**Removal Efficiency**

**Average Daily Removal Efficiency (ADRE)**

**R**potw = Σ[(**I**r,*n* – **E**potw,n)/**I**r,*n*]

*N*

**R**potw = Plant Removal Efficiency decimal%

**I**r = Average Influent Pollutant Concentration mg/l

**E**potw = Average Effluent Pollutant Concentration mg/l

*n* = Paired data sets, numbered 1 to *N* integer

**Mean Removal Efficiency (MRE)**

**R**potw = **I**r – **E**potw

**I**r

**R**potw = Plant Removal Efficiency decimal%

**I**r = Average Influent Pollutant Concentration mg/l

**E**potw = Average Effluent Pollutant Concentration mg/l

**Mean Removal Efficiency from Biosolids Data**

**R**potw = (**S**u x **8.34** x **PS**/**100** x **Q**biosolids x **G**biosolids)

(**I**r x **8.34** x **Q**potw)

**R**potw = Plant Removal Efficiency decimal%

**PS** = Average Percent Solids of Biosolids to Disposal %

**S**u = Average Biosolids Pollutant Concentration mg/kg

**Q**biosolids = Average Total Biosolids Daily Flow Rate to Disposal MGD

**G**biosolids = Average Specific Gravity of Biosolids (water = 1.0) kg/l

**I**r = Average Influent Pollutant Concentration mg/l

**Q**potw = POTW Average Daily Flow Rate MGD

**Allowable/Maximum Allowable Headworks Loading**

**AHL/MAHL based on MEPDES Permit Limit**

**AHL**mepdes = **8.34** x **C**mepdes x **Q**potw

(**1** - **R**potw)

**AHL**mepdes = AHL/MAHL based on MEPDES Permit Limit #/day

**C**mepdes = MEPDES Permit Limit (convert from #/day at mg/l

average daily flow)

**Q**potw = POTW Average Daily Flow Rate MGD

**R**potw = Plant Removal Efficiency decimal%

**AHL/MAHL based on Acute, Chronic, of Human Health Criteria**

**AHL**wq = **8.34** x [**C**wq (**Q**str + **Q**potw) - (**C**str x **Q**str)]

(**1** - **R**potw)

**AHL**wq = AHL/MAHL based on Acute, Chronic, or Human Health Water Quality Criteria #/day

**C**wq = State Water Quality Criteria, current *Chapter 584, Appendix A* mg/l

**Q**str = Receiving Stream (upstream) Flow MGD

(Utilize the appropriate dilution factor flows: acute/modified acute, chronic,

and harmonic mean, respectively, from Fact Sheet. 1 cfs = 0.6463 MGD)

**Q**potw = POTW Average Daily Flow Rate MGD

**C**str = Receiving Stream background pollutant concentration (10% of Water mg/l

Quality Criteria)

**R**potw = Plant Removal Efficiency decimal%

**AHL/MAHL based on Secondary Inhibition Pollutant Concentration**

**AHL**2°inh = **8.34** x **C**2°inh x **Q**potw

**1 - R**2°inh

**AHL**2°inh = AHL/MAHL based on Secondary Inhibition Pollutant Concentration #/day

**C**2°inh = Secondary Treatment Inhibition Pollutant Concentration (from mg/l

*EPA Local Limits Development Guidance Appendices, 2004,*

*Appendix G – Literature Inhibition Values*, or site-specific data)

**Q**potw = POTW Average Daily Flow Rate MGD

**R**2°inh = Removal Efficiency through Primary Treatment (from *EPA Local* decimal%

*Limits Development Guidance Appendices, 2004, Appendix G -*

*Priority Pollutant Removal Efficiencies*, or site specific data)

**AHL/MAHL based on Biosolids Criteria**

**AHL**biosolids = (**S**u x **8.34** x **PS**/**100** x **Q**biosolids x **G**biosolids)

(**I**r x **8.34** x **Q**potw)

**AHL**biosolids = AHL/MAHL based on Biosolids #/day

**PS** = Average Percent Solids of biosolids to Disposal %

**S**u = Average Biosolids Pollutant Concentration mg/kg

**Q**biosolids = Average Total Biosolids Daily Flow Rate to Disposal MGD

**G**biosolids = Average Specific Gravity of Biosolids kg/l

**I**r = Average Influent Pollutant Concentration mg/l

**Q**potw = POTW Average Daily Flow Rate MGD

**Maximum Allowable Industrial Headworks Loading**

**Residential/Commercial Loading Determination**

**L**unc = **8.34** x **C**unc x **Q**unc

**L**unc = Headworks Loading from Uncontrolled Residential and Commercial Sources #/day

**C**unc = Pollutant Concentration of Uncontrolled Residential and Commercial Sources mg/l

**Q**unc = Flow from Uncontrolled Residential and Commercial Sources MGD

**MAIHL**

**MAIHL** = [**MAHL** x (**1** - **SF**)] - [**L**unc + **HW** + **GA**]

**MAIHL** = Maximum Allowable Industrial Headworks Loading #/day

**MAHL** = Maximum Allowable Headworks Loading (the most *restrictive* of the calculated AHLs) #/day

**SF** = Safety Factor (this is optional; recommend a minimum of .05) decimal%

**L**unc = Headworks Loading from Uncontrolled Residential and Commercial Sources #/day

**HW** = Loading from hauled waste, not covered by IPT Program #/day

**GA** = Growth Allowance (this is optional, based on 5 years’ anticipated future development) #/day

**Uniform Concentration Limit**

**Uniform Concentration Limit**

**C**ucl = **MAIHL**\_\_\_\_

**8.34** x **Q**industrial

**C**ucl = Uniform Concentration Limit mg/l

**Q**industrial = Total Daily Flow from all Industrial Contributors MGD