DEPARTMENT OF

ENVIRONMENTAL CONSERVATION

18 AAC 75

Oil and Other Hazardous Substances Pollution Control

Public Comment Draft

March 19, 2018

Comment Period Ends
April 26, 2018 5:00 p.m.

Commented [SS1]: This regulations update is primarily to address changes in toxicity values for a number of important polyaromatic compounds (mainly benzo(a) pyrene which is used as a surrogate with relative potency factor for other cancer causing PAHs). A few other amendments are included and are annotated in this informational markup document.

Bill Walker
Governor

Larry Hartig
Commissioner

18 AAC 75.325(g) is amended to read:

(g) If using method two or method three for determining the applicable soil cleanup levels as described in 18 AAC 75.340 and 18 AAC 75.341, or if applying the groundwater cleanup levels at Table C in 18 AAC 75.345, a responsible person shall ensure that, after completing site cleanup, the risk from hazardous substances does not exceed a cumulative carcinogenic risk standard of 1 in 100,000 across all exposure pathways and does not exceed a cumulative noncarcinogenic risk standard at a hazard index of one, reported to one significant figure, across all exposure pathways. Instructions for determining cumulative risk are provided in the department's *Procedures for Calculating Cumulative Risk*, dated **February 1, 2018,** [SEPTEMBER 15, 2016 AND] adopted by reference.

Commented [SS2]: This change is necessary due to the cleanup levels that are being updated, as those changes affect the pathway specific screening levels used to calculate cumulative risk.

18 AAC 75.325(i) is amended to read:

(i) A responsible person**, owner, or operator** shall obtain approval before disposing of soil or groundwater from a site

Commented [SS3]: Owner or operator are added to responsible party to address the fact that sometimes it may be an owner or operator who seeks to transport soil or groundwater from a site.

(1) that is subject to the site cleanup rules; or

(2) for which [THE RESPONSIBLE PERSON HAS RECEIVED] a written determination from the department **has been granted** under 18 AAC 75.380(d)(1) **that documents contamination remaining above method two soil cleanup levels or groundwater cleanup levels listed in Table C;**

Commented [SS4]: This amendment allows for the freedom to move soil or groundwater from a site closed under method two without seeking department approval.

(Eff. 1/22/99, Register 149; am 8/27/2000, Register 155; am 1/30/2003, Register 165; am 10/9/2008, Register 188; am 6/17/2015, Register 214; am 1/1/2016, Register 217; am 11/6/2016, Register 220; am __/__/____, Register ___)

Authority: AS 46.03.020 AS 46.03.740 AS 46.04.020

AS 46.03.050 AS 46.03.745 AS 46.04.070

AS 46.03.710 AS 46.03.822 AS 46.09.020

Editor's note: The department's *Procedures for Calculating Cumulative Risk*, adopted by reference in 18 AAC 75.325 may be viewed at or obtained from the department's offices in Anchorage, Fairbanks, Juneau, and Soldotna or the department's Internet website at **http://dec.alaska.gov/spar/csp/guidance-forms.** [HTTP://DEC.ALASKA.GOV/SPAR/CSP/GUIDANCE_FORMS/CSGUIDANCE.HTM.]

Commented [SS5]: Reflects changes to DEC's webpage addresses.

. . .

18 AAC 75.340(e)(1) is amended to read:

(1) migration to groundwater or human health pathway in Table B1 or migration to groundwater or inhalation pathway in Table B2, based on the use of approved site-specific soil data, and the equations set out in the department's *Procedures for Calculating Cleanup Levels*, dated **February 1, 2018** [SEPTEMBER 15, 2016], adopted by reference;

Commented [SS6]: This change is necessary due to the cleanup levels that are being updated, as the change to toxicity values and chemical specific parameters for those compounds must also be updated in this adopted by reference document. In addition, a minor correction was made to include the word, "volatile" in addition to particulates for the inhalation pathway.

18 AAC 75.340(f)(1) is amended to read:

(1) performs a site-specific risk assessment and submits a risk assessment report to the department for approval, and if the department determines that the alternative cleanup level is protective of human health, safety, and welfare, and of the environment based on the site-specific risk assessment; in performing the risk assessment, a responsible person shall follow the department's *Risk Assessment Procedures Manual*, dated **February 1, 2018** [October 1, 2015], adopted by reference; and

Commented [SS7]: This document is updated only to reference the current versions of the Procedures for Calculating Cleanup Levels and Procedures for Calculating Cumulative Risk and newer versions of other referenced documents.

18 AAC 75.340(h)(2) is amended to read:

(2) the **limit of quantitation and limit of detection** [PRACTICAL QUANTITATION LIMIT] for the hazardous substance exceeds the applicable cleanup level set out in 18 AAC 75.341 for that substance.

Commented [SS8]: This change refers to updates to Section 355 of this chapter. The change in term reflects current standard practice and term usage. See Section 355 for additional detail.

18 AAC 75.340(k) is amended to read:

(k) For a cleanup conducted under methods two and three, a chemical that is detected at one-tenth or more of the Table B1 **human health** [DIRECT CONTACT AND INHALATION] cleanup levels set out in 18 AAC 75.341(c) must be included when calculating cumulative risk under 18 AAC 75.325(g). (Eff. 1/22/99, Register 149; am 8/27/2000, Register 155; am 1/30/2003, Register 165; am 10/9/2008, Register 188; am 1/1/2016, Register 217; am 11/6/2016, Register 220; am __/__/____, Register ___)

Commented [SS9]: This change corrects an error that was missed during the 2016 update when the direct contact and inhalation pathway were combined and renamed, "human health."

Authority: AS 46.03.020 AS 46.03.740 AS 46.04.070
AS 46.03.050 AS 46.03.745 AS 46.09.020
AS 46.03.710 AS 46.04.020

Editor's note: The documents adopted by reference in 18 AAC 75.340 may be reviewed at, or requested from, the department's offices in Anchorage, Fairbanks, Juneau, and Soldotna. The documents adopted by reference may also be viewed through the department's Internet website at **http://dec.alaska.gov/spar/csp/guidance-forms.** [HTTP://DEC.ALASKA.GOV/SPAR/CSP/GUIDANCE_FORMS/CSGUIDANCE.HTM.]

. . .

18 AAC 75.341(c) is repealed and readopted to read:

(c) If a responsible person uses method two for chemicals other than petroleum hydrocarbons under 18 AAC 75.340, the soil cleanup levels must be based on Table B1 in this subsection.

TABLE B1. METHOD TWO – SOIL CLEANUP LEVELS TABLE (See notes for additional requirements)

Hazardous Substance	CAS Number[1]	health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)	Arctic Zone[2] Human Health[5] (mg/kg)	Under 40 Inch Zone[3] Human Health[5] (mg/kg)	Over 40 Inch Zone[4] Human Health[5] (mg/kg)	Migration to Groundwater[6] (mg/kg)
Acenaphthene[7]	83-32-9	nc	6300	4600	3800	37
Acenaphthylene[7,8]	208-96-8	nc	3100	2300	1900	18
Acetone	67-64-1	nc	1.0 x 10^5; [9]	81000	65000	38
Aldrin	309-00-2	ca	0.67	0.49	0.40	0.0099
~~Ammonium Perchlorate~~	~~7790-98-9~~	~~nc~~	~~96~~	~~71~~	~~58~~	~~0.037~~
Anthracene[7]	120-12-7	nc	31000	23000	19000	390
Antimony (metallic)	7440-36-0	nc	55	41	33	4.6
Arsenic, Inorganic[11]	7440-38-2	ca	12	8.8	7.2	0.20
Barium	7440-39-3	nc	25000	20000	17000	2100
Benz[a]anthracene[7]	56-55-3	m	~~2.7~~20	~~2.0~~14	~~1.7~~12	~~0.28~~0.70
Benzaldehyde	100-52-7	nc	~~770~~[10]770 (3000)[10]	~~770~~[10]770 (2300)[10]	~~770~~[10]770 (1800)[10]	0.52
Benzene[7]	71-43-2	ca	16	11	8.1	0.022
Benzo[a]pyrene[7]	50-32-8	m	~~0.28~~2.0	~~0.20~~1.5	~~0.17~~1.2	~~0.27~~1.9
Benzo[b]fluoranthene[7]	205-99-2	m	~~2.8~~20	~~2.0~~15	~~1.7~~12	~~2.7~~20
Benzo[g,h,i]perylene[7,8]	191-24-2	nc	3100	2300	1900	15000
Benzo[k]fluoranthene[7]	207-08-9	m	~~28~~200	~~20~~150	~~17~~120	~~27~~190
Benzoic Acid	65-85-0	nc	1.0 x 10^5; [9]	1.0 x 10^5; [9]	1.0 x 10^5; [9]	200
Benzyl Alcohol	100-51-6	nc	11000	8200	6700	5.7
Beryllium and compounds	7440-41-7	nc	270	200	170	260
Bis(2-chloroethyl)ether	111-44-4	ca	4.0	2.8	2.1	0.00042
Bis(2-ethylhexyl)phthalate	117-81-7	ca	680	500	410	88
Bromobenzene	108-86-1	nc	~~160~~[10]160 (410)[10]	~~160~~[10]160 (290)[10]	~~160~~[10]160 (215)[10]	0.36
Bromodichloromethane	75-27-4	ca	5.3	3.6	2.6	0.0043
Bromoform	75-25-2	ca	340	240	170	0.10
Bromomethane	74-83-9	nc	15	10	7.4	0.024

Commented [SS10]: This compound is removed from the list and replaced with Perchlorate and Perchlorate Salts, which includes ammonium perchlorate, among other forms. See the listing for Perchlorate and Salts to review the cleanup levels.

Commented [SS11]: This change reflects updated toxicity information from benzo(a pyrene in IRIS. The relative potency factor is applied here which affects these cancer causing PAHs: (benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenz[a,h]anthracene, and indeno[1,2,3-c,d]pyrene)

Commented [SS12]: The table now includes the risk-based cleanup level in parentheses for compounds such as this one that are capped at saturation limits. Additional explanation is provided in footnote 10.

Commented [SS13]: This change reflects updated toxicity information about this compound.

Commented [SS14]: This change reflects updated toxicity information about this compound.

Commented [SS15]: This change reflects updated toxicity information about this compound.

TABLE B1. METHOD TWO – SOIL CLEANUP LEVELS TABLE (See notes for additional requirements)						
Hazardous Substance	CAS Number[1]	health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)	Arctic Zone[2] Human Health[5] (mg/kg)	Under 40 Inch Zone[3] Human Health[5] (mg/kg)	Over 40 Inch Zone[4] Human Health[5] (mg/kg)	Migration to Groundwater[6] (mg/kg)
Butadiene, 1,3-	106-99-0	ca	1.2	0.86	0.64	0.0012
Butanol, N-	71-36-3	nc	~~6500~~[10] 6500 (14000)[10]	~~6500~~[10] 6500 (10000)[10]	~~6500~~[10] 6500 (8300)[10]	5.3
Butyl Benzyl Phthalate	85-68-7	ca	5000	3700	3000	16
Butylbenzene, n-	104-51-8	nc	~~20~~[10] 20 (6800)[10]	~~20~~[10] 20 (5000)[10]	~~20~~[10] 20 (4150)[10]	23
Butylbenzene, sec-	135-98-8	nc	~~28~~[10] 28 (14000)[10]	~~28~~[10] 28 (10000)[10]	~~28~~[10] 28 (8300)[10]	42
Butylbenzene, tert-	98-06-6	nc	~~35~~[10] 36 (14000)[10]	~~35~~[10] 36 (10000)[10]	~~35~~[10] 36 (10000)[10]	11
Cadmium ~~(Diet)~~	7440-43-9	nc	120	92	76	9.1
Carbon Disulfide	75-15-0	nc	~~500~~[10] 500 (1600)[10]	~~500~~[10] 500 (1100)[10]	~~500~~[10] 500 (800)[10]	2.9
Carbon Tetrachloride	56-23-5	ca	13	9.1	6.6	0.021
Chlordane	12789-03-6	ca	29	22	17	0.18
Chlordecone (Kepone)	143-50-0	ca	0.95	0.70	0.58	0.0083
Chloroaniline, p-	106-47-8	ca	47	35	29	0.015
Chlorobenzene	108-90-7	nc	~~180~~[10] 180 (370)[10]	~~180~~[10] 180 (250)[10]	~~180~~[10] 180 (180)[10]	0.46
Chloroform	67-66-3	ca	5.8	4.0	2.9	0.0071
Chloromethane	74-87-3	nc	250	170	120	0.61
Chloronaphthalene, Beta-	91-58-7	nc	8400	6200	5100	26
Chlorophenol, 2-	95-57-8	nc	680	510	410	0.71
Chromium(III), Insoluble Salts[12]	16065-83-1	nc	1.0 x 10^5; [9]	1.0 x 10^5; [9]	1.0 x 10^5; [9]	1.0 x 10^5; [9]
Chromium(VI)[12]	18540-29-9	m	4.9	3.9	3.2	0.089
Chrysene[7]	218-01-9	m	~~280~~2000	~~200~~1500	~~170~~1200	~~82~~600
Copper	7440-50-8	nc	5500	4100	3300	370
Cresol, m-	108-39-4	nc	5500	4100	3400	6.1
Cresol, o-	95-48-7	nc	5500	4100	3400	6.2

Commented [SS16]: This change reflects updated toxicity information about this compound.

TABLE B1. METHOD TWO – SOIL CLEANUP LEVELS TABLE (See notes for additional requirements)

Hazardous Substance	CAS Number[1]	health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)	Arctic Zone[2] Human Health[5] (mg/kg)	Under 40 Inch Zone[3] Human Health[5] (mg/kg)	Over 40 Inch Zone[4] Human Health[5] (mg/kg)	Migration to Groundwater[6] (mg/kg)
Cresol, p-	106-44-5	nc	11000	8200	6700	12
Cumene	98-82-8	nc	~~54~~[10]54 (2500)[10]	~~54~~[10]54 (1700)[10]	~~54~~[10]54 (1300)[10]	5.6
Cyanide (CN-)[13]	57-12-5	nc	48	34	26	0.20
Cyclohexane	110-82-7	nc	~~77~~[10]77 (14000)[10]	~~77~~[10]77 (9400)[10]	~~77~~[10]77 (6700)[10]	150
DDD	72-54-8	ca	~~40~~3.3	~~29~~2.5	~~24~~2.0	~~0.49~~0.098
DDE, p,p'-	72-55-9	ca	34	25	20	0.72
DDT	50-29-3	ca	33	24	20	5.1
Dibenz[a,h]anthracene[7]	53-70-3	m	~~0.28~~2.0	~~0.20~~1.5	~~0.17~~1.2	~~0.87~~6.3
Dibenzofuran	132-64-9	nc	130	95	77	0.97
Dibromochloromethane	124-48-1	ca	140	110	88	0.0027
Dibromoethane, 1,2- (Ethylene Dibromide)	106-93-4	ca	0.62	0.42	0.31	0.00024
Dibromomethane (Methylene Bromide)	74-95-3	nc	45	31	22	0.025
Dibutyl Phthalate	84-74-2	nc	11000	8200	6700	16
Dichlorobenzene, 1,2-	95-50-1	nc	~~78~~[10]78 (2300)[10]	~~78~~[10]78 (1600)[10]	~~78~~[10]78 (1200)[10]	2.4
Dichlorobenzene, 1,3-[8]	541-73-1	nc	~~62~~[10]62 (2000)[10]	~~62~~[10]62 (1400)[10]	~~62~~[10]62 (1000)[10]	2.3
Dichlorobenzene, 1,4-	106-46-7	ca	31	21	15	0.037
Dichlorobenzidine, 3,3'-	91-94-1	ca	21	16	13	0.056
Dichlorodifluoromethane	75-71-8	nc	220	150	110	3.9
Dichloroethane, 1,1-	75-34-3	ca	67	46	33	0.092
Dichloroethane, 1,2-	107-06-2	ca	~~7.9~~8.0	5.5	3.9	0.0055
Dichloroethylene, 1,1-	75-35-4	nc	480	330	240	1.2
Dichloroethylene, 1,2-cis-	156-59-2	nc	270	200	170	0.12
Dichloroethylene, 1,2-trans-	156-60-5	nc	~~960~~[10]960 (2700)[10]	~~960~~[10]960 (2000)[10]	~~960~~[10]960 (1700)[10]	1.3
Dichlorophenol, 2,4-	120-83-2	nc	330	250	200	0.21

Commented [SS17]: This change reflects the use of a new toxicity source.

Commented [SS18]: This change reflects updated toxicity information about this compound.

Commented [SS19]: This cleanup level is updated due to a slight change in the dispersion constant for the Arctic zone.

TABLE B1. METHOD TWO – SOIL CLEANUP LEVELS TABLE (See notes for additional requirements)

Hazardous Substance	CAS Number[1]	health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)	Arctic Zone[2] Human Health[5] (mg/kg)	Under 40 Inch Zone[3] Human Health[5] (mg/kg)	Over 40 Inch Zone[4] Human Health[5] (mg/kg)	Migration to Groundwater[6] (mg/kg)
Dichlorophenoxy Acetic Acid, 2,4-	94-75-7	nc	1200	910	740	0.53
Dichloropropane, 1,2-	78-87-5	~~ca~~nc	~~16~~25	~~11~~17	~~8.0~~12	~~0.016~~0.030
Dichloropropene, 1,3-	542-75-6	ca	~~29~~30	21	15	0.018
Dieldrin	60-57-1	ca	0.59	0.44	0.36	0.0047
Diethyl Phthalate	84-66-2	nc	88000	66000	54000	60
Dimethylphenol, 2,4-	105-67-9	nc	2200	1600	1300	3.2
Dimethylphthalate[8]	131-11-3	nc	88000	66000	54000	48
Dinitrobenzene, 1,2-	528-29-0	nc	11	8.2	6.7	0.014
Dinitrobenzene, 1,3-	99-65-0	nc	11	8.2	6.7	0.014
Dinitrobenzene, 1,4-	100-25-4	nc	11	8.2	6.7	0.014
Dinitrophenol, 2,4-	51-28-5	nc	220	160	130	0.34
Dinitrotoluene, 2,4-	121-14-2	ca	30	23	18	0.024
Dinitrotoluene, 2,6-	606-20-2	ca	6.3	4.7	3.8	0.0050
Dinitrotoluene, 2-Amino-4,6-	35572-78-2	nc	270	200	160	0.25
Dinitrotoluene, 4-Amino-2,6-	19406-51-0	nc	270	200	160	0.25
Dioxane, 1,4-	123-91-1	ca	100	73	58	0.012
Diphenylamine	122-39-4	nc	~~2800~~11000	~~2000~~8200	~~1700~~6700	~~4.3~~17
Endosulfan (Endosulfan I + Endosulfan II)	115-29-7	nc	820	610	500	9.3
Endrin	72-20-8	nc	33	25	20	0.61
Ethyl Chloride	75-00-3	nc	~~1400[10]~~1400 (29000)[10]	~~1400[10]~~1400 (20000)[10]	~~1400[10]~~1400 (14000)[10]	72
Ethylbenzene[7]	100-41-4	ca	72	49	35	0.13
Ethylene Glycol	107-21-1	nc	1.0 x 10^5; [9]	1.0 x 10^5; [9]	1.0 x 10^5; [9]	110
Fluoranthene[7]	206-44-0	nc	4200	3100	2500	590
Fluorene[7]	86-73-7	nc	4200	3100	2500	36
Formaldehyde	50-00-0	ca	430	290	210	0.011
Heptachlor	76-44-8	ca	2.2	1.6	1.3	0.0076
Heptachlor Epoxide	1024-57-3	ca	1.2	0.86	0.69	0.0019

Commented [SS20]: This change reflects updated toxicity information about this compound. In addition, the noncarcinogenic effects are now the risk driver for this compound.

Commented [SS21]: This cleanup level is updated due to a slight change in the dispersion constant for the Arctic zone.

Commented [SS22]: This change reflects updated toxicity information about this compound.

Commented [SS23]: The name of this compound is updated to reflect the way that laboratories analyze and report the results.

TABLE B1. METHOD TWO – SOIL CLEANUP LEVELS TABLE (See notes for additional requirements)						
Hazardous Substance	CAS Number[1]	health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)	Arctic Zone[2] Human Health[5] (mg/kg)	Under 40 Inch Zone[3] Human Health[5] (mg/kg)	Over 40 Inch Zone[4] Human Health[5] (mg/kg)	Migration to Groundwater[6] (mg/kg)
Hexachlorobenzene	118-74-1	ca	2.8	2.0	1.5	0.0082
Hexachlorobutadiene	87-68-3	nc	~~3.3[10]~~3.3 (14)[10]	~~3.3[10]~~3.3 (10)[10]	~~3.3[10]~~3.3 (7.2)[10]	0.020
Hexachlorocyclohexane, Alpha-	319-84-6	ca	1.5	1.1	0.91	0.0029
Hexachlorocyclohexane, Beta-	319-85-7	ca	5.3	3.9	3.2	0.010
Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	ca	9.9	7.4	6.0	0.016
Hexachlorocyclopentadiene	77-47-4	nc	2.0	1.4	1.0	0.0093
Hexachloroethane	67-72-1	ca	~~24~~25	17	12	0.018
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	ca	110	79	64	0.027
Hexane, N-	110-54-3	nc	~~130[10]~~140 (1600)[10]	~~130[10]~~140 (1100)[10]	~~130[10]~~140 (750)[10]	130[10]
Hexanone, 2-	591-78-6	nc	380	270	210	0.11
Hydrazine	302-01-2	ca	~~0.79~~0.76	0.55	0.40	~~2.9~~3.1 x 10^{-5}
Indeno[1,2,3-cd]pyrene[7]	193-39-5	m	~~2.8~~20	~~2.0~~15	~~1.7~~12	~~8.8~~65
Isophorone	78-59-1	ca	10000	7400	6100	2.7
Isopropanol	67-63-0	nc	14000	9500	6800	1.1
Lead and Compounds[14]	7439-92-1	nc	400	400	400	n/a
Manganese	7439-96-5	nc	2900	2700	2000	370
Mercuric Chloride[8]	7487-94-7	nc	41	30	25	3.9
Mercury (elemental)	7439-97-6	nc	~~3.1[10]~~3.1 (28)[10]	~~3.1[10]~~3.1 (19)[10]	~~3.1[10]~~3.1 (14)[10]	0.36
Methanol	67-56-1	nc	1.0 x 10^5; [9]	1.0 x 10^5; [9]	1.0 x 10^5; [9]	54
Methoxychlor	72-43-5	nc	550	410	340	13
Methyl Ethyl Ketone (2-Butanone)	78-93-3	nc	~~23000[10]~~23000 (53000)[10]	~~23000[10]~~23000 (38000)[10]	~~23000[10]~~23000 (30000)[10]	15
Methyl Isobutyl Ketone (4-methyl-2-pentanone)	108-10-1	nc	~~2200[10]~~2200 (69000)[10]	~~2200[10]~~2200 (47000)[10]	~~2200[10]~~2200 (34000)[10]	18
Methyl Mercury	22967-92-6	nc	14	10	8.3	180

Commented [SS24]: This cleanup level is updated due to a slight change in the dispersion constant for the Arctic zone.

Commented [SS25]: This change reflects updated chemical parameters.

Commented [SS26]: This change reflects updated toxicity information about this compound.

Commented [SS27]: This compound has been added due to its detection at some federal military sites in Alaska and the recent availability of toxicity information.

TABLE B1. METHOD TWO – SOIL CLEANUP LEVELS TABLE (See notes for additional requirements)						
Hazardous Substance	CAS Number[1]	health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)	Arctic Zone[2] Human Health[5] (mg/kg)	Under 40 Inch Zone[3] Human Health[5] (mg/kg)	Over 40 Inch Zone[4] Human Health[5] (mg/kg)	Migration to Groundwater[6] (mg/kg)
Methyl tert-Butyl Ether (MTBE)	1634-04-4	ca	970	670	480	0.40
Methylene Chloride	75-09-2	nc	630	460	360	0.33
Methylnaphthalene, 1-	90-12-0	ca	~~68~~[10]68 (310)[10]	~~68~~[10]68 (230)[10]	~~68~~[10]68 (190)[10]	0.41
Methylnaphthalene, 2-	91-57-6	nc	420	310	250	1.3
Naphthalene[7]	91-20-3	ca	42	29	20	0.038
Nickel Soluble Salts	7440-02-0	nc	2600	2000	1700	340
Nitrobenzene	98-95-3	ca	~~63~~64	43	31	0.0079
Nitroglycerin	55-63-0	nc	11	8.2	6.7	0.0082
Nitroguanidine	556-88-7	nc	11000	8200	6700	5.8
Nitrosodimethylamine, N-	62-75-9	m	0.036	0.026	0.020	3.3×10^{-6}
Nitroso-di-N-propylamine, N-	621-64-7	ca	1.4	1.00	0.82	0.00068
Nitrosodiphenylamine, N-	86-30-6	ca	1900	1400	1200	4.6
Nitrotoluene, m-	99-08-1	nc	11	8.2	6.7	0.013
Nitrotoluene, o-	88-72-2	ca	55	41	34	0.024
Nitrotoluene, p-	99-99-0	nc	440	330	270	0.32
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	nc	6700	5000	4100	9.7
Octyl Phthalate, di-N-	117-84-0	nc	1100	820	670	370
Pentachlorophenol	87-86-5	ca	18	13	11	0.0043
Pentaerythritol tetranitrate (PETN)	78-11-5	nc	220	160	130	0.43
Perchlorate and Perchlorate Salts	14797-73-0	nc	96	71	58	0.037
Perfluorooctane~~Sulfonate~~sulfonic Acid (PFOS)[208]	1763-23-1	nc	2.2	1.6	1.3	0.0030
Perfluorooctanoic Acid (PFOA)[208]	335-67-1	nc	2.2	1.6	1.3	0.0017
Phenanthrene[7,8]	85-01-8	nc	3100	2300	1900	39
Phenol	108-95-2	nc	33000	25000	20000	29
Phosphorus, White	7723-14-0	nc	2.7	2.0	1.7	0.020
Polychlorinated Biphenyls (total)[15]	1336-36-3	ca	1.0	1.0	1.0	n/a
Propyl benzene	103-65-1	nc	~~52~~[10]52	~~52~~[10]52	~~52~~[10]52	9.1

Commented [SS28]: This cleanup level is updated due to a slight change in the dispersion constant for the Arctic zone.

Commented [SS29]: This compound replaces Ammonium Perchlorate, see above.

Commented [SS30]: Updated name only, which reflects how the contaminant is analyzed and reported by laboratories.

TABLE B1. METHOD TWO – SOIL CLEANUP LEVELS TABLE (See notes for additional requirements)

Hazardous Substance	CAS Number[1]	health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)	Arctic Zone[2] Human Health[5] (mg/kg)	Under 40 Inch Zone[3] Human Health[5] (mg/kg)	Over 40 Inch Zone[4] Human Health[5] (mg/kg)	Migration to Groundwater[6] (mg/kg)
			~~(5200)[10]~~	~~(3700)[10]~~	~~(2800)[10]~~	
Pyrene[7]	129-00-0	nc	3100	2300	1900	87
Selenium	7782-49-2	nc	680	510	410	6.9
Silver	7440-22-4	nc	680	510	410	11
Strontium	7440-24-6	nc	82000	61000	50000	5600
Styrene	100-42-5	nc	~~180[10]~~180 (8100)[10]	~~180[10]~~180 (5700)[10]	~~180[10]~~180 (4200)[10]	10
TCDD, 2,3,7,8-[16]	1746-01-6	ca	8.2×10^{-5}	6.0×10^{-5}	4.9×10^{-5}	3.9×10^{-6}
Tetrachloroethane, 1,1,1,2-	630-20-6	ca	30	21	15	0.022
Tetrachloroethane, 1,1,2,2-	79-34-5	ca	8.8	6.1	4.4	0.0030
Tetrachloroethylene	127-18-4	nc	~~68[10]~~68 (140)[10]	~~68[10]~~68 (95)[10]	~~68[10]~~68 (69)[10]	0.19
Tetryl (Trinitrophenylmethylnitramine)	479-45-8	nc	270	200	170	2.5
Thallium (Soluble Salts)	7440-28-0	nc	1.4	1.00	0.83	0.19
Toluene[7]	108-88-3	nc	~~200[10]~~200 (8000)[10]	~~200[10]~~200 (5800)[10]	~~200[10]~~200 (4500)[10]	6.7
Toxaphene	8001-35-2	ca	8.6	6.4	5.2	0.72
Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1	nc	~~740[10]~~740 (16000)[10]	~~740[10]~~740 (11000)[10]	~~740[10]~~740 (7700)[10]	~~1700~~310
Trichlorobenzene, 1,2,3-	87-61-6	nc	110	81	66	0.15
Trichlorobenzene, 1,2,4-	120-82-1	nc	~~65~~66	45	32	0.082
Trichloroethane, 1,1,1-	71-55-6	nc	~~360[10]~~360 (160000)[10]	~~360[10]~~360 (11000)[10]	~~360[10]~~360 (7800)[10]	32
Trichloroethane, 1,1,2-	79-00-5	nc	2.3	1.6	1.1	0.0014
Trichloroethylene	79-01-6	nc	7.1	4.9	3.5	0.011
Trichlorofluoromethane	75-69-4	nc	~~980[10]~~980 (41000)[10]	~~980[10]~~980 (30000)[10]	~~980[10]~~980 (25000)[10]	41
Trichlorophenol, 2,4,5-	95-95-4	nc	11000	8200	6700	28
Trichlorophenol, 2,4,6-	88-06-2	nc	110	82	67	0.092

Commented [SS31]: This compound has been added due to its detection at some federal military sites in Alaska and the recent availability of toxicity information.

Commented [SS32]: This change reflects updated toxicity information for this compound.

TABLE B1. METHOD TWO – SOIL CLEANUP LEVELS TABLE (See notes for additional requirements)						
Hazardous Substance	CAS Number[1]	health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)	Arctic Zone[2] Human Health[5] (mg/kg)	Under 40 Inch Zone[3] Human Health[5] (mg/kg)	Over 40 Inch Zone[4] Human Health[5] (mg/kg)	Migration to Groundwater[6] (mg/kg)
Trichlorophenoxyacetic Acid, 2,4,5-	93-76-5	nc	1100	820	670	0.66
Trichlorophenoxypropionic acid, -2,4,5	93-72-1	nc	880	660	540	0.55
Trichloropropane, 1,2,3-	96-18-4	m	0.089	0.066	0.054	3.1×10^{-5}
Trimethylbenzene, 1,2,4-	95-63-6	nc	~~43~~[10] 43 (400)[10]	~~43~~[10] 43 (280)[10)]	~~33~~ 43 (210)[10]	~~0.16~~0.61
Trimethylbenzene, 1,3,5-	108-67-8	nc	~~37~~[10] 37 (360)[10]	~~37~~[10] 37 (250)[10]	~~37~~[10] 37 (180)[10]	~~1.3~~0.66
Tri-n-butyltin	688-73-3	nc	41	30	25	0.68
Trinitrobenzene, 1,3,5-	99-35-4	nc	3900	2900	2400	15
Trinitrotoluene, 2,4,6-	118-96-7	nc	64	47	39	0.39
Vanadium and Compounds	7440-62-2	nc	680	510	420	1100
Vinyl Acetate	108-05-4	nc	2100	1400	1000	1.1
Vinyl Chloride	75-01-4	ca	0.69	0.65	0.61	0.00080
Xylenes[7]	1330-20-7	nc	~~57~~[10] 57 (710)[10]	~~57~~[10] 57 (490)[10]	~~57~~[10] 57 (350)[10]	1.5
Zinc and Compounds	7440-66-6	nc	41000	30000	25000	4900
See notes to table for further requirements. “n/a” means not applicable.						

Commented [SS33]: New toxicity information for groundwater exposure.

Commented [SS34]: New toxicity information for groundwater exposure.

NOTES TO TABLE B1 FOLLOW TABLE B2 IN (d) OF THIS SECTION

Notes to Tables B1 and B2:

If applicable, alternative cleanup levels must be protective of migration to surface water. Concentrations of hazardous substances in soil must be calculated and presented on a per dry weight basis. For volatile organic hazardous substances for which toxicity data are not currently available or calculated levels exceed the calculated saturation concentration, the cleanup level that applies at a site is the calculated saturation concentration determined using the equations set out in the *Procedures for Calculating Cleanup Levels*, adopted by reference in 18 AAC 75.340. The cleanup level from Table B1 or B2 that applies at a site is the most stringent of the applicable exposure pathway-specific cleanup levels based on human health, ingestion, inhalation, or migration to groundwater. Where the superscript figure "9" follows the exponent "10^{5}", separated by a semicolon, the figure "9" refers to Note 9.

1. "CAS Number" means the Chemical Abstract Service (CAS) registry number uniquely assigned to chemicals by the American Chemical Society and recorded in the CAS Registry System.

2. "Arctic zone" is defined at 18 AAC 75.990.

3. "Under 40 inch zone" means a site that receives mean annual precipitation of less than 40 inches each year.

4. "Over 40 inch zone" means a site that receives mean annual precipitation of 40 or more inches each year.

5. The "Human Health" exposure pathway is the cumulative exposure pathway through dermal contact, ingestion, and inhalation of volatile and particulate compounds from hazardous

substances in the soil but excludes the vapor intrusion pathway of indoor air inhalation.

6. The "Migration to Groundwater" exposure pathway is the potential for hazardous substances to leach to groundwater where they may result in a completed human health exposure pathway through dermal contact, ingestion, or inhalation of contaminants at or above levels listed in Table C at 18 AAC 75.345(b)(1); soil cleanup levels protective of migration to surface water must be determined on a site-specific basis.

7. If using method two or method three, the applicable petroleum hydrocarbon cleanup levels must be met in addition to the applicable chemical-specific cleanup levels for benzene, ethylbenzene, toluene, and total xylenes; the chemical-specific cleanup levels for the polynuclear aromatic hydrocarbons acenaphthene, acenaphthylene, anthracene, benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]pyrene, chrysene, dibenz[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-c,d]pyrene, naphthalene, phenanthrene, and pyrene must also be met unless the department determines that those cleanup levels need not be met to protect human health, safety, and welfare, and the environment.

8. Where one or more toxicological values were unavailable, toxicity values from surrogate compounds or other sources were used as presented in Table 6 in the *Procedures for Calculating Cleanup Levels*, adopted by reference in 18 AAC 75.340.

Commented [SS35]: This footnote has changed. Instead of listing surrogates and toxicity sources for certain compounds, the reader is referred to the table in the adopted by reference document.

9. The ceiling limit of 100,000 mg/kg is equivalent to a chemical representing 10 percent by weight of the soil sample. At this contaminant concentration and higher, the assumptions for soil contact may be violated (for example, soil adherence and wind-borne dispersion assumptions) due to the presence of the foreign substance itself.

10. This level is based on a soil saturation concentration (Csat) using the equations set out in *Procedures for Calculating Cleanup Levels*, adopted by reference in 18 AAC 75.340. The

Csat value is listed first, followed by the human health risk-based cleanup level in parentheses. The human health risk-based cleanup level assumptions do not take free product into consideration. Per 18 AAC 75.325(f), free product must be recovered to the maximum extent practicable. Contaminant concentrations above the Csat value trigger the need to assess the practicability of product recovery; if the department determines product recovery is impracticable, the risk-based cleanup level may be applied as long as the cumulative risk standards are met.

Commented [SS36]: This footnote has been revised to clarify the listing of both the saturation concentration and the risk-based concentration for these chemicals and to clarify the evaluation of free product recovery when concentrations remain above Csat.

11. Due to the prevalence of naturally occurring arsenic throughout the state, arsenic at a site will be considered background arsenic unless anthropogenic contribution from a source, activity, or mobilization by means of another introduced contaminant is known or suspected.

12. Due to the prevalence of naturally occurring chromium III throughout the state, sample results reported for total chromium detected at a site will be considered background chromium III unless anthropogenic contribution of chromium III or VI from a source, activity, or mobilization by means of another introduced contaminant is known or suspected. The calculated chromium III migration to groundwater cleanup level exceeds 1,000,000 parts per million.

13. Cyanide expressed as free, or physiologically available cyanide.

14. Lead cleanup levels are based on land use; for residential land use, the soil cleanup level is 400 mg/kg. For commercial or industrial land use, as applied in 18 AAC 75.340(e)(3), the soil cleanup level is 800 mg/kg; through an approved site-specific risk assessment, conducted according to the *Risk Assessment Procedures Manual*, adopted by reference in 18 AAC 75.340, approved exposure models may be used to evaluate exposure to a child resident or an adult worker; a responsible person may also propose an alternative cleanup level, through a site-specific risk assessment conducted according to the *Risk Assessment Procedures Manual*, and

based on a chemical speciation of the lead present at the site. For soils contaminated with lead more than 15 feet below ground surface, lead cleanup levels will be determined on a site-specific basis.

15. For unrestricted land use, polychlorinated biphenyls (PCBs) in soil shall be cleaned up to the listed value, unless the department determines that a different cleanup level is necessary as provided in 18 AAC 75.340(i); with the prior approval of the department, PCBs in soil may be cleaned up to

(A) between 1 and 10 mg/kg if the responsible person

(i) caps each area containing PCBs in soil at levels between 1 and 10 mg/kg; for purposes of this Note 15, "caps" means covering an area of PCB contaminated soil with an appropriate material to prevent exposure of humans and the environment to PCBs; to be approved, a cap must be designed and constructed of a material acceptable to the department and of sufficient strength and durability to withstand the use of the surface that is exposed to the environment; within 72 hours after discovery of a breach to the integrity of a cap, the responsible person or the landowner shall initiate repairs to that breach; and

(ii) provides the department within 60 days after completing the cleanup, documentation that the responsible person has recorded a deed notation in the appropriate land records, or on another instrument that is normally examined during a title search, documenting that PCBs remain in the soil, that the contaminated soil has been capped, and that subsequent interest holders may have legal obligations with respect to the cap and the contaminated soil; or

(B) an alternative PCB soil cleanup level developed through an approved site-

Commented [SS37]: This footnote has been updated to incorporate information previously included in the Editor's note that follows this section. See (C) below.

specific risk assessment, conducted according to the *Risk Assessment Procedures Manual*, adopted by reference at 18 AAC 75.340.

(C) The applicable EPA rule governing disposal and cleanup of PCB contaminated facilities under 40 C.F.R. Part 761.61 (PCB remediation waste) may apply to PCB cleanup at a contaminated site. The PCB cleanup levels listed in Table B1 are based on cleanup levels referred to in 40 C.F.R. 761.61 for high occupancy areas with no cap.

Commented [SS38]: This was moved from an Editor's note to here.

16. This cleanup level is for 2,3,7,8-Tetrachlorordibenzo-*p*-Dioxin (TCDD) only; all cleanup levels for polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) congeners must be determined on a site-specific basis using the TCDD toxicity equivalent (TEQ) approach. See the *Procedures for Calculating Cumulative Risk*.

Commented [SS39]: Added detail.

17. This level is the concentration of C_6 - C_{10}, C_{10} - C_{25}, or C_{25} - C_{36} petroleum hydrocarbon range in surface and subsurface soil that if exceeded, indicates an increased potential for hazardous substance migration or for risk to human health, safety, or welfare, or to the environment; the level of a petroleum hydrocarbon may not remain at a concentration above the maximum allowable concentration unless a responsible person demonstrates that the petroleum hydrocarbon will not migrate and will not pose a significant risk to human health, safety, or welfare, or to the environment; free product must be recovered as required by 18 AAC 75.325(f).

18. "Ingestion" means a potential pathway of exposure to hazardous substances through direct consumption of the soil.

19. "Inhalation" means a potential pathway to volatile organic hazardous substances in the soil through volatilization. (Eff. 1/22/99, Register 149; am 8/27/2000, Register 155; am 10/9/2008, Register 188; am 11/6/2016, Register 220; am __/__/____, Register ___)

Authority: AS 46.03.020 AS 46.03.740 AS 46.04.070
AS 46.03.050 AS 46.03.745 AS 46.09.020
AS 46.03.710 AS 46.04.020

[EDITOR'S NOTE: THE APPLICABLE EPA RULE GOVERNING DISPOSAL AND CLEANUP OF PCB CONTAMINATED FACILITIES UNDER 40 C.F.R. PART 761.61 (PCB REMEDIATION WASTE) MAY APPLY TO PCB CLEANUP AT A CONTAMINATED SITE. THE PCB CLEANUP LEVELS LISTED IN TABLE B1 ARE BASED ON CLEANUP LEVELS REFERRED TO IN 40 C.F.R. 761.61 FOR HIGH OCCUPANCY AREAS WITH NO CAP.]

Commented [SS40]: See footnote for PCBs

…

18 AAC 75.345(b)(1) is repealed and readopted to read:

(1) the cleanup levels in Table C if the current use or the reasonably expected potential future use of the groundwater, determined under 18 AAC 75.350, is a drinking water source;

TABLE C. GROUNDWATER CLEANUP LEVELS

Hazardous Substance	CAS Number[1]	Health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)	Groundwater Human Health Cleanup Level[2] (micrograms /liter)
Acenaphthene	83-32-9	nc	530
Acenaphthylene[3]	208-96-8	nc	260
Acetone	67-64-1	nc	14000
Aldrin	309-00-2	ca	0.0092
~~Ammonium Perchlorate~~	~~07790-98-9~~	~~nc~~	~~14~~
Anthracene	120-12-7	nc	434 (1800)[4]
Antimony (metallic)	7440-36-0	nc	7.8
Arsenic, Inorganic[5]	7440-38-2	ca	0.52
Barium	7440-39-3	nc	3800
Benz[a]anthracene	56-55-3	m	~~0.12~~ 30

Commented [SS41]: This compound is removed from the list and replaced with Perchlorate and Perchlorate Salts, which includes ammonium perchlorate, among other forms. See the listing for Perchlorate and Salts to review the cleanup levels.

Commented [SS42]: This change reflects updated toxicity information from benzo(a pyrene in IRIS. The relative potency factor is applied here which affects these cancer causing PAHs: (benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenz[a,h]anthracene, and indeno[1,2,3-c,d]pyrene)

TABLE C. GROUNDWATER CLEANUP LEVELS

Hazardous Substance	CAS Number[1]	Health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)	Groundwater Human Health Cleanup Level[2] (micrograms /liter)
Benzaldehyde	100-52-7	nc	~~1900~~190
Benzene	71-43-2	ca	4.6
Benzo[a]pyrene	50-32-8	m	~~0.03~~0.25
Benzo[b]fluoranthene	205-99-2	m	~~0.34~~2.5
Benzo[g,h,i]perylene[3]	191-24-2	nc	~~0.26~~[4]0.26 (600)[4]
Benzo[k]fluoranthene	207-08-9	m	~~0.80~~[4]0.80 (25)[4]
Benzoic Acid	65-85-0	nc	75000
Benzyl Alcohol	100-51-6	nc	2000
Beryllium and compounds	7440-41-7	nc	25
Bis(2-chloroethyl)ether	111-44-4	ca	0.14
Bis(2-ethylhexyl)phthalate	117-81-7	ca	56
Bromobenzene	108-86-1	nc	62
Bromodichloromethane	75-27-4	ca	1.3
Bromoform	75-25-2	ca	33
Bromomethane	74-83-9	nc	7.5
Butadiene, 1,3-	106-99-0	ca	0.18
Butanol, N-	71-36-3	nc	2000
Butyl Benzyl Phthalate	85-68-7	ca	160
Butylbenzene, n-	104-51-8	nc	1000
Butylbenzene, sec-	135-98-8	nc	2000
Butylbenzene, tert-	98-06-6	nc	690
Cadmium (Diet)	7440-43-9	nc	9.2
Carbon Disulfide	75-15-0	nc	810
Carbon Tetrachloride	56-23-5	ca	4.6
Chlordane	12789-03-6	ca	0.20
Chlordecone (Kepone)	143-50-0	ca	0.035
Chloroaniline, p-	106-47-8	ca	3.7
Chlorobenzene	108-90-7	nc	78
Chloroform	67-66-3	ca	2.2
Chloromethane	74-87-3	nc	190
Chloronaphthalene, Beta-	91-58-7	nc	750
Chlorophenol, 2-	95-57-8	nc	91
Chromium(III), Insoluble Salts[6]	16065-83-1	nc	22000
Chromium(VI)[6]	18540-29-9	m	0.35

Commented [SS43]: This change corrects a transcription error that occurred during the 2016 updates.

Commented [SS44]: This change reflects updated toxicity information for this compound.

Commented [SS45]: This change reflects updated toxicity information for this compound.

Commented [SS46]: The table now includes the risk-based cleanup level in parentheses for compounds such as this one that are capped at solubility limits. Additional explanation is provided in footnote 4.

Commented [SS47]: This change reflects updated toxicity information for this compound.

TABLE C. GROUNDWATER CLEANUP LEVELS			
Hazardous Substance	**CAS Number[1]**	**Health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)**	**Groundwater Human Health Cleanup Level[2] (micrograms /liter)**
Chrysene	218-01-9	m	~~2.0[4]~~2.0 (250)[4]
Copper	7440-50-8	nc	800
Cresol, m-	108-39-4	nc	930
Cresol, o-	95-48-7	nc	930
Cresol, p-	106-44-5	nc	1900
Cumene	98-82-8	nc	450
Cyanide (CN-)	57-12-5	nc	1.5
Cyclohexane	110-82-7	nc	13000
DDD	72-54-8	ca	~~0.32~~0.060
DDE, p,p'-	72-55-9	ca	0.46
DDT	50-29-3	ca	2.3
Dibenz[a,h]anthracene	53-70-3	m	~~0.034~~0.25
Dibenzofuran	132-64-9	nc	7.9
Dibromochloromethane	124-48-1	ca	8.7
Dibromoethane, 1,2- (Ethylene Dibromide)	106-93-4	ca	0.075
Dibromomethane (Methylene Bromide)	74-95-3	nc	8.3
Dibutyl Phthalate	84-74-2	nc	900
Dichlorobenzene, 1,2-	95-50-1	nc	300
Dichlorobenzene, 1,3-[3]	541-73-1	nc	300
Dichlorobenzene, 1,4-	106-46-7	ca	4.8
Dichlorobenzidine, 3,3'-	91-94-1	ca	1.3
Dichlorodifluoromethane	75-71-8	nc	200
Dichloroethane, 1,1-	75-34-3	ca	28
Dichloroethane, 1,2-	107-06-2	ca	1.7
Dichloroethylene, 1,1-	75-35-4	nc	280
Dichloroethylene, 1,2-cis-	156-59-2	nc	36
Dichloroethylene, 1,2-trans-	156-60-5	nc	360
Dichlorophenol, 2,4-	120-83-2	nc	46
Dichlorophenoxy Acetic Acid, 2,4-	94-75-7	nc	170
Dichloropropane, 1,2-	78-87-5	~~nc~~ca	~~8.2~~4.4
Dichloropropene, 1,3-	542-75-6	ca	4.7
Dieldrin	60-57-1	ca	0.018
Diethyl Phthalate	84-66-2	nc	15000
Dimethylphenol, 2,4-	105-67-9	nc	360

Commented [SS48]: This change reflects the use of a new toxicity source for this compound.

Commented [SS49]: This change reflects updated toxicity information about this compound.

Commented [SS50]: This change is to reflect that the noncarcinogenic effects are now the risk driver for this compound.

TABLE C. GROUNDWATER CLEANUP LEVELS			
Hazardous Substance	**CAS Number[1]**	**Health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)**	**Groundwater Human Health Cleanup Level[2] (micrograms /liter)**
Dimethylphthalate[3]	131-11-3	nc	16000
Dinitrobenzene, 1,2-	528-29-0	nc	1.9
Dinitrobenzene, 1,3-	99-65-0	nc	2.0
Dinitrobenzene, 1,4-	100-25-4	nc	2.0
Dinitrophenol, 2,4-	51-28-5	nc	39
Dinitrotoluene, 2,4-	121-14-2	ca	2.4
Dinitrotoluene, 2,6-	606-20-2	ca	0.49
Dinitrotoluene, 2-Amino-4,6-	35572-78-2	nc	39
Dinitrotoluene, 4-Amino-2,6-	19406-51-0	nc	39
Dioxane, 1,4-	123-91-1	ca	4.6
Diphenylamine	122-39-4	nc	~~310~~1300
Endosulfan	115-29-7	nc	100
Endrin	72-20-8	nc	2.3
Ethyl Chloride	75-00-3	nc	21000
Ethylbenzene	100-41-4	ca	15
Ethylene Glycol	107-21-1	nc	40000
Fluoranthene	206-44-0	Nc	~~260~~[4]260 (800)[4]
Fluorene	86-73-7	nc	290
Formaldehyde	50-00-0	ca	4.3
Heptachlor	76-44-8	ca	0.014
Heptachlor Epoxide	1024-57-3	ca	0.014
Hexachlorobenzene	118-74-1	ca	0.098
Hexachlorobutadiene	87-68-3	nc	1.4
Hexachlorocyclohexane, Alpha-	319-84-6	ca	0.072
Hexachlorocyclohexane, Beta-	319-85-7	ca	0.25
Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	ca	0.42
Hexachlorocyclopentadiene	77-47-4	nc	0.41
Hexachloroethane	67-72-1	ca	3.3
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	ca	7.0
Hexane, N-	110-54-3	nc	1500
Hexanone, 2-	591-78-6	nc	38
Hydrazine	302-01-2	ca	0.011
Indeno[1,2,3-cd]pyrene	193-39-5	m	~~0.19~~[4]0.19 (2.5)[4]
Isophorone	78-59-1	ca	780

Commented [SS51]: This change reflects updated toxicity information about this compound.

Commented [SS52]: This change reflects updated toxicity information about the surrogate used to calculate the cleanup level for this compound.

TABLE C. GROUNDWATER CLEANUP LEVELS			
Hazardous Substance	**CAS Number[1]**	**Health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)**	**Groundwater Human Health Cleanup Level[2] (micrograms /liter)**
Isopropanol	67-63-0	nc	410
Lead and Compounds[7]	7439-92-1	nc	15
Manganese	7439-96-5	nc	430[1]
Mercuric Chloride[3]	7487-94-7	nc	5.7
Mercury (elemental)	7439-97-6	nc	0.52
Methanol	67-56-1	nc	20000
Methoxychlor	72-43-5	nc	37
Methyl Ethyl Ketone (2-Butanone)	78-93-3	nc	5600
Methyl Isobutyl Ketone (4-methyl-2-pentanone)	108-10-1	nc	6300
Methyl Mercury	22967-92-6	nc	2.0
Methyl tert-Butyl Ether (MTBE)	1634-04-4	ca	140
Methylene Chloride	75-09-2	nc	110
Methylnaphthalene, 1-	90-12-0	ca	11
Methylnaphthalene, 2-	91-57-6	nc	36
Naphthalene	91-20-3	ca	1.7
Nickel Soluble Salts	7440-02-0	nc	390
Nitrobenzene	98-95-3	ca	1.4
Nitroglycerin	55-63-0	nc	2.0
Nitroguanidine	556-88-7	nc	2000
Nitrosodimethylamine, N-	62-75-9	m	0.0011
Nitroso-di-N-propylamine, N-	621-64-7	ca	0.11
Nitrosodiphenylamine, N-	86-30-6	ca	120
Nitrotoluene, m-	99-08-1	nc	1.7
Nitrotoluene, o-	88-72-2	ca	3.1
Nitrotoluene, p-	99-99-0	nc	43
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	nc	1000
Octyl Phthalate, di-N-	117-84-0	nc	~~22~~[4]22 (200)[4]
Pentachlorophenol	87-86-5	ca	0.41
Pentaerythritol tetranitrate (PETN)	78-11-5	nc	39
Perchlorate and Perchlorate Salts	14797-73-0	nc	14[1]
Perfluorooctane ~~Sulfonate~~sulfonic Acid (PFOS)[~~93~~]	1763-23-1	nc	0.40
Perfluorooctanoic Acid (PFOA)[~~93~~]	335-67-1	nc	0.40
Phenanthrene[3]	85-01-8	nc	170
Phenol	108-95-2	nc	5800

Commented [SS53]: This compound has been added due to its detection at some federal military sites in Alaska and the recent availability of toxicity information.

Commented [SS54]: This compound replaces Ammonium Perchlorate, see above.

TABLE C. GROUNDWATER CLEANUP LEVELS

Hazardous Substance	CAS Number[1]	Health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)	Groundwater Human Health Cleanup Level[2] (micrograms /liter)
Phosphorus, White	7723-14-0	nc	0.40
Polychlorinated Biphenyls (PCBs)	1336-36-3	ca	0.4450
Propyl benzene	103-65-1	nc	660
Pyrene	129-00-0	nc	120
Selenium	7782-49-2	nc	100
Silver	7440-22-4	nc	94
Styrene	100-42-5	nc	1200
Strontium	7440-24-6	nc	12000
TCDD, 2,3,7,8-[8]	1746-01-6	ca	1.2 x 10^{-6}
Tetrachloroethane, 1,1,1,2-	630-20-6	ca	5.7
Tetrachloroethane, 1,1,2,2-	79-34-5	ca	0.76
Tetrachloroethylene	127-18-4	nc	41
Tetryl (Trinitrophenylmethylnitramine)	479-45-8	nc	39
Thallium (Soluble Salts)	7440-28-0	nc	0.20
Toluene	108-88-3	nc	1100
Toxaphene	8001-35-2	ca	0.71
Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1	nc	5500010000
Trichlorobenzene, 1,2,3-	87-61-6	nc	7.0
Trichlorobenzene, 1,2,4-	120-82-1	nc	4.0
Trichloroethane, 1,1,1-	71-55-6	nc	8000
Trichloroethane, 1,1,2-	79-00-5	nc	0.41
Trichloroethylene	79-01-6	nc	2.8
Trichlorofluoromethane	75-69-4	nc	5200
Trichlorophenol, 2,4,5-	95-95-4	nc	1200
Trichlorophenol, 2,4,6-	88-06-2	nc	12
Trichlorophenoxyacetic Acid, 2,4,5-	93-76-5	nc	160
Trichlorophenoxypropionic acid, -2,4,5	93-72-1	nc	110
Trichloropropane, 1,2,3-	96-18-4	m	0.0075
Trimethylbenzene, 1,2,4-	95-63-6	nc	1556
Trimethylbenzene, 1,3,5-	108-67-8	nc	12060
Tri-n-butyltin	688-73-3	nc	3.7
Trinitrobenzene, 1,3,5-	99-35-4	nc	590
Trinitrotoluene, 2,4,6-	118-96-7	nc	9.8
Vanadium and Compounds	7440-62-2	nc	86

Commented [SS55]: This level has been updated to the risk-based concentration rather than the federal MCL.

Commented [SS56]: This compound has been added due to its detection at some federal military sites in Alaska and the recent availability of toxicity information.

Commented [SS57]: This change reflects updated toxicity information about this compound.

Commented [SS58]: This change reflects updated toxicity information about this compound.

Commented [SS59]: This change reflects updated toxicity information about this compound.

TABLE C. GROUNDWATER CLEANUP LEVELS			
Hazardous Substance	**CAS Number[1]**	**Health effect that drives risk: carcinogen (ca); noncarcinogen (nc); mutagen (m)**	**Groundwater Human Health Cleanup Level[2] (micrograms /liter)**
Vinyl Acetate	108-05-4	nc	410
Vinyl Chloride	75-01-4	ca	0.19
Xylenes	1330-20-7	nc	190
Zinc and Compounds	7440-66-6	nc	6000
			PETROLEUM HYDROCARBONS
C_6-C_{10} GRO		nc	2200
C_{10}-C_{25} DRO		nc	1500
C_{25}-C_{36} RRO		nc	1100

Notes to Table C:

1. "CAS Number" means the Chemical Abstract Service (CAS) registry number uniquely assigned to chemicals by the American Chemical Society and recorded in the CAS Registry System.

2. The "Human Health" exposure pathway is the cumulative exposure pathway through dermal contact, ingestion, and inhalation of volatile compounds from hazardous substances in the water.

3. Where one or more toxicological values were unavailable, toxicity values from surrogate compounds or other sources were used as presented in Table 6 from the *Procedures for Calculating Cleanup Levels*, adopted by reference in 18 AAC 75.340.

Commented [SS60]: This footnote has changed. Instead of listing surrogates and toxicity sources for certain compounds, the reader is referred to the table in the adopted by reference document.

4. This level is set at the compound's solubility concentration using the equations set out in the *Procedures for Calculating Cleanup Levels*, adopted by reference in 18 AAC 75.340. The solubility value is listed first, followed by the human health risk-based cleanup level in parentheses. The human health risk-based cleanup level assumptions do not take free product into consideration. Per 18 AAC 75.325(f), free product must be recovered to the maximum

extent practicable. Contaminant concentrations above the solubility value trigger the need to assess the practicability of product recover; if the department determines product recovery is impracticable, the risk-based cleanup level may be applied as long as the cumulative risk standards are met.

Commented [SS61]: This footnote has been revised to clarify the listing of both the solubility concentration and the risk-based concentration for these chemicals and to clarify the evaluation of free product recovery when concentrations remain above Csat.

5. Due to the prevalence of naturally occurring arsenic throughout the state, arsenic at a site will be considered background arsenic unless anthropogenic contribution from a source, activity, or mobilization by means of another introduced contaminant is known or suspected.

6. Due to the prevalence of naturally occurring chromium III throughout the state, sample results reported for total chromium detected at a site will be considered background chromium III unless anthropogenic contribution of chromium III or VI from a source, activity, or mobilization by means of another introduced contaminant is known or suspected.

7. The lead cleanup level is taken from EPA's action level for lead in water.

8. This cleanup level is for 2,3,7,8-Tetrachlorordibenzo-*p*-Dioxin (TCDD) only; all cleanup levels for polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) congeners must be determined on a site-specific basis using the TCDD toxicity equivalent (TEQ) approach. See the *Procedures for Calculating Cumulative Risk*. (Eff. 1/22/99, Register 149; am 8/27/2000, Register 155; am 1/30/2003, Register 165; am 10/9/2008, Register 188; am 6/17/2015, Register 214; am 11/6/2016, Register 220; am __/__/____, Register ___)

Commented [SS62]: Added detail.

Authority: AS 46.03.020 AS 46.03.740 AS 46.04.070
AS 46.03.050 AS 46.03.745 AS 46.09.010
AS 46.03.710 AS 46.04.020 AS 46.09.020

. . .

18 AAC 75.355(c) is amended to read:

(c) If a hazardous substance is suspected at the site because of empirical evidence or prior analysis, but is not detected or is detected at a concentration below the **limit of quantitation** [PRACTICAL QUANTITATION LIMIT], and the **limit of quantitation** [PRACTICAL QUANTITATION LIMIT] is higher than the cleanup level for that substance,

(1) the department will determine the responsible person to have attained the cleanup level[,] if [ADDITIONALLY THE MORE STRINGENT OF] the [FOLLOWING CONDITIONS IS MET:] **limit of quantitation or limit of detection is equal to or no greater than the quantitation limit or limit of detection achieved by a laboratory approved for that method by the department under 18 AAC 78.800 – 18 AAC 78.815; and**

18 AAC 75.355(c)(1)(A) is repealed:

(A) repealed __/__/___.

18 AAC 75.355(c)(1)(B) is repealed:

(B) repealed __/__/___.

18 AAC 75.355(c)(2) is amended to read:

(2) [AND] if the department determines that additional action is necessary to ensure protection of human health, safety, or welfare, or of the environment, the department will require one or more of the following:

(A) use of a surrogate measure to estimate the concentration of the hazardous substance;

(B) use of a specialized sample collection or analytical method to improve

Commented [SS63]: Updates terms to those now in standard use and provides a more straightforward process for achieving a cleanup level that is below the limit of detection.

Commented [SS64]: These two subparagraphs are repealed:

(A) the practical quantitation limit is no greater than 10 times the method detection limit for all hazardous substances other than polychlorinated biphenyls where the practical quantitation limit is no greater than five times the method detection limit; or

(B) the practical quantitation limit is no greater than the practical quantitation limit established in EPA's *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846), Third Edition, including Final Update IV (2009), adopted by reference;

(A) is repealed because of the now standard practice of applying limits of detection and limits of quantitation.

In (B), the adoption by reference of SW-846 is repealed as it does not reference all methods that may be considered for use. Under the proposed change, to use any method, it must be carried out by a laboratory that has received approval for that method under the department's laboratory approval program (see 18 AAC 78.800-815). The intent is to provide more flexibility for the regulated community in choosing analytical methods.

the accuracy, precision, **limit of detection** [METHOD DETECTION LIMIT], or **limit of quantitation** [PRACTICAL QUANTITATION LIMIT] for the hazardous substances at the site; or

Commented [SS65]: Updates the terms to those standardly used.

18 AAC 75.355(d) is amended to read:

(d) [AMONG THE ANALYTICAL METHODS SET OUT IN EPA'S TEST METHODS FOR EVALUATING SOLID WASTE, PHYSICAL/CHEMICAL METHODS (SW-846), AS ADOPTED BY REFERENCE IN (C) OF THIS SECTION, IF THERE IS MORE THAN ONE ANALYTICAL METHOD FOR A HAZARDOUS SUBSTANCE, A RESPONSIBLE PERSON MAY SELECT ANY OF THOSE METHODS WITH A PRACTICAL QUANTITATION LIMIT LESS THAN THE APPLICABLE CLEANUP LEVEL. IF ONLY ONE ANALYTICAL METHOD HAS A PRACTICAL QUANTITATION LIMIT LESS THAN THE APPLICABLE CLEANUP LEVEL, THAT METHOD MUST BE USED.] Analysis for petroleum contamination must follow the applicable Alaska methods for petroleum hydrocarbons referred to in Table 1 of Chapter 2 of the *Underground Storage Tanks Procedures Manual*, dated **March 22, 2017**[AUGUST 18, 2014]. Table 1 of Chapter 2 and Appendices C and D of the *Underground Storage Tanks Procedures Manual*, dated **March 22, 2017** [AUGUST 18, 2014] are adopted by reference.(Eff. 1/22/99, Register 149; am 8/27/2000, Register 155; am 1/30/2003, Register 165; am 6/17/2015, Register 214; am __/__/____, Register ___)

Commented [SS66]: This language is deleted because it appeared redundant and prior subsections already address these issues.

Commented [SS67]: Updates the adoption by reference to the most current version currently in use and previously adopted by reference in 18 AAC 78 in March of 2017.

Authority: AS 44.46.025 AS 46.03.710 AS 46.04.020
AS 46.03.020 AS 46.03.740 AS 46.04.070
AS 46.03.050 AS 46.03.745 AS 46.09.020

The Editor's note for 18 AAC 75.355 is amended to read:

Editor's note. The document[DOCUMENTS] adopted by reference in 18 AAC 75.355 may be viewed at or obtained from the department's offices in Anchorage, Fairbanks, Juneau, and Soldotna, or the department's Internet website at **http://dec.alaska.gov/spar/csp/guidance-forms.** [HTTP://DEC.ALASKA.GOV/SPAR/CSP/GUIDANCE_FORMS/CSGUIDANCE.HTM. EPA'S TEST METHODS FOR EVALUATING SOLID WASTE, PHYSICAL/CHEMICAL METHODS (SW-846) MAY ALSO BE VIEWED AT HTTP://WWW.EPA.GOV/WASTES/HAZARD/TESTMETHODS/SW846/ONLINE/INDEX.HTM.]

. . .

The Editor's note for 18 AAC 75.365 is amended to read:

Editor's note: The department's *Operation Requirements for Soil Treatment Facilities*, adopted by reference in 18 AAC 75.365(a)(1), may be viewed at or obtained from the department's offices in Anchorage, Fairbanks, Juneau, and Soldotna, or the department's Internet website at **http://dec.alaska.gov/spar/csp/guidance-forms.** [HTTP://DEC.ALASKA.GOV/SPAR/CSP/GUIDANCE_FORMS/CSGUIDANCE.HTM.]

. . .

18 AAC 75.370(b) is amended to read:

(b) A responsible person**, owner, or operator** shall obtain approval before moving or disposing of soil subject to the site cleanup rules. (Eff. 1/22/99, Register 149; am 8/27/2000, Register 155; am 10/9/2008, Register 188; am 6/17/2015, Register 214; am 11/6/2016, Register 220; am__/__/____, Register ___).

Commented [SS68]: Owner or operator are added to responsible party to address the fact that sometimes it may be an owner or operator who seeks to transport soil or groundwater from a site.

Authority: AS 46.03.020 AS 46.03.740 AS 46.04.070
AS 46.03.050 AS 46.03.745 AS 46.09.020
AS 46.03.710 AS 46.04.020

...

18 AAC 75.990(94) is repealed:

(94) repealed __/__/___;

18 AAC 75.990 is amended by adding new paragraphs to read:

(199) "limit of detection" is the smallest concentration of a substance that must be present in a sample in order to be detected at the detection limit with 99% confidence. At the limit of detection, the false negative rate (Type II error) is 1%. A limit of detection may be used as the lowest concentration for reliably reporting a non-detect of a specific analyte in a specific matrix with a specific method at 99% confidence.

(200) "limit of quantitation" is the smallest concentration that produces a quantitative result with known and recorded precision and bias. The limit of quantitation shall be set at or above the concentration of the lowest initial calibration standard and within the calibration range. (Eff. 5/14/92, Register 122; am 9/25/93, Register 127; am 4/4/97, Register 142; am 4/11/97, Register 142; am 1/22/99, Register 149; am 8/27/2000, Register 155; am 10/28/2000, Register 156; am 11/27/2002, Register 164; am 12/14/2002, Register 164; am 1/30/2003, Register 165; am 8/8/2003, Register 167; am 5/26/2004, Register 170; am 12/30/2006, Register 180; am 10/9/2008, Register 188; am 4/8/2012, Register 202; am 9/4/2014, Register 211; am 6/17/2015, Register 214; am 4/16/2016, Register 218; am 11/6/2016, Register 220; 3/23/2017, Register 221; am 7/1/2017, Register 222; am __/__/____, Register ___)

Commented [SS69]: This definition is repealed:
(94) "practical quantitation limit" means the lowest concentration that can be reliably measured within specified limits of precision, accuracy, representativeness, completeness, and comparability when testing field samples under routine laboratory operating conditions using approved methods;

Commented [SS70]: These definitions are added to correspond to the changes made to 18 AAC 75.355.

Authority: AS 46.03.020 AS 46.03.755 AS 46.04.055
AS 46.03.050 AS 46.03.822 AS 46.04.070
AS 46.03.710 AS 46.04.020 AS 46.08.140
AS 46.03.740 AS 46.04.030 AS 46.09.010
AS 46.03.745 AS 46.04.035 AS 46.09.020