#234

Antidegradation Permit Calculator
Antideg_PSNH Merr(003A+SE)20101004DiffUS7Q10 #234.xls
Max Permit Conc

10/17/2011

INPUT (only add input to green shaded cells)			
		PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF
Parameter		Aluminum Total (chronic)	Antimony Total (chronic)
Best Possible Water Quality (BWQ)	mg/L	0	0.000
Water Quality Criteria (WQC)	mg/L	0.087	1.600
% of Total Assimilative Capacity (AC.) to be held in reserve for future	%	10.0%	10.0%
Maximum % of Remaining Assimilative Capacity to be Insignficant Discharge	%	20.0%	20.0%
Existing Permit Conditions			
River - Uptream Flow (Q up)	cfs	578	578
River - Upstream Concentration (C up); usually 90th percentile	mg/L	0.046231986	0.000141
WWTF - Existing Permit Flow (Q wwtf)	mgd	6.3	6.3
WWTF - Existing Permit Concentration (C wwtf)(**Note-converted to dissolved if criteria are dissolved - per Comstock**)	mg/L	0.65000	0.000158
Proposed Permit Conditions			
River - Upstream Flow (Q up); usually the same as Existing	cfs	577.74	577.74
River - Upstream Concentration (C up); usually same as Existing	mg/L	0.046231986	0.000141
WWTF - Proposed Permit Flow (Q wwtf)	mgd	5.29	5.29
RESULTS			
Comments		PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF
Parameter		Aluminum	Antimony
Best Possible Water Quality (BWQ)	mg/L	0	0
Water Quality Criteria (WQC)	mg/L	0.087	1.6
EXISTING PERMIT CONDITIONS			
River - Uptream Flow (Q up)	cfs	578.000	578.000
River - Uptream Flow (Q up)	mgd	373.626	373.626
River - Upstream Concentration (C up); usually 90th percentile	mg/L	0.046231986	0.000140723
River - Upstream Loading	lbs/day	144.061	0.438

WWTF - Existing Permit Flow (Q wwtf)	mgd	6.300	6.300
tion (C wwtf)(Note-converted to dissolved if criteria are dissolved - per Comstock)	mg/L	0.650	0.000
WWTF - Existing Permit Loading	lbs/day	34.152	0.008
River - Downstream Flow (Q down)	cfs	587.746	587.746
River - Downstream Flow (Q down)	mgd	379.926	379.926
River - Downstream Concentration (C down)	mg/L	0.056244	0.000141
Dilution at Existing WWTF Flow		60.306	60.306
River - Assimilative Capacity (AC)	mg/L	0.087000	1.600000
River - Reserve Assimilative Capacity (RESAC)	%	10.0%	10.0%
River - Reserve Assimilative Capacity Conc (RESAC)	mg/L	0.07830	1.44000
River - Remaining Assimilative Capacity (REMAC)	mg/L	0.02206	1.43986
River - % of Total Assimilative Capacity Remaining [(AC-Cdown)/AC]	%	35.4%	100.0%
ver - Maximum % of Remaining Assimilative Capacity to be Insignficant Discharge	%	20.0%	20.0%
River - Maximum Concentration to be Insignificant Discharge	mg/L	0.060655	0.288113
River - Downstream Condition		**Meets WQSs**	**Meets WQSs**
River - Downstream Tier		**2**	**2**
PROPOSED PERMIT LIMITS			
WWTF - Proposed Permit Flow (Q wwtf)	mgd	5.290	5.290
River - Upstream Flow (Q up); usually the same as Existing	cfs	577.740	577.740
River - Upstream Flow (Q up); usually the same as Existing	mgd	373.458	373.458
River - Upstream Concentration (C up); usually same as Existing	mg/L	0.04623	0.000141
River - Upstream Loading at WWTF Permit Flow	lbs/day	143.996	0.438
River - Downstream Flow (Q down)	cfs	585.924	585.924
River - Downstream Flow (Q down)	mgd	378.748	378.748
Dilution at Permit Flow		71.597	71.597
Proposed Permit Limits to Match Existing Permit WWTF Loadings			
WWTF - Permit Concentration	mg/L	0.774102	0.000188
WWTF - Permit Loading	lbs/day	34.15230	0.00830
Max Proposed Permit Limits to be an Insignificant Discharge			
River - Maximum Downstream Concentration (C down)	mg/L	0.061	0.28811
River - Maximum Downstream Loading	lbs/day	191.595	910.079
WWTF - Maximum Permit Concentration	mg/L	**1.078878**	**20.618088**
WWTF - Maximum Permit Loading	lbs/day	**47.598578**	**909.641163**

Permit Limits if Downstream River is Impaired or has less than 10% RESAC.			
River - Maximum Downstream Concentration (C down)	mg/L	Not Applicable	Not Applicable
River - Maximum Downstream Loading	lbs/day	Not Applicable	Not Applicable
River-Assumed Upstream Concentration (C up)	mg/L	Not Applicable	Not Applicable
River - Assumed Upstream Loading	lbs/day	Not Applicable	Not Applicable
WWTF - Maximum Permit Concentration	mg/L	**Not Applicable**	**Not Applicable**
WWTF - Maximum Permit Loading	lbs/day	**Not Applicable**	**Not Applicable**

PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF
Arsenic Total (f only)	Arsenic Diss. (chronic)	Beryllium Total (Chronic)	Cadmium Diss. (chronic)	Chromium+3 Diss. (chronic)	Chromium+6 Diss. (chronic)	Copper Diss. (chronic)
0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000140	0.150	0.0053	0.0008000	0.0240	0.011000	0.00270
10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
1990	578	578	578	578	578	578
0.000415	0.000415	0.0001102	0.000046	0.000239	0.000340	0.001185
6.3	6.3	6.3	6.3	6.3	6.3	6.3
0.00190	0.00190	0.001080	0.00018566	0.001625	0.00019	0.00960
1990	577.74	577.74	577.74	577.74	577.74	577.74
0.000415	0.000415	0.000110	0.000046	0.000239	0.000340	0.001185
5.29	5.29	5.29	5.29	5.29	5.29	5.29

PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF
Arsenic	Arsenic	Beryllium	Cadmium	Chromium+3	Chromium+6	Copper
0	0	0	0	0	0	0
0.00014	0.15	0.0053	0.0008	0.024	0.011	0.0027
1990.000	578.000	578.000	578.000	578.000	578.000	578.000
1286.361	373.626	373.626	373.626	373.626	373.626	373.626
0.000414912	0.000414912	0.000110188	4.56559E-05	0.000238851	0.00034	0.001184581
4.451	1.293	0.343	0.142	0.744	1.059	3.691

6.300	6.300	6.300	6.300	6.300	6.300	6.300
0.002	0.002	0.001	0.000	0.001625	0.000192	0.010
0.100	0.100	0.057	0.010	0.085	0.010	0.504
1999.746	587.746	587.746	587.746	587.746	587.746	587.746
1292.661	379.926	379.926	379.926	379.926	379.926	379.926
0.000422	0.000440	0.000126	0.000048	0.000262	0.000338	0.001324
205.184	60.306	60.306	60.306	60.306	60.306	60.306
0.000140	0.150000	0.005300	0.000800	0.024000	0.011000	0.002700
10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
0.00013	0.13500	0.00477	0.00072	0.02160	0.00990	0.00243
-0.00030	0.13456	0.00464	0.00067	0.02134	0.00956	0.00111
0.0%	99.7%	97.6%	94.0%	98.9%	96.9%	51.0%
20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Not Applicable	0.027352	0.001055	0.000182	0.004529	0.002250	0.001545
Impaired	**Meets WQSs**	**Meets WQSs**	**Meets WQSs**	**Meets WQSs**	**Meets WQSs**	**Meets WQSs**
Impaired	**2**	**2**	**2**	**2**	**2**	**2**
5.290	5.290	5.290	5.290	5.290	5.290	5.290
1990.000	577.740	577.740	577.740	577.740	577.740	577.740
1286.361	373.458	373.458	373.458	373.458	373.458	373.458
0.000415	0.000415	0.000110	0.000046	0.000239	0.000340	0.001185
4.451	1.292	0.343	0.142	0.744	1.059	3.690
1998.184	585.924	585.924	585.924	585.924	585.924	585.924
1291.651	378.748	378.748	378.748	378.748	378.748	378.748
244.168	71.597	71.597	71.597	71.597	71.597	71.597
0.002263	0.002263	0.001286	0.000221	0.001936	0.000229	0.011433
0.09983	0.09983	0.05675	0.00975	0.08540	0.01009	0.50440
Not Applicable	0.027	0.001	0.000	0.004529	0.002250	0.001545
Not Applicable	86.397	3.333	0.576	14.308	7.107	4.881
Not Applicable	**1.929004**	**0.067757**	**0.009835**	**0.307435**	**0.137093**	**0.027011**
Not Applicable	**85.104957**	**2.989346**	**0.433899**	**13.563591**	**6.048349**	**1.191692**

0.000126	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
1.35732	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
0.00013	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
1.35176	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
0.000126	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**
0.005559	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**

PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF
Lead Diss. (chronic)	Mercury Total (fish only)	Mercury Diss. (chronic)	Nickel Diss. (chronic)	Selenium Total (chronic)	Silver Diss. (acute)	Thallium Total (fish only)
0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000540	0.000051	0.000770	0.01610	0.005000	0.000320	0.00630
10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
578	578	578	578	578	578	578
0.000178	0.00001400	0.000011901	0.000386	0.000615	0.000164	0.000044
6.3	6.3	6.3	6.3	6.3	6.3	6.3
0.001063	0.000006	0.00000510	0.0021934	0.00150	0.000034	0.00029
577.74	577.74	577.74	577.74	577.74	577.74	577.74
0.000178	0.00001400	0.000011901	0.000386	0.000615	0.000164	0.000044
5.29	5.29	5.29	5.29	5.29	5.29	5.29
PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF	PSNH Merrimack Station Scrubber WWTF
Lead	Mercury	Mercury	Nickel	Selenium	Silver	Thallium
0	0	0	0	0	0	0
0.00054	0.000051	0.00077	0.0161	0.005	0.00032	0.0063
578.000	578.000	578.000	578.000	578.000	578.000	578.000
373.626	373.626	373.626	373.626	373.626	373.626	373.626
0.000178345	1.40013E-05	1.19011E-05	0.000386071	0.000614723	0.000164005	4.43435E-05
0.556	0.044	0.037	1.203	1.916	0.511	0.138

6.300	6.300	6.300	6.300	6.300	6.300	6.300
0.001	0.000	0.000	0.002	0.002	0.000	0.000
0.056	0.000315	0.000	0.115	0.079	0.00179	0.01518
587.746	587.746	587.746	587.746	587.746	587.746	587.746
379.926	379.926	379.926	379.926	379.926	379.926	379.926
0.000193	0.000014	0.000012	0.000416	0.000629	0.000162	0.000048
60.306	60.306	60.306	60.306	60.306	60.306	60.306
0.000540	0.000051	0.000770	0.016100	0.005000	0.000320	0.006300
10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
0.00049	0.00005	0.00069	0.01449	0.00450	0.00029	0.00567
0.00029	0.00003	0.00068	0.01407	0.00387	0.00013	0.00562
64.3%	72.8%	98.5%	97.4%	87.4%	49.4%	99.2%
20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
0.000252	0.000020	0.000148	0.003231	0.001404	0.000187	0.001173
Meets WQSs	**Meets WQSs**	**Meets WQSs**	**Meets WQSs**	**Meets WQSs**	**Meets WQSs**	**Meets WQSs**
2	**2**	**2**	**2**	**2**	**2**	**2**
5.290	5.290	5.290	5.290	5.290	5.290	5.290
577.740	577.740	577.740	577.740	577.740	577.740	577.740
373.458	373.458	373.458	373.458	373.458	373.458	373.458
0.000178	0.000014	0.000012	0.000386	0.000615	0.000164	0.000044
0.555	0.044	0.037	1.202	1.915	0.511	0.138
585.924	585.924	585.924	585.924	585.924	585.924	585.924
378.748	378.748	378.748	378.748	378.748	378.748	378.748
71.597	71.597	71.597	71.597	71.597	71.597	71.597
0.001265	0.000007	0.000006	0.002612	0.001786	0.000040	0.000344
0.05583	0.00032	0.00027	0.11525	0.07881	0.00179	0.01518
0.000252	0.000020	0.000148	0.003231	0.001404	0.000187	0.001173
0.795	0.064	0.468	10.205	4.433	0.591	3.704
0.005424	**0.000463**	**0.009758**	**0.204063**	**0.057090**	**0.001816**	**0.080833**
0.239279	**0.020435**	**0.430526**	**9.002954**	**2.518749**	**0.080122**	**3.566229**

Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Not Applicable	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**
Not Applicable	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**

PSNH Merrimack Station Scrubber WWTF	**PSNH Merrimack Station Scrubber WWTF**	**PSNH Merrimack Station Scrubber WWTF**
Zinc Diss. (acute)	**Manganese Total (fish only)**	**Iron Total (chronic)**
0.000	0.000	0.000
0.03620	0.10	1.0
10.0%	10.0%	10.0%
20.0%	20.0%	20.0%
578	578	578
0.003488	0.027200	0.272000
6.3	6.3	6.3
0.01858	0.05500	0.70000
577.74	577.74	577.74
0.003488	0.027200	0.272000
5.29	5.29	5.29
PSNH Merrimack Station Scrubber WWTF	**PSNH Merrimack Station Scrubber WWTF**	**PSNH Merrimack Station Scrubber WWTF**
Zinc	**Manganese**	**Iron**
0	0	0
0.0362	0.1	1
578.000	578.000	578.000
373.626	373.626	373.626
0.003487876	0.0272	0.272
10.868	84.756	847.564

6.300	6.300	6.300
0.019	0.055	0.700
0.976	2.890	36.779
587.746	587.746	587.746
379.926	379.926	379.926
0.003738	0.027661	0.279097
60.306	60.306	60.306
0.036200	0.100000	1.000000
10.0%	10.0%	10.0%
0.03258	0.09000	0.90000
0.02884	0.06234	0.62090
89.7%	72.3%	72.1%
20.0%	20.0%	20.0%
0.009507	0.040129	0.403278
Meets WQSs	**Meets WQSs**	**Meets WQSs**
2	**2**	**2**
5.290	5.290	5.290
577.740	577.740	577.740
373.458	373.458	373.458
0.003488	0.027200	0.272000
10.863	84.718	847.183
585.924	585.924	585.924
378.748	378.748	378.748
71.597	71.597	71.597
0.022130	0.065501	0.833648
0.97634	2.88981	36.77940
0.009507	0.040129	0.403278
30.029	126.757	1273.858
0.434406	**0.952863**	**9.671096**
19.165386	**42.038973**	**426.675222**

Not Applicable	Not Applicable	Not Applicable
Not Applicable	Not Applicable	Not Applicable
Not Applicable	Not Applicable	Not Applicable
Not Applicable	Not Applicable	Not Applicable
Not Applicable	**Not Applicable**	**Not Applicable**
Not Applicable	**Not Applicable**	**Not Applicable**

PSNH Merrimack Station (Upstream POTWs at Design Q)

Parameter	Number of Effluent Samples "n"	Maximum Value (line) (mg/l)	Reasonable Potential Multiplication Factor	Max Value x Factor (mg/l)	Maximum Allowable Permit Concentration to use < 20% ARAC* (mg/l)	Reasonable Potential (Yes/No)
Aluminum (Chronic)	6	0.65	3.8	2.47	1.0789	YES
Antimony (Chronic)	6	0.000158	3.8	0.0006004	20.6181	NO
Arsenic (Fish cons.)	6	0.0019	3.8	0.00722	Not Applicable	Exceeds Criteria
Arsenic (chronic)	6	0.0019	3.8	0.00722	1.9290	NO
Beryllium (Chronic)	6	0.00108	3.8	0.004104	0.0678	NO
Cadmium (Chronic)	6	0.00018566	3.8	0.000705508	0.0098	NO
Chromium +3 (Chronic)	6	0.0016254	3.8	0.00617652	0.30743	NO
Chromium +6 (Chronic)	6	0.000192	3.8	0.0007296	0.1371	NO
Copper (Chronic)	**8**	0.0096	**3.3**	0.03168	0.0270	YES
Lead (Chronic)	6	0.0010625	3.8	0.0040375	0.0054	NO
Mercury (Fish cons.)	6	0.000006	3.8	0.0000228	0.00046	NO
Mercury (chronic)	6	0.0000051	3.8	0.00001938	0.00976	NO
Nickel (Chronic)	6	0.0021934	3.8	0.00833492	0.2041	NO
Selenium (Chronic)	6	0.0015	3.8	0.0057	0.0571	NO
Silver (Acute)	6	0.000034	3.8	0.0001292	0.00182	NO
Thallium (Fish cons.)	6	0.000289	3.8	0.0010982	0.0808	NO
Zinc (Chronic)	6	0.018582	3.8	0.0706116	0.4344	NO
Manganese (Fish cons.)	6	0.055	3.8	0.209	0.9529	NO
Iron (Chronic)	**8**	0.7	**3.3**	2.31	9.671	NO
Ammonia (Chronic)	6	2.6	3.8	9.88	37.144	NO
Nitrate (Water + fish)	6	0.5	3.8	1.9	122.069	NO
Chloride (Chronic)	6	27.0	3.8	102.6	2747.19	NO

*Available Remaining Assimilative Capacity