
Appendix D

Conversions Used To Place Pollutant Limits in the Same Units

1) Conversions for Inorganic Pollutants

Pollutant limits originally expressed in RSCs were converted to RP_c s using the following equation:

$$RP_c = RSC \times AWSAR \times 0.001 \times SL$$

where:

RP_c	=	cumulative reference application rate of pollutant in biosolids (kg-pollutant/ha-land)
RSC	=	reference concentration of pollutant in biosolids (mg-pollutant/kg-biosolids DW)
AWSAR	=	annual whole biosolids application rate (mt-biosolids DW/ha/yr)
0.001	=	conversion factor
SL	=	number of years of site life

The annual whole biosolids application rate (AWSAR) is the maximum amount of biosolids that can be applied to a hectare in a year, as defined in the Part 503 rule. An AWSAR of 10 mt-biosolids DW/ha/yr, which is somewhat higher than the typical application rate of 7 mt, and a site life of 100 years, a reasonable maximum site life, were used. Therefore:

$$RP_c = RSC \times 0.001 \times 10 \times 100$$

Because of the factors used, the RP_c s for Pathways 3,5, and 7 are the same numbers as the analogous RSCs, but the units differ. The RP_c s and RSCs for inorganics are shown in Chapter 4, Table 11.

2) Conversions for Organic Pollutants

Pollutant limits originally expressed in RSCs were converted to RP_a s using the following equation:

$$RP_a = RSC \times AWSAR \times 0.001$$

where:

RP_a	=	reference annual application rate of pollutant (kg-pollutant/ha/yr)
RSC	=	reference concentration of pollutant in biosolids (mg-pollutant/kg-biosolids DW)
AWSAR	=	annual whole biosolids application rate (mt-biosolids DW/ha/yr)
0.001	=	conversion factor

Therefore, based on the same assumption regarding the AWSAR discussed above (10 mt-biosolids DW/ha/yr):

$$RP_a = RSC \times 10 \times 0.001$$

A "site life" was not used for degradable organic pollutants (as it was for inorganics above) because for organics that degrade, there is no limit on site life. The RP_a s and RSCs for organics are shown in Chapter 4, Table 11.

3) Additional Useful Conversions

Additional conversions derived from the above two conversions were useful for comparing pollutant limits, including:

For inorganics:

$$RP_c = \frac{RP_a}{0.01} = 100 \times RP_a$$

For organics:

$$RP_a = \frac{RP_c}{100}$$

4) Equation Used To Express Pollutant Limit as a Soil Concentration

$$RLC = \frac{RP}{MS \times 10^{-9}}$$

where:

RLC	=	allowed soil concentration of pollutant (μ g-pollutant/g-soil DW)
RP	=	reference application of pollutant (kg-pollutant/ha-land)
MS	=	2×10^9 g/ha (assumed mass of soil in upper 15 cm)
10^{-9}	=	conversion factor (kg/ μ g)