

APPENDIX C**BOULDER TMDL METALS LIMIT CALCULATIONS AND ASSUMPTIONS**

Water Quality-based Effluent Limits for metals using EPA-recommended limit calculation using *EPA Technical Support Document (TSD) for Water Quality-based Toxics Control* (EPA, 1991).

Table C-1. Criteria for Aquatic Life Protection (at 25 mg/l water hardness), Cr

Pollutant	Acute (ug/L)	Chronic (ug/L)
Cu	3.79	2.85
Fe	--	1000
Pb	13.98	0.545

Table C-2. Receiving water quality (East Boulder River), Cs

Pollutant	mg/L, total recoverable
Cu	0.001
Fe	0.03
Pb	0.0005

Table C-3. Receiving Water Flow (East Boulder River), Qs

Chronic	7Q10 (cfs)	5
Acute	10% 7Q10 (cfs)	0.5
Effluent Discharge, Q(eff), cfs:		1.65

Wasteload concentrations are derived from the following formula:

$$C_d = \frac{C_r * (Q_d + Q_s) - C_s * Q_s}{Q_d}$$

Where: C_d = resulting WLA, mg/L

C_r = receiving water standard, mg/L

Q_d = discharge rate, cfs

Q_s = 7Q10 of receiving water, cfs

C_s = upstream receiving water concentration, mg/L (median value)

Table C-4. Wasteload Concentration (C_d)

Pollutant	Acute	Chronic
Cu	0.0046	0.0085
Fe		3.9394
Pb	0.0181	0.0007

Calculate Long-term Average (LTA)

Assumptions for multiplier (Table 5-1, TSD)

CV = 0.6	
Use 99th percentile for both	
Multiplier - Acute:	0.321
Multiplier - Chronic:	0.527

Table C-5: Long Term Average

Pollutant	Acute	Chronic
Cu	0.00149	0.00446
Fe		2.07606
Pb	0.00580	0.00036

Calculate Limits - Maximum Daily (MDL) and Ave. Monthly (AML)

Most restrictive LTA is used		
Assumptions for multiplier (Table 5-1, TSD)		
MDL - assume CV = 0.6, 99th percentile		
AML - assume CV = 0.6, 95th percentile		
	MDL multiplier	3.11
	AML multiplier	1.55

Table C-6. Concentration Limits

Pollutant	MDL	AML
Cu	0.0139	0.0069
Fe	6.4565	3.2179
Pb	0.0011	0.0006