

# RR Program's Soil RCL Spreadsheet Update

December 2017

DNR-RR-052f

The Wisconsin DNR Remediation and Redevelopment Program (RR) has updated the numerical soil standards in the RR spreadsheet of residual contaminant levels (RCLs). The RCLs were determined using the recently-updated U.S. EPA RSL web-calculator. All EPA exposure defaults were used, with the exception of selecting a hazard quotient of 1 and selecting Chicago, IL, for the climatic zone in the web-calculator. This document provides a summary of changes to the direct-contact RCLs (DC-RCLs) that are now in the December 2017 spreadsheet. The last section of this document has the exposure parameter values used to calculate the RCLs.

Table 1 (below) lists new DC-RCLs for several chemicals (e.g., Diphenyl ether) that were not in earlier versions of the spreadsheet. Table 2 lists the chemicals that have been removed from the previous update. Table 3 (next page) has the chemicals whose DC-RCLs have changed from March 2017. Table 4 has the chemicals whose groundwater-protective RCLs have changed.

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 standards 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 (December 2017)**

(For the December 2017 update, 6 new CAS were added since March 2017.)

*Perfluorobutanesulfonate was added with the same parameters (except CAS) as Perfluorobutane sulfonic acid (in Table 3).  
Perfluorooctanesulfonate was added with the same parameters (except CAS) as Perfluorooctane sulfonic acid (in Table 3).*

Contaminant	CAS Number	New DC-RCLs (mg/kg)		Basis
		NonIndustrial	Industrial	
Diphenyl Ether	101-84-8	4.85E+01	2.04E+02	nc
Lactonitrile	78-97-7	1.26E+01	1.64E+02	nc
Perfluorobutanesulfonate	45187-15-3	1.26E+03	1.64E+04	nc
Perfluorooctanesulfonate	45298-90-6	1.26E+00	1.64E+01	nc
Toluic Acid, p-	99-94-5	3.16E+02	4.10E+03	nc
Tribromophenol, 2,4,6-	118-79-6	5.69E+02	7.39E+03	nc

**Table 2: List of Chemicals Removed from the RR's Spreadsheet of RCLs (December 2017)**

(For the December 2017 update, 6 chemicals were removed since March 2017.)

Contaminant	Removed
	CAS Number
Barium Chromate	10294-40-3
Calcium Chromate	13765-19-0
Dimethylphthalate	131-11-3
Lead Chromate	7758-97-6
Sodium Dichromate	10588-01-9
Strontium Chromate	7789-06-02

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**Table 3: List of Direct-Contact RCLs that Changed in RR's Spreadsheet (updated December 2017)**

- A few chemicals were renamed. Their previous names are in the "Old Name" column. Perfluorobutane sulfonic acid (PFBS) was previously Perfluorobutane Sulfonate (PFBS). Perfluorooctane sulfonic acid (PFOS) was previously Perfluorooctane Sulfonate (PFOS).
- The chemical DDD,p,p'- is now deemed a volatile when it wasn't previously.
- A few chemicals have new toxicity values, so their DC-RCLs changed.

Contaminant	Old Name (March 2017)	CAS Number	Volatile? Mar. 2017?	Volatile? Dec. 2017?	Non-Industrial DC-RCL (mg/kg)			Industrial DC-RCL (mg/kg)		
					Old	Current	Basis	Old	Current	Basis
<b>Bromo-3-fluorobenzene, 1-</b>	DDD	1073-06-9	Yes	Yes	896.	<b>23.5</b>	nc	896.	350.	nc
<b>Bromo-4-fluorobenzene, 1-</b>		460-00-4	Yes	Yes	323.	<b>23.5</b>	nc	323.	323.	Csat
<b>Bromopropane, 1-</b>		106-94-5	Yes	Yes	966.	322.	nc	966.	966.	Csat
<b>DDD, p,p'- (DDD)</b>		72-54-8	No	Yes	2.26	1.9	nc	9.57	9.57	ca
<b>Dichloropropane, 1,2-</b>		78-87-5	Yes	Yes	0.406	3.4	ca	1.78	15.	ca
<b>Glutaraldehyde</b>		111-30-8	No	No	100,000.	<b>6,030.</b>	nc	100,000.	71,400.	nc
<b>Heptanal, n-</b>		111-71-7	Yes	Yes	209.	<b>35.2</b>	nc	209.	148.	nc
Perfluorobutane sulfonic acid (PFBS)	Perfluorobutane Sulfonate (PFBS)	375-73-5	No	No	1,260.	1,260.	nc	16,400.	16,400.	nc
Perfluorooctane sulfonic acid (PFOS)	Perfluorooctane Sulfonate (PFOS)	1763-23-1	No	No	1.26	1.26	nc	16.4	16.4	nc

**Table 4: List of Chemical Whose Groundwater-Protective RCLs Changed (December 2017)**

The previous March 2017 update carried over the GW-protective RCLs (GW-RCLs) from June 2016. For the December 2017 update, there were small changes for 5 chemicals whose toxicity values changed since June 2016. The 2 PAHs in the list have their toxicity values tied to benzo[a]pyrene's whose toxicity values changed in January 2017. The 2 pesticides (Dimethoate and EPTC) were affected with the switch from EPA IRIS to EPA Office of Pesticide Programs (OPP) for their toxicity values. Lastly, Trimethylbenzenes' toxicity values were previously from PPRTV; now, they are from IRIS.

Contaminant	CAS Number	GW-RCL (mg/kg)	
		Old	Current (December 2017)
<b>Benzo(b)fluoranthene (PAH)</b>	205-99-2	0.2397	0.239 <u>0</u>
<b>Chrysene (PAH)</b>	218-01-9	0.0723	0.072 <u>1</u>
<b>Dimethoate</b>	60-51-5	4.51E-04	4.52E-04
<b>EPTC</b>	759-94-4	0.1316	0.132 <u>2</u>
Trimethylbenzenes (1,2,4- and 1,3,5- combined)	95-63-6 / 108-67-8	6.91E-01	6.89E-01

Update to RR-890 and RCL Spreadsheet (December 2017)

To calculate DC-RCLs, the default hazard quotient and climatic zone need to be changed in the U.S. EPA RSL web-calculator.

Exposure Parameter Values Used in Determining DC-RCLs

Select HQ of 1.

Select Screening Level Type

Regional Screening Levels (RSLs)  
 Regional Removal Management Levels (RMLs)

Select Hazard Quotient

0.1  
 1  
 Other: \_\_\_\_\_

In October 2016, the Wisconsin Department of Health Services recommended using the default exposure values in the U.S. EPA RSL website when calculating soil RCLs.

This means that the RSL web-calculator exposure defaults (shown in the rightmost column below) need **not** be changed even if they are not the same as what are in NR 720.

	NR 720 RCL Defaults (Replaced by values on the right)	Web-Calculator Defaults
<b>Non-Industrial Setting</b>		
BW-Adult (kg):	70	<b>80</b>
Exposure Duration (yr):	30	<b>26</b> (= 6 as child + 20 as adult)
SA-Child (cm <sup>2</sup> /d):	2800	<b>2373</b>
SA-Adult (cm <sup>2</sup> /d):	5700	<b>6032</b>
T (VF Aver. time):	30 yr = 9.5e8 s	26 yr = <b>8.2e8 s</b>
<b>Industrial Setting</b>		
BW-Adult (kg):	70	<b>80</b>
ED (yr):	25	<b>25</b>
AFw:	0.2	<b>0.12</b>
SA-Adult (cm <sup>2</sup> /d):	3300	<b>3527</b>
T (VF Aver. time):	30 yr = 9.5e8 s	26 yr = <b>8.2e8 s</b>

Select "Chicago, IL" to get acceptable values of PEF and VF necessary in the calculations in both non-industrial and industrial settings.

**Particulate Emission Factor**

Chicago, IL

City (Climatic Zone) - Selection based on most

As (acres)

1359344438 PEF (particulate emission factor) m<sup>3</sup>/kg

93.77 Q/C<sub>wp</sub> (g/m<sup>2</sup>-s per kg/m<sup>3</sup>) PEF Selection

16.2302 A (PEF Dispersion Constant)

18.7762 B (PEF Dispersion Constant)

216.108 C (PEF Dispersion Constant)

0.5 V (fraction of vegetative cover) unitless

4.69 U<sub>m</sub> (mean annual wind speed) m/s

11.32 U<sub>t</sub> (equivalent threshold value)

0.194 F(x) (function dependent on U<sub>m</sub>/U<sub>t</sub>) unitless

**Volatilization Factor**

Chicago, IL

City (Climatic Zone)

As (acres)

68.18 Q/C<sub>wp</sub> (g/m<sup>2</sup>-s per kg/m<sup>3</sup>) VF Selection

11.911 A (VF Dispersion Constant)

18.4385 B (VF Dispersion Constant)

209.7845 C (VF Dispersion Constant)

0.006 f<sub>oc</sub> (fraction organic carbon in soil) g/g

1.5 ρ<sub>s</sub> (dry soil bulk density) g/cm<sup>3</sup>

0.15 θ<sub>w</sub> (water-filled soil porosity) L<sub>water</sub>/L<sub>soil</sub>

2.65 ρ<sub>s</sub> (soil particle density) g/cm<sup>3</sup>

819936000 T (exposure interval) s