

## DEPARTMENT OF ENVIRONMENTAL QUALITY

### REMEDIATION AND REDEVELOPMENT DIVISION

#### ENVIRONMENTAL CONTAMINATION RESPONSE ACTIVITY

(By authority conferred on the director of the Department of Environmental Quality by sections 20104(1) and 20120a(18) of 1994 PA 451, MCL 324.20104(1) and 324.20120a(18).

#### CLEANUP CRITERIA REQUIREMENTS FOR RESPONSE ACTIVITY

##### **R 299.1 Definitions; A to I.**

Rule 1. As used in this part:

(a) "Act" means 1994 PA 451, MCL 324.101 to 324.90106, known as the Natural Resources and Environmental Protection Act.

(b) "Acute toxicity" means the ability of a hazardous substance to cause a debilitating or injurious effect in an organism as a result of a single or short-term exposure.

(c) "Ambient air" means the atmosphere outside of buildings.

(d) "Applicable criterion" means a cleanup criterion for a relevant pathway. A criterion is not an applicable criterion if the exposure pathway is not a relevant pathway at the facility or if the exposure it addresses is reliably restricted by a restrictive covenant or institutional control or other mechanism allowed for under part 201 of the act and these rules.

(e) "Aquifer" means a geological formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs.

(f) "Best available information" means, when used in relation to a risk assessment or the development of cleanup criteria, the most scientifically credible and relevant data available about a particular hazardous substance. Such information may include, but is not limited to, any of the following:

(i) The peer reviewed scientific literature.

(ii) Information sources recognized by the risk assessment community, such as the integrated risk information system database maintained by the United States environmental protection agency or other scientifically reliable databases.

(iii) Other scientific studies that are acceptable to the department.

(g) "Cancer slope factor" means a plausible upper-bound estimate of the probability of a response per unit dose of a hazardous substance over a lifetime. The cancer slope factor is used to estimate an upper bound probability of an individual developing cancer as a result of a lifetime exposure to a particular level of a potential carcinogen.

(h) "Carcinogen" means a hazardous substance which, based on the weight of evidence, causes an increased incidence of benign or malignant neoplasms in animals or humans or that substantially decreases the time in which neoplasms develop in animals or humans.

(i) "Chronic toxicity" means the ability of a hazardous substance to cause an injurious or debilitating effect in an organism that results from repeated exposure to the hazardous

substance for a time period representing a substantial portion of the natural life expectancy of the organism.

(j) “ $C_{\text{sat}}$ ” means the concentration in soil at which the solubility limits of the soil pore water, the vapor phase limits of the soil pore air, and the absorptive limits of the soil particles have been reached. As used in these rules,  $C_{\text{sat}}$  is a theoretical threshold above which a free-phase liquid (non-aqueous phase liquid) hazardous substance may exist.

(k) “Direct contact” means exposure to hazardous substances through ingestion or dermal contact.

(l) “Generic residential” means the cleanup criteria established by the department under section 20120a(1)(a) of the act and these rules.

(m) “Groundwater” means water below the land surface in a zone of saturation.

(n) “Increased cancer risk of 1 in 100,000” means the 95% upper bound on the calculated risk of 1 additional cancer above the background cancer rate per 100,000 individuals continuously exposed to a carcinogen at a given average daily dose for a 70-year lifetime.

(o) “Inhalation unit risk factor” means the additional lifetime cancer risk occurring in a population in which all individuals are exposed continuously for life to a concentration of 1 microgram per cubic meter of the hazardous substance in the air they breathe. The inhalation unit risk factor shall be calculated under the provisions of part 55 of the act and the rules promulgated under that part.

(p) “Initial threshold screening level” means a concentration in air of a toxic air contaminant which is used to evaluate noncarcinogenic health effects and is calculated under part 55 of the act and the rules promulgated under that part.

(q) “Institutional control” means a measure which is approved by the department, which takes a form other than a restrictive covenant, and which limits or prohibits certain activities that may interfere with the integrity or effectiveness of a remedial action or result in exposure to hazardous substances at a facility, or which provides notice about the presence of a hazardous substance at a facility in concentrations that exceed only an aesthetic-based cleanup criterion.

(r) “Ionizing organic hazardous substance” means an organic hazardous substance that has functional chemical groups that become ions when exposed to varying pH conditions.

History: 2013 AACS.

## **R 299.2 Definitions; L to V.**

Rule 2. As used in this part:

(a) “Land or resource use restrictions” means the provisions of any of the following measures that are used to limit or prohibit activities that may interfere with the integrity or effectiveness of a response activity, or to limit or prohibit activities that may result in exposure to hazardous substances at a facility, or to provide notice about the presence of a hazardous substance at a facility in concentrations that exceed only an aesthetic-based cleanup criterion:

(i) A restrictive covenant.

(ii) A notice of approved environmental remediation.

(iii) An institutional control, which may be a local ordinance or any form of preapproved institutional control, such as a notice of aesthetic impact.

(b) "Leachate" means liquid, including any suspended components in the liquid, that has percolated through or drained from a hazardous substance or soil contaminated with a hazardous substance.

(c) "Linearized multistage model" means a dose-response model which assumes that there are a number of distinct biological stages or changes that must occur for a normal cell to be transformed into a tumor and which assumes the dose-response relationship to be linear at low doses.

(d) "Notice of aesthetic impact" means a document that describes conditions at a facility that result from the presence of hazardous substances at concentrations which exceed only cleanup criteria that are based on aesthetic impacts.

(e) "Reference dose" or "RfD" means a conservative estimate of the daily intake of the human population, including sensitive subgroups, that is likely to be without appreciable risk of deleterious effect during a lifetime. The reference dose is expressed in units of milligrams per kilogram body weight per day.

(f) "Relative source contribution factor" or "RSC" means that portion of a person's total daily intake of a noncarcinogenic hazardous substance that comes from the medium being addressed by the cleanup criterion.

(g) "Relevant pathway" means an exposure pathway that is reasonable and relevant because there is a reasonable potential for exposure to a hazardous substance to occur to a human or nonhuman receptor. The components of an exposure pathway are a source or release of a hazardous substance, an exposure point, and, if the exposure point is not the source or point of release, a transport medium. The existence of a municipal water supply, exposure barrier, or other similar feature does not automatically make an exposure pathway irrelevant.

(h) "Risk assessment" means the analytical process used to determine the risk to the public health, safety, or welfare or to the environment associated with a release or threat of release of a hazardous substance at a facility.

(i) "Secondary maximum contaminant level" means the United States environmental protection agency's secondary maximum contaminant level for protection of the public welfare for substances that may adversely affect the taste, odor, color, appearance, or any aesthetic quality of drinking water, as set forth in 40 C.F.R. part 143 (revised as of July 1, 2012), which is adopted by reference in these rules and which is available for inspection at the Lansing office of the department, 525 West Allegan Street, Lansing, Michigan. Copies of the provisions may be purchased, at a cost as of the time of adoption of these rules of \$55.00, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401 (Stock Number 869-044-00152-7), or from the Department of Environmental Quality, Remediation and Redevelopment Division, 525 West Allegan Street, Lansing, Michigan 48933, at cost.

(j) "Toxicological interaction" means simultaneous exposure to 2 or more hazardous substances which will produce a toxicological response that is greater or less than their individual responses.

(k) "Weight of evidence," a term of art used in risk assessment, means an evaluation of the relevant scientific data conducted to determine the likelihood that a hazardous substance is a human carcinogen or causes noncancer adverse health effects, or both. The evaluation may include any of the following information in addition to toxicological bioassays:

- (i) Structure-activity relationships.
  - (ii) chemical-physical properties.
  - (iii) Short-term test findings.
  - (iv) Results of appropriate physiological, biological, and toxicological observations.
  - (v) Comparative metabolism and pharmacokinetic studies.
- (1) “Volatile” means any compound that exhibits a Henry’s law constant equal to or greater than 0.00001 atmosphere-cubic meter per mole at standard temperature and pressure.

History: 2013 AACCS.

**R 299.3 Response activities; protection of public health, safety, welfare, and environment required; rules applicable to interim response actions designed to meet cleanup criteria; degree of cleanup; modification of cleanup category; aquifers; unacceptability of response activity plan.**

Rule 3. (1) All response activities shall be protective of the public health, safety, and welfare and the environment. Applicable generic cleanup criteria established by the department pursuant to section 20120a(1) and site specific cleanup criteria approved by the department under section 20120a(2) and 20120b of the act and these rules reflect the department’s judgment, at the time the criteria are established or approved by the department, about the numerical criteria required to meet this protectiveness requirement, subject to the provisions of R 299.4(3), R 299.28, and R 299.34(2).

(2) The rules in this part apply to interim response activities that are designed to meet cleanup criteria. References in this part to response activity also include those interim response activities.

(3) The category of land use-based remedial action under section 20120a(1) of the act or the site-specific cleanup criteria identified under sections 20120a(2) and 20120b of the act may be modified by the person proposing to conduct the response activity that will result in modification during implementation or after completion of a remedial action, if appropriate to the facility and if that modification is accomplished in a manner that is consistent with the act and these rules.

(4) If a revised land use-based remedial action includes characteristics that are required to be approved by the department, then the person implementing the change shall seek department approval as required by part 201 of the act and these rules.

(5) The horizontal and vertical extent of hazardous substance concentrations in an aquifer above the higher of either the concentration allowed by section 20120a(1)(a) or (10) of the act, as applicable, shall not increase after the initiation of remedial actions to address an aquifer, except as approved by the director as provided in section 20118(5) and (6) of the act.

(6) All remedial actions that address the remediation of an aquifer shall provide for removal of the hazardous substance or substances from the aquifer, either through active remediation or as a result of naturally occurring biological or chemical processes which can be documented to occur at the facility, except as provided in section 20118(5) and (6) of the act.

History: 2013 AACCS.

#### **R 299.4 General requirements for application of cleanup criteria.**

Rule 4. (1) All cleanup criteria used in response activity undertaken under part 201 of the act and these rules shall be based on best available information.

(2) The generic cleanup criteria developed by the department using the algorithms presented in these rules are derived primarily from data that reflect chronic toxicity endpoints. If a hazardous substance has a more sensitive toxic effect than those associated with the chronic toxicity data used to calculate a generic criterion, then a criterion shall be developed to address the most sensitive effect. The generic cleanup criteria established by the department shall be accepted as protective of the most sensitive toxic effect in a given exposure pathway for the hazardous substance in question.

(3) If the department has not calculated a criterion for a hazardous substance for a given exposure pathway, then the person proposing or implementing the response activity shall supply the necessary data for the department to calculate a criterion or establish a criterion under subrule (4) of this rule, unless the department determines that a numerical criterion is not required to assure that a given response activity will be protective.

(4) A generic or site-specific cleanup criterion may be established by the department based on best professional judgment instead of a calculation based on minimum toxicity data for a specific hazardous substance when the minimum toxicity data are not available for that hazardous substance, but data of sufficient quality are available to show that the hazardous substance in question can be adequately assessed by comparison to the toxicity of another hazardous substance for which sufficient data are available. A criterion may be established by the department in this manner when the hazardous substances are expected by the department to have similar fate and toxicity.

History: 2013 AACS.

#### **R 299.6 Generic cleanup criteria; toxicological and chemical-physical properties; use of generic cleanup criteria as risk based screening levels; procedure for developing additional generic criteria.**

Rule 6. (1) Except as provided in subrules (9), (10) and (11) of this rule, generic groundwater cleanup criteria for the residential and nonresidential categories shall be the values shown in table 1 of R 299.44. If a generic groundwater cleanup criterion is higher than the flammability and explosivity screening level shown in table 1 of R 299.44, then the person proposing or implementing response activity shall document whether additional response activity is required to protect against the acute hazard.

(2) Except as provided in subrules (9), (10), and (11) of this rule, generic soil cleanup criteria for the residential category shall be the values shown in table 2 of R 299.46. If soil concentrations are greater than  $C_{sat}$ , then the person proposing or implementing response activity shall evaluate whether additional response activity is required to control free-phase liquids or to protect against risks associated with free-phase liquids that are not accounted for in development of the generic criteria.

(3) Except as provided in subrules (9), (10), and (11) of this rule, generic soil cleanup criteria for the nonresidential category shall be the values shown in table 3 of R 299.48.

(4) The generic cleanup criteria shown in R 299.44, R 299.46, and R 299.48 and identified under subrule (12) of this rule may be used and known as risk-based screening levels for corrective actions required under part 213 of the act.

(5) Generic cleanup criteria under R 299.44, R 299.46, and R 299.48 are based on the target detection limit or background concentration in the following cases:

(a) If a calculated cleanup criterion is less than the target detection limit for that hazardous substance in a given medium, then the target detection limit is the cleanup criterion. Criteria to which this subdivision applies are designated with a footnote in the criteria tables.

(b) A background concentration may be substituted for a generic cleanup criterion when the background concentration is higher than a criterion shown in R 299.44, R 299.46, or R 299.48.

(6) If a hazardous substance imparts adverse aesthetic characteristics to groundwater at a concentration less than the health-based criterion for that hazardous substance, then the aesthetic-based criterion derived under R 299.9 is shown as the drinking water criterion in the table of generic cleanup criteria in R 299.44 and designated with a footnote.

(7) Except as provided in section 20120a(9) of the act, R 299.49(1)(l), and R 299.49(1)(o), the toxicological and physical-chemical input values used by the department to derive generic cleanup criteria with the equations and default assumptions provided in R 299.10, R 299.14, R 299.20, R 299.22, R 299.24, and R 299.26 are shown in table 4 of R 299.50.

(8) Toxicological and chemical-physical data in table 4 of R 299.50, if available, shall be used in conjunction with the equations and default assumptions that appear in these rules for the development of generic cleanup criteria under subrules (9) or (10) of this rule, except as provided in section 20120a(9) of the act, R 299.49(1)(l), and R 299.49(1)(o).

(9) For a substance that is not listed in the cleanup criteria tables in R 299.44, R 299.46, or R 299.48, the department may determine if the substance is a hazardous substance using best available information about the toxicological and physical-chemical properties of that substance and use that information to develop a generic or site-specific cleanup criterion.

(10) For a substance that is listed in the cleanup criteria tables in R 299.44, R 299.46, or R 299.48, if the department obtains sufficient information to support calculation of a cleanup criterion which is designated in the cleanup criteria tables or table 4 of R 299.50 with a footnote "ID" or "NA," the department shall use best available information to calculate a cleanup criterion for the hazardous substance.

(11) If a new state drinking water standard is established or a state drinking water standard is changed after the effective date of this rule, the drinking water standard in effect under section 5 of 1976 PA 399, MCL 325.1005, shall become the generic residential cleanup criterion under R 299.44, as provided in section 20120a(5) of the act.

(12) If a generic cleanup criterion is developed under subrule (9) or (10) of this rule, or modified under subrule (11) of this rule, the department shall make the new toxicological and physical-chemical data and criterion available by announcing it on the department's internet web site, and by publishing notice of the change in the department calendar, or by such other means that effectively notifies interested persons. The new criterion shall take effect when published and announced by the department as required in this rule. The

new data and resulting cleanup criterion shall remain effective and be used as required under these rules until the department promulgates revised data and criteria pursuant to administrative procedures act, 1969 PA 306, MCL 24.201 to 24.328.

History: 2013 AACS.

**R 299.8 Groundwater cleanup criteria generally.**

Rule 8. (1) Except as provided in subrule (2) of this rule, the generic groundwater cleanup criteria applicable at a given facility shall be the most restrictive of the criteria developed under R 299.9, R 299.10, or R 299.14, considering those pathways that are reasonable and relevant to the facility and the category of cleanup criteria being proposed or implemented.

(2) If a generic groundwater cleanup criterion developed under R 299.9, R 299.10, or R 299.14 is greater than the solubility limit of that hazardous substance in water at 25° Celsius, then the solubility limit shall be the generic criteria for that pathway.

History: 2013 AACS.

**R 299.9 Calculation of generic cleanup criteria for groundwater in aquifer based on adverse aesthetic impacts.**

Rule 9. (1) If a hazardous substance, singly or in combination with other hazardous substances present at the facility, imparts adverse aesthetic characteristics to groundwater in an aquifer, then the cleanup criterion shall be the secondary maximum contaminant level, or, if there is no secondary maximum contaminant level, then the concentration that is documented as the taste or odor threshold concentration or the concentration below which appearance or other aesthetic characteristics are not adversely affected. The criteria of this subrule shall apply only when the level required by this subrule is less than the level required by section 20120a(4) of the act. A taste or odor threshold concentration or a concentration adversely affecting appearance shall be determined according to methods approved by the United States environmental protection agency.

(2) For the purposes of this rule, the point of exposure shall be presumed to be any point in the affected aquifer.

History: 2013 AACS.

**R 299.10 Generic cleanup criteria for groundwater in aquifer based on ingestion of groundwater for drinking water.**

Rule 10. (1) Exposure to groundwater by ingestion shall be considered a relevant pathway for groundwater that satisfies either of the following conditions:

(a) The groundwater is in an aquifer.

(b) The groundwater is not in an aquifer, but can reasonably be expected to transport a hazardous substance into an aquifer in a concentration that exceeds the generic residential criteria developed under subrule (2) of this rule.

(2) The criteria developed pursuant to R 299.9 and R 299.10 are not applicable if ingestion of the groundwater is, or as part of the response activity will be, reliably restricted by a restrictive covenant, a notice of approved environmental remediation, or an institutional control that is allowed for under these rules and approved by the department, if approval is required.

(3) Cleanup criteria for groundwater based on ingestion of groundwater for drinking water shall be calculated according to the following algorithms, except as provided for in R 299.34. Criteria calculated under this subrule shall be the generic cleanup criterion, unless a state drinking water standard is available or, if a criterion protective of adverse aesthetic characteristics is more restrictive, as provided for in section 20120a(5) of the act.



EQUATION FOR CARCINOGENIC EFFECTS:

$$DWC = \frac{TR \times BW \times AT \times CF}{SF \times EF \times ED \times IR_{dw}}$$

where,

DWC	(Drinking water criterion)	=	chemical-specific (ug/L or ppb)
TR	(Target risk level)	=	10 <sup>-5</sup>
BW	(Body weight)	=	70 kg
AT	(Averaging time in days)	=	25,550 days (70 years x 365 days/year)
CF	(Conversion factor)	=	1000 ug/mg
SF	(Oral cancer slope factor)	=	chemical-specific (mg/kg-day) <sup>-1</sup>
EF	(Exposure frequency)	=	350 days/year (residential) 245 days/year (nonresidential)
ED	(Exposure duration)	=	30 years (residential) 21 years (nonresidential)
IR <sub>dw</sub>	(Drinking water ingestion rate)	=	2 liters/day (residential) 1 liter/day (nonresidential)

EQUATION FOR NONCARCINOGENS:

$$DWC = \frac{THQ \times RfD \times BW \times AT \times RSC \times CF}{EF \times ED \times IR_{dw}}$$

where,

DWC	(Drinking water criterion)	=	chemical-specific (ug/L or ppb)
THQ	(Target hazard quotient)	=	1
RfD	(Oral reference dose)	=	chemical-specific (mg/kg-day)
BW	(Body weight)	=	70 kg
AT	(Averaging time)	=	10,950 days (30 years x 365 days/year - residential) 7,665 days (21 years x 365 days/year - nonresidential)
RSC	(Relative source contribution)	=	chemical-specific or 0.2 if chemical-specific data are not available
CF	(Conversion factor)	=	1000 ug/mg
EF	(Exposure frequency)	=	350 days/year (residential) 245 days/year (nonresidential)
ED	(Exposure duration)	=	30 years (residential) 21 years (nonresidential)
IR <sub>dw</sub>	(Drinking water ingestion rate)	=	2 liters/day (residential) 1 liter/day (nonresidential)

(4) For the purposes of this rule, the point of exposure shall be presumed to be any point in the affected aquifer.

**R 299.14 Generic cleanup criteria for groundwater based on hazardous substance vapors emanating from groundwater to indoor air.**

Rule 14. (1) Inhalation of hazardous substance vapors volatilizing from groundwater to indoor air shall be considered a reasonable and relevant exposure pathway for hazardous substances in groundwater that have a Henry’s law constant greater than or equal to 0.00001 atm-m<sup>3</sup>/mole.

(2) Except as provided in subrule (1) of this rule, if any of the following conditions exist, the generic criteria developed pursuant to this rule shall not apply and a site-specific evaluation of indoor inhalation risks shall be conducted:

(a) There is a structure present or planned to be constructed at the facility which does not have a concrete block or poured concrete floor and walls.

(b) The highest water table elevation of a contaminated saturated zone at the facility, considering seasonal variation, is within 3 meters of the ground surface.

(c) There is a sump present that is not completely isolated from the surrounding soil by its materials of construction, or there is other direct entry of contaminated groundwater into the basement.

(3) Groundwater cleanup criteria based on inhalation of hazardous substance vapors volatilizing from groundwater to indoor air shall be called groundwater volatilization indoor air inhalation criteria (“GVIIC”). The GVIIC is determined by the following series of calculations, except as provided in R 299.34(3):

**EQUATION FOR CARCINOGENIC EFFECTS:**

$$GVIIC = \frac{TR \times AT \times AIR}{IURF \times EF \times ED \times CR_{building}}$$

where,

GVIIC	(Groundwater volatilization indoor air inhalation criteria)	= chemical-specific, ug/L
TR	(Target risk level)	= 10 <sup>-5</sup>
AT	(Averaging time)	= 25,550 days (70 x 365)
AIR	(Adjusted inhalation rate)	= 1 (residential) = 2 (nonresidential)
IURF	(Inhalation unit risk factor)	= chemical-specific, (ug/m <sup>3</sup> ) <sup>-1</sup>
EF	(Exposure frequency)	= 350 days/year (residential) = 245 days/year (nonresidential)
ED	(Exposure duration)	= 30 years (residential) = 21 years (nonresidential)
CR <sub>building</sub>	(Ratio of indoor air concentration to groundwater concentration)	= chemical-specific, (ug/m <sup>3</sup> )/(ug/L)

EQUATION FOR NONCARCINOGENIC EFFECTS:

$$GVIC = \frac{THQ \times AT}{(1/ITSL) \times EF \times ED \times CR_{building}}$$

where,

GVIIC	(Groundwater volatilization indoor air inhalation criteria)	= chemical-specific, ug/L
THQ	(Target hazard quotient)	= 1
AT	(Averaging time)	= 10,950 days (residential) = 7,665 days (nonresidential)
EF	(Exposure frequency)	= 350 days/year (residential) = 245 days/year (nonresidential)
ED	(Exposure duration)	= 30 years (residential) = 21 years (nonresidential)
ITSL	(Initial threshold screening level)	= chemical-specific, ug/m <sup>3</sup>
CR <sub>building</sub>	(Ratio of indoor air concentration to groundwater concentration)	= chemical-specific, (ug/m <sup>3</sup> )/(ug/L)

The ratio of the indoor air concentration to the groundwater concentration is calculated as:

$$CR_{building} = CR_{source}^{gw} \times \alpha$$

where,

CR <sub>building</sub>	(Ratio of indoor air concentration to groundwater concentration)	= chemical-specific, (ug/m <sup>3</sup> )/(ug/L)
α	(Attenuation coefficient)	= chemical-specific, unitless
CR <sub>source</sub> <sup>gw</sup>	(Ratio of soil vapor concentration to groundwater/source concentration)	= chemical-specific, (ug/m <sup>3</sup> )/(ug/L)

The soil vapor-phase concentration generated from a hazardous substance in groundwater is assumed to be in equilibrium with the aqueous phase concentration (C<sub>w</sub>) of that substance as related by the dimensionless Henry's law constant (H') such that:

$$CR_{source}^{gw} = H' \times TAF \times C_w \times 10^3 L/m^3$$

where,

CR <sub>source</sub> <sup>gw</sup>	(Ratio of soil vapor concentration to groundwater/source concentration)	= chemical-specific, (ug/m <sup>3</sup> )/(ug/L)
H'	(Dimensionless Henry's law constant, where H' = HLC x 41)	= chemical-specific, unitless
HLC	(Henry's law constant at 25 degrees)	= chemical-specific,

	Celsius)	(atm-m <sup>3</sup> /mol)
TAF	(Temperature adjustment factor)	= 0.5, unitless
C <sub>w</sub>	(Uniform unit groundwater concentration)	= 1 ug/L

The intrusion rate of hazardous substance vapors into buildings is predicted using an analytical solution which couples both diffusive and convective transport of vapors emanating from groundwater into enclosed spaces. An attenuation coefficient ( $\alpha$ ) is calculated that is expressed as the ratio of building indoor air concentration to the vapor-phase concentration at the source. Values of  $\alpha$  are calculated assuming infinite source conditions. For infinite source conditions  $\alpha$  is written as follows:

$$\alpha = \frac{\left[ \frac{D_T^{\text{eff}} A_b}{Q_{\text{building}} L_T} \times \exp\left( \frac{Q_{\text{soil}} L_{\text{crack}}}{D_{\text{crack}} A_{\text{crack}}} \right) \right]}{\left[ \exp\left( \frac{Q_{\text{soil}} L_{\text{crack}}}{D_{\text{crack}} A_{\text{crack}}} \right) + \frac{D_T^{\text{eff}} A_b}{Q_{\text{building}} L_T} \right] + \left[ \frac{D_T^{\text{eff}} A_b}{Q_{\text{soil}} L_T} \left[ \exp\left( \frac{Q_{\text{soil}} L_{\text{crack}}}{D_{\text{crack}} A_{\text{crack}}} \right) - 1 \right] \right]}$$

where,

$\alpha$	(Attenuation coefficient)	= unitless
$D_T^{\text{eff}}$	(Total effective diffusion coefficient)	= chemical-specific, cm <sup>2</sup> /s
$D_{\text{crack}}$	(Effective diffusion coefficient through crack)	= cm <sup>2</sup> /s, ( $D_{\text{crack}} = D_v^{\text{eff}}$ , see equation for $D_v^{\text{eff}}$ below)
$A_b$	(Area of enclosed space below grade)	= 1.96E+6 cm <sup>2</sup> (residential) = 3.83E+6 cm <sup>2</sup> (nonresidential)
$Q_{\text{building}}$	(Building ventilation rate)	= 1.51E+5 cm <sup>3</sup> /s (residential) = 5.04E+5 cm <sup>3</sup> /s (nonresidential)
$L_{\text{crack}}$	(Building foundation thickness)	= 15 cm
$L_T$	(Source-building separation distance)	= 115 cm (residential) = 300 cm (nonresidential)
$Q_{\text{soil}}$	(Volumetric flow rate of soil vapor into the building)	= 0.81 cm <sup>3</sup> /s (residential) = 2.10 cm <sup>3</sup> /s (nonresidential)
$A_{\text{crack}}$	(Total area of cracks below grade)	= 196 cm <sup>2</sup> (residential) = 383 cm <sup>2</sup> (nonresidential)
$\exp(p)$	(The base of the natural logarithm raised to power p)	= e <sup>p</sup>

To characterize contaminant diffusion from groundwater into buildings a total effective diffusion coefficient ( $D_T^{\text{eff}}$ ) is calculated to account for both liquid phase diffusion of the contaminant through the capillary fringe, ( $D_{\text{cf}}^{\text{eff}}$ ), and vapor phase diffusion through the vadose zone, ( $D_v^{\text{eff}}$ ). The calculation is as follows:

$$D_T^{\text{eff}} = \frac{L_T}{\left[ \frac{(h_v + L_{\text{crack}})}{D_v^{\text{eff}}} \right] + (h_{\text{cf}}/D_{\text{cf}}^{\text{eff}})}$$

where,

$D_T^{\text{eff}}$	(Total effective diffusion coefficient)	= chemical-specific, cm <sup>2</sup> /s
$L_T$	(Source-building separation distance)	= 115 cm (residential) = 300 cm (nonresidential)
$h_v$	(Thickness of vadose zone below enclosed space floor)	= 75 cm (residential) = 260 cm (nonresidential)
$L_{\text{crack}}$	(Building foundation thickness)	= 15 cm
$D_v^{\text{eff}}$	(Effective diffusion coefficient through vadose zone)	= chemical-specific, cm <sup>2</sup> /s
$h_{\text{cf}}$	(Thickness of capillary fringe)	= 25 cm
$D_{\text{cf}}^{\text{eff}}$	(Effective diffusion coefficient through capillary fringe)	= chemical-specific, cm <sup>2</sup> /s

The effective diffusion coefficient calculation for the vadose zone ( $D_v^{\text{eff}}$ ) is written as:

$$D_v^{\text{eff}} = \left[ D_a \left( \theta_a^{3.33} / n^2 \right) \right] + \left[ \frac{D_w}{H' \times \text{TAF}} \left( \theta_w^{3.33} / n^2 \right) \right]$$

where,

$D_v^{\text{eff}}$	(Effective diffusion coefficient through vadose zone)	= chemical-specific, cm <sup>2</sup> /s
$D_a$	(Diffusivity in air)	= chemical-specific, cm <sup>2</sup> /s
$\theta_a$	(Soil air-filled porosity)	= 0.13 cm <sup>3</sup> /cm <sup>3</sup>
$N$	(Total soil porosity)	= 0.43 cm <sup>3</sup> /cm <sup>3</sup>
$D_w$	(Diffusivity in water)	= chemical-specific, cm <sup>2</sup> /s
$H'$	(Dimensionless Henry's law constant, where $H' = \text{HLC} \times 41$ )	= chemical-specific, unitless
$\text{HLC}$	(Henry's law constant)	= chemical-specific, (atm-m <sup>3</sup> /mol)
$\text{TAF}$	(Temperature adjustment factor)	= 0.5
$\theta_w$	(Soil water-filled porosity)	= 0.3 cm <sup>3</sup> /cm <sup>3</sup>

The effective diffusion coefficient calculation for the capillary fringe ( $D_{\text{cf}}^{\text{eff}}$ ) is written as:

$$D_{\text{cf}}^{\text{eff}} = \left[ D_a \left( \theta_{a,\text{cf}}^{3.33} / n^2 \right) \right] + \left[ \frac{D_w}{H' \times \text{TAF}} \left( \theta_{w,\text{cf}}^{3.33} / n^2 \right) \right]$$

where,

$D_{cf}^{eff}$	(Effective diffusion coefficient through capillary fringe)	= chemical-specific, $cm^2/s$
$D_a$	(Diffusivity in air)	= chemical-specific, $cm^2/s$
$\theta_{a,cf}$	(Soil air-filled porosity in capillary fringe)	= $0.078 cm^3/cm^3$
$D_w$	(Diffusivity in water)	= chemical-specific, $cm^2/s$
$H'$	(Dimensionless Henry's law constant, where $H' = HLC \times 41$ )	= chemical-specific, unitless
HLC	(Henry's law constant)	= chemical-specific, $(atm \cdot m^3/mol)$
TAF	(Temperature adjustment factor)	= 0.5
$\theta_{w,cf}$	(Soil water-filled porosity in capillary fringe)	= $0.352 cm^3/cm^3$
N	(Total soil porosity)	= $0.43 cm^3/cm^3$

(4) Facility-specific measurements of the following parameters may be substituted individually for the generic assumptions and still allow the facility to satisfy the generic categorical criteria under section 20120a(1)(a) to (e) of the act:

- (a) Dry soil bulk density.
- (b) Fraction of organic carbon in soil.
- (c) Soil vapor permeability.
- (d) Temperature adjustment factor for Henry's law constant.
- (e) Source-building foundation separation distance.
- (f) Vertical thickness of capillary fringe.

Facility-specific measurements shall be based on representative characterization. Documentation of all facility specific values shall be provided in the response activity plan, no further action report, or other response activity documentation.

(5) The department may approve methods to demonstrate compliance with criteria for the exposure pathway if those methods are more representative of in-situ conditions at the facility. Methods acceptable to the department may include, but are not limited to, use of representative soil gas concentrations.

History: 2013 AACCS.

### **R 299.18 Cleanup criteria for soil generally.**

Rule 18. (1) The generic cleanup criteria for soil at a facility shall be the most restrictive of the applicable criteria developed under R 299.20 to R 299.28, considering those pathways that are reasonable and relevant at the facility and the category being proposed or implemented.

(2) If a generic soil cleanup criterion developed under R 299.20 to R 299.26 is greater than the  $C_{sat}$  concentration for that hazardous substance, then the generic criteria may not apply. A site specific risk evaluation may be conducted for each relevant exposure pathway where free-phase liquids or non-aqueous phase liquids (NAPL) are present.

History: 2013 AACS.

**R 299.20 Generic cleanup criteria for soil based on direct contact.**

Rule 20. (1) Cleanup criteria for soil based on direct contact shall be calculated for the generic residential category according to the following algorithms, except as provided in R 299.34(3):

EQUATION FOR CARCINOGENS:

$$DCC = \frac{TR \times AT \times CF}{SF \times [(EF_i \times IF \times AE_i) + (EF_d \times DF \times AE_d)]}$$

where,

DCC	(Direct contact criterion)	=	chemical-specific, ug/kg or ppb
TR	(Target risk level)	=	10 <sup>-5</sup>
AT	(Averaging time)	=	25,550 days (70 years x 365 days/year)
CF	(Conversion factor)	=	1E+9 ug/kg
SF	(Oral cancer slope factor)	=	chemical-specific (mg/kg-day) <sup>-1</sup>
EF <sub>i</sub>	(Ingestion exposure frequency)	=	350 days/year
IF	(Age-adjusted soil ingestion factor)	=	114 mg-year/kg-day*
AE <sub>i</sub>	(Ingestion absorption efficiency)	=	chemical-specific or default specified at R 299.20(3)
EF <sub>d</sub>	(Dermal exposure frequency)	=	245 days/year
DF	(Age-adjusted soil dermal factor)	=	353 mg-year/kg-day**
AE <sub>d</sub>	(Dermal absorption efficiency)	=	chemical-specific or default specified at R 299.20(3)

EQUATIONS FOR NONCARCINOGENS:

$$DCC = \frac{THQ \times RfD \times AT \times CF \times RSC}{[(EF_i \times IF \times AE_i) + (EF_d \times DF \times AE_d)]}$$

where,

DCC	(Direct contact criterion)	=	chemical-specific (ug/kg or ppb)
THQ	(Target hazard quotient)	=	1
RfD	(Oral reference dose)	=	chemical-specific mg/kg-/day
AT	(Averaging time)	=	10,950 days (30 years x 365 days/year)
CF	(Conversion factor)	=	1E+9 ug/kg
RSC	(Relative source contribution)	=	1
EF <sub>i</sub>	(Ingestion exposure frequency)	=	350 days/year
IF	(Age-adjusted soil ingestion factor)	=	114 mg-year/kg-day*
AE <sub>i</sub>	(Ingestion absorption efficiency)	=	chemical-specific or default specified at R 299.20(3)
EF <sub>d</sub>	(Dermal exposure frequency)	=	245 days/year
DF	(Age-adjusted soil dermal factor)	=	353 mg-year/kg-day**
AE <sub>d</sub>	(Dermal absorption efficiency)	=	chemical-specific or default specified at R 299.20(3)

and,



$$* IF = \left( \frac{IR_{\text{age 1-6}} \times ED_{\text{age 1-6}}}{BW_{\text{age 1-6}}} \right) + \left( \frac{IR_{\text{adult}} \times ED_{\text{adult}}}{BW_{\text{adult}}} \right)$$

where,

$IR_{\text{soil/age 1-6}}$	(Soil ingestion rate)	=	200 mg/day
$ED_{\text{age 1-6}}$	(Exposure duration)	=	6 years
$BW_{\text{age 1-6}}$	(Body weight)	=	15 kg
$IR_{\text{adult}}$	(Soil ingestion rate)	=	100 mg/day
$ED_{\text{adult}}$	(Exposure duration)	=	24 years
$BW_{\text{adult}}$	(Body weight)	=	70 kg

and,

$$** DF = \left( \frac{SA_{\text{age 1-6}} \times EV \times AF_{\text{age 1-6}} \times ED_{\text{age 1-6}}}{BW_{\text{age 1-6}}} \right) + \left( \frac{SA_{\text{adult}} \times EV \times AF_{\text{adult}} \times ED_{\text{adult}}}{BW_{\text{adult}}} \right)$$

where,

$SA_{\text{age 1-6}}$	(Skin surface area)	=	2,670 cm <sup>2</sup> /dayevent
$EV$	(Event frequency)	=	1 event/day
$AF_{\text{age 1-6}}$	(Soil adherence factor)	=	0.2 mg/cm <sup>2</sup>
$ED_{\text{age 1-6}}$	(Exposure duration)	=	6 years
$BW_{\text{age 1-6}}$	(Body weight)	=	15 kg
$SA_{\text{adult}}$	(Skin surface area)	=	5,800 cm <sup>2</sup> /dayevent
$AF_{\text{adult}}$	(Soil adherence factor)	=	0.07 mg/cm <sup>2</sup>
$ED_{\text{adult}}$	(Exposure duration)	=	24 years
$BW_{\text{adult}}$	(Body weight)	=	70 kg

(2) Cleanup criteria for soil based on direct contact shall be calculated for the generic nonresidential category according to the following algorithms, except as provided in R 299.34(3):

EQUATION FOR CARCINOGENS:

$$DCC = \frac{TR \times BW \times AT \times CF}{SF \times ED \times [(EF_i \times IR_s \times AE_i) + (EF_d \times SA \times EV \times AF \times AE_d)]}$$

where,

DCC	(Direct contact criterion)	=	chemical-specific, ug/kg or ppb
TR	(Target risk level)	=	10 <sup>-5</sup>
BW	(Body weight)	=	70 kg
AT	(Averaging time)	=	25,550 days (70 years x 365 days/year)
CF	(Conversion factor)	=	1E+9 ug/kg
SF	(Oral cancer slope factor)	=	chemical-specific (mg/kg-day) <sup>-1</sup>
ED	(Exposure duration)	=	21 years
EF <sub>i</sub>	(Ingestion exposure frequency)	=	245 days/year
IR <sub>s</sub>	(Soil ingestion rate)	=	100 mg/day (residential)
AE <sub>i</sub>	(Ingestion absorption efficiency)	=	chemical-specific or default specified at R 299.20(3)
EF <sub>d</sub>	(Dermal exposure frequency)	=	160 days/year
SA	(Skin surface area)	=	3,300 cm <sup>2</sup> /day event
EV	(Event frequency)	=	1 event/day
AF	(Soil adherence factor)	=	0.2 mg/cm <sup>2</sup> (nonresidential)
AE <sub>d</sub>	(Dermal absorption efficiency)	=	chemical-specific or default specified at R 299.20(3)

EQUATION FOR NONCARCINOGENS:

$$DCC = \frac{THQ \times RfD \times BW \times AT \times CF \times RSC}{ED \times [(EF_i \times IR_s \times AE_i) + (EF_d \times SA \times EV \times AF \times AE_d)]}$$

where,

DCC	(Direct contact criterion)	=	chemical-specific, ug/kg or ppb
THQ	(Target hazard quotient)	=	1
RfD	(Oral reference dose)	=	chemical-specific, mg/kg-/day
BW	(Body weight)	=	70 kg
AT	(Averaging time)	=	7,665 days (21 years x 365 days/year)
CF	(Conversion factor)	=	1E+9 ug/kg
RSC	(Relative source contribution)	=	1
ED	(Exposure duration)	=	21 years
EF <sub>i</sub>	(Ingestion exposure frequency)	=	245 days/year
IR <sub>s</sub>	(Soil ingestion rate)	=	100 mg/day
AE <sub>i</sub>	(Ingestion absorption efficiency)	=	chemical-specific or default specified at R 299.20(3)
EF <sub>d</sub>	(Dermal exposure frequency)	=	160 days/year
SA	(Skin surface area)	=	3,300 cm <sup>2</sup> /day event
EV	(Event frequency)	=	1 event/day
AF	(Soil adherence factor)	=	0.2 mg/cm <sup>2</sup> (nonresidential)
AE <sub>d</sub>	(Dermal absorption efficiency)	=	chemical-specific or default specified at R 299.20(3)

(3) Absorption efficiencies used to calculate generic direct contact criteria are as follows:

(a) Chemical-specific data may be submitted to the department to support development of a new generic criterion under R 299.6(9) or (10) and shall be used in this rule if determined by the department to be the best available information.

(b) If chemical-specific data are not available, then the following default absorption efficiencies shall be used:

(i) AE<sub>i</sub> shall be 50% for organic hazardous substances which exhibit a log octanol water partitioning coefficient greater than 5 and a molecular weight greater than 200 grams per mole or which are not ionizing organic compounds, and 100% for all other organic hazardous substances.

(ii) AE<sub>i</sub> shall be 50% for inorganic hazardous substances.

(iii) AE<sub>d</sub> shall be assumed to be 10% for organic hazardous substances.

(iv) AE<sub>d</sub> shall be assumed to be 1% for inorganic hazardous substances.

(4) To demonstrate compliance with generic direct contact criteria, the criteria shall be applied without regard to the depth of contaminated soil.

History: 2013 AACS.

### **R 299.22 Generic cleanup criteria for soil based on leaching of hazardous substances into groundwater.**

Rule 22. (1) To assure that soils do not pose a threat of aquifer contamination, the concentration of the hazardous substance in soil shall be below that which produces a concentration in leachate that is equal to the least restrictive of the applicable

groundwater criteria specified in subdivisions (a) to (c) of this subrule, or below a criterion based on the soil-water partitioning characteristics of a hazardous substance as provided in subrule (4) of this rule, whichever is higher. The selection of the following least restrictive value, and comparison to the soil-water partitioning value, shall be done separately for each pathway that is relevant at the facility:

(a) The groundwater criteria developed under R 299.8 to 299.14.

(b) The leachate concentration generated by background soil.

(c) The groundwater concentration allowed by target detection limit, if it is higher than a risk-based criterion that would otherwise be the most restrictive.

(2) Leachate testing is not required to demonstrate compliance with subrule (1) of this rule if the total concentration of a hazardous substance in soil does not exceed 20 times the lowest groundwater cleanup criterion that is applicable at the facility or does not exceed the soil-water partitioning value established under subrule (4) of this rule, whichever is higher.

(3) Leachate concentrations shall be determined by a method that best represents in-situ conditions. For the purposes of this rule, the following test methods are acceptable:

(a) The United States environmental protection agency's toxicity characteristic leaching procedure (TCLP) (revised as of July 1992) or the synthetic precipitation leachate procedure (SPLP) (revised as of September 1994) as set forth in SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, (revised to include Update III, June 13, 1997), published by the United States Environmental Protection Agency, which are adopted by reference in these rules and which are available for inspection at the Lansing office of the department, 525 West Allegan Street, Lansing, Michigan. Copies of the provisions may be purchased at a cost as of the time of adoption of these rules of \$239.00 from the National Technical Information Service, United States Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161 (publication number PB97-156111GEI), or from the Department of Environmental Quality, Remediation and Redevelopment Division, 525 West Allegan, Lansing, Michigan 48909, at cost.

(b) Other methods accepted by the department to more accurately simulate conditions at the site than the test methods specified in subdivision (a) of this subrule.

(4) The department may, if adequate data are available, establish acceptable soil concentrations based on soil-water partitioning characteristics of a hazardous substance.

History: 2013 AACCS.

#### **R 299.24 Generic cleanup criteria for soil based on indoor inhalation of hazardous substance vapors volatilized from soil.**

Rule 24. (1) Indoor inhalation of hazardous substance vapors volatilizing to indoor air from soil shall be considered a reasonable and relevant exposure pathway only for hazardous substances that have a Henry's law constant greater than or equal to 0.00001 atm-m<sup>3</sup>/mole.

(2) Except as provided in subrule (1) of this rule, if any of the following conditions exist, the generic criteria developed pursuant to this rule shall not apply and a site-specific evaluation of indoor inhalation risks shall be conducted:

(a) There is a structure present or planned to be constructed at the facility which does not have a concrete block or poured concrete floor and walls.

(b) There is a sump present that is not completely isolated from the surrounding soil by its materials of construction.

(3) Soil cleanup criteria based on indoor inhalation of volatile emissions from hazardous substances in soil shall be called soil volatilization indoor air inhalation criteria (“SVIIC”). The SVIIC is determined by the following series of calculations, except as provided in R 299.34(3):

EQUATION FOR CARCINOGENIC EFFECTS:

$$SVIIC = \frac{TR \times AT \times AIR}{IURF \times EF \times ED \times CR_{building}}$$

where,

SVIIC	(Soil volatilization indoor air inhalation criterion)	= chemical-specific, ug/kg
TR	(Target risk level)	= 10 <sup>-5</sup>
AT	(Averaging time)	= 25,550 days (70 years x 365 days/year)
AIR	(Adjusted inhalation rate)	= 1 (residential) = 2 (nonresidential)
IURF	(Inhalation unit risk factor)	= chemical-specific, (ug/m <sup>3</sup> ) <sup>-1</sup>
EF	(Exposure frequency)	= 350 days/year (residential) = 245 days/year (nonresidential)
ED	(Exposure duration)	= 30 years (residential) = 21 years (nonresidential)
CR <sub>building</sub>	(Ratio of indoor air concentration to soil concentration)	= chemical-specific, (ug/m <sup>3</sup> )/(ug/kg)

EQUATION FOR NONCARCINOGENIC EFFECTS:

$$SVIIC = \frac{THQ \times AT}{(1/ITSL) \times EF \times ED \times CR_{building}}$$

where,

SVIIC	(Soil volatilization indoor air inhalation criterion)	= chemical-specific, ug/kg
THQ	(Target hazard quotient)	= 1
AT	(Averaging time)	= 10,950 days (residential) = 7,665 days (nonresidential)
EF	(Exposure frequency)	= 350 days/year (residential) = 245 days/year (nonresidential)
ED	(Exposure duration)	= 30 years (residential) = 21 years (nonresidential)
ITSL	(Initial threshold screening level)	= chemical-specific, ug/m <sup>3</sup>
CR <sub>building</sub>	(Ratio of indoor air concentration to soil concentration)	= chemical-specific, (ug/m <sup>3</sup> )/(ug/kg)

The contaminant vapor concentration in the building indoor air is written as:

$$CR_{\text{building}} = CR_{\text{source}}^{\text{soil}} \times \alpha$$

where,

CR <sub>building</sub>	(Ratio of indoor air concentration to soil concentration)	= chemical-specific, (ug/m <sup>3</sup> )/(ug/kg)
α	(Attenuation coefficient)	= chemical-specific, Unitless
CR <sub>source</sub> <sup>soil</sup>	(Ratio of soil vapor concentration to soil/source concentration)	= chemical-specific, (ug/m <sup>3</sup> )/(ug/kg)

The vapor-phase contaminant concentration at the source for soil is written as:

$$CR_{\text{source}}^{\text{soil}} = \frac{H' \times TAF \times C_s \times \rho_b \times 10^{-3} \text{ kg/g} \times 10^6 \text{ cm}^3/\text{m}^3}{\theta_w + (k_d \times \rho_b) + (H' \times TAF \times \theta_a)}$$

where,

$CR_{source}^{soil}$	(Ratio of soil vapor concentration to soil/source concentration)	= chemical-specific, (ug/m <sup>3</sup> )/(ug/kg)
$H'$	(Dimensionless Henry's law constant, where $H' = HLC \times 41$ )	= chemical-specific, unitless
$HLC$	(Henry's law constant at 25 degrees Celsius)	= chemical-specific, (atm-m <sup>3</sup> /mol)
$TAF$	(Temperature adjustment factor)	= 0.5, unitless
$C_s$	(Uniform concentration in soil)	= 1 ug/kg
$\rho_b$	(Dry soil bulk density)	= 1.5 g/cm <sup>3</sup>
$\theta_w$	(Soil water-filled porosity)	= 0.3 cm <sup>3</sup> /cm <sup>3</sup>
$k_d$	(Soil-water partition coefficient)	= chemical-specific, cm <sup>3</sup> /g (equivalent to L/kg)
	For organic compounds	= $K_{oc}$ (cm <sup>3</sup> /g) x $f_{oc}$ (g/g)
	For inorganic compounds	= chemical-specific, cm <sup>3</sup> /g
$K_{oc}$	(Soil organic carbon partition coefficient)	= chemical-specific, cm <sup>3</sup> /g
$f_{oc}$	(Fraction of organic carbon content of soil)	= 0.002 g/g (0.2%)
$\theta_a$	(Soil air-filled porosity)	= 0.13 cm <sup>3</sup> /cm <sup>3</sup>

The intrusion rate of hazardous substance vapors into buildings is predicted using an analytical solution which couples both diffusive and convective transport of vapors emanating from subsurface soil into enclosed spaces. An attenuation coefficient ( $\alpha$ ) is calculated that is expressed as the ratio of building indoor air concentration to the vapor-phase concentration at the source. Values of  $\alpha$  are calculated assuming infinite source conditions. For infinite source conditions  $\alpha$  is written as follows:

$$\alpha = \frac{\left[ \frac{D_v^{eff} A_b}{Q_{building-L-T}} \times \exp\left(\frac{Q_{soil} L_{crack}}{D_{crack} A_{crack}}\right) \right]}{\left[ \exp\left(\frac{Q_{soil} L_{crack}}{D_{crack} A_{crack}}\right) + \frac{D_v^{eff} A_b}{Q_{building-L-T}} + \frac{D_v^{eff} A_b}{Q_{soil} L-T} \left[ \exp\left(\frac{Q_{soil} L_{crack}}{D_{crack} A_{crack}}\right) - 1 \right] \right]}$$

where,

$\alpha$	(Attenuation coefficient)	= unitless
$D_v^{\text{eff}}$	(Effective diffusion coefficient through vadose zone)	= chemical-specific, $\text{cm}^2/\text{s}$
$D^{\text{crack}}$	(Effective diffusion coefficient through crack)	= $\text{cm}^2/\text{s}$ , ( $D^{\text{crack}} = D_v^{\text{eff}}$ , see equation for $D_v^{\text{eff}}$ below)
$A_b$	(Area of enclosed space below grade)	= $1.96\text{E}+6 \text{ cm}^2$ (residential) = $3.83\text{E}+6 \text{ cm}^2$ (nonresidential)
$Q_{\text{building}}$	(Building ventilation rate)	= $1.51\text{E}+5 \text{ cm}^3/\text{s}$ (residential) = $5.04\text{E}+5 \text{ cm}^3/\text{s}$ (nonresidential)
$L_{\text{crack}}$	(Building foundation thickness)	= 15 cm
$L_T$	(Source-building separation distance)	= 15 cm (All land use categories)
$Q_{\text{soil}}$	(Volumetric flow rate of soil vapor into the building)	= $0.81 \text{ cm}^3/\text{s}$ (residential) = $2.10 \text{ cm}^3/\text{s}$ (nonresidential)
$A_{\text{crack}}$	(Total area of cracks below grade)	= $196 \text{ cm}^2$ (residential) = $383 \text{ cm}^2$ (nonresidential)
$\exp(p)$	(The base of the natural logarithm raised to power p)	= $e^p$

The effective diffusion coefficient calculation for the vadose zone ( $D_v^{\text{eff}}$ ) is written as:

$$D_v^{\text{eff}} = \left[ D_a \left( \theta_a^{3.33} / n^2 \right) \right] + \left[ \frac{D_w}{H' \times \text{TAF}} \left( \theta_w^{3.33} / n^2 \right) \right]$$

where,

$D_v^{\text{eff}}$	(Effective diffusion coefficient through vadose zone)	= chemical-specific, $\text{cm}^2/\text{s}$
$D_a$	(Diffusivity in air)	= chemical-specific, $\text{cm}^2/\text{s}$
$\theta_a$	(Soil air-filled porosity)	= $0.13 \text{ cm}^3/\text{cm}^3$
$n$	(Total soil porosity)	= $0.43 \text{ cm}^3/\text{cm}^3$
$D_w$	(Diffusivity in water)	= chemical-specific, $\text{cm}^2/\text{s}$
$H'$	(Dimensionless Henry's law constant, where $H' = \text{HLC} \times 41$ )	= chemical-specific, unitless
$\text{HLC}$	(Henry's law constant)	= chemical-specific, $(\text{atm}\cdot\text{m}^3/\text{mol})$
$\theta_w$	(Soil water-filled porosity)	= $0.3 \text{ cm}^3/\text{cm}^3$

(4) Facility-specific measurements of the following parameters may be substituted individually for the generic assumptions and still allow the facility to satisfy the categorical criteria in section 20120a(1)(a) to (e) of the act:

(a) Dry soil bulk density.



- (b) Fraction of organic carbon in soil.
- (c) Soil vapor permeability.
- (d) Temperature adjustment factor for Henry's law constant.

Facility-specific measurements shall be based on representative characterization. Documentation of all facility specific values shall be provided in the response activity plan or no further action report.

(5) The department may approve methods to demonstrate compliance with criteria for this exposure pathway if those methods are more representative of in-situ conditions at the facility. Methods acceptable to the department may include, but are not limited to, evaluation of representative soil gas concentrations.

History: 2013 AACCS.

**R 299.26 Generic cleanup criteria for soil based on inhalation of hazardous substances in ambient air.**

Rule 26. (1) Inhalation of hazardous substance emissions in ambient air from soil shall be considered a reasonable and relevant pathway for all facilities.

(2) Generic cleanup criteria for soil based on inhalation of volatile hazardous substance emission to ambient air shall be called volatile soil inhalation criteria (VSIC). Generic cleanup criteria for soil based on inhalation of particulate hazardous substance emission to ambient air shall be called particulate soil inhalation criteria (PSIC). The generic residential VSIC and PSIC are calculated as follows, except as provided in R 299.34(3):

**EQUATIONS FOR CARCINOGENS:**

$$VSIC = \frac{TR \times AT}{IURF \times EF \times ED \times (1/VF)}$$

where,

VSIC	(Volatile soil inhalation criterion)	= chemical-specific, ug/kg or ppb
TR	(Target risk level)	= 10 <sup>-5</sup>
AT	(Averaging time)	= 25,550 days (70 years x 365 days/year)
IURF	(Inhalation unit risk factor)	= chemical-specific (ug/m <sup>3</sup> ) <sup>-1</sup>
EF	(Exposure frequency)	= 350 days/year
ED	(Exposure duration)	= 30 years
VF	(Volatilization factor)	= chemical-specific, m <sup>3</sup> /kg

and,

$$PSIC = \frac{TR \times AT}{IURF \times EF \times ED \times (1/PEF)}$$

where,

PSIC	(Particulate soil inhalation criterion)	= chemical-specific, ug/kg or ppb
TR	(Target risk level)	= $10^{-5}$
AT	(Averaging time)	= 25,550 days (70 years x 365 days/year)
IURF	(Inhalation unit risk factor)	= chemical-specific $(\text{ug}/\text{m}^3)^{-1}$
EF	(Exposure frequency)	= 350 days/year
ED	(Exposure duration)	= 30 years
PEF	(Particulate emission factor)	= chemical-specific, $\text{m}^3/\text{kg}$

#### EQUATIONS FOR NONCARCINOGENS:

$$\text{VSIC} = \frac{\text{THQ} \times \text{AT}}{\text{EF} \times \text{ED} \times (1/\text{ITSL} \times 1/\text{VF})}$$

where,

VSIC	(Volatile soil inhalation criterion)	= chemical-specific, ug/kg or ppb
THQ	(Target hazard quotient)	= 1
AT	(Averaging time)	= 10,950 days (30 years x 365 days/year)
EF	(Exposure frequency)	= 350 days/year
ED	(Exposure duration)	= 30 years
ITSL	(Initial threshold screening level)	= chemical-specific, $\text{ug}/\text{m}^3$
VF	(Volatilization factor)	= chemical-specific, $\text{m}^3/\text{kg}$

and,

$$\text{PSIC} = \frac{\text{THQ} \times \text{AT}}{\text{EF} \times \text{ED} \times (1/\text{ITSL} \times 1/\text{PEF})}$$

where,

PSIC	(Particulate soil inhalation criterion)	= chemical-specific, ug/kg or ppb
THQ	(Target hazard quotient)	= 1
AT	(Averaging time)	= 10,950 days (30 years x 365 days/year)
EF	(Exposure frequency)	= 350 days/year
ED	(Exposure duration)	= 30 years
ITSL	(Initial threshold screening level)	= chemical-specific, $\text{ug}/\text{m}^3$
PEF	(Particulate emission factor)	= chemical-specific, $\text{m}^3/\text{kg}$

(3) The soil to air volatilization factor (VF) relates the concentration of a contaminant in the soil to the concentration of volatilized contaminant in the ambient air. If the vertical extent of the contaminant source has not been characterized, then the VF shall be calculated based on the infinite equation presented in subdivision (a) of this subrule. If the vertical extent of the contaminant source has been adequately characterized throughout the facility, then the VF shall be calculated either by the finite source equation presented in subdivision (b) of this subrule or the mass balance equation presented in subdivision (c) of this subrule, whichever yields the highest VSIC.

$$(a) \quad VF = (Q/C) \times (1/J_s^{ave})$$

$J_s^{ave}$ , using the infinite source model shall be calculated as follows:

$$J_s^{ave} = \rho_b (4D_A/\pi t)^{1/2} \times 10^4 \text{ cm}^2/\text{m}^2$$

and  $D_A$  shall be calculated as:

$$D_A = \frac{[(\theta_a^{3.33} D_a (H' \times TAF) + \theta_w^{3.33} D_w)/n^2]}{\rho_b K_d + \theta_w + \theta_a (H' \times TAF)}$$

where,

VF	(Volatilization factor)	=	chemical-specific, m <sup>3</sup> /kg
$J_s^{ave}$	(Normalized average flux from soil)	=	chemical-specific, g/m <sup>2</sup> -second
$D_A$	(Apparent diffusivity)	=	chemical-specific, cm <sup>2</sup> /second
Q/C	(Dispersion factor for 1/2 acre)	=	82.33, g/m <sup>2</sup> -second per kg/m <sup>3</sup>
T	(Exposure time)	=	seconds (ED x 3.1536E+7 seconds/yr)
$\theta_a$	(Soil air-filled porosity)	=	0.28 $L_{air}/L_{soil}$
N	(Total soil porosity)	=	0.43 $L_{pore}/L_{soil}$
$\theta_w$	(Soil water-filled porosity)	=	0.15 $L_{water}/L_{soil}$
$\rho_b$	(Dry soil bulk density)	=	1.5 g/cm <sup>3</sup>
$D_a$	(Diffusivity in air)	=	chemical-specific, cm <sup>2</sup> /second
$D_w$	(Diffusivity in water)	=	chemical-specific, cm <sup>2</sup> /second
H'	(Dimensionless Henry's law constant, where H' = HLC x 41)	=	chemical-specific, unitless
HLC	(Henry's law constant at 25 <sup>0</sup> C)	=	chemical-specific, atm-m <sup>3</sup> /mol
TAF	(Temperature adjustment factor)	=	0.5
$K_d$	(Soil-water partition coefficient)	=	chemical-specific, cm <sup>3</sup> /g
	For organic compounds	=	$K_{oc}$ (cm <sup>3</sup> /g) x $f_{oc}$ (g/g)
	For inorganic compounds	=	chemical-specific, cm <sup>3</sup> /g

$K_{oc}$	(Soil organic carbon partition coefficient)	=	chemical-specific, $\text{cm}^3/\text{g}$
$f_{oc}$	(Organic carbon content of soil)	=	0.006 g/g (0.6%)

(b) The simplified finite source model equation for VF shall be calculated as follows:

$$VF = (Q/C) \times (C_0 / \rho_b) \times (1 / J_s^{ave})$$

and,

$$J_s = C_0 (D_A / \pi t)^{1/2} [1 - \exp(-d_s^2 / 4D_A t)]$$

where,

VF	(Volatilization factor)	=	chemical-specific, $\text{m}^3/\text{kg}$
Q/C	(Dispersion factor for 1/2 acre)	=	82.33, $\text{g}/\text{m}^2\text{-second}$ per $\text{kg}/\text{m}^3$
$C_0$	(Uniform contaminant concentration at $t=0$ )	=	1.5 E-6 $\text{g}/\text{cm}^3$
$\rho_b$	(Dry soil bulk density)	=	1.5 $\text{g}/\text{cm}^3$
$J_s^{ave}$	(Normalized average flux from soil)	=	chemical-specific, $\text{g}/\text{m}^2\text{-second}$
$J_s$	(Instantaneous flux from soil at time t)	=	chemical-specific, $\text{g}/\text{m}^2\text{-second}$
$D_A$	(Apparent diffusivity - see equation above)	=	chemical-specific, $\text{cm}^2/\text{second}$
T	(Time)	=	seconds
$d_s$	(Thickness of source)	=	site-specific, meters
$\exp(p)$	(The base of the natural logarithm raised to power (p))	=	$e^p$

(c) Mass balance VF shall be calculated as follows:

$$VF = (Q/C) \times \frac{AT \times (3.15 \times 10^{-7} \text{ seconds/year})}{\rho_b \times d_s \times 10^6 \text{ g/Mg}}$$

where,

VF	(Volatilization factor)	=	chemical-specific, m <sup>3</sup> /kg
Q/C	(Dispersion factor for 1/2 acre)	=	82.33, g/m <sup>2</sup> -second per kg/m <sup>3</sup>
AT	(Exposure period)	=	scenario-specific, years
ρ <sub>b</sub>	(Dry soil bulk density)	=	1.5 mg/m <sup>3</sup>
d <sub>s</sub>	(Average source depth)	=	site-specific, meters

(4) The particulate emission factor shall be calculated as follows:

$$PEF = (Q/C) \times 1 / [(E_w \times (1 - V)) + E_v]$$

where,

PEF	(Particulate emission factor)	=	chemical-specific, m <sup>3</sup> /kg
Q/C	(Dispersion factor for 1/2 acre)	=	82.33, g/m <sup>2</sup> -second per kg/m <sup>3</sup>
E <sub>w</sub>	(Emission due to wind)	=	g/m <sup>2</sup> per second
E <sub>v</sub>	(Emission due to vehicle traffic)	=	g/m <sup>2</sup> per second
V	(Vegetative cover)	=	0.5 (50%), unitless

(5) VSIC and PSIC for nonresidential facilities shall be calculated as follows, except as provided in R 299.34(3):

#### EQUATIONS FOR CARCINOGENS:

$$VSIC = \frac{TR \times AT \times AIR}{IURF \times EF \times ED \times (1/VF)}$$

where,

VSIC	(Volatile soil inhalation criterion)	=	chemical-specific, ug/kg or ppb
TR	(Target risk level)	=	10 <sup>-5</sup>
AT	(Averaging time)	=	25,550 days (70 years x 365 days/year)
AIR	(Adjusted inhalation rate)	=	(20 m <sup>3</sup> /day)/(10 m <sup>3</sup> /day)
IURF	(Inhalation unit risk factor)	=	chemical-specific (ug/m <sup>3</sup> ) <sup>-1</sup>
EF	(Exposure frequency)	=	245 days/year
ED	(Exposure duration)	=	21 years
VF	(Volatilization factor)	=	chemical-specific, m <sup>3</sup> /kg

and,

$$PSIC = \frac{TR \times AT \times AIR}{IURF \times EF \times ED \times (1/PEF)}$$

where,

PSIC	(Particulate soil inhalation criterion)	= chemical-specific, ug/kg or ppb
TR	(Target risk level)	= $10^{-5}$
AT	(Averaging time)	= 25,550 days (70 years x 365 days/year)
AIR	(Adjusted inhalation rate)	= $(20 \text{ m}^3/\text{day})/(10 \text{ m}^3/\text{day})$
IURF	(Inhalation unit risk factor)	= chemical-specific $(\text{ug}/\text{m}^3)^{-1}$
EF	(Exposure frequency)	= 245 days/year
ED	(Exposure duration)	= 21 years
PEF	(Particulate emission factor)	= chemical-specific, $\text{m}^3/\text{kg}$

#### EQUATIONS FOR NONCARCINOGENS:

$$\text{VSIC} = \frac{\text{THQ} \times \text{AT}}{\text{EF} \times \text{ED} \times (1/\text{ITSL} \times 1/\text{VF})}$$

where,

VSIC	(Volatile soil inhalation criterion)	= chemical-specific, ug/kg or ppb
THQ	(Target hazard quotient)	= 1
AT	(Averaging time)	= 7,665 days (21 years x 365 days/year)
EF	(Exposure frequency)	= 245 days/year
ED	(Exposure duration)	= 21 years
ITSL	(Initial threshold screening level)	= chemical-specific, $\text{ug}/\text{m}^3$
VF	(Volatilization factor)	= chemical-specific, $\text{m}^3/\text{kg}$

and,

$$\text{PSIC} = \frac{\text{THQ} \times \text{AT}}{\text{EF} \times \text{ED} \times (1/\text{ITSL} \times 1/\text{PEF})}$$

where,

PSIC	(Particulate soil inhalation criterion)	= chemical-specific, ug/kg or ppb
THQ	(Target hazard quotient)	= 1
AT	(Averaging time)	= 7,665 days (21 years x 365 days/year)
EF	(Exposure frequency)	= 245 days/year
ED	(Exposure duration)	= 21 years
ITSL	(Initial threshold screening level)	= chemical-specific, ug/m <sup>3</sup>
PEF	(Particulate emission factor)	= chemical-specific, m <sup>3</sup> /kg

(6) The generic SIC are calculated for a source area size of 1/2 acre. The generic SIC shall be adjusted for other source area sizes by multiplying the generic SIC by the modifiers given in the following table. Where the actual source area size falls between the sizes given in this subrule, generic SIC shall be multiplied by the modifier for the next largest source size.

Modifiers		
Source Size (ft <sup>2</sup> or acres)	Q/C (g/m <sup>2</sup> -s per kg/m <sup>3</sup> )	Modifier
400 ft <sup>2</sup>	261.26	3.17
1000 ft <sup>2</sup>	180.76	2.2
2000 ft <sup>2</sup>	144.91	1.76
¼ acre	94.56	1.15
½ acre	82.33	1
1 acre	71.74	0.87
2 acres	63.51	0.77
5 acres	54.62	0.66
10 acres	49.13	0.6
32 acres	41.55	0.5
100 acres	35.66	0.43

(7) Facility-specific measurements of the following parameters may be substituted for the generic assumptions and still allow the facility to satisfy the categorical criteria in section 20120a(1)(a) to (e) of the act:

- (a) Dry soil bulk density ( $\rho_b$ ).
- (b) Soil water-filled porosity ( $\theta_w$ ).
- (c) Soil air-filled porosity ( $\theta_a$ ).
- (d) Fraction of organic carbon in soil ( $f_{oc}$ ).
- (e) Emission due to wind ( $E_w$ ).
- (f) Dispersion factor ( $Q/C$ ).

Facility-specific measurements shall be based on representative characterization. Documentation of all facility-specific values shall be provided in the response activity plan, no further action report, or other response activity documentation.

(8) A person who is implementing response activity may demonstrate compliance with the generic criteria developed under this rule through the collection and analysis of ambient air samples within the facility boundaries, if the hazardous substance concentration in surficial soil is representative of facility conditions.

History: 2013 AACCS.

**R 299.28 Cleanup criteria for contaminated environmental media based on other injury which requires consideration.**

Rule 28. (1) To assure that hazardous substances in contaminated environmental media do not pose unacceptable risks not accounted for by other rules in this part, the concentration of a hazardous substance in a given environmental medium shall meet cleanup criteria based on sound scientific principles and determined by the department to be necessary to protect the public health, safety, and welfare and the environment from any of the following:

- (a) Food chain contamination.
- (b) Damage to soil or biota in the soil that impairs the use of such soil for agricultural purposes.
- (c) Phytotoxicity.
- (d) Physical hazards.
- (e) Nonsystemic or acute toxicity.
- (f) Injury that may result from the direct transport or runoff of hazardous substances in soil into surface water.
- (g) Injury to the groundwater resource which may impair its use for other purposes that are determined by the department to be reasonable and relevant considerations at a facility.
- (h) Other injury that requires consideration.

(2) The basis for and information used by the department to develop cleanup criteria under this rule shall be made available to the public upon request.

History: 2013 AACCS.

**R 299.30 Surface water and surface water sediments; cleanup criteria.**

Rule 30. (1) Any response activity plan that addresses surface water or sediments associated with waters of the state shall include site-specific cleanup criteria established by the department on the basis of sound scientific principles and evaluation of bulk sediment chemistry, sediment toxicity, and benthic community populations. Criteria shall be established considering the need to eliminate or mitigate the following use impairments, as appropriate to the facility in question:

- (a) Restrictions on fish or wildlife consumption.
- (b) Tainting of fish and wildlife flavor.
- (c) Degraded fish or wildlife populations.
- (d) Fish tumors or other deformities.
- (e) Bird or animal deformities or reproductive problems.
- (f) Degradation of benthos.



- (g) Restrictions on dredging activities.
  - (h) Eutrophication or undesirable algae.
  - (i) Restrictions on drinking water consumption or taste or odor problems.
  - (j) Beach closings.
  - (k) Degradation of aesthetics.
  - (l) Added costs to agriculture, industry, or a local unit of government.
  - (m) Degradation of phytoplankton or zooplankton populations.
  - (n) Loss of fish and wildlife habitat.
  - (o) Unacceptable risk through human contact as a result of absorption of hazardous substances through the skin or by incidental ingestion of sediments.
  - (p) Other unacceptable risks to human receptors exposed to hazardous substances in sediments.
- (2) The basis for, and information used by the department to develop, cleanup criteria under this rule shall be made available to the public upon request.

History: 2013 AACCS.

**R 299.34 Risk assessment and development of cleanup criteria for certain substances; special considerations.**

Rule 34. (1) All polychlorinated and polybrominated dibenzodioxins and dibenzofurans shall be considered as 1 hazardous substance, expressed as an equivalent concentration of 2,3,7,8-tetrachlorodibenzo-p-dioxin, based upon the relative potency and concentration of the congeners present at the facility.

(2) If 2 or more hazardous substances are present and known to result in toxicological interaction, then the interactive effects shall be considered in establishing levels that are protective of the public health, safety, and welfare and the environment.

(3) The department may calculate generic cleanup criteria for certain hazardous substances using exposure assumptions other than those shown in the algorithms in these rules if either of the following conditions is satisfied:

- (a) A hazardous substance causes an adverse effect in a sensitive subpopulation that is not adequately protected or represented by the generic exposure assumptions.
- (b) The toxicokinetics of a hazardous substance are not best represented by the average daily dose, when accounting for the most sensitive effect.

History: 2013 AACCS.

**R 299.36 Calculation of criteria based on noncarcinogenic endpoints; minimum toxicity data.**

Rule 36. (1) The minimum data required to calculate a cleanup criterion for a noncarcinogen when the route of exposure is ingestion or dermal absorption shall be the reference dose that is determined on the basis of the best available information and considering the weight of evidence.

(2) The minimum data required to calculate a cleanup criterion for a noncarcinogen when the route of exposure is inhalation shall be the minimum data required for

calculation of an initial threshold screening level developed under part 55 of the act, and rules promulgated under part 55.

History: 2013 AACCS.

**R 299.38 Determination of cancer slope factors for use in calculation of criteria based on carcinogenic endpoints.**

Rule 38. (1) A non-threshold mechanism of carcinogenesis shall be assumed unless biological data adequately demonstrate the existence of a threshold on a hazardous substance-specific basis.

(2) All appropriate human epidemiologic data, animal cancer bioassay data, and all other pertinent data shall be considered and a cancer slope factor developed if the weight of evidence for carcinogenicity is sufficient. Preferred data are those from studies which use the same route of exposure addressed by the criteria. However, in the absence of such data, route-to-route extrapolations may be conducted where appropriate, considering whether the critical effect is systemic and thus possible for each different route of exposure. The risk-associated dose shall be set at a level corresponding to an increased cancer risk of 1 in 100,000. If acceptable human epidemiologic data are available for a hazardous substance, then those data shall be used to derive the risk-associated dose. If acceptable human epidemiologic data are not available, then the risk-associated dose shall be derived from available animal bioassay data. Data from a species that is considered most biologically relevant to humans, that is, responds most like humans, is preferred where all other considerations regarding quality of data are equal. In the absence of data to distinguish the most relevant species, data from the most sensitive species tested, that is the species showing a carcinogenic effect at the lowest administered dose, shall generally be used.

(3) If animal bioassay data are used and a non-threshold mechanism of carcinogenicity is assumed, then the data shall be fitted to a linearized multistage model, for example, a Global '86 or equivalent computer model. Global '86 is the linearized multistage model that was derived by Howe, Crump, and Van Landingham (1986), which was prepared for the United States environmental protection agency under subcontract 2-251u-2745 to Research Triangle Institute, contract 68-01-6826, and which the United States environmental protection agency uses to determine cancer potencies. The upper-bound 95% confidence limit on risk, or the lower 95% confidence limit on dose, at the 1 in 100,000 risk level shall be used to calculate a risk-associated dose for individual hazardous substances. Other models, including modifications or variations of the linearized multistage model that are more appropriate to the available data, may be used where scientifically justified.

(4) If the duration of the study is significantly less than the natural lifespan of the test animal, then the slope factor may be adjusted on a case-by-case basis to compensate for latent tumors that were not expressed. The lifespan of a rat is assumed to be 104 weeks and the lifespan of a mouse is assumed to be 90 weeks. If the test animal is a rat and the study duration is less than 90 weeks, or if the test animal is a mouse and the study duration is less than 78 weeks, then the slope factor shall be multiplied by the following factor: the expected lifespan (L) divided by the study duration ( $L_e$ ) raised to the third power,  $[(L/L_e)^3]$ .

(5) A species scaling factor shall be used to account for differences between test species and humans. It shall be assumed that scaling daily administered doses by body mass raised to the 3/4 power achieves equivalence in lifetime carcinogenic risk in different mammalian species. To derive a human slope factor from animal data, the default procedure shall be to multiply the animal slope factor by the ratio of human to animal body weights raised to the 1/4 power. However, if adequate pharmacokinetic and metabolism studies are available, then these data may be factored into the adjustment for species differences on a case-by-case basis.

(6) Additional adjustments shall be made to the data as appropriate. For some cancer data sets, it may be appropriate to combine incidences of multiple tumor types or combine benign and malignant tumors of the same histogenic origin. All doses shall be adjusted to give an average daily dose over the study duration. Adjustments shall be made to the tumor incidence for early mortality. Animals dying before the appearance of the first tumor within their dose group shall be removed from the data set. Before quantification of the dose response, a goodness-of-fit evaluation of the data shall be conducted.

(7) If human epidemiologic data, animal bioassay data, or other biological data indicate that a chemical causes cancer via a threshold mechanism, then the risk-associated dose may, on a case-by-case basis, be calculated using a method that assumes a threshold mechanism is operative.

(8) Inhalation unit risk factors shall be calculated in the same manner as cancer risk screening levels for inhalation risk under part 55 of the act.

History: 2013 AACCS.

**R 299.40 Availability of information used by department to establish cleanup criteria; public review and comment on revised criteria.**

Rule 40. (1) The department shall make available to the public the detailed basis for calculation of any cleanup criterion established under these rules, including the references for original studies, papers, or other sources of information that were used or considered. Requests for information under this rule shall specify the hazardous substance and exposure pathways for which information is desired.

(2) Any proposed change to a criterion shall be published by the department and subject to review and comment as part of the rule-making process.

History: 2013 AACCS.

**R 299.44 Generic groundwater cleanup criteria.**

Rule 44. The generic groundwater cleanup criteria for all categories shall be as shown in table 1.

**TABLE 1. GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

All criteria, unless otherwise noted, are expressed in units of parts per billion (ppb). One ppb is equivalent to 1 microgram per liter (ug/L). Criteria with 6 or more digits are expressed in scientific notation. For example, 200,000 is presented as 2.0E+5. A footnote is designated by a letter in parentheses and is explained in the footnote pages that follow the criteria tables. When the risk-based criterion is less than the target detection limit (TDL), the TDL is listed as the criterion (§324.20120a(10)). In these cases, 2 numbers are present in the cell. The first number is the criterion (i.e., TDL), and the second number is the risk-based or solubility value, whichever is lower.

Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
Acenaphthene	83329	1,300	3,800	38	4,200 (S)	4,200 (S)	4,240	ID
Acenaphthylene	208968	52	150	ID	3,900 (S)	3,900 (S)	3,930	ID
Acetaldehyde (I)	75070	950	2,700	130	1.1E+6	2.3E+6	1.00E+9	8.9E+6
Acetate	71501	4,200	12,000	(G)	ID	ID	ID	ID
Acetic acid	64197	4,200	12,000	(G)	NLV	NLV	6.00E+9	1.0E+9 (D)
Acetone (I)	67641	730	2,100	1,700	1.0E+9 (D,S)	1.0E+9 (D,S)	1.00E+9	1.5E+7
Acetonitrile	75058	140	400	NA	2.4E+7	4.5E+7	2.00E+8	2.1E+7
Acetophenone	98862	1,500	4,400	ID	6.1E+6 (S)	6.1E+6 (S)	6.10E+6	ID
Acrolein (I)	107028	120	330	NA	2,100	4,200	2.10E+8	6.7E+6
Acrylamide	79061	0.5 (A)	0.5 (A)	10 (X)	NLV	NLV	2.20E+9	NA
Acrylic acid	79107	3,900	11,000	NA	1.2E+7	2.8E+7	1.00E+9	1.0E+9 (D)
Acrylonitrile (I)	107131	2.6	11	2.0 (M); 1.2	34,000	1.9E+5	7.50E+7	6.4E+6
Alachlor	15972608	2.0 (A)	2.0 (A)	11 (X)	NLV	NLV	1.83E+5	ID

Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
Aldicarb	116063	3.0 (A)	3.0 (A)	NA	NLV	NLV	6.00E+6	ID
Aldicarb sulfone	1646884	2.0 (A)	2.0 (A)	NA	NLV	NLV	7.80E+6	ID
Aldicarb sulfoxide	1646873	4.0 (A)	4.0 (A)	NA	NLV	NLV	2.80E+7	ID
Aldrin	309002	0.098	0.4	0.01 (M); 8.7E-6	180 (S)	180 (S)	180	ID
Aluminum (B)	7429905	50 (V)	50 (V)	NA	NLV	NLV	NA	ID
Ammonia	7664417	10,000 (N)	10,000 (N)	(CC)	3.2E+6	7.1E+6	5.30E+8	ID
t-Amyl methyl ether (TAME)	994058	190 (E)	190 (E)	NA	2.6E+5	5.7E+5	2.64E+6	NA
Aniline	62533	53	220	4	NLV	NLV	3.60E+7	NA
Anthracene	120127	43 (S)	43 (S)	ID	43 (S)	43 (S)	43.4	ID
Antimony	7440360	6.0 (A)	6.0 (A)	130 (X)	NLV	NLV	NA	ID
Arsenic	7440382	10 (A)	10 (A)	10	NLV	NLV	NA	ID
Asbestos (BB)	1332214	7.0E MFL (A)	7.0E MFL (A)	NA	NLV	NLV	NA	NA
Atrazine	1912249	3.0 (A)	3.0 (A)	7.3	NLV	NLV	70,000	ID
Azobenzene	103333	23	94	ID	6,400 (S)	6,400 (S)	6,400	ID
Barium (B)	7440393	2,000 (A)	2,000 (A)	(G)	NLV	NLV	NA	ID

**TABLE 1. GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;**

All criteria, unless otherwise noted, are expressed in units of parts per billion (ppb). One ppb is equivalent to 1 microgram per liter (ug/L). Criteria with 6 or more digits are expressed in scientific notation. For example, 200,000 is presented as 2.0E+5. A footnote is designated by a letter in parentheses and is explained in the footnote pages that follow the criteria tables. When the risk-based criterion is less than the target detection limit (TDL), the TDL is listed as the criterion (§324.20120a(10)). In these cases, 2 numbers are present in the cell. The first number is the criterion (i.e., TDL), and the second number is the risk-based or solubility value, whichever is lower.

Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
Benzene (I)	71432	5.0 (A)	5.0 (A)	200 (X)	5,600	35,000	1.75E+6	68,000
Benzidine	92875	0.3 (M); 0.0037	0.3 (M); 0.015	0.3 (M); 0.073	NLV	NLV	5.20E+5	ID
Benzo(a)anthracene (Q)	56553	2.1	8.5	ID	NLV	NLV	9.4	ID
Benzo(b)fluoranthene (Q)	205992	1.5 (S,AA)	1.5 (S,AA)	ID	ID	ID	1.5	ID
Benzo(k)fluoranthene (Q)	207089	1.0 (M); 0.8 (S)	1.0 (M); 0.8 (S)	NA	NLV	NLV	0.8	ID
Benzo(g,h,i)perylene	191242	1.0 (M); 0.26 (S)	1.0 (M); 0.26 (S)	ID	NLV	NLV	0.26	ID
Benzo(a)pyrene (Q)	50328	5.0 (A)	5.0 (A)	ID	NLV	NLV	1.62	ID
Benzoic acid	65850	32,000	92,000	NA	NLV	NLV	3.50E+6	ID
Benzyl alcohol	100516	10,000	29,000	NA	NLV	NLV	4.40E+7	ID
Benzyl chloride	100447	7.7	32	NA	12,000	77,000	4.90E+5	NA
Beryllium	7440417	4.0 (A)	4.0 (A)	(G)	NLV	NLV	NA	ID
bis(2-Chloroethoxy)ethane	112265	ID	ID	ID	NLV	NLV	1.89E+7	ID
bis(2-Chloroethyl)ether (I)	111444	2	8.3	1.0 (M); 0.79	38,000	2.1E+5	1.72E+7	1.7E+7 (S)
bis(2-Ethylhexyl)phthalate	117817	6.0 (A)	6.0 (A)	25	NLV	NLV	340	NA

Boron (B)	7440428	500 (F)	500 (F)	7,200 (X)	NLV	NLV	NA	ID
Bromate	15541454	10 (A)	10 (A)	40 (X)	NLV	NLV	38,000	ID
Bromobenzene (I)	108861	18	50	NA	1.8E+5	3.9E+5	4.13E+5	ID
Bromodichloromethane	75274	80 (A,W)	80 (A,W)	ID	4,800	37,000	6.74E+6	ID
Bromoform	75252	80 (A,W)	80 (A,W)	ID	4.7E+5	3.1E+6 (S)	3.10E+6	ID
Bromomethane	74839	10	29	35	4,000	9,000	1.45E+7	ID
n-Butanol (I)	71363	950	2,700	9,800 (X)	NLV	NLV	7.40E+7	4.7E+7
2-Butanone (MEK) (I)	78933	13,000	38,000	2,200	2.4E+8 (S)	2.4E+8 (S)	2.40E+8	ID
n-Butyl acetate	123864	550	1,600	NA	6.7E+6 (S)	6.7E+6 (S)	6.70E+6	2.5E+6
t-Butyl alcohol	75650	3,900	11,000	NA	1.0E+9 (D,S)	1.0E+9 (D,S)	1.00E+9	6.1E+7
Butyl benzyl phthalate	85687	1,200	2,700 (S)	67 (X)	NLV	NLV	2,690	ID
n-Butylbenzene	104518	80	230	ID	ID	ID	NA	ID
sec-Butylbenzene	135988	80	230	ID	ID	ID	NA	ID
t-Butylbenzene (I)	98066	80	230	ID	ID	ID	NA	ID

**TABLE 1. GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;**

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Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
Cadmium (B)	7440439	5.0 (A)	5.0 (A)	(G,X)	NLV	NLV	NA	ID
Camphene (I)	79925	ID	ID	NA	440	1,000	33,400	ID
Caprolactam	105602	5,800	17,000	NA	NLV	NLV	5.25E+9	NA
Carbaryl	63252	700	2,000	NA	ID	ID	1.26E+5	ID
Carbazole	86748	85	350	10 (M); 4.0	NLV	NLV	7,480	ID
Carbofuran	1563662	40 (A)	40 (A)	NA	NLV	NLV	7.00E+5	ID
Carbon disulfide (I,R)	75150	800	2,300	ID	2.5E+5	5.5E+5	1.19E+6	13,000
Carbon tetrachloride	56235	5.0 (A)	5.0 (A)	45 (X)	370	2,400	7.93E+5	ID
Chlordane (J)	57749	2.0 (A)	2.0 (A)	2.0 (M); 0.00025	56 (S)	56 (S)	56	ID
Chloride	16887006	2.5E+5 (E)	2.5E+5 (E)	(FF)	NLV	NLV	NA	ID
Chlorobenzene (I)	108907	100 (A)	100 (A)	25	2.1E+5	4.7E+5 (S)	4.72E+5	1.6E+5
p-Chlorobenzene sulfonic acid	98668	7,300	21,000	ID	ID	ID	NA	ID
1-Chloro-1,1-difluoroethane	75683	15,000	44,000	NA	3.9E+6 (S)	3.9E+6 (S)	3.90E+6	NA
Chloroethane	75003	430	1,700	1,100 (X)	5.7E+6 (S)	5.7E+6 (S)	5.74E+6	1.1E+5
2-Chloroethyl vinyl ether	110758	ID	ID	NA	ID	ID	1.50E+7	ID



Chloroform	67663	80 (A,W)	80 (A,W)	350	28,000	1.8E+5	7.92E+6	ID
Chloromethane (I)	74873	260	1,100	ID	8,600	45,000	6.34E+6	36,000
4-Chloro-3-methylphenol	59507	150	420	7.4	NLV	NLV	3.90E+6	ID
beta-Chloronaphthalene	91587	1,800	5,200	NA	ID	ID	6,740	ID
2-Chlorophenol	95578	45	130	18	4.9E+5	1.1E+6	2.20E+7	ID
o-Chlorotoluene (I)	95498	150	420	ID	2.2E+5	3.7E+5 (S)	3.73E+5	ID
Chlorpyrifos	2921882	22	63	2.0 (M); 0.002	2.9	6.6	1,120	ID
Chromium (III) (B,H)	16065831	100 (A)	100 (A)	(G,X)	NLV	NLV	NA	ID
Chromium (VI)	18540299	100 (A)	100 (A)	11	NLV	NLV	NA	ID
Chrysene (Q)	218019	1.6 (S)	1.6 (S)	ID	ID	ID	1.6	ID
Cobalt	7440484	40	100	100	NLV	NLV	NA	ID
Copper (B)	7440508	1,000 (E)	1,000 (E)	(G)	NLV	NLV	NA	ID
Cyanazine	21725462	2.3	9.4	56 (X)	NLV	NLV	1.70E+5	ID

**TABLE 1. GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;**

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Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
Cyanide (P,R)	57125	200 (A)	200 (A)	5.2	NLV	NLV	NA	ID
Cyclohexanone	108941	33,000	94,000	NA	1,500	3,300	2.30E+7	NA
Dacthal	1861321	73	210	NA	NLV	NLV	500	ID
Dalapon	75990	200 (A)	200 (A)	NA	NLV	NLV	5.02E+8	ID
4-4'-DDD	72548	9.1	37	NA	NLV	NLV	90	ID
4-4'-DDE	72559	4.3	15	NA	NLV	NLV	120	ID
4-4'-DDT	50293	3.6	10	0.02 (M); 1.1E-5	NLV	NLV	25	NA
Decabromodiphenyl ether	1163195	30 (S)	30 (S)	NA	30 (S)	30 (S)	30	ID
Di-n-butyl phthalate	84742	880	2,500	9.7	NLV	NLV	11,200	NA
Di(2-ethylhexyl) adipate	103231	400 (A)	400 (A)	ID	NLV	NLV	471	ID
Di-n-octyl phthalate	117840	130	380	ID	NLV	NLV	3,000	ID
Diacetone alcohol (I)	123422	ID	ID	NA	NLV	NLV	1.00E+9	1.0E+9 (S)
Diazinon	333415	1.3	3.8	1.0 (M); 0.004	NLV	NLV	68,800	NA
Dibenzo(a,h)anthracene (Q)	53703	2.0 (M); 0.21	2.0 (M); 0.85	ID	NLV	NLV	2.49	ID
Dibenzofuran	132649	ID	ID	4	10,000 (S)	10,000 (S)	10,000	ID
Dibromochloromethane	124481	80 (A,W)	80 (A,W)	ID	14,000	1.1E+5	2.60E+6	ID
Dibromochloropropane	96128	0.2 (A)	0.2 (A)	ID	220	1,200 (S)	1,230	NA
Dibromomethane	74953	80	230	NA	ID	ID	1.10E+7	ID

Dicamba	1918009	220	630	NA	NLV	NLV	4.50E+6	ID
1,2-Dichlorobenzene	95501	600 (A)	600 (A)	13	1.6E+5 (S)	1.6E+5 (S)	1.56E+5	NA
1,3-Dichlorobenzene	541731	6.6	19	28	18,000	41,000	1.11E+5	ID
1,4-Dichlorobenzene	106467	75 (A)	75 (A)	17	16,000	74,000 (S)	73,800	NA
3,3'-Dichlorobenzidine	91941	1.1	4.3	0.3 (M); 0.2	NLV	NLV	3,110	ID
Dichlorodifluoromethane	75718	1,700	4,800	ID	2.2E+5	3.0E+5 (S)	3.00E+5	ID
1,1-Dichloroethane	75343	880	2,500	740	1.0E+6	2.3E+6	5.06E+6	3.8E+5
1,2-Dichloroethane (I)	107062	5.0 (A)	5.0 (A)	360 (X)	9,600	59,000	8.52E+6	2.5E+6
1,1-Dichloroethylene (I)	75354	7.0 (A)	7.0 (A)	130	200	1,300	2.25E+6	97,000
cis-1,2-Dichloroethylene	156592	70 (A)	70 (A)	620	93,000	2.1E+5	3.50E+6	5.3E+5

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PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;**

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Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
trans-1,2-Dichloroethylene	156605	100 (A)	100 (A)	1,500 (X)	85,000	2.0E+5	6.30E+6	2.3E+5
2,6-Dichloro-4-nitroaniline	99309	2,200	6,300	NA	NLV	NLV	7,000	ID
2,4-Dichlorophenol	120832	73	210	11	NLV	NLV	4.50E+6	ID
2,4-Dichlorophenoxyacetic acid	94757	70 (A)	70 (A)	220	NLV	NLV	6.80E+5	ID
1,2-Dichloropropane (I)	78875	5.0 (A)	5.0 (A)	230 (X)	16,000	36,000	2.80E+6	5.5E+5
1,3-Dichloropropene	542756	8.5	35	9.0 (X)	3,900	26,000	2.80E+6	1.3E+5
Dichlorovos	62737	1.6	6.7	NA	NLV	NLV	1.60E+7	NA
Dicyclohexyl phthalate	84617	ID	ID	NA	ID	ID	4,000	ID
Dieldrin	60571	0.11	0.43	0.02 (M); 6.5E-6	200 (S)	200 (S)	195	ID
Diethyl ether	60297	10 (E)	10 (E)	ID	6.1E+7 (S)	6.1E+7 (S)	6.10E+7	6.5E+5
Diethyl phthalate	84662	5,500	16,000	110	NLV	NLV	1.08E+6	NA
Diethylene glycol monobutyl ether	112345	88	250	NA	NLV	NLV	1.00E+9	ID
Diisopropyl ether	108203	30	86	ID	8,000 (S)	8,000 (S)	8,041	8,000 (S)
Diisopropylamine (I)	108189	5.6	16	NA	2.1E+7	3.7E+7 (S)	3.69E+7	4.6E+6
Dimethyl phthalate	131113	73,000	2.10E+05	NA	NLV	NLV	4.19E+6	NA

N,N-Dimethylacetamide	127195	180	520	4,100 (X)	NLV	NLV	1.00E+9	NA
N,N-Dimethylaniline	121697	16	46	NA	2.4E+5	1.3E+6 (S)	1.27E+6	NA
Dimethylformamide (I)	68122	700	2,000	NA	NLV	NLV	1.00E+9	ID
2,4-Dimethylphenol	105679	370	1,000	380	NLV	NLV	7.87E+6	ID
2,6-Dimethylphenol	576261	4.4	13	NA	NLV	NLV	6.14E+6	ID
3,4-Dimethylphenol	95658	10	29	25	NLV	NLV	4.93E+6	ID
Dimethylsulfoxide	67685	2.2E+5	6.3E+5	1.9E+5	NLV	NLV	1.66E+8	ID
2,4-Dinitrotoluene	121142	7.7	32	NA	NLV	NLV	2.70E+5	ID
Dinoseb	88857	7.0 (A)	7.0 (A)	1.0 (M); 0.48	NLV	NLV	52,000	ID
1,4-Dioxane (I)	123911	85	350	2,800 (X)	NLV	NLV	9.00E+8	1.4E+8
Diquat	85007	20 (A)	20 (A)	20 (M); 6.0	NLV	NLV	7.00E+5	ID
Dissolved oxygen (DO)	NA	ID	ID	(EE)	ID	ID	NA	NA
Diuron	330541	31	90	NA	NLV	NLV	37,300	ID

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PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;**

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Endosulfan (J)	115297	44	130	0.03 (M); 0.029	ID	ID	510	ID
Endothall	145733	100 (A)	100 (A)	NA	NLV	NLV	1.00E+8	ID
Endrin	72208	2.0 (A)	2.0 (A)	ID	NLV	NLV	250	ID
Epichlorohydrin (I)	106898	5.0 (M); 2.0 (A)	5.0 (M); 2.0 (A)	NA	3.2E+5	6.3E+5	6.60E+7	4.7E+7
Ethanol (I)	64175	1.9E+6	3.8E+6	ID	NLV	NLV	1.00E+9	9.7E+7
Ethyl acetate (I)	141786	6,600	19,000	NA	6.4E+7 (S)	6.4E+7 (S)	6.40E+7	4.2E+6
Ethyl-tert-butyl ether (ETBE)	637923	49 (E)	49 (E)	ID	2.9E+6	5.6E+6 (S)	5.63E+6	ID
Ethylbenzene (I)	100414	74 (E)	74 (E)	18	1.1E+5	1.7E+5 (S)	1.69E+5	43,000
Ethylene dibromide	106934	0.05 (A)	0.05 (A)	5.7 (X)	2,400	15,000	4.20E+6	ID
Ethylene glycol	107211	15,000	42,000	1.9E+5 (X)	NLV	NLV	1.00E+9	NA
Ethylene glycol monobutyl ether	111762	3,700	10,000	NA	2.9E+6	6.5E+6	2.24E+8	NA
Fluoranthene	206440	210 (S)	210 (S)	1.6	210 (S)	210 (S)	206	ID
Fluorene	86737	880	2,000 (S)	12	2,000 (S)	2,000 (S)	1,980	ID
Fluorine (soluble fluoride) (B)	7782414	2,000 (E)	2,000 (E)	ID	NLV	NLV	NA	ID
Formaldehyde	50000	1,300	3,800	120	63,000	3.6E+5	5.50E+8	ID
Formic acid (I,U)	64186	10,000	29,000	ID	7.7E+6	1.5E+7	1.00E+9	1.0E+9 (D)

1-Formylpiperidine	2591868	80	230	NA	ID	ID	NA	ID
Gentian violet	548629	15	63	NA	NLV	NLV	1.00E+6	ID
Glyphosate	1071836	700 (A)	700 (A)	NA	NLV	NLV	1.16E+7	ID
Heptachlor	76448	0.4 (A)	0.4 (A)	0.01 (M); 0.0018	180 (S)	180 (S)	180	ID
Heptachlor epoxide	1024573	0.2 (A)	0.2 (A)	ID	NLV	NLV	200	ID
n-Heptane	142825	2,700 (S)	2,700 (S)	NA	2,700 (S)	2,700 (S)	2,690	200
Hexabromobenzene	87821	0.17 (S); 20	0.17 (S); 58	ID	ID	ID	0.17	ID
Hexachlorobenzene (C-66)	118741	1.0 (A)	1.0 (A)	0.2 (M); 0.0003	440	3,000	6,200	ID
Hexachlorobutadiene (C-46)	87683	15	42	0.053	1,600	3,200 (S)	3,230	ID
alpha-Hexachlorocyclohexane	319846	0.43	1.7	ID	2,000 (S)	2,000 (S)	2,000	ID
beta-Hexachlorocyclohexane	319857	0.88	3.6	ID	NLV	NLV	240	ID
Hexachlorocyclopentadiene (C-56)	77474	50 (A)	50 (A)	ID	130	420	1,800	ID

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Hexachloroethane	67721	7.3	21	6.7 (X)	27,000	50,000 (S)	50,000	ID
n-Hexane	110543	3,000	8,600	NA	12,000 (S)	12,000 (S)	12,000	12,000 (S)
2-Hexanone	591786	1,000	2,900	ID	4.2E+6	8.7E+6	1.60E+7	NA
Indeno(1,2,3-cd)pyrene (Q)	193395	2.0 (M); 0.022 (S)	2.0 (M); 0.022 (S)	ID	NLV	NLV	0.022	ID
Iron (B)	7439896	300 (E)	300 (E)	NA	NLV	NLV	NA	ID
Isobutyl alcohol (I)	78831	2,300	6,700	NA	7.6E+7 (S)	7.6E+7 (S)	7.60E+7	ID
Isophorone	78591	770	3,100	1,300 (X)	NLV	NLV	1.20E+7	ID
Isopropyl alcohol (I)	67630	470	1,300	57,000 (X)	NLV	NLV	1.00E+9	6.0E+7
Isopropyl benzene	98828	800	2,300	28	56,000 (S)	56,000 (S)	56,000	29,000
Lead (B)	7439921	4.0 (L)	4.0 (L)	(G,X)	NLV	NLV	NA	ID
Lindane	58899	0.2 (A)	0.2 (A)	0.03 (M); 0.026	ID	ID	6,800	ID
Lithium (B)	7439932	170	350	440	NLV	NLV	NA	ID
Magnesium (B)	7439954	4.0E+5	1.1E+6	NA	NLV	NLV	NA	ID
Manganese (B)	7439965	50 (E)	50 (E)	(G,X)	NLV	NLV	NA	ID
Mercury (Total) (B,Z)	Varies	2.0 (A)	2.0 (A)	0.0013	56 (S)	56 (S)	56	ID
Methane	74828	ID	ID	NA	(K)	(K)	NA	(AA)
Methanol	67561	3,700	10,000	5.9E+5 (X)	2.9E+7 (S)	2.9E+7 (S)	2.90E+7	4.5E+6



Methoxychlor	72435	40 (A)	40 (A)	NA	ID	ID	45	ID
2-Methoxyethanol (I)	109864	7.3	21	NA	NLV	NLV	1.00E+9	ID
2-Methyl-4-chlorophenoxyacetic acid	94746	7.3	21	NA	NLV	NLV	9.24E+5	ID
2-Methyl-4,6-dinitrophenol	534521	20 (M); 2.6	20 (M); 7.3	NA	NLV	NLV	2.00E+5	ID
N-Methyl-morpholine (I)	109024	20	56	NA	NLV	NLV	1.00E+9	ID
Methyl parathion	298000	1.8	5.2	NA	NLV	NLV	50,000	ID
4-Methyl-2-pentanone (MIBK) (I)	108101	1,800	5,200	ID	2.0E+7 (S)	2.0E+7 (S)	2.00E+7	ID
Methyl-tert-butyl ether (MTBE)	1634044	40 (E)	40 (E)	7,100 (X)	4.7E+7 (S)	4.7E+7 (S)	4.68E+7	ID
Methylcyclopentane (I)	96377	ID	ID	NA	22,000	49,000	73,890	ID
4,4'-Methylene-bis-2-chloroaniline	101144	1.1	4.5	NA	NLV	NLV	14,000	ID
Methylene chloride	75092	5.0 (A)	5.0 (A)	1,500 (X)	2.2E+5	1.4E+6	1.70E+7	ID

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2-Methylnaphthalene	91576	260	750	19	25,000 (S)	25,000 (S)	24,600	ID
Methylphenols (J)	1319773	370	1,000	30 (M); 25	NLV	NLV	2.80E+7	NA
Metolachlor	51218452	240	990	15	NLV	NLV	5.30E+5	ID
Metribuzin	21087649	180	520	NA	ID	ID	1.20E+6	ID
Mirex	2385855	0.02 (M); 6.8E-6 (S)	0.02 (M); 6.8E-6 (S)	0.02 (M); 6.8E-6 (S)	ID	ID	6.80E-6	NA
Molybdenum (B)	7439987	73	210	3,200 (X)	NLV	NLV	NA	ID
Naphthalene	91203	520	1,500	11	31,000 (S)	31,000 (S)	31,000	NA
Nickel (B)	7440020	100 (A)	100 (A)	(G)	NLV	NLV	NA	ID
Nitrate (B,N)	14797558	10,000 (A,N)	10,000 (A,N)	ID	NLV	NLV	NA	ID
Nitrite (B,N)	14797650	1,000 (A,N)	1,000 (A,N)	NA	NLV	NLV	NA	ID
Nitrobenzene (I)	98953	3.4	9.6	180 (X)	2.8E+5	5.5E+5	2.09E+6	NA
2-Nitrophenol	88755	20	58	ID	NLV	NLV	2.50E+6	ID
n-Nitroso-di-n-propylamine	621647	5.0 (M); 0.19	5.0 (M); 0.77	NA	NLV	NLV	9.89E+6	ID
N-Nitrosodiphenylamine	86306	270	1,100	NA	NLV	NLV	35,100	ID
Oxamyl	23135220	200 (A)	200 (A)	NA	NLV	NLV	2.80E+8	ID
Oxo-hexyl acetate	88230357	73	210	NA	ID	ID	NA	ID
Pendimethalin	40487421	280 (S)	280 (S)	NA	NLV	NLV	275	ID

Pentachlorobenzene	608935	6.1	17	5.0 (M); 0.019	ID	ID	650	ID
Pentachloronitrobenzene	82688	32 (S)	32 (S)	NA	32 (S)	32 (S)	32	ID
Pentachlorophenol	87865	1.0 (A)	1.0 (A)	(G,X)	NLV	NLV	1.85E+6	ID
Pentane	109660	ID	ID	NA	38,000 (S)	38,000 (S)	38,200	340
2-Pentene (I)	109682	ID	ID	NA	ID	ID	2.03E+5	ID
pH	NA	6.5 to 8.5 (E)	6.5 to 8.5 (E)	6.5 to 9.0	ID	ID	NA	NA
Phenanthrene	85018	52	150	2.0 (M); 1.4	1,000 (S)	1,000 (S)	1,000	ID
Phenol	108952	4,400	13,000	450	NLV	NLV	8.28E+7	NA
Phenytoin	57410	17	68	89 (X)	NLV	NLV	32,000	ID
Phosphorus (Total)	7723140	63,000	2.40E+05	(EE)	NLV	NLV	NA	ID
Phthalic acid	88993	14,000	40,000	NA	NLV	NLV	1.42E+7	ID

**TABLE 1. GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;**

All criteria, unless otherwise noted, are expressed in units of parts per billion (ppb). One ppb is equivalent to 1 microgram per liter (ug/L). Criteria with 6 or more digits are expressed in scientific notation. For example, 200,000 is presented as 2.0E+5. A footnote is designated by a letter in parentheses and is explained in the footnote pages that follow the criteria tables. When the risk-based criterion is less than the target detection limit (TDL), the TDL is listed as the criterion (§324.20120a(10)). In these cases, 2 numbers are present in the cell. The first number is the criterion (i.e., TDL), and the second number is the risk-based or solubility value, whichever is lower.

Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
Phthalic anhydride	85449	15,000	44,000	NA	NLV	NLV	6.20E+6	NA
Picloram	1918021	500 (A)	500 (A)	46	NLV	NLV	4.30E+5	ID
Piperidine	110894	3.2	9.2	NA	NLV	NLV	1.00E+9	ID
Polybrominated biphenyls (J)	67774327	0.03	0.09	ID	NLV	NLV	1.66E+7	ID
Polychlorinated biphenyls (PCBs) (J,T)	1336363	0.5 (A)	0.5 (A)	0.2 (M); 2.6E-5	45 (S)	45 (S)	44.7	ID
Prometon	1610180	160	460	NA	NLV	NLV	7.50E+5	ID
Propachlor	1918167	95	270	NA	NLV	NLV	6.55E+5	ID
Propazine	139402	200	560	NA	NLV	NLV	8,600	ID
Propionic acid	79094	12,000	35,000	ID	NLV	NLV	1.00E+9	1.0E+9 (D)
Propyl alcohol (I)	71238	1,400	4,000	NA	NLV	NLV	1.00E+9	7.1E+7
n-Propylbenzene (I)	103651	80	230	ID	ID	ID	NA	ID
Propylene glycol	57556	1.5E+5	4.2E+5	2.9E+5	NLV	NLV	1.00E+9	ID
Pyrene	129000	140 (S)	140 (S)	ID	140 (S)	140 (S)	135	ID
Pyridine (I)	110861	20 (M); 7.3	21	NA	5,500	12,000	3.00E+5	81,000
Selenium (B)	7782492	50 (A)	50 (A)	5	NLV	NLV	NA	ID
Silver (B)	7440224	34	98	0.2 (M); 0.06	NLV	NLV	NA	ID

Silvex (2,4,5-TP)	93721	50 (A)	50 (A)	30	NLV	NLV	1.40E+5	ID
Simazine	122349	4.0 (A)	4.0 (A)	17	NLV	NLV	4,470	ID
Sodium	17341252	2.3E+S(HH)	3.5E+5	NA	NLV	NLV	NA	ID
Sodium azide	26628228	88	250	50 (M); 7.3	ID	ID	NA	ID
Strontium (B)	7440246	4,600	13,000	21,000	NLV	NLV	NA	ID
Styrene	100425	100 (A)	100 (A)	80 (X)	1.7E+5	3.1E+5 (S)	3.10E+5	1.4E+5
Sulfate	14808798	2.5E+5 (E)	2.5E+5 (E)	NA	NLV	NLV	NA	ID
Tebuthiuron	34014181	510	1,500	NA	NLV	NLV	2.50E+6	ID
2,3,7,8- Tetrabromodibenzo- p-dioxin (O)	50585416	(O)	(O)	(O)	NLV	NLV	0.00996	ID
1,2,4,5- Tetrachlorobenzene	95943	1,300 (S)	1,300 (S)	2.9 (X)	1,300 (S)	1,300 (S)	1,300	ID
2,3,7,8- Tetrachlorodibenzo- p-dioxin (O)	1746016	3.0E-5 (A)	3.0E-5 (A)	1.0E-5 (M); 3.1E-9	NLV	NLV	0.019	ID
1,1,1,2- Tetrachloroethane	630206	77	320	ID	15,000	96,000	1.10E+6	ID

**TABLE 1. GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;**

All criteria, unless otherwise noted, are expressed in units of parts per billion (ppb). One ppb is equivalent to 1 microgram per liter (ug/L). Criteria with 6 or more digits are expressed in scientific notation. For example, 200,000 is presented as 2.0E+5. A footnote is designated by a letter in parentheses and is explained in the footnote pages that follow the criteria tables. When the risk-based criterion is less than the target detection limit (TDL), the TDL is listed as the criterion (§324.20120a(10)). In these cases, 2 numbers are present in the cell. The first number is the criterion (i.e., TDL), and the second number is the risk-based or solubility value, whichever is lower.

Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
1,1,2,2-Tetrachloroethane	79345	8.5	35	78 (X)	12,000	77,000	2.97E+6	ID
Tetrachloroethylene	127184	5.0 (A)	5.0 (A)	60 (X)	25,000	1.7E+5	2.00E+5	ID
Tetrahydrofuran	109999	95	270	11,000 (X)	6.9E+6	1.6E+7	1.00E+9	60,000
Tetranitromethane	509148	ID	ID	NA	580	3,200	85,000	ID
Thallium (B)	7440280	2.0 (A)	2.0 (A)	3.7 (X)	NLV	NLV	NA	ID
Toluene (I)	108883	790 (E)	790 (E)	270	5.3E+5 (S)	5.3E+5 (S)	5.26E+5	61,000
p-Toluidine	106490	15	62	NA	NLV	NLV	7.60E+6	NA
Total dissolved solids (TDS)	NA	5.0E+5 (E)	5.0E+5 (E)	(EE)	ID	ID	NA	NA
Toxaphene	8001352	3.0 (A)	3.0 (A)	1.0 (M); 6.8E-5	NLV	NLV	740	ID
Triallate	2303175	95	270	NA	ID	ID	4,000	ID
Tributylamine	102829	10	29	ID	14,000	32,000	75,400	ID
1,2,4-Trichlorobenzene	120821	70 (A)	70 (A)	99 (X)	3.0E+5 (S)	3.0E+5 (S)	3.00E+5	NA
1,1,1-Trichloroethane	71556	200 (A)	200 (A)	89	6.6E+5	1.3E+6 (S)	1.33E+6	ID
1,1,2-Trichloroethane	79005	5.0 (A)	5.0 (A)	330 (X)	17,000	1.1E+5	4.42E+6	NA
Trichloroethylene	79016	5.0 (A)	5.0 (A)	200 (X)	2,200	4,900	1.10E+6	ID
Trichlorofluoromethane	75694	2,600	7,300	NA	1.1E+6 (S)	1.1E+6 (S)	1.10E+6	ID
2,4,5-Trichlorophenol	95954	730	2,100	NA	NLV	NLV	1.20E+6	ID
2,4,6-Trichlorophenol	88062	120	470	5	NLV	NLV	8.00E+5	ID

1,2,3-Trichloropropane	96184	42	120	NA	8,300	18,000	1.90E+6	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	76131	1.7E+5 (S)	1.7E+5 (S)	32	1.7E+5 (S)	1.7E+5 (S)	1.70E+5	ID
Triethanolamine	102716	3,700	10,000	NA	NLV	NLV	1.00E+9	ID
Triethylene glycol	112276	4,300	12,000	NA	NLV	NLV	1.00E+6	ID
3-Trifluoromethyl-4-nitrophenol	88302	4,500	13,000	NA	NLV	NLV	5.00E+6	ID
Trifluralin	1582098	37	110	NA	ID	ID	8,100	ID
2,2,4-Trimethyl pentane	540841	ID	ID	NA	2,300 (S)	2,300 (S)	2,330	160
2,4,4-Trimethyl-2-pentene (I)	107404	ID	ID	NA	ID	ID	11,900	ID
1,2,4-Trimethylbenzene (I)	95636	63 (E)	63 (E)	17	56,000 (S)	56,000 (S)	55,890	56,000 (S)
1,3,5-Trimethylbenzene (I)	108678	72 (E)	72 (E)	45	61,000 (S)	61,000 (S)	61,150	ID

**TABLE 1. GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;**

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Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater or Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
Triphenyl phosphate	115866	1,200	1,400 (S)	NA	NLV	NLV	1,430	ID
tris(2,3-Dibromopropyl)phosphate	126727	10 (M); 0.71	10 (M); 2.9	ID	4,700 (S)	4,700 (S)	4,700	ID
Urea	57136	ID	ID	NA	NLV	NLV	NA	ID
Vanadium	7440622	4.5	62	27	NLV	NLV	NA	ID
Vinyl acetate (I)	108054	640	1,800	NA	4.1E+6	8.9E+6	2.00E+7	1.8E+6
Vinyl chloride	75014	2.0 (A)	2.0 (A)	13 (X)	1,100	13,000	2.76E+6	33,000
White phosphorus (R)	1218510 3	0.11	0.31	NA	NLV	NLV	NA	ID
Xylenes (I)	1330207	280 (E)	280 (E)	41	1.9E+5 (S)	1.9E+5 (S)	1.86E+5	70,000
Zinc (B)	7440666	2,400	5,000 (E)	(G)	NLV	NLV	NA	ID

History: 2013 AACS.



**R 299.46 Generic soil cleanup criteria for residential category.**

Rule 46 The generic soil cleanup criteria for residential category shall be as shown in table 2.

**TABLE 2. SOIL: RESIDENTIAL  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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			Groundwater Protection		Indoor Air	Ambient Air (Y) (C)				Contact	Csat
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Level	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface 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
Acenaphthene	83329	NA	3.0E+5	8,700	1.9E+8	8.1E+7	8.1E+7	8.1E+7	1.4E+10	4.1E+7	NA
Acenaphthylene	208968	NA	5,900	ID	1.6E+6	2.2E+6	2.2E+6	2.2E+6	2.3E+9	1.6E+6	NA
Acetaldehyde (I)	75070	NA	19,000	2,600	2.2E+5	1.7E+5	1.7E+5	2.8E+5	6.0E+8	2.9E+7	1.1E+8
Acetate	71501	NA	ID	(G)	ID	ID	ID	ID	ID	ID	ID
Acetic acid	64197	NA	84,000	(G)	NLV	NLV	NLV	NLV	1.7E+10	1.3E+8	6.5E+8
Acetone (I)	67641	NA	15,000	34,000	2.9E+8 (C)	1.3E+8	1.3E+8	1.9E+8	3.9E+11	2.3E+7	1.1E+8
Acetonitrile	75058	NA	2,800	NA	4.8E+6	1.6E+6	1.6E+6	2.1E+6	4.0E+9	4.3E+6	2.2E+7
Acetophenone	98862	NA	30,000	ID	1.2E+8 (C)	4.4E+7	4.4E+7	4.4E+7	3.3E+10	4.7E+7 (C)	1.1E+6
Acrolein (I)	107028	NA	2,400	NA	410	310	310	610	1.3E+6	3.6E+6	2.3E+7
Acrylamide	79061	NA	10	200 (X)	NLV	NLV	NLV	NLV	2.4E+6	1,900	NA
Acrylic acid	79107	NA	78,000	NA	2.4E+6	1.9E+5	2.3E+5	2.3E+5	6.7E+7	3.5E+7 (DD)	1.1E+8
Acrylonitrile (I)	107131	NA	100 (M); 52	100 (M); 40	6,600	5,000	5,100	10,000	4.6E+7	16,000	8.3E+6

Alachlor	15972 608	NA	52	290 (X)	NLV	NLV	NLV	NLV	ID	93,000	NA
Aldicarb	11606 3	NA	60	NA	NLV	NLV	NLV	NLV	ID	2.3E+5	NA
Aldicarb sulfone	16468 84	NA	200 (M); 40	NA	NLV	NLV	NLV	NLV	ID	2.5E+5	NA
Aldicarb sulfoxide	16468 73	NA	200(M); 80	NA	NLV	NLV	NLV	NLV	ID	2.9E+5	NA
Aldrin	30900 2	NA	NLL	NLL	1.3E+6	58,000	58,000	58,000	6.4E+5	1,000	NA
Aluminum (B)	74299 05	6.9E+6	1,000	NA	NLV	NLV	NLV	NLV	ID	5.0E+7 (DD)	NA
Ammonia	76644 17	NA	ID	(CC)	ID	ID	ID	ID	6.7E+9	ID	1.0E+7
t-Amyl methyl ether (TAME)	99405 8	NA	3,900	NA	58,000	3.4E+5	7.6E+5	1.8E+6	4.1E+9	2.9E+7 (C)	4.4E+5
Aniline	62533	NA	1,100	330 (M); 80	NLV	NLV	NLV	NLV	6.7E+7	3.3E+5	4.5E+6
Anthracene	12012 7	NA	41,000	ID	1.0E+9 (D)	1.4E+9	1.4E+9	1.4E+9	6.7E+10	2.3E+8	NA
Antimony	74403 60	NA	4,300	94,000 (X)	NLV	NLV	NLV	NLV	1.3E+7	1.8E+5	NA
Arsenic	74403 82	5,800	4,600	4,600	NLV	NLV	NLV	NLV	7.2E+5	7,600	NA
Asbestos (BB)	13322 14	NA	NLL	NLL	NLV	NLV	NLV	NLV	1.0E+7 (M); 68,000	ID	NA
Atrazine	19122 49	NA	60	150	NLV	NLV	NLV	NLV	ID	71,000 (DD)	NA
Azobenzene	10333 3	NA	4,200	ID	6.1E+6	6.3E+5	6.3E+5	6.3E+5	1.0E+8	1.4E+5	NA

**TABLE 2. SOIL: RESIDENTIAL  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Level	Groundwater Protection		Indoor Air	Ambient Air (Y) (C)				Contact	Csat
			Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface 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
Barium (B)	7440393	75,000	1.3E+6	(G)	NLV	NLV	NLV	NLV	3.3E+8	3.7E+7	NA
Benzene (I)	71432	NA	100	4,000 (X)	1,600	13,000	34,000	79,000	3.8E+8	1.8E+5	4.0E+5
Benzidine	92875	NA	1,000 (M); 6.0	1,000 (M); 6.0	NLV	NLV	NLV	NLV	46,000	1,000 (M); 23	NA
Benzo(a)anthracene (Q)	56553	NA	NLL	NLL	NLV	NLV	NLV	NLV	ID	20,000	NA
Benzo(b)fluoranthene (Q)	205992	NA	NLL	NLL	ID	ID	ID	ID	ID	20,000	NA
Benzo(k)fluoranthene (Q)	207089	NA	NLL	NLL	NLV	NLV	NLV	NLV	ID	2.0E+5	NA
Benzo(g,h,i)perylene	191242	NA	NLL	NLL	NLV	NLV	NLV	NLV	8.0E+8	2.5E+6	NA
Benzo(a)pyrene (Q)	50328	NA	NLL	NLL	NLV	NLV	NLV	NLV	1.5E+6	2,000	NA
Benzoic acid	65850	NA	6.4E+5	NA	NLV	NLV	NLV	NLV	ID	9.9E+8	NA
Benzyl alcohol	100516	NA	2.0E+5	NA	NLV	NLV	NLV	NLV	3.3E+11	3.2E+8 (C)	5.8E+6
Benzyl chloride	100447	NA	150	NA	6,300	14,000	14,000	17,000	6.2E+7	48,000	2.3E+5

Beryllium	744041 7	NA	51,000	(G)	NLV	NLV	NLV	NLV	1.3E+6	4.1E+5	NA
bis(2-Chloroethoxy)ethane	112265	NA	ID	ID	NLV	NLV	NLV	NLV	ID	ID	2.7E+6
bis(2-Chloroethyl)ether (I)	111444	NA	100	100 (M); 20	8,300	3,800	3,800	3,800	9.4E+6	13,000	2.2E+6
bis(2-Ethylhexyl)phthalate	117817	NA	NLL	NLL	NLV	NLV	NLV	NLV	7.0E+8	2.8E+6	1.0E+7
Boron (B)	744042 8	NA	10,000	1.4E+5 (X)	NLV	NLV	NLV	NLV	ID	4.8E+7 (DD)	NA
Bromate	155414 54	NA	200	800 (X)	NLV	NLV	NLV	NLV	ID	17,000	NA
Bromobenzene (I)	108861	NA	550	NA	3.1E+5	4.5E+5	4.5E+5	4.5E+5	5.3E+8	5.4E+5	7.6E+5
Bromodichloromethane	75274	NA	1,600 (W)	ID	1,200	9,100	9,700	19,000	8.4E+7	1.1E+5	1.5E+6
Bromoform	75252	NA	1,600 (W)	ID	1.5E+5	9.0E+5	9.0E+5	9.0E+5	2.8E+9	8.2E+5	8.7E+5
Bromomethane	74839	NA	200	700	860	11,000	57,000	1.4E+5	3.3E+8	3.2E+5	2.2E+6
n-Butanol (I)	71363	NA	19,000	2.0E+5	NLV	NLV	NLV	NLV	2.3E+10	2.9E+7 (C)	8.7E+6
2-Butanone (MEK) (I)	78933	NA	2.6E+5	44,000	5.4E+7 (C)	2.9E+7	2.9E+7	3.5E+7	6.7E+10	1.2E+8 (C, DD)	2.7E+7
n-Butyl acetate	123864	NA	11,000	NA	5.6E+7 (C)	1.1E+8	2.6E+8	3.2E+8	4.7E+11	1.7E+7 (C)	1.1E+6
t-Butyl alcohol	75650	NA	78,000	NA	3.1E+8 (C)	9.7E+7	2.0E+8	2.0E+8	1.3E+11	1.2E+8 (C)	1.1E+8
Butyl benzyl phthalate	85687	NA	2.2E+6 (C)	1.2E+5 (X)	NLV	NLV	NLV	NLV	4.7E+10	3.6E+7 (C)	3.1E+5
n-Butylbenzene	104518	NA	1,600	ID	ID	ID	ID	ID	2.0E+9	2.5E+6	1.0E+7

**TABLE 2. SOIL: RESIDENTIAL  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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sec-Butylbenzene	135988	NA	1,600	ID	ID	ID	ID	ID	4.0E+8	2.5E+6	1.0E+7
t-Butylbenzene (I)	98066	NA	1,600	ID	ID	ID	ID	ID	6.7E+8	2.5E+6	1.0E+7
Cadmium (B)	7440439	1,200	6,000	(G,X)	NLV	NLV	NLV	NLV	1.7E+6	5.5E+5	NA
Camphene (I)	79925	NA	ID	NA	3,700	1.5E+5	9.1E+5	2.2E+6	5.3E+9	ID	NA
Caprolactam	105602	NA	1.2E+5	NA	NLV	NLV	NLV	NLV	6.7E+8	5.3E+7 (DD)	NA
Carbaryl	63252	NA	14,000	NA	ID	ID	ID	ID	ID	2.2E+7	NA
Carbazole	86748	NA	9,400	1,100	NLV	NLV	NLV	NLV	6.2E+7	5.3E+5	NA
Carbofuran	1563662	NA	800	NA	NLV	NLV	NLV	NLV	ID	1.1E+6	NA
Carbon disulfide (I,R)	75150	NA	16,000	ID	76,000	1.3E+6	7.9E+6	1.9E+7	4.7E+10	7.2E+6 (C, DD)	2.8E+5
Carbon tetrachloride	56235	NA	100	900 (X)	190	3,500	12,000	28,000	1.3E+8	96,000	3.9E+5
Chlordane (J)	57749	NA	NLL	NLL	1.1E+7	1.2E+6	1.2E+6	1.2E+6	3.1E+7	31,000	NA
Chloride	16887006	NA	5.0E+6	(X)	NLV	NLV	NLV	NLV	ID	5.0E+5 (F)	NA

Chlorobenzene (I)	108907	NA	2,000	500	1.2E+5	7.7E+5	9.9E+5	2.1E+6	4.7E+9	4.3E+6 (C)	2.6E+5
p-Chlorobenzene sulfonic acid	98668	NA	1.5E+5	ID	ID	ID	ID	ID	ID	2.3E+8	ID
1-Chloro-1,1-difluoroethane	75683	NA	3.0E+5	NA	2.9E+6 (C)	7.9E+7	5.6E+8	1.4E+9	3.3E+12	4.7E+8 (C)	9.6E+5
Chloroethane	75003	NA	8,600	22,000 (X)	2.9E+6 (C)	3.00E+07	1.2E+8	2.8E+8	6.7E+11	2.6E+6 (C)	9.5E+5
2-Chloroethyl vinyl ether	110758	NA	ID	NA	ID	ID	ID	ID	ID	ID	1.9E+6
Chloroform	67663	NA	1,600 (W)	7,000	7,200	45,000	1.2E+5	2.7E+5	1.3E+9	1.2E+6	1.5E+6
Chloromethane (I)	74873	NA	5,200	ID	2,300	40,000	4.1E+5	1.0E+6	4.9E+9	1.6E+6 (C)	1.1E+6
4-Chloro-3-methylphenol	59507	NA	5,800	280	NLV	NLV	NLV	NLV	ID	4.5E+6	NA
beta-Chloronaphthalene	91587	NA	6.2E+5	NA	ID	ID	ID	ID	ID	5.6E+7	NA
2-Chlorophenol	95578	NA	900	360	4.3E+5	9.6E+5	9.6E+5	9.6E+5	1.2E+9	1.4E+6	1.9E+7
o-Chlorotoluene (I)	95498	NA	3,300	ID	2.7E+5	1.2E+6	2.9E+6	6.3E+6	4.7E+9	4.5E+6 (C)	5.0E+5
Chlorpyrifos	2921882	NA	17,000	1,500	130	4,600	23,000	55,000	1.3E+8	1.1E+7	NA
Chromium (III) (B,H)	16065831	18,000 (total)	1.0E+9 (D)	(G,X)	NLV	NLV	NLV	NLV	3.3E+8	7.9E+8	NA
Chromium (VI)	18540299	NA	30,000	3,300	NLV	NLV	NLV	NLV	2.6E+5	2.5E+6	NA
Chrysene (Q)	218019	NA	NLL	NLL	ID	ID	ID	ID	ID	2.0E+6	NA

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Cobalt	7440484	6,800	800	2,000	NLV	NLV	NLV	NLV	1.3E+7	2.6E+6	NA
Copper (B)	7440508	32,000	5.8E+6	(G)	NLV	NLV	NLV	NLV	1.3E+8	2.0E+7	NA
Cyanazine	21725462	NA	200	1,100 (X)	NLV	NLV	NLV	NLV	ID	14,000	NA
Cyanide (P,R)	57125	390 (total)	4,000	100	NLV	NLV	NLV	NLV	2.5E+5	12,000	NA
Cyclohexanone	108941	NA	5.2E+6	NA	17,000	1.0E+6	1.1E+7	2.7E+7	6.7E+10	1.0E+9 (C,D)	2.2E+8
Dacthal	1861321	NA	50,000	NA	NLV	NLV	NLV	NLV	ID	2.3E+6	NA
Dalapon	75990	NA	4,000	NA	NLV	NLV	NLV	NLV	ID	1.9E+7	5.9E+7
4-4'-DDD	72548	NA	NLL	NLL	NLV	NLV	NLV	NLV	4.4E+7	95,000	NA
4-4'-DDE	72559	NA	NLL	NLL	NLV	NLV	NLV	NLV	3.2E+7	45,000	NA
4-4'-DDT	50293	NA	NLL	NLL	NLV	NLV	NLV	NLV	3.2E+7	57,000	NA
Decabromodiphenyl ether	1163195	NA	1.4E+5	NA	1.0E+9 (D)	8.6E+7	8.6E+7	8.6E+7	2.3E+9	3.8E+6	NA
Di-n-butyl phthalate	84742	NA	9.6E+5 (C)	11,000	NLV	NLV	NLV	NLV	3.3E+9	2.7E+7 (C)	7.6E+5



Di(2-ethylhexyl) adipate	103231	NA	1.3E+7 (C)	ID	NLV	NLV	NLV	NLV	9.2E+9	1.5E+7 (C, DD)	9.6E+5
Di-n-octyl phthalate	117840	NA	1.0E+8	ID	NLV	NLV	NLV	NLV	3.1E+10	6.9E+6	1.4E+8
Diacetone alcohol (I)	123422	NA	ID	NA	NLV	NLV	NLV	NLV	1.6E+11	ID	1.1E+8
Diazinon	333415	NA	95	72	NLV	NLV	NLV	NLV	ID	12,000 (DD)	3.1E+5
Dibenzo(a,h)anthracene (Q)	53703	NA	NLL	NLL	NLV	NLV	NLV	NLV	ID	2,000	NA
Dibenzofuran	132649	NA	ID	1,700	2.0E+6	1.3E+5	1.3E+5	1.3E+5	6.7E+6	ID	NA
Dibromochloromethane	124481	NA	1,600 (W)	ID	3,900	24,000	24,000	33,000	1.3E+8	1.1E+5	6.1E+5
Dibromochloropropane	96128	NA	10 (M); 4.0	ID	220	260	260	260	5.6E+5	4,400 (C)	1,200
Dibromomethane	74953	NA	1,600	NA	ID	ID	ID	ID	ID	2.5E+6 (C)	2.0E+6
Dicamba	1918009	NA	4,400	NA	NA	NLV	NLV	NLV	ID	3.4E+6	NA
1,2-Dichlorobenzene	95501	NA	14,000	280	1.1E+7 (C)	3.9E+7	3.9E+7	5.2E+7	1.0E+11	1.9E+7 (C)	2.1E+5
1,3-Dichlorobenzene	541731	NA	170	680	26,000	79,000	79,000	1.1E+5	2.0E+8	2.0E+5 (C)	1.7E+5
1,4-Dichlorobenzene	106467	NA	1,700	360	19,000	77,000	77,000	1.1E+5	4.5E+8	4.0E+5	NA
3,3'-Dichlorobenzidine	91941	NA	2,000 (M); 28	2,000 (M); 7.4	NLV	NLV	NLV	NLV	6.5E+6	6,600	NA
Dichlorodifluoromethane	75718	NA	95,000	ID	9.0E+5	5.3E+7	5.5E+8	1.4E+9	3.3E+12	5.2E+7 (C)	1.0E+6

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1,1-Dichloroethane	75343	NA	18,000	15,000	2.3E+5	2.1E+6	5.9E+6	1.4E+7	3.3E+10	2.7E+7 (C)	8.9E+5
1,2-Dichloroethane (I)	107062	NA	100	7,200 (X)	2,100	6,200	11,000	26,000	1.2E+8	91,000	1.2E+6
1,1-Dichloroethylene (I)	75354	NA	140	2,600	62	1,100	5,300	13,000	6.2E+7	2.0E+5	5.7E+5
cis-1,2-Dichloroethylene	156592	NA	1,400	12,000	22,000	1.8E+5	4.2E+5	9.9E+5	2.3E+9	2.5E+6 (C)	6.4E+5
trans-1,2-Dichloroethylene	156605	NA	2,000	30,000 (X)	23,000	2.8E+5	8.3E+5	2.0E+6	4.7E+9	3.8E+6 (C)	1.4E+6
2,6-Dichloro-4-nitroaniline	99309	NA	44,000	NA	NLV	NLV	NLV	NLV	ID	6.8E+7	NA
2,4-Dichlorophenol	120832	NA	1,500	330 (M); 220	NLV	NLV	NLV	NLV	5.1E+9	6.6E+5 (DD)	1.8E+6

2,4-Dichlorophenoxy acetic acid	94757	NA	1,400	4,400	NLV	NLV	NLV	NLV	6.7E+9	2.5E+6	NA
1,2-Dichloropropane (I)	78875	NA	100	4,600 (X)	4,000	25,000	50,000	1.1E+5	2.7E+8	1.4E+5	5.5E+5
1,3-Dichloropropene	542756	NA	170	180 (X)	1,000	18,000	68,000	1.6E+5	7.8E+8	10,000	6.2E+5
Dichlorovos	62737	NA	50 (M); 32	NA	NLV	NLV	NLV	NLV	3.3E+7	10,000	2.2E+6
Dicyclohexyl phthalate	84617	NA	ID	NA	ID	ID	ID	ID	ID	ID	NA
Dieldrin	60571	NA	NLL	NLL	1.4E+5	19,000	19,000	19,000	6.8E+5	1,100	NA
Diethyl ether	60297	NA	200	ID	2.8E+7 (C)	8.5E+7	1.5E+8	3.4E+8	8.0E+11	1.1E+8 (C)	7.4E+6
Diethyl phthalate	84662	NA	1.1E+5	2,200	NLV	NLV	NLV	NLV	3.3E+9	1.7E+8 (C)	7.4E+5
Diethylene glycol monobutyl ether	112345	NA	1,800	NA	NLV	NLV	NLV	NLV	1.3E+9	2.7E+6	1.1E+8
Diisopropyl ether	108203	NA	600	ID	6.7E+5 (C)	3.4E+5	7.6E+5	1.8E+6	4.1E+9	9.2E+5 (C)	1,300
Diisopropylamine (I)	108189	NA	110	NA	5.5E+6	6.2E+6	6.2E+6	7.3E+6	1.3E+10	1.7E+5	6.7E+6
Dimethyl phthalate	131113	NA	1.5E+6 (C)	NA	NLV	NLV	NLV	NLV	3.3E+9	1.0E+9 (C,D)	7.9E+5
N,N-Dimethylacetamide	127195	NA	3,600	82,000 (X)	NLV	NLV	NLV	NLV	ID	5.6E+6	1.1E+8
N,N-Dimethylaniline	121697	NA	320	NA	1.7E+5	1.5E+5	1.5E+5	1.5E+5	2.6E+8	5.0E+5	8.0E+5
Dimethylformamide (I)	68122	NA	14,000	NA	NLV	NLV	NLV	NLV	2.0E+9	2.2E+7	1.1E+8
2,4-Dimethylphenol	105679	NA	7,400	7,600	NLV	NLV	NLV	NLV	4.7E+9	1.1E+7	NA

2,6-Dimethylphenol	576261	NA	330 (M); 88	NA	NLV	NLV	NLV	NLV	1.3E+8	1.4E+5	NA
3,4-Dimethylphenol	95658	NA	330 (M); 200	500	NLV	NLV	NLV	NLV	2.3E+8	3.2E+5	NA
Dimethylsulfoxide	67685	NA	4.4E+6	3.8E+6	NLV	NLV	NLV	NLV	1.3E+9	1.0E+9 (C,D)	1.8E+7
2,4-Dinitrotoluene	121142	NA	430	NA	NLV	NLV	NLV	NLV	1.6E+7	48,000	NA

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Dinoseb	88857	NA	300	200 (M); 43	NLV	NLV	NLV	NLV	2.7E+8	66,000 (DD)	1.4E+5
1,4-Dioxane (I)	123911	NA	1,700	56,000 (X)	NLV	NLV	NLV	NLV	5.7E+8	5.3E+5	9.7E+7
Diquat	85007	NA	400	400	NLV	NLV	NLV	NLV	ID	5.0E+5	NA
Diuron	330541	NA	620	NA	NLV	NLV	NLV	NLV	4.7E+8	9.7E+5	NA
Endosulfan (J)	115297	NA	NLL	NLL	ID	ID	ID	ID	ID	1.4E+6	NA
Endothall	145733	NA	NLL	NLL	NLV	NLV	NLV	NLV	2.3E+9	3.8E+6	NA
Endrin	72208	NA	NLL	NLL	NLV	NLV	NLV	NLV	ID	65,000	NA
Epichlorohydrin (I)	106898	NA	100	NA	64,000	31,000	31,000	35,000	6.7E+7	8,900	7.3E+6
Ethanol (I)	64175	NA	3.8E+7	ID	NLV	NLV	NLV	NLV	1.3E+12	1.0E+9 (C,D,DD)	1.1E+8
Ethyl acetate (I)	141786	NA	1.3E+5	NA	3.8E+7 (C)	4.9E+7	4.9E+7	9.8E+7	2.1E+11	2.0E+8 (C)	7.5E+6
Ethyl-tert-butyl ether (ETBE)	637923	NA	980	ID	5.4E+5	1.9E+6	4.5E+6	1.1E+7	2.5E+10	ID	6.5E+5
Ethylbenzene (I)	100414	NA	1,500	360	87,000	7.2E+5	1.0E+6	2.2E+6	1.0E+10	2.2E+7 (C)	1.4E+5

Ethylene dibromide	106934	NA	20 (M); 1.0	110 (X)	670	1,700	1,700	3,300	1.4E+7	92	8.9E+5
Ethylene glycol	107211	NA	3.0E+5	3.8E+6 (X)	NLV	NLV	NLV	NLV	6.7E+10	4.5E+8 (C)	1.1E+8
Ethylene glycol monobutyl ether	111762	NA	74,000	NA	7.4E+5	1.8E+7	1.5E+8	3.6E+8	8.7E+11	1.1E+8 (C)	4.1E+7
Fluoranthene	206440	NA	7.3E+5	5,500	1.0E+9 (D)	7.4E+8	7.4E+8	7.4E+8	9.3E+9	4.6E+7	NA
Fluorene	86737	NA	3.9E+5	5,300	5.8E+8	1.3E+8	1.3E+8	1.3E+8	9.3E+9	2.7E+7	NA
Fluorine (soluble fluoride) (B)	778241 4	NA	40,000	ID	NLV	NLV	NLV	NLV	ID	9.0E+6 (DD)	NA
Formaldehyde	50000	NA	26,000	2,400	12,000	13,000	23,000	52,000	2.4E+8	4.1E+7	6.0E+7
Formic acid (I,U)	64186	NA	2.0E+5	ID	1.5E+6	2.1E+5	1.4E+5	1.4E+5	1.3E+8	3.2E+8 (C)	1.1E+8
1-Formylpiperidine	259186 8	NA	1,600	NA	ID	ID	ID	ID	ID	2.5E+6	1.0E+7
Gentian violet	548629	NA	300	NA	NLV	NLV	NLV	NLV	ID	96,000	NA
Glyphosate	107183 6	NA	NLL	NLL	NLV	NLV	NLV	NLV	ID	1.1E+7 (DD)	NA
Heptachlor	76448	NA	NLL	NLL	3.5E+5	62,000	62,000	62,000	2.4E+6	5,600	NA
Heptachlor epoxide	102457 3	NA	NLL	NLL	NLV	NLV	NLV	NLV	1.2E+6	3,100	NA
n-Heptane	142825	NA	4.6E+7 (C)	NA	1.5E+6 (C)	2.1E+7	4.4E+7	1.0E+8	2.3E+11	9.9E+8 (C)	2.4E+5
Hexabromobenzene	87821	NA	5,400	ID	ID	ID	ID	ID	ID	1.1E+6	NA

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Hexachlorobenzene (C-66)	118741	NA	1,800	350	41,000	17,000	17,000	17,000	6.8E+6	8,900	NA
Hexachlorobutadiene (C-46)	87683	NA	26,000	91	1.3E+5	1.3E+5	1.3E+5	1.3E+5	1.4E+8	1.0E+5	3.5E+5
alpha-Hexachlorocyclohexane	319846	NA	18	ID	30,000	12,000	22,000	25,000	1.7E+6	2,600	NA
beta-Hexachlorocyclohexane	319857	NA	37	ID	NLV	NLV	NLV	NLV	5.9E+6	5,400	NA
Hexachlorocyclopentadiene (C-56)	77474	NA	3.2E+5	ID	30,000	50,000	50,000	50,000	1.3E+7	2.3E+6 (C)	7.2E+5
Hexachloroethane	67721	NA	430	1,800 (X)	40,000	5.5E+5	9.3E+5	9.3E+5	2.3E+8	2.3E+5	NA
n-Hexane	110543	NA	1.8E+5 (C)	NA	5.1E+5 (C)	3.0E+6	3.2E+6	6.2E+6	1.3E+10	9.2E+7 (C)	44,000
2-Hexanone	591786	NA	20,000	ID	9.9E+5	1.1E+6	1.1E+6	1.4E+6	2.7E+9	3.2E+7 (C)	2.5E+6
Indeno(1,2,3-cd)pyrene (Q)	193395	NA	NLL	NLL	NLV	NLV	NLV	NLV	ID	20,000	NA
Iron (B)	743989	1.2E+7	6,000	NA	NLV	NLV	NLV	NLV	ID	1.6E+8	NA

	6										
Isobutyl alcohol (I)	78831	NA	46,000	NA	2.3E+8 (C)	7.9E+7	7.9E+7	7.9E+7	1.0E+11	7.2E+7 (C)	8.9E+6
Isophorone	78591	NA	15,000	26,000 (X)	NLV	NLV	NLV	NLV	1.2E+10	4.8E+6 (C)	2.4E+6
Isopropyl alcohol (I)	67630	NA	9,400	1.1E+6 (X)	NLV	NLV	NLV	NLV	1.5E+10	1.4E+7	1.1E+8
Isopropyl benzene	98828	NA	91,000	3,200	4.0E+5 (C)	1.7E+6	1.7E+6	2.8E+6	5.8E+9	2.5E+7 (C)	3.9E+5
Lead (B)	743992 1	21,000	7.0E+5	(G,X)	NLV	NLV	NLV	NLV	1.0E+8	4.0E+5	NA
Lindane	58899	NA	20 (M); 7.0	20 (M); 1.1	ID	ID	ID	ID	ID	8,300	NA
Lithium (B)	743993 2	9,800	3,400	8,800	NLV	NLV	NLV	NLV	2.3E+9	4.2E+6 (DD)	NA
Magnesium (B)	743995 4	NA	8.0E+6	NA	NLV	NLV	NLV	NLV	6.7E+9	1.0E+9 (D)	NA
Manganese (B)	743996 5	4.4E+5	1,000	(G,X)	NLV	NLV	NLV	NLV	3.3E+6	2.5E+7	NA
Mercury (Total) (B,Z)	Varies	130	1,700	50 (M); 1.2	48,000	52,000	52,000	52,000	2.0E+7	1.6E+5	NA
Methane	74828	NA	ID	NA	8.4E+6 ug/m3 (GG)	ID	ID	ID	ID	ID	ID
Methanol	67561	NA	74,000	1.2E+7 (C)	3.7E+7 (C)	3.1E+7	4.4E+7	9.6E+7	2.2E+11	1.1E+8 (C)	3.1E+6
Methoxychlor	72435	NA	16,000	NA	ID	ID	ID	ID	ID	1.9E+6	NA
2-Methoxyethanol (I)	109864	NA	150	NA	NLV	NLV	NLV	NLV	1.3E+9	2.3E+5	1.1E+8
2-Methyl-4- chlorophenoxyacetic acid	94746	NA	390	NA	NLV	NLV	NLV	NLV	ID	2.3E+5	NA
2-Methyl-4,6- dinitrophenol	534521	NA	830 (M); 400	NA	NLV	NLV	NLV	NLV	1.3E+8	79,000	NA
N-Methyl-morpholine (I)	109024	NA	400	NA	NLV	NLV	NLV	NLV	ID	6.1E+5	1.1E+8





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Methyl parathion	298000	NA	46	NA	NLV	NLV	NLV	NLV	ID	56,000	NA
4-Methyl-2-pentanone (MIBK) (I)	108101	NA	36,000	ID	3.7E+7 (C)	4.5E+7	4.5E+7	6.7E+7	1.4E+11	5.6E+7 (C)	2.7E+6
Methyl-tert-butyl ether (MTBE)	1634044	NA	800	1.4E+5 (X)	9.9E+6 (C)	2.5E+7	3.9E+7	8.7E+7	2.0E+11	1.5E+6	5.9E+6
Methylcyclopentane (I)	96377	NA	ID	NA	92,000	2.3E+6	8.2E+6	2.0E+7	4.7E+10	ID	3.5E+5
4,4'-Methylene-bis-2-chloroaniline (MBOCA)	101144	NA	NLL	NLL	NLV	NLV	NLV	NLV	8.4E+7	6,800	NA
Methylene chloride	75092	NA	100	30,000 (X)	45,000	2.1E+5	5.9E+5	1.4E+6	6.6E+9	1.3E+6	2.3E+6
2-Methylnaphthalene	91576	NA	57,000	4,200	2.7E+6	1.5E+6	1.5E+6	1.5E+6	6.7E+8	8.1E+6	NA
Methylphenols (J)	1319773	NA	7,400	1,000 (M); 600	NLV	NLV	NLV	NLV	6.7E+9	1.1E+7	NA
Metolachlor	51218452	NA	4,800	300	NLV	NLV	NLV	NLV	ID	1.5E+6 (C, DD)	4.4E+5

Metribuzin	210876 49	NA	3,600	NA	ID	ID	ID	ID	ID	9.6E+6	NA
Mirex	238585 5	NA	NLL	NLL	ID	ID	ID	ID	ID	9,600	NA
Molybdenum (B)	743998 7	NA	1,500	64,000 (X)	NLV	NLV	NLV	NLV	ID	2.6E+6	NA
Naphthalene	91203	NA	35,000	730	2.5E+5	3.0E+5	3.0E+5	3.0E+5	2.0E+8	1.6E+7	NA
Nickel (B)	744002 0	20,000	1.0E+5	(G)	NLV	NLV	NLV	NLV	1.3E+7	4.0E+7	NA
Nitrate (B,N)	147975 58	NA	2.0E+5 (N)	ID	NLV	NLV	NLV	NLV	ID	ID	NA
Nitrite (B,N)	147976 50	NA	20,000 (N)	NA	NLV	NLV	NLV	NLV	ID	ID	NA
Nitrobenzene (I)	98953	NA	330 (M); 68	3,600 (X)	91,000	54,000	54,000	54,000	4.7E+7	1.0E+5	4.9E+5
2-Nitrophenol	88755	NA	400	ID	NLV	NLV	NLV	NLV	ID	6.3E+5	NA
n-Nitroso-di-n-propylamine	621647	NA	330 (M); 100	NA	NLV	NLV	NLV	NLV	1.6E+6	1,200	1.5E+6
N-Nitrosodiphenylamine	86306	NA	5,400	NA	NLV	NLV	NLV	NLV	2.2E+9	1.7E+6	NA
Oxamyl	231352 20	NA	4,000	NA	NLV	NLV	NLV	NLV	ID	8.6E+6	NA
Oxo-hexyl acetate	882303 57	NA	1,500	NA	ID	ID	ID	ID	5.4E+9	2.3E+6	1.0E+7
Pendimethalin	404874 21	NA	1.1E+6	NA	NLV	NLV	NLV	NLV	ID	4.6E+7	NA
Pentachlorobenzene	608935	NA	29,000	9,500	ID	ID	ID	ID	ID	3.2E+5 (C)	1.9E+5
Pentachloronitrobenzene	82688	NA	37,000	NA	1.2E+5	2.3E+5	2.3E+5	2.3E+5	3.3E+8	1.7E+6	NA
Pentachlorophenol	87865	NA	22	(G,X)	NLV	NLV	NLV	NLV	1.0E+8	90,000	NA
Pentane	109660	NA	ID	NA	9.7E+5 (C)	3.7E+7	3.1E+8	5.8E+8	1.2E+12	ID	2.4E+5

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2-Pentene (I)	109682	NA	ID	NA	ID	ID	ID	ID	ID	ID	ID	2.2E+5
Phenanthrene	85018	NA	56,000	2,100	2.8E+6	1.6E+5	1.6E+5	1.6E+5	6.7E+6	1.6E+6		NA
Phenol	108952	NA	88,000	9,000	NLV	NLV	NLV	NLV	4.0E+10	4.0E+7 (C, DD)		1.2E+7
Phenytoin	57410	NA	830	4300 (X)	NLV	NLV	NLV	NLV	2.2E+8	1.0E+5		NA
Phosphorus (Total)	7723140	NA	1.3E+6	(EE)	NLV	NLV	NLV	NLV	6.7E+7	1.0E+9 (D)		NA
Phthalic acid	88993	NA	2.8E+5	NA	NLV	NLV	NLV	NLV	ID	4.3E+8 (C)		1.7E+6
Phthalic anhydride	85449	NA	3.0E+5	NA	NLV	NLV	NLV	NLV	ID	4.7E+8 (C)		1.1E+6
Picloram	1918021	NA	10,000	920	NLV	NLV	NLV	NLV	ID	1.6E+7		NA
Piperidine	110894	NA	64	NA	NLV	NLV	NLV	NLV	9.3E+9	99,000		1.2E+8
Polybrominated biphenyls (J)	67774327	NA	NLL	NLL	NLV	NLV	NLV	NLV	ID	1,200		NA
Polychlorinated biphenyls (PCBs) (J,T)	1336363	NA	NLL	NLL	3.0E+6	2.4E+5	7.9E+6	7.9E+6	5.2E+6	(T)		NA
Prometon	1610180	NA	4,900	NA	NLV	NLV	NLV	NLV	ID	5.0E+6		NA
Propachlor	191816	NA	1,900	NA	NLV	NLV	NLV	NLV	ID	2.9E+6		NA

	7										
Propazine	139402	NA	4,000	NA	NLV	NLV	NLV	NLV	ID	6.1E+6	NA
Propionic acid	79094	NA	2.4E+5	ID	NLV	NLV	NLV	NLV	2.0E+10	3.8E+8 (C)	1.1E+8
Propyl alcohol (I)	71238	NA	28,000	NA	NLV	NLV	NLV	NLV	4.9E+10	1.3E+7 (DD)	1.1E+8
n-Propylbenzene (I)	103651	NA	1,600	ID	ID	ID	ID	ID	1.3E+9	2.5E+6	1.0E+7
Propylene glycol	57556	NA	3.0E+6	5.8E+6	NLV	NLV	NLV	NLV	4.0E+11	1.0E+9 (C,D)	1.1E+8
Pyrene	129000	NA	4.8E+5	ID	1.0E+9 (D)	6.5E+8	6.5E+8	6.5E+8	6.7E+9	2.9E+7	NA
Pyridine (I)	110861	NA	400	NA	1,100	8,200	40,000	97,000	2.3E+8	2.3E+5 (C)	37,000
Selenium (B)	778249 2	410	4,000	400	NLV	NLV	NLV	NLV	1.3E+8	2.6E+6	NA
Silver (B)	744022 4	1,000	4,500	100 (M); 27	NLV	NLV	NLV	NLV	6.7E+6	2.5E+6	NA
Silvex (2,4,5-TP)	93721	NA	3,600	2,200	NLV	NLV	NLV	NLV	ID	1.7E+6	NA
Simazine	122349	NA	80	340	NLV	NLV	NLV	NLV	ID	1.2E+6	NA
Sodium	173412 52	NA	4.6E+6	NA	NLV	NLV	NLV	NLV	ID	1.0E+9 (D)	NA
Sodium azide	266282 28	NA	1,800	1,000	ID	ID	ID	ID	ID	2.7E+6	NA
Strontium (B)	744024 6	NA	92,000	4.2E+5	NLV	NLV	NLV	NLV	ID	3.3E+8	NA

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Styrene	100425	NA	2,700	2,100 (X)	2.5E+5	9.7E+5	9.7E+5	1.4E+6	5.5E+9	4.0E+5	5.2E+5
Sulfate	14808798	NA	5.0E+6	NA	NLV	NLV	NLV	NLV	ID	ID	NA
Tebuthiuron	34014181	NA	10,000	NA	NLV	NLV	NLV	NLV	ID	4.6E+6 (DD)	NA
2,3,7,8-Tetrabromodibenzo-p-dioxin (O)	50585416	NA	NLL	NLL	NLV	NLV	NLV	NLV	(O)	(O)	NA
1,2,4,5-Tetrachlorobenzene	95943	NA	1.5E+6	3,400 (X)	5.8E+5	2.3E+5	2.3E+5	2.3E+5	6.7E+7	7.7E+7	NA
2,3,7,8-Tetrachlorodibenzo-p-dioxin (O)	1746016	NA	NLL	NLL	NLV	NLV	NLV	NLV	71 (O)	0.09 (O)	NA
1,1,1,2-Tetrachloroethane	630206	NA	1,500	ID	6,200	36,000	54,000	1.0E+5	4.2E+8	4.8E+5 (C)	4.4E+5
1,1,2,2-Tetrachloroethane	79345	NA	170	1,600 (X)	4,300	10,000	10,000	14,000	5.4E+7	53,000	8.7E+5
Tetrachloroethylene	127184	NA	100	1,200 (X)	11,000	1.7E+5	4.8E+5	1.1E+6	2.7E+9	2.0E+5 (C)	88,000

Tetrahydrofuran	109999	NA	1,900	2.2E+5 (X)	1.3E+6	1.3E+7	6.7E+7	1.6E+8	3.9E+11	2.9E+6	1.2E+8
Tetranitromethane	509148	NA	ID	NA	500(M); 110	500 (M); 51	ID	ID	2.1E+5	ID	ID
Thallium (B)	7440280	NA	2,300	4,200 (X)	NLV	NLV	NLV	NLV	1.3E+7	35,000	NA
Toluene (I)	108883	NA	16,000	5,400	3.3E+5 (C)	2.8E+6	5.1E+6	1.2E+7	2.7E+10	5.0E+7 (C)	2.5E+5
p-Toluidine	106490	NA	660 (M); 300	NA	NLV	NLV	NLV	NLV	1.0E+8	94,000	1.2E+6
Toxaphene	8001352	NA	24,000	8,200	NLV	NLV	NLV	NLV	9.7E+6	20,000	NA
Triallate	2303175	NA	95,000	NA	ID	ID	ID	ID	ID	2.9E+6 (C)	2.5E+5
Tributylamine	102829	NA	7,800	ID	5.8E+5	6.0E+5	6.0E+5	6.0E+5	4.7E+8	7.9E+5	3.7E+6
1,2,4-Trichlorobenzene	120821	NA	4,200	5,900 (X)	9.6E+6 (C)	2.8E+7	2.8E+7	2.8E+7	2.5E+10	9.9E+5 (DD)	1.1E+6
1,1,1-Trichloroethane	71556	NA	4,000	1,800	2.5E+5	3.8E+6	1.2E+7	2.8E+7	6.7E+10	5.0E+8 (C)	4.6E+5
1,1,2-Trichloroethane	79005	NA	100	6,600 (X)	4,600	17,000	21,000	44,000	1.9E+8	1.8E+5	9.2E+5
Trichloroethylene	79016	NA	100	4,000 (X)	1,000	11,000	25,000	57,000	1.3E+8	1.1E+5 (DD)	5.0E+5
Trichlorofluoromethane	75694	NA	52,000	NA	2.8E+6 (C)	9.2E+7	6.3E+8	1.5E+9	3.8E+12	7.9E+7 (C)	5.6E+5
2,4,5-Trichlorophenol	95954	NA	39,000	NA	NLV	NLV	NLV	NLV	2.3E+10	2.3E+7	NA
2,4,6-Trichlorophenol	88062	NA	2,400	330 (M); 100	NLV	NLV	NLV	NLV	1.0E+9	7.1E+5	NA
1,2,3-Trichloropropane	96184	NA	840	NA	4,000	9,200	9,200	11,000	2.0E+7	1.3E+6 (C)	8.3E+5
1,1,2-Trichloro-1,2,2-trifluoroethane	76131	NA	9.0E+6 (C)	1,700	5.1E+6 (C)	1.8E+8	8.8E+8	2.1E+9	5.1E+12	1.0E+9 (C,D)	5.5E+5
Triethanolamine	102716	NA	74,000	NA	NLV	NLV	NLV	NLV	3.3E+9	1.1E+8	1.1E+8

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Triethylene glycol	112276	NA	86,000	NA	NLV	NLV	NLV	NLV	ID	3.9E+7 (C,DD)	1.1E+5
3-Trifluoromethyl-4-nitrophenol	88302	NA	1.1E+5	NA	NLV	NLV	NLV	NLV	ID	4.1E+7 (DD)	NA
Trifluralin	1582098	NA	1.9E+5	NA	ID	ID	ID	ID	ID	2.0E+6	NA
2,2,4-Trimethylpentane	540841	NA	ID	NA	1.1E+5 (C)	5.2E+6	3.9E+7	9.6E+7	2.3E+11	ID	19,000
2,4,4-Trimethyl-2-pentene (I)	107404	NA	ID	NA	ID	ID	ID	ID	ID	ID	56,000
1,2,4-Trimethylbenzene (I)	95636	NA	2,100	570	4.3E+6 (C)	2.1E+7	5.0E+8	5.0E+8	8.2E+10	3.2E+7 (C)	1.1E+5
1,3,5-Trimethylbenzene (I)	108678	NA	1,800	1,100	2.6E+6 (C)	1.6E+7	3.8E+8	3.8E+8	8.2E+10	3.2E+7 (C)	94,000
Triphenyl phosphate	115866	NA	1.5E+6 (C)	NA	NLV	NLV	NLV	NLV	ID	3.6E+7 (C)	1.1E+5
tris(2,3-Dibromopropyl)phos	126727	NA	930	ID	82,000 (C)	18,000	18,000	18,000	5.9E+6	4,400	27,000



phate											
Urea	57136	NA	ID	NA	NLV	NLV	NLV	NLV	ID	ID	NA
Vanadium	744062 2	NA	72,000	4.3E+5	NLV	NLV	NLV	NLV	ID	7.5E+5 (DD)	NA
Vinyl acetate (I)	108054	NA	13,000	NA	7.9E+5	1.7E+6	2.6E+6	5.8E+6	1.3E+10	5.8E+6 (C,DD)	2.4E+6
Vinyl chloride	75014	NA	40	260 (X)	270	4,200	30,000	73,000	3.5E+8	3,800	4.9E+5
White phosphorus (R)	121851 03	NA	2.2	NA	NLV	NLV	NLV	NLV	ID	2,300 (DD)	NA
Xylenes (I)	133020 7	NA	5,600	820	6.3E+6 (C)	4.6E+7	6.1E+7	1.3E+8	2.9E+11	4.1E+8 (C)	1.5E+5
Zinc (B)	744066 6	47,000	2.4E+6	(G)	NLV	NLV	NLV	NLV	ID	1.7E+8	NA

History: 2013 AACS.

**R 299.48 Generic soil cleanup criteria for nonresidential category.**

Rule 48. Generic soil cleanup criteria for nonresidential category shall be as shown in table 3.

**TABLE 3. SOIL: NONRESIDENTIAL  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

All criteria, unless otherwise noted, are expressed in units of parts per billion (ppb). One ppb is equivalent to 1 microgram per kilogram (ug/kg). Criteria with 6 or more digits are expressed in scientific notation. For example, 200,000 is presented as 2.0E+5. A footnote is designated by a letter in parentheses and is explained in the footnote pages that follow the criteria tables. When the risk-based criterion is less than the target detection limit (TDL), the TDL is listed as the criterion (§324.20120a(10)). In these cases, 2 numbers are present in the cell. The first number is the criterion (i.e., TDL), and the second number is the risk-based value.

Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Groundwater Protection			Indoor Air	Ambient Air (Y) (C)				Contact	Csat
			Residential Drinking Water Protection Criteria	Nonresidential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Soil Volatilization to Indoor Air Inhalation Criteria	Infinitesimal 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
Acenaphthene	83329	NA	3.0E+5	8.8E+5	8,700	3.5E+8	9.7E+7	9.7E+7	9.7E+7	6.2E+9	1.3E+8	NA
Acenaphthylene	208968	NA	5,900	17,000	ID	3.0E+6	2.7E+6	2.7E+6	2.7E+6	1.0E+9	5.2E+6	NA
Acetaldehyde (I)	75070	NA	19,000	54,000	2,600	4.0E+5	2.1E+5	2.1E+5	2.9E+5	2.6E+8	9.5E+7	1.1E+8
Acetate	71501	NA	ID	ID	(G)	ID	ID	ID	ID	ID	ID	ID
Acetic acid	64197	NA	84,000	2.4E+5	(G)	NLV	NLV	NLV	NLV	7.4E+9	4.2E+8	6.5E+8
Acetone (I)	67641	NA	15,000	42,000	34,000	5.4E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.1E+8
Acetonitrile	75058	NA	2,800	8,000	NA	8.8E+6	1.9E+6	1.9E+6	2.2E+6	1.8E+9	1.4E+7	2.2E+7
Acetophenone	98862	NA	30,000	88,000	ID	2.1E+8 (C)	5.2E+7	5.2E+7	5.2E+7	1.4E+10	1.5E+8 (C)	1.1E+6
Acrolein (I)	107028	NA	2,400	6,600	NA	760	370	370	630	5.9E+5	1.2E+7	2.3E+7
Acrylamide	79061	NA	10	10	200 (X)	NLV	NLV	NLV	NLV	3.0E+6	8,700	NA

Acrylic acid	79107	NA	78,000	2.2E+5	NA	5.5E+6	2.2E+5	2.7E+5	2.7E+5	2.9E+7	2.1E+8 (C,DD)	1.1E+8
Acrylonitrile (I)	10713 1	NA	100 (M); 52	220	100 (M); 40	35,000	17,000	17,000	31,000	5.8E+7	74,000	8.3E+6
Alachlor	15972 608	NA	52	52	290 (X)	NLV	NLV	NLV	NLV	ID	3.9E+5	NA
Aldicarb	11606 3	NA	60	60	NA	NLV	NLV	NLV	NLV	ID	7.3E+5	NA
Aldicarb sulfone	16468 84	NA	200 (M); 40	200 (M); 40	NA	NLV	NLV	NLV	NLV	ID	8.0E+5	NA
Aldicarb sulfoxide	16468 73	NA	200(M); 80	200 (M); 80	NA	NLV	NLV	NLV	NLV	ID	9.5E+5	NA
Aldrin	30900 2	NA	NLL	NLL	NLL	7.1E+6	2.0E+5	2.0E+5	2.0E+5	8.0E+5	4,300	NA
Aluminum (B)	74299 05	6.9E+6	1,000	1,000	NA	NLV	NLV	NLV	NLV	ID	3.7E+8 (DD)	NA
Ammonia	76644 17	NA	ID	ID	(CC)	ID	ID	ID	ID	2.9E+9	ID	1.0E+7
t-Amyl methyl ether (TAME)	99405 8	NA	3,900	3,900	NA	1.1E+5	4.0E+5	7.8E+5	1.8E+6	1.8E+9	9.5E+7 (C)	4.4E+5
Aniline	62533	NA	1,100	4,400	330 (M); 80	NLV	NLV	NLV	NLV	2.9E+7	1.5E+6	4.5E+6
Anthracene	12012 7	NA	41,000	41,000	ID	1.0E+9 (D)	1.6E+9	1.6E+9	1.6E+9	2.9E+10	7.3E+8	NA
Antimony	74403 60	NA	4,300	4,300	94,000 (X)	NLV	NLV	NLV	NLV	5.9E+6	6.7E+5	NA
Arsenic	74403 82	5,800	4,600	4,600	4,600	NLV	NLV	NLV	NLV	9.1E+5	37,000	NA
Asbestos (BB)	13322 14	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.0E+7 (M); 85,000	ID	NA
Atrazine	19122 49	NA	60	60	150	NLV	NLV	NLV	NLV	ID	3.3E+5 (DD)	NA
Azobenzene	10333 3	NA	4,200	17,000	ID	3.2E+7	2.1E+6	2.1E+6	2.1E+6	1.3E+8	6.6E+5	NA

**TABLE 3. SOIL: NONRESIDENTIAL  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;**

All criteria, unless otherwise noted, are expressed in units of parts per billion (ppb). One ppb is equivalent to 1 microgram per kilogram (ug/kg). Criteria with 6 or more digits are expressed in scientific notation. For example, 200,000 is presented as 2.0E+5. A footnote is designated by a letter in parentheses and is explained in the footnote pages that follow the criteria tables. When the risk-based criterion is less than the target detection limit (TDL), the TDL is listed as the criterion (§324.20120a(10)). In these cases, 2 numbers are present in the cell. The first number is the criterion (i.e., TDL), and the second number is the risk-based value.

Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Groundwater Protection			Indoor Air	Ambient Air (Y) (C)				Contact	Csat
			Residential Drinking Water Protection Criteria & RBSLs	Nonresidential Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Direct Contact Criteria & RBSLs	Soil Saturation Concentration Screening Levels
Barium (B)	7440393	75,000	1.3E+6	1.3E+6	(G)	NLV	NLV	NLV	NLV	1.5E+8	1.3E+8	NA
Benzene (I)	71432	NA	100	100	4,000 (X)	8,400	45,000	99,000	2.3E+5	4.7E+8	8.4E+5 (C)	4.0E+5
Benzidine	92875	NA	1,000 (M); 6.0	1,000 (M); 6.0	1,000 (M); 6.0	NLV	NLV	NLV	NLV	59,000	1,000 (M); 110	NA
Benzo(a)anthracene (Q)	56553	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	80,000	NA
Benzo(b)fluoranthene (Q)	205992	NA	NLL	NLL	NLL	ID	ID	ID	ID	ID	80,000	NA
Benzo(k)fluoranthene (Q)	207089	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	8.0E+5	NA
Benzo(g,h,i)perylene	191242	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	3.5E+8	7.0E+6	NA
Benzo(a)pyrene	50328	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.9E+6	8,000	NA

(Q)													
Benzoic acid	65850	NA	6.4E+5	1.8E+6	NA	NLV	NLV	NLV	NLV	ID	1.0E+9 (D)	NA	
Benzyl alcohol	10051 6	NA	2.0E+5	5.8E+5	NA	NLV	NLV	NLV	NLV	1.5E+1 1	1.0E+9 (C,D)	5.8E+6	
Benzyl chloride	10044 7	NA	150	640	NA	33,000	48,000	48,000	52,000	7.8E+7	2.2E+5	2.3E+5	
Beryllium	74404 17	NA	51,000	51,000	(G)	NLV	NLV	NLV	NLV	5.9E+5	1.6E+6	NA	
bis(2-Chloroethoxy)ethane	11226 5	NA	ID	ID	ID	NLV	NLV	NLV	NLV	ID	ID	2.7E+6	
bis(2-Chloroethyl)ether (I)	11144 4	NA	100	170	100 (M); 20	44,000	13,000	13,000	13,000	1.2E+7	58,000	2.2E+6	
bis(2-Ethylhexyl)phthalate	11781 7	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	8.9E+8	1.2E+7 (C)	1.0E+7	
Boron (B)	74404 28	NA	10,000	10,000	1.4E+5 (X)	NLV	NLV	NLV	NLV	ID	3.5E+8 (DD)	NA	
Bromate	15541 454	NA	200	200	800 (X)	NLV	NLV	NLV	NLV	ID	91,000	NA	
Bromobenzene (I)	10886 1	NA	550	1,500	NA	5.8E+5	5.4E+5	5.4E+5	5.4E+5	2.4E+8	1.7E+6 (C)	7.6E+5	
Bromodichloromethane	75274	NA	1,600 (W)	1,600 (W)	ID	6,400	31,000	31,000	57,000	1.1E+8	4.9E+5	1.5E+6	
Bromoform	75252	NA	1,600 (W)	1,600 (W)	ID	7.7E+5	3.1E+6	3.1E+6	3.1E+6	3.6E+9	3.8E+6 (C)	8.7E+5	
Bromomethane	74839	NA	200	580	700	1,600	13,000	57,000	1.4E+5	1.5E+8	1.0E+6	2.2E+6	
n-Butanol (I)	71363	NA	19,000	54,000	2.00E+05	NLV	NLV	NLV	NLV	1.0E+1 0	9.5E+7 (C)	8.7E+6	
2-Butanone (MEK) (I)	78933	NA	2.6E+5	7.6E+5	44,000	9.9E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+1 0	7.0E+8 (C,DD)	2.7E+7	
n-Butyl acetate	12386 4	NA	11,000	32,000	NA	1.0E+8 (C)	1.4E+8	3.1E+8	3.5E+8	2.1E+1 1	5.5E+7 (C)	1.1E+6	
t-Butyl alcohol	75650	NA	78,000	2.2E+5	NA	5.8E+8	1.2E+8	2.4E+8	2.4E+8	5.6E+1	3.9E+8	1.1E+8	

						(C)				0	(C)	
Butyl benzyl phthalate	85687	NA	2.2E+6 (C)	5.0E+6 (C)	1.2E+5 (X)	NLV	NLV	NLV	NLV	2.1E+1 0	1.2E+8 (C)	3.1E+5
n-Butylbenzene	10451 8	NA	1,600	4,600	ID	ID	ID	ID	ID	8.8E+8	8.0E+6	1.0E+7

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			Groundwater Protection			Indoor Air	Ambient Air (Y) (C)				Contact	Csat
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Residential Drinking Water Protection Criteria & RBSLs	Nonresidential Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Direct Contact Criteria & RBSLs	Soil Saturation Concentration Screening Levels
sec-Butylbenzene	135988	NA	1,600	4,600	ID	ID	ID	ID	ID	1.8E+8	8.0E+6	1.0E+7
t-Butylbenzene (I)	98066	NA	1,600	4,600	ID	ID	ID	ID	ID	2.9E+8	8.0E+6	1.0E+7
Cadmium (B)	7440439	1,200	6,000	6,000	(G,X)	NLV	NLV	NLV	NLV	2.2E+6	2.1E+6	NA
Camphene (I)	79925	NA	ID	ID	NA	6,700	1.8E+5	9.1E+5	2.2E+6	2.4E+9	ID	NA
Caprolactam	105602	NA	1.2E+5	3.4E+5	NA	NLV	NLV	NLV	NLV	2.9E+8	3.1E+8 (DD)	NA
Carbaryl	63252	NA	14,000	40,000	NA	ID	ID	ID	ID	ID	7.0E+7	NA
Carbazole	86748	NA	9,400	39,000	1,100	NLV	NLV	NLV	NLV	7.8E+7	2.4E+6	NA
Carbofuran	1563662	NA	800	800	NA	NLV	NLV	NLV	NLV	ID	3.6E+6	NA
Carbon disulfide (I,R)	75150	NA	16,000	46,000	ID	1.4E+5	1.6E+6	8.0E+6	1.9E+7	2.1E+10	4.3E+7 (C,DD)	2.8E+5



Carbon tetrachloride	56235	NA	100	100	900 (X)	990	12,000	34,000	79,000	1.7E+8	4.4E+5 (C)	3.9E+5
Chlordane (J)	57749	NA	NLL	NLL	NLL	5.9E+7	4.2E+6	4.2E+6	4.2E+6	2.1E+7	1.5E+5	NA
Chloride	16887006	NA	5.0E+6	5.0E+6	(X)	NLV	NLV	NLV	NLV	ID	5.0E+5 (F)	NA
Chlorobenzene (I)	108907	NA	2,000	2,000	500	2.2E+5	9.2E+5	1.1E+6	2.1E+6	2.1E+9	1.4E+7 (C)	2.6E+5
p-Chlorobenzene sulfonic acid	98668	NA	1.5E+5	4.2E+5	ID	ID	ID	ID	ID	ID	7.3E+8	ID
1-Chloro-1,1-difluoroethane	75683	NA	3.0E+5	8.8E+5	NA	5.4E+6 (C)	9.4E+7	5.7E+8	1.4E+9	1.5E+12	1.0E+9 (C,D)	9.6E+5
Chloroethane	75003	NA	8,600	34,000	22,000 (X)	5.3E+6 (C)	3.6E+7	1.2E+8	2.8E+8	2.9E+11	1.2E+7 (C)	9.5E+5
2-Chloroethyl vinyl ether	110758	NA	ID	ID	NA	ID	ID	ID	ID	ID	ID	1.9E+6
Chloroform	67663	NA	1,600 (W)	1,600 (W)	7,000	38,000	1.5E+5	3.4E+5	7.9E+5	1.6E+9	5.5E+6 (C)	1.5E+6
Chloromethane (I)	74873	NA	5,200	22,000	ID	10,000	1.2E+5	1.0E+6	2.5E+6	2.6E+9	7.4E+6 (C)	1.1E+6
4-Chloro-3-methylphenol	59507	NA	5,800	16,000	280	NLV	NLV	NLV	NLV	ID	1.5E+7	NA
beta-Chloronaphthalene	91587	NA	6.2E+5	1.8E+6	NA	ID	ID	ID	ID	ID	1.8E+8	NA
2-Chlorophenol	95578	NA	900	2,600	360	8.0E+5	1.1E+6	1.1E+6	1.1E+6	5.3E+8	4.5E+6	1.9E+7
o-Chlorotoluene (I)	95498	NA	3,300	9,300	ID	5.0E+5	1.5E+6	3.1E+6	6.4E+6	2.1E+9	1.5E+7 (C)	5.0E+5
Chlorpyrifos	2921882	NA	17,000	48,000	1,500	240	5,500	23,000	56,000	5.9E+7	3.4E+7	NA
Chromium (III) (B,H)	16065831	18,000 (total)	1.0E+9 (D)	1.0E+9 (D)	(G,X)	NLV	NLV	NLV	NLV	1.5E+8	1.0E+9 (D)	NA
Chromium (VI)	18540299	NA	30,000	30,000	3,300	NLV	NLV	NLV	NLV	2.4E+5	9.2E+6	NA
Chrysene (Q)	218019	NA	NLL	NLL	NLL	ID	ID	ID	ID	ID	8.0E+6	NA



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Cobalt	7440484	6,800	800	2,000	2,000	NLV	NLV	NLV	NLV	5.9E+6	9.0E+6	NA
Copper (B)	7440508	32,000	5.8E+6	5.8E+6	(G)	NLV	NLV	NLV	NLV	5.9E+7	7.3E+7	NA
Cyanazine	21725462	NA	200	200	1,100 (X)	NLV	NLV	NLV	NLV	ID	66,000	NA
Cyanide (P,R)	57125	390 (total)	4,000	4,000	100	NLV	NLV	NLV	NLV	2.5E+5	2.5E+5	NA
Cyclohexanone	108941	NA	5.2E+6	1.5E+7	NA	32,000	1.3E+6	1.1E+7	2.7E+7	2.9E+10	1.0E+9 (C,D)	2.2E+8
Dacthal	1861321	NA	50,000	1.4E+5	NA	NLV	NLV	NLV	NLV	ID	7.3E+6	NA
Dalapon	75990	NA	4,000	4,000	NA	NLV	NLV	NLV	NLV	ID	6.2E+7 (C)	5.9E+7
4-4'-DDD	72548	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	5.6E+7	4.0E+5	NA
4-4'-DDE	72559	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	4.0E+7	1.9E+5	NA

4-4'-DDT	50293	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	4.0E+7	2.8E+5	NA
Decabromodiphenyl ether	1163195	NA	1.4E+5	1.4E+5	NA	1.0E+9 (D)	1.0E+8	1.0E+8	1.0E+8	1.0E+9	1.1E+7	NA
Di-n-butyl phthalate	84742	NA	9.6E+5 (C)	2.7E+6 (C)	11,000	NLV	NLV	NLV	NLV	1.5E+9	8.7E+7 (C)	7.6E+5
Di(2-ethylhexyl) adipate	103231	NA	1.3E+7 (C)	1.3E+7 (C)	ID	NLV	NLV	NLV	NLV	1.2E+10	6.3E+7 (C,DD)	9.6E+5
Di-n-octyl phthalate	117840	NA	1.0E+8	2.9E+8 (C)	ID	NLV	NLV	NLV	NLV	1.4E+10	2.0E+7	1.4E+8
Diacetone alcohol (I)	123422	NA	ID	ID	NA	NLV	NLV	NLV	NLV	7.1E+10	ID	1.1E+8
Diazinon	333415	NA	95	280	72	NLV	NLV	NLV	NLV	ID	70,000 (DD)	3.1E+5
Dibenzo(a,h)anthracene (Q)	53703	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	8,000	NA
Dibenzofuran	132649	NA	ID	ID	1,700	3.6E+6	1.6E+5	1.6E+5	1.6E+5	2.9E+6	ID	NA
Dibromochloromethane	124481	NA	1,600 (W)	1,600 (W)	ID	21,000	80,000	80,000	98,000	1.6E+8	5.0E+5	6.1E+5
Dibromochloropropane	96128	NA	10 (M); 4.0	10 (M); 4.0	ID	1,200	900	900	900	7.0E+5	20,000 (C)	1,200
Dibromomethane	74953	NA	1,600	4,600	NA	ID	ID	ID	ID	ID	8.0E+6 (C)	2.0E+6
Dicamba	1918009	NA	4,400	13,000	NA	NLV	NLV	NLV	NLV	ID	1.7E+7	NA
1,2-Dichlorobenzene	95501	NA	14,000	14,000	280	2.0E+7 (C)	4.6E+7	4.6E+7	5.5E+7	4.4E+10	6.3E+7 (C)	2.1E+5
1,3-Dichlorobenzene	541731	NA	170	480	680	48,000	94,000	94,000	1.1E+5	8.8E+7	6.6E+5 (C)	1.7E+5
1,4-Dichlorobenzene	106467	NA	1,700	1,700	360	1.0E+5	2.6E+5	2.6E+5	3.4E+5	5.7E+8	1.9E+6	NA
3,3'-Dichlorobenzidine	91941	NA	2,000 (M); 28	2,000 (M); 110	2,000 (M); 7.4	NLV	NLV	NLV	NLV	8.2E+6	30,000	NA
Dichlorodifluoromethane	75718	NA	95,000	2.7E+5	ID	1.7E+6	6.3E+7	5.5E+8	1.4E+9	1.5E+12	1.7E+8 (C)	1.0E+6

**TABLE 3. SOIL: NONRESIDENTIAL  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;**

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Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Groundwater Protection			Indoor Air	Ambient Air (Y) (C)				Contact	Csat
			Residential Drinking Water Protection Criteria & RBSLs	Nonresidential Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Direct Contact Criteria & RBSLs	Soil Saturation Concentration Screening Levels
1,1-Dichloroethane	75343	NA	18,000	50,000	15,000	4.3E+5	2.5E+6	6.0E+6	1.4E+7	1.5E+10	8.7E+7 (C)	8.9E+5
1,2-Dichloroethane (I)	107062	NA	100	100	7,200 (X)	11,000	21,000	33,000	74,000	1.5E+8	4.2E+5	1.2E+6
1,1-Dichloroethylene (I)	75354	NA	140	140	2,600	330	3,700	15,000	37,000	7.8E+7	6.6E+5 (C)	5.7E+5
cis-1,2-Dichloroethylene	156592	NA	1,400	1,400	12,000	41,000	2.1E+5	4.3E+5	1.0E+6	1.0E+9	8.0E+6 (C)	6.4E+5
trans-1,2-Dichloroethylene	156605	NA	2,000	2,000	30,000 (X)	43,000	3.3E+5	8.4E+5	2.0E+6	2.1E+9	1.2E+7 (C)	1.4E+6
2,6-Dichloro-4-nitroaniline	99309	NA	44,000	1.3E+5	NA	NLV	NLV	NLV	NLV	ID	2.2E+8	NA
2,4-Dichlorophenol	120832	NA	1,500	4,200	330 (M); 220	NLV	NLV	NLV	NLV	2.3E+9	3.9E+6 (C,DD)	1.8E+6

											)	
2,4-Dichlorophenoxyacetic acid	94757	NA	1,400	1,400	4,400	NLV	NLV	NLV	NLV	2.9E+9	8.6E+6	NA
1,2-Dichloropropane (I)	78875	NA	100	100	4,600 (X)	7,400	30,000	51,000	1.2E+5	1.2E+8	6.6E+5 (C)	5.5E+5
1,3-Dichloropropene	54275 6	NA	170	700	180 (X)	5,400	60,000	2.0E+5	4.7E+5	5.9E+8	2.4E+5	6.2E+5
Dichlorovos	62737	NA	50 (M); 32	130	NA	NLV	NLV	NLV	NLV	1.5E+7	47,000	2.2E+6
Dicyclohexyl phthalate	84617	NA	ID	ID	NA	ID	ID	ID	ID	ID	ID	NA
Dieldrin	60571	NA	NLL	NLL	NLL	7.2E+5	64,000	64,000	64,000	8.5E+5	4,700	NA
Diethyl ether	60297	NA	200	200	ID	5.2E+7 (C)	1.0E+8	1.6E+8	3.5E+8	3.5E+1 1	3.6E+8 (C)	7.4E+6
Diethyl phthalate	84662	NA	1.1E+5	3.2E+5	2,200	NLV	NLV	NLV	NLV	1.5E+9	5.5E+8 (C)	7.4E+5
Diethylene glycol monobutyl ether	11234 5	NA	1,800	5,000	NA	NLV	NLV	NLV	NLV	5.9E+8	8.7E+6	1.1E+8
Diisopropyl ether	10820 3	NA	600	1,700 (C)	ID	1.2E+6 (C)	3.2E+6	4.8E+6	1.0E+7	1.1E+1 0	3.0E+6 (C)	1,300
Diisopropylamine (I)	10818 9	NA	110	320	NA	1.0E+7 (C)	7.4E+6	7.4E+6	7.7E+6	5.9E+9	5.6E+5	6.7E+6
Dimethyl phthalate	13111 3	NA	1.5E+6 (C)	4.2E+6 (C)	NA	NLV	NLV	NLV	NLV	1.5E+9	1.0E+9 (C,D)	7.9E+5
N,N-Dimethylacetamide	12719 5	NA	3,600	10,000	82,000 (X)	NLV	NLV	NLV	NLV	ID	1.8E+7	1.1E+8
N,N-Dimethylaniline	12169 7	NA	320	920	NA	8.9E+5 (C)	5.2E+5	5.2E+5	5.2E+5	3.3E+8	1.6E+6 (C)	8.0E+5
Dimethylformamide (I)	68122	NA	14,000	40,000	NA	NLV	NLV	NLV	NLV	8.8E+8	7.0E+7	1.1E+8
2,4-Dimethylphenol	10567 9	NA	7,400	20,000	7,600	NLV	NLV	NLV	NLV	2.1E+9	3.6E+7	NA

2,6-Dimethylphenol	57626 1	NA	330 (M); 88	330 (M); 260	NA	NLV	NLV	NLV	NLV	5.9E+7	4.4E+ 5	NA
3,4-Dimethylphenol	95658	NA	330 (M); 200	580	500	NLV	NLV	NLV	NLV	1.0E+8	1.0E+ 6	NA
Dimethylsulfoxide	67685	NA	4.4E+6	1.3E+7	3.8E+6	NLV	NLV	NLV	NLV	5.9E+8	1.0E+ 9 (C,D)	1.8E+7
2,4-Dinitrotoluene	12114 2	NA	430	640	NA	NLV	NLV	NLV	NLV	2.0E+7	2.2E+ 5	NA

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Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Groundwater Protection			Indoor Air	Ambient Air (Y) (C)				Contact	Csat
			Residential Drinking Water Protection Criteria & RBSLs	Nonresidential Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Direct Contact Criteria & RBSLs	Soil Saturation Concentration Screening Levels
Dinoseb	88857	NA	300	300	200 (M); 43	NLV	NLV	NLV	NLV	1.2E+8	3.9E+5 (C,DD)	1.4E+5
1,4-Dioxane (I)	12391 1	NA	1,700	7,000	56,000 (X)	NLV	NLV	NLV	NLV	7.1E+8	2.4E+6	9.7E+7
Diquat	85007	NA	400	400	400	NLV	NLV	NLV	NLV	ID	1.6E+6	NA
Diuron	33054 1	NA	620	1,800	NA	NLV	NLV	NLV	NLV	2.1E+8	3.1E+6	NA

Endosulfan (J)	11529 7	NA	NLL	NLL	NLL	ID	ID	ID	ID	ID	4.4E+6	NA
Endothall	14573 3	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.0E+9	1.2E+7	NA
Endrin	72208	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	1.9E+5	NA
Epichlorohydrin (I)	10689 8	NA	100	100	NA	1.2E+5	37,000	37,000	37,000	2.9E+7	41,000	7.3E+6
Ethanol (I)	64175	NA	3.8E+7	7.6E+7	ID	NLV	NLV	NLV	NLV	5.6E+1 1	1.0E+9 (C,D,DD)	1.1E+8
Ethyl acetate (I)	14178 6	NA	1.3E+5	3.8E+5	NA	7.0E+7 (C)	5.9E+7	5.9E+7	1.0E+8	9.4E+1 0	6.6E+8 (C)	7.5E+6
Ethyl-tert-butyl ether (ETBE)	63792 3	NA	980	980	ID	1.7E+6 (C)	2.3E+6	4.6E+6	1.1E+7	1.1E+1 0	ID	6.5E+5
Ethylbenzene (I)	10041 4	NA	1,500	1,500	360	4.6E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+1 0	7.1E+7 (C)	1.4E+5
Ethylene dibromide	10693 4	NA	20 (M); 1.0	20 (M); 1.0	110 (X)	3,600	5,800	5,800	9,800	1.8E+7	430	8.9E+5
Ethylene glycol	10721 1	NA	3.0E+5	8.4E+5	3.8E+6 (X)	NLV	NLV	NLV	NLV	2.9E+1 0	1.0E+9 (C,D)	1.1E+8
Ethylene glycol monobutyl ether	11176 2	NA	74,000	2.0E+5	NA	1.4E+6	2.1E+7	1.5E+8	3.6E+8	3.8E+1 1	3.6E+8 (C)	4.1E+7
Fluoranthene	20644 0	NA	7.3E+5	7.3E+5	5,500	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	NA
Fluorene	86737	NA	3.9E+5	8.9E+5	5,300	1.0E+9 (D)	1.5E+8	1.5E+8	1.5E+8	4.1E+9	8.7E+7	NA
Fluorine (soluble fluoride) (B)	77824 14	NA	40,000	40,000	ID	NLV	NLV	NLV	NLV	ID	6.7E+7 (DD)	NA
Formaldehyde	50000	NA	26,000	76,000	2,400	65,000	43,000	69,000	1.5E+5	2.6E+8	1.3E+8 (C)	6.0E+7
Formic acid (I,U)	64186	NA	2.0E+5	5.8E+5	ID	2.8E+6	2.6E+5	1.6E+5	1.6E+5	5.9E+7	1.0E+9 (C,D)	1.1E+8
1-	25918	NA	1,600	4,600	NA	ID	ID	ID	ID	ID	8.0E+6	1.0E+7



Formylpiperidine	68											
Gentian violet	548629	NA	300	1,300	NA	NLV	NLV	NLV	NLV	ID	4.4E+5	NA
Glyphosate	1071836	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	5.7E+7 (DD)	NA
Heptachlor	76448	NA	NLL	NLL	NLL	1.9E+6	2.1E+5	2.1E+5	2.1E+5	3.0E+6	23,000	NA
Heptachlor epoxide	1024573	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.5E+6	9,500	NA
n-Heptane	142825	NA	4.6E+7 (C)	1.3E+8 (C)	NA	2.7E+6 (C)	2.5E+7	4.5E+7	1.0E+8	1.0E+1 1	1.0E+9 (C,D)	2.4E+5

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Hexabromobenzene	87821	NA	5,400	5,400	ID	ID	ID	ID	ID	ID	3.1E+6	NA
Hexachlorobenzene (C-66)	118741	NA	1,800	1,800	350	2.2E+5	56,000	56,000	56,000	8.5E+6	37,000	NA
Hexachlorobutadiene (C-46)	87683	NA	26,000	72,000	91	7.1E+5 (C)	4.6E+5	4.6E+5	4.6E+5	1.8E+8	4.7E+5 (C)	3.5E+5
alpha-Hexachlorocyclohexane	319846	NA	18	71	ID	1.6E+5	41,000	86,000	86,000	2.1E+6	12,000	NA
beta-Hexachlorocyclohexane	319857	NA	37	150	ID	NLV	NLV	NLV	NLV	7.4E+6	25,000	NA
Hexachlorocyclopentadiene (C-56)	77474	NA	3.2E+5	3.2E+5	ID	56,000	60,000	60,000	60,000	5.9E+6	6.7E+6 (C)	7.2E+5

Hexachloroethane	67721	NA	430	1,200	1,800 (X)	79,000	6.6E+5	1.4E+6	1.4E+6	1.0E+8	7.3E +5	NA
n-Hexane	11054 3	NA	1.8E+5 (C)	5.1E+5 (C)	NA	9.5E+5 (C)	3.5E+6	3.5E+6	6.4E+6	5.9E+9	3.0E +8 (C)	44,000
2-Hexanone	59178 6	NA	20,000	58,000	ID	1.8E+6	1.3E+6	1.3E+6	1.5E+6	1.2E+9	1.0E +8 (C)	2.5E+6
Indeno(1,2,3- cd)pyrene (Q)	19339 5	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	80,00 0	NA
Iron (B)	74398 96	1.2E+7	6,000	6,000	NA	NLV	NLV	NLV	NLV	ID	5.8E +8	NA
Isobutyl alcohol (I)	78831	NA	46,000	1.3E+5	NA	4.3E+8 (C)	9.5E+7	9.5E+7	9.5E+7	4.4E+1 0	2.3E +8 (C)	8.9E+6
Isophorone	78591	NA	15,000	62,000	26,000 (X)	NLV	NLV	NLV	NLV	8.2E+9	2.2E +7 (C)	2.4E+6
Isopropyl alcohol (I)	67630	NA	9,400	26,000	1.1E+6 (X)	NLV	NLV	NLV	NLV	6.5E+9	4.7E +7	1.1E+8
Isopropyl benzene	98828	NA	91,000	2.6E+5	3,200	7.3E+5 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	8.0E +7 (C)	3.9E+5
Lead (B)	74399 21	21,000	7.0E+5	7.0E+5	(G,X)	NLV	NLV	NLV	NLV	4.4E+7	9.0E +5 (DD)	NA
Lindane	58899	NA	20 (M); 7.0	20 (M); 7.0	20 (M); 1.1	ID	ID	ID	ID	ID	42,00 0	NA
Lithium (B)	74399 32	9,800	3,400	7,000	8,800	NLV	NLV	NLV	NLV	1.0E+9	3.1E +7 (DD)	NA
Magnesium (B)	74399 54	NA	8.0E+6	2.2E+7	NA	NLV	NLV	NLV	NLV	2.9E+9	1.0E +9 (D)	NA
Manganese (B)	74399 65	4.4E+5	1,000	1,000	(G,X)	NLV	NLV	NLV	NLV	1.5E+6	9.0E +7	NA
Mercury (Total)	Varies	130	1,700	1,700	50 (M);	89,000	62,000	62,000	62,000	8.8E+6	5.8E	NA

(B,Z)					1.2						+5	
Methane	74828	NA	ID	ID	NA	8.4E+6 ug/m <sup>3</sup> (GG)	ID	ID	ID	ID	ID	ID
Methanol	67561	NA	74,000	2.0E+5	1.2E+7 (C)	6.7E+7 (C)	3.7E+7	4.6E+7	9.7E+7	9.6E+1 0	3.6E +8 (C)	3.1E+6
Methoxychlor	72435	NA	16,000	16,000	NA	ID	ID	ID	ID	ID	5.6E +6	NA
2-Methoxyethanol (I)	10986 4	NA	150	420	NA	NLV	NLV	NLV	NLV	5.9E+8	7.3E +5	1.1E+8
2-Methyl-4- chlorophenoxyaceti c acid	94746	NA	390	1,100	NA	NLV	NLV	NLV	NLV	ID	7.3E +5	NA
2-Methyl-4,6- dinitrophenol	53452 1	NA	830 (M); 400	830 (M); 400	NA	NLV	NLV	NLV	NLV	5.9E+7	2.6E +5	NA

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							RBSLs					
N-Methylmorpholine (I)	10902 4	NA	400	1,100	NA	NLV	NLV	NLV	NLV	ID	2.0E+6	1.1E+8
Methyl parathion	29800 0	NA	46	130	NA	NLV	NLV	NLV	NLV	ID	1.8E+5	NA
4-Methyl-2-pentanone (MIBK) (I)	10810 1	NA	36,000	1.0E+5	ID	6.9E+7 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+1 0	1.8E+8 (C)	2.7E+6
Methyl-tert-butyl ether (MTBE)	16340 44	NA	800	800	1.4E+5 (X)	1.8E+7 (C)	3.0E+7	4.1E+7	8.9E+7	8.8E+1 0	7.1E+6 (C)	5.9E+6
Methylcyclopentane (I)	96377	NA	ID	ID	NA	1.7E+5	2.8E+6	8.3E+6	2.0E+7	2.1E+1 0	ID	3.5E+5
4,4'-Methylenebis-2-chloroaniline	10114 4	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.1E+8	32,000	NA
Methylene chloride	75092	NA	100	100	30,000 (X)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	5.8E+6 (C)	2.3E+6
2-Methylnaphthalene	91576	NA	57,000	1.7E+5	4,200	4.9E+6	1.8E+6	1.8E+6	1.8E+6	2.9E+8	2.6E+7	NA
Methylphenols (J)	13197 73	NA	7,400	20,000	1,000 (M); 600	NLV	NLV	NLV	NLV	2.9E+9	3.6E+7	NA
Metolachlor	51218 452	NA	4,800	20,000	300	NLV	NLV	NLV	NLV	ID	6.9E+6 (C,DD)	4.4E+5
Metribuzin	21087 649	NA	3,600	10,000	NA	ID	ID	ID	ID	ID	2.8E+7	NA
Mirex	23858 55	NA	NLL	NLL	NLL	ID	ID	ID	ID	ID	40,000	NA
Molybdenum (B)	74399 87	NA	1,500	4,200	64,000 (X)	NLV	NLV	NLV	NLV	ID	9.6E+6	NA
Naphthalene	91203	NA	35,000	1.0E+5	730	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	NA
Nickel (B)	74400 20	20,000	1.0E+5	1.0E+5	(G)	NLV	NLV	NLV	NLV	1.6E+7	1.5E+8	NA
Nitrate (B,N)	14797 558	NA	2.0E+5 (N)	2.0E+5 (N)	ID	NLV	NLV	NLV	NLV	ID	ID	NA
Nitrite (B,N)	14797 650	NA	20,000 (N)	20,000 (N)	NA	NLV	NLV	NLV	NLV	ID	ID	NA

Nitrobenzene (I)	98953	NA	330 (M); 68	330 (M); 190	3,600 (X)	1.7E+5	64,000	64,000	64,000	2.1E+7	3.4E+5	4.9E+5
2-Nitrophenol	88755	NA	400	1,200	ID	NLV	NLV	NLV	NLV	ID	2.0E+6	NA
n-Nitroso-di-n-propylamine	62164 7	NA	330 (M); 100	330 (M); 100	NA	NLV	NLV	NLV	NLV	2.0E+6	5,400	1.5E+6
N-Nitrosodiphenylamine	86306	NA	5,400	22,000	NA	NLV	NLV	NLV	NLV	2.8E+9	7.8E+6	NA
Oxamyl	23135 220	NA	4,000	4,000	NA	NLV	NLV	NLV	NLV	ID	2.8E+7	NA
Oxo-hexyl acetate	88230 357	NA	1,500	4,200	NA	ID	ID	ID	ID	2.4E+9	7.3E+6	1.0E+7
Pendimethalin	40487 421	NA	1.1E+6	1.1E+6	NA	NLV	NLV	NLV	NLV	ID	1.3E+8	NA
Pentachlorobenzene	60893 5	NA	29,000	81,000	9,500	ID	ID	ID	ID	ID	9.3E+5 (C)	1.9E+5
Pentachloronitrobenzene	82688	NA	37,000	37,000	NA	2.2E+5	2.8E+5	2.8E+5	2.8E+5	1.5E+8	5.5E+6	NA

**TABLE 3. SOIL: NONRESIDENTIAL  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;**

All criteria, unless otherwise noted, are expressed in units of parts per billion (ppb). One ppb is equivalent to 1 microgram per kilogram (ug/kg). Criteria with 6 or more digits are expressed in scientific notation. For example, 200,000 is presented as 2.0E+5. A footnote is designated by a letter in parentheses and is explained in the footnote pages that follow the criteria tables. When the risk-based criterion is less than the target detection limit (TDL), the TDL is listed as the criterion (§324.20120a(10)). In these cases, 2 numbers are present in the cell. The first number is the criterion (i.e., TDL), and the second number is the risk-based value.

Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Groundwater Protection			Indoor Air	Ambient Air (Y) (C)				Contact	Csat
			Residential Drinking Water Protection Criteria & RBSLs	Nonresidential Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Direct Contact Criteria & RBSLs	Soil Saturation Concentration Screening Levels
Pentachlorophenol	87865	NA	22	22	(G,X)	NLV	NLV	NLV	NLV	1.3E+8	3.2E+5	NA
Pentane	109660	NA	ID	ID	NA	1.8E+5	4.4E+7	3.4E+8	6.0E+8	5.3E+1 1	ID	2.4E+5
2-Pentene (I)	109682	NA	ID	ID	NA	ID	ID	ID	ID	ID	ID	2.2E+5
Phenanthrene	85018	NA	56,000	1.6E+5	2,100	5.1E+6	1.9E+5	1.9E+5	1.9E+5	2.9E+6	5.2E+6	NA
Phenol	108952	NA	88,000	2.6E+5	9,000	NLV	NLV	NLV	NLV	1.8E+1 0	2.3E+8 (C,DD)	1.2E+7
Phenytol	57410	NA	830	3300	4300 (X)	NLV	NLV	NLV	NLV	2.8E+8	4.8E+5	NA
Phosphorus (Total)	772314 0	NA	1.3E+6	4.8E+6	(EE)	NLV	NLV	NLV	NLV	2.9E+7	1.0E+9 (D)	NA
Phthalic acid	88993	NA	2.8E+5	8.0E+5	NA	NLV	NLV	NLV	NLV	ID	1.0E+9 (C,D)	1.7E+6
Phthalic anhydride	85449	NA	3.0E+5	8.8E+5	NA	NLV	NLV	NLV	NLV	ID	1.0E+9 (C,D)	1.1E+6
Picloram	191802 1	NA	10,000	10,000	920	NLV	NLV	NLV	NLV	ID	5.1E+7	NA

Piperidine	110894	NA	64	180	NA	NLV	NLV	NLV	NLV	4.1E+9	3.2E+5	1.2E+8
Polybrominated biphenyls (J)	677743 27	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	4,800	NA
Polychlorinated biphenyls (PCBs) (J,T)	133636 3	NA	NLL	NLL	NLL	1.6E+7	8.1E+5	2.8E+7	2.8E+7	6.5E+6	(T)	NA
Prometon	161018 0	NA	4,900	14,000	NA	NLV	NLV	NLV	NLV	ID	1.6E+7	NA
Propachlor	191816 7	NA	1,900	5,400	NA	NLV	NLV	NLV	NLV	ID	9.5E+6	NA
Propazine	139402	NA	4,000	11,000	NA	NLV	NLV	NLV	NLV	ID	2.0E+7	NA
Propionic acid	79094	NA	2.4E+5	7.0E+5	ID	NLV	NLV	NLV	NLV	8.8E+9	1.0E+9 (C,D)	1.1E+8
Propyl alcohol (I)	71238	NA	28,000	80,000	NA	NLV	NLV	NLV	NLV	2.1E+10	7.4E+7 (DD)	1.1E+8
n-Propylbenzene (I)	103651	NA	1,600	4,600	ID	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7
Propylene glycol	57556	NA	3.0E+6	8.4E+6	5.8E+6	NLV	NLV	NLV	NLV	1.8E+11	1.0E+9 (C,D)	1.1E+8
Pyrene	129000	NA	4.8E+5	4.8E+5	ID	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	NA
Pyridine (I)	110861	NA	400	420	NA	2,000	9,800	40,000	97,000	1.0E+8	7.3E+5 (C)	37,000
Selenium (B)	778249 2	410	4,000	4,000	400	NLV	NLV	NLV	NLV	5.9E+7	9.6E+6	NA
Silver (B)	744022 4	1,000	4,500	13,000	100 (M); 27	NLV	NLV	NLV	NLV	2.9E+6	9.0E+6	NA
Silvex (2,4,5-TP)	93721	NA	3,600	3,600	2,200	NLV	NLV	NLV	NLV	ID	5.5E+6	NA
Simazine	122349	NA	80	80	340	NLV	NLV	NLV	NLV	ID	3.8E+6	NA
Sodium	173412 52	NA	4.6E+6	7.0E+6	NA	NLV	NLV	NLV	NLV	ID	1.0E+9 (D)	NA

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Sodium azide	26628228	NA	1,800	5,000	1,000	ID	ID	ID	ID	ID	8.7E+6	NA
Strontium (B)	7440246	NA	92,000	2.6E+5	4.2E+5	NLV	NLV	NLV	NLV	ID	1.0E+9 (D)	NA
Styrene	100425	NA	2,700	2,700	2,100 (X)	1.3E+6 (C)	3.3E+6	3.3E+6	4.2E+6	6.9E+9	1.9E+6 (C)	5.2E+5
Sulfate	14808798	NA	5.0E+6	5.0E+6	NA	NLV	NLV	NLV	NLV	ID	ID	NA
Tebuthiuron	34014181	NA	10,000	30,000	NA	NLV	NLV	NLV	NLV	ID	2.7E+7 (DD)	NA
2,3,7,8-Tetrabromodibenzo-p-dioxin (O)	50585416	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	(O)	(O)	NA
1,2,4,5-Tetrachlorobenzene	95943	NA	1.5E+6	1.5E+6	3,400 (X)	1.1E+6	2.7E+5	2.7E+5	2.7E+5	2.9E+7	2.5E+8	NA
2,3,7,8-Tetrachlorodibenzo-p-dioxin (O)	1746016	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	59 (O)	0.99 (O)	NA

1,1,1,2-Tetrachloroethane	630206	NA	1,500	6,400	ID	33,000	1.2E+5	2.1E+5	3.3E+5	5.3E+8	2.2E+6 (C)	4.4E+5
1,1,2,2-Tetrachloroethane	79345	NA	170	700	1,600 (X)	23,000	34,000	34,000	34,000	6.8E+7	2.4E+5	8.7E+5
Tetrachloroethylene	127184	NA	100	100	1,200 (X)	21,000	2.1E+5	4.9E+5	1.1E+6	1.2E+9	9.3E+5 (C)	88,000
Tetrahydrofuran	109999	NA	1,900	5,400	2.2E+5 (X)	2.4E+6	1.5E+7	6.7E+7	1.6E+8	1.7E+11	9.5E+6	1.2E+8
Tetranitromethane	509148	NA	ID	ID	NA	600	500 (M); 180	ID	ID	2.6E+5	ID	ID
Thallium (B)	7440280	NA	2,300	2,300	4,200 (X)	NLV	NLV	NLV	NLV	5.9E+6	1.3E+5	NA
Toluene (I)	108883	NA	16,000	16,000	5,400	6.1E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	1.6E+8 (C)	2.5E+5
p-Toluidine	106490	NA	660 (M); 300	1,200	NA	NLV	NLV	NLV	NLV	1.3E+8	4.3E+5	1.2E+6
Toxaphene	8001352	NA	24,000	24,000	8,200	NLV	NLV	NLV	NLV	1.2E+7	85,000	NA
Triallate	2303175	NA	95,000	2.7E+5 (C)	NA	ID	ID	ID	ID	ID	9.5E+6 (C)	2.5E+5
Tributylamine	102829	NA	7,800	23,000	ID	1.1E+6	7.2E+5	7.2E+5	7.2E+5	2.1E+8	2.6E+6	3.7E+6
1,2,4-Trichlorobenzene	120821	NA	4,200	4,200	5,900 (X)	1.8E+7 (C)	3.4E+7	3.4E+7	3.4E+7	1.1E+10	5.8E+6 (C,DD)	1.1E+6
1,1,1-Trichloroethane	71556	NA	4,000	4,000	1,800	4.6E+5	4.5E+6	1.5E+7	3.1E+7	2.9E+10	1.0E+9 (C,D)	4.6E+5
1,1,2-Trichloroethane	79005	NA	100	100	6,600 (X)	24,000	57,000	57,000	1.2E+5	2.5E+8	8.4E+5	9.2E+5
Trichloroethylene	79016	NA	100	100	4,000 (X)	1,900	14,000	25,000	58,000	5.9E+7	6.6E+5 (C,DD)	5.0E+5
Trichlorofluoromethane	75694	NA	52,000	1.5E+5	NA	5.1E+6(C)	1.1E+8	1.4E+10	1.4E+10	1.7E+10	2.6E+8	5.6E+5

ethane						)		1	1	2	(C)	
2,4,5-Trichlorophenol	95954	NA	39,000	1.1E+5	NA	NLV	NLV	NLV	NLV	1.0E+10	7.3E+7	NA
2,4,6-Trichlorophenol	88062	NA	2,400	9,400	330 (M); 100	NLV	NLV	NLV	NLV	1.3E+9	3.3E+6	NA

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1,2,3-Trichloropropane	96184	NA	840	2,400	NA	7,500	11,000	11,000	12,000	8.8E+6	4.2E+6 (C)	8.3E+5
1,1,2-Trichloro-1,2,2-trifluoroethane	76131	NA	9.0E+6 (C)	9.0E+6 (C)	1,700	9.3E+6 (C)	2.1E+8	8.9E+8	2.1E+9	2.3E+12	1.0E+9 (C,D)	5.5E+5
Triethanolamine	102716	NA	74,000	2.0E+5	NA	NLV	NLV	NLV	NLV	1.5E+9	3.6E+8 (C)	1.1E+8
Triethylene glycol	112276	NA	86,000	2.4E+5 (C)	NA	NLV	NLV	NLV	NLV	ID	2.3E+8 (C,DD)	1.1E+5
3-Trifluoromethyl-4-nitrophenol	88302	NA	1.1E+5	3.1E+5	NA	NLV	NLV	NLV	NLV	ID	2.4E+8 (DD)	NA
Trifluralin	1582098	NA	1.9E+5	5.7E+5	NA	ID	ID	ID	ID	ID	5.7E+6	NA
2,2,4-Trimethyl	54084	NA	ID	ID	NA	2.0E+5	6.3E+6	4.0E+7	9.6E+7	1.0E+1	ID	19,000

pentane	1					(C)				1		
2,4,4-Trimethyl-2-pentene (I)	107404	NA	ID	ID	NA	ID	ID	ID	ID	ID	ID	56,000
1,2,4-Trimethylbenzene (I)	95636	NA	2,100	2,100	570	8.0E+6 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.0E+8 (C)	1.1E+5
1,3,5-Trimethylbenzene (I)	108678	NA	1,800	1,800	1,100	4.8E+6 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	1.0E+8 (C)	94,000
Triphenyl phosphate	115866	NA	1.5E+6 (C)	1.8E+6 (C)	NA	NLV	NLV	NLV	NLV	ID	1.2E+8 (C)	1.1E+5
tris(2,3-Dibromopropyl)phosphate	126727	NA	930	930	ID	4.3E+5 (C)	60,000	60,000	60,000	7.4E+6	20,000	27,000
Urea	57136	NA	ID	ID	NA	NLV	NLV	NLV	NLV	ID	ID	NA
Vanadium	7440622	NA	72,000	9.9E+5	4.3E+5	NLV	NLV	NLV	NLV	ID	5.5E+6 (DD)	NA
Vinyl acetate (I)	108054	NA	13,000	36,000	NA	1.5E+6	2.0E+6	2.7E+6	5.9E+6	5.9E+9	3.4E+7 (C,DD)	2.4E+6
Vinyl chloride	75014	NA	40	40	260 (X)	2,800	29,000	1.7E+5	4.2E+5	8.9E+8	34,000	4.9E+5
White phosphorus (R)	12185103	NA	2.2	6	NA	NLV	NLV	NLV	NLV	ID	17,000 (DD)	NA
Xylenes (I)	1330207	NA	5,600	5,600	820	1.2E+7 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.0E+9 (C,D)	1.5E+5
Zinc (B)	7440666	47,000	2.4E+6	5.0E+6	(G)	NLV	NLV	NLV	NLV	ID	6.3E+8	NA

History: 2013 AACCS.

**R 299.49 Footnotes for generic cleanup criteria tables.**

Rule 49. (1) The footnotes that apply to the generic criteria tables in R 299.44, R 299.46, and R 299.48 are as follows:

- (A) Criterion is the state of Michigan drinking water standard established pursuant to Section 5 of 1976 PA 399, MCL 325.1005.
- (B) Background, as defined in R 299.1(b), may be substituted if higher than the calculated cleanup criterion. Background levels may be less than criteria for some inorganic compounds.
- (C) The criterion developed under R 299.20 to R 299.26 exceeds the chemical-specific soil saturation screening level ( $C_{sat}$ ). The person proposing or implementing response activity shall document whether additional response activity is required to control free-phase liquids or NAPL to protect against risks associated with free-phase liquids by using methods appropriate for the free-phase liquids present. Development of a site-specific  $C_{sat}$  or methods presented in R 299.22, R 299.24(5), and R 299.26(8) may be conducted for the relevant exposure pathways.
- (D) Calculated criterion exceeds 100 percent, hence it is reduced to 100 percent or 1.0E+9 parts per billion (ppb).
- (E) Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). A notice of aesthetic impact may be employed as an institutional control mechanism if groundwater concentrations exceed the aesthetic drinking water criterion, but do not exceed the applicable health-based drinking water value provided in the following table:

<b>Hazardous Substance</b>	<b>Chemical Abstract Service Number</b>	<b>Residential Health-Based Drinking Water Value</b>	<b>Non-Residential Health-Based Drinking Water Value</b>
Aluminum	7429905	300	4,100
tertiary Amyl methyl ether	994058	910	2,600
Copper	7440508	1,400	4,000
Diethyl ether	60297	3,700	10,000
Ethylbenzene	100414	700	700
Iron	7439896	2,000	5,600
Manganese	7439965	860	2,500
Methyl-tert-butyl ether (MTBE)	1634044	240	690
Toluene	108883	1,000	1,000
1,2,4-Trimethylbenzene	95636	1,000	2,900
1,3,5-Trimethylbenzene	108678	1,000	2,900
Xylenes	1330207	10,000	10,000

- (F) Criterion is based on adverse impacts to plant life and phytotoxicity.
- (G) Groundwater surface water interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving surface water. The final chronic value (FCV) for the protection of aquatic life shall be calculated based on the pH or hardness of the receiving surface water. Where water hardness exceeds 400 mg CaCO<sub>3</sub>/L, use 400 mg CaCO<sub>3</sub>/L for the FCV calculation. The FCV formula provides values in units of ug/L or ppb. The generic GSI criterion is the lesser of the calculated FCV, the wildlife value (WV), and the surface water human non-drinking water value (HNDV). The soil GSI protection criteria for these hazardous substances are the greater of the 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote.

Hazardous Substance	FCV Formula ug/L	FCV Conversion Factor (CF)	WV ug/L	HNDV ug/L
Acetate	EXP(0.2732*(pH) + 7.0362)	NA	NA	1.3E+6
Acetic Acid	EXP(0.2732*(pH) + 7.0362)	NA	NA	1.3E+6
Barium	EXP(1.0629*(LnH)+1.1869)	NA	NA	1.6E+5
Beryllium	EXP(2.5279*(LnH)-10.7689)	NA	NA	1,200
Cadmium <sup>⊗</sup>	(EXP(0.7852*(LnH)-2.715))*CF	1.101672- (EXP(0.041829))	NA	130
Chromium (III) <sup>⊗</sup>	(EXP(0.819*(LnH)+0.6848))*CF	0.86	NA	9,400
Copper	(EXP(0.8545*(LnH)-1.702)) *CF	0.96	NA	38,000
Lead <sup>⊗</sup>	(EXP(0.9859*(LnH)-1.270))*CF	1.46203- (EXP(0.14571))	NA	190
Manganese <sup>⊗</sup>	EXP(0.8784*(LnH)+3.5385)	NA	NA	59,000
Nickel	(EXP(0.846*(LnH)+0.0584))*CF	0.997	NA	2.1E+5
Pentachlorophenol <sup>⊗</sup>	EXP(1.005*(pH)-5.134)	NA	NA	2.8
Zinc	(EXP(0.8473*(LnH)+0.884))*CF	0.986	NA	16,000

where,

EXP(x) = The base of the natural logarithm raised to power x (e<sup>x</sup>).

LnH = The natural logarithm of water hardness in mg CaCO<sub>3</sub>/L.

\* = The multiplication symbol.

⊗ = The GSI criterion developed here may not be protective for surface water that is used as a drinking water source. Refer to footnote (X) for

further guidance.

A spreadsheet that may be used to calculate GSI and GSI protection criteria for (G)-footnoted hazardous substances is available on the Department of Environmental Quality (DEQ) internet web site.

- (H) Valence-specific chromium data (Cr III and Cr VI) shall be compared to the corresponding valence-specific cleanup criteria. If both Cr III and Cr VI are present in groundwater, the total concentration of both cannot exceed the drinking water criterion of 100 ug/L. If analytical data are provided for total chromium only, they shall be compared to the cleanup criteria for Cr VI. Cr III soil 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, through an approved land or resource use restriction.
- (I) Hazardous substance may exhibit the characteristic of ignitability as defined in 40 C.F.R. §261.21 (revised as of July 1, 2001), which is adopted by reference in these rules and is available for inspection at the DEQ, 525 West Allegan Street, Lansing, Michigan. Copies of the regulation may be purchased, at a cost as of the time of adoption of these rules of \$45, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401 (stock number 869-044-00155-1), or from the DEQ, Remediation and Redevelopment Division (RRD), 525 West Allegan Street, Lansing, Michigan 48933, at cost.
- (J) Hazardous substance may be present in several isomer forms. Isomer-specific concentrations shall be added together for comparison to criteria.
- (K) Hazardous substance may be flammable or explosive, or both.
- (L) Criteria for lead are derived using a biologically based model, as allowed for under Section 20120a(9) of the NREPA, and are not calculated using the algorithms and assumptions specified in pathway-specific rules. The generic residential drinking water criterion of 4 ug/L is linked to the generic residential soil direct contact criterion of 400 mg/kg. A higher concentration in the drinking water, up to the state action level of 15 ug/L, may be allowed as a site-specific remedy and still allow for drinking water use, under Section 20120a(2) and 20120b of the NREPA if soil concentrations are appropriately lower than 400 mg/kg. If a site-specific criterion is approved based on this subdivision, a notice shall be filed on the deed for all property where the groundwater concentrations will exceed 4 ug/L to provide notice of the potential for unacceptable risk if soil or groundwater concentrations increase. Acceptable combinations of site-specific soil and drinking water concentrations are presented in the following table:

**Acceptable Combinations of Lead in Drinking Water and Soil**

<b>Drinking Water Concentration (ug/L)</b>	<b>Soil Concentration (mg/kg)</b>
5	386-395
6	376-385
7	376-385
8	366-375



9	356-365
10	346-355
11	336-345
12	336-345
13	326-335
14	316-325
15	306-315

- (M) Calculated criterion is below the analytical target detection limit, therefore, the criterion defaults to the target detection limit.
- (N) The concentrations of all potential sources of nitrate-nitrogen (e.g., ammonia-N, nitrite-N, nitrate-N) in groundwater that is used as a source of drinking water shall not, when added together, exceed the nitrate drinking water criterion of 10,000 ug/L. Where leaching to groundwater is a relevant pathway, soil concentrations of all potential sources of nitrate-nitrogen shall not, when added together, exceed the nitrate drinking water protection criterion of 2.0E+5 ug/kg.
- (O) The concentration of all polychlorinated and polybrominated dibenzodioxin and dibenzofuran isomers present at a facility, expressed as an equivalent concentration of 2,3,7,8-tetrachlorodibenzo-p-dioxin based upon their relative potency, shall be added together and compared to the criteria for 2,3,7,8-tetrachlorodibenzo-p-dioxin. The generic cleanup criteria for 2,3,7,8-tetrachlorodibenzo-p-dioxin are not calculated according to the algorithms presented in R 299.14 to R 299.26. The generic cleanup criteria are being held at the values that the DEQ has used since August 1998, in recognition of the fact that national efforts to reassess risks posed by dioxin are not yet complete. Until these studies are complete, it is premature to select a revised slope factor and/or reference dose for calculation of generic cleanup criteria.
- (P) Amenable cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with all groundwater criteria. Total cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with soil criteria. Nonresidential direct contact criteria may not be protective of the potential for release of hydrogen cyanide gas. Additional land or resource use restrictions may be necessary to protect for the acute inhalation concerns associated with hydrogen cyanide gas.
- (Q) Criteria for carcinogenic polycyclic aromatic hydrocarbons were developed using relative potential potencies to benzo(a)pyrene.
- (R) Hazardous substance may exhibit the characteristic of reactivity as defined in 40 C.F.R. §261.23 (revised as of July 1, 2001), which is adopted by reference in these rules and is available for inspection at the DEQ, 525 West Allegan Street, Lansing, Michigan. Copies of the regulation may be purchased, at a cost as of the time of adoption of these rules of \$45, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401 (stock number 869-044-00155-1), or from the DEQ, RRD, 525 West Allegan Street, Lansing, Michigan 48933, at cost.
- (S) Criterion defaults to the hazardous substance-specific water solubility limit.

- (T) Refer to the federal Toxic Substances Control Act (TSCA), 40 C.F.R. §761, Subpart D and 40 C.F.R. §761, Subpart G, to determine the applicability of TSCA cleanup standards. Subpart D and Subpart G of 40 C.F.R. §761 (July 1, 2001) are adopted by reference in these rules and are available for inspection at the DEQ, 525 West Allegan Street, Lansing, Michigan. Copies of the regulations may be purchased, at a cost as of the time of adoption of these rules of \$55, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401, or from the DEQ, RRD, 525 West Allegan Street, Lansing, Michigan 48933, at cost. Alternatives to compliance with the TSCA standards listed below are possible under 40 C.F.R. §761 Subpart D. New releases may be subject to the standards identified in 40 C.F.R. §761, Subpart G. Use Part 201 soil direct contact cleanup criteria in the following table if TSCA standards are not applicable.

<b>Land Use Category</b>	<b>TSCA, Subpart D Cleanup Standards</b>	<b>Part 201 Soil Direct Contact Cleanup Criteria</b>
Residential	1,000 ppb, or 10,000 ppb if capped	4,000 ppb
Nonresidential	1,000 ppb, or 10,000 ppb if capped	16,000 ppb

- (U) Hazardous substance may exhibit the characteristic of corrosivity as defined in 40 C.F.R. §261.22 (revised as of July 1, 2001), which is adopted by reference in these rules and is available for inspection at the DEQ, 525 West Allegan Street, Lansing, Michigan. Copies of the regulation may be purchased, at a cost as of the time of adoption of these rules of \$45, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401 (stock number 869-044-00155-1), or from the DEQ, RRD, 525 West Allegan Street, Lansing, Michigan 48933, at cost.
- (V) Criterion is the aesthetic drinking water value as required by Section 20120(a)(5) of the NREPA. Concentrations up to 200 ug/L may be acceptable, and still allow for drinking water use, as part of a site-specific cleanup under Section 20120a(2) and 20120b of the NREPA.
- (W) Concentrations of trihalomethanes in groundwater shall be added together to determine compliance with the Michigan drinking water standard of 80 ug/L. Concentrations of trihalomethanes in soil shall be added together to determine compliance with the drinking water protection criterion of 1,600 ug/kg.
- (X) The GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source. For a groundwater discharge to the Great Lakes and their connecting waters or discharge in close proximity to a water supply intake in inland surface waters, the generic GSI

criterion shall be the surface water human drinking water value (HDV) listed in the table in this footnote, except for those HDV indicated with an asterisk. For HDV with an asterisk, the generic GSI criterion shall be the lowest of the HDV, the WV, and the calculated FCV. See formulas in footnote (G). Soil protection criteria based on the HDV shall be as listed in the table in this footnote, except for those values with an asterisk. Soil GSI protection criteria based on the HDV shall be as listed in the table in this footnote, except for those values with an asterisk. Soil GSI protection criteria for compounds with an asterisk shall be the greater of 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote.

<b>Hazardous Substance</b>	<b>Chemical Abstract Service Number</b>	<b>Surface Water Human Drinking Water Values (HDV) (ug/L)</b>	<b>Soil GSI Protection Criteria for HDV (ug/kg)</b>
Acrylamide	79061	0.5 (M); 0.12	10
Alachlor	15972608	3.5	88
Antimony	7440360	2.0 (M); 1.7	1,200
Benzene	71432	12	240
Boron	7440428	4,000	80,000
Bromate	15541454	10 (M); 0.5	200
n-Butanol	71363	3,500	70,000
Butyl benzyl phthalate	85687	6.9	13,000
Cadmium	7440439	2.5*	*
Carbon tetrachloride	56235	5.6	110
Chloride	16887006	50,000	1.0E+6
Chloroethane	75003	170	3,400
Chromium (III)	16065831	120*	*
Cyanazine	21725462	2.0 (M); 0.93	200 (M); 40
1,2-Dichloroethane	107062	6.0	120
trans-1,2-Dichloroethylene	156605	470	9,400
1,2-Dichloropropane	78875	9.1	180
1,3-Dichloropropene	542756	3.3	100 (M); 66
N,N-Dimethylacetamide	127195	700	14,000
1,4-Dioxane	123911	34	680
Ethylene dibromide	106934	0.17	20 (M); 3.4
Ethylene glycol	107211	56,000	1.1E+6
Hexachloroethane	67721	5.3	310
Isophorone	78591	310	6,200
Isopropyl alcohol	67630	28,000	5.6E+5
Lead	7439921	14*	*

<b>Hazardous Substance</b>	<b>Chemical Abstract Service Number</b>	<b>Surface Water Human Drinking Water Values (HDV) (ug/L)</b>	<b>Soil GSI Protection Criteria for HDV (ug/kg)</b>
Manganese	7439965	1,300*	*
Methanol	67561	14,000	2.8E+5
Methyl-tert-butyl ether (MTBE)	1634044	100	2,000
Methylene chloride	75092	47	940
Molybdenum	7439987	120	2,400
Nitrobenzene	98953	4.7	330 (M); 94
Pentachlorophenol	87865	1.8*	*
Styrene	100425	20	530
1,2,4,5-Tetrachlorobenzene	95943	2.8	3,300
1,1,2,2-Tetrachloroethane	79345	3.2	64
Tetrachloroethylene	127184	11	220
Tetrahydrofuran	109999	350	7,000
Thallium	7440280	2.0 (M); 1.2	1,400
1,2,4-Trichlorobenzene	120821	80	4,700
1,1,2-Trichloroethane	79005	12	240
Trichloroethylene	79016	29	580
Vinyl chloride	75014	1.0 (M); 0.25	40 (M); 20

(Y) Source size modifiers shown in the following table shall be used to determine soil inhalation criteria for ambient air when the source size is not one-half acre. The modifier shall be multiplied by the generic soil inhalation criteria shown in the table of generic cleanup criteria to determine the applicable criterion. See Footnote (C).

<b>Source Size sq. feet or acres</b>	<b>Modifier</b>
400 sq feet	3.17
1000 sq feet	2.2
2000 sq feet	1.76
1/4 acre	1.15
1/2 acre	1
1 acre	0.87

2 acre	0.77
5 acre	0.66
10 acre	0.6
32 acre	0.5
100 acre	0.43

- (Z) Mercury is typically measured as total mercury. The generic cleanup criteria, however, are based on data for different species of mercury. Specifically, data for elemental mercury, chemical abstract service (CAS) number 7439976, serve as the basis for the soil volatilization to indoor air criteria, groundwater volatilization to indoor air, and soil inhalation criteria. Data for methyl mercury, CAS number 22967926, serve as the basis for the GSI criterion; and data for mercuric chloride, CAS number 7487947, serve as the basis for the drinking water, groundwater contact, soil direct contact, and the groundwater protection criteria. Comparison to criteria shall be based on species-specific analytical data only if sufficient facility characterization has been conducted to rule out the presence of other species of mercury.
- (AA) Use 10,000 ug/l where groundwater enters a structure through the use of a water well, sump or other device. Use 28,000 ug/l for all other uses.
- (BB) The state drinking water standard for asbestos (fibers greater than 10 micrometers in length) is in units of a million fibers per liter of water (MFL). Soil concentrations of asbestos are determined by polarized light microscopy.
- (CC) Groundwater: The generic GSI criteria are based on the toxicity of unionized ammonia (NH<sub>3</sub>); the criteria are 29 ug/L and 53 ug/L for cold water and warm water surface water, respectively. As a result, the GSI criterion shall be compared to the percent of the total ammonia concentration in the groundwater that will become NH<sub>3</sub> in the surface water. This percent NH<sub>3</sub> is a function of the pH and temperature of the receiving surface water and can be estimated using the following table, taken from Emerson, et al., (Journal of the Fisheries Research Board of Canada, Volume 32(12):2382, 1975).

**Percent NH<sub>3</sub> in Aqueous Ammonia Solutions for 0-30 °C and pH 6-10**

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Temp (°F)	Temp (°C)	pH								
		6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0

32.0	0	0.00827	0.0261	0.0826	0.261	0.820	2.55	7.64	20.7	45.3
33.8	1	0.00899	0.0284	0.0898	0.284	0.891	2.77	8.25	22.1	47.3
35.6	2	0.00977	0.0309	0.0977	0.308	0.968	3.00	8.90	23.6	49.4
37.4	3	0.0106	0.0336	0.106	0.335	1.05	3.25	9.60	25.1	51.5
39.2	4	0.0115	0.0364	0.115	0.363	1.14	3.52	10.3	26.7	53.5
41.0	5	0.0125	0.0395	0.125	0.394	1.23	3.80	11.1	28.3	55.6
42.8	6	0.0136	0.0429	0.135	0.427	1.34	4.11	11.9	30.0	57.6
44.6	7	0.0147	0.0464	0.147	0.462	1.45	4.44	12.8	31.7	59.5
46.4	8	0.0159	0.0503	0.159	0.501	1.57	4.79	13.7	33.5	61.4
48.2	9	0.0172	0.0544	0.172	0.542	1.69	5.16	14.7	35.3	63.3
50.0	10	0.0186	0.0589	0.186	0.586	1.83	5.56	15.7	37.1	65.1
51.8	11	0.0201	0.0637	0.201	0.633	1.97	5.99	16.8	38.9	66.8
53.6	12	0.0218	0.0688	0.217	0.684	2.13	6.44	17.9	40.8	68.5
55.4	13	0.0235	0.0743	0.235	0.738	2.30	6.92	19.0	42.6	70.2
57.2	14	0.0254	0.0802	0.253	0.796	2.48	7.43	20.2	44.5	71.7
59.0	15	0.0274	0.0865	0.273	0.859	2.67	7.97	21.5	46.4	73.3
60.8	16	0.0295	0.0933	0.294	0.925	2.87	8.54	22.8	48.3	74.7
62.6	17	0.0318	0.101	0.317	0.996	3.08	9.14	24.1	50.2	76.1
64.4	18	0.0343	0.108	0.342	1.07	3.31	9.78	25.5	52.0	77.4
66.2	19	0.0369	0.117	0.368	1.15	3.56	10.5	27.0	53.9	78.7
68.0	20	0.0397	0.125	0.396	1.24	3.82	11.2	28.4	55.7	79.9
69.8	21	0.0427	0.135	0.425	1.33	4.10	11.9	29.9	57.5	81.0
71.6	22	0.0459	0.145	0.457	1.43	4.39	12.7	31.5	59.2	82.1
73.4	23	0.0493	0.156	0.491	1.54	4.70	13.5	33.0	60.9	83.2
75.2	24	0.0530	0.167	0.527	1.65	5.03	14.4	34.6	62.6	84.1
77.0	25	0.0569	0.180	0.566	1.77	5.38	15.3	36.3	64.3	85.1
78.8	26	0.0610	0.193	0.607	1.89	5.75	16.2	37.9	65.9	85.9
80.6	27	0.0654	0.207	0.651	2.03	6.15	17.2	39.6	67.4	86.8
82.4	28	0.0701	0.221	0.697	2.17	6.56	18.2	41.2	68.9	87.3
84.2	29	0.0752	0.237	0.747	2.32	7.00	19.2	42.9	70.4	88.3
86.0	30	0.0805	0.254	0.799	2.48	7.46	20.3	44.6	71.8	89.0

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The generic approach for estimating NH<sub>3</sub> assumes a default pH of 8 and default temperatures of 68°F and 85°F for cold water and warm water surface water, respectively. The resulting percent NH<sub>3</sub> is 3.8 percent and 7.2 percent for cold water and warm water, respectively. This default percentage shall be multiplied by the total ammonia-nitrogen (NH<sub>3</sub>-N) concentration in the groundwater and the resulting NH<sub>3</sub> concentration compared to the applicable GSI criterion. As an alternative, the maximum pH and temperature data from the specific receiving

surface water can be used to estimate, from the table in this footnote, a lower percent unionized ammonia concentration for comparison to the generic GSI.

Soil: The generic soil GSI protection criteria for unionized ammonia are 580 ug/kg and 1,100 ug/kg for cold water and warm water surface water, respectively.

- (DD) Hazardous substance causes developmental effects. Residential direct contact criteria are protective of both prenatal and postnatal exposure. Nonresidential direct contact criteria are protective for a pregnant adult receptor.
- (EE) The following are applicable generic GSI criteria as required by Section 20120e of the NREPA.

<b>Hazardous Substance</b>	<b>GSI (ug/L)</b>	<b>Notes</b>
Phosphorus	1,000	Criteria applicable unless receiving water is a surface water that has a phosphorus waste load allocation or is an inland lake. In those cases, contact the department for applicable values.
Total dissolved solids (TDS)	5.0E+5	If TDS data are not available, the TDS criterion may be used a screening level for the sum of the concentrations of the following substances: calcium, chlorides, iron, magnesium, potassium, sodium, sulfate.
Dissolved Oxygen (DO): Cold receiving waters Warm receiving waters	≥ 7,000 ≥ 5,000	Since a low level of DO can be harmful to aquatic life, the criterion represents a minimum level that on-site samples must exceed. This is in contrast to other criteria which represent “not to exceed” concentrations. DO criteria are not applicable if groundwater Carbonaceous Biochemical Oxygen Demand (CBOD) is less than 10,000 ug/L and groundwater ammonia concentration is less than 2,000 ug/L.

- (FF) The chloride GSI criterion shall be 125 mg/l when the discharge is to surface waters of the state designated as public water supply sources or 50 mg/l when the discharge is to the Great Lakes or connecting waters. Chloride GSI criteria shall not apply for surface waters of the state that are not designated as a public water supply source, however, the total dissolved solids criterion is applicable.
- (GG) Risk-based criteria are not available for methane due to insufficient toxicity data. An acceptable soil gas concentration (presented for both residential and

- nonresidential land uses) was derived utilizing 25 percent of the lower explosive level for methane. This equates to 1.25 percent or  $8.4E+6$  ug/m<sup>3</sup>.
- (HH) The residential criterion for sodium is 230,000 ug/l in accordance with the Sodium Advisory Council recommendation and revised Groundwater Discharge Standards.

“ID” means insufficient data to develop criterion.

“NA” means a criterion or value is not available or, in the case of background and CAS numbers, not applicable.

“NLL” means hazardous substance is not likely to leach under most soil conditions.

“NLV” means hazardous substance is not likely to volatilize under most conditions.

History: 2013 AACS.

**R 299.50 Toxicological and chemical-physical properties.**

Rule 50. (1) The toxicological and chemical-physical properties used to calculate generic shall be as shown in table 4, except as provided in section 20120a(9) of the act, R 299.49(1)(l) and R 299.49(1)(o).

(2) Abbreviations used in table 4 have the following meanings when used in this rule:

(a) “NA” means not available.

(b) “NR” means not relevant.



**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA FOR PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

Scientific notation is represented by E+ or E- a value, for example 200,000 is presented as 2.0E+5. Units are as indicated in each column heading. The dataset for each hazardous substance requires 22 columns across two pages. Review all 22 columns when evaluating data for a specific hazardous substance.

Hazardous Substance	Chemical Abstract Service Number	Oral Reference Dose	Oral Slope Factor	Chronic Inhalation Reference Concentration	Inhalation Unit Risk Factor	Occupational Short Term Exposure Level	Relative Source Contribution for Drinking Water	Ingestion Absorption Efficiency	Dermal Absorption Efficiency	Relative Source Contribution for Soil	Log Octanol-Water Partition Coefficient	Soil Organic Carbon-Water Partition Coefficients for Organic Compounds
		RfD	SF	RfC	IURF	STEL	RSC	AEi	AEd	RSC	Log Kow	Koc
		mg/kg-day	(mg/kg-day) <sup>-1</sup>	ug/m <sup>3</sup>	(ug/m <sup>3</sup> ) <sup>-1</sup>	ug/m <sup>3</sup>	unitless	unitless	unitless	unitless	unitless	L/kg
Acenaphthene	83329	1.80E-01	NA	2.10E+02	NA	NA	0.2	1	0.1	1	3.92	7,140
Acenaphthylene	208968	7.10E-03	NA	3.50E+01	NA	NA	0.2	1	0.1	1	3.6	3,460
Acetaldehyde (l)	75070	1.30E-01	NA	9.00E+00	2.20E-06	4.50E+04	0.2	1	0.1	1	-0.367	0.613
Acetate	71501	5.70E-01	NA	NA	NA	NA	0.2	NA	NA	NA	NA	NA
Acetic acid	64197	5.70E-01	NA	2.50E+02	NA	3.70E+04	0.2	1	0.1	1	-0.23	0.595
Acetone (l)	67641	1.00E-01	NA	5.90E+03	NA	1.70E+06	0.2	1	0.1	1	-0.24	0.581
Acetonitrile	75058	1.90E-02	NA	6.00E+01	NA	1.01E+05	0.2	1	0.1	1	-0.337	0.648
Acetophenone	98862	2.10E-01	NA	4.90E+02	NA	NA	0.2	1	0.1	1	1.6	37.4
Acrolein (l)	107028	1.60E-02	NA	2.00E-02	NA	6.90E+02	0.2	1	0.1	1	-0.01	1.18
Acrylamide	79061	2.00E-04	2.80E+00	6	1.30E-03	NA	0.2	1	0.1	1	-0.96	0.114
Acrylic acid	79107	5.30E-01	NA	1.00E+00	NA	NA	0.2	1	0.1	1	0.35	2.21
Acrylonitrile (l)	107131	NA	3.30E-01	2.00E+00	6.80E-05	NA	0.2	1	0.1	1	0.255	1.78
Alachlor	15972608	1.00E-02	9.60E-02	NA	NA	NA	0.2	0.5	0.1	1	3.52	734
Aldicarb	116063	1.00E-03	NA	NA	NA	NA	0.2	1	0.1	1	1.1	12.1
Aldicarb sulfone	1646884	1.10E-03	NA	NA	NA	NA	0.2	1	0.1	1	-0.57	0.275
Aldicarb sulfoxide	1646873	1.30E-03	NA	NA	NA	NA	0.2	1	0.1	1	-0.67	0.22
Aldrin	309002	2.50E-05	8.70E+00	NA	4.90E-03	NA	0.2	0.5	0.1	1	6.5	2.45E+06
Aluminum (B)	7429905	3.30E-01	NA	NA	NA	NA	0.2	0.5	0.01	1	NR	NR
Ammonia	7664417	NA	NA	1.00E+02	NA	2.40E+04	0.2	1	0.1	1	NA	NA

t-Amyl methyl ether (TAME)	994058	1.30E-01	NA	6.20E+01	NA	NA	0.2	1	0.1	1	1.73	28.1
Aniline	62533	NA	1.60E-02	1.00E+00	1.60E-06	NA	0.2	1	0.1	1	0.978	9.15
Anthracene	120127	1.00E+00	NA	1.00E+03	NA	NA	0.2	1	0.1	1	4.55	29,700
Antimony	7440360	3.50E-04	NA	2.00E-01	NA	NA	0.2	0.5	0.01	1	NR	NR
Arsenic	7440382	2.70E-04	1.50E+00	NA	4.30E-03	NA	0.2	0.5	0.03	1	NR	NR
Asbestos (BB)	1332214	NA	NA	NA	4.60E-02	NA	1	1	0	1	NR	NR
Atrazine	1912249	3.50E-02	7.40E-02	NA	NA	NA	0.2	1	0.1	1	2.7	451
Azobenzene	103333	NA	3.70E-02	NA	3.10E-05	NA	0.2	1	0.1	1	3.82	5,690
Barium (B)	7440393	7.00E-02	NA	5.00E+00	NA	NA	1	0.5	0.01	1	NR	NR

**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

Scientific notation is represented by E+ or E- a value, for example 200,000 is presented as 2.0E+5. Units are as indicated in each column heading. The dataset for each hazardous substance consists of 22 columns across two pages. Review all 22 columns when evaluating data for a specific hazardous substance.

Hazardous Substance	Chemical Abstract Service Number	Soil Koc for Ionizing Organic Compounds at pH=6.8	Soil-Water Distribution Coefficients for Inorganic Compounds at pH=6.8	Henry's Law Constant at 25°C	Air Diffusivity	Water Diffusivity	Lower Explosive Limit in Air	Flash Point	Water Solubility	Physical State at Standard Temperature and Pressure	Molecular Weight
			Kd	HLC	D <sub>i</sub> or D <sub>a</sub> or D <sup>air</sup>	D <sub>w</sub>	LEL	FP	S		MW
		L/kg	L/kg	atm·m <sup>3</sup> /mol	cm <sup>2</sup> /s	cm <sup>2</sup> /s	unitless	°F	ug/L	unitless	g/mol
Acenaphthene	83329	NR	NR	1.55E-04	0.0421	7.69E-06	NA	NA	4,240	Solid	154.2
Acenaphthylene	208968	NR	NR	1.48E-03	0.08	8.00E-06	NA	NA	3,930	Solid	152.271
Acetaldehyde (l)	75070	NR	NR	7.95E-05	0.08	8.00E-06	0.04	-36	1.00E+09	Liquid	44.1
Acetate	71501	NA	NA	NA	NA	NA	NA	NA	ID	NA	NA
Acetic acid	64197	NR	NR	1.00E-07	0.08	8.00E-06	0.04	103	6.00E+09	Liquid	60.05
Acetone (l)	67641	NR	NR	3.88E-05	0.124	1.14E-05	0.025	0	1.00E+09	Liquid	58.08
Acetonitrile	75058	NR	NR	2.40E-05	0.13	1.70E-05	0.03	42	2.00E+08	Liquid	41.05
Acetophenone	98862	NR	NR	1.10E-05	0.08	8.00E-06	NA	NA	6.10E+06	Liquid	120.2
Acrolein (l)	107028	NR	NR	9.40E-05	0.11	1.20E-05	0.028	-15	2.10E+08	Liquid	56.06
Acrylamide	79061	NR	NR	3.22E-10	0.097	1.10E-04	NA	280	2.20E+09	Solid	71.08
Acrylic acid	79107	NR	NR	3.20E-07	0.08	8.00E-06	0.024	121	1.00E+09	Liquid	72.06
Acrylonitrile (l)	107131	NR	NR	1.00E-04	0.12	1.30E-05	0.03	30	7.50E+07	Liquid	53.06
Alachlor	15972608	NR	NR	8.32E-09	0.08	8.00E-06	NA	NA	1.83E+05	Solid	269.77
Aldicarb	116063	NR	NR	4.17E-09	0.08	8.00E-06	NA	NA	6.00E+06	Solid	190.25
Aldicarb sulfone	1646884	NR	NR	3.37E-09	0.08	8.00E-06	NA	NA	7.80E+06	Solid	222.27
Aldicarb sulfoxide	1646873	NR	NR	9.69E-10	0.08	8.00E-06	NA	NA	2.80E+07	Solid	206.27
Aldrin	309002	NR	NR	1.70E-04	0.0132	4.86E-06	NA	NA	180	Solid	364.9
Aluminum (B)	7429905	NR	NA	NR	NR	NR	NA	NA	NA	Inorganic	26.982
Ammonia	7664417	NR	NR	3.20E-04	0.08	8.00E-06	0.15	NA	5.30E+08	Liquid	17.04

t-Amyl methyl ether (TAME)	994058	NR	NR	2.68E-03	0.08	8.00E-06	NA	NA	2.64E+06	Liquid	102.18
Aniline	62533	NR	NR	2.30E-06	0.07	8.30E-06	0.013	158	3.60E+07	Liquid	93.13
Anthracene	120127	NR	NR	6.50E-05	0.0324	7.74E-06	NA	NA	43.4	Solid	178.24
Antimony	7440360	NR	45	NR	NR	NR	NA	NA	NA	Inorganic	121.76
Arsenic	7440382	NR	29	NR	NR	NR	NA	NA	NA	Inorganic	74.922
Asbestos (BB)	1332214	NR	NA	NR	NR	NR	NR	NR	NA	Inorganic	NA
Atrazine	1912249	NR	NR	2.63E-09	0.08	8.00E-06	NA	NA	70,000	Solid	215.72
Azobenzene	103333	NR	NR	1.35E-05	0.08	8.00E-06	NA	NA	6,400	Solid	182.23
Barium (B)	7440393	NR	41	NR	NR	NR	NA	NA	NA	Inorganic	137.327

**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA FOR PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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Hazardous Substance	Chemical Abstract Service Number	Oral Reference Dose	Oral Slope Factor	Chronic Inhalation Reference Concentration	Inhalation Unit Risk Factor	Occupational Short Term Exposure Level	Relative Source Contribution for Drinking Water	Ingestion Absorption Efficiency	Dermal Absorption Efficiency	Relative Source Contribution for Soil	Log Octanol-Water Partition Coefficient	Soil Organic Carbon-Water Partition Coefficients for Organic Compounds
		RfD mg/kg-day	SF (mg/kg-day) <sup>-1</sup>	RIC ug/m <sup>3</sup>	IURF (ug/m <sup>3</sup> ) <sup>-1</sup>	STEL ug/m <sup>3</sup>	RSC unitless	AEi unitless	AEd unitless	RSC unitless	Log Kow unitless	Koc L/kg
Benzene (l)	71432	NA	2.90E-02	30	8.30E-06	8.00E+03	0.2	1	0.1	1	2.13	58.2
Benzidine	92875	2.70E-03	2.30E+02	NA	6.70E-02	NA	0.2	1	0.1	1	1.66	42.9
Benzo(a)anthracene (Q)	56553	NA	4.10E-01	NA	NA	NA	0.2	0.5	0.13	1	5.7	4.01E+05
Benzo(b)fluoranthene (Q)	205992	NA	4.10E-01	NA	NA	NA	0.2	0.5	0.13	1	6.2	1.24E+06
Benzo(k)fluoranthene (Q)	207089	NA	4.10E-02	NA	NA	NA	0.2	0.5	0.13	1	6.2	1.24E+06
Benzo(g,h,i)perylene	191242	7.10E-03	NA	1.20E+01	NA	NA	0.2	0.5	0.13	1	6.7	3.86E+06
Benzo(a)pyrene (Q)	50328	NA	4.10E+00	NA	2.10E-03	NA	0.2	0.5	0.13	1	6.11	1.01E+06
Benzoic acid	65850	4.40E+00	NA	NA	NA	NA	0.2	1	0.1	1	1.86	0.6
Benzyl alcohol	100516	1.40E+00	NA	5.00E+03	NA	NA	0.2	1	0.1	1	1.11	12.3
Benzyl chloride	100447	NA	1.10E-01	NA	5.00E-05	NA	0.2	1	0.1	1	2.3	182
Beryllium	7440417	1.50E-03	NA	2.00E-02	2.40E-03	1.00E+01	0.2	1	0	1	NR	NR
bis(2-Chloroethoxy)ethane	112265	NA	NA	NA	NA	NA	0.2	1	0.1	1	1.28	18.1
bis(2-Chloroethyl)ether (l)	111444	NA	4.20E-01	NA	3.30E-04	5.80E+04	0.2	1	0.1	1	1.21	10.9
bis(2-Ethylhexyl)phthalate	117817	1.90E-02	3.20E-03	NA	4.43E-06	1.00E+04	0.2	0.5	0.1	1	7.3	1.50E+07
Boron (B)	7440428	3.20E-01	NA	NA	NA	NA	0.2	0.5	0.01	1	NR	NR
Bromate	15541454	4.00E-03	7.00E-01	NA	NA	NA	0.2	0.5	0.01	1	0.63	NR
Bromobenzene (l)	108861	2.40E-03	NA	8.00E+00	NA	NA	0.2	1	0.1	1	2.99	870
Bromodichloromethane	75274	1.80E-02	5.00E-02	NA	3.70E-05	NA	0.2	1	0.1	1	2.1	55.1
Bromoform	75252	1.80E-02	6.40E-03	NA	1.10E-06	NA	0.2	1	0.1	1	2.35	87
Bromomethane	74839	1.40E-03	NA	5.00E+00	NA	NA	0.2	1	0.1	1	1.18	14.5
n-Butanol (l)	71363	1.30E-01	NA	3.50E+02	NA	1.52E+05	0.2	1	0.1	1	0.851	5.65

2-Butanone (MEK) (l)	78933	1.80E+00	NA	1.00E+03	NA	8.85E+05	0.2	1	0.1	1	0.279	1.99
n-Butyl acetate	123864	7.60E-02	NA	7.10E+03	NA	9.50E+05	0.2	1	0.1	1	1.78	30.8
t-Butyl alcohol	75650	5.40E-01	NA	1.89E+03	NA	NA	0.2	1	0.1	1	0.35	2.27
Butyl benzyl phthalate	85687	1.60E-01	NA	7.00E+02	NA	NA	0.2	1	0.1	1	4.84	57,300
n-Butylbenzene	104518	1.10E-02	NA	30	NA	NA	0.2	1	0.1	1	4.38	20,200
sec-Butylbenzene	135988	1.10E-02	NA	6.00E+00	NA	NA	0.2	1	0.1	1	4.57	31,100
t-Butylbenzene (l)	98066	1.10E-02	NA	10	NA	NA	0.2	1	0.1	1	4.11	11,000

**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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Hazardous Substance	Chemical Abstract Service Number	Soil Koc for Ionizing Organic Compounds at pH=6.8	Soil-Water Distribution Coefficients for Inorganic Compounds at pH=6.8	Henry's Law Constant at 25°C	Air Diffusivity	Water Diffusivity	Lower Explosive Limit in Air	Flash Point	Water Solubility	Physical State at Standard Temperature and Pressure	Molecular Weight
			Kd	HLC	D <sub>i</sub> or D <sub>a</sub> or D <sup>air</sup>	D <sub>w</sub>	LEL	FP	S		
		L/kg	L/kg	atm-m <sup>3</sup> /mol	cm <sup>2</sup> /s	cm <sup>2</sup> /s	unitless	°F	ug/L	unitless	g/mol
Benzene (I)	71432	NR	NR	5.55E-03	0.088	9.80E-06	0.012	12	1.75E+06	Liquid	78.11
Benidine	92875	NR	NR	3.90E-11	0.08	1.50E-05	NA	NA	5.20E+05	Solid	184.24
Benzo(a)anthracene (Q)	56553	NR	NR	3.35E-06	0.051	9.00E-06	NA	NA	9.4	Solid	228.3
Benzo(b)fluoranthene (Q)	205992	NR	NR	1.11E-04	0.0226	5.56E-06	NA	NA	1.5	Solid	252.32
Benzo(k)fluoranthene (Q)	207089	NR	NR	8.29E-07	0.0226	5.56E-06	NA	NA	0.8	Solid	252.32
Benzo(g,h,i)perylene	191242	NR	NR	5.34E-08	0.08	8.00E-06	NA	NA	0.26	Solid	276.34
Benzo(a)pyrene (Q)	50328	NR	NR	1.13E-06	0.043	9.00E-06	NA	NA	1.62	Solid	252.32
Benzoic acid	65850	0.6	NR	1.54E-06	0.0536	7.97E-06	NA	NA	3.50E+06	Solid	122.1
Benzyl alcohol	100516	NR	NR	3.90E-07	0.08	8.00E-06	NA	NA	4.40E+07	Liquid	108.13
Benzyl chloride	100447	NR	NR	4.00E-04	0.075	7.80E-06	0.011	153	4.90E+05	Liquid	126.58
Beryllium	7440417	NR	790	NR	NR	NR	NA	NA	NA	Inorganic	9.012
bis(2-Chloroethoxy)ethane	112265	NR	NR	7.81E-07	0.08	8.00E-06	NA	NA	1.89E+07	Liquid	187.07
bis(2-Chloroethyl)ether (I)	111444	NR	NR	1.80E-05	0.0692	7.53E-06	0.027	131	1.72E+07	Liquid	143.01
bis(2-Ethylhexyl)phthalate	117817	NR	NR	1.02E-07	0.0351	3.66E-06	NA	420	340	Liquid	390.57
Boron (B)	7440428	NR	NA	NR	NR	NR	NA	NA	NA	Inorganic	10.811
Bromate	15541454	NR	NA	1.00E+00	NR	NR	NA	NA	38,000	Solid	79.9
Bromobenzene (I)	108861	NR	NR	4.74E-04	0.08	8.00E-06	NA	NA	4.13E+05	Liquid	157.015
Bromodichloromethane	75274	NR	NR	1.60E-03	0.0298	1.06E-05	NA	NA	6.74E+06	Liquid	163.8
Bromoform	75252	NR	NR	5.35E-04	0.0149	1.03E-05	NA	NA	3.10E+06	Liquid	252.8
Bromomethane	74839	NR	NR	1.42E-02	0.08	8.00E-06	0.1	NA	1.45E+07	Liquid	94.94

n-Butanol (l)	71363	NR	NR	8.81E-06	0.08	9.60E-06	0.014	84	7.40E+07	Liquid	74.14
2-Butanone (MEK) (l)	78933	NR	NR	3.60E-05	0.081	9.80E-06	NA	16	2.40E+08	Liquid	72.1
n-Butyl acetate	123864	NR	NR	3.20E-04	0.08	8.00E-06	0.017	72	6.70E+06	Liquid	116.16
t-Butyl alcohol	75650	NR	NR	1.17E-05	0.08	8.00E-06	0.024	52	1.00E+09	Liquid	74.12
Butyl benzyl phthalate	85687	NR	NR	1.26E-06	0.0174	4.83E-06	NA	NA	2,690	Liquid	312.37
n-Butylbenzene	104518	NR	NR	NA	0.08	8.00E-06	NA	NA	NA	Liquid	134.22
sec-Butylbenzene	135988	NR	NR	NA	0.08	8.00E-06	NA	NA	NA	Liquid	134.22
t-Butylbenzene (l)	98066	NR	NR	NA	0.08	8.00E-06	NA	NA	NA	Liquid	134.22



**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA FOR PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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Hazardous Substance	Chemical Abstract Service Number	Oral Reference Dose	Oral Slope Factor	Chronic Inhalation Reference Concentration	Inhalation Unit Risk Factor	Occupational Short Term Exposure Level	Relative Source Contribution for Drinking Water	Ingestion Absorption Efficiency	Dermal Absorption Efficiency	Relative Source Contribution for Soil	Log Octanol-Water Partition Coefficient	Soil Organic Carbon-Water Partition Coefficients for Organic Compounds
		RfD mg/kg-day	SF (mg/kg-day) <sup>-1</sup>	RfC ug/m <sup>3</sup>	IURF (ug/m <sup>3</sup> ) <sup>-1</sup>	STEL ug/m <sup>3</sup>	RSC unitless	AEi unitless	AEd unitless	RSC unitless	Log Kow unitless	Koc L/kg
Cadmium (B)	7440439	1.00E-03	NA	NA	1.80E-03	NA	0.2	0.5	0.001	1	NR	NR
Camphene (I)	79925	NA	NA	80	NA	NA	0.2	1	0.1	1	3.53	2,950
Caprolactam	105602	8.00E-01	NA	1.00E+01	NA	4.60E+04	0.2	1	0.1	1	-0.19	0.65
Carbaryl	63252	9.60E-02	NA	NA	NA	NA	0.2	1	0.1	1	2.4	229
Carbazole	86748	NA	1.00E-02	NA	5.00E-05	NA	0.2	1	0.1	1	3.59	3,380
Carbofuran	1563662	5.00E-03	NA	NA	NA	NA	0.2	1	0.1	1	1.6	37.4
Carbon disulfide (I,R)	75150	1.10E-01	NA	7.00E+02	NA	NA	0.2	1	0.1	1	2	45.9
Carbon tetrachloride	56235	7.10E-04	5.50E-02	100	2.36E-05	6.30E+04	0.2	1	0.1	1	2.73	174
Chlordane (J)	57749	1.50E-03	3.50E-01	7.00E-01	1.00E-04	NA	0.2	0.5	0.04	1	6.32	1.21E+05
Chloride	16887006	NA	NA	NA	NA	NA	0.2	0.5	0.01	1	NR	NR
Chlorobenzene (I)	108907	1.90E-02	NA	7.00E+01	NA	NA	0.2	1	0.1	1	2.86	220
p-Chlorobenzene sulfonic acid	98668	1.00E+00	NA	NA	NA	NA	0.2	1	0.1	1	-0.52	4.64E-01
1-Chloro-1,1-difluoroethane	75683	2.10E+00	NA	5.00E+04	NA	NA	0.2	1	0.1	1	1.81	32.5
Chloroethane	75003	1.80E+01	2.00E-03	1.00E+04	NA	NA	0.2	1	0.1	1	1.4	23.8
2-Chloroethyl vinyl ether	110758	NA	NA	NA	NA	NA	0.2	1	0.1	1	1.07	8.43
Chloroform	67663	1.30E-02	4.40E-03	NA	2.40E-06	NA	0.2	1	0.1	1	1.92	39.7
Chloromethane (I)	74873	NA	3.30E-03	9.00E+01	6.39E-07	2.07E+05	0.2	1	0.1	1	0.91	6.3
4-Chloro-3-methylphenol	59507	2.00E-02	NA	NA	NA	NA	0.2	1	0.1	1	3.1	1,120
beta-Chloronaphthalene	91587	2.50E-01	NA	NA	NA	NA	0.2	1	0.1	1	4.1	10,700
2-Chlorophenol	95578	6.20E-03	NA	1.80E+01	NA	NA	0.2	1	0.1	1	2.15	388
o-Chlorotoluene (I)	95498	2.00E-02	NA	7.00E+01	NA	NA	0.2	1	0.1	1	3.42	612

Chlorpyrifos	2921882	3.00E-02	NA	2.00E+00	NA	NA	0.2	0.5	0.1	1	5.3	18,900
Chromium (III) (B,H)	16065831	1.50E+00	NA	5.00E+00	NA	NA	0.7	0.5	0.01	1	NR	NR
Chromium (VI)	18540299	4.80E-03	NA	8.00E-03	1.20E-02	NA	0.7	0.5	0.01	1	NR	NR
Chrysene (Q)	218019	NA	4.10E-03	NA	NA	NA	0.2	0.5	0.13	1	5.7	4.01E+05
Cobalt	7440484	5.00E-03	NA	2.00E-01	NA	NA	0.2	0.5	0.01	1	NR	NR
Copper (B)	7440508	3.80E-02	NA	2.00E+00	NA	NA	1	0.5	0.01	1	NR	NR
Cyanazine	21725462	3.00E-03	3.70E-01	NA	NA	NA	0.2	1	0.1	1	2.2	146

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PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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Hazardous Substance	Chemical Abstract Service Number	Soil Koc for Ionizing Organic Compounds at pH=6.8	Soil-Water Distribution Coefficients for Inorganic Compounds at pH=6.8	Henry's Law Constant at 25°C	Air Diffusivity	Water Diffusivity	Lower Explosive Limit in Air	Flash Point	Water Solubility	Physical State at Standard Temperature and Pressure	Molecular Weight
			Kd	HLC	D <sub>i</sub> or D <sub>a</sub> or D <sup>air</sup>	D <sub>w</sub>	LEL	FP	S		
		L/kg	L/kg	atm·m <sup>3</sup> /mol	cm <sup>2</sup> /s	cm <sup>2</sup> /s	unitless	°F	ug/L	unitless	g/mol
Cadmium (B)	7440439	NR	75	NR	NR	NR	NA	NA	NA	Inorganic	112.411
Camphene (I)	79925	NR	NR	2.05E+00	0.08	8.00E-06	NA	NA	33,400	Solid	136.26
Caprolactam	105602	NR	NR	2.53E-08	0.08	8.00E-06	0.014	282	5.25E+09	Solid	113.2
Carbaryl	63252	NR	NR	6.80E-04	0.08	8.00E-06	NA	NA	1.26E+05	Solid	201.24
Carbazole	86748	NR	NR	1.53E-08	0.039	7.03E-06	NA	NA	7,480	Solid	167.21
Carbofuran	1563662	NR	NR	3.90E-10	0.08	8.00E-06	NA	NA	7.00E+05	Solid	221.3
Carbon disulfide (I,R)	75150	NR	NR	3.03E-02	0.104	1.00E-05	0.013	-22	1.19E+06	Liquid	76.14
Carbon tetrachloride	56235	NR	NR	3.04E-02	0.078	8.80E-06	NA	NA	7.93E+05	Liquid	153.92
Chlordane (J)	57749	NR	NR	4.86E-05	0.0118	4.37E-06	NA	NA	56	Solid	409.8
Chloride	16887006	NR	NA	NR	NR	NR	NA	NA	NA	Inorganic	35.453
Chlorobenzene (I)	108907	NR	NR	3.70E-03	0.073	8.70E-06	0.013	82	4.72E+05	Liquid	112.56
p-Chlorobenzene sulfonic acid	98668	NR	NR	NA	NA	NA	NA	226	NA	Solid	192.62
1-Chloro-1,1-difluoroethane	75683	NR	NR	6.16E-02	0.08	8.00E-06	0.06	NA	3.90E+06	Gas	100.5
Chloroethane	75003	NR	NR	8.80E-03	0.08	8.00E-06	0.038	-58	5.74E+06	Liquid	64.52
2-Chloroethyl vinyl ether	110758	NR	NR	6.25E-04	0.08	8.00E-06	NA	NA	1.50E+07	Liquid	106.55
Chloroform	67663	NR	NR	3.67E-03	0.104	1.00E-05	NA	NA	7.92E+06	Liquid	119.38
Chloromethane (I)	74873	NR	NR	4.52E-02	0.13	6.50E-06	0.081	-60.8	6.34E+06	Liquid	50.49
4-Chloro-3-methylphenol	59507	NR	NR	4.00E-07	0.08	8.00E-06	NA	NA	3.90E+06	Solid	142.6
beta-Chloronaphthalene	91587	NR	NR	3.10E-04	0.08	8.00E-06	NA	NA	6,740	Solid	162.62
2-Chlorophenol	95578	388	NR	3.91E-04	0.0501	9.46E-06	NA	NA	2.20E+07	Liquid	128.56

o-Chlorotoluene (I)	95498	NR	NR	3.57E-03	0.08	8.00E-06	NA	96	3.73E+05	Liquid	126.58
Chlorpyrifos	2921882	NR	NR	7.80E+00	0.08	8.00E-06	NA	NA	1,120	Solid	350.59
Chromium (III) (B,H)	16065831	NR	1.80E+06	NR	NR	NR	NA	NA	NA	Inorganic	51.996
Chromium (VI)	18540299	NR	19	NR	NR	NR	NA	NA	NA	Inorganic	51.996
Chrysene (Q)	218019	NR	NR	9.46E-05	0.0248	6.21E-06	NA	NA	1.6	Solid	228.3
Cobalt	7440484	NR	NA	NR	NR	NR	NA	NA	NA	Inorganic	58.933
Copper (B)	7440508	NR	360	NR	NR	NR	NA	NA	NA	Inorganic	63.546
Cyanazine	21725462	NR	NR	1.00E-10	0.08	8.00E-06	NA	NA	1.70E+05	Solid	241

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Hazardous Substance	Chemical Abstract Service Number	Oral Reference Dose	Oral Slope Factor	Chronic Inhalation Reference Concentration	Inhalation Unit Risk Factor	Occupational Short Term Exposure Level	Relative Source Contribution for Drinking Water	Ingestion Absorption Efficiency	Dermal Absorption Efficiency	Relative Source Contribution for Soil	Log Octanol-Water Partition Coefficient	Soil Organic Carbon-Water Partition Coefficients for Organic Compounds
		RfD	SF	RfC	IURF	STEL	RSC	AEi	AEd	RSC	Log Kow	Koc
		mg/kg-day	(mg/kg-day) <sup>-1</sup>	ug/m <sup>3</sup>	(ug/m <sup>3</sup> ) <sup>-1</sup>	ug/m <sup>3</sup>	unitless	unitless	unitless	unitless	unitless	L/kg
Cyanide (P,R)	57125	5.40E-03	NA	5.00E+01	NA	NA	0.2	1	0	1	NA	NA
Cyclohexanone	108941	4.50E+00	NA	1.00E+03	NA	NA	0.2	1	0.1	1	0.81	6.26
Dacthal	1861321	1.00E-02	NA	NA	NA	NA	0.2	1	0.1	1	4.4	21,200
Dalapon	75990	8.50E-02	NA	NA	NA	NA	0.2	1	0.1	1	0.77	5.72
4-4'-DDD	72548	3.00E-03	9.40E-02	NA	7.00E-05	NA	0.2	0.5	0.1	1	6.1	81,100
4-4'-DDE	72559	7.00E-04	2.00E-01	NA	9.70E-05	NA	0.2	0.5	0.1	1	6.76	2.70E+05
4-4'-DDT	50293	5.00E-04	2.00E-01	NA	9.70E-05	NA	0.2	0.5	0.03	1	6.53	1.78E+05
Decabromodiphenyl ether	1163195	1.00E-02	NA	3.50E+01	4.00E-07	NA	0.2	0.5	0.1	1	5.24	1.42E+05
Di-n-butyl phthalate	84742	1.20E-01	NA	5.00E+01	NA	NA	0.2	1	0.1	1	4.61	34,000
Di(2-ethylhexyl) adipate	103231	1.70E+00	5.90E-04	NA	3.40E-07	NA	0.2	0.5	0.1	1	6.11	1.01E+06
Di-n-octyl phthalate	117840	1.80E-02	NA	4.70E+02	NA	NA	0.2	0.5	0.1	1	7.51	2.41E+07
Diacetone alcohol (I)	123422	NA	NA	2.40E+03	NA	NA	0.2	1	0.1	1	-0.34	0.464
Diazinon	333415	1.80E-04	NA	NA	NA	NA	0.2	1	0.1	1	3.4	2,200
Dibenzo(a,h)anthracene (Q)	53703	NA	4.10E+00	NA	NA	NA	0.2	0.5	0.13	1	6.69	3.77E+06
Dibenzofuran	132649	NA	NA	1.00E-01	NA	NA	0.2	1	0.1	1	4.2	13,500
Dibromochloromethane	124481	2.10E-02	4.90E-02	NA	2.45E-05	NA	0.2	1	0.1	1	2.17	62.6
Dibromochloropropane	96128	NA	1.20E+00	2.00E-01	5.60E-03	NA	0.2	1	0.1	1	2.68	431
Dibromomethane	74953	1.10E-02	NA	NA	NA	NA	0.2	1	0.1	1	1.62	39.2
Dicamba	1918009	3.00E-02	NA	NA	NA	NA	0.2	0.5	0.1	1	2.4	95.3
1,2-Dichlorobenzene	95501	8.60E-02	NA	1.50E+03	NA	3.01E+05	0.2	1	0.1	1	3.43	623

1,3-Dichlorobenzene	541731	9.00E-04	NA	3.00E+00	NA	NA	0.2	1	0.1	1	3.5	708
1,4-Dichlorobenzene	106467	NA	1.30E-02	8.00E+02	6.90E-06	NA	0.2	1	0.1	1	3.42	612
3,3'-Dichlorobenzidine	91941	NA	8.00E-01	NA	4.80E-04	NA	0.2	1	0.1	1	3.51	721
Dichlorodifluoromethane	75718	2.30E-01	NA	4.95E+04	NA	NA	0.2	1	0.1	1	2.15	60.4
1,1-Dichloroethane	75343	1.20E-01	NA	5.00E+02	NA	NA	0.2	1	0.1	1	1.79	31.3
1,2-Dichloroethane (l)	107062	NA	5.80E-02	NA	2.60E-05	NA	0.2	1	0.1	1	1.47	17.5
1,1-Dichloroethylene (l)	75354	9.00E-04	NA	2.00E+02	5.00E-05	7.90E+04	0.2	1	0.1	1	2.13	58.2
cis-1,2-Dichloroethylene	156592	1.10E-02	NA	3.40E+01	NA	NA	0.2	1	0.1	1	1.86	35.6

**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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Hazardous Substance	Chemical Abstract Service Number	Soil Koc for Ionizing Organic Compounds at pH=6.8	Soil-Water Distribution Coefficients for Inorganic Compounds at pH=6.8	Henry's Law Constant at 25°C	Air Diffusivity	Water Diffusivity	Lower Explosive Limit in Air	Flash Point	Water Solubility	Physical State at Standard Temperature and Pressure	Molecular Weight
			Kd	HLC	D <sub>l</sub> or D <sub>g</sub> or D <sup>air</sup>	D <sub>w</sub>	LEL	FP	S		
		L/kg	L/kg	atm-m <sup>3</sup> /mol	cm <sup>2</sup> /s	cm <sup>2</sup> /s	unitless	°F	ug/L	unitless	g/mol
Cyanide (P,R)	57125	NR	NR	NR	0.08	8.00E-06	NA	NA	NA	Inorganic	26.02
Cyclohexanone	108941	NR	NR	7.80E+00	0.08	8.00E-06	NA	146	2.30E+07	Liquid	98.14
Dacthal	1861321	NR	NR	2.18E-06	0.08	8.00E-06	NA	NA	500	Solid	331
Dalapon	75990	NR	NR	6.43E-08	0.08	8.00E-06	NA	NA	5.02E+08	Liquid	142.97
4-4'-DDD	72548	NR	NR	4.00E-06	0.0169	4.76E-06	NA	NA	90	Solid	320.05
4-4'-DDE	72559	NR	NR	2.10E-05	0.0144	5.87E-06	NA	NA	120	Solid	518.03
4-4'-DDT	50293	NR	NR	8.10E-06	0.0137	4.95E-06	NA	162	25	Solid	354.49
Decabromodiphenyl ether	1163195	NR	NR	4.02E-05	0.08	8.00E-06	NA	NA	30	Solid	959.22
Di-n-butyl phthalate	84742	NR	NR	9.38E-10	0.0438	7.86E-06	NA	315	11,200	Liquid	278.34
Di(2-ethylhexyl) adipate	103231	NR	NR	4.34E-07	0.08	8.00E-06	NA	NA	471	Liquid	370
Di-n-octyl phthalate	117840	NR	NR	7.66E-07	0.0151	3.58E-06	NA	NA	3,000	Liquid	390.62
Diacetone alcohol (I)	123422	NR	NR	2.61E-07	0.08	8.00E-06	0.018	125	1.00E+09	Liquid	116.2
Diazinon	333415	NR	NR	1.13E-07	0.08	8.00E-06	NA	180	68,800	Liquid	304.3
Dibenzo(a,h)anthracene (Q)	53703	NR	NR	1.47E-08	0.0202	5.18E-06	NA	NA	2.49	Solid	278.36
Dibenzofuran	132649	NR	NR	1.30E-05	0.08	8.00E-06	NA	NA	10,000	Solid	168.21
Dibromochloromethane	124481	NR	NR	7.83E-04	0.0229	1.05E-05	NA	NA	2.60E+06	Liquid	208.29
Dibromochloropropane	96128	NR	NR	1.90E-04	0.08	8.00E-06	NA	170	1,230	Liquid	236.34
Dibromomethane	74953	NR	NR	9.00E-04	0.08	8.60E-06	NA	NA	1.10E+07	Liquid	173.85
Dicamba	1918009	NR	NR	7.90E-09	0.08	8.00E-06	NA	NA	4.50E+06	Solid	221.04
1,2-Dichlorobenzene	95501	NR	NR	1.90E-03	0.069	7.90E-06	0.022	151	1.56E+05	Liquid	147.01

1,3-Dichlorobenzene	541731	NR	NR	1.80E-03	0.08	8.00E-06	NA	NA	1.11E+05	Liquid	147.01
1,4-Dichlorobenzene	106467	NR	NR	2.43E-03	0.069	7.90E-06	0.025	150	73,800	Solid	147
3,3'-Dichlorobenzidine	91941	NR	NR	4.00E-09	0.0194	6.74E-06	NA	NA	3,110	Solid	253.1
Dichlorodifluoromethane	75718	NR	NR	2.60E+00	0.08	8.00E-06	NA	NA	3.00E+05	Liquid	120.91
1,1-Dichloroethane	75343	NR	NR	5.62E-03	0.0742	1.05E-05	0.054	2	5.06E+06	Liquid	98.96
1,2-Dichloroethane (l)	107062	NR	NR	9.79E-04	0.104	9.90E-06	0.062	56	8.52E+06	Liquid	98.97
1,1-Dichloroethylene (l)	75354	NR	NR	2.61E-02	0.09	1.04E-05	0.065	-2	2.25E+06	Liquid	96.94
cis-1,2-Dichloroethylene	156592	NR	NR	4.08E-03	0.0736	1.13E-05	0.056	36	3.50E+06	Liquid	96.94



**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA FOR PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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Hazardous Substance	Chemical Abstract Service Number	Oral Reference Dose	Oral Slope Factor	Chronic Inhalation Reference Concentration	Inhalation Unit Risk Factor	Occupational Short Term Exposure Level	Relative Source Contribution for Drinking Water	Ingestion Absorption Efficiency	Dermal Absorption Efficiency	Relative Source Contribution for Soil	Log Octanol-Water Partition Coefficient	Soil Organic Carbon-Water Partition Coefficients for Organic Compounds
		RfD	SF	RfC	IURF	STEL	RSC	AEi	AEd	RSC	Log Kow	Koc
		mg/kg-day	(mg/kg-day) <sup>-1</sup>	ug/m <sup>3</sup>	(ug/m <sup>3</sup> ) <sup>-1</sup>	ug/m <sup>3</sup>	unitless	unitless	unitless	unitless	unitless	L/kg
trans-1,2-Dichloroethylene	156605	1.70E-02	NA	7.00E+01	NA	NA	0.2	1	0.1	1	2.07	52.2
2,6-Dichloro-4-nitroaniline	99309	3.00E-01	NA	NA	NA	NA	0.2	1	0.1	1	2.76	517
2,4-Dichlorophenol	120832	1.00E-02	NA	7.70E+01	NA	NA	0.2	1	0.1	1	3.08	147
2,4-Dichlorophenoxyacetic acid	94757	1.00E-02	NA	1.00E+02	NA	NA	0.2	1	0.05	1	2.7	451
1,2-Dichloropropane (l)	78875	4.40E-01	3.70E-02	4.00E+00	NA	5.08E+05	0.2	1	0.1	1	1.97	43.5
1,3-Dichloropropene	542756	3.40E-02	1.00E-01	2.00E+01	4.00E-06	NA	0.2	1	0.1	1	2	45.9
Dichlorovos	62737	4.00E-04	5.20E-01	5.00E-01	NA	NA	0.2	1	0.1	1	1.4	15.4
Dicyclohexyl phthalate	84617	NA	NA	NA	NA	NA	0.2	0.5	0.1	1	6.2	1.24E+06
Dieldrin	60571	7.60E-05	8.00E+00	NA	4.60E-03	NA	0.2	0.5	0.1	1	5.37	21,400
Diethyl ether	60297	5.00E-01	NA	1.20E+04	NA	1.52E+06	0.2	1	0.1	1	0.83	6.55
Diethyl phthalate	84662	7.50E-01	NA	5.00E+01	NA	NA	0.2	1	0.1	1	2.5	287
Diethylene glycol monobutyl ether	112345	1.20E-02	NA	2.00E+01	NA	NA	0.2	1	0.1	1	0.32	2.06
Diisopropyl ether	108203	4.10E-03	NA	3.58E+02	NA	NA	0.2	1	0.1	1	1.67	25.2
Diisopropylamine (l)	108189	7.70E-04	NA	2.00E+02	NA	NA	0.2	1	0.1	1	1.6	37.4
Dimethyl phthalate	131113	1.00E+01	NA	5.00E+01	NA	NA	0.2	1	0.1	1	1.64	41
N,N-Dimethylacetamide	127195	2.50E-02	NA	NA	NA	NA	0.2	1	0.1	1	-0.77	0.175
N,N-Dimethylaniline	121697	2.20E-03	NA	NA	1.18E-05	5.00E+04	0.2	1	0.1	1	2.46	262
Dimethylformamide (l)	68122	9.60E-02	NA	3.00E+01	NA	NA	0.2	1	0.1	1	-1.01	0.102
2,4-Dimethylphenol	105679	5.00E-02	NA	7.00E+01	NA	NA	0.2	1	0.1	1	2.36	209
2,6-Dimethylphenol	576261	6.00E-04	NA	2.00E+00	NA	NA	0.2	1	0.1	1	2.36	209

3,4-Dimethylphenol	95658	1.40E-03	NA	3.50E+00	NA	NA	0.2	1	0.1	1	2.23	156
Dimethylsulfoxide	67685	3.00E+01	NA	2.00E+01	NA	NA	0.2	1	0.1	1	-1.66	0.0234
2,4-Dinitrotoluene	121142	2.00E-03	1.10E-01	2.00E+00	2.00E-04	NA	0.2	1	0.1	1	2.01	94.6
Dinoseb	88857	1.00E-03	NA	4.00E+00	NA	NA	0.2	1	0.1	1	3.15	1,250
1,4-Dioxane (l)	123911	NA	1.00E-02	100	5.50E-06	NA	0.2	1	0.1	1	-0.39	0.588
Diquat	85007	2.20E-03	NA	NA	NA	NA	0.2	1	0.1	1	-2.82	0.00169
Dissolved oxygen (DO)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diuron	330541	4.30E-03	NA	7.00E+00	NA	NA	0.2	1	0.1	1	2.77	187

**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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Hazardous Substance	Chemical Abstract Service Number	Soil Koc for Ionizing Organic Compounds at pH=6.8	Soil-Water Distribution Coefficients for Inorganic Compounds at pH=6.8	Henry's Law Constant at 25°C	Air Diffusivity	Water Diffusivity	Lower Explosive Limit in Air	Flash Point	Water Solubility	Physical State at Standard Temperature and Pressure	Molecular Weight
			Kd	HLC	D <sub>i</sub> or D <sub>a</sub> or D <sup>air</sup>	D <sub>w</sub>	LEL	FP	S		
		L/kg	L/kg	atm·m <sup>3</sup> /mol	cm <sup>2</sup> /s	cm <sup>2</sup> /s	unitless	°F	ug/L	unitless	g/mol
trans-1,2-Dichloroethylene	156605	NR	NR	9.38E-03	0.0707	1.19E-05	0.056	36	6.30E+06	Liquid	96.94
2,6-Dichloro-4-nitroaniline	99309	NR	NR	4.67E-08	0.08	8.00E-06	NA	NA	7,000	Solid	207.02
2,4-Dichlorophenol	120832	147	NR	3.16E-06	0.0346	8.77E-06	NA	NA	4.50E+06	Liquid	163
2,4-Dichlorophenoxyacetic acid	94757	NR	NR	4.50E-06	0.059	6.50E-06	NA	NA	6.80E+05	Solid	221.04
1,2-Dichloropropane (l)	78875	NR	NR	2.80E-03	0.0782	8.73E-06	0.034	60	2.80E+06	Liquid	112.99
1,3-Dichloropropene	542756	NR	NR	1.77E-02	0.0626	1.00E-05	0.053	77	2.80E+06	Liquid	110.97
Dichlorovos	62737	NR	NR	9.58E-07	0.08	8.00E-06	NA	175	1.60E+07	Liquid	220.98
Dicyclohexyl phthalate	84617	NR	NR	7.61E-05	0.08	8.00E-06	NA	NA	4,000	Solid	330.43
Dieldrin	60571	NR	NR	1.51E-05	0.0125	4.74E-06	NA	NA	195	Solid	380.9
Diethyl ether	60297	NR	NR	8.70E-04	0.074	9.30E-06	0.019	-49	6.10E+07	Liquid	74.12
Diethyl phthalate	84662	NR	NR	4.50E-07	0.0256	6.35E-06	NA	322	1.08E+06	Liquid	222.23
Diethylene glycol monobutyl ether	112345	NR	NR	1.52E-09	0.08	8.00E-06	NA	NA	1.00E+09	Liquid	162.23
Diisopropyl ether	108203	NR	NR	1.30E-03	0.08	8.00E-06	0.014	-18	8,041	Liquid	102.18
Diisopropylamine (l)	108189	NR	NR	9.60E-05	0.08	8.00E-06	0.011	20	3.69E+07	Liquid	101.22
Dimethyl phthalate	131113	NR	NR	5.78E-07	0.067	6.30E-06	NA	295	4.19E+06	Liquid	194.19
N,N-Dimethylacetamide	127195	NR	NR	1.31E-08	0.08	8.00E-06	NA	158	1.00E+09	Liquid	87.14
N,N-Dimethylaniline	121697	NR	NR	8.12E-05	0.08	8.00E-06	NA	142	1.27E+06	Liquid	121.18
Dimethylformamide (l)	68122	NR	NR	7.39E-08	0.08	8.00E-06	NA	136	1.00E+09	Liquid	73.1
2,4-Dimethylphenol	105679	NR	NR	2.00E-06	0.0584	8.69E-06	NA	NA	7.87E+06	Solid	122.16
2,6-Dimethylphenol	576261	NR	NR	5.02E-06	0.08	8.00E-06	NA	NA	6.14E+06	Solid	122.16

3,4-Dimethylphenol	95658	NR	NR	3.78E-07	0.08	8.00E-06	NA	NA	4.93E+06	Solid	122.16
Dimethylsulfoxide	67685	NR	NR	5.80E-08	0.08	8.00E-06	NA	NA	1.66E+08	Liquid	78.14
2,4-Dinitrotoluene	121142	NR	NR	9.26E-08	0.203	7.06E-06	NA	NA	2.70E+05	Solid	183.15
Dinoseb	88857	NR	NR	4.60E-07	0.08	8.00E-06	NA	NA	52,000	Liquid	240.2
1,4-Dioxane (l)	123911	NR	NR	4.90E-06	0.23	1.00E-05	0.02	55	9.00E+08	Liquid	88.11
Diquat	85007	NR	NR	1.42E-13	0.08	8.00E-06	NA	NA	7.00E+05	Solid	344.08
Dissolved oxygen (DO)	NA	NR	NA	NR	NA	NA	NA	NA	NA	NA	NA
Diuron	330541	NR	NR	2.70E-06	0.08	8.00E-06	NA	NA	37,300	Solid	233.1

**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA FOR PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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Hazardous Substance	Chemical Abstract Service Number	Oral Reference Dose	Oral Slope Factor	Chronic Inhalation Reference Concentration	Inhalation Unit Risk Factor	Occupational Short Term Exposure Level	Relative Source Contribution for Drinking Water	Ingestion Absorption Efficiency	Dermal Absorption Efficiency	Relative Source Contribution for Soil	Log Octanol-Water Partition Coefficient	Soil Organic Carbon-Water Partition Coefficients for Organic Compounds
		RfD	SF	RfC	IURF	STEL	RSC	AEi	AEd	RSC	Log Kow	Koc
		mg/kg-day	(mg/kg-day) <sup>-1</sup>	ug/m <sup>3</sup>	(ug/m <sup>3</sup> ) <sup>-1</sup>	ug/m <sup>3</sup>	unitless	unitless	unitless	unitless	unitless	L/kg
Endosulfan (J)	115297	6.00E-03	NA	NA	NA	NA	0.2	1	0.1	1	4.1	2,110
Endothall	145733	1.70E-02	NA	3.50E+01	NA	NA	0.2	1	0.1	1	-0.55	0.288
Endrin	72208	1.70E-04	NA	NA	NA	NA	0.2	0.5	0.1	1	5.06	12,200
Epichlorohydrin (I)	106898	1.00E-03	5.90E-01	1.00E+00	1.20E-06	NA	0.2	1	0.1	1	0.26	1.92
Ethanol (I)	64175	6.20E+01	NA	1.90E+04	NA	NA	1	1	0.1	1	-0.31	0.496
Ethyl acetate (I)	141786	9.00E-01	NA	3.20E+03	NA	NA	0.2	1	0.1	1	0.69	4.77
Ethyl-tert-butyl ether (ETBE)	637923	NA	NA	3.73E+02	NA	NA	NA	1	0.1	1	1.92	3.97
Ethylbenzene (I)	100414	9.70E-02	NA	1.00E+03	3.10E-07	5.43E+05	0.2	1	0.1	1	3.14	367
Ethylene dibromide	106934	NA	5.70E+01	9.00E+00	2.20E-04	NA	0.2	1	0.1	1	1.75	52.5
Ethylene glycol	107211	2.00E+00	NA	1.00E+03	NA	1.00E+05	0.2	1	0.1	1	-1.4	0.0421
Ethylene glycol monobutyl ether	111762	5.00E-01	NA	1.30E+04	NA	NA	0.2	1	0.1	1	0.83	6.55
Fluoranthene	206440	1.20E-01	NA	1.40E+02	NA	NA	0.2	0.5	0.1	1	5.12	1.08E+05
Fluorene	86737	1.20E-01	NA	1.40E+02	NA	NA	0.2	1	0.1	1	4.21	13,800
Fluorine (soluble fluoride) (B)	7782414	6.00E-02	NA	NA	NA	3.10E+03	1	0.5	0.01	1	NR	NR
Formaldehyde	50000	1.80E-01	NA	9.00E+00	1.30E-05	3.70E+02	0.2	1	0.1	1	-0.051	1.09
Formic acid (I,U)	64186	1.40E+00	NA	2.00E+00	NA	1.90E+04	0.2	1	0.1	1	-0.538	0.449
1-Formylpiperidine	2591868	1.10E-02	NA	NA	NA	NA	0.2	1	0.1	1	NA	NA
Gentian violet	548629	1.40E-01	5.50E-02	NA	NA	NA	0.2	1	0.1	1	0.51	3.17
Glyphosate	1071836	1.00E-01	NA	NA	NA	NA	0.2	0.5	0.1	1	-4.47	4.04E-05
Heptachlor	76448	2.30E-03	1.60E+00	NA	1.30E-03	NA	0.2	0.5	0.1	1	6.26	1.43E+06

Heptachlor epoxide	1024573	8.50E-06	2.90E+00	NA	2.60E-03	NA	0.2	0.5	0.1	1	5	82,300
n-Heptane	142825	4.40E+00	NA	3.50E+03	NA	2.05E+06	0.2	1	0.1	1	4.72	43,700
Hexabromobenzene	87821	2.80E-03	NA	NA	NA	NA	0.2	0.5	0.1	1	6.1	9.92E+05
Hexachlorobenzene (C-66)	118741	8.00E-04	1.00E+00	NA	4.60E-04	NA	0.2	0.5	0.1	1	5.89	55,300
Hexachlorobutadiene (C-46)	87683	2.00E-03	5.20E-02	NA	2.20E-05	NA	0.2	1	0.1	1	4.81	53,500
alpha-Hexachlorocyclohexane	319846	NA	2.00E+00	NA	1.83E-03	NA	0.2	1	0.1	1	3.8	1,220
beta-Hexachlorocyclohexane	319857	NA	9.70E-01	NA	5.30E-04	NA	0.2	1	0.1	1	3.81	1,250
Hexachlorocyclopentadiene (C-56)	77474	6.00E-03	NA	2.00E-01	NA	NA	0.2	0.5	0.1	1	5.39	1.99E+05

**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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Hazardous Substance	Chemical Abstract Service Number	Soil Koc for Ionizing Organic Compounds at pH=6.8	Soil-Water Distribution Coefficients for Inorganic Compounds at pH=6.8	Henry's Law Constant at 25°C	Air Diffusivity	Water Diffusivity	Lower Explosive Limit in Air	Flash Point	Water Solubility	Physical State at Standard Temperature and Pressure	Molecular Weight
					D <sub>i</sub> or D <sub>a</sub> or D <sup>air</sup>	D <sub>w</sub>	LEL	FP	S		
		L/kg	L/kg	atm·m <sup>3</sup> /mol	cm <sup>2</sup> /s	cm <sup>2</sup> /s	unitless	°F	ug/L	unitless	g/mol
Endosulfan (J)	115297	NR	NR	1.12E-05	0.0115	4.55E-06	NA	NA	510	Solid	406.9
Endothall	145733	NR	NR	2.60E-10	0.08	8.00E-06	NA	NA	1.00E+08	Solid	186.18
Endrin	72208	NR	NR	7.52E-06	0.0125	4.74E-06	NA	NA	250	Solid	380.9
Epichlorohydrin (I)	106898	NR	NR	3.00E-05	0.086	9.80E-06	0.038	93	6.60E+07	Liquid	92.53
Ethanol (I)	64175	NR	NR	6.29E-06	0.08	8.00E-06	0.033	55	1.00E+09	Liquid	46.07
Ethyl acetate (I)	141786	NR	NR	1.70E-04	0.073	9.70E-06	0.02	24	6.40E+07	Liquid	88.12
Ethyl-tert-butyl ether (ETBE)	637923	NR	NR	1.39E-03	0.08	8.00E-06	NA	NA	5.63E+06	Liquid	102.18
Ethylbenzene (I)	100414	NR	NR	7.88E-03	0.075	7.80E-06	0.008	55	1.69E+05	Liquid	106.17
Ethylene dibromide	106934	NR	NR	4.60E-04	0.08	8.00E-06	NA	NA	4.20E+06	Liquid	187.9
Ethylene glycol	107211	NR	NR	6.00E-08	0.08	8.00E-06	0.032	232	1.00E+09	Liquid	62.07
Ethylene glycol monobutyl ether	111762	NR	NR	5.13E-02	0.08	8.00E-06	NA	143	2.24E+08	Liquid	118.2
Fluoranthene	206440	NR	NR	1.61E-05	0.0302	6.35E-06	NA	NA	206	Solid	202.24
Fluorene	86737	NR	NR	6.36E-05	0.0363	7.88E-06	NA	NA	1,980	Solid	166.23
Fluorine (soluble fluoride) (B)	7782414	NR	NA	NR	NR	NR	NA	NA	NA	Inorganic	38
Formaldehyde	50000	NR	NR	2.80E-04	0.18	2.00E-05	0.07	NA	5.50E+08	Liquid	30.03
Formic acid (I,U)	64186	NR	NR	2.50E-06	0.079	1.40E-06	0.18	122	1.00E+09	Liquid	46.03
1-Formylpiperidine	2591868	NR	NR	NA	0.08	8.00E-06	NA	NA	NA	Liquid	113.2
Gentian violet	548629	NR	NR	3.06E-16	0.08	8.00E-06	NA	NA	1.00E+06	Solid	408
Glyphosate	1071836	NR	NR	1.50E-09	0.08	8.00E-06	NA	NA	1.16E+07	Solid	169.09
Heptachlor	76448	NR	NR	1.48E-03	0.0112	5.69E-06	NA	NA	180	Solid	373.4
Heptachlor epoxide	1024573	NR	NR	9.50E-06	0.0132	4.23E-06	NA	NA	200	Solid	389.32

n-Heptane	142825	NR	NR	2.11E+00	0.08	8.00E-06	0.0105	25	2,690	Liquid	100.2
Hexabromobenzene	87821	NR	NR	1.30E-05	0.08	8.00E-06	NA	NA	0.17	Solid	551
Hexachlorobenzene (C-66)	118741	NR	NR	1.32E-03	0.0542	5.91E-06	NA	NA	6,200	Solid	284.78
Hexachlorobutadiene (C-46)	87683	NR	NR	8.15E-03	0.0561	6.16E-06	NA	NA	3,230	Liquid	260.76
alpha-Hexachlorocyclohexane	319846	NR	NR	1.06E-05	0.0142	7.34E-06	NA	NA	2,000	Solid	290.82
beta-Hexachlorocyclohexane	319857	NR	NR	7.43E-07	0.0142	7.34E-06	NA	NA	240	Solid	290.82
Hexachlorocyclopentadiene (C-56)	77474	NR	NR	2.70E-02	0.0161	7.21E-06	NA	NA	1,800	Liquid	272.77



**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA FOR PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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Hazardous Substance	Chemical Abstract Service Number	Oral Reference Dose	Oral Slope Factor	Chronic Inhalation Reference Concentration	Inhalation Unit Risk Factor	Occupational Short Term Exposure Level	Relative Source Contribution for Drinking Water	Ingestion Absorption Efficiency	Dermal Absorption Efficiency	Relative Source Contribution for Soil	Log Octanol-Water Partition Coefficient	Soil Organic Carbon-Water Partition Coefficients for Organic Compounds
		RfD	SF	RfC	IURF	STEL	RSC	AEi	AEd	RSC	Log Kow	Koc
		mg/kg-day	(mg/kg-day) <sup>-1</sup>	ug/m <sup>3</sup>	(ug/m <sup>3</sup> ) <sup>-1</sup>	ug/m <sup>3</sup>	unitless	unitless	unitless	unitless	unitless	L/kg
Hexachloroethane	67721	1.00E-03	8.50E-03	3.50E+00	4.00E-06	NA	0.2	1	0.1	1	4	1,760
n-Hexane	110543	4.10E-01	NA	2.00E+02	NA	NA	0.2	1	0.1	1	4	1,760
2-Hexanone	591786	1.40E-01	NA	4.00E+01	NA	NA	0.2	1	0.1	1	1.4	23.8
Indeno(1,2,3-cd)pyrene (Q)	193395	NA	4.10E-01	NA	NA	NA	0.2	0.5	0.13	1	6.65	3.45E+06
Iron (B)	7439896	3.00E-01	NA	NA	NA	NA	0.2	0.5	0.01	1	NR	NR
Isobutyl alcohol (I)	78831	3.20E-01	NA	1.50E+03	NA	NA	0.2	1	0.1	1	0.75	5.46
Isophorone	78591	1.50E-01	1.10E-03	2.80E+02	2.70E-07	2.80E+04	0.2	1	0.1	1	1.699	46.8
Isopropyl alcohol (I)	67630	6.40E-02	NA	2.20E+02	NA	1.23E+06	0.2	1	0.1	1	0.05	1.31
Isopropyl benzene	98828	1.10E-01	NA	8.70E+01	NA	NA	0.2	1	0.1	1	3.6	3,460
Lead (B)	7439921	NA	NA	1.50E+00	NA	NA	0.2	0.5	0.01	1	NR	NR
Lindane	58899	3.30E-04	7.10E-01	NA	NA	NA	0.2	1	0.04	1	3.73	1,080
Lithium (B)	7439932	2.80E-02	NA	3.50E+01	NA	NA	0.2	0.5	0.01	1	NR	NR
Magnesium (B)	7439954	1.10E+01	NA	1.00E+02	NA	NA	1	0.5	0.01	1	NR	NR
Manganese (B)	7439965	4.70E-02	NA	5.00E-02	NA	NA	0.5	0.5	0.01	1	NR	NR
Mercury (Total) (B,Z)	Varies	3.00E-04	NA	3.00E-01	NA	NA	0.2	0.5	0.01	1	5.95	NR
Methane	74828	NA	NA	NA	NA	NA	0.2	1	0.1	1	1.09	11.8
Methanol	67561	5.00E-01	NA	3.25E+03	NA	3.28E+06	0.2	1	0.1	1	-0.72	0.196
Methoxychlor	72435	5.00E-03	NA	NA	NA	NA	0.2	0.5	0.1	1	5.08	12,600
2-Methoxyethanol (I)	109864	1.00E-03	NA	2.00E+01	NA	NA	0.2	1	0.1	1	-0.77	0.175
2-Methyl-4-chlorophenoxyacetic acid	94746	1.00E-03	NA	NA	NA	NA	0.2	1	0.1	1	3.25	1,570

2-Methyl-4,6-dinitrophenol	534521	3.50E-04	NA	2.00E+00	NA	NA	0.2	1	0.1	1	2.1	116
N-Methyl-morpholine (l)	109024	2.70E-03	NA	NA	NA	NA	0.2	1	0.1	1	-0.33	0.474
Methyl parathion	298000	2.50E-04	NA	NA	NA	NA	0.2	1	0.1	1	2.9	710
4-Methyl-2-pentanone (MIBK) (l)	108101	2.50E-01	NA	2.05E+03	NA	3.07E+06	0.2	1	0.1	1	1.18	14.5
Methyl-tert-butyl ether (MTBE)	1634044	3.30E-02	3.40E-03	3.00E+03	NA	NA	0.2	1	0.1	1	0.99	9.41
Methylcyclopentane (l)	96377	NA	NA	700	NA	NA	0.2	1	0.1	1	3.37	2,060
4,4'-Methylene-bis-2- chloroaniline	101144	7.30E-04	7.70E-01	NA	3.70E-05	NA	0.2	1	0.1	1	3.92	7,140
Methylene chloride	75092	5.80E-02	4.20E-03	2.00E+03	4.70E-07	NA	0.2	1	0.1	1	1.26	11.9

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Hazardous Substance	Chemical Abstract Service Number	Soil Koc for Ionizing Organic Compounds at pH=6.8	Soil-Water Distribution Coefficients for Inorganic Compounds at pH=6.8	Henry's Law Constant at 25°C	Air Diffusivity	Water Diffusivity	Lower Explosive Limit in Air	Flash Point	Water Solubility	Physical State at Standard Temperature and Pressure	Molecular Weight
			Kd	HLC	D <sub>i</sub> or D <sub>a</sub> or D <sup>air</sup>	D <sub>w</sub>	LEL	FP	S		MW
		L/kg	L/kg	atm-m <sup>3</sup> /mol	cm <sup>2</sup> /s	cm <sup>2</sup> /s	unitless	°F	ug/L	unitless	g/mol
Hexachloroethane	67721	NR	NR	3.89E-03	0.0025	6.80E-06	NA	NA	50,000	Solid	236.74
n-Hexane	110543	NR	NR	1.40E-02	0.08	8.00E-06	0.011	-7	12,000	Liquid	86.18
2-Hexanone	591786	NR	NR	9.57E-05	0.08	8.00E-06	NA	77	1.60E+07	Liquid	100.16
Indeno(1,2,3-cd)pyrene (Q)	193395	NR	NR	1.60E-06	0.019	5.66E-06	NA	NA	0.022	Solid	276.34
Iron (B)	7439896	NR	NA	NR	NR	NR	NA	NA	NA	Inorganic	55.845
Isobutyl alcohol (I)	78831	NR	NR	1.30E-05	0.08	8.00E-06	NA	82	7.60E+07	Liquid	74.14
Isophorone	78591	NR	NR	6.20E-06	0.0623	6.76E-06	0.008	184	1.20E+07	Liquid	138.23
Isopropyl alcohol (I)	67630	NR	NR	8.07E-06	0.08	8.00E-06	0.02	53	1.00E+09	Liquid	60.09
Isopropyl benzene	98828	NR	NR	1.50E-02	0.086	7.10E-06	0.009	96	56,000	Liquid	122.16
Lead (B)	7439921	NR	11,000	NR	NR	NR	NA	NA	NA	Inorganic	207.2
Lindane	58899	NR	NR	1.40E-05	0.0176	7.34E-06	NA	NA	6,800	Solid	290.9
Lithium (B)	7439932	NR	NA	NR	NR	NR	NA	NA	NA	Inorganic	6.941
Magnesium (B)	7439954	NR	NA	NR	NR	NR	NA	NA	NA	Inorganic	24.305
Manganese (B)	7439965	NR	NA	NR	NR	NR	NA	NA	NA	Inorganic	54.938
Mercury (Total) (B,Z)	Varies	NR	52	7.10E-10	0.037	6.30E-06	NA	NA	56	Inorganic	200.59
Methane	74828	NR	NR	6.58E-01	0.08	8.00E-06	0.053	-306	NA	Gas	16.04
Methanol	67561	NR	NR	1.70E-04	0.15	1.30E-05	0.06	52	2.90E+07	Liquid	32.05
Methoxychlor	72435	NR	NR	1.58E-05	0.0156	4.46E-06	NA	NA	45	Solid	345.7
2-Methoxyethanol (I)	109864	NR	NR	9.51E-07	0.08	8.00E-06	NA	NA	1.00E+09	Liquid	76.1
2-Methyl-4-chlorophenoxyacetic acid	94746	NR	NR	1.33E-09	0.08	8.00E-06	NA	NA	9.24E+05	Solid	305.79

2-Methyl-4,6-dinitrophenol	534521	NR	NR	4.30E-07	0.08	8.00E-06	NA	NA	2.00E+05	Solid	198.13
N-Methyl-morpholine (l)	109024	NR	NR	2.50E-07	0.08	8.00E-06	NA	NA	1.00E+09	Liquid	101.17
Methyl parathion	298000	NR	NR	1.10E-07	0.08	8.00E-06	NA	NA	50,000	Solid	263.23
4-Methyl-2-pentanone (MIBK) (l)	108101	NR	NR	1.20E-04	0.075	7.80E-06	NA	64	2.00E+07	Liquid	100.2
Methyl-tert-butyl ether (MTBE)	1634044	NR	NR	6.39E-04	0.08	8.00E-06	NA	NA	4.68E+07	Liquid	88.15
Methylcyclopentane (l)	96377	NR	NR	3.63E-01	0.08	8.00E-06	NA	NA	73,890	Liquid	84.16
4,4'-Methylene-bis-2-chloroaniline	101144	NR	NR	4.10E-11	0.08	8.00E-06	NA	NA	14,000	Solid	267.17
Methylene chloride	75092	NR	NR	2.40E-03	0.101	1.17E-05	0.13	NA	1.70E+07	Liquid	50.5

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Hazardous Substance	Chemical Abstract Service Number	Oral Reference Dose	Oral Slope Factor	Chronic Inhalation Reference Concentration	Inhalation Unit Risk Factor	Occupational Short Term Exposure Level	Relative Source Contribution for Drinking Water	Ingestion Absorption Efficiency	Dermal Absorption Efficiency	Relative Source Contribution for Soil	Log Octanol-Water Partition Coefficient	Soil Organic Carbon-Water Partition Coefficients for Organic Compounds
		RfD	SF	RfC	IURF	STEL	RSC	AEi	AEd	RSC	Log Kow	Koc
		mg/kg-day	(mg/kg-day) <sup>-1</sup>	ug/m <sup>3</sup>	(ug/m <sup>3</sup> ) <sup>-1</sup>	ug/m <sup>3</sup>	unitless	unitless	unitless	unitless	unitless	L/kg
2-Methylnaphthalene	91576	3.60E-02	NA	1.00E+01	NA	NA	0.2	1	0.1	1	3.9	6,820
Methylphenols (J)	1319773	5.00E-02	NA	1.00E+02	NA	NA	0.2	1	0.1	1	1.99	45.1
Metolachlor	51218452	2.30E-01	3.50E-03	NA	NA	NA	0.2	1	0.1	1	3.13	361
Metribuzin	21087649	2.50E-02	NA	NA	NA	NA	0.2	0.5	0.1	1	1.7	46.9
Mirex	2385855	2.30E-04	9.30E-01	NA	NA	NA	0.2	0.5	0.1	1	6.7	3.86E+06
Molybdenum (B)	7439987	5.00E-03	NA	NA	NA	NA	0.4	0.5	0.01	1	NR	NR
Naphthalene	91203	7.10E-02	NA	3.00E+00	3.10E-06	7.90E+04	0.2	1	0.1	1	3.36	2,010
Nickel (B)	7440020	7.60E-02	NA	NA	2.40E-04	NA	0.2	0.5	0.01	1	NR	NR
Nitrate (B,N)	14797558	1.60E+00	NA	NA	NA	NA	1	0.5	0.01	1	NR	NR
Nitrite (B,N)	14797650	1.00E-01	NA	NA	NA	NA	1	0.5	0.01	1	NR	NR
Nitrobenzene (I)	98953	4.60E-04	NA	7.00E-01	2.00E-05	NA	0.2	1	0.1	1	1.84	64.4
2-Nitrophenol	88755	2.80E-03	NA	NA	NA	NA	0.2	1	0.1	1	1.8	58.8
n-Nitroso-di-n-propylamine	621647	2.50E-01	4.50E+00	NA	2.00E-03	NA	0.2	1	0.1	1	1.4	23.8
N-Nitrosodiphenylamine	86306	2.50E-01	3.10E-03	NA	1.40E-06	NA	0.2	1	0.1	1	3.16	381
Oxamyl	23135220	3.80E-02	NA	NA	NA	NA	0.2	1	0.1	1	-0.47	0.508
Oxo-hexyl acetate	88230357	1.00E-02	NA	3.10E+01	NA	NA	0.2	1	0.1	1	NA	NA
Pendimethalin	40487421	1.20E-01	NA	NA	NA	NA	0.2	0.5	0.1	1	5.18	1.24E+05
Pentachlorobenzene	608935	8.30E-04	NA	NA	NA	NA	0.2	0.5	0.1	1	5.26	1.48E+05
Pentachloronitrobenzene	82688	7.50E-03	NA	5.00E+00	NA	NA	0.2	1	0.1	1	4.64	36,400
Pentachlorophenol	87865	3.00E-02	6.80E-02	1.00E+02	3.00E-05	NA	0.2	0.5	0.25	1	5.09	592

Pentane	109660	NA	NA	1.80E+04	NA	2.21E+06	0.2	1	0.1	1	3.42	2,300
2-Pentene (l)	109682	NA	NA	NA	NA	NA	0.2	1	0.1	1	2.58	344
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR
Phenanthrene	85018	7.10E-03	NA	1.00E-01	NA	NA	0.2	1	0.1	1	4.6	33,300
Phenol	108952	6.00E-01	NA	6.00E+02	NA	NA	0.2	1	0.1	1	1.48	17.8
Phenytoln	57410	3.00E-02	5.10E-02	NA	1.40E-05	NA	0.2	1	0.1	1	2.47	1473
Phosphorus (Total)	7723140	1.10E+01	NA	1.00E+00	NA	NA	0.2	0.5	0.1	1	NR	NA
Phthalic acid	88993	1.90E+00	NA	NA	NA	NA	0.2	1	0.1	1	0.73	5.22

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			Kd	HLC	D <sub>i</sub> or D <sub>a</sub> or D <sup>air</sup>	D <sub>w</sub>	LEL	FP	S		
		L/kg	L/kg	atm·m <sup>3</sup> /mol	cm <sup>2</sup> /s	cm <sup>2</sup> /s	unitless	°F	ug/L	unitless	g/mol
2-Methylnaphthalene	91576	NR	NR	4.99E-04	0.08	8.00E-06	NA	NA	24,600	Solid	142.2
Methylphenols (J)	1319773	NR	NR	1.60E-06	0.074	8.30E-06	NA	178	2.80E+07	Solid	108.13
Metolachlor	51218452	NR	NR	9.90E-09	0.08	8.00E-06	NA	NA	5.30E+05	Liquid	283.83
Metribuzin	21087649	NR	NR	8.80E-02	0.08	8.00E-06	NA	NA	1.20E+06	Solid	214.29
Mirex	2385855	NR	NR	5.16E-04	0.08	8.00E-06	NA	NA	6.80E-06	Solid	545.54
Molybdenum (B)	7439987	NR	NA	NR	NR	NR	NA	NA	NA	Inorganic	95.94
Naphthalene	91203	NR	NR	4.83E-04	0.059	7.50E-06	0.009	174	31,000	Solid	128.17
Nickel (B)	7440020	NR	65	NR	NR	NR	NA	NA	NA	Inorganic	58.7
Nitrate (B,N)	14797558	NR	NA	NR	NR	NR	NA	NA	NA	Inorganic	62
Nitrite (B,N)	14797650	NR	NA	NR	NR	NR	NA	NA	NA	Inorganic	46
Nitrobenzene (I)	98953	NR	NR	2.40E-05	0.076	8.60E-06	NA	190	2.09E+06	Liquid	123.11
2-Nitrophenol	88755	NR	NR	3.50E-06	0.08	8.00E-06	NA	NA	2.50E+06	Solid	139.11
n-Nitroso-di-n-propylamine	621647	NR	NR	2.25E-06	0.0545	8.17E-06	NA	NA	9.89E+06	Liquid	130.22
N-Nitrosodiphenylamine	86306	NR	NR	5.00E-06	0.0312	6.35E-06	NA	NA	35,100	Solid	198.22
Oxamyl	23135220	NR	NR	2.37E-10	0.08	8.00E-06	NA	NA	2.80E+08	Solid	219.29
Oxo-hexyl acetate	88230357	NR	NR	NA	0.08	8.00E-06	NA	NA	NA	Liquid	144.2
Pendimethalin	40487421	NR	NR	8.56E-07	0.08	8.00E-06	NA	NA	275	Solid	281.31
Pentachlorobenzene	608935	NR	NR	8.40E-04	0.067	6.30E-06	NA	NA	650	Liquid	250.3
Pentachloronitrobenzene	82688	NR	NR	2.90E-02	0.08	8.00E-06	NA	NA	32	Solid	295.32
Pentachlorophenol	87865	592	NR	2.44E-08	0.056	6.10E-06	NA	NA	1.85E+06	Solid	266.32

Pentane	109660	NR	NR	1.26E+00	0.08	8.00E-06	0.015	-57	38,200	Liquid	72.15
2-Pentene (l)	109682	NR	NR	2.30E-01	0.08	8.00E-06	NA	NA	2.03E+05	Liquid	70.13
pH	NA	NR	NA	NR	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	85018	NR	NR	2.30E-05	0.08	8.00E-06	NA	NA	1,000	Solid	178.24
Phenol	108952	NR	NR	3.97E-07	0.082	9.10E-06	0.018	175	8.28E+07	Liquid	147.01
Phenytoin	57410	NA	NR	1.02E-11	0.08	8.00E-06	NA	NA	3.20E+04	Solid	252.2718
Phosphorus (Total)	7723140	NR	NR	NR	0.08	8.00E-06	NA	NA	NA	Solid	30.974
Phthalic acid	88993	NR	NR	2.18E-12	0.08	8.00E-06	NA	NA	1.42E+07	Liquid	166.13



**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA FOR  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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Hazardous Substance	Chemical Abstract Service Number	Oral Reference Dose	Oral Slope Factor	Chronic Inhalation Reference Concentration	Inhalation Unit Risk Factor	Occupational Short Term Exposure Level	Relative Source Contribution for Drinking Water	Ingestion Absorption Efficiency	Dermal Absorption Efficiency	Relative Source Contribution for Soil	Log Octanol-Water Partition Coefficient	Soil Organic Carbon-Water Partition Coefficients for Organic Compounds
		RfD	SF	RfC	IURF	STEL	RSC	AEi	AEd	RSC	Log Kow	Koc
		mg/kg-day	(mg/kg-day) <sup>-1</sup>	ug/m <sup>3</sup>	(ug/m <sup>3</sup> ) <sup>-1</sup>	ug/m <sup>3</sup>	unitless	unitless	unitless	unitless	unitless	L/kg
Phthalic anhydride	85449	2.10E+00	NA	NA	NA	NA	0.2	1	0.1	1	1.6	37.4
Picloram	1918021	7.00E-02	NA	NA	NA	NA	0.2	1	0.1	1	0.3	1.97
Piperidine	110894	4.40E-04	NA	1.40E+02	NA	NA	0.2	1	0.1	1	0.84	6.7
Polybrominated biphenyls (J)	67774327	4.30E-06	7.20E+00	NA	NA	NA	0.2	0.5	0.1	1	7.07	8.91E+06
Polychlorinated biphenyls (PCBs) (J,T)	1336363	2.00E-05	2.00E+00	NA	6.00E-04	NA	0.2	0.5	0.14	1	5.58	3.06E+05
Prometon	1610180	2.20E-02	NA	NA	NA	NA	0.2	1	0.1	1	2.99	870
Propachlor	1918167	1.30E-02	NA	NA	NA	NA	0.2	1	0.1	1	2.01	94.6
Propazine	139402	2.70E-02	NA	NA	NA	NA	0.2	1	0.1	1	2.75	505
Propionic acid	79094	1.70E+00	NA	3.00E+02	NA	NA	0.2	1	0.1	1	0.28	1.89
Propyl alcohol (I)	71238	1.90E-01	NA	7.30E+02	NA	6.14E+05	0.2	1	0.1	1	0.25	1.89
n-Propylbenzene (I)	103651	1.10E-02	NA	2.00E+01	NA	NA	0.2	1	0.1	1	3.69	4,240
Propylene glycol	57556	2.00E+01	NA	6.00E+03	NA	NA	0.2	1	0.1	1	-0.92	0.125
Pyrene	129000	7.50E-02	NA	1.00E+02	NA	NA	0.2	0.5	0.1	1	5.11	1.06E+05
Pyridine (I)	110861	1.00E-03	NA	3.50E+00	NA	NA	0.2	1	0.1	1	0.67	4.56
Selenium (B)	7782492	5.00E-03	NA	2.00E+00	NA	NA	0.2	0.5	0.01	1	NR	NR
Silver (B)	7440224	4.70E-03	NA	1.00E-01	NA	NA	0.2	0.5	0.01	1	NR	NR
Silvex (2,4,5-TP)	93721	7.50E-03	NA	NA	NA	NA	0.2	1	0.1	1	3.4	2,200
Simazine	122349	5.20E-03	NA	NA	NA	NA	0.2	1	0.1	1	1.93	79
Sodium	17341252	3.40E+01	NA	NA	NA	NA	0.1	0.5	0.01	1	NR	NR
Sodium azide	26628228	1.20E-02	NA	NA	NA	NA	0.2	1	0.1	1	NA	NA
Strontium (B)	7440246	6.30E-01	NA	NA	NA	NA	0.2	0.5	0.01	1	NR	NR

Styrene	100425	2.00E-01	1.30E-02	1.00E+03	5.70E-07	1.70E+05	0.2	1	0.1	1	2.94	777
Sulfate	14808798	NA	NA	NA	NA	NA	NA	0.5	0.1	1	NR	NR
Tebuthiuron	34014181	7.00E-02	NA	NA	NA	NA	0.2	1	0.1	1	1.78	56.2
2,3,7,8-Tetrabromodibenzo-p-dioxin (O)	50585416	NA	7.50E+04	NA	NA	NA	0.2	0.5	0.03	1	7.24	1.31E+07
1,2,4,5-Tetrachlorobenzene	95943	3.40E-01	NA	1.00E+00	NA	NA	0.2	1	0.1	1	4.64	36,400
2,3,7,8-Tetrachlorodibenzo-p-dioxin (O)	1746016	NA	7.50E+04	2.00E-06	4.40E+01	NA	0.2	0.5	0.03	1	7.04	8.33E+06
1,1,1,2-Tetrachloroethane	630206	8.90E-02	1.10E-02	NA	7.40E-06	NA	0.2	1	0.1	1	2.63	145

**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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Hazardous Substance	Chemical Abstract Service Number	Soil Koc for Ionizing Organic Compounds at pH=6.8	Soil-Water Distribution Coefficients for Inorganic Compounds at pH=6.8	Henry's Law Constant at 25°C	Air Diffusivity	Water Diffusivity	Lower Explosive Limit in Air	Flash Point	Water Solubility	Physical State at Standard Temperature and Pressure	Molecular Weight
					D <sub>i</sub> or D <sub>a</sub> or D <sup>air</sup>	D <sub>w</sub>	LEL	FP	S		
		L/kg	L/kg	atm-m <sup>3</sup> /mol	cm <sup>2</sup> /s	cm <sup>2</sup> /s	unitless	°F	ug/L	unitless	g/mol
Phthalic anhydride	85449	NR	NR	1.63E-08	0.08	8.00E-06	1.70E+07	305	6.20E+06	Liquid	148.1
Picloram	1918021	NR	NR	4.05E-11	0.08	8.00E-06	NA	NA	4.30E+05	Solid	241.48
Piperidine	110894	NR	NR	4.45E-06	0.08	8.00E-06	NA	NA	1.00E+09	Liquid	85.15
Polybrominated biphenyls (J)	67774327	NR	NR	3.90E-06	0.08	8.00E-06	NA	NA	1.66E+07	Solid	NA
Polychlorinated biphenyls (PCBs) (J,T)	1336363	NR	NR	4.20E-04	0.08	8.00E-06	NA	NA	44.7	Solid	268.4
Prometon	1610180	NR	NR	1.98E-09	0.08	8.00E-06	NA	NA	7.50E+05	Solid	225.29
Propachlor	1918167	NR	NR	1.09E-07	0.08	8.00E-06	NA	NA	6.55E+05	Solid	211.69
Propazine	139402	NR	NR	4.60E-09	0.08	8.00E-06	NA	NA	8,600	Solid	229.75
Propionic acid	79094	NR	NR	4.45E-07	0.08	8.00E-06	0.029	126	1.00E+09	Liquid	74.09
Propyl alcohol (I)	71238	NR	NR	7.41E-06	0.08	8.00E-06	0.022	72	1.00E+09	Liquid	60.11
n-Propylbenzene (I)	103651	NR	NR	NA	0.08	8.00E-06	NA	NA	NA	Liquid	120.19
Propylene glycol	57556	NR	NR	1.24E-08	0.08	8.00E-06	NA	NA	1.00E+09	Liquid	76.1
Pyrene	129000	NR	NR	1.10E-05	0.0272	7.24E-06	NA	NA	135	Solid	202.26
Pyridine (I)	110861	NR	NR	7.00E-03	0.091	7.60E-06	0.018	68	3.00E+05	Liquid	79.11
Selenium (B)	7782492	NR	5	NR	NR	NR	NA	NA	NA	Inorganic	78.96
Silver (B)	7440224	NR	8.3	NR	NR	NR	NA	NA	NA	Inorganic	107.868
Silvex (2,4,5-TP)	93721	NR	NR	1.30E-08	0.08	8.00E-06	NA	NA	1.40E+05	Solid	269.51
Simazine	122349	NR	NR	3.37E-09	0.08	8.00E-06	NA	NA	4,470	Solid	201.67
Sodium	17341252	NR	NA	NR	NR	NR	NA	NA	NA	Inorganic	23
Sodium azide	26628228	NR	NA	NA	0.08	8.00E-06	NA	NA	NA	Solid	65.01
Strontium (B)	7440246	NR	NA	NR	NA	NA	NA	NA	NA	Inorganic	87.62

Styrene	100425	NR	NR	2.75E-03	0.071	8.00E-06	0.009	88	3.10E+05	Liquid	104.15
Sulfate	14808798	NR	NA	NR	0.08	8.00E-06	NA	NA	NA	Inorganic	96.066
Tebuthiuron	34014181	NR	NR	2.40E-10	0.08	8.00E-06	NA	NA	2.50E+06	Solid	228.31
2,3,7,8-Tetrabromodibenzo-p-dioxin (O)	50585416	NR	NR	2.95E-07	0.08	8.00E-06	NA	NA	0.00996	Solid	499.6
1,2,4,5-Tetrachlorobenzene	95943	NR	NR	1.20E-03	0.08	8.00E-06	NA	NA	1,300	Solid	215.28
2,3,7,8-Tetrachlorodibenzo-p-dioxin (O)	1746016	NR	NR	9.20E-06	0.047	8.00E-06	NA	NA	0.019	Solid	322
1,1,1,2-Tetrachloroethane	630206	NR	NR	2.40E-03	0.071	7.90E-06	NA	NA	1.10E+06	Liquid	167.85

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PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

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Hazardous Substance	Chemical Abstract Service Number	Oral Reference Dose	Oral Slope Factor	Chronic Inhalation Reference Concentration	Inhalation Unit Risk Factor	Occupational Short Term Exposure Level	Relative Source Contribution for Drinking Water	Ingestion Absorption Efficiency	Dermal Absorption Efficiency	Relative Source Contribution for Soil	Log Octanol-Water Partition Coefficient	Soil Organic Carbon-Water Partition Coefficients for Organic Compounds
		RfD mg/kg-day	SF (mg/kg-day) <sup>-1</sup>	RfC ug/m <sup>3</sup>	IURF (ug/m <sup>3</sup> ) <sup>-1</sup>	STEL ug/m <sup>3</sup>	RSC unitless	AEi unitless	AEd unitless	RSC unitless	Log Kow unitless	Koc L/kg
1,1,2,2-Tetrachloroethane	79345	NA	1.00E-01	NA	5.80E-05	NA	0.2	1	0.1	1	2.39	93.5
Tetrachloroethylene	127184	1.00E-02	2.60E-02	4.00E+01	5.80E-07	6.85E+05	0.2	1	0.1	1	2.67	156
Tetrahydrofuran	109999	1.30E-02	NA	5.90E+03	2.00E-06	7.37E+05	0.2	1	0.1	1	0.46	2.83
Tetranitromethane	509148	NA	NA	4.00E-01	1.50E-02	NA	0.2	NA	NA	1	-2.05	9.66E-03
Thallium (B)	7440280	6.70E-05	NA	0.2	NA	NA	0.2	0.5	0.01	1	NR	NR
Toluene (I)	108883	2.20E-01	NA	4.00E+02	NA	NA	0.2	1	0.1	1	2.75	180
p-Toluidine	106490	NA	5.60E-02	NA	3.10E-05	NA	0.2	1	0.1	1	1.39	23.3
Total dissolved solids (TDS)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR
Toxaphene	8001352	NA	4.40E-01	NA	3.20E-04	1.00E+03	0.2	0.5	0.1	1	5.5	2.55E+05
Triallate	2303175	1.30E-02	NA	NA	NA	NA	0.2	1	0.1	1	4.57	31,100
Tributylamine	102829	3.50E-03	NA	7.00E+00	NA	NA	0.2	1	0.1	1	4.46	24,200
1,2,4-Trichlorobenzene	120821	1.50E-02	NA	3.70E+02	NA	3.70E+04	0.2	1	0.1	1	4.01	1,790
1,1,1-Trichloroethane	71556	2.20E+00	NA	1.00E+03	NA	2.46E+06	0.2	1	0.1	1	2.48	110
1,1,2-Trichloroethane	79005	3.90E-03	2.90E-02	NA	1.60E-05	NA	0.2	1	0.1	1	2.05	50.3
Trichloroethylene	79016	1.70E-03	1.00E-02	2.00E+00	1.70E-06	5.37E+05	0.2	1	0.1	1	2.71	168
Trichlorofluoromethane	75694	3.50E-01	NA	5.62E+04	NA	5.62E+06	0.2	1	0.1	1	2.53	121
2,4,5-Trichlorophenol	95954	1.00E-01	NA	3.50E+02	NA	NA	0.2	1	0.1	1	3.9	1,597
2,4,6-Trichlorophenol	88062	NA	7.40E-03	NA	3.10E-06	NA	0.2	1	0.1	1	3.7	381
1,2,3-Trichloropropane	96184	5.70E-03	NA	0.3	NA	NA	0.2	1	0.1	1	2.26	167
1,1,2-Trichloro-1,2,2-trifluoroethane	76131	2.70E+01	NA	7.67E+04	NA	9.59E+06	0.2	1	0.1	1	3.15	1,250
Triethanolamine	102716	5.00E-01	NA	5.00E+01	NA	NA	0.2	1	0.1	1	-1.38	0.044

Triethylene glycol	112276	5.90E-01	NA	NA	NA	NA	0.2	1	0.1	1	-1.69	0.0218
3-Trifluoromethyl-4-nitrophenol	88302	6.20E-01	NA	NA	NA	NA	0.2	1	0.1	1	2.87	663
Trifluralin	1582098	5.10E-03	4.50E-03	NA	NA	NA	0.2	0.5	0.1	1	5.3	1.62E+05
2,2,4-Trimethyl pentane	540841	NA	NA	3.50E+03	NA	NA	0.2	1	0.1	1	4.09	2,080
2,4,4-Trimethyl-2-pentene (I)	107404	NA	NA	NA	NA	NA	0.2	1	0.1	1	4	1,760
1,2,4-Trimethylbenzene (I)	95636	1.40E-01	NA	1.23E+03	NA	NA	0.2	1	0.1	1	3.67	965
1,3,5-Trimethylbenzene (I)	108678	1.40E-01	NA	1.23E+03	NA	NA	0.2	1	0.1	1	3.5	708

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Hazardous Substance	Chemical Abstract Service Number	Soil Koc for Ionizing Organic Compounds at pH=6.8	Soil-Water Distribution Coefficients for Inorganic Compounds at pH=6.8	Henry's Law Constant at 25°C	Air Diffusivity	Water Diffusivity	Lower Explosive Limit in Air	Flash Point	Water Solubility	Physical State at Standard Temperature and Pressure	Molecular Weight
					D <sub>i</sub> or D <sub>a</sub> or D <sup>air</sup>	D <sub>w</sub>	LEL	FP	S		
		L/kg	L/kg	atm·m <sup>3</sup> /mol	cm <sup>2</sup> /s	cm <sup>2</sup> /s	unitless	°F	ug/L	unitless	g/mol
1,1,2,2-Tetrachloroethane	79345	NR	NR	3.45E-04	0.071	7.90E-06	NA	NA	2.97E+06	Liquid	167.85
Tetrachloroethylene	127184	NR	NR	1.84E-02	0.072	8.20E-06	NA	NA	2.00E+05	Liquid	165.83
Tetrahydrofuran	109999	NR	NR	9.63E-03	0.08	8.00E-06	0.02	6	1.00E+09	Liquid	72.12
Tetranitromethane	509148	NR	NR	2.60E-05	0.08	8.00E-06	NA	NA	85,000	Liquid	196.03
Thallium (B)	7440280	NR	71	NR	NR	NR	NA	NA	NA	Inorganic	204.383
Toluene (I)	108883	NR	NR	6.64E-03	0.087	8.60E-06	0.011	40	5.26E+05	Liquid	92.14
p-Toluidine	106490	NR	NR	6.10E-06	0.08	8.00E-06	NA	188	7.60E+06	Liquid	107.17
Total dissolved solids (TDS)	NA	NR	NA	NR	NA	NA	NA	NA	NA	NA	NA
Toxaphene	8001352	NR	NR	6.00E-06	0.0116	4.34E-06	NA	NA	740	Solid	414
Triallate	2303175	NR	NR	1.93E-05	0.08	8.00E-06	NA	NA	4,000	Liquid	304.66
Tributylamine	102829	NR	NR	5.60E-03	0.08	8.00E-06	NA	NA	75,400	Liquid	185.4
1,2,4-Trichlorobenzene	120821	NR	NR	1.42E-03	0.03	8.23E-06	NA	222	3.00E+05	Liquid	181.45
1,1,1-Trichloroethane	71556	NR	NR	1.72E-02	0.078	8.80E-06	0.075	NA	1.33E+06	Liquid	133.4
1,1,2-Trichloroethane	79005	NR	NR	9.13E-04	0.078	8.80E-06	0.06	NA	4.42E+06	Liquid	133.4
Trichloroethylene	79016	NR	NR	1.03E-02	0.079	9.10E-06	0.08	NA	1.10E+06	Liquid	131.39
Trichlorofluoromethane	75694	NR	NR	1.30E-01	0.087	9.70E-06	NA	NA	1.10E+06	Liquid	137.38
2,4,5-Trichlorophenol	95954	1,597	NR	4.33E-06	0.0291	7.03E-06	NA	NA	1.20E+06	Solid	197.5
2,4,6-Trichlorophenol	88062	381	NR	7.79E-06	0.0318	6.25E-06	NA	NA	8.00E+05	Solid	197.5
1,2,3-Trichloropropane	96184	NR	NR	3.80E-04	0.071	7.90E-06	NA	160	1.90E+06	Liquid	147.43
1,1,2-Trichloro-1,2,2-trifluoroethane	76131	NR	NR	5.30E-01	0.078	8.20E-06	NA	NA	1.70E+05	Liquid	187.38
Triethanolamine	102716	NR	NR	3.38E-19	0.08	8.00E-06	NA	NA	1.00E+09	Liquid	149.19

Triethylene glycol	112276	NR	NR	2.61E-10	0.0427	8.06E-06	NA	NA	1.00E+06	Liquid	150.17
3-Trifluoromethyl-4-nitrophenol	88302	NR	NR	1.92E-08	0.08	8.00E-06	NA	NA	5.00E+06	Solid	207
Trifluralin	1582098	NR	NR	2.60E-05	0.08	8.00E-06	NA	NA	8,100	Solid	335.29
2,2,4-Trimethyl pentane	540841	NR	NR	3.13E+00	0.08	8.00E-06	0.011	10	2,330	Liquid	114.23
2,4,4-Trimethyl-2-pentene (l)	107404	NR	NR	8.81E-01	0.08	8.00E-06	NA	NA	11,900	Liquid	112.2
1,2,4-Trimethylbenzene (l)	95636	NR	NR	5.87E-03	0.08	8.00E-06	0.009	112	55,890	Liquid	120.2
1,3,5-Trimethylbenzene (l)	108678	NR	NR	7.38E-03	0.08	8.00E-06	NA	122	61,150	Liquid	120.2



**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA FOR  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

Scientific notation is represented by E+ or E- a value, for example 200,000 is presented as 2.0E+5. Units are as indicated in each column heading. The dataset for each hazardous substance requires 22 columns across two pages. Review all 22 columns when evaluating data for a specific hazardous substance.

Hazardous Substance	Chemical Abstract Service Number	Oral Reference Dose	Oral Slope Factor	Chronic Inhalation Reference Concentration	Inhalation Unit Risk Factor	Occupational Short Term Exposure Level	Relative Source Contribution for Drinking Water	Ingestion Absorption Efficiency	Dermal Absorption Efficiency	Relative Source Contribution for Soil	Log Octanol-Water Partition Coefficient	Soil Organic Carbon-Water Partition Coefficients for Organic Compounds
		RfD	SF	RfC	IURF	STEL	RSC	AEi	AEd	RSC	Log Kow	Koc
		mg/kg-day	(mg/kg-day) <sup>-1</sup>	ug/m <sup>3</sup>	(ug/m <sup>3</sup> ) <sup>-1</sup>	ug/m <sup>3</sup>	unitless	unitless	unitless	unitless	unitless	L/kg
Triphenyl phosphate	115866	1.60E-01	NA	NA	NA	NA	0.2	1	0.1	1	4.67	39,000
tris(2,3-Dibromopropyl)phosphate	126727	NA	1.20E+00	NA	5.30E-04	NA	0.2	1	0.1	1	3.51	2,820
Urea	57136	NA	NA	NA	NA	NA	0.2	1	0.1	1	-2.11	0.0256
Vanadium	7440622	5.00E-03	NA	NA	NA	NA	0.2	0.5	0.01	1	NR	NR
Vinyl acetate (I)	108054	8.80E-02	NA	2.00E+02	NA	5.30E+04	0.2	1	0.1	1	0.73	5.22
Vinyl chloride	75014	3.00E-03	1.40E+00	1.00E+02	8.80E-06	NA	0.2	1	0.1	1	1.5	18.5
White phosphorus (R)	12185103	1.50E-05	NA	NA	NA	NA	0.2	0.5	0.01	1	NR	NR
Xylenes (I)	1330207	1.80E+00	NA	4.40E+03	NA	6.51E+05	0.2	1	0.1	1	3.11	348
Zinc (B)	7440666	3.30E-01	NA	NA	NA	NA	0.2	0.5	0.01	1	NR	NR

**TABLE 4. TOXICOLOGICAL AND CHEMICAL-PHYSICAL DATA  
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

Scientific notation is represented by E+ or E- a value, for example 200,000 is presented as 2.0E+5. Units are as indicated in each column heading. The dataset for each hazardous substance consists of 22 columns across two pages. Review all 22 columns when evaluating data for a specific hazardous substance.

Hazardous Substance	Chemical Abstract Service Number	Soil Koc for Ionizing Organic Compounds at pH=6.8	Soil-Water Distribution Coefficients for Inorganic Compounds at pH=6.8	Henry's Law Constant at 25°C	Air Diffusivity	Water Diffusivity	Lower Explosive Limit in Air	Flash Point	Water Solubility	Physical State at Standard Temperature and Pressure	Molecular Weight
			Kd	HLC	D <sub>l</sub> or D <sub>g</sub> or D <sup>air</sup>	D <sub>w</sub>	LEL	FP	S		MW
		L/kg	L/kg	atm-m <sup>3</sup> /mol	cm <sup>2</sup> /s	cm <sup>2</sup> /s	unitless	°F	ug/L	unitless	g/mol
Triphenyl phosphate	115866	NR	NR	3.60E-07	0.08	8.00E-06	NA	NA	1,430	Liquid	326.3
tris(2,3-Dibromopropyl)phosphate	126727	NR	NR	3.00E-05	0.08	8.00E-06	NA	NA	4,700	Liquid	697.67
Urea	57136	NR	NR	NR	0.08	8.00E-06	NA	NA	NA	Solid	60.07
Vanadium	7440622	NR	1,000	NR	NR	NR	NA	NA	NA	Inorganic	50.942
Vinyl acetate (I)	108054	NR	NR	5.11E-04	0.085	9.20E-06	0.026	18	2.00E+07	Liquid	86.09
Vinyl chloride	75014	NR	NR	2.70E-02	0.106	1.23E-05	0.036	NA	2.76E+06	Liquid	62.5
White phosphorus (R)	12185103	NR	NA	NR	NR	NR	NA	NA	NA	Inorganic	123.9
Xylenes (I)	1330207	NR	NR	6.04E-03	0.078	3.21E-05	NA	NA	1.86E+05	Liquid	106.17
Zinc (B)	7440666	NR	62	NR	NR	NR	NA	NA	NA	Inorganic	65.39

History: 2013 AACS.