RR Program RCL Spreadsheet Update

June 2016   **DNR-RR-052d**

The U.S. EPA has updated the Regional Screening Level (RSL) website in May 2016. To correspond with EPA's update, the Wisconsin DNR likewise has updated the numerical soil standards or residual contaminant levels (RCLs) in the Remediation and Redevelopment program's spreadsheet of RCLs. This document provides a summary of what is new in the May 2016 spreadsheet.

Table 1 has the "new" chemicals (e.g. Thallic Oxide) that weren't in earlier versions of the spreadsheet.

Table 2 has the chemicals (e.g. TPH) that are no longer in the June 2016 updated RCLs even though they are still in EPA's RSL table. These chemicals do not have proper CAS numbers unlike the rest of the chemicals in the spreadsheet of RCLs.

Table 3 has the chemicals (e.g. Cyanide) whose DC-RCLs have changed. Chemicals where rounding-off errors (in their third significant digit) may be the reason for the slight difference were not included. Table 3 also includes one chemical whose DC-RCLs did not changed, but whose name had changed in the RSL list.

Table 4 has the 1 chemical (Pentachlorophenol) whose groundwater-protective RCL ("GW-RCL") has changed. The GW-RCL changed because its Koc (soil organic-carbon / water partitioning coefficient) had changed.

It is important to note that since May 2014, some default exposure factors in the EPA RSL web-calculator have changed. Now, in order to calculate NR 720 RCLs using the web-calculator, a few of the EPA defaults must be changed. The specific values needing manual entry in the web-calculator can be found in the last two pages of this update document.

Lastly, the updated RCLs may affect the closure decision for any current or incoming closure requests. Under s. NR 724.19, Wis. Adm. Code, responsible parties are required to comply with new or revised standard if the DNR determines that compliance to a more stringent revised standard is necessary to ensure that the remedial action will be protective of public health, safety, welfare or the environment.

Table 1: List of New Chemicals Added to the RR's Spreadsheet of RCLs (June 2016)

(For the June 2016 update, 6 new chemicals were added since December 2015.)

Contaminant	CAS Number	New DC-RCLs (mg/kg)		Basis
		Non-Industrial	Industrial	
Bromopropane, 1-	106-94-5	9.66E+02	9.66E+02	Csat
Thallic Oxide	1314-32-5	1.56E+00	2.04E+01	nc
Thallium Selenite	12039-52-0	7.82E-01	1.02E+01	nc
Toluene-2,4-diisocyanate	584-84-9	9.87E+00	4.15E+01	nc
Toluene-2,6-diisocyanate	91-08-7	8.18E+00	3.44E+01	nc
Toluidine, o- (Methylaniline, 2-)	95-53-4	3.03E+01	1.08E+02	ca

Table 2: List of Chemicals NO Longer Included in RR's Spreadsheet of RCLs (June 2016)

If your site includes any of the chemicals in this list, look them up in EPA's Generic RSL Tables rather than RR's RCL spreadsheet. They are missing proper CAS numbers unlike the rest of the chemicals in the RCL spreadsheet.

Hexachlorodibenzo-p-dioxin, Mixture	Dinitrotoluene Mixture, 2,4/2,6-
Uranium (Soluble Salts)	Nickel Refinery Dust
Thiocyanates	Tributyltin Compounds
Styrene-Acrylonitrile (SAN) Trimer	Total Petroleum Hydrocarbons (Aliphatic High)
Refractory Ceramic Fibers	Total Petroleum Hydrocarbons (Aliphatic Medium)
JP-8	Total Petroleum Hydrocarbons (Aliphatic Low)
JP-7	Total Petroleum Hydrocarbons (Aromatic High)
JP-5	Total Petroleum Hydrocarbons (Aromatic Medium)
Dibutyltin Compounds	Total Petroleum Hydrocarbons (Aromatic Low)

Table 3: List of Direct-Contact RCLs that Changed in RR's Spreadsheet (updated June 2016)

Listed below are the relatively few chemicals whose toxicity values changed since December 2015.

Bold chemical name indicates chemical's RCL has decreased.
Red values indicates RCL has decreased by a factor of 5 or more.

Chemical	Previous Name	CAS Number	Non-Industrial DC-RCL (mg/kg)			Industrial DC-RCL (mg/kg)		
			Old	Current (June 2016)	Basis	Old	Current (June 2016)	Basis
Benzaldehyde		100-52-7	1,160.	160.	ca	1,160.	715.	Csat
Chloronitrobenzene, p-		100-00-5	61.1	8.09	ca	274.	28.7	ca
Cyanide (CN-)		57-12-5	4.13	27.9	nc	18.4	197.	nc
Dimethylvinylchloride		513-37-1	0.27	1.43	ca	1.36	7.14	ca
HCDD, 1,2,3,4,6,7,8,-		35822-46-9	4.84E-04	4.41E-04	ca	2.17E-03	1.81E-03	ca
Lead acetate		301-04-2	1.73	57.1	ca	6.16	203.	ca
Phenol, 2-(1-methylethoxy)-, methylcarbamate	Propanediol, 1,2-	114-26-1	244.	244.	nc	2,460.	2,460.	nc
Thallium (I) Nitrate		10102-45-1	0.55	0.78	nc	7.15	10.2	nc
Thallium Acetate		563-68-8	0.47	0.78	nc	6.13	10.2	nc
Thallium Chloride		7791-12-0	0.47	0.78	nc	6.13	10.2	nc

Table 4: List of Chemical Whose Groundwater-Protective RCL Changed (June 2016)

For the June 2016 update, the hierarchy of Koc sources was modified so that the previous Koc values for the nine ionizable organics identified in U.S. EPA's SSL [1996]* are used first. This change has affected the RCL for 1 chemical with an NR 140 ES as listed below.

Bold chemical name indicates chemical's RCL has decreased.
Red values indicates RCL has decreased by a factor of 5 or more.

Contaminant	CAS Number	GW-RCL (mg/kg)	
		Old	Current (June 2016)
Pentachlorophenol (PCP)	87-86-5	0.0101	0.0014

* U.S. EPA, Soil Screening Guidance [1996]: https://semspub.epa.gov/work/03/2218759.pdf

Non-Industrial DC-RCLs: Use the circled values in the U.S. EPA RSL web-calculator

Resident
Exposure to Soil

Instructions

Exposure Assessment Details

☐ Substitute Soil-Saturation Concentration (CSAT) for soil inhalation RSL?

☐ Substitute theoretical ceiling limit for total soil RSL?

Age Segment (yr)	AF (mg/cm^2)	BW (kg)	ED (yr)	EF (day/yr)	ET (hr/event)	IRS (mg/day)	SA (cm^2/day)
0-2	0.2	15	2	350	24	200	2800
2-6	0.2	15	4	350	24	200	2800
6-16	0.07	70	10	350	24	100	5700
16-26	0.07	70	14	350	24	100	5700
Child (0-6)	0.2	15	6	350	24	200	2800
Adult (6-26)	0.07	70	24	350	24	100	5700

Particulate Emission Factor

Particulate Emission Factor

Chicago, IL (7) ▼ City (Climatic Zone) - Selection based on most likely climatic conditions for the site

.5 A$_s$ (acres)

4.69 U$_m$ (mean annual wind speed) m/s

11.32 U$_t$ (equivalent threshold value)

0.5 V (fraction of vegetative cover) unitless

16.8653	A (PEF Dispersion Constant)
18.7848	B (PEF Dispersion Constant)
215.0624	C (PEF Dispersion Constant)

0.194	F(x) (function dependant on U$_m$/U$_t$) unitless
1426854388.0	PEF (particulate emission factor) m^3/kg
98.430714368	Q/C$_{wind}$ (g/m^2-s per kg/m^3)

Volatilization Factor

Volatilization Factor

Diffusivity in air (D$_{ia}$)

Diffusivity in water (D$_{iw}$)

0.006 foc (fraction organic carbon in soil) g/g

Chicago, IL (7) ▼ City (Climatic Zone) - Selection based on most likely climatic conditions for the site

1.5 ρ_b (dry soil bulk density) g/cm^3

2.65 ρ_s (soil particle density) g/cm^3

.5 A$_s$ (acres)

0.15 θ_w (water-filled soil porosity) L$_{water}$/L$_{soil}$

9.5e08 T (exposure interval) s

| 16.8653 | A (VF Dispersion Constant) |
| 18.7848 | B (VF Dispersion Constant) |

| 215.0624 | C (VF Dispersion Constant) |
| 98.430714368 | Q/C$_{vol}$ (g/m^2-s per kg/m^3) |

Industrial DC-RCLs: Use the circled values in the U.S. EPA RSL web-calculator

Composite Worker
Exposure to Soil

Ingestion, Dermal and Inhalation Exposure

☐ Substitute Soil-Saturation Concentration (CSAT) for soil inhalation RSL?

☐ Substitute theoretical ceiling limit for total soil RSL?

0.2	AF_w (skin adherence factor) mg/cm^2	1	THQ (target hazard quotient) unitless
70	BW_w (body weight)	100	IR_w (soil ingestion rate) mg/day
25	ED_w (exposure duration) yr	70	LT (lifetime) yr
250	EF_w (exposure frequency) d/yr	3300	SA_w (surface area) cm^2/day
8	ET_w (exposure time) hr	1.0E-6	TR (target cancer risk) unitless

Particulate Emission Factor

Particulate Emission Factor

Chicago, IL (7) ▾	City (Climatic Zone) - Selection based on most likely climatic conditions for the site	11.32	U_t (equivalent threshold value)
.5	A_s (acres)	0.5	V (fraction of vegetative cover) unitless
4.69	U_m (mean annual wind speed) m/s		

16.8653	A (PEF Dispersion Constant)	0.194	F(x) (function dependant on U_m/U_t) unitless
18.7848	B (PEF Dispersion Constant)	1426854388.0	PEF (particulate emission factor) m^3/kg
215.0624	C (PEF Dispersion Constant)	98.430714368	Q/C$_{wind}$ (g/m^2-s per kg/m^3)

Volatilization Factor

Volatilization Factor

Diffusivity in air (D_{ia})

Diffusivity in water (D_{iw})

0.006	foc (fraction organic carbon in soil) g/g	.5	A_s (acres)
Chicago, IL (7) ▾	City (Climatic Zone) - Selection based on most likely climatic conditions for the site	0.15	θ_w (water-filled soil porosity) L_{water}/L_{soil}
1.5	ρ_b (dry soil bulk density) g/cm^3	9.5e08	T (exposure interval) s
2.65	ρ_s (soil particle density) g/cm^3		

16.8653	A (VF Dispersion Constant)	215.0624	C (VF Dispersion Constant)
18.7848	B (VF Dispersion Constant)	98.430714368	Q/C$_{vol}$ (g/m^2-s per kg/m^3)