STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

"Better Service for a Better Environment"

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: www.deq.state.mi.us

RUSSELL J. HARDING, Director

REPLY TO:

JACKSON DISTRICT OFFICE
STATE OFFICE BUILDING
301 E LOUIS GLICK HWY
JACKSON MI 49201-1556

March 23, 1998

Mr. Mony G. Chabria
U S Environmental Protection Agency
Region 5 - Office of Regional Counsel
77 West Jackson Road, C-14J
Chicago, Illinois 60604-3590

Dear Mr. Chabria:

We appreciate and support the efforts of your agency and other interested parties to further complete PCB contamination "removal actions" at the Textile Road site of Washtenaw County through the Comprehensive Environmental Response, Compensation, and Liability Act program. Those actions, as proposed and revised over the last year, will accomplish significant additional proper management of the PCBs released at that property.

For the purpose of contemplating actions to ultimately secure a cleanup that our agency can approve pursuant to Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended, please note the attached information regarding our "generic" PCB cleanup criteria. The attached sheets provide specific criteria our agency believes best represents protective PCB concentrations according to the risk based standards established by our statute. See in particular, item "T" on the sheet with page number 6.32. As will be noted there, under some circumstances, the state defers to Toxic Substance Control Act standards.

As in all cases, there are a wide range of means by which a site like this can achieve cleanup that will comply with our standards. We remain available to discuss options with you and with the parties proposing removal actions. If more detail is needed with regards to the specific PCB criteria attached, we will be glad to put you in contact with our division's toxicology staff.

Sincerely,

Gary Klepper

Gary Klepper
District Supervisor
Environmental Response Division
517-780-7852

GK:kl
Attachments
cc: Mr. R. Dowe Parsons, DEQ
Ms. Vicki Katko, DEQ

INTEGRATED TABLE
of
PART 201 CLEANUP CRITERIA
and
SCREENING LEVELS

Table Explanation

The following table presents cleanup criteria and screening levels for Part 201. Substances are listed alphabetically within typically used analytical groups. The table is divided into three parts:

Groundwater: Residential and Industrial-Commercial (pages 6.1 - 6.10)
Soil: Residential (pages 6.11 - 6.20)
Soil: Industrial and Commercial II, III, and IV (pages 6.21 - 6.30)

Numbers shown at the tops of the columns (#1 to #29) are reference to "Guidesheets" that present key considerations in the use and interpretation of specific values. Footnotes used in the table are explained on pages 6.31 through 6.33.

Values within a bolded box **[ ]** represent the lowest generic residential soil and groundwater criterion for a given hazardous substance. Bolded values are presented for those substances having either a full set of criteria or having a partial set where professional judgment can be made that the lowest presented criterion is protective of pathways lacking criteria. Therefore, the bolded value reliably represents that level in soil and in groundwater at and below which no significant risk is present. Such a location is therefore not a facility. However, bolded values may not necessarily be applicable cleanup targets for a given facility. For example, the, drinking water protection criteria (Columns #1 and 2) are not applicable at locations where the groundwater is not in an aquifer. The lowest criterion is not bolded for substances lacking GSI criteria. With respect to substances lacking GSI criteria, it may not be possible to reach definitive conclusions regarding status as a facility or compliance with cleanup criteria until a GSI criterion is general or a professional determination is made by Surface Water Quality Division that on-site concentrations are protective of surface water.

The table cleanup criteria and screening values will have additional values added as they are generated. In addition, values may be revised to reflect changes in scientific data or policy decisions. To confirm information in this table or obtain newly generated or revised criteria, contact the ERD Toxicology Unit.

GROUNDWATER: RESIDENTIAL AND INDUSTRIAL-COMMERCIAL

PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS

Developed under the authority of the

NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994 PA 451, AS AMENDED

Residential criteria were calculated using currently available toxicological and chemical-specific data. These criteria may change as new data become available. They are not necessarily final cleanup standards. Scientific notation is represented by E+ or E- a value, for example 2×10^6 is reported as 2.0E+6. Please refer to Operational Memorandum #6 for analytical methods and method detection limits. All values are expressed in units of parts per billion (ug/L).

		#1	#2	#3	#4	#5	#6	#7	#8	#9
Chemical	Chemical Abstract Service Number	Residential & Commercial I Drinking Water Criteria	Industrial & Commercial II, III & IV Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential & Commercial I Groundwater Volatilization to Indoor Air Inhalation Criteria	Industrial & Commercial II, III & IV Groundwater Volatilization to Indoor Air Inhalation Criteria	Groundwater Contact Criteria	Water Solubility	Flammability and Explosivity Screening Level	Groundwater Acute Inhalation Screening Level
BTEX + MTBE										
Benzene (I)	71432	5 (A)	5 (A)	200 (X)	5,600	36,000	9,200	1.8E+6	34,000	67,000
Ethylbenzene (I)	100414	74 (E)	74 (E)	18	1.7E+5 (S)	1.7E+5 (S)	1.7E+5 (S)	1.7E+5	22,000	1.7E+5 (S)
Methyl-tert-butyl ether (MTBE)	1634044	240 (Z)	690 (Z)	730 (X)	4.7E+7 (S)	4.7E+7 (S)	5.8E+5	4.7E+7	ID	ID
Toluene (I)	108883	790 (E)	790 (E)	140	5.3E+5 (S)	5.3E+5 (S)	5.3E+5 (S)	5.3E+5	ID	ID
Xylenes (I)	1330207	280 (E)	280 (E)	35	1.9E+5 (S)	1.9E+5 (S)	1.9E+5 (S)	1.9E+5	35,000	1.9E+5 (S)
VOLATILES										
Acetone (I)	67641	730	2,100	1,700	1.0E+9 (D)	1.0E+9 (D)	3.0E+7	Miscible	7.5E+6	1.0E+9 (D)
Acrolein (I)	107028	120	330	NA	2,100	4,200	3.4E+6	2.1E+8	3.3E+6	3.4E+5
Acrylonitrile (I)	107131	1.6	6.4	4.9 (X)	34,000	1.9E+5	8,000	7.5E+7	ID	ID
Benzyl chloride	100447	5	20	NA	12,000	78,000	1,900	4.9E+5	ID	ID
Bromobenzene (I)	108861	18	50	NA	1.8E+5	4.0E+5	NA	4.1E+5	ID	ID
Bromodichloromethane	75274	100 (A,W)	100 (A,W)	NA	4,800	38,000	10,000	6.7E+6	ID	ID
Bromoform	75252	100 (A,W)	100 (A,W)	ID	4.8E+5	3.1E+6 (S)	1.1E+5	3.1E+6	ID	ID
Bromomethane	74839	10	29	35	4,000	9,100	64,000	1.5E+7	ID	ID
n-Butanol (I)	71363	950	2,700	NA	NLV	NLV	8.3E+6	7.4E+7	2.4E+7	7.4E+7 (S)
2-Butanone (MEK) (I)	78933	13,000	36,000	NA	2.4E+8 (S)	2.4E+8 (S)	2.4E+8 (S)	2.4E+8	ID	2.4E+8 (S)
n-Butyl acetate (I)	123864	550	1,800	NA	6.7E+6 (S)	6.7E+6 (S)	ID	6.7E+6	1.2E+6	6.7E+6 (S)
t-Butyl alcohol (I)	75650	3,900	11,000	NA	1.0E+9 (D)	1.0E+9 (D)	ID	Miscible	ID	ID
n-Butylbenzene	104518	80	230	NA	ID	ID	ID	NA	ID	ID
sec-Butylbenzene	135988	80	230	NA	ID	ID	ID	NA	ID	ID
tert-Butylbenzene (I)	98066	80	230	NA	ID	ID	ID	NA	ID	ID
Carbon disulfide (I, R)	75150	800	2,300	NA	2.5E+5	5.5E+5	1.1E+6	1.2E+6	ID	ID

GROUNDWATER: RESIDENTIAL AND INDUSTRIAL-COMMERCIAL
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS

		#1	#2	#3	#4	#5	#6	#7	#8	#9
Chemical	Chemical Abstract Service Number	Residential & Commercial I Drinking Water Criteria	Industrial & Commercial II, III & IV Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential & Commercial I Groundwater Volatilization to Indoor Air Inhalation Criteria	Industrial & Commercial II, III & IV Groundwater Volatilization to Indoor Air Inhalation Criteria	Groundwater Contact Criteria	Water Solubility	Flammability and Explosivity Screening Level	Groundwater Acute Inhalation Screening Level
Pentachlorobenzene	608935	6.1	17	NA	ID	ID	170	650	ID	ID
Pentachloronitrobenzene	82688	32 (S)	32 (S)	NA	32 (S)	32 (S)	32 (S)	32	ID	ID
Piperidine	110894	3.2	9.2	NA	NLV	NLV	ID	Miscible	ID	ID
Propionic acid (I)	79094	18,000 (M)	35,000	ID	NLV	NLV	ID	Miscible	ID	ID
Pyridine (I)	110861	7.3	21	NA	5,500	12,000	89,000	3.0E+5	ID	ID
1,2,4,5-Tetrachlorobenzene	95943	1,300 (S)	1,300 (S)	NA	ID	ID	1,300 (S)	1,300	ID	ID
p-Toluidine	106490	4.5	18	NA	NLV	NLV	ID	7.6E+6	ID	ID
Tributylamine	102829	10	29	ID	14,000	75,000 (S)	ID	75,000	ID	ID
1,2,4-Trichlorobenzene	120821	70 (A)	70 (A)	NA	3.0E+5 (S)	3.0E+5 (S)	16,000	3.0E+5	ID	3.0E+5 (S)
Triphenyl phosphate	115866	1,200	1,400 (S)	NA	NLV	NLV	1,400 (S)	1,400	ID	ID
tris(2,3-Dibromopropyl)phosphate	126727	0.47	1.9	NA	4,700 (S)	4,700 (S)	1,500	4,700	ID	ID
PCBs										
Polychlorinated biphenyls (PCBs) (J,T)	1336363	0.5 (A)	0.5 (A)	IP	45 (S)	45 (S)	2.4	45	ID	ID
PHTHALATES										
bis(2-Ethylhexyl)phthalate	117817	6 (A)	6 (A)	IP	NLV	NLV	46	340	ID	340 (S)
Butyl benzyl phthalate	85687	1,200	2,700 (S)	NA	NLV	NLV	2,700 (S)	2,700	ID	ID
Di-n-butyl phthalate	84742	880	2,500	NA	NLV	NLV	11,000 (S)	11,000	ID	ID
Dicyclohexyl phthalate	84617	ID	ID	NA	ID	ID	ID	4,000	ID	ID
Diethyl phthalate	84662	5,500	16,000	NA	NLV	NLV	1.1E+6 (S)	1.1E+6	ID	ID
PESTICIDES										
Alachlor	15972608	2 (A)	2 (A)	NA	NLV	NLV	ID	1.8E+5	ID	ID
Aldrin	309002	0.05	0.2	NA	180 (S)	180 (S)	0.12	180	ID	ID
Atrazine	1912249	3 (A)	3 (A)	7.3 (X)	NLV	NLV	ID	70,000	ID	ID
Chlordane	57749	2 (A)	2 (A)	IP	56 (S)	56 (S)	2.8	56	ID	ID
Chlorpyrifos	2921882	22	63	NA	2.9	6.7	ID	1,100	ID	ID
Cyanazine	21725462	10 (M)	10 (M)	NA	NLV	NLV	ID	1.7E+5	ID	ID
Dacthal	1861321	73	210	NA	NLV	NLV	ID	500	ID	ID
4-4'-DDD	72548	3.5	14	NA	NLV	NLV	12	90	ID	ID
4-4'-DDE	72559	2.5	10	NA	ID	ID	12	120	ID	ID
4-4'-DDT	50293	2.5	10	0.02 (M)	NLV	NLV	5.3	25	ID	ID

SOIL: RESIDENTIAL AND COMMERCIAL I

PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS

			Groundwater Protection			Indoor Air	Ambient Air (Y)				Direct Contact	
		#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20
Chemical	Chemical Abstract Service Number	Statewide Default Background Levels	Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Groundwater Contact Protection Criteria	Soil Volatilization to Indoor Air Inhalation Criteria	Infinite Source Volatile Soil Inhalation Criteria (VSIC)	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria	Direct Contact Criteria	Soil Saturation Concentration Screening Levels
Pentachloronitrobenzene	82688	NA	37,000	NA	37,000	1.2E+5	2.3E+5	2.3E+5	2.3E+5	3.3E+8	3.2E+6	NA
Piperidine	110894	NA	64	NA	ID	NLV	ID	ID	ID	9.3E+9	48,000	1.0E+7
Propionic acid (I)	79094	NA	3.6E+5	NA	ID	NLV	ID	ID	ID	2.0E+10	1.0E+7 (C)	1.0E+7
Pyridine (I)	110861	NA	330 (M)	NA	37,000 (C)	1,100	8,200	40,000	97,000	2.3E+8	37,000 (C)	37,000
1,2,4,5-Tetrachlorobenzene	95943	NA	1.5E+6	NA	1.5E+6	ID	ID	ID	ID	ID	1.4E+8	NA
p-Toluidine	106490	NA	660 (M)	NA	ID	NLV	76,000	4.4E+6	4.4E+6	1.0E+8	52,000	1.2E+6
Tributylamine	102829	NA	200	ID	ID	ID	ID	ID	ID	4.7E+8	1.5E+5	1.0E+7
1,2,4-Trichlorobenzene	120821	NA	4,100	NA	9.4E+5	1.1E+6 (C)	2.8E+7	2.8E+7	2.8E+7	2.5E+10	1.1E+6 (C)	1.1E+6
Triphenyl phosphate	115866	NA	1.1E+5 (C)	NA	1.1E+5 (C)	ID	ID	ID	ID	ID	1.1E+5 (C)	1.1E+5
Tris(2,3-Dibromopropyl)phosphate	126727	NA	43	NA	27,000 (C)	27,000 (C)	18,000	18,000	18,000	5.9E+6	5,500	27,000
PCBs												
Polychlorinated biphenyls (PCBs) (J,T)	1336363	NA	NLL	NLL	NLL	5.5E+5	44,000	44,000	44,000	5.2E+6	(T)	NA
PHTHALATES												
bis(2-Ethylhexyl)phthalate	117817	NA	NLL	NLL	NLL	NLV	1.5E+9	3.0E+10	3.0E+10	7.0E+8	7.0E+5	1.0E+7
Butyl benzyl phthalate	85687	NA	3.1E+5 (C)	NA	3.1E+5 (C)	NLV	8.7E+9	1.1E+10	1.1E+10	4.7E+10	3.1E+5 (C)	3.1E+5
Di-n-butyl phthalate	84742	NA	7.6E+5 (C)	NA	7.6E+5 (C)	NLV	4.9E+8	5.3E+10	5.3E+10	3.3E+9	7.6E+5 (C)	7.6E+5
Dicyclohexyl phthalate	84617	NA	ID	NA	ID	ID	ID	ID	ID	ID	ID	NA
Diethyl phthalate	84662	NA	1.1E+5	NA	7.4E+5 (C)	NLV	4.6E+7	6.0E+7	6.0E+7	3.3E+9	7.4E+5 (C)	7.4E+5
PESTICIDES												
Alachlor	15972608	NA	40	NA	ID	NLV	ID	ID	ID	ID	1.2E+5	NA
Aldrin	309002	NA	NLL	NLL	NLL	1.3E+6	58,000	58,000	58,000	6.4E+5	580	NA
Atrazine	1912249	NA	60	150 (X)	ID	NLV	ID	ID	ID	ID	45,000	NA
Chlordane	57749	NA	NLL	NLL	NLL	3.0E+6	3.3E+5	3.3E+5	3.3E+5	8.4E+6	7,600	NA
Chlorpyrifos	2921882	NA	440	NA	ID	ID	ID	ID	ID	1.3E+8	1.3E+6	NA
Cyanazine	21725462	NA	500 (M)	NA	ID	NLV	ID	ID	ID	ID	17,000	NA
Dacthal	1861321	NA	1,500	NA	ID	NLV	ID	ID	ID	ID	4.2E+6	NA
4-4'-DDD	72548	NA	NLL	NLL	NLL	NLV	ID	ID	ID	ID	41,000	NA
4-4'-DDE	72559	NA	NLL	NLL	NLL	ID	ID	ID	ID	ID	29,000	NA
4-4'-DDT	50293	NA	NLL	NLL	NLL	NLV	1.2E+7	1.7E+7	1.7E+7	3.2E+7	29,000	NA
Diazinon	333415	NA	26	NA	ID	NLV	ID	ID	ID	ID	76,000	1.0E+7

SOIL: INDUSTRIAL AND COMMERCIAL II, III, AND IV

PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS

			Groundwater Protection				Indoor Air	Ambient Air (Y)				Direct Contact			
		#10	#21		#12	#13	#22	#23	#24	#25	#26	#27	#28	#29	#20
Chemical	Chemical Abstract Service Number	Statewide Default Background Levels	Residential Drinking Water Protection Criteria	Industrial And Commercial Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Groundwater Contact Protection Criteria	Soil Volatilization to Indoor Air Inhalation Criteria	Infinite Source Volatile Soil Inhalation Criteria (VSIC)	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria	Industrial	Commercial III	Commercial IV	Soil Saturation Concentration Screening Levels
Pentachlorobenzene	608935	NA	29,000	61,000	NA	1.9E+5 (C)	ID	ID	ID	ID	ID	1.9E+5 (C)	1.9E+5 (C)	1.9E+5 (C)	1.9E+5
Pentachloronitrobenzene	82688	NA	37,000	37,000	NA	37,000	2.2E+5	2.8E+5	2.8E+5	2.8E+5	1.5E+8	3.4E+7	4.7E+7	1.1E+8	NA
Piperidine	110894	NA	64	180	NA	ID	NLV	ID	ID	ID	4.1E+9	3.3E+5	4.6E+5	9.1E+5	1.0E+7
Propionic acid (I)	79094	NA	3.6E+5	7.0E+5	NA	ID	NLV	ID	ID	ID	8.8E+9	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Pyridine (I)	110861	NA	330 (M)	420	NA	37,000 (C)	2,000	9,800	40,000	97,000	1.0E+8	37,000 (C)	37,000 (C)	37,000 (C)	37,000
1,2,4,5-Tetrachlorobenzene	95943	NA	1.5E+6	1.5E+6	NA	1.5E+6	ID	ID	ID	ID	ID	1.0E+9 (D)	1.0E+9 (D)	1.0E+9 (D)	NA
p-Toluidine	106490	NA	660 (M)	660 (M)	NA	ID	NLV	2.8E+5	1.5E+7	1.5E+7	1.3E+8	7.9E+5	1.1E+6	1.2E+6 (C)	1.2E+6
Tributylamine	102829	NA	200	580	ID	ID	ID	ID	ID	ID	2.1E+8	1.0E+6	1.5E+6	2.9E+6	1.0E+7
1,2,4-Trichlorobenzene	120821	NA	4,100	4,200	NA	9.4E+5	1.1E+6 (C)	3.4E+7	3.4E+7	3.4E+7	1.1E+10	1.1E+6 (C)	1.1E+6 (C)	1.1E+6 (C)	1.1E+6
Triphenyl phosphate	115866	NA	1.1E+5 (C)	1.1E+5 (C)	NA	1.1E+5 (C)	NLV	ID	ID	ID	ID	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
tris(2,3-Dibromopropyl)phosphate	126727	NA	43	180	NA	27,000 (C)	27,000 (C)	60,000	60,000	60,000	7.4E+6	27,000 (C)	27,000 (C)	27,000 (C)	27,000
PCBs															
Polychlorinated biphenyls (PCBs) (J,T)	1336363	NA	NLL	NLL	NLL	NLL	2.9E+6	1.5E+5	1.5E+5	1.5E+5	6.5E+6	(T)	(T)	(T)	NA
PHTHALATES															
bis(2-Ethylhexyl)phthalate	117817	NA	NLL	NLL	NLL	NLL	NLV	5.1E+9	1.2E+11	1.2E+11	8.9E+8	1.0E+7 (C)	1.0C+7 (C)	1.0C+7 (C)	1.0E+7
Butyl benzyl phthalate	85687	NA	3.1E+5 (C)	3.1E+5 (C)	NA	3.1E+5 (C)	NLV	1.0E+10	1.4E+10	1.4E+10	2.1E+10	3.1E+5 (C)	3.1E+5 (C)	3.1E+5 (C)	3.1E+5
Di-n-butyl phthalate	84742	NA	7.6E+5 (C)	7.6E+5 (C)	NA	7.6E+5 (C)	NLV	5.9E+8	7.5E+10	7.5E+10	1.5E+9	7.6E+5 (C)	7.6E+5 (C)	7.6E+5 (C)	7.6E+5
Dicyclohexyl phthalate	84617	NA	ID	ID	NA	ID	ID	ID	ID	ID	ID	ID	ID	ID	NA
Diethyl phthalate	84662	NA	1.1E+5	3.2E+5	NA	7.4E+5 (C)	NLV	5.4E+7	7.2E+7	7.2E+7	1.5E+9	7.4E+5 (C)	7.4E+5 (C)	7.4E+5 (C)	7.4E+5
PESTICIDES															
Alachlor	15972608	NA	40	40	NA	ID	NLV	ID	ID	ID	ID	1.9E+6	2.6E+6	6.2E+6	NA
Aldrin	309002	NA	NLL	NLL	NLL	NLL	7.1E+6	2.0E+5	2.0E+5	2.0E+5	8.0E+5	8,800	12,000	29,000	NA
Atrazine	1912249	NA	60	60	150 (X)	ID	NLV	ID	ID	ID	ID	6.8E+5	9.5E+5	2.3E+6	NA
Chlordane	57749	NA	NLL	NLL	NLL	NLL	1.6E+7	1.1E+6	1.1E+6	1.1E+6	1.1E+7	1.2E+5	1.6E+5	3.8E+5	NA
Chlorpyrifos	2921882	NA	440	1,300	NA	ID	ID	ID	ID	ID	5.9E+7	1.4E+7	1.9E+7	4.5E+7	NA
Cyanazine	21725462	NA	500 (M)	500 (M)	NA	ID	NLV	ID	ID	ID	ID	2.6E+5	3.6E+5	8.5E+5	NA
Dacthal	1861321	NA	1,500	4,200	NA	ID	NLV	ID	ID	ID	ID	4.5E+7	6.3E+7	1.5E+8	NA
4-4'-DDD	72548	NA	NLL	NLL	NLL	NLL	NLV	ID	ID	ID	ID	6.3E+5	8.8E+5	2.1E+6	NA
4-4'-DDE	72559	NA	NLL	NLL	NLL	NLL	ID	ID	ID	ID	ID	4.4E+5	6.2E+5	1.5E+6	NA
4-4'-DDT	50293	NA	NLL	NLL	NLL	NLL	NLV	4.2E+7	6.1E+7	6.1E+7	4.0E+7	4.4E+5	6.2E+5	1.5E+6	NA

FOOTNOTES

{A} Criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.

{B} Background, as defined in Rule 299.5701(c), may be substituted if higher than the cleanup criterion.

{C} Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat. Concentrations greater than Csat are acceptable cleanup criteria for this pathway where a site-specific demonstration indicates that free-phase contaminant is not present. Consult the Generic Soil Saturation Screening Concentrations: Technical Support Document, dated January 17, 1997 for further guidance on development of site-specific Csat values.

{D} Calculated criterion exceeds 100%, hence it is reduced to 100% (i.e., 1.0E+9 ppb). Evaluation of free phase contaminant, environmental impacts, adverse aesthetics and acute or local toxicity is required.

{E} Criterion is the aesthetic drinking water value, as required by Sec. 20120(1)(5).

{F} Criterion is based on adverse impacts to plant life (i.e., phytotoxicity).

{G} GSI value is pH or water hardness dependent. The Final Chronic Value (FCV) for the protection of aquatic life must be calculated based on the pH or hardness of the receiving surface water. Where water hardness exceeds 400 mg $CaCO_3$/L, use 400 mg $CaCO_3$/L for the FCV calculation. The generic GSI criterion is the lesser of the calculated FCV, the wildlife value (WV) and the surface water non-drinking water value. For these chemicals, the soil GSI protection criteria will be based on the final generic GSI criterion determined by the process described in this footnote. Contact an ERD toxicologist for further guidance.

Chemical	FCV Formula	FCV Conversion Factor	Wildlife Value	Surface Water Non-Drinking Water Value
Beryllium	EXP(2.5279(LnH)-10.7689)	NA	NA	1,200
Cadmium	(EXP(0.7852*(LnH)-2.715))*CF(Cd)	CF(Cd) = 1.10167-[(LnH)*(0.04184)]	NA	130
Chromium (III)	(EXP(0.819*(LnH)+0.6848))*0.86	NA	NA	9,400
Copper	(EXP(0.8545*(LnH)-1.702))*0.96	NA	NA	64,000
Lead	(EXP(1.273*(LnH)-3.296))*CF(Pb)	CF(Pb) = 1.10167-[(LnH)*(0.04184)]	NA	190
Nickel	(EXP(0.846*(LnH)+0.0584))*0.997	NA	NA	2.1E+5
Pentachlorophenol	EXP(1.005*(pH)-5.134)	NA	NA	2.8
Zinc	(EXP(0.8473*(LnH)+0.884))*0.986	NA	NA	22,000

Where,

EXP(x) = The base of the natural logarithm raised to power x (e^x).
LnH = The natural logarithm of water hardness in mg $CaCO_3$/L.
* = The multiplication symbol.

{H} Valence-specific chromium data (Cr III and Cr VI) must be compared to the corresponding valence-specific cleanup criteria. If analytical data are provided for "total" chromium only, then values for Cr VI must be applied as the cleanup criteria. Cr III cleanup criterion for protection of drinking water can only be used at sites where groundwater is prevented from being used as a public water supply, currently and in the future.

{I} Chemical may exhibit the characteristic of ignitability as defined in 40 CFR 261.21. Contact an ERD toxicologist for further direction.

{J} Chemical may be present in several isomer forms. Isomer-specific concentrations must be added together for comparison to criteria. Contact an ERD toxicologist if further explanation is needed.

{K} Criterion is based on flammability and/or explosivity potential.

{L} Higher groundwater concentrations (up to 15 ug/L) may be acceptable if the soil concentration is less than 400 ppm and groundwater migrating off-site will not result in unacceptable exposures. Contact an ERD toxicologist if further explanation is needed.

{M} Calculated criterion is below the analytical method detection limit (MDL), therefore, the criterion defaults to the MDL.

{N} The concentrations of all potential sources of nitrate-nitrogen (e.g., ammonia-N, nitrite-N, nitrate-N) must be added together and compared to nitrate criteria. Contact an ERD toxicologist if further direction is needed.

{O} All polychlorinated and polybrominated dibenzodioxins and dibenzofurans are considered as one hazardous substance. The concentration of all isomers present at a facility, expressed as an equivalent concentration of 2,3,7,8-tetrachlorodibenzo-p-dioxin based upon their relative potency, must be added together and compared to the criteria for 2,3,7,8-tetrachlorodibenzo-p-dioxin. Contact an ERD toxicologist for details.

{P} Criterion is based on the EPA action level for releasable cyanide. Higher total cyanide concentrations may be acceptable if analytical data are provided to demonstrate that levels of releasable cyanide do not exceed 2.5E+5 ug/kg. Contact an ERD toxicologist if further direction is needed.

{Q} Criteria for carcinogenic polycyclic aromatic hydrocarbons (PAHs) were developed using "relative potential potencies" (RPPs) to benzo(a)pyrene.

{R} Chemical may exhibit the characteristic of reactivity as defined in 40 CFR 261.23. Contact an ERD toxicologist for further direction.

{S} Criterion is based on the chemical-specific water solubility limit.

{T} Refer to the Toxic Substances Control Act (TSCA), Subpart G - PCB Spill Cleanup Policy to determine the applicability of TSCA cleanup standards. Use Part 201 cleanup criteria in the table below where TSCA standards are not applicable.

LAND USE CATEGORY	TSCA	PART 201
Residential & Commercial I	1,000 ppb in the upper 10 inches 10,000 ppb 10 inches and below	1,200 ppb
Industrial & Commercial II	25,000 ppb at all depths	9,900 ppb
Commercial III	1,000 ppb in the upper 10 inches 10,000 ppb 10 inches and below	14,000 ppb
Commercial IV	1,000 ppb in the upper 10 inches 10,000 ppb 10 inches and below	26,000 ppb

{U} Chemical may exhibit the characteristic of corrosivity as defined in 40 CFR 261.22. Contact an ERD toxicologist for further direction.

{V} Criterion is the aesthetic drinking water value (secondary maximum contaminant level), as required by Sec. 20120(1)(5). Higher concentrations (up to 200 ug/L) may be acceptable on a case-by-case basis. Contact an ERD toxicologist for further explanation.

{W} Concentrations of trihalomethanes in groundwater must be added together to determine compliance with the State of Michigan Drinking Water Standard of 100 ug/L. Concentrations of trihalomethanes in soil must be added together to determine compliance with the drinking water protection criterion of 2,000 ug/kg.

{X} The GSI criterion shown is not protective for surface water that is used as a drinking water source. For groundwater discharges to the Great Lakes and their connecting waters or discharges in close proximity to water supply intake(s) in inland surface waters, the generic GSI criterion is the Surface Water Drinking Water Value (SWDWV) listed in the table below except for those SWDWV indicted with an asterisk. For SWDWV with an asterisk, the generic GSI criterion is the lesser of the SWDWV, the WV and the calculated FCV (see table in footnote {G}). For chemicals indicated by the {X} footnote, the soil GSI protection criteria will be based on the final generic GSI criterion determined by the process described in this footnote. Contact an ERD toxicologist if further guidance is needed.

Chemical	Chemical Abstract Service Number	Surface Water Drinking Water Values
Acrylonitrile	107131	0.87
Arsenic	7440382	50
Atrazine	1912249	4.3
Benzene	71432	12
Cadmium	7440439	2.5*
Carbon tetrachloride	56235	5.6
Chloroform	67663	77
Chromium (III)	16065831	120*
3,3'-Dichlorobenzidine	91941	20 {M}
1,2-Dichloroethane	107062	6
1,1-Dichloroethylene	75354	24
1,2-Dichloropropane	78875	9.1
N,N-Dimethylacetamide	127195	700
Hexachloroethane	67721	5.3
Lead	7439921	14*
Methyl-tert-butyl ether (MTBE)	1634044	120
Methylene chloride	75092	47
Molybdenum	7439987	120
Pentachlorophenol	87865	1.8*
1,1,2,2-Tetrachloroethane	79345	3.2
Tetrachloroethylene	127184	11
Thallium	7440280	1.2
1,1,2-Trichloroethane	79005	12
Trichloroethylene	79016	29

{Y} Source size modifiers for Soil Inhalation Criteria (SIC) for Ambient Air. See guidesheets #15-18 and #23-26 or contact an ERD toxicologist if further guidance is needed.

Source Size sq. feet or acres	Modifier
400 sq feet	3.17
1000 sq feet	2.2
2000 sq feet	1.76
1/2 acre	1
1 acre	0.87
5 acre	0.66
10 acre	0.6
32 acre	0.5
100 acre	0.43

{Z} Groundwater concentrations at or less than the health-based drinking water criterion are likely to have adverse odors. An aesthetic drinking water criterion is in process. The soil health-based drinking water protection criterion may also not be protective of adverse aesthetic impacts. Adverse odors in groundwater and soil values protective of these effects must be addressed qualitatively until an aesthetic criterion is finalized.

ID = *Inadequate data* to develop criterion.

IP = Development of generic GSI value *in process* but not yet complete. This notation is equivalent to "NLS" as used in the August 18, 1997 addendum to Operational Memoranda #8 and #14, and the Rule 57 Water Quality Values table presented on the Surface Water Quality Division's Internet homepage.

Miscible = Chemical is capable of mixing with water in all proportions.

NA = Criterion or value is *not available* or, as is the case for Csat, *not applicable*.

NLL = Chemical is *not likely to leach* under most soil conditions.

NLV = Chemical is *not likely to volatilize* under most conditions.