3745-300-08 **Generic numerical standards.**

[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see paragraph (B) of rule 3745-300-01 of the Administrative Code titled "Incorporation by reference."]

(A) Generic numerical standards.

(1) Applicability.

(a) Generic numerical standards listed in this rule for hazardous substances and petroleum may be used to demonstrate compliance with applicable standards provided the exposure scenario for the property comports with land use and activity patterns used to derive the generic numerical standard. Generic numerical standards are provided for complete exposure pathways to petroleum releases (paragraph (B) of this rule), direct contact with hazardous substances in soil to human receptors (paragraph (C) of this rule), unrestricted potable use for hazardous substances in ground water (paragraph (D) of this rule), and complete exposure pathways to human and ecological receptors from surface water and sediment (paragraphs (F), (G) and (H) of this rule).

(b) If complete exposure pathways exist on a property that are not considered in the development of a generic numerical standard listed in this rule or if a generic numerical standard is not listed for chemicals of concern on a property, applicable standards must be derived in accordance with rule 3745-300-09 of the Administrative Code. Demonstration of compliance with applicable standards at a property may be made using a combination of generic numerical standards in accordance with this rule and standards developed through a property-specific risk assessment in accordance with rule 3745-300-09 of the Administrative Code.

(c) If radioactive materials are identified at a property, the property may be subject to the Atomic Energy Act and regulations adopted thereunder and Chapters 3701. and 3747. of the Revised Code and rules adopted thereunder. If radionuclides or radioactive materials are present at a property, the cleanup of the radionuclides or radioactive material shall be conducted in compliance with requirements of the Ohio department of health. Remedy approval by the Ohio department of health shall be considered sufficient to meet applicable standards for radionuclides or radioactive materials for the voluntary action and may be considered a generic numerical standard.

(d) If polychlorinated biphenyls are identified at a property, the property may be subject to cleanup levels or other provisions of the Toxic Substances Control Act and regulations adopted thereunder. Polychlorinated biphenyls shall be addressed within the voluntary action as a hazardous substance and meet either generic numerical standards in accordance with this rule or property-specific standards in accordance with rule 3745-300-09 of the Administrative Code.

(2) Assumptions.

(a) Summation of risk and hazard across complete exposure pathways.

If more than one complete exposure pathway exists to each receptor population, the incremental cancer risk and hazard indices determined for each exposure pathway must be summed to calculate a cumulative cancer risk and hazard index to each receptor population. All final cumulative human health carcinogenic risk and non-carcinogenic hazard levels are based on one significant figure.

(b) If the generic numerical standards of this rule are applied to one or more exposure units or identified areas of the property and applicable standards, as determined in accordance with rule 3745-300-09 of the Administrative Code, are applied to one or more other areas of the property, then the volunteer must ensure that the risk and hazard levels for each receptor on the property do not exceed:

(i) One excess cancer in a population of 100,000 (1×10^{-5}); and

(ii) A hazard index of 1.

All final cumulative human health carcinogenic risk and non-carcinogenic hazard levels are based on one significant figure.

(c) Points of compliance. The volunteer must comply with the applicable standards at all points of compliance at the property, for each environmental media and complete exposure pathway, in accordance with paragraph (I) of rule 3745-300-07 of the Administrative Code.

(3) A property-specific risk assessment must be conducted in accordance with the procedures established in rule 3745-300-09 of the Administrative Code to determine applicable standards instead of or in addition to using the generic numerical standards from this rule, if any of the following apply to the property:

(a) The complete exposure pathways as identified in accordance with paragraph (F)(1) of rule 3745-300-07 of the Administrative Code, include exposure pathways that are not considered in the development of standards listed in this rule. Such exposure pathways include, but are not limited to, volatilization of contaminants to indoor air or non-potable use of ground water;

(b) The exposure factors for the receptors identified in paragraph (E)(6) of rule 3745-300-07 of the Administrative Code are not considered in the development of standards listed in this rule;

(c) The chemicals of concern on the property consist of hazardous substances or petroleum that do not have generic numerical standards included in this rule. If only some of the chemicals of concern identified have a generic numerical standard listed in this rule, a

volunteer may use the applicable generic numerical standards for the chemicals of concern having listed standards and conduct a property-specific risk assessment in accordance with rule 3745-300-09 of the Administrative Code. When using a combination of generic numerical standards and applicable standards determined by a property-specific risk assessment conducted in accordance with rule 3745-300-09 of the Administrative Code, the volunteer must adjust the concentrations of the applicable standards to meet the human health risk and hazard levels described in paragraph (A)(2)(b) of this rule;

(d) Concentrations of chemicals of concern in surface water or sediment exceed applicable standards determined in accordance with this rule;

(e) Complete exposure pathways to important ecological resources other than sediment or surface water exist; or

(f) It is determined that chemicals of concern on or emanating from the property are persistent, bioaccumulative, and toxic in animal tissue and the development of the generic standards, other than Ohio-specific sediment reference values contained in attachment H of Ohio EPA's "Guidance for Conducting Ecological Risk Assessments," do not consider bioaccumulative effects.

(B) Generic numerical standards for petroleum.

(1) Applicability.

(a) The generic numerical standards referenced in paragraph (B)(3) of this rule apply to all petroleum releases regardless of the source or how the petroleum was released. After eligibility requirements in accordance with rule 3745-300-02 of the Administrative Code have been met, applicable standards for all petroleum releases on the property must be achieved in accordance with this chapter.

(b) The generic numerical standards referenced in paragraph (B)(3) of this rule apply to the exposure pathways for which rules adopted under division (B) of section 3737.882 of the Revised Code have numerical clean-up standards. If an exposure pathway is not addressed by a generic numerical standard under division (B) of section 3737.882 of the Revised Code, then the exposure pathway must be evaluated in accordance with rule 3745-300-09 of the Administrative Code.

(2) Assumptions.

(a) The points of compliance for generic petroleum standards are those identified in paragraph (I)(1) for rule 3745-300-07 of the Administrative Code. For example, exposure pathways that are encompassed within the generic direct-contact soil standard shall use the points of compliance indicated in paragraph (I)(1)(a)(i) of rule 3745-300-07

of the Administrative Code. The volunteer must comply with the applicable standards at all points of compliance at the property, for each environmental medium and complete exposure pathway, in accordance with paragraph (I) of rule 3745-300-07 of the Administrative Code.

(b) Cumulative adjustment for multiple chemicals and summation of risk across complete exposure pathways that are required for chemicals of concern on the property in order to comply with paragraphs (A)(2)(a) and (E) of this rule may not necessarily apply for generic petroleum standards referenced in paragraph (B)(3) of this rule. Cumulative adjustment for multiple chemicals and summation of risk across complete exposure pathways to meet generic petroleum standards are required only when required by rules adopted under division (B) of section 3737.882 of the Revised Code.

(c) When ground water exceeds unrestricted potable use standards, ground water response requirements in accordance with rule 3745-300-10 of the Administrative Code must be met. Properties with free product exceed applicable standards for unrestricted potable use of ground water.

(d) Commercial and industrial land use categories (as described in paragraph (C)(2)(c) of this rule) require implementation of institutional controls in accordance with paragraph (C)(3) of rule 3745-300-11 of the Administrative Code.

(3) Generic numerical clean-up standards for petroleum.

The generic numerical standards for petroleum at residential, commercial, or industrial properties are the standards established in rules adopted under division (B) of section 3737.882 of the Revised Code, as provided in division (B)(1) of section 3746.04 of the Revised Code. The state fire marshal's bureau of underground storage tank regulations administers the rules adopted under division (B) of section 3737.882 of the Revised Code. Property-specific standards for petroleum may be developed using rule 3745-300-09 of the Administrative Code.

(C) Generic direct-contact soil standards for hazardous substances.

(1) Applicability.

(a) When applying generic direct-contact standards to soils on a property, a volunteer must select the generic land use or activity category which is consistent with the exposure factors for the generic land use or activity category contained in paragraph (C)(2)(c) of this rule. The exposure factor distributions used in the development of generic numerical standards are contained in Ohio EPA's "Support Document For the Development of Generic Numerical Standards and Risk Assessment Procedures." Generic direct-contact soil standards for commercial and industrial land uses are equal unless paragraph (B)(1)(b) of rule 3745-300-09 of the Administrative Code applies.

(b) A property-specific risk assessment must be conducted in accordance with the procedures established in rule 3745-300-09 of the Administrative Code, to determine applicable standards instead of or in addition to using the generic direct-contact soil standards, if any conditions of paragraph (A)(3) of this rule apply.

(c) Generic numerical standards for petroleum releases are identified in paragraph (B)(3) of this rule. The standards listed in paragraph (C)(3) of this rule apply to releases of hazardous substances.

(2) Assumptions.

(a) Single chemical.

The generic direct-contact soil standards presented in paragraph (C) of this rule assume a single chemical of concern is present within an identified area or exposure unit.

(i) The single chemical generic direct-contact soil standards set forth in this rule are based on the following risk and hazard levels.

(*a*) For hazardous substances having carcinogenic effects, the chemical-specific carcinogenic risk must not exceed one excess cancer in a population of 100,000 (i.e., 1×10^{-5}); and

(*b*) For hazardous substances having non-carcinogenic effects, the chemical-specific risk must not exceed a hazard index of 1.

(ii) The concentration of a chemical of concern, as determined in accordance with paragraph (F)(5) of rule 3745-300-07 of the Administrative Code, must not exceed the single chemical generic direct-contact soil standard for that chemical.

(b) Cumulative adjustment for multiple chemicals.

When more than one chemical of concern is present within an identified area or exposure unit and an applicable generic direct-contact soil standard for each of the chemicals of concern is contained in paragraphs (C)(3)(b), (C)(3)(c) or (C)(3)(d) of this rule, the standard for each chemical of concern must be adjusted for the presence of multiple chemicals in order to meet the risk and hazard levels described in paragraph (C)(2)(a) of this rule. A cumulative adjustment for multiple chemicals must also be made when using a combination of generic direct-contact soil standards and applicable standards determined by a property-specific risk assessment in accordance with rule 3745-300-09 of the Administrative Code. The incremental risk and hazard from direct contact to soils must be added to the incremental risk and hazard from other complete exposure pathways to the same receptor population, in accordance with (A)(2)(a) of this rule. All

final cumulative human health carcinogenic risk and non-carcinogenic hazard levels are based on one significant figure.

(c) Land use and activity categories.

The generic direct-contact soil standards established in this rule are based upon the intended use of the property after the completion of a voluntary action. Standards applied to commercial and industrial land use categories require implementation of institutional controls in accordance with paragraph (C)(3) of rule 3745-300-11 of the Administrative Code. Land use and activity categories must be determined as follows:

(i) Residential land use category.

Residential land use is land use with a high frequency of potential exposure of adults and children to dermal contact with soil, inhalation of vapors and particles from soil and ingestion of soil. Residential land use is considered protective for, and may be applied to, any and all categories of land use, without further restriction. Examples of residential land uses include, but are not limited to residences; day care facilities; schools, colleges and other educational institutions; nursing homes, elder care and other long-term health care facilities; and correctional facilities.

(ii) Commercial land use category.

Commercial land use is land use with potential exposure of adult workers during a business day and potential exposures of adults and children who are customers, patrons or visitors to commercial facilities during the business day. Commercial land use has potential exposure of adults to dermal contact with soil, inhalation of vapors and particles from soil and ingestion of soil. Examples of commercial land uses include, but are not limited to warehouses; retail gasoline stations; retail establishments; professional offices; hospitals and clinics; religious institutions; hotels; motels; and parking facilities.

(iii) Industrial land use category.

Industrial land use is land use with potential exposure of adult workers during a business day and potential exposures of adults and children who are visitors to industrial facilities during the business day. Industrial land use has potential exposure of adults to dermal contact with soil, inhalation of vapors and particles from soil and ingestion of soil. Examples of industrial land uses include, but are not limited to: lumberyards; power plants; manufacturing facilities such as metal-working shops, plating shops, blast furnaces, coke plants, oil refineries, brick factories, chemical plants and plastics plants; assembly plants; non-public airport areas; limited access highways; railroad switching yards; and marine port facilities.

(iv) Construction or excavation activities.

Construction or excavation activities include invasive activities that result in potential exposure of adult workers during the business day for a portion of one year. Exposures during construction or excavation activities are of greater intensity and shorter duration than those for the commercial and industrial land use categories. Construction or excavation activities have potential exposures of adults to dermal contact with soil, inhalation of vapors and particles from soil, and ingestion of soil. Examples of construction or excavation activities include but are not limited to maintenance or installation of utilities; installation of building footers or foundations; grading; trenching; or laying utility lines or cables; and repair of engineering controls where there is significant exposure to soils.

(3) Generic numerical direct-contact soil standards.

(a) The generic direct-contact soil standards for carcinogenic and non-carcinogenic chemicals of concern are derived considering only the following exposures; ingestion of soil, dermal contact with soil, inhalation of volatile compounds in outdoor air and the inhalation and ingestion of particulate emissions. Any and all applicable exposures not considered within the generic direct-contact soil standards shall be addressed in accordance with rule 3745-300-09 of the Administrative Code.

The soil saturation concentrations are calculated using the U.S. EPA recommended soil saturation equation specified in paragraph (C)(3)(e) of this rule. This equation is not recommended for compounds that are at solid phase at ambient soil temperatures; therefore, no generic soil saturation values were calculated for those chemicals whose melting point is greater than seventeen degrees Celsius. Further, soil saturation values were determined only for those chemicals whose physicochemical parameters used to derive the soil saturation concentrations could be verified. The volunteer may use the equation specified in paragraph (C)(3)(e) of this rule, along with property-specific information, to calculate a property-specific soil saturation concentration in lieu of the generic soil saturation concentrations listed in tables I through III in paragraphs (C)(3)(b) through (C)(3)(d) of this rule.

(b) Table I: generic direct-contact soil standards for carcinogenic and non-carcinogenic chemicals of concern - residential land use category (values are in mg/kg).

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
Volatile Organic Chemicals					
67-64-1	Acetone	64,000	NA	100,000	64,000
71-43-2	Benzene	94	64	920	64

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
75-15-0	Carbon Disulfide	1,400	NA	1,400	1,400
56-23-5	Carbon Tetrachloride	5.5	6.6	1,400	5.5
108-90-7	Chlorobenzene	410	NA	740	410
75-00-3	Chloroethane	10,000	3,700	2,200	2,200
67-66-3	Chloroform	300	6.6	3,400	6.6
124-48-1	Dibromochloromethane	1,500	130	1,600	130
75-71-8	Dichlorodifluoromethane	380	NA	1,400	380
75-34-3	Dichloroethane, 1,1-	2,000	NA	2,300	2,000
107-06-2	Dichloroethane, 1,2-	1,400	8.7	2,900	8.7
75-35-4	Dichloroethene, 1,1-	410	NA	1,700	410
156-59-2	Dichloroethene, *cis*-1,2-	760	NA	2,200	760
156-60-5	Dichloroethene, *trans*-1,2-	180	NA	1,800	180
78-87-5	Dichloropropane, 1,2 -	23	19	1,100	19
542-75-6	Dichloropropene, 1,3 -	92	35	810	35
123-91-1	Dioxane, 1,4-	7,400	260	270,000	260
60-29-7	Ethyl Ether	15,000	NA	33,000	15,000
100-41-4	Ethylbenzene	3,600	NA	230	230
50-00-0	Formaldehyde	1,900	560	130,000	560
64-18-6	Formic acid	1,200	NA	170,000	1,200
110-54-3	Hexane, *n*-	530	NA	190	190
78-83-1	Isobutyl Alcohol	23,000	NA	40,000	23,000
67-56-1	Methanol	33,000	NA	110,000	33,000
78-93-3	Methyl Ethyl Ketone (MEK)	37,000	NA	100,000	37,000
108-10-1	Methyl Isobutyl Ketone (MIBK)	5,800	NA	16,000	5,800
1634-04-4	Methyl *tert*-Butyl Ether (MTBE)	21,000	850	6,700	850
75-09-2	Methylene Chloride	2,200	250	2,300	250
100-42-5	Styrene	9,500	NA	1,700	1,700
630-20-6	Tetrachloroethane , 1,1,1,2-	2,300	37	750	37
79-34-5	Tetrachloroethane, 1,1,2,2-	4,500	11	1,700	11
127-18-4	Tetrachloroethene	510	17	380	17
108-88-3	Toluene	5,100	NA	520	520
71-55-6	Trichloroethane, 1,1,1-	6,100	NA	1,300	1,300
79-00-5	Trichloroethane, 1,1,2-	300	25	2,600	25
79-01-6	Trichloroethene	2,300	65	950	65
75-69-4	Trichlorofluoromethane	1,200	NA	1,600	1,200
96-18-4	Trichloropropane, 1,2,3-	450	1.5	1,100	1.5
75-01-4	Vinyl Chloride	98	4.6	1,100	4.6
1330-20-7	Xylenes, Total	1,000	NA	370	370
Semi-Volatile Organic Chemicals					
83-32-9	Acenaphthene	3,500	NA	NA	3,500
98-86-2	Acetophenone	6,300	NA	NA	6,300

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
107-13-1	Acrylonitrile	35	6.6	22,000	6.6
62-53-3	Aniline	220	1,500	62,000	220
120-12-7	Anthracene	18,000	NA	NA	18,000
92-87-5	Benzidine	190	0.04	NA	0.04
56-55-3	Benzo(a)anthracene	NA	11	NA	11
50-32-8	Benzo(a)pyrene	NA	1.1	NA	1.1
205-99-2	Benzo(b)fluoranthene	NA	11	NA	11
207-08-9	Benzo(k)fluoranthene	NA	110	NA	110
117-81-7	Bis (2-ethylhexyl) Phthalate (BEHP & DEHP)	1,300	620	190	190
85-68-7	Butyl Benzyl Phthalate	13,000	620	58	58
86-74-8	Carbazole	NA	430	NA	430
57-74-9	Chlordane	34	28	NA	28
218-01-9	Chrysene	NA	1,100	NA	1,100
53-70-3	Dibenz(a,h)anthracene	NA	1.1	NA	1.1
95-50-1	Dichlorobenzene, 1,2- (o)	2,300	NA	370	370
106-46-7	Dichlorobenzene, 1,4- (p)	3,500	60	NA	60
91-94-1	Dichlorobenzidine, 3,3-	NA	19	NA	19
72-54-8	Dichlorodiphenyldichloroethane (DDD)	140	42	NA	42
72-55-9	Dichlorodiphenyldichloroethene (DDE)	NA	29	NA	29
50-29-3	Dichlorodiphenyltrichloroethane (DDT)	36	30	NA	30
94-75-7	Dichlorophenoxyacetic acid, 2,4-	630	NA	NA	630
84-66-2	Diethyl Phthalate	50,000	NA	590	590
105-67-9	Dimethylphenol, 2,4-	1,300	NA	NA	1,300
84-74-2	Di-*n*-butyl Phthalate	6,300	NA	110	110
99-65-0	Dinitrobenzene, 1,3- (m)	6.3	NA	NA	6.3
528-29-0	Dinitrobenzene, 1,2-	6.3	NA	NA	6.3
121-14-2	Dinitrotoluene, 2,4-	120	13	NA	13
606-20-2	Dinitrotoluene, 2,6-	63	13	NA	13
72-20-8	Endrin	19	NA	NA	19
107-21-1	Ethylene Glycol	110,000	NA	110,000	110,000
206-44-0	Fluoranthene	2,400	NA	NA	2,400
86-73-7	Fluorene	2,400	NA	NA	2,400
76-44-8	Heptachlor	31	1.8	NA	1.8
1024-57-3	Heptachlor Epoxide	0.81	0.95	NA	0.81
87-68-3	Hexachloro-1,3-Butadiene	13	83	1,000	13
118-74-1	Hexachlorobenzene	50	5.2	NA	5.2
67-72-1	Hexachloroethane	63	550	NA	63
193-39-5	Indeno(1,2,3-c,d)pyrene	NA	11	NA	11
78-59-1	Isophorone	12,000	9,100	4,600	4,600
98-82-8	Isopropylbenzene (Cumene)	2,700	NA	260	260

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
58-89-9	Lindane	21	8.7	NA	8.7
108-39-4	m-cresol	3,100	NA	61,000	3,100
72-43-5	Methoxychlor	310	NA	NA	310
90-12-0	Methylnaphthalene, 1-	4,100	NA	360	360
91-20-3	Naphthalene	180	69	NA	69
98-95-3	Nitrobenzene	27	NA	1,500	27
86-30-6	Nitrosodiphenylamine, *n*-	1,300	1,700	NA	1,300
95-48-7	o-cresol	3,100	NA	NA	3,100
117-84-0	Octyl Phthalate, di-*n*-	2,500	NA	12	12
106-44-5	p-cresol	310	NA	NA	310
87-86-5	Pentachlorophenol	1,400	55	NA	55
108-95-2	Phenol	15,000	NA	NA	15,000
1336-36-3	Polychlorinated Biphenyls	1.2	4.0	NA	1.2
129-00-0	Pyrene	1,800	NA	NA	1,800
110-86-1	Pyridine	63	NA	400,000	63
93-72-1	Silvex	500	NA	NA	500
8001-35-2	Toxaphene	NA	7.8	NA	7.8
95-95-4	Trichlorophenol, 2,4,5-	6,300	NA	NA	6,300
88-06-2	Trichlorophenol, 2,4,6-	NA	770	NA	770
95-63-6	Trimethylbenzene, 1,2,4-	85	NA	250	85
108-67-8	Trimethylbenzene, 1,3,5-	69	NA	200	69
99-35-4	Trinitrobenzene, 1,3,5- (s)	1,900	NA	NA	1,900
108-05-4	Vinyl Acetate	1,400	NA	2,700	1,400
	Inorganic Chemicals				
7440-36-0	Antimony	30	NA	NA	30
7440-38-2	Arsenic, Inorganic	21	6.7	NA	6.7
7440-39-3	Barium and Compounds	15,000	NA	NA	15,000
7440-41-7	Beryllium and Compounds	150	16,000	NA	150
7440-43-9	Cadmium	72	22,000	NA	72
16065-83-1	Chromium (III)	110,000	NA	NA	110,000
18540-29-9	Chromium (VI)	230	3,300	NA	230
7440-48-4	Cobalt	1,400	14,000	NA	1,400
57-12-5	Cyanide, Free	1,500	NA	NA	1,500
7782-41-4	Fluorine (soluble fluoride)	4,500	NA	NA	4,500
7439-97-6	Mercury	7.6	NA	NA	7.6
7440-02-0	Nickel (Soluble Salts)	1,500	NA	NA	1,500
7782-49-2	Selenium and Compounds	380	NA	NA	380
7440-22-4	Silver	380	NA	NA	380
7440-28-0	Thallium	6.1	NA	NA	6.1
7440-62-2	Vanadium	680	NA	NA	680
7440-66-6	Zinc and Compounds	23,000	NA	NA	23,000

(c) Table II: generic direct-contact soil standards for carcinogenic and non-carcinogenic chemicals of concern - Commercial and Industrial Land Use Categories (values are in mg/kg).

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
Volatile Organic Chemicals					
67-64-1	Acetone	850,000	NA	100,000	100,000
71-43-2	Benzene	170	140	920	140
75-15-0	Carbon Disulfide	2,200	NA	1,400	1,400
56-23-5	Carbon Tetrachloride	8.2	15	1,400	8.2
108-90-7	Chlorobenzene	710	NA	740	710
75-00-3	Chloroethane	18,000	68,000	2,200	2,200
67-66-3	Chloroform	600	14	3,400	14
124-48-1	Dibromochloromethane	59,000	2,300	1,600	1,600
75-71-8	Dichlorodifluoromethane	520	NA	1,400	520
75-34-3	Dichloroethane, 1,1-	3,000	NA	2,300	2,300
107-06-2	Dichloroethane, 1,2-	17,000	19	2,900	19
75-35-4	Dichloroethene, 1,1-	610	NA	1,700	610
156-59-2	Dichloroethene, *cis*-1,2-	29,000	NA	2,200	2,200
156-60-5	Dichloroethene, *trans*-1,2-	260	NA	1,800	260
78-87-5	Dichloropropane, 1,2 -	31	41	1,100	31
542-75-6	Dichloropropene, 1,3 -	130	84	810	84
123-91-1	Dioxane, 1,4-	160,000	600	270,000	600
60-29-7	Ethyl Ether	590,000	NA	33,000	33,000
100-41-4	Ethylbenzene	8,500	NA	230	230
50-00-0	Formaldehyde	2,900	1,200	130,000	1,200
64-18-6	Formic acid	1,700	NA	170,000	1,700
110-54-3	Hexane, *n*-	800	NA	190	190
78-83-1	Isobutyl Alcohol	880,000	NA	40,000	40,000
67-56-1	Methanol	240,000	NA	110,000	110,000
78-93-3	Methyl Ethyl Ketone (MEK)	220,000	NA	100,000	100,000
108-10-1	Methyl Isobutyl Ketone (MIBK)	97,000	NA	16,000	16,000
1634-04-4	Methyl *tert*-Butyl Ether (MTBE)	28,000	1,900	6,700	1,900
75-09-2	Methylene Chloride	4,900	570	2,300	570
100-42-5	Styrene	29,000	NA	1,700	1,700
630-20-6	Tetrachloroethane , 1,1,1,2-	88,000	81	750	81
79-34-5	Tetrachloroethane, 1,1,2,2-	180,000	24	1,700	24
127-18-4	Tetrachloroethene	1,700	53	380	53
108-88-3	Toluene	33,000	NA	520	520
71-55-6	Trichloroethane, 1,1,1-	11,000	NA	1,300	1,300
79-00-5	Trichloroethane, 1,1,2-	12,000	55	2,600	55
79-01-6	Trichloroethene	3,200	150	950	150
75-69-4	Trichlorofluoromethane	1,600	NA	1,600	1,600
96-18-4	Trichloropropane, 1,2,3-	18,000	28	1,100	28

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
75-01-4	Vinyl Chloride	210	12	1,100	12
1330-20-7	Xylenes, Total	1,500	NA	370	370
Semi-Volatile Organic Chemicals					
83-32-9	Acenaphthene	56,000	NA	NA	56,000
98-86-2	Acetophenone	110,000	NA	NA	110,000
107-13-1	Acrylonitrile	48	16	22,000	16
62-53-3	Aniline	540	7,400	62,000	540
120-12-7	Anthracene	280,000	NA	NA	280,000
92-87-5	Benzidine	3,400	0..30	NA	0..30
56-55-3	Benzo(a)anthracene	NA	76	NA	76
50-32-8	Benzo(a)pyrene	NA	7.7	NA	7.7
205-99-2	Benzo(b)fluoranthene	NA	77	NA	77
207-08-9	Benzo(k)fluoranthene	NA	770	NA	770
117-81-7	Bis (2-ethylhexyl) Phthalate (BEHP & DEHP)	22,000	4,800	190	190
85-68-7	Butyl Benzyl Phthalate	220,000	4,800	58	58
86-74-8	Carbazole	NA	3,400	NA	3,400
57-74-9	Chlordane	670	270	NA	270
218-01-9	Chrysene	NA	7,600	NA	7,600
53-70-3	Dibenz(a,h)anthracene	NA	7.7	NA	7.7
95-50-1	Dichlorobenzene, 1,2- (o)	4,600	NA	370	370
106-46-7	Dichlorobenzene, 1,4- (p)	17,000	130	NA	130
91-94-1	Dichlorobenzidine, 3,3-	NA	110	NA	110
72-54-8	Dichlorodiphenyldichloroethane (DDD)	4,100	470	NA	470
72-55-9	Dichlorodiphenyldichloroethene (DDE)	NA	310	NA	310
50-29-3	Dichlorodiphenyltrichloroethane (DDT)	1,000	350	NA	350
94-75-7	Dichlorophenoxyacetic acid, 2,4-	11,000	NA	NA	11,000
84-66-2	Diethyl Phthalate	900,000	NA	590	590
105-67-9	Dimethylphenol, 2,4-	22,000	NA	NA	22,000
84-74-2	Di-*n*-butyl Phthalate	110,000	NA	110	110
99-65-0	Dinitrobenzene, 1,3- (m)	110	NA	NA	110
528-29-0	Dinitrobenzene, 1,2-	110	NA	NA	110
121-14-2	Dinitrotoluene, 2,4-	2,200	98	NA	98
606-20-2	Dinitrotoluene, 2,6-	1,100	100	NA	100
72-20-8	Endrin	340	NA	NA	340
107-21-1	Ethylene Glycol	760,000	NA	110,000	110,000
206-44-0	Fluoranthene	37,000	NA	NA	37,000
86-73-7	Fluorene	37,000	NA	NA	37,000
76-44-8	Heptachlor	560	8.9	NA	8.9
1024-57-3	Heptachlor Epoxide	15	7.0	NA	7.0
87-68-3	Hexachloro-1,3-Butadiene	220	240	1,000	220
118-74-1	Hexachlorobenzene	900	28	NA	28

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
67-72-1	Hexachloroethane	1,100	1,700	NA	1,100
193-39-5	Indeno(1,2,3-c,d)pyrene	NA	77	NA	77
78-59-1	Isophorone	140,000	71,000	4,600	4,600
98-82-8	Isopropylbenzene (Cumene)	5,700	NA	260	260
58-89-9	Lindane	550	70	NA	70
108-39-4	m-cresol	56,000	NA	61,000	56,000
72-43-5	Methoxychlor	5,600	NA	NA	5,600
90-12-0	Methylnaphthalene, 1-	66,000	NA	360	360
91-20-3	Naphthalene	280	150	NA	150
98-95-3	Nitrobenzene	170	NA	1,500	170
86-30-6	Nitrosodiphenylamine, *n*-	22,000	10,000	NA	10,000
95-48-7	o-cresol	56,000	NA	NA	56,000
117-84-0	Octyl Phthalate, di-*n*-	45,000	NA	12	12
106-44-5	p-cresol	5,600	NA	NA	5,600
87-86-5	Pentachlorophenol	17,000	280	NA	280
108-95-2	Phenol	66,000	NA	NA	66,000
1336-36-3	Polychlorinated Biphenyls	18	26	NA	18
129-00-0	Pyrene	28,000	NA	NA	28,000
110-86-1	Pyridine	1,100	NA	400,000	1,100
93-72-1	Silvex	9,000	NA	NA	9,000
8001-35-2	Toxaphene	NA	59	NA	59
95-95-4	Trichlorophenol, 2,4,5-	110,000	NA	NA	110,000
88-06-2	Trichlorophenol, 2,4,6-	NA	4,400	NA	4,400
95-63-6	Trimethylbenzene, 1,2,4-	120	NA	250	120
108-67-8	Trimethylbenzene, 1,3,5-	95	NA	200	95
99-35-4	Trinitrobenzene, 1,3,5- (s)	34,000	NA	NA	34,000
108-05-4	Vinyl Acetate	2,000	NA	2,700	2,000
Inorganic Chemicals					
7440-36-0	Antimony	1,200	NA	NA	1,200
7440-38-2	Arsenic, Inorganic	610	82	NA	82
7440-39-3	Barium and Compounds	370,000	NA	NA	370,000
7440-41-7	Beryllium and Compounds	5,100	39,000	NA	5,100
7440-43-9	Cadmium	2,300	52,000	NA	2,300
16065-83-1	Chromium (III)	1,000,000	NA	NA	1,000,000
18540-29-9	Chromium (VI)	8,400	7,900	NA	7,900
7440-48-4	Cobalt	23,000	34,000	NA	23,000
57-12-5	Cyanide, Free	59,000	NA	NA	59,000
7782-41-4	Fluorine (soluble fluoride)	180,000	NA	NA	180,000
7439-97-6	Mercury	290	NA	NA	290
7440-02-0	Nickel (Soluble Salts)	44,000	NA	NA	44,000
7782-49-2	Selenium and Compounds	15,000	NA	NA	15,000
7440-22-4	Silver	15,000	NA	NA	15,000
7440-28-0	Thallium	230	NA	NA	230
7440-62-2	Vanadium	26,000	NA	NA	26,000
7440-66-6	Zinc and Compounds	880,000	NA	NA	880,000

(d) Table III: generic direct-contact soil standards for carcinogenic and non-carcinogenic chemicals of concern - construction and excavation activities category: (values are in mg/kg).

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
Volatile Organic Chemicals					
67-64-1	Acetone	320,000	NA	100,000	100,000
71-43-2	Benzene	150	540	920	150
75-15-0	Carbon Disulfide	190	NA	1,400	190
56-23-5	Carbon Tetrachloride	24	56	1,400	24
108-90-7	Chlorobenzene	2,100	NA	740	740
75-00-3	Chloroethane	5,500	470,000	2,200	2,200
67-66-3	Chloroform	430	55	3,400	55
124-48-1	Dibromochloromethane	390,000	16,000	1,600	1,600
75-71-8	Dichlorodifluoromethane	1,500	NA	1,400	1,400
75-34-3	Dichloroethane, 1,1-	2,500	NA	2,300	2,300
107-06-2	Dichloroethane, 1,2-	6,600	75	2,900	75
75-35-4	Dichloroethene, 1,1-	180	NA	1,700	180
156-59-2	Dichloroethene, *cis*-1,2-	190,000	NA	2,200	2,200
156-60-5	Dichloroethene, *trans*-1,2-	78	NA	1,800	78
78-87-5	Dichloropropane, 1,2 -	30	160	1,100	30
542-75-6	Dichloropropene, 1,3 -	38	330	810	38
123-91-1	Dioxane, 1,4-	87,000	2,300	270,000	2,300
60-29-7	Ethyl Ether	1,000,000	NA	33,000	33,000
100-41-4	Ethylbenzene	2,600	NA	230	230
50-00-0	Formaldehyde	3,500	4,700	130,000	3,500
64-18-6	Formic acid	1,500	NA	170,000	1,500
110-54-3	Hexane, *n*-	710	NA	190	190
78-83-1	Isobutyl Alcohol	1,000,000	NA	40,000	40,000
67-56-1	Methanol	1,000,000	NA	110,000	110,000
78-93-3	Methyl Ethyl Ketone (MEK)	15,000	NA	100,000	15,000
108-10-1	Methyl Isobutyl Ketone (MIBK)	12,000	NA	16,000	12,000
1634-04-4	Methyl *tert*-Butyl Ether (MTBE)	8,300	7,500	6,700	6,700
75-09-2	Methylene Chloride	1,500	2,200	2,300	1,500
100-42-5	Styrene	27,000	NA	1,700	1,700
630-20-6	Tetrachloroethane , 1,1,1,2-	58,000	310	750	310
79-34-5	Tetrachloroethane, 1,1,2,2-	970,000	94	1,700	94
127-18-4	Tetrachloroethene	540	220	380	220
108-88-3	Toluene	2,000	NA	520	520
71-55-6	Trichloroethane, 1,1,1-	33,000	NA	1,300	1,300
79-00-5	Trichloroethane, 1,1,2-	78,000	210	2,600	210

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
79-01-6	Trichloroethene	960	560	950	560
75-69-4	Trichlorofluoromethane	4,800	NA	1,600	1,600
96-18-4	Trichloropropane, 1,2,3-	120,000	190	1,100	190
75-01-4	Vinyl Chloride	63	48	1,100	48
1330-20-7	Xylenes, Total	440	NA	370	370
Semi-Volatile Organic Chemicals					
83-32-9	Acenaphthene	440,000	NA	NA	440,000
98-86-2	Acetophenone	850,000	NA	NA	850,000
107-13-1	Acrylonitrile	14	69	22,000	14
62-53-3	Aniline	1,300	44,000	62,000	1,300
120-12-7	Anthracene	1,000,000	NA	NA	1,000,000
92-87-5	Benzidine	2,600	2.5	NA	2.5
56-55-3	Benzo(a)anthracene	NA	680	NA	680
50-32-8	Benzo(a)pyrene	NA	69	NA	69
205-99-2	Benzo(b)fluoranthene	NA	690	NA	690
207-08-9	Benzo(k)fluoranthene	NA	6,900	NA	6,900
117-81-7	Bis (2-ethylhexyl) Phthalate (BEHP & DEHP)	170,000	42,000	190	190
85-68-7	Butyl Benzyl Phthalate	1,000,000	43,000	58	58
86-74-8	Carbazole	NA	30,000	NA	30,000
57-74-9	Chlordane	77	1,900	NA	77
218-01-9	Chrysene	NA	69,000	NA	69,000
53-70-3	Dibenz(a,h)anthracene	NA	69	NA	69
95-50-1	Dichlorobenzene, 1,2- (o)	12,000	NA	370	370
106-46-7	Dichlorobenzene, 1,4- (p)	15,000	510	NA	510
91-94-1	Dichlorobenzidine, 3,3-	NA	730	NA	730
72-54-8	Dichlorodiphenyldichloroethane (DDD)	2,800	3,500	NA	2,800
72-55-9	Dichlorodiphenyldichloroethene (DDE)	NA	2,200	NA	2,200
50-29-3	Dichlorodiphenyltrichloroethane (DDT)	700	2,700	NA	700
94-75-7	Dichlorophenoxyacetic acid, 2,4-	8,500	NA	NA	8,500
84-66-2	Diethyl Phthalate	1,000,000	NA	590	590
105-67-9	Dimethylphenol, 2,4-	170,000	NA	NA	170,000
84-74-2	Di-*n*-butyl Phthalate	850,000	NA	110	110
99-65-0	Dinitrobenzene, 1,3- (m)	850	NA	NA	850
528-29-0	Dinitrobenzene, 1,2-	850	NA	NA	850
121-14-2	Dinitrotoluene, 2,4-	1,700	870	NA	870
606-20-2	Dinitrotoluene, 2,6-	8,600	880	NA	880
72-20-8	Endrin	1,700	NA	NA	1,700
107-21-1	Ethylene Glycol	1,000,000	NA	110,000	110,000
206-44-0	Fluoranthene	290,000	NA	NA	290,000
86-73-7	Fluorene	290,000	NA	NA	290,000
76-44-8	Heptachlor	85	52	NA	52

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
1024-57-3	Heptachlor Epoxide	11	58	NA	11
87-68-3	Hexachloro-1,3-Butadiene	170	1,100	1,000	170
118-74-1	Hexachlorobenzene	85	170	NA	85
67-72-1	Hexachloroethane	8,500	8,000	NA	8,000
193-39-5	Indeno(1,2,3-c,d)pyrene	NA	690	NA	690
78-59-1	Isophorone	1,000,000	630,000	4,600	4,600
98-82-8	Isopropylbenzene (Cumene)	17,000	NA	260	260
58-89-9	Lindane	3,900	420	NA	420
108-39-4	m-cresol	430,000	NA	61,000	61,000
72-43-5	Methoxychlor	4,300	NA	NA	4,300
90-12-0	Methylnaphthalene, 1-	51,000	NA	360	360
91-20-3	Naphthalene	84	580	NA	84
98-95-3	Nitrobenzene	610	NA	1,500	610
86-30-6	Nitrosodiphenylamine, *n*-	17,000	71,000	NA	17,000
95-48-7	o-cresol	430,000	NA	NA	430,000
117-84-0	Octyl Phthalate, di-*n*-	340,000	NA	12	12
106-44-5	p-cresol	4,300	NA	NA	4,300
87-86-5	Pentachlorophenol	460	2,600	NA	460
108-95-2	Phenol	510,000	NA	NA	510,000
1336-36-3	Polychlorinated Biphenyls	42	230	NA	42
129-00-0	Pyrene	220,000	NA	NA	220,000
110-86-1	Pyridine	8,500	NA	400,000	8,500
93-72-1	Silvex	6,800	NA	NA	6,800
8001-35-2	Toxaphene	NA	500	NA	500
95-95-4	Trichlorophenol, 2,4,5-	850,000	NA	NA	850,000
88-06-2	Trichlorophenol, 2,4,6-	NA	29,000	NA	29,000
95-63-6	Trimethylbenzene, 1,2,4-	35	NA	250	35
108-67-8	Trimethylbenzene, 1,3,5-	280	NA	200	200
99-35-4	Trinitrobenzene, 1,3,5- (s)	430	NA	NA	430
108-05-4	Vinyl Acetate	100	NA	2,700	100
Inorganic Chemicals					
7440-36-0	Antimony	390	NA	NA	390
7440-38-2	Arsenic, Inorganic	420	640	NA	420
7440-39-3	Barium and Compounds	120,000	NA	NA	120,000
7440-41-7	Beryllium and Compounds	3,100	63,000	NA	3,100
7440-43-9	Cadmium	1,600	83,000	NA	1,600
16065-83-1	Chromium (III)	1,000,000	NA	NA	1,000,000
18540-29-9	Chromium (VI)	15,000	13,000	NA	13,000
7440-48-4	Cobalt	4,000	54,000	NA	4,000
57-12-5	Cyanide, Free	39,000	NA	NA	39,000
7782-41-4	Fluorine (soluble fluoride)	120,000	NA	NA	120,000
7439-97-6	Mercury	190	NA	NA	190
7440-02-0	Nickel (Soluble Salts)	21,000	NA	NA	21,000
7782-49-2	Selenium and Compounds	9,700	NA	NA	9,700

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
7440-22-4	Silver	9,700	NA	NA	9,700
7440-28-0	Thallium	1,600	NA	NA	1,600
7440-62-2	Vanadium	17,000	NA	NA	17,000
7440-66-6	Zinc and Compounds	580,000	NA	NA	580,000

(e) Calculating property-specific soil saturation concentrations.

(i) In lieu of using the generic soil saturation concentrations listed in table I through table III in paragraphs (C)(3)(b) through (C)(3)(d) of this rule, the volunteer may use the following equation to calculate a property-specific soil saturation concentration:

$$C_{sat} = \frac{S}{\rho_b} (K_d \rho_b + \theta_w + H'\theta_a)$$

Where :

C_{sat} *is the soil saturation concentration (mg/kg)*

S *is the water solubility (mg/L water)*

ρ_b *is dry soil bulk density (kg/L)*

K_d *is the soil - water partition coefficient (L/kg) (default is* $K_d = K_{oc} \times f_{oc}$*)*

K_{oc} *is the soil organic carbon/water partition coefficient (L/kg)*

f_{oc} *is the fraction organic carbon of soil (g/g)*

θ_w *is the water - filled soil porosity* (L_{water} / L_{soil})

H' is the dimensionless Henry's Law constant

θ_a *is the air - filled soil porosity* (L_{pore} / L_{soil}).

(ii) All chemical-specific values for the above equation must be obtained from one of the following sources:

(a) U.S. EPA's "Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites;"

(b) Ohio EPA's "Support Document for the Development of Generic Numerical Standards and Risk Assessment Procedures;"

(*c*) Hazardous substances data bank;

(d) The physical properties database;

(e) CHEMFATE chemical search;

(f) Risk assessment information system; or

(g) If chemical-specific values for the equation specified in this paragraph are not available in the sources listed in this paragraph, contact an Ohio EPA division of emergency and remedial response representative.

(i) Physical values must be obtained from one of the following sources:

(*a*) Physical values must be obtained from one of the following sources:

(*i*) U.S. EPA's "Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites;" or

(ii) Property-specific data that meet the criteria contained in paragraph (D)(3)(b)(iv) of rule 3745-300-09 of the Administrative Code.

(f) Table IV: generic direct-contact standards for lead (values are in mg/kg).

	Residential Land Use	Commercial/Industrial Land Use	Construction and Excavation Activities
Lead	400	1800	750

The lead standards contained in the table IV take into account other factors and assumptions in addition to the carcinogenic or non-carcinogenic risk of lead. Therefore, using the cumulative risk considerations contained in paragraph (C)(2)(b) of this rule is not appropriate and need not be performed.

(D) Generic unrestricted potable use standards for hazardous substances in ground water.

(1) Applicability.

(a) The generic unrestricted potable use standards contained in paragraph (D)(3) of this rule apply as determined in accordance with rule 3745-300-10 of the Administrative Code.

(b) A property-specific risk assessment must be conducted in accordance with the procedures established in rule 3745-300-09 of the Administrative Code to determine applicable standards in place of or in addition to using the generic unrestricted potable use standards if any of paragraph (A)(3)(a) through (A)(3)(c) of this rule apply to the property, and those exposures are required to be evaluated under rule 3745-300-10 of the Administrative Code;

(c) The standards listed in paragraph (D)(3) of this rule apply to releases of hazardous substances. Generic numerical standards for petroleum releases are identified in paragraph (B)(3) of this rule.

(2) Assumptions.

The generic unrestricted potable use standards contained in table V in paragraph (D)(3)(b) of this rule or table VI in paragraph (D)(3)(c) of this rule were determined using the assumption that the ground water on, underlying and emanating from the property will be used as a source of water for drinking, cooking, showering and bathing.

(a) The generic unrestricted potable use standards listed in table V in paragraph (D)(3)(b) of this rule are maximum contaminant levels or other regulatory established criteria which take into account factors and assumptions in addition to carcinogenic risk and non-carcinogenic hazards of the chemical. Therefore, the volunteer does not need to include the values for the chemicals of concern in table V in paragraph (D)(3)(b) of this rule in the cumulative adjustment for multiple chemicals required by paragraph (D)(2)(c) of this rule.

(b) The risk-derived generic unrestricted potable use standards presented in table VI in paragraph (D)(3)(c) of this rule assume a single chemical of concern is present in the ground water on, underlying, or emanating from the property.

(i) The generic unrestricted potable use standards presented in table VI in paragraph (D)(3)(c) of this rule are based on the following risk and hazard levels:

(*a*) For hazardous substances having carcinogenic effects, the chemical-specific carcinogenic risk must not exceed one excess cancer in a population of 100,000 (i.e. 1×10^{-5}); and

(*b*) For hazardous substances having non-carcinogenic effects, the chemical-specific hazard must not exceed a hazard index of 1.

(ii) The concentration of chemicals of concern, as determined in accordance with paragraph (F)(5) of rule 3745-300-07 of the Administrative Code, must not exceed the single chemical generic unrestricted potable use standard. Applicable ground water response requirements are included in rule 3745-300-10 of the Administrative Code.

(c) Multiple chemicals.

When more than one chemical of concern is present at a property and applicable generic unrestricted potable use standards for the chemicals of concern are contained in table VI in paragraph (D)(3)(c) of this rule, the values for each chemical of concern contained in

table VI must be adjusted for the presence of multiple chemicals in order to meet the human health risk and hazard levels described in paragraph (D)(2)(b)(i) of this rule. Those chemicals of concern present on the property that have applicable generic unrestricted potable use standards available in table V in paragraph (D)(3)(b) of this rule are not included within the multiple chemical adjustment. The cumulative adjustment must be made in accordance with paragraph (E)(2) of this rule. All final cumulative human health carcinogenic risk and non-carcinogenic hazard levels are based on one significant figure. A cumulative adjustment for multiple chemicals must also be made when using a combination of values listed in table VI and applicable standards determined by a property-specific risk assessment conducted in accordance with rule 3745-300-09 of the Administrative Code.

(3) The generic unrestricted potable use standards for ground water.

(a) The generic unrestricted potable use standards for petroleum at commercial, industrial, and residential properties are the standards established in rules adopted under division (B) of section 3737.882 of the Revised Code, as provided by division (B)(1) of section 3746.04 of the Revised Code.

(b) Table V: generic unrestricted potable use standards based on maximum contaminant levels or other regulatory established criteria (values are in µg/l, or micrograms per liter).

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Generic Unrestricted Potable Use Standard for a Single Chemical (µg/L)
Volatile Organic Chemicals		
71-43-2	Benzene	5
56-23-5	Carbon Tetrachloride	5
108-90-7	Chlorobenzene	100
107-06-2	Dichloroethane, 1,2-	5
75-35-4	Dichloroethene, 1,1-	7
156-59-2	Dichloroethene, *cis*-1,2-	70
156-60-5	Dichloroethene, *trans*-1,2-	100
78-87-5	Dichloropropane, 1,2 -	5
100-41-4	Ethylbenzene	700
1634-04-4	Methyl *tert*-Butyl Ether (MTBE)	40
75-09-2	Methylene Chloride	5
100-42-5	Styrene	100
127-18-4	Tetrachloroethene	5
108-88-3	Toluene	1,000
71-55-6	Trichloroethane, 1,1,1-	200
79-00-5	Trichloroethane, 1,1,2-	5
79-01-6	Trichloroethene	5
75-01-4	Vinyl Chloride	2
1330-20-7	Xylenes, Total	10,000

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Generic Unrestricted Potable Use Standard for a Single Chemical (μg/L)
Inorganic Chemicals		
7440-36-0	Antimony	6
7440-38-2	Arsenic, Inorganic	10
12001-28-4	Asbestos	7*
7440-39-3	Barium and Compounds	2,000
7440-41-7	Beryllium and Compounds	4
7440-43-9	Cadmium	5
7440-47-3	Chromium, Total	100
57-12-5	Cyanide, Free	200
7782-41-4	Fluorine (soluble fluoride)	4,000
7439-92-1	Lead	15
7439-97-6	Mercury	2
7782-49-2	Selenium and Compounds	50
7440-28-0	Thallium	2
Semi-Volatile Organic Chemicals and Pesticides		
15972-60-8	Alachlor	2
1912-24-9	Atrazine	3
50-32-8	Benzo(a)pyrene	0.2
117-81-7	Bis (2-ethylhexyl) Phthalate (BEHP & DEHP)	6
1563-66-2	Carbofuran	40
57-74-9	Chlordane	2
75-99-0	Dalapon	200
95-50-1	Dichlorobenzene, 1,2- (o)	600
106-46-7	Dichlorobenzene, 1,4- (p)	75
94-75-7	Dichlorophenoxyacetic acid, 2,4-	70
103-23-1	Di(2-ethylhexyl)adipate	400
96-12-8	Dibromochloropropane (DBCP)	0.2
88-85-7	Dinoseb	7
1746-01-6	Dioxin (2,3,7,8-TCDD)	0.00003
85-00-7	Diquat	20
145-73-3	Endothall	100
72-20-8	Endrin	2
106-93-4	Ethylene Dibromide (EDB)	0.05
107-18-36	Glyphosate	700
76-44-8	Heptachlor	0.4
1024-57-3	Heptachlor Epoxide	0.2
118-74-1	Hexachlorobenzene	1
77-47-4	Hexachlorocyclopentadiene	50
58-89-9	Lindane	0.2
72-43-5	Methoxychlor	40
23135-22-0	Oxamyl (Vydate)	200
87-86-5	Pentachlorophenol	1
1918-02-1	Picloram	500
1336-36-3	Polychlorinated Biphenyls	0.5
93-72-1	Silvex (2,4,5 TP)	50

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Generic Unrestricted Potable Use Standard for a Single Chemical (μg/L)
122-34-9	Simazine	4
8001-35-2	Toxaphene	3
120-82-1	Trichlorobenzene, 1,2,4-	70
Trihalomethanes (THMs)		
Not Available	Trihalomethanes, Total	80

* Units for this standard are in million fibers per liter, for all fibers longer than ten micrometers in length.

(c) Table VI: risk-derived generic unrestricted potable use standards (values are in μg/l, or micrograms per liter).

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Generic Unrestricted Potable Use Standard for a Single Chemical (μg/L)
Volatile Organic Chemicals				
67-64-1	Acetone	14,000	NA	14,000
75-15-0	Carbon Disulfide	1,400	NA	1,400
75-00-3	Chloroethane	6,200	550	550
67-66-3	Chloroform	150	40	40
124-48-1	Dibromochloromethane	320	19	19
75-71-8	Dichlorodifluoromethane	2,100	NA	2,100
75-34-3	Dichloroethane, 1,1-	2,600	250	250
542-75-6	Dichloropropene, 1,3 -	270	16	16
123-91-1	Dioxane, 1,4-	1,600	140	140
60-29-7	Ethyl Ether	3,200	NA	3,200
50-00-0	Formaldehyde	3,200	NA	3,200
64-18-6	Formic acid	32,000	NA	32,000
110-54-3	Hexane, n-	910	NA	910
78-83-1	Isobutyl Alcohol	4,700	NA	4,700
67-56-1	Methanol	7,900	NA	7,900
78-93-3	Methyl Ethyl Ketone (MEK)	8,900	NA	8,900
108-10-1	Methyl Isobutyl Ketone (MIBK)	1,200	NA	1,200
630-20-6	Tetrachloroethane , 1,1,1,2-	470	56	56
79-34-5	Tetrachloroethane, 1,1,2,2-	930	7.0	7.0
75-69-4	Trichlorofluoromethane	3,800	NA	3,800
Semi-Volatile Organic Chemicals				
83-32-9	Acenaphthene	950	NA	950
98-86-2	Acetophenone	1,600	NA	1,600
62-53-3	Aniline	110	280	110
120-12-7	Anthracene	4,700	NA	4,700
56-55-3	Benzo(a)anthracene	NA	0.63	0.63
205-99-2	Benzo(b)fluoranthene	NA	0.46	0.46
207-08-9	Benzo(k)fluoranthene	NA	22	22

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Generic Unrestricted Potable Use Standard for a Single Chemical (μg/L)
85-68-7	Butyl Benzyl Phthalate	3,200	110	110
86-74-8	Carbazole	NA	79	79
218-01-9	Chrysene	NA	63	63
72-54-8	Dichlorodiphenyldichloroethane (DDD)	22	3.5	3.5
72-55-9	Dichlorodiphenyldichloroethene (DDE)	NA	2.6	2.6
50-29-3	Dichlorodiphenyltrichloroethane (DDT)	4.8	2.0	2.0
84-66-2	Diethyl Phthalate	13,000	NA	13,000
105-67-9	Dimethylphenol, 2,4-	310	NA	310
84-74-2	Di-*n*-butyl Phthalate	1,500	NA	1,500
107-21-1	Ethylene Glycol	32,000	NA	32,000
206-44-0	Fluoranthene	420	NA	420
86-73-7	Fluorene	630	NA	630
67-72-1	Hexachloroethane	15	100	15
193-39-5	Indeno(1,2,3-c,d)pyrene	NA	0.34	0.34
78-59-1	Isophorone	3,200	1700	1,700
98-82-8	Isopropylbenzene (Cumene)	1,400	NA	1,400
108-39-4	m-cresol	790	NA	790
90-12-0	Methylnaphthalene, 1-	1,100	NA	1,100
91-20-3	Naphthalene	67	100	67
86-30-6	Nitrosodiphenylamine, *n*-	310	300	300
95-48-7	o-cresol	790	NA	790
117-84-0	Octyl Phthalate, di-*n*-	630	NA	630
106-44-5	p-cresol	79	NA	79
108-95-2	Phenol	4,700	NA	4,700
129-00-0	Pyrene	470	NA	470
110-86-1	Pyridine	16	NA	16
95-95-4	Trichlorophenol, 2,4,5-	1,600	NA	1,600
88-06-2	Trichlorophenol, 2,4,6-	NA	120	120
95-63-6	Trimethylbenzene, 1,2,4-	140	NA	140
108-67-8	Trimethylbenzene, 1,3,5-	140	NA	140
99-35-4	Trinitrobenzene, 1,3,5- (s)	470	NA	470
108-05-4	Vinyl Acetate	4,300	NA	4,300
Inorganic Chemicals				
7440-48-4	Cobalt	320	NA	320
7440-02-0	Nickel (Soluble Salts)	320	NA	320
7440-22-4	Silver	79	NA	79
7440-62-2	Vanadium	130	NA	130
7440-66-6	Zinc and Compounds	4,700	NA	4,700

(E) Procedures for cumulative adjustment for multiple chemicals

(1) Concentration of chemicals of concern in soils.

(a) Several procedures may be used to adjust for the presence of multiple carcinogenic chemicals of concern in an identified area or exposure unit to comply with paragraph (C)(2)(b) of this rule. One method is to divide the exposure point concentration ($chem_a$) for each chemical of concern by the "Carcinogenic Single Chemical Direct-Contact Soil Standard" ($GDCSC_a$) in table I in paragraph (C)(3)(b) of this rule, table II in paragraph (C)(3)(b) of this rule, or table III in paragraph (C)(3)(d) of this rule. The resultant ratios are summed as an expression of estimated risk (see the equation below). When the summed ratios result in a value less than one, carcinogenic risk levels have been met on the property. When the summed ratios result in a value greater than one the carcinogenic risk levels are not met and remedial action is required.

$$\left(\frac{[\,chem_a\,]}{GDCSC_a} + \frac{[\,chem_b\,]}{GDCSC_b} + ...\right) = \begin{array}{c}\textit{cumulative cancer risk ratio for}\\ \textit{direct contact soils on the property}\end{array}$$

(b) Several procedures may be used to adjust for the presence of multiple non-carcinogenic chemicals of concern in an identified area or exposure unit to comply with paragraph (C)(2)(b) of this rule. One method is to divide the exposure point concentration ($chem_a$) for each chemical of concern by the "Non-carcinogenic Single Chemical Direct-Contact Soil Standard" ($GDCSN_a$) in table I in paragraph (C)(3)(b) of this rule, table II in paragraph (C)(3)(c) of this rule, or table III in paragraph (C)(3)(d) of this rule. The resultant ratios are summed as an expression of estimated hazard index (see the equation below). When the summed ratios result in a value less than one, non-carcinogenic risk levels have been met on the property. When the summed ratios result in a value greater than one the non-carcinogenic risk levels are not met and remedial action is required.

$$\left(\frac{[\,chem_a\,]}{GDCSN_a} + \frac{[\,chem_b\,]}{GDCSN_b} + ...\right) = \begin{array}{c}\textit{cumulative noncancer risk ratio for}\\ \textit{direct contact soils on the property}\end{array}$$

Non-cancer risk ratios for non-carcinogenic chemicals of concern which do not exhibit the same toxic endpoint may be excluded from the calculation of the cumulative non-cancer risk ratio described above if a written justification for such exclusion is submitted. The consideration of all major toxic endpoints and mechanisms of action must include, at a minimum, those identified with the critical effect upon which the reference dose or reference concentration for each non-carcinogenic chemical of concern is based. The source for each reference dose and reference concentration for each non-carcinogenic chemical for which generic direct-contact soil standards have been derived, are cited in Ohio EPA's "Support Document for the Development of Generic Numerical Standards and Risk Assessment Procedures." It may be necessary to calculate more than one

cumulative non-cancer risk ratio for a property resulting from the segregation of non-carcinogenic chemicals of concern on the basis of toxic endpoints or mechanisms of action.

(c) For situations where a chemical of concern poses both carcinogenic and non-carcinogenic risks and a value for the chemical of concern is listed in both the "Standard for Single Chemical Carcinogens" column and the "Standard for Single Chemical Non-carcinogens" column contained in paragraph (C)(3) of this rule or an applicable single chemical carcinogen and non-carcinogen standard has been determined in accordance with rule 3745-300-09 of the Administrative Code, the chemical of concern must be included in the multiple carcinogenic chemical adjustment calculation under paragraph (E)(1)(a) of this rule and the adjustment calculation for multiple non-carcinogenic chemicals under paragraph (E)(1)(b) of this rule. The applicable standard for the chemical of concern will be the lowest of the values determined by using the equations in this paragraph or, if appropriate, the soil saturation concentration.

(2) Concentration of chemicals of concern in ground water.

(a) Several procedures may be used to adjust for the presence of multiple carcinogenic chemicals of concern in groundwater to comply with paragraph (D)(2)(c) of this rule. One method is to divide the exposure point concentration ($chem_a$) for each chemical of concern by the "Carcinogenic Single Chemical Unrestricted Potable Use Standard" ($GUPCS_a$) in table VI in paragraph (D)(3)(c) of this rule. The resultant ratios are summed as an expression of estimated risk (see the equation below). When the summed ratios result in a value less than one, carcinogenic risk levels have been met on the property. When the summed ratios result in a value greater than one the carcinogenic risk levels are not met and remedial action is required.

$$\left(\frac{[chem_a]}{GUPCS_a} + \frac{[chem_b]}{GUPCS_b} + ...\right) = \begin{array}{c} cumulative\ cancer\ risk\ ratio\ for \\ generic\ unrestricted\ potable\ use \\ ground\ water\ on\ the\ property \end{array}$$

(b) Several procedures may be used to adjust for the presence of multiple non-carcinogenic chemicals of concern in groundwater to comply with paragraph (D)(2)(c) of this rule. One method is to divide the exposure point concentration ($chem_a$) for each chemical of concern by the "Non-carcinogenic Single Chemical Unrestricted Potable Use Standard" ($GUPNS_a$) in table VI in paragraph (D)(3)(c) of this rule. The resultant ratios are summed as an expression of estimated hazard index (see the equation below). When the summed ratios result in a value less than one, non-carcinogenic hazard levels have been

met on the property. When the summed ratios result in a value greater than one the non-carcinogenic hazard levels are not met and remedial action is required.

$$\left(\frac{[chem_a]}{GUPNS_a} + \frac{[chem_b]}{GUPNS_b} + ...\right) = \begin{array}{c}\textit{cumulative noncancer risk ratio for}\\ \textit{generic potable use ground water}\\ \textit{on the Property}\end{array}$$

Non-cancer risk ratios for non-carcinogenic chemicals of concern which do not exhibit the same toxic endpoint may be excluded from the calculation of the cumulative non-cancer risk ratio described above if a written justification for such exclusion is submitted. The consideration of all major toxic endpoints and mechanisms of action must include, at a minimum, those identified with the critical effect upon which the reference dose or reference concentration for each non-carcinogenic chemical of concern is based. The source for each reference dose and reference concentration for each non-carcinogenic chemical for which generic unrestricted potable use standards have been derived, are cited in Ohio EPA's "Support Document for the Development of Generic Numerical Standards and Risk Assessment Procedures." It may be necessary to calculate more than one cumulative non-cancer risk ratio for a property resulting from the segregation of non-carcinogenic chemicals of concern on the basis of toxic endpoints or mechanisms of action.

(c) For situations where a chemical of concern poses both carcinogenic and non-carcinogenic risk and a value for the chemical of concern is listed in both the "Standard for Single Chemical Carcinogens" column and the "Standard for Single Chemical Non-carcinogens" column contained in table VI in paragraph (D)(3)(c) of this rule or an applicable single chemical carcinogen and non-carcinogen standard has been determined in accordance with rule 3745-300-09 of the Administrative Code, the chemical of concern must be evaluated in the adjustment calculation for multiple carcinogenic chemicals under paragraph (E)(2)(a) of this rule and the multiple non-carcinogenic chemical adjustment calculation under paragraph (E)(2)(b)of this rule. The applicable standard for the chemical of concern is the lowest value determined by using the equations in this paragraph.

(F) Generic numerical standards for surface water.

(1) Applicability.

(a) The generic numerical standards for surface water in paragraph (F)(2) of this rule apply to a property as determined in accordance with paragraph (F) of rule 3745-300-07 of the Administrative Code.

(b) For all releases of petroleum on underlying or emanating to surface water of the state, the generic petroleum standards are contained within paragraph (B) of this rule.

(2) Generic surface water standards.

(a) For all releases or source areas of hazardous substances on, underlying or emanating from the property to surface waters of the state, surface water chemical concentrations must be compared to the chemical criteria pursuant to Chapter 3745-1 of the Administrative Code. The outside mixing zone average criteria for human health and aquatic life and wildlife should be compared against ambient samples averaged over a thirty-day period. Single ambient samples are not to exceed the outside the mixing zone maximum. If all chemical constituents are below their corresponding chemical criteria, then the surface water may be eliminated as an exposure medium. If chemical constituents exceed their corresponding chemical criteria, then the surface water shall be further assessed in accordance with rule 3745-300-09 of the Administrative Code.

For the purposes of this rule, the generic numerical standards for surface water apply regardless of whether the release or source area of hazardous substances is a point source or nonpoint source.

(b) All regulated point source discharges of pollutants to surface waters of the state and any other regulated discharges that occur from or on the property must comply with all permit and other applicable requirements of the Federal Water Pollution Control Act and Chapter 6111. of the Revised Code, and the regulations adopted thereunder.

The permit and other applicable requirements of point source discharges include but are not limited to: (a) the national pollutant discharge elimination system permit issued pursuant to Chapter 3745-33 of the Administrative Code (also referred to as Ohio NPDES permits), and (b) the water quality certification issued pursuant to Chapter 3745-32 of the Administrative Code. A volunteer may obtain a consolidated standards permit for activities conducted in connection with a voluntary action which require permits from the director.

(c) Storm water associated with industrial activity that is discharged to surface waters of the state or is discharged through a separate municipal storm sewer system must comply with the applicable requirements contained in 40 C.F.R. 122.26.

(G) Generic numerical standards for human exposure to sediments.

(1) Applicability.

(a) For purposes of this rule and rule 3745-300-07 of the Administrative Code, human health exposure pathways to sediment on or emanating from the property are considered complete when the surface water which contains the sediments:

(i) Produces or can produce a consistent supply of edible-sized fish and the chemicals of concern in the sediment are persistent, bioaccumulative and toxic; or

(ii) Is reasonably anticipated to support recreational activities such as wading, swimming, or boating.

(b) For all releases of petroleum on, underlying or emanating to surface waters of the state which contains sediments, the generic petroleum standards are contained in paragraph (B) of this rule.

(c) If the concentrations of chemicals of concern in sediment exceed the generic numerical standards for human exposure to sediment, the volunteer must conduct a human health property-specific risk assessment following the methodology outlined in paragraph (D) of rule 3745-300-09 of the Administrative Code or conduct a remedy in accordance with the 3745-300-11 of the Administrative Code.

(2) Generic numerical standards for human exposure to sediment.

(a) Generic direct-contact standards for sediments are the generic direct-contact soil standards for residential land use specified in paragraph (C)(3)(b) of this rule. Cumulative adjustment for multiple chemicals must be evaluated in accordance with paragraph (C)(2)(b) of this rule.

(b) If chemicals of concern in sediment are persistent, bioaccumulative and toxic and the surface water containing the sediments produces or can produce a consistent supply of edible-sized fish, the volunteer must conduct a human health property-specific risk assessment in accordance with rule 3745-300-09 of the Administrative Code to evaluate fish consumption.

(H) Generic numerical standards for exposure of important ecological resources to sediments.

(1) Applicability.

(a) The volunteer may smaples sediments directly and apply the applicable standards in accordance with (H)(2)(a) and (H)(2)(b) of this rule; or

(b) Demonstrate compliance with applicable standards in accordance with paragraph (F)(5) of rule 3745-300-09 of the Administrative Code.

(2) Generic numerical standards for exposure of important ecological resources to sediments.

(a) The volunteer may compare the concentration of chemicals of concern in sediments on the property to the Ohio-specific sediment reference values contained in attachment H of Ohio EPA's "Guidance for Conducting Ecological Risk Assessments"; or

(b) For each chemical of concern for which the volunteer does not compare the sediment concentrations to the Ohio-specific sediment reference values, the ecotoxicologically-based benchmarks from the following hierarchy must be used:

(i) Consensus-based threshold effects concentration values contained in MacDonald, Ingersoll and Berger's "Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems"; or

(ii) U.S. EPA, region 5 ecological screening levels.

(3) If concentrations of chemicals of concern do not exceed Ohio-specific sediment reference values or appropriate ecotoxicologically-based benchmarks and the provisions in paragraph (A)(3)(f) of this rule do not apply, then the applicable standards have been met.

(4) The volunteer shall evaluate the sediments on the property in accordance with paragraph (F) of rule 3745-300-09 of the Administrative Code or conduct a remedy in accordance with rule 3745-300-11 of the Administrative Code if any of the following apply:

(a) The sediments on the property exceed applicable standards in accordance with this rule; or

(b) The sediment samples were not compared to the sediment values in accordance with paragraph (H)(2) of this rule.

(I) Developing soil standards for leaching of chemicals of concern from soil to ground water.

(1) Applicability.

(a) Soil standards for leaching may be developed when one or more ground water zones are determined to meet unrestricted potable use standards and the potential for leaching of chemicals of concern from soil to ground water is determined to be a complete exposure pathway.

(b) Soil standards for leaching may be developed when one or more ground water zones are determined to exceed unrestricted potable use standards and the potential for leaching of chemicals of concern from soil to ground water is a complete exposure pathway that must be evaluated in accordance with:

(i) Applicable ground water response requirements contained in paragraph (E) of rule 3745-300-10 of the Administrative Code; or

(ii) A pathway completeness determination in paragraph (F)(1) of rule 3745-300-07 of the Administrative Code.

(2) Soil standards for leaching.

(a) Soil standards for leaching when the underlying ground water zone meets unrestricted potable use standards.

Soil standards for leaching are the soil concentrations determined to be protective of the applicable ground water zone and will not cause unrestricted potable use standards to be exceeded in the ground water zone as demonstrated in accordance with paragraph (F)(3)(a) of rule 3745-300-07 of the Administrative Code.

(b) Soil standards for leaching when the underlying ground water zone exceeds unrestricted potable use standards.

(i) Soil standards for leaching are the soil concentrations determined to be protective of the applicable ground water response requirements for the ground water zone as determined by rule 3745-300-10 of the Administrative Code.

(ii) Soil standards for leaching are the soil concentrations determined to be protective of any other applicable standard in ground water that must be met in accordance with a pathway completeness determination and the demonstration of compliance with applicable standards.

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Certification

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Date

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