Attachment M Ammonia in Receiving Water

R1 to R5 Ammonia Summer Receiving and Projected Limits

Date	Station	Temp [1]	pH [2]	Salinity	I	pKas	Average monthly Ammonia	1/2 Ammonia for ND			
										MDEL	0.772388
										AMEL	0.290793
Oct-11	R1	18.6	7.54	1.5	0.029936	9.248472586	0.5	0.5			
Oct-11	R2	19.3	7.9	1.4	0.027938	9.248240754	2.1	2.1			
Oct-11	R3	18.8	7.72	1.4	0.027938	9.248240754	0.5	0.5			
Oct-11	R4	19.1	7.49	1.4	0.027938	9.248240754	0.7	0.7			
Oct-11	R5	19.7	8.07	1.4	0.027938	9.248240754	0.5	0.5			
May-12	R1	19.8	7.84	3.1	0.061968	9.252188255	1.5	1.5			
May-12	R2	19.6	8.34	2.9	0.057958	9.25172314	0.3	0.3			
May-12	R3	19.72	8.31	2.8	0.055954	9.251490654	0.1	0.1			
May-12	R4	19.6	7.7	1.6	0.031935	9.248704464	0.1	0.1			
May-12	R5	19.26	8.43	2.3	0.045939	9.250328923	0.1	0.1			
Jun-12	R1	20.9	7.83	2.3	0.045939	9.250328923	1.4	1.4			
Jun-12	R2	22	8.53	2.3	0.045939	9.250328923	0.4	0.4			
Jun-12	R3	21.25	8.4	2.2	0.043937	9.250096717	0.4	0.4			
Jun-12	R4	21.21	7.55	1.5	0.029936	9.248472586	0.2	0.2			
Jun-12	R5	21.61	8.43	2.1	0.041936	9.249864558	0.4	0.4			
Jul-12	R1	21.68	8.25	1.7	0.033934	9.24893639	0.7	0.7			
Jul-12	R2	22.76	8.96	1.6	0.031935	9.248704464	0.2	0.2			
Jul-12	R3	22.28	8.93	1.7	0.033934	9.24893639	<.1	0.05			
Jul-12	R4	21.9	7.59	1.3	0.025939	9.248008968	<.1	0.05			
Jul-12	R5	22.69	8.41	1.6	0.031935	9.248704464	<.1	0.05			
Aug-12	R1	22.6	7.87	1.8	0.158078	9.263337081	0.7	0.7			
Aug-12	R2	24.45	8.45	1.7	0.033934	9.24893639	0.6	0.6			
Aug-12	R3	24.88	8.41	1.7	0.033934	9.24893639	0.6	0.6			
Aug-12	R4	23.05	7.42	1.2	0.023942	9.24777723	0.2	0.2			
Aug-12	R5	23.94	7.89	1.8	0.035934	9.249168362	0.3	0.3			
Sep-12	R1										
Sep-12	R2	24.55	9.08	1.3	0.025939	9.248008968	0.1	0.1			
Sep-12	R3	23.07	8.84	1.3	0.025939	9.248008968	0.1	0.1			
Sep-12	R4	22.89	7.35	1.2	0.023942	9.24777723	0.1	0.1			
Sep-12	R5	22.34	8.95	1.4	0.027938	9.248240754	0.1	0.1			
Oct-12	R1	20.06	8.44	1.4	0.027938	9.248240754	0.3	0.3			
Oct-12	R2	22.02	8.85	1.4	0.027938	9.248240754	<.1	0.05			
Oct-12	R3	20.52	8.65	1.4	0.027938	9.248240754	<.1	0.05			
Oct-12	R4	20.28	7.46	1.3	0.025939	9.248008968	<.1	0.05			
Oct-12	R5	20.71	8.88	1.4	0.027938	9.248240754	<.1	0.05			
Max		24.88	9.08	3.1			2.1	2.1			
Mini		18.6	7.35	1.2			0.1	0.05			
STDEV		1.727642	0.51772	0.49018				0.457533			
Avg		21.38588	8.198824	1.717647				0.398529			
CV		0.080784	0.063146	0.285379				**1.148052**			
90%		23.679	8.915	2.3	0.045939	9.250328923	**0.789705**		**1-hour EPA Objective (total ammonia)**		
50%		21.43	8.325	1.55	0.030936	9.248588519		**0.418235**	**4-day EPA Objective (total ammonia)**		
									Conc.	LTA	
					ECA Multiplier 1-HR 99%			0.180439	0.789705005	0.142493	
					ECA Multiplier 4-Day 99%			0.33323	0.418235307	0.139369	
					MDEL Multiplier 99%			5.542047		MDEL	0.772388
					AMEL Multiplier 95%			2.086503		AMEL	0.290793

R1 to R5 Ammonia Winter Receiving and Projected Limits

Date	Station	Temp [1]	pH [2]	Salinity	I
Nov-11	R2	15.7	8.47	1.4	0.027937532
Nov-11	R3	14.9	8.11	1.3	0.025939383
Nov-11	R4	15.3	7.89	1.3	0.025939383
Dec-11	R2	12.1	7.97	2	0.039934878
Dec-11	R3	10.8	7.81	1.7	0.033934393
Dec-11	R4	10.9	7.77	1.7	0.033934393
Jan-12	R2	13.3	7.88	2.3	0.045938989
Jan-12	R3	12.51	7.72	1.7	0.033934393
Jan-12	R4	12.63	7.74	1.9	0.037934313
Feb-12	R2	14.2	7.93	2.3	0.045938989
Feb-12	R3	13.71	7.79	2.2	0.043937216
Feb-12	R4	13.8	7.62	2.1	0.041935845
Mar-12	R2	14.8	7.8	7	0.14047948
Mar-12	R3	14.65	7.82	8.3	0.166788003
Mar-12	R4	16.31	7.7	1.4	0.027937532
Apr-12	R2	15.5	7.9	21.1	0.4295764
Apr-12	R3	14.59	7.8	21.5	0.437899898
Apr-12	R4	19.33	7.92	2.4	0.047941167
Nov-12	R1	16.43	8.63	1.4	0.027937532
Nov-12	R1	15.7	8.71	1.3	0.025939383
Nov-12	R2	18.03	8.93	1.3	0.025939383
Nov-12	R3	16.5	8.8	1.3	0.025939383
Nov-12	R4	16.59	7.9	1.3	0.025939383
Nov-12	R5	16.74	8.86	1.4	0.027937532
Dec-12	R2	15.175	8.78	1.9	0.037934313
Dec-12	R3	15	8.613	2.1	0.041935845
Dec-12	R4	14.645	8.1125	1.9	0.037934313
Dec-12	R5	14.9225	8.44	1.925	0.038434417
Jan-13	R2				
Jan-13	R3	10.7825	8.78	1.9	0.037934313
Jan-13	R4	10.9025	8.66	1.95	0.038934545
Feb-13	R2				
Feb-13	R3	13.6425	8.825	1.65	0.032934665
Feb-13	R4	13.7875	8.57	1.6	0.031935037
Mar-13	R2				
Mar-13	R3	16.3275	8.79	1.5	0.029936084
Mar-13	R4	16.0725	8.525	1.45	0.028936758
Apr-13	R2				
Apr-13	R3	18.1875	8.4675	1.4	0.027937532
Apr-13	R4	18.82	8.2225	1.325	0.026438883
Max		19.33	8.93	21.5	
Mini		10.7825	7.62	1.3	
STDEV		2.153377	0.42745	4.62964106	
Avg		14.81347	8.229319	3.11666667	
CV		0.145366	0.051942	1.48544633	
90%		17.385	8.795	4.7	0.094102853
50%		14.91125	8.11125	1.7	0.033934393
					ECA M
					ECA M
					MDE
					AME

pKas	Ammonia	1/2 Ammonia for ND		MDEL	1.421888
9.248241	0.2	0.2		AMEL	0.618978
9.248009	<0.1	0.05			
9.248009	0.1	0.1			
9.249632	0.2	0.2			
9.248936	0.2	0.2			
9.248936	0.1	0.1			
9.250329	0.3	0.3			
9.248936	0.1	0.1			
9.2494	0.1	0.1			
9.250329	0.2	0.2			
9.250097	0.2	0.2			
9.249865	0.1	0.1			
9.261296	0.1	0.1			
9.264347	0.2	0.2			
9.248241	0.1	0.1			
9.294831	0.7	0.7			
9.295796	0.1	0.1			
9.250561	0.5	0.5			
9.248241	0.2	0.2			
9.248009	0.2	0.2			
9.248009	0.1	0.1			
9.248009	0.1	0.1			
9.248009	0.1	0.1			
9.248241	0.1	0.1			
9.2494	0.2	0.2			
9.249865	0.2	0.2			
9.2494	0.2	0.2			
9.249458	0.3	0.3			
9.2494	,1	0.05			
9.249516	,1	0.05			
9.24882	,1	0.05			
9.248704	,1	0.05			
9.248473	,1	0.05			
9.248357	,1	0.05			
9.248241	0.5	0.5			
9.248067	0.2	0.2			
			Conc.	LTA	
		0.7	1.421888	0.352819	
		0.05	1.055409	0.462116	
		0.139685		MDEL	1.421888
		0.173611		AMEL	0.618978
		0.804587			
9.255916	**1.421888**	**1-hour EPA Objective (expressed as total ammonia)**			
9.248936	**1.055409**	**4-day EPA Objective (expressed as total ammonia)**			
ultiplier 1-HR 99%		0.248135			
ultiplier 4-Day 99%		0.437855			
. Multiplier 99%		4.030072			
. Multiplier 95%		1.754377			

R4 only Ammonia Summer Receiving and Projected Limits

Date	Station	Temp [1]	pH [2]	Salinity	I	pKas	Average monthly Ammonia	1/2 Ammonia for ND		MDEL	4.954069
										AMEL	1.920674
Oct-11	R4	19.1	7.49	1.4	0.027938	9.248240754	0.7	0.7			
May-12	R4	19.6	7.7	1.6	0.031935	9.248704464	0.1	0.1			
Jun-12	R4	21.21	7.55	1.5	0.029936	9.248472586	0.2	0.2			
Jul-12	R4	21.9	7.59	1.3	0.025939	9.248008968	<.1	0.05			
Aug-12	R4	23.05	7.42	1.2	0.023942	9.24777723	0.2	0.2			
Sep-12	R4	22.89	7.35	1.2	0.023942	9.24777723	0.1	0.1			
Oct-12	R4	20.28	7.46	1.3	0.025939	9.248008968	<.1	0.05			
Max		23.05	7.7	1.6			0.7	0.7			
Mini		19.1	7.35	1.2			0.1	0.05			
STDEV		1.442495	0.107362	0.139971				0.212132			
Avg		21.14714	7.508571	1.357143				0.2			
CV		0.068212	0.014299	0.103136				**1.06066**			
90%		22.954	7.634	1.54	0.030736	9.248565332	**11.41069**		**1-hour EPA Objective (expressed**		
50%		21.21	7.49	1.3	0.025939	9.248008968		**2.695811**	**4-day EPA Objective (expressed**		
									Conc.	LTA	
						ECA Multiplier 1-HR 99%		0.193486	11.41069	2.207812	
						ECA Multiplier 4-Day 99%		0.355568	2.695811	0.958545	
						MDEL Multiplier 99%		5.168322		MDEL	4.954069
						AMEL Multiplier 95%		2.003738		AMEL	1.920674

R4 only Ammonia Winter Receiving and Projected Limits											
Date	Station	Temp [1]	pH [2]	Salinity	I	pKas	Ammonia	1/2 Ammonia for ND		MDEL	1.781730
										AMEL	0.740539
Nov-11	R4	15.3	7.89	1.3	0.025939383	9.248009	0.1	0.1			
Dec-11	R4	10.9	7.77	1.7	0.033934393	9.248936	0.1	0.1			
Jan-12	R4	12.63	7.74	1.9	0.037934313	9.2494	0.1	0.1			
Feb-12	R4	13.8	7.62	2.1	0.041935845	9.249865	0.1	0.1			
Mar-12	R4	16.31	7.7	1.4	0.027937532	9.248241	0.1	0.1			
Apr-12	R4	19.33	7.92	2.4	0.047941167	9.250561	0.5	0.5			
Nov-12	R4	16.59	7.9	1.3	0.025939383	9.248009	0.1	0.1			
Dec-12	R4	14.645	8.1125	1.9	0.037934313	9.2494	0.2	0.2			
Jan-13	R4	10.9025	8.66	1.95	0.038934545	9.249516	,1	0.05			
Feb-13	R2										
Feb-13	R3	13.6425	8.825	1.65	0.032934665	9.24882	,1	0.05			
Feb-13	R4	13.7875	8.57	1.6	0.031935037	9.248704	,1	0.05			
Mar-13	R4	16.0725	8.525	1.45	0.028936758	9.248357	,1	0.05			
Apr-13	R4	18.82	8.2225	1.325	0.026438883	9.248067	0.2	0.2			
									Conc.	LTA	
Max		19.33	8.825	2.4				0.5	1.78173	0.401957	
Mini		10.9	7.62	1.3				0.05	1.651348	0.670247	
STDEV		2.519536	0.39218	0.33014252				0.116913		MDEL	1.781730
Avg		14.82538	8.111923	1.69038462				0.130769		AMEL	0.740539
CV		0.169947	0.048346	0.19530615				**0.89404**			
90%		18.374	8.642	2.07	0.041335513	9.249795	**1.78173**	**1-hour EPA Objective (expressed as total**			
50%		14.645	7.92	1.65	0.032934665	9.24882	**1.651348**	**4-day EPA Objective (expressed as total a**			
					ECA Multiplier 1-HR 99%			0.225599			
					ECA Multiplier 4-Day 95%			0.405879			
					MDEL Multiplier 99%			4.432641			
					AMEL Multiplier 95%			1.842336			