

NPDES CALCULATIONS BASED ON THE CALIFORNIA TOXIC RULE
FOR CALEXICO PERMIT NO.CA7000009

WATER QUALITY BASED EFFLUENT LIMIT CALCULATIONS FOR FRESHWATER

WQBELs Calculation Summary

Facility Name: Calexico
NPDES Number: CA7000009
Session ID: 4
Session Name: FW Run No. 1
User Name: Carmj
Session Date: 7/10/02

	AMEL(ug/l)	MDEL(ug/l)
Mercury (Hg)	0.0510	0.1024

Period used for effluent data: From 4/17/01 to 12/11/01
Period used for ambient data: From 4/17/01 to 12/11/01

STREAM CONDITIONS:

Ambient TSS (mg/l): 30
Ambient Hardness (mg/l CaCO3): 340
Ambient pH (SU): 7.5

MIXING CONDITIONS:

Acute Receiving Water Flow (cfs): 1
Facility Maximum Daily Flow (MGD): 1
Acute Dilution Ratio: 0

Chronic Receiving Water Flow (cfs): 1
Facility 4-day avg Daily max flow (MGD): 1
Chronic Dilution Ratio: 0

Human Health Receiving Water Flow (cfs): 1
Long Term Mean Flow (MGD): 1
Human Health Dilution Ratio: 0

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**NPDES CALCULATIONS BASED ON THE CALIFORNIA TOXIC RULE
FOR CALEXICO PERMIT NO.CA7000009
WATER QUALITY BASED EFFLUENT LIMIT CALCULATIONS FOR SALT WATER
WQBELs Calculation Summary**

Facility Name:	Calexico
NPDES Number:	CA7000009
Session ID:	5
Session Name:	SW Run No 1
User Name:	carmj
Session Date:	7/10/02

	AMEL(ug/l)	MDEL(ug/l)
Copper (Cu)	2.3917	4.8000
Mercury (Hg)	0.0510	0.1024

Period used for effluent data: From 4/17/01 to 12/11/01
Period used for ambient data: From 4/17/01 to 12/11/01

STREAM CONDITIONS:

Ambient TSS (mg/l):	30
Ambient Hardness (mg/l CaCO3):	340
Ambient pH (SU):	7.5

MIXING CONDITIONS:

Acute Receiving Water Flow (cfs):	1
Facility Maximum Daily Flow (MGD):	1
Acute Dilution Ratio:	0
Chronic Receiving Water Flow (cfs):	1
Facility 4-day avg Daily max flow (MGD):	1
Chronic Dilution Ratio:	0
Human Health Receiving Water Flow (cfs):	1
Long Term Mean Flow (MGD):	1
Human Health Dilution Ratio:	0

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NPDES CALCULATIONS BASED ON THE CALIFORNIA TOXIC RULE
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COMPLIANCE SUMMARY REPORT

Compliance Summary Report

Facility Name: Calexico
NPDES Number: CA7000009
Session ID: 4
Session Name: FW Run No. 1
User Name: Carmj
Session Date: 7/10/02

Compliance Summary Report

Facility Name: Calexico
NPDES Number: CA7000009
Session ID: 5
Session Name: SW Run No 1
User Name: carmj
Session Date: 7/10/02

Copper (Cu)		MDEL (ug/l) = 4.8	ML (ug/l) = 0.5
Value	Detect	Date	Compliance
7.9	True	4/17/01	Non Compliant

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**NPDES CALCULATIONS BASED ON THE CALIFORNIA TOXIC RULE
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REASONABLE POTENTIAL ASSESSMENT REPORT**

REASONABLE POTENTIAL ASSESSMENT

Facility Name : Calexico
NPDES Number : CA7000009

CAPWTT Session ID : 4
CAPWTT Session Name : FW Run No. 1
CAPWTT Session Date : 7/10/02

Pollutant : Mercury (Hg)
ISWP Criteria : 0.051 ug/l
WQBEL Required?: YES

EFFLUENT DATA SUMMARY:

This pollutant was detected 2 times out of 3 observations. The MEC is set to the maximum detected value.

MEC = 0.08 ug/L (detect)

REASONABLE POTENTIAL:

MEC is GREATER THAN the criterion requiring an effluent limitation for Mercury (Hg).

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**NPDES CALCULATIONS BASED ON THE CALIFORNIA TOXIC RULE
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REASONAL POTENTIAL ASSESSMENT REPORT**

REASONABLE POTENTIAL ASSESSMENT

Facility Name : Calexico
NPDES Number : CA7000009

CAPWTT Session ID : 5
CAPWTT Session Name : SW Run No 1
CAPWTT Session Date : 7/10/02

Pollutant : Copper (Cu)
ISWP Criteria : 3.100 ug/l
WQBEL Required?: YES

EFFLUENT DATA SUMMARY:

This pollutant was detected 3 times out of 3 observations. The MEC is set to the maximum detected value.

MEC = 7.9 ug/L (detect)

REASONABLE POTENTIAL:

MEC is GREATER THAN the criterion requiring an effluent limitation for Copper (Cu).

Pollutant : Mercury (Hg)
ISWP Criteria : 0.051 ug/l
WQBEL Required?: YES

EFFLUENT DATA SUMMARY:

This pollutant was detected 2 times out of 3 observations. The MEC is set to the maximum detected value.

MEC = 0.08 ug/L (detect)

REASONABLE POTENTIAL:

MEC is GREATER THAN the criterion requiring an effluent limitation for Mercury (Hg).

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**NPDES CALCULATIONS BASED ON THE CALIFORNIA TOXIC RULE
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CRITERIA CALCULATION SUMMARY FOR METALS & POLLUTANTS

CRITERIA CALCULATION SUMMARY FOR METALS & POLLUTANTS WITH SSOs

Facility Name : Calexico
NPDES Number : CA7000009

CAPWTT Session ID : 4
CAPWTT Session Name : FW Run No. 1
CAPWTT Session Date : 7/10/02

Ambient TSS (mg/l) : 30
Ambient Hardness (mg/l CaCO₃) : 340
Ambient pH (SU) : 7.5

Mercury (Hg)
EPA CF Factors

CF Acute : 1
CF Chronic : 1

Acute Criteria (ug/l) : NA
Chronic Criteria (ug/l) : NA
Human Health Criteria (ug/l) : 0.051

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CRITERIA CALCULATION SUMMARY FOR METALS & POLLUTANTS

CRITERIA CALCULATION SUMMARY FOR METALS & POLLUTANTS WITH SSOs

Facility Name : Calexico
NPDES Number : CA7000009

CAPWTT Session ID : 5
CAPWTT Session Name : SW Run No 1
CAPWTT Session Date : 7/10/02

Ambient TSS (mg/l) : 30
Ambient Hardness (mg/l CaCO₃) : 340
Ambient pH (SU) : 7.5

Copper (Cu)
EPA CF Factors

CF Acute : 0.83
CF Chronic : 0.83

Acute Criteria (ug/l) : 4.8
Chronic Criteria (ug/l) : 3.1
Human Health Criteria (ug/l) : NA

Mercury (Hg)
EPA CF Factors

CF Acute : 1
CF Chronic : 1

Acute Criteria (ug/l) : NA
Chronic Criteria (ug/l) : NA
Human Health Criteria (ug/l) : 0.051

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CALCULATIONS FOR AMEL AND MDEL

**PART 1 CALCULATION OF EFFLUENT CONCENTRATION ALLOWANCES
(ECA)**

For each water quality criterion/objective, calculate the effluent concentration allowance (*ECA*) using the following steady-state mass balance equation:

$$ECA = C + D (C - B) \text{ when } C > B, \text{ and}$$

$$ECA = C \text{ when } C \leq B,$$

where

- C = the priority pollutant criterion/objective, adjusted (as described in section 1.2), if necessary, for hardness, pH, and translators (as described in section 1.4.1);
- D = the dilution credit (as determined in section 1.4.2); and
- B = the ambient background concentration. The ambient background concentration shall be the observed maximum as determined in accordance with section 1.4.3.1 with the exception that an *ECA* calculated from a priority pollutant criterion/objective that is intended to protect human health from carcinogenic effects shall use the ambient background concentration as an arithmetic mean determined in accordance with section 1.4.3.2.

The concentration units for C and B must be identical. Both C and B shall be expressed as total recoverable, unless inappropriate. The dilution credit is unitless.

VALUES USED IN ECA CALCULATION

Pollutant	Ambient B	C Acute	D Acute	ECA Acute	C Chronic	D Chronic	ECA Chronic	C HH	D HH	ECA HH
Mercury	0.4	NA	0.00	NA	NA	0.00	NA	0.051	0.00	0.051
Copper	12	4.8	0.00	4.8	3.1	0.00	3.1	NA	0.00	NA

FOR MERCURY (acute)

$$ECA_{ACUTE} = C_{ACUTE} + D_{ACUTE} \times (C_{ACUTE} - \text{Ambient B})$$

$$ECA_{ACUTE} = \text{NA}$$

FOR MERCURY (chronic)

$$ECA_{CHRONIC} = C_{CHRONIC} + D_{CHRONIC} \times (C_{CHRONIC} - \text{Ambient B})$$

$$ECA_{CHRONIC} = \text{NA}$$

FOR COPPER (acute)

$$ECA_{ACUTE} = C_{ACUTE} + D_{ACUTE} \times (C_{ACUTE} - \text{Ambient B})$$

$$ECA_{ACUTE} = 4.8$$

FOR COPPER (chronic)

$$ECA_{CHRONIC} = C_{CHRONIC} + D_{CHRONIC} \times (C_{CHRONIC} - \text{Ambient B})$$

$$ECA_{CHRONIC} = 3.1$$

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CALCULATIONS FOR AMEL AND MDEL

Pollutant	ECA _{Acute} (µg/L)	ECA _{Chronic} (µg/L)
Mercury	NA	NA
Copper	4.8	3.1

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
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**NPDES CALCULATIONS BASED ON THE CALIFORNIA TOXIC RULE
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CALCULATIONS FOR AMEL AND MDEL

STEP 2 CALCULATIONS OF LONG TERM AVERAGES (LTA)

For each *ECA* based on an aquatic life criterion/objective, determine the long-term average discharge condition (*LTA*) by multiplying the *ECA* with a factor (multiplier) that adjusts for effluent variability. The multiplier shall be calculated as described below, or shall be found in Table 1. To use Table 1, the *coefficient of variation (*CV*) for the effluent pollutant concentration data must first be calculated. If (a) the number of effluent data points is less than ten, or (b) at least 80 percent of the data are reported as not detected, the *CV* shall be set equal to 0.6. When calculating *CV* in this procedure, if an effluent data point is below the detection limit for the pollutant in that sample, one-half of the detection limit shall be used as a value in the calculations. Multipliers for acute and chronic criteria/objectives that correspond to the *CV* can then be found in Table 1.

Cv	WLa Multipliers		
	95th percentile	99 percentile	
0.1	0.853	0.797	<u>Acute</u>
0.2	0.736	0.643	
0.3	0.644	0.527	
0.4	0.571	0.44	
0.5	0.514	0.373	
0.6	0.468	0.321	
0.7	0.432	0.281	<u>Table 5-1</u>
0.8	0.403	0.249	
0.9	0.379	0.224	
1	0.360	0.204	
1.1	0.344	0.187	
1.2	0.330	0.174	
1.3	0.319	0.162	
1.4	0.310	0.153	
1.5	0.302	0.144	
1.6	0.296	0.137	
1.7	0.290	0.131	
1.8	0.285	0.126	
1.9	0.281	0.121	
2	0.277	0.117	

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CALCULATIONS FOR AMEL AND MDEL

Cv	WLa Multipliers		<u>Chronic</u>
	95th percentile	99 percentile	
0.1	0.922	0.891	
0.2	0.853	0.797	
0.3	0.791	0.715	
0.4	0.736	0.643	
0.5	0.687	0.581	
0.6	0.644	0.527	
0.7	0.606	0.481	
0.8	0.571	0.440	
0.9	0.541	0.404	
1	0.514	0.373	
1.1	0.490	0.345	
1.2	0.468	0.321	
1.3	0.449	0.300	
1.4	0.432	0.281	
1.5	0.417	0.264	
1.6	0.403	0.249	
1.7	0.390	0.236	
1.8	0.379	0.224	
1.9	0.369	0.214	
2	0.360	0.204	

Table 5-1

LTA Equations

$LTA_{Acute} = ECA_{Acute} * ECA \text{ multiplier}_{Acute}^{99}$ (from Table 1)

$LTA_{Chronic} = ECA_{Chronic} * ECA \text{ multiplier}_{Chronic}^{99}$ (from Table 1)

VALUES USED IN LTA CALCULATION

Pollutant	CV Q	Sigma	Mult Acute	Mult Chronic	LTA Acute	LTA Chronic	LTA Min
Mercury	0.600	0.555	0.321	0.527	NA	NA	NA
Copper	0.600	0.555	0.321	0.527	1.541	1.635	1.541

VALUES USED FOR ECA_{Acute} and $ECA_{Chronic}$

Pollutant	ECA_{Acute} (µg/L)	$ECA_{Chronic}$ (µg/L)
Mercury	NA	NA
Copper	4.8	3.1

FOR MERCURY (acute)

$LTA_{ACUTE} = ECA_{ACUTE} * ECA \text{ multiplier}_{Acute}^{99}$

$LTA_{ACUTE} = NA$

FOR MERCURY (chronic)

$LTA_{CHRONIC} = ECA_{CHRONIC} * ECA \text{ multiplier}_{Chronic}^{99}$

$LTA_{CHRONIC} = NA$

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CALCULATIONS FOR AMEL AND MDEL

FOR COPPER (acute)

$$LTA_{ACUTE} = ECA_{ACUTE} \times ECA \text{ multiplier}_{Acute}^{99}$$

$$LTA_{ACUTE} = 4.8 \times 0.321 = 1.541$$

FOR COPPER (chronic)

$$LTA_{CHRONIC} = ECA_{CHRONIC} \times ECA \text{ multiplier}_{Chronic}^{99}$$

$$LTA_{CHRONIC} = 3.1 \times 0.527 = 1.635$$

Select the lowest (most limiting) of the *LTA*s for the pollutant derived in *Step 2*.

LTA

Pollutant	<i>LTA</i> _{Acute} (µg/L)	<i>LTA</i> _{Chronic} (µg/L)
Mercury	NA	NA
Copper	1.541	1.635

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CALCULATIONS FOR AMEL AND MDEL

**STEP 3 CALCULATIONS OF AVERAGE MONTHLY EFFLUENT LIMITATION (AMEL)
AND MAXIMUM DAILY EFFLUENT LIMITATION (MDEL)**

Calculate water quality-based effluent limitations (an *average monthly effluent limitation, AMEL, and a *maximum daily effluent limitation, MDEL) by multiplying the most limiting *LTA* (as selected in *Step 2*) with a factor (multiplier) that adjusts for the averaging periods and exceedance frequencies of the criteria/objectives and the effluent limitations, and the effluent monitoring frequency as follows:

$$AMEL_{\text{aquatic life}} = LTA * AMEL_{\text{multiplier95}} \text{ (from Table 5-2)}$$

$$MDEL_{\text{aquatic life}} = LTA * MDEL_{\text{multiplier99}} \text{ (from Table 5-2)}$$

The AMEL and MDEL multipliers shall be calculated as described below, or shall be found in Table 5-2 using the previously calculated *CV* and the monthly sampling frequency (*n*) of the pollutant in the effluent. If the sampling frequency is four times a month or less, *n* shall be set equal to 4. For this method only, maximum daily effluent limitations shall be used for publicly-owned treatment works (POTWs) in place of average weekly limitations.

Cv	LTA multipliers		
	95th percentile	99 percentile	
0.1	1.170	1.25	<u>Maximum Daily Limit MDL</u>
0.2	1.360	1.55	
0.3	1.550	1.9	
0.4	1.750	2.27	
0.5	1.950	2.68	
0.6	2.130	3.11	
0.7	2.310	3.56	
0.8	2.480	4.01	
0.9	2.640	4.46	
1	2.780	4.9	
1.1	2.910	5.34	<u>Table 5-2</u>
1.2	3.030	5.76	
1.3	3.130	6.17	
1.4	3.230	6.56	
1.5	3.310	6.93	
1.6	3.380	7.29	
1.7	3.450	7.63	
1.8	3.510	7.95	
1.9	3.560	8.26	
2	3.600	8.55	

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CALCULATIONS FOR AMEL AND MDEL

Cv	LTA Multipliers									
	95th percentile					99 percentile				
	n=1	n=2	n=4	n=10	n=30	n=1	n=2	n=4	n=10	n=30
0.1	1.170	1.12	1.08	1.06	1.03	1.25	1.18	1.121	1.08	1.04
0.2	1.360	1.25	1.17	1.12	1.06	1.55	1.37	1.25	1.16	1.09
0.3	1.550	1.38	1.26	1.18	1.09	1.9	1.59	1.4	1.24	1.13
0.4	1.750	1.52	1.36	1.25	1.12	2.27	1.83	1.55	1.33	1.18
0.5	1.950	1.66	1.45	1.31	1.16	2.68	2.09	1.72	1.42	1.23
0.6	2.130	1.8	1.55	1.38	1.19	3.11	2.37	1.9	1.52	1.28
0.7	2.310	1.94	1.65	1.45	1.22	3.56	2.66	2.08	1.62	1.33
0.8	2.480	2.07	1.75	1.52	1.26	4.01	2.96	2.27	1.73	1.39
0.9	2.640	2.2	1.85	1.59	1.29	4.46	3.28	2.48	1.84	1.44
1	2.780	2.33	1.95	1.66	1.33	4.9	3.59	2.68	1.96	1.5
1.1	2.910	2.45	2.04	1.73	1.36	5.34	3.91	2.9	2.07	1.56
1.2	3.030	2.56	2.13	1.8	1.39	5.76	4.23	3.11	2.19	1.62
1.3	3.130	2.67	2.23	1.87	1.43	6.17	4.55	3.34	2.32	1.68
1.4	3.230	2.77	2.31	1.94	1.47	6.56	4.86	3.56	2.45	1.74
1.5	3.310	2.86	2.4	2	1.5	6.93	5.17	3.78	2.58	1.8
1.6	3.380	2.95	2.48	2.07	1.54	7.29	5.47	4.01	2.71	1.87
1.7	3.450	3.03	2.56	2.14	1.57	7.63	5.77	4.23	2.84	1.93
1.8	3.510	3.1	2.64	2.2	1.61	7.95	6.06	4.46	2.98	2
1.9	3.560	3.17	2.71	2.27	1.64	8.26	6.34	4.68	3.12	2.07
2	3.600	3.23	2.78	2.33	1.68	8.55	6.61	4.9	3.26	2.14

Average Monthly Limit (AML) Table 5-2

For the applicable human health criterion/objective, set the AMEL equal to the ECA (from *Step 1*).

$$\text{AMEL}_{\text{human health}} = \text{ECA}$$

To calculate the MDEL for a human health criterion/objective, multiply the ECA by the ratio of the MDEL multiplier to the AMEL multiplier.

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CALCULATIONS FOR AMEL AND MDEL

VALUES USED IN AMEL MDEL CALCULATION

Pollutant	LTA Min	CV Q	N samp	AMEL Mult	AMEL Aqua	MDEL Mult	MDEL Aqua	AMEL HH	MDEL/AMEL	MDEL HH
Mercury	NA	0.600	4.000	1.553	NA	3.116	NA	.051	2.0069	0.102
Copper	1.541	0.600	4.000	1.553	2.392	3.116	4.8	NA	2.0069	NA

FOR MERCURY

AMEL_{human health} = ECA

AMEL_{human health} = 0.051 µg/L

MDEL_{human health} = ECA x MDEL_{multiplier}/AMEL_{multiplier}

MDEL_{human health} = 0.051 x (2.0069) = 0.102 µg/L

FOR COPPER

AMEL_{aquatic life} = LTA Min x AMEL Mult

AMEL_{aquatic life} = 1.541 x 1.553 = 2.392 µg/L

MDEL_{aquatic life} = LTA Min x MDEL Mult

MDEL_{aquatic life} = 1.541 x 3.116 = 4.8 µg/L

Pollutant	AMEL (µg/L)	MDEL (µg/L)
Mercury	0.051	0.1027
Copper	2.3917	4.8