

**Arizona Department of Environmental Quality UST Program
Release Reporting & Corrective Action Guidance**

Tier 1 Cleanup Standards – Petroleum Products

COMPOUNDS OF CONCERN	SOIL (mg/Kg)				GROUNDWATER (µg/L)	
	CHILD CARE OR SCHOOL ¹	RESIDENTIAL ²	NON-RESIDENTIAL ²	SOIL LEACHING ³	DRINKING WATER ²	RISK-BASED LEVEL
Volatile Organic Compounds (VOCs)						
Benzene	0.65	0.65	1.4	0.44	5	NA
<i>n</i> -Butyl benzene	240*	240*	240*	397 [159]	NE	240
<i>sec</i> -Butyl benzene	220*	220*	220*	305 [150]	NE	240
<i>tert</i> -Butyl benzene	390*	390*	390*	302 [264]	NE	240
Carbon disulfide	360	360	720*	85	NE	700
Cumene (isopropyl benzene)	92*	92*	92*	122 [65]	NE	660
Cyclohexane	140*	140*	140*	4,444 [125]	NE	10,300
Cyclohexanone	310,000	310,000	1,000,000**	952	NE	30,400
1,2-Dichloroethane (DCA)	0.28	2.8	6.0	0.25	5	NA
Ethyl benzene	400*	400*	400*	176	700	NA
Ethylene dibromide (dibromoethane, EDB)	0.029	0.29	0.63	0.0027	0.05	NA
<i>n</i> -Hexane	110*	110*	110*	1,075 [83]	NE	
Methyl cyclohexane	230*	230*	230*	9,976 [170]	NE	5200
Methyl ethyl ketone (2-butanone, MEK)	23,000	23,000	34,000*	122	NE	4200
Methyl isobutyl ketone (4-methyl-2-pentanone, MIBK)	5300	5300	17,000*	48	NE	560
Methyl <i>tert</i> -butyl ether (MTBE)	32	320	710	0.47	NE	11
<i>n</i> -Propyl benzene	240*	240*	240*	397 [159]	NE	240
Toluene	650*	650*	650*	154	1000	NA
1,2,4-Trimethyl benzene	52	52	170	26	NE	12

¹ This enforceable Tier 1 cleanup standard applies to sites which are currently, or the currently intended future use is, where children below the age of 18 years are reasonably expected to be in frequent repeated contact with soil [A.A.C. R-18-7-205(E)].

² Enforceable Tier 1 cleanup standards are the Soil Remediation Levels (SRLs) taken from A.A.C. R-18-7-Appendix A, and the Aquifer Water Quality Standards (AWQSS) taken from R-18-11-406.

³ The ADEQ minimum Groundwater Protection Levels (GPLs) are protective of soil contaminant leaching to groundwater, based on achieving the drinking water standards in groundwater. For those inorganics having no value shown, the model did not yield accurate results. For PAHs, values are not shown due to the relatively limited mobility in soils.

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1,3,5-Trimethyl benzene	21	21	70	6.0	NE	12
Xylenes, total	270	270	420*	2,611 [271]	10,000	NA
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	3700	3700	29,000	981	NE	370
Acenaphthylene	NE	NE	NE	NE	NE	NE
Anthracene	22,000	22,000	240,000	31,804	NE	1800
Benz(a)anthracene	0.69	6.9	21	1,000,000**	NE	0.02
Benzo(b)fluoranthene	0.69	6.9	21	1,000,000**	NE	0.02
Benzo(k)fluoranthene	6.9	69	210	1,000,000**	NE	0.2
Benzo(a)pyrene	0.069	0.69	2.1	1,000,000**	0.2	NA
Chrysene	68	680	2000	258,549	NE	1.5
Dibenz(a,h)anthracene	0.069	0.69	2.1	1,000,000**	NE	0.002
Fluoranthene	2300	2300	22,000	1,000,000**	NE	240
Fluorene	2700	2700	26,000	2,091	NE	240
Indeno(1,2,3-c,d)pyrene	0.69	6.9	21	1,000,000**	NE	0.02
Methyl naphthalene	NE	NE	NE	NE	NE	NE
Naphthalene	56	56	190	4	NE	6
Phenanthrene	NE	NE	NE	NE	NE	NE
Pyrene	2300	2300	29,000	56,244	NE	180
Inorganic Compounds						
Antimony	31	31	410	35	6	NA
Arsenic	10	10	10	290	10	NA
Beryllium	150	150	1900	23	4	NA
Cadmium	39	39	510	29	5	NA
Lead	400	400	800	290	50	2, TT
Mercury	23	23	310	12	2	NA
Molybdenum	390	390	5100		NE	35
Selenium	390	390	5100	290	50	NA
Vanadium	78	78	1000		NE	7
Other Organic Compounds						
2-Methyl phenol (o-cresol)	3100	3100	31,000	0.016	NE	300

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3-Methyl phenol	3100	3100	31,000	<i>0.016</i>	NE	350
4-Methyl phenol	310	310	3100	<i>0.016</i>	NE	35
1,1-Biphenyl	350*	350*	350*		NE	350
Carbazole	27	270	860	<i>9.8</i>	NE	0.6

Legend:

“NA” denotes not applicable.

“NE” denotes non-existent.

“TT” denotes a US EPA mandated treatment technique that requires systems to control the corrosiveness of water so that leaching of lead and copper from the water distribution system is limited. If more than 10% of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1,300 µg/L, and for lead is 15 µg/L. Therefore, the allowable level in groundwater may be greater than the risk-based level.

* denotes this SRL is based on saturation in soil rather than a risk-based calculation. Saturation means that level at which free organic phase may form in soil.

** This SRL is based on a ceiling level of allowable contaminant in soil at 1 kilogram chemical per kilogram soil, which is physically not possible. The concentration resulting in a health risk is determined to be greater than this SRL. The applicable Tier 1 cleanup level is the lesser of the ADEQ minimum GPL or the concentration which constitutes free-phase or solid waste.

Italics indicates that these are screening values only to be used for purposes of risk assessment, only when a risk assessment for groundwater is required for groundwater closure. For VOCs, these screening values can not be applied to indoor air vapor intrusion.

[Number] indicates that this compound may form free-phase at this concentration if the organic content of soils is 0.1 percent or less.

Analytical Methods for Chemicals Listed in Table: VOCs should be analyzed by 8260B with the following exceptions: EDB for groundwater must be analyzed by 504.1. PAHs should be analyzed by 8310, or 8270C if the practical quantitation limit is sufficiently low. Check with the laboratory. Inorganics should be analyzed by 6010B, typically for crude product, lubes/greases, and new or used/waste oils. Only mercury requires analysis by 7471A. Some metals (barium, chromium, copper, nickel, tin, titanium, and zinc) are also found in crudes, greases, and used/waste oils, but levels in environmental releases may be much lower than the residential SRL and minimum GPL. o-Cresol should be analyzed by 8270C or 8041. Carbazole can be analyzed by 1625. If soil gas samples are collected, TO-15 and Method 21 should be used for VOCs. Naphthalene should be analyzed by NIOSH 5506. Check with the laboratory for adequately low practical quantitation limits.