40.0321: continued

(e) a release to the environment of oil and/or hazardous material which produces immediate or acute adverse impacts to freshwater or saltwater fish populations; or

(f) a release to the environment which produces readily apparent effects to human health, including respiratory distress or dermal irritation.

(2) For the purpose of fulfilling the "Two Hour" release notification obligations of 310 CMR 40.0311(7), the following releases could pose an Imminent Hazard to human health:

(a) a release to the environment indicated by the measurement of oil and/or hazardous material in a private drinking water supply well at a concentration equal to or greater than ten times the Category RCGW-1 Reportable Concentration, as described in 310 CMR 40.0360 through 40.0369 and listed at 310 CMR 40.1600; or

(b) a release to the environment indicated by the measurement of concentrations of hazardous material, equal to or greater than any of the following concentrations at the ground surface or within a depth of twelve inches below the ground surface, at any location within 500 feet of a residential dwelling, school, playground, recreation area or park, unless access by children is controlled or prevented by means of bituminous pavement, concrete, fence, or other physical barrier

Hazardous Material	CAS number	Concentration (ug/g dry wt)
Arsenic (total)	7440382	40
Cadmium (total)	7440439	60
Chromium (VI) (or Total Chromium in the absence of CrVI data)	18540299	200
Cyanide (available)	57125	100
Mercury (total)	7439976	300
Methyl Mercury	22967926	10
PCB (total)	1336363	10

or

(c) a release to the environment for which estimated long-term risk levels associated with current exposures are greater than ten times the Cumulative Receptor Risk Limits in 310 CMR 40.0993~~(6)~~(10). Past exposures may be included in such evaluations to the extent that it is reasonable to quantify those exposures.

(3) For the purpose of fulfilling the notification obligations of 310 CMR 40.0312(2), threats of release which pose or could pose an Imminent Hazard to health, safety, public welfare and/or the environment shall consist of any threat of release where, if the release were to occur, it is likely that that release would meet any of the criteria described in 310 CMR 40.0321(1) or (2).

(4) Notwithstanding the provisions of 310 CMR 40.0321(2) and 40.0321(3), a person required to notify under 310 CMR 40.0331 may demonstrate to the Department by a preponderance of the evidence that release or site conditions specified in 310 CMR 40.0321(2) and/or (3) do not constitute an actual Imminent Hazard to human health, in conformance with the Imminent Hazard Evaluation process described in 310 CMR 40.0426, and in consideration of the site-specific factors and the risk assessment and risk management criteria contained in 310 CMR 40.0950. No such demonstration, however, shall relieve any person of the obligation to notify the Department of a release or threat of release under the provisions of 310 CMR 40.0311 or 40.0312.

(5) No provision contained in 310 CMR 40.0321 shall limit the Department's authority to determine that an Imminent Hazard exists at any site, consistent with the provisions of 310 CMR 40.0950, nor shall any such provision limit the Department's authority to undertake response actions, seek any reimbursement or compensation due to the Commonwealth, or pursue enforcement actions in accordance with any such determination.

40.0322: Response Actions to Prevent or Abate Imminent Hazards

(1) An Immediate Response Action, as described in 310 CMR 40.0400, shall be taken to prevent, eliminate, or abate all Imminent Hazards.

40.0955: continued

(2) The characterization of the risk of harm to human health shall be conducted using Method 3, as described in 310 CMR 40.0993.

(a) The toxicity information used to characterize risk shall be consistent with the type and duration of exposure under evaluation, and shall be clearly identified and documented. Primary consideration shall be given to information developed by the Massachusetts Department of Environmental Protection for the purpose of conducting such risk assessments. Examples of such toxicity information include:

1. Reference Doses and Reference Concentrations; and
2. Carcinogenic Slope Factors and Unit Risk values.

(b) The conditions at the disposal site pose an Imminent Hazard based upon the potential for carcinogenic health effects if, for the oil and/or hazardous material evaluated and for each receptor, the estimated Excess Lifetime Cancer Risk is greater than a cancer risk limit which is an Excess Lifetime Cancer Risk equal to one-in-100,000.

(c) The conditions at the disposal site pose an Imminent Hazard based upon the potential for non-cancer health effects if, for the oil and/or hazardous material evaluated and for each receptor, the non-cancer risk calculated is greater than a non-cancer risk limit of:

1. a Hazard Index (or equivalent ratio of exposure) equal to one for oil or hazardous materials that have the potential to cause serious effects (including but not limited to lethal, developmental, or neurological effects) following short-term exposures, for example lead or cyanide; and
2. a Hazard Index equal to ten for all other oil or hazardous materials.

(d) A release to the environment which produces readily apparent effects to human health poses an Imminent Hazard. A quantitative evaluation of such exposures is not required.

(e) The mathematical equations used to calculate the risk estimates shall be clearly presented and documented.

(3) The risk of harm to the environment shall be characterized based on the data collected pursuant to the response action being performed and the site, receptor, and exposure information identified in 310 CMR 40.0995. The following conditions shall constitute an Imminent Hazard to the environment:

(a) evidence of stressed biota attributable to the release at the disposal site, including, without limitation, fish kills or abiotic conditions; or

(b) a release to the environment of oil or hazardous material which produces immediate or acute adverse impacts to freshwater or saltwater fish populations.

(4) The documentation of the Imminent Hazard Evaluation shall clearly state whether the conditions at the disposal site pose an Imminent Hazard based upon the criteria described in 310 CMR 40.0955(1) through (3).

40.0956: Substantial Hazard Evaluation

(1) The focus of a Substantial Hazard Evaluation shall be on possible exposures to Human and Environmental Receptors, considering the current use(s) of the disposal site and the surrounding environment and, where applicable, any Activity and Use Limitation for the site. A Substantial Hazard Evaluation shall not include fish consumption where a fish advisory has been put in place by the Commonwealth of Massachusetts or the federal government and the public is fully informed of the advisory by signage and/or other communication media.

(a) A condition of No Substantial Hazard to Health would exist if, for an appropriate Exposure Period, no Cumulative Receptor Cancer Risk and no Cumulative Receptor Non-cancer Risk is greater than the Cumulative Receptor Risk Limits specified at 310 CMR 40.0993(~~6~~10);

(b) The period of exposure to be considered shall be equal to or greater than the time from Notification to the date that the Substantial Hazard evaluation is conducted, plus five years; and

(c) A quantitative evaluation of human health risk is not required if there is no current exposure to oil and/or hazardous material at the disposal site.

310 CMR 40.0000 DEPARTMENT OF ENVIRONMENTAL PROTECTION

310 CMR 40.0974(2): **TABLE 1** ††

MCP Method 1 GROUNDWATER STANDARDS
APPLICABLE IN AREAS WHERE THE GROUNDWATER IS CONSIDERED TO BE ONE OR MORE OF THE FOLLOWING CATEGORIES PER 310 CMR 40.0932

Oil and/or Hazardous Material	CAS Number	GW-1 Standard ug/liter (ppb)	GW-2 Standard ug/liter (ppb)	GW-3 Standard ug/liter (ppb)
DIETHYL PHTHALATE	84-66-2	2,000	50,000	9,000
DIMETHYL PHTHALATE	131-11-3	300	50,000	50,000
DIMETHYLPHENOL, 2,4-	105-67-9	60	40,000	50,000
DINITROPHENOL, 2,4-	51-28-5	200	50,000	20,000
DINITROTOLUENE, 2,4-	121-14-2	30	20,000	50,000
DIOXANE, 1,4-	123-91-1	0.3	6,000	50,000
ENDOSULFAN	115-29-7	10	NA	2
ENDRIN	72-20-8	2	NA	5
ETHYLBENZENE	100-41-4	700	20,000	5,000
ETHYLENE DIBROMIDE	106-93-4	0.02	2	50,000
FLUORANTHENE	206-44-0	90	NA	200
FLUORENE	86-73-7	30	NA	40
HEPTACHLOR	76-44-8	0.4	2	1
HEPTACHLOR EPOXIDE	1024-57-3	0.2	7	2
HEXACHLOROBENZENE	118-74-1	1	1	6,000
HEXACHLOROBUTADIENE	87-68-3	0.6	50	3,000
HEXACHLOROCYCLOHEXANE, GAMMA (gamma-HCH)	58-89-9	0.2	200	4
HEXACHLOROETHANE	67-72-1	8	100	50,000
HMX	2691-41-0	200	50,000	50,000
INDENO(1,2,3-cd)PYRENE	193-39-5	0.5	NA	100
LEAD	7439-92-1	15	NA	10
MERCURY	7439-97-6	2	NA	20
METHOXYCHLOR	72-43-5	40	NA	10
METHYL ETHYL KETONE	78-93-3	4,000	50,000	50,000
METHYL ISOBUTYL KETONE	108-10-1	350	50,000	50,000
METHYL MERCURY	22967-92-6	0.3	NA	20
METHYL TERT BUTYL ETHER	1634-04-4	70	50,000	50,000
METHYLNAPHTHALENE, 2-	91-57-6	10	2,000	20,000
NAPHTHALENE	91-20-3	140	700	20,000
NICKEL	7440-02-0	100	NA	200
PENTACHLOROPHENOL	87-86-5	1	NA	200
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ***	-	0.02	NA	-
PERFLUORODECANOIC ACID (PFDA)	335-76-2	See PFAS	NA	40,000
PERFLUOROHEPTANOIC ACID (PFHpA)	375-85-9	See PFAS	NA	40,000
PERFLUOROHEXANESULFONIC ACID (PFHxS)	355-46-4	See PFAS	NA	500
PERFLUORONONANOIC ACID (PFNA)	375-95-1	See PFAS	NA	40,000
PERFLUOROOCTANESULFONIC ACID (PFOS)	1763-23-1	See PFAS	NA	500
PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	See PFAS	NA	40,000
PERCHLORATE	-	2	NA	1,000
PETROLEUM HYDROCARBONS				
TOTAL PETROLEUM HYDROCARBON †	NA	200	5,000	5,000
ALIPHATIC HYDROCARBONS				
C5 through C8 Aliphatic Hydrocarbons	NA	300	3,000	50,000
C9 through C12 Aliphatic Hydrocarbons	NA	700	5,000	50,000
C9 through C18 Aliphatic Hydrocarbons	NA	700	5,000	50,000
C19 through C36 Aliphatic Hydrocarbons	NA	14,000	NA	50,000
AROMATIC HYDROCARBONS				
C9 through C10 Aromatic Hydrocarbons	NA	200	4,000	50,000
C11 through C22 Aromatic Hydrocarbons	NA	200	50,000	5,000
PHENANTHRENE	85-01-8	40	NA	10,000
PHENOL	108-95-2	1,000	50,000	2,000
POLYCHLORINATED BIPHENYLS (PCBs)	1336-36-3	0.5	5	10
PYRENE	129-00-0	60	NA	20
RDX	121-82-4	1	50,000	50,000
SELENIUM	7782-49-2	50	NA	100
SILVER	7440-22-4	100	NA	7
STYRENE	100-42-5	100	100	6,000
TETRACHLORODIBENZO-p-DIOXIN (TCDD), 2,3,7,8- (equivalents)	1746-01-6	3.E-05	NA	4.E-02

310 CMR 40.0974(2): **TABLE 1** ††

MCP Method 1 GROUNDWATER STANDARDS
APPLICABLE IN AREAS WHERE THE GROUNDWATER IS CONSIDERED TO BE ONE OR MORE OF THE FOLLOWING CATEGORIES PER 310 CMR 40.0932

Oil and/or Hazardous Material	CAS Number	GW-1 Standard ug/liter (ppb)	GW-2 Standard ug/liter (ppb)	GW-3 Standard ug/liter (ppb)
TETRACHLOROETHANE, 1,1,1,2-	630-20-6	5	10	50,000
TETRACHLOROETHANE, 1,1,2,2-	79-34-5	2	9	50,000
TETRACHLOROETHYLENE	127-18-4	5	50	30,000
THALLIUM	7440-28-0	2	NA	3,000
TOLUENE	108-88-3	1,000	50,000	40,000
TRICHLOROBENZENE, 1,2,4-	120-82-1	70	200	50,000
TRICHLOROETHANE, 1,1,1-	71-55-6	200	4,000	20,000
TRICHLOROETHANE, 1,1,2-	79-00-5	5	900	50,000
TRICHLOROETHYLENE	79-01-6	5	5	5,000
TRICHLOROPHENOL, 2,4,5-	95-95-4	200	50,000	3,000
TRICHLOROPHENOL 2,4,6-	88-06-2	10	5,000	500
VANADIUM	7440-62-2	30	NA	4,000
VINYL CHLORIDE	75-01-4	2	2	50,000
XYLENES (Mixed Isomers)	1330-20-7	10,000	3,000	5,000
ZINC	7440-66-6	5,000	NA	900

NA - Not Applicable
* - The Total Chromium standard is applicable in the absence of species-specific data for Chromium III and Chromium VI.
** - Cyanide expressed as Physiologically Available Cyanide (PAC). In the absence of measured Physiologically Available Cyanide, the standard is applicable to Total Cyanide.
*** - The Per- and Polyfluoroalkyl Substances (PFAS) standard for GW-1 is for ~~shall be compared to~~ the sum of the concentrations of the following PFAS compounds: perfluorodecanoic acid (PFDA), perfluoroheptanoic acid (PFHpA), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA), perfluorooctanesulfonic acid (PFOS), and perfluorooctanoic acid (PFOA)~~, perfluorooctanesulfonic acid (PFOS), and perfluorononanoic acid (PFNA)~~. The listed PFAS compounds and associated CAS numbers are ~~for~~ the acid forms of these PFAS compounds. The ~~information~~ PFAS standards presented in Table 1 ~~are~~ also apply ~~applicable~~ to the respective anionic forms of these PFAS compounds. These anions may form salts with any of a number of cations resulting in a variety of possible chemical species, each having a unique CAS number.
† - The Total Petroleum Hydrocarbon (TPH) standard may be used as an alternative to the appropriate combinations of the Aliphatic and Aromatic Hydrocarbon Fraction standards. The use of the general TPH standard is a valid option only for C9 and greater petroleum hydrocarbons; it is not appropriate for the characterization of risks associated with lighter (gasoline-range) hydrocarbons.
†† - The Department periodically reviews the scientific basis for these Standards and amends them, as appropriate, to incorporate new scientific information.

40.0975: Identification of Applicable Soil Standards in Method 1

The MCP Method 1 Soil Standards consider both the potential risk of harm resulting from direct exposure to the oil and/or hazardous material in the soil and the potential impacts on the groundwater at the disposal site. The applicability of a specific numerical Standard is thus a function of both the soil and the groundwater category identified:

(1) The category of soil (S-1, S-2, or S-3) at each Exposure Point determines which one of the three tables of MCP Method 1 Soil Standards is applicable.

(2) The category of groundwater (GW-1, GW-2, and/or GW-3) at or near each Exposure Point determines which column of the applicable MCP Method 1 Soil Standards table are relevant to the soil at the Exposure Point. If more than one groundwater category is applicable at the disposal site, then multiple MCP Method 1 Soil Standards may be applicable to the soil of interest, and the lowest of those identified standards shall be selected to characterize the risk of harm.

(3) The MCP Method 1 Soil Standards listed in Table 2 in 310 CMR 40.0975(6)(a) are applicable to soil determined to be category S-1.

(4) The MCP Method 1 Soil Standards listed in Table 3 in 310 CMR 40.0975(6)(b) are applicable to soil determined to be category S-2.

(5) The MCP Method 1 Soil Standards listed in Table 4 in 310 CMR 40.0975(6)(c) are applicable to soil determined to be category S-3.

310 CMR 40.0975(6)(a): **TABLE 2** ††

MCP Method 1: SOIL CATEGORY S-1 STANDARDS APPLICABLE TO SOIL WHERE THE COMBINATION OF SOIL & GROUNDWATER CATEGORIES ARE:

Oil and/or Hazardous Material	CAS Number	S-1 SOIL & GW-1 ug/g (ppm)	S-1 SOIL & GW-2 ug/g (ppm)	S-1 SOIL & GW-3 ug/g (ppm)
DICHLOROETHANE, 1,1-	75-34-3	0.4	9	500
DICHLOROETHANE, 1,2-	107-06-2	0.1	0.1	20
DICHLOROETHYLENE, 1,1-	75-35-4	3	40	500
DICHLOROETHYLENE, CIS-1,2-	156-59-2	0.3	0.1	100
DICHLOROETHYLENE, TRANS-1,2-	156-60-5	1	1	500
DICHLOROMETHANE	75-09-2	0.1	4	400
DICHLOROPHENOL, 2,4-	120-83-2	0.7	60	40
DICHLOROPROPANE, 1,2-	78-87-5	0.1	0.1	30
DICHLOROPROPENE, 1,3-	542-75-6	0.01	0.4	20
DIELDRIN	60-57-1	0.08	0.08	0.08
DIETHYL PHTHALATE	84-66-2	10	200	300
DIMETHYL PHTHALATE	131-11-3	0.7	50	600
DIMETHYLPHENOL, 2,4-	105-67-9	0.7	100	500
DINITROPHENOL, 2,4-	51-28-5	3	50	50
DINITROTOLUENE, 2,4-	121-14-2	0.7	2	2
DIOXANE, 1,4-	123-91-1	0.2	6	20
ENDOSULFAN	115-29-7	0.5	300	1
ENDRIN	72-20-8	10	10	10
ETHYLBENZENE	100-41-4	40	500	500
ETHYLENE DIBROMIDE	106-93-4	0.1	0.1	1
FLUORANTHENE	206-44-0	1,000	1,000	1,000
FLUORENE	86-73-7	1,000	1,000	1,000
HEPTACHLOR	76-44-8	0.3	0.3	0.3
HEPTACHLOR EPOXIDE	1024-57-3	0.1	0.1	0.1
HEXACHLOROBENZENE	118-74-1	0.7	0.7	0.7
HEXACHLOROBUTADIENE	87-68-3	30	30	30
HEXACHLOROCYCLOHEXANE, GAMMA (gamma-HCH)	58-89-9	0.003	1	0.5
HEXACHLOROETHANE	67-72-1	0.7	3	50
HMX	2691-41-0	2	100	1,000
INDENO(1,2,3-cd)PYRENE	193-39-5	7	7	7
LEAD	7439-92-1	200	200	200
MERCURY	7439-97-6	20	20	20
METHOXYCHLOR	72-43-5	200	200	200
METHYL ETHYL KETONE	78-93-3	4	50	400
METHYL ISOBUTYL KETONE	108-10-1	0.4	50	400
METHYL MERCURY	22967-92-6	4	4	4
METHYL TERT BUTYL ETHER	1634-04-4	0.1	100	100
METHYLNAPHTHALENE, 2-	91-57-6	0.7	80	300
NAPHTHALENE	91-20-3	4	20	500
NICKEL	7440-02-0	600	600	600
PENTACHLOROPHENOL	87-86-5	3	3	3
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ***	-	~~0.0002~~	-	-
PEFLUORODECANOIC ACID (PFDA)	335-76-2	3E-04~~See PFAS~~	0.3	0.3
PERFLUOROHEPTANOIC ACID (PFHpA)	375-85-9	5E-04~~See PFAS~~	0.3	0.3
PERFLUOROHEXANESULFONIC ACID (PFHxS)	355-46-4	3E-04~~See PFAS~~	0.3	0.3

310 CMR 40.0000 DEPARTMENT OF ENVIRONMENTAL PROTECTION

310 CMR 40.0975(6)(a): **TABLE 2** ††

MCP Method 1: SOIL CATEGORY S-1 STANDARDS APPLICABLE TO SOIL WHERE THE COMBINATION OF SOIL & GROUNDWATER CATEGORIES ARE:

Oil and/or Hazardous Material	CAS Number	S-1 SOIL & GW-1 ug/g (ppm)	S-1 SOIL & GW-2 ug/g (ppm)	S-1 SOIL & GW-3 ug/g (ppm)
PERFLUORONONANOIC ACID (PFNA)	375-95-1	3.2E-04~~See PFAS~~	0.3	0.3
PERFLUOROOCTANESULFONIC ACID (PFOS)	1763-23-1	2E-03~~See PFAS~~	0.3	0.3
PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	7.2E-04~~See PFAS~~	0.3	0.3
PERCHLORATE	-	0.1	3	3

310 CMR 40.0000 DEPARTMENT OF ENVIRONMENTAL PROTECTION

310 CMR 40.0975(6)(a): **TABLE 2** ††

MCP Method 1: SOIL CATEGORY S-1 STANDARDS
APPLICABLE TO SOIL WHERE THE COMBINATION OF SOIL & GROUNDWATER CATEGORIES ARE:

Oil and/or Hazardous Material	CAS Number	S-1 SOIL & GW-1 ug/g (ppm)	S-1 SOIL & GW-2 ug/g (ppm)	S-1 SOIL & GW-3 ug/g (ppm)
PETROLEUM HYDROCARBONS				
TOTAL PETROLEUM HYDROCARBON †	NA	1,000	1,000	1,000
ALIPHATIC HYDROCARBONS				
C5 through C8 Aliphatic Hydrocarbons	NA	100	100	100
C9 through C12 Aliphatic Hydrocarbons	NA	1,000	1,000	1,000
C9 through C18 Aliphatic Hydrocarbons	NA	1,000	1,000	1,000
C19 through C36 Aliphatic Hydrocarbons	NA	3,000	3,000	3,000
AROMATIC HYDROCARBONS				
C9 through C10 Aromatic Hydrocarbons	NA	100	100	100
C11 through C22 Aromatic Hydrocarbons	NA	1,000	1,000	1,000
PHENANTHRENE	85-01-8	10	500	500
PHENOL	108-95-2	1	50	20
POLYCHLORINATED BIPHENYLS (PCBs)	1336-36-3	1	1	1
PYRENE	129-00-0	1,000	1,000	1,000
RDX	121-82-4	1	20	20
SELENIUM	7782-49-2	400	400	400
SILVER	7440-22-4	100	100	100
STYRENE	100-42-5	3	4	70
TETRACHLORODIBENZO-p-DIOXIN (TCDD), 2,3,7,8- (equivalents)	1746-01-6	2.E-05	2.E-05	2.E-05
TETRACHLOROETHANE, 1,1,1,2-	630-20-6	0.1	0.1	80
TETRACHLOROETHANE, 1,1,2,2-	79-34-5	0.005	0.02	10
TETRACHLOROETHYLENE	127-18-4	1	10	30
THALLIUM	7440-28-0	8	8	8
TOLUENE	108-88-3	30	500	500
TRICHLOROBENZENE, 1,2,4-	120-82-1	2	6	700
TRICHLOROETHANE, 1,1,1-	71-55-6	30	500	500
TRICHLOROETHANE, 1,1,2-	79-00-5	0.1	2	40
TRICHLOROETHYLENE	79-01-6	0.3	0.3	30
TRICHLOROPHENOL, 2,4,5-	95-95-4	4	1,000	600
TRICHLOROPHENOL 2,4,6-	88-06-2	0.7	20	20
VANADIUM	7440-62-2	400	400	400
VINYL CHLORIDE	75-01-4	0.9	0.7	1
XYLENES (Mixed Isomers)	1330-20-7	400	100	500
ZINC	7440-66-6	1,000	1,000	1,000

NOTE: All concentrations of oil and/or hazardous material in soil are calculated and presented on a dry weight/dry weight basis.
NA - Not Applicable

* - The Total Chromium standard is applicable in the absence of species-specific data for Chromium III and Chromium VI.

** - Cyanide expressed as Physiologically Available Cyanide (PAC). In the absence of measured Physiologically Available Cyanide, the standard is applicable to Total Cyanide.

*** - ~~The Per- and Polyfluoroalkyl Substances (PFAS) standard shall be compared to the sum of the concentrations of the following PFAS: perfluorodecanoic acid (PFDA), perfluoroheptanoic acid (PFHpA), perfluorohexanesulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), and perfluorononanoic acid (PFNA).~~ The listed compounds and associated CAS numbers are for the acid forms of these PFAS compounds. The ~~information~~ PFAS standards presented in Table 2 ~~are~~ also apply ~~applicable~~ to the respective anionic forms of these PFAS compounds. These anions may form salts with any of a number of cations resulting in a variety of possible chemical species, each having a unique CAS number.

† - The Total Petroleum Hydrocarbon (TPH) standard may be used as an alternative to the appropriate combinations of the Aliphatic and Aromatic Hydrocarbon Fraction standards. The use of the general TPH standard is a valid option only for C9 and greater petroleum hydrocarbons; it is not appropriate for the characterization of risks associated with lighter (gasoline-range) hydrocarbons.

†† - The Department periodically reviews the scientific basis for these Standards and amends them, as appropriate, to incorporate new scientific information.

310 CMR 40.0000 DEPARTMENT OF ENVIRONMENTAL PROTECTION

310 CMR 40.0975(6)(b): **TABLE 3** ††

MCP Method 1: SOIL CATEGORY S-2 STANDARDS
APPLICABLE TO SOIL WHERE THE COMBINATION OF SOIL & GROUNDWATER CATEGORIES ARE:

Oil and/or Hazardous Material	CAS Number	S-2 SOIL & GW-1 ug/g (ppm)	S-2 SOIL & GW-2 ug/g (ppm)	S-2 SOIL & GW-3 ug/g (ppm)
DICHLOROMETHANE	75-09-2	0.1	4	700
DICHLOROPHENOL, 2,4-	120-83-2	0.7	60	40
DICHLOROPROPANE, 1,2-	78-87-5	0.1	0.1	100
DICHLOROPROPENE, 1,3-	542-75-6	0.01	0.4	90
DIELDRIN	60-57-1	0.5	0.5	0.5
DIETHYL PHTHALATE	84-66-2	10	200	300
DIMETHYL PHTHALATE	131-11-3	0.7	50	600
DIMETHYLPHENOL, 2,4-	105-67-9	0.7	100	1,000
DINITROPHENOL, 2,4-	51-28-5	3	50	100
DINITROTOLUENE, 2,4-	121-14-2	0.7	10	10
DIOXANE, 1-4-	123-91-1	0.2	6	90
ENDOSULFAN	115-29-7	0.5	500	1
ENDRIN	72-20-8	20	20	20
ETHYLBENZENE	100-41-4	40	1,000	1,000
ETHYLENE DIBROMIDE	106-93-4	0.1	0.1	5
FLUORANTHENE	206-44-0	3,000	3,000	3,000
FLUORENE	86-73-7	3,000	3,000	3,000
HEPTACHLOR	76-44-8	2	2	2
HEPTACHLOR EPOXIDE	1024-57-3	0.9	0.9	0.9
HEXACHLOROBENZENE	118-74-1	0.8	0.8	0.8
HEXACHLOROBUTADIENE	87-68-3	100	100	100
HEXACHLOROCYCLOHEXANE, GAMMA (gamma-HCH)	58-89-9	0.003	2	0.5
HEXACHLOROETHANE	67-72-1	0.7	3	200
HMX	2691-41-0	2	100	1,000
INDENO(1,2,3-cd)PYRENE	193-39-5	40	40	40
LEAD	7439-92-1	600	600	600
MERCURY	7439-97-6	30	30	30
METHOXYCHLOR	72-43-5	400	400	400
METHYL ETHYL KETONE	78-93-3	4	50	400
METHYL ISOBUTYL KETONE	108-10-1	0.4	50	400
METHYL MERCURY	22967-92-6	8	8	8
METHYL TERT BUTYL ETHER	1634-04-4	0.1	100	500
METHYLNAPHTHALENE, 2-	91-57-6	1	80	500
NAPHTHALENE	91-20-3	4	20	1,000
NICKEL	7440-02-0	1,000	1,000	1,000
PENTACHLOROPHENOL	87-86-5	3	20	10
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ***	-	~~0.0002~~	-	-
PERFLUORODECANOIC ACID (PFDA)	335-76-2	3E-04~~See PFAS~~	0.4	0.4
PERFLUOROHEPTANOIC ACID (PFHpA)	375-85-9	5E-04~~See PFAS~~	0.4	0.4
PERFLUOROHEXANESULFONIC ACID (PFHxS)	355-46-6	3E-04~~See PFAS~~	0.4	0.4
PERFLUORONONANOIC ACID (PFNA)	375-95-1	3.2E-04~~See PFAS~~	0.4	0.4
PERFLUOROOCTANESULFONIC ACID (PFOS)	1763-23-1	2E-03~~See PFAS~~	0.4	0.4
PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	7.2E-04~~See PFAS~~	0.4	0.4
PERCHLORATE	-	0.1	5	5
PETROLEUM HYDROCARBONS				
TOTAL PETROLEUM HYDROCARBON †	NA	1,000	3,000	3,000
ALIPHATIC HYDROCARBONS				
C5 through C8 Aliphatic Hydrocarbons	NA	500	500	500
C9 through C12 Aliphatic Hydrocarbons	NA	3,000	3,000	3,000
C9 through C18 Aliphatic Hydrocarbons	NA	3,000	3,000	3,000
C19 through C36 Aliphatic Hydrocarbons	NA	5,000	5,000	5,000
AROMATIC HYDROCARBONS				
C9 through C10 Aromatic Hydrocarbons	NA	300	500	500

310 CMR 40.0000 DEPARTMENT OF ENVIRONMENTAL PROTECTION

310 CMR 40.0975(6)(b): **TABLE 3** ††

MCP Method 1: SOIL CATEGORY S-2 STANDARDS

APPLICABLE TO SOIL WHERE THE COMBINATION OF SOIL & GROUNDWATER CATEGORIES ARE:

Oil and/or Hazardous Material	CAS Number	S-2 SOIL & GW-1 ug/g (ppm)	S-2 SOIL & GW-2 ug/g (ppm)	S-2 SOIL & GW-3 ug/g (ppm)
C11 through C22 Aromatic Hydrocarbons	NA	1,000	3,000	3,000
PHENANTHRENE	85-01-8	20	1,000	1,000
PHENOL	108-95-2	1	50	20
POLYCHLORINATED BIPHENYLS (PCBs)	1336-36-3	4	4	4
PYRENE	129-00-0	3,000	3,000	3,000
RDX	121-82-4	1	80	80
SELENIUM	7782-49-2	700	700	700
SILVER	7440-22-4	200	200	200
STYRENE	100-42-5	3	4	300
TETRACHLORODIBENZO-p-DIOXIN (TCDD), 2,3,7,8- (equivalents)	1746-01-6	5.E-05	5.E-05	5.E-05
TETRACHLOROETHANE, 1,1,1,2-	630-20-6	0.1	0.1	400
TETRACHLOROETHANE, 1,1,2,2-	79-34-5	0.005	0.02	50
TETRACHLOROETHYLENE	127-18-4	1	10	200
THALLIUM	7440-28-0	60	60	60
TOLUENE	108-88-3	30	1,000	1,000
TRICHLOROBENZENE, 1,2,4-	120-82-1	2	6	3,000
TRICHLOROETHANE, 1,1,1-	71-55-6	30	600	1,000
TRICHLOROETHANE, 1,1,2-	79-00-5	0.1	2	200
TRICHLOROETHYLENE	79-01-6	0.3	0.3	60
TRICHLOROPHENOL, 2,4,5-	95-95-4	4	1,000	600
TRICHLOROPHENOL 2,4,6-	88-06-2	0.7	20	20
VANADIUM	7440-62-2	700	700	700
VINYL CHLORIDE	75-01-4	0.9	0.7	7
XYLENES (Mixed Isomers)	1330-20-7	400	100	1,000
ZINC	7440-66-6	3,000	3,000	3,000

NOTE: All concentrations of oil and/or hazardous material in soil are calculated and presented on a dry weight/dry weight basis.

NA- Not Applicable

* - The Total Chromium standard is applicable in the absence of species-specific data for Chromium III and Chromium VI.

** - Cyanide expressed as Physiologically Available Cyanide (PAC). In the absence of measured Physiologically Available Cyanide, the standard is applicable to Total Cyanide.

*** - ~~The Per- and Polyfluoroalkyl Substances (PFAS) standard shall be compared to the sum of the concentrations of the following PFAS: perfluorodecanoic acid (PFDA), perfluoroheptanoic acid (PFHpA), perfluorohexanesulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), and perfluorononanoic acid (PFNA).~~ The listed PFAS compounds and associated CAS numbers are for the acid forms of these PFAS compounds. The PFAS standards ~~information~~ presented in Table 3 ~~are~~ also apply ~~applicable~~ to the respective anionic forms of these PFAS compounds. These anions may form salts with any of a number of cations resulting in a variety of possible chemical species, each having a unique CAS number.

† - The Total Petroleum Hydrocarbon (TPH) standard may be used as an alternative to the appropriate combinations of the Aliphatic and Aromatic Hydrocarbon Fraction standards. The use of the general TPH standard is a valid option only for C9 and greater petroleum hydrocarbons; it is not appropriate for the characterization of risks associated with lighter (gasoline-range) hydrocarbons.

†† - The Department periodically reviews the scientific basis for these Standards and amends them, as appropriate, to incorporate new scientific information.

310 CMR 40.0000 DEPARTMENT OF ENVIRONMENTAL PROTECTION

310 CMR 40.0975(6)(c): **TABLE 4** ††

MCP Method 1: SOIL CATEGORY S-3 STANDARDS
APPLICABLE TO SOIL WHERE THE COMBINATION OF SOIL & GROUNDWATER CATEGORIES ARE:

Oil and/or Hazardous Material	CAS Number	S-3 SOIL & GW-1 ug/g (ppm)	S-3 SOIL & GW-2 ug/g (ppm)	S-3 SOIL & GW-3 ug/g (ppm)
DICHLOROMETHANE	75-09-2	0.1	4	700
DICHLOROPHENOL, 2,4-	120-83-2	0.7	60	40
DICHLOROPROPANE, 1,2-	78-87-5	0.1	0.1	1,000
DICHLOROPROPENE, 1,3-	542-75-6	0.01	0.4	100
DIELDRIN	60-57-1	3	3	3
DIETHYL PHTHALATE	84-66-2	10	200	300
DIMETHYL PHTHALATE	131-11-3	0.7	50	600
DIMETHYLPHENOL, 2,4-	105-67-9	0.7	100	1,000
DINITROPHENOL, 2,4-	51-28-5	3	50	100
DINITROTOLUENE, 2,4-	121-14-2	0.7	50	80
DIOXANE, 1,4-	123-91-1	0.2	6	500
ENDOSULFAN	115-29-7	0.5	500	1
ENDRIN	72-20-8	20	20	20
ETHYLBENZENE	100-41-4	40	1,000	3,000
ETHYLENE DIBROMIDE	106-93-4	0.1	0.1	40
FLUORANTHENE	206-44-0	5,000	5,000	5,000
FLUORENE	86-73-7	5,000	5,000	5,000
HEPTACHLOR	76-44-8	10	10	10
HEPTACHLOR EPOXIDE	1024-57-3	1	1	1
HEXACHLOROBENZENE	118-74-1	0.8	0.8	0.8
HEXACHLOROBUTADIENE	87-68-3	100	100	100
HEXACHLOROCYCLOHEXANE, GAMMA (gamma-HCH)	58-89-9	0.003	2	0.5
HEXACHLOROETHANE	67-72-1	0.7	3	200
HMX	2691-41-0	2	100	1,000
INDENO(1,2,3-cd)PYRENE	193-39-5	300	300	300
LEAD	7439-92-1	600	600	600
MERCURY	7439-97-6	30	30	30
METHOXYCHLOR	72-43-5	400	400	400
METHYL ETHYL KETONE	78-93-3	4	50	400
METHYL ISOBUTYL KETONE	108-10-1	0.4	50	400
METHYL MERCURY	22967-92-6	8	8	8
METHYL TERT BUTYL ETHER	1634-04-4	0.1	100	500
METHYLNAPHTHALENE, 2-	91-57-6	1	80	500
NAPHTHALENE	91-20-3	4	20	3,000
NICKEL	7440-02-0	1,000	1,000	1,000
PENTACHLOROPHENOL	87-86-5	3	70	10
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ***	~~-~~	~~-0.0002~~	~~--~~	~~--~~
PERFLUORODECANOIC ACID (PFDA)	335-76-2	3E-04~~See PFAS~~	0.4	0.4
PERFLUOROHEPTANOIC ACID (PFHpA)	375-85-9	5E-04~~See PFAS~~	0.4	0.4
PERFLUOROHEXANESULFONIC ACID (PFHxS)	355-46-4	3E-04~~See PFAS~~	0.4	0.4
PERFLUORONONANOIC ACID (PFNA)	375-95-1	3.2E-04~~See PFAS~~	0.4	0.4
PERFLUOROOCTANESULFONIC ACID (PFOS)	1763-23-1	2E-03~~See PFAS~~	0.4	0.4
PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	7.2E-04~~See PFAS~~	0.4	0.4
PERCHLORATE	-	0.1	5	5

310 CMR 40.0000 DEPARTMENT OF ENVIRONMENTAL PROTECTION

310 CMR 40.0975(6)(c): **TABLE 4** ††

MCP Method 1: SOIL CATEGORY S-3 STANDARDS
APPLICABLE TO SOIL WHERE THE COMBINATION OF SOIL & GROUNDWATER CATEGORIES ARE:

Oil and/or Hazardous Material	CAS Number	S-3 SOIL & GW-1 ug/g (ppm)	S-3 SOIL & GW-2 ug/g (ppm)	S-3 SOIL & GW-3 ug/g (ppm)
PETROLEUM HYDROCARBONS				
TOTAL PETROLEUM HYDROCARBON †	NA	1,000	5,000	5,000
ALIPHATIC HYDROCARBONS				
C5 through C8 Aliphatic Hydrocarbons	NA	500	500	500
C9 through C12 Aliphatic Hydrocarbons	NA	5,000	5,000	5,000
C9 through C18 Aliphatic Hydrocarbons	NA	5,000	5,000	5,000
C19 through C36 Aliphatic Hydrocarbons	NA	5,000	5,000	5,000
AROMATIC HYDROCARBONS				
C9 through C10 Aromatic Hydrocarbons	NA	300	500	500
C11 through C22 Aromatic Hydrocarbons	NA	1,000	5,000	5,000
PHENANTHRENE	85-01-8	20	3,000	3,000
PHENOL	108-95-2	1	50	20
POLYCHLORINATED BIPHENYLS (PCBs)	1336-36-3	4	4	4
PYRENE	129-00-0	5,000	5,000	5,000
RDX	121-82-4	1	100	400
SELENIUM	7782-49-2	700	700	700
SILVER	7440-22-4	200	200	200
STYRENE	100-42-5	3	4	2,000
TETRACHLORODIBENZO-p-DIOXIN (TCDD), 2,3,7,8- (equivalents)	1746-01-6	5.E-05	5.E-05	5.E-05
TETRACHLOROETHANE, 1,1,1,2-	630-20-6	0.1	0.1	500
TETRACHLOROETHANE, 1,1,2,2-	79-34-5	0.005	0.02	400
TETRACHLOROETHYLENE	127-18-4	1	10	1,000
THALLIUM	7440-28-0	80	80	80
TOLUENE	108-88-3	30	2,000	3,000
TRICHLOROBENZENE, 1,2,4-	120-82-1	2	6	5,000
TRICHLOROETHANE, 1,1,1-	71-55-6	30	600	3,000
TRICHLOROETHANE, 1,1,2-	79-00-5	0.1	2	500
TRICHLOROETHYLENE	79-01-6	0.3	0.3	60
TRICHLOROPHENOL, 2,4,5-	95-95-4	4	1,000	600
TRICHLOROPHENOL 2,4,6-	88-06-2	0.7	20	20
VANADIUM	7440-62-2	700	700	700
VINYL CHLORIDE	75-01-4	0.9	0.7	60
XYLENES (Mixed Isomers)	1330-20-7	400	100	3,000
ZINC	7440-66-6	5,000	5,000	5,000

310 CMR 40.0000 DEPARTMENT OF ENVIRONMENTAL PROTECTION

310 CMR 40.0975(6)(c): **TABLE 4** ††

MCP Method 1: SOIL CATEGORY S-3 STANDARDS
APPLICABLE TO SOIL WHERE THE COMBINATION OF SOIL & GROUNDWATER CATEGORIES ARE:

Oil and/or Hazardous Material	CAS Number	S-3 SOIL & GW-1 ug/g (ppm)	S-3 SOIL & GW-2 ug/g (ppm)	S-3 SOIL & GW-3 ug/g (ppm)

NOTE: All concentrations of oil and/or hazardous material in soil are calculated and presented on a dry weight/dry weight basis.

NA- Not Applicable

* - The Total Chromium standard is applicable in the absence of species-specific data for Chromium III and Chromium VI.

** - Cyanide expressed as Physiologically Available Cyanide (PAC). In the absence of measured Physiologically Available Cyanide, the standard is applicable to Total Cyanide.

***- ~~The Per- and Polyfluoroalkyl Substances (PFAS) standard shall be compared to the sum of the concentrations of the following PFAS: perfluorodecanoic acid (PFDA), perfluoroheptanoic acid (PFHpA), perfluorohexanesulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), and perfluorononanoic acid (PFNA).~~ The listed PFAS compounds and associated CAS numbers are for the acid forms of these PFAS compounds. The ~~information~~ PFAS standards presented in Table 4 ~~are~~ also apply ~~applicable~~ to the respective anionic forms of these PFAS compounds. These anions may form salts with any of a number of cations resulting in a variety of possible chemical species, each having a unique CAS number.

† - The Total Petroleum Hydrocarbon (TPH) standard may be used as an alternative to the appropriate combinations of the Aliphatic and Aromatic Hydrocarbon Fraction standards. The use of the general TPH standard is a valid option only for C9 and greater petroleum hydrocarbons; it is not appropriate for the characterization of risks associated with lighter (gasoline-range) hydrocarbons.

†† - The Department periodically reviews the scientific basis for these Standards and amends them, as appropriate, to incorporate new scientific information.

310 CMR 40.0985(6): **TABLE 5** ††

MCP Method 2: DIRECT CONTACT EXPOSURE-BASED SOIL CONCENTRATIONS APPLICABLE TO THE SPECIFIED SOIL CATEGORY.

Oil and/or Hazardous Material	CAS Number	Soil Category S-1 ug/g (ppm)	Soil Category S-2 ug/g (ppm)	Soil Category S-3 ug/g (ppm)
ENDOSULFAN	115-29-7	300	500	500
ENDRIN	72-20-8	10	20	20
ETHYLBENZENE	100-41-4	500	1,000	3,000
ETHYLENE DIBROMIDE	106-93-4	1	5	40
FLUORANTHENE	206-44-0	1,000	3,000	5,000
FLUORENE	86-73-7	1,000	3,000	5,000
HEPTACHLOR	76-44-8	0.3	2	10
HEPTACHLOR EPOXIDE	1024-57-3	0.1	0.9	1
HEXACHLOROBENZENE	118-74-1	0.7	0.8	0.8
HEXACHLOROBUTADIENE	87-68-3	30	100	100
HEXACHLOROCYCLOHEXANE, GAMMA (gamma-HCH)	58-89-9	1	7	60
HEXACHLOROETHANE	67-72-1	50	200	200
HMX	2691-41-0	1,000	3,000	5,000
INDENO(1,2,3-cd)PYRENE	193-39-5	7	40	300
LEAD	7439-92-1	200	600	600
MERCURY	7439-97-6	20	30	30
METHOXYCHLOR	72-43-5	200	400	400
METHYL ETHYL KETONE	78-93-3	500	1,000	3,000
METHYL ISOBUTYL KETONE	108-10-1	500	1,000	3,000
METHYL MERCURY	22967-92-6	4	8	8
METHYL TERT BUTYL ETHER	1634-04-4	100	500	500
METHYLNAPHTHALENE, 2-	91-57-6	300	500	500
NAPHTHALENE	91-20-3	500	1,000	3,000
NICKEL	7440-02-0	600	1,000	1,000
PENTACHLOROPHENOL	87-86-5	3	20	70
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)***				
PERFLUORODECANOIC ACID (PFDA)	335-76-2	0.3	0.4	0.4
PERFLUOROHEPTANOIC ACID (PFHpA)	375-85-9	0.3	0.4	0.4
PERFLUOROHEXANESULFONIC ACID (PFHxS)	355-46-4	0.3	0.4	0.4
PERFLUORONONANOIC ACID (PFNA)	375-95-1	0.3	0.4	0.4
PERFLUOROOCTANESULFONIC ACID (PFOS)	1763-23-1	0.3	0.4	0.4
PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	0.3	0.4	0.4
PERCHLORATE	NA	3	5	5
PETROLEUM HYDROCARBONS				
TOTAL PETROLEUM HYDROCARBON †	NA	1,000	3,000	5,000
ALIPHATIC HYDROCARBONS				
C5 through C8 Aliphatic Hydrocarbons	NA	100	500	500
C9 through C12 Aliphatic Hydrocarbons	NA	1,000	3,000	5,000
C9 through C18 Aliphatic Hydrocarbons	NA	1,000	3,000	5,000
C19 through C36 Aliphatic Hydrocarbons	NA	3,000	5,000	5,000
AROMATIC HYDROCARBONS				
C9 through C10 Aromatic Hydrocarbons	NA	100	500	500
C11 through C22 Aromatic Hydrocarbons	NA	1,000	3,000	5,000
PHENANTHRENE	85-01-8	500	1,000	3,000
PHENOL	108-95-2	500	1,000	3,000
POLYCHLORINATED BIPHENYLS (PCBs)	1336-36-3	1	4	4
PYRENE	129-00-0	1,000	3,000	5,000
RDX	121-82-4	20	80	400
SELENIUM	7782-49-2	400	700	700
SILVER	7440-22-4	100	200	200
STYRENE	100-42-5	70	300	3,000
TETRACHLORODIBENZO-p-DIOXIN (TCDD), 2,3,7,8- (equivalents)	1746-01-6	2.E-05	5.E-05	5.E-05
TETRACHLOROETHANE, 1,1,1,2-	630-20-6	80	400	500

TETRACHLOROETHANE, 1,1,2,2-	79-34-5	10	50	400

310 CMR 40.0985(6): **TABLE 5** ††

MCP Method 2: DIRECT CONTACT EXPOSURE-BASED SOIL CONCENTRATIONS APPLICABLE TO THE SPECIFIED SOIL CATEGORY.

Oil and/or Hazardous Material	CAS Number	Soil Category S-1 ug/g (ppm)	Soil Category S-2 ug/g (ppm)	Soil Category S-3 ug/g (ppm)
TETRACHLOROETHYLENE	127-18-4	30	200	1000
THALLIUM	7440-28-0	8	60	80
TOLUENE	108-88-3	500	1,000	3,000
TRICHLOROBENZENE, 1,2,4-	120-82-1	700	3,000	5,000
TRICHLOROETHANE, 1,1,1-	71-55-6	500	1,000	3,000
TRICHLOROETHANE, 1,1,2-	79-00-5	40	200	500
TRICHLOROETHYLENE	79-01-6	30	60	60
TRICHLOROPHENOL, 2,4,5-	95-95-4	1,000	3,000	5,000
TRICHLOROPHENOL 2,4,6-	88-06-2	20	400	400
VANADIUM	7440-62-2	400	700	700
VINYL CHLORIDE	75-01-4	1	7	60
XYLENES (Mixed Isomers)	1330-20-7	500	1,000	3,000
ZINC	7440-66-6	1,000	3,000	5,000

NOTE: All concentrations of oil and/or hazardous material in soil are calculated and presented on a dry weight/dry weight basis.

NA - Not Applicable

* - The Total Chromium standard is applicable in the absence of species-specific data for Chromium III and Chromium VI.

** - Cyanide expressed as Physiologically Available Cyanide (PAC). In the absence of measured Physiologically Available Cyanide, the standard is applicable to Total Cyanide.

*** - The listed PFAS compounds and associated CAS numbers are for the acid forms of these PFAS compounds. The PFAS standards ~~information~~ presented in Table 5 ~~are~~ also apply ~~applicable~~ to the respective anionic forms of these PFAS compounds. These anions may form salts with any of a number of cations resulting in a variety of possible chemical species, each having a unique CAS number.

† - The Total Petroleum Hydrocarbon (TPH) standard may be used as an alternative to the appropriate combinations of the Aliphatic and Aromatic Hydrocarbon Fraction standards. The use of the general TPH standard is a valid option only for C9 and greater petroleum hydrocarbons; it is not appropriate for the characterization of risks associated with lighter (gasoline-range) hydrocarbons.

†† - The Department periodically reviews the scientific basis for these Standards and amends them, as appropriate, to incorporate new scientific information.

40.0986: Determination of Method 2 GW-2 Standards.

(1) MCP Method 1 GW-2 Standards consider the potential for oil and/or hazardous material to volatilize from the groundwater and migrate to indoor air. These standards may be modified under Method 2, or a determination may be made that one or more GW-2 standards are not applicable, based upon site-specific conditions. Modifications of a standard will result in a proposed MCP Method 2 GW-2 Standard. Proposed Method 2 standards or the determination that one or more GW-2 standards are not applicable shall be scientifically justified and sufficiently documented to demonstrate that the Response Action Performance Standard, described in 310 CMR 40.0191 has been met.

(2) An MCP Method 2 GW-2 Standard shall be protective of migration of oil and/or hazardous material into indoor air. The presence of oil and/or hazardous material in the groundwater at the proposed MCP Method 2 GW-2 Standard below or near a building shall not result in indoor air concentrations which pose a significant risk of harm to health, public welfare or the environment. The MCP Method 2 GW-2 Standard may be greater or less than the corresponding MCP Method 1 GW-2 Standard, or it may be determined that the Method 1 Standard is not applicable, based upon site-specific conditions. The development of such standards shall be documented by:

(a) site-specific information on source, hydrogeological, and building conditions which demonstrates that the oil and/or hazardous material in the groundwater will not infiltrate to indoor air and result in significant risk of harm to health, public welfare or the environment; and/or

(b) soil gas characterization data, indoor air characterization data, and other information and data resulting from field investigation conducted at and proximate to the disposal site.

Final PFAS-related amendments, 310 CMR 40.0000: Redline/Strikeout against proposed regulations (*what changed from proposed*)
This does NOT include changes that appeared in the public hearing draft that are not directly related to PFAS.

310 CMR 40.0000 DEPARTMENT OF ENVIRONMENTAL PROTECTION

40.0992: General Approach to Method 3

Method 3 relies upon detailed information about the site, the oil and/or hazardous material, and potential exposures to Human and Environmental Receptors under all current and reasonably foreseeable Site Activities and Uses to characterize the risk of harm. The scope and level of effort of the Method 3 Risk Characterization shall reflect the site-specific nature of this Method, and the information used to characterize the risk shall be sufficiently documented to demonstrate that the Response Action Performance Standard, described in 310 CMR 40.0191, has been met.

(1) The Method 3 Risk Characterization shall be performed in a manner consistent with scientifically acceptable risk assessment practices, and consider guidance published by the Department and EPA.

(2) In performing a Method 3 Risk Characterization, the objective shall be to provide a conservative estimate of the impact that the oil and/or hazardous material may have on the Human and Environmental Receptors at the disposal site and in the surrounding environment.

(3) This Risk Characterization process makes use of existing standards, Upper Concentration Limits in Groundwater and Soil, quantitative estimates of cancer and noncancer health risks, and both quantitative and qualitative evaluations of risk to public welfare and the environment to determine the need for a remedial action or to demonstrate that a condition of No Significant Risk exists or has been achieved.

(a) The Method 3 characterization of the risk of harm to human health is described in 310 CMR 40.0993.

(b) The Method 3 characterization of the risk of harm to public welfare is described in 310 CMR 40.0994.

(c) The Method 3 characterization of the risk of harm to the environment is described in 310 CMR 40.0995.

(d) The list of Upper Concentration Limits in Groundwater and Soil is in 310 CMR 40.0996(6).

(4) The risk of harm to safety shall also be characterized, as described in 310 CMR 40.0960.

40.0993: Method 3 Human Health Risk Characterization

Under Method 3, the risk of harm to human health shall be characterized for all current and reasonably foreseeable Site Activities and Uses identified in 310 CMR 40.0923, as follows:

(1) The site, receptor and exposure information described in 310 CMR 40.0901 through 40.0920 shall be identified and documented.

(2) The groundwater and soil categories applicable to the disposal site shall be identified and documented, as described in 310 CMR 40.0930. The groundwater and soil categories shall be considered as general indicators of exposure potential in a Method 3 evaluation.

(3) All applicable or suitably analogous health standards shall be identified in the documentation of the Method 3 Risk Characterization. The MCP Method 1 Groundwater and Soil Standards listed in 310 CMR 40.0970 are not considered applicable or suitably analogous, as those standards represent an alternative approach to Method 3. The list of potentially applicable or suitably analogous standards includes, but is not limited to:

(a) Massachusetts Drinking Water Quality Standards promulgated in 310 CMR 22.00: *Drinking Water*, ~~including the requirements described at 310 CMR 44.03(8),~~ which are considered applicable to all category GW-1 groundwater;

(b) Massachusetts Air Quality Standards promulgated in 310 CMR 6.00: *Ambient Air Quality Standards for the Commonwealth of Massachusetts*; and

(c) Massachusetts Surface Water Quality Standards promulgated in 314 CMR 4.00: *Massachusetts Surface Water Quality Standards*.

(4) The frequency, duration and intensity of exposure to each oil and/or hazardous material at the disposal site for each receptor at each Exposure Point shall be determined and documented, considering the current and reasonably foreseeable Site Activities and Uses identified for the disposal site. The magnitude of each receptor's total exposure to the oil and/or hazardous material at the disposal site is calculated in a manner which provides a conservative estimate of the potential exposures. Assessments conducted using a probabilistic analysis shall identify the 95th percentile estimate of each receptor's potential exposure.

(5) For each identified Human Receptor, cumulative cancer risks and cumulative non-cancer risks shall be calculated.

~~(a)~~ Chemical-specific toxicity information used to estimate the cancer and non-cancer risks shall be identified and documented, and the selection of this information shall take into account standards and guidance published by the Department. Primary consideration shall be given to information developed by the Massachusetts Department of Environmental Protection for the purpose of conducting such risk assessments. Examples of such toxicity information include:

~~1.~~ (a) Reference Doses and Reference Concentrations; and

~~2.~~ (b) Carcinogenic Slope Factors and Unit Risks values.

(6) When identifying toxicity values for use in a Method 3 Risk Characterization, the following toxicity values ~~developed by MassDEP~~ shall be used:

(a) For perchlorate, a chronic and subchronic reference dose of 7E-5 mg/(kg-day);~~.~~

(b) For methyl tert-butyl ether, a chronic RfD of 1E-1 mg/(kg-day);~~.~~

(c) For methyl tert-butyl ether, a subchronic RfD of 1E0 mg/(kg-day);~~.~~

(d) For tetrachloroethylene, an oral cancer slope factor of 2E-2 per mg/(kg-day);~~.~~

(e) For tetrachloroethylene, an inhalation unit risk of 3E-6 per ug/cubic meter;~~.~~ and

(f) For the sum of the following per- and polyfluoroalkyl substances (PFAS), a chronic and subchronic reference dose of 5E-6 mg/kg/day:

1. Perfluorodecanoic acid (PFDA);
2. Perfluoroheptanoic acid (PFHpA);
3. Perfluorohexanesulfonic acid (PFHxS);
4. Perfluorononanoic acid (PFNA);
5. Perfluorooctanesulfonic acid (PFOS); and
6. Perfluorooctanoic acid (PFOA).

(7) If an applicable toxicity value is not listed at 310 CMR 40.0993(6), technical justification for the value selected must be provided. Preferential consideration shall be given to sources of toxicity values in accordance with the following hierarchy:

(a) Toxicity values adopted or otherwise published by MassDEP;

(b) Toxicity values listed in EPA's Integrated Risk Information System (IRIS) database; and

(c) Other EPA and non-EPA sources, including but not limited to EPA Provisional Peer Reviewed Toxicity Values (PPRTVs); Minimum Risk Levels (MRLs) published by U.S. Agency for Toxic Substances and Disease Registry (ATSDR); and values published by California Environmental Protection Agency. In selecting a source for a toxicity value pursuant to 310 CMR 40.0993(7)(c), there should be a preference for toxicity assessments that are informed by current scientific information and account for the most sensitive endpoints.

(8) For receptors who may be exposed to mixtures of oil and/or hazardous material, or through multiple Exposure Pathways at the disposal site, the cumulative risk shall reflect those multiple exposures. Risk estimates are presumed to be additive unless an alternative mechanism is demonstrated to be appropriate.

(9) Risk calculations performed using a probabilistic analysis shall identify the cumulative cancer and non-cancer risks associated with the 95th percentile estimate of exposure.

(10) The Cumulative Receptor Cancer Risks shall be compared to a Cumulative Cancer Risk Limit which is an Excess Lifetime Cancer Risk equal to one-in-one hundred thousand. Cumulative Receptor Non-cancer Risks shall be compared to a Cumulative Non-cancer Risk Limit which is a Hazard Index equal to one. Estimated Exposure Point Concentrations shall be compared to any applicable or suitably analogous standards.

(11) A condition of no significant risk of harm to human health exists or has been achieved if:

(a) no Exposure Point Concentration of oil and/or hazardous material is greater than an applicable

or suitably analogous public health standard;

(b) no Cumulative Receptor Cancer Risk calculated is greater than the Cumulative Cancer Risk Limit; and

(c) no Cumulative Receptor Non-cancer Risk is greater than the Cumulative Receptor Non-cancer Risk Limit.

(12) The documentation of the Method 3 human health Risk Characterization shall clearly state whether or not a condition of no significant risk of harm to human health exists or has been achieved, based upon the criteria described in 310 CMR 40.0993(11).

(13) All mathematical equations used to calculate cumulative receptor cancer and non-cancer risks shall be clearly presented and documented.

40.0994: Method 3 Public Welfare Risk Characterization

Purpose. There are two purposes for conducting a characterization of risk to public welfare: (a) to identify and evaluate nuisance conditions which may be localized, and (b) to identify and evaluate significant community effects. The characterization of risk to public welfare shall consider effects which are or may result from the presence of residual contamination or the implementation of a proposed remedial alternative.

The characterization of risk to public welfare shall be conducted for all current and reasonably foreseeable Site Activities and Uses identified in 310 CMR 40.0923, as follows:

(1) The characterization of the risk of harm to public welfare shall consider the site, receptor, and exposure information identified in 310 CMR 40.0901 through 40.0930, as well as data collected pursuant to the response action(s) being performed.

310 CMR 40.0996(6): **TABLE 6** ††

MCP Method 3: UPPER CONCENTRATION LIMITS (UCLs) IN GROUNDWATER AND SOIL

Oil and/or Hazardous Material	CAS Number	UCLs IN GROUNDWATER ug/L (ppb)	UCLs IN SOIL ug/g (ppm)
DICHLOROMETHANE	75-09-2	100,000	7,000
DICHLOROPHENOL, 2,4-	120-83-2	100,000	8,000
DICHLOROPROPANE, 1,2-	78-87-5	100,000	10,000
DICHLOROPROPENE, 1,3-	542-75-6	2,000	9,000
DIELDRIN	60-57-1	80	30
DIETHYL PHTHALATE	84-66-2	100,000	10,000
DIMETHYL PHTHALATE	131-11-3	100,000	10,000
DIMETHYLPHENOL, 2,4-	105-67-9	100,000	10,000
DINITROPHENOL, 2,4-	51-28-5	100,000	8,000
DINITROTOLUENE, 2,4-	121-14-2	100,000	800
DIOXANE, 1,4-	123-91-1	100,000	5,000
ENDOSULFAN	115-29-7	100	5,000
ENDRIN	72-20-8	50	200
ETHYLBENZENE	100-41-4	100,000	10,000
ETHYLENE DIBROMIDE	106-93-4	100,000	400
FLUORANTHENE	206-44-0	2,000	10,000
FLUORENE	86-73-7	400	10,000
HEPTACHLOR	76-44-8	20	100
HEPTACHLOR EPOXIDE	1024-57-3	70	10
HEXACHLOROBENZENE	118-74-1	60,000	8
HEXACHLOROBUTADIENE	87-68-3	30,000	1,000
HEXACHLOROCYCLOHEXANE, GAMMA (gamma-HCH)	58-89-9	2,000	600
HEXACHLOROETHANE	67-72-1	100,000	2,000
HMX	2691-41-0	100,000	10,000
INDENO(1,2,3-cd)PYRENE	193-39-5	1,000	3,000
LEAD	7439-92-1	150	6,000
MERCURY	7439-97-6	200	300
METHOXYCHLOR	72-43-5	400	4,000
METHYL ETHYL KETONE	78-93-3	100,000	10,000
METHYL ISOBUTYL KETONE	108-10-1	100,000	10,000
METHYL MERCURY	22967-92-6	200	80
METHYL TERT BUTYL ETHER	1634-04-4	100,000	5,000
METHYLNAPHTHALENE, 2-	91-57-6	100,000	5,000
NAPHTHALENE	91-20-3	100,000	10,000
NICKEL	7440-02-0	2,000	10,000
PENTACHLOROPHENOL	87-86-5	2,000	700
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)***			
PERFLUORODECANOIC ACID (PFDA)	335-76-2	100,000	4
PERFLUOROHEPTANOIC ACID (PFHpA)	375-85-9	100,000	4
PERFLUOROHEXANESULFONIC ACID (PFHxS)	355-46-4	5,000	4
PERFLUORONONANOIC ACID (PFNA)	375-95-1	100,000	4
PERFLUOROOCTANESULFONIC ACID (PFOS)	1763-23-1	5,000	4
PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	100,000	4
PERCHLORATE	-	10,000	50
PETROLEUM HYDROCARBONS			
TOTAL PETROLEUM HYDROCARBON †	NA	50,000	10,000
ALIPHATIC HYDROCARBONS			
C5 through C8 Aliphatic Hydrocarbons	NA	100,000	5,000
C9 through C12 Aliphatic Hydrocarbons	NA	100,000	20,000
C9 through C18 Aliphatic Hydrocarbons	NA	100,000	20,000
C19 through C36 Aliphatic Hydrocarbons	NA	100,000	20,000
AROMATIC HYDROCARBONS			
C9 through C10 Aromatic Hydrocarbons	NA	100,000	5,000
C11 through C22 Aromatic Hydrocarbons	NA	100,000	10,000
PHENANTHRENE	85-01-8	100,000	10,000
PHENOL	108-95-2	100,000	10,000

310 CMR 40.0996(6): **TABLE 6** ††

MCP Method 3: UPPER CONCENTRATION LIMITS (UCLs) IN GROUNDWATER AND SOIL

Oil and/or Hazardous Material	CAS Number	UCLs IN GROUNDWATER ug/L (ppb)	UCLs IN SOIL ug/g (ppm)
POLYCHLORINATED BIPHENYLS (PCBs)	1336-36-3	100	100
PYRENE	129-00-0	600	10,000
RDX	121-82-4	100,000	4,000
SELENIUM	7782-49-2	1,000	7,000
SILVER	7440-22-4	1,000	2,000
STYRENE	100-42-5	60,000	10,000
TETRACHLORODIBENZO-p-DIOXIN (TCDD), 2,3,7,8- (equivalents)	1746-01-6	4.E-01	5.E-04
TETRACHLOROETHANE, 1,1,1,2-	630-20-6	100,000	5,000
TETRACHLOROETHANE, 1,1,2,2-	79-34-5	100,000	4,000
TETRACHLOROETHYLENE	127-18-4	100,000	10,000
THALLIUM	7440-28-0	30,000	800
TOLUENE	108-88-3	100,000	10,000
TRICHLOROBENZENE, 1,2,4-	120-82-1	100,000	10,000
TRICHLOROETHANE, 1,1,1-	71-55-6	100,000	10,000
TRICHLOROETHANE, 1,1,2-	79-00-5	100,000	5,000
TRICHLOROETHYLENE	79-01-6	50,000	600
TRICHLOROPHENOL, 2,4,5-	95-95-4	100,000	10,000
TRICHLOROPHENOL 2,4,6-	88-06-2	50,000	4,000
VANADIUM	7440-62-2	40,000	7,000
VINYL CHLORIDE	75-01-4	100,000	600
XYLENES (Mixed Isomers)	1330-20-7	100,000	10,000
ZINC	7440-66-6	50,000	10,000

NOTE: All concentrations of oil and/or hazardous material in soil are calculated and presented on a dry weight/dry weight basis.

NA - Not Applicable

* - The Total Chromium standard is applicable in the absence of species-specific data for Chromium III and Chromium VI.

** - Cyanide expressed as Physiologically Available Cyanide (PAC). In the absence of measured Physiologically Available Cyanide, the standard is applicable to Total Cyanide.

*** - The listed compounds and associated CAS numbers are for the acid forms of these PFAS compounds. The ~~information~~ PFAS standards presented in Table 6 are also applicable to the respective anionic forms of these PFAS compounds. These anions may form salts with any of a number of cations resulting in a variety of possible chemical species, each having a unique CAS number.

† - The Total Petroleum Hydrocarbon (TPH) standard may be used as an alternative to the appropriate combinations of the Aliphatic and Aromatic Hydrocarbon Fraction standards. The use of the general TPH standard is a valid option only for C9 and greater petroleum hydrocarbons; it is not appropriate for the characterization of risks associated with lighter (gasoline-range) hydrocarbons.

†† - The Department periodically reviews the scientific basis for these Standards and amends them, as appropriate, to incorporate new scientific information.

SUBPART J: PERMANENT AND TEMPORARY SOLUTIONS

40.1000: Permanent and Temporary Solutions

310 CMR 40.1001 through 40.1099 shall be cited collectively as 310 CMR 40.1000.

40.1001: Purpose

(1) 310 CMR 40.1000 establishes requirements and procedures for:

(a) determining when the response actions taken at a site where there has been a release or threat of release of oil and/or hazardous material to the environment are sufficient to meet the requirements of a Permanent or Temporary Solution;

(b) implementing Activity and Use Limitations;

(c) identifying any conditions that apply to maintaining the Permanent or Temporary Solution; and

(d) documenting and supporting the Permanent or Temporary Solution in a Permanent Solution Statement or Temporary Solution Statement.

40.1002: Applicability

The requirements contained in 310 CMR 40.1000 are applicable to all releases and threats of release of oil and/or hazardous material which require notification to the Department under the provisions of 310 CMR 40.0300, except as specifically provided in 310 CMR 40.0110 for a site or disposal site that is adequately regulated.

310 CMR 40.0000 DEPARTMENT OF ENVIRONMENTAL PROTECTION

SUBPART P: **MASSACHUSETTS OIL AND HAZARDOUS MATERIAL LIST TABLE OF CONTENTS**

TABLE 1 - MASSACHUSETTS OIL AND HAZARDOUS MATERIAL LIST (ALPHABETICAL LISTING)

NOTES:

The Massachusetts Oil and Hazardous Materials List (MOHML) contains oils and hazardous materials subject to 310 CMR 40.0000 and their reportable quantities (RQs) and reportable concentrations (RCs). These values are referred to in the notification requirements (310 CMR 40.0300). ~~This list~~ The MOHML is organized alphabetically by chemical name and includes the unique Chemical Abstracts Service Number (CAS Number) assigned to a substance. ~~and references~~ The MOHML refers to other lists on which a substance appears, each such other list identified by the following name source codes:

< Name Source 1 - The Department of Transportation (DOT) Hazardous Materials List (49 CFR Part 172.101 Hazardous Materials Table)

< Name Source 2 - The Resource Conservation and Recovery Act Appendix VIII List (40 CFR Part 261 - Appendix VIII Hazardous Constituents)

< Name Source 3 - The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Hazardous Substance and Waste Stream Lists (40 CFR Part 302 - Table 302.4)

< Name Source 4 - The Extremely Hazardous Substance List as mandated by Superfund Amendments and Reauthorization Act, Title III, Section 302 (40 CFR Part 355 Appendices A and B)

< Name Source 5 - DEP Allowable Ambient Limits (AALs) and Drinking Water Guidelines

< Name Source 6 - The Massachusetts Substance List (MSL)(105 CMR 670.000: *"Right to Know"* Appendix A)

< Name Source 7 - The Chemical Abstracts name, 9th collective period, 1972-1976

< Name Source 8 - The EPA Right to Know list, Section 313 of the Emergency Planning and Community Right to Know Act of 1986 (40 CFR Part 372.65).

CHEMICAL NAME	CAS NUM.	DEP RQ (Pounds)	NAME SOURCES	Reportable Concentrations GW1 (mg/l)	GW2 (mg/l)	S1 (mg/kg)	S2 (mg/kg)
2-PENTENE, 3,4,4-TRIMETHYL-	00598-96-9	50	7,6	5	50	500	5000
2,4-PENTENEDIONE	00123-54-6	100	7,6	10	100	1000	10000
PENTYL ACETATE	00628-63-7	100	6,1,3	10	100	1000	10000
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) (sum of constituents listed below)		—		2E-05			
PERFLUORODECANOIC ACID (PFDA)	335-76-2	1		see PFAS	40 3E-04 ~~0.0002~~		0.4
PERFLUOROHEPTANOIC ACID (PFHpA)	375-85-9	1		see PFAS	40 5E-04 ~~0.0002~~		0.4
PERFLUOROHEXANESULFONIC ACID (PFHxS)	355-46-4	1		see PFAS	0.5 3E-04 ~~0.0002~~		0.4
PERFLUORONONANOIC ACID (PFNA)	375-95-1	1		see PFAS	40 3.2E-04 ~~0.0002~~		0.4
PERFLUOROOCTANESULFONIC ACID (PFOS)	1763-23-1	1		see PFAS	0.5 2E-03 ~~0.0002~~		0.4
PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	1		see PFAS	40 7.2E-04 ~~0.0002~~		0.4
PERACETIC ACID	00079-21-0	1	4,6,8,1	0.1	1	10	100
PERCHLORATE COMPOUNDS, NOS		10	6,10.002	1	0.1	5	
PERCHLORIC ACID	07601-90-3	10	6,1,7	(See RCs of any listed constituents)			
PERCHLOROETHYLENE	127-18-4	10	1,3,5,6,8	0.005	0.05	1	10
PERCHLOROMETHYL MERCAPTAN	00594-42-3	10	6,1,2,3,4	1	10	100	1000
PERFLUOROISOBUTYLENE	00382-21-8	1	6	0.1	1	10	100
PERMANGANATE OF POTASH	07722-64-7	10	1,3,6	(See RCs of any listed constituents)			
PERMANGANIC ACID (HMnO4), POTASSIUM SALT	07722-64-7	10	7,1,3,6	(See RCs of any listed constituents)			
PERMETHRIN	52645-53-1	1	6	0.1	1	10	100
PEROXIDE, BIS(1,1-DIMETHYLETHYL)-	00110-05-4	10	7,1,6	1	10	100	1000
PEROXIDE, DIACETYL-	00110-22-5	10	7,1,6	1	10	100	1000
PEROXIDE, DIBENZOYL	00094-36-0	10	7,1,6,8	1	10	100	1000
PEROXYACETIC ACID	00079-21-0	1	1,6,4,8	0.1	1	10	100
PETROLEUM BASED OIL (DEP RQ in gallons)		10	5	(See TPH RC and RCs of other relevant constituents)			
PETROLEUM DISTILLATES	08030-30-6	10	6,1,5	(See TPH RC and RCs of other relevant constituents)			
PETROLEUM ETHER	08030-30-6	10	6,1,5	(See TPH RC and RCs of other relevant constituents)			
PETROLEUM HYDROCARBONS							
TOTAL PETROLEUM HYDROCARBONS (TPH) (DEP RQ in gallons)		10	5	0.2	5	1000	3000
ALIPHATIC HYDROCARBONS							
C_5 through C_8 Aliphatic Hydrocarbons				0.3	3	100	500
C_9 through C_{12} Aliphatic Hydrocarbons				0.7	5	1000	3000
C_9 through C_{18} Aliphatic Hydrocarbons				0.7	5	1000	3000
C_{19} through C_{36} Aliphatic Hydrocarbons				14	50	3000	5000
AROMATIC HYDROCARBONS							

CHEMICAL NAME	CAS NUM.	DEP RQ (Pounds)	NAME SOURCES	Reportable Concentrations GW1 (mg/l)	GW2 (mg/l)	S1 (mg/kg)	S2 (mg/kg)
C_9 through C_{10} Aromatic Hydrocarbons				0.2	4	100	500
C_{11} through C_{22} Aromatic Hydrocarbons				0.2	5	1000	3000
PETROLEUM NAPHTHA	08030-30-6	10	6,1,5	(See TPH RC and RCs of other relevant constituents)			
PHENACETIN	00062-44-2	10	2,3,6	1	10	100	1000

Delete TABLE 2 of the Massachusetts Oil and Hazardous Material List (310 CMR 40.1600) in its entirety.