

Reasonable Potential Analysis
 no ND, <10 Data Points - assumed Lognormal distribution

AR# 1086

Date	AI (mg/L)
6/30/2009	0.11
7/7/2009	0.65
9/18/2009	0.15
9/25/2009	0.21
12/22/2009	0.58
1/21/2010	0.32

AI - (Lognormal distribution assumed)		
Estimated Maximum Effluent Concentration		
K = number of samples =	6	
Max Concentration	0.6500	
CV(X) = Coefficient of Variation* =	0.6	
99th percentile multiplication factor**	3.8	
95th percentile multiplication factor**	2.1	
Max Estimate = Max*99th percentile multiplication factor**	2.4700 mg/L	2470 µg/L
Estimated Max 99th percentile =		
Max Estimate = Max*95th percentile multiplication factor**	1.3650 mg/L	1365 µg/L
Estimated Max 95th Percentile =		

*Conservative estimate of CV. See box 3-2 in Technical Support Document for Water Quality Based Toxics Control
 **Multiplication factors from Table 3-1 and Table 3-2 in Technical Support Document for Water Quality Based Toxics Control
 These factors will automatically populate based on the number of samples (up to 10) entered in the data table

Agrees with NHDDES calculation

Histogram 1

Aluminum

max 0.65
min 0.11
number of bins 10 *not including min bin - bin 0 (so total of 11)
bin separation 0.054

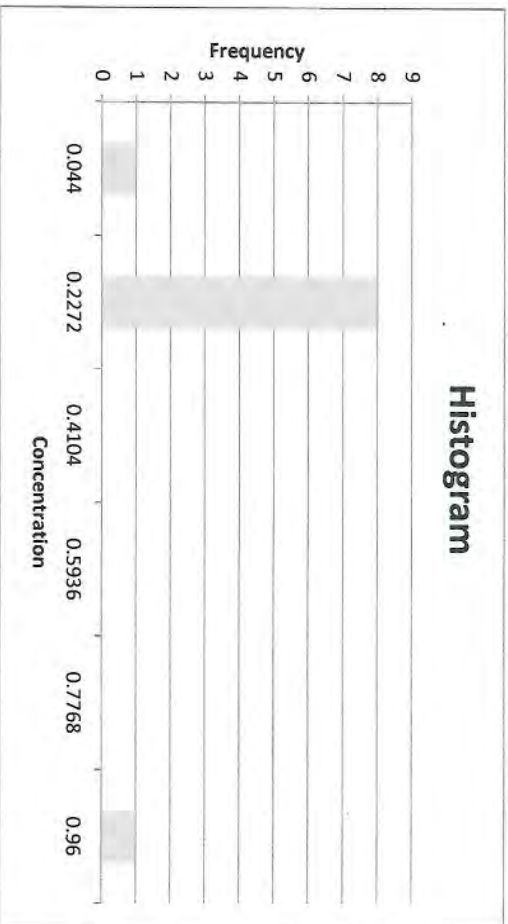
Bin	count
0	0.11
1	0.164
2	0.218
3	0.272
4	0.326
5	0.38
6	0.434
7	0.488
8	0.542
9	0.596
10	0.65



Histogram 2

max 0.65
min 0.11
number of bins 5 *not including min bin - bin 0 (so total of 6)
bin separation 0.108

Bin	count
0	0.11
1	0.218
2	0.326
3	0.434
4	0.542
5	0.65



	Metal	Qd (cfs)	Cd (mg/l)	Qs (cfs)	Cs (mg/l)	Qr (cfs)	Cr = [(QdCd+QsCs)/Qr] (mg/l)	(Criteria)*0.9	Reasonable Potential?	(95th)>Criteria * 0.9	Limit (Cd) = (Qr*(Criteria*0.9) - QsCs)/Qd (mg/l)
Chronic	Aluminum	5.29	1.3650	577.74	0.045	585.92	0.057050	0.078300	No	No	Not Required

$QdCd + QsCs = QrCr$

Where:

Metal = Aluminum
 Qd = 5.29 cfs
 Cd = 1.37 mg/l
 Qs = 577.74 cfs
 Cs = 0.045360 mg/l
 Qr = 585.92 cfs
 Metal Criteria (RP) = 0.087 mg/l
 Cr = Unknown mg/l

Outfall 003A Flow: Average Monthly
 Outfall 003A 95th Percentile Concentration
 Upstream Flow (Q10)
 Upstream Concentration (Data is unadjusted for upstream POTW's at their design flow)
 Resultant Flow
 Aluminum Metal Criteria: Chronic
 Resultant Concentration

Reasonable Potential Analysis
 no ND, < 10 Data Points - assumed Lognormal distribution

Date	Ar (mg/L)
6/30/2009	0.00162
7/7/2009	0.0019
9/18/2009	0.0017
9/25/2009	0.0015
12/22/2009	0.0012
1/21/2010	0.0016

Ar - (Lognormal distribution assumed)

Estimated Maximum Effluent Concentration		
k = number of samples =	6	
Max Concentration	0.00190000	
cv(x) = Coefficient of Variation* =	0.6	
99th percentile multiplication factor**	3.8	
95th percentile multiplication factor**	2.1	
Max Estimate = Max*99th percentile multiplication factor**		
Estimated Max 99th percentile =	0.00722000 mg/L	7.22 µg/L
Max Estimate = Max*95th percentile multiplication factor**		
Estimated Max 95th Percentile =	0.00399000 mg/L	3.99 µg/L

*Conservative estimate of CV. See box 3-2 in Technical Support Document for Water Quality Based Toxics Control

**Multiplication factors from Table 3-1 and Table 3-2 in Technical Support Document for Water Quality Based Toxics Control
 These factors will automatically populate based on the number of samples (up to 10) entered in the data table

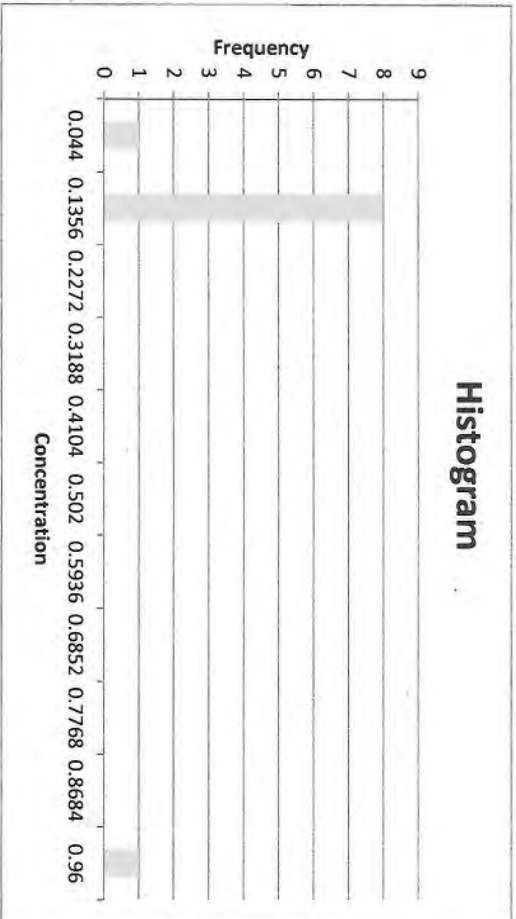
Agrees with NHDES calculation

Histogram 1

Arsenic

max 0.0019
 min 0.0012
 number of bins 10 *not including min bin - bin 0 (so total of 11)
 bin separation 0.00007

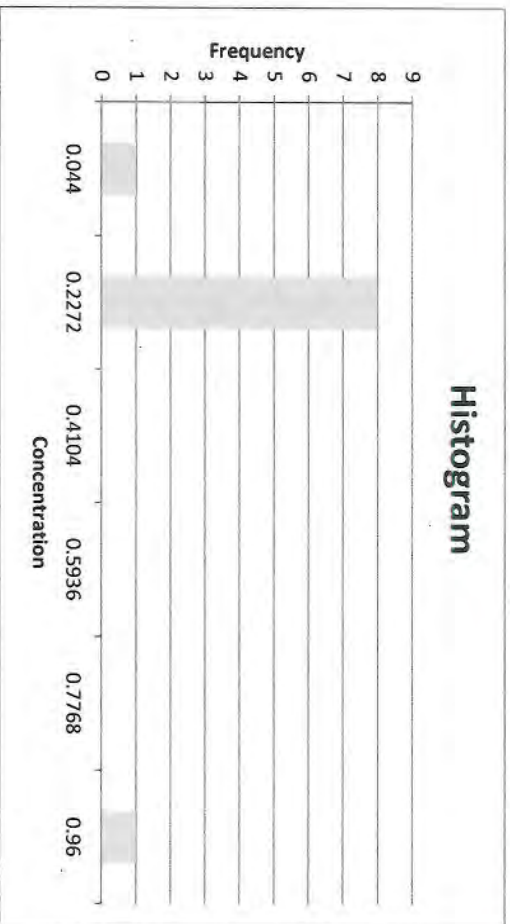
Bin	count
0	0.0012
1	0.00127
2	0.00134
3	0.00141
4	0.00148
5	0.00155
6	0.00162
7	0.00169
8	0.00176
9	0.00183
10	0.0019



Histogram 2

max 0.0019
 min 0.0012
 number of bins 5 *not including min bin - bin 0 (so total of 6)
 bin separation 0.00014

Bin	count
0	0.0012
1	0.00134
2	0.00148
3	0.00162
4	0.00176
5	0.0019



	Metal	Qd (cfs)	Cd (mg/l)	Qs (cfs)	Cs (mg/l)	Qr (cfs)	Cr = [(QdCd+QsCs)/Qr] (mg/l)	(Criteria)*0.9	Reasonable Potential?	(95th)>Criteria * 0.9	Limit (Cd) = (Qr*(Criteria*0.9) - QsCs)/Qd (mg/l)
Chronic	Arsenic	5.29	0.003990	577.74	0.000346	585.92	0.000377	0.135000	No	No	Not Required

$$QdCd + QsCs = QrCr$$

Where:

Metal = Arsenic

Qd = 5.29 cfs

Cd = 0.003990 mg/l

Qs = 577.74 cfs

Cs = 0.000346 mg/l

Qr = 585.92 cfs

Metal Criteria (RP) = 0.15 mg/l

Cr = Unknown mg/l

Outfall 003A Flow: Average Monthly

Outfall 003A 95th Percentile Concentration

Upstream Flow (7Q10)

Upstream Concentration

Resultant Flow

Arsenic Metal Criteria: Chronic Resultant Concentration

(Data is unadjusted for upstream POTW's at their design flow)

Copper Reasonable Potential Analysis

data with ND, >10 samples, lognormal distribution

Cu - (Lognormal distribution, ND)

Date PSNH Sampling	Date	Cu* (mg/l)	ln Cu	$(Y_i - u_y)^2$
6/30/2009	9/30/2008	0.01	-4.6052	0.613404461
7/7/2009	12/31/2008	0		
9/18/2009	3/31/2009	0		
9/25/2009	6/30/2009	0.01	-4.6052	0.613404461
12/22/2009	9/30/2009	0.01	-4.6052	0.613404461
1/21/2010	12/31/2009	0.02	-3.9120	0.008109766
	3/31/2010	0.03	-3.5066	0.099484017
	6/30/2010	0		
	9/30/2010	0.01	-4.6052	0.613404461
	12/31/2010	0.01	-4.6052	0.613404461
	3/31/2011	0.7	-0.3567	12.00826129
	6/30/2011	0.03	-3.5066	0.099484017
	9/30/2011	0.02	-3.9120	0.008109766

Daily Maximum Effluent Derivation (some measurements < detection limit)

Detection Limit** = 5.0
 u_y = Avg of Nat. Log of daily Discharge (mg/L) = -3.82197
 $S(Y_i - u_y)^2$ = 15.29047
 k = number of daily samples = 11
 r = number of non-detects = 3
 s_y^2 = estimated variance = $(S[(Y_i - u_y)^2]) / (k-r-1)$ = 2.18435
 s_y = standard deviation = square root s_y^2 = 1.47796
 δ = number of nondetect values/number of samples = 0.27273
 z 99th percentile = z-score[(0.99- δ)/(1- δ)] = 2.20435
 z 95th percentile = z-score[(0.95- δ)/(1- δ)] = 1.485165457

Daily Max = $\exp(u_y + z\text{-score} * s_y)$

99th Percentile Daily Max Estimate = 0.5689 mg/l

95th Percentile Daily Max Estimate = 0.1965 mg/l

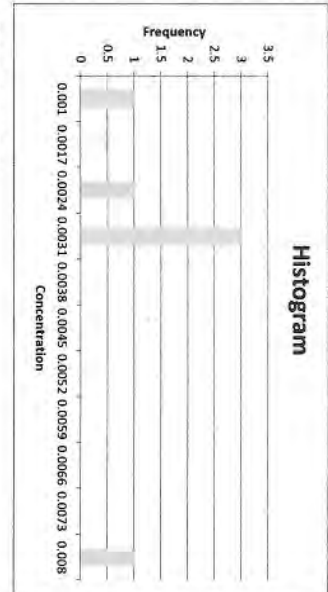
** Detection limit here is the detection limit that resulted in the greatest number of Non Detects in the dataset

Histogram 1

Copper

max 2.01
min 0.01 *not including NDS
number of bins 10 *not including min bin - bin 0 (so total of 11)
bin separation 0.2

Bin	count
0	5
1	4
2	0
3	0
4	1
5	0
6	0
7	0
8	1
9	1
10	1

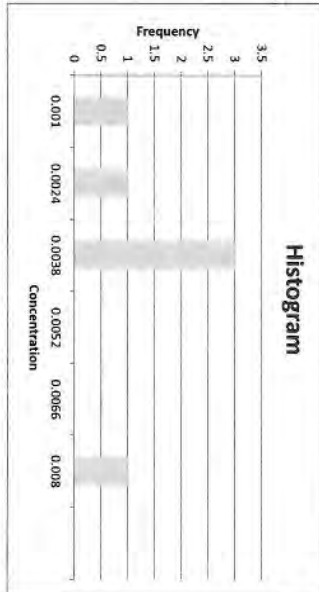


*ND values not plotted

Histogram 2

max 2.01
min 0.01 *not including NDS
number of bins 5 *not including min bin - bin 0 (so total of 6)
bin separation 0.4

Bin	count
0	5
1	4
2	1
3	0
4	1
5	1



*ND values not plotted

Mass Balance Calculation - Copper

	Qd (cfs)	Cd (ug/l)	Qs (cfs)	Cs (ug/l)	Qr (cfs)	Cr = [(QdCd+QsCs)/Qr] (ug/l)	Criteria * 0.9	Reasonable Potential?	Cu(95th) > Criteria * 0.9	Limit (Cd) = (Qr*(Criteria*0.9) - QsCs)/Qd (ug/l)
ACUTE	Copper	2.01	0.1965	14.46	0.55	16.47	4.37	No	No	Not Required
CHRONIC	Copper	1.55	0.1965	14.92	0.55	16.47	2.82	No	No	Not Required

$QdCd + QsCs = QrCr$

Where:

Metal = Copper
 7Q10 = 16.47
 Qd = 2.01
 Qdc = 1.55
 Cd = 0.1965
 Qs = 14.46
 Qsc = 0.55
 Cs = 14.92
 Qr = 16.47
 Qra = 16.47
 Metal Criteria = 4.86
 Metal Criteria = 3.13
 Cr = Unknown

7Q10 Flow
 Outfall 001 Flow: ACUTE
 Outfall 001 Flow: CHRONIC
 Outfall 001 95th Percentile Concentration
 Upstream Flow: ACUTE
 Upstream Flow: CHRONIC
 Upstream Concentration
 Resultant Flow: ACUTE
 Resultant Flow: CHRONIC
 Copper Metal Criteria: ACUTE
 Copper Metal Criteria: CHRONIC
 Resultant Concentration

	Metal	Qd (cfs)	Cd (mg/l)	Qs (cfs)	Cs (mg/l)	Qr (cfs)	Cr = [(QdCd+QsCs)/Qr] (mg/l)	(Criteria)*0.9	Reasonable Potential?	(95th)>Criteria * 0.9	Limit (Cd) = (Qr*(Criteria*0.9) - QsCs)/Qd (mg/l)
Chronic	Copper	5.29	0.196526	577.74	0.000560	585.92	0.002327	0.002430	No	No	Not Required

$$QdCd + QsCs = QrCr$$

Where:

Metal = Copper
 Qd = 5.29 cfs
 Cd = 0.196526 mg/l
 Qs = 577.74 cfs
 Cs = 0.000560 mg/l
 Qr = 585.92 cfs
 Metal Criteria (Rp) = 0.0027 mg/l
 Cr = Unknown mg/l

Outfall 003A Flow: Average Monthly
 Outfall 003A 95th Percentile Concentration Using DMR Data 09/08 - 09/11
 Upstream Flow (7Q10) (Data is unadjusted for upstream POTW's at their design flow)
 Resultant Flow
 Copper Metal Criteria, Chronic
 Resultant Concentration

Copper Reasonable Potential Analysis

data with ND, >10 samples, lognormal distribution

Cu- (Lognormal distribution, ND)

Daily Maximum Effluent Derivation (some measurements < detection limit)

Detection Limit** = 5.0
 u_y = Avg of Nat. Log of daily Discharge (mg/L) = -3.92511
 $S (y_i - u_y)^2 = 19.61313$
 k = number of daily samples = 40
 r = number of non-detects = 15
 s_y^2 = estimated variance = $(S(y_i - u_y)^2) / (k-r-1) = 0.81721$
 s_y = standard deviation = square root $s_y^2 = 0.90400$
 δ = number of nondetect values/number of samples = 0.37500
 z 99th percentile= $z\text{-score}((0.99-\delta)/(1-\delta)) = 2.14441$
 z 95th percentile= $z\text{-score}((0.95-\delta)/(1-\delta)) = 1.40507156$

Daily Max = $\exp(u_y + z\text{-score} * s_y)$

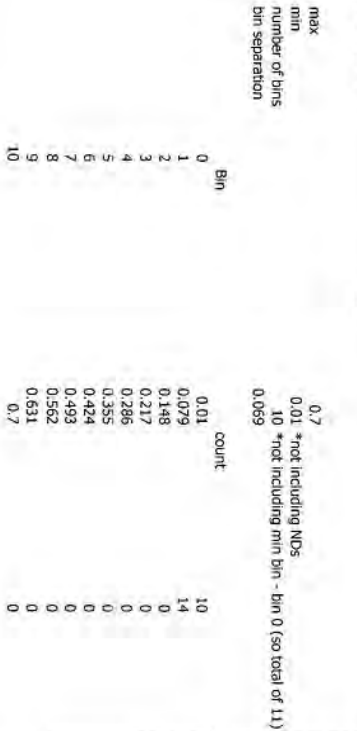
99th Percentile Daily Max Estimate= 0.1372 mg/l

95th Percentile Daily Max Estimate = 0.0703 mg/l

** Detection limit here is the detection limit that resulted in the greatest number of Non Detects in the dataset.

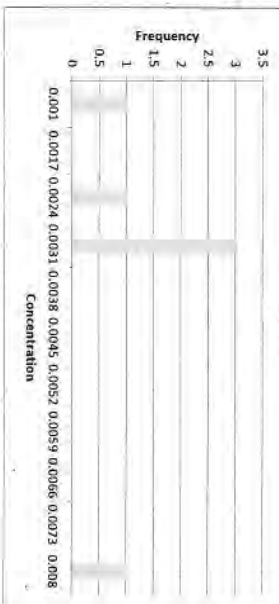
Date	Cu* (mg/l)	In Cu (mg/l)	$(y_i - u_y)^2$
3/31/2005	0.00		
6/30/2005	0.00		
9/30/2005	0.02	-3.9120	0.00017124
12/31/2005	0.00		
3/31/2006	0.00		
6/30/2006	0.00		
9/30/2006	0.02	-3.9120	0.00017124
12/31/2006	0.05	-2.9957	0.863740883
3/31/2007	0.00		
6/30/2007	0.00		
9/30/2007	0.00		
12/31/2007	0.02	-3.9120	0.00017124
3/31/2008	0.01	-4.6052	0.462483375
6/30/2008	0.01	-4.6052	0.462483375
9/30/2008	0.01	-4.6052	0.462483375
12/31/2008	0.00		
3/31/2009	0.00		
6/30/2009	0.01	-4.6052	0.462483375
9/30/2009	0.01	-4.6052	0.462483375
12/31/2009	0.02	-3.9120	0.00017124
3/31/2010	0.03	-3.5066	0.175184928
6/30/2010	0.00		
9/30/2010	0.01	-4.6052	0.462483375
12/31/2010	0.01	-4.6052	0.462483375
3/31/2011	0.70	-0.3567	12.73372078
6/30/2011	0.03	-3.5066	0.175184928
9/30/2011	0.02	-3.9120	0.00017124
12/31/2011	0.01	-4.6052	0.462483375
3/31/2012	0.00		
6/30/2012	0.02	-3.9120	0.00017124
9/30/2012	0.01	-4.6052	0.462483375
12/31/2012	0.01	-4.6052	0.462483375
3/31/2013	0.00		
6/30/2013	0.02	-3.9120	0.00017124
9/30/2013	0.03	-3.5066	0.175184928
12/31/2013	0.02	-3.9120	0.00017124

Histogram 1



*ND values not plotted

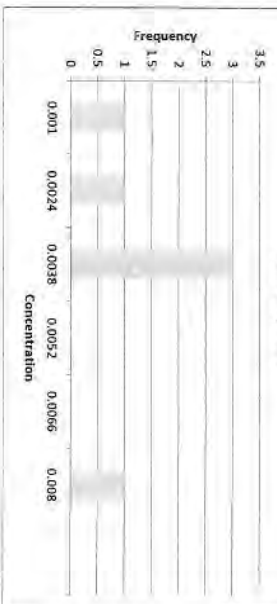
Histogram



Histogram 2



Histogram



	Metal	Qd (cfs)	Cd (mg/l)	Qs (cfs)	Cs (mg/l)	Qr (cfs)	Cr = [(QdCd+QsCs)/Qr] (mg/l)	(Criteria)*0.9	Reasonable Potential?	(95th) > Criteria * 0.9	Limit (Cd) = (Qr*(Criteria*0.9) - QsCs)/Qd (mg/l)
Chronic	Copper	5.29	0.070304	577.74	0.000560	585.92	0.001187	0.002430	No	No	Not Required

$$QdCd + QsCs = QrCr$$

Where:

Metal = Copper

Qd = 5.29 cfs

Cd = 0.070304 mg/l

Qs = 577.74 cfs

Cs = 0.000560 mg/l

Qr = 585.92 cfs

Metal Criteria (RP) = 0.0027 mg/l

Cr = Unknown mg/l

Outfall 003A Flow, Average Monthly

Outfall 003A 95th Percentile Concentration Using DWR Data 03/05 - 12/11

Upstream Flow (7Q10)

Upstream Concentration (Data is unadjusted for upstream POTW's at their design flow)

Resultant Flow

Copper Metal Criteria; Chronic

Resultant Concentration

Reasonable Potential Analysis
 no ND, <10 Data Points - assumed Lognormal distribution

Date	Chlorides (mg/L)
6/30/2009	21
7/7/2009	13
9/18/2009	27
9/25/2009	27
12/22/2009	16
1/21/2010	20

Chlorides - (Lognormal distribution assumed)

Estimated Maximum Effluent Concentration		
k = number of samples =	6	
Max Concentration	27.00	
CV(x) = Coefficient of Variation* =	0.6	
99th percentile multiplication factor***	3.8	
95th percentile multiplication factor**	2.1	
Max Estimate = Max*99th percentile multiplication factor**		
Estimated Max 99th percentile =	102.6000 mg/L	102600 µg/L
Max Estimate = Max*95th percentile multiplication factor**		
Estimated Max 95th Percentile =	56.7000 mg/L	56700 µg/L

Agrees with NHDES calculation

*Conservative estimate of CV. See box 3-2 in Technical Support Document for Water Quality Based Toxics Control
 **Multiplication factors from Table 3-1 and Table 3-2 in Technical Support Document for Water Quality Based Toxics Control
 These factors will automatically populate based on the number of samples (up to 10) entered in the data table

Histogram 1

Chlorides

max 27
min 13
number of bins 10 *not including min bin - bin 0 (so total of 11)
bin separation 1.4

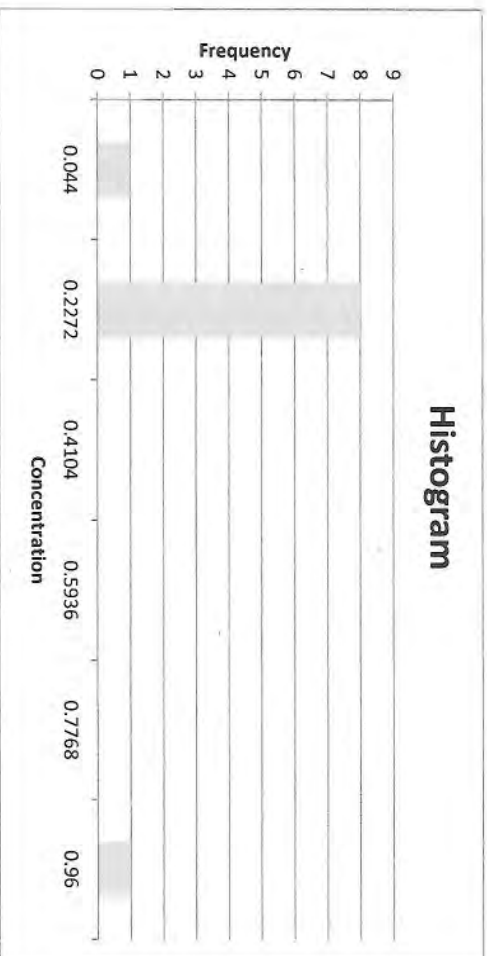
Bin	count
0	13
1	14.4
2	15.8
3	17.2
4	18.6
5	20
6	21.4
7	22.8
8	24.2
9	25.6
10	27



Histogram 2

max 27
min 13
number of bins 5 *not including min bin - bin 0 (so total of 6)
bin separation 2.8

Bin	count
0	13
1	15.8
2	18.6
3	21.4
4	24.2
5	27



	Metal	Qd (cfs)	Cd (mg/l)	Qs (cfs)	Cs (mg/l)	Qr (cfs)	Cr = [(QdCd+QsCs)/Qr] (mg/l)	(Criteria)*0.9	Reasonable Potential?	(95th)>Criteria * 0.9	Limit (Cd) = (Qr*(Criteria*0.9) - QsCs)/Qd (mg/l)
Chronic	Chlorides	5.29	56.70	577.74	18.20	585.92	18.457714	207.00	No	No	Not Required

$QdCd + QsCs = QrCr$

Where: Metal = Chlorides
 Qd = 5.29 cfs
 Cd = 56.70 mg/l
 Qs = 577.74 cfs
 Cs = 18.20 mg/l
 Qr = 585.92 cfs
 Metal Criteria (RP) = 230 mg/l
 Cr = Unknown mg/l

Outfall 003A Flow: Average Monthly
 Outfall 003A 95th Percentile Concentration
 Upstream Flow (7Q10)
 Upstream Concentration (Data is unadjusted for upstream POTW's at their design flow)
 Resultant Flow
 Chloride Metal Criteria: Chronic
 Resultant Concentration

Reasonable Potential Analysis
 no ND, <10 Data Points - assumed Lognormal distribution

Date	Hg (mg/L)
6/30/2009	0.00000036
7/7/2009	0.00000054
9/18/2009	0.0000019
9/25/2009	0.0000024
12/22/2009	0.0000029
1/21/2010	0.0000061

Hg - (Lognormal distribution assumed)

Estimated Maximum Effluent Concentration		
k = number of samples =	6	
Max Concentration	0.00000610	
cV(x) = Coefficient of Variation* =	0.6	
99th percentile multiplication factor**	3.8	
95th percentile multiplication factor**	2.1	
Max Estimate = Max*99th percentile multiplication factor**		0.02318 µg/L
Estimated Max 99th percentile =	0.00002318 mg/L	
Max Estimate = Max*95th percentile multiplication factor**		0.01281 µg/L
Estimated Max 95th Percentile =	0.00001281 mg/L	

*Conservative estimate of CV. See box 3-2 in Technical Support Document for Water Quality Based Toxics Control
 **Multiplication factors from Table 3-1 and Table 3-2 in Technical Support Document for Water Quality Based Toxics Control
 These factors will automatically populate based on the number of samples (up to 10) entered in the data table

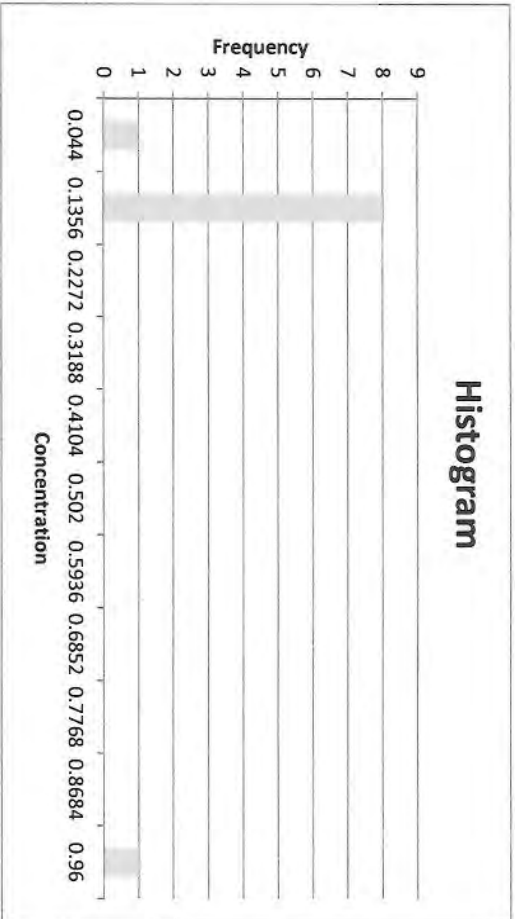
Does NOT agree with NHDES calculation because of state-wide mercury impairment and NHDES approach to hold the load for the FGD discharge.

Histogram 1

Mercury

max 6.1E-06
min 1.9E-06
number of bins 10 *not including min bin - bin 0 (so total of 11)
bin separation 4.2E-07

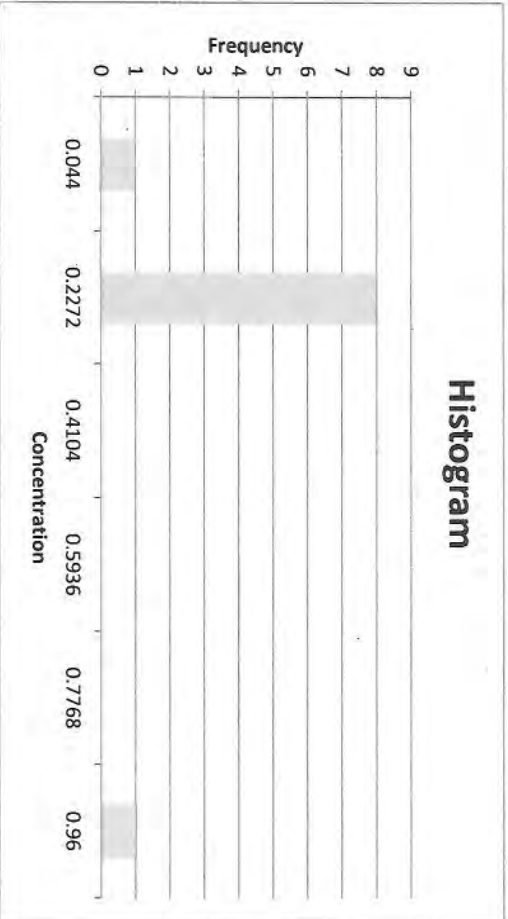
Bin	count	
0	1.9E-06	1
1	2.3E-06	0
2	2.7E-06	1
3	3.2E-06	1
4	3.6E-06	0
5	4E-06	1
6	4.4E-06	0
7	4.8E-06	0
8	5.3E-06	0
9	5.7E-06	1
10	6.1E-06	1



Histogram 2

max 6.1E-06
min 1.9E-06
number of bins 5 *not including min bin - bin 0 (so total of 6)
bin separation 8.4E-07

Bin	count	
0	1.9E-06	1
1	2.7E-06	1
2	3.6E-06	1
3	4.4E-06	1
4	5.3E-06	0
5	6.1E-06	2



Chronic	Metal	Qd (cfs)	Cd (mg/l)	Qs (cfs)	Cs (mg/l)	Qr (cfs)	Cr = [(QdCd + QsCs) / Qr] (mg/l)	(Criteria) * 0.9	Reasonable Potential?	(95th) > Criteria * 0.9	Limit (Cd) = (Qr * (Criteria * 0.9) - QsCs) / Qd (mg/l)
	Mercury	5.29	0.000013	577.74	0.000001	585.92	0.000001	0.000693	No	No	Not Required

$$QdCd + QsCs = QrCr$$

Where:

Metal = Mercury
 Qd = 5.29 cfs
 Cd = 0.00001281 mg/l
 Qs = 577.74 cfs
 Cs = 0.000001 mg/l
 Qr = 585.92 cfs
 Metal Criteria (RP) = 0.00077 mg/l
 Cr = Unknown mg/l

Outfall 003A Flow; Average Monthly
 Outfall 003A 95th Percentile Concentration
 Upstream Flow (7Q10)
 Upstream Concentration (Data is unadjusted for upstream POTW's at their design flow)
 Resultant Flow
 Resultant Concentration
 Mercury/Metal Criteria; Chronic
 Resultant Concentration

Reasonable Potential Analysis
 no ND, <10 Data Points - assumed Lognormal distribution

Date	Se (mg/L)
6/30/2009	0.0006
7/7/2009	0.0015
9/18/2009	0.0009
9/25/2009	0.0005
12/22/2009	0.0005
1/21/2010	0.0005

Se - (Lognormal distribution assumed)

Estimated Maximum Effluent Concentration		
k = number of samples =	6	
Max Concentration	0.00150000	
cv(X) = Coefficient of Variation* =	0.6	
99th percentile multiplication factor**	3.8	
95th percentile multiplication factor***	2.1	
Max Estimate = Max*99th percentile multiplication factor**		5.7 µg/L
Estimated Max 99th percentile =	0.00570000 mg/L	
Max Estimate = Max*95th percentile multiplication factor**		0 µg/L

Agrees with NHDES calculation

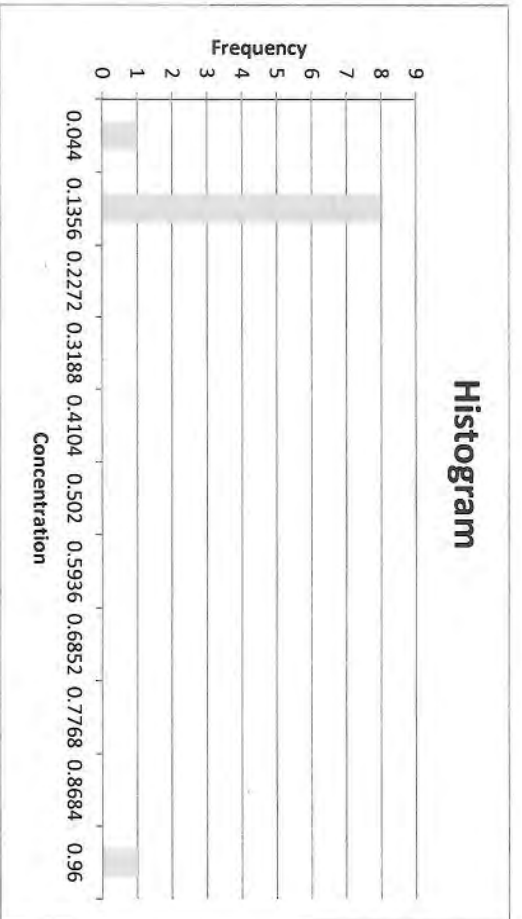
*Conservative estimate of CV. See box 3-2 in Technical Support Document for Water Quality Based Toxics Control
 **Multiplication factors from Table 3-1 and Table 3-2 in Technical Support Document for Water Quality Based Toxics Control
 These factors will automatically populate based on the number of samples (up to 10) entered in the data table

Histogram 1

Selenium

max 0.0015
 min 0.0005
 number of bins 10 *not including min bin - bin 0 (so total of 11)
 bin separation 0.0001

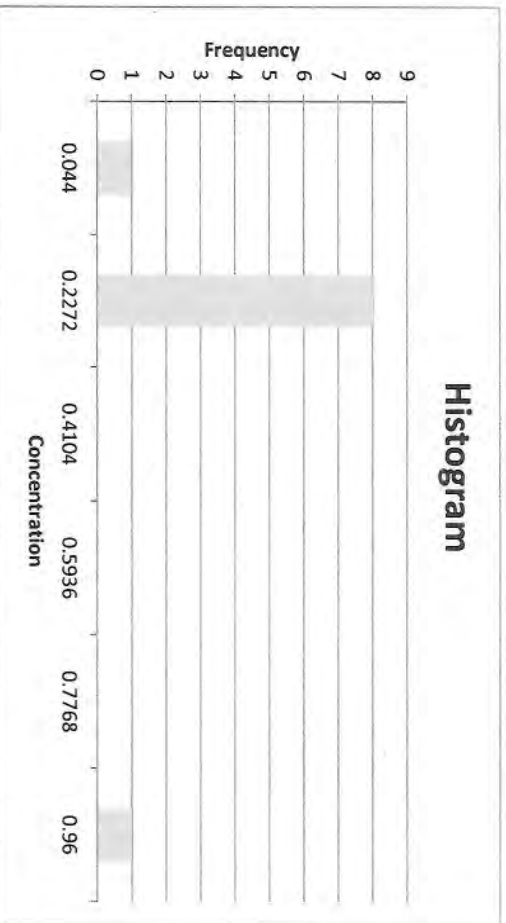
Bin	count
0	0.0005
1	0.0006
2	0.0007
3	0.0008
4	0.0009
5	0.001
6	0.0011
7	0.0012
8	0.0013
9	0.0014
10	0.0015



Histogram 2

max 0.0015
 min 0.0005
 number of bins 5 *not including min bin - bin 0 (so total of 6)
 bin separation 0.0002

Bin	count
0	0.0005
1	0.0007
2	0.0009
3	0.0011
4	0.0013
5	0.0015



	Metal	Qd (cfs)	Cd (mg/l)	Qs (cfs)	Cs (mg/l)	Qr (cfs)	Cr = [(QdCd+QsCs)/Qr] (mg/l)	(Criteria)*0.9	Reasonable Potential?	(95th)>Criteria * 0.9	Limit (Cd) = (Qr*(Criteria*0.9) - QsCs)/qd (mg/l)
Chronic	Selenium	5.29	0.000000	577.74	0.000520	585.92	0.000513	0.004500	No	No	Not Required

$$QdCd + QsCs = QrCr$$

Where:

Metal = Selenium
 Qd = 5.29 cfs
 Cd = 0.000000 mg/l
 Qs = 577.74 cfs
 Cs = 0.000520 mg/l
 Qr = 585.92 cfs
 Metal Criteria (Rp) = 0.005 mg/l
 Cr = Unknown mg/l

Outfall 003A Flow; Average Monthly
 Outfall 003A 95th Percentile Concentration
 Upstream Flow (7Q10)
 Upstream Concentration (Data is unadjusted for upstream POTW's at their design flow)
 Resultant Flow
 Selenium Metal Criteria; Chronic
 Resultant Concentration