Llywodraeth Cymru / Welsh Government

A487 New Dyfi Bridge

Environmental Statement - Volume 3: Appendix 10.5

Controlled Waters Assessment Criteria and Human Health Assessment Criteria

Final Issue | 2015

Human Health Assessment Criteria		C4SL - December 2014		LQM S4UL - DECEMBER 2014					
	Units (Dry Weight)	Residential without Plant Uptake	Commercial	Residential no plant uptake			Commercial		
				Residential no plant uptake			Commercial		
		6%	6%	1%	2.5%	6%	1%	2.5%	6%
		Residential without Plant Upta	Commercial (6%)	without Plant U	without Plant U	without Plant U	Commercial (1%	ommercial (2.5	Commercial (6%
Metals		-	-	-	-	-	-	-	-
Antimony	mg/kg	-	-	-	-	-	-	-	-
Arsenic	mg/kg	40	640	-	-	40	-	-	640
Beryllium	mg/kg	-	-	-	-	1.7	-	-	12
Cadmium	mg/kg	150	410	-	-	85	-	-	190
Chromium (III)	mg/kg	-	-	-	-	910	-	-	8600
Chromium (VI)	mg/kg	21	49	-	-	6	-	-	33
Copper	mg/kg	-	-	-	-	7100	-	-	68000
Lead	mg/kg	310	2300	-	-	-	-	-	-
Mercury elemental	mg/kg	-	-	-	-	1.2	-	-	58 (25.8)
Mercury inorganic	mg/kg	-	-	-	-	56	-	-	1100
Mercury methyl	mg/kg	-	-	-	-	15	-	-	320
Nickel	mg/kg	-	-	-	-	180	-	-	980
Selenium	mg/kg	-	-	-	-	430	-	-	12000
Vanadium (Pentavalent)	mg/kg	-	-	-	-	1200	-	-	9000
Zinc	mg/kg	-	-	-	-	40000	-	-	730000
Miscellaneous		-	-	-	-	-	-	-	-
Molybdenum	mg/kg	-	-	-	-	-	-	-	-
Barium	mg/kg	-	-	-	-	-	-	-	-
Inorganic Free Cyanide (chronic)	mg/kg	-	-	-	-	-	-	-	-
Inorganic Free Cyanide (acute)	mg/kg	-	-	-	-	-	-	-	-
Boron	mg/kg	-	-	-	-	11000	-	-	240000
Carbon disulphide	mg/kg	-	-	0.14	0.29	0.62	11	22	47
Hexachloro-1,3-butadiene	mg/kg	-	-	0.32	0.78	1.8	31	66	120
PAHs		-	-	-	-	-	-	-	-
Acenaphthene	mg/kg	-	-	3000 (57)	4700 (141)	6000 (336)	84000 (57.0)	97000 (141)	100000
Acenaphthylene	mg/kg	-	-	2900 (86.1)	4600 (212)	6000 (506)	83000 (86.1)	97000 (212)	100000
Anthracene	mg/kg	-	-	31000 (1,17)	35000	37000	520000	540000	540000
Benzo[a]anthracene	mg/kg	-	-	11	14	15	170	170	180
Benzo[a]pyrene	mg/kg	5.3	77	3.2	3.2	3.2	35	35	36
Benzo[b]fluoranthene	mg/kg	-	-	3.9	4	4	44	44	45
Benzo[k]fluoranthene	mg/kg	-	-	110	110	110	1200	1200	1200
Benzo[ghi]perylene	mg/kg	-	-	360	360	360	3900	4000	4000
Chrysene	mg/kg	-	-	30	31	32	350	350	350
Dibenz[ah]anthracene	mg/kg	-	-	0.31	0.32	0.32	3.5	3.6	3.6
Fluoranthene	mg/kg	-	-	1500	1600	1600	23000	23000	23000
Fluorene	mg/kg	-	-	2800 (30.9)	3800 (76.5)	4500 (183)	63000 (30.9)	68000	71000
Indeno[123-cd]pyrene	mg/kg	-	-	45	46	46	500	510	510
Naphthalene	mg/kg	-	-	2.3	5.6	13	190 (76.4)	460 (183)	1100 (432)
Phenanthrene	mg/kg	-	-	1300 (36.0)	1500	1500	22000	22000	23000
Pyrene	mg/kg	-	-	3700	3800	3800	54000	54000	54000
Coal Tar (BaP as Surrogate Marker)	mg/kg	-	-	1.2	1.2	1.2	15	15	15
TPH		-	-	-	-	-	-	-	-
TPH - Aliphatic EC5-EC6	mg/kg	-	-	42	78	160	3200 (304)	5900 (558)	12000 (1150)
TPH - Aliphatic >EC6-EC8	mg/kg	-	-	100	230	530	7800 (144)	17000 (322)	40000 (736)
TPH - Aliphatic >EC8-EC10	mg/kg	-	-	27	65	150	2000 (78)	4800 (190)	11000 (451)
TPH - Aliphatic >EC10-EC12	mg/kg	-	-	130 (48)	330 (118)	770 (283)	9700 (48)	23000 (118)	47000 (283)
TPH - Aliphatic >EC12-EC16	mg/kg	-	-	1100 (24)	2400 (59)	4400 (142)	59000 (24)	82000 (59)	90000 (142)
TPH - Aliphatic >EC16-EC35	mg/kg	-	-	65000 (8.48)	92000 (21)	110000	1600000	1700000	1800000
TPH - Aliphatic >EC35-EC44	mg/kg	-	-	65000 (8.48)	92000 (21)	110000	1600000	1700000	1800000
TPH - Aromatic >EC5-EC7	mg/kg	-	-	370	690	1400	26000 (1220)	46000 (2260)	86000 (4710)
TPH - Aromatic >EC7-EC8	mg/kg	-	-	860	1800	3900	56000 (869)	110000 (1920)	180000 (4360)
TPH - Aromatic >EC8-EC10	mg/kg	-	-	47	110	270	3500 (613)	8100 (1500)	17000 (3580)
TPH - Aromatic >EC10-EC12	mg/kg	-	-	250	590	1200	3800	28000 (899)	34000 (2150)
TPH - Aromatic >EC12-EC16	mg/kg	-	-	1800	2300 (419)	2500	36000 (169)	37000	38000
TPH - Aromatic >EC16-EC21	mg/kg	-	-	1900	1900	1900	28000	28000	28000
TPH - Aromatic >EC21-EC35	mg/kg	-	-	1900	1900	1900	28000	28000	28000
TPH - Aromatic >EC35-EC44	mg/kg	-	-	1900	1900	1900	28000	28000	28000
TPH - Aromatic & Aliphatic >EC44-EC70	mg/kg	-	-	1900	1900	1900	28000	28000	28000
BTEX		-	-	-	-	-	-	-	-
Benzene	mg/kg	3.3	98	0.38	0.7	1.4	27	47	90
Ethylbenzene	mg/kg	-	-	83	190	440	5700 (518)	13000 (1220)	27000 (2840)
Toluene	mg/kg	-	-	880 (869)	1900	3900	56000 (869)	110000 (1920)	180000 (4360)
o-Xylene	mg/kg	-	-	88	210	480	6600 (478)	15000 (1120)	33000 (2620)
m-Xylene	mg/kg	-	-	82	190	450	6200 (625)	**14000** (1470)	31000 (3460)
p-Xylene	mg/kg	-	-	**79**	**180**	**430**	**5900** (576)	**14000** (1350)	**30000** (3170)
Chloroalkanes & alkenes		-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	-	-	0.0092	0.013	0.023	0.67	0.97	1.7
1,1,1-Trichloroethane	mg/kg	-	-	9	18	40	660	1300	3000
1,1,2,2-Tetrachloroethane	mg/kg	-	-	3.9	8	17	270	550	1100
1,1,1,2-Tetrachloroethane	mg/kg	-	-	1.5	3.5	8.2	110	250	560
Tetrachloroethene (PCE)	mg/kg	-	-	0.18	0.4	0.92	19	42	95
Tetrachloromethane (Carbon Tetrachloride)	mg/kg	-	-	0.026	0.056	0.13	2.9	6.3	14
Trichloroethene (TCE)	mg/kg	-	-	0.017	0.036	0.08	1.2	2.6	5.7
Trichloromethane (Chloroform)	mg/kg	-	-	1.2	2.1	4.2	99	170	350
Chloroethene (Vinyl Chloride)	mg/kg	-	-	0.00077	0.001	0.0015	0.059	0.077	0.12
Explosives		-	-	-	-	-	-	-	-
2,4,6-Trinitrotoluene (TNT)	mg/kg	-	-	65	66	66	1000	1000	1000
RDX	mg/kg	-	-	13000	13000	13000	210000	210000	210000
HMX	mg/kg	-	-	6700	6700	6700	110000	110000	110000
Pesticides		-	-	-	-	-	-	-	-
Aldrin	mg/kg	-	-	7.3	7.4	7.5	170	170	170
Dieldrin	mg/kg	-	-	7	7.3	7.4	170	170	170
Atrazine	mg/kg	-	-	610	620	620	9300	9400	9400
Dichlorvos	mg/kg	-	-	6.4	6.5	6.6	140	140	140
α-Endosulfan	mg/kg	-	-	160 (0.003)	280 (0.007)	410 (0.016)	5600 (0.003)	7400 (0.007)	8400 (0.016)
β-Endosulfan	mg/kg	-	-	190 (0.00007)	320 (0.0002)	440 (0.0004)	6300 (0.00007)	7800 (0.0002)	8700
α-Hexachlorocyclohexane	mg/kg	-	-	6.9	9.2	11	170	180	180
β-Hexachlorocyclohexane	mg/kg	-	-	3.7	3.8	3.8	65	65	65
γ-Hexachlorocyclohexane (Lindane)	mg/kg	-	-	2.9	3.3	3.5	67	69	70
Chlorobenzenes		-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	-	-	0.46	1	2.4	56	130	290
1,2-Dichlorobenzene	mg/kg	-	-	24	57	130	2000 (571)	4800 (1370)	11000 (3240)
1,3-Dichlorobenzene	mg/kg	-	-	0.44	1.1	2.5	30	73	170
1,4-Dichlorobenzene	mg/kg	-	-	61	150	350	4400 (224)	10000 (540)	25000 (1280)
1,2,3-Trichlorobenzene	mg/kg	-	-	1.5	3.7	8.8	102	250	590
1,2,4-Trichlorobenzene	mg/kg	-	-	2.6	6.4	15	220	530	1300
1,3,5-Trichlorobenzene	mg/kg	-	-	0.33	0.81	1.9	23	55	130
1,2,3,4-Tetrachlorobenzene	mg/kg	-	-	24	56	120	1700 (122)	3080 (304)	4400 (728)
1,2,3,5-Tetrachlorobenzene	mg/kg	-	-	0.75	1.9	4.3	49 (39.4)	120 (98.1)	240 (235)
1,2,4,5-Tetrachlorobenzene	mg/kg	-	-	0.73	1.7	3.5	42 (19.7)	72 (49.1)	96
Pentachlorobenzene	mg/kg	-	-	19	30	38	640 (43.0)	770 (107)	830
Hexachlorobenzene	mg/kg	-	-	4.1 (0.2)	5.7 (0.5)	6.7 (1.2)	110 (0.2)	120	120
Phenols		-	-	-	-	-	-	-	-
Phenol	mg/kg	-	-	440	690	1200	440 (26000)	690 (30000)	1300 (34000)
Chlorophenols		-	-	-	-	-	-	-	-
2-Chlorophenol	mg/kg	-	-	94	150	210	3500	4000	4300
2,4-Dichlorophenol	mg/kg	-	-	94	150	210	3500	4000	4300
2,4,6-Trichlorophenol	mg/kg	-	-	94	150	210	3500	4000	4300
2,3,4,6-Tetrachlorophenol	mg/kg	-	-	94	150	210	3500	4000	4300
Pentachlorophenol	mg/kg	-	-	27 (16.4)	29	31	400	400	400

a) Based on a sandy loam soil as defined in SR3 (Environment Agency, 2009b) and 1, 2.5 and 6% soil organic matter (SOM)
b) S4UL for Pentachlorobenzene will vary according to SOM for all land uses
c) Figures are rounded to two significant figures
d) S4ULs assume that free phase contamination is not present
e) S4ULs based on a sub-surface soil to indoor air correction factor of 1

Controlled Waters Assessment Criteria

Determinand	Environmental Quality Standards, ug/l	Drinking Water Standards, ug/l
Arsenic	50	10
Chromium (III)	4.7	50
Chromium (VI)	3.4	-
Copper	1	2000
Cyanide	1	50
Mercury	0.05	1
Phenol	7.7	0.5
Zinc	10.9	5000
Toluene	74	-
Anthracene	0.1	-
Benzene	10	1
Cadmium	0.08	5
Fluoranthene	0.0063	-
Lead	1.2	10
Naphthalene	2	-
Nickel	4	20
Benzo(a)pyrene	0.00017	-
Petroleum hydrocarbons	-	10