
2.7E-01 h	2.0E-02 i	2.7E-01 h	2.0E-02 r	0	0.10	510-15-6	Chlorobenzilate	1.6E+00 ca	7.1E+00 ca	2.5E-02 ca	2.5E-01 ca		
	2.0E-01 h		2.0E-01 r	0	0.10	74-11-3	p-Chlorobenzoic acid	1.3E+04 nc	1.0E+05 max	7.3E+02 nc	7.3E+03 nc		
	2.0E-02 h		2.0E-02 r	0	0.10	98-56-6	4-Chlorobenzotrifluoride	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		
	2.0E-02 h		2.0E-03 h	1	0.10	126-99-8	2-Chloro-1,3-butadiene	3.6E+00 nc	1.2E+01 nc	7.3E+00 nc	1.4E+01 nc		
	4.0E-01 h		4.0E-01 r	1	0.10	109-69-3	1-Chlorobutane	4.8E+02 sat	4.8E+02 sat	1.5E+03 nc	2.4E+03 nc		
	1.4E+01 r		1.4E+01 i	1	0.10	75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	3.4E+02 sat	3.4E+02 sat	5.2E+04 nc	8.7E+04 nc		
				1	0.10	110-75-8	2-Chloroethyl vinyl ether						
	1.4E+01 r		1.4E+01 i	1	0.10	75-45-6	Chlorodifluoromethane	3.4E+02 sat	3.4E+02 sat	5.1E+04 nc	8.5E+04 nc		
8.1E-03 i	1.0E-02 i	8.1E-02 i	1.0E-02 r	1	0.10	67-66-3	Chloroform	2.5E-01 ca	5.3E-01 ca	8.4E-02 ca	1.6E-01 ca	6.0E-01	3.0E-02
1.3E-02 h		6.3E-03 h		1	0.10	74-87-3	Chloromethane	1.2E+00 ca	2.6E+00 ca	1.1E+00 ca	1.5E+00 ca		
5.5E-01 h		5.9E-01 r		0	0.10	95-69-2	4-Chloro-2-methylaniline	7.7E-01 ca	3.3E+00 ca	1.2E-02 ca	1.2E-01 ca		
4.5E-01 h		4.6E-01 r		0	0.10	3165-93-3	4-Chloro-2-methylaniline hydrochloride	9.7E-01 ca	4.1E+00 ca	1.5E-02 ca	1.5E-01 ca		
	8.0E-02 i		8.0E-02 r	1	0.10	91-58-7	**beta-Chloronaphthalene**	1.1E+02 sat	1.1E+02 sat	2.9E+02 nc	4.9E+02 nc		
2.5E-02 h		2.5E-02 r	r	0	0.10	88-73-3	o-Chloronitrobenzene	1.9E+01 ca	7.6E+01 ca	2.7E-01 ca	2.7E+00 ca		
1.8E-02 h		1.8E-02 r	r	0	0.10	100-00-5	p-Chloronitrobenzene	2.5E+01 ca	1.1E+02 ca	3.7E-01 ca	3.7E+00 ca		
	5.0E-03 i		5.0E-03 r	1	0.10	95-57-8	**2-Chlorophenol**	9.1E+01 nc	3.7E+02 nc	1.8E+01 nc	3.8E+01 nc	4.0E+00	2.0E-01
	2.9E-02 r		2.9E-02 h	1	0.10	75-29-6	2-Chloropropane	1.7E+02 nc	5.8E+02 nc	1.0E+02 nc	1.7E+02 nc		
1.1E-02 h	1.5E-02 i	1.1E-02 r	1.5E-02 r	0	0.10	1897-45-6	Chlorothalonil	4.0E+01 ca**	1.7E+02 ca*	6.1E-01 ca*	6.1E+00 ca*		
	2.0E-02 i		2.0E-02 r	1	0.10	95-49-8	o-Chlorotoluene	1.6E+02 nc	5.5E+02 nc	7.3E+01 nc	1.2E+02 nc		
	2.0E-01 i		2.0E-01 r	0	0.10	101-21-3	Chlorpropham	1.3E+04 nc	1.0E+05 max	7.3E+02 nc	7.3E+03 nc		
	3.0E-03 i		3.0E-03 r	0	0.10	2921-88-2	Chlorpyrifos	2.0E+02 nc	2.0E+03 nc	1.1E+01 nc	1.1E+02 nc		
	1.0E-02 h		1.0E-02 r	0	0.10	5598-13-0	Chlorpyrifos-methyl	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	64902-72-3	Chlorsulfuron	3.3E+03 nc	3.4E+04 nc	1.8E+02 nc	1.8E+03 nc		
	8.0E-04 h		8.0E-04 r	0	0.10	602-38-56-4	Chlorthiophos	5.2E+01 nc	5.5E+02 nc	2.9E+00 nc	2.9E+01 nc		
		4.2E+01 i		0	0.01	n/a	Total Chromium (1/6 ratio Cr VI/Cr III)	2.1E+02 ca	4.5E+02 ca	1.6E-04 ca		3.8E+01	2.0E+00
	5.0E-03 i	2.9E+02 i		0	0.01	7440-47-3	Chromium VI	3.0E+01 ca	6.4E+01 ca	2.3E-05 ca	1.8E+02 nc	3.8E+01	2.0E+00
							"CAL-Modified PRG" (PEA, 1994)	**2.0E-01**			**1.6E-01**		
	6.0E-02 n		2.9E-04 n	0	0.01	7440-48-4	Cobalt	4.6E+03 nc	9.7E+04 nc	1.0E+00 nc	2.2E+03 nc		
		2.2E+00 i		0	0.01	8007-45-2	Coke Oven Emissions			3.1E-03 ca			
	3.7E-02 h			0	0.01	7440-50-8	Copper and compounds	2.8E+03 nc	6.3E+04 nc		1.4E+03 nc		
1.9E+00 h	1.0E-02 x	1.9E+00 x	1.0E-02 r	1	0.10	123-73-9	Crotonaldehyde	5.3E-03 ca	1.1E-02 ca	3.5E-03 ca	5.9E-03 ca		
	4.0E-02 i		2.6E-03 h	1	0.10	98-82-8	Cumene	1.9E+01 nc	6.2E+01 nc	9.4E+00 nc	1.9E+01 nc		
8.4E-01 h	2.0E-03 h	8.4E-01 r	2.0E-03 r	0	0.10	21725-46-2	Cyanazine	5.3E-01 ca*	2.3E+00 ca	8.0E-03 ca	8.0E-02 ca		
					0.01	n/a	Cyanides						
	1.0E-01 h			0	0.01	542-62-1	Barium cyanide	7.7E+03 nc	1.0E+05 max		3.7E+03 nc		
	4.0E-02 i			0	0.01	592-01-8	Calcium cyanide	3.1E+03 nc	6.8E+04 nc		1.5E+03 nc		

Key: i=IRIS h=HEAST n=NCEA x=WITHDRAWN r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION								CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
													Migration to Ground Water	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.			Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	DAF 20 (mg/kg)	DAF 1 (mg/kg)
	5.0E-02 i			0	0.01	506-77-4		**Chlorine cyanide**	3.8E+03 nc	8.5E+04 nc		1.8E+03 nc		
	5.0E-03 i			0	0.01	544-92-3		Copper cyanide	3.8E+02 nc	8.5E+03 nc		1.8E+02 nc		
	4.0E-02 i			0	0.10	460-19-5		Cyanogen	2.6E+03 nc	2.7E+04 nc		1.5E+03 nc		
	9.0E-02 i			0	0.10	506-68-3		Cyanogen bromide	5.9E+03 nc	1.0E+05 max		3.3E+03 nc		
	5.0E-02 i			0	0.10	506-77-4		Cyanogen chloride	3.3E+03 nc	3.4E+04 nc		1.8E+03 nc		
	2.0E-02 i			0	0.10	57-12-5		Free cyanide	1.3E+03 nc	1.4E+04 nc		7.3E+02 nc	4.0E+01	2.0E+00
	2.0E-02 i		8.6E-04 i	1	0.10	74-90-8		**Hydrogen cyanide**	1.1E+01 nc	3.5E+01 nc	3.1E+00 nc	6.2E+00 nc		
	5.0E-02 i			0	0.10	151-50-8		Potassium cyanide	3.3E+03 nc	3.4E+04 nc		1.8E+03 nc		
	2.0E-01 i			0	0.10	506-61-6		Potassium silver cyanide	1.3E+04 nc	1.0E+05 max		7.3E+03 nc		
	1.0E-01 i			0	0.10	506-64-9		Silver cyanide	6.5E+03 nc	1.0E+05 max		3.7E+03 nc		
	4.0E-02 i			0	0.10	143-33-9		Sodium cyanide	2.6E+03 nc	2.7E+04 nc		1.5E+03 nc		
	5.0E-02 i			0	0.10	557-21-1		Zinc cyanide	3.3E+03 nc	3.4E+04 nc		1.8E+03 nc		
	5.0E+00 i		5.0E+00 r	0	0.10	108-94-1		Cyclohexanone	1.0E+05 max	1.0E+05 max	1.8E+04 nc	1.8E+05 nc		
	2.3E-01 x		2.0E-01 x	0	0.10	108-91-8		Cyclohexylamine	1.3E+04 nc	1.0E+05 max	7.3E+02 nc	7.3E+03 nc		
	5.0E-03 i		5.0E-03 x	0	0.10	68085-85-8		Cyhalothrin/Karate	3.3E+02 nc	3.4E+03 nc	1.8E+01 nc	1.8E+02 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	52315-07-8		Cypermethrin	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
	7.5E-03 i		7.5E-03 r	0	0.10	66215-27-8		Cyromazine	4.9E+02 nc	5.1E+03 nc	2.7E+01 nc	2.7E+02 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	1861-32-1		Dacthal	6.5E+02 nc	1.0E+05 max	3.7E+01 nc	3.7E+02 nc		
	3.0E-02 i		3.0E-02 r	0	0.10	75-99-0		Dalapon	2.0E+03 nc	2.0E+04 nc	1.1E+02 nc	1.1E+03 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	39515-41-8		Danitol	1.6E+03 nc	1.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
2.4E-01 i		2.4E-01 r		0	0.10	72-54-8		DDD	1.9E+00 ca	7.9E+00 ca	2.8E-02 ca	2.8E-01 ca	1.6E+01	8.0E-01
3.4E-01 i		3.4E-01 r		0	0.10	72-55-9		DDE	1.3E+00 ca	5.6E+00 ca	2.0E-02 ca	2.0E-01 ca	5.4E+01	3.0E+00
3.4E-01 i	5.0E-04 i	3.4E-01 i	5.0E-04 r	0	0.10	50-29-3		DDT	1.3E+00 ca*	5.6E+00 ca*	2.0E-02 ca*	2.0E-01 ca*	3.2E+01	2.0E+00
	1.0E-02 i		1.0E-02 r	0	0.10	1163-19-5		Decabromodiphenyl ether	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
	4.0E-05 i		4.0E-05 r	0	0.10	8065-48-3		Demeton	2.6E+00 nc	2.7E+01 nc	1.5E-01 nc	1.5E+00 nc		
6.1E-02 h		6.1E-02 r		0	0.10	2303-16-4		Diallate	7.3E+00 ca	3.1E+01 ca	1.1E-01 ca	1.1E+00 ca		
	9.0E-04 h		9.0E-04 r	0	0.10	333-41-5		Diazinon	5.9E+01 nc	6.1E+02 nc	3.3E+00 nc	3.3E+01 nc		
	4.0E-03 n		4.0E-03 r	1	0.10	132-64-9		**Dibenzofuran**	1.4E+02 sat	1.4E+02 sat	1.5E+01 nc	2.4E+01 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	106-37-6		1,4-Dibromobenzene	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
8.4E-02 i	2.0E-02 i	5.4E-02 r	2.0E-02 r	0	0.10	124-48-1		Dibromochloromethane	5.3E+00 ca*	2.3E+01 ca	8.0E-02 ca	1.0E+00 ca	4.0E-01	2.0E-02
1.4E+00 h	5.7E-05 r	2.4E-01 h	5.7E-05 i	0	0.10	96-12-8		1,2-Dibromo-3-chloropropane	3.2E-01 ca**	1.4E+00 ca*	2.1E-01 nc	4.8E-02 ca*		
								"CAL-Modified PRG" (PEA, 1994)	**6.0E-02**		**9.6E-04**	**4.7E-03**		
8.5E+01 i	5.7E-05 r	7.7E-01 i	5.7E-05 h	1	0.10	106-93-4		1,2-Dibromoethane	4.9E-03 ca	2.0E-02 ca	8.7E-03 ca*	7.6E-04 ca		
	1.0E-01 i		1.0E-01 r	0	0.10	84-74-2		Dibutyl phthalate	6.5E+03 nc	6.8E+04 nc	3.7E+02 nc	3.7E+03 nc	2.3E+03	2.7E+02
	3.0E-02 i		3.0E-02 r	0	0.10	1918-00-9		Dicamba	2.0E+03 nc	2.0E+04 nc	1.1E+02 nc	1.1E+03 nc		
	9.0E-02 i		9.0E-02 h	1	0.10	95-50-1		1,2-Dichlorobenzene	7.0E+02 sat	7.0E+02 sat	2.1E+02 nc	3.7E+02 nc	1.7E+01	9.0E-01
	3.0E-02 n		3.0E-02 r	1	0.10	541-73-1		**1,3-Dichlorobenzene**	5.0E+02 nc	8.6E+02 sat	1.1E+02 nc	1.8E+02 nc		
2.4E-02 n	2.3E-01 r	2.4E-02 r	2.3E-01 i	1	0.10	106-46-7		1,4-Dichlorobenzene	3.6E+00 ca	8.5E+00 ca	2.8E-01 ca	4.7E-01 ca	2.0E+00	1.0E-01
4.5E-01 i		4.5E-01 r		0	0.10	91-94-1		3,3-Dichlorobenzidine	9.9E-01 ca	4.2E+00 ca	1.5E-02 ca	1.5E-01 ca	7.0E-03	3.0E-04
9.3E+00 r		9.3E+00 h		1	0.10	764-41-0		1,4-Dichloro-2-butene	7.5E-03 ca	1.7E-02 ca	7.2E-04 ca	1.2E-03 ca		
	2.0E-01 i		5.7E-02 h	1	0.10	75-71-8		Dichlorodifluoromethane	9.4E+01 nc	3.1E+02 nc	2.1E+02 nc	3.9E+02 nc		
	1.0E-01 h		1.4E-01 h	1	0.10	75-34-3		1,1-Dichloroethane	5.0E+02 nc	1.7E+03 nc	5.2E+02 nc	8.1E+02 nc	2.3E+01	1.0E+00
9.1E-02 i	2.0E-03 r	9.1E-02 i	2.0E-03 n	1	0.10	107-06-2		**1,2-Dichloroethane (EDC)**	2.5E-01 ca*	5.5E-01 ca*	7.4E-02 ca	1.2E-01 ca	2.0E-02	1.0E-03
6.0E-01 i	9.0E-03 i	1.8E-01 i	9.0E-03 r	1	0.10	75-35-4		1,1-Dichloroethylene	3.7E-02 ca	8.0E-02 ca	3.8E-02 ca	4.6E-02 ca	6.0E-02	3.0E-03
	1.0E-02 h		1.0E-02 i	1	0.10	156-59-2		1,2-Dichloroethylene (cis)	3.1E+01 nc	1.0E+02 nc	3.7E+01 nc	6.1E+01 nc	4.0E-01	2.0E-02
	2.0E-02 i		2.0E-02 r	1	0.10	156-60-5		1,2-Dichloroethylene (trans)	7.8E+01 nc	2.7E+02 nc	7.3E+01 nc	1.2E+02 nc	7.0E-01	3.0E-02
	9.0E-03 h		9.0E-03 r	1	0.10	540-59-0		1,2-Dichloroethylene (mixture)	3.5E+01 nc	1.2E+02 nc	3.3E+01 nc	5.5E+01 nc		
	3.0E-03 i		3.0E-03 r	0	0.10	120-83-2		2,4-Dichlorophenol	2.0E+02 nc	2.0E+03 nc	1.1E+01 nc	1.1E+02 nc	1.0E+00	5.0E-02

Key : i=IRIS h=HEAST n=NCEA x=WITHDRAWN r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION								CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.			Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
	8.0E-03 i		8.0E-03 r	0	0.10	94-82-6		4-(2,4-Dichlorophenoxy)butyric Acid (2,4-D	5.2E+02 nc	5.5E+03 nc	2.9E+01 nc	2.9E+02 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	94-75-7		2,4-Dichlorophenoxyacetic Acid (2,4-D)	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
6.3E-02 h	1.1E-03 r	6.6E-02 r	1.1E-03 i	1	0.10	78-87-5		1,2-Dichloropropane	3.1E-01 ca*	6.8E-01 ca*	9.9E-02 ca*	1.6E-01 ca*	3.0E-02	1.0E-03
1.8E-01 h	3.0E-04 i	3.3E-01 h	5.7E-03 i	1	0.10	542-75-6		1,3-Dichloropropene	2.5E-01 ca*	5.5E-01 ca	5.2E-02 ca	8.1E-02 ca	4.0E-03	2.0E-04
	3.0E-03 i		3.0E-03 r	0	0.10	616-23-9		2,3-Dichloropropanol	2.0E+02 nc	2.0E+03 nc	1.1E+01 nc	1.1E+02 nc		
2.9E-01 i	5.0E-04 i	2.9E-01 r	1.4E-04 i	0	0.10	62-73-7		Dichlorvos	1.5E+00 ca**	6.6E+00 ca*	2.3E-02 ca*	2.3E-01 ca*		
4.4E-01 x		4.4E-01 r		0	0.10	115-32-2		Dicofol	1.0E+00 ca	4.3E+00 ca	1.5E-02 ca	1.5E-01 ca		
	3.0E-02 h		5.7E-05 h	1	0.10	77-73-6		Dicyclopentadiene			2.1E-01 nc	4.2E-01 nc		
1.6E+01 i	5.0E-05 i	1.6E+01 i	5.0E-05 r	0	0.10	60-57-1		Dieldrin	2.8E-02 ca*	1.2E-01 ca	4.2E-04 ca	4.2E-03 ca	4.0E-03	2.0E-04
	5.7E-03 h		5.7E-03 x	0	0.10	112-34-5		Diethylene glycol, monobutyl ether	3.7E+02 nc	3.9E+03 nc	2.1E+01 nc	2.1E+02 nc		
	2.0E+00 h		2.0E+00 r	0	0.10	111-90-0		Diethylene glycol, monoethyl ether	1.0E+05 max	1.0E+05 max	7.3E+03 nc	7.3E+04 nc		
	1.1E-02 h		1.1E-02 r	0	0.10	617-84-5		Diethylformamide	7.2E+02 nc	7.5E+03 nc	4.0E+01 nc	4.0E+02 nc		
1.2E-03 i	6.0E-01 i	1.2E-03 r	6.0E-01 r	0	0.10	103-23-1		Di(2-ethylhexyl)adipate	3.7E+02 nc	1.6E+03 nc	5.6E+00 nc	5.6E+01 nc		
	8.0E-01 i		8.0E-01 r	0	0.10	84-66-2		Diethyl phthalate	5.2E+04 nc	1.0E+05 max	2.9E+03 nc	2.9E+04 nc		
4.7E+03 h		4.7E+03 r		0	0.10	56-53-1		Diethylstilbestrol	9.5E-05 ca	4.1E-04 ca	1.4E-06 ca	1.4E-05 ca		
	8.0E-02 i		8.0E-02 r	0	0.10	43222-48-6		Difenzoquat (Avenge)	5.2E+03 nc	5.5E+04 nc	2.9E+02 nc	2.9E+03 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	35367-38-5		Diflubenzuron	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		
	1.1E+01 r		1.1E+01 i	1	0.10	75-37-6		1,1-Difluoroethane			4.2E+04 nc	6.9E+04 nc		
	8.0E-02 i		8.0E-02 r	0	0.10	1445-75-6		Diisopropyl methylphosphonate	5.2E+03 nc	5.5E+04 nc	2.9E+02 nc	2.9E+03 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	55290-64-7		Dimethipin	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		
	2.0E-04 i		2.0E-04 r	0	0.10	60-51-5		Dimethoate	1.3E+01 nc	1.4E+02 nc	7.3E-01 nc	7.3E+00 nc		
1.4E-02 h		1.4E-02 r		0	0.10	119-90-4		3,3'-Dimethoxybenzidine	3.2E+01 ca	1.4E+02 ca	4.8E-01 ca	4.8E+00 ca		
	5.7E-06 r		5.7E-06 x	1	0.10	124-40-3		Dimethylamine	6.5E-02 nc	2.4E-01 nc	2.1E-02 nc	3.5E-02 nc		
	2.0E-03 i		2.0E-03 r	0	0.10	121-69-7		N-N-Dimethylaniline	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
7.5E-03 h		7.5E-01 r		0	0.10	95-68-1		2,4-Dimethylaniline	5.9E-01 ca	2.5E+00 ca	9.0E-03 ca	9.0E-02 ca		
5.8E-03 h		5.8E-01 r		0	0.10	21436-96-4		2,4-Dimethylaniline hydrochloride	7.7E-01 ca	3.3E+00 ca	1.2E-02 ca	1.2E-01 ca		
9.2E+00 h		9.2E+00 r		0	0.10	119-93-7		3,3'-Dimethylbenzidine	4.8E-02 ca	2.1E-01 ca	7.3E-04 ca	7.3E-03 ca		
2.5E+00 x		1.5E+00 x		0	0.10	57-14-7		1,1-Dimethylhydrazine	1.7E-01 ca	7.3E-01 ca	1.9E-03 ca	2.6E-02 ca		
3.7E+01 x		1.0E-01 x		0	0.10	540-73-8		1,2-Dimethylhydrazine	1.2E-02 ca	5.2E-02 ca	1.8E-04 ca	1.8E-03 ca		
	1.0E-01 h		8.6E-03 i	0	0.10	68-12-2		N,N-Dimethylformamide	6.5E+03 nc	6.8E+04 nc	3.1E+01 nc	3.7E+03 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	105-67-9		2,4-Dimethylphenol	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc	9.0E+00	4.0E-01
	6.0E-04 i		6.0E-04 r	0	0.10	576-26-1		2,6-Dimethylphenol	3.9E+01 nc	4.1E+02 nc	2.2E+00 nc	2.2E+01 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	95-65-8		3,4-Dimethylphenol	6.5E+01 nc	6.8E+02 nc	3.7E+00 nc	3.7E+01 nc		
	1.0E+01 h		1.0E+01 r	0	0.10	131-11-3		Dimethyl phthalate	1.0E+05 max	1.0E+05 max	3.7E+04 nc	3.7E+05 nc		
	1.0E-01 i		1.0E-01 r	0	0.10	120-61-6		Dimethyl terephthalate	6.5E+03 nc	6.8E+04 nc	3.7E+02 nc	3.7E+03 nc		
	2.0E-03 i		2.0E-03 r	0	0.10	131-89-5		4,6-Dinitro-o-cyclohexyl phenol	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
	1.0E-04 i		1.0E-04 r	0	0.10	99-65-0		1,3-Dinitrobenzene	6.5E+00 nc	6.8E+01 nc	3.7E-01 nc	3.7E+00 nc		
	4.0E-04 h		4.0E-04 r	0	0.10	528-29-0		1,2-Dinitrobenzene	2.6E+01 nc	2.7E+02 nc	1.5E+00 nc	1.5E+01 nc		
	4.0E-04 h		4.0E-04 r	0	0.10	100-25-4		1,4-Dinitrobenzene	2.6E+01 nc	2.7E+02 nc	1.5E+00 nc	1.5E+01 nc		
	2.0E-03 i		2.0E-03 r	0	0.10	51-28-5		2,4-Dinitrophenol	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc	3.0E-01	1.0E-02
6.8E-01 i		6.8E-01 r		0	0.10	25321-14-6		Dinitrotoluene mixture	6.5E-01 ca	2.8E+00 ca	9.9E-03 ca	9.9E-02 ca	8.0E-04	4.0E-05
	2.0E-03 i		2.0E-03 r	0	0.10	121-14-2		2,4-Dinitrotoluene (also see Dinitrotoluene mixture)	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc	8.0E-04	4.0E-05
	1.0E-03 h		1.0E-03 r	0	0.10	606-20-2		2,6-Dinitrotoluene (also see Dinitrotoluene mixture)	6.5E+01 nc	6.8E+02 nc	3.7E+00 nc	3.7E+01 nc	7.0E-04	3.0E-05
	1.0E-03 i		1.0E-03 r	0	0.10	88-85-7		Dinoseb	6.5E+01 nc	6.8E+02 nc	3.7E+00 nc	3.7E+01 nc		
	2.0E-02 h		2.0E-02 r	0	0.10	117-84-0		di-n-Octyl phthalate	1.3E+03 nc	1.0E+04 sat	7.3E+01 nc	7.3E+02 nc	1.0E+04	1.0E+04
1.1E-02 i		1.1E-02 r		0	0.10	123-91-1		1,4-Dioxane	4.0E+01 ca	1.7E+02 ca	6.1E-01 ca	6.1E+00 ca		
	3.0E-02 i		3.0E-02 r	0	0.10	957-51-7		Diphenamid	2.0E+03 nc	2.0E+04 nc	1.1E+02 nc	1.1E+03 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	122-39-4		Diphenylamine	1.6E+03 nc	1.7E+04 nc	9.1E+01 nc	9.1E+02 nc		

Key : i=IRIS h=HEAST n=NCEA x=WITHDRAWN r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION							CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
												Migration to Ground Water	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	DAF 20 (mg/kg)	DAF 1 (mg/kg)
8.0E-01 i		7.7E-01 i		0	0.10	122-66-7	1,2-Diphenylhydrazine	5.6E-01 ca	2.4E+00 ca	8.7E-03 ca	8.4E-02 ca		
	2.2E-03 i		2.2E-03 r	0	0.10	85-00-7	Diquat	1.4E+02 nc	1.5E+03 nc	8.0E+00 nc	8.0E+01 nc		
8.4E+00 h		8.6E+00 r		0	0.10	1937-37-7	Direct black 38	5.2E-02 ca	2.2E-01 ca	7.8E-04 ca	7.8E-03 ca		
8.1E+00 h		8.1E+00 r		0	0.10	2602-46-2	Direct blue 6	5.5E-02 ca	2.4E-01 ca	8.3E-04 ca	8.3E-03 ca		
9.3E+00 h		9.3E+00 r		0	0.10	16071-86-6	Direct brown 95	4.8E-02 ca	2.1E-01 ca	7.2E-04 ca	7.2E-03 ca		
	4.0E-05 i		4.0E-05 r	0	0.10	298-04-4	Disulfoton	2.6E+00 nc	2.7E+01 nc	1.5E-01 nc	1.5E+00 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	505-29-3	1,4-Dithiane	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
	2.0E-03 i		2.0E-03 r	0	0.10	330-54-1	Diuron	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
	4.0E-03 i		4.0E-03 r	0	0.10	2439-10-3	Dodine	2.6E+02 nc	2.7E+03 nc	1.5E+01 nc	1.5E+02 nc		
	6.0E-03 i		6.0E-03 r	0	0.10	115-29-7	Endosulfan	3.9E+02 nc	4.1E+03 nc	2.2E+01 nc	2.2E+02 nc	1.8E+01	9.0E-01
	2.0E-02 i		2.0E-02 r	0	0.10	145-73-3	Endothall	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		
	3.0E-04 i		3.0E-04 r	0	0.10	72-20-8	Endrin	2.0E+01 nc	2.0E+02 nc	1.1E+00 nc	1.1E+01 nc	1.0E+00	5.0E-02
3.9E-03 i	2.0E-03 h	4.2E-03 h	2.9E-04 i	1	0.10	106-89-8	Epichlorohydrin	7.5E+00 nc	2.5E+01 nc	1.0E+00 nc	2.0E+00 nc		
	5.7E-03 r		5.7E-01 i	0	0.10	106-88-7	1,2-Epoxybutane	3.7E+02 nc	3.9E+03 nc	2.1E+01 nc	2.1E+02 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	759-94-4	EPTC (S-Ethyl dipropylthiocarbamate)	1.6E+03 nc	1.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
	5.0E-03 i		5.0E-03 r	0	0.10	16672-87-0	Ethephon (2-chloroethyl phosphonic acid)	3.3E+02 nc	3.4E+03 nc	1.8E+01 nc	1.8E+02 nc		
	5.0E-04 i		5.0E-04 r	0	0.10	563-12-2	Ethion	3.3E+01 nc	3.4E+02 nc	1.8E+00 nc	1.8E+01 nc		
	4.0E-01 h		5.7E-02 i	0	0.10	110-80-5	2-Ethoxyethanol	2.6E+04 nc	1.0E+05 max	2.1E+02 nc	1.5E+04 nc		
	1.0E-01 h		3.0E-02 r	0	0.10	111-15-9	2-Ethoxyethanol acetate	2.0E+04 nc	1.0E+05 max	1.1E+03 nc	1.1E+04 nc		
	9.0E-01 i		9.0E-01 r	1	0.10	141-78-6	Ethyl acetate	1.8E+04 nc	1.0E+05 max	3.3E+03 nc	5.5E+03 nc		
4.8E-02 h		4.8E-02 r		1	0.10	140-88-5	Ethyl acrylate	2.1E-01 ca	4.5E-01 ca	1.4E-01 ca	2.3E-01 ca		
	1.0E-01 i		2.9E-01 i	1	0.10	100-41-4	Ethylbenzene	2.3E+02 sat	2.3E+02 sat	1.1E+03 nc	1.3E+03 nc	1.3E+01	7.0E-01
	5.0E-01 h		3.0E+01 r	0	0.10	109-78-4	Ethylene cyanohydrin	2.0E+04 nc	1.0E+05 max	1.1E+03 nc	1.1E+04 nc		
	2.0E-02 h		2.0E+02 r	0	0.10	107-15-3	Ethylene diamine	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		
	2.0E+00 i		2.0E+02 r	0	0.10	107-21-1	Ethylene glycol	1.3E+05 nc	1.0E+05 max	7.3E+03 nc	7.3E+04 nc		
	5.7E-03 r		5.7E+03 h	0	0.10	111-76-2	Ethylene glycol, monobutyl ether	3.7E+02 nc	3.9E+03 nc	2.1E+01 nc	2.1E+02 nc		
1.9E+00 h		3.5E-04 h		1	0.10	75-21-8	Ethylene oxide	1.3E-01 ca	3.2E-01 ca	1.9E-02 ca	2.4E-02 ca		
1.1E-01 h	6.0E-05 i	1.1E-01 r	8.0E-05 r	0	0.10	96-45-7	Ethylene thiourea (ETU)	4.0E+00 ca**	1.7E+01 ca*	6.1E-02 ca*	6.1E-01 ca*		
	2.0E-02 n		2.9E+00 i	1	0.10	75-00-3	Ethyl chloride	1.1E+03 nc	1.6E+03 sat	1.0E+04 nc	7.1E+02 nc		
	2.0E-01 i		2.0E-01 r	1	0.10	60-29-7	Ethyl ether	1.8E+03 sat	1.8E+03 sat	7.3E+02 nc	1.2E+03 nc		
	9.0E-02 h		9.0E-02 r	1	0.10	97-63-2	Ethyl methacrylate	1.4E+02 sat	1.4E+02 sat	3.3E+02 nc	5.5E+02 nc		
	1.0E-05 i		1.0E-05 r	0	0.10	2104-64-5	Ethyl p-nitrophenyl phenylphosphorothioat	6.5E-01 nc	6.8E+00 nc	3.7E-02 nc	3.7E-01 nc		
	1.0E-00 i		1.0E+00 r	0	0.10	84-72-0	Ethylphthalyl ethyl glycolate	1.0E+05 max	1.0E+05 max	1.1E+04 nc	1.1E+05 nc		
	8.0E-03 i		8.0E-03 r	0	0.10	101200-48-0	Express	5.2E+02 nc	5.5E+03 nc	2.9E+01 nc	2.9E+02 nc		
	2.5E-04 i		2.5E-04 r	0	0.10	22224-92-6	Fenamiphos	1.6E+01 nc	1.7E+02 nc	9.1E-01 nc	9.1E+00 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	2164-17-2	Fluometuron	8.5E+02 nc	8.9E+03 nc	4.7E+01 nc	4.7E+02 nc		
	6.0E-02 i		6.0E-02 r	0	0.10	7782-41-4	Fluorine (soluble fluoride)	3.9E+03 nc	4.1E+04 nc	2.2E+02 nc	2.2E+03 nc		
	8.0E-02 i		8.0E+02 r	0	0.10	59756-60-4	Fluoridone	5.2E+03 nc	5.5E+04 nc	2.9E+02 nc	2.9E+03 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	56425-91-3	Flurprimidol	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		
	6.0E-02 i		6.0E+02 r	0	0.10	66332-96-5	Flutolanil	3.9E+03 nc	4.1E+04 nc	2.2E+02 nc	2.2E+03 nc		
	3.0E-02 i		1.0E-02 r	0	0.10	69409-94-5	Fluvalinate	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
3.5E-03 i	1.0E-01 i	3.5E-03 r	1.0E-01 r	0	0.10	133-07-3	Folpet	1.3E+02 ca*	5.5E+02 ca	1.9E+00 ca	1.9E+01 ca		
1.9E-01 i		1.9E-01 r		0	0.10	72178-02-0	Fomesafen	2.3E+00 ca	1.0E+01 ca	3.5E-02 ca	3.5E-01 ca		
	2.0E-03 i		2.0E-01 r	0	0.10	944-22-9	Fonofos	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
	1.5E-01 i	4.6E-02 i		0	0.10	50-00-0	Formaldehyde	9.8E+03 nc	1.0E+05 nc	1.5E-01 ca	5.5E+03 nc		
	2.0E-00 h		2.0E+00 r	0	0.10	64-18-6	Formic Acid	1.0E+05 max	1.0E+05 max	7.3E+03 nc	7.3E+04 nc		
	3.0E-00 i		3.0E+00 r	0	0.10	39148-24-8	Fosetyl-al	1.0E+05 max	1.0E+05 max	1.1E+04 nc	1.1E+05 nc		
	1.0E-03 i		1.0E-03 r	1	0.10	110-00-9	Furan	2.5E+00 nc	8.5E+00 nc	3.7E+00 nc	6.1E+00 nc		

Key : i=IRIS h=HEAST n=NCEA x=WITHDRAWN r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION							CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs soils	CAS No.		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
3.8E+00 h		3.8E+00 r		0	0.10	67-45-6	Furazolidone	1.2E-01 ca	5.0E-01 ca	1.8E-03 ca	1.8E-02 ca		
	3.0E-03 i		1.4E-02 h	0	0.10	98-01-1	Furfural	2.0E+02 nc	2.0E+03 nc	5.2E+01 nc	1.1E+02 nc		
5.0E+01 h		5.0E+01 r		0	0.10	531-82-8	Furium	8.9E-03 ca	3.8E-02 ca	1.3E-04 ca	1.3E-03 ca		
3.0E-02 i		3.0E-02 r		0	0.10	60568-05-0	Furmecyclox	1.5E+01 ca	6.4E+01 ca	2.2E-01 ca	2.2E+00 ca		
	4.0E-04 i		4.0E-04 r	0	0.10	77182-82-2	Glufosinate-ammonium	2.6E+01 nc	2.7E+02 nc	1.5E+00 nc	1.5E+01 nc		
	4.0E-04 i		2.9E-04 h	0	0.10	765-34-4	Glycidaldehyde	2.6E+01 nc	2.7E+02 nc	1.0E+00 nc	1.5E+01 nc		
	1.0E-01 i		1.0E-01 r	0	0.10	1071-83-6	Glyphosate	6.5E+03 nc	6.8E+04 nc	3.7E+02 nc	3.7E+03 nc		
	5.0E-05 i		5.0E-05 r	0	0.10	69806-40-2	Haloxyfop-methyl	3.3E+00 nc	3.4E+01 nc	1.8E-01 nc	1.8E+00 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	79277-27-3	Harmony	8.5E+02 nc	8.9E+03 nc	4.7E+01 nc	4.7E+02 nc		
4.5E+00 i	5.0E-04 i	4.6E+00 i	5.0E-04 r	0	0.10	76-44-8	Heptachlor	9.9E-02 ca	4.2E-01 ca	1.5E-03 ca	1.5E-02 ca	2.3E+01	1.0E+00
9.1E+00 i	1.3E-05 i	9.1E+00 i	1.3E-05 r	0	0.10	1024-57-3	Heptachlor epoxide	4.9E-02 ca**	2.1E-01 ca*	7.4E-04 ca*	7.4E-03 ca*	7.0E-01	3.0E-02
	2.0E-03 i		2.0E-03 r	0	0.10	87-82-1	Hexabromobenzene	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
1.6E+00 i	8.0E-04 i	1.6E+00 i	8.0E-04 r	0	0.10	118-74-1	Hexachlorobenzene	2.8E-01 ca*	1.2E+00 ca	4.2E-03 ca	4.2E-02 ca	2.0E+00	1.0E-01
7.8E-02 i	2.0E-04 h	7.8E-02 i	2.0E-04 r	0	0.10	87-68-3	Hexachlorobutadiene	5.7E+00 ca**	2.4E+01 ca*	8.7E-02 ca*	8.6E-01 ca*	2.0E+00	1.0E-01
6.3E+00 i		6.3E+00 i		0	0.10	319-84-6	HCH (alpha)	7.1E-02 ca	3.0E-01 ca	1.1E-03 ca	1.1E-02 ca	5.0E-04	3.0E-05
1.8E+00 i		1.8E+00 i		0	0.10	319-85-7	HCH (beta)	2.5E-01 ca	1.1E+00 ca	3.7E-03 ca	3.7E-02 ca	3.0E-03	1.0E-04
1.3E+00 h	3.0E-04 i	1.3E+00 r	3.0E-04 r	0	0.10	58-89-9	HCH (gamma) Lindane	3.4E-01 ca*	1.5E+00 ca	5.2E-03 ca	5.2E-02 ca	9.0E-03	5.0E-04
1.8E+00 i		1.8E+00 i		0	0.10	58-89-9	HCH-technical	2.5E-01 ca	1.1E+00 ca	3.8E-03 ca	3.7E-02 ca	3.0E-03	1.0E-04
	7.0E-03 i		2.0E-05 h	0	0.10	77-47-4	Hexachlorocyclopentadiene	4.5E+02 nc	4.6E+03 nc	7.3E-02 nc	2.6E+02 nc	4.0E+02	2.0E+01
6.2E+03 x		4.6E-03 i		0	0.10	19408-74-3	Hexachlorodibenzo-p-dioxin mixture (HxCDD)	7.2E-05 ca	3.1E-04 ca	1.5E-06 ca	1.1E-05 ca		
1.4E-02 x	1.0E-03 i	1.4E-02 i	1.0E-03 r	0	0.10	67-72-1	Hexachloroethane	3.2E+01 ca**	1.4E+02 ca**	4.8E-01 ca**	4.8E+00 ca**	5.0E-01	2.0E-02
	3.0E-04 i		3.0E-04 r	0	0.10	70-30-4	Hexachlorophene	2.0E+01 nc	2.0E+02 nc	1.1E+00 nc	1.1E+01 nc		
1.1E-01 i	3.0E-03 i	1.1E-01 r	3.0E-03 r	0	0.10	121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	4.0E+00 ca*	1.7E+01 ca	6.1E-02 ca	6.1E-01 ca		
	2.9E-06 r		2.9E-06 i	0	0.10	822-06-0	1,6-Hexamethylene diisocyanate			1.0E-02 nc	1.0E-01 nc		
	6.0E-02 h		5.7E-02 i	1	0.10	110-54-3	n-Hexane	1.1E+02 sat	1.1E+02 sat	2.1E+02 nc	3.5E+02 nc		
	3.3E-02 i		3.3E-02 r	0	0.10	51235-04-2	Hexazinone	2.2E+03 nc	2.2E+04 nc	1.2E+02 nc	1.2E+03 nc		
3.0E+00 i		1.7E-01 i		0	0.10	302-01-2	Hydrazine, hydrazine sulfate	1.5E-01 ca	6.4E-01 ca	3.9E-04 ca	2.2E-02 ca		
			5.7E-03 i	0	0.10	7647-01-0	Hydrogen chloride			2.1E+01 nc			
	3.0E-03 i		2.9E-04 i	1	0.10	7783-06-4	Hydrogen sulfide			1.0E+00 nc	2.0E+00 nc		
	4.0E-02 h		4.0E-02 r	0	0.10	123-31-9	p-Hydroquinone	2.6E+03 nc	2.7E+04 nc	1.5E+02 nc	1.5E+03 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	35554-44-0	Imazalil	8.5E+02 nc	8.9E+03 nc	4.7E+01 nc	4.7E+02 nc		
	2.5E-01 i		2.5E-01 r	0	0.10	81335-37-7	Imazaquin	1.6E+04 nc	1.0E+05 max	9.1E+02 nc	9.1E+03 nc		
	4.0E-02 i		4.0E-02 r	0	0.10	36734-19-7	Iprodione	2.6E+03 nc	2.7E+04 nc	1.5E+02 nc	1.5E+03 nc		
	3.0E-01 i		3.0E-01 r	1	0.10	78-83-1	**Isobutanol**	1.1E+04 nc	1.0E+05 max	1.1E+03 nc	1.8E+03 nc		
5.5E-04 i	2.0E-01 i	9.5E-04 r	2.0E-01 r	0	0.10	78-59-1	Isophorone	4.7E+02 ca*	2.0E+03 ca*	7.1E+00 ca	7.1E+01 ca	5.0E-01	3.0E-02
	1.5E-02 i		1.5E-02 r	0	0.10	33820-53-0	Isopropalin	9.8E+02 nc	1.0E+04 nc	5.5E+01 nc	5.5E+02 nc		
	1.0E-01 i		1.1E-01 r	0	0.10	1832-54-8	Isopropyl methyl phosphonic acid	6.5E+03 nc	6.8E+04 nc	4.0E+02 nc	3.7E+03 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	82558-50-7	Isoxaben	3.3E+03 nc	3.4E+04 nc	1.8E+02 nc	1.8E+03 nc		
1.8E+01 h		1.8E+01 r		0	0.10	143-50-0	Kepone	2.5E-02 ca	1.1E-01 ca	3.7E-04 ca	3.7E-03 ca		
	2.0E-03 i		2.0E-03 r	0	0.10	77501-63-4	Lactofen	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
Residential PRG Based on Uptake Bicklnetic Model				0	n/a	7439-92-1	Lead	4.0E+02 nc	1.0E+03 nc		4.0E+00 nc		
							"CAL-Modified PRG" (PEA, 1994)	**1.3E+02**					
	1.0E-07 i			0	0.10	78-00-2	Lead (tetraethyl)	6.5E-03 nc	6.8E-02 nc		3.7E-03 nc		
	2.0E-03 i		2.0E-03 r	0	0.10	330-55-2	Linuron	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
	2.0E-02 n			0	0.01	7439-93-2	Lithium	1.5E+03 nc	3.4E+04 nc		7.3E+02 nc		
	2.0E-01 i		2.0E-01 r	0	0.10	83055-99-6	Londax	1.3E+04 nc	1.0E+05 max	7.3E+02 nc	7.3E+03 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	121-75-5	Malathion	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		

Key : i=IRIS h=HEAST n=NCEA x=WITHDRAWN r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION							CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
												Migration to Ground Water	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	DAF 20 (mg/kg)	DAF 1 (mg/kg)
	1.0E-01 i		1.0E-01 r	0	0.10	108-31-6	Maleic anhydride	6.5E+03 nc	6.8E+04 nc	3.7E+02 nc	3.7E+03 nc		
	5.0E-01 i		5.0E-01 i	1	0.10	123-33-1	**Maleic hydrazide**	1.7E+03 nc	2.4E+03 sat	1.8E+03 nc	3.0E+03 nc		
	2.0E-05 r		2.0E-05 r	0	0.10	109-77-3	Malononitrile	1.3E+00 nc	1.4E+01 nc	7.3E-02 nc	7.3E-01 nc		
	1.0E-02 h		3.0E-02 r	0	0.10	8018-01-7	Mancozeb	2.0E+03 nc	2.0E+04 nc	1.1E+02 nc	1.1E+03 nc		
	5.0E-01 i		5.0E-01 r	0	0.10	12427-38-2	Maneb	3.3E+02 nc	3.4E+03 nc	1.8E+01 nc	1.8E+02 nc		
	4.7E-02 i		1.4E-05 i	0	0.01	7439-96-5	**Manganese and compounds**	3.2E+03 nc	4.3E+04 nc	5.1E-02 nc	1.7E+03 nc		
	9.0E-05 h		5.0E-05 r	0	0.10	950-10-7	Mephosfolan	5.9E+00 nc	6.1E+01 nc	3.3E-01 nc	3.3E+00 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	24307-26-4	Mepiquat	2.0E+03 nc	2.0E+04 nc	1.1E+02 nc	1.1E+03 nc		
	3.0E-04 i			0	0.01	7439-97-6	Mercuric chloride	2.3E+01 nc	5.1E+02 nc		1.1E+01 nc		
			8.6E-05 i	n/a	n/a	7439-97-6	Mercury (elemental)			3.1E-01 nc			
	1.0E-04 i			0	0.10	22967-92-6	Mercury (methyl)	6.5E+00 nc	6.8E+01 nc		3.7E+00 nc		
	3.0E-05 i		3.0E-05 r	0	0.10	150-50-5	Merphos	2.0E+00 nc	2.0E+01 nc	1.1E-01 nc	1.1E+00 nc		
	3.0E-05 i		3.0E-05 r	0	0.10	78-48-8	Merphos oxide	2.0E+00 nc	2.0E+01 nc	1.1E-01 nc	1.1E+00 nc		
	6.0E-02 i		6.0E-02 r	0	0.10	57837-19-1	Metalaxyl	3.9E+03 nc	4.1E+04 nc	2.2E+02 nc	2.2E+03 nc		
	1.0E-04 i		2.0E-04 h	1	0.10	126-98-7	Methacrylonitrile	2.0E+00 nc	8.1E+00 nc	7.3E-01 nc	1.0E+00 nc		
	5.0E-05 i		5.0E-05 r	0	0.10	10265-92-6	Methamidophos	3.3E+00 nc	3.4E+01 nc	1.8E-01 nc	1.8E+00 nc		
	5.0E-01 i		5.0E-01 r	0	0.10	67-56-1	Methanol	3.3E+04 nc	1.0E+05 max	1.8E+03 nc	1.8E+04 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	950-37-8	Methidathion	6.5E+01 nc	6.8E+02 nc	3.7E+00 nc	3.7E+01 nc		
	2.5E-02 i		2.5E-02 r	1	0.10	16752-77-5	**Methomyl**	4.4E+01 nc	1.5E+02 nc	9.1E+01 nc	1.5E+02 nc		
	5.0E-03 i		5.0E-03 r	0	0.10	72-43-5	Methoxychlor	3.3E+02 nc	3.4E+03 nc	1.8E+01 nc	1.8E+02 nc	1.6E+02	8.0E+00
	1.0E-01 h		5.7E-01 i	0	0.10	109-86-4	2-Methoxyethanol	6.5E+01 nc	6.8E+02 nc	2.1E+01 nc	3.7E+01 nc		
	2.0E-03 h		2.0E-03 r	0	0.10	110-49-6	2-Methoxyethanol acetate	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
6.6E-02 h		4.6E-02 r		0	0.10	99-59-2	2-Methoxy-5-nitroaniline	9.7E+00 ca	4.1E+01 ca	1.5E-01 ca	1.5E+00 ca		
	1.0E+00 h		1.0E+00 r	1	0.10	79-20-9	Methyl acetate	2.1E+04 nc	8.8E+04 nc	3.7E+03 nc	6.1E+03 nc		
	1.0E-02 n		1.0E-02 r	1	0.10	96-33-3	Methyl acrylate	6.9E+01 nc	2.3E+02 nc	1.1E+02 nc	1.8E+02 nc		
2.4E-01 h		2.4E-01 r		0	0.10	100-61-8	2-Methylaniline (o-toluidine)	1.9E+00 ca	7.9E+00 ca	2.8E-02 ca	2.8E-01 ca		
1.6E-01 h		1.8E-01 r		0	0.10	636-21-5	2-Methylaniline hydrochloride	2.5E+00 ca	1.1E+01 ca	3.7E-02 ca	3.7E-01 ca		
	1.0E+00 x		1.0E+00 r	0	0.10	79-22-1	Methyl chlorocarbonate	6.5E+04 nc	1.0E+05 max	3.7E+03 nc	3.7E+04 nc		
	5.0E-04 i		5.0E-04 r	0	0.10	94-74-6	2-Methyl-4-chlorophenoxyacetic acid	3.3E+01 nc	3.4E+02 nc	1.8E+00 nc	1.8E+01 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	94-81-5	4-(2-Methyl-4-chlorophenoxy) butyric acid	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	93-65-2	2-(2-Methyl-4-chlorophenoxy) propionic acid	6.5E+01 nc	6.8E+02 nc	3.7E+00 nc	3.7E+01 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	16484-77-8	2-(2-Methyl-1,4-chlorophenoxy) propionic acid	6.5E+01 nc	6.8E+02 nc	3.7E+00 nc	3.7E+01 nc		
	8.6E-01 r		8.6E-01 h	0	0.10	108-87-2	Methylcyclohexane	5.6E+04 nc	1.0E+05 max	3.1E+03 nc	3.1E+04 nc		
2.5E-01 h		2.5E-01 r		0	0.10	101-77-9	4,4'-Methylenebisbenzeneamine	1.8E+00 ca	7.6E+00 ca	2.7E-02 ca	2.7E-01 ca		
1.3E-01 h	7.0E-04 h	1.3E-01 h	7.0E-04 r	0	0.10	101-14-4	4,4'-Methylene bis(2-chloroaniline)	3.4E+00 ca*	1.5E+01 ca*	5.2E-02 ca*	5.2E-01 ca*		
4.6E-02 i		4.6E-02 r		0	0.10	101-61-1	4,4'-Methylene bis(N,N'-dimethyl)aniline	9.7E+00 ca	4.1E+01 ca	1.5E-01 ca	1.5E+00 ca		
	1.0E-02 h		1.0E-02 r	0	0.10	74-95-3	Methylene bromide	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
7.5E-03 i	6.0E-02 i	1.6E-03 i	8.6E-01 h	1	0.10	75-09-2	Methylene chloride	7.8E+00 ca	1.8E+01 ca	4.1E+00 ca	4.3E+00 ca	2.0E-02	1.0E-03
			5.7E-06 i	0	n/a	101-68-8	4,4'-Methylenediphenyl isocyanate			2.1E-02 nc			
	6.0E-01 i		2.9E-01 i	1	0.10	78-93-3	Methyl ethyl ketone	7.1E+03 nc	2.7E+04 nc	1.0E+03 nc	1.9E+03 nc		
1.1E+00 n		1.1E+00 r		0	0.10	60-34-4	Methyl hydrazine	4.0E-01 ca	1.7E+00 ca	6.1E-03 ca	6.1E-02 ca		
	8.0E-02 h		2.1E-02 h	1	0.10	108-10-1	**Methyl isobutyl ketone**	7.7E+02 nc	2.8E+03 nc	8.3E+01 nc	1.6E+02 nc		
	8.0E-02 h		8.0E-02 r	1	0.10	80-62-6	**Methyl methacrylate**	7.6E+02 nc	2.8E+03 nc	2.9E+02 nc	4.9E+02 nc		
3.3E-02 h		3.3E-02 r		0	0.10	99-55-8	2-Methyl-5-nitroaniline	1.3E+01 ca	5.8E+01 ca	2.0E-01 ca	2.0E+00 ca		
	2.5E-04 i		2.5E-04 r	0	0.10	298-00-0	Methyl parathion	1.6E+01 nc	1.7E+02 nc	9.1E-01 nc	9.1E+00 nc		
	5.0E-02 x		5.0E-02 r	0	0.10	95-48-7	2-Methylphenol	3.3E+03 nc	3.4E+04 nc	1.8E+02 nc	1.8E+03 nc	1.5E+01	8.0E-01
	5.0E-02 x		5.0E-02 r	0	0.10	108-39-4	3-Methylphenol	3.3E+03 nc	3.4E+04 nc	1.8E+02 nc	1.8E+03 nc		
	5.0E-03 h		5.0E-03 r	0	0.10	106-44-5	4-Methylphenol	3.3E+02 nc	3.4E+03 nc	1.8E+01 nc	1.8E+02 nc		

Key: i=IRIS h=HEAST n=NCEA x=WITHDRAWN r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION							CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
				V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)										
	6.0E-03 h		1.1E-02 h	1	0.10	25013-15-4	Methyl styrene (mixture)	1.2E+02 nc	5.2E+02 nc	4.2E+01 nc	6.0E+01 nc		
	7.0E-02 h		7.0E-02 r	1	0.10	98-83-9	Methyl styrene (alpha)	6.8E+02 sat	6.8E+02 sat	2.6E+02 nc	4.3E+02 nc		
	5.0E-03 n		8.6E+01 i	1	0.10	1634-04-4	**Methyl tertbutyl ether (MTBE)**			3.1E+03 nc	1.8E+02 nc		
	1.5E-01 i		1.5E-01 r	0	0.10	51218-45-2	Metolaclor (Dual)	9.8E+03 nc	1.0E+05 max	5.5E+02 nc	5.5E+03 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	21087-64-9	Metribuzin	1.6E+03 nc	1.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
3.0E+00 h	2.0E-04 i	1.8E+00 r	2.0E-04 r	0	0.10	2385-85-5	Mirex	2.5E-01 ca*	1.1E+00 ca	3.7E-03 ca	3.7E-02 ca		
	2.0E-03 i		2.0E-03 r	0	0.10	2212-67-1	Molinate	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
	5.0E-03 h			0	0.01	7439-98-7	Molybdenum	3.8E+02 nc	8.5E+03 nc		1.8E+02 nc		
	1.0E-01 h		1.0E-01 h	0	0.10	10599-90-3	Monochloramine	6.5E+03 nc	6.8E+04 nc	3.7E+02 nc	3.7E+03 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	300-76-5	Naled	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
	1.0E-01 i		1.0E-01 r	0	0.10	15299-99-7	Napropamide	6.5E+03 nc	6.8E+04 nc	3.7E+02 nc	3.7E+03 nc		
	2.0E-02 i			0	0.01	7440-02-0	Nickel (soluble salts)	1.5E+03 nc	3.4E+04 nc		7.3E+02 nc	1.3E+02	7.0E+00
							"CAL-Modified PRG" (PEA, 1994)	1.5E+02					
		9.4E-01 i		0	0.01	n/a	Nickel refinery dust			8.0E-03 ca			
		1.7E+00 i		0	0.01	12035-72-2	Nickel subsulfide		1.1E+04 ca	4.0E-03 ca			
	1.5E-03 x		1.5E-03 r	0	0.10	1929-82-4	Nitrapyrin	9.8E+01 nc	1.0E+03 nc	5.5E+00 nc	5.5E+01 nc		
	1.6E+00 i			0	0.10	14797-55-8	Nitrate				5.8E+04 nc		
	1.0E-01 x			0	0.10	10102-43-9	Nitric Oxide	6.5E+03 nc	1.0E+05 max		3.7E+03 nc		
	1.0E-01 i			0	0.10	14797-65-0	Nitrite	6.5E+03 nc	1.0E+05 max		3.7E+03 nc		
	6.0E-05 r		5.7E-05 h	0	0.10	88-74-4	2-Nitroaniline	3.9E+00 nc	4.1E+01 nc	2.1E-01 nc	2.2E+00 nc		
				0	0.10	99-09-2	3-Nitroaniline						
				0	0.10	100-01-6	4-Nitroaniline						
	5.0E-04 i		5.7E-04 h	1	0.10	98-95-3	**Nitrobenzene**	1.8E+01 nc	9.4E+01 nc	2.1E+00 nc	3.4E+00 nc	1.0E-01	7.0E-03
	7.0E-02 h		7.0E-02 r	0	0.10	67-20-9	Nitrofurantoin	4.6E+03 nc	4.8E+04 nc	2.6E+02 nc	2.6E+03 nc		
1.5E+00 h		9.4E+00 h		0	0.10	59-87-0	Nitrofurazone	3.0E-01 ca	1.3E+00 ca	7.2E-04 ca	4.5E-02 ca		
	1.0E+00 x			0	0.10	101102-44-0	Nitrogen dioxide						
	1.0E-01 i		1.0E-01 r	0	0.10	556-88-7	Nitroguanidine	6.5E+03 nc	6.8E+04 nc	3.7E+02 nc	3.7E+03 nc		
				0	0.10	100-02-7	4-Nitrophenol						
8.4E+00 r	5.7E-03 r	9.4E+00 h	5.7E-03 i	1	0.10	79-46-9	2-Nitropropane			7.2E-04 ca	3.5E+01 ca		
5.4E+00 i		5.4E+00 i		1	0.10	924-16-3	**N-Nitrosodi-n-butylamine**	2.2E-02 ca	5.5E-02 ca	1.2E-03 ca	2.0E-03 ca		
2.8E+00 i		2.8E+00 r		0	0.10	1116-54-7	N-Nitrosodiethanolamine	1.6E-01 ca	6.8E-01 ca	2.4E-03 ca	2.4E-02 ca		
1.5E+02 i		1.5E+02 i		0	0.10	55-18-5	N-Nitrosodiethylamine	3.0E-03 ca	1.3E-02 ca	4.5E-05 ca	4.5E-04 ca		
5.1E+01 i		4.9E+01 i		0	0.10	62-75-9	N-Nitrosodimethylamine	8.7E-03 ca	3.7E-02 ca	1.4E-04 ca	1.3E-03 ca		
5.9E-03 i		4.9E-03 r		0	0.10	86-30-6	N-Nitrosodiphenylamine	9.1E+01 ca	3.9E+02 ca	1.4E+00 ca	1.4E+01 ca	1.0E+00	6.0E-02
7.0E+00 i		7.0E+00 r		0	0.10	621-64-7	N-Nitroso di-n-propylamine	6.3E-02 ca	2.7E-01 ca	9.6E-04 ca	9.6E-03 ca	5.0E-05	2.0E-06
2.2E+01 i		2.2E+01 r		0	0.10	10595-95-6	N-Nitroso-N-methylethylamine	2.0E-02 ca	8.7E-02 ca	3.1E-04 ca	3.1E-03 ca		
2.1E+00 i		2.1E+00 i		0	0.10	930-55-2	N-Nitrosopyrrolidine	2.1E-01 ca	9.1E-01 ca	3.1E-03 ca	3.2E-02 ca		
	1.0E-02 h		1.0E-02 r	0	0.10	99-08-1	m-Nitrotoluene	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
	1.0E-02 h		1.0E-02 r	0	0.10	99-99-0	p-Nitrotoluene	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
	4.0E-02 i		4.0E-02 r	0	0.10	27314-13-2	Norflurazon						
	7.0E-04 i		7.0E-04 r	0	0.10	85509-19-9	NuStar	4.6E+01 nc	4.8E+02 nc	2.6E+00 nc	2.6E+01 nc		
	3.0E-03 i		3.0E-03 r	0	0.10	32536-52-0	Octabromodiphenyl ether	2.0E+02 nc	2.0E+03 nc	1.1E+01 nc	1.1E+02 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	2691-41-0	Octahydro-1357-tetranitro-1357-tetrazocine (HMX)	3.3E+03 nc	3.4E+04 nc	1.8E+02 nc	1.8E+03 nc		
	2.0E-03 h		2.0E-03 r	0	0.10	152-16-9	Octamethylpyrophosphoramide	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	19044-88-3	Oryzalin	3.3E+03 nc	3.4E+04 nc	1.8E+02 nc	1.8E+03 nc		
	5.0E-03 i		5.0E-03 r	0	0.10	19666-30-9	Oxadiazon	3.3E+02 nc	3.4E+03 nc	1.8E+01 nc	1.8E+02 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	23135-22-0	Oxamyl	1.6E+03 nc	1.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
	3.0E-02 i		3.0E-02 r	0	0.10	42874-03-3	Oxyfluorfen	2.0E+02 nc	2.0E+03 nc	1.1E+01 nc	1.1E+02 nc		

Key : i=IRIS h=HEAST n=NCEA x=WITHDRAWN r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION							CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
												Migration to Ground Water	
SFo 1/(mg/kg-c)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	DAF 20 (mg/kg)	DAF 1 (mg/kg)
	1.3E-02 i		1.3E-02 r	0	0.10	76738-62-0	Paclobutrazol	8.5E+02 nc	8.9E+03 nc	4.7E+01 nc	4.7E+02 nc		
	4.5E-03 i		4.5E-03 r	0	0.10	4685-14-7	Paraquat	2.9E+02 nc	3.1E+03 nc	1.6E+01 nc	1.6E+02 nc		
	6.0E-03 h		6.0E-03 r	0	0.10	56-38-2	Parathion	3.9E+02 nc	4.1E+03 nc	2.2E+01 nc	2.2E+02 nc		
	5.0E-02 h		5.0E-02 r	0	0.10	1114-71-2	Pebulate	3.3E+03 nc	3.4E+04 nc	1.8E+02 nc	1.8E+03 nc		
	4.0E-02 i		4.0E-02 r	0	0.10	40487-42-1	Pendimethalin	2.6E+03 nc	2.7E+04 nc	1.5E+02 nc	1.5E+03 nc		
2.3E-02 h		2.3E-02 r		0	0.10	87-84-3	Pentabromo-6-chloro cyclohexane	1.9E+01 ca	8.3E+01 ca	2.9E-01 ca	2.9E+00 ca		
	2.0E-03 i		2.0E-03 r	0	0.10	32534-81-9	Pentabromodiphenyl ether	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
	8.0E-04 i		8.0E-04 r	0	0.10	608-93-5	Pentachlorobenzene	5.2E+01 nc	5.5E+02 nc	2.9E+00 nc	2.9E+01 nc		
2.6E-02 h	3.0E-03 i	2.6E-01 r	3.0E-03 r	0	0.10	82-68-8	Pentachloronitrobenzene	1.7E+00 ca*	7.3E+00 ca	2.6E-02 ca	2.6E-01 ca		
1.2E-01 i	3.0E-02 i	1.2E-01 r	3.0E-02 r	0	0.25	87-86-5	Pentachlorophenol	2.5E+00 ca	7.9E+00 ca	5.6E-02 ca	5.6E-01 ca	3.0E-02	1.0E-03
	5.0E-02 i		5.0E-02 r	0	0.10	52645-53-1	Permethrin	3.3E+03 nc	3.4E+04 nc	1.8E+02 nc	1.8E+03 nc		
	2.5E-01 i		2.5E-01 r	0	0.10	13684-63-4	Phenmedipham	1.6E+04 nc	1.0E+05 max	9.1E+02 nc	9.1E+03 nc		
	6.0E-01 i		6.0E-01 r	0	0.10	108-95-2	Phenol	3.9E+04 nc	1.0E+05 max	2.2E+03 nc	2.2E+04 nc	1.0E+02	5.0E+00
	6.0E-03 i		6.0E-03 r	0	0.10	108-45-2	m-Phenylenediamine	3.9E+02 nc	4.1E+03 nc	2.2E+01 nc	2.2E+02 nc		
	1.5E-01 h		1.5E-01 i	0	0.10	106-50-3	p-Phenylenediamine	1.2E+04 nc	1.0E+05 max	6.9E+02 nc	6.9E+03 nc		
	8.0E-05 i		8.0E-05 r	0	0.10	62-38-4	Phenylmercuric acetate	5.2E+00 nc	5.5E+01 nc	2.9E-01 nc	2.9E+00 nc		
1.5E-03 h		1.9E-03 r		0	0.10	90-43-7	2-Phenylphenol	2.3E+02 ca	9.8E+02 ca	3.5E+00 ca	3.5E+01 ca		
	2.0E-04 h		2.0E-04 r	0	0.10	298-02-2	Phorate	1.3E+01 nc	1.4E+02 nc	7.3E-01 nc	7.3E+00 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	732-11-6	Phosmet	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		
	3.0E-04 h		3.0E-05 i	0	0.10	7803-51-2	Phosphine	2.0E+01 nc	2.0E+02 nc	3.1E-01 nc	1.1E+01 nc		
			2.9E-03 i	n/a	n/a	7664-38-2	**Phosphoric acid**			1.0E+01 nc			
	2.0E-05 i		2.0E-05 r	0	0.10	7723-14-0	Phosphorus (white)			7.3E-02 nc			
	1.0E+00 h		1.0E+00 r	0	0.10	100-21-0	p-Phthalic acid			3.7E+03 nc			
	3.0E-02 i		3.0E-02 h	0	0.10	85-44-9	Phthalic anhydride			1.2E+02 nc			
	7.0E-02 i		7.0E-02 r	0	0.10	1918-02-1	Picloram	4.6E+03 nc	4.8E+04 nc	2.6E+02 nc	2.6E+03 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	23505-41-1	Pirimiphos-methyl	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
8.5E-00 h	7.0E-06 h	8.9E+00 r	7.0E-06 r	0	0.10		Polybrominated biphenyls	5.0E-02 ca**	2.1E-01 ca*	7.6E-04 ca*	7.6E-03 ca*		
7.7E+00 i		7.7E+00 r		0	0.06	1336-36-3	Polychlorinated biphenyls (PCBs)	6.6E-02 ca*	3.4E-01 ca*	8.7E-04 ca*	8.7E-03 ca*		
	7.0E-05 i		7.0E-05 r	0	0.06	12674-11-2	Aroclor 1016 (see PCBs for cancer endpoint)	4.9E+00 nc	6.5E+01 nc	2.6E-01 nc	2.6E+00 nc		
	2.0E-05 i		2.0E-05 r	0	0.06	11097-69-1	Aroclor 1254 (see PCBs for cancer endpoint)	1.4E+00 nc	1.9E+01 nc	7.3E-02 nc	7.3E-01 nc		
					0.10		Polynuclear aromatic hydrocarbons (PAHs)						
	6.0E-02 i		6.0E-02 r	1	0.10	83-32-9	Acenaphthene	1.1E+02 sat	1.1E+02 sat	2.2E+02 nc	3.7E+02 nc	5.7E+02	2.9E+01
	3.0E-01 i		3.0E-01 r	1	0.10	120-12-7	Anthracene	5.7E+00 sat	5.7E+00 sat	1.1E+03 nc	1.8E+03 nc	1.2E+04	5.9E+02
7.3E-01 n		7.3E-01 r		0	0.10	56-55-3	Benz[a]anthracene	6.1E-01 ca	2.6E+00 ca	9.2E-03 ca	9.2E-02 ca	2.0E+00	8.0E-02
7.3E-01 n		7.3E-01 r		0	0.10	205-99-2	Benzo[b]fluoranthene	6.1E-01 ca	2.6E+00 ca	9.2E-03 ca	9.2E-02 ca	5.0E+00	2.0E-01
7.3E-02 n		7.3E-02 r		0	0.10	207-08-9	Benzo[k]fluoranthene	6.1E+00 ca	2.6E+01 ca	9.2E-02 ca	9.2E-01 ca	4.9E+01	2.0E+00
							"CAL-Modified PRG" (PEA, 1994)	**6.1E-01**					
							PAHs continued						
7.3E+00 i		7.3E+00 r		0	0.10	50-32-8	Benzo[a]pyrene	6.1E-02 ca	2.6E-01 ca	9.2E-04 ca	9.2E-03 ca	8.0E+00	4.0E-01
							"CAL-Modified PRG" (PEA, 1994)				**1.5E-03**		
7.3E-03 n		7.3E-03 r		0	0.10	218-01-9	Chrysene	7.2E+00 sat	7.2E+00 sat	9.2E-01 ca	9.2E+00 ca	1.6E+02	8.0E+00
							"CAL-Modified PRG" (PEA, 1994)	**6.1E+00**					
7.3E+00 h		7.3E+00 r		0	0.10	53-70-3	Dibenz[ah]anthracene	6.1E-02 ca	2.6E-01 ca	9.2E-04 ca	9.2E-03 ca	2.0E+00	8.0E-02
	4.0E-02 i		4.0E-02 r	0	0.10	206-44-0	Fluoranthene	2.6E+03 nc	2.7E+04 nc	1.5E+02 nc	1.5E+03 nc	4.3E+03	2.1E+02
	6.0E-02 i		4.0E-02 r	1	0.10	86-73-7	Fluorene	9.0E+01 sat	9.0E+01 sat	1.5E+02 nc	2.4E+02 nc	5.6E+02	2.8E+01
7.3E-01 n		7.3E-01 r		0	0.10	193-39-5	Indeno[1,2,3-cd]pyrene	6.1E-01 ca	2.6E+00 ca	9.2E-03 ca	9.2E-02 ca	1.4E+01	7.0E-01
	4.0E-02 n		4.0E-02 r	1	0.10	91-20-3	Naphthalene	2.4E+02 sat	2.4E+02 sat	1.5E+02 nc	2.4E+02 nc	8.4E+01	4.0E+00

Key: i=IRIS h=HEAST n=NCEA x=WITHDRAWN r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION							CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
				V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)										
	3.0E-02 i		3.0E-02 r	1	0.10	129-00-0	Pyrene	1.0E+02 sat	1.0E+02 sat	1.1E+02 nc	1.8E+02 nc	4.2E+03	2.1E+02
1.5E-01 i	9.0E-03 i	1.5E-01 r	9.0E-03 r	0	0.10	67747-09-5	Prochloraz	3.0E+00 ca	1.3E+01 ca	4.5E-02 ca	3.3E+02 ca		
	6.0E-03 h		6.0E-03 r	0	0.10	26399-36-0	Profluralin	3.9E+02 nc	4.1E+03 nc	2.2E+01 nc	2.2E+02 nc		
	1.5E-02 i		1.5E-02 r	0	0.10	1610-18-0	Prometon	9.8E+02 nc	1.0E+04 nc	5.5E+01 nc	5.5E+02 nc		
	4.0E-03 i		4.0E-03 r	0	0.10	7287-19-6	Prometryn	2.6E+02 nc	2.7E+03 nc	1.5E+01 nc	1.5E+02 nc		
	7.5E-02 i		7.5E-02 r	0	0.10	23950-58-5	Pronamide	4.9E+03 nc	5.1E+04 nc	2.7E+02 nc	2.7E+03 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	1918-16-7	Propachlor	8.5E+02 nc	8.9E+03 nc	4.7E+01 nc	4.7E+02 nc		
	5.0E-03 i		5.0E-03 r	0	0.10	709-98-8	Propanil	3.3E+02 nc	3.4E+03 nc	1.8E+01 nc	1.8E+02 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	2312-35-8	Propargite	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	107-19-7	Propargyl alcohol	1.3E+02 nc	1.4E+03 nc	7.3E+00 nc	7.3E+01 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	139-40-2	Propazine	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	122-42-9	Propham	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	60207-90-1	Propiconazole	8.5E+02 nc	8.9E+03 nc	4.7E+01 nc	4.7E+02 nc		
	2.0E+01 h		2.0E+01 r	0	0.10	57-55-6	Propylene glycol	1.0E+05 max	1.0E+05 max	7.3E+04 nc	7.3E+05 nc		
	7.0E-01 h		7.0E-01 r	0	0.10	111-35-3	Propylene glycol, monoethyl ether	4.6E+04 nc	1.0E+05 max	2.6E+03 nc	2.6E+04 nc		
	7.0E-01 h		5.7E-01 i	0	0.10	107-98-2	Propylene glycol, monomethyl ether	4.6E+04 nc	1.0E+05 max	2.1E+03 nc	2.6E+04 nc		
2.4E-01 i	8.6E-03 r	1.3E-02 i	8.6E-03 i	1	0.10	75-56-9	Propylene oxide			5.2E-01 ca	2.2E-01 ca		
	2.5E-01 i		2.5E-01 r	0	0.10	81335-77-5	Pursuit	1.6E+04 nc	1.0E+05 max	9.1E+02 nc	9.1E+03 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	51630-58-1	Pydrin	1.6E+03 nc	1.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	110-86-1	Pyridine	6.5E+01 nc	6.8E+02 nc	3.7E+00 nc	3.7E+01 nc		
	5.0E-04 i		5.0E-04 r	0	0.10	13593-03-8	Quinalphos	3.3E+01 nc	3.4E+02 nc	1.8E+00 nc	1.8E+01 nc		
1.2E+01 h		1.2E+01 r		0	0.10	91-22-5	Quinoline	3.7E-02 ca	1.6E-01 ca	5.6E-04 ca	5.6E-03 ca		
1.1E-01 i	3.0E-03 i	1.1E-01 r	3.0E-03 r	0	0.10	121-82-4	RDX (Cyclonite)	4.0E+00 ca*	1.7E+01 ca	6.1E-02 ca	6.1E-01 ca		
	3.0E-02 i		3.0E-02 r	0	0.10	10453-86-8	Resmethrin	2.0E+03 nc	2.0E+04 nc	1.1E+02 nc	1.1E+03 nc		
	5.0E-02 h		5.0E-02 r	0	0.10	299-84-3	Ronnel	3.3E+03 nc	3.4E+04 nc	1.8E+02 nc	1.8E+03 nc		
	4.0E-03 i		4.0E-03 r	0	0.10	83-79-4	Rotenone	2.6E+02 nc	2.7E+03 nc	1.5E+01 nc	1.5E+02 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	78587-05-0	Savey	1.6E+03 nc	1.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
	5.0E-03 i			0	0.10	7783-00-8	Selenious Acid	3.3E+02 nc	3.4E+03 nc		1.8E+02 nc		
	5.0E-03 i			0	0.01	7782-49-2	Selenium	3.8E+02 nc	6.5E+03 nc		1.8E+02 nc	5.0E+00	3.0E-01
	5.0E-03 h			0	0.10	630-10-4	Selenourea	3.3E+02 nc	3.4E+03 nc		1.8E+02 nc		
	9.0E-02 i		9.0E-02 r	0	0.10	74051-80-2	Sethoxydim	5.9E+03 nc	6.1E+04 nc	3.3E+02 nc	3.3E+03 nc		
	5.0E-03 i			0	0.01	7440-22-4	Silver and compounds	3.8E+02 nc	6.5E+03 nc		1.8E+02 nc	3.4E+01	2.0E+00
1.2E-01 h	5.0E-03 i	1.2E-01 r	2.2E-03 r	0	0.10	122-34-9	Simazine	3.7E+00 ca*	1.6E+01 ca*	5.6E-02 ca	5.6E-01 ca		
	4.0E-03 i		4.0E-03 r	0	0.10	26628-22-8	Sodium azide	2.6E+02 nc	2.7E+03 nc	1.5E+01 nc	1.5E+02 nc		
2.7E-03 h	3.0E-02 i	2.7E-03 r	3.0E-02 r	0	0.10	148-18-5	Sodium diethyldithiocarbamate	1.6E+00 ca	7.1E+00 ca	2.5E-02 ca	2.5E-01 ca		
	2.0E-05 i		2.0E-05 r	0	0.10	62-74-8	Sodium fluoroacetate	1.3E+00 nc	1.4E+01 nc	7.3E-02 nc	7.3E-01 nc		
	1.0E-03 h		1.0E-03 r	0	0.10	13718-26-8	Sodium metavanadate	6.5E+01 nc	6.8E+02 nc	3.7E+00 nc	3.7E+01 nc		
	6.0E-03 i			0	0.01	7440-24-6	Strontium, stable	4.6E+04 nc	1.0E+05 max		2.2E+04 nc		
	3.0E-04 i		3.0E-04 r	0	0.10	57-24-9	Strychnine	2.0E+01 nc	2.0E+02 nc	1.1E+00 nc	1.1E+01 nc		
	2.0E-01 i		2.9E-01 i	1	0.10	100-42-5	Styrene	6.8E+02 sat	6.8E+02 sat	1.1E+03 nc	1.6E+03 nc	4.0E+00	2.0E-01
	2.5E-02 i		2.5E-02 r	0	0.10	88671-89-0	Systhane	1.6E+03 nc	1.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
1.5E+05 h		1.5E+05 h		0	0.03	1746-01-6	2,3,7,8-TCDD (dioxin)	3.8E-06 ca	2.4E-05 ca	4.5E-08 ca	4.5E-07 ca		
	7.0E-02 i		7.0E-02 r	0	0.10	34014-18-1	Tebuthiuron	4.6E+03 nc	4.8E+04 nc	2.6E+02 nc	2.6E+03 nc		
	2.0E-02 h		2.0E-02 r	0	0.10	3383-96-8	Temephos	1.3E+03 nc	1.4E+04 nc	7.3E+01 nc	7.3E+02 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	5902-51-2	Terbacil	8.5E+02 nc	8.9E+03 nc	4.7E+01 nc	4.7E+02 nc		
	2.5E-05 h		2.5E-05 r	0	0.10	13071-79-9	Terbufos	1.6E+00 nc	1.7E+01 nc	9.1E-02 nc	9.1E-01 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	886-50-0	Terbutryn	6.5E+01 nc	6.8E+02 nc	3.7E+00 nc	3.7E+01 nc		
	3.0E-04 i		3.0E-04 r	0	0.10	95-94-3	1,2,4,5-Tetrachlorobenzene	2.0E+01 nc	2.0E+02 nc	1.1E+00 nc	1.1E+01 nc		

Key: i=IRIS h=HEAST n=NCEA x=WITHDRAWN r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION							CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
				V O C	skin abs. solis	CAS No.		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)										
2.9E-02 i	3.0E-02 i	2.6E-02 i	3.0E-02 r	1	0.10	630-20-6	1,1,1,2-Tetrachloroethane	2.4E+00 ca	5.4E+00 ca	2.6E-01 ca	4.3E-01 ca		
2.0E-01 i		2.0E-01 i		1	0.10	79-34-5	1,1,2,2-Tetrachloroethane	4.5E-01 ca	1.1E+00 ca	3.3E-02 ca	5.5E-02 ca	3.0E-03	2.0E-04
5.2E-02 n	1.0E-02 i	2.0E-03 n	1.0E-02 r	1	0.10	127-18-4	Tetrachloroethylene (PCE)	5.4E+00 ca	1.7E+01 ca	3.3E+00 ca	1.1E+00 ca	6.0E-02	3.0E-03
							"CAL-Modified PRG" (PEA, 1994)			**3.2E-01**			
	1.0E-02 i		1.0E-02 r	0	0.10	58-90-2	2,3,4,6-Tetrachlorophenol	2.0E+03 nc	2.0E+04 nc	1.1E+02 nc	1.1E+03 nc		
2.0E+01 h		2.0E+01 r		0	0.10	5216-25-1	p,a,a,a-Tetrachlorotoluene	2.2E-02 ca	9.5E-02 ca	3.4E-04 ca	3.4E-03 ca		
2.4E-02 h	1.0E-02 i	2.4E-02 r	1.0E-02 r	0	0.10	961-11-5	Tetrachlorovinphos	1.9E+01 ca	7.9E+01 ca	2.8E-01 ca	2.8E+00 ca		
	5.0E-04 i		5.0E-04 r	0	0.10	3689-24-5	Tetraethyldithiopyrophosphate	3.3E+01 nc	3.4E+02 nc	1.8E+00 nc	1.8E+01 nc		
	7.0E-05 h			0	0.01	1314-32-5	Thallic oxide	5.4E+00 nc	1.2E+02 nc		2.6E+00 nc		
	9.0E-05 i			0	0.01	563-68-8	Thallium acetate	6.9E+00 nc	1.5E+02 nc		3.3E+00 nc	7.0E-01	4.0E-01
	6.0E-05 i			0	0.01	6533-73-9	Thallium carbonate	6.1E+00 nc	1.4E+02 nc		2.9E+00 nc	7.0E-01	4.0E-01
	6.0E-05 i			0	0.01	7791-12-0	Thallium chloride	6.1E+00 nc	1.4E+02 nc		2.9E+00 nc	7.0E-01	4.0E-01
	9.0E-05 i			0	0.01	10102-45-1	Thallium nitrate	6.9E+00 nc	1.5E+02 nc		3.3E+00 nc	7.0E-01	4.0E-01
	9.0E-05 x			0	0.01	12039-52-0	Thallium selenite	6.9E+00 nc	1.5E+02 nc		3.3E+00 nc	7.0E-01	4.0E-01
	8.0E-05 i			0	0.01	7446-18-6	Thallium sulfate	6.1E+00 nc	1.4E+02 nc		2.9E+00 nc	7.0E-01	4.0E-01
	1.2E-02 i		1.2E-02 r	0	0.10	28249-77-6	Thiobencarb	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
	1.0E-02 x		1.0E-02 r	0	0.10	3689-24-5	2-(Thiocyanomethylthio)- benzothiazole (TCMTB)	2.0E+03 nc	2.0E+04 nc	1.1E+02 nc	1.1E+03 nc		
	3.0E-04 h		3.0E-04 r	0	0.10	39196-18-4	Thiofanox	2.0E+01 nc	2.0E+02 nc	1.1E+00 nc	1.1E+01 nc		
	8.0E-02 i		8.0E-02 r	0	0.10	23564-05-8	Thiophanate-methyl	5.2E+03 nc	5.5E+04 nc	2.9E+02 nc	2.9E+03 nc		
	5.0E-03 i		5.0E-03 r	0	0.10	137-26-8	Thiram	3.3E+02 nc	3.4E+03 nc	1.8E+01 nc	1.8E+02 nc		
	5.0E-01 h			0	0.01	n/a	Tin (inorganic, see tributyltin oxide for organic tin)	4.6E+04 nc	1.0E+05 max		2.2E+04 nc		
	2.0E-01 i		1.1E-01 h	1	0.10	108-88-3	Toluene	7.9E+02 nc	8.8E+02 sat	4.0E+02 nc	7.2E+02 nc	1.2E+01	6.0E-01
3.2E+00 h		3.2E+00 r		0	0.10	95-80-7	Toluene-2,4-diamine	1.4E-01 ca	6.0E-01 ca	2.1E-03 ca	2.1E-02 ca		
	6.0E-01 h		6.0E-01 r	0	0.10	95-70-5	Toluene-2,5-diamine	3.9E+04 nc	1.0E+05 max	2.2E+03 nc	2.2E+04 nc		
	2.0E-01 h		2.0E-01 r	0	0.10	823-40-5	Toluene-2,6-diamine	1.3E+04 nc	1.0E+05 max	7.3E+02 nc	7.3E+03 nc		
1.9E-01 i		1.9E-01 r		0	0.10	106-49-0	p-Toluidine	2.3E+00 ca	1.0E+01 ca	3.5E-02 ca	3.5E-01 ca		
1.1E+00 i		1.1E+00 i		0	0.10	8001-35-2	Toxaphene	4.0E-01 ca	1.7E+00 ca	6.0E-03 ca	6.1E-02 ca	3.1E+01	2.0E+00
	7.5E-03 i		7.5E-03 r	0	0.10	66841-25-6	Tralomethrin	4.9E+02 nc	5.1E+03 nc	2.7E+01 nc	2.7E+02 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	2303-17-5	Triallate	8.5E+02 nc	8.9E+03 nc	4.7E+01 nc	4.7E+02 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	82097-50-5	Triasulfuron	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
	5.0E-01 i		5.0E-01 r	0	0.10	615-54-3	1,2,4-Tribromobenzene	3.3E+02 nc	3.4E+03 nc	1.8E+01 nc	1.8E+02 nc		
	3.0E-05 i		3.0E-05 r	0	0.10	56-35-9	Tributyltin oxide (TBTO)	2.0E+00 nc	2.0E+01 nc	1.1E-01 nc	1.1E+00 nc		
1.4E-02 h		1.4E-02 r		0	0.10	634-93-5	2,4,6-Trichloroaniline	1.3E+01 ca	5.6E+01 ca	2.0E-01 ca	2.0E+00 ca		
2.9E-02 h		2.9E-02 r		0	0.10	33663-50-2	2,4,6-Trichloroaniline hydrochloride	1.5E+01 ca	6.6E+01 ca	2.3E-01 ca	2.3E+00 ca		
	1.0E-02 i		5.7E-02 h	1	0.10	120-82-1	1,2,4-Trichlorobenzene	5.7E+02 nc	5.5E+03 sat	2.1E+02 nc	1.9E+02 nc	5.0E+00	3.0E-01
	3.5E-02 n		2.9E-01 x	1	0.10	71-55-6	**1,1,1-Trichloroethane**	1.2E+03 nc	3.0E+03 sat	1.0E+03 nc	7.9E+02 nc	2.0E+00	1.0E-01
5.7E-02 i	4.0E-03 i	5.6E-02 i	4.0E-03 r	1	0.10	79-00-5	1,1,2-Trichloroethane	6.5E-01 ca	1.5E+00 ca	1.2E-01 ca	2.0E-01 ca	2.0E-02	9.0E-04
1.1E-02 n	6.0E-03 n	6.0E-03 n	6.0E-03 r	1	0.10	79-01-6	Trichloroethylene (TCE)	3.2E+00 ca*	7.0E+00 ca*	1.1E+00 ca*	1.6E+00 ca*	6.0E-02	3.0E-03
	3.0E-01 i		2.0E-01 h	1	0.10	75-69-4	Trichlorofluoromethane	3.6E+02 nc	1.3E+03 nc	7.3E+02 nc	1.3E+03 nc		
	1.0E-01 i		1.0E-01 r	0	0.10	95-95-4	2,4,5-Trichlorophenol	6.5E+03 nc	6.8E+04 nc	3.7E+02 nc	3.7E+03 nc	2.7E+02	1.4E+01
1.1E-02 i		1.1E-02 r		0	0.10	88-06-2	2,4,6-Trichlorophenol	4.0E+01 ca	1.7E+02 ca	6.2E-01 ca	6.1E+00 ca	2.0E-01	8.0E-03
	1.0E-02 i		1.0E-02 r	0	0.10	93-76-5	2,4,5-Trichlorophenoxyacetic Acid	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
	8.0E-03 i		8.0E-03 r	0	0.10	93-72-1	2-(2,4,5-Trichlorophenoxy) propionic acid	5.2E+02 nc	5.5E+03 nc	2.9E+01 nc	2.9E+02 nc		
	5.0E-03 i		5.0E-03 r	1	0.10	598-77-6	1,1,2-Trichloropropane	1.5E+01 nc	5.0E+01 nc	1.8E+01 nc	3.0E+01 nc		
7.0E+00 h	6.0E-03 i	7.0E+00 r	5.0E-03 r	1	0.10	96-18-4	1,2,3-Trichloropropane	1.4E-03 ca	3.1E-03 ca	9.6E-04 ca	1.6E-03 ca		
	5.0E-03 h		5.0E-03 r	1	0.10	96-19-5	1,2,3-Trichloropropene	1.1E+01 nc	3.8E+01 nc	1.8E+01 nc	3.0E+01 nc		
	5.0E+01 i		8.8E+00 h	1	0.10	76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.6E+03 sat	5.6E+03 sat	3.1E+04 nc	5.9E+04 nc		
	3.0E-03 i		3.0E-03 r	0	0.10	58138-08-2	Tridiphane	2.0E+02 nc	2.0E+03 nc	1.1E+01 nc	1.1E+02 nc		

Key: i=IRIS h=HEAST n=NCEA x=WITHDRAWN r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION							CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
				V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)										
	2.0E-03 r		2.0E-03 r	1	0.10	121-44-8	Triethylamine	2.3E+01 nc	8.4E+01 nc	7.3E+00 nc	1.2E+01 nc		
7.7E-03 i	7.5E-03 i	7.7E-03 r	7.5E-03 r	0	0.10	1582-09-8	Trifluralin	5.8E+01 ca**	2.5E+02 ca*	8.7E-01 ca*	8.7E+00 ca*		
1.7E-02 h		1.7E-02 f		0	0.10	512-56-1	Trimethyl phosphate	1.2E+01 ca	5.2E+01 ca	1.8E-01 ca	1.8E+00 ca		
	5.0E-05 i		5.0E-05 r	0	0.10	99-35-4	1,3,5-Trinitrobenzene	3.3E+00 nc	3.4E+01 nc	1.8E-01 nc	1.8E+00 nc		
	1.0E-02 h		1.0E-02 r	0	0.10	479-45-8	Trinitrophenylmethylnitramine	6.5E+02 nc	6.8E+03 nc	3.7E+01 nc	3.7E+02 nc		
3.0E-02 i	5.0E-04 i	3.0E-02 f	5.0E-04 r	0	0.10	118-96-7	2,4,6-Trinitrotoluene	1.5E+01 ca**	6.4E+01 ca**	2.2E-01 ca**	2.2E+00 ca**		
	1.0E-03 i			0	0.01	7440-61-1	Uranium (soluble salts)						
	7.0E-03 h			0	0.01	7440-62-2	Vanadium	5.4E+02 nc	1.2E+04 nc		2.6E+02 nc	6.0E+03	3.0E+02
	9.0E-03 i			0	0.01	1314-62-1	Vanadium pentoxide	6.9E+02 nc	1.5E+04 nc		3.3E+02 nc	6.0E+03	3.0E+02
	2.0E-02 h			0	0.01	13701-70-7	Vanadium sulfate	1.5E+03 nc	3.4E+04 nc		7.3E+02 nc	6.0E+03	3.0E+02
	1.0E-03 i		1.0E-03 r	0	0.10	1929-77-7	Vernam	6.5E+01 nc	6.8E+02 nc	3.7E+00 nc	3.7E+01 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	50471-44-8	Vinclozolin	1.6E+03 nc	1.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
	1.0E-30 h		5.7E-02 i	1	0.10	108-05-4	**Vinyl acetate**	7.8E+02 nc	2.6E+03 nc	2.1E+02 nc	4.1E+02 nc	1.7E+02	8.0E+00
1.1E-01 r	8.6E-04 r	1.1E-01 h	8.6E-04 i	1	0.10	593-60-2	**Vinyl bromide (bromoethene)**	1.9E-01 ca*	4.1E-01 ca*	6.1E-02 ca*	1.0E-01 ca*		
1.9E+00 h		3.0E-01 h		1	0.10	75-01-4	Vinyl chloride	1.6E-02 ca	3.5E-02 ca	2.2E-02 ca	2.0E-02 ca	1.0E-02	7.0E-04
	3.0E-04 i		3.0E-04 r	0	0.10	81-81-2	Warfarin	2.0E+01 nc	2.0E+02 nc	1.1E+00 nc	1.1E+01 nc		
	2.0E+00 i		2.0E-01 x	1	0.10	108-38-3	m-Xylene	3.2E+02 sat	3.2E+02 sat	7.3E+02 nc	1.4E+03 nc	2.1E+02	1.0E+01
	2.0E+00 i		2.0E-01 x	1	0.10	95-47-6	o-Xylene	3.2E+02 sat	3.2E+02 sat	7.3E+02 nc	1.4E+03 nc	1.9E+02	9.0E+00
				1	0.10	106-42-3	p-Xylene	3.2E+02 sat	3.2E+02 sat			2.0E+02	1.0E+01
	2.0E+00 i		2.0E-01 x	1	0.10	1330-20-7	Xylene (mixed)	3.2E+02 sat	3.2E+02 sat	7.3E+02 nc	1.4E+03 nc	2.0E+02	1.0E+01
	3.0E-01 i			0	0.01	7440-66-6	Zinc	2.3E+04 nc	1.0E+05 max		1.1E+04 nc	1.2E+04	6.2E+02
	3.0E-04 i			0	0.01	1314-84-7	Zinc phosphide	2.3E+01 nc	5.1E+02 nc		1.1E+01 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	12122-67-7	Zineb	3.3E+03 nc	3.4E+04 nc	1.8E+02 nc	1.8E+03 nc		

APPENDIX E

EPA REGION 3 RISK-BASED CONCENTRATIONS

Farhana

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SUBJECT: Risk-Based Concentration Table DATE: 4/1/98

FROM: Jennifer Hubbard, Toxicologist
Superfund Technical Support Section (3HS41)

TO: RBC Table Users

Attached is the EPA Region III Risk-Based Concentration (RBC) Table, which we prepare and post periodically for all interested parties. This Spring 1998 version has been streamlined, as described in detail below.

IMPORTANT NOTES: To make the RBC Table more accessible and to minimize paper usage, it is now primarily available through the Internet. The address is:
http://www.epa.gov/reg3hwmd/riskmenu.htm.
The Table is available in both Lotus and Excel as "self-extracting" files. These files should be downloaded and then processed with your computer's "run" function. The files can then be viewed in Lotus or Excel. If you have technical questions about the toxicological or risk assessment aspects of the RBCs, please contact Jennifer Hubbard at 215-566-3328. Other questions can be addressed to Vanessa Sizer or Terri Fields at 215-566-3041. You can also consult the Frequently Asked Questions, below.

CONTENTS, USES, AND LIMITATIONS OF THE RBC TABLE

The RBC Table contains Reference Doses (RfDs) and Cancer Slope Factors (CSFs) for 400-500 chemicals. These toxicity factors have been combined with "standard" exposure scenarios to calculate RBCs--chemical concentrations corresponding to fixed levels of risk (i.e., a Hazard Quotient (HQ) of 1, or lifetime cancer risk of 1E-6, whichever occurs at a lower concentration) in water, air, fish tissue, and soil.

The Region III toxicologists use RBCs to screen sites not yet on the NPL, respond rapidly to citizen inquiries, and spot-check formal baseline risk assessments. The primary use of RBCs is for chemical screening during baseline risk assessment (see EPA Regional Guidance EPA/903/R-93-001, "Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening"). The exposure equations come from EPA's Risk Assessment Guidance for Superfund (RAGS), while the exposure factors are those recommended in RAGS or supplemental guidance from the Superfund program. The attached technical background document provides specific equations and assumptions. Simply put, RBCs are like risk assessments run in reverse. For a single

contaminant in a single medium, under standard default exposure assumptions, the RBC corresponds to the target risk or hazard quotient.

RBCs also have several important limitations. Specifically excluded from consideration are (1) transfers from soil to air and groundwater, 2) cumulative risk from multiple contaminants or media, and (3) dermal risk. Additionally, the risks for inhalation of vapors from water are based on a very simple model, whereas detailed risk assessments may use more detailed showering models. Also, the toxicity information in the Table has been assembled by hand and (despite extensive checking and years of use) may contain errors. It's advisable to cross-check before relying on any RfDs or CSFs in the Table. If you note any errors, please let us know.

It is important to note that this Table uses inhalation RfDs and CSFs rather than RfCs and inhalation unit cancer risks. This is because the latter factors incorporate exposure assumptions and therefore can only be used for one exposure scenario. Because risk assessors need to evaluate risks for many types of scenarios, the factors have been converted to the more traditional RfDs and CSFs. Unless otherwise indicated in the toxicity-factor source, the assumption is that RfCs and unit risks should be adjusted by a 70-kilogram body weight and a 20 m^3/day inhalation rate to generate the RfDs and CSFs.

Many users want to know if the RBCs can be used as valid no-action levels or cleanup levels, especially for soils. The answer is a bit complex. First, it is important to realize that <u>the RBC Table does not constitute regulation or guidance, and should not be viewed as a substitute for a site-specific risk assessment</u>. For sites where:

1. A single medium is contaminated;

2. A single contaminant contributes nearly all the health risk;

3. Volatilization, leaching, dermal contact, and other pathways not included in the RBCs are not expected to be significant;

4. The exposure scenarios and assumptions used in the RBC table are appropriate for the site;

5. The fixed risk levels used in the RBC table are appropriate for the site; and

6. Risk to ecological receptors is not expected to be significant;

the RBCs would probably be protective as no-action levels or cleanup goals. However, to the extent that a site deviates from this description, as most do, the RBCs would not necessarily be appropriate.

<u>To summarize, the Table should generally not be used to set cleanup or no-action levels at</u>

CERCLA sites or RCRA Corrective Action sites, to substitute for EPA guidance for preparing baseline risk assessments, or to determine if a waste is hazardous under RCRA.

SPECIAL NOTE

The RBC Table was originally developed by Roy L. Smith, Ph.D., for use by risk assessors in the Region III Superfund program. Dr. Smith is no longer with Region III, and the Table continues to evolve. You may notice some modifications of formatting and conventions used in the Table.

For instance, besides formatting, the following changes are noteworthy:

• As usual, updated toxicity factors have been used wherever available. However, because IRIS and provisional values are updated more frequently than the RBC Table, RBC Table users are ultimately responsible for obtaining the most up-to-date values. The RBC Table is provided as a convenience, but toxicity factors are compiled from the original sources and it is those original sources that should serve as the definitive reference.

• Certain outdated and withdrawn numbers have been removed from the Table.

• RBCs will no longer be rounded to 1E6 ppm. For certain low-toxicity chemicals, the RBCs exceed possible concentrations at the target risks. In such cases, Dr. Smith rounded these numbers to the highest possible concentration, or 1E6 ppm. The rounding has been discontinued so that Table users can adjust the RBCs to a different target risk whenever necessary. For example, when screening chemicals at a target HQ of 0.1, noncarcinogenic RBCs may simply be divided by 10. Such scaling is not possible when RBCs are rounded.

• This Table was originally compiled to assist Superfund risk assessors in screening hazardous waste sites. The large number of chemicals has made the Table unwieldy and difficult to keep current. Many of the chemicals do not typically (or even occasionally) appear at Superfund sites. In the 1998 version of the Table, the 600+ chemicals have been reduced to some 400-500 chemicals by eliminating many of those atypical chemicals. Through time, the Table may continue to grow or decrease in size. Comments on this issue would be appreciated. (A list of the deleted chemicals is attached.)

• At Region III Superfund sites, noncancer RBCs are typically adjusted downward to correspond to a target HQ of 0.1 rather than 1. (This is done to ensure that chemicals with additive effects are not prematurely eliminated during screening.) However, some chemicals have RBCs at HQs of 0.1 that are lower than their RBCs at 1E-6 cancer risk. In other words, the screening RBC would change from carcinogenic to noncarcinogenic. A new feature of this Table is that these chemicals are now flagged with a "!" symbol. Therefore, assessors screening with adjusted RBCs will be alerted to this situation. (We are also soliciting comments on whether the default target HQ on the RBC table should be 0.1 rather than 1.)

• Earlier versions of this Table included a substitution of inhalation toxicity factors for oral factors whenever oral factors were unavailable (this applied only to groundwater and air, but not soil or fish). This practice has been discontinued in order to minimize the uncertainty associated with such a conversion. The discontinuation of this practice does not significantly decrease the number of available RBCs.

• CAS numbers and volatility status have begun to be re-checked in accordance with comments from users. At this time, about two-thirds of the chemicals have been checked for volatility, and about 90% of the CAS numbers have been verified.

• Earlier versions of this Table included soil screening levels (SSLs), when those values were available in draft form. Since the finalization of the SSL Guidance, risk assessors are urged to consult the final SSL Guidance directly. The Guidance has detailed recommendations on site-specific sampling and site-specific SSL generation. (Soil Screening Guidance: User's Guide, April 1996, Publication 9355.4-23; and Soil Screening Guidance: Technical Background Document, May 1996; EPA/540/R-95/128)

FREQUENTLY ASKED QUESTIONS

To help you better understand the RBC Table, here are answers to our most often-asked questions:

1. How can the age-adjusted inhalation factor (11.66) be less than the inhalation rate for either a child (12) or an adult (20)?

> Age-adjusted factors are not intake rates, but rather partial calculations which have different units from intake rates. (Therefore, they are not directly comparable.) The fact that these partial calculations have values similar to intake rates is really coincidental, an artifact of the similar magnitude of years of exposure and time-averaged body weight.

2. For manganese, IRIS shows an oral RfD of 0.14 mg/kg/day, but the RBC Table uses 2E-2 mg/kg/day. Why?

> The IRIS RfD includes manganese from all sources, including diet. The explanatory text in IRIS recommends using a modifying factor of 3 when calculating risks associated with non-food sources, and the Table follows this recommendation. IRIS also recommends subtracting dietary exposure (default assumption in this case 5 mg). Thus, the IRIS RfD has been lowered by a factor of 2 x 3, or 6. The Table now reflects manganese RBCs for both "food" and "non-food" (most environmental) sources.

3. What is the source of the child's inhalation rate of 12 m^3/day?

> The calculation comes from basic physiology. It's a scaling of the mass-specific 20 m^3/day

rate for adults from a body mass of 70 kg to 15 kg, using the 2/3 power of mass, as follows:

Ircm = mass-specific child inhalation rate (m^3/kg/day)
Irc = child inhalation rate (m^3/day)

20 m^3/day / 70 kg = 0.286 m^3/kg/day (mass-specific adult inhalation rate)

0.286 m^3/kg/day x ($70^{0.67}$) = (Ircm) x ($15^{0.67}$)

Ircm = 0.803 m^3/kg/day

Irc = Ircm x 15 kg = 0.803 m^3/kg/day x 15 kg = 12.04 m^3/day

4. Can the oral RfDs in the RBC Table be applied to dermal exposure?

Not directly. Oral RfDs are usually based on administered dose and therefore tacitly include a GI absorption factor. Thus, any use of oral RfDs in dermal risk calculations should involve removing this absorption factor. Consult the Risk Assessment Guidance for Superfund, Part A, Appendix A, for further details on how to do this.

5. The exposure variables table in the RBC background document lists the averaging time for non-carcinogens as "ED*365." What does that mean?

ED is exposure duration, in years, and * is the computer-ese symbol for multiplication. Multiplying ED by 365 simply converts the duration to days. In fact, the ED term is included in both the numerator and denominator of the RBC algorithms for non-cancer risk, canceling it altogether. See RAGS for more information.

6. Why is inorganic lead not included in the RBC Table?

EPA has no consensus RfD or CSF for inorganic lead, so it is not possible to calculate RBCs as we have done for other chemicals. EPA considers lead to be a special case because of the difficulty in identifying the classic "threshold" needed to develop an RfD.

EPA therefore evaluates lead exposure by using blood-lead modeling, such as the Integrated Exposure-Uptake Biokinetic Model (IEUBK). The EPA Office of Solid Waste has also released a detailed directive on risk assessment and cleanup of residential soil lead. The directive recommends that soil lead levels less than 400 mg/kg are generally safe for residential use. Above that level, the document suggests collecting data and modeling blood-lead levels with the IEUBK model. For the purposes of screening, therefore, 400 mg/kg is recommended for residential soils. For water, we suggest 15 ug/l

(the EPA Action Level in water), and for air, the National Ambient Air Quality Standard.

7. Where did the CSFs for carcinogenic PAHs come from?

The PAH CSFs are all calculated relative to benzo[a]pyrene, which has an IRIS slope factor. The relative factors for the other PAHs can be found in "Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons," Final Draft, ECAO-CIN-842 (March, 1993).

8. May I please have a copy of a previous RBC Table?

We do not distribute outdated copies of the RBC Table. Each new version of the Table supersedes all previous versions.

9. Please elaborate on the meaning of the "W" source code in the Table.

The "W" code means that a RfD or CSF is currently not present on either IRIS or HEAST, but that it was once present on either IRIS or HEAST and was removed. Such withdrawal usually indicates that consensus on the number no longer exists among EPA scientists, but not that EPA believes the contaminant to be unimportant.

Withdrawn numbers are shown in the Table because we still need to deal with these contaminants during the long delays before replacement numbers are ready. For the purpose of screening, a "W" value is similar to a provisional value in that neither value has achieved Agency consensus. The "W" code should serve as a clear warning that before making any serious decision involving that contaminant, you will need to develop an interim value based on current scientific understanding.

If you are assessing risks at a site where a major contaminant is coded "W," consider working with your Region EPA risk assessor to develop a current toxicity constant. If the site is being studied under CERCLA, the EPA-NCEA Regional Technical Support group may be able to assist.

10. Can I get copies of supporting docouments for interim toxicity constants which are coded "E" in the RBC Table?

Unfortunately, Region 3 does not have a complete set of supporting documents. The EPA-NCEA Superfund Technical Support Center prepares these interim toxicity constants in response to site-specific requests from Regional risk assessors, and sends the documentation only to the requestor. The RBC Tables contain only the latest interim values that we've either requested or have otherwise received. NCEA maintains the

master data base of these chemicals, but will not release documentation of provisional values unless they are recent. Furthermore, since NCEA's Superfund Technical Support Center is mainly for the support of Superfund, it usually cannot develop new criteria unless authorized to do so for a specific Superfund project.

If an "E"-coded contaminant is a chemical of potential concern at your site, we urge you to work with the EPA Regional risk assessor assigned to the project in order to develop or obtain documentation for provisional values. EPA Region 3 furnishes documents only when needed to support Regional risk assessments or recommendations.

Attached is a list of "E"-coded chemicals whose supporting documentation was issued prior to 1996, indicating that toxicity information may need to be updated.

Attachments

"DISCONTINUED" CHEMICALS

These chemicals may still have toxicity criteria available in IRIS, HEAST, or NCEA provisional values. However, they are not routine chemicals and therefore will not be routinely maintained in the RBC Table, unless our Table users report a significant need for chemicals to be re-added. Some of the chemicals on this Table were deleted because supporting toxicity information has been withdrawn or is unavailable.

acephate
acifluorfen
ally
aluminum phosphide
ametryn
amitraz
antimony potassium tartrate
aramite
avermectin B1
bayleton
benomyl
bidrin
bis(2-chloro-1-methylethyl)ether
bisphenol A
4-bromophenyl phenyl ether
bromoxynil octanoate
cacodylic acid
captan
chloramben
chloroacetaldehyde
4-chlorobenzotrifluoride
4-chloro-2-methylaniline hydrochloride
chlorothalonil
chlorsulfuron
coal tar creosote
cyclohexlamine
danitol
demeton
diethylforamide
dimethipin
N,N-dimethylformamide
diphenamid
direct blue 6
dodine
ethephon
acetone cyanohyrin
acrylic acid
allyl alcohol
amdro
m-aminophenol
ammonium sulfamate
apollo
asulam
barium cyanide
benefin
benzotrichloride
biphenthin
boron trifluoride
bromoxynil
butylphthalyl butylglycolate
captafol
carboxin
chlorimuron-ethyl
2-chloroacetophenone
2-chloroethyl vinyl ether
chlorpropham
chlorthiophos
cyromazine
decabromodiphenyl ether
diallate
diflubenzuron
dimethoate
dimethyl terephthalate
direct black 38
direct brown 95
1,2-epoxybutane
2-ethoxyethanol acetate

ethyl acrylate
ethylene cyanohydrin
ethyl p-nitrophenyl phenylphosphorothioate
ethylphthalyl ethyl glycolate express
fluoridone
flutolanil
folpet
furium
glufosinate-ammonium
harmony
imazaquin
isoxaben
lactofen
linuron
maleic hydrazide
mancozeb
merphos
metalaxyl
methomyl
2-methoxyethanol
2-methylaniline hydrochloride
4,4-methylene bisbenzeneamine
molinate
napropamide
nickel subsulfide
3-nitroaniline
nitroguanidine
nustar
octamethylpyrophosphoramide
pebulate
pentabromo-6-chlorocyclohexane
pentabromodiphenyl ether
phenylmercuric acetate
phosmet
pirimiphos-methyl
profluralin
propargyl alcohol
propham
propylene oxide
quinalphos
selenourea
sodium fluoroacetate
systhane

EPTC

flurprimidol
fluvalinate
fosteyl-al
furmecyclox
haloxyfop-methyl
imazalil
iprodione
kepone

londax
malononitrile
maneb
merphos oxide
methamidophos
2-methoxyethanol acetate
2-methoxy-5-nitroaniline
methyl chlorocarbonate
metribuzin
2-naphthylamine

nitrapyrin
4-nitroaniline
norflurazon
octabromodiphenyl ether
paclobutrazol
pendimethalin

phenmedipham
phorate
picloram
prochloraz
pronamide
propazine
propiconazole
pydrin
savey
sethoxydim
sodium metavanadate
tebuthiuron

temephos
terbufos
tetrachlorovinphos
thallium selenide
2-(thiocyanomethylthio)-benzothiazole
thiofanox
thiram
triallate
2,4,6-trichloroaniline hydrochloride
tridiphane
trifluralin
terbacil
terbutryn
tetraethyldithiopyrophosphate
thiophanate-methyl
tralomethrin
triasulfuron
triethylamine
vernam

NCEA ("E") CHEMICALS WITH SUPPORTING INFORMATION PRE-1996

aminodinitrotoluenes
bis(2-ethylhexyl)phthalate, inhalation CSF
chloroethane, oral CSF
dibenzofuran
1,4-dichlorobenzene, inhalation CSF
4,6-dinitro-2-methylphenol
2-hexanone
nitroglycerin
4-nitrophenol
polychlorinated terphenyls
benzo[a]pyrene, inhalation CSF
naphthalene
titanium
titanium dioxide

NCEA information on lithium, CSFs for PAHs relative to benzo[a]pyrene, tetrachloroethene CSFs, and trichloroethene were originally produced prior to 1996, but NCEA has confirmed within the last two years that the information is still current.

temephos
terbufos
tetrachlorovinphos
thallium selenide
2-(thiocyanomethylthio)-benzothiazole
thiofanox
thiram
triallate
2,4,6-trichloroaniline hydrochloride
tridiphane
trifluralin
terbacil
terbutryn
tetraethyldithiopyrophosphate
thiophanate-methyl
tralomethrin
triasulfuron
triethylamine
vernam

NCEA ("E") CHEMICALS WITH SUPPORTING INFORMATION PRE-1996

aminodinitrotoluenes
bis(2-ethylhexyl)phthalate, inhalation CSF
chloroethane, oral CSF
dibenzofuran
1,4-dichlorobenzene, inhalation CSF
4,6-dinitro-2-methylphenol
2-hexanone
nitroglycerin
4-nitrophenol
polychlorinated terphenyls
benzo[a]pyrene, inhalation CSF
naphthalene
titanium
titanium dioxide

NCEA information on lithium, CSFs for PAHs relative to benzo[a]pyrene, tetrachloroethene CSFs, and trichloroethene were originally produced prior to 1996, but NCEA has confirmed within the last two years that the information is still current.

Sources: GPA Regi — Tabulated/Updated from IRIS or HEAST — Basis: C = Carcinogenic effects, N = Noncarcinogenic effects, I = RB — NBC-c

E = EPA-NCEA provisional; other — R, J concentrations

Chemical	CAS	RfDo mg/kg/d		CSFo 1/mg/kg/d		RfDi mg/kg/d		CSFi 1/mg/kg/d		VOC	Tap water ug/l			Ambient air ug/m3			Fish mg/kg			Soil Industrial mg/kg			Residential mg/kg	
ACETALDEHYDE	75070					2.57E-03	I	7.7E-03	I					8.1E-01	C									
ACETOCHLOR	34256821	2E-02	I								7.3E+02	N		7.3E+01	N		2.7E+01	N		4.1E+04	N		1.6E+03	N
ACETONE	67641	1.00E-01	I								3.7E+03	N		3.7E+02	N		1.4E+02	N		2.0E+05	N		7.8E+03	N
ACETONITRILE	75058	6.00E-03	I			1.40E-02	A				2.2E+02	N		5.1E+01	N		8.1E+00	N		1.2E+04	N		4.7E+02	N
ACETOPHENONE	98862	1.00E-01	I			5.70E-06	W			y	4.2E-02	N		2.1E-02	N		1.4E+02	N		2.0E+05	N		7.8E+03	N
ACROLEIN	107028	2.00E-02	H			5.70E-06	I			y	4.2E-02	N		2.1E-02	N		2.7E+01	N		4.1E+04	N		1.6E+03	N
ACRYLAMIDE	79061	2.00E-04	I	4.50E+00	I			4.50E+00	I		1.5E-02	C		1.4E-03	C		7.0E-04	C		1.3E+00	C		1.4E-01	C
ACRYLONITRILE	107131	1.00E-03	H	5.40E-01	I	5.70E-04	I	2.40E-01	I		1.2E-01	C		2.6E-02	C		5.8E-03	C		1.1E+01	C		1.2E+00	C
ALACHLOR	15972608	1.00E-02	I	8.00E-02	H						8.4E-01	C		7.8E-02	C		3.9E-02	C		7.2E+01	C		8.0E+00	C
ALAR	1596845	1.50E-01	I								5.5E+03	N		5.5E+02	N		2.0E+02	N		3.1E+05	N		1.2E+04	N
ALDICARB	116063	1.00E-03	I								3.7E+01	N		3.7E+00	N		1.4E+00	N		2.0E+03	N		7.8E+01	N
ALDICARB SULFONE	1646884	1.00E-03	I								3.7E+01	N		3.7E+00	N		1.4E+00	N		2.0E+03	N		7.8E+01	N
ALDRIN	309002	3.00E-05	I	1.70E+01	I			1.70E+01	I		3.9E-03	C		3.7E-04	C		1.9E-04	C		3.4E-01	C		3.8E-02	C
ALUMINUM	7429905	1.00E+00	E			1.00E-03	E				3.7E+04	N		3.7E+00	N		1.4E+03	N		2.0E+06	N		7.8E+04	N
AMINODINITROTOLUENES		6.00E-05	E								2.2E+00	N		2.2E-01	N		8.1E-02	N		1.2E+02	N		4.7E+00	N
4-AMINOPYRIDINE	504245	2.00E-05	H								7.3E-01	N		7.3E-02	N		2.7E-02	N		4.1E+01	N		1.6E+00	N
AMMONIA	7664417					2.86E-02	I			y	2.1E+02	N		1.0E+02	N									
ANILINE	62533			5.70E-03	I	2.90E-04	I			y	1.9E+00	C	I	1.1E+00	N		5.5E-01	C		1.0E+03	C		1.1E+02	C
ANTIMONY	7440360	4.00E-04	I								1.5E+01	N		1.5E+00	N		5.4E-01	N		8.2E+02	N		3.1E+01	N
ANTIMONY PENTOXIDE	1314609	5.00E-04	H								1.8E+01	N		1.8E+00	N		6.8E-01	N		1.0E+03	N		3.9E+01	N
ANTIMONY TETROXIDE	1332815	4.00E-04	H								1.5E+01	N		1.5E+00	N		5.4E-01	N		8.2E+02	N		3.1E+01	N
ANTIMONY TRIOXIDE	1309644	4.00E-04	H			5.70E-05	I				1.5E+01	N		2.1E-01	N		5.4E-01	N		8.2E+02	N		3.1E+01	N
ARSENIC	7440382	3.00E-04	I	1.50E+00	I			1.51E+01	I		4.5E-02	C		4.1E-04	C		2.1E-03	C		3.8E+00	C		4.3E-01	C
ARSINE	7784421					1.40E-05	I			y	1.0E-01	N		5.1E-02	N									
ASSURE	76578148	9.00E-03	I								3.3E+02	N		3.3E+01	N		1.2E+01	N		1.8E+04	N		7.0E+02	N
ATRAZINE	1912249	3.50E-02	I	2.20E-01	H						3.0E-01	C		2.8E-02	C		1.4E-02	C		2.6E+01	C		2.9E+00	C
AZOBENZENE	103333			1.10E-01	I			1.10E-01	I		6.1E-01	C		5.7E-02	C		2.9E-02	C		5.2E+01	C		5.8E+00	C
BARIUM	7440393	7.00E-02	I			1.40E-04	A				2.6E+03	N		5.1E-01	N		9.5E+01	N		1.4E+05	N		5.5E+03	N
BAYGON	114261	4.00E-03	I								1.5E+02	N		1.5E+01	N		5.4E+00	N		8.2E+03	N		3.1E+02	N
BAYTHROID	68359375	2.50E-02	I								9.1E+02	N		9.1E+01	N		3.4E+01	N		5.1E+04	N		2.0E+03	N
BENTAZON	25057890	3.00E-02	I								1.1E+03	N		1.1E+02	N		4.1E+01	N		6.1E+04	N		2.3E+03	N
BENZALDEHYDE	100527	1.00E-01	I								3.7E+03	N		3.7E+02	N		1.4E+02	N		2.0E+05	N		7.8E+03	N
BENZENE	71432	3.00E-03	E	2.90E-02	I	1.70E-03	E	2.90E-02	I	y	3.8E-01	C		2.2E-01	C		1.1E-01	C		2.0E+02	C		2.2E+01	C
BENZENETHIOL	108985	1.00E-05	H							y	6.1E-02	N		3.7E-02	N		1.4E-02	N		2.0E+01	N		7.8E-01	N
BENZIDINE	92875	3.00E-03	I	2.30E+02	I			2.30E+02	I		2.9E-04	C		2.7E-05	C		1.4E-05	C		2.5E-02	C		2.8E-03	C
BENZOIC ACID	65850	4.00E+00	I								1.5E+05	N		1.5E+04	N		5.4E+03	N		8.2E+06	N		3.1E+05	N
BENZYL ALCOHOL	100516	3.00E-01	H								1.1E+04	N		1.1E+03	N		4.1E+02	N		6.1E+05	N		2.3E+04	N
BENZYL CHLORIDE	100447			0.17	I					y	6.2E-02	C		3.7E-02	C		1.9E-02	C		3.4E+01	C		3.8E+00	C
BERYLLIUM	7440417	2.00E-03	I			5.7E-06	I	8.40E+00	I		7.3E-01	N		7.5E-04	C		2.7E+00	N		4.1E+03	N		1.6E+02	N
BIPHENYL	92524	5.00E-02	I							y	3.0E+02	N		1.8E+02	N		6.8E+01	N		1.0E+05	N		3.9E+03	N
BIS(2-CHLOROETHYL)ETHER	111444			1.10E+00	I			1.10E+00	I		6.1E-02	C		5.7E-03	C		2.9E-03	C		5.2E+00	C		5.8E-01	C
BIS(2-CHLOROISOPROPYL)ETHE	108601	4.00E-02	I	7.00E-02	H			3.50E-02	H	y	2.8E-01	C		1.8E-01	C		4.5E-02	C		8.2E+01	C		9.1E+00	C
BIS(CHLOROMETHYL)ETHER	92524			2.20E+02	I			2.20E+02	I	y	4.8E-05	C		2.8E-05	C		1.4E-05	C		2.5E-02	C		2.9E-03	C
BIS(2-ETHYLHEXYL)PHTHALATE	111444	2.00E-02	I	1.40E-02	I			1.40E-02	E		4.8E+00	C		4.5E-01	C		2.3E-01	C		4.1E+02	C		4.6E+01	C
BORON	108601	9.00E-02	I			5.70E-03	H				3.3E+03	N		2.1E+01	N		1.2E+02	N		1.8E+05	N		7.0E+03	N
BROMODICHLOROMETHANE	75274	2.00E-02	I	6.20E-02	I					y	1.7E-01	C		1.0E-01	C		5.1E-02	C		9.2E+01	C		1.0E+01	C
BROMOETHENE	593602							1.10E-01	H	y	1.1E-01	C		5.7E-02	C									
BROMOFORM	75252	2.00E-02	I	7.90E-03	I			3.90E-03	I	y	2.3E+00	C		1.6E+00	C		4.0E-01	C		7.2E+02	C		8.1E+01	C
BROMOMETHANE	74839	1.40E-03	I			1.40E-03	I			y	6.5E+00	N		5.1E+00	N		1.9E+00	N		2.9E+03	N		1.1E+02	N
BROMOPHOS	2104963	5.00E-03	H							y	3.0E+01	N		1.8E+01	N		6.8E+00	N		1.0E+04	N		3.9E+02	N
1,3-BUTADIENE	106990							1.80E+00	H	y	7.0E-03	C		3.5E-03	C									
1-BUTANOL	71363	1.00E-01	I								3.7E+03	N		3.7E+02	N		1.4E+02	N		2.0E+05	N		7.8E+03	N
BUTYLBENZYLPHTHALATE	85687	2.00E-01	I								7.3E+03	N		7.3E+02	N		2.7E+02	N		4.1E+05	N		1.6E+04	N
BUTYLATE	2008415	5.00E-02	I								1.8E+03	N		1.8E+02	N		6.8E+01	N		1.0E+05	N		3.9E+03	N
N-BUTYLBENZENE	104518	1.00E-02	E							y	6.1E+01	N		3.7E+01	N		1.4E+01	N		2.0E+04	N		7.8E+02	N
SEC-BUTYLBENZENE	135988	1.00E-02	E							y	6.1E+01	N		3.7E+01	N		1.4E+01	N		2.0E+04	N		7.8E+02	N
TERT-BUTYLBENZENE	98066	1.00E-02	E							y	6.1E+01	N		3.7E+01	N		1.4E+01	N		2.0E+04	N		7.8E+02	N

Source EPA IRIS RBC Table 4/15/98 Withdrawn from IRIS or HEAST Basis: C = Carcinogen = Noncarcinogenic effects I = RBC at HI of 0.1 < RBC-c

E = EPA-NCEA provisional value O = other

Chemical	CAS	RfDo mg/kg/d		CSFo 1/mg/kg/d		RfDi mg/kg/d		CSFi 1/mg/kg/d		VOC	Risk-based concentrations: Tap water ug/l			Ambient air ug/m3			Fish mg/kg			Soil Industrial mg/kg			Residential mg/kg		
CADMIUM-WATER	7440439	5.00E-04	I					6.30E+00	I		1.8E+01	N		9.9E-04	C		6.8E-01	N		1.0E+03	N		3.9E+01	N	
CADMIUM-FOOD	7440439	1.00E-03	I					6.30E+00	I		3.7E+01	N		9.9E-04	C		1.4E+00	N		2.0E+03	N		7.8E+01	N	
CAPROLACTAM	105602	5.00E-01	I								1.8E+04	N		1.8E+03	N		6.8E+02	N		1.0E+06	N		3.9E+04	N	
CARBARYL	63252	1.00E-01	I								3.7E+03	N		3.7E+02	N		1.4E+02	N		2.0E+05	N		7.8E+03	N	
CARBON DISULFIDE	75150	1.00E-01	I			2.00E-01	I			y	1.0E+03	N		7.3E+02	N		1.4E+02	N		2.0E+05	N		7.8E+03	N	
CARBON TETRACHLORIDE	56235	7.00E-04	I	1.30E-01	I	5.71E-04	E	5.30E-02	I	y	1.6E-01	C		1.2E-01	C		2.4E-02	C		4.4E+01	C		4.9E+00	C	
CARBOSULFAN	55285148	1.00E-02	I								3.7E+02	N		3.7E+01	N		1.4E+01	N		2.0E+04	N		7.8E+02	N	
CHLORAL	75876	2.00E-03	I							y	1.2E+01	N		7.3E+00	N		2.7E+00	N		4.1E+03	N		1.5E+02	N	
CHLORANIL	118752			4.00E-01	H						1.7E-01	C		1.6E-02	C		7.9E-03	C		1.4E+01	C		1.5E+00	C	
CHLORDANE	57749	5.00E-04	I	3.5E-01	I	2.00E-04		3.5E-01	I		1.9E-01	C		1.8E-02	C		9.0E-03	C		1.6E+01	C		1.8E+00	C	
CHLORINE	7782505	1.00E-01	I							y	6.1E+02	N		3.7E+02	N		1.4E+02	N		2.0E+05	N		7.8E+03	N	
CHLORINE DIOXIDE	10049044					5.70E-05	I			y	4.2E-01	N		2.1E-01	N										
CHLOROACETIC ACID	79118	2.00E-03	H								7.3E+01	N		7.3E+00	N		2.7E+00	N		4.1E+03	N		1.5E+02	N	
4-CHLOROANILINE	106478	4.00E-03	I								1.5E+02	N		1.5E+01	N		5.4E+00	N		8.2E+03	N		3.1E+02	N	
CHLOROBENZENE	108907	2.00E-02	I			5.00E-03	A			y	3.5E+01	N		1.8E+01	N		2.7E+01	N		4.1E+04	N		1.6E+03	N	
CHLOROBENZILATE	510156	2.00E-02	I	2.70E-01	H			2.70E-01	H		2.5E-01	C		2.3E-02	C		1.2E-02	C		2.1E+01	C		2.4E+00	C	
P-CHLOROBENZOIC ACID	74113	2.00E-01	H								7.3E+03	N		7.3E+02	N		2.7E+02	N		4.1E+05	N		1.5E+04	N	
2-CHLORO-1,3-BUTADIENE	126998	2.00E-02	A			2.00E-03	H			y	1.4E+01	N		7.3E+00	N		2.7E+01	N		4.1E+04	N		1.5E+03	N	
1-CHLOROBUTANE	109693	4.00E-01	H							y	2.4E+03	N		1.5E+03	N		5.4E+02	N		8.2E+05	N		3.1E+04	N	
1-CHLORO-1,1-DIFLUOROETHANE	75683					1.40E+01	I			y	1.0E+05	N		5.1E+04	N										
CHLORODIFLUOROMETHANE	75456					1.40E+01	I			y	1.0E+05	N		5.1E+04	N										
CHLOROETHANE	75003	4.00E-01	E	2.90E-03	E	2.90E+00	I			y	3.6E+00	C		2.2E+00	C		1.1E+00	C		2.0E+03	C		2.2E+02	C	
CHLOROFORM	67663	1.00E-02	I	6.10E-03	I	8.6E-05	E	8.10E-02	I	y	1.5E-01	C	I	7.7E-02	C	I	5.2E-01	C		9.4E+02	C		1.0E+02	C	I
CHLOROMETHANE	74873			1.30E-02	H			6.00E-03	H	y	1.5E+00	C		1.0E+00	C		2.4E-01	C		4.4E+02	C		4.9E+01	C	
4-CHLORO-2-METHYLANILINE	95692			5.80E-01	H						1.2E-01	C		1.1E-02	C		5.4E-03	C		9.9E+00	C		1.1E+00	C	
BETA-CHLORONAPHTHALENE	91587	8.00E-02	I							y	4.9E+02	N		2.9E+02	N		1.1E+02	N		1.6E+05	N		6.3E+03	N	
O-CHLORONITROBENZENE	88733			2.50E-02	H					y	4.2E-01	C		2.5E-01	C		1.3E-01	C		2.3E+02	C		2.6E+01	C	
P-CHLORONITROBENZENE	100005			1.80E-02	H					y	5.9E-01	C		3.5E-01	C		1.8E-01	C		3.2E+02	C		3.5E+01	C	
2-CHLOROPHENOL	95578	5.00E-03	I								1.8E+02	N		1.8E+01	N		6.8E+00	N		1.0E+04	N		3.9E+02	N	
2-CHLOROPROPANE	75296					2.90E-02	H			y	2.1E+02	N		1.1E+02	N										
O-CHLOROTOLUENE	95498	2.00E-02	I							y	1.2E+02	N		7.3E+01	N		2.7E+01	N		4.1E+04	N		1.6E+03	N	
CHLORPYRIFOS	2921882	3.00E-03	I								1.1E+02	N		1.1E+01	N		4.1E+00	N		6.1E+03	N		2.3E+02	N	
CHLORPYRIFOS-METHYL	5598130	1.00E-02	H								3.7E+02	N		3.7E+01	N		1.4E+01	N		2.0E+04	N		7.8E+02	N	
CHROMIUM III	16065831	1.00E+00	I								3.7E+04	N		3.7E+03	N		1.4E+03	N		2.0E+06	N		7.8E+04	N	
CHROMIUM VI	18540299	5.00E-03	I			1.00E-07	E	4.10E+01	H		1.8E+02	N		1.5E-04	C	I	6.8E+00	N		1.0E+04	N		3.9E+02	N	
COBALT	7440484	6.00E-02	E								2.2E+03	N		2.2E+02	N		8.1E+01	N		1.2E+05	N		4.7E+03	N	
COKE OVEN EMISSIONS (COAL TA	8007452							2.2	I	y	5.7E-03	C		2.8E-03	C										
COPPER	7440508	4.00E-02	H								1.5E+03	N		1.5E+02	N		5.4E+01	N		8.2E+04	N		3.1E+03	N	
CROTONALDEHYDE	123739			1.90E+00	H						3.5E-02	C		3.3E-03	C		1.7E-03	C		3.0E+00	C		3.4E-01	C	
CUMENE	98828	1.00E-01	I			1.10E-01	I			y	6.6E+02	N		4.0E+02	N		1.4E+02	N		2.0E+05	N		7.8E+03	N	
CYANIDE (FREE)	57125	2.00E-02	I								7.3E+02	N		7.3E+01	N		2.7E+01	N		4.1E+04	N		1.5E+03	N	
CALCIUM CYANIDE	592018	4E-02	I								1.5E+03	N		1.5E+02	N		5.4E+01	N		8.2E+04	N		3.1E+03	N	

Source: EPA/IRIS, 2/98 Table 4-15 [illegible] drawn from IRIS or HEAST

Basis: C = Carcinogenic effects N = Noncarc[illegible]ects [illegible] = RBC at Hi of 0.1 < RBC-c

E = EPA-NCEA provisi[illegible] value O = other

Risk-based concentrations

Chemical	CAS	RfDo mg/kg/d		CSFo 1/mg/kg/d		RfDi mg/kg/d		CSFi 1/mg/kg/d		VOC	Tap water ug/l		Ambient air ug/m3		Fish mg/kg		Soil Industrial mg/kg		Residential mg/kg	
COPPER CYANIDE	544923	5.00E-03	I								1.8E+02	N	1.8E+01	N	6.8E+00	N	1.0E+04	N	3.9E+02	N
CYANAZINE	21725462	2.00E-03	H	8.40E-01	H						8.0E-02	C	7.5E-03	C	3.8E-03	C	6.8E+00	C	7.6E-01	C
CYANOGEN	460195	4.00E-02	I							y	2.4E+02	N	1.5E+02	N	5.4E+01	N	8.2E+04	N	3.1E+03	N
CYANOGEN BROMIDE	506683	9.00E-02	I								3.3E+03	N	3.3E+02	N	1.2E+02	N	1.8E+05	N	7.0E+03	N
CYANOGEN CHLORIDE	506774	5.00E-02	I								1.8E+03	N	1.8E+02	N	6.8E+01	N	1.0E+05	N	3.9E+03	N
HYDROGEN CYANIDE	74908	2.00E-02	I			8.60E-04	I			y	6.2E+00	N	3.1E+00	N	2.7E+01	N	4.1E+04	N	1.6E+03	N
POTASSIUM CYANIDE	151508	5.00E-02	I								1.8E+03	N	1.8E+02	N	6.8E+01	N	1.0E+05	N	3.9E+03	N
POTASSIUM SILVER CYANIDE	506616	2.00E-01	I								7.3E+03	N	7.3E+02	N	2.7E+02	N	4.1E+05	N	1.6E+04	N
SILVER CYANIDE	506649	1.00E-01	I								3.7E+03	N	3.7E+02	N	1.4E+02	N	2.0E+05	N	7.8E+03	N
SODIUM CYANIDE	143339	4.00E-02	I								1.5E+03	N	1.5E+02	N	5.4E+01	N	8.2E+04	N	3.1E+03	N
THIOCYANATE		1.00E-01	E								3.7E+03	N	3.7E+02	N	1.4E+02	N	2.0E+05	N	7.8E+03	N
ZINC CYANIDE	557211	5.00E-02	I								1.8E+03	N	1.8E+02	N	6.8E+01	N	1.0E+05	N	3.9E+03	N
CYCLOHEXANONE	108941	5.00E+00	I								1.8E+05	N	1.8E+04	N	6.8E+03	N	1.0E+07	N	3.9E+05	N
CYHALOTHRIN/KARATE	68085858	5.00E-03	I								1.8E+02	N	1.8E+01	N	6.8E+00	N	1.0E+04	N	3.9E+02	N
CYPERMETHRIN	52315078	1.00E-02	I								3.7E+02	N	3.7E+01	N	1.4E+01	N	2.0E+04	N	7.8E+02	N
DACTHAL	1861321	1.00E-02	I								3.7E+02	N	3.7E+01	N	1.4E+01	N	2.0E+04	N	7.8E+02	N
DALAPON	75990	3.00E-02	I								1.1E+03	N	1.1E+02	N	4.1E+01	N	6.1E+04	N	2.3E+03	N
DDD	72548			2.40E-01	I						2.8E-01	C	2.6E-02	C	1.3E-02	C	2.4E+01	C	2.7E+00	C
DDE	72559			3.40E-01	I						2.0E-01	C	1.8E-02	C	9.3E-03	C	1.7E+01	C	1.9E+00	C
DDT	50293	5.00E-04	I	3.40E-01	I			3.40E-01	I		2.0E-01	C	1.8E-02	C	9.3E-03	C	1.7E+01	C	1.9E+00	C
DIAZINON	333415	9.00E-04	H								3.3E+01	N	3.3E+00	N	1.2E+00	N	1.8E+03	N	7.0E+01	N
DIBENZOFURAN	132649	4.00E-03	E							y	2.4E+01	N	1.5E+01	N	5.4E+00	N	8.2E+03	N	3.1E+02	N
1,4-DIBROMOBENZENE	106376	1.00E-02	I							y	6.1E+01	N	3.7E+01	N	1.4E+01	N	2.0E+04	N	7.8E+02	N
DIBROMOCHLOROMETHANE	124481	2.00E-02	I	8.40E-02	I					y	1.3E-01	C	7.5E-02	C	3.8E-02	C	6.8E+01	C	7.6E+00	C
1,2-DIBROMO-3-CHLOROPROPAN	96128			1.40E+00	H	5.70E-05	I	2.40E-03	H	y	4.7E-02	C	2.1E-01	N	2.3E-03	C	4.1E+00	C	4.6E-01	C
1,2-DIBROMOETHANE	106934			8.50E+01	I	5.70E-05	H	7.60E-01	I	y	7.5E-04	C	8.2E-03	C	3.7E-05	C	6.7E-02	C	7.5E-03	C
DIBUTYLPHTHALATE	84742	1.00E-01	I								3.7E+03	N	3.7E+02	N	1.4E+02	N	2.0E+05	N	7.8E+03	N
DICAMBA	1918009	3.00E-02	I								1.1E+03	N	1.1E+02	N	4.1E+01	N	6.1E+04	N	2.3E+03	N
1,2-DICHLOROBENZENE	95501	9.00E-02	I			9.00E-03	E			y	5.4E+01	N	3.3E+01	N	1.2E+02	N	1.8E+05	N	7.0E+03	N
1,3-DICHLOROBENZENE	541731	3.00E-02	E			2.00E-03	E			y	1.4E+01	N	7.3E+00	N	4.1E+01	N	6.1E+04	N	2.3E+03	N
1,4-DICHLOROBENZENE	106467	3.00E-02	E	2.40E-02	H	2.29E-01	I	2.2E-02	E	y	4.7E-01	C	2.8E-01	C	1.3E-01	C	2.4E+02	C	2.7E+01	C
3,3'-DICHLOROBENZIDINE	91941			4.50E-01	I						1.5E-01	C	1.4E-02	C	7.0E-03	C	1.3E+01	C	1.4E+00	C
1,4-DICHLORO-2-BUTENE	764410							9.30E+00	H	y	1.3E-03	C	6.7E-04	C						
DICHLORODIFLUOROMETHANE	75718	2.00E-01	I			5.00E-02	A			y	3.5E+02	N	1.8E+02	N	2.7E+02	N	4.1E+05	N	1.6E+04	N
1,1-DICHLOROETHANE	75343	1.00E-01	H			1.40E-01	A			y	8.0E+02	N	5.1E+02	N	1.4E+02	N	2.0E+05	N	7.8E+03	N
1,2-DICHLOROETHANE	107062	3.00E-02	E	9.10E-02	I	1.40E-03	E	9.10E-02	I	y	1.2E-01	C	6.9E-02	C	3.5E-02	C	6.3E+01	C	7.0E+00	C
1,1-DICHLOROETHENE	75354	9.00E-03	I	6.00E-01	I			1.75E-01	I	y	4.4E-02	C	3.6E-02	C	5.3E-03	C	9.5E+00	C	1.1E+00	C
CIS-1,2-DICHLOROETHENE	156592	1.00E-02	H							y	6.1E+01	N	3.7E+01	N	1.4E+01	N	2.0E+04	N	7.8E+02	N
TRANS-1,2-DICHLOROETHENE	156605	2.00E-02	I							y	1.2E+02	N	7.3E+01	N	2.7E+01	N	4.1E+04	N	1.6E+03	N
TOTAL 1,2-DICHLOROETHENE	540590	9.00E-03	H							y	5.5E+01	N	3.3E+01	N	1.2E+01	N	1.8E+04	N	7.0E+02	N
2,4-DICHLOROPHENOL	120832	3.00E-03	I								1.1E+02	N	1.1E+01	N	4.1E+00	N	6.1E+03	N	2.3E+02	N
2,4-D	94757	1.00E-02	I							y	6.1E+01	N	3.7E+01	N	1.4E+01	N	2.0E+04	N	7.8E+02	N
4-(2,4-DICHLOROPHENOXY)BUTY	94826	8E-03	I								2.9E+02	N	2.9E+01	N	1.1E+01	N	1.6E+04	N	6.3E+02	N
1,2-DICHLOROPROPANE	78875			6.80E-02	H	1.14E-03	I			y	1.6E-01	C	9.2E-02	C	4.6E-02	C	8.4E+01	C	9.4E+00	C
2,3-DICHLOROPROPANOL	616239	3.00E-03	I								1.1E+02	N	1.1E+01	N	4.1E+00	N	6.1E+03	N	2.3E+02	N
1,3-DICHLOROPROPENE	542756	3.00E-04	I	1.80E-01	H	5.71E-03	I	1.30E-01	H	y	7.7E-02	C	4.8E-02	C	1.8E-02	C	3.2E+01	C	3.5E+00	C
DICHLORVOS	62737	5E-04	I	0.29	I	1.43E-04	I				2.3E-01	C	2.2E-02	C	1.1E-02	C	2.0E+01	C	2.2E+00	C
DICOFOL	115322			4.4E-01	W						1.5E-01	C	1.4E-02	C	7.2E-03	C	1.3E+01	C	1.5E+00	C
DICYCLOPENTADIENE	77736	3E-02	H			8.00E-05	A			y	4.4E-01	N	2.2E-01	N	4.1E+01	N	6.1E+04	N	2.3E+03	N
DIELDRIN	60571	5.00E-05	I	1.60E+01	I			1.60E+01	I		4.2E-03	C	3.9E-04	C	2.0E-04	C	3.6E-01	C	4.0E-02	C
DIESEL EMISSIONS						1.40E-03	I						5.1E+00	N						
DIETHYLPHTHALATE	84662	8.00E-01	I								2.9E+04	N	2.9E+03	N	1.1E+03	N	1.6E+06	N	6.3E+04	N
DIETHYLENE GLYCOL, MONOBUT	112345					5.70E-03	H						2.1E+01	N						
DIETHYLENE GLYCOL, MONOETH	111900	2.00E+00	H								7.3E+04	N	7.3E+03	N	2.7E+03	N	4.1E+05	N	1.6E+05	N

Source: EPA RBC, 60 Federal Register 4915/98 = Withdrawn from IRIS or HEAST Basis: C = Carcinogenic effects, N = Non-carcinogenic effects * = RBC at HI of 0.1 < RBC-c

E = EPA-NCEA provisional value, O = other

Chemical	CAS	RfDo mg/kg/d		CSFo 1/mg/kg/d		RfDi mg/kg/d		CSFi 1/mg/kg/d		VOC	Risk-based concentrations: Tap water ug/l			Ambient air ug/m3			Fish mg/kg			Soil Industrial mg/kg			Residential mg/kg	
DI(2-ETHYLHEXYL)ADIPATE	103231	6.00E-01	I	1.20E-03	I						5.6E+01	C		5.2E+00	C		2.6E+00	C		4.8E+03	C		5.3E+02	C
DIETHYLSTILBESTROL	56531			4.70E+03	H						1.4E-05	C		1.3E-06	C		6.7E-07	C		1.2E-03	C		1.4E-04	C
DIFENZOQUAT (AVENGE)	43222486	8.00E-02	I								2.9E+03	N		2.9E+02	N		1.1E+02	N		1.6E+05	N		6.3E+03	N
1,1-DIFLUOROETHANE	75376					1.10E+01	I			y	8.0E+04	N		4.0E+04	N									
DIISOPROPYL METHYLPHOSPHON	1445756	8.00E-02	I								2.9E+03	N		2.9E+02	N		1.1E+02	N		1.6E+05	N		6.3E+03	N
3,3'-DIMETHOXYBENZIDINE	119904			1.40E-02	H						4.8E+00	C		4.5E-01	C		2.3E-01	C		4.1E+02	C		4.6E+01	C
DIMETHYLAMINE	124403					5.70E-06	W							2.1E-02	N									
2,4-DIMETHYLANILINE HYDROCHL	21436964			5.80E-01	H						1.2E-01	C		1.1E-02	C		5.4E-03	C		9.9E+00	C		1.1E+00	C
2,4-DIMETHYLANILINE	95681			7.50E-01	H						8.9E-02	C		8.3E-03	C		4.2E-03	C		7.6E+00	C		8.5E-01	C
N,N-DIMETHYLANILINE	121697	2.00E-03	I								7.3E+01	N		7.3E+00	N		2.7E+00	N		4.1E+03	N		1.6E+02	N
3,3'-DIMETHYLBENZIDINE	119937			9.20E+00	H						7.3E-03	C		6.8E-04	C		3.4E-04	C		6.2E-01	C		6.9E-02	C
1,1-DIMETHYLHYDRAZINE	57147			2.60E+00	W			3.50E+00	W		2.6E-02	C		1.6E-03	C		1.2E-03	C		2.2E+00	C		2.5E-01	C
1,2-DIMETHYLHYDRAZINE	540738			3.70E+01	W			3.70E+01	W		1.8E-03	C		1.7E-04	C		8.5E-05	C		1.5E-01	C		1.7E-02	C
2,4-DIMETHYLPHENOL	105679	2.00E-02	I								7.3E+02	N		7.3E+01	N		2.7E+01	N		4.1E+04	N		1.6E+03	N
2,6-DIMETHYLPHENOL	576261	6.00E-04	I								2.2E+01	N		2.2E+00	N		8.1E-01	N		1.2E+03	N		4.7E+01	N
3,4-DIMETHYLPHENOL	95658	1.00E-03	I								3.7E+01	N		3.7E+00	N		1.4E+00	N		2.0E+03	N		7.8E+01	N
DIMETHYLPHTHALATE	131113	1.00E+01	W								3.7E+05	N		3.7E+04	N		1.4E+04	N		2.0E+07	N		7.8E+05	N
1,2-DINITROBENZENE	528290	4.00E-04	H								1.5E+01	N		1.5E+00	N		5.4E-01	N		8.2E+02	N		3.1E+01	N
1,3-DINITROBENZENE	99650	1.00E-04	I								3.7E+00	N		3.7E-01	N		1.4E-01	N		2.0E+02	N		7.8E+00	N
1,4-DINITROBENZENE	100254	4.00E-04	H								1.5E+01	N		1.5E+00	N		5.4E-01	N		8.2E+02	N		3.1E+01	N
4,6-DINITRO-O-CYCLOHEXYL PHE	131895	2.00E-03	I								7.3E+01	N		7.3E+00	N		2.7E+00	N		4.1E+03	N		1.6E+02	N
4,6-DINITRO-2-METHYLPHENOL	534521	1.00E-04	E								3.7E+00	N		3.7E-01	N		1.4E-01	N		2.0E+02	N		7.8E+00	N
2,4-DINITROPHENOL	51285	2.00E-03	I								7.3E+01	N		7.3E+00	N		2.7E+00	N		4.1E+03	N		1.6E+02	N
DINITROTOLUENE MIX				6.80E-01	I						9.8E-02	C		9.2E-03	C		4.6E-03	C		8.4E+00	C		9.4E-01	C
2,4-DINITROTOLUENE	121142	2.00E-03	I								7.3E+01	N		7.3E+00	N		2.7E+00	N		4.1E+03	N		1.6E+02	N
2,6-DINITROTOLUENE	606202	1.00E-03	H								3.7E+01	N		3.7E+00	N		1.4E+00	N		2.0E+03	N		7.8E+01	N
DINOSEB	88857	1.00E-03	I							y	6.1E+00	N		3.7E+00	N		1.4E+00	N		2.0E+03	N		7.8E+01	N
DIOCTYLPHTHALATE	117840	2.00E-02	H								7.3E+02	N		7.3E+01	N		2.7E+01	N		4.1E+04	N		1.6E+03	N
1,4-DIOXANE	123911			1.10E-02	I						6.1E+00	C		5.7E-01	C		2.9E-01	C		5.2E+02	C		5.8E+01	C
DIPHENYLAMINE	122394	2.50E-02	I								9.1E+02	N		9.1E+01	N		3.4E+01	N		5.1E+04	N		2.0E+03	N
1,2-DIPHENYLHYDRAZINE	122667			8.00E-01	I			8.00E-01	I		8.4E-02	C		7.8E-03	C		3.9E-03	C		7.2E+00	C		8.0E-01	C
DIQUAT	85007	2.20E-03	I								8.0E+01	N		8.0E+00	N		3.0E+00	N		4.5E+03	N		1.7E+02	N
DISULFOTON	298044	4.00E-05	I							y	2.4E-01	N		1.5E-01	N		5.4E-02	N		8.2E+01	N		3.1E+00	N
1,4-DITHIANE	505293	1.00E-02	I								3.7E+02	N		3.7E+01	N		1.4E+01	N		2.0E+04	N		7.8E+02	N
DIURON	330541	2.00E-03	I								7.3E+01	N		7.3E+00	N		2.7E+00	N		4.1E+03	N		1.6E+02	N
ENDOSULFAN	115297	6.00E-03	I								2.2E+02	N		2.2E+01	N		8.1E+00	N		1.2E+04	N		4.7E+02	N
ENDRIN	72208	3.00E-04	I								1.1E+01	N		1.1E+00	N		4.1E-01	N		6.1E+02	N		2.3E+01	N
EPICHLOROHYDRIN	106898	2.00E-03	H	9.90E-03	I	2.86E-04	I	4.20E-03	I		6.8E+00	C		1.0E+00	N		3.2E-01	C	*	5.8E+02	C	*	6.5E+01	C
ETHION	563122	5.00E-04	I								1.8E+01	N		1.8E+00	N		6.8E-01	N		1.0E+03	N		3.9E+01	N
2-ETHOXYETHANOL	110805	4.00E-01	H			5.70E-02	I				1.5E+04	N		2.1E+02	N		5.4E+02	N		8.2E+05	N		3.1E+04	N
ETHYL ACETATE	141786	9.00E-01	I							y	5.5E+03	N		3.3E+03	N		1.2E+03	N		1.8E+06	N		7.0E+04	N
ETHYLBENZENE	100414	1.00E-01	I			2.90E-01	I			y	1.3E+03	N		1.1E+03	N		1.4E+02	N		2.0E+05	N		7.8E+03	N
ETHYLENE DIAMINE	107153	2.00E-02	H								7.3E+02	N		7.3E+01	N		2.7E+01	N		4.1E+04	N		1.6E+03	N
ETHYLENE GLYCOL	107211	2.00E+00	I								7.3E+04	N		7.3E+03	N		2.7E+03	N		4.1E+06	N		1.6E+05	N
ETHYLENE GLYCOL, MONOBUTYL	111762					5.70E-03	H							2.1E+01	N									
ETHYLENE OXIDE	75218			1.00E+00	H			3.50E-01	H		5.7E-02	C		1.8E-02	C		3.2E-03	C		5.7E+00	C		6.4E-01	C
ETHYLENE THIOUREA	96457	8.00E-05	I	1.1E-01	H						8.1E-01	C	*	5.7E-02	C	*	2.9E-02	C	*	5.2E+01	C	*	5.8E+00	C
ETHYL ETHER	60297	2.00E-01	I							y	1.2E+03	N		7.3E+02	N		2.7E+02	N		4.1E+05	N		1.6E+04	N
ETHYL METHACRYLATE	97632	9.00E-02	H							y	5.5E+02	N		3.3E+02	N		1.2E+02	N		1.8E+05	N		7.0E+03	N
FENAMIPHOS	22224926	2.50E-04	I								9.1E+00	N		9.1E-01	N		3.4E-01	N		5.1E+02	N		2.0E+01	N
FLUOMETURON	2164172	1.30E-02	I								4.7E+02	N		4.7E+01	N		1.8E+01	N		2.7E+04	N		1.0E+03	N

Source: EPA-RBC [illegible] = Withdrawn from IRIS or HEAST Basis: C = Carcinogenic effects N = [illegible]genic effects 1 = RBC at HI of 0.1 < RBC-c

E = EPA-NCEA provisional value O = other

Chemical	CAS	RfDo mg/kg/d		CSFo 1/mg/kg/d		RfDi mg/kg/d		CSFi 1/mg/kg/d		VOC	Risk-based concentrations: Tap water ug/l			Ambient air ug/m3			Fish mg/kg			Soil Industrial mg/kg			Residential mg/kg	
FLUORINE	7782414	6.00E-02	I								2.2E+03	N		2.2E+02	N		8.1E+01	N		1.2E+05	N		4.7E+03	N
FOMESAFEN	72178020			1.90E-01	I						3.5E-01	C		3.3E-02	C		1.7E-02	C		3.0E+01	C		3.4E+00	C
FONOFOS	944229	2.00E-03	I								7.3E+01	N		7.3E+00	N		2.7E+00	N		4.1E+03	N		1.6E+02	N
FORMALDEHYDE	50000	2.00E-01	I					4.50E-02	I		7.3E+03	N		1.4E-01	C		2.7E+02	N		4.1E+05	N		1.6E+04	N
FORMIC ACID	64186	2.00E+00	H								7.3E+04	N		7.3E+03	N		2.7E+03	N		4.1E+06	N		1.6E+05	N
FURAN	110009	1.00E-03	I							y	6.1E+00	N		3.7E+00	N		1.4E+00	N		2.0E+03	N		7.8E+01	N
FURAZOLIDONE	67458			3.60E+00	H						1.8E-02	C		1.6E-03	C		6.3E-04	C		1.5E+00	C		1.7E-01	C
FURFURAL	98011	3.00E-03	I			1.00E-02	A				1.1E+02	N		3.7E+01	N		4.1E+00	N		6.1E+03	N		2.3E+02	N
GLYCIDALDEHYDE	765344	4.00E-04	I			2.90E-04	H				1.5E+01	N		1.1E+00	N		5.4E-01	N		8.2E+02	N		3.1E+01	N
GLYPHOSATE	1071836	1.00E-01	I								3.7E+03	N		3.7E+02	N		1.4E+02	N		2.0E+05	N		7.8E+03	N
HEPTACHLOR	76448	5.00E-04	I	4.50E+00	I			4.50E+00	I	y	2.3E-03	C		1.4E-03	C		7.0E-04	C		1.3E+00	C		1.4E-01	C
HEPTACHLOR EPOXIDE	1024573	1.30E-05	I	9.10E+00	I			9.10E+00	I	y	1.2E-03	C		6.9E-04	C		3.5E-04	C		6.3E-01	C		7.0E-02	C
HEXABROMOBENZENE	87821	2.00E-03	I								7.3E+01	N		7.3E+00	N		2.7E+00	N		4.1E+03	N		1.6E+02	N
HEXACHLOROBENZENE	118741	8.00E-04	I	1.60E+00	I			1.60E+00	I	y	6.6E-03	C		3.9E-03	C		2.0E-03	C		3.6E+00	C		4.0E-01	C
HEXACHLOROBUTADIENE	87683	2.00E-04	H	7.80E-02	I			7.80E-02	I	y	1.4E-01	C	I	8.0E-02	C	I	4.0E-02	C	I	7.3E+01	C	I	8.2E+00	C
ALPHA-HCH	319846			6.30E+00	I			6.30E+00	I		1.1E-02	C		9.9E-04	C		5.0E-04	C		9.1E-01	C		1.0E-01	C
BETA-HCH	319857			1.80E+00	I			1.80E+00	I		3.7E-02	C		3.5E-03	C		1.8E-03	C		3.2E+00	C		3.5E-01	C
GAMMA-HCH (LINDANE)	58899	3.00E-04	I	1.30E+00	H						5.2E-02	C		4.8E-03	C		2.4E-03	C		4.4E+00	C		4.9E-01	C
TECHNICAL HCH	608731			1.80E+00	I			1.80E+00	I		3.7E-02	C		3.5E-03	C		1.8E-03	C		3.2E+00	C		3.5E-01	C
HEXACHLOROCYCLOPENTADIENE	77474	7.00E-03	I			2.00E-05	H			y	1.5E-01	N		7.3E-02	N		9.5E+00	N		1.4E+04	N		5.5E+02	N
HEXACHLORODIBENZODIOXIN MI	19408743			6.20E+03	I			4.55E+03	I		1.1E-05	C		1.4E-06	C		5.1E-07	C		9.2E-04	C		1.0E-04	C
HEXACHLOROETHANE	67721	1.00E-03	I	1.40E-02	I			1.40E-02	I	y	7.5E-01	C	I	4.5E-01	C	I	2.3E-01	C	I	4.1E+02	C	I	4.6E+01	C
HEXACHLOROPHENE	70304	3.00E-04	I								1.1E+01	N		1.1E+00	N		4.1E-01	N		6.1E+02	N		2.3E+01	N
1,6-HEXAMETHYLENE DIISOCYAN	822060					2.90E-06	I							1.1E-02	N									
HEXANE	110543	6.00E-02	H			5.71E-02	I			y	3.5E+02	N		2.1E+02	N		8.1E+01	N		1.2E+05	N		4.7E+03	N
2-HEXANONE	591786	4.00E-02	E			1.4E-03	E				1.5E+03	N		5.1E+00	N		5.4E+01	N		8.2E+04	N		3.1E+03	N
HEXAZINONE	51235042	3.30E-02	I								1.2E+03	N		1.2E+02	N		4.5E+01	N		6.7E+04	N		2.6E+03	N
HMX	2691410	5.00E-02	I								1.8E+03	N		1.8E+02	N		6.8E+01	N		1.0E+05	N		3.9E+03	N
HYDRAZINE	302012			3.00E+00	I			1.70E+01	I		2.2E-02	C		3.7E-04	C		1.1E-03	C		1.9E+00	C		2.1E-01	C
HYDROGEN CHLORIDE	7647010					5.70E-03	I							2.1E+01	N									
HYDROGEN SULFIDE	7783064	3.00E-03	I			2.85E-04	I				1.1E+02	N		1.0E+00	N		4.1E+00	N		6.1E+03	N		2.3E+02	N
HYDROQUINONE	123319	4.00E-02	H								1.5E+03	N		1.5E+02	N		5.4E+01	N		8.2E+04	N		3.1E+03	N
IRON	7439896	3.00E-01	E								1.1E+04	N		1.1E+03	N		4.1E+02	N		6.1E+05	N		2.3E+04	N
ISOBUTANOL	78831	3.00E-01	I							y	1.8E+03	N		1.1E+03	N		4.1E+02	N		6.1E+05	N		2.3E+04	N
ISOPHORONE	78591	2.00E-01	I	9.50E-04	I						7.0E+01	C		6.6E+00	C		3.3E+00	C		6.0E+03	C		6.7E+02	C
ISOPROPALIN	33820530	1.50E-02	I								5.5E+02	N		5.5E+01	N		2.0E+01	N		3.1E+04	N		1.2E+03	N
ISOPROPYL METHYL PHOSPHONI	1832548	1.00E-01	I								3.7E+03	N		3.7E+02	N		1.4E+02	N		2.0E+05	N		7.8E+03	N
TETRAETHYLLEAD	78002	1.00E-07	I							y	6.1E-04	N		3.7E-04	N		1.4E-04	N		2.0E-01	N		7.8E-03	N
LITHIUM	7439932	2.00E-02	E								7.3E+02	N		7.3E+01	N		2.7E+01	N		4.1E+04	N		1.6E+03	N
MALATHION	121755	2.00E-02	I								7.3E+02	N		7.3E+01	N		2.7E+01	N		4.1E+04	N		1.6E+03	N
MALEIC ANHYDRIDE	108316	1.00E-01	I								3.7E+03	N		3.7E+02	N		1.4E+02	N		2.0E+05	N		7.8E+03	N
MANGANESE-NONFOOD	7439965	2.00E-02	I			1.43E-05	I				7.3E+02	N		5.2E-02	N		2.7E+01	N		4.1E+04	N		1.6E+03	N
MANGANESE-FOOD	7439965	1.40E-01	I			1.43E-05	I				5.1E+03	N		5.2E-02	N		1.9E+02	N		2.9E+05	N		1.1E+04	N
MEPHOSFOLAN	950107	9.00E-05	H								3.3E+00	N		3.3E-01	N		1.2E-01	N		1.8E+02	N		7.0E+00	N
MEPIQUAT CHLORIDE	24307264	3.00E-02	I								1.1E+03	N		1.1E+02	N		4.1E+01	N		6.1E+04	N		2.3E+03	N
MERCURIC CHLORIDE	7487947	3.00E-04	I								1.1E+01	N		1.1E+00	N		4.1E-01	N		6.1E+02	N		2.3E+01	N
MERCURY (INORGANIC)	7439976					8.60E-05	I							3.1E-01	N									
METHYLMERCURY	22967926	1.00E-04	I								3.7E+00	N		3.7E-01	N		1.4E-01	N		2.0E+02	N		7.8E+00	N
METHACRYLONITRILE	126987	1.00E-04	I			2.00E-04	A			y	1.0E+00	N		7.3E-01	N		1.4E-01	N		2.0E+02	N		7.8E+00	N
METHANOL	67561	5.00E-01	I								1.8E+04	N		1.8E+03	N		6.8E+02	N		1.0E+06	N		3.9E+04	N
METHIDATHION	950378	1.00E-03	I								3.7E+01	N		3.7E+00	N		1.4E+00	N		2.0E+03	N		7.8E+01	N

Source: EPA Region 3 RBC Table 4/15/98 W = Withdrawn from IRIS or HEAST Basis: C = Carcinogen N = Noncarcinogenic effects I = RBC at HI of 0.1 < RBC-c

E = EPA-NCEA provisional value O = other

Chemical	CAS	RfDo mg/kg/d		CSFo 1/mg/kg/d		RfDi mg/kg/d		CSFi 1/mg/kg/d		VOC	Risk-based concentrations: Tap water ug/l		Ambient air ug/m3		Fish mg/kg		Soil Industrial mg/kg		Residential mg/kg	
METHOXYCHLOR	72435	5.00E-03	I								1.8E+02	N	1.8E+01	N	6.8E+00	N	1.0E+04	N	3.9E+02	N
METHYL ACETATE	79209	1.00E+00	H							y	6.1E+03	N	3.7E+03	N	1.4E+03	N	2.0E+06	N	7.8E+04	N
METHYL ACRYLATE	96333	3.00E-02	A							y	1.8E+02	N	1.1E+02	N	4.1E+01	N	6.1E+04	N	2.3E+03	N
2-METHYLANILINE	95534			2.40E-01	H						2.8E-01	C	2.6E-02	C	1.3E-02	C	2.4E+01	C	2.7E+00	C
4-(2-METHYL-4-CHLOROPHENOXY	94815	1.00E-02	I								3.7E+02	N	3.7E+01	N	1.4E+01	N	2.0E+04	N	7.8E+02	N
2-METHYL-4-CHLOROPHENOXYA	94746	5.00E-04	I								1.8E+01	N	1.8E+00	N	6.8E-01	N	1.0E+03	N	3.9E+01	N
2-(2-METHYL-4-CHLOROPHENOXY	93652	1.00E-03	I								3.7E+01	N	3.7E+00	N	1.4E+00	N	2.0E+03	N	7.8E+01	N
METHYLCYCLOHEXANE	108872					8.60E-01	H			y	6.3E+03	N	3.1E+03	N						
METHYLENE BROMIDE	74953	1.00E-02	A							y	6.1E+01	N	3.7E+01	N	1.4E+01	N	2.0E+04	N	7.8E+02	N
METHYLENE CHLORIDE	75092	6.00E-02	I	7.50E-03	I	8.60E-01	H	1.65E-03	I	y	4.1E+00	C	3.8E+00	C	4.2E-01	C	7.6E+02	C	8.5E+01	C
4,4'-METHYLENE BIS(2-CHLOROA	101144	7.00E-04	H	1.30E-01	H			1.30E-01	H		5.2E-01	C	4.8E-02	C	2.4E-02	C	4.4E+01	C	4.9E-00	C
4,4'-METHYLENE BIS(N,N'-DIMETH	101611			4.60E-02	I						1.5E+00	C	1.4E-01	C	6.9E-02	C	1.2E+02	C	1.4E-01	C
4,4'-METHYLENEDIPHENYL ISOCY	101688					1.7E-04	I						6.2E-01	N						
METHYL ETHYL KETONE (2-BUTA	78933	6.00E-01	I			2.86E-01	I			y	1.9E+03	N	1.0E+03	N	6.1E+02	N	1.2E+06	N	4.7E+04	N
METHYL HYDRAZINE	60344			1.10E+00	W						6.1E-02	C	5.7E-03	C	2.9E-03	C	5.2E+00	C	5.9E-01	C
METHYL ISOBUTYL KETONE (4-M	108101	8.00E-02	H			2.00E-02	A				2.9E+03	N	7.3E+01	N	1.1E+02	N	1.6E+05	N	6.3E+03	N
METHYL METHACRYLATE	80626	1.40E+00	I			2.00E-01	I			y	1.4E+03	N	7.3E+02	N	1.9E+03	N	2.9E+06	N	1.1E+05	N
2-METHYL-5-NITROANILINE	99558			3.30E-02	H						2.0E+00	C	1.9E-01	C	9.6E-02	C	1.7E+02	C	1.9E+01	C
METHYL PARATHION	298000	2.50E-04	I								9.1E+00	N	9.1E-01	N	3.4E-01	N	5.1E+02	N	2.0E+01	N
2-METHYLPHENOL	95487	5.00E-02	I								1.8E+03	N	1.8E+02	N	6.8E+01	N	1.0E+05	N	3.9E+03	N
3-METHYLPHENOL	108394	5.00E-02	I								1.8E+03	N	1.8E+02	N	6.8E+01	N	1.0E+05	N	3.9E+03	N
4-METHYLPHENOL	106445	5.00E-03	H								1.8E+02	N	1.8E+01	N	6.8E+00	N	1.0E+04	N	3.9E+02	N
METHYLSTYRENE MIX	25013154	6.00E-03	A			1.00E-02	A			y	5.5E+01	N	3.7E+01	N	8.1E+00	N	1.2E+04	N	4.7E+02	N
ALPHA-METHYLSTYRENE	98839	7.00E-02	A							y	4.3E+02	N	2.6E+02	N	9.6E+01	N	1.4E+05	N	5.5E+03	N
METHYL TERT-BUTYL ETHER	1634044					8.57E-01	I			y	6.3E+03	N	3.1E+03	N						
METOLACHLOR (DUAL)	51218452	1.50E-01	I								5.5E+03	N	5.5E+02	N	2.0E+02	N	3.1E+05	N	1.2E+04	N
MIREX	2385855	2.00E-04	I							y	1.2E+00	N	7.3E-01	N	2.7E-01	N	4.1E+02	N	1.6E+01	N
MOLYBDENUM	7439987	5E-03	I								1.8E+02	N	1.8E+01	N	6.8E+00	N	1.0E+04	N	3.9E+02	N
MONOCHLORAMINE	10599903	1E-01	I								3.7E+03	N	3.7E+02	N	1.4E+02	N	2.0E+05	N	7.8E+03	N
NALED	300765	2E-03	I								7.3E+01	N	7.3E+00	N	2.7E+00	N	4.1E+03	N	1.6E+02	N
NICKEL REFINERY DUST								8.4E-01	I				7.5E-03	C						
NICKEL	7440020	2.00E-02	I								7.3E+02	N	7.3E+01	N	2.7E+01	N	4.1E+04	N	1.6E+03	N
NITRATE	14797558	1.60E+00	I								5.8E+04	N	5.8E+03	N	2.2E+03	N	3.3E+06	N	1.3E+05	N
NITRIC OXIDE	10102439	1.00E-01	W							y	6.1E+02	N	3.7E+02	N	1.4E+02	N	2.0E+05	N	7.8E+03	N
NITRITE	14797650	1.00E-01	I								3.7E+03	N	3.7E+02	N	1.4E+02	N	2.0E+05	N	7.8E+03	N
2-NITROANILINE	88744					5.70E-05	H						2.1E-01	N						
NITROBENZENE	98953	5.00E-04	I			6.00E-04	A				1.8E+01	N	2.2E+00	N	6.8E-01	N	1.0E+03	N	3.9E+01	N
NITROFURANTOIN	67209	7.00E-02	H								2.6E+03	N	2.6E+02	N	9.5E+01	N	1.4E+05	N	5.5E+03	N
NITROFURAZONE	59870			1.50E+00	H						4.5E-02	C	4.2E-03	C	2.1E-03	C	3.8E+00	C	4.3E-01	C
NITROGEN DIOXIDE	10102440	1.00E+00	W							y	6.1E+03	N	3.7E+03	N	1.4E+03	N	2.0E+06	N	7.8E+04	N
NITROGLYCERIN	55630			2.10E+00	E						3.2E-02	C	3.0E-03	C	1.5E-03	C	2.7E+00	C	3.0E-01	C
4-NITROPHENOL	100027	8.00E-03	E								2.9E+02	N	2.9E+01	N	1.1E+01	N	1.6E+04	N	6.3E+02	N
2-NITROPROPANE	79469					5.70E-03	I	9.40E+00	H				6.7E-04	C						
N-NITROSO-DI-N-BUTYLAMINE	924163			5.40E+00	I			5.60E+00	I		1.2E-02	C	1.1E-03	C	5.8E-04	C	1.1E+00	C	1.2E-01	C
N-NITROSODIETHANOLAMINE	1116547			2.80E+00	I						2.4E-02	C	2.2E-03	C	1.1E-03	C	2.0E+00	C	2.3E-01	C

Source EPA-Rt RBC Table 4/15/98 = Withdrawn from IRIS or HEAST Basis: C = Carcinogen N = Noncarcinogenic effects 1 = RBC at HI of 0.1 < RBC-c

E = EPA-NCEA provisional value O = other

Chemical	CAS	RfDo mg/kg/d		CSFo 1/mg/kg/d		RfDi mg/kg/d		CSFi 1/mg/kg/d		VOC	Risk-based concentrations: Tap water ug/l		Ambient air ug/m3		Fish mg/kg		Soil Industrial mg/kg		Residential mg/kg	
N-NITROSODIETHYLAMINE	55185			1.50E+02	I			1.50E+02	I		4.5E-04	C	4.2E-05	C	2.1E-05	C	3.9E-02	C	4.3E-03	C
N-NITROSODIMETHYLAMINE	62759			5.10E+01	I			5.10E+01	I		1.3E-03	C	1.2E-04	C	6.2E-05	C	1.1E-01	C	1.3E-02	C
N-NITROSODIPHENYLAMINE	86306			4.90E-03	I						1.4E+01	C	1.3E+00	C	6.4E-01	C	1.2E+03	C	1.3E+02	C
N-NITROSODIPROPYLAMINE	621647			7.00E+00	I						9.6E-03	C	8.9E-04	C	4.5E-04	C	8.2E-01	C	9.1E-02	C
N-NITROSO-N-ETHYLUREA	759739			1.40E+02	H						4.8E-04	C	4.5E-05	C	2.3E-05	C	4.1E-02	C	4.6E-03	C
N-NITROSO-N-METHYLETHYLAM	10595956			2.20E+01	I						3.0E-03	C	2.8E-04	C	1.4E-04	C	2.6E-01	C	2.9E-02	C
N-NITROSOPYRROLIDINE	930552			2.10E+00	I			2.10E+00	I		3.2E-02	C	3.0E-03	C	1.5E-03	C	2.7E+00	C	3.0E-01	C
M-NITROTOLUENE	99081	2.00E-02	E							y	1.2E+02	N	7.3E+01	N	2.7E+01	N	4.1E+04	N	1.6E+03	N
O-NITROTOLUENE	88722	1.00E-02	H							y	6.1E+01	N	3.7E+01	N	1.4E+01	N	2.0E+04	N	7.8E+02	N
P-NITROTOLUENE	99990	1.00E-02	H							y	6.1E+01	N	3.7E+01	N	1.4E+01	N	2.0E+04	N	7.8E+02	N
ORYZALIN	19044883	5.00E-02	I								1.8E+03	N	1.8E+02	N	6.8E+01	N	1.0E+05	N	3.9E+03	N
OXADIAZON	19666309	5.00E-03	I								1.8E+02	N	1.8E+01	N	6.8E+00	N	1.0E+04	N	3.9E+02	N
OXAMYL	23135220	2.50E-02	I								9.1E+02	N	9.1E+01	N	3.4E+01	N	5.1E+04	N	2.0E+03	N
OXYFLUORFEN	42874033	3.00E-03	I								1.1E+02	N	1.1E+01	N	4.1E+00	N	6.1E+03	N	2.3E+02	N
PARAQUAT DICHLORIDE	1910425	4.50E-03	I								1.6E+02	N	1.6E+01	N	6.1E+00	N	9.2E+03	N	3.5E+02	N
PARATHION	56382	6.00E-03	H								2.2E+02	N	2.2E+01	N	8.1E+00	N	1.2E+04	N	4.7E+02	N
PENTACHLOROBENZENE	608935	8.00E-04	I							y	4.9E+00	N	2.9E+00	N	1.1E+00	N	1.6E+03	N	6.3E+01	N
PENTACHLORONITROBENZENE	82688	3.00E-03	I	2.60E-01	H					y	4.1E-02	C	2.4E-02	C	1.2E-02	C	2.2E+01	C	2.5E+00	C
PENTACHLOROPHENOL	87865	3.00E-02	I	1.20E-01	I						5.6E-01	C	5.2E-02	C	2.6E-02	C	4.8E+01	C	5.3E+00	C
PERMETHRIN	52645531	5.00E-02	I								1.8E+03	N	1.8E+02	N	6.8E+01	N	1.0E+05	N	3.9E+03	N
PHENOL	108952	6.00E-01	I								2.2E+04	N	2.2E+03	N	8.1E+02	N	1.2E+06	N	4.7E+04	N
M-PHENYLENEDIAMINE	108452	6.00E-03	I								2.2E+02	N	2.2E+01	N	8.1E+00	N	1.2E+04	N	4.7E+02	N
O-PHENYLENEDIAMINE	95545			4.70E-02	H						1.4E+00	C	1.3E-01	C	5.7E-02	C	1.2E+02	C	1.4E+01	C
P-PHENYLENEDIAMINE	106503	1.90E-01	H								6.9E+03	N	6.9E+02	N	2.6E+02	N	3.9E+05	N	1.5E+04	N
2-PHENYLPHENOL	90437			1.90E-03	H						3.5E+01	C	3.3E+00	C	1.7E+00	C	3.0E+03	C	3.4E+02	C
PHOSPHINE	7803512	3.00E-04	I			8.60E-05	I				1.1E+01	N	3.1E-01	N	4.1E-01	N	6.1E+02	N	2.3E+01	N
PHOSPHORIC ACID	7664382					2.90E-03	I						1.1E+01	N						
PHOSPHORUS (WHITE)	7723140	2.00E-05	I								7.3E-01	N	7.3E-02	N	2.7E-02	N	4.1E+01	N	1.6E+00	N
P-PHTHALIC ACID	100210	1.00E+00	H								3.7E+04	N	3.7E+03	N	1.4E+03	N	2.0E+06	N	7.8E+04	N
PHTHALIC ANHYDRIDE	85449	2.00E+00	I			3.43E-02	H				7.3E+04	N	1.3E+02	N	2.7E+03	N	4.1E+06	N	1.6E+05	N

Source: EPA R6 RBC Table 4/15/08 Withdrawn from IRIS or HEAST Basis: C = Carcinogenic effects; N = Noncarcinogenic effects; I = RBC at HI of 0.1 < RBC-c

E = EPA-NCEA provisional value; O = other

Chemical	CAS	RfDo mg/kg/d		CSFo 1/mg/kg/d		RfDi mg/kg/d		CSFi 1/mg/kg/d		VOC	Risk-based concentrations: Tap water ug/l			Ambient air ug/m3			Fish mg/kg			Soil Industrial mg/kg			Residential mg/kg	
POLYBROMINATED BIPHENYLS		7.00E-06	H	8.90E+00	H						7.5E-03	C		7.0E-04	C		3.5E-04	C		6.4E-01	C		7.2E-02	C
POLYCHLORINATED BIPHENYLS	1336363			2.00E+00	I			2.00E+00	I		3.3E-02	C		3.1E-03	C		1.6E-03	C		2.9E+00	C		3.2E-01	C
AROCLOR-1016	12674112	7.00E-05	I	7.00E-02	I			7.00E-02	I		9.8E-01	C	I	8.9E-02	C	I	4.5E-02	C	I	8.2E+01	C	I	5.5E+00	N
AROCLOR-1221	11104282			2.00E+00	I			2.00E+00	I		3.3E-02	C		3.1E-03	C		1.6E-03	C		2.9E+00	C		3.2E-01	C
AROCLOR-1232	11141165			2.00E+00	I			2.00E+00	I		3.3E-02	C		3.1E-03	C		1.6E-03	C		2.9E+00	C		3.2E-01	C
AROCLOR-1242	53469219			2.00E+00	I			2.00E+00	I		3.3E-02	C		3.1E-03	C		1.6E-03	C		2.9E+00	C		3.2E-01	C
AROCLOR-1248	12672296			2.00E+00	I			2.00E+00	I		3.3E-02	C		3.1E-03	C		1.6E-03	C		2.9E+00	C		3.2E-01	C
AROCLOR-1254	11097691	2.00E-05	I	2.00E+00	I			2.00E+00	I		3.3E-02	C		3.1E-03	C		1.6E-03	C		2.9E+00	C		3.2E-01	C
AROCLOR-1260	11096825			2.00E+00	I			2.00E+00	I		3.3E-02	C		3.1E-03	C		1.6E-03	C		2.9E+00	C		3.2E-01	C
POLYCHLORINATED TERPHENYLS	61788338			4.50E+00	E						1.5E-02	C		1.4E-03	C		7.0E-04	C		1.3E+00	C		1.4E-01	C
POLYNUCLEAR AROMATIC HYDROCARBONS:																								
ACENAPHTHENE	83329	6.00E-02	I								2.2E+03	N		2.2E+02	N		8.1E+01	N		1.2E+05	N		4.7E+03	N
ANTHRACENE	120127	3.00E-01	I								1.1E+04	N		1.1E+03	N		4.1E+02	N		6.1E+05	N		2.3E+04	N
BENZ[A]ANTHRACENE	56553			7.30E-01	E						9.2E-02	C		8.6E-03	C		4.3E-03	C		7.8E+00	C		8.7E-01	C
BENZO[B]FLUORANTHENE	205992			7.30E-01	E						9.2E-02	C		8.6E-03	C		4.3E-03	C		7.8E+00	C		8.7E-01	C
BENZO[K]FLUORANTHENE	207089			7.30E-02	E						9.2E-01	C		8.6E-02	C		4.3E-02	C		7.8E+01	C		8.7E+00	C
BENZO[A]PYRENE	50328			7.30E+00	I			3.10E+00	E		9.2E-03	C		2.0E-03	C		4.3E-04	C		7.8E-01	C		8.7E-02	C
CARBAZOLE	86748			2.00E-02	H						3.3E+00	C		3.1E-01	C		1.6E-01	C		2.9E+02	C		3.2E+01	C
CHRYSENE	218019			7.30E-03	E						9.2E+00	C		8.6E-01	C		4.3E-01	C		7.8E+02	C		8.7E+01	C
DIBENZ[A,H]ANTHRACENE	53703			7.30E+00	E						9.2E-03	C		8.6E-04	C		4.3E-04	C		7.8E-01	C		8.7E-02	C
DIBENZOFURAN	132649	4.00E-03	E								1.5E+02	N		1.5E+01	N		5.4E+00	N		8.2E+03	N		3.1E+02	N
FLUORANTHENE	206440	4.00E-02	I								1.5E+03	N		1.5E+02	N		5.4E+01	N		8.2E+04	N		3.1E+03	N
FLUORENE	86737	4.00E-02	I								1.5E+03	N		1.5E+02	N		5.4E+01	N		8.2E+04	N		3.1E+03	N
INDENO[1,2,3-C,D]PYRENE	193395			7.30E-01	E						9.2E-02	C		8.6E-03	C		4.3E-03	C		7.8E+00	C		8.7E-01	C
2-METHYLNAPHTHALENE	91576	4.00E-02	E								1.5E+03	N		1.5E+02	N		5.4E+01	N		8.2E+04	N		3.1E+03	N
NAPHTHALENE	91203	4.00E-02	E			1.00E-04	E				1.5E+03	N		3.7E-01	N		5.4E+01	N		8.2E+04	N		3.1E+03	N
PYRENE	129000	3.00E-02	I								1.1E+03	N		1.1E+02	N		4.1E+01	N		6.1E+04	N		2.3E+03	N
PROMETON	1610180	1.50E-02	I								5.5E+02	N		5.5E+01	N		2.0E+01	N		3.1E+04	N		1.2E+03	N
PROMETRYN	7287196	4.00E-03	I								1.5E+02	N		1.5E+01	N		5.4E+00	N		8.2E+03	N		3.1E+02	N
PROPACHLOR	1918167	1.30E-02	I								4.7E+02	N		4.7E+01	N		1.8E+01	N		2.7E+04	N		1.0E+03	N
PROPANIL	709988	5.00E-03	I								1.8E+02	N		1.8E+01	N		6.8E+00	N		1.0E+04	N		3.9E+02	N
PROPARGITE	2312358	2.00E-02	I								7.3E+02	N		7.3E+01	N		2.7E+01	N		4.1E+04	N		1.6E+03	N
N-PROPYLBENZENE		1.00E-02	E							y	5.1E+01	N		3.7E+01	N		1.4E+01	N		2.0E+04	N		7.8E+02	N
PROPYLENE GLYCOL	57556	2.00E+01	H								7.3E+05	N		7.3E+04	N		2.7E+04	N		4.1E+07	N		1.6E+06	N
PROPYLENE GLYCOL, MONOETHY	52125538	7.00E-01	H								2.6E+04	N		2.6E+03	N		9.5E+02	N		1.4E+06	N		5.5E+04	N
PROPYLENE GLYCOL, MONOMETH	107982	7.00E-01	H			5.70E-01	I				2.6E+04	N		2.1E+03	N		9.5E+02	N		1.4E+06	N		5.5E+04	N
PURSUIT	81335775	2.50E-01	I								9.1E+03	N		9.1E+02	N		3.4E+02	N		5.1E+05	N		2.0E+04	N
PYRIDINE	110861	1.00E-03	I								3.7E+01	N		3.7E+00	N		1.4E+00	N		2.0E+03	N		7.8E+01	N
QUINOLINE	91225			1.20E+01	H						5.6E-03	C		5.2E-04	C		2.6E-04	C		4.8E-01	C		5.3E-02	C
RDX	121824	3.00E-03	I	1.10E-01	I						6.1E-01	C		5.7E-02	C		2.9E-02	C		5.2E+01	C		5.8E+00	C
RESMETHRIN	10453868	3.00E-02	I								1.1E+03	N		1.1E+02	N		4.1E+01	N		6.1E+04	N		2.3E+03	N
RONNEL	299843	5.00E-02	H								1.8E+03	N		1.8E+02	N		6.8E+01	N		1.0E+05	N		3.9E+03	N
ROTENONE	83794	4.00E-03	I								1.5E+02	N		1.5E+01	N		5.4E+00	N		8.2E+03	N		3.1E+02	N
SELENIOUS ACID	7783008	5.00E-03	I								1.8E+02	N		1.8E+01	N		6.8E+00	N		1.0E+04	N		3.9E+02	N
SELENIUM	7782492	5.00E-03	I								1.8E+02	N		1.8E+01	N		6.8E+00	N		1.0E+04	N		3.9E+02	N
SILVER	7440224	5.00E-03	I								1.8E+02	N		1.8E+01	N		6.8E+00	N		1.0E+04	N		3.9E+02	N
SIMAZINE	122349	5.00E-03	I	1.20E-01	H						5.6E-01	C		5.2E-02	C		2.6E-02	C		4.8E+01	C		5.3E+00	C
SODIUM AZIDE	26628228	4.00E-03	I								1.5E+02	N		1.5E+01	N		5.4E+00	N		8.2E+03	N		3.1E+02	N

Source EPA Rs RBC Table 4/15/98 = Withdrawn from IRIS or HEAST Basis C = Carcinogen. I = Noncarcinogenic effects f = RBC at HI of 0.1 < RBC-c

E = EPA-NCEA provisional value O = other

Chemical	CAS	RfDo mg/kg/d		CSFo 1/mg/kg/d		RfDi mg/kg/d		CSFi 1/mg/kg/d		VOC	Risk-based concentrations: Tap water ug/l		Ambient air ug/m3		Fish mg/kg		Soil Industrial mg/kg		Residential mg/kg	
SODIUM DIETHYLDITHIOCARBAM	148185	3.00E-02	I	2.70E-01	H						2.5E-01	C	2.3E-02	C	1.2E-02	C	2.1E+01	C	2.4E+00	C
STRONTIUM, STABLE	7440246	6.00E-01	I								2.2E+04	N	2.2E+03	N	8.1E+02	N	1.2E+06	N	4.7E+04	N
STRYCHNINE	57249	3.00E-04	I								1.1E+01	N	1.1E+00	N	4.1E-01	N	6.1E+02	N	2.3E+01	N
STYRENE	100425	2.00E-01	I			2.86E-01	I			y	1.6E+03	N	1.0E+03	N	2.7E+02	N	4.1E+05	N	1.6E+04	N
2,3,7,8-TETRACHLORODIBENZODI	1746016			1.50E+05	H			1.50E+05	H		4.5E-07	C	4.2E-08	C	2.1E-08	C	3.8E-05	C	4.3E-06	C
1,2,4,5-TETRACHLOROBENZENE	95943	3.00E-04	I							y	1.8E+00	N	1.1E+00	N	4.1E-01	N	6.1E+02	N	2.3E+01	N
1,1,1,2-TETRACHLOROETHANE	630206	3.00E-02	I	2.60E-02	I			2.60E-02	I	y	4.1E-01	C	2.4E-01	C	1.2E-01	C	2.2E+02	C	2.5E+01	C
1,1,2,2-TETRACHLOROETHANE	79345			2.00E-01	I			2.00E-01	I	y	5.3E-02	C	3.1E-02	C	1.6E-02	C	2.9E+01	C	3.2E+00	C
TETRACHLOROETHENE	127184	1.00E-02	I	5.20E-02	E	1.4E-01	E	2.00E-03	E	y	1.1E+00	C	3.1E+00	C	6.1E-02	C	1.1E+02	C	1.2E+01	C
2,3,4,6-TETRACHLOROPHENOL	58902	3.00E-02	I								1.1E+03	N	1.1E+02	N	4.1E+01	N	6.1E+04	N	2.3E+03	N
P,A,A,A-TETRACHLOROTOLUENE	5216251			2.00E+01	H					y	5.3E-04	C	3.1E-04	C	1.6E-04	C	2.9E-01	C	3.2E-02	C
1,1,1,2-TETRAFLUOROETHANE	811972					2.29E+01	I			y	1.7E+05	N	8.4E+04	N						
TETRYL	479458	1.00E-02	H								3.7E+02	N	3.7E+01	N	1.4E+01	N	2.0E+04	N	7.8E+02	N
THALLIC OXIDE	1314325	7.00E-05	W								2.6E+00	N	2.6E-01	N	9.5E-02	N	1.4E+02	N	5.5E+00	N
THALLIUM	7440280	7.00E-05	O								2.6E+00	N	2.6E-01	N	9.5E-02	N	1.4E+02	N	5.5E+00	N
THALIUM ACETATE	563688	9.00E-05	I								3.3E+00	N	3.3E-01	N	1.2E-01	N	1.8E+02	N	7.0E+00	N
THALLIUM CARBONATE	6533739	8.00E-05	I								2.9E+00	N	2.9E-01	N	1.1E-01	N	1.6E+02	N	6.3E+00	N
THALLIUM CHLORIDE	7791120	8.00E-05	I								2.9E+00	N	2.9E-01	N	1.1E-01	N	1.6E+02	N	6.3E+00	N
THALLIUM NITRATE	10102451	9.00E-05	I								3.3E+00	N	3.3E-01	N	1.2E-01	N	1.8E+02	N	7.0E+00	N
THALLIUM SULFATE (2:1)	7446186	8.00E-05	I								2.9E+00	N	2.9E-01	N	1.1E-01	N	1.6E+02	N	5.3E+00	N
THIOBENCARB	28249776	1.00E-02	I								3.7E+02	N	3.7E+01	N	1.4E+01	N	2.0E+04	N	7.8E+02	N
TIN	7440315	6.00E-01	H								2.2E+04	N	2.2E+03	N	8.1E+02	N	1.2E+06	N	4.7E+04	N
TITANIUM	7440326	4.00E+00	E			8.60E-03	E				1.5E+05	N	3.1E+01	N	5.4E+03	N	8.2E+06	N	3.1E+05	N
TITANIUM DIOXIDE	13463677	4.00E+00	E			8.60E-03	E				1.5E+05	N	3.1E+01	N	5.4E+03	N	8.2E+06	N	3.1E+05	N
TOLUENE	108883	2.00E-01	I			1.14E-01	I			y	7.5E+02	N	4.2E+02	N	2.7E+02	N	4.1E+05	N	1.6E+04	N
TOLUENE-2,4-DIAMINE	95807			3.20E+00	H						2.1E-02	C	2.0E-03	C	9.9E-04	C	1.8E+00	C	2.0E-01	C
TOLUENE-2,5-DIAMINE	95705	6.00E-01	H								2.2E+04	N	2.2E+03	N	8.1E+02	N	1.2E+06	N	4.7E+04	N
TOLUENE-2,6-DIAMINE	823405	2.00E-01	H								7.3E+03	N	7.3E+02	N	2.7E+02	N	4.1E+05	N	1.6E+04	N
P-TOLUIDINE	106490			1.90E-01	H						3.5E-01	C	3.3E-02	C	1.7E-02	C	3.0E+01	C	3.4E+00	C
TOXAPHENE	8001352			1.10E+00	I			1.10E+00	I		6.1E-02	C	5.7E-03	C	2.9E-03	C	5.2E+00	C	5.8E-01	C
1,2,4-TRIBROMOBENZENE	615543	5.00E-03	I							y	3.0E+01	N	1.8E+01	N	6.8E+00	N	1.0E+04	N	3.9E+02	N
TRIBUTYLTIN OXIDE	56359	3.00E-04	I								1.1E+01	N	1.1E+00	N	4.1E-01	N	6.1E+02	N	2.3E+01	N
2,4,6-TRICHLOROANILINE	634935			3.40E-02	H						2.0E+00	C	1.8E-01	C	9.3E-02	C	1.7E+02	C	1.9E+01	C
1,2,4-TRICHLOROBENZENE	120821	1.00E-02	I			5.70E-02	H			y	1.9E+02	N	2.1E+02	N	1.4E+01	N	2.0E+04	N	7.8E+02	N
1,1,1-TRICHLOROETHANE	71556	2.00E-02	E			2.86E-01	E			y	5.4E+02	N	1.0E+03	N	2.7E+01	N	4.1E+04	N	1.6E+03	N
1,1,2-TRICHLOROETHANE	79005	4.00E-03	I	5.70E-02	I			5.60E-02	I	y	1.9E-01	C	1.1E-01	C	5.5E-02	C	1.0E+02	C	1.1E+01	C
TRICHLOROETHENE	79016	6.00E-03	E	1.10E-02	E			6.00E-03	E	y	1.6E+00	C	1.0E+00	C	2.9E-01	C	5.2E+02	C	5.8E+01	C
TRICHLOROFLUOROMETHANE	75694	3.00E-01	I			2.00E-01	A			y	1.3E+03	N	7.3E+02	N	4.1E+02	N	6.1E+05	N	2.3E+04	N
2,4,5-TRICHLOROPHENOL	95954	1.00E-01	I								3.7E+03	N	3.7E+02	N	1.4E+02	N	2.0E+05	N	7.8E+03	N
2,4,6-TRICHLOROPHENOL	88062			1.10E-02	I			1.00E-02	I		6.1E+00	C	6.3E-01	C	2.9E-01	C	5.2E+02	C	5.8E+01	C
2,4,5-T	93765	1.00E-02	I								3.7E+02	N	3.7E+01	N	1.4E+01	N	2.0E+04	N	7.8E+02	N
2-(2,4,5-TRICHLOROPHENOXY)PR	93721	8.00E-03	I								2.9E+02	N	2.9E+01	N	1.1E+01	N	1.6E+04	N	6.3E+02	N

Source: EPA-R[illegible] RBC Table 4/15/98 W = Withdrawn from IRIS or HEAST Basis: C = Carcinogen. N = Noncarcinogenic effects I = RBC at HI of 0.1 < RBC-c

E = EPA-NCEA provisional value O = other

Chemical	CAS	RfDo mg/kg/d		CSFo 1/mg/kg/d		RfDi mg/kg/d		CSFi 1/mg/kg/d		VOC	Risk-based concentrations: Tap water ug/l			Ambient air ug/m3			Fish mg/kg			Soil Industrial mg/kg			Residential mg/kg	
1,1,2-TRICHLOROPROPANE	598776	5.00E-03	I							y	3.0E+01	N		1.8E+01	N		6.8E+00	N		1.0E+04	N		3.9E+02	N
1,2,3-TRICHLOROPROPANE	96184	6.00E-03	I	7.00E+00	H					y	1.5E-03	C		8.9E-04	C		4.5E-04	C		8.2E-01	C		9.1E-02	C
1,2,3-TRICHLOROPROPENE	96195	5.00E-03	H							y	3.0E+01	N		1.8E+01	N		6.8E+00	N		1.0E+04	N		3.9E+02	N
1,1,2-TRICHLORO-1,2,2-TRIFLUOR	76131	3.00E+01	I			8.60E+00	H			y	5.9E+04	N		3.1E+04	N		4.1E+04	N		6.1E+07	N		2.3E+06	N
1,2,4-TRIMETHYLBENZENE	95636	5.00E-02	E			1.70E-03	E			y	1.2E+01	N		6.2E+00	N		6.8E+01	N		1.0E+05	N		3.9E+03	N
1,3,5-TRIMETHYLBENZENE	108678	5.00E-02	E			1.70E-03	E			y	1.2E+01	N		6.2E+00	N		6.8E+01	N		1.0E+05	N		3.9E+03	N
TRIMETHYL PHOSPHATE	512561			3.70E-02	H						1.8E+00	C		1.7E-01	C		8.5E-02	C		1.5E+02	C		1.7E+01	C
1,3,5-TRINITROBENZENE	99354	3.00E-02	I								1.1E+03	N		1.1E+02	N		4.1E+01	N		6.1E+04	N		2.3E+03	N
2,4,6-TRINITROTOLUENE	118967	5.00E-04	I	3.00E-02	I						2.2E+00	C	I	2.1E-01	C	I	1.1E-01	C	I	1.9E+02	C	I	2.1E+01	C
URANIUM (SOLUBLE SALTS)		3.00E-03	I								1.1E+02	N		1.1E+01	N		4.1E+00	N		6.1E+03	N		2.3E+02	N
VANADIUM	7440622	7.00E-03	H								2.6E+02	N		2.6E+01	N		9.5E+00	N		1.4E+04	N		5.5E+02	N
VANADIUM PENTOXIDE	1314621	9.00E-03	I								3.3E+02	N		3.3E+01	N		1.2E+01	N		1.8E+04	N		7.0E+02	N
VANADIUM SULFATE	16785812	2.00E-02	H								7.3E+02	N		7.3E+01	N		2.7E+01	N		4.1E+04	N		1.6E+03	N
VINCLOZOLIN	50471448	2.50E-02	I								9.1E+02	N		9.1E+01	N		3.4E+01	N		5.1E+04	N		2.0E+03	N
VINYL ACETATE	108054	1.00E+00	H			5.71E-02	I			y	4.1E+02	N		2.1E+02	N		1.4E+03	N		2.0E+06	N		7.8E+04	N
VINYL BROMIDE	593602					8.60E-04	I			y	6.3E+00	N		3.1E+00	N									
VINYL CHLORIDE	75014			1.90E+00	H			3.00E-01	H	y	1.9E-02	C		2.1E-02	C		1.7E-03	C		3.0E+00	C		3.4E-01	C
WARFARIN	81812	3.00E-04	I								1.1E+01	N		1.1E+00	N		4.1E-01	N		6.1E+02	N		2.3E+01	N
M-XYLENE	108383	2.00E+00	H							y	1.2E+04	N		7.3E+03	N		2.7E+03	N		4.1E+06	N		1.6E+05	N
O-XYLENE	95476	2.00E+00	H							y	1.2E+04	N		7.3E+03	N		2.7E+03	N		4.1E+06	N		1.6E+05	N
P-XYLENE	106423									y														
XYLENES	1330207	2.00E+00	I							y	1.2E+04	N		7.3E+03	N		2.7E+03	N		4.1E+06	N		1.6E+05	N
ZINC	7440666	3.00E-01	I								1.1E+04	N		1.1E+03	N		4.1E+02	N		6.1E+05	N		2.3E+04	N
ZINC PHOSPHIDE	1314847	3E-04	I								1.1E+01	N		1.1E+00	N		4.1E-01	N		6.1E+02	N		2.3E+01	N
ZINEB	12122677	5E-02	I								1.8E+03	N		1.8E+02	N		6.8E+01	N		1.0E+05	N		3.9E+03	N