



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING



C. HEIDI GRETHER
DIRECTOR

October 25, 2018

Mr. Greg Fink, Director
EH&S Risk Management
Stericycle Environmental Solutions
18000 72nd Avenue South, Suite 217
Kent, Washington 98032

Dear Mr. Fink:

SUBJECT: Transmittal of Site-Specific Volatilization to Indoor Air Criteria;
Petro-Chem Processing Group of Nortru, LLC, Detroit, Michigan;
MID 980 615 298

The purpose of this letter is to transmit Department of Environmental Quality (DEQ) site-specific criteria for soil, groundwater and soil gas for compounds of interest for the vapor intrusion investigation being conducted by the Petro-Chem Processing Group of Nortru, LLC (PCPG) facility located at 421 Lycaste Street in Detroit, Michigan. The site-specific volatilization to indoor air criteria for several different exposure scenarios are attached and summarized below.

Table Number	Exposure Scenario
Table 1	Nonresidential slab-on-grade structure less than 50,000 square feet in size
Table 2	Nonresidential slab-on-grade structure greater than 50,000 square feet in size
Table 3	Nonresidential structure with an unoccupied basement and less than 50,000 square feet in size
Table 4	Nonresidential structure with an unoccupied basement and greater than 50,000 square feet in size
Table 5	Nonresidential slab-on-grade structure less than 50,000 square feet in size and adjusted for a 12-hour exposure
Table 6	Nonresidential slab-on-grade structure greater than 50,000 square feet in size and adjusted for a 12-hour exposure
Table 7	Nonresidential structure with an unoccupied basement less than 50,000 square feet in size and adjusted for a 12-hour exposure
Table 8	Nonresidential structure with an unoccupied basement greater than 50,000 square feet in size and adjusted for a 12-hour exposure
Table 9	Residential slab-on-grade house
Table 10	Residential house with a habitable basement

The DEQ developed the site-specific soil, groundwater, and soil gas criteria using values that better reflect best available information regarding facility geology and hydrogeology, building-specific information, and the toxicity and exposure risks posed by the hazardous substances present at the facility. Facility information used in the development of the

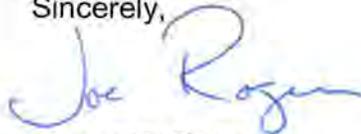
site-specific criteria includes: sandy soils representative of conditions in Wayne County and a depth to groundwater of five feet. The term "unoccupied basement" is used to describe nonresidential basements that are only used by employees for simply retrieving something from storage. The presence of office space, meeting rooms, lounges, bathrooms, breakrooms, and kitchens are all good examples of nonresidential basements that should be considered occupied or have the potential to be occupied.

Provided that the conditions used to develop the site-specific criteria are met, the values may be used without further documentation. If desired, the facility may initiate the development of other site-specific criteria using additional site-specific information consistent with the statutory provisions for development of site-specific criteria of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Such a process will require DEQ involvement and any other site-specific criteria developed will require DEQ review and approval.

The site-specific criteria should be used to evaluate groundwater, soil, soil gas, and sub-slab soil gas collected as part of the facility's volatilization to indoor air pathway investigation. In addition, the indoor air data should be evaluated against the Recommended Interim Action Screening Levels and the Time-Sensitive Recommended Interim Action Screening Levels (TS RIASL). Concentrations in sub-slab soil gas greater than the site-specific criteria should be interpreted as indicative of a potential long-term source of inhalation exposure risk. The exceedance of an indoor air TS RIASL will require more rapid exposure mitigation, such as immediately increased ventilation, and/or may require collaboration with the Michigan Department of Health and Human Services and/or the local health department.

If you have any questions, please contact me at 517-284-6569; rogersj5@michigan.gov; or at DEQ, Waste Management and Radiological Protection Division, P.O. Box 30241, Lansing, Michigan 48909-7741.

Sincerely,



Joseph T. Rogers
Senior Geologist and Vapor Intrusion Specialist
Hazardous Waste Section
Waste Management and Radiological
Protection Division

Enclosure

cc: Mr. Ed Burk, PCPG
Ms. Kellie Wing, Bureau Veritas North America, Inc.
Ms. Tracy Kecskemeti, DEQ
Ms. Virginia Himich, DEQ
Mr. Daniel Dailey, DEQ
Ms. Jeanette Noechel, DEQ
Mr. Jim Day, DEQ
Mr. John McCabe, DEQ
Mr. Nathan Erber, DEQ
Corrective Action File

Table 1. Nonresidential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a nonresidential structure (< 50,000 ft²) with a **slab-on-grade**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater Not In Contact (GWNIC)	Soil	Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
67641	Acetone	1.5E+08 st	3.1E+06 st	1.0E+06 st
994058	t-Amyl methyl ether (TAME)	97 (ID) nc	DATA	3,200 nc
71432	Benzene	380 ca	47 (M) ca	260 ca
78933	2-Butanone (MEK)	1.8E+07 (SE) dev	3.7E+05 (SE) dev	1.7E+05 (SE) dev
75650	t-Butyl alcohol	1,200 (ID) nc	DATA	3,700 nc
104518	n-Butylbenzene	12,000 (S) sol	9,800 nc	10,000 nc
135988	sec-Butylbenzene	18,000 (S) sol	49,000 (C) nc	20 nc
98066	t-Butylbenzene	22 nc	11 (M) nc	20 nc
108907	Chlorobenzene	9,100 nc	1,400 nc	2,600 nc
95501	1,2-Dichlorobenzene	1.2E+05 nc	26,000 nc	15,000 nc
541731	1,3-Dichlorobenzene	870 nc	180 nc	150 nc
106467	1,4-Dichlorobenzene	3,200 ca	660 ca	510 ca
75343	1,1-Dichloroethane	1,800 ca	74 ca	1,200 ca
107062	1,2-Dichloroethane	560 ca	23 (M) ca	77 ca
75354	1,1-Dichloroethylene	2,900 nc	220 nc	10,000 nc
156592	cis-1,2-Dichloroethylene	810 nc	37 (M) nc	410 nc
156605	trans-1,2-Dichloroethylene	3,400 nc	210 nc	4,100 nc
60297	Diethyl ether	3.1E+05 nc	6,200 nc	51,000 nc
108203	Diisopropyl ether	91,000 (SE) dev	2,300 (SE) dev	23,000 (SE) dev
64175	Ethanol	6.3E+08 (SE) st	1.6E+07 (SE) st	6.3E+05 (SE) st
637923	Ethyl-tert-butyl ether (ETBE)	580 (ID) nc	DATA	19,000 nc
100414	Ethylbenzene	1,200 ca	340 ca	800 ca
106934	Ethylene dibromide	77 ca	2.1 (M) ca	3.3 ca
110543	n-Hexane	1,000 (GW) nc	440 nc	36,000 nc
98828	Isopropyl benzene	270 ca	110 (M) ca	190 ca
108101	4-Methyl-2-pentanone (MIBK)	6.7E+06 (SE) dev	1.5E+05 (SE) dev	1.0E+05 (SE) dev

Table 1. Nonresidential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a nonresidential structure (< 50,000 ft²) with a **slab-on-grade**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater Not In Contact (GWNIC)	Soil	Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
1634044	Methyl-tert-butyl ether (MTBE)	1.1E+05 ca	2,100 ca	7,700 ca
91576	2-Methylnaphthalene	21,000 nc	30,000 nc	510 nc
91203	Naphthalene	2,000 ca	1,900 ca	59 ca
103651	n-Propylbenzene	46,000 (SE) dev	21,000 (SE) dev	33,000 (SE) dev
127184	Tetrachloroethylene	1,100 (SE) st	74 (SE) st	1,400 (SE) st
109999	Tetrahydrofuran	8.7E+06 nc	2.2E+05 nc	1.0E+05 nc
108883	Toluene	3.8E+05 (SE) st	64,000 (SE) st	2.5E+05 (SE) st
79016	Trichloroethylene	70 (DD) dev	4.0 (M) dev	67 (DD) dev
540841	2,2,4-Trimethyl pentane	2,400 (S) (GW) sol	2,200 (M) nc	1.8E+05 nc
526738	1,2,3-Trimethylbenzene	13,000 nc	4,800 nc	3,100 nc
95636	1,2,4-Trimethylbenzene	7,400 nc	2,600 nc	3,100 nc
108678	1,3,5-Trimethylbenzene	5,200 nc	1,800 nc	3,100 nc
75014	Vinyl chloride	92 ca	8.2 (M) ca	450 ca
1330207	Xylenes	20,000 nc	5,000 nc	11,000 nc
99876	4-Isopropyltoluene	NA	NA	NA

**Soil gas site-specific criteria are applicable for all depths.

- Acceptable Air Values (AAV) endpoint basis used for site-specific criterion: **(ca)** = Carcinogenic; **(nc)** = Non-Carcinogenic; **(dev)** = Developmental; **(mut)** = Mutagenic cancer; **(st)** = Short-term (i.e., less than chronic exposure); Agency for Toxic Substances and Disease Registry Inhalation Minimum Risk Level for Acute Inhalation or Intermediate Inhalation exposure durations; U.S. Environmental Protection Agency Integrated Risk Information System Reference Concentration for short-term exposure; or Air Quality Division Acute Initial Threshold Screening Level.
- Footnote **C**: The site-specific VIAC exceeds the chemical-specific soil saturation screening level (Csat). The person proposing or implementing response activity shall document whether additional response activity is required to control NAPL to protect against risks associated with NAPL by using methods appropriate for the NAPL present.
- Footnote **DATA**: Insufficient physical chemical parameters to calculate site-specific criteria for specified media. If detections are present in specified media, site-specific soil gas criteria should be used to evaluate risk.
- Footnote **GW**: The calculated value for a hazardous substance based upon GWIC is considered protective when it is greater than the calculated value for GWNIC.
- Footnote **ID**: Requires further evaluation to determine the appropriate media to sample.
- Footnote **M**: Site-specific criterion may be below target detection limits (**TDL**). In accordance with Sec. 20120a(10) when the TDL for a hazardous substance is greater than the developed cleanup criterion, the criterion is the TDL.
- Footnote **NA**: The hazardous substance has not been previously evaluated by the Remediation and Redevelopment Division Toxicology Unit. The identification, collection, and evaluation of toxicological literature and chemical-physical data cannot be completed within the timeframe requested.
- Footnote **NV**: The hazardous substance does not meet the department's definition of a volatile; therefore, no criteria were developed.
- Footnote **SE**: Site-specific criteria based on single event exposure; therefore, sampling methods should reflect shorter exposure scenarios.
- Footnote **S**: Calculated health-based value exceeds the hazardous substance-specific water solubility limit; therefore, the water solubility limit is the criterion.

Table 2. Nonresidential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a nonresidential structure (> 50,000 ft²) with a **slab-on-grade**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater Not In Contact (GWNIC)	Soil	Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
67641	Acetone	2.2E+08 st	4.6E+06 st	1.0E+06 st
994058	t-Amyl methyl ether (TAME)	150 (ID) nc	DATA	3,200 nc
71432	Benzene	570 ca	71 ca	260 ca
78933	2-Butanone (MEK)	2.7E+07 (SE) dev	5.6E+05 (SE) dev	1.7E+05 (SE) dev
75650	t-Butyl alcohol	1,700 (ID) nc	DATA	3,700 nc
104518	n-Butylbenzene	12,000 (S) sol	15,000 nc	10,000 nc
135988	sec-Butylbenzene	18,000 (S) sol	49,000 (C) nc	20 nc
98066	t-Butylbenzene	33 nc	17 (M) nc	20 nc
108907	Chlorobenzene	14,000 nc	2,200 nc	2,600 nc
95501	1,2-Dichlorobenzene	1.6E+05 (S) sol	39,000 nc	15,000 nc
541731	1,3-Dichlorobenzene	1,300 nc	270 nc	150 nc
106467	1,4-Dichlorobenzene	4,800 ca	980 ca	510 ca
75343	1,1-Dichloroethane	2,700 ca	110 ca	1,200 ca
107062	1,2-Dichloroethane	840 ca	35 (M) ca	77 ca
75354	1,1-Dichloroethylene	4,300 nc	330 nc	10,000 nc
156592	cis-1,2-Dichloroethylene	1,200 nc	55 nc	410 nc
156605	trans-1,2-Dichloroethylene	5,100 nc	320 nc	4,100 nc
60297	Diethyl ether	4.6E+05 nc	9,300 nc	51,000 nc
108203	Diisopropyl ether	1.4E+05 (SE) dev	3,500 (SE) dev	23,000 (SE) dev
64175	Ethanol	9.4E+08 (SE) st	2.4E+07 (SE) st	6.3E+05 (SE) st
637923	Ethyl-tert-butyl ether (ETBE)	870 (CC) nc	DATA	19,000 nc
100414	Ethylbenzene	1,800 ca	510 ca	800 ca
106934	Ethylene dibromide	120 ca	3.1 (M) ca	3.3 ca
110543	n-Hexane	1,500 (GW) nc	660 nc	36,000 nc
98828	Isopropyl benzene	400 ca	160 (M) ca	190 ca
108101	4-Methyl-2-pentanone (MIBK)	1.0E+07 (SE) dev	2.2E+05 (SE) dev	1.0E+05 (SE) dev

Table 2. Nonresidential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a nonresidential structure (> 50,000 ft²) with a **slab-on-grade**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater Not In Contact (GWNIC)	Soil	Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
1634044	Methyl-tert-butyl ether (MTBE)	1.6E+05 ca	3,100 ca	7,700 ca
91576	2-Methylnaphthalene	25,000 (S) sol	45,000 nc	510 nc
91203	Naphthalene	3,000 ca	2,800 ca	59 ca
103651	n-Propylbenzene	52,000 (S) (SE) sol	32,000 (SE) dev	33,000 (SE) dev
127184	Tetrachloroethylene	1,600 (SE) st	110 (SE) st	1,400 (SE) st
109999	Tetrahydrofuran	1.3E+07 nc	3.4E+05 nc	1.0E+05 nc
108883	Toluene	5.3E+05 (S) (SE) sol	96,000 (SE) st	2.5E+05 (SE) st
79016	Trichloroethylene	110 (SE) dev	6.0 (M) (SE) dev	67 (SE) dev
540841	2,2,4-Trimethyl pentane	2,400 (S) (GW) sol	3,300 nc	1.8E+05 nc
526738	1,2,3-Trimethylbenzene	20,000 nc	7,200 nc	3,100 nc
95636	1,2,4-Trimethylbenzene	11,000 nc	3,900 nc	3,100 nc
108678	1,3,5-Trimethylbenzene	7,900 nc	2,700 nc	3,100 nc
75014	Vinyl chloride	140 ca	12 (M) ca	450 ca
1330207	Xylenes	30,000 nc	7,500 nc	11,000 nc
99876	4-Isopropyltoluene	NA	NA	NA

**Soil gas site-specific criteria are applicable for all depths.

- Acceptable Air Values (AAV) endpoint basis used for site-specific criterion: (**ca**) = Carcinogenic; (**nc**) = Non-Carcinogenic; (**dev**) = Developmental; (**mut**) = Mutagenic cancer; (**st**) = Short-term (i.e., less than chronic exposure); Agency for Toxic Substances and Disease Registry Inhalation Minimum Risk Level for Acute Inhalation or Intermediate Inhalation exposure durations; U.S. Environmental Protection Agency Integrated Risk Information System Reference Concentration for short-term exposure; or Air Quality Division Acute Initial Threshold Screening Level.
- Footnote **C**: The site-specific VIAC exceeds the chemical-specific soil saturation screening level (Csat). The person proposing or implementing response activity shall document whether additional response activity is required to control NAPL to protect against risks associated with NAPL by using methods appropriate for the NAPL present.
- Footnote **DATA**: Insufficient physical chemical parameters to calculate site-specific criteria for specified media. If detections are present in specified media, site-specific soil gas criteria should be used to evaluate risk.
- Footnote **GW**: The calculated value for a hazardous substance based upon GWIC is considered protective when it is greater than the calculated value for GWNIC.
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- Footnote **NA**: The hazardous substance has not been previously evaluated by the Remediation and Redevelopment Division Toxicology Unit. The identification, collection, and evaluation of toxicological literature and chemical-physical data cannot be completed within the timeframe requested.
- Footnote **NV**: The hazardous substance does not meet the department's definition of a volatile; therefore, no criteria were developed.
- Footnote **SE**: Site-specific criteria based on single event exposure; therefore, sampling methods should reflect shorter exposure scenarios.
- Footnote **S**: Calculated health-based value exceeds the hazardous substance-specific water solubility limit; therefore, the water solubility limit is the criterion.

Table 3. Nonresidential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a nonresidential structure (< 50,000 ft²) with an **unoccupied basement**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m ³)
67641	Acetone	2.0E+05 (SE) st	4.5E+06 st	1.0E+06 st
994058	t-Amyl methyl ether (TAME)	97 (ID) nc	DATA	3,200 nc
71432	Benzene	8.4 ca	68 ca	260 ca
78933	2-Butanone (MEK)	12,000 (SE) dev	5.4E+05 (SE) dev	1.7E+05 (SE) dev
75650	t-Butyl alcohol	1,200 (ID) nc	DATA	3,700 nc
104518	n-Butylbenzene	360 nc	14,000 nc	10,000 nc
135988	sec-Butylbenzene	400 nc	49,000 (C) nc	20 nc
98066	t-Butylbenzene	0.71 (M) nc	16 (M) nc	20 nc
108907	Chlorobenzene	110 nc	2,100 nc	2,600 nc
95501	1,2-Dichlorobenzene	950 nc	38,000 nc	15,000 nc
541731	1,3-Dichlorobenzene	7.9 nc	260 nc	150 nc
106467	1,4-Dichlorobenzene	28 ca	950 ca	510 ca
75343	1,1-Dichloroethane	40 ca	110 ca	1,200 ca
107062	1,2-Dichloroethane	5.1 ca	34 (M) ca	77 ca
75354	1,1-Dichloroethylene	250 nc	310 nc	10,000 nc
156592	cis-1,2-Dichloroethylene	14 nc	53 nc	410 nc
156605	trans-1,2-Dichloroethylene	20 nc	310 nc	4,100 nc
60297	Diethyl ether	3,100 nc	9,000 nc	51,000 nc
108203	Diisopropyl ether	710 (SE) dev	3,400 (SE) dev	23,000 (SE) dev
64175	Ethanol	3.1E+05 (SE) st	2.3E+07 (SE) st	6.3E+05 (SE) st
637923	Ethyl-tert-butyl ether (ETBE)	580 (ID) nc	DATA	19,000 nc
100414	Ethylbenzene	28 ca	500 ca	800 ca
106934	Ethylene dibromide	0.39 ca	3.0 (M) ca	3.3 ca
110543	n-Hexane	1,000 nc	640 nc	36,000 nc
98828	Isopropyl benzene	6.7 ca	150 (M) ca	190 ca
108101	4-Methyl-2-pentanone (MIBK)	5,000 (SE) dev	2.1E+05 (SE) dev	1.0E+05 (SE) dev

Table 3. Nonresidential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a nonresidential structure (< 50,000 ft²) with an **unoccupied basement**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC)	Soil	Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
1634044	Methyl-tert-butyl ether (MTBE)	810 ca	3,000 ca	7,700 ca
91576	2-Methylnaphthalene	110 nc	44,000 nc	510 nc
91203	Naphthalene	12 ca	2,700 ca	59 ca
103651	n-Propylbenzene	970 (SE) dev	31,000 (SE) dev	33,000 (SE) dev
127184	Tetrachloroethylene	35 (SE) st	110 (SE) st	1,400 (SE) st
109999	Tetrahydrofuran	72,000 nc	3.3E+05 nc	1.0E+05 nc
108883	Toluene	6,600 (SE) st	93,000 (SE) st	2.5E+05 (SE) st
79016	Trichloroethylene	1.6 (SE) dev	5.8 (M) (SE) dev	67 (SE) dev
540841	2,2,4-Trimethyl pentane	2,400 (S) sol	3,200 nc	1.8E+05 nc
526738	1,2,3-Trimethylbenzene	150 nc	7,000 nc	3,100 nc
95636	1,2,4-Trimethylbenzene	120 nc	3,800 nc	3,100 nc
108678	1,3,5-Trimethylbenzene	110 nc	2,600 nc	3,100 nc
75014	Vinyl chloride	10 ca	12 (M) ca	450 ca
1330207	Xylenes	410 nc	7,200 nc	11,000 nc
99876	4-Isopropyltoluene	NA	NA	NA

**Soil gas site-specific criteria are applicable for all depths.

- Acceptable Air Values (AAV) endpoint basis used for site-specific criterion: **(ca)** = Carcinogenic; **(nc)** = Non-Carcinogenic; **(dev)** = Developmental; **(mut)** = Mutagenic cancer; **(st)** = Short-term (i.e., less than chronic exposure); Agency for Toxic Substances and Disease Registry Inhalation Minimum Risk Level for Acute Inhalation or Intermediate Inhalation exposure durations; U.S. Environmental Protection Agency Integrated Risk Information System Reference Concentration for short-term exposure; or Air Quality Division Acute Initial Threshold Screening Level.
- Footnote **C**: The site-specific VIAC exceeds the chemical-specific soil saturation screening level (Csat). The person proposing or implementing response activity shall document whether additional response activity is required to control NAPL to protect against risks associated with NAPL by using methods appropriate for the NAPL present.
- Footnote **DATA**: Insufficient physical chemical parameters to calculate site-specific criteria for specified media. If detections are present in specified media, site-specific soil gas criteria should be used to evaluate risk.
- Footnote **GW**: The calculated value for a hazardous substance based upon GWIC is considered protective when it is greater than the calculated value for GWNIC.
- Footnote **ID**: Requires further evaluation to determine the appropriate media to sample.
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- Footnote **NA**: The hazardous substance has not been previously evaluated by the Remediation and Redevelopment Division Toxicology Unit. The identification, collection, and evaluation of toxicological literature and chemical-physical data cannot be completed within the timeframe requested.
- Footnote **NV**: The hazardous substance does not meet the department's definition of a volatile; therefore, no criteria were developed.
- Footnote **SE**: Site-specific criteria based on single event exposure; therefore, sampling methods should reflect shorter exposure scenarios.
- Footnote **S**: Calculated health-based value exceeds the hazardous substance-specific water solubility limit; therefore, the water solubility limit is the criterion.

Table 4. Nonresidential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a nonresidential structure (> 50,000 ft²) with an **unoccupied basement**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC)	Soil	Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
67641	Acetone	2.7E+05 (SE) st	6.8E+06 st	1.0E+06 st
994058	t-Amyl methyl ether (TAME)	150 (ID) nc	DATA	3,200 nc
71432	Benzene	12 ca	100 ca	260 ca
78933	2-Butanone (MEK)	17,000 (DD) dev	8.1E+05 (DD) dev	1.7E+05 (DD) dev
75650	t-Butyl alcohol	1,700 (ID) nc	DATA	3,700 nc
104518	n-Butylbenzene	520 nc	21,000 nc	10,000 nc
135988	sec-Butylbenzene	400 nc	49,000 (C) nc	20 nc
98066	t-Butylbenzene	1.0 nc	25 (M) nc	20 nc
108907	Chlorobenzene	150 nc	3,100 nc	2,600 nc
95501	1,2-Dichlorobenzene	1,200 nc	57,000 nc	15,000 nc
541731	1,3-Dichlorobenzene	10 nc	390 nc	150 nc
106467	1,4-Dichlorobenzene	35 ca	1,400 ca	510 ca
75343	1,1-Dichloroethane	55 ca	160 ca	1,200 ca
107062	1,2-Dichloroethane	6.0 ca	50 ca	77 ca
75354	1,1-Dichloroethylene	370 nc	470 nc	10,000 nc
156592	cis-1,2-Dichloroethylene	19 nc	80 nc	410 nc
156605	trans-1,2-Dichloroethylene	20 nc	460 nc	4,100 nc
60297	Diethyl ether	3,800 nc	14,000 nc	51,000 nc
108203	Diisopropyl ether	1,100 (SE) dev	5,100 (SE) dev	23,000 (SE) dev
64175	Ethanol	4.2E+05 (SE) st	3.5E+07 (SE) st	6.3E+05 (SE) st
637923	Ethyl-tert-butyl ether (ETBE)	870 (ID) nc	DATA	19,000 nc
100414	Ethylbenzene	39 ca	740 ca	800 ca
106934	Ethylene dibromide	0.44 ca	4.5 (M) ca	3.3 ca
110543	n-Hexane	1,500 nc	960 nc	36,000 nc
98828	Isopropyl benzene	9.4 ca	230 (M) ca	190 ca
108101	4-Methyl-2-pentanone (MIBK)	7,300 (SE) dev	3.2E+05 (SE) dev	1.0E+05 (SE) dev

Table 4. Nonresidential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a nonresidential structure (> 50,000 ft²) with an **unoccupied basement**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC)	Soil	Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
1634044	Methyl-tert-butyl ether (MTBE)	930 ca	4,500 ca	7,700 ca
91576	2-Methylnaphthalene	120 nc	66,000 nc	510 nc
91203	Naphthalene	13 ca	4,100 ca	59 ca
103651	n-Propylbenzene	1,500 (SE) dev	46,000 (SE) dev	33,000 (SE) dev
127184	Tetrachloroethylene	53 (SE) st	160 (SE) st	1,400 (SE) st
109999	Tetrahydrofuran	74,000 nc	4.9E+05 nc	1.0E+05 nc
108883	Toluene	9,900 (SE) st	1.4E+05 (SE) st	2.5E+05 (SE) st
79016	Trichloroethylene	2.4 (SE) dev	8.7 (M) (SE) dev	67 (SE) dev
540841	2,2,4-Trimethyl pentane	2,400 (S) sol	4,800 nc	1.8E+05 nc
526738	1,2,3-Trimethylbenzene	190 nc	10,000 nc	3,100 nc
95636	1,2,4-Trimethylbenzene	170 nc	5,600 nc	3,100 nc
108678	1,3,5-Trimethylbenzene	160 nc	3,900 nc	3,100 nc
75014	Vinyl chloride	15 ca	18 (M) ca	450 ca
1330207	Xylenes	560 nc	11,000 nc	11,000 nc
99876	4-Isopropyltoluene	NA	NA	NA

**Soil gas site-specific criteria are applicable for all depths.

- Acceptable Air Values (AAV) endpoint basis used for site-specific criterion: **(ca)** = Carcinogenic; **(nc)** = Non-Carcinogenic; **(dev)** = Developmental; **(mut)** = Mutagenic cancer; **(st)** = Short-term (i.e., less than chronic exposure); Agency for Toxic Substances and Disease Registry Inhalation Minimum Risk Level for Acute Inhalation or Intermediate Inhalation exposure durations; U.S. Environmental Protection Agency Integrated Risk Information System Reference Concentration for short-term exposure; or Air Quality Division Acute Initial Threshold Screening Level.
- Footnote **C**: The site-specific VIAC exceeds the chemical-specific soil saturation screening level (Csat). The person proposing or implementing response activity shall document whether additional response activity is required to control NAPL to protect against risks associated with NAPL by using methods appropriate for the NAPL present.
- Footnote **DATA**: Insufficient physical chemical parameters to calculate site-specific criteria for specified media. If detections are present in specified media, site-specific soil gas criteria should be used to evaluate risk.
- Footnote **GW**: The calculated value for a hazardous substance based upon GWIC is considered protective when it is greater than the calculated value for GWNIC.
- Footnote **ID**: Requires further evaluation to determine the appropriate media to sample.
- Footnote **M**: Site-specific criterion may be below target detection limits (**TDL**). In accordance with Sec. 20120a(10) when the TDL for a hazardous substance is greater than the developed cleanup criterion, the criterion is the TDL.
- Footnote **NA**: The hazardous substance has not been previously evaluated by the Remediation and Redevelopment Division Toxicology Unit. The identification, collection, and evaluation of toxicological literature and chemical-physical data cannot be completed within the timeframe requested.
- Footnote **NV**: The hazardous substance does not meet the department's definition of a volatile; therefore, no criteria were developed.
- Footnote **SE**: Site-specific criteria based on single event exposure; therefore, sampling methods should reflect shorter exposure scenarios.
- Footnote **S**: Calculated health-based value exceeds the hazardous substance-specific water solubility limit; therefore, the water solubility limit is the criterion.

Table 5. Nonresidential Volatilization to Indoor Air Criteria (VIAC) adjusted for 12-hr workday exposure. The following are **restricted** site-specific criteria that apply to a nonresidential structure (< 50,000 ft²) with a **slab-on-grade**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	12-hr Groundwater Not In Contact (GWNIC)	12-hr Soil	12-hr Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
67641	Acetone (#)	1.5E+08 st	3.1E+06 st	1.0E+06 st
994058	t-Amyl methyl ether (TAME)	190 (ID) nc	DATA	6,300 nc
71432	Benzene	760 ca	94 ca	510 ca
78933	2-Butanone (MEK)	3.6E+07 (SE) dev	7.4E+05 (SE) dev	3.3E+05 (SE) dev
75650	t-Butyl alcohol	2,400 (ID) nc	DATA	7,400 nc
104518	n-Butylbenzene	12,000 (S) sol	20,000 nc	20,000 nc
135988	sec-Butylbenzene	18,000 (S) sol	49,000 (C) nc	41 nc
98066	t-Butylbenzene	44 nc	23 (M) nc	41 nc
108907	Chlorobenzene	18,000 nc	2,900 nc	5,100 nc
95501	1,2-Dichlorobenzene	1.6E+05 (S) sol	52,000 nc	31,000 nc
541731	1,3-Dichlorobenzene	1,700 nc	360 nc	310 nc
106467	1,4-Dichlorobenzene	6,400 ca	1,300 ca	1,000 ca
75343	1,1-Dichloroethane	3,600 ca	150 ca	2,500 ca
107062	1,2-Dichloroethane	1,100 ca	46 (M) ca	150 ca
75354	1,1-Dichloroethylene	5,700 nc	430 nc	20,000 nc
156592	cis-1,2-Dichloroethylene	1,600 nc	74 nc	820 nc
156605	trans-1,2-Dichloroethylene	6,800 nc	420 nc	8,200 nc
60297	Diethyl ether	6.2E+05 nc	12,000 nc	1.0E+05 nc
108203	Diisopropyl ether	1.8E+05 (SE) dev	4,700 (SE) dev	47,000 (SE) dev
64175	Ethanol (#)	6.3E+08 (SE) st	1.6E+07 (SE) st	6.3E+05 (SE) st
637923	Ethyl-tert-butyl ether (ETBE)	1,200 (ID) nc	DATA	38,000 nc
100414	Ethylbenzene	2,400 ca	680 ca	1,600 ca
106934	Ethylene dibromide	150 ca	4.2 (M) ca	6.6 ca
110543	n-Hexane	2,000 (GW) nc	890 nc	72,000 nc
98828	Isopropyl benzene	540 ca	210 (M) ca	380 ca
108101	4-Methyl-2-pentanone (MIBK)	1.3E+07 (SE) dev	2.9E+05 (SE) dev	2.0E+05 (SE) dev

Table 5. Nonresidential Volatilization to Indoor Air Criteria (VIAC) adjusted for 12-hr workday exposure. The following are **restricted** site-specific criteria that apply to a nonresidential structure (< 50,000 ft²) with a **slab-on-grade**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	12-hr Groundwater Not In Contact (GWNIC)	12-hr Soil	12-hr Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
1634044	Methyl-tert-butyl ether (MTBE)	2.2E+05 ca	4,200 ca	15,000 ca
91576	2-Methylnaphthalene	25,000 (S) sol	60,000 nc	1,000 nc
91203	Naphthalene	4,000 ca	3,800 ca	120 ca
103651	n-Propylbenzene (#)	46,000 (SE) dev	21,000 (SE) dev	33,000 (SE) dev
127184	Tetrachloroethylene	2,200 st	150 st	2,700 st
109999	Tetrahydrofuran	1.7E+07 nc	4.5E+05 nc	2.0E+05 nc
108883	Toluene (#)	3.8E+05 (SE) st	64,000 (SE) st	2.5E+05 (SE) st
79016	Trichloroethylene	140 (SE) dev	8.0 (M) (SE) dev	130 (SE) dev
540841	2,2,4-Trimethyl pentane	2,400 (S) (GW) sol	4,500 nc	3.6E+05 nc
526738	1,2,3-Trimethylbenzene	27,000 nc	9,600 nc	6,100 nc
95636	1,2,4-Trimethylbenzene	15,000 nc	5,200 nc	6,100 nc
108678	1,3,5-Trimethylbenzene	10,000 nc	3,600 nc	6,100 nc
75014	Vinyl chloride	180 ca	16 (M) ca	910 ca
1330207	Xylenes	41,000 nc	9,900 nc	22,000 nc
99876	4-Isopropyltoluene	NA	NA	NA

**Soil gas site-specific criteria are applicable for all depths.

- Acceptable Air Values (AAV) endpoint basis used for site-specific criterion: (**ca**) = Carcinogenic; (**nc**) = Non-Carcinogenic; (**dev**) = Developmental; (**mut**) = Mutagenic cancer; (**st**) = Short-term (i.e., less than chronic exposure); Agency for Toxic Substances and Disease Registry Inhalation Minimum Risk Level for Acute Inhalation or Intermediate Inhalation exposure durations; U.S. Environmental Protection Agency Integrated Risk Information System Reference Concentration for short-term exposure; or Air Quality Division Acute Initial Threshold Screening Level.
- Footnote (#): Acceptable air concentrations (AAC) cannot be adjusted to a 12-hour exposure time for hazardous substance.
- Footnote C: The site-specific VIAC exceeds the chemical-specific soil saturation screening level (Csat). The person proposing or implementing response activity shall document whether additional response activity is required to control NAPL to protect against risks associated with NAPL by using methods appropriate for the NAPL present.
- Footnote DATA: Insufficient physical chemical parameters to calculate site-specific criteria for specified media. If detections are present in specified media, site-specific soil gas criteria should be used to evaluate risk.
- Footnote GW: The calculated value for a hazardous substance based upon GWIC is considered protective when it is greater than the calculated value for GWNIC.
- Footnote ID: Requires further evaluation to determine the appropriate media to sample.
- Footnote M: Site-specific criterion may be below target detection limits (TDL). In accordance with Sec. 20120a(10) when the TDL for a hazardous substance is greater than the developed cleanup criterion, the criterion is the TDL.
- Footnote NA: The hazardous substance has not been previously evaluated by the Remediation and Redevelopment Division Toxicology Unit. The identification, collection, and evaluation of toxicological literature and chemical-physical data cannot be completed within the timeframe requested.
- Footnote NV: The hazardous substance does not meet the department's definition of a volatile; therefore, no criteria were developed.
- Footnote SE: Site-specific criteria based on single event exposure; therefore, sampling methods should reflect shorter exposure scenarios.
- Footnote S: Calculated health-based value exceeds the hazardous substance-specific water solubility limit; therefore, the water solubility limit is the criterion.

Table 6. Nonresidential Volatilization to Indoor Air Criteria (VIAC) **adjusted for 12-hr workday exposure**. The following are **restricted** site-specific criteria that apply to a nonresidential structure (> 50,000 ft²) with a **slab-on-grade**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	12-hr Groundwater Not In Contact (GWNIC)	12-hr Soil	12-hr Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
67641	Acetone (#)	2.2E+08 st	4.6E+06 st	1.0E+06 st
994058	t-Amyl methyl ether (TAME)	290 (ID) nc	DATA	6,300 nc
71432	Benzene	1,100 ca	140 ca	510 ca
78933	2-Butanone (MEK)	5.5E+07 (SE) dev	1.1E+06 (SE) dev	3.3E+05 (SE) dev
75650	t-Butyl alcohol	3,300 (ID) nc	DATA	7,400 nc
104518	n-Butylbenzene	12,000 (S) sol	29,000 nc	20,000 nc
135988	sec-Butylbenzene	18,000 (S) sol	49,000 (C) nc	41 nc
98066	t-Butylbenzene	66 nc	34 (M) nc	41 nc
108907	Chlorobenzene	27,000 nc	4,300 nc	5,100 nc
95501	1,2-Dichlorobenzene	1.6E+05 (S) sol	78,000 nc	31,000 nc
541731	1,3-Dichlorobenzene	2,600 nc	540 nc	310 nc
106467	1,4-Dichlorobenzene	9,600 ca	2,000 ca	1,000 ca
75343	1,1-Dichloroethane	5,400 ca	220 ca	2,500 ca
107062	1,2-Dichloroethane	1,700 ca	69 ca	150 ca
75354	1,1-Dichloroethylene	8,600 nc	650 nc	20,000 nc
156592	cis-1,2-Dichloroethylene	2,400 nc	110 nc	820 nc
156605	trans-1,2-Dichloroethylene	10,000 nc	630 nc	8,200 nc
60297	Diethyl ether	9.3E+05 nc	19,000 nc	1.0E+05 nc
108203	Diisopropyl ether	2.7E+05 (SE) dev	7,000 (SE) dev	47,000 (SE) dev
64175	Ethanol (#)	9.4E+08 (SE) st	2.4E+07 (SE) st	6.3E+05 (SE) st
637923	Ethyl-tert-butyl ether (ETBE)	1,700 (ID) nc	DATA	38,000 nc
100414	Ethylbenzene	3,600 ca	1,000 ca	1,600 ca
106934	Ethylene dibromide	230 ca	6.2 (M) ca	6.6 ca
110543	n-Hexane	3,000 (GW) nc	1,300 nc	72,000 nc
98828	Isopropyl benzene	810 ca	320 ca	380 ca
108101	4-Methyl-2-pentanone (MIBK)	1.9E+07 (S) (SE) sol	4.4E+05 (SE) dev	2.0E+05 (SE) dev

Table 6. Nonresidential Volatilization to Indoor Air Criteria (VIAC) adjusted for 12-hr workday exposure. The following are **restricted** site-specific criteria that apply to a nonresidential structure (> 50,000 ft²) with a **slab-on-grade**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	12-hr Groundwater Not In Contact (GWNIC)	12-hr Soil	12-hr Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
1634044	Methyl-tert-butyl ether (MTBE)	3.2E+05 ca	6,300 ca	15,000 ca
91576	2-Methylnaphthalene	25,000 (S) sol	90,000 nc	1,000 nc
91203	Naphthalene	5,900 ca	5,700 ca	120 ca
103651	n-Propylbenzene (#)	52,000 (S) (SE) sol	32,000 (SE) dev	33,000 (SE) dev
127184	Tetrachloroethylene	3,300 (SE) st	220 (SE) st	2,700 (SE) st
109999	Tetrahydrofuran	2.6E+07 nc	6.7E+05 nc	2.0E+05 nc
108883	Toluene (#)	5.3E+05 (S) sol	96,000 st	2.5E+05 st
79016	Trichloroethylene	210 (SE) dev	12 (M) (SE) dev	130 (SE) dev
540841	2,2,4-Trimethyl pentane	2,400 (S) (GW) sol	6,700 nc	3.6E+05 nc
526738	1,2,3-Trimethylbenzene	40,000 nc	14,000 nc	6,100 nc
95636	1,2,4-Trimethylbenzene	22,000 nc	7,800 nc	6,100 nc
108678	1,3,5-Trimethylbenzene	16,000 nc	5,400 nc	6,100 nc
75014	Vinyl chloride	280 ca	24 (M) ca	910 ca
1330207	Xylenes	61,000 nc	15,000 nc	22,000 nc
99876	4-Isopropyltoluene	NA	NA	NA

**Soil gas site-specific criteria are applicable for all depths.

- Acceptable Air Values (AAV) endpoint basis used for site-specific criterion: **(ca)** = Carcinogenic; **(nc)** = Non-Carcinogenic; **(dev)** = Developmental; **(mut)** = Mutagenic cancer; **(st)** = Short-term (i.e., less than chronic exposure); Agency for Toxic Substances and Disease Registry Inhalation Minimum Risk Level for Acute Inhalation or Intermediate Inhalation exposure durations; U.S. Environmental Protection Agency Integrated Risk Information System Reference Concentration for short-term exposure; or Air Quality Division Acute Initial Threshold Screening Level.
- Footnote **(#)**: Acceptable air concentrations (AAC) cannot be adjusted to a 12-hour exposure time for hazardous substance.
- Footnote **C**: The site-specific VIAC exceeds the chemical-specific soil saturation screening level (Csat). The person proposing or implementing response activity shall document whether additional response activity is required to control NAPL to protect against risks associated with NAPL by using methods appropriate for the NAPL present.
- Footnote **DATA**: Insufficient physical chemical parameters to calculate site-specific criteria for specified media. If detections are present in specified media, site-specific soil gas criteria should be used to evaluate risk.
- Footnote **GW**: The calculated value for a hazardous substance based upon GWIC is considered protective when it is greater than the calculated value for GWNIC.
- Footnote **ID**: Requires further evaluation to determine the appropriate media to sample.
- Footnote **M**: Site-specific criterion may be below target detection limits (**TDL**). In accordance with Sec. 20120a(10) when the TDL for a hazardous substance is greater than the developed cleanup criterion, the criterion is the TDL.
- Footnote **NA**: The hazardous substance has not been previously evaluated by the Remediation and Redevelopment Division Toxicology Unit. The identification, collection, and evaluation of toxicological literature and chemical-physical data cannot be completed within the timeframe requested.
- Footnote **NV**: The hazardous substance does not meet the department's definition of a volatile; therefore, no criteria were developed.
- Footnote **SE**: Site-specific criteria based on single event exposure; therefore, sampling methods should reflect shorter exposure scenarios.
- Footnote **S**: Calculated health-based value exceeds the hazardous substance-specific water solubility limit; therefore, the water solubility limit is the criterion.

Table 7. Nonresidential Volatilization to Indoor Air Criteria (VIAC) adjusted for 12-hr workday exposure. The following are **restricted** site-specific criteria that apply to a nonresidential structure (< 50,000 ft²) with an **unoccupied basement**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	12-hr Groundwater In Contact (GWIC) (µg/L)	12-hr Soil (µg/kg)	12-hr Soil Gas** (µg/m ³)
67641	Acetone (#)	2.0E+05 (SE) st	4.5E+06 st	1.0E+06 st
994058	t-Amyl methyl ether (TAME)	190 (ID) nc	DATA	6,300 nc
71432	Benzene	17 ca	140 ca	510 ca
78933	2-Butanone (MEK)	24,000 (SE) dev	1.1E+06 (SE) dev	3.3E+05 (SE) dev
75650	t-Butyl alcohol	2,400 (ID) nc	DATA	7,400 nc
104518	n-Butylbenzene	720 nc	28,000 nc	20,000 nc
135988	sec-Butylbenzene	790 nc	49,000 (C) nc	41 nc
98066	t-Butylbenzene	1.4 nc	33 (M) nc	41 nc
108907	Chlorobenzene	220 nc	4,200 nc	5,100 nc
95501	1,2-Dichlorobenzene	1,900 nc	76,000 nc	31,000 nc
541731	1,3-Dichlorobenzene	16 nc	520 nc	310 nc
106467	1,4-Dichlorobenzene	55 ca	1,900 ca	1,000 ca
75343	1,1-Dichloroethane	80 ca	220 ca	2,500 ca
107062	1,2-Dichloroethane	10 ca	67 ca	150 ca
75354	1,1-Dichloroethylene	500 nc	630 nc	20,000 nc
156592	cis-1,2-Dichloroethylene	28 nc	110 nc	820 nc
156605	trans-1,2-Dichloroethylene	40 nc	610 nc	8,200 nc
60297	Diethyl ether	6,300 nc	18,000 nc	1.0E+05 nc
108203	Diisopropyl ether	1,400 (SE) dev	6,800 (SE) dev	47,000 (SE) dev
64175	Ethanol (#)	3.1E+05 (SE) st	2.3E+07 (SE) st	6.3E+05 (SE) st
637923	Ethyl-tert-butyl ether (ETBE)	1,200 (ID) nc	DATA	38,000 nc
100414	Ethylbenzene	56 ca	990 ca	1,600 ca
106934	Ethylene dibromide	0.78 ca	6.0 (M) ca	6.6 ca
110543	n-Hexane	2,000 nc	1,300 nc	72,000 nc
98828	Isopropyl benzene	13 ca	310 ca	380 ca
108101	4-Methyl-2-pentanone (MIBK)	10,000 (SE) dev	4.2E+05 (SE) dev	2.0E+05 (SE) dev

Table 7. Nonresidential Volatilization to Indoor Air Criteria (VIAC) adjusted for 12-hr workday exposure. The following are **restricted** site-specific criteria that apply to a nonresidential structure (< 50,000 ft²) with an **unoccupied basement**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	12-hr Groundwater In Contact (GWIC)	12-hr Soil	12-hr Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
1634044	Methyl-tert-butyl ether (MTBE)	1,600 ca	6,100 ca	15,000 ca
91576	2-Methylnaphthalene	230 nc	87,000 nc	1,000 nc
91203	Naphthalene	23 ca	5,500 ca	120 ca
103651	n-Propylbenzene (#)	970 (SE) dev	31,000 (SE) dev	33,000 (SE) dev
127184	Tetrachloroethylene	70 (SE) st	210 (SE) st	2,700 (SE) st
109999	Tetrahydrofuran	1.4E+05 nc	6.5E+05 nc	2.0E+05 nc
108883	Toluene (#)	6,600 (SE) st	93,000 (SE) st	2.5E+05 (SE) st
79016	Trichloroethylene	3.3 (SE) dev	12 (M) (SE) dev	130 (SE) dev
540841	2,2,4-Trimethyl pentane	2,400 (S) sol	6,500 nc	3.6E+05 nc
526738	1,2,3-Trimethylbenzene	300 nc	14,000 nc	6,100 nc
95636	1,2,4-Trimethylbenzene	240 nc	7,500 nc	6,100 nc
108678	1,3,5-Trimethylbenzene	220 nc	5,200 nc	6,100 nc
75014	Vinyl chloride	21 ca	24 (M) ca	910 ca
1330207	Xylenes	810 nc	14,000 nc	22,000 nc
99876	4-Isopropyltoluene	NA	NA	NA

**Soil gas site-specific criteria are applicable for all depths.

- Acceptable Air Values (AAV) endpoint basis used for site-specific criterion: (**ca**) = Carcinogenic; (**nc**) = Non-Carcinogenic; (**dev**) = Developmental; (**mut**) = Mutagenic cancer; (**st**) = Short-term (i.e., less than chronic exposure); Agency for Toxic Substances and Disease Registry Inhalation Minimum Risk Level for Acute Inhalation or Intermediate Inhalation exposure durations; U.S. Environmental Protection Agency Integrated Risk Information System Reference Concentration for short-term exposure; or Air Quality Division Acute Initial Threshold Screening Level.
- Footnote (#): Acceptable air concentrations (AAC) cannot be adjusted to a 12-hour exposure time for hazardous substance.
- Footnote C: The site-specific VIAC exceeds the chemical-specific soil saturation screening level (Csat). The person proposing or implementing response activity shall document whether additional response activity is required to control NAPL to protect against risks associated with NAPL by using methods appropriate for the NAPL present.
- Footnote DATA: Insufficient physical chemical parameters to calculate site-specific criteria for specified media. If detections are present in specified media, site-specific soil gas criteria should be used to evaluate risk.
- Footnote GW: The calculated value for a hazardous substance based upon GWIC is considered protective when it is greater than the calculated value for GWNIC.
- Footnote ID: Requires further evaluation to determine the appropriate media to sample.
- Footnote M: Site-specific criterion may be below target detection limits (TDL). In accordance with Sec. 20120a(10) when the TDL for a hazardous substance is greater than the developed cleanup criterion, the criterion is the TDL.
- Footnote NA: The hazardous substance has not been previously evaluated by the Remediation and Redevelopment Division Toxicology Unit. The identification, collection, and evaluation of toxicological literature and chemical-physical data cannot be completed within the timeframe requested.
- Footnote NV: The hazardous substance does not meet the department's definition of a volatile; therefore, no criteria were developed.
- Footnote SE: Site-specific criteria based on single event exposure; therefore, sampling methods should reflect shorter exposure scenarios.
- Footnote S: Calculated health-based value exceeds the hazardous substance-specific water solubility limit; therefore, the water solubility limit is the criterion.

Table 8. Nonresidential Volatilization to Indoor Air Criteria (VIAC) adjusted for 12-hr workday exposure. The following are **restricted** site-specific criteria that apply to a nonresidential structure (> 50,000 ft²) with an **unoccupied basement**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	12-hr Groundwater In Contact (GWIC) (µg/L)	12-hr Soil (µg/kg)	12-hr Soil Gas** (µg/m ³)
67641	Acetone (#)	2.7E+05 (SE) st	6.8E+06 st	1.0E+06 st
994058	t-Amyl methyl ether (TAME)	290 (ID) nc	DATA	6,300 nc
71432	Benzene	23 ca	210 ca	510 ca
78933	2-Butanone (MEK)	34,000 (SE) dev	1.6E+06 (SE) dev	3.3E+05 (SE) dev
75650	t-Butyl alcohol	3,300 (ID) nc	DATA	7,400 nc
104518	n-Butylbenzene	1,000 nc	36,000 nc	20,000 nc
135988	sec-Butylbenzene	790 nc	49,000 (C) nc	41 nc
98066	t-Butylbenzene	2.0 nc	49 (M) nc	41 nc
108907	Chlorobenzene	290 nc	6,300 nc	5,100 nc
95501	1,2-Dichlorobenzene	2,300 nc	1.1E+05 nc	31,000 nc
541731	1,3-Dichlorobenzene	20 nc	780 nc	310 nc
106467	1,4-Dichlorobenzene	70 ca	2,900 ca	1,000 ca
75343	1,1-Dichloroethane	110 ca	320 ca	2,500 ca
107062	1,2-Dichloroethane	12 ca	100 ca	150 ca
75354	1,1-Dichloroethylene	740 nc	940 nc	20,000 nc
156592	cis-1,2-Dichloroethylene	38 nc	160 nc	820 nc
156605	trans-1,2-Dichloroethylene	41 nc	920 nc	8,200 nc
60297	Diethyl ether	7,700 nc	27,000 nc	1.0E+05 nc
108203	Diisopropyl ether	2,100 (SE) dev	10,000 (SE) dev	47,000 (SE) dev
64175	Ethanol (#)	4.2E+05 (SE) st	3.5E+07 (SE) st	6.3E+05 (SE) st
637923	Ethyl-tert-butyl ether (ETBE)	1,700 (ID) nc	DATA	38,000 nc
100414	Ethylbenzene	78 ca	1,500 ca	1,600 ca
106934	Ethylene dibromide	0.88 ca	9.1 (M) ca	6.6 ca
110543	n-Hexane	3,000 nc	1,900 nc	72,000 nc
98828	Isopropyl benzene	19 ca	460 ca	380 ca
108101	4-Methyl-2-pentanone (MIBK)	15,000 (SE) dev	6.3E+05 (SE) dev	2.0E+05 (SE) dev

Table 8. Nonresidential Volatilization to Indoor Air Criteria (VIAC) adjusted for 12-hr workday exposure. The following are **restricted** site-specific criteria that apply to a nonresidential structure (> 50,000 ft²) with an **unoccupied basement**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	12-hr Groundwater In Contact (GWIC)	12-hr Soil	12-hr Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
1634044	Methyl-tert-butyl ether (MTBE)	1,900 ca	9,100 ca	15,000 ca
91576	2-Methylnaphthalene	250 nc	1.3E+05 nc	1,000 nc
91203	Naphthalene	25 ca	8,200 ca	120 ca
103651	n-Propylbenzene (#)	1,500 (SE) dev	46,000 (SE) dev	33,000 (SE) dev
127184	Tetrachloroethylene	110 (SE) st	320 (SE) st	2,700 (SE) st
109999	Tetrahydrofuran	1.5E+05 nc	9.8E+05 nc	2.0E+05 nc
108883	Toluene (#)	9,900 (SE) st	1.4E+05 (SE) st	2.5E+05 (SE) st
79016	Trichloroethylene	4.9 (SE) dev	17 (M) (SE) dev	130 (SE) dev
540841	2,2,4-Trimethyl pentane	2,400 (S) sol	9,700 nc	3.6E+05 nc
526738	1,2,3-Trimethylbenzene	390 nc	21,000 nc	6,100 nc
95636	1,2,4-Trimethylbenzene	330 nc	11,000 nc	6,100 nc
108678	1,3,5-Trimethylbenzene	310 nc	7,800 nc	6,100 nc
75014	Vinyl chloride	31 ca	36 (M) ca	910 ca
1330207	Xylenes	1,100 nc	22,000 nc	22,000 nc
99876	4-Isopropyltoluene	NA	NA	NA

**Soil gas site-specific criteria are applicable for all depths.

- Acceptable Air Values (AAV) endpoint basis used for site-specific criterion: **(ca)** = Carcinogenic; **(nc)** = Non-Carcinogenic; **(dev)** = Developmental; **(mut)** = Mutagenic cancer; **(st)** = Short-term (i.e., less than chronic exposure); Agency for Toxic Substances and Disease Registry Inhalation Minimum Risk Level for Acute Inhalation or Intermediate Inhalation exposure durations; U.S. Environmental Protection Agency Integrated Risk Information System Reference Concentration for short-term exposure; or Air Quality Division Acute Initial Threshold Screening Level.
- Footnote **(#)**: Acceptable air concentrations (AAC) cannot be adjusted to a 12-hour exposure time for hazardous substance.
- Footnote **C**: The site-specific VIAC exceeds the chemical-specific soil saturation screening level (Csat). The person proposing or implementing response activity shall document whether additional response activity is required to control NAPL to protect against risks associated with NAPL by using methods appropriate for the NAPL present.
- Footnote **DATA**: Insufficient physical chemical parameters to calculate site-specific criteria for specified media. If detections are present in specified media, site-specific soil gas criteria should be used to evaluate risk.
- Footnote **GW**: The calculated value for a hazardous substance based upon GWIC is considered protective when it is greater than the calculated value for GWNIC.
- Footnote **ID**: Requires further evaluation to determine the appropriate media to sample.
- Footnote **M**: Site-specific criterion may be below target detection limits (**TDL**). In accordance with Sec. 20120a(10) when the TDL for a hazardous substance is greater than the developed cleanup criterion, the criterion is the TDL.
- Footnote **NA**: The hazardous substance has not been previously evaluated by the Remediation and Redevelopment Division Toxicology Unit. The identification, collection, and evaluation of toxicological literature and chemical-physical data cannot be completed within the timeframe requested.
- Footnote **NV**: The hazardous substance does not meet the department's definition of a volatile; therefore, no criteria were developed.
- Footnote **SE**: Site-specific criteria based on single event exposure; therefore, sampling methods should reflect shorter exposure scenarios.
- Footnote **S**: Calculated health-based value exceeds the hazardous substance-specific water solubility limit; therefore, the water solubility limit is the criterion.

Table 9. Residential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a residential **house** with a **slab-on-grade**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater Not In Contact (GWNIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m ³)
67641	Acetone	1.8E+07 st	2.6E+05 st	1.0E+06 st
994058	t-Amyl methyl ether (TAME)	3.9 (M) (ID) nc	DATA	2,200 nc
71432	Benzene	22 ca	1.7 (M) ca	110 ca
78933	2-Butanone (MEK)	2.3E+06 (SE) dev	31,000 (SE) dev	1.7E+05 (SE) dev
75650	t-Butyl alcohol	230 (ID) nc	DATA	2,500 nc
104518	n-Butylbenzene	1,300 nc	560 nc	7,000 nc
135988	sec-Butylbenzene	3,400 nc	3,800 nc	14 nc
98066	t-Butylbenzene	2.1 nc	0.64 (M) nc	14 nc
108907	Chlorobenzene	850 nc	82 nc	1,700 nc
95501	1,2-Dichlorobenzene	12,000 nc	1,500 nc	10,000 nc
541731	1,3-Dichlorobenzene	84 nc	10 (M) nc	100 nc
106467	1,4-Dichlorobenzene	190 ca	23 (M) ca	220 ca
75343	1,1-Dichloroethane	100 ca	2.6 (M) ca	530 ca
107062	1,2-Dichloroethane	32 ca	0.82 (M) ca	33 ca
75354	1,1-Dichloroethylene	260 nc	12 (M) nc	7,000 nc
156592	cis-1,2-Dichloroethylene	74 nc	2.1 (M) nc	280 nc
156605	trans-1,2-Dichloroethylene	310 nc	12 (M) nc	2,800 nc
60297	Diethyl ether	28,000 nc	350 nc	35,000 nc
108203	Diisopropyl ether	13,000 (SE) dev	200 (M) (SE) dev	23,000 (SE) dev
64175	Ethanol	6.5E+07 (SE) st	1.3E+06 (SE) st	6.3E+05 (SE) st
637923	Ethyl-tert-butyl ether (ETBE)	22 (ID) nc	DATA	13,000 nc
100414	Ethylbenzene	71 ca	12 (M) ca	340 ca
106934	Ethylene dibromide	4.7 ca	7.4E-02 (M) ca	1.4 ca
110543	n-Hexane	29 (GW) nc	25 nc	24,000 nc
98828	Isopropyl benzene	16 ca	3.8 (M) ca	81 ca
108101	4-Methyl-2-pentanone (MIBK)	8.9E+05 (SE) dev	12,000 (SE) dev	1.0E+05 (SE) dev

Table 9. Residential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a residential **house** with a **slab-on-grade**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater Not In Contact (GWNIC)	Soil	Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
1634044	Methyl-tert-butyl ether (MTBE)	6,300 ca	74 (M) ca	3,300 ca
91576	2-Methylnaphthalene	2,000 nc	1,700 nc	350 nc
91203	Naphthalene	120 ca	67 (M) ca	25 ca
103651	n-Propylbenzene	6,500 (SE) dev	1,800 (SE) dev	33,000 (SE) dev
127184	Tetrachloroethylene	160 (SE) st	6.2 (M) (SE) st	1,400 (SE) st
109999	Tetrahydrofuran	7.4E+05 nc	13,000 nc	70,000 nc
108883	Toluene	36,000 nc	3,700 nc	1.7E+05 nc
79016	Trichloroethylene	9.7 (SE) dev	0.33 (M) (SE) dev	67 (SE) dev
540841	2,2,4-Trimethyl pentane	160 (GW) nc	130 (M) nc	1.2E+05 nc
526738	1,2,3-Trimethylbenzene	1,300 nc	270 nc	2,100 nc
95636	1,2,4-Trimethylbenzene	710 nc	150 nc	2,100 nc
108678	1,3,5-Trimethylbenzene	500 nc	100 nc	2,100 nc
75014	Vinyl chloride	1.4 mut	8.2E-02 (M) mut	54 mut
1330207	Xylenes	1,900 nc	280 nc	7,600 nc
99876	4-Isopropyltoluene	NA	NA	NA

**Soil gas site-specific criteria are applicable for all depths.

- Acceptable Air Values (AAV) endpoint basis used for site-specific criterion: (**ca**) = Carcinogenic; (**nc**) = Non-Carcinogenic; (**dev**) = Developmental; (**mut**) = Mutagenic cancer; (**st**) = Short-term (i.e., less than chronic exposure); Agency for Toxic Substances and Disease Registry Inhalation Minimum Risk Level for Acute Inhalation or Intermediate Inhalation exposure durations; U.S. Environmental Protection Agency Integrated Risk Information System Reference Concentration for short-term exposure; or Air Quality Division Acute Initial Threshold Screening Level.
- Footnote **DATA**: Insufficient physical chemical parameters to calculate site-specific criteria for specified media. If detections are present in specified media, site-specific soil gas criteria should be used to evaluate risk.
- Footnote **GW**: The calculated value for a hazardous substance based upon GWIC is considered protective when it is greater than the calculated value for GWNIC.
- Footnote **ID**: Requires further evaluation to determine the appropriate media to sample.
- Footnote **M**: Site-specific criterion may be below target detection limits (**TDL**). In accordance with Sec. 20120a(10) when the TDL for a hazardous substance is greater than the developed cleanup criterion, the criterion is the TDL.
- Footnote **NA**: The hazardous substance has not been previously evaluated by the Remediation and Redevelopment Division Toxicology Unit. The identification, collection, and evaluation of toxicological literature and chemical-physical data cannot be completed within the timeframe requested.
- Footnote **NV**: The hazardous substance does not meet the department's definition of a volatile; therefore, no criteria were developed.
- Footnote **SE**: Site-specific criteria based on single event exposure; therefore, sampling methods should reflect shorter exposure scenarios.
- Footnote **S**: Calculated health-based value exceeds the hazardous substance-specific water solubility limit; therefore, the water solubility limit is the criterion.

Table 10. Residential Volatilization to Indoor Air Criteria (VIAC). The following are **unrestricted** site-specific criteria that apply to a residential **house** with a **habitable basement**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC)	Soil	Soil Gas**
		($\mu\text{g/L}$)	($\mu\text{g/kg}$)	($\mu\text{g/m}^3$)
67641	Acetone	50,000 (SE) st	2.6E+05 st	1.0E+06 st
994058	t-Amyl methyl ether (TAME)	3.9 (M) (ID) nc	DATA	2,200 nc
71432	Benzene	1.0 ca	1.7 (M) ca	110 ca
78933	2-Butanone (MEK)	2,600 (SE) dev	31,000 (SE) dev	1.7E+05 (SE) dev
75650	t-Butyl alcohol	230 (ID) nc	DATA	2,500 nc
104518	n-Butylbenzene	44 nc	550 nc	7,000 nc
135988	sec-Butylbenzene	270 nc	3,800 nc	14 nc
98066	t-Butylbenzene	7.7E-02 (M) nc	0.64 (M) nc	14 nc
108907	Chlorobenzene	33 nc	82 nc	1,700 nc
95501	1,2-Dichlorobenzene	370 nc	1,500 nc	10,000 nc
541731	1,3-Dichlorobenzene	2.6 nc	10 (M) nc	100 nc
106467	1,4-Dichlorobenzene	5.9 ca	23 (M) ca	220 ca
75343	1,1-Dichloroethane	4.7 ca	2.6 (M) ca	530 ca
107062	1,2-Dichloroethane	1.4 ca	0.82 (M) ca	33 ca
75354	1,1-Dichloroethylene	18 nc	12 (M) nc	7,000 nc
156592	cis-1,2-Dichloroethylene	3.4 nc	2.1 (M) nc	280 nc
156605	trans-1,2-Dichloroethylene	13 nc	12 (M) nc	2,800 nc
60297	Diethyl ether	1,200 nc	350 nc	35,000 nc
108203	Diisopropyl ether	36 (SE) dev	190 (M) (SE) dev	23,000 (SE) dev
64175	Ethanol	1.0E+05 (SE) st	1.3E+06 (SE) st	6.3E+05 (SE) st
637923	Ethyl-tert-butyl ether (ETBE)	22 (ID) nc	DATA	13,000 nc
100414	Ethylbenzene	2.8 ca	12 (M) ca	340 ca
106934	Ethylene dibromide	0.13 ca	7.4E-02 (M) ca	1.4 ca
110543	n-Hexane	29 nc	25 nc	24,000 nc
98828	Isopropyl benzene	0.60 (M) ca	3.8 (M) ca	81 ca
108101	4-Methyl-2-pentanone (MIBK)	720 (SE) dev	12,000 (SE) dev	1.0E+05 (SE) dev

Table 10. Residential Volatilization to Indoor Air Criteria (VIAC). The following are **unrestricted** site-specific criteria that apply to a residential **house** with a **habitable basement**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC)	Soil	Soil Gas**
		(µg/L)	(µg/kg)	(µg/m ³)
1634044	Methyl-tert-butyl ether (MTBE)	250 ca	74 (M) ca	3,300 ca
91576	2-Methylnaphthalene	66 nc	1,700 nc	350 nc
91203	Naphthalene	4.2 (M) ca	67 (M) ca	25 ca
103651	n-Propylbenzene	43 (SE) dev	1,800 (SE) dev	33,000 (SE) dev
127184	Tetrachloroethylene	1.5 (SE) st	6.2 (M) (SE) st	1,400 (SE) st
109999	Tetrahydrofuran	45,000 nc	13,000 nc	70,000 nc
108883	Toluene	300 (SE) st	3,700 nc	1.7E+05 nc
79016	Trichloroethylene	7.3E-02 (M) (SE) dev	0.33 (M) (SE) dev	67 (SE) dev
540841	2,2,4-Trimethyl pentane	160 nc	130 (M) nc	1.2E+05 nc
526738	1,2,3-Trimethylbenzene	43 nc	270 nc	2,100 nc
95636	1,2,4-Trimethylbenzene	25 nc	150 nc	2,100 nc
108678	1,3,5-Trimethylbenzene	18 nc	100 nc	2,100 nc
75014	Vinyl chloride	0.12 (M) mut	8.2E-02 (M) mut	54 mut
1330207	Xylenes	75 nc	280 nc	7,600 nc
99876	4-Isopropyltoluene	NA	NA	NA

**Soil gas site-specific criteria are applicable for all depths.

- Acceptable Air Values (AAV) endpoint basis used for site-specific criterion: **(ca)** = Carcinogenic; **(nc)** = Non-Carcinogenic; **(dev)** = Developmental; **(mut)** = Mutagenic cancer; **(st)** = Short-term (i.e., less than chronic exposure); Agency for Toxic Substances and Disease Registry Inhalation Minimum Risk Level for Acute Inhalation or Intermediate Inhalation exposure durations; U.S. Environmental Protection Agency Integrated Risk Information System Reference Concentration for short-term exposure; or Air Quality Division Acute Initial Threshold Screening Level.
- Footnote **DATA**: Insufficient physical chemical parameters to calculate site-specific criteria for specified media. If detections are present in specified media, site-specific soil gas criteria should be used to evaluate risk.
- Footnote **GW**: The calculated value for a hazardous substance based upon GWIC is considered protective when it is greater than the calculated value for GWNIC.
- Footnote **ID**: Requires further evaluation to determine the appropriate media to sample.
- Footnote **M**: Site-specific criterion may be below target detection limits (**TDL**). In accordance with Sec. 20120a(10) when the TDL for a hazardous substance is greater than the developed cleanup criterion, the criterion is the TDL.
- Footnote **NA**: The hazardous substance has not been previously evaluated by the Remediation and Redevelopment Division Toxicology Unit. The identification, collection, and evaluation of toxicological literature and chemical-physical data cannot be completed within the timeframe requested.
- Footnote **NV**: The hazardous substance does not meet the department's definition of a volatile; therefore, no criteria were developed.
- Footnote **SE**: Site-specific criteria based on single event exposure; therefore, sampling methods should reflect shorter exposure scenarios.
- Footnote **S**: Calculated health-based value exceeds the hazardous substance-specific water solubility limit; therefore, the water solubility limit is the criterion.