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SUPPLEMENTAL DATA REPORT ON INVESTIGATIONS OF MARINE DISSOLVED --ETC(U)
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GRADUATE SCHOOL OF OCEANOGRAPHY
UNIVERSITY OF RHODE ISLAND
KINGSTON, RHODE ISLAND

SUPPLEMENTAL DATA REPORT ON INVESTIGATIONS OF MARINE DISSOLVED ORGANIC MATTER PROTONATION EQUILIBRIA

Reference No. 78-1

by

Douglas L. Huizenga

Approved for distribution Dana R. Kester

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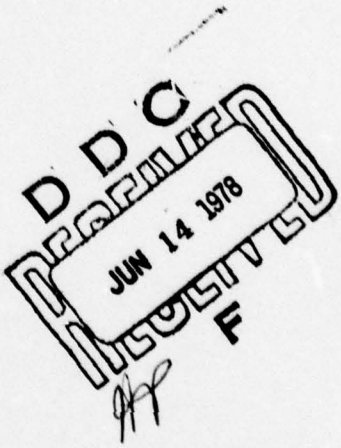

May 1978

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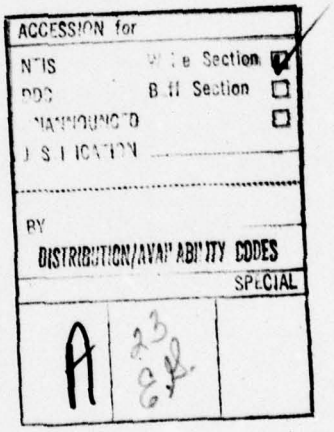

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1. Introduction

This data report is a supplemental record of data and calculations related to the M.S. thesis of Douglas L. Huizenga, Protonation Characteristics of the Dissolved Organic Matter in Seawater (University of Rhode Island, 1977). The individual fraction titration data, calculated organic matter titration curves, model parameters, and copies of computer programs are presented.

Organic Matter Samples

The organic matter samples investigated are listed in Table 1. The location, date, and depth of sample collection are given. A specific blank is associated with each sample and is given in the last column of Table 1. Blanks were prepared to be equivalent on a volume basis with the samples. The last ten samples were all handled in the same manner and only have a single blank sample.

Titration Names

Each titration was assigned a unique name, such as GG1371A. The first letter(s) plus the first number ("GG1") indicates the sample code and fraction number (here sample GG, fraction 1). The rest of the name specifies the lab book page number for the titration (here page 371A). A few titrations of 0.7m $NaClO_4$ without added sample were performed. The names for titration of medium alone begin with "MD". A fraction number of 0 indicates

that the sample was not obtained by the charcoal isolation procedure. A fraction number of 4 indicates a sample where all three fractions from charcoal were combined.

Titrations Performed

Titration information for every titration is given in Table 2. The order of samples in this table is also the order in which the titration data are presented. The use of the titration parameters is given in Appendix A of the thesis. All the information about a titration that is needed to do the calculations is given in this table.

Table 1. Collection and sample isolation information for samples. Concentrations are mg OC/l.

Sample Code	Sample	Location	Date	Depth	[OC] Original 0	[OC] after Isolation 1	2	3	Blank
D	Sediment Fulvic Acid Solution A	W Passage Narra. B.		sediment	298[a]	42	281	213	C
S	Sediment Fulvic Acid Solution B	W Passage Narra. B.		sediment	122[b]	79	74	100	T
CC	Diatom Cellular Material	laboratory culture			32[c]	CC4 - 102[d]			DD
N	Narragansett Bay A	41°34'N 71°24'W	16March76	surface		230	117	217	O
P	Narragansett Bay B	41°34'N 71°24'W	13April76	surface		235	188	202	W
GG	Coastal Equatorial Atl., surface	4°18'N 7°00'W	5June76	25m		349	347	266	FF
HH	Equatorial Atlantic, surface	2°33'S 7°00'W	7June76	25m		362	333	318	FF
II	Equatorial Atlantic, intermediate	6°24'N 25°36'W	12June76	1500m		250	185	178	FF
JJ	Coastal Peru, moderate productivity	13°00'S 76°42'W	15April75	25m		329	258	298	FF
KK	Sargasso Sea, intermediate	36°35'N 66°03'W	14May74	1000m		293	205	188	FF
LL	Coastal Peru, O_2 minimum	11°00'S 78°30'W	18April75	50-75m		271	256	211	FF
MM	Coastal Peru, high productivity	13°25'S 76°35'W	10April75	10-20m		276[e]	264	303	FF
NN	Coastal Peru, low productivity	15°20'S 78°30'W	13April75	25-50m		424	324	305	FF
OO	Mixed River Water (Blackstone, Pawtuxet, and Taunton Rivers)		14Feb77			592	722	625	FF
QQ	Block Island Sound Water, surface, coastal	5.5km S Point Judith, RI	9March77	surface		383	365	293	FF

[a] medium is 0.5M NaCl.

[b] medium is 0.2M NaCl.

[c] seawater medium.

[d] Three fractions from charcoal were combined to give one sample designated CC4.

[e] Sample was filtered through 0.4 filter due to presence of flocs.

Table 2. Titration information.

Type, OM is an organic matter sample

BL is a blank sample

w , weight of water in sample at start of titration, g

[OM], amount of organic carbon in sample at start of titration, mg

E , pH electrode calibration E , mV

ρ_t, grams of titrant solution / ml

w_{H_2O}, grams of H_2O / gram titrant solution

OH_t, moles of OH^- / kg titrant

Date, date when titration was performed

Blank, blank appropriate for that sample

Sample Weight, weight of sample taken initially, g

I, ionic strength of solution at start of titration, m

Factor, that fraction of initial sample in the test solution

Sample	Type	w_o	[OM]	E_o	ρ_t	w_{H_2O}	OH_t	Date	Blank	Sample Weight	I	Factor	
D0185A	OM	53.337	1.49	417.67	1.0399	0.92466	0.045906	01/02/76	C0184A	5.0101	0.682	1.0000	
C0184A	BL	53.371	-	418.16	1.0399	0.92466	0.045906	01/02/76	-	5.0537	0.682	1.0000	
D0189B	OM	53.369	1.49	421.17	1.0390	0.92476	0.047512	01/24/76	C0188A	5.0114	0.682	1.0000	
C0188A	BL	53.394	-	420.79	1.0390	0.92476	0.047512	01/24/76	-	5.0627	0.682	0.9999	
D1215A	OM	49.795	0.84	418.26	1.0387	0.92419	0.042600	03/01/76	C1213B	19.9733	0.420	0.9979	No NH_3 removal.
C1213B	BL	46.200	-	419.12	1.0387	0.92419	0.042600	03/01/76	-	19.9567	0.420	0.9287	No NH_3 removal.
D2218B	OM	33.853	0.97	418.92	1.0387	0.92419	0.042600	03/04/76	C2217A	3.4768	0.608	0.9968	
C2217A	BL	33.850	-	419.54	1.0387	0.92419	0.042600	03/04/76	-	3.4554	0.608	0.9853	
D3222A	OM	32.705	0.74	420.02	1.0387	0.92419	0.042600	03/11/76	C3220B	3.4765	0.626	0.9954	
C3220B	BL	32.757	-	419.62	1.0387	0.92419	0.042600	03/11/76	-	3.4928	0.626	0.9962	
S0313A	OM	12.306	0.96	428.07	1.0406	0.92199	0.046280	07/07/76	T0313A	7.9546	0.699	0.9915	
T0313A	BL	12.439	-	428.07	1.0406	0.92199	0.046280	07/07/76	-	7.9549	0.699	0.9965	
S0296A	OM	16.479	0.99	429.02	1.0406	0.92199	0.046280	06/23/76	T0296A	8.1629	0.701	0.9924	
T0296A	BL	16.622	-	429.02	1.0406	0.92199	0.046280	06/23/76	-	8.2276	0.701	0.9995	
S1299B	OM	18.957	0.94	429.08	1.0406	0.92199	0.046280	06/26/76	T1299B	11.9499	0.683	0.9909	
T1299B	BL	18.902	-	429.08	1.0406	0.92199	0.046280	06/26/76	-	11.9334	0.687	0.9944	
S2303A	OM	17.872	0.80	429.04	1.0406	0.92199	0.046280	06/28/76	T2303A	10.9063	0.700	0.9909	
T2303A	BL	17.940	-	429.04	1.0406	0.92199	0.046280	06/28/76	-	10.9040	0.700	0.9944	
S3306B	OM	16.334	0.98	429.87	1.0406	0.92199	0.046280	07/02/76	T3306B	9.9038	0.700	0.9910	
T3306B	BL	16.422	-	429.87	1.0406	0.92199	0.046280	07/02/76	-	9.8938	0.700	0.9973	
CC0362B	OM	33.080	0.99	420.10	1.0387	0.93756	0.047386	11/14/76	DD0362B	31.8200	-	1.0000	Seawater medium, w_o is total weight of sol'n.

Sample	Type	w_o	[OM]	E_o	ρ_t	w_{H_2O}	OH_t	Date	Blank	Sample Weight	I	Factor	
DD0362B	BL	43.870	-	420.10	1.0387	0.93756	0.047386	11/14/76	-	41.8400	-	1.0000	Seawater medium, w_o is total weight of sol'n.
CC0366A	OM	22.894	0.71	419.00	1.0387	0.93756	0.047386	11/19/76	DD0362B	21.9978	-	1.0000	Seawater medium, w_o is total weight of sol'n.
CC4364B	OM	14.518	0.88	419.75	1.0387	0.93756	0.047386	11/17/76	DD4364B	8.8300	0.705	0.9761	
DD4364B	BL	19.955	-	419.75	1.0387	0.93756	0.047386	11/17/76	-	11.980	0.701	0.9856	
N1255B	OM	17.251	2.06	425.20	1.0387	0.92419	0.042600	04/21/76	O1257A	8.9877	0.700	0.9958	
O1257A	BL	11.358	-	425.80	1.0387	0.92419	0.042600	04/21/76	-	5.6759	0.678	0.9978	
N1237A	OM	15.522	0.89	428.82	1.0387	0.92419	0.042600	03/31/76	O1235A	3.9539	0.696	0.9839	
O1235A	BL	17.080	-	428.06	1.0387	0.92419	0.042600	03/31/76	-	3.9761	0.714	0.9940	
N2250B	OM	18.721	1.03	426.14	1.0387	0.92419	0.042600	04/13/76	O2254A	8.8897	0.700	0.9913	
O2254A	BL	13.946	-	425.44	1.0387	0.92419	0.042600	04/13/76	-	7.9750	0.700	0.9954	
N3247B	OM	16.045	1.92	427.12	1.0387	0.92419	0.042600	04/11/76	O3249A	8.9007	0.765	0.9947	
O3249A	BL	14.710	-	426.28	1.0387	0.92419	0.042600	04/11/76	-	7.9475	0.799	0.9908	
P1318A	OM	13.258	1.16	418.25	1.0406	0.92199	0.046280	07/18/76	W1318A	4.9762	0.674	0.9895	
W1318A	BL	13.115	-	418.25	1.0406	0.92199	0.046280	07/18/76	-	4.9555	0.678	0.9869	
P1340B	OM	13.394	1.17	416.71	1.0406	0.92199	0.046280	08/08/76	W1340B	4.9884	0.698	0.9870	
W1340B	BL	13.496	-	416.71	1.0406	0.92199	0.046280	08/08/76	-	4.9729	0.700	0.9930	
P2320A	OM	13.665	0.93	417.07	1.0406	0.92199	0.046280	07/19/76	W2320A	4.9721	0.699	0.9935	
W2320A	BL	13.619	-	417.07	1.0406	0.92199	0.046280	07/19/76	-	4.9648	0.700	0.9935	
P2338B	OM	13.629	0.94	417.77	1.0406	0.92199	0.046280	08/07/76	W2338B	4.9822	0.700	0.9952	
W2338B	BL	13.626	-	417.77	1.0406	0.92199	0.046280	08/07/76	-	4.9718	0.701	0.9958	
P3322A	OM	13.554	0.99	415.32	1.0406	0.92199	0.046280	07/20/76	W3322A	4.9537	0.700	0.9926	

Sample	Type	w_o	[OM]	E_o	ρ_t	w_{H_2O}	OH_t	Date	Blank	Sample Weight	I	Factor
W3322A	BL	13.570	-	415.32	1.0406	0.92199	0.046280	07/20/77	-	4.9546	0.700	0.9939
GG1371A	OM	13.883	1.12	417.43	1.0387	0.93756	0.047386	12/08/76	FF1371A	3.2336	0.695	0.9891
GG1392A	OM	13.886	1.12	418.13	1.0387	0.93756	0.047386	02/10/77	FF1371A	3.2404	0.695	0.9895
GG2373A	OM	13.872	1.04	417.33	1.0387	0.93756	0.047386	12/09/76	FF2373A	3.0172	0.700	0.9918
GG2421B	OM	13.844	1.04	415.32	1.0387	0.93756	0.047386	03/28/77	FF2373A	3.0127	0.700	0.9909
GG3374B	OM	13.764	1.05	417.38	1.0387	0.93756	0.047386	12/10/76	FF3374B	4.0281	0.700	0.9831
GG3421B	OM	13.831	1.06	415.37	1.0387	0.93756	0.047386	03/28/77	FF3374B	4.0301	0.699	0.9902
HH1377B	OM	13.911	1.17	416.33	1.0387	0.93756	0.047386	12/16/76	FF1371A	3.2269	0.694	0.9900
HH1399C	OM	13.963	1.18	416.13	1.0387	0.93756	0.047386	03/02/77	FF1371A	3.3059	0.691	0.9899
HH2378B	OM	13.824	0.99	416.93	1.0387	0.93756	0.047386	12/17/76	FF2373A	3.0147	0.700	0.9889
HH2399B	OM	13.806	0.99	415.93	1.0387	0.93756	0.047386	03/01/77	FF2373A	3.0102	0.700	0.9886
HH3378B	OM	13.867	1.27	416.33	1.0387	0.93756	0.047386	12/17/76	FF3374B	4.0430	0.699	0.9902
HH3399B	OM	13.807	1.27	416.33	1.0387	0.93756	0.047386	03/01/77	FF3374B	4.0435	0.700	0.9891
II1380A	OM	13.989	1.09	416.23	1.0387	0.93756	0.047386	12/18/76	FF1380A	4.3961	0.693	0.9945
II1399C	OM	13.975	1.08	415.73	1.0387	0.93756	0.047386	03/02/77	FF1380A	4.3805	0.692	0.9916
II2381B	OM	13.883	1.09	416.33	1.0387	0.93756	0.047386	12/19/76	FF2381B	5.9604	0.699	0.9908
II2404A	OM	13.818	1.09	415.43	1.0387	0.93756	0.047386	03/03/77	FF2381B	5.9520	0.700	0.9889
II3382B	OM	13.818	1.09	415.78	1.0387	0.93756	0.047386	12/20/76	FF3382B	6.1788	0.700	0.9880
II3404A	OM	13.791	1.10	415.63	1.0387	0.93756	0.047386	03/03/77	FF3382B	6.2285	0.700	0.9881
JJ1383B	OM	13.918	1.06	415.53	1.0387	0.93756	0.047386	12/23/76	FF1371A	3.2282	0.695	0.9912
JJ1407A	OM	13.888	1.05	416.57	1.0387	0.93756	0.047386	03/09/77	FF1371A	3.2307	0.695	0.9896

Sample	Type	w_o	[OM]	E_o	ρ_t	w_{H_2O}	OH_t	Date	Blank	Sample Weight	I	Factor
JJ2386A	OM	13.835	1.54	417.83	1.0387	0.93756	0.047386	01/05/77	FF2381B	5.9584	0.700	0.9891
JJ2405A	OM	13.792	1.26	415.13	1.0387	0.93756	0.047386	03/04/77	FF2381B	4.9578	0.701	0.9883
JJ3387A	OM	13.834	1.20	416.93	1.0387	0.93756	0.047386	01/06/77	FF3374B	4.0317	0.698	0.9874
JJ3405A	OM	13.767	1.18	415.33	1.0387	0.93756	0.047386	03/04/77	FF3374B	4.0258	0.700	0.9872
KK1383B	OM	13.748	0.95	414.98	1.0387	0.93756	0.047386	12/23/76	FF1371A	3.2299	0.696	0.9816
KK1407A	OM	13.962	0.94	416.67	1.0387	0.93756	0.047386	03/09/77	FF1371A	3.2288	0.693	0.9923
KK2386A	OM	13.912	1.22	417.13	1.0387	0.93756	0.047386	01/05/77	FF2381B	5.9552	0.698	0.9920
KK2408A	OM	13.802	1.21	416.72	1.0387	0.93756	0.047386	03/10/77	FF2381B	5.9762	0.700	0.9878
KK3387A	OM	13.812	1.16	416.83	1.0387	0.93756	0.047386	01/06/77	FF3382B	6.1939	0.700	0.9877
KK3408A	OM	13.784	1.15	417.17	1.0387	0.93756	0.047386	03/10/77	FF3382B	6.1976	0.700	0.9871
LL1392A	OM	14.020	1.18	417.63	1.0387	0.93756	0.047386	02/10/77	FF1380A	4.3979	0.690	0.9921
LL1410A	OM	14.001	1.18	416.42	1.0387	0.93756	0.047386	03/12/77	FF1380A	4.4065	0.691	0.9921
LL2393A	OM	13.856	1.51	418.03	1.0387	0.93756	0.047386	02/11/77	FF2381B	5.9626	0.700	0.9903
LL2409A	OM	13.831	1.51	416.12	1.0387	0.93756	0.047386	03/11/77	FF2381B	5.9562	0.700	0.9902
LL3393A	OM	13.816	1.29	418.33	1.0387	0.93756	0.047386	02/11/77	FF3382B	6.1891	0.700	0.9879
LL3409A	OM	13.800	1.29	416.42	1.0387	0.03756	0.047386	03/11/77	FF3382B	6.1876	0.701	0.9897
MM1396A	OM	13.957	1.21	416.53	1.0387	0.93756	0.047386	02/14/77	FF1380A	4.4118	0.699	0.9911
MM1410A	OM	14.011	1.20	415.87	1.0387	0.93756	0.047386	03/12/77	FF1380A	4.3914	0.690	0.9918
MM2394B	OM	13.806	1.55	417.88	1.0387	0.93756	0.047386	02/12/77	FF2381B	5.9519	0.700	0.9876
MM2411A	OM	13.784	1.55	415.67	1.0387	0.93756	0.047386	03/13/77	FF2381B	5.9609	0.700	0.9868
MM3394A	OM	13.782	1.21	417.43	1.0387	0.93756	0.047386	02/12/77	FF3374B	4.0434	0.700	0.9866

Sample	Type	w_o	[OM]	E_o	ρ_t	w_{H_2O}	OH_t	Date	Blank	Sample Weight	J	Factor
MM3411A	OM	13.851	1.21	415.87	1.0387	0.93756	0.047386	03/13/77	FF3374B	4.0315	0.698	0.9896
NN1396A	OM	13.935	1.36	416.98	1.0387	0.93756	0.047386	02/14/77	FF1371A	3.2355	0.694	0.9918
NN1413A	OM	13.982	1.35	414.67	1.0387	0.93756	0.047386	03/15/77	FF1371A	3.2156	0.692	0.9928
NN2395A	OM	13.819	1.91	417.13	1.0387	0.93756	0.047386	02/13/77	FF2381B	5.9570	0.700	0.9883
NN2412A	OM	13.825	1.91	415.37	1.0387	0.93756	0.047386	03/14/77	FF2381B	5.9633	0.700	0.9907
NN3395A	OM	13.837	1.22	416.73	1.0387	0.93756	0.047386	02/13/77	FF3374B	4.0309	0.700	0.9900
NN3412A	OM	13.828	1.22	415.57	1.0387	0.93756	0.047386	03/14/77	FF3374B	4.0214	0.700	0.9915
OO1413A	OM	13.806	1.89	414.57	1.0387	0.93756	0.047386	03/15/77	FF1371A	3.2350	0.696	0.9850
OO1423A	OM	13.823	1.89	414.87	1.0387	0.93756	0.047386	03/27/77	FF1371A	3.2270	0.696	0.9871
OO2414A	OM	13.843	2.15	414.27	1.0387	0.93756	0.047386	03/16/77	FF2373A	3.0038	0.700	0.9921
OO2420A	OM	13.797	2.15	416.37	1.0387	0.93756	0.047386	03/27/77	FF2373A	3.0087	0.700	0.9887
OO3414A	OM	13.935	2.49	414.07	1.0387	0.93756	0.047386	03/16/77	FF3374B	4.0361	0.694	0.9881
OO3420A	OM	13.796	2.49	416.22	1.0387	0.93756	0.047386	03/27/77	FF3374B	4.0353	0.700	0.9877
QQ1423A	OM	13.899	1.23	415.07	1.0387	0.93756	0.047386	03/29/77	FF1371A	3.2523	0.695	0.9903
QQ1426A	OM	13.928	1.22	414.27	1.0387	0.93756	0.047386	04/01/77	FF1371A	3.2238	0.694	0.9914
QQ2424A	OM	13.837	1.10	414.92	1.0387	0.93756	0.047386	03/30/77	FF2373A	3.0122	0.698	0.9885
QQ2425A	OM	13.873	1.10	414.27	1.0387	0.93756	0.047386	03/31/77	FF2373A	3.0140	0.698	0.9915
QQ3424A	OM	13.843	1.17	414.77	1.0387	0.93756	0.047386	03/30/77	FF3374B	4.0311	0.700	0.9906
QQ3425A	OM	13.820	1.18	414.57	1.0387	0.93756	0.047386	03/31/77	FF3374B	4.0297	0.699	0.9895
FF1371A	BL	13.982	-	417.63	1.0387	0.93756	0.047386	12/08/76	-	3.2287	0.695	0.9937
FF2373A	BL	13.888	-	417.83	1.0387	0.93756	0.047386	12/09/76	-	3.0116	0.699	0.9908

Sample	Type	w_o	[OM]	E_o	ρ_t	w_{H_2O}	OH_t	Date	Blank	Sample Weight	I	Factor	
FF3374B	BL	13.857	-	417.23	1.0387	0.93756	0.047386	12/10/76	-	4.0302	0.700	0.9893	
FF1380A	BL	13.971	-	416.63	1.0387	0.93756	0.047386	12/18/76	-	4.3965	0.691	0.9902	
FF2381B	BL	13.858	-	416.83	1.0387	0.93756	0.047386	12/19/76	-	5.9585	0.699	0.9893	
FF3382B	BL	13.870	-	416.33	1.0387	0.93756	0.047386	12/20/76	-	6.1908	0.700	0.9908	
S1315A	OM	12.370	0.58	431.30	1.0406	0.92199	0.046280	07/13/76	T1315A	7.3704	0.698	0.9952	Special. Filter through 0.2μ filter.
T1315A	BL	16.378	-	431.30	1.0406	0.92199	0.046280	07/13/76	-	9.9581	0.701	0.9796	Special. Unfiltered.
S1311A	OM	14.051	0.63	428.18	1.0406	0.92199	0.046280	07/06/76	T1311A	7.9776	0.690	0.9945	Special. NaCl medium.
T1311A	BL	13.916	-	428.18	1.0406	0.92199	0.046280	07/06/76	-	7.9699	0.693	0.9907	Special. NaCl medium.
GG1390A	OM	13.956	1.12	416.53	1.0387	0.93756	0.047386	02/03/77	FF1371A	3.2433	0.693	0.9899	Special. N_2 bubbled for NH_3 removal.
GG2390A	OM	13.815	1.04	416.93	1.0387	0.93756	0.047386	02/03/77	FF2373A	3.0260	0.699	0.9900	Special. N_2 bubbled for NH_3 removal.
GG3391A	OM	13.856	1.06	416.68	1.0387	0.93756	0.047386	02/04/77	FF3374B	4.0448	0.697	0.9883	Special. N_2 bubbled for NH_3 removal.
QQ1426A	OM	13.786	1.22	414.27	1.0387	0.93756	0.047386	04/01/77	MSW427A	3.2298	0.694	0.9903	Ca,Mg,Na ClO_4 medium.
MSW427A	MD	14.938	-	414.22	1.0387	0.93756	0.047386	04/01/77	-				Ca,Mg,Na ClO_4 medium with no blank added.
QQ1431A	OM	14.108	1.23	416.12	1.0387	0.93756	0.047386	04/07/77	FF1371A	3.2300	0.698	0.9924	Special. 1.9μmoles Cu^{2+} added to solution.
QQ1433-6	OM	13.874	0.99	416.27	1.0387	0.93756	0.047386	04/19/77	FF1371A	3.2300	0.694	0.9879	UV irradiate OM 1 Hr. (OC is measured)
QQ1433-4	OM	13.911	0.95	416.47	1.0387	0.93756	0.047386	04/19/77	FF1371A	3.2277	0.695	0.9911	UV irradiate OM 3 Hr. (OC is measured)
QQ1433-2	OM	13.910	0.70	416.97	1.0387	0.93756	0.047386	04/19/77	FF1371A	3.2271	0.694	0.9904	UV irradiate OM 10.5 Hr. (OC is measured)
QQ1437A	OM	13.873	0.42	426.57	1.0387	0.93756	0.047386	07/02/77	FF1437A	1.0975	0.698	0.9936	Special. Low [OC].
FF1437A	BL	13.914	-	427.27	1.0387	0.93756	0.047386	07/02/77	-	1.0932	0.696	0.9926	Special. Small amount of blank.
QQ1435A	OM	13.980	1.24	427.17	1.0387	0.93756	0.047386	06/29/77	FF1371A	3.2272	0.692	0.9913	Forward titration - OH titrant
		17.081	1.24	427.17	1.0376	0.92180	0.052785						Back titration - H titrant

Sample	Type	w_o	[OM]	E_o	ρ_t	w_{H_2O}	OH_t	Date	Blank	Sample Weight	I	Factor
MD223B	MD	39.440	-	421.37	1.0387	0.92419	0.042600	03/14/76				
MD298B	MD	70.700	-	429.22	1.0406	0.92199	0.046280	06/26/76				
MD369A	MD	65.317	-	419.10	1.0387	0.93756	0.047386	12/06/76				
MD376B	MD	83.307	-	416.63	1.0387	0.93756	0.047386	12/15/76				
MD419B	MD	94.271	-	416.12	1.0387	0.93756	0.047386	03/25/77				

II. Acid-Base Titration Data

The data for titration of organic matter samples and blanks are presented in Table 3.

Table 3. Experimental data from titrations. Ordering of data is nearly that of Table 2.

ML, volume of titrant added, ml

EH, potential of electrode pair, mV

D0185A

ML	EH
0.000	273.00
.200	271.65
.400	270.20
.600	268.70
1.000	265.40
1.500	260.60
2.000	254.90
2.500	247.80
2.900	240.45
3.100	235.90
3.400	227.15
3.650	216.80
3.800	208.40
4.000	190.50
4.070	180.60
4.100	175.00
4.140	166.10
4.160	160.20
4.180	153.40
4.200	144.00
4.220	132.50
4.242	114.50
4.260	93.80
4.276	70.20
4.290	52.80
4.300	40.30
4.310	23.40
4.320	8.90
4.330	-7.80
4.340	-24.60
4.350	-39.50
4.360	-52.60
4.380	-70.00
4.400	-81.80
4.430	-95.50
4.460	-105.90
4.500	-116.40
4.560	-129.50
4.650	-144.80
4.750	-158.20
4.850	-168.70
4.970	-178.50
5.100	-186.40
5.300	-195.90
5.500	-202.90
5.700	-208.50
6.000	-215.10
6.500	-223.20
7.100	-230.30
8.000	-238.20
8.800	-243.50
10.000	-249.50
10.800	-252.70
11.400	-254.90
12.000	-256.70

C0184A

ML	EH
0.000	273.30
.200	271.80
.400	270.40
.600	268.80
1.000	265.40
1.500	260.45
2.000	254.40
2.300	250.10
2.600	244.90
3.000	235.90
3.300	226.30
3.600	211.10
3.750	198.10
3.820	188.55
3.870	179.09
3.890	174.25
3.910	167.40
3.930	158.60
3.950	146.30
3.960	136.60
3.970	125.50
3.980	103.60
3.990	67.10
4.000	20.60
4.010	-49.00
4.020	-93.00
4.030	-105.70
4.050	-122.10
4.070	-132.70
4.100	-142.50
4.140	-152.70
4.200	-163.40
4.250	-170.00
4.340	-178.70
4.480	-188.50
4.680	-198.00
4.900	-205.30
5.200	-212.70
5.530	-218.90
6.000	-225.50
6.450	-230.60
7.000	-235.50
7.500	-239.30
8.000	-242.50
10.000	-251.70

D0189B

ML	EH
0.000	303.10
.110	302.80
.225	302.50
.340	302.20
.530	301.70
1.060	300.20
1.580	298.60
2.090	297.00
2.610	295.30
3.130	293.50
3.630	291.70
4.140	289.70
4.540	288.00
4.920	286.40
5.320	284.60
5.730	282.60
6.130	280.50
6.545	278.20
6.960	275.70
7.250	273.80
7.560	271.60
7.870	269.20
8.170	266.70
8.475	264.00
8.790	260.90
9.100	257.40
9.425	253.30
9.750	248.40
10.054	242.90
10.260	238.40
10.474	232.80
10.687	225.80
10.904	216.25
11.074	205.40
11.189	194.80
11.281	182.15
11.375	159.90
11.405	148.90
11.426	137.40
11.450	116.75
11.460	106.50
11.475	88.80
11.490	70.30
11.505	48.00
11.520	26.10
11.535	2.60
11.550	-25.70
11.565	-46.70
11.580	-60.80
11.600	-74.40
11.630	-89.40
11.670	-104.80
11.718	-116.40
11.768	-127.60
11.836	-138.65
11.883	-145.90
11.994	-159.20
12.126	-171.10
12.306	-183.10

C0188A

ML	EH
0.000	302.60
.100	302.30
.210	302.00
.320	301.70
.500	301.20
1.000	299.70
1.500	298.10
2.000	296.50
2.500	294.80
3.000	293.00
3.500	291.20
4.000	289.20
4.400	287.60
4.800	285.90
5.200	284.10
5.600	282.10
6.000	280.00
6.400	277.70
6.800	275.20
7.100	273.20
7.400	271.10
7.700	268.80
8.000	266.20
8.300	263.50
8.600	260.40
8.900	256.90
9.200	252.80
9.500	248.10
9.800	242.40
10.000	237.90
10.200	232.30
10.400	225.30
10.600	215.80
10.750	204.90
10.850	194.40
10.930	181.60
11.000	159.50
11.020	148.20
11.040	124.60
11.050	94.20
11.055	70.60
11.060	34.30
11.070	-58.90
11.080	-81.90
11.090	-94.20
11.100	-104.20
11.120	-117.80
11.140	-128.10
11.170	-139.10
11.200	-146.40
11.270	-159.70
11.370	-171.60
11.530	-183.60
11.730	-193.60
12.000	-202.90
12.400	-212.30
13.000	-221.90
14.000	-232.40

D1215A

ML	EH
0.000	299.80
.110	299.50
.210	299.20
.280	299.00
.400	298.70
.500	298.40
2.104	294.00
3.653	288.20
6.260	279.20
8.158	269.20
9.530	259.20
10.496	249.20
11.173	239.20
11.683	228.30
11.980	219.20
12.212	209.20
12.373	199.20
12.492	189.20
12.574	179.20
12.639	169.10
12.682	159.20
12.719	149.20
12.747	139.20
12.768	128.90
12.800	109.90
12.830	84.60
12.850	64.30
12.870	47.30
12.900	31.10
12.940	14.70
12.950	11.40
12.980	3.30
13.018	-4.80
13.036	-7.40
13.175	-25.30
13.470	-44.50
14.050	-63.80
15.300	-84.70
16.180	-94.00
17.400	-104.00
18.820	-113.60
20.140	-131.70
22.150	-131.70
24.650	-144.10
26.600	-154.00

C1213B

ML	EH
0.000	300.60
.100	300.30
.200	300.00
.300	299.80
.400	299.50
.500	299.20
2.000	294.80
3.430	290.00
5.840	280.00
7.604	270.00
8.866	260.00
9.750	250.00
10.373	240.00
10.803	230.00
11.099	220.00
11.303	210.00
11.443	200.00
11.540	190.00
11.608	180.00
11.652	170.00
11.685	160.00
11.712	150.00
11.729	140.10
11.742	130.00
11.757	111.50
11.770	88.40
11.782	65.50
11.795	48.60
11.815	28.30
11.840	11.70
11.890	-6.50
11.990	-24.60
12.200	-43.50
12.600	-63.00
13.400	-83.30
14.000	-93.30
14.800	-103.10
15.750	-112.80
17.000	-123.10
18.000	-130.90
19.700	-143.30
21.000	-153.20
22.180	-162.50
23.300	-173.10
24.000	-180.70
25.000	-193.40
26.000	-206.10

D2218B

ML.	EH
0.000	300.70
.026	300.60
.050	300.50
.072	300.40
.096	300.30
.215	299.85
.414	299.00
.606	298.20
.792	297.40
.998	296.50
1.995	291.80
2.465	289.40
4.082	279.40
5.260	269.40
6.110	259.40
6.706	249.40
7.124	239.40
7.418	229.40
7.622	219.40
7.761	209.40
7.862	199.40
7.936	189.30
7.992	179.40
8.031	169.30
8.060	159.25
8.089	149.40
8.109	135.70
8.114	123.10
8.124	112.20
8.135	98.30
8.146	77.80
8.156	55.20
8.166	31.00
8.180	-1.00
8.192	-27.60
8.205	-42.60
8.220	-53.70
8.260	-73.10
8.300	-85.40
8.360	-98.30
8.430	-109.40
8.520	-120.80
8.610	-130.20
8.722	-141.20
8.846	-152.40
9.008	-165.30
9.144	-175.30
9.310	-185.50
9.506	-195.50
9.774	-205.30
10.032	-212.70

C2217A

ML.	EH
0.000	301.30
.016	301.20
.045	301.10
.066	301.00
.091	300.90
.210	300.45
.404	299.60
.600	298.80
.800	298.00
1.000	297.10
2.000	292.40
2.468	290.00
4.087	280.00
5.260	270.00
6.098	260.00
6.688	250.00
7.096	240.00
7.378	230.00
7.575	220.00
7.700	211.00
7.710	210.00
7.802	200.00
7.859	190.00
7.906	180.00
7.932	170.00
7.953	160.00
7.969	150.00
7.985	136.00
7.996	123.90
8.004	101.10
8.010	84.50
8.020	18.50
8.030	-36.50
8.040	-64.20
8.050	-78.90
8.065	-91.80
8.085	-105.80
8.110	-117.90
8.140	-128.30
8.180	-140.50
8.230	-151.80
8.300	-164.90
8.380	-174.90
8.485	-184.90
8.637	-194.90
8.862	-204.90
9.169	-214.90
9.694	-224.90
10.463	-234.90
11.695	-244.90
13.670	-254.90

D3222A

ML.	EH
0.000	301.90
.024	301.80
.050	301.70
.100	301.50
.150	301.30
.200	301.10
.300	300.65
.400	300.20
2.415	290.40
3.960	280.40
5.076	270.40
5.876	260.40
6.437	250.40
6.830	240.40
7.103	230.40
7.289	220.40
7.423	210.40
7.515	200.35
7.575	190.20
7.625	180.20
7.654	170.10
7.676	160.50
7.695	151.30
7.710	140.90
7.720	131.80
7.730	119.40
7.740	100.90
7.750	65.50
7.760	23.90
7.770	-6.10
7.780	-28.00
7.790	-41.60
7.805	-56.20
7.820	-67.10
7.850	-84.00
7.880	-94.70
7.920	-104.10
7.970	-115.60
8.030	-125.20
8.112	-136.80
8.194	-147.10
8.288	-156.80
8.430	-172.00
8.540	-180.60
8.690	-190.00
8.910	-200.20
9.210	-210.00
9.650	-219.90
10.290	-229.50
11.330	-239.80
12.840	-249.30
15.460	-259.45
15.620	-259.80

C3220B

ML.	EH
0.000	301.40
.050	301.20
.100	300.90
.150	300.70
.200	300.50
.250	300.25
.304	300.00
1.000	296.90
2.000	291.90
2.350	290.00
3.894	280.00
5.015	270.00
5.812	260.00
6.374	250.00
6.764	240.00
7.036	230.00
7.221	220.00
7.347	210.00
7.436	200.00
7.498	189.80
7.539	179.80
7.565	170.00
7.586	160.00
7.602	150.30
7.612	140.30
7.621	129.30
7.631	108.20
7.640	68.70
7.650	-2.20
7.660	-44.60
7.670	-62.90
7.680	-74.20
7.700	-86.50
7.730	-102.10
7.760	-113.90
7.800	-124.30
7.860	-137.60
7.920	-147.70
8.000	-159.80
8.100	-171.50
8.200	-180.20
8.350	-190.30
8.560	-200.40
8.860	-210.30
9.310	-220.30
9.980	-230.00
11.050	-240.10
12.750	-249.70
15.650	-259.80

S0313A

ML	EH
0.000	309.80
.732	300.00
1.293	289.90
1.697	280.00
1.990	270.00
2.197	260.00
2.346	250.00
2.450	239.90
2.523	230.10
2.580	219.20
2.618	210.10
2.654	200.10
2.683	190.20
2.712	180.30
2.742	171.30
2.778	156.10
2.802	143.80
2.828	130.40
2.850	115.60
2.870	100.20
2.886	87.20
2.902	71.10
2.920	55.20
2.936	41.90
2.960	14.20
2.980	-5.20
3.000	-19.70
3.020	-29.70
3.050	-41.40
3.100	-56.80
3.170	-71.50
3.270	-87.50
3.400	-102.90
3.550	-116.30
3.730	-129.50
3.960	-144.20
4.200	-157.60
4.500	-176.10
4.800	-194.00
5.100	-207.30
5.400	-218.10
5.700	-226.20
6.000	-232.45

T0313A

ML	EH
0.000	309.80
.705	300.00
1.242	289.90
1.626	279.90
1.899	270.00
2.100	259.40
2.227	250.00
2.319	239.90
2.382	230.00
2.432	219.20
2.459	210.10
2.481	200.10
2.496	189.70
2.506	180.20
2.516	169.85
2.526	154.40
2.536	127.50
2.546	65.70
2.556	-44.90
2.566	-84.80
2.576	-104.00
2.586	-115.10
2.600	-127.20
2.626	-142.30
2.660	-158.60
2.720	-176.20
2.834	-194.25
2.978	-207.30
3.174	-218.10
3.388	-226.10
3.620	-232.50
6.000	-259.80

S0296A

ML	EH
0.000	310.60
.980	300.50
1.704	290.60
2.240	280.50
2.615	270.60
2.881	260.60
3.072	250.50
3.204	240.60
3.300	230.50
3.368	220.60
3.420	210.80
3.458	201.80
3.490	191.40
3.520	180.10
3.546	169.20
3.566	157.20
3.584	144.40
3.600	132.40
3.615	118.60
3.630	101.90
3.642	89.00
3.660	66.10
3.676	48.00
3.690	34.20
3.710	14.90
3.730	2.40
3.750	-16.90
3.770	-30.30
3.800	-44.80
3.830	-56.60
3.870	-67.80
3.930	-79.90
4.000	-92.30
4.080	-102.50
4.200	-115.30
4.400	-133.10
4.600	-149.00
4.800	-163.60
5.100	-181.30
5.400	-194.80
5.800	-208.10
6.300	-220.10
6.900	-230.40
7.800	-240.90
8.000	-242.80

T0296A

ML	EH
0.000	310.70
.009	310.60
.976	300.50
1.680	290.55
2.190	280.50
2.556	270.60
2.810	260.60
2.990	250.30
3.110	240.50
3.194	230.50
3.254	220.60
3.291	210.75
3.318	201.80
3.341	191.30
3.355	180.15
3.364	170.10
3.374	150.00
3.384	96.60
3.394	-17.20
3.404	-64.60
3.414	-88.40
3.430	-107.00
3.450	-122.90
3.480	-140.60
3.536	-160.10
3.640	-180.80
3.760	-194.20
3.980	-208.30
4.290	-220.20
4.720	-230.40
5.420	-240.90
5.590	-242.80
8.000	-259.30

S1299B

ML	EH
0.000	310.85
.008	310.80
.017	310.75
1.200	299.95
2.000	290.10
2.598	280.00
3.024	270.10
3.329	260.10
3.546	250.10
3.700	240.05
3.810	230.20
3.895	220.30
3.961	210.40
4.017	200.40
4.061	190.60
4.100	181.10
4.140	171.10
4.170	161.70
4.203	150.50
4.232	140.50
4.260	125.60
4.280	112.60
4.295	103.00
4.312	91.10
4.330	78.20
4.345	67.20
4.362	54.80
4.380	44.50
4.400	33.70
4.430	19.90
4.460	4.20
4.490	-11.70
4.520	-23.50
4.560	-39.70
4.600	-52.50
4.650	-63.40
4.750	-80.40
4.850	-92.00
5.000	-105.60
5.200	-120.10
5.450	-134.70
5.800	-153.30
6.100	-167.10
6.400	-180.40
6.750	-193.60
7.200	-206.30
7.700	-216.20
8.500	-228.70

T1299B

ML	EH
0.000	310.80
1.156	299.95
1.924	290.10
2.494	280.00
2.892	270.10
3.176	260.00
3.371	250.15
3.508	240.10
3.604	230.10
3.669	220.30
3.714	210.40
3.748	200.40
3.772	190.00
3.787	180.80
3.796	173.90
3.806	162.90
3.818	145.30
3.830	116.20
3.840	79.10
3.850	19.90
3.860	-29.90
3.870	-45.70
3.880	-56.70
3.890	-65.10
3.916	-79.90
3.950	-92.40
4.000	-106.20
4.062	-119.80
4.136	-133.40
4.250	-153.00
4.330	-165.20
4.450	-180.10
4.600	-193.20
4.820	-205.50
5.100	-215.90
5.670	-228.90
6.000	-234.00
8.000	-251.40
9.500	-258.60

S2303A

ML	EH
0.000	310.70
1.110	300.00
1.872	290.00
2.427	280.00
2.824	270.00
3.102	260.00
3.297	250.00
3.435	240.00
3.531	230.00
3.597	220.00
3.647	210.00
3.681	199.90
3.706	189.90
3.725	180.00
3.742	169.70
3.754	158.50
3.764	146.70
3.774	134.00
3.784	111.30
3.794	75.40
3.804	20.00
3.814	-38.60
3.824	-71.30
3.836	-95.50
3.850	-113.70
3.865	-127.50
3.882	-138.40
3.910	-151.80
3.950	-163.70
4.000	-174.10
4.080	-185.50
4.190	-195.60
4.352	-205.55
4.587	-215.50
4.950	-225.50
5.508	-235.50
6.000	-241.65

T2303A

ML	EH
0.000	310.70
1.094	300.00
1.846	290.00
2.390	280.00
2.776	270.00
3.048	260.00
3.237	250.00
3.365	240.00
3.455	230.00
3.515	220.00
3.558	210.00
3.588	199.80
3.607	189.90
3.622	180.20
3.634	169.70
3.644	156.30
3.654	130.00
3.664	53.10
3.674	-60.10
3.684	-90.80
3.694	-105.80
3.704	-117.40
3.714	-125.80
3.734	-138.35
3.764	-151.80
3.803	-163.70
3.854	-174.15
3.934	-185.50
4.047	-195.60
4.206	-205.60
4.450	-215.60
4.812	-225.50
5.384	-235.50
5.884	-241.60
6.000	-242.70

S3306B

ML	EH
0.000	311.50
1.020	300.90
1.720	291.00
2.240	281.00
2.607	271.00
2.870	261.00
3.068	250.00
3.192	240.00
3.280	230.00
3.343	220.00
3.387	210.00
3.419	200.00
3.445	189.90
3.462	180.00
3.476	170.90
3.486	161.00
3.496	150.40
3.506	135.00
3.514	117.90
3.522	95.60
3.530	65.80
3.540	23.40
3.550	-29.40
3.560	-67.60
3.570	-86.10
3.580	-100.60
3.590	-111.30
3.604	-123.20
3.620	-134.50
3.640	-143.90
3.670	-155.80
3.710	-167.00
3.770	-178.20
3.850	-188.60
3.970	-199.00
4.165	-210.00
4.434	-220.00
4.842	-230.00
5.478	-240.00
6.000	-245.75

T3306B

ML	EH
0.000	311.50
1.008	300.90
1.702	291.00
2.217	281.00
2.580	271.00
2.838	261.00
3.031	250.00
3.150	240.00
3.233	230.00
3.289	220.00
3.330	210.00
3.358	200.00
3.380	188.25
3.396	175.30
3.410	154.80
3.420	129.30
3.430	69.50
3.440	-35.00
3.450	-76.80
3.460	-95.00
3.470	-106.30
3.480	-115.00
3.491	-123.10
3.508	-134.10
3.528	-143.60
3.560	-155.80
3.601	-167.00
3.661	-178.20
3.743	-188.60
3.861	-199.00
4.060	-210.00
4.331	-220.00
4.745	-230.00
5.391	-240.00
5.935	-245.70
6.000	-246.20

CC0362B

ML	EH
0.000	301.75
2.000	293.60
4.000	283.10
5.700	270.40
6.800	258.00
7.600	243.60
8.000	232.00
8.400	211.30
8.520	200.30
8.600	189.50
8.650	179.40
8.690	169.40
8.720	158.40
8.740	149.10
8.760	138.10
8.780	128.50
8.810	113.50
8.835	103.10
8.860	93.40
8.900	82.40
8.940	73.10
9.000	60.70
9.050	49.10
9.150	27.00
9.250	-4.00
9.350	-46.90
9.400	-60.90
9.480	-74.90
9.580	-84.40
9.700	-93.40
9.830	-103.60
10.000	-118.10

DD0362B

ML	EH
0.000	301.80
2.000	295.80
4.000	288.70
5.300	283.00
6.000	279.60
7.500	270.50
8.900	258.40
10.000	242.90
10.500	231.20
10.970	211.80
11.100	202.70
11.220	189.60
11.280	179.60
11.330	166.50
11.360	153.80
11.390	134.50
11.410	106.70
11.420	89.10
11.430	72.10
11.440	57.70
11.450	38.90
11.460	24.00
11.480	-5.30
11.500	-29.00
11.520	-39.00
11.560	-56.20
11.610	-70.30
11.680	-86.40
11.780	-104.40
11.900	-122.30
12.000	-134.90
12.200	-154.90
12.500	-168.30
12.900	-174.60
13.150	-175.90
13.500	-177.30
14.000	-178.70

CC0366A

ML	EH
0.000	300.80
.050	300.60
1.700	290.70
3.000	280.40
3.900	270.55
4.600	259.90
5.100	248.75
5.360	240.40
5.590	230.40
5.740	220.60
5.860	209.40
5.940	198.40
5.990	189.00
6.026	179.70
6.054	169.30
6.080	155.80
6.096	144.90
6.112	133.60
6.122	126.20
6.136	116.15
6.150	107.00
6.166	97.20
6.184	90.30
6.212	78.50
6.238	69.90
6.266	61.00
6.290	52.00
6.330	41.50
6.370	28.00
6.410	12.50
6.440	-4.30
6.470	-24.20
6.490	-36.50
6.510	-48.10
6.530	-56.40
6.560	-66.70
6.600	-75.30
6.680	-86.20
6.780	-96.20
6.900	-109.60
7.100	-130.00
7.300	-162.40
7.400	-169.50
7.600	-174.10
8.000	-177.50

CC4364B

ML	EH
0.000	300.45
.900	289.70
1.500	280.10
2.000	268.80
2.400	255.10
2.700	238.30
2.840	225.30
2.930	212.20
2.950	208.00
3.000	197.20
3.034	186.00
3.060	173.50
3.085	160.50
3.105	144.95
3.120	129.50
3.135	109.30
3.145	90.80
3.155	71.40
3.165	55.20
3.180	33.60
3.195	17.40
3.215	0.00
3.240	-13.50
3.280	-26.80
3.340	-40.30
3.450	-55.90
3.650	-72.00
4.000	-88.85
4.500	-104.40
5.100	-118.00
5.800	-131.60
6.500	-144.40
7.200	-158.30
8.000	-179.10

DD4364B

ML	EH
0.000	300.80
.040	300.50
1.200	290.00
2.000	280.10
2.600	269.80
3.200	253.90
3.530	238.15
3.690	225.40
3.790	212.80
3.840	202.50
3.890	188.00
3.920	171.40
3.940	151.80
3.960	129.20
3.970	118.80
3.980	106.70
3.990	87.30
4.000	52.30
4.010	22.80
4.020	8.40
4.040	-8.70
4.060	-19.60
4.100	-33.60
4.180	-49.20
4.300	-63.50
4.600	-83.10
5.100	-101.90
5.750	-118.40
6.500	-133.60
7.000	-143.00
7.700	-157.00
8.000	-163.20
8.700	-181.70

N1255B

ML	EH
0.000	308.21
.170	306.86
1.000	299.81
2.000	289.98
2.700	278.78
3.300	266.50
3.700	254.77
4.000	242.37
4.200	230.90
4.320	222.30
4.450	210.16
4.550	198.22
4.620	188.03
4.670	179.03
4.720	169.52
4.770	157.81
4.820	144.80
4.860	131.76
4.890	120.49
4.920	108.07
4.940	96.68
4.960	82.34
4.980	65.21
5.000	48.90
5.020	31.82
5.040	14.95
5.060	-1.40
5.080	-14.92
5.100	-25.79
5.130	-38.82
5.170	-51.90
5.200	-59.95
5.250	-70.60
5.350	-85.96
5.450	-97.02
5.570	-107.80
5.800	-124.30
6.000	-136.20
6.300	-152.22
6.600	-168.20
7.000	-189.90
7.500	-210.30
8.000	-222.40
9.000	-237.60
10.000	-246.48

O1257A

ML	EH
0.000	307.64
.100	306.40
.200	305.11
.300	303.78
.400	302.44
.500	301.03
1.000	293.03
1.500	282.44
2.000	265.99
2.260	251.98
2.400	237.72
2.500	221.42
2.552	207.25
2.580	193.02
2.600	177.96
2.610	168.22
2.620	155.54
2.630	138.29
2.640	123.16
2.650	104.44
2.660	69.40
2.670	3.65
2.680	-16.55
2.710	-44.10
2.740	-56.57
2.780	-69.44
2.830	-79.88
2.900	-91.53
3.000	-103.93
3.200	-122.24
3.400	-137.06
3.650	-155.50
3.800	-167.22
4.000	-183.83
4.200	-199.52
4.400	-210.87
4.700	-222.83
5.000	-230.78
5.400	-238.40
6.000	-246.34

N1237A

ML	EH
0.000	310.40
1.000	300.10
2.000	285.40
2.700	268.60
3.044	254.90
3.280	239.80
3.430	224.95
3.526	210.10
3.590	194.00
3.633	180.50
3.668	165.10
3.692	151.10
3.715	134.90
3.730	119.90
3.740	108.30
3.749	95.50
3.756	81.10
3.762	63.80
3.768	48.60
3.774	28.50
3.780	11.90
3.788	-4.90
3.800	-23.20
3.814	-37.10
3.834	-50.20
3.870	-65.10
3.920	-79.50
4.000	-94.40
4.124	-110.00
4.270	-125.00
4.440	-139.90
4.610	-154.70
4.780	-169.90
4.960	-185.00
5.051	-191.50
5.180	-199.40
5.550	-215.20
6.000	-226.90
6.500	-235.40
7.200	-243.60
8.000	-250.20
9.000	-256.20
10.000	-260.70

O1235A

ML	EH
0.000	309.75
.050	309.30
.100	309.00
.150	308.50
.200	308.10
1.000	300.60
2.000	288.20
2.800	272.70
3.194	260.30
3.495	244.70
3.652	230.00
3.748	214.85
3.803	200.20
3.834	185.20
3.852	170.10
3.863	156.30
3.873	142.40
3.882	124.20
3.892	103.40
3.910	2.20
3.920	-21.80
3.930	-36.10
3.948	-51.00
3.976	-65.15
4.028	-80.50
4.110	-95.60
4.220	-110.40
4.360	-125.50
4.520	-140.60
4.680	-155.60
4.840	-171.00
5.010	-185.40
5.240	-200.30
5.610	-215.20
6.300	-230.80
7.000	-240.00
8.000	-248.50
9.000	-254.60
10.000	-259.30
12.000	-265.90
14.000	-270.60

N2250B

ML	EH
0.000	307.77
.900	300.36
1.860	290.36
2.600	279.77
3.100	269.81
3.500	258.44
3.720	249.54
3.890	240.17
4.000	231.94
4.100	221.84
4.180	210.35
4.240	198.93
4.280	187.07
4.310	176.91
4.330	168.72
4.350	156.44
4.370	140.50
4.390	121.13
4.410	90.40
4.420	64.86
4.430	39.61
4.440	-8.70
4.450	-63.62
4.460	-99.05
4.470	-102.84
4.485	-117.34
4.505	-130.99
4.540	-147.74
4.600	-165.98
4.680	-179.75
4.800	-192.35
4.950	-202.95
5.200	-213.65
5.502	-222.49
6.000	-232.24
6.700	-241.32
8.000	-251.76

O2254A

ML	EH
0.000	307.01
.500	301.62
1.000	295.33
1.600	285.85
2.000	277.47
2.400	265.74
2.650	254.98
2.800	245.55
2.910	235.86
2.990	225.79
3.050	214.98
3.084	205.37
3.110	195.60
3.130	185.45
3.144	175.42
3.154	164.16
3.164	147.07
3.174	109.31
3.184	40.41
3.194	-74.09
3.204	-105.88
3.214	-121.13
3.224	-131.71
3.240	-144.02
3.260	-155.76
3.290	-167.72
3.330	-177.54
3.400	-189.40
3.500	-200.08
3.650	-210.40
3.900	-221.50
4.300	-232.48
4.900	-242.45
5.600	-249.94
6.000	-253.23

N3247B

ML	EH
0.000	308.76
.100	307.84
.500	304.00
.900	299.74
1.650	289.99
2.000	284.26
2.220	280.04
2.650	269.51
2.940	259.72
3.160	249.24
3.300	240.36
3.420	229.99
3.510	219.51
3.574	209.51
3.625	200.39
3.670	189.59
3.710	179.07
3.739	169.92
3.764	160.07
3.786	150.88
3.810	139.54
3.828	129.16
3.842	119.93
3.854	108.30
3.864	97.21
3.874	84.26
3.884	67.15
3.894	50.35
3.904	26.82
3.914	-.30
3.924	-27.24
3.934	-51.32
3.944	-68.98
3.954	-84.72
3.970	-101.89
3.990	-117.79
4.010	-129.78
4.040	-144.98
4.080	-158.03
4.130	-170.06
4.220	-183.92
4.400	-200.26
4.700	-215.10
5.200	-228.86
6.000	-241.32

O3249A

ML	EH
0.000	307.96
.700	300.27
1.420	290.16
2.000	278.72
2.300	270.49
2.580	259.84
2.760	249.93
2.890	239.80
2.980	229.33
3.040	219.80
3.082	209.33
3.112	199.61
3.134	188.97
3.150	176.57
3.164	160.34
3.174	137.58
3.182	102.00
3.190	38.60
3.200	-54.36
3.210	-91.82
3.220	-108.85
3.235	-125.35
3.250	-138.17
3.280	-154.95
3.320	-167.86
3.380	-180.79
3.470	-192.68
3.600	-203.76
3.810	-215.09
4.000	-222.97
4.300	-229.99
4.700	-237.40
5.333	-245.42

P1318A

ML	EH
0.000	299.90
.801	290.00
1.412	280.00
1.860	270.00
2.184	260.00
2.421	250.00
2.591	240.00
2.718	230.00
2.811	220.00
2.881	210.10
2.939	199.95
2.980	189.90
3.015	180.00
3.044	169.80
3.065	160.60
3.086	150.00
3.105	138.90
3.120	129.20
3.132	120.00
3.144	106.80
3.154	94.00
3.164	80.70
3.174	62.90
3.184	37.80
3.194	13.80
3.204	-6.60
3.218	-26.60
3.234	-40.10
3.256	-54.40
3.276	-62.50
3.300	-69.90
3.400	-90.20
3.500	-103.20
3.700	-121.60
3.920	-137.50
4.140	-151.70
4.420	-170.70
4.750	-195.90
5.001	-212.70
5.270	-225.50
5.550	-234.70
6.000	-244.90

W1318A

ML	EH
0.000	299.90
.788	289.95
1.378	280.00
1.807	270.00
2.118	259.90
2.330	250.00
2.478	240.00
2.581	230.00
2.654	220.00
2.703	209.90
2.740	199.55
2.761	189.80
2.778	179.45
2.790	169.00
2.800	157.00
2.810	138.50
2.820	111.00
2.830	88.00
2.840	44.30
2.850	-13.00
2.860	-34.90
2.874	-50.50
2.896	-65.50
2.926	-76.70
2.970	-89.10
3.010	-97.40
3.070	-106.90
3.170	-119.60
3.300	-133.00
3.500	-151.40
3.720	-172.10
3.940	-194.05
4.160	-211.95
4.410	-225.50
4.670	-234.80
5.084	-244.90
5.200	-247.10

P1340B

ML	EH
0.000	298.40
.100	297.30
.703	289.80
1.334	279.90
1.800	270.00
2.146	260.00
2.394	249.90
2.573	240.00
2.705	230.00
2.805	220.00
2.882	209.45
2.938	200.00
2.980	190.10
3.017	180.00
3.048	169.65
3.071	160.15
3.090	150.90
3.109	140.80
3.126	130.35
3.141	120.65
3.156	107.20
3.171	90.60
3.184	72.60
3.194	54.50
3.202	41.70
3.212	23.40
3.222	6.80
3.234	-11.20
3.248	-30.40
3.262	-44.80
3.278	-56.50
3.300	-67.20
3.340	-80.80
3.400	-95.40
3.490	-110.00
3.614	-124.90
3.776	-139.50
3.960	-154.70
4.180	-171.20
4.360	-184.90
4.580	-201.50
4.800	-214.40
5.200	-230.90

W1340B

ML	EH
0.000	298.40
.100	297.30
.700	289.70
1.314	279.85
1.760	269.95
2.086	259.90
2.320	249.40
2.466	240.00
2.578	229.80
2.661	218.80
2.704	210.00
2.743	199.90
2.766	190.10
2.784	180.15
2.797	170.50
2.808	158.20
2.818	144.10
2.826	131.80
2.833	117.50
2.840	99.20
2.848	74.40
2.854	41.90
2.860	9.20
2.865	-12.10
2.872	-32.40
2.880	-44.90
2.894	-56.20
2.930	-73.90
2.951	-81.15
3.000	-94.00
3.090	-109.30
3.210	-124.15
3.366	-140.00
3.530	-155.10
3.690	-170.40
3.838	-185.10
4.018	-201.60
4.194	-214.30
4.560	-230.90
5.200	-246.60

P2320A

ML	EH
0.000	298.80
.736	290.00
1.377	280.00
1.848	269.90
2.178	260.00
2.416	250.00
2.580	240.10
2.700	230.00
2.783	220.00
2.850	208.70
2.886	199.90
2.932	185.30
2.960	170.50
2.982	155.20
3.000	138.80
3.011	126.10
3.020	112.70
3.030	92.90
3.040	58.70
3.050	12.20
3.060	-55.50
3.070	-102.00
3.080	-120.10
3.090	-131.50
3.105	-145.20
3.130	-160.05
3.166	-175.70
3.226	-190.30
3.326	-204.80
3.510	-220.00
3.850	-235.10
4.000	-239.50

W2320A

ML	EH
0.000	298.80
.728	290.00
1.359	280.00
1.821	269.95
2.150	260.00
2.380	250.00
2.544	239.85
2.654	229.80
2.730	219.95
2.790	207.70
2.820	199.30
2.854	183.85
2.870	171.40
2.882	156.00
2.892	135.40
2.900	101.00
2.906	59.50
2.912	-3.40
2.918	-57.70
2.924	-96.70
2.931	-117.00
2.940	-132.30
2.950	-144.40
2.966	-156.70
3.005	-174.90
3.060	-189.60
3.150	-203.70
3.340	-220.10
3.668	-235.10
3.813	-239.50
4.000	-244.20

P2338B

ML	EH
0.000	299.40
.044	299.00
.784	290.00
1.408	279.90
1.856	270.00
2.180	260.00
2.420	249.40
2.570	240.00
2.683	230.00
2.770	219.20
2.822	210.10
2.864	199.95
2.896	189.70
2.919	180.00
2.944	166.90
2.964	151.70
2.978	136.60
2.990	120.90
3.000	102.70
3.008	82.70
3.014	63.80
3.020	44.00
3.028	17.00
3.036	-27.20
3.044	-72.20
3.052	-98.70
3.062	-115.30
3.074	-128.10
3.090	-141.00
3.110	-153.30
3.140	-165.30
3.200	-182.90
3.266	-194.50
3.400	-209.20
3.600	-222.20
3.800	-230.70
4.000	-236.80

W2338B

ML	EH
0.000	299.40
.040	298.90
.758	290.00
1.366	279.95
1.806	269.90
2.116	260.00
2.338	250.00
2.490	239.90
2.595	229.90
2.670	219.60
2.718	209.90
2.754	199.60
2.776	190.05
2.793	180.10
2.806	168.90
2.818	154.70
2.828	135.00
2.836	104.60
2.842	65.70
2.848	.90
2.854	-52.80
2.860	-92.40
2.866	-110.30
2.872	-120.80
2.882	-134.10
2.896	-146.80
2.918	-160.00
2.944	-170.20
2.980	-181.40
3.050	-195.00
3.170	-209.00
3.370	-222.70
3.560	-230.90
3.720	-236.10
3.800	-238.00
4.000	-242.70

P3322A

ML	EH
0.000	297.00
.596	290.00
1.264	279.90
1.749	270.00
2.101	260.00
2.352	249.95
2.530	239.90
2.660	229.40
2.745	219.90
2.810	209.55
2.856	200.00
2.893	189.60
2.920	179.95
2.943	169.80
2.959	159.80
2.973	150.20
2.984	141.30
2.996	129.60
3.006	118.80
3.016	104.50
3.024	90.70
3.032	73.30
3.040	50.50
3.048	19.00
3.054	-10.20
3.062	-54.30
3.072	-88.40
3.082	-117.30
3.092	-131.10
3.102	-141.10
3.120	-153.60
3.150	-169.40
3.190	-182.80
3.240	-193.15
3.310	-203.80
3.410	-213.75
3.560	-223.90
3.790	-234.10
4.000	-240.65

W3322A

ML	EH
0.000	297.00
.592	289.90
1.248	279.90
1.723	270.00
2.080	259.50
2.314	249.85
2.480	240.00
2.598	229.90
2.679	219.90
2.737	210.00
2.780	198.15
2.802	189.50
2.820	180.70
2.834	171.20
2.846	158.10
2.856	142.00
2.862	124.60
2.866	111.40
2.870	80.50
2.875	45.30
2.880	-7.70
2.885	-50.80
2.890	-84.10
2.895	-102.40
2.900	-114.30
2.910	-129.50
2.920	-138.10
2.938	-151.50
2.970	-169.20
3.010	-183.00
3.058	-193.30
3.126	-203.40
3.226	-213.70
3.376	-223.90
3.606	-234.10
3.816	-240.65
4.000	-245.10

GG1371A

ML	EH
0.000	299.00
.734	290.05
1.360	280.00
1.810	270.10
2.144	260.00
2.380	250.10
2.552	240.00
2.678	229.85
2.766	220.00
2.836	209.50
2.886	200.05
2.930	188.40
2.956	179.80
2.986	169.90
3.008	159.70
3.026	149.80
3.042	140.00
3.056	129.80
3.068	120.20
3.080	109.15
3.088	100.50
3.096	89.10
3.104	71.60
3.110	55.60
3.118	38.40
3.128	5.40
3.136	-17.70
3.146	-35.60
3.156	-47.50
3.170	-58.30
3.200	-73.80
3.244	-89.30
3.310	-103.50
3.400	-117.10
3.520	-132.20
3.650	-146.10
3.790	-160.55
3.920	-175.10
4.100	-194.50
4.280	-210.00
4.540	-224.70
4.900	-237.20
5.500	-249.60

GG1392A

ML	EH
0.000	299.80
.100	298.75
.700	291.50
1.400	280.55
1.850	270.70
2.200	260.05
2.430	250.20
2.600	240.00
2.720	230.25
2.810	220.20
2.880	209.45
2.930	199.50
2.966	190.00
3.000	179.60
3.024	169.70
3.046	159.75
3.062	150.60
3.080	139.40
3.094	129.10
3.102	121.00
3.114	108.05
3.122	98.50
3.130	84.20
3.138	70.20
3.146	51.90
3.152	37.50
3.160	10.00
3.168	-13.20
3.176	-28.80
3.186	-42.10
3.200	-54.80
3.220	-67.50
3.250	-79.30
3.300	-93.20
3.350	-103.30
3.450	-118.30
3.600	-135.80
3.800	-156.60
4.000	-178.05
4.202	-198.50
4.400	-213.40
4.600	-223.60
4.900	-234.20

GG2373A

ML	EH
0.000	299.00
.100	297.95
.740	290.05
1.360	280.10
1.820	269.85
2.140	259.95
2.370	249.70
2.530	239.60
2.640	229.60
2.714	220.00
2.780	208.60
2.814	199.60
2.844	189.60
2.866	180.00
2.884	170.10
2.900	157.10
2.910	146.20
2.920	135.00
2.928	120.45
2.934	108.60
2.940	90.50
2.944	63.30
2.948	25.90
2.952	18.70
2.956	-56.70
2.960	-75.80
2.964	-93.30
2.970	-107.70
2.980	-126.50
2.990	-138.60
3.002	-150.50
3.026	-165.10
3.070	-180.70
3.140	-195.30
3.270	-210.60
3.500	-225.30
3.750	-235.20
4.000	-242.00
4.500	-251.50

GG2421B

ML	EH
0.000	296.90
.100	295.80
.650	289.10
1.400	277.00
1.800	268.00
2.100	258.70
2.300	250.30
2.500	238.30
2.650	223.95
2.750	207.90
2.804	193.05
2.841	178.10
2.860	166.30
2.878	151.50
2.892	135.10
2.900	120.30
2.908	99.90
2.916	71.70
2.922	38.70
2.930	-37.60
2.940	-86.80
2.950	-109.60
2.960	-124.30
2.980	-143.20
3.010	-162.20
3.060	-180.40

GG3374B

ML	EH
0.000	299.10
.100	298.00
.750	290.05
1.380	280.10
1.840	270.00
2.170	260.05
2.400	250.10
2.568	239.95
2.684	229.90
2.764	219.80
2.824	209.60
2.864	200.10
2.900	188.80
2.920	180.05
2.940	170.00
2.952	160.80
2.968	149.15
2.978	139.70
2.986	130.30
2.993	119.90
2.998	109.10
3.002	98.45
3.006	84.60
3.010	65.40
3.014	41.10
3.018	10.00
3.022	-28.00
3.026	-54.40
3.030	-75.40
3.035	-93.80
3.040	-105.40
3.046	-117.30
3.054	-128.50
3.064	-137.70
3.080	-150.80
3.105	-165.30
3.144	-179.65
3.220	-195.40
3.350	-210.60
3.570	-224.90
3.750	-232.40
4.000	-239.90

GG3421B

ML	EH
0.000	297.00
.100	296.00
.650	289.30
1.300	279.25
1.750	269.80
2.100	259.60
2.350	249.20
2.500	240.30
2.620	230.80
2.710	220.50
2.770	210.90
2.820	199.90
2.852	190.10
2.878	179.30
2.896	169.90
2.910	160.10
2.922	150.20
2.932	140.20
2.940	130.70
2.948	117.60
2.954	105.10
2.960	87.30
2.964	74.10
2.970	43.20
2.976	5.30
2.982	-37.80
2.990	-67.70
3.000	-90.50
3.010	-103.60
3.026	-117.70
3.050	-133.50
3.090	-153.70
3.150	-175.90
3.220	-191.70
3.300	-203.20
3.400	-212.90
3.550	-223.20

HH1377B

ML	EH
0.000	298.60
.100	296.90
.680	290.10
1.328	280.20
1.816	270.00
2.168	260.00
2.420	249.80
2.596	240.00
2.726	230.05
2.824	219.90
2.900	209.30
2.952	199.70
2.996	190.00
3.030	180.00
3.062	169.45
3.088	159.90
3.108	149.85
3.128	139.40
3.144	129.25
3.157	119.60
3.170	109.60
3.180	99.40
3.190	87.90
3.200	67.90
3.206	52.40
3.212	33.90
3.220	7.40
3.226	-10.70
3.232	-24.40
3.240	-39.30
3.250	-52.90
3.270	-68.40
3.300	-82.80
3.350	-99.30
3.424	-115.00
3.520	-130.10
3.700	-153.70
3.810	-168.20
4.000	-192.00

HH1399C

ML	EH
0.000	297.80
.100	296.75
.680	290.90
1.300	280.60
1.820	270.10
2.170	260.30
2.450	249.30
2.656	237.90
2.770	228.50
2.850	220.10
2.926	209.80
2.980	199.95
3.030	187.90
3.060	178.50
3.090	168.30
3.110	159.20
3.130	149.60
3.150	137.10
3.170	123.10
3.182	113.50
3.196	98.40
3.206	81.50
3.214	66.30
3.222	47.50
3.228	32.55
3.234	15.30
3.240	-3.70
3.246	-24.40
3.252	-38.10
3.260	-49.10
3.276	-63.50
3.292	-72.90
3.310	-82.00
3.340	-92.90
3.390	-105.50
3.440	-115.70
3.500	-125.30
3.570	-135.30
3.650	-145.70
3.750	-158.30
3.850	-171.00
3.930	-181.30
4.000	-189.50
4.100	-200.30
4.250	-212.75
4.500	-226.30
4.700	-233.70

HH2378B

ML	EH
0.000	298.60
.100	297.50
.680	290.50
1.350	279.90
1.800	270.20
2.140	260.00
2.370	249.80
2.530	240.10
2.640	230.50
2.730	219.40
2.790	208.80
2.824	200.00
2.854	190.15
2.878	180.10
2.896	169.10
2.907	159.60
2.917	150.40
2.927	140.20
2.934	130.10
2.940	121.10
2.950	92.55
2.954	74.50
2.958	49.30
2.962	18.30
2.966	-28.10
2.970	-57.60
2.976	-89.70
2.982	-106.00
2.988	-117.90
2.996	-130.80
3.006	-142.60
3.024	-156.10
3.042	-165.30
3.086	-181.00
3.154	-195.80
3.280	-210.50
3.510	-225.70
3.750	-235.20
4.000	-242.10
4.500	-251.70

HH2399B

ML	EH
0.000	297.60
.100	296.50
.700	289.10
1.270	280.20
1.750	270.15
2.100	259.80
2.330	250.20
2.500	240.00
2.620	229.90
2.700	219.90
2.758	210.10
2.800	200.30
2.832	190.00
2.854	179.80
2.872	169.80
2.890	156.60
2.902	143.20
2.914	123.60
2.920	112.40
2.926	93.30
2.932	68.60
2.938	23.20
2.944	-45.90
2.950	-84.70
2.956	-103.00
2.962	-115.00
2.970	-126.10
2.980	-137.30
2.992	-147.30
3.006	-158.10
3.020	-164.80
3.050	-176.70
3.100	-189.50
3.170	-201.10
3.260	-210.80
3.400	-220.70
3.600	-230.50
3.900	-240.20

HH3378B

ML	EH
0.000	298.00
.100	296.90
.670	290.10
1.330	280.00
1.808	270.00
2.150	260.05
2.390	250.10
2.564	240.00
2.696	229.90
2.772	220.00
2.834	209.80
2.880	200.00
2.912	190.00
2.940	180.00
2.960	170.20
2.980	159.20
2.993	149.80
3.004	138.55
3.014	128.40
3.022	119.20
3.028	110.00
3.034	99.60
3.040	85.30
3.044	71.00
3.048	53.10
3.052	31.50
3.056	-4.60
3.060	-34.60
3.064	-60.20
3.068	-75.80
3.074	-97.00
3.080	-109.40
3.090	-127.90
3.100	-141.60
3.116	-155.00
3.146	-170.30
3.200	-186.80
3.244	-195.30
3.360	-209.50
3.580	-224.80
3.760	-232.60
4.000	-240.00

HH3399B

ML	EH
0.000	298.00
.100	296.90
.650	290.20
1.300	280.20
1.770	270.20
2.114	260.10
2.350	250.20
2.530	239.50
2.640	230.30
2.730	219.80
2.790	210.00
2.834	200.30
2.870	189.05
2.900	177.40
2.920	166.80
2.940	154.20
2.956	138.80
2.966	128.40
2.976	115.60
2.984	101.80
2.990	87.80
3.000	49.00
3.006	14.00
3.012	-44.60
3.018	-72.20
3.024	-94.70
3.032	-113.80
3.040	-125.70
3.050	-139.30
3.060	-148.30
3.080	-160.40
3.110	-173.90
3.150	-185.50
3.200	-194.90
3.300	-207.70
3.450	-219.60
3.700	-231.80

II1380A

ML	EH
0.000	297.90
.100	296.90
.680	290.00
1.340	280.10
1.830	269.95
2.180	260.20
2.440	249.90
2.620	239.90
2.750	230.00
2.850	219.60
2.920	209.50
2.973	200.10
3.014	189.85
3.048	179.60
3.076	169.80
3.100	159.00
3.118	149.20
3.133	140.10
3.148	129.90
3.160	120.10
3.172	109.40
3.180	100.15
3.186	91.70
3.194	78.80
3.200	64.70
3.206	49.30
3.212	28.00
3.218	1.80
3.224	-24.80
3.230	-44.40
3.236	-58.10
3.244	-70.60
3.256	-84.50
3.280	-100.90
3.307	-114.90
3.350	-131.05
3.400	-146.00
3.452	-160.00
3.514	-174.90
3.600	-190.80
3.720	-206.00
3.850	-216.60
4.000	-225.05

II1399C

ML	EH
0.000	297.40
.100	296.35
.600	290.40
1.300	280.00
1.780	270.30
2.150	259.85
2.400	250.00
2.600	238.90
2.720	229.65
2.810	220.20
2.900	207.10
2.940	199.35
2.978	189.90
3.010	179.90
3.040	168.80
3.060	158.80
3.080	148.60
3.100	136.00
3.120	119.65
3.140	99.10
3.150	83.75
3.156	73.05
3.162	61.35
3.168	49.70
3.174	37.10
3.182	11.70
3.190	-15.25
3.198	-44.10
3.206	-63.60
3.214	-74.50
3.222	-82.90
3.232	-91.60
3.250	-104.00
3.270	-113.40
3.300	-124.80
3.340	-137.80
3.400	-154.30
3.470	-171.80
3.560	-189.30
3.660	-202.70
3.800	-215.00
4.000	-226.25

II2381B

ML	EH
0.000	298.00
.100	296.90
.676	290.05
1.320	280.20
1.810	269.90
2.150	259.85
2.380	250.20
2.554	240.00
2.674	229.80
2.760	219.40
2.814	210.05
2.860	199.50
2.890	190.10
2.912	179.90
2.930	170.40
2.946	158.70
2.956	150.00
2.966	140.00
2.974	129.45
2.980	119.30
2.985	109.30
2.990	95.50
2.994	80.40
2.998	51.40
3.002	14.00
3.006	-39.20
3.010	-70.20
3.014	-87.90
3.020	-106.30
3.028	-121.90
3.038	-135.30
3.058	-153.60
3.086	-168.40
3.120	-180.90
3.188	-195.10
3.310	-210.20
3.540	-225.50
3.750	-234.20
4.000	-241.40

II2404A

ML	EH
0.000	297.10
.100	296.10
.600	290.10
1.250	280.30
1.750	270.00
2.100	259.80
2.340	250.10
2.520	239.50
2.650	228.30
2.720	220.00
2.790	208.20
2.830	198.20
2.860	188.15
2.890	175.10
2.910	161.40
2.924	149.70
2.940	129.00
2.950	108.90
2.956	91.20
2.962	63.80
2.968	17.90
2.972	-23.40
2.976	-62.60
2.980	-82.90
2.984	-98.10
2.990	-113.10
3.000	-131.80
3.010	-142.30
3.030	-158.30
3.050	-168.40
3.080	-179.00
3.120	-189.10
3.180	-199.30
3.280	-210.70
3.450	-222.80
3.600	-230.05

II3382B

ML	EH
0.000	297.40
.100	296.30
.620	290.10
1.280	280.10
1.760	270.10
2.110	259.90
2.350	250.00
2.520	240.00
2.644	229.90
2.730	219.90
2.792	210.00
2.840	199.50
2.872	190.10
2.898	179.90
2.919	169.90
2.936	160.30
2.949	150.00
2.961	139.60
2.971	130.00
2.979	120.15
2.986	109.50
2.992	98.50
2.996	87.10
3.000	72.10
3.004	53.80
3.008	31.20
3.012	-3.80
3.016	-44.60
3.020	-65.50
3.024	-86.40
3.028	-96.30
3.034	-111.80
3.042	-125.50
3.054	-140.40
3.072	-155.00
3.100	-170.20
3.147	-185.00
3.230	-200.20
3.380	-215.40
3.640	-230.00
4.000	-241.60

II3404A

ML	EH
0.000	297.30
.100	296.25
.600	290.30
1.300	279.90
1.770	270.30
2.200	257.60
2.400	249.05
2.550	240.40
2.670	230.90
2.770	219.90
2.842	208.30
2.900	194.60
2.940	180.35
2.960	170.45
2.980	159.00
3.000	143.00
3.014	127.90
3.024	113.35
3.032	98.30
3.040	78.10
3.046	49.80
3.050	27.30
3.054	-6.90
3.058	-39.80
3.062	-61.70
3.068	-84.10
3.074	-99.20
3.082	-113.20
3.090	-123.40
3.104	-140.00
3.118	-150.65
3.134	-158.80
3.160	-171.35
3.190	-180.30
3.240	-192.00
3.300	-200.90
3.400	-211.40
3.550	-222.05
3.700	-229.30

JJ1383B

ML	EH
0.000	297.20
.100	296.10
.630	289.90
1.300	279.80
1.800	269.55
2.200	257.70
2.400	249.40
2.570	240.00
2.710	229.10
2.800	219.50
2.880	208.10
2.930	198.50
2.970	189.90
3.010	179.80
3.050	169.50
3.100	157.20
3.130	149.75
3.170	141.20
3.210	134.70
3.260	124.50
3.310	112.30
3.360	93.90
3.380	84.00
3.400	72.10
3.420	59.30
3.440	47.80
3.460	34.40
3.480	23.90
3.500	6.20
3.520	-11.60
3.540	-10.70
3.550	-30.80
3.570	-58.10
3.600	-84.70
3.650	-109.80
3.700	-126.60
3.800	-153.70
3.880	-171.60
4.000	-192.20

JJ1407A

ML	EH
0.000	298.20
.100	297.10
.670	290.10
1.300	280.30
1.770	270.25
2.130	259.55
2.360	249.60
2.530	239.65
2.650	229.60
2.746	218.80
2.806	209.80
2.870	197.25
2.904	189.35
2.944	178.80
2.980	169.60
3.020	159.30
3.060	149.50
3.100	141.00
3.150	132.00
3.210	118.30
3.250	106.80
3.290	88.70
3.310	75.00
3.330	63.40
3.350	50.00
3.380	30.80
3.420	6.40
3.460	-29.70
3.500	-54.60

JJ2386A

ML	EH
0.000	299.50
.100	298.40
.700	291.20
1.400	280.20
1.850	270.40
2.180	260.30
2.430	249.50
2.600	238.85
2.700	229.90
2.790	218.90
2.840	210.40
2.920	189.00
2.944	179.65
2.964	169.25
2.980	159.20
2.992	150.20
3.002	140.30
3.010	129.20
3.020	116.40
3.030	95.50
3.036	82.80
3.042	65.40
3.048	46.80
3.056	11.70
3.064	-33.20
3.074	-74.50
3.084	-97.30
3.100	-119.00
3.120	-138.20
3.150	-155.80
3.190	-171.20
3.250	-185.90
3.330	-198.30
3.430	-207.60
3.550	-215.30
3.700	-223.40
4.000	-234.90

JJ2405A

ML	EH
0.000	297.00
.100	295.90
.600	290.00
1.300	279.40
1.750	270.10
2.150	258.60
2.370	249.40
2.540	239.60
2.660	229.60
2.750	219.20
2.810	209.40
2.860	197.70
2.900	184.95
2.920	175.70
2.940	164.50
2.958	150.65
2.974	134.10
2.984	120.80
2.992	105.20
2.998	88.80
3.002	74.10
3.006	53.40
3.010	32.65
3.016	-3.40
3.022	-48.00
3.028	-79.60
3.034	-98.60
3.040	-111.20
3.048	-125.90
3.058	-138.50
3.070	-148.70
3.086	-158.50
3.110	-170.60
3.140	-180.60
3.200	-193.90
3.350	-212.30
3.500	-222.70
3.650	-230.00

JJ3387A

ML	EH
0.000	298.70
.100	297.60
.700	290.30
1.350	280.20
1.820	270.10
2.150	260.20
2.390	250.10
2.550	240.60
2.680	229.70
2.770	218.90
2.820	210.50
2.870	199.50
2.900	190.30
2.930	179.30
2.950	169.20
2.964	160.60
2.980	149.50
2.994	138.00
3.004	124.70
3.012	113.80
3.020	98.60
3.026	86.00
3.032	67.80
3.038	44.20
3.044	0.00
3.050	-47.20
3.056	-77.20
3.064	-102.90
3.072	-118.00
3.082	-132.10
3.100	-150.70
3.130	-167.40
3.166	-180.00
3.240	-195.40
3.370	-210.70
3.600	-225.60
3.800	-233.60
4.000	-239.60

JJ3405A

ML	EH
0.000	297.00
.100	295.90
.600	290.00
1.300	279.50
1.800	269.00
2.160	258.20
2.370	249.35
2.550	238.80
2.700	225.60
2.800	212.00
2.870	196.70
2.920	180.30
2.950	165.10
2.970	152.90
2.990	137.00
3.010	108.90
3.020	90.00
3.030	55.90
3.040	2.00
3.044	-33.50
3.048	-59.40
3.054	-89.00
3.060	-105.00
3.068	-119.00
3.078	-131.70
3.090	-142.90
3.110	-158.60
3.140	-172.80
3.180	-184.50
3.240	-196.30
3.320	-206.80
3.420	-215.75
3.600	-226.55

KK1383B

ML	EH
0.000	296.60
.100	295.50
.620	289.20
1.200	280.70
1.730	270.10
2.100	259.80
2.350	250.10
2.530	240.35
2.670	229.70
2.760	220.10
2.830	209.90
2.880	200.30
2.920	189.85
2.950	180.00
2.980	167.90
3.000	157.70
3.014	148.70
3.028	139.90
3.040	129.90
3.050	120.50
3.060	109.90
3.070	98.00
3.080	82.35
3.086	72.00
3.094	60.40
3.104	47.90
3.114	38.30
3.126	27.40
3.140	7.90
3.150	-25.40
3.160	-53.40
3.170	-68.50
3.190	-89.40
3.214	-105.90
3.250	-121.90
3.320	-144.40
3.380	-160.00
3.450	-176.00
3.530	-190.50
3.650	-205.80
3.800	-218.00
4.000	-228.70

KK1407A

ML	EH
0.000	298.30
.100	297.20
.660	290.40
1.330	280.10
1.800	270.30
2.150	260.20
2.400	249.90
2.570	240.10
2.690	230.60
2.790	219.60
2.850	209.95
2.902	199.60
2.938	189.70
2.966	179.40
2.990	169.60
3.010	158.30
3.030	144.90
3.044	134.90
3.058	120.70
3.070	107.60
3.078	98.10
3.086	86.30
3.094	72.90
3.102	60.20
3.110	51.30
3.124	37.60
3.140	21.90
3.160	-25.30
3.172	-54.30
3.184	-70.60
3.200	-84.40
3.220	-97.00
3.250	-111.80
3.290	-125.00
3.330	-136.80
3.380	-149.00
3.450	-165.00
3.520	-178.90
3.620	-194.40
3.750	-208.40
4.000	-224.30

KK2386A

ML	EH
0.000	298.80
.100	297.80
.700	290.50
1.400	279.50
1.830	270.00
2.170	259.70
2.400	249.60
2.560	239.90
2.670	230.50
2.760	219.60
2.820	209.15
2.860	199.55
2.890	189.80
2.914	179.80
2.933	169.95
2.950	157.60
2.960	149.20
2.970	139.25
2.981	125.10
2.990	109.10
2.996	91.70
3.001	73.65
3.006	44.00
3.010	11.20
3.014	-20.30
3.020	-59.00
3.030	-88.90
3.040	-104.80
3.050	-117.30
3.064	-130.40
3.080	-141.90
3.100	-153.40
3.130	-167.00
3.170	-179.30
3.220	-190.80
3.284	-200.20
3.380	-210.50
3.530	-221.00
3.730	-230.50
4.000	-239.05

KK2408A

ML	EH
0.000	298.30
.100	297.20
.650	290.40
1.300	280.20
1.760	270.10
2.100	259.80
2.320	250.25
2.484	240.30
2.600	230.20
2.682	220.30
2.740	210.15
2.786	199.85
2.820	188.50
2.840	179.55
2.858	169.60
2.874	158.85
2.886	149.70
2.896	138.70
2.904	126.80
2.912	113.70
2.920	95.90
2.926	76.25
2.930	59.30
2.934	39.65
2.938	12.20
2.942	-24.20
2.946	-54.10
2.950	-69.55
2.955	-81.40
2.964	-97.20
2.976	-110.20
2.990	-122.30
3.006	-135.00
3.026	-147.20
3.052	-160.00
3.080	-169.90
3.140	-185.60
3.240	-201.10
3.400	-215.55
3.650	-228.90

KK3387A

ML	EH
0.000	298.60
.100	297.55
.700	290.65
1.400	280.20
1.900	269.85
2.230	260.40
2.480	250.10
2.650	240.30
2.780	229.50
2.880	217.30
2.922	210.30
2.970	199.70
3.000	190.75
3.030	179.60
3.050	169.80
3.066	160.30
3.080	150.30
3.090	141.90
3.100	131.70
3.110	118.40
3.120	102.00
3.126	89.90
3.132	68.60
3.138	42.90
3.144	-4.00
3.150	-61.40
3.160	-103.90
3.170	-122.30
3.180	-136.60
3.200	-154.60
3.230	-170.80
3.278	-184.90
3.360	-200.20
3.520	-216.20
3.770	-230.00
4.000	-238.20

KK3408A

ML	EH
0.000	298.95
.100	292.85
.740	289.90
1.360	279.85
1.820	269.60
2.[illegible]40	259.60
2.[illegible]0	247.70
2.[illegible]20	240.10
2.640	229.60
2.720	219.90
2.780	209.80
2.822	200.05
2.856	189.05
2.880	180.35
2.900	170.30
2.918	159.00
2.930	149.40
2.940	140.30
2.950	127.95
2.960	113.10
2.970	95.50
2.978	76.60
2.984	54.20
2.990	28.90
3.000	-42.70
3.010	-93.00
3.020	-111.20
3.040	-136.60
3.060	-151.90
3.090	-163.60
3.130	-178.80
3.190	-191.70
3.270	-203.30
3.370	-212.80
3.500	-221.40

LL1392A

ML	EH
0.000	299.30
.100	298.25
.700	291.10
1.400	280.30
1.880	269.90
2.200	260.15
2.440	250.05
2.600	240.35
2.730	229.30
2.810	219.60
2.870	209.60
2.910	200.60
2.950	189.00
2.974	179.85
3.000	168.00
3.014	159.75
3.030	148.35
3.050	130.60
3.060	118.50
3.070	103.40
3.080	82.20
3.090	53.50
3.100	-4.70
3.110	-62.10
3.120	-83.60
3.136	-102.90
3.154	-117.70
3.170	-127.90
3.190	-138.20
3.220	-152.90
3.260	-167.90
3.310	-181.60
3.370	-193.00
3.500	-208.60
3.650	-219.55
3.800	-227.10
4.000	-234.45

LL1410A

ML	EH
0.000	297.95
.100	296.85
.670	290.10
1.320	280.20
1.800	270.30
2.150	260.20
2.400	250.00
2.600	238.10
2.700	229.70
2.780	220.65
2.850	209.30
2.900	198.90
2.930	190.05
2.954	181.40
2.978	171.70
2.992	165.00
3.020	145.10
3.036	130.10
3.046	117.90
3.056	101.80
3.064	87.10
3.072	66.40
3.078	42.50
3.084	14.50
3.090	-16.70
3.096	-35.80
3.102	-49.10
3.110	-61.10
3.122	-71.60
3.140	-83.30
3.180	-100.00
3.230	-115.05
3.300	-129.90
3.400	-148.40
3.510	-168.30
3.600	-183.10
3.720	-198.80
3.850	-210.70
4.000	-220.00

LL2393A

ML	EH
0.000	299.70
.100	298.70
.700	291.35
1.400	280.20
1.840	270.30
2.160	260.30
2.390	250.20
2.550	240.20
2.670	229.40
2.746	219.95
2.804	209.90
2.850	199.00
2.880	189.70
2.906	179.40
2.926	169.75
2.945	159.30
2.959	149.90
2.974	139.50
2.990	129.20
3.002	120.20
3.015	112.20
3.030	100.90
3.042	89.80
3.050	76.30
3.060	53.90
3.070	23.30
3.076	4.60
3.084	-12.90
3.096	-38.60
3.106	-60.90
3.120	-87.30
3.130	-101.50
3.150	-121.40
3.170	-136.40
3.200	-153.10
3.230	-166.00
3.270	-178.50
3.310	-187.10
3.400	-200.85
3.560	-215.50
3.730	-225.15
4.000	-235.20

LL2409A

ML	EH
0.000	297.70
.100	296.60
.700	289.10
1.260	280.30
1.750	269.80
2.100	259.30
2.320	249.90
2.500	238.80
2.600	230.05
2.690	219.30
2.750	208.85
2.794	199.20
2.830	187.80
2.860	175.40
2.886	163.90
2.910	148.50
2.930	134.85
2.946	122.80
2.960	113.30
2.980	99.40
3.000	74.80
3.020	24.60
3.028	-.20
3.036	-17.40
3.044	-39.30
3.060	-77.50
3.080	-106.70
3.110	-139.10
3.140	-156.70
3.180	-172.80

LL3393A

ML	EH
0.000	300.00
.100	298.90
.700	291.70
1.420	280.05
1.860	270.10
2.200	259.20
2.400	250.30
2.560	240.20
2.680	229.45
2.754	220.20
2.820	208.75
2.856	200.00
2.890	189.85
2.914	179.85
2.934	170.30
2.950	159.80
2.962	150.50
2.974	140.20
2.984	130.40
2.994	117.30
3.002	103.70
3.008	91.30
3.014	74.60
3.020	55.60
3.024	38.70
3.028	21.40
3.034	-6.80
3.040	-45.40
3.046	-74.70
3.054	-99.10
3.062	-114.20
3.072	-128.10
3.084	-139.40
3.106	-155.10
3.138	-170.30
3.170	-180.40
3.250	-196.10
3.380	-210.60
3.530	-220.90
3.750	-230.90
4.000	-238.70

LL3409A

ML	EH
0.000	298.05
.100	296.90
.700	289.60
1.300	280.35
1.800	269.80
2.150	259.20
2.360	250.30
2.540	239.80
2.660	229.60
2.750	218.90
2.806	210.10
2.850	200.20
2.890	189.20
2.920	176.70
2.960	152.20
2.976	139.90
2.990	126.50
3.000	111.45
3.010	91.80
3.016	75.90
3.022	56.80
3.028	30.90
3.034	2.90
3.038	-15.80
3.044	-57.30
3.050	-83.10
3.058	-101.30
3.066	-113.50
3.076	-124.40
3.090	-137.00
3.110	-153.10
3.140	-168.50
3.190	-183.50
3.250	-195.90
3.330	-206.05
3.420	-214.20
3.600	-225.30

MM1396A

ML	EH
0.000	298.20
.100	297.15
.700	289.90
1.350	279.70
1.800	270.20
2.150	260.00
2.400	249.50
2.570	239.60
2.700	229.00
2.780	219.90
2.846	209.90
2.900	199.30
2.934	190.30
2.966	180.20
2.994	170.10
3.020	158.40
3.038	149.40
3.054	139.90
3.070	130.20
3.086	120.20
3.100	110.30
3.113	100.80
3.126	90.70
3.138	82.50
3.150	73.40
3.170	54.90
3.186	37.00
3.200	14.60
3.210	-7.10
3.220	-23.00
3.230	-38.60
3.250	-67.60
3.270	-93.00
3.290	-112.80
3.310	-128.10
3.340	-145.80
3.390	-167.00
3.440	-181.30
3.510	-194.70
3.610	-206.90
3.750	-218.10
4.000	-230.40

MM1410A

ML	EH
0.000	297.50
.100	296.40
.620	290.20
1.300	279.90
1.770	270.20
2.150	259.30
2.370	250.30
2.550	240.30
2.700	228.30
2.780	219.50
2.840	210.35
2.894	200.10
2.932	190.10
2.964	179.80
2.992	169.80
3.012	159.90
3.030	149.90
3.048	138.70
3.062	128.75
3.074	119.70
3.086	110.45
3.098	99.10
3.110	86.10
3.120	77.50
3.134	65.10
3.150	48.50
3.165	29.70
3.178	5.70
3.186	-9.90
3.194	-30.00
3.200	-41.50
3.214	-68.40
3.230	-90.10
3.250	-114.10
3.290	-140.60
3.330	-160.80
3.380	-177.20
3.440	-190.80
3.500	-199.60
3.600	-210.30
3.750	-221.10

MM2394B

ML	EH
0.000	299.60
.100	298.60
.700	291.30
1.400	280.30
1.850	270.45
2.200	259.65
2.400	251.00
2.580	240.10
2.700	229.80
2.800	217.10
2.850	207.90
2.890	198.70
2.920	189.15
2.940	181.70
2.960	171.40
2.980	159.60
2.995	149.00
3.008	135.70
3.020	122.00
3.030	105.10
3.038	88.40
3.044	69.40
3.048	52.20
3.052	35.20
3.056	16.80
3.060	-5.80
3.064	-34.40
3.068	-57.60
3.072	-76.50
3.076	-89.00
3.082	-104.60
3.090	-118.60
3.106	-138.80
3.120	-150.30
3.140	-161.70
3.180	-177.20
3.230	-189.35
3.320	-202.80
3.500	-218.10
3.700	-228.40
4.000	-238.50

MM2411A

ML	EH
0.000	297.30
.100	296.20
.600	290.20
1.300	279.40
1.750	269.70
2.100	259.30
2.330	249.50
2.500	239.20
2.610	230.00
2.700	219.70
2.760	209.85
2.810	198.70
2.840	189.90
2.866	180.10
2.890	168.95
2.910	155.20
2.924	143.80
2.934	133.90
2.944	121.00
2.954	102.70
2.962	86.00
2.968	70.50
2.974	55.00
2.980	37.60
2.986	19.80
2.991	10.80
3.000	-31.90
3.020	-93.90
3.040	-118.20
3.070	-140.50
3.110	-160.90
3.150	-175.60
3.200	-187.30
3.270	-199.10
3.360	-209.30
3.500	-219.40

MM3394A

ML	EH
0.000	299.10
.100	298.00
.700	290.60
1.350	280.20
1.800	270.25
2.130	260.10
2.360	249.90
2.520	240.10
2.630	230.60
2.720	219.70
2.780	209.35
2.820	200.20
2.854	189.45
2.880	179.40
2.900	169.75
2.916	160.10
2.930	150.30
2.942	139.95
2.952	128.60
2.960	117.20
2.970	100.20
2.978	79.70
2.984	60.10
2.990	29.70
2.996	-12.20
3.002	-57.00
3.008	-81.90
3.016	-105.90
3.026	-123.90
3.040	-140.80
3.060	-156.90
3.100	-174.50
3.150	-188.00
3.220	-199.45
3.320	-210.30
3.500	-222.50
3.700	-231.40
4.000	-240.50

MM3411A

ML	EH
0.000	297.50
.100	296.50
.620	290.20
1.280	280.10
1.760	270.00
2.110	259.90
2.350	250.00
2.530	239.40
2.650	229.30
2.730	220.10
2.800	209.00
2.840	200.00
2.876	189.75
2.902	180.20
2.922	170.20
2.940	159.70
2.956	147.40
2.970	135.20
2.982	121.70
2.992	105.30
3.000	84.90
3.006	63.80
3.012	30.70
3.018	-11.30
3.024	-50.50
3.030	-73.20
3.040	-101.60
3.050	-120.10
3.060	-132.90
3.074	-144.60
3.090	-154.10
3.114	-167.70
3.150	-180.40
3.200	-191.30
3.300	-205.50
3.420	-216.30
3.550	-224.35

NN1396A

ML	EH
0.000	298.70
.100	297.70
.700	290.55
1.400	279.80
1.850	270.35
2.200	260.20
2.450	250.00
2.630	239.85
2.750	230.40
2.850	219.70
2.920	209.40
3.000	192.50
3.044	179.40
3.070	169.55
3.092	160.10
3.112	149.20
3.130	138.80
3.142	130.80
3.154	119.70
3.164	111.10
3.174	99.40
3.184	86.90
3.200	62.30
3.214	44.90
3.228	30.00
3.240	3.20
3.250	-27.40
3.260	-44.90
3.274	-59.60
3.290	-70.30
3.316	-83.60
3.360	-98.30
3.460	-119.40
3.700	-153.40
3.830	-170.70
4.000	-191.70
4.200	-210.30
4.400	-222.40

NN1413A

ML	EH
0.000	296.25
.100	295.15
.600	289.20
1.200	280.45
1.700	270.70
2.100	259.90
2.400	248.15
2.550	239.90
2.700	228.80
2.800	218.40
2.860	209.60
2.900	203.10
2.950	191.20
2.990	180.80
3.020	169.50
3.044	159.30
3.060	151.00
3.080	140.70
3.100	127.20
3.116	111.70
3.130	96.20
3.140	82.60
3.148	69.40
3.154	60.00
3.162	50.70
3.174	39.30
3.188	22.50
3.204	-24.30
3.216	-47.80
3.230	-62.00
3.254	-78.00
3.290	-91.75
3.350	-108.70
3.430	-123.70
3.530	-138.50
3.650	-154.40
3.800	-173.70
4.000	-198.20
4.100	-207.30
4.250	-218.00

NN2395A

ML	EH
0.000	298.80
.100	297.70
.700	290.30
1.330	280.40
1.800	270.20
2.130	260.20
2.360	250.30
2.530	240.00
2.650	229.70
2.730	220.30
2.790	210.80
2.840	199.90
2.874	189.80
2.900	180.40
2.922	170.10
2.940	159.70
2.954	149.40
2.966	139.70
2.976	130.10
2.986	119.00
2.996	104.10
3.004	85.00
3.010	66.50
3.016	45.10
3.022	17.20
3.028	-16.60
3.034	-52.20
3.040	-77.70
3.046	-96.20
3.052	-108.10
3.060	-119.80
3.074	-135.50
3.090	-147.40
3.110	-160.10
3.140	-172.60
3.190	-186.20
3.260	-198.50
3.360	-209.60
3.500	-219.90
3.700	-229.60
4.000	-239.35

NN2412A

ML	EH
0.000	297.00
.100	295.85
.600	289.80
1.240	280.10
1.720	270.20
2.100	259.30
2.320	250.20
2.500	239.80
2.620	230.30
2.720	219.00
2.800	205.70
2.860	189.90
2.890	180.40
2.910	171.20
2.926	162.60
2.940	154.40
2.954	143.10
2.970	129.30
2.982	117.30
2.990	105.60
2.996	94.60
3.000	86.90
3.006	67.40
3.010	51.50
3.014	34.00
3.018	17.00
3.022	-.60
3.028	-35.30
3.034	-66.40
3.040	-81.50
3.048	-102.40
3.056	-115.40
3.066	-126.60
3.078	-136.70
3.094	-148.80
3.110	-159.10
3.130	-168.20
3.180	-183.60
3.242	-196.20
3.320	-206.10
3.420	-215.00
3.600	-225.80

NN3395A

ML	EH
0.000	298.40
.100	297.35
.700	289.90
1.300	280.50
1.800	269.60
2.100	260.50
2.350	249.85
2.500	240.80
2.620	230.85
2.710	220.20
2.770	210.10
2.814	200.40
2.846	190.45
2.872	180.40
2.900	166.00
2.920	152.50
2.934	140.30
2.944	128.90
2.952	116.95
2.960	100.60
2.966	86.10
2.970	74.00
2.976	46.70
2.982	12.90
2.988	-28.60
2.994	-61.40
3.000	-84.20
3.006	-99.60
3.012	-110.70
3.020	-122.40
3.030	-132.90
3.050	-149.90
3.076	-164.40
3.110	-176.90
3.160	-189.25
3.250	-202.90
3.400	-216.35
3.600	-227.50
3.800	-235.00
4.000	-240.70

NN3412A

ML	EH
0.000	297.60
.102	296.45
.600	290.50
1.300	280.00
1.770	270.20
2.150	259.20
2.370	250.10
2.550	239.60
2.666	230.30
2.760	219.30
2.820	209.65
2.870	198.90
2.906	188.10
2.930	177.40
2.946	169.90
2.964	159.10
2.980	148.20
2.990	139.50
3.000	127.60
3.010	112.90
3.016	100.40
3.022	86.80
3.028	64.40
3.034	34.40
3.040	1.90
3.044	-17.00
3.050	-48.00
3.060	-80.20
3.070	-95.80
3.090	-118.60
3.110	-133.20
3.140	-150.80
3.180	-166.60
3.230	-181.00
3.290	-192.20
3.370	-203.10
3.470	-212.00

001413A

ML	EH
0.000	296.20
.100	295.10
.600	289.20
1.220	280.15
1.720	270.50
2.100	260.55
2.380	250.40
2.580	240.50
2.720	230.95
2.840	219.90
2.920	210.20
2.990	199.90
3.042	189.50
3.086	179.90
3.120	170.20
3.156	158.80
3.182	150.30
3.208	139.35
3.230	128.00
3.246	119.60
3.260	110.80
3.280	96.70
3.300	76.60
3.316	53.20
3.330	28.20
3.340	12.90
3.350	-7.00
3.370	-34.50
3.390	-52.90
3.420	-74.10
3.450	-86.50
3.500	-101.20
3.570	-116.50
3.650	-130.00
3.760	-145.60
3.880	-161.50
4.000	-177.30
4.130	-193.60
4.270	-208.00
4.400	-217.20
4.550	-225.60

001423A

ML	EH
0.000	296.50
.100	295.40
.600	289.50
1.230	280.30
1.760	269.85
2.150	259.15
2.380	250.40
2.600	239.00
2.720	230.80
2.840	219.95
2.920	210.20
2.990	199.60
3.040	190.20
3.084	180.10
3.120	170.60
3.154	160.20
3.184	149.50
3.210	138.55
3.230	129.55
3.250	119.00
3.270	106.30
3.280	98.80
3.290	90.00
3.300	80.30
3.310	68.10
3.320	54.60
3.330	40.10
3.340	26.20
3.350	11.70
3.362	-6.50
3.380	-26.70
3.400	-44.60
3.430	-62.00
3.480	-78.70
3.560	-96.00
3.680	-112.80
3.800	-125.30
4.000	-142.90
4.500	-186.30
4.720	-205.00

002414A

ML	EH
0.000	295.90
.100	294.80
.600	288.80
1.200	279.90
1.700	270.00
2.060	260.20
2.320	250.20
2.510	240.10
2.644	230.10
2.750	219.00
2.830	207.60
2.874	199.40
2.914	189.60
2.950	179.10
2.980	169.00
3.000	160.90
3.020	150.90
3.040	140.60
3.060	127.70
3.080	112.60
3.100	89.20
3.114	59.00
3.122	38.00
3.130	9.30
3.138	-20.10
3.146	-52.00
3.154	-71.80
3.162	-84.30
3.174	-98.80
3.190	-113.50
3.210	-128.70
3.240	-144.80
3.280	-160.40
3.330	-177.50
3.390	-190.40
3.460	-201.10
3.550	-210.30
3.650	-218.00

002420A

ML	EH
0.000	298.00
.100	296.90
.650	290.20
1.300	280.00
1.800	269.10
2.100	260.05
2.350	249.60
2.550	237.30
2.650	228.60
2.720	220.70
2.790	210.40
2.844	199.90
2.884	189.70
2.914	180.00
2.940	170.80
2.960	161.95
2.980	152.30
3.000	140.40
3.015	130.50
3.026	122.10
3.040	109.30
3.050	96.30
3.058	83.60
3.064	72.00
3.070	55.10
3.074	41.50
3.078	27.40
3.084	-1.60
3.090	-28.20
3.096	-53.90
3.102	-71.70
3.110	-89.30
3.120	-105.80
3.130	-118.00
3.150	-135.90
3.170	-148.70
3.200	-163.70
3.240	-176.70
3.290	-187.60
3.350	-197.80
3.430	-207.10
3.550	-217.00
3.700	-225.50

003414A

ML	EH
0.000	295.70
.100	294.60
.600	288.70
1.200	279.90
1.700	270.10
2.070	260.30
2.350	250.00
2.550	239.60
2.700	228.80
2.800	219.10
2.870	210.10
2.930	200.10
2.980	190.50
3.020	180.30
3.054	170.00
3.086	159.90
3.110	149.50
3.130	139.90
3.150	129.40
3.170	117.25
3.188	103.90
3.200	91.50
3.210	77.30
3.220	62.40
3.230	44.20
3.240	26.60
3.250	5.90
3.260	-15.40
3.270	-32.70
3.280	-47.70
3.290	-60.00
3.310	-80.50
3.335	-96.00
3.370	-110.50
3.430	-130.30
3.500	-147.90
3.580	-166.50
3.660	-182.90
3.750	-196.90
3.870	-209.80
4.000	-219.30

003420A

ML	EH
0.000	297.90
.100	296.80
.650	290.20
1.300	280.20
1.800	269.80
2.150	259.70
2.380	250.40
2.560	240.50
2.700	229.90
2.800	219.60
2.870	210.10
2.930	199.60
2.974	190.10
3.010	180.40
3.054	166.60
3.100	148.30
3.120	138.00
3.140	127.20
3.160	112.70
3.170	104.30
3.180	94.50
3.190	82.90
3.200	66.20
3.210	46.90
3.218	29.00
3.226	11.70
3.234	-5.80
3.242	-21.90
3.250	-39.70
3.260	-56.20
3.280	-79.70
3.300	-96.40
3.330	-115.40
3.360	-128.80
3.400	-143.50
3.450	-159.90
3.530	-180.60
3.610	-194.50
3.700	-205.20
3.850	-217.50

S1315A

ML	EH
0.000	313.00
.740	303.00
1.289	293.00
1.692	283.00
1.982	273.00
2.187	263.00
2.333	253.00
2.437	243.00
2.510	233.00
2.565	223.00
2.605	212.90
2.639	202.90
2.663	192.90
2.682	182.85
2.700	172.40
2.716	162.00
2.730	152.60
2.742	141.40
2.752	130.30
2.762	117.75
2.770	104.40
2.778	88.90
2.784	77.30
2.792	59.90
2.800	42.00
2.809	23.20
2.816	5.70
2.824	-12.40
2.836	-36.00
2.850	-53.50
2.870	-69.30
2.900	-84.00
2.940	-97.30
2.990	-111.00
3.050	-124.50
3.120	-138.40
3.220	-157.60
3.340	-176.90
3.470	-192.30
3.600	-202.60
3.772	-212.20
4.000	-221.20
4.400	-231.60
5.000	-241.60

T1315A

ML	EH
0.000	313.00
.948	303.00
1.652	293.00
2.160	282.95
2.518	273.00
2.778	262.65
2.948	252.90
3.067	242.90
3.152	233.00
3.220	221.15
3.254	212.25
3.280	202.85
3.300	192.80
3.320	178.10
3.334	161.64
3.344	138.70
3.354	92.40
3.360	59.20
3.370	1.80
3.380	-33.30
3.390	-52.80
3.400	-62.20
3.420	-74.90
3.444	-85.70
3.480	-98.35
3.550	-115.90
3.590	-124.80
3.660	-138.70
3.770	-158.55
3.892	-176.60
4.054	-192.30
4.214	-202.65
4.434	-212.30
4.729	-221.25
5.245	-231.70
6.034	-241.60

S1311A

ML	EH
0.000	309.90
.832	300.00
1.459	290.00
1.918	280.00
2.255	269.95
2.489	260.00
2.657	250.00
2.777	240.00
2.865	230.00
2.931	220.00
2.980	209.90
3.018	200.10
3.054	190.30
3.084	180.70
3.112	170.80
3.142	160.20
3.164	150.20
3.186	139.10
3.202	128.80
3.214	117.60
3.224	106.50
3.234	94.10
3.244	78.80
3.254	65.20
3.264	51.30
3.274	43.20
3.290	27.30
3.310	11.20
3.330	-1.50
3.360	-18.00
3.390	-29.90
3.430	-42.80
3.480	-55.50
3.550	-69.30
3.620	-80.50
3.700	-90.50
3.800	-100.70
3.940	-112.00
4.100	-122.50
4.300	-133.70
4.600	-147.90
4.900	-162.00
5.300	-178.60
5.600	-188.30
6.000	-202.70

T1311A

ML	EH
0.000	309.90
.804	300.00
1.410	290.00
1.850	280.00
2.164	269.95
2.385	260.00
2.541	250.00
2.649	239.95
2.725	229.85
2.777	219.90
2.814	209.90
2.843	199.90
2.864	188.60
2.874	180.90
2.884	170.70
2.894	158.50
2.904	137.00
2.914	98.40
2.924	49.70
2.934	-11.10
2.944	-49.70
2.954	-64.60
2.964	-75.90
2.984	-89.50
3.010	-101.30
3.050	-114.80
3.110	-131.90
3.170	-146.80
3.230	-160.40
3.290	-172.30
3.360	-183.10
3.440	-192.30
3.540	-201.10
3.640	-207.50

GG1390A

ML	EH
0.000	298.20
.100	297.15
.700	289.90
1.330	280.15
1.800	270.20
2.150	259.95
2.400	249.50
2.560	240.30
2.690	230.00
2.780	220.15
2.850	209.70
2.900	199.90
2.940	190.10
2.972	179.90
2.996	170.35
3.020	159.20
3.040	148.40
3.052	140.00
3.065	130.40
3.076	120.90
3.086	110.50
3.096	99.40
3.104	87.00
3.112	71.90
3.120	55.10
3.130	19.30
3.136	-.40
3.144	-23.50
3.154	-40.90
3.164	-51.90
3.180	-64.20
3.200	-74.90
3.230	-86.20
3.280	-99.30
3.350	-112.30
3.450	-126.40
3.600	-144.00
3.760	-161.60
3.900	-177.50
4.054	-194.30
4.250	-211.30
4.520	-226.10
4.900	-238.60
5.300	-247.20
5.500	-250.55

GG2390A

ML	EH
0.000	298.60
.100	297.55
.700	290.20
1.320	280.35
1.800	269.95
2.130	259.90
2.350	250.30
2.520	239.90
2.650	227.90
2.710	220.10
2.760	211.40
2.810	199.30
2.840	189.55
2.860	180.20
2.878	169.30
2.890	160.20
2.900	149.45
2.910	137.80
2.920	122.70
2.930	99.50
2.936	82.70
2.942	57.90
2.948	15.60
2.954	-30.90
2.960	-52.20
2.970	-89.80
2.980	-107.30
2.990	-120.30
3.000	-133.30
3.020	-149.00
3.050	-165.20
3.080	-175.20
3.130	-187.30
3.200	-198.50
3.300	-209.50
3.500	-223.10
3.800	-235.20
4.000	-240.90

GG3391A

ML	EH
0.000	298.40
.100	297.40
.700	290.00
1.330	280.10
1.800	270.00
2.130	260.00
2.360	250.00
2.530	239.80
2.650	229.30
2.724	220.30
2.784	210.20
2.830	199.60
2.860	190.00
2.884	180.25
2.904	169.50
2.920	158.10
2.930	150.60
2.944	136.20
2.954	121.60
2.962	105.80
2.970	84.35
2.980	41.40
2.986	14.90
2.992	-26.90
3.000	-67.70
3.010	-93.20
3.020	-107.90
3.040	-127.60
3.070	-149.50
3.100	-163.90
3.130	-174.70
3.170	-185.40
3.220	-195.40
3.300	-205.20
3.400	-214.30
3.550	-223.80
3.750	-232.40
4.000	-240.10

QQ1426A

ML	EH
0.000	296.00
.100	294.90
.600	288.80
1.200	280.00
1.700	270.30
2.000	262.50
2.300	252.10
2.500	242.40
2.670	230.70
2.700	228.20
2.800	217.70
2.880	206.10
2.930	196.20
2.970	186.30
3.010	173.30
3.040	161.50
3.070	146.10
3.090	133.30
3.110	115.50
3.124	100.40
3.134	86.50
3.142	72.80
3.150	56.60
3.158	34.60
3.164	17.40
3.174	-12.00
3.186	-33.20
3.200	-48.10
3.220	-62.50
3.250	-75.40
3.300	-89.60
3.400	-106.90
3.540	-119.70

QQ1431A

ML	EH
0.000	297.70
.100	296.60
.600	290.65
1.300	280.10
1.800	269.80
2.150	259.65
2.400	249.70
2.550	241.50
2.680	232.30
2.800	220.50
2.870	211.10
2.930	200.60
2.976	190.00
3.010	180.00
3.040	170.00
3.054	159.10
3.084	149.70
3.102	139.20
3.120	126.80
3.134	114.65
3.144	105.50
3.154	92.50
3.162	81.60
3.170	69.20
3.176	58.60
3.184	45.40
3.192	30.50
3.200	16.80
3.210	3.30
3.230	-18.70
3.260	-46.70
3.300	-71.40
3.370	-95.80
3.450	-112.20
3.550	-127.60
3.700	-146.60
4.000	-182.70

QQ1433-6

ML	EH
0.000	297.90
.100	296.80
.600	290.80
1.300	280.00
1.800	269.70
2.100	261.10
2.350	251.30
2.550	240.20
2.700	228.30
2.810	215.40
2.900	199.70
2.950	187.00
2.990	174.10
3.020	161.50
3.040	151.70
3.060	138.70
3.080	123.20
3.100	102.10
3.114	77.70
3.122	57.80
3.130	33.40
3.136	11.70
3.150	-29.90
3.165	-47.60

QQ1433-4

ML	EH
0.000	298.05
.100	297.10
.650	290.40
1.200	282.10
1.800	269.80
2.150	259.60
2.400	249.10
2.550	240.50
2.650	233.10
2.750	223.65
2.830	213.50
2.890	203.40
2.950	189.30
3.000	173.90
3.030	161.70
3.050	151.70
3.070	140.00
3.090	126.40
3.110	105.20
3.120	89.70
3.128	74.20
3.134	59.10
3.140	43.90
3.146	20.60
3.152	-4.70
3.158	-21.09
3.170	-39.90

QQ1433-2

ML	EH
0.000	298.55
.100	297.40
.650	290.65
1.200	282.20
1.800	269.85
2.200	257.20
2.400	248.10
2.550	238.90
2.670	229.00
2.770	217.70
2.840	207.00
2.890	197.20
2.926	188.30
2.956	179.70
2.980	169.00
3.020	157.50
3.050	144.60
3.080	128.70
3.100	115.65
3.115	99.90
3.125	86.20
3.132	70.80
3.138	55.20
3.142	43.10
3.150	1.80
3.160	-29.90
3.170	-45.30

QQ1437A

ML	EH
0.000	308.20
.100	307.20
.670	300.10
1.300	289.95
1.890	278.75
2.030	269.90
2.300	260.40
2.470	249.90
2.580	240.30
2.660	230.30
2.720	219.65
2.760	209.90
2.790	200.20
2.812	190.30
2.830	180.20
2.844	169.40
2.854	159.80
2.862	150.40
2.870	140.50
2.877	129.10
2.884	111.10
2.893	99.80
2.892	83.30
2.896	59.20
2.898	43.30
2.900	27.20
2.903	-2.80
2.908	-28.30
2.916	-49.40

QQ1435A (forward, OH^- titrant)

ML	EH
0.000	308.8
0.100	307.7
0.700	300.5
1.350	290.35
1.800	280.9
2.200	269.05
2.400	260.7
2.580	250.6
2.710	240.5
2.806	230.3
2.880	219.8
2.930	210.5
2.970	201.0
3.000	192.2
3.032	181.5
3.054	171.95
3.074	161.9
3.093	151.9
3.107	142.0
3.120	131.9
3.131	121.1
3.140	111.2
3.146	100.9
3.152	090.8
3.157	081.8
3.162	072.45
3.167	057.0
3.170	052.1
3.173	044.5
3.177	032.5
3.180	024.4
3.184	010.0

QQ1435A (back, H^+ titrant)

ML	EH
2.000	290.8
1.400	280.7
1.000	270.5
0.720	259.4
0.550	249.5
0.440	240.6
0.350	230.7
0.280	219.9
0.230	209.4
0.194	200.1
0.164	190.7
0.140	181.2
0.116	169.7
0.098	160.2
0.084	152.0
0.072	143.65
0.060	132.6
0.050	123.2
0.040	109.5
0.032	096.9
0.026	084.4
0.020	067.8
0.015	056.3
0.010	042.3
0.004	021.6
0.000	010.0

MSW427A

ML	EH
0.000	295.80
.100	294.80
.600	289.50
1.200	281.70
1.700	273.40
2.000	267.00
2.400	255.40
2.750	238.60
2.950	220.70
3.050	203.30
3.130	168.40
3.150	142.10
3.170	48.90
3.180	-76.20
3.190	-105.90
3.200	-120.80

FF1437A

ML	EH
0.000	309.00
.100	307.90
.650	301.20
1.300	290.90
1.800	279.70
2.100	270.20
2.300	261.40
2.480	250.00
2.600	238.30
2.690	226.40
2.740	211.40
2.770	199.00
2.786	189.40
2.798	178.90
2.808	165.40
2.816	144.60
2.820	131.90
2.823	116.70
2.826	91.70
2.828	68.60
2.830	48.50
2.832	9.00
2.834	-16.00
2.836	-28.90
2.841	-51.30

QQ1423A

ML	EH
0.000	296.70
.100	295.60
.600	289.70
1.200	280.90
1.730	270.40
2.100	260.30
2.400	248.50
2.600	236.90
2.700	228.90
2.780	220.85
2.860	210.10
2.920	199.40
2.960	190.10
2.994	180.50
3.030	166.80
3.050	158.40
3.081	141.50
3.100	128.60
3.120	110.20
3.140	85.30
3.156	52.10
3.166	28.60
3.174	6.30
3.182	-15.10
3.190	-29.80
3.200	-43.10
3.216	-57.10
3.236	-68.10
3.260	-77.70
3.300	-89.60
3.360	-102.10
3.450	-115.60
3.570	-129.70
3.700	-142.80
3.830	-155.10
4.000	-171.10
4.200	-191.60
4.400	-208.90
4.600	-220.42

QQ1426A

ML	EH
0.000	295.85
.100	294.80
.600	288.80
1.200	279.80
1.700	270.00
2.000	262.10
2.200	255.30
2.400	246.80
2.600	234.80
2.800	215.30
2.890	200.70
2.940	189.50
2.970	180.70
3.000	170.30
3.020	162.10
3.040	153.00
3.060	141.00
3.074	132.00
3.086	123.10
3.098	111.40
3.108	99.80
3.116	88.00
3.124	74.10
3.130	60.10
3.136	46.00
3.142	28.60
3.148	6.70
3.152	-6.90
3.160	-29.00
3.170	-44.30
3.184	-58.70
3.200	-69.70
3.230	-84.40
3.270	-96.60
3.320	-108.10
3.400	-121.80

QQ2424A

ML	EH
0.000	296.60
.100	295.50
.600	289.40
1.200	280.40
1.700	270.40
2.000	262.20
2.300	250.80
2.500	239.50
2.660	225.50
2.760	211.70
2.820	198.90
2.850	189.80
2.870	182.10
2.890	173.10
2.910	159.70
2.924	149.40
2.936	138.00
2.950	118.50
2.960	97.00
2.966	78.90
2.972	49.40
2.978	8.60
2.984	-47.20
2.990	-65.80
3.000	-93.90
3.010	-107.80
3.030	-130.30
3.060	-150.50
3.100	-168.60
3.200	-193.90
3.400	-216.10

QQ2425A

ML	EH
0.000	295.90
.100	294.80
.600	288.70
1.200	279.70
1.700	269.65
2.000	261.50
2.200	254.40
2.360	247.10
2.480	240.00
2.580	232.50
2.670	223.50
2.750	212.30
2.810	199.80
2.850	188.00
2.874	178.70
2.900	164.30
2.920	149.70
2.934	136.40
2.946	120.90
2.954	105.30
2.960	89.40
2.964	77.90
2.968	64.00
2.972	45.90
2.978	9.90
2.984	-31.10
2.990	-62.70
3.000	-90.90
3.010	-106.70
3.030	-127.90
3.050	-141.90
3.080	-158.10
3.120	-173.60
3.170	-186.60
3.250	-200.20
3.350	-210.90

QQ3424A

ML	EH
0.000	296.40
.100	295.30
.600	289.15
1.300	278.40
1.720	269.50
2.050	260.30
2.300	250.50
2.490	240.00
2.620	229.70
2.700	220.90
2.770	210.50
2.820	200.20
2.860	189.10
2.890	177.90
2.910	167.90
2.930	156.00
2.950	140.80
2.960	131.10
2.970	119.20
2.980	103.50
2.990	80.30
2.996	63.40
3.000	46.70
3.006	17.30
3.012	-13.50
3.018	-36.10
3.026	-59.10
3.038	-79.20
3.054	-97.50
3.080	-115.50
3.110	-131.60
3.140	-143.70
3.190	-161.20
3.250	-177.90
3.330	-193.30
3.450	-207.50

QQ3425A

ML	EH
0.000	296.20
.100	295.15
.600	289.10
1.200	280.10
1.700	270.10
2.000	262.00
2.300	250.80
2.500	239.75
2.650	227.50
2.720	219.50
2.780	210.40
2.830	200.20
2.874	187.80
2.900	177.70
2.920	168.50
2.940	157.00
2.960	141.10
2.974	128.00
2.986	12.40
2.996	93.90
3.002	79.90
3.008	59.10
3.012	45.30
3.016	31.20
3.022	.70
3.028	-33.10
3.034	-57.20
3.040	-71.70
3.048	-88.30
3.060	-105.50
3.080	-124.70
3.110	-146.40
3.150	-165.00
3.200	-181.30
3.270	-195.90
3.350	-206.50
3.450	-215.70

FF1371A

ML	EH
0.000	299.20
.760	290.10
1.390	280.00
1.840	270.00
2.170	259.80
2.390	249.80
2.544	240.00
2.652	230.00
2.730	219.60
2.780	210.00
2.820	198.50
2.840	189.80
2.856	180.15
2.872	168.80
2.880	159.50
2.888	149.00
2.894	136.50
2.899	120.50
2.904	91.20
2.908	70.50
2.913	37.30
2.916	1.80
2.920	-26.40
2.925	-42.40
2.934	-60.40
2.944	-72.90
2.960	-85.40
3.000	-104.10
3.040	-117.70
3.100	-132.45
3.160	-146.10
3.230	-160.30
3.310	-175.50
3.420	-193.30
3.580	-210.20
3.820	-225.00
4.150	-237.05
4.800	-250.70
5.500	-259.50

FF2373A

ML	EH
0.000	299.50
.100	298.40
.780	290.00
1.400	280.05
1.851	269.90
2.170	259.95
2.390	250.00
2.544	240.00
2.650	230.00
2.726	219.80
2.780	209.40
2.810	200.20
2.836	189.70
2.852	179.80
2.865	169.60
2.874	159.20
2.884	141.10
2.891	117.10
2.896	37.80
2.900	-59.30
2.906	-105.60
2.912	-120.80
2.920	-133.90
2.930	-145.20
2.944	-156.60
2.958	-165.00
3.000	-180.35
3.070	-195.30
3.194	-210.10
3.420	-225.10
3.670	-235.00
3.930	-242.30
4.500	-252.70

FF3374B

ML	EH
0.000	299.10
.100	298.05
.750	290.05
1.370	280.10
1.824	270.10
2.150	259.90
2.370	250.00
2.530	239.90
2.638	230.00
2.710	220.10
2.762	210.10
2.800	199.30
2.822	189.90
2.840	179.50
2.851	169.70
2.860	159.70
2.866	149.40
2.872	137.20
2.878	109.90
2.882	80.30
2.888	-60.00
2.894	-100.00
2.900	-117.20
2.905	-128.60
2.911	-136.60
2.924	-150.20
2.946	-164.50
2.990	-180.25
3.056	-195.20
3.180	-210.00
3.400	-224.70
3.600	-233.10
3.800	-239.20
4.000	-224.00

FF1380A

ML	EH
0.000	298.30
.100	297.20
.680	290.30
1.330	280.30
1.800	270.50
2.154	260.00
2.392	249.90
2.550	240.40
2.670	230.10
2.750	220.00
2.810	208.60
2.842	200.40
2.870	190.20
2.890	179.60
2.901	170.30
2.910	159.70
2.918	149.00
2.926	131.30
2.932	112.00
2.937	89.50
2.941	75.00
2.946	56.80
2.950	14.20
2.954	-16.60
2.958	-30.60
2.964	-45.10
2.972	-57.30
2.986	-71.10
3.005	-84.30
3.044	-100.40
3.100	-115.70
3.180	-131.70
3.270	-147.20
3.350	-160.35
3.450	-176.15
3.550	-190.55
3.690	-206.00
3.810	-215.50
4.000	-225.80

FF2381B

ML	EH
0.000	298.50
.100	297.40
.670	290.60
1.320	280.60
1.790	270.80
2.140	260.60
2.380	250.40
2.544	240.40
2.660	230.10
2.740	220.00
2.794	210.00
2.830	200.30
2.856	190.20
2.874	180.50
2.888	169.50
2.900	151.90
2.906	138.70
2.912	115.60
2.916	74.80
2.920	-21.50
2.924	-73.90
2.928	-93.90
2.934	-110.70
2.942	-126.10
2.952	-140.20
2.972	-155.50
3.000	-170.40
3.026	-179.70
3.100	-196.00
3.210	-209.70
3.420	-224.30
3.630	-233.40
3.900	-241.40
4.000	-243.70

FF3382B

ML	EH
0.000	298.00
.100	296.90
.620	290.70
1.284	280.70
1.764	270.70
2.110	260.70
2.354	250.60
2.522	240.50
2.640	230.40
2.720	220.20
2.776	210.00
2.812	200.10
2.838	190.50
2.856	179.50
2.868	170.50
2.878	159.40
2.884	149.10
2.888	140.10
2.892	127.20
2.896	103.00
2.900	-2.50
2.904	-74.00
2.908	-96.80
2.912	-107.90
2.918	-121.70
2.930	-139.00
2.948	-155.30
2.976	-170.20
3.022	-185.55
3.100	-200.10
3.250	-215.50
3.520	-230.50
3.850	-241.10
4.000	-244.60

MD223B

ML	EH
0.000	303.1
0.050	302.9
0.100	302.75
0.150	302.6
0.200	302.4
0.500	301.3
1.000	299.4
2.000	295.3
3.000	290.7
4.000	285.35
5.000	278.9
6.000	270.7
6.900	260.6
7.54	250.4
8.000	239.5
8.270	230.0
8.470	220.0
8.611	209.8
8.700	200.2
8.764	190.5
8.810	180.1
8.840	170.6
8.870	154.6
8.890	135.2
8.905	104.1
8.920	004.4
8.935	-089.7
8.950	-110.1
8.990	-136.7
9.040	-151.9
9.100	-163.5
9.200	-175.6
9.390	-189.35
9.680	-201.9
10.202	-214.9
11.100	-228.2
12.000	-236.6

MD298B

ML	EH
0.000	310.9
2.000	306.5
4.000	301.4
6.000	295.4
8.000	288.0
10.000	278.2
11.500	267.7
12.700	255.1
13.300	245.5
13.750	235.1
14.050	224.9
14.250	214.9
14.400	203.4
14.490	193.0
14.550	183.05
14.584	174.7
14.620	162.7
14.650	145.7
14.660	136.1
14.671	121.4
14.680	097.2
14.690	052.2
14.700	-012.9
14.710	-049.2
14.720	-078.4
14.730	-091.7
14.740	-099.3
14.760	-111.9
14.780	-120.2
14.810	-128.8
14.850	-137.4
14.900	-145.6
14.980	-154.8
15.120	-165.8
15.300	-175.35
15.580	-185.4
16.000	-195.5
16.500	-203.8
17.300	-213.15
18.000	-219.1
19.700	-229.3
21.000	-234.8
22.000	-238.3
23.400	-242.35
24.000	-243.8
26.000	-248.05

MD369A

ML	EH
0.000	301.0
1.000	298.7
2.000	296.15
4.000	290.45
6.000	283.6
8.000	274.8
9.700	264.55
10.900	254.1
11.700	243.9
12.200	234.9
12.600	224.4
12.900	212.4
13.080	201.0
13.200	189.4
13.300	172.8
13.340	160.2
13.360	150.5
13.386	133.8
13.400	114.25
13.410	073.9
13.420	-040.5
13.430	-074.9
13.440	-089.3
13.460	-106.2
13.490	-120.1
13.530	-134.3
13.600	-148.9
13.730	-166.2
13.920	-180.4
14.300	-196.4
14.900	-210.5
16.000	-225.1
18.000	-239.5
20.000	-248.4

MD376B

ML	EH
0.000	298.3
2.000	294.5
4.000	290.3
6.000	285.4
8.000	279.8
10.000	272.9
10.700	270.1
12.680	260.0
14.000	250.6
15.030	240.0
15.700	229.8
16.200	218.5
16.460	209.8
16.680	199.3
16.810	190.05
16.910	179.8
16.978	170.05
17.022	160.2
17.053	150.0
17.078	139.5
17.092	130.2
17.102	120.1
17.108	110.8
17.114	099.7
17.118	089.5
17.122	077.3
17.126	058.0
17.130	017.1
17.132	-008.5
17.136	-040.3
17.140	-054.6
17.144	-067.2
17.148	-076.0
17.156	-085.9
17.174	-100.9
17.190	-109.9
17.210	-120.0
17.240	-129.5
17.290	-140.9
17.350	-151.3
17.420	-159.8
17.540	-170.2
17.720	-180.9
17.940	-189.9
18.300	-210.0
18.830	-200.05
19.620	-220.0
20.800	-229.9
22.000	-236.8

MD419B

ML	EH
0.000	297.7
2.000	294.4
4.000	290.7
6.000	286.6
8.000	282.0
10.000	276.6
12.000	270.1
14.000	261.6
15.700	251.8
17.200	238.6
17.800	230.7
18.400	219.5
18.800	208.1
19.050	197.1
19.220	185.7
19.330	174.5
19.420	159.55
19.470	145.9
19.500	131.8
19.520	116.8
19.530	107.6
19.540	096.35
19.550	081.8
19.560	067.2
19.570	051.3
19.580	032.2
19.590	008.9
19.600	-036.0
19.620	-081.9
19.640	-097.7
19.670	-112.0
19.710	-126.1
19.770	-138.8
19.880	-154.0
20.000	-164.5
20.200	-176.7
20.600	-191.4
21.100	-202.9
22.000	-215.45

III. Organic Matter Titration Curves

Calculations for each titration made by the program TCRVDI are reported in Table 4. Weighted averages of the seperate fraction titration curves were made, producing combined titration curves. These combined titration curves are reported in Table 5. The averages were made with values interpolated to each 0.1 pH unit.

Table 4. Calculated organic matter titration curves for organic sample - blank pairs. Ordering as in Table 2.

PH, calculated pH

MCMPOC, OH^- consumed by organic matter, μmoles/mg OC

D0185A-C0184A

PH	MCMPOC
2.4682	1.455E 00
2.4927	1.334E 00
2.5181	1.573E 00
2.5739	1.866E 00
2.6550	2.101E 00
2.7514	2.661E 00
2.8714	3.111E 00
2.9956	4.029E 00
3.0725	3.962E 00
3.2204	4.612E 00
3.3954	5.587E 00
3.5374	5.665E 00
3.8399	6.418E 00
4.0073	6.837E 00
4.1019	6.975E 00
4.2524	7.390E 00
4.3521	7.601E 00
4.4670	7.845E 00
4.6259	8.031E 00
4.8203	8.307E 00
5.1246	8.642E 00
5.4745	8.970E 00
5.8734	9.276E 00
6.1675	9.598E 00
6.3788	9.832E 00
6.6645	1.004E 01
6.9096	1.028E 01
7.1919	1.053E 01
7.4758	1.077E 01
7.7277	1.102E 01
7.9491	1.127E 01
8.2432	1.179E 01
8.4427	1.234E 01
8.6743	1.317E 01
8.8501	1.387E 01
9.0276	1.474E 01
9.2498	1.600E 01
9.5076	1.748E 01
9.7341	1.872E 01
9.9116	1.974E 01
10.0773	2.059E 01
10.2195	2.114E 01
10.3714	2.171E 01
10.4837	2.211E 01
10.5843	2.221E 01
10.6959	2.248E 01
10.8328	2.250E 01
10.9528	2.319E 01
11.0863	2.287E 01
11.1760	2.224E 01
11.2774	1.892E 01
11.2774	0.000E 00

D0189B-C0188A

PH	MCMPOC
2.0008	1.658E 00
2.0059	1.957E 00
2.0110	2.125E 00
2.0194	2.432E 00
2.0448	3.328E 00
2.0718	3.916E 00
2.0989	4.255E 00
2.1276	4.852E 00
2.1580	5.457E 00
2.1885	5.465E 00
2.2223	5.694E 00
2.2510	4.872E 00
2.2781	4.955E 00
2.3085	4.939E 00
2.3423	5.189E 00
2.3778	5.157E 00
2.4167	5.594E 00
2.4589	6.042E 00
2.4910	5.707E 00
2.5292	5.958E 00
2.5688	5.838E 00
2.6111	6.215E 00
2.6567	6.368E 00
2.7091	6.813E 00
2.7683	7.105E 00
2.8376	7.888E 00
2.9204	8.291E 00
3.0134	8.776E 00
3.0894	8.946E 00
3.1841	9.378E 00
3.3024	9.783E 00
3.4638	1.029E 01
3.6472	1.096E 01
3.8264	1.141E 01
4.0402	1.182E 01
4.4163	1.260E 01
4.6023	1.295E 01
4.7967	1.331E 01
5.1457	1.367E 01
5.3190	1.388E 01
5.6182	1.421E 01
5.9309	1.458E 01
6.3078	1.498E 01
6.6780	1.538E 01
7.0752	1.579E 01
7.5536	1.619E 01
7.9086	1.661E 01
8.1469	1.704E 01
8.3768	1.750E 01
8.6303	1.819E 01
8.8906	1.901E 01
9.0867	2.003E 01
9.2760	2.099E 01
9.4628	2.224E 01
9.5851	2.282E 01
9.8102	2.418E 01
10.0113	2.526E 01
10.2142	2.594E 01

D1215A-C1213B

PH	MCMPOC
2.0074	1.251E 00
2.0125	8.410E-01
2.0159	-5.815E-01
2.0210	-5.045E-01
2.0260	-9.119E-01
2.1004	-1.557E 00
2.0294	1.613E 02
2.3506	-9.867E-01
2.5196	-1.376E 00
2.6886	-9.235E-01
2.8577	-3.549E-01
3.0267	-1.522E-01
3.2110	6.757E-01
3.3648	1.029E 00
3.5338	1.636E 00
3.7028	2.147E 00
3.8719	2.894E 00
4.0409	3.342E 00
4.2116	4.238E 00
4.3790	4.648E 00
4.5480	5.062E 00
4.7170	5.560E 00
4.8911	5.920E 00
5.2123	6.741E 00
5.6409	7.520E 00
5.9831	7.964E 00
6.2705	8.270E 00
6.5443	8.944E 00
6.8215	9.757E 00
6.8773	1.090E 01
7.0142	1.036E 01
7.1511	1.110E 01
7.1951	1.163E 01
7.4976	1.334E 01
7.8222	1.674E 01
8.1484	2.482E 01
8.5017	4.334E 01
8.6589	5.801E 01
8.8279	7.609E 01
8.9902	9.751E 01
9.2961	3.941E 01
9.2961	1.453E 02
9.5057	1.805E 02
9.6731	2.094E 02

D2218B-C2217A

PH	MCMPOC
2.0000	6.021E-01
2.0017	4.930E-01
2.0034	4.654E-01
2.0051	4.562E-01
2.0127	4.688E-01
2.0270	8.413E-01
2.0406	4.985E-01
2.0541	-1.397E-01
2.0693	1.078E-01
2.1487	-4.228E-02
2.1893	3.086E-02
2.3584	-9.703E-02
2.5274	8.602E-02
2.6964	5.994E-01
2.8654	8.481E-01
3.0345	1.286E 00
3.2035	1.821E 00
3.3725	2.131E 00
3.5416	2.305E 00
3.7106	2.714E 00
3.8813	3.464E 00
4.0487	3.896E 00
4.2194	4.476E 00
4.3893	4.840E 00
4.5558	5.033E 00
4.7874	5.231E 00
5.0003	5.348E 00
5.1846	5.629E 00
5.4195	5.907E 00
5.7661	6.130E 00
6.1481	6.429E 00
6.5571	6.719E 00
7.0980	7.110E 00
7.5477	7.437E 00
7.8812	7.861E 00
7.9888	8.362E 00
8.3168	9.746E 00
8.5247	1.105E 01
8.7427	1.304E 01
8.9304	1.542E 01
9.1231	1.837E 01
9.2819	2.122E 01
9.4679	2.468E 01
9.6572	2.807E 01
9.8753	3.232E 01
10.0443	3.490E 01
10.2167	3.761E 01
10.3857	3.962E 01
10.5514	4.179E 01
10.6765	4.328E 01

D3222A-C3220B

PB	MCMPOC
1.9983	1.435E 00
2.0000	1.496E 00
2.0034	2.000E 00
2.0063	2.999E 00
2.0101	3.004E 00
2.0177	3.013E 00
2.0254	3.988E 00
2.1910	4.110E 00
2.3600	4.316E 00
2.5291	4.124E 00
2.6981	4.379E 00
2.8671	4.372E 00
3.0362	4.589E 00
3.2052	4.674E 00
3.3742	4.751E 00
3.5433	5.242E 00
3.7132	5.412E 00
3.8847	5.316E 00
4.0538	5.858E 00
4.2245	6.002E 00
4.3867	6.114E 00
4.5423	6.342E 00
4.7181	6.594E 00
4.8719	6.746E 00
5.0815	6.950E 00
5.3942	7.137E 00
5.9926	7.272E 00
6.6957	7.520E 00
7.2028	7.841E 00
7.5730	8.131E 00
7.8029	8.537E 00
8.0497	9.006E 00
8.2339	9.454E 00
8.5196	9.904E 00
8.7005	1.051E 01
8.8594	1.173E 01
9.0538	1.281E 01
9.2160	1.414E 01
9.4121	1.592E 01
9.5862	1.721E 01
9.7502	1.853E 01
10.0071	1.988E 01
10.1525	2.040E 01
10.3114	2.100E 01
10.4838	2.139E 01
10.6494	2.150E 01
10.8168	2.121E 01
10.9790	1.990E 01
11.1531	1.673E 01
11.3137	6.592E 00
11.3137	0.000E 00

S0313A-T0313A

PH	MCMPOC
1.9992	0.000E 00
2.1648	1.733E 00
2.3355	3.225E 00
2.5029	4.624E 00
2.6719	5.584E 00
2.8409	6.557E 00
3.0100	7.164E 00
3.1807	7.816E 00
3.3463	8.383E 00
3.5306	8.729E 00
3.6844	9.295E 00
3.8534	1.001E 01
4.0208	1.076E 01
4.1881	1.168E 01
4.3403	1.276E 01
4.5972	1.405E 01
4.8051	1.501E 01
5.0316	1.606E 01
5.2818	1.702E 01
5.5421	1.790E 01
5.7618	1.859E 01
6.0340	1.927E 01
6.3027	2.008E 01
6.5275	2.082E 01
6.9958	2.190E 01
7.3237	2.282E 01
7.5688	2.376E 01
7.7378	2.472E 01
7.9356	2.617E 01
8.1959	2.851E 01
8.4444	3.184E 01
8.7148	3.662E 01
8.9752	4.275E 01
9.2017	4.968E 01
9.4248	5.789E 01
9.6733	6.813E 01
9.8998	7.879E 01
10.2125	9.077E 01
10.5150	1.002E 02
10.7399	1.080E 02
10.9224	1.134E 02
11.0593	1.176E 02
11.1650	1.214E 02

S0296A-T0296A

PH	MCMPOC
2.0017	-4.340E-01
2.1724	6.030E-01
2.3398	2.041E 00
2.5105	3.349E 00
2.6778	3.940E 00
2.8469	4.630E 00
3.0176	5.409E 00
3.1849	5.933E 00
3.3556	6.493E 00
3.5230	6.907E 00
3.6886	7.662E 00
3.8408	8.199E 00
4.0166	8.657E 00
4.2076	9.428E 00
4.3918	1.024E 01
4.5947	1.092E 01
4.8110	1.158E 01
5.0139	1.225E 01
5.2471	1.285E 01
5.5294	1.343E 01
5.7475	1.393E 01
6.1346	1.471E 01
6.4405	1.541E 01
6.6738	1.604E 01
7.0000	1.693E 01
7.2113	1.785E 01
7.5375	1.874E 01
7.7640	1.958E 01
8.0091	2.089E 01
8.2086	2.223E 01
8.3979	2.403E 01
8.6024	2.670E 01
8.8120	2.977E 01
8.9844	3.324E 01
9.2008	3.839E 01
9.5017	4.682E 01
9.7705	5.478E 01
10.0172	6.212E 01
10.3164	7.233E 01
10.5446	8.090E 01
10.7694	9.035E 01
10.9723	9.970E 01
11.1464	1.080E 02
11.3239	1.180E 02
11.3560	1.196E 02

S1299B-T1299B

PH	MCMPOC
1.9993	4.099E-01
2.0002	5.972E-01
2.1827	2.082E 00
2.3492	3.607E 00
2.5199	4.956E 00
2.6873	6.332E 00
2.8563	7.510E 00
3.0254	8.428E 00
3.1952	9.289E 00
3.3617	1.007E 01
3.5291	1.103E 01
3.6964	1.210E 01
3.8654	1.322E 01
4.0311	1.432E 01
4.1917	1.550E 01
4.3607	1.693E 01
4.5196	1.804E 01
4.7089	1.934E 01
4.8780	2.054E 01
5.1298	2.166E 01
5.3496	2.243E 01
5.5118	2.307E 01
5.7130	2.378E 01
5.9310	2.452E 01
6.1170	2.520E 01
6.3266	2.596E 01
6.5007	2.679E 01
6.6832	2.772E 01
6.9165	2.914E 01
7.1819	3.052E 01
7.4506	3.189E 01
7.6501	3.330E 01
7.9239	3.497E 01
8.1403	3.651E 01
8.3245	3.846E 01
8.6119	4.207E 01
8.8080	4.558E 01
9.0379	5.075E 01
9.2830	5.761E 01
9.5298	6.632E 01
9.8442	7.868E 01
10.0774	8.925E 01
10.3022	9.906E 01
10.5254	1.091E 02
10.7400	1.201E 02
10.9074	1.318E 02
11.1187	1.446E 02

S2303A-T2303A

PH	MCMPOC
2.0003	0.000E 00
2.1812	1.213E 00
2.3502	1.986E 00
2.5193	2.773E 00
2.6883	3.523E 00
2.8573	3.946E 00
3.0264	4.351E 00
3.1954	4.982E 00
3.3644	5.363E 00
3.5335	5.738E 00
3.7025	6.170E 00
3.8732	6.435E 00
4.0423	6.783E 00
4.2096	7.013E 00
4.3837	7.331E 00
4.5730	7.552E 00
4.7725	7.836E 00
4.9872	8.149E 00
5.3709	8.514E 00
5.9777	8.836E 00
6.9141	9.089E 00
7.9047	9.380E 00
8.4574	9.649E 00
8.8665	9.803E 00
9.1741	9.825E 00
9.4074	9.775E 00
9.5916	9.755E 00
9.8181	9.648E 00
10.0193	9.717E 00
10.1951	9.683E 00
10.3878	9.687E 00
10.5585	9.532E 00
10.7267	9.796E 00
10.8949	9.409E 00
11.0639	9.405E 00
11.2329	8.693E 00
11.3369	8.009E 00

S3306B-T3306B

PH	MCMPOC
2.0008	0.000E 00
2.1800	8.551E-01
2.3474	1.333E 00
2.5164	1.714E 00
2.6854	2.006E 00
2.8545	2.320E 00
3.0404	2.616E 00
3.2094	2.894E 00
3.3785	3.161E 00
3.5475	3.520E 00
3.7165	3.678E 00
3.8856	3.882E 00
4.0563	4.235E 00
4.2236	4.421E 00
4.3775	4.679E 00
4.5448	4.840E 00
4.7240	5.040E 00
4.9843	5.236E 00
5.2733	5.427E 00
5.6503	5.638E 00
6.1540	5.800E 00
6.8707	6.093E 00
7.7632	6.338E 00
8.4089	6.422E 00
8.7216	6.556E 00
8.9667	6.566E 00
9.1476	6.530E 00
9.3487	6.465E 00
9.5397	6.386E 00
9.6986	6.394E 00
9.8998	6.343E 00
10.0891	6.305E 00
10.2784	6.321E 00
10.4542	6.244E 00
10.6300	6.373E 00
10.8159	6.229E 00
10.9850	6.202E 00
11.1540	6.016E 00
11.3230	5.695E 00
11.4202	4.439E 00

CC0362B-DD0362B

PH	MCMPOC
2.0005	-6.254E-01
2.1383	1.223E 00
2.3158	1.032E 00
2.5304	1.786E 00
2.7400	3.360E 00
2.9834	4.822E 00
3.1795	5.384E 00
3.5294	6.102E 00
3.7153	6.638E 00
3.8979	6.918E 00
4.0686	7.149E 00
4.2377	7.706E 00
4.4236	8.066E 00
4.5808	8.379E 00
4.7667	8.732E 00
4.9290	9.355E 00
5.1826	1.044E 01
5.3584	1.142E 01
5.5223	1.246E 01
5.7082	1.421E 01
5.8654	1.599E 01
6.0751	1.866E 01
6.2711	2.089E 01
6.6447	2.536E 01
7.1687	2.954E 01
7.8938	3.229E 01
8.1305	3.334E 01
8.3671	3.532E 01
8.5277	3.874E 01
8.6799	4.293E 01
8.8523	4.727E 01
9.0974	5.211E 01

CC0366A-DD0362B

PH	MCMPOC
2.0014	2.259E 00
2.1687	4.732E 00
2.3428	5.059E 00
2.5093	5.891E 00
2.6893	7.794E 00
2.8778	9.622E 00
3.0189	7.638E 00
3.1880	8.122E 00
3.3536	9.730E 00
3.5429	8.700E 00
3.7289	9.155E 00
3.8878	9.506E 00
4.0450	9.925E 00
4.2208	1.034E 01
4.4490	1.078E 01
4.6332	1.118E 01
4.8242	1.166E 01
4.9493	1.215E 01
5.1192	1.286E 01
5.2738	1.359E 01
5.4395	1.449E 01
5.5561	1.560E 01
5.7556	1.729E 01
5.9009	1.891E 01
6.0514	2.063E 01
6.2035	2.209E 01
6.3810	2.466E 01
6.6092	2.712E 01
6.8712	2.952E 01
7.1552	3.118E 01
7.4915	3.267E 01
7.6995	3.341E 01
7.8955	3.386E 01
8.0358	3.455E 01
8.2099	3.535E 01
8.3553	3.690E 01
8.5396	4.074E 01
8.7086	4.572E 01
8.9351	5.117E 01
9.2799	5.979E 01
9.8276	5.952E 01
9.9476	6.055E 01
10.0254	6.385E 01
10.0828	7.434E 01

CC4364B-DD4364B

PH	MCMPOC
2.0166	-1.853E 00
2.1983	5.211E-01
2.3605	2.513E 00
2.5516	4.528E 00
2.7831	5.863E 00
3.0671	7.499E 00
3.2868	8.659E 00
3.5083	9.537E 00
3.5793	9.826E 00
3.7618	1.079E 01
3.9511	1.126E 01
4.1624	1.179E 01
4.3822	1.258E 01
4.6450	1.309E 01
4.9062	1.338E 01
5.2476	1.348E 01
5.5603	1.362E 01
5.8883	1.392E 01
6.1621	1.429E 01
6.5272	1.484E 01
6.8010	1.537E 01
7.0952	1.584E 01
7.3234	1.646E 01
7.5482	1.741E 01
7.7764	1.857E 01
8.0401	2.058E 01
8.3122	2.388E 01
8.5970	3.032E 01
8.8599	4.015E 01
9.0898	5.191E 01
9.3196	6.392E 01
9.5360	7.586E 01
9.7710	8.682E 01
10.1226	9.743E 01

N1255B-01257A

PH	MCMPOC
2.0003	3.178E 00
2.1195	3.904E 00
2.2857	6.562E 00
2.4750	6.025E 00
2.6826	6.735E 00
2.8808	7.797E 00
3.0904	9.302E 00
3.2843	1.067E 01
3.4297	1.153E 01
3.6349	1.275E 01
3.8367	1.393E 01
4.0090	1.488E 01
4.1611	1.556E 01
4.3218	1.630E 01
4.5198	1.706E 01
4.7397	1.787E 01
4.9601	1.846E 01
5.1506	1.887E 01
5.3605	1.930E 01
5.5531	1.959E 01
5.7955	1.989E 01
6.0850	2.017E 01
6.3607	2.052E 01
6.6494	2.086E 01
6.9346	2.121E 01
7.2110	2.151E 01
7.4395	2.172E 01
7.6232	2.181E 01
7.8435	2.199E 01
8.0646	2.207E 01
8.2006	2.202E 01
8.3807	2.199E 01
8.6403	2.152E 01
8.8272	2.117E 01
9.0095	2.060E 01
9.2884	1.954E 01
9.4895	1.860E 01
9.7603	1.796E 01
10.0304	1.764E 01
10.3972	1.759E 01
10.7421	1.822E 01
10.9466	1.935E 01
11.2035	1.954E 01
11.3536	2.019E 01

N1237A-01235A

PH	MCMPOC
2.0017	-5.516E-01
2.1758	-5.560E-02
2.4243	7.689E-01
2.7082	7.496E-01
2.9398	1.657E 00
3.1951	2.430E 00
3.4461	3.862E 00
3.6971	5.026E 00
3.9692	6.007E 00
4.1974	7.100E 00
4.4577	8.114E 00
4.6944	8.824E 00
4.9682	9.525E 00
5.2218	9.938E 00
5.4179	1.018E 01
5.6342	1.047E 01
5.8776	1.070E 01
6.1700	1.086E 01
6.4270	1.104E 01
6.7667	1.118E 01
7.0473	1.134E 01
7.3313	1.152E 01
7.6406	1.174E 01
7.8756	1.196E 01
8.0970	1.224E 01
8.3489	1.265E 01
8.5923	1.293E 01
8.8442	1.328E 01
9.1078	1.421E 01
9.3614	1.517E 01
9.6133	1.649E 01
9.8634	1.781E 01
10.1203	1.913E 01
10.3756	1.998E 01
10.4855	1.998E 01
10.6190	2.088E 01
10.8861	2.094E 01
11.0838	1.993E 01
11.2275	2.009E 01
11.3661	1.851E 01
11.4777	1.806E 01
11.5791	1.813E 01
11.6552	1.578E 01

N2250B-02254A

PH	MCMPOC
2.1261	8.441E-01
2.2951	1.541E 00
2.4741	7.620E-01
2.6425	1.397E 00
2.8347	1.235E 00
2.9851	1.355E 00
3.1435	1.660E 00
3.2826	1.906E 00
3.4533	2.217E 00
3.6476	2.594E 00
3.8406	3.203E 00
4.0411	3.469E 00
4.2128	3.909E 00
4.3513	4.326E 00
4.5588	4.703E 00
4.8283	5.159E 00
5.1557	5.722E 00
5.6751	6.247E 00
6.1068	6.463E 00
6.5336	6.687E 00
7.3502	6.873E 00
8.2786	7.026E 00
8.6915	7.140E 00
8.9415	7.302E 00
9.1866	7.444E 00
9.4173	7.610E 00
9.7005	7.756E 00
10.0088	8.035E 00
10.2416	8.024E 00
10.4545	8.162E 00
10.6337	7.818E 00
10.8146	7.769E 00
10.9640	7.905E 00
11.1288	8.186E 00
11.2823	6.745E 00
11.4588	3.062E 00

N3247B-03249A

PH	MCMPOC
2.0007	-9.140E-02
2.0162	1.080E-01
2.0811	5.397E-01
2.1531	6.926E-01
2.3180	1.043E 00
2.4148	1.807E 00
2.4861	1.499E 00
2.6641	2.053E 00
2.8296	2.462E 00
3.0068	2.952E 00
3.1569	3.344E 00
3.3322	3.879E 00
3.5093	4.359E 00
3.6783	4.841E 00
3.8325	5.311E 00
4.0150	5.791E 00
4.1929	6.371E 00
4.3475	6.823E 00
4.5140	7.198E 00
4.6694	7.603E 00
4.8611	8.031E 00
5.0365	8.381E 00
5.1925	8.652E 00
5.3891	8.863E 00
5.5766	9.044E 00
5.7955	9.234E 00
6.0847	9.410E 00
6.3687	9.587E 00
6.7664	9.749E 00
7.2248	9.906E 00
7.6802	1.006E 01
8.0872	1.023E 01
8.3857	1.035E 01
8.6518	1.047E 01
8.9420	1.064E 01
9.2108	1.079E 01
9.4135	1.094E 01
9.6704	1.107E 01
9.8910	1.127E 01
10.0943	1.137E 01
10.3286	1.153E 01
10.6048	1.169E 01
10.8556	1.196E 01
11.0882	1.202E 01
11.2988	1.069E 01

P1318A-W1318A

PH	MCMPOC
2.0005	0.000E 00
2.1678	3.493E-01
2.3369	7.878E-01
2.5059	1.382E 00
2.6749	1.911E 00
2.8440	2.723E 00
3.0130	3.570E 00
3.1820	4.519E 00
3.3511	5.317E 00
3.5184	6.207E 00
3.6900	7.081E 00
3.8599	7.851E 00
4.0272	8.620E 00
4.1996	9.321E 00
4.3551	9.860E 00
4.5343	1.045E 01
4.7219	1.098E 01
4.8859	1.146E 01
5.0414	1.181E 01
5.2645	1.210E 01
5.4809	1.228E 01
5.7057	1.252E 01
6.0066	1.276E 01
6.4309	1.295E 01
6.8365	1.319E 01
7.1814	1.345E 01
7.5194	1.373E 01
7.7476	1.404E 01
7.9894	1.432E 01
8.1263	1.465E 01
8.2514	1.497E 01
8.5945	1.629E 01
8.8142	1.744E 01
9.1253	1.975E 01
9.3940	2.219E 01
9.6340	2.485E 01
9.9552	2.800E 01
10.3812	3.089E 01
10.6651	3.245E 01
10.8815	3.371E 01
11.0370	3.454E 01
11.2094	3.573E 01

P1340B-W1340B

PH	MCMPOC
1.9998	0.000E 00
2.0184	3.111E-02
2.1452	6.640E-01
2.3125	1.359E 00
2.4799	2.286E 00
2.6489	3.251E 00
2.8196	4.223E 00
2.9870	5.171E 00
3.1560	6.119E 00
3.3250	7.125E 00
3.5034	8.081E 00
3.6631	8.896E 00
3.8305	9.669E 00
4.0012	1.045E 01
4.1761	1.117E 01
4.3367	1.177E 01
4.4931	1.227E 01
4.6638	1.277E 01
4.8404	1.320E 01
5.0044	1.362E 01
5.2317	1.402E 01
5.5123	1.439E 01
5.8166	1.470E 01
6.1225	1.498E 01
6.3389	1.521E 01
6.6482	1.548E 01
6.9288	1.577E 01
7.2331	1.609E 01
7.5576	1.640E 01
7.8010	1.662E 01
7.9988	1.668E 01
8.1797	1.670E 01
8.4096	1.697E 01
8.6564	1.706E 01
8.9031	1.719E 01
9.1550	1.733E 01
9.4018	1.812E 01
9.6587	1.898E 01
9.9376	2.099E 01
10.1692	2.276E 01
10.4498	2.443E 01
10.6679	2.616E 01
10.9468	2.776E 01

P2320A-W2320A

PH	MCMPOC
1.9992	0.000E 00
2.1479	2.869E-01
2.3169	6.944E-01
2.4877	9.939E-01
2.6550	1.074E 00
2.8240	1.448E 00
2.9914	1.629E 00
3.1621	2.031E 00
3.3311	2.287E 00
3.5221	2.874E 00
3.6709	3.036E 00
3.9177	3.706E 00
4.1678	4.122E 00
4.4265	4.654E 00
4.7037	5.173E 00
4.9184	5.544E 00
5.1449	5.848E 00
5.4795	6.164E 00
6.0576	6.427E 00
6.8436	6.714E 00
7.9880	6.855E 00
8.7740	6.954E 00
9.0800	7.108E 00
9.2727	7.278E 00
9.5042	7.456E 00
9.7552	7.601E 00
10.0198	7.656E 00
10.2666	7.829E 00
10.5117	7.901E 00
10.7686	8.279E 00
11.0238	8.783E 00
11.0982	9.017E 00

P2338B-W2338B

PH	MCMPOC
2.0008	0.000E 00
2.0076	6.143E-01
2.1597	1.324E 00
2.3305	2.024E 00
2.4978	2.766E 00
2.6668	3.255E 00
2.8460	3.712E 00
3.0049	4.148E 00
3.1739	4.533E 00
3.3565	4.992E 00
3.5103	5.348E 00
3.6819	5.667E 00
3.8551	6.086E 00
4.0191	6.418E 00
4.2405	6.952E 00
4.4975	7.370E 00
4.7527	7.695E 00
5.0181	8.078E 00
5.3257	8.355E 00
5.6638	8.607E 00
5.9833	8.771E 00
6.3180	8.985E 00
6.7743	9.266E 00
7.5215	9.439E 00
8.2821	9.551E 00
8.7301	9.696E 00
9.0107	9.863E 00
9.2270	1.004E 01
9.4451	1.023E 01
9.6530	1.038E 01
9.8558	1.065E 01
10.1533	1.084E 01
10.3494	1.116E 01
10.5979	1.160E 01
10.8176	1.212E 01
10.9613	1.249E 01
11.0644	1.279E 01

P3322A-W3322A

PH	MCMPOC
2.0000	0.000E 00
2.1183	6.336E-01
2.2890	8.499E-01
2.4564	1.364E 00
2.6254	1.967E 00
2.7953	2.099E 00
2.9652	2.518E 00
3.1427	2.968E 00
3.3032	3.364E 00
3.4782	3.629E 00
3.6396	4.183E 00
3.8154	4.600E 00
3.9785	4.973E 00
4.1501	5.403E 00
4.3191	5.736E 00
4.4814	6.103E 00
4.6318	6.379E 00
4.8296	6.766E 00
5.0122	7.084E 00
5.2539	7.418E 00
5.4872	7.720E 00
5.7813	7.995E 00
6.1667	8.227E 00
6.6991	8.460E 00
7.1927	8.615E 00
7.9381	8.750E 00
8.5145	8.962E 00
9.0030	8.924E 00
9.2363	8.930E 00
9.4053	8.825E 00
9.6166	8.838E 00
9.8837	8.898E 00
10.1102	8.957E 00
10.2852	9.063E 00
10.4652	8.941E 00
10.6334	9.100E 00
10.8049	9.144E 00
10.9773	9.158E 00
11.0881	9.170E 00

GG1371A-FF1371A

PH	MCMPOC
2.0019	0.000E 00
2.1531	-3.594E-01
2.3230	-3.416E-01
2.4904	-1.569E-01
2.6611	9.717E-02
2.8284	7.842E-01
2.9992	1.280E 00
3.1707	1.991E 00
3.3372	2.628E 00
3.5147	3.281E 00
3.6744	4.044E 00
3.8714	4.752E 00
4.0167	5.274E 00
4.1841	5.984E 00
4.3565	6.536E 00
4.5238	6.997E 00
4.6895	7.482E 00
4.8619	7.931E 00
5.0242	8.328E 00
5.2110	8.773E 00
5.3572	9.061E 00
5.5499	9.325E 00
5.8457	9.529E 00
6.1161	9.685E 00
6.4069	9.924E 00
6.9647	1.024E 01
7.3551	1.046E 01
7.6577	1.072E 01
7.8589	1.095E 01
8.0414	1.133E 01
8.3034	1.213E 01
8.5654	1.306E 01
8.8054	1.463E 01
9.0353	1.687E 01
9.2906	1.950E 01
9.5255	2.256E 01
9.7698	2.560E 01
10.0157	2.798E 01
10.3436	3.053E 01
10.6056	3.204E 01
10.8541	3.318E 01
11.0654	3.431E 01
11.2750	3.496E 01

GG1392A-FF1371A

PH	MCMPOC
2.0179	9.321E-01
2.1405	8.731E-01
2.3256	9.951E-01
2.4921	1.387E 00
2.6721	1.733E 00
2.8386	2.410E 00
3.0110	2.993E 00
3.1758	3.707E 00
3.3457	4.372E 00
3.5274	5.074E 00
3.6956	5.761E 00
3.8562	6.372E 00
4.0319	7.125E 00
4.1993	7.571E 00
4.3675	8.156E 00
4.5221	8.555E 00
4.7115	9.098E 00
4.8856	9.555E 00
5.0225	9.796E 00
5.2414	1.023E 01
5.4028	1.051E 01
5.6445	1.074E 01
5.8812	1.098E 01
6.1905	1.121E 01
6.4339	1.138E 01
6.8987	1.163E 01
7.2909	1.186E 01
7.5546	1.209E 01
7.7794	1.235E 01
7.9941	1.269E 01
8.2088	1.319E 01
8.4082	1.395E 01
8.6432	1.506E 01
8.8139	1.631E 01
9.0674	1.874E 01
9.3633	2.217E 01
9.7148	2.671E 01
10.0774	3.050E 01
10.4231	3.304E 01
10.6749	3.450E 01
10.8474	3.607E 01
11.0265	3.702E 01

GG2373A-FF2373A

PH	MCMPOC
2.0002	0.000E 00
2.0179	2.200E-01
2.1515	2.543E-01
2.3196	-1.969E-01
2.4929	-4.211E-01
2.6602	-5.436E-01
2.8335	-6.072E-01
3.0042	-4.511E-01
3.1733	-2.786E-01
3.3355	-1.728E-01
3.5282	1.053E-01
3.6804	3.308E-01
3.8494	5.801E-01
4.0117	8.715E-01
4.1790	1.116E 00
4.3987	1.345E 00
4.5830	1.534E 00
4.7723	1.784E 00
5.0183	1.962E 00
5.2186	2.169E 00
5.5245	2.399E 00
5.9843	2.507E 00
6.6165	2.597E 00
6.7382	2.772E 00
8.0127	2.814E 00
8.3355	2.900E 00
8.5313	2.982E 00
8.8747	3.158E 00
9.1925	3.227E 00
9.3971	3.296E 00
9.5982	3.289E 00
9.8450	3.411E 00
10.1087	3.496E 00
10.3555	3.591E 00
10.6141	3.771E 00
10.8626	4.186E 00
11.0299	4.345E 00
11.1449	4.874E 00
11.3054	4.650E 00

GG2421B-FF2373A

PH	MCMPOC
2.0017	-3.859E-01
2.0203	-3.285E-01
2.1335	1.131E-01
2.3381	-9.221E-01
2.4902	-8.575E-01
2.6474	-1.082E 00
2.7894	-9.699E-01
2.9922	-1.112E 00
3.2348	-8.470E-01
3.5061	-7.555E-01
3.7571	-4.047E-01
4.0098	-3.128E-02
4.2093	1.606E-01
4.4594	4.849E-01
4.7366	7.631E-01
4.9868	9.380E-01
5.3316	1.194E 00
5.8083	1.489E 00
6.3661	1.675E 00
7.6558	1.902E 00
8.4875	2.175E 00
8.8729	2.490E 00
9.1214	2.680E 00
9.4408	2.994E 00
9.7020	3.322E 00
10.0696	3.607E 00

GG3374B-FF3374B

PH	MCMPOC
1.9993	-6.653E-01
2.0179	-7.254E-01
2.1523	-1.993E-01
2.3205	5.827E-01
2.4912	9.518E-01
2.6594	1.614E 00
2.8276	2.115E 00
2.9992	2.526E 00
3.1690	2.902E 00
3.3398	3.275E 00
3.5122	3.669E 00
3.6728	3.987E 00
3.8638	4.443E 00
4.0117	4.676E 00
4.1815	5.077E 00
4.3371	5.252E 00
4.5340	5.674E 00
4.6937	5.926E 00
4.8526	6.175E 00
5.0284	6.397E 00
5.2110	6.525E 00
5.3910	6.645E 00
5.6251	6.745E 00
5.9496	6.877E 00
6.3604	7.016E 00
6.8861	7.142E 00
7.5284	7.253E 00
7.9746	7.388E 00
8.3296	7.456E 00
8.6406	7.562E 00
8.8367	7.664E 00
9.0379	7.751E 00
9.2272	7.897E 00
9.3827	8.032E 00
9.6041	8.179E 00
9.8492	8.256E 00
10.0918	8.218E 00
10.3580	8.512E 00
10.6149	8.447E 00
10.8567	8.651E 00
10.9834	8.774E 00
11.1102	0.000E 00

GG3421B-FF3374B

PH	MCMPOC
2.0008	-1.059E 00
2.0177	-7.068E-01
2.1310	-3.982E-01
2.3009	-2.142E-01
2.4606	5.384E-03
2.6330	1.764E-01
2.8088	3.695E-01
2.9593	4.867E-01
3.1198	7.389E-01
3.2939	9.979E-01
3.4562	1.253E 00
3.6422	1.574E 00
3.8078	1.862E 00
3.9904	2.145E 00
4.1493	2.445E 00
4.3149	2.665E 00
4.4823	2.922E 00
4.6513	3.147E 00
4.8119	3.360E 00
5.0333	3.598E 00
5.2446	3.761E 00
5.5455	3.928E 00
5.7686	4.050E 00
6.2909	4.267E 00
6.9315	4.471E 00
7.6601	4.664E 00
8.1655	4.947E 00
8.5509	5.253E 00
8.7723	5.610E 00
9.0107	6.125E 00
9.2777	6.880E 00
9.6192	7.846E 00
9.9944	8.494E 00
10.2615	8.978E 00
10.4559	9.212E 00
10.6198	9.771E 00
10.7939	9.592E 00

HH1377B-FF1371A

PH	MCMPOC
2.0188	7.117E-01
2.1337	1.341E 00
2.3010	1.605E 00
2.4735	1.832E 00
2.6425	2.411E 00
2.8149	2.970E 00
2.9806	3.586E 00
3.1487	4.290E 00
3.3203	5.040E 00
3.4995	5.773E 00
3.6618	6.519E 00
3.8257	7.314E 00
3.9948	8.010E 00
4.1731	8.722E 00
4.3345	9.427E 00
4.5044	9.940E 00
4.6810	1.055E 01
4.8526	1.106E 01
5.0157	1.148E 01
5.1848	1.195E 01
5.3572	1.239E 01
5.5516	1.264E 01
5.8896	1.290E 01
6.1516	1.305E 01
6.4643	1.319E 01
6.9123	1.344E 01
7.2182	1.360E 01
7.4498	1.377E 01
7.7017	1.393E 01
7.9315	1.410E 01
8.1935	1.454E 01
8.4370	1.514E 01
8.7159	1.591E 01
8.9812	1.730E 01
9.2365	1.895E 01
9.6354	2.209E 01
9.8805	2.364E 01
10.2828	2.580E 01

HH1399C-FF1371A

PH	MCMPOC
2.0179	8.664E-01
2.1168	1.371E 00
2.2909	1.781E 00
2.4684	2.269E 00
2.6340	2.818E 00
2.8200	3.555E 00
3.0127	4.296E 00
3.1716	5.072E 00
3.3136	5.785E 00
3.4877	6.530E 00
3.6542	7.261E 00
3.8578	8.059E 00
4.0167	8.662E 00
4.1891	9.315E 00
4.3430	9.800E 00
4.5052	1.032E 01
4.7165	1.088E 01
4.9532	1.152E 01
5.1154	1.193E 01
5.3707	1.241E 01
5.6564	1.270E 01
5.9133	1.291E 01
6.2311	1.313E 01
6.4838	1.329E 01
6.7754	1.348E 01
7.0965	1.366E 01
7.4464	1.378E 01
7.6780	1.388E 01
7.8639	1.403E 01
8.1073	1.438E 01
8.2662	1.473E 01
8.4200	1.503E 01
8.6043	1.548E 01
8.8173	1.645E 01
8.9897	1.729E 01
9.1520	1.833E 01
9.3210	1.953E 01
9.4968	2.097E 01
9.7098	2.259E 01
9.9244	2.403E 01
10.0985	2.494E 01
10.2372	2.575E 01
10.4197	2.639E 01
10.6302	2.744E 01
10.8592	2.872E 01
10.9843	2.871E 01

HH2378B-FF2373A

PH	MCMPOC
2.0002	-7.615E-04
2.0188	2.246E-02
2.1371	8.151E-01
2.3163	1.472E-01
2.4802	5.268E-01
2.6526	5.129E-01
2.8251	3.190E-01
2.9890	6.489E-01
3.1513	8.444E-01
3.3389	1.008E 00
3.5181	1.211E 00
3.6668	1.453E 00
3.8333	1.710E 00
4.0032	2.042E 00
4.1891	2.223E 00
4.3497	2.355E 00
4.5052	2.589E 00
4.6777	2.799E 00
4.8484	3.001E 00
5.0005	3.169E 00
5.4831	3.522E 00
5.7882	3.664E 00
6.2142	3.785E 00
6.7382	3.907E 00
7.5225	4.011E 00
8.0110	4.151E 00
8.5637	4.254E 00
8.8393	4.447E 00
9.0404	4.520E 00
9.2584	4.568E 00
9.4579	4.603E 00
9.6861	4.737E 00
9.8416	4.903E 00
10.1070	4.997E 00
10.3572	4.972E 00
10.6056	5.215E 00
10.8626	5.482E 00
11.0232	5.693E 00
11.1398	6.319E 00
11.3021	6.184E 00

HH2399B-FF2373A

PH	MCMPOC
2.0002	-7.605E-04
2.0188	2.890E-02
2.1438	2.520E-01
2.2943	2.604E-01
2.4642	2.432E-01
2.6391	-7.025E-02
2.8014	1.332E-02
2.9738	5.333E-03
3.1445	2.294E-01
3.3136	2.441E-01
3.4792	3.895E-01
3.6449	6.501E-01
3.8190	9.929E-01
3.9914	1.088E 00
4.1604	1.321E 00
4.3835	1.620E 00
4.6100	1.851E 00
4.9413	2.113E 00
5.1307	2.282E 00
5.4535	2.521E 00
5.8710	2.742E 00
6.6384	2.912E 00
7.8065	3.070E 00
8.4623	3.187E 00
8.7716	3.368E 00
8.9745	3.491E 00
9.1621	3.636E 00
9.3514	3.775E 00
9.5205	3.930E 00
9.7030	3.971E 00
9.8163	4.124E 00
10.0174	4.117E 00
10.2338	4.175E 00
10.4299	4.258E 00
10.5938	4.716E 00
10.7612	4.701E 00
10.9268	5.585E 00
11.0908	6.703E 00

HH3378B-FF3374B

PH	MCMPOC
2.0002	-7.385E-01
2.0188	-7.906E-01
2.1337	-1.280E-01
2.3044	3.448E-01
2.4735	7.375E-01
2.6416	1.241E 00
2.8098	1.571E 00
2.9896	1.861E 00
3.1513	2.125E 00
3.3186	2.553E 00
3.4910	2.834E 00
3.6567	3.240E 00
3.8257	3.500E 00
3.9948	3.890E 00
4.1604	4.206E 00
4.3463	4.585E 00
4.5052	4.871E 00
4.6954	5.078E 00
4.8670	5.356E 00
5.0225	5.587E 00
5.1780	5.741E 00
5.3538	5.916E 00
5.5955	6.074E 00
5.8372	6.184E 00
6.1398	6.309E 00
6.5049	6.428E 00
7.1151	6.524E 00
7.6222	6.629E 00
8.0549	6.741E 00
8.3186	6.809E 00
8.6770	6.918E 00
8.8866	7.013E 00
9.1993	7.116E 00
9.4207	7.114E 00
9.6574	7.127E 00
9.9160	7.138E 00
10.1949	7.088E 00
10.3386	7.338E 00
10.5837	7.245E 00
10.8372	7.345E 00
10.9691	7.393E 00
11.0842	7.772E 00

HH3399B-FF3374B

PH	MCMPOC
2.0002	-7.353E-01
2.0188	-7.704E-01
2.1320	-4.766E-01
2.3010	-1.152E-01
2.4701	-8.461E-02
2.6408	2.630E-01
2.8081	5.003E-01
2.9890	6.597E-01
3.1445	9.520E-01
3.3220	1.323E 00
3.4877	1.632E 00
3.6516	1.967E 00
3.8418	2.259E 00
4.0387	2.670E 00
4.2179	3.003E 00
4.4309	3.397E 00
4.6912	3.705E 00
4.8670	3.978E 00
5.0833	4.257E 00
5.3166	4.473E 00
5.5532	4.632E 00
6.2091	4.926E 00
6.8007	5.101E 00
7.7912	5.237E 00
8.2578	5.377E 00
8.6381	5.479E 00
8.9609	5.579E 00
9.1621	5.703E 00
9.3920	5.728E 00
9.5441	5.783E 00
9.7486	5.902E 00
9.9768	5.851E 00
10.1729	5.877E 00
10.3318	6.213E 00
10.5482	6.131E 00
10.7493	5.881E 00
10.9555	6.402E 00

II1380A-FF1380A

PH	MCMPOC
2.0002	0.000E 00
2.0171	4.055E-01
2.1337	3.404E-01
2.3010	9.618E-01
2.4726	1.021E 00
2.6374	1.963E 00
2.8115	2.454E 00
2.9806	2.960E 00
3.1479	3.615E 00
3.3237	4.356E 00
3.4944	5.113E 00
3.6533	5.768E 00
3.8266	6.342E 00
3.9998	7.001E 00
4.1655	7.739E 00
4.3480	8.400E 00
4.5137	8.882E 00
4.6675	9.365E 00
4.8399	9.840E 00
5.0056	1.024E 01
5.1864	1.064E 01
5.3428	1.091E 01
5.4856	1.110E 01
5.7037	1.131E 01
5.9420	1.140E 01
6.2023	1.154E 01
6.5624	1.172E 01
7.0052	1.186E 01
7.4549	1.192E 01
7.7862	1.186E 01
8.0177	1.173E 01
8.2290	1.152E 01
8.4640	1.117E 01
8.7412	1.046E 01
8.9779	9.365E 00
9.2508	7.729E 00
9.5035	6.100E 00
9.7402	4.617E 00
9.9921	3.161E 00
10.2608	2.098E 00
10.5177	1.304E 00
10.6969	1.001E 00
10.8398	7.263E-01

II1399C-FF1380A

PH	MCMPOC
2.0002	0.000E 00
2.0179	2.061E-01
2.1185	1.773E-01
2.2943	3.934E-01
2.4582	5.957E-01
2.6349	9.423E-01
2.8014	1.408E 00
2.9890	1.927E 00
3.1454	2.483E 00
3.3051	3.096E 00
3.5265	3.958E 00
3.6575	4.410E 00
3.8173	4.960E 00
3.9863	5.534E 00
4.1739	6.274E 00
4.3430	6.738E 00
4.5154	7.362E 00
4.7284	8.007E 00
5.0047	8.651E 00
5.3521	9.320E 00
5.6116	9.608E 00
5.7924	9.747E 00
5.9902	9.874E 00
6.1871	1.005E 01
6.4001	1.027E 01
6.8294	1.053E 01
7.2858	1.073E 01
7.7726	1.066E 01
8.1023	1.038E 01
8.2865	1.019E 01
8.4285	1.000E 01
8.5756	9.599E 00
8.7852	8.898E 00
8.9440	8.241E 00
9.1367	7.205E 00
9.3565	5.874E 00
9.6354	4.162E 00
9.9312	2.381E 00
10.2270	1.090E 00
10.4535	3.196E-01
10.6614	3.008E-01
10.8516	3.261E-01

II2381B-FF2381B

PH	MCMPOC
2.0002	0.000E 00
2.0188	-8.147E-03
2.1345	6.955E-02
2.3010	1.864E-01
2.4752	1.364E-01
2.6450	1.112E-02
2.8081	1.255E-01
2.9806	3.185E-01
3.1530	5.175E-01
3.3288	6.555E-01
3.4868	8.099E-01
3.6651	1.089E 00
3.8240	1.349E 00
3.9964	1.476E 00
4.1570	1.742E 00
4.3548	2.066E 00
4.5019	2.264E 00
4.6709	2.510E 00
4.8492	2.731E 00
5.0208	2.883E 00
5.1898	3.033E 00
5.4231	3.198E 00
5.6783	3.312E 00
6.1685	3.422E 00
6.8007	3.533E 00
7.7000	3.586E 00
8.2240	3.660E 00
8.5232	3.704E 00
8.8342	3.724E 00
9.0979	3.754E 00
9.3244	3.816E 00
9.6337	3.783E 00
9.8839	3.852E 00
10.0952	3.854E 00
10.3352	4.009E 00
10.5904	4.254E 00
10.8491	4.409E 00
10.9961	4.665E 00
11.1178	4.961E 00

II2404A-FF2381B

PH	MCMPOC
2.0002	-6.928E-04
2.0171	4.218E-01
2.1185	3.230E-01
2.2841	2.305E-01
2.4583	-2.776E-01
2.6307	-6.004E-01
2.7946	-3.308E-01
2.9738	-3.830E-01
3.1631	-2.476E-01
3.3034	-4.670E-02
3.5029	1.167E-01
3.6719	2.878E-01
3.8418	4.985E-01
4.0624	8.679E-01
4.2939	1.164E 00
4.4917	1.445E 00
4.8416	1.817E 00
5.1814	2.072E 00
5.4806	2.265E 00
5.9437	2.439E 00
6.7196	2.624E 00
7.4177	2.727E 00
8.0803	2.773E 00
8.4234	2.841E 00
8.6804	2.865E 00
8.9339	2.888E 00
9.2500	2.865E 00
9.4275	2.963E 00
9.6979	2.888E 00
9.8687	2.936E 00
10.0478	3.097E 00
10.2186	3.004E 00
10.3910	3.330E 00
10.5837	3.724E 00
10.7882	3.679E 00
10.9108	4.054E 00

II3382B-FF3382B

PH	MCMPOC
2.0010	-2.047E-01
2.0196	-1.719E-01
2.1244	-4.452E-02
2.2934	-7.142E-02
2.4625	4.012E-02
2.6349	8.551E-02
2.8022	1.804E-01
2.9713	3.740E-01
3.1420	6.538E-01
3.3110	1.000E 00
3.4784	1.328E 00
3.6558	1.734E 00
3.8147	2.034E 00
3.9872	2.450E 00
4.1562	2.786E 00
4.3185	3.165E 00
4.4926	3.461E 00
4.6684	3.786E 00
4.8306	4.104E 00
4.9971	4.370E 00
5.1771	4.607E 00
5.3631	4.818E 00
5.5558	4.980E 00
5.8093	5.135E 00
6.1187	5.284E 00
6.5007	5.426E 00
7.0923	5.547E 00
7.7819	5.624E 00
8.1352	5.752E 00
8.4885	5.817E 00
8.6558	5.919E 00
8.9179	5.937E 00
9.1494	5.992E 00
9.4013	6.053E 00
9.6481	6.141E 00
9.9050	6.150E 00
10.1552	6.304E 00
10.4121	6.504E 00
10.6690	6.705E 00
10.9158	6.865E 00
11.1119	7.495E 00

II3404A-FF3382B

PH	MCMPOC
2.0002	0.000E 00
2.0179	2.274E-01
2.1185	3.827E-01
2.2943	8.297E-01
2.4566	1.359E 00
2.6712	1.985E 00
2.8158	2.029E 00
2.9620	2.340E 00
3.1225	2.639E 00
3.3085	3.070E 00
3.5046	3.499E 00
3.7361	4.076E 00
3.9770	4.599E 00
4.1444	4.886E 00
4.3379	5.309E 00
4.6084	5.819E 00
4.8636	6.215E 00
5.1095	6.547E 00
5.3639	6.817E 00
5.7054	7.141E 00
6.1837	7.361E 00
6.5641	7.502E 00
7.1422	7.621E 00
7.6983	7.718E 00
8.0685	7.842E 00
8.4471	8.005E 00
8.7023	8.142E 00
8.9390	8.260E 00
9.1114	8.409E 00
9.3920	8.518E 00
9.5720	8.621E 00
9.7098	8.840E 00
9.9219	8.932E 00
10.0732	9.081E 00
10.2710	9.153E 00
10.4214	9.696E 00
10.5989	9.620E 00
10.7789	9.567E 00
10.9015	1.047E 01

JJ1383B-FF1371A

PH	MCMPOC
2.0188	7.832E-01
2.1236	1.460E 00
2.2943	1.594E 00
2.4675	1.966E 00
2.6679	1.854E 00
2.8081	2.701E 00
2.9670	3.273E 00
3.1513	3.856E 00
3.3136	4.524E 00
3.5063	5.282E 00
3.6685	6.045E 00
3.8139	6.874E 00
3.9846	7.892E 00
4.1587	9.058E 00
4.3666	1.082E 01
4.4926	1.195E 01
4.6371	1.358E 01
4.7470	1.529E 01
4.9194	1.747E 01
5.1256	1.965E 01
5.4366	2.183E 01
5.6040	2.267E 01
5.8051	2.350E 01
6.0215	2.433E 01
6.2159	2.518E 01
6.4424	2.602E 01
6.6198	2.690E 01
6.9190	2.776E 01
7.2199	2.859E 01
7.2047	2.953E 01
7.5445	2.984E 01
8.0059	3.026E 01
8.4555	3.051E 01
8.8798	3.033E 01
9.1638	3.001E 01
9.6219	2.914E 01
9.9244	2.863E 01
10.2726	2.857E 01

JJ1407A-FF1371A

PH	MCMPOC
2.0194	6.440E-01
2.1378	1.429E-01
2.3034	1.693E-01
2.4733	4.342E-02
2.6542	2.898E-02
2.8223	2.278E-01
2.9905	6.650E-01
3.1604	1.074E 00
3.3430	1.701E 00
3.4951	2.303E 00
3.7072	3.212E 00
3.8408	3.960E 00
4.0191	5.006E 00
4.1746	6.090E 00
4.3487	7.505E 00
4.5144	9.028E 00
4.6580	1.069E 01
4.8102	1.286E 01
5.0418	1.548E 01
5.2361	1.727E 01
5.5421	1.900E 01
5.7737	1.981E 01
5.9697	2.066E 01
6.1962	2.150E 01
6.5208	2.279E 01
6.9332	2.457E 01
7.5434	2.620E 01
7.9643	2.762E 01

JJ2386A-FF2381B

PH	MCMPOC
2.0002	0.000E 00
2.0188	5.305E-03
2.1405	1.647E-01
2.3264	4.845E-01
2.4921	4.798E-01
2.6628	4.160E-01
2.8453	7.300E-01
3.0254	1.008E 00
3.1766	1.116E 00
3.3626	1.382E 00
3.5063	1.547E 00
3.8680	2.067E 00
4.0260	2.315E 00
4.2018	2.555E 00
4.3717	2.848E 00
4.5238	3.055E 00
4.6912	3.231E 00
4.8788	3.391E 00
5.0952	3.606E 00
5.4484	3.860E 00
5.6631	4.012E 00
5.9572	4.168E 00
6.2716	4.335E 00
6.8649	4.544E 00
7.6239	4.726E 00
8.3220	4.939E 00
8.7074	5.091E 00
9.0742	5.307E 00
9.3988	5.549E 00
9.6962	5.769E 00
9.9566	6.071E 00
10.2050	6.277E 00
10.4146	6.670E 00
10.5718	7.484E 00
10.7020	8.008E 00
10.8389	9.057E 00
11.0333	9.326E 00

JJ2405A-FF2381B

PH	MCMPOC
2.0154	7.253E-01
2.1151	9.749E-01
2.2943	7.279E-01
2.4515	6.349E-01
2.6459	5.143E-01
2.8014	6.924E-01
2.9670	8.908E-01
3.1361	1.020E 00
3.3119	1.178E 00
3.4775	1.376E 00
3.6753	1.608E 00
3.8908	1.994E 00
4.0472	2.178E 00
4.2365	2.481E 00
4.4706	2.817E 00
4.7503	3.168E 00
4.9752	3.424E 00
5.2388	3.634E 00
5.5161	3.806E 00
5.7645	3.906E 00
6.1144	4.026E 00
6.4652	4.149E 00
7.0745	4.325E 00
7.8284	4.454E 00
8.3626	4.576E 00
8.6837	4.644E 00
8.8967	4.703E 00
9.1452	4.726E 00
9.3582	4.784E 00
9.5306	4.813E 00
9.6963	4.911E 00
9.9008	4.965E 00
10.0698	5.103E 00
10.2946	5.154E 00
10.6056	5.563E 00
10.7814	5.607E 00
10.9048	6.032E 00

JJ3387A-FF3374B

PH	MCMPOC
1.9985	-3.904E-01
2.0171	-4.927E-01
2.1405	-1.701E-01
2.3112	2.933E-01
2.4819	5.177E-01
2.6493	9.314E-01
2.8200	1.346E 00
2.9806	1.641E 00
3.1648	1.902E 00
3.3474	2.454E 00
3.4894	2.716E 00
3.6753	3.134E 00
3.8308	3.458E 00
4.0167	3.892E 00
4.1875	4.247E 00
4.3328	4.505E 00
4.5205	4.880E 00
4.7148	5.222E 00
4.9397	5.500E 00
5.1239	5.730E 00
5.3808	5.959E 00
5.5938	6.136E 00
5.9015	6.327E 00
6.3004	6.532E 00
7.0475	6.701E 00
7.8453	6.864E 00
8.3524	6.984E 00
8.7868	7.133E 00
9.0421	7.243E 00
9.2804	7.359E 00
9.5948	7.405E 00
9.8771	7.450E 00
10.0901	7.485E 00
10.3504	7.773E 00
10.6090	7.764E 00
10.8609	7.850E 00
10.9961	8.180E 00
11.0975	0.000E 00

JJ3405A-FF3374B

PH	MCMPOC
2.0002	-7.891E-01
2.0188	-8.147E-01
2.1185	1.755E-01
2.2960	8.084E-01
2.4735	9.983E-01
2.6560	1.264E 00
2.8056	1.793E 00
2.9839	2.045E 00
3.2071	2.547E 00
3.4369	3.152E 00
3.6956	3.611E 00
3.9728	4.300E 00
4.2297	4.801E 00
4.4359	5.245E 00
4.7047	5.735E 00
5.1797	6.294E 00
5.4992	6.602E 00
6.0756	6.914E 00
6.9866	7.236E 00
7.5867	7.340E 00
8.0245	7.461E 00
8.5248	7.538E 00
8.7953	7.663E 00
9.0319	7.795E 00
9.2466	7.966E 00
9.4359	8.081E 00
9.7013	8.136E 00
9.9413	8.149E 00
10.1391	8.305E 00
10.3386	8.649E 00
10.5161	8.472E 00
10.6673	8.485E 00
10.8499	9.295E 00

KK1383B-FF1371A

PH	MCMPOC
2.0196	7.141E-01
2.1261	8.512E-01
2.2698	2.006E 00
2.4490	2.200E 00
2.6231	2.622E 00
2.7870	3.306E 00
2.9518	3.882E 00
3.1318	4.525E 00
3.2941	5.125E 00
3.4665	5.678E 00
3.6288	6.342E 00
3.8054	6.924E 00
3.9719	7.558E 00
4.1765	8.211E 00
4.3489	8.752E 00
4.5010	9.123E 00
4.6498	9.600E 00
4.8188	1.001E 01
4.9777	1.038E 01
5.1569	1.079E 01
5.3580	1.120E 01
5.6225	1.158E 01
5.7975	1.178E 01
5.9936	1.210E 01
6.2049	1.252E 01
6.3671	1.297E 01
6.5514	1.353E 01
6.8810	1.417E 01
7.4439	1.447E 01
7.9172	1.450E 01
8.1724	1.455E 01
8.5257	1.434E 01
8.8046	1.378E 01
9.0750	1.319E 01
9.4554	1.200E 01
9.7191	1.131E 01
9.9895	1.070E 01
10.2346	1.038E 01
10.4932	1.013E 01
10.6995	1.025E 01
10.8803	1.117E 01

KK1407A-FF1371A

PH	MCMPOC
2.0194	6.945E-01
2.1344	3.230E-01
2.3085	4.192E-01
2.4741	1.008E 00
2.6449	1.416E 00
2.8190	1.922E 00
2.9846	2.423E 00
3.1452	3.069E 00
3.3311	3.723E 00
3.4943	4.121E 00
3.6692	4.880E 00
3.8365	5.448E 00
4.0106	5.992E 00
4.1763	6.524E 00
4.3673	7.013E 00
4.5938	7.573E 00
4.7628	8.060E 00
5.0029	8.562E 00
5.2243	9.064E 00
5.3849	9.399E 00
5.5843	9.708E 00
5.8109	9.991E 00
6.0255	1.030E 01
6.1760	1.065E 01
6.4075	1.128E 01
6.6729	1.204E 01
7.4708	1.280E 01
7.9610	1.287E 01
8.2365	1.292E 01
8.4697	1.292E 01
8.6827	1.265E 01
8.9329	1.228E 01
9.1560	1.197E 01
9.3555	1.150E 01
9.5617	1.126E 01
9.8322	1.073E 01
10.0671	1.046E 01
10.3291	1.066E 01
10.5658	1.054E 01
10.8345	1.112E 01

KK2386A-FF2381B

PH	MCMPOC
2.0002	0.000E 00
2.0171	3.524E-01
2.1405	5.194E-02
2.3264	3.007E-01
2.4870	-1.964E-01
2.6611	-2.697E-01
2.8318	-2.979E-01
2.9958	-1.193E-01
3.1547	3.092E-02
3.3389	2.231E-01
3.5156	4.370E-01
3.6778	6.560E-01
3.8426	8.702E-01
4.0117	1.110E 00
4.1782	1.369E 00
4.3869	1.710E 00
4.5289	1.910E 00
4.6971	2.130E 00
4.9363	2.423E 00
5.2067	2.662E 00
5.5008	2.835E 00
5.8060	2.968E 00
6.3071	3.120E 00
6.8616	3.226E 00
7.3940	3.335E 00
8.0482	3.459E 00
8.5536	3.693E 00
8.8223	3.896E 00
9.0336	4.074E 00
9.2551	4.327E 00
9.4495	4.594E 00
9.6438	4.792E 00
9.8737	5.009E 00
10.0816	5.345E 00
10.2760	5.255E 00
10.4349	5.473E 00
10.6090	5.713E 00
10.7865	5.648E 00
10.9471	5.894E 00
11.0916	6.224E 00

KK2408A-FF2381B

PH	MCMPOC
2.0017	-3.314E-01
2.0203	-2.895E-01
2.1352	-9.402E-01
2.3076	-1.160E 00
2.4784	-1.746E 00
2.6525	-1.933E 00
2.8139	-2.076E 00
2.9821	-2.016E 00
3.1528	-1.908E 00
3.3201	-1.777E 00
3.4917	-1.680E 00
3.6658	-1.360E 00
3.8577	-1.114E 00
4.0090	-9.539E-01
4.1771	-7.347E-01
4.3589	-3.859E-01
4.5135	-1.313E-01
4.6995	7.294E-02
4.9006	2.723E-01
5.1220	4.716E-01
5.4229	7.263E-01
5.7551	8.923E-01
6.0416	1.023E 00
6.3737	1.153E 00
6.8377	1.269E 00
7.4530	1.367E 00
7.9584	1.437E 00
8.2196	1.552E 00
8.4199	1.682E 00
8.6870	1.900E 00
8.9067	2.200E 00
9.1112	2.518E 00
9.3259	2.834E 00
9.5321	3.131E 00
9.7485	3.409E 00
9.9158	3.794E 00
10.1812	4.070E 00
10.4432	4.581E 00
10.6875	4.912E 00
10.9131	5.720E 00

KK3387A-FF3382B

PH	MCMPOC
2.0162	5.940E-01
2.1329	1.961E 00
2.3095	3.122E 00
2.4844	4.110E 00
2.6442	4.650E 00
2.8183	5.061E 00
2.9839	5.533E 00
3.1665	5.945E 00
3.3727	6.483E 00
3.4910	6.657E 00
3.6702	7.100E 00
3.8215	7.360E 00
4.0100	7.867E 00
4.1756	8.186E 00
4.3362	8.503E 00
4.5052	8.845E 00
4.6472	9.108E 00
4.8196	9.391E 00
5.0445	9.698E 00
5.3217	1.002E 01
5.5262	1.025E 01
5.8862	1.047E 01
6.3207	1.069E 01
7.1134	1.086E 01
8.0837	1.098E 01
8.8021	1.109E 01
9.1131	1.118E 01
9.3548	1.118E 01
9.6591	1.122E 01
9.9329	1.117E 01
10.1712	1.142E 01
10.4299	1.134E 01
10.7003	1.112E 01
10.9336	1.123E 01
11.0722	1.020E 01

KK3408A-FF3382B

PH	MCMPOC
2.1014	-1.742E 01
2.1513	6.685E-01
2.3212	1.429E-01
2.4944	9.766E-03
2.6635	-1.495E-01
2.8646	-5.265E-02
2.9931	-3.259E-02
3.1706	1.534E-01
3.3345	4.556E-01
3.5052	7.470E-01
3.6700	1.072E 00
3.8560	1.364E 00
4.0030	1.786E 00
4.1729	2.091E 00
4.3639	2.445E 00
4.5262	2.724E 00
4.6800	2.984E 00
4.8888	3.249E 00
5.1398	3.573E 00
5.4373	3.922E 00
5.7568	4.234E 00
6.1354	4.455E 00
6.5630	4.671E 00
7.7733	4.952E 00
8.6236	5.159E 00
8.9312	5.319E 00
9.3605	5.532E 00
9.6192	5.696E 00
9.8169	6.129E 00
10.0739	6.178E 00
10.2919	6.398E 00
10.4880	6.425E 00
10.6486	6.769E 00
10.7939	6.402E 00

LL1392A-FF1380A

PH	MCMPOC
2.0002	0.000E 00
2.0179	1.758E-01
2.1388	1.904E-01
2.3213	7.179E-01
2.4971	8.158E-01
2.6619	7.653E-01
2.8327	1.060E 00
2.9966	1.201E 00
3.1834	1.515E 00
3.3474	1.792E 00
3.5164	2.092E 00
3.6685	2.329E 00
3.8646	2.743E 00
4.0193	3.044E 00
4.2196	3.588E 00
4.3590	3.883E 00
4.5517	4.214E 00
4.8518	4.722E 00
5.0563	4.982E 00
5.3115	5.238E 00
5.6699	5.439E 00
6.1550	5.559E 00
7.1388	5.717E 00
8.1090	5.075E 00
8.4724	4.327E 00
8.7987	2.856E 00
9.0489	1.171E 00
9.2213	-2.963E-01
9.3954	-1.871E 00
9.6438	-4.270E 00
9.8974	-6.509E 00
10.1290	-8.219E 00
10.3217	-9.336E 00
10.5854	-1.037E 01
10.7705	-1.113E 01
10.8981	3.550E 00

LL1410A-FF1380A

PH	MCMPOC
2.0025	-5.325E-01
2.0211	-5.010E-01
2.1352	-4.431E-01
2.3026	-2.376E-01
2.4699	-1.411E-01
2.6406	2.179E-01
2.8131	4.247E-01
3.0142	8.393E-01
3.1562	9.493E-01
3.3092	1.290E 00
3.5010	1.617E 00
3.6768	2.017E 00
3.8264	2.253E 00
3.9726	2.569E 00
4.1366	3.032E 00
4.2498	3.355E 00
4.5862	3.924E 00
4.8398	4.313E 00
5.0460	4.572E 00
5.3181	4.817E 00
5.5666	5.009E 00
5.9165	5.104E 00
6.3205	5.187E 00
6.7938	5.327E 00
7.3212	5.409E 00
7.6440	5.405E 00
7.8688	5.387E 00
8.0717	5.338E 00
8.2492	5.388E 00
8.4469	5.435E 00
8.7292	5.462E 00
8.9836	5.276E 00
9.2346	5.141E 00
9.5473	4.878E 00
9.8837	4.326E 00
10.1339	3.991E 00
10.3993	3.728E 00
10.6004	3.973E 00
10.7576	4.276E 00

LL2393A-FF2381B

PH	MCMPOC
2.0002	-5.015E-04
2.0171	2.963E-01
2.1413	2.763E-02
2.3298	1.129E-01
2.4971	-2.630E-01
2.6662	-4.883E-01
2.8369	-4.112E-01
3.0059	-3.063E-01
3.1885	-1.520E-01
3.3482	-1.152E-02
3.5181	1.819E-01
3.7023	4.555E-01
3.8595	6.929E-01
4.0336	9.612E-01
4.1968	1.231E 00
4.3734	1.618E 00
4.5323	1.889E 00
4.7081	2.227E 00
4.8822	2.661E 00
5.0343	2.976E 00
5.1695	3.356E 00
5.3605	3.809E 00
5.5482	4.165E 00
5.7764	4.383E 00
6.1550	4.678E 00
6.6722	4.962E 00
6.9883	5.132E 00
7.2841	5.370E 00
7.7186	5.705E 00
8.0955	5.976E 00
8.5418	6.307E 00
8.7818	6.496E 00
9.1182	6.853E 00
9.3717	7.180E 00
9.6540	7.497E 00
9.8720	7.707E 00
10.0833	7.968E 00
10.2287	7.999E 00
10.4611	8.210E 00
10.7088	8.142E 00
10.8719	8.579E 00
11.0418	8.778E 00

LL2409A-FF2381B

PH	MCMPOC
2.0017	-2.665E-01
2.0203	-2.394E-01
2.1471	-6.502E-01
2.2958	-1.005E 00
2.4733	-1.514E 00
2.6508	-1.620E 00
2.8097	-1.644E 00
2.9973	-1.599E 00
3.1452	-1.545E 00
3.3269	-1.453E 00
3.5035	-1.310E 00
3.6667	-1.026E 00
3.8594	-7.681E-01
4.0690	-4.556E-01
4.2634	9.782E-03
4.5237	4.704E-01
4.7544	9.403E-01
4.9581	1.360E 00
5.1187	1.744E 00
5.3536	2.352E 00
5.7694	2.926E 00
6.6180	3.508E 00
7.0372	3.736E 00
7.3279	3.973E 00
7.6981	4.185E 00
8.3438	4.600E 00
8.8374	5.000E 00
9.3851	5.379E 00
9.6826	5.635E 00
9.9547	5.904E 00

LL3393A-FF3382B

PH	MCMPOC
2.0002	0.000E 00
2.0188	1.485E-02
2.1405	6.208E-01
2.3374	5.456E-01
2.5056	5.059E-01
2.6898	5.338E-01
2.8403	6.508E-01
3.0110	8.032E-01
3.1927	1.039E 00
3.3491	1.284E 00
3.5426	1.642E 00
3.6905	1.880E 00
3.8621	2.241E 00
4.0311	2.554E 00
4.1925	2.869E 00
4.3700	3.139E 00
4.5272	3.394E 00
4.7013	3.688E 00
4.8670	3.954E 00
5.0884	4.247E 00
5.3183	4.473E 00
5.5279	4.684E 00
5.8102	4.889E 00
6.1313	5.090E 00
6.4170	5.219E 00
6.7094	5.346E 00
7.1861	5.530E 00
7.8386	5.677E 00
8.3338	5.831E 00
8.7463	5.944E 00
9.0015	6.019E 00
9.2365	6.088E 00
9.4275	6.210E 00
9.6929	6.338E 00
9.9498	6.384E 00
10.1205	6.455E 00
10.3859	6.591E 00
10.6310	6.516E 00
10.8051	6.104E 00
10.9741	6.459E 00
11.1060	6.768E 00

LL3409A-FF3382B

PH	MCMPOC
2.0008	-1.382E-01
2.0203	-2.676E-01
2.1437	1.719E-01
2.3000	5.584E-02
2.4784	4.129E-01
2.6575	4.742E-01
2.8080	4.359E-01
2.9855	8.220E-01
3.1579	1.006E 00
3.3387	1.379E 00
3.4875	1.681E 00
3.6548	1.993E 00
3.8408	2.444E 00
4.0521	2.846E 00
4.4662	3.522E 00
4.6741	3.910E 00
4.9006	4.291E 00
5.1550	4.578E 00
5.4872	4.891E 00
5.7559	5.097E 00
6.0788	5.299E 00
6.5166	5.490E 00
6.9899	5.679E 00
7.3060	5.795E 00
8.0074	5.936E 00
8.4435	6.069E 00
8.7512	6.220E 00
8.9574	6.343E 00
9.1417	6.517E 00
9.3546	6.719E 00
9.6268	6.837E 00
9.8871	6.945E 00
10.1406	7.215E 00
10.3502	7.157E 00
10.5218	7.139E 00
10.6596	7.560E 00
10.8472	7.222E 00

MM1396A-FF1380A

PH	MCMPOC
2.0002	-6.252E-04
2.0179	1.889E-01
2.1405	4.875E-02
2.3129	-1.069E-01
2.4735	-2.007E-01
2.6459	6.204E-02
2.8234	2.201E-01
2.9907	5.860E-01
3.1699	1.007E 00
3.3237	1.332E 00
3.4927	1.878E 00
3.6719	2.364E 00
3.8240	2.743E 00
3.9948	3.263E 00
4.1655	3.898E 00
4.3633	4.557E 00
4.5154	5.015E 00
4.6760	5.486E 00
4.8399	5.964E 00
5.0090	6.489E 00
5.1763	6.939E 00
5.3369	7.382E 00
5.5076	7.820E 00
5.6462	8.219E 00
5.8000	8.605E 00
6.1127	9.225E 00
6.4153	9.808E 00
6.7939	1.029E 01
7.1607	1.058E 01
7.4295	1.087E 01
7.6932	1.105E 01
8.1834	1.101E 01
8.6127	1.006E 01
8.9474	8.301E 00
9.2061	6.169E 00
9.5052	3.335E 00
9.8636	7.899E-02
10.1053	-1.691E 00
10.3318	-2.974E 00
10.5380	-3.515E 00
10.7274	-4.159E 00
10.9353	0.000E 00

MM1410A-FF1380A

PH	MCMPOC
2.0008	-1.498E-01
2.0194	-1.497E-01
2.1242	-2.590E-01
2.2983	-4.241E-01
2.4623	-5.344E-01
2.6466	-3.338E-01
2.7987	-5.890E-02
2.9677	1.521E-01
3.1706	5.781E-01
3.3193	9.922E-01
3.4740	1.444E 00
3.6472	1.873E 00
3.8163	2.281E 00
3.9904	2.770E 00
4.1594	3.404E 00
4.3267	3.875E 00
4.4958	4.302E 00
4.6851	4.812E 00
4.8533	5.212E 00
5.0063	5.588E 00
5.1626	5.965E 00
5.3545	6.353E 00
5.5742	6.721E 00
5.7196	7.034E 00
5.9292	7.468E 00
6.2098	7.992E 00
6.5276	8.535E 00
6.9332	8.964E 00
7.1969	9.209E 00
7.5367	9.349E 00
7.7311	9.406E 00
8.1858	9.146E 00
8.5526	8.374E 00
8.9582	6.144E 00
9.4062	2.194E 00
9.7476	-1.136E 00
10.0248	-3.359E 00
10.2547	-4.783E 00
10.4035	-5.558E 00
10.5843	-5.964E 00
10.7669	-6.581E 00

MM2394A-FF2381B

PH	MCMPOC
2.0162	4.430E-01
2.1396	3.128E-01
2.3256	6.495E-01
2.4921	5.987E-01
2.6746	6.715E-01
2.8208	6.852E-01
3.0051	9.653E-01
3.1792	1.249E 00
3.3938	1.557E 00
3.5494	1.741E 00
3.7049	2.027E 00
3.8663	2.249E 00
3.9922	2.447E 00
4.1663	2.665E 00
4.3658	3.029E 00
4.5450	3.305E 00
4.7698	3.552E 00
5.0014	3.820E 00
5.2870	4.058E 00
5.5693	4.260E 00
5.8905	4.404E 00
6.1812	4.508E 00
6.4686	4.613E 00
6.7796	4.715E 00
7.1616	4.813E 00
7.6450	4.887E 00
8.0372	4.958E 00
8.3567	5.025E 00
8.5680	5.073E 00
8.8316	5.106E 00
9.0683	5.156E 00
9.4097	5.250E 00
9.6041	5.225E 00
9.7968	5.258E 00
10.0588	5.379E 00
10.2642	5.302E 00
10.4915	5.361E 00
10.7502	5.291E 00
10.9243	5.539E 00
11.0950	5.615E 00

MM2411A-FF2381B

PH	MCMPOC
2.0008	-1.150E-01
2.0194	-8.940E-02
2.1209	-9.731E-02
2.3034	-4.719E-01
2.4674	-8.760E-01
2.6432	-1.011E 00
2.8088	-9.910E-01
2.9829	-9.801E-01
3.1384	-7.596E-01
3.3125	-5.905E-01
3.4790	-4.336E-01
3.6675	-1.910E-01
3.8163	4.615E-02
3.9819	2.778E-01
4.1704	5.778E-01
4.4028	9.053E-01
4.5955	1.154E 00
4.7628	1.352E 00
4.9809	1.564E 00
5.2902	1.791E 00
5.5725	1.993E 00
5.8345	2.142E 00
6.0965	2.312E 00
6.3906	2.479E 00
6.6915	2.647E 00
6.8436	2.794E 00
7.5654	3.013E 00
8.6134	3.425E 00
9.0242	3.759E 00
9.4011	4.267E 00
9.7459	4.634E 00
9.9944	4.915E 00
10.1922	5.115E 00
10.3917	5.432E 00
10.5641	5.703E 00
10.7348	5.873E 00

MM3394A-FF3374B

PH	MCMPOC
2.0002	-7.710E-01
2.0188	-8.001E-01
2.1438	-7.187E-01
2.3196	-6.958E-01
2.4878	-6.394E-01
2.6594	-3.403E-01
2.8318	-7.730E-02
2.9975	1.502E-01
3.1580	4.318E-01
3.3423	8.771E-01
3.5172	1.205E 00
3.6719	1.530E 00
3.8536	1.877E 00
4.0235	2.239E 00
4.1866	2.615E 00
4.3497	2.915E 00
4.5154	3.251E 00
4.6903	3.531E 00
4.8822	3.808E 00
5.0749	4.032E 00
5.3622	4.322E 00
5.7088	4.538E 00
6.0401	4.748E 00
6.5539	4.940E 00
7.2622	5.111E 00
8.0194	5.278E 00
8.4403	5.383E 00
8.8460	5.514E 00
9.1503	5.641E 00
9.4359	5.718E 00
9.7081	5.746E 00
10.0056	5.760E 00
10.2338	5.747E 00
10.4273	5.835E 00
10.6107	6.092E 00
10.8169	6.027E 00
10.9674	6.305E 00
11.1212	0.000E 00

MM3411A-FF3374B

PH	MCMPOC
2.0008	-9.293E-01
2.0177	-6.260E-01
2.1242	-2.868E-01
2.2950	-1.912E-01
2.4657	-2.453E-01
2.6364	1.781E-01
2.8038	4.570E-01
2.9829	5.984E-01
3.1537	8.273E-01
3.3092	1.263E 00
3.4968	1.649E 00
3.6489	1.971E 00
3.8222	2.361E 00
3.9836	2.717E 00
4.1526	3.023E 00
4.3301	3.354E 00
4.5380	3.699E 00
4.7443	4.031E 00
4.9724	4.399E 00
5.2497	4.670E 00
5.5945	4.883E 00
5.9511	5.068E 00
6.5106	5.255E 00
7.2206	5.426E 00
7.8832	5.602E 00
8.2669	5.755E 00
8.7470	5.986E 00
9.0597	6.125E 00
9.2760	6.266E 00
9.4738	6.424E 00
9.6344	6.645E 00
9.8643	6.677E 00
10.0789	6.698E 00
10.2632	6.856E 00
10.5032	6.934E 00
10.6858	6.813E 00
10.8218	7.202E 00

NN1396A-FF1371A

PH	MCMPOC
2.0162	1.059E 00
2.1371	1.235E 00
2.3188	1.544E 00
2.4785	2.209E 00
2.6501	2.575E 00
2.8225	3.137E 00
2.9941	3.705E 00
3.1538	4.278E 00
3.3347	4.878E 00
3.5088	5.414E 00
3.7945	6.414E 00
4.0159	7.146E 00
4.1824	7.586E 00
4.3421	8.062E 00
4.5264	8.481E 00
4.7022	8.944E 00
4.8374	9.271E 00
5.0250	9.580E 00
5.1704	9.889E 00
5.3682	1.018E 01
5.5794	1.046E 01
5.9953	1.088E 01
6.2894	1.129E 01
6.5412	1.173E 01
6.9943	1.209E 01
7.5115	1.229E 01
7.8073	1.245E 01
8.0558	1.269E 01
8.2366	1.297E 01
8.4615	1.336E 01
8.7099	1.389E 01
9.0666	1.542E 01
9.6413	1.875E 01
9.9337	2.026E 01
10.2887	2.191E 01
10.6031	2.306E 01
10.8076	2.336E 01

NN1413A-FF1371A

PH	MCMPOC
2.0203	3.193E-01
2.1209	3.928E-01
2.2688	7.351E-01
2.4336	7.695E-01
2.6161	8.957E-01
2.8147	1.231E 00
2.9542	1.661E 00
3.1418	2.235E 00
3.3176	2.818E 00
3.4664	3.183E 00
3.5762	3.652E 00
3.7774	4.149E 00
3.9532	4.874E 00
4.1442	5.352E 00
4.3166	5.832E 00
4.4569	6.173E 00
4.6310	6.670E 00
4.8592	7.200E 00
5.1212	7.635E 00
5.3832	8.048E 00
5.6131	8.323E 00
5.8362	8.521E 00
5.9951	8.685E 00
6.1523	8.925E 00
6.3450	9.299E 00
6.6290	9.744E 00
7.4200	1.013E 01
7.8173	1.032E 01
8.0573	1.057E 01
8.3278	1.095E 01
8.5602	1.151E 01
8.8467	1.233E 01
9.1002	1.350E 01
9.3504	1.491E 01
9.6192	1.662E 01
9.9454	1.849E 01
10.3595	2.017E 01
10.5134	2.067E 01
10.6942	2.124E 01

NN2395A-FF2381B

PH	MCMPOC
2.0002	0.000E 00
2.0188	7.009E-03
2.1438	-1.804E-01
2.3112	-2.628E-01
2.4836	-4.062E-01
2.6526	-5.258E-01
2.8200	-5.114E-01
2.9941	-3.789E-01
3.1682	-2.073E-01
3.3271	-5.899E-02
3.4877	1.689E-01
3.6719	4.166E-01
3.8426	6.376E-01
4.0015	8.654E-01
4.1756	1.095E 00
4.3514	1.373E 00
4.5255	1.569E 00
4.6895	1.765E 00
4.8518	1.955E 00
5.0394	2.139E 00
5.2912	2.346E 00
5.6141	2.504E 00
5.9268	2.625E 00
6.2885	2.756E 00
6.7601	2.881E 00
7.3315	3.000E 00
7.9332	3.089E 00
8.3643	3.180E 00
8.6770	3.229E 00
8.8781	3.275E 00
9.0759	3.334E 00
9.3413	3.438E 00
9.5424	3.518E 00
9.7571	3.535E 00
9.9684	3.646E 00
10.1983	3.652E 00
10.4062	3.770E 00
10.5938	4.024E 00
10.7679	3.825E 00
10.9319	4.143E 00
11.0967	4.377E 00

NN2412A-FF2381B

PH	MCMPOC
2.0008	-9.362E-02
2.0203	-1.880E-01
2.1225	-3.404E-01
2.2865	-3.764E-01
2.4539	-6.338E-01
2.6381	-7.583E-01
2.7919	-6.380E-01
2.9677	-6.152E-01
3.1283	-3.870E-01
3.3193	-2.536E-01
3.5441	5.512E-02
3.8112	3.551E-01
3.9718	6.536E-01
4.1273	8.475E-01
4.2726	1.061E 00
4.4113	1.278E 00
4.6023	1.484E 00
4.8355	1.775E 00
5.0384	2.004E 00
5.2361	2.167E 00
5.4221	2.294E 00
5.5522	2.378E 00
5.8818	2.492E 00
6.1506	2.578E 00
6.4464	2.662E 00
6.7338	2.747E 00
7.0313	2.832E 00
7.6178	2.938E 00
8.1435	3.032E 00
8.3988	3.137E 00
8.7520	3.207E 00
8.9718	3.281E 00
9.1611	3.389E 00
9.3318	3.519E 00
9.5363	3.600E 00
9.7104	3.635E 00
9.8643	3.711E 00
10.1246	3.869E 00
10.3376	3.997E 00
10.5049	4.076E 00
10.6553	4.189E 00
10.8379	4.825E 00

NN3395A-FF3374B

PH	MCMPOC
2.0002	-7.671E-01
2.0179	-6.490E-01
2.1438	-8.280E-01
2.3027	-4.851E-01
2.4870	-8.620E-01
2.6408	-4.757E-01
2.8208	-3.556E-01
2.9738	-1.696E-01
3.1420	2.071E-02
3.3220	3.336E-01
3.4927	5.883E-01
3.6567	9.546E-01
3.8249	1.232E 00
3.9948	1.554E 00
4.2382	2.027E 00
4.4664	2.430E 00
4.6726	2.740E 00
4.8653	3.003E 00
5.0673	3.220E 00
5.3436	3.428E 00
5.5887	3.591E 00
5.7933	3.708E 00
6.2547	3.903E 00
6.8261	4.087E 00
7.5276	4.258E 00
8.0820	4.439E 00
8.4674	4.543E 00
8.7277	4.692E 00
8.9153	4.786E 00
9.1131	4.927E 00
9.2906	5.097E 00
9.5779	5.284E 00
9.8230	5.453E 00
10.0343	5.449E 00
10.2431	5.521E 00
10.4738	5.574E 00
10.7011	5.534E 00
10.8896	6.061E 00
11.0164	6.429E 00
11.1127	0.000E 00

NN3412A-FF3374B

PH	MCMPOC
2.0135	3.191E-01
2.1141	9.136E-01
2.2916	1.205E 00
2.4572	1.192E 00
2.6432	1.417E 00
2.7970	1.775E 00
2.9745	1.888E 00
3.1317	2.213E 00
3.3176	2.498E 00
3.4807	2.827E 00
3.6624	3.239E 00
3.8450	3.617E 00
4.0259	3.851E 00
4.1526	4.157E 00
4.3352	4.476E 00
4.5194	4.852E 00
4.6665	5.082E 00
4.8676	5.336E 00
5.1161	5.610E 00
5.3274	5.768E 00
5.5573	5.936E 00
5.9359	6.109E 00
6.4430	6.300E 00
6.9924	6.486E 00
7.3119	6.614E 00
7.8359	6.803E 00
8.3802	7.071E 00
8.6438	7.380E 00
9.0292	7.914E 00
9.2760	8.427E 00
9.5735	9.002E 00
9.8406	9.640E 00
10.0840	1.004E 01
10.2733	1.053E 01
10.4576	1.082E 01
10.6080	1.176E 01

001413A-FF1371A

PH	MCMPOC
2.0194	3.710E-01
2.1192	7.212E-01
2.2721	1.177E 00
2.4353	1.598E 00
2.6034	2.058E 00
2.7750	2.594E 00
2.9424	3.210E 00
3.1038	3.754E 00
3.2906	4.408E 00
3.4545	4.994E 00
3.6286	5.751E 00
3.8044	6.355E 00
3.9667	7.046E 00
4.1307	7.562E 00
4.3234	8.184E 00
4.4670	8.689E 00
4.6521	9.199E 00
4.8440	9.655E 00
4.9860	1.000E 01
5.1347	1.032E 01
5.3731	1.078E 01
5.7128	1.121E 01
6.1083	1.152E 01
6.5309	1.180E 01
6.7896	1.203E 01
7.1259	1.224E 01
7.5908	1.264E 01
7.9018	1.297E 01
8.2601	1.340E 01
8.4697	1.380E 01
8.7182	1.433E 01
8.9768	1.512E 01
9.2050	1.592E 01
9.4687	1.706E 01
9.7375	1.822E 01
10.0046	1.922E 01
10.2801	2.005E 01
10.5235	2.042E 01
10.6790	2.089E 01
10.8210	2.129E 01

001423A-FF1371A

PH	MCMPOC
2.0194	3.683E-01
2.1192	7.029E-01
2.2747	1.159E 00
2.4513	1.485E 00
2.6322	1.879E 00
2.7801	2.351E 00
2.9728	2.924E 00
3.1114	3.546E 00
3.2948	4.274E 00
3.4596	4.866E 00
3.6388	5.608E 00
3.7977	6.237E 00
3.9684	6.899E 00
4.1290	7.474E 00
4.3048	8.065E 00
4.4856	8.628E 00
4.6707	9.146E 00
4.8229	9.574E 00
5.0012	1.001E 01
5.2159	1.047E 01
5.3426	1.070E 01
5.4914	1.092E 01
5.6553	1.113E 01
5.8616	1.133E 01
6.0898	1.154E 01
6.3349	1.174E 01
6.5698	1.196E 01
6.8149	1.219E 01
7.1225	1.246E 01
7.4640	1.285E 01
7.7666	1.324E 01
8.0607	1.380E 01
8.3430	1.473E 01
8.6354	1.607E 01
8.9194	1.815E 01
9.1307	2.019E 01
9.4282	2.349E 01
10.1618	3.069E 01
10.4779	3.269E 01

002414A-FF2373A

PH	MCMPOC
2.0008	-8.310E-02
2.0194	-6.647E-02
2.1209	2.965E-01
2.2713	3.737E-01
2.4386	3.913E-01
2.6043	4.300E-01
2.7733	4.718E-01
2.9441	6.965E-01
3.1131	9.445E-01
3.3007	1.221E 00
3.4934	1.559E 00
3.6320	1.879E 00
3.7977	2.192E 00
3.9752	2.561E 00
4.1459	2.931E 00
4.2828	3.202E 00
4.4518	3.496E 00
4.6259	3.824E 00
4.8440	4.178E 00
5.0992	4.540E 00
5.4948	4.964E 00
6.0052	5.241E 00
6.3602	5.394E 00
6.8453	5.548E 00
7.3423	5.704E 00
7.8815	5.857E 00
8.2162	6.004E 00
8.4275	6.150E 00
8.6726	6.382E 00
8.9211	6.678E 00
9.1780	6.978E 00
9.4501	7.394E 00
9.7138	7.901E 00
10.0029	8.177E 00
10.2209	8.457E 00
10.4018	8.728E 00
10.5573	9.029E 00
10.6875	9.184E 00

002420A-FF2373A

PH	MCMPOC
2.0008	-8.282E-02
2.0194	-5.865E-02
2.1327	1.970E-01
2.3051	-8.121E-02
2.4894	-2.230E-01
2.6423	-1.395E-01
2.8190	-2.420E-02
3.0269	2.200E-01
3.1739	4.119E-01
3.3075	6.715E-01
3.4816	9.364E-01
3.6591	1.286E 00
3.8315	1.606E 00
3.9954	1.908E 00
4.1509	2.224E 00
4.3005	2.483E 00
4.4637	2.789E 00
4.6648	3.098E 00
4.8321	3.371E 00
4.9741	3.567E 00
5.1905	3.836E 00
5.4102	4.046E 00
5.6249	4.211E 00
5.8210	4.332E 00
6.1067	4.445E 00
6.3365	4.517E 00
6.5749	4.593E 00
7.0651	4.703E 00
7.5147	4.815E 00
7.9491	4.928E 00
8.2500	5.027E 00
8.5475	5.158E 00
8.8264	5.339E 00
9.0326	5.466E 00
9.3352	5.693E 00
9.5516	5.877E 00
9.8051	6.088E 00
10.0248	6.262E 00
10.2091	6.472E 00
10.3815	6.672E 00
10.5387	6.732E 00
10.7061	6.765E 00
10.8497	7.286E 00

003414A-FF3374B

PH	MCMPOC
2.0008	-4.543E-01
2.0194	-4.795E-01
2.1192	-1.253E-01
2.2679	1.537E-01
2.4336	1.978E-01
2.5992	4.412E-01
2.7733	7.368E-01
2.9491	1.014E 00
3.1317	1.357E 00
3.2956	1.790E 00
3.4478	2.154E 00
3.6168	2.535E 00
3.7791	2.984E 00
3.9515	3.378E 00
4.1256	3.773E 00
4.2963	4.209E 00
4.4721	4.542E 00
4.6344	4.838E 00
4.8119	5.155E 00
5.0172	5.498E 00
5.2429	5.800E 00
5.4525	6.004E 00
5.6925	6.163E 00
5.9444	6.348E 00
6.2520	6.530E 00
6.5495	6.713E 00
6.8994	6.893E 00
7.2595	7.073E 00
7.5519	7.256E 00
7.8054	7.440E 00
8.0134	7.628E 00
8.3599	7.969E 00
8.6219	8.417E 00
8.8670	9.036E 00
9.2017	1.007E 01
9.4992	1.116E 01
9.8136	1.224E 01
10.0908	1.294E 01
10.3274	1.351E 01
10.5455	1.385E 01
10.7060	1.403E 01

003420A-FF3374B

PH	MCMPOC
2.0000	-3.560E-01
2.0186	-3.750E-01
2.1302	-5.672E-02
2.2992	9.668E-02
2.4750	3.188E-01
2.6457	6.965E-01
2.8029	1.021E 00
2.9702	1.315E 00
3.1494	1.650E 00
3.3235	2.088E 00
3.4841	2.479E 00
3.6616	2.904E 00
3.8222	3.306E 00
3.9861	3.673E 00
4.2194	4.224E 00
4.5287	4.874E 00
4.7028	5.170E 00
4.8854	5.509E 00
5.1305	5.841E 00
5.2725	6.010E 00
5.4381	6.182E 00
5.6342	6.349E 00
5.9165	6.526E 00
6.2427	6.707E 00
6.5453	6.850E 00
6.8377	6.994E 00
7.1335	7.137E 00
7.4057	7.282E 00
7.7066	7.425E 00
7.9855	7.609E 00
8.3827	7.945E 00
8.6650	8.291E 00
8.9861	8.771E 00
9.2126	9.254E 00
9.4611	9.809E 00
9.7383	1.039E 01
10.0882	1.097E 01
10.3232	1.137E 01
10.5041	1.151E 01
10.7120	1.161E 01

QQ1423A-FF1371A

PH	MCMPOC
2.0194	5.470E-01
2.1192	9.539E-01
2.2679	1.312E 00
2.4454	1.334E 00
2.6161	1.652E 00
2.8156	2.071E 00
3.0117	2.613E 00
3.1469	3.178E 00
3.2830	3.786E 00
3.4647	4.413E 00
3.6455	5.150E 00
3.8027	5.738E 00
3.9650	6.393E 00
4.1966	7.036E 00
4.3386	7.537E 00
4.6242	8.315E 00
4.8524	8.857E 00
5.1533	9.480E 00
5.5742	1.011E 01
6.1354	1.052E 01
6.5326	1.080E 01
6.9096	1.104E 01
7.2713	1.126E 01
7.5198	1.149E 01
7.7446	1.172E 01
7.9812	1.210E 01
8.1672	1.262E 01
8.3294	1.323E 01
8.5306	1.417E 01
8.7419	1.551E 01
8.9701	1.767E 01
9.2084	2.040E 01
9.4298	2.338E 01
9.6378	2.630E 01
9.9082	2.985E 01
10.2547	3.307E 01
10.5472	3.512E 01
10.7419	3.673E 01

QQ1426A-FF1371A

PH	MCMPOC
2.0194	5.442E-01
2.1209	5.777E-01
2.2730	4.727E-01
2.4386	7.149E-01
2.5722	8.387E-01
2.6871	5.404E-01
2.8308	1.094E 00
3.0336	1.857E 00
3.3633	3.053E 00
3.6100	4.041E 00
3.7994	4.760E 00
3.9481	5.305E 00
4.1239	5.887E 00
4.2625	6.303E 00
4.4163	6.808E 00
4.6192	7.300E 00
4.7713	7.699E 00
4.9217	8.071E 00
5.1195	8.441E 00
5.3156	8.765E 00
5.5150	9.007E 00
5.7500	9.221E 00
5.9866	9.367E 00
6.2250	9.524E 00
6.5191	9.675E 00
6.8893	9.842E 00
7.1192	9.945E 00
7.4927	1.014E 01
7.7514	1.036E 01
7.9948	1.064E 01
8.1807	1.100E 01
8.4292	1.158E 01
8.6354	1.229E 01
8.8298	1.330E 01
9.0614	1.488E 01

QQ2424A-FF2373A

PH	MCMPOC
2.0186	5.645E-02
2.1217	4.104E-01
2.2738	3.366E-01
2.4429	3.022E-01
2.5815	1.248E-01
2.7742	2.253E-02
2.9652	1.038E-01
3.2018	3.547E-01
3.4351	7.679E-01
3.6515	1.143E 00
3.8053	1.425E 00
3.9354	1.649E 00
4.0876	1.954E 00
4.3141	2.215E 00
4.4882	2.540E 00
4.6809	2.798E 00
5.0165	3.171E 00
5.3739	3.514E 00
5.6799	3.732E 00
6.1785	3.917E 00
6.8682	4.097E 00
7.8114	4.263E 00
8.1258	4.483E 00
8.6007	4.768E 00
8.8357	5.135E 00
9.2160	5.579E 00
9.5575	6.167E 00
9.8634	6.756E 00
10.2911	7.221E 00
10.6663	7.667E 00

QQ2425A-FF2373A

PH	MCMPOC
2.0008	-1.528E-01
2.0194	-1.399E-01
2.1226	1.605E-01
2.2747	5.839E-02
2.4446	-9.349E-02
2.5823	-1.793E-01
2.7023	-5.194E-01
2.8257	-5.747E-01
2.9457	-2.903E-01
3.0725	-1.329E-01
3.2246	4.383E-02
3.4140	2.912E-01
3.6253	5.964E-01
3.8247	9.693E-01
3.9819	1.300E 00
4.2253	1.637E 00
4.4721	2.051E 00
4.6969	2.362E 00
4.9589	2.697E 00
5.2226	2.935E 00
5.4914	3.159E 00
5.6858	3.306E 00
5.9207	3.446E 00
6.2267	3.573E 00
6.8352	3.764E 00
7.5282	3.957E 00
8.0624	4.168E 00
8.5390	4.452E 00
8.8061	4.808E 00
9.1645	5.324E 00
9.4011	5.782E 00
9.6749	6.341E 00
9.9370	6.775E 00
10.1567	7.189E 00
10.3866	7.701E 00
10.5674	8.168E 00

QQ3424A-FF3374B

PH	MCMPOC
2.0008	-9.606E-01
2.0194	-9.860E-01
2.1234	-9.518E-01
2.3051	-8.963E-01
2.4555	-7.488E-01
2.6111	-2.740E-01
2.7767	-7.974E-02
2.9542	1.291E-01
3.1283	3.451E-01
3.2770	6.908E-01
3.4528	1.079E 00
3.6269	1.457E 00
3.8146	1.882E 00
4.0039	2.287E 00
4.1729	2.634E 00
4.3741	3.036E 00
4.6310	3.529E 00
4.7950	3.790E 00
4.9961	4.101E 00
5.2615	4.391E 00
5.6537	4.680E 00
5.9393	4.892E 00
6.2216	5.031E 00
6.7186	5.230E 00
7.2392	5.427E 00
7.6212	5.639E 00
8.0100	5.934E 00
8.3497	6.327E 00
8.6591	6.885E 00
8.9633	7.757E 00
9.2355	8.730E 00
9.4400	9.571E 00
9.7358	1.076E 01
10.0181	1.163E 01
10.2784	1.247E 01
10.5184	1.324E 01

QQ3425A-FF3374B

PH	MCMPOC
2.0008	-9.508E-01
2.0186	-7.999E-01
2.1209	-3.935E-01
2.2730	-4.323E-02
2.4420	5.472E-02
2.5789	3.115E-01
2.7683	5.428E-01
2.9550	6.846E-01
3.1621	8.670E-01
3.2973	1.342E 00
3.4511	1.699E 00
3.6236	2.084E 00
3.8332	2.538E 00
4.0039	2.881E 00
4.1594	3.264E 00
4.3538	3.655E 00
4.6225	4.125E 00
4.8440	4.515E 00
5.1077	4.873E 00
5.4204	5.168E 00
5.6570	5.339E 00
6.0086	5.544E 00
6.2419	5.686E 00
6.4802	5.828E 00
6.9958	6.024E 00
7.5671	6.214E 00
7.9745	6.421E 00
8.2196	6.605E 00
8.5002	6.836E 00
8.7909	7.205E 00
9.1154	7.743E 00
9.4823	8.341E 00
9.7967	8.976E 00
10.0722	9.280E 00
10.3190	9.627E 00
10.4981	9.592E 00
10.6537	9.724E 00

S1315A-T1315A

PH	MCMPOC
1.9997	0.000E 00
2.1687	1.992E 00
2.3377	3.427E 00
2.5068	5.190E 00
2.6758	6.659E 00
2.8448	7.927E 00
3.0139	8.947E 00
3.1829	1.008E 01
3.3519	1.074E 01
3.5210	1.171E 01
3.6917	1.239E 01
3.8607	1.343E 01
4.0298	1.418E 01
4.1996	1.489E 01
4.3763	1.568E 01
4.5521	1.645E 01
4.7110	1.735E 01
4.9003	1.804E 01
5.0879	1.868E 01
5.3000	1.934E 01
5.5257	1.982E 01
5.7877	2.029E 01
5.9838	2.065E 01
6.2779	2.112E 01
6.5805	2.159E 01
6.8982	2.213E 01
7.1941	2.252E 01
7.5000	2.289E 01
7.8989	2.342E 01
8.1947	2.400E 01
8.4618	2.438E 01
8.7103	2.505E 01
8.9351	2.606E 01
9.1667	2.686E 01
9.3949	2.819E 01
9.6298	2.963E 01
9.9544	3.127E 01
10.2806	3.306E 01
10.5409	3.388E 01
10.7150	3.469E 01
10.8773	3.527E 01
11.0294	3.566E 01
11.2052	3.672E 01
11.3742	3.675E 01

S1311A-T1311A

PH	MCMPOC
1.9993	0.000E 00
2.1667	1.544E 00
2.3357	2.700E 00
2.5047	3.826E 00
2.6746	5.352E 00
2.8428	6.181E 00
3.0118	6.983E 00
3.1809	7.862E 00
3.3499	8.768E 00
3.5189	9.753E 00
3.6897	1.060E 01
3.8553	1.131E 01
4.0210	1.264E 01
4.1832	1.391E 01
4.3506	1.530E 01
4.5298	1.692E 01
4.6988	1.820E 01
4.8864	1.948E 01
5.0605	2.046E 01
5.2498	2.116E 01
5.4375	2.170E 01
5.6471	2.223E 01
5.9057	2.275E 01
6.1356	2.330E 01
6.3705	2.385E 01
6.5074	2.450E 01
6.7762	2.553E 01
7.0483	2.685E 01
7.2630	2.822E 01
7.5419	3.025E 01
7.7431	3.231E 01
7.9611	3.511E 01
8.1758	3.849E 01
8.4091	4.305E 01
8.5984	4.743E 01
8.7674	5.235E 01
8.9398	5.826E 01
9.1308	6.641E 01
9.3083	7.592E 01
9.4976	8.810E 01
9.7377	1.066E 02
9.9760	1.246E 02
10.2566	1.481E 02
10.4206	1.653E 02
10.6640	1.835E 02

GG1390A-FF1371A

PH	MCMPOC
2.0179	9.146E-01
2.1405	7.224E-01
2.3053	8.969E-01
2.4735	9.584E-01
2.6467	1.072E 00
2.8234	1.407E 00
2.9789	1.876E 00
3.1530	2.408E 00
3.3195	2.963E 00
3.4961	3.486E 00
3.6618	4.128E 00
3.8274	4.768E 00
3.9998	5.393E 00
4.1613	5.848E 00
4.3497	6.418E 00
4.5323	6.933E 00
4.6743	7.277E 00
4.8365	7.683E 00
4.9971	8.036E 00
5.1729	8.388E 00
5.3605	8.745E 00
5.5701	9.000E 00
5.8254	9.224E 00
6.1094	9.460E 00
6.7145	9.712E 00
7.0475	9.900E 00
7.4380	1.011E 01
7.7321	1.034E 01
7.9180	1.056E 01
8.1259	1.096E 01
8.3068	1.144E 01
8.4978	1.212E 01
8.7192	1.310E 01
8.9390	1.471E 01
9.1773	1.691E 01
9.4748	2.021E 01
9.7723	2.351E 01
10.0411	2.595E 01
10.3251	2.817E 01
10.6124	2.974E 01
10.8626	3.107E 01
11.0739	3.236E 01
11.2192	3.197E 01
11.2759	3.377E 01

GG2390A-FF2373A

PH	MCMPOC
2.0002	-7.244E-04
2.0179	2.386E-01
2.1422	5.995E-01
2.3087	8.181E-02
2.4845	3.369E-02
2.6543	-7.031E-02
2.8166	-4.950E-02
2.9924	7.700E-02
3.1952	2.382E-01
3.3271	3.418E-01
3.4741	4.539E-01
3.6787	6.990E-01
3.8435	9.822E-01
4.0015	1.187E 00
4.1858	1.364E 00
4.3396	1.550E 00
4.5213	1.715E 00
4.7182	1.915E 00
4.9735	2.181E 00
5.3656	2.515E 00
5.6496	2.749E 00
6.0688	2.960E 00
6.7838	3.140E 00
7.5698	3.334E 00
7.9299	3.576E 00
8.5654	3.854E 00
8.8612	4.210E 00
9.0810	4.442E 00
9.3007	4.556E 00
9.5661	4.821E 00
9.8399	5.145E 00
10.0090	5.312E 00
10.2135	5.565E 00
10.4028	6.009E 00
10.5887	6.403E 00
10.8186	6.694E 00
11.0232	7.898E 00
11.1195	8.147E 00

GG3391A-FF3374B

PH	MCMPOC
1.9993	-6.634E-01
2.0162	-3.772E-01
2.1413	-4.334E-01
2.3087	-2.618E-01
2.4794	-1.598E-01
2.6484	4.298E-02
2.8174	1.110E-01
2.9899	3.394E-01
3.1673	5.153E-01
3.3195	9.124E-01
3.4902	1.188E 00
3.6694	1.541E 00
3.8316	1.845E 00
3.9965	2.157E 00
4.1782	2.489E 00
4.3709	2.767E 00
4.4976	3.029E 00
4.7410	3.348E 00
4.9878	3.664E 00
5.2549	3.888E 00
5.6175	4.125E 00
6.3435	4.484E 00
6.7914	4.710E 00
7.4980	4.906E 00
8.1876	5.160E 00
8.6187	5.447E 00
8.8519	5.756E 00
9.2001	6.310E 00
9.5703	6.845E 00
9.8137	7.243E 00
9.9963	7.302E 00
10.1771	7.425E 00
10.3969	6.595E 00
10.5118	7.664E 00
10.6657	7.620E 00
10.8262	7.984E 00
10.9716	8.359E 00
11.1018	0.000E 00

QQ1426A-MSW427A

PH	MCMPOC
2.0177	4.970E-01
2.1209	-2.812E-01
2.2696	-1.917E-01
2.4336	-2.084E-01
2.5654	3.808E-01
2.7412	8.341E-01
2.9052	1.379E 00
3.1029	2.021E 00
3.1452	2.192E 00
3.3227	2.474E 00
3.5188	3.219E 00
3.6861	4.038E 00
3.8534	4.807E 00
4.0732	5.311E 00
4.2726	5.911E 00
4.5330	6.685E 00
4.7493	7.309E 00
5.0502	7.974E 00
5.3054	8.418E 00
5.5404	8.710E 00
5.7720	8.924E 00
6.0458	9.117E 00
6.4177	9.336E 00
6.7084	9.527E 00
7.2054	9.843E 00
7.5637	1.026E 01
7.8156	1.078E 01
8.0590	1.155E 01
8.2770	1.272E 01
8.5171	1.457E 01
8.8095	1.837E 01
9.0259	2.370E 01

QQ1431A-FF1371A

PH	MCMPOC
2.0203	3.261E-01
2.1209	2.701E-01
2.2992	-4.786E-02
2.4733	1.161E-01
2.6449	1.937E-01
2.8139	7.908E-01
2.9517	1.233E 00
3.1072	1.825E 00
3.3066	2.547E 00
3.4655	3.148E 00
3.6430	3.892E 00
3.8222	4.577E 00
3.9912	5.224E 00
4.1602	5.841E 00
4.3445	6.363E 00
4.5034	6.870E 00
4.6809	7.361E 00
4.8905	7.897E 00
5.0958	8.328E 00
5.2505	8.666E 00
5.4702	8.976E 00
5.6545	9.214E 00
5.8641	9.437E 00
6.0433	9.612E 00
6.2664	9.852E 00
6.5183	1.010E 01
6.7498	1.037E 01
6.9780	1.072E 01
7.3499	1.140E 01
7.8232	1.229E 01
8.2407	1.328E 01
8.6531	1.457E 01
8.9304	1.614E 01
9.1907	1.793E 01
9.5118	2.065E 01
10.1220	2.500E 01

QQ1433-6-FF1371A

PH	MCMPOC
2.0194	6.873E-01
2.1209	8.248E-01
2.3034	2.442E-01
2.4775	1.071E 00
2.6229	1.599E 00
2.7885	2.033E 00
2.9762	2.485E 00
3.1773	3.279E 00
3.3954	4.296E 00
3.6608	5.509E 00
3.8754	6.442E 00
4.0935	7.403E 00
4.3065	8.209E 00
4.4721	8.819E 00
4.6919	9.449E 00
4.9539	1.017E 01
5.3195	1.096E 01
5.7230	1.144E 01
6.0593	1.167E 01
6.4718	1.190E 01
6.8386	1.210E 01
7.5418	1.252E 01
7.8409	1.296E 01

QQ1433-4-FF1371A

PH	MCMPOC
2.0177	1.135E 00
2.1310	7.865E-01
2.2713	1.004E 00
2.4792	6.387E-01
2.6516	1.136E 00
2.8291	1.669E 00
2.9745	2.325E 00
3.0996	2.966E 00
3.2593	3.769E 00
3.4309	4.573E 00
3.6016	5.455E 00
3.8399	6.524E 00
4.1002	7.842E 00
4.3065	8.678E 00
4.4755	9.305E 00
4.6733	9.995E 00
4.9031	1.077E 01
5.2615	1.157E 01
5.5235	1.195E 01
5.7855	1.221E 01
6.0407	1.239E 01
6.3129	1.258E 01
6.6915	1.277E 01
7.1192	1.299E 01
7.3947	1.315E 01
7.7142	1.352E 01

QQ1433-2-FF1371A

PH	MCMPOC
2.0211	3.722E-01
2.1352	-3.898E-01
2.2781	-3.774E-01
2.4868	-5.410E-01
2.7006	-9.055E-02
2.8545	4.252E-01
3.0100	1.011E 00
3.1773	2.048E 00
3.3693	3.349E 00
3.5492	4.656E 00
3.7149	5.840E 00
3.8653	6.978E 00
4.0106	8.090E 00
4.1915	9.422E 00
4.3859	1.082E 01
4.6040	1.231E 01
4.8727	1.397E 01
5.0933	1.513E 01
5.3595	1.600E 01
5.5911	1.653E 01
5.8514	1.682E 01
6.1151	1.707E 01
6.3196	1.722E 01
7.0177	1.751E 01
7.5536	1.787E 01
7.8139	1.821E 01

QQ1437A-FF1437A

PH	MCMPOC
2.0008	-1.062E 00
2.0177	3.453E-02
2.1378	-3.805E-01
2.3093	-8.551E-01
2.4986	-3.005E-01
2.6482	-1.423E-01
2.8088	2.409E-01
2.9863	7.916E-01
3.1486	1.790E 00
3.3176	2.195E 00
3.4943	2.879E 00
3.6624	3.064E 00
3.8247	3.866E 00
3.9937	4.321E 00
4.1645	4.983E 00
4.3470	5.595E 00
4.5093	6.140E 00
4.6682	6.655E 00
4.8355	7.176E 00
5.0282	7.695E 00
5.3325	8.055E 00
5.5235	8.365E 00
5.8024	8.633E 00
6.2098	8.844E 00
6.4795	8.920E 00
6.7507	9.059E 00
7.2579	9.195E 00
7.6088	9.441E 00
8.0455	9.852E 00

QQ1435A- forward and back titrations

QQ1435A(forward)-FF1371A

pH	MCMPOC
3.155	2.73
3.328	3.37
3.505	4.02
3.662	4.72
3.823	5.33
3.972	5.90
4.153	6.50
4.314	7.03
4.484	7.51
4.652	8.03
4.820	8.43
4.991	8.81
5.174	9.17
5.341	9.46
5.515	9.62
5.686	9.78
5.838	9.92
5.996	10.05
6.257	10.16
6.340	10.25
6.468	10.32
6.671	10.44
6.808	10.54
7.052	10.64

QQ1435A(back, H^+ titrant)-FF1371A

pH	MCMPOC
7.052	10.64
6.855	10.50
6.506	10.31
6.269	10.17
6.074	10.03
5.794	9.87
5.582	9.72
5.370	9.46
5.138	9.12
4.979	8.75
4.792	8.37
4.651	8.00
4.513	7.56
4.352	7.09
4.158	6.51
3.997	5.89
3.838	5.39
3.681	4.94
3.504	4.14
3.321	3.59
3.154	2.93
3.003	2.13

Note: w_o is for pH 3.5 for FF1
w_o = 17.349

Table 5. Combined titration curve data. Units are μmoles/mg OC.

pH	DO[1]	D	SO[1]	S	N	P
2.10	-3.61	-1.21	-5.62	-5.06	-2.75	-3.21
2.20	-2.95	28.76	-4.79	-4.32	-2.15	-2.90
2.30	-3.21	9.04	-3.92	-3.69	-1.55	-2.61
2.40	-2.96	-.97	-3.10	-3.06	-1.42	-2.24
2.50	-2.78	-1.03	-2.29	-2.43	-1.51	-1.85
2.60	-2.34	-.84	-1.81	-1.86	-1.27	-1.48
2.70	-1.82	-.57	-1.34	-1.30	-1.07	-1.15
2.80	-1.21	-.37	-.85	-.82	-.75	-.79
2.90	-.61	-.19	-.41	-.39	-.40	-.40
3.00	0.00	0.00	0.00	0.00	0.00	0.00
3.10	.17	.29	.36	.42	.40	.42
3.20	.61	.62	.70	.82	.80	.83
3.30	1.05	.81	1.04	1.14	1.27	1.23
3.40	1.47	1.01	1.31	1.48	1.72	1.61
3.50	1.66	1.24	1.53	1.89	2.14	2.01
3.60	1.94	1.48	1.89	2.25	2.55	2.41
3.70	2.21	1.72	2.30	2.60	2.98	2.78
3.80	2.46	2.08	2.69	2.99	3.38	3.15
3.90	2.69	2.42	3.06	3.38	3.76	3.51
4.00	2.92	2.69	3.41	3.76	4.12	3.86
4.10	3.10	3.02	3.87	4.14	4.51	4.19
4.20	3.34	3.39	4.35	4.50	4.91	4.51
4.30	3.56	3.62	4.93	4.91	5.28	4.80
4.40	3.77	3.82	5.43	5.31	5.62	5.08
4.50	3.95	4.00	5.85	5.66	5.92	5.34
4.60	4.10	4.17	6.27	6.02	6.21	5.58
4.70	4.27	4.35	6.65	6.40	6.50	5.82
4.80	4.43	4.49	7.03	6.74	6.75	6.04
4.90	4.54	4.61	7.43	7.05	6.98	6.26
5.00	4.64	4.75	7.83	7.31	7.20	6.47
5.10	4.75	4.93	8.17	7.55	7.38	6.62
5.20	4.86	5.11	8.49	7.76	7.56	6.76
5.30	4.97	5.25	8.79	7.97	7.70	6.88
5.40	5.07	5.38	9.06	8.16	7.84	6.99
5.50	5.17	5.49	9.33	8.34	7.96	7.10
5.60	5.26	5.59	9.61	8.51	8.08	7.19
5.70	5.36	5.68	9.88	8.67	8.18	7.28
5.80	5.46	5.77	10.14	8.82	8.27	7.37
5.90	5.56	5.86	10.36	8.98	8.35	7.44
6.00	5.67	5.95	10.58	9.14	8.42	7.51
6.10	5.77	6.03	10.83	9.29	8.49	7.57
6.20	5.88	6.11	11.09	9.44	8.57	7.64
6.30	5.99	6.21	11.35	9.59	8.65	7.70
6.40	6.10	6.34	11.63	9.77	8.73	7.76
6.50	6.19	6.48	11.92	9.95	8.80	7.82
6.60	6.28	6.62	12.19	10.14	8.86	7.88
6.70	6.37	6.77	12.44	10.34	8.92	7.94
6.80	6.47	6.93	12.69	10.56	8.98	8.01
6.90	6.58	7.12	12.94	10.77	9.05	8.07
7.00	6.67	7.26	13.19	10.96	9.11	8.13
7.10	6.76	7.50	13.55	11.14	9.17	8.19
7.20	6.85	7.87	13.91	11.32	9.24	8.25
7.30	6.93	8.13	14.19	11.50	9.30	8.31
7.40	7.02	8.40	14.51	11.68	9.35	8.36
7.50	7.10	8.67	14.84	11.88	9.41	8.42
7.60	7.20	9.15	15.22	12.12	9.45	8.49
7.70	7.31	9.66	15.69	12.34	9.51	8.56
7.80	7.43	10.17	16.24	12.54	9.58	8.63
7.90	7.54	11.17	16.88	12.74	9.64	8.67
8.00	7.70	12.29	17.57	12.98	9.70	8.73

[1] This represents the average of two titration curves for the fulvic acid sample before charcoal fractionation.

pH	GG	HH	II	JJ	KK	LL
2.10	-1.16	-1.88	-1.55	-1.26	-3.41	-.58
2.20	-1.17	-1.65	-1.43	-1.14	-1.58	-.51
2.30	-1.19	-1.53	-1.26	-1.03	-1.35	-.43
2.40	-1.11	-1.37	-1.20	-.97	-1.22	-.42
2.50	-.99	-1.19	-1.09	-.92	-1.08	-.42
2.60	-.88	-.97	-.86	-.90	-.93	-.38
2.70	-.70	-.74	-.63	-.78	-.72	-.34
2.80	-.43	-.52	-.43	-.48	-.49	-.25
2.90	-.21	-.27	-.22	-.23	-.25	-.12
3.00	0.00	0.00	0.00	0.00	0.00	0.00
3.10	.29	.31	.28	.22	.28	.11
3.20	.58	.63	.57	.47	.56	.24
3.30	.85	.95	.88	.77	.84	.40
3.40	1.12	1.25	1.19	1.07	1.08	.56
3.50	1.38	1.54	1.50	1.36	1.32	.72
3.60	1.70	1.87	1.80	1.69	1.65	.90
3.70	2.00	2.20	2.09	2.02	1.95	1.08
3.80	2.29	2.50	2.36	2.42	2.21	1.27
3.90	2.57	2.81	2.64	2.84	2.50	1.46
4.00	2.86	3.11	2.93	3.26	2.78	1.65
4.10	3.13	3.39	3.25	3.71	3.04	1.88
4.20	3.39	3.67	3.56	4.20	3.30	2.12
4.30	3.62	3.95	3.83	4.74	3.55	2.33
4.40	3.85	4.20	4.10	5.31	3.78	2.51
4.50	4.07	4.44	4.35	5.90	4.00	2.68
4.60	4.28	4.66	4.59	6.59	4.23	2.85
4.70	4.50	4.87	4.83	7.41	4.46	3.03
4.80	4.69	5.08	5.05	8.25	4.67	3.21
4.90	4.88	5.29	5.25	8.98	4.85	3.37
5.00	5.03	5.49	5.44	9.65	5.03	3.52
5.10	5.19	5.68	5.61	10.28	5.21	3.66
5.20	5.35	5.84	5.77	10.80	5.39	3.80
5.30	5.48	5.99	5.91	11.22	5.55	3.93
5.40	5.61	6.12	6.04	11.61	5.70	4.04
5.50	5.70	6.22	6.14	11.97	5.83	4.14
5.60	5.78	6.31	6.22	12.26	5.94	4.22
5.70	5.85	6.38	6.30	12.50	6.04	4.28
5.80	5.91	6.44	6.35	12.74	6.14	4.34
5.90	5.97	6.51	6.40	12.99	6.25	4.38
6.00	6.02	6.56	6.45	13.24	6.37	4.42
6.10	6.07	6.61	6.50	13.48	6.51	4.47
6.20	6.13	6.66	6.56	13.73	6.66	4.50
6.30	6.18	6.70	6.62	13.96	6.85	4.54
6.40	6.24	6.74	6.68	14.19	7.03	4.57
6.50	6.28	6.78	6.72	14.44	7.23	4.61
6.60	6.32	6.83	6.76	14.71	7.40	4.65
6.70	6.37	6.87	6.80	14.94	7.55	4.68
6.80	6.42	6.91	6.83	15.15	7.64	4.71
6.90	6.45	6.95	6.86	15.37	7.73	4.74
7.00	6.49	6.98	6.89	15.55	7.79	4.77
7.10	6.53	7.02	6.91	15.71	7.84	4.81
7.20	6.57	7.05	6.94	15.87	7.90	4.83
7.30	6.61	7.09	6.96	16.26	7.95	4.84
7.40	6.66	7.12	6.96	16.36	8.00	4.84
7.50	6.71	7.16	6.96	16.47	8.04	4.85
7.60	6.77	7.20	6.95	16.59	8.05	4.85
7.70	6.84	7.24	6.95	16.72	8.06	4.85
7.80	6.92	7.29	6.94	16.85	8.07	4.85
7.90	7.02	7.35	6.91	16.98	8.09	4.85
8.00	7.14	7.44	6.87	9.35	8.11	4.84

pH	MM	NN	OO	QQ
2.10	-.47	-1.29	-1.69	-.88
2.20	-.51	-1.17	-1.48	-.79
2.30	-.55	-1.04	-1.33	-.74
2.40	-.61	-.97	-1.22	-.70
2.50	-.62	-.88	-1.08	-.64
2.60	-.50	-.77	-.90	-.58
2.70	-.38	-.62	-.70	-.60
2.80	-.27	-.43	-.48	-.44
2.90	-.15	-.22	-.25	-.22
3.00	0.00	0.00	0.00	0.00
3.10	.19	.25	.27	.25
3.20	.39	.50	.55	.53
3.30	.61	.75	.84	.83
3.40	.85	.98	1.12	1.11
3.50	1.08	1.23	1.42	1.39
3.60	1.30	1.51	1.74	1.69
3.70	1.52	1.76	2.04	1.98
3.80	1.73	2.01	2.33	2.28
3.90	1.97	2.29	2.64	2.57
4.00	2.21	2.55	2.94	2.85
4.10	2.49	2.78	3.21	3.10
4.20	2.76	3.00	3.49	3.33
4.30	3.00	3.24	3.75	3.58
4.40	3.23	3.46	4.01	3.83
4.50	3.46	3.67	4.26	4.05
4.60	3.68	3.88	4.49	4.26
4.70	3.89	4.09	4.71	4.46
4.80	4.09	4.28	4.92	4.66
4.90	4.29	4.44	5.12	4.84
5.00	4.49	4.58	5.32	5.01
5.10	4.67	4.73	5.49	5.16
5.20	4.84	4.87	5.65	5.30
5.30	5.01	4.99	5.80	5.42
5.40	5.16	5.10	5.94	5.54
5.50	5.30	5.20	6.05	5.64
5.60	5.46	5.30	6.15	5.74
5.70	5.61	5.38	6.24	5.81
5.80	5.75	5.45	6.31	5.88
5.90	5.88	5.52	6.39	5.94
6.00	6.01	5.60	6.46	6.00
6.10	6.13	5.70	6.52	6.06
6.20	6.25	5.81	6.58	6.11
6.30	6.37	5.92	6.64	6.16
6.40	6.48	6.04	6.70	6.21
6.50	6.58	6.15	6.77	6.26
6.60	6.66	6.24	6.83	6.31
6.70	6.74	6.30	6.89	6.35
6.80	6.82	6.35	6.96	6.39
6.90	6.88	6.40	7.01	6.44
7.00	6.94	6.45	7.07	6.48
7.10	7.00	6.49	7.12	6.52
7.20	7.06	6.52	7.19	6.56
7.30	7.11	6.56	7.26	6.61
7.40	7.16	6.60	7.33	6.66
7.50	7.20	6.63	7.40	6.71
7.60	7.24	6.67	7.47	6.78
7.70	7.28	6.71	7.55	6.85
7.80	7.28	6.75	7.64	6.93
7.90	7.27	6.81	7.74	7.03
8.00	7.27	6.89	7.85	7.13

IV. Model Calculations for the Type 1 Sites

The modified Henderson-Hasselbach equation was used as the basis for non-linear least squares fits of the Type 1 site titration curves. Calculations were performed over the pH range 3 to 6. Model parameters for fits calculated by program NLNOM for the seperate fraction titration curves are given in Table 6. Calculation results with NLNOM for the combined titration curves are given in the thesis. Calculations performed subsequent to the thesis with the SAS 76 NLIN program for the combined titration curves are given in Table 7.

The modified Henderson-Hasselbach equation as used for the calculations was:

$$X = C2/(10^{**}((pK_a - pH)/N)+1) - C1$$

where C2, total number of sites or T(-COOH)

pK_a, a constant (that pH where half the sites are dissociated)

pH, negative log of the hydrogen ion concentration

N, a constant

X, MCMPOC or the μmoles of base consumed/mg OC

Table 6. Parameters from model fit to Type 1 sites for the individual fraction titrations calculated with program NLNOM.

N, a constant

pK_a, a constant (that pH where half the sites are dissociated)

T(-COOH), C2 or the total number of Type 1 sites

C1, adjustable offset of the titration curve

SUMSQ, sum of squares, $\Sigma(X_{observed}-X_{estimate})$

n, number of data points used in the calculation

Titration	N	pK_a	T(-COOH) μmoles/mg OC	C1	SUMSQ	n
GG1371A	1.99	3.59	13.85	3.28	0.0413	16
GG1392A	2.10	3.38	14.82	2.91	0.0224	16
GG2373A	1.64	3.92	4.10	1.36	0.0202	15
GG2421B	1.60	4.10	3.39	1.67	0.0223	10
GG3374B	1.60	3.73	6.09	-1.05	0.0253	16
GG3421B	1.70	3.80	5.08	0.70	0.00275	15
HH1377B	1.91	3.66	14.86	0.93	0.0356	16
HH1399C	2.32	3.13	18.41	4.32	0.0433	16
HH2378B	1.86	3.90	4.56	0.48	0.0216	14
HH2399B	1.66	4.04	3.65	0.67	0.0261	13
HH3378B	1.88	3.67	6.88	0.20	0.0176	16
HH3399B	2.08	3.61	7.05	1.66	0.0087	13
II1380A	1.74	3.70	12.50	0.37	0.0599	17
II1399C	1.76	3.76	11.57	1.04	0.0321	15
II2381B	1.41	4.14	3.70	0.10	0.0115	15
II2404A	1.39	4.08	3.41	0.83	0.0072	12
II3382B	1.81	3.90	7.01	1.27	0.0832	16
II3404A	2.29	3.46	9.20	1.18	0.0044	12
JJ1383B	1.11	4.68	22.28	-3.37	1.041	16
JJ1407A	1.07	4.68	21.23	-0.66	0.852	16
JJ2386A	1.74	3.94	4.47	0.04	0.0096	15
JJ2405A	1.43	4.07	3.83	-0.31	0.0032	13
JJ3387A	2.02	3.51	8.15	1.32	0.0136	15
JJ3405A	1.80	3.71	7.14	-0.11	0.0127	9
KK1383B	2.53	3.39	15.95	2.52	0.0153	12
KK1407A	2.94	3.15	17.88	5.88	0.0357	15
KK2386A	1.40	4.12	3.79	0.59	0.0018	14
KK2408A	1.36	4.18	3.58	2.46	0.0176	14
KK3387A	1.97	3.72	7.74	-3.32	0.0129	15
KK3408A	2.07	3.83	7.11	2.16	0.0147	14
LL1392A	1.28	4.06	5.03	-0.68	0.0091	13
LL1410A	1.32	3.96	5.33	0.04	0.0250	15

Titration	N	pK_a	T(-COOH) µmoles/mg OC	C1	SUMSQ	n
LL2393A	1.82	4.85	7.06	0.92	0.0394	17
LL2409A	1.70	4.79	6.56	2.22	0.0315	13
LL3393A	1.92	3.94	6.26	0.77	0.0049	16
LL3409A	2.20	3.60	7.80	2.04	0.0096	12
MM1396A	2.85	4.34	15.66	3.40	0.0264	17
MM1410A	2.73	3.96	13.61	4.05	0.0364	17
MM2394B	1.84	3.86	5.09	0.30	0.0096	15
MM2411A	1.54	4.07	3.94	1.56	0.0049	14
MM3394A	1.70	3.80	6.43	1.43	0.0085	14
MM3411A	1.94	3.53	7.59	2.09	0.0147	14
NN1396A	2.28	3.42	13.29	1.49	0.0090	15
NN1413A	2.01	3.65	11.13	1.75	0.0301	16
NN2395A	1.62	4.00	4.04	1.16	0.0026	15
NN2412A	1.51	4.10	3.86	1.12	0.0062	15
NN3395A	1.57	3.87	5.32	1.32	0.0037	14
NN3412A	1.62	3.83	5.73	-0.66	0.0159	15
OO1413A	2.09	3.55	13.96	1.55	0.0135	15
OO1423A	2.09	3.54	14.36	1.95	0.0081	17
OO2414A	1.79	3.95	6.45	0.71	0.0029	13
OO2420A	1.82	3.93	6.12	1.26	0.0026	17
OO3414A	1.94	3.66	8.42	1.54	0.0077	16
OO3420A	1.95	3.66	8.39	1.30	0.0028	15
QQ1423A	2.46	3.10	17.43	5.74	0.0138	13
QQ1426A	1.93	3.51	12.83	2.78	0.0142	16
QQ2424A	2.23	3.54	6.94	2.52	0.0055	12
QQ2425A	1.75	3.96	5.17	1.38	0.0085	14
QQ3424A	1.89	3.71	7.44	2.09	0.0052	14
QQ3425A	2.28	3.35	9.65	3.43	0.0220	13
10.5HrUVQQ1433-2	1.58	3.92	21.65	3.40	0.1724	15
3HrUVQQ1433-4	1.77	3.61	15.30	2.17	0.0243	13
1HrUVQQ1433-6	1.92	3.50	15.39	2.91	0.0104	11

Titration	N	pK_a	T(-COOH) umoles/mg OC	C1	SUMSQ	n
N1237A	1.81	3.44	15.36	3.99	0.0761	12
N1255B	2.02	3.12	22.73	1.79	0.0141	15
N2250B	1.70	4.00	6.90	0.00	0.0324	12
N3247B	1.77	3.81	9.36	-0.56	0.0190	17
P1318A	1.72	3.38	15.45	2.23	0.0355	16
P1340B	2.06	3.03	20.26	4.68	0.0071	15
P2320A	2.10	3.71	8.01	0.82	0.0304	11
P2338	1.98	3.44	8.02	-1.15	0.0113	14
P3322A	2.18	3.69	9.32	0.39	0.0202	15

Table 7. Parameter values and asymptotically valid errors for selected combined titration curves calculated with SAS 76 program NLIN.

TCOOH, C2 or the total number of Type 1 sites

pK_a', a constant (that pH where half the sites are dissoci

N, a constant

C, adjustable offset of the titration curve

Table 7. Parameter values and asymptotically valid errors for selected combined titration curves calculated with SAS 76 program NLIN.

TCOOH, C2 or the total number of Type 1 sites

pK_a, a constant (that pH where half the sites are dissociated)

N, a constant

C, adjustable offset of the titration curve

	Estimate	Std. Error	95% Confidence Interval	
Sample N				
TCOOH	13.815	0.267	13.268	14.363
pK_a	3.506	0.026	3.454	3.559
N	1.851	0.031	1.786	1.916
C	4.781	0.237	4.294	5.268
Sample P				
TCOOH	13.509	0.276	12.943	14.075
pK_a	3.328	0.029	3.268	3.388
N	1.955	0.030	1.892	2.018
C	5.434	0.252	4.917	5.950
Sample GG				
TCOOH	9.730	0.211	9.297	10.164
pK_a	3.606	0.028	3.548	3.664
N	1.924	0.039	1.843	2.005
C	3.146	0.182	2.773	3.520
Sample HH				
TCOOH	10.891	0.311	10.253	11.530
pK_a	3.575	0.038	3.496	3.653
N	1.982	0.052	1.874	2.089
C	3.661	0.269	3.109	4.212
Sample II				
TCOOH	9.596	0.247	9.088	10.103
pK_a	3.747	0.030	3.685	3.810
N	1.779	0.048	1.680	1.878
C	2.593	0.207	2.168	3.017

	Estimate	Std. Error	95% Confidence Interval	
Sample KK				
TCOOH	11.617	0.276	11.049	12.184
pK_a	3.562	0.035	3.491	3.634
N	2.380	0.052	2.273	2.487
C	4.257	0.231	3.782	4.732
Sample NN				
TCOOH	8.963	0.121	8.714	9.212
pK_a	3.666	0.017	3.631	3.702
N	1.982	0.026	1.928	2.036
C	2.809	0.102	2.600	3.018
Sample OO				
TCOOH	10.331	0.134	10.056	10.606
pK_a	3.674	0.016	3.640	3.708
N	1.965	0.025	1.913	2.017
C	3.214	0.113	2.983	3.446
Sample QQ				
TCOOH	10.025	0.163	9.690	10.360
pK_a	3.557	0.022	3.512	3.602
N	1.982	0.029	1.922	2.043
C	3.449	0.142	3.158	3.740

V. Programs Used for Calculations

TCRVDI and NLNOM

These programs were used on the laboratory Varian computer system. TCRVDI performs curve difference calculations and was used to subtract blank titration curves from organic sample titration curves. NLNOM performs the least squares fit of the model to the titration curve over a specified pH range.

SAS 76 NLIN

A copy of the cards used for running the SAS 76 NLIN program are given. The Marquardt method was used for all calculations.

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```
      TITLE TCRVDI
C#######################################################################
C                                          THIS MODULE WILL CRUNCH
C      TEST CRVDIF                          DATA ONLY IT IS PROTO
C
C
C   THIS IS REVISION B :  THIS REVISION INCORPORATES FLEXIBLE I/O
C                      -- ALSO IT SUPRESSES THE CORE IMAGE DUMP,
C                         AND RATHER OUTPUTS ONLY THE VITAL DATA
C                     *** ALSO NOTE THAT THE VERSION OF  CRVDIF ...
C                         USED HERE IN IS THE MOST CURRENT REVISION
C                         AND SHOULD BE THE VERSION USED IN THE GLOBAL
C                         OMTITR SYSTEM.  SR
C                     ### REV B INCORPORATES SIGN OFF FROM ROOT SEGMENT
C                            KICKS OUT LAST PAGE
C
C          REVISION C:  THIS REVISION CORRECTLY INTERPOLATES
C                       DATA SETS WHICH DO NOT HAVE MATCHING ENDPOINTS
C                       (IF NO INTERPOLATION IS POSSIBLE THE PROGRAM
C                       SO NOTIFIES THE OPERATOR.  ADDITIONALLY THE
C                       PROGRAM NOW SIGNS'OFF TO INDICATE COMPLETION.
C
C              RIFFLE 28SP76        (SEE OMTITR FOR SYSTEM)
C:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
C
C
C ********************NOTE EXTERNAL STMTS ARE RESTRICTED TO ROOTONLY
      EXTERNAL BPFCBS
      COMMON /FCBS/ IBFCB (13), IBLU, IPFCB (13), IPLU /INTERA/INTER
      COMMON /IOSPEC/ LISTLU, IOLUN
C****************************** NOTE ALL ROOTS MUST MAKE ONE WRITE STMT
C                                THIS PUTS V$FORTIO IN PROG, A MUST
C**********************************************************************
C   LET HIM KNOW WHAT'S GOING ON
C**********************************************************************
C--------------------------------------
C  SATISFY FLEXIBLE INTERACTIVE I/O REQMT
C--------------------------------------
C                                        SPECIFY PROGS NAME AS PER TITLE
      WRITE(1,920)
  920 FORMAT('1THIS IS ***TCRVDI*REV C**')
C                                     PROVIDE 4 RESPECFICATION OF LISTLU
C                                         AND IOLUN FROM CURRENT UNITS
C                                      (NOTE THIS IS ALWAY FIRST DONE AT OC.
      GO TO 921
 8040 WRITE(IOLUN,922)
      READ(IOLUN,923) LISTLU, IOLUN
      GO TO 924
C
C
  921 WRITE(1,922)
  922 FORMAT(' SPECIFY LISTLU,IOLUN'/' +### +###')
      READ(1,923) LISTLU,IOLUN
  923 FORMAT(1X,I4,1X,I4)
C..........
C   ECHO
C...........
  924 WRITE(IOLUN,920)
```

```
      WRITE(IOLUN,923) LISTLU,IOLUN
C
C
C
C==========================================================
C          PROG REALLY STARTS HERE
C==========================================================
C
   84 WRITE(IOLUN,205)
  205 FORMAT(' DATA TAPE ON DRIVE ?YES=1'/
     +      ' +#')
      READ(IOLUN,206) IYES
  206 FORMAT(1X,I2)
      IF(IYES.NE.1) GO TO 84
C
C
C
      CALL CRVDIF
      WRITE(IOLUN,436)
  436 FORMAT(' ::::TCRVDI BYE*:::::')
      END

C
C
C
C
C
C
C
C
C
C
C
C
C
C
C
C
C

C#######################################################################
C    CRVDIF        DOUG'S "CURVE DIFFERENCE" PROG
C
C              THIS ROUTINE CALCULATES DIFFERENTIAL TITER UPTAKE
C                  OF SEA WATER SAMPLES BY ORGANIC MATTER, BASED ON
C                  POTENTIOMETRIC TITRATION WITH OH' RE: WRITEUP
C
C
C             THIS IS REVISION C: WHICH ENCORPORATES THE INTERACTIVE
C                     LOGICAL UNIT SPECIFICATION IN RUNTIME. INITIALLY
C                     INTEROGATION IS TO THE OPCOM DEVICE.
C
C                       THE INTERPOLATION HAS BEEN CORRECTED TO HANDLE
C                    NONCOINCIDENT ENDPOINTS, BOTH ENDS, AND THE OPERATOR
C                    IS NOTIFIED IF INTERPOLATION IS NOT POSSIBLE.
C
C                  ALSO I HAVE OMMITED THE SUPERFLUOUS CORE IMAGE DUMP
C                      WHICH WAS NEEDED DURING DEBUG SEGMENT.  SR.
```

```
PAGE   3    08/09/77      VORTEX    CTUF                    824 HOURS

      C
      C       THIS PROG ASSUMES DATA HAS BEEN PLACED ON LUN 174=MT IN
      C              THE FORMAT SET FORTH IN WRITE UPFOR CRVIF
      C
      C  TO BE PROTOTYPE FOR
      C     SUBROUTINE (OVLAY)
      C
      C           ::: THIS PROG REQUIRS CALLER TO INITILIZ :::
      C           ::: COMMON BLOCK /FCBS/ VIA EXTERNAL STMT:::
      C           ::: REFRENCNG BLOCK DATA PROG BPFCBS    :::
      C           :::   THAT PROG IS OM RESIDNT          :::
      C
      C             ((CALLING PROG MUST HAVE AT LEAST ONE WRITE STMT))
      C                          ((IF THE PROG IS TO BE RUN AS OV))
      C                                          28SP76 RIFFLE
      C:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
            SUBROUTINE CRVDIF
      C                                                          SET STORGE
            COMMON /IOSPEC/ LISTLU, IOLUN
            COMMON /FCBS/ IBFCB (13), IBLU, IPFCB (13), IPLU /INTERA/INTER
            DIMENSION RPLOT (15), IPLOT (60), LABLX (15), LABLY (15)
            DIMENSION DATA (60,6), NCODE (8), NOTE (35), PARAM (12)
            DIMENSION MYFCB (13)
            DATA (RPLOT (I),I=1,9)/1.0,1.0,0.0,7.0,  1.0,1.0,+90.,9.0,
           1+1.0/
            DATA (LABLX (I), I=1,15) /7*2H  ,2HPH, 7*2H  /
            DATA (LABLY (I),I=1,15) /' M','IC','RO','MO','LE','S ',
           1 'OH',' C','ON','SU','ME','D/','MG',' 0','C '/
      C-------------------------------------------------------------------
      C                                                    GET THE LUNS
      C                                                     4 DATA AREA ON
      C                                                     DISC VIA BPFCBS
      C                                                     (MAIN INITIALIZS)
      C
            LUN=IBLU
            DO    1  I=1,13
            MYFCB (I)=IBFCB (I)
        1   CONTINUE
            IREW=0
            CALL V$OPEN (13,LUN,MYFCB,IREW)
      C
      C
      C-------------------------------------------------------------------
      C                                                    SET LOOP PARAMS
      C                                                      WIL BE 2 PASS'S
            ISET=1
            ICLEAR=6
            NSET=1
            INDEX=1
            GO TO   3
      C
        2   ISET=ISET+1
            ICLEAR=4
            NSET=5
            INDEX=7
      C.....................................................  FIRST TIM READ PLT HEDR
        3   IF(ISET.EQ.1) READ (174, 4) (IPLOT (I),I=48,60)
        4   FORMAT(1X,2A2,  T7,3A2,  T14,4A2,  T23,4A2)
```

```
PAGE   4    08/09/77     VORTEX      CTUF                              824 HOURS
      C
      C...................................................READ PARAMS EACH D SET
            READ(174,5) NCODE (NSET), NCODE (NSET+1), NCODE(NSET+2),
           1 NCODE (NSET+3)
       5    FORMAT(1X,4A2)
            READ(174,60) (NOTE(I),I=1,35)
        60  FORMAT(1X,35A2)
            READ(174,61) PARAM(INDEX),PARAM(INDEX+1),PARAM(INDEX+2),
           1 PARAM(INDEX+3),PARAM(INDEX+4),PARAM(INDEX+5)
         61 FORMAT(1X,F7.3, T10,F5.2,  T16,F7.2,  T24,E11.4,
           1  T36,E11.4,  T48,E11.4)
      C.............................................  CLEAN ARRAY UP
            DO  51 J=1,ICLEAR
            DO  6 N=1,60
            DATA (N,J)=0.0
        6   CONTINUE
       51   CONTINUE
      C...................................................READ RAW DATA
      C                                           --NOTE (-) VOLUME OR 60 PTS
      C                                               IS THE CURRENT LIMITATION
            NPAIRS=0
       7    NPAIRS=NPAIRS+1
        8   READ(174,50) VOLML,EH
         50 FORMAT(F7.3,  T9,F7.2)
            DATA (NPAIRS,1)=VOLML
            DATA (NPAIRS,2) =EH
            IF((NPAIRS.EQ.60).OR.(VOLML.LT.0.0)) GO TO 9
            GO TO 7
      C...................................................KILL FLAG ROW
      C                                                  (FLAG IS ANY -VOLML)
      C                                                  ( THE EH IS ARBITRARY&#0)
        9   IF(VOLML.LT.0.0) NPAIRS=NPAIRS-1
      C
      C
      C*****************************************************************
      C                                                  ORDER WRT ML (INC DWN)
      C                                                      ORDER3 OM RESIDNT
      C*****************************************************************
            MXRDIM=60
            MXCDIM=6
            MXRSUB=NPAIRS
            MXCSUB=2
            NCOL=1
            I1DC0=1
      C-----------------------------------------------------------------------
            CALL ORDER3(DATA,MXRDIM,MXCDIM,MXRSUB,MXCSUB,NCOL,I1DC0)
      C-----------------------------------------------------------------------
      C
      C
      C
      C="="="="="="="="="="="="="="="="="="="="="="="="="="="="="="="="
      C  THIS SEGMENT IS PURPOSELY MASKED, FOR FUTURE TEST
      C
      C     WRITE(LISTLU,1848) ((DATA (J,K),K=1,6), J=1,NPAIRS)
      C1848 FORMAT(' ',T2,0PF7.3,  T10,0PF7.2,  T18,0PF8.4, T27, 1PE11.4,
      C    1 T39,0PF8.4, T50, 1PE11.4)
      C="="="="="="="="="="="="="="="="="="="="="="="="="="="="="="="="="=
      C
```

```
PAGE   5    08/09/77      VORTEX    CTUF                    824 HOURS

  233     C.....................................SET ROW COUNT IN CURRENT X
  234           IPLOT (10)=NPAIRS
  235     C
  236     C
  237     C
  238     C
  239     C
  240     C*************************************************************************
  241     C                                                    CALC MICROMO/ML
  242     C*************************************************************************
  243           CONVRS=PARAM (INDEX+3)* PARAM (INDEX+5)*(10.**6)
  244           CONTINUE
  245           IF(ISET.EQ.1) GO TO 70
  246           CONVRS=(PARAM(1)/PARAM(7))*CONVRS
  247     C
  248     C
  249     C
  250     C*************************************************************************
  251     C                                                 CALC PRELIM PH & CONSUMP
  252     C*************************************************************************
  253      70   DO 10 J=1,NPAIRS
  254           DATA (J,3)=     -((DATA (J,2)-PARAM (INDEX+2))/59.16)
  255           IF(ISET.EQ.1) DATA(J,5)=DATA(J,3)
  256           DATA(J,4)=DATA(J,1)*CONVRS
  257           IF(ISET.EQ.1) DATA(J,6)=DATA(J,4)
  258        10 CONTINUE
  259     C
  260     C
  261     C
  262     C-------------------------------------------------------------------------
  263     C                                                STIK ROW COUNT IN UNUSED
  264     C-------------------------------------------------------------------------
  265           IPLOT (38+ISET)=NPAIRS
  266     C
  267     C
  268     C
  269     C
  270     C*************************************************************************
  271     C                                                  WRITE DATA SET ON DISC
  272     C*************************************************************************
  273           MYFCB (4)=4
  274           IF(ISET.EQ.2) MYFCB (4)= 8
  275     C #$%#$%#$% NOTE BINRY WRITES ARE ALWAYS ONE ENTIR SECTR FOR SPEED #$%
  276           WRITE(13) ((DATA (J,K),J=1,60), K=1,4)
  277     C
  278     C
  279     C
  280     C
  281     C
  282     C*************************************************************************
  283     C                                                  DUMP CALCS TO STATOS
  284     C$$$ PLEASE NOTE THE VARAIBLE SUBSCRIP PROBLEM INPUT &OUT
  285     C
  286     C     IE., VDM FORTRAN WILL NOT ACCEPT IMPLICIT DO LOOPS IN THE READ
  287     C          OR WRITE STATMENT WHEN THE FIRST ELEMENT IS VARIABLE.
  288     C*************************************************************************
  289           WRITE(LISTLU,11) NCODE(NSET),NCODE(NSET+1),NCODE(NSET+2),
  290          1 NCODE(NSET+3)
```

```
PAGE   6    08/09/77      VORTEX    CTUF                    824 HOURS

   291       11  FORMAT('1',4A2)
   292           WRITE(LISTLU, 4) (IPLOT (I),I=48,60)
   293           WRITE(LISTLU,12) (NOTE(I), I=1,35)
   294      12   FORMAT(' ',35A2/)
   295      C
   296      C
   297           WRITE(LISTLU,13)
   298      13   FORMAT(1X,T4,'WZERO',  T11,'XOM',  T18,'EZRO',
   299          1  T28,'TRO',   T39,'THHO',  T51,'TM')
   300           WRITE(LISTLU,14) PARAM(INDEX),PARAM(INDEX+1),PARAM(INDEX+2),
   301          1 PARAM(INDEX+3),PARAM(INDEX+4),PARAM(INDEX+5)
   302      14   FORMAT(1X,0PF7.3,  T10,0PF5.2,  T16,0PF7.2,  T24,1PE11.4,
   303          1   T36,1PE11.4,  T48,1PE11.4//)
   304      C
   305      C
   306           WRITE(LISTLU,15)
   307        15 FORMAT(1X,  T5,'ML',  T13,'EH',  T22,'PH',  T30,'MCMOH')
   308      C
   309           WRITE(LISTLU,16) ((DATA (J,K), K=1,4), J=1,NPAIRS)
   310      16   FORMAT(1X,  T2,0PF7.3,  T10,0PF7.2,  T18,0PF8.4,  T27,1PE11.4)
   311      C
   312      C.....GET SECOND IF NOT IN Y.P
   313           IF(ISET.EQ.1) GO TO   2
   314      C
   315      C
   316      C
   317      C
   318      C
   319      C
   320      C
   321      C    : : : : : : :  PRELIM PROCESS FINISHED : : : : : : :
   322      C
   323      C
   324      C
   325      C
   326      C**********************************************************************
   327      C                                                  DO LINEAR NEAREST NEIGHBR
   328      C                                                    INTERPOLATION IF DEFINED
   329      C**********************************************************************
   330      C RESET THE "LOWER BRACKET FOUND" FLAG TO NOT FOUND CONDITION.
   331           IBRAKT=0
   332      C  INITILIZE THE NEXT POTENTIAL INTERPOLATABLE POINTS INDEX PARAM
   333           L=1
   334      C  SET THE INDEX POINTER TO THE SECONDARY DATA SETS START
   335           K=1
   336      C  NOW DO SAME FOR THE PRIMARY DATA SET
   337           J=1
   338      C
   339      C
   340      C----------------------------------------------------------------------
   341      C  COMPARE THE PRIMARY DATA SETS INDEPENDENT VARIABLE TO THE CURRENT
   342      C        SECONDARY SETS INDEPENDENT VARIABLES VALUE.
   343      C----------------------------------------------------------------------
   344       17   IF(DATA (J,5).GT.DATA (K,3)) GO TO  18
   345      C
   346      C
   347      C  IF A LOWER BRACKET HAS BEEN SET, IT IS THE CLOSEST POINT
   348      C    AVAILABLE IN THE FURNISHED DATA SET.  SINCE THE CLOSEST UPPER
```

```
C     UPPER BOUND, HAS ALSO BEEN FOUND HENCE WE'VE FOUND THE MINIMUM
C     INTERPOLABLE INTERVAL.   GO INTERPOLATE.
      IF(IBRAKT.EQ.1) GO TO  19
C
C
C  NO LOWER BOUND HAS YET BEEN SET,  HOWEVER IF THE PRIMARY AND
C       SECONDARY SETS ARE EQUAL WE HAVE DEGENERATELY INTERPOLATED, SO
C       SAVE IT.
      IF(DATA (J,5).EQ.DATA (K,3)) GO TO   20
C
C
C  NO INTERPOLATIONS WERE POSSIBLE OVER ENTIRE INTERVAL IF NEXT TRUE
      IF((J.EQ.IPLOT(39)).AND.((L-1).EQ.0)) GO TO 1001
C
C  SOME INTERPOLATIONS WERE POSSIBLE, BUT NEAR THE END THEY WERE NOT
C      HENCE SAVE THOSE WHICH WERE
      IF(J.EQ.IPLOT(39)) GO TO 22
C   ELSE TRY PRIMARY SETS NEXT INDEPENDENT VALUE, NO BRACKET HAVING
C       MATERIALIZED.
      J=J+1
      GO TO  17
C
C
C
C--------------------------------------------------------------------------
C  IN THIS LOOP WE'RE LOOKING FOR AN UPPER BOUND FOR INTERPOLATION
C--------------------------------------------------------------------------
C  EXIT IF LAST SECONDARY'S INDEPENDENT IS LESS THAN THE PRIMARY'S
C       FIRST INDEPENDENT POINT (IE., NON COINCIDENT DOMAINS)
   18 IF((K.EQ.IPLOT (40)).AND.((L-1).EQ.0)) GO TO 1001
C
C  IF THERE ARE NO MORE INTERPOLATIONS POSSIBLE, BUT SOME HAD OCCURRED
C      DUMP THE GOOD STUFF TO DISC.
      IF(K.EQ.IPLOT(40)) GO TO 22
C
C
C  BUMP SECONDARY DATA SET'S INDEX 4 NEXT TEST,AND SET BRACKET(INDICATIN
C       THAT A LOWER BOUND WRT THE PRIMARY POINT IN QUESTION
C           HAS BEENFOUND.
      K=K+1
      IBRAKT=1
      GO TO  17
C
C
C--------------------------------------------------------------------------
C  DO A CLASSICAL LINEAR INTERPOLATION     SEE FIGURE (26SEP76)
C--------------------------------------------------------------------------
   19 DATA (L,2)=  (DATA (J,5)-DATA ((K-1),3))  *  (DATA (K,4)-
     1 DATA ((K-1),4)) / (DATA (K,3)-DATA ((K-1),3)) + DATA ((K-1),4)
      GO TO   21
C
C
C . . . . . . . . . . . . . . . . .
C  DEGENERATELLY INTERPOLATE
C . . . . . . . . . . . . . . . . .
   20 DATA (L,2)=DATA (K,4)
C
C
```

```
PAGE   8    08/09/77      VORTEX    CTUF                    824 HOURS

  407     C-------------------------------------------------------------------
  408     C  CALCULATE THE DIFFERENTIAL DEPENDENT (IE. SEC-PRI) VALUE BASED
  409     C    ON THE INTERPOLATION, THEN NORMALIZE WRT FACTOR PARAM (2),
  410     C     WHICH FOR THE CASE AT HAND IS THE TOTAL ORGANIC MATTER CONTENT
  411     C-------------------------------------------------------------------
  412       21  DATA (L,1)=(DATA (J,6)-DATA (L,2))/PARAM (2)
  413     C
  414     C
  415     C-------------------------------------------------------------------
  416     C  STORE ALL DATA CORRESPONDING TO A DIFFERENTIAL MEASUREMENT
  417     C-------------------------------------------------------------------
  418     C
  419     C  PLACE PRIMARY INDEPENDENT INTO THE RESULT MATRIX
  420          DATA (L,5)=DATA (J,5)
  421     C
  422     C  PLACE THE PRIMARY DEPENDENT INTO SAME ARRAY
  423          DATA (L,6)=DATA (J,6)
  424     C
  425     C  IF INTERPOLATIONS  HAVE BEEN ATTEMPTED OVER ALL
  426     C       PRIMARY INDEPENDENT VARIBLES, THEN WE'RE DONE. GO DUMP.
  427          IF(J.EQ.IPLOT (39)) GO TO  22
  428     C
  429     C  ELSE BUMP THE INDEX TO THE NEXT PRIMARY INDEPENDENT VALU.
  430          J=J+1
  431     C
  432     C    AND INCREMENT THE COUNTER HOLDING THE # OF VALID INTERPOLATIONS
  433     C      WHICH HAVE BEEN POSSIBLE TO THE NEXT POTENTIAL VALUE.
  434          L=L+1
  435          GO TO  17
  436     C
  437     C
  438     C
  439     C-------------------------------------------------------------
  440     C  NOTIFY OPERATOR NO INTERPOLATION POSSIBLE
  441     C-------------------------------------------------------------
  442       1001 WRITE(LISTLU,1000)
  443       1000 FORMAT(' NO INTERP POSIBLE')
  444          GO TO 26
  445     C
  446     C
  447     C
  448     C*****************************************************************
  449     C                                                DUMP FINAL CALC(DATA
  450     C                                                 2 B PLOTD) TO DISC
  451     C*****************************************************************
  452       22    MYFCB (4)= 12
  453          WRITE(13) ((DATA (J,K), J=1,60), K=1,2)
  454          MYFCB (4)= 14
  455          WRITE(13) ((DATA (J,K), J=1,60), K=5,6)
  456     C
  457     C
  458     C
  459     C
  460     C*****************************************************************
  461     C                                          SET UP PLOT REQ SECTOR
  462     C                                 (WE ARE PREPARING TO USE BIPLOT)
  463     C*****************************************************************
  464     C
```

```
PAGE   9    08/09/77      VORTEX     CTUF                      824 HOURS
      C                                                          FIRST X
      C                                      NOTE L IS THE INDEX OF THE INTEROP-
      C                                          ATABLE DATA POINTS ARRAY SEE
      C                                          SOURCE REGION 300 , LININTERPOL.
            IPLOT (9)= 14
            IPLOT (10)= L
            IPLOT (11)=+1
      C                                                          THEN Y1
            IPLOT (12)=12
            IPLOT (13) =L
            IPLOT (14)= +4
      C                                                  SET END Y AXI FLAGS
            IPLOT (15)=0
            IPLOT (16)=0
            IPLOT (17)=0
      C                                                  WE WANT LEDG AND BX&LN
            IPLOT (1)=1
            IPLOT (3)=+1
      C
      C------------------------------------------------------------------------
      C                                               DUMP PLOT REQ SEC T DISC
      C                                                (REMEMBER WE POINT TO 3)
      C------------------------------------------------------------------------
            MYFCB (4)= 3
            WRITE(13) RPLOT, IPLOT, LABLX, LABLY
      C
      C
      C----------------------------------------------------------------------
      C                                                      SHOW HIM PLOT REQ
      C                                                       FOR FUTURE REFRNCE
      C-----------------------------------------------------------------------
            WRITE(LISTLU,4334)
       4334 FORMAT('1PLOT REQ SECT')
            WRITE(LISTLU,8818) RPLOT
       8818 FORMAT(1P5E10.3)
            WRITE(LISTLU,8819)  (IPLOT(I), I=1,47)
       8819 FORMAT(1X,12(I6,1X))
            WRITE(LISTLU,12) (IPLOT (I),I=48,60)
            WRITE(LISTLU,12) LABLX
            WRITE(LISTLU,12) LABLY
      C
      C------------------------------------------------------------------------
      C         DISC FORMAT POST CRUNCH.......            THEN SHOW HOW HIS DATA
      C                                                    DISC AREA WAS WRITN
      C------------------------------------------------------------------------
            WRITE(LISTLU,6543) LUN, (MYFCB (I), I=8,10)
       6543 FORMAT(///' BINRY DATASECTRS ON'/ ' LUN=',I3, 3X, 'FIL=', 3A2/
           1' 1=SYSTM',3X,'2=SYSTM',3X,'3=PLOTREQ'/
           1' 4=ML PRI',3X,' 5=EH PR',3X,'6=PH PR',3X,'7=PMCMOH'/
           1' 8=ML SEC',3X,'9=EH SE',3X,'10=PH SE',3X,'11=SMCMOH'/
           1' 12=MCMPOC',3X,'13=SMCMOH*',3X,'14=PH PRI (INTERPOLATABLE)'/
           1' 15=PMCMOH (F(PH PRI))')
      C
      C
      C
      C**********************************************************************
      C                                                       DUMP DAT 2B PLOTD
      C                                                         TO STATOS
```

```
PAGE  10    08/09/77        VORTEX     CTUF                       824 HOURS
      C***************************************************************
            WRITE(LISTLU, 23)
        23  FORMAT('1 ')
            WRITE(LISTLU, 4) (IPLOT (I), I=48,60)
      C
            WRITE(LISTLU, 24)
        24  FORMAT(1X/' ',T12,'H ACTIVITY'/ T5,'PH',  T14,'MCMPOC',
           1   T26,'PMCMOH',  T38,'SMCMOH')
      C
            DO  26 J=1,L
            WRITE(LISTLU, 25) DATA (J,5), DATA (J,1), DATA (J,6), DATA (J,2)
        25  FORMAT(1X,0PF8.4,  T12,1PE10.3,  T24,1PE10.3,  T36,1PE10.3)
      C
      C
      C
      C
      C
        26  CONTINUE
      C KICK OUT LAST PAGE
            WRITE(LISTLU,1002)
      1002  FORMAT(' ***CRVDIF BYE***')
            WRITE(LISTLU,23)
      C
      C
      C
      C***************************************************************
      C                                       CLOSE PLOT FILE OHNE UPDATE
      C***************************************************************
            CALL V$CLOS(13,0)
      C                                          RETURN TO ROOT SEGMENT
      C                                            OMTITR  (IF AS OVLAY)
            RETURN
            END


      '()'()
```

PAGE 1 08/09/77 VORTEX CTUF 831 HOURS

```
C##########################################################################
C########################################################################
C##########################################################################
C                         NLNOM - VI77 WITH DISC WRITE        HUIZENGA
C########################################################################
C########################################################################
C       NLNOM - A NONLINEAR LEAST-SQUARES FIT TO OM TOTRATION DATA
C                  WITH A FOUR PARAMETER MODIFIED HENDERSON-HASSELBACH
C                  RELATIONSHIP.
C                  DEPENDENT VARIABLE X IS THE MCMPOC (OH CONSUMED BY OM)
C
C          X=C2/(10**((PK-PH(I))/N)+1)-C1
C
C                 DERIVED FROM RELATIONSHIP
C                           PH=PK+NLOG10(ALPHA/1-ALPHA)
C                        WHERE ALPHA IS DEGREE OF DISSOCIATION
C
C                 IN THE FORM APPLIED TO THIS DATA
C                           PH=PK+N*LOG((X+C1)/(C2-(X+C1)))
C   OH CONSUMED BY OM                X=MCMPOC
C                                    C1=SHIFT OF CURVE
C TOTAL # OF SITES                   C2=TMCMPOC
C
C
C
C#######################################################################
C########################################################################
C      DISC WRITE TO  LUN=23  SECT 4&8 FILE=IBINRY
C
       TITLE NLNOM
       DIMENSION SUMSQ(2),PH(60),X(60), IFCBUD(13)
       DIMENSION IDUMMY(120), AMODEL(60), ADIFF(60)
       DATA IFCBUD (3)/'  '/,(IFCBUD (I),I=8,10)/'IB','IN','RY'/
       IREW=0
C
C
C      GET DATA AS STORED BY TCRVDI ON FILE IBINRY
C
C
       CALL V*OPEN(13,23,IFCBUD,IREW)
       IFCBUD (4)=14
       READ(13) PH
       IFCBUD (4)=12
       READ(13) X
       IFCBUD (4)=3
       READ(13) IDUMMY
       NUMBER=IDUMMY (40)
       WRITE(1,100)
 100   FORMAT('1 THIS IS NLNOM')
       WRITE(1,102)
 102   FORMAT(' INPUT LISTLU, IOLUN')
       WRITE(1,106)
 106   FORMAT(' +### +###')
       READ(1,108) LISTLU, IOLUN
 108   FORMAT(1X,I4,1X,I4)
       WRITE(IOLUN,100)
       WRITE(LISTLU,100)
       WRITE(IOLUN,109)
```

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```
    109   FORMAT(' INPUT STARTING VALUES: C1 C2 PK N')
          WRITE(IOLUN,110)
    110   FORMAT(' +##.#### +##.#### +##.#### +##.####')
          READ(IOLUN,112) C1, C2, C3, C4
    112   FORMAT(1X,F8.4,1X,F8.4,1X,F8.4,1X,F8.4)
          WRITE(IOLUN,114)
    114   FORMAT(' WHAT PH RANGE?')
          WRITE(IOLUN,116)
    116   FORMAT(1X,'+##.### +##.###')
          READ(IOLUN,118) PHMIN, PHMAX
    118   FORMAT(1X,F7.3,1X,F7.3)
          WRITE(IOLUN,120)
    120   FORMAT(' CONVERGENCE CRITERION')
          WRITE(IOLUN,122)
    122   FORMAT(1X,'+#######      IN E FORMAT  ')
          READ(IOLUN,124) CONV
    124   FORMAT(1X,E8.5)
          WRITE(IOLUN,121)
    121   FORMAT(' WRITE MODEL CURVE TO DISC?  1=YES'/1X,'+#')
          READ(IOLUN,123) IDISC
    123   FORMAT(1X,I2)
          SUMSQO=-1.
          K=1
          WRITE(LISTLU,126) CONV, PHMIN, PHMAX
    126   FORMAT('0ITERATIVE PROCEDURE   CONV=',1PE13.6,'  PH RANGE ',
         +0PF7.3,' - ',0PF7.3)
          WRITE(LISTLU,128) K,C1,C2,C3,C4
    128   FORMAT('0',I6,4(1X,1PE13.6))
    150   C=0.434294
          F1F1=0.
          F1F2=0.
          F1F3=0.
          F1F4=0.
          F2F2=0.
          F2F3=0.
          F2F4=0.
          F3F3=0.
          F3F4=0.
          F4F4=0.
          CF0=0.
          CF1=0.
          CF2=0.
          CF3=0.
          CF4=0.
          PK=C3
          AN=C4
          SUMSQ (2)=0.
          SUMSQ (1)=0.
C
C
C     NOW CALCULATE THE DERIVATIVES OF THE FUNCTION WITH RESPECT
C     TO EACH OF THE CONSTANTS TO BE DETERMINRD.
C     CALCULATE THE SUMS OF DERIVATIVE PRODUCTS.
C
          DO 200 I=1,60
          IF(PH(I).LT.PHMIN) GO TO 200
          IF(PH(I).GT.PHMAX) GO TO 300
          VAR=EXP((PK-PH(I))/(C*AN))
```

```
      F1=-1.
      F2=1./(VAR+1.)
      F3=-C2*VAR/(C*AN*(VAR+1.)**2)
      F4=-C2*(PK-PH(I))*VAR*(-1.0)/(C*(AN*(VAR+1))**2)
      F=C2/(VAR+1)-C1
      F1F1=F1F1+F1*F1
      F1F2=F1F2+F1*F2
      F2F1=F1F2
      F1F3=F1F3+F1*F3
      F3F1=F1F3
      F1F4=F1F4+F1*F4
      F4F1=F1F4
      F2F2=F2F2+F2*F2
      F2F3=F2F3+F2*F3
      F3F2=F2F3
      F2F4=F2F4+F2*F4
      F4F2=F2F4
      F3F3=F3F3+F3*F3
      F3F4=F3F4+F3*F4
      F4F3=F3F4
      F4F4=F4F4+F4*F4
      CF0=CF0+(X(I)-F)**2
      CF1=CF1+(X(I)-F)*F1
      CF2=CF2+(X(I)-F)*F2
      CF3=CF3+(X(I)-F)*F3
      CF4=CF4+(X(I)-F)*F4
200   CONTINUE
300   IF(SUMSQ0.LT.0.) GO TO 310
      IF(SUMSQ0.GE.CF0) GO TO 301
      CF0=SUMSQ0
      GO TO 700
301   IF(((SUMSQ0-CF0)/CF0).LT.CONV) GO TO 1000
X     WRITE(LISTLU,302) K,C1,C2,C3,C4,CF0
X302   FORMAT(1X,I6,5(1X,1PE13.6))
C
C
C
C      DO MATRIX ALGRBRA TYPE CALCULATIONS.
C      D   IS MATRIX OF THE GENERAL EQUATIONS WITH NO REARRANGSMENTS.
C      D1,D2,D3,D4  ARE MATRICES WITH RIGHT HAND SIDE OF THE SET
C                     OF EQUATIONS SUBSTITUTED FOR THE
C                     COLUMN N.
C
C           WHAT ALL THIS DOES IS TO SOLVE THE SET OF FOUR EQUATIONS
C           BY DOING CALCULATIONS ON 4X4 MATRICES.
C
C
310   D=F1F1*(F2F2*(F3F3*F4F4-F4F3*F3F4)-F2F3*(F3F2*F4F4-F4F2*F3F4)+
     +F2F4*(F3F2*F4F3-F4F2*F3F3))
     +-F1F2*(F2F1*(F3F3*F4F4-F4F3*F3F4)-F2F3*(F3F1*F4F4-F4F1*F3F4)
     ++F2F4*(F3F1*F4F3-F4F1*F3F3))
     ++F1F3*(F2F1*(F3F2*F4F4-F4F2*F3F4)-F2F2*(F3F1*F4F4-F4F1*F3F4)
     ++F2F4*(F3F1*F4F2-F4F1*F3F2))
     +-F1F4*(F2F1*(F3F2*F4F3-F4F2*F3F3)-F2F2*(F3F1*F4F3-F4F1*F3F3)
     ++F2F3*(F3F1*F4F2-F4F1*F3F2))
311   D1=(CF1*(F2F2*(F3F3*F4F4-F4F3*F3F4)-F2F3*(F3F2*F4F4-F4F2*F3F4)+
     +F2F4*(F3F2*F4F3-F4F2*F3F3))
     +-F1F2*(CF2*(F3F3*F4F4-F4F3*F3F4)-F2F3*(CF3*F4F4-CF4*F3F4)
```

```
PAGE   4    08/09/77        VORTEX     CTUF                          831 HOURS
             ++F2F4*(CF3*F4F3-CF4*F3F3))
             ++F1F3*(CF2*(F3F2*F4F4-F4F2*F3F4)-F2F2*(CF3*F4F4-CF4*F3F4)
             ++F2F4*(CF3*F4F2-CF4*F3F2))
             +-F1F4*(CF2*(F3F2*F4F3-F4F2*F3F3)-F2F2*(CF3*F4F3-CF4*F3F3)
             ++F2F3*(CF3*F4F2-CF4*F3F2)))/D
      320     D2=(F1F1*(CF2*(F3F3*F4F4-F4F3*F3F4)-F2F3*(CF3*F4F4-CF4*F3F4)+
             +F2F4*(CF3*F4F3-CF4*F3F3))
             +-CF1*(F2F1*(F3F3*F4F4-F4F3*F3F4)-F2F3*(F3F1*F4F4-F4F1*F3F4)
             ++F2F4*(F3F1*F4F3-F4F1*F3F3))
             ++F1F3*(F2F1*(CF3*F4F4-CF4*F3F4)-CF2*(F3F1*F4F4-F4F1*F3F4)
             ++F2F4*(F3F1*CF4-F4F1*CF3))
             +-F1F4*(F2F1*(CF3*F4F3-CF4*F3F3)-CF2*(F3F1*F4F3-F4F1*F3F3)
             ++F2F3*(F3F1*CF4-F4F1*CF3)))/D
      330     D3=(F1F1*(F2F2*(CF3*F4F4-CF4*F3F4)-CF2*(F3F2*F4F4-F4F2*F3F4)+
             +F2F4*(F3F2*CF4-F4F2*CF3))
             +-F1F2*(F2F1*(CF3*F4F4-CF4*F3F4)-CF2*(F3F1*F4F4-F4F1*F3F4)
             ++F2F4*(F3F1*CF4-F4F1*CF3))
             ++CF1*(F2F1*(F3F2*F4F4-F4F2*F3F4)-F2F2*(F3F1*F4F4-F4F1*F3F4)
             ++F2F4*(F3F1*F4F2-F4F1*F3F2))
             +-F1F4*(F2F1*(F3F2*CF4-F4F2*CF3)-F2F2*(F3F1*CF4-F4F1*CF3)
             ++CF2*(F3F1*F4F2-F4F1*F3F2)))/D
      340     D4=(F1F1*(F2F2*(F3F3*CF4-F4F3*CF3)-F2F3*(F3F2*CF4-F4F2*CF3)+
             +CF2*(F3F2*F4F3-F4F2*F3F3))
             +-F1F2*(F2F1*(F3F3*CF4-F4F3*CF3)-F2F3*(F3F1*CF4-F4F1*CF3)
             ++CF2*(F3F1*F4F3-F4F1*F3F3))
             ++F1F3*(F2F1*(F3F2*CF4-F4F2*CF3)-F2F2*(F3F1*CF4-F4F1*CF3)
             ++CF2*(F3F1*F4F2-F4F1*F3F2))
             +-CF1*(F2F1*(F3F2*F4F3-F4F2*F3F3)-F2F2*(F3F1*F4F3-F4F1*F3F3)
             ++F2F3*(F3F1*F4F2-F4F1*F3F2)))/D
           Y=1.
              K=K+1
      C
      C
      C
      C          NOW DO CALCULATION OF SUM OF SQUARES WITH BOTH
      C          THE FULL CORRECTION TO THE FOUR PARAMETERS
      C          DETERMINED ABOVE AND WITH 1/2 THE CORRECTION.
      C
      C
      400     DO 600 I=1,2
              AI=FLOAT(I)/Y
              CE1=C1+D1*AI/2.
              CE2=C2+D2*AI/2.
              CE3=C3+D3*AI/2.
              CE4=C4+D4*AI/2.
              DO 500 J=1,60
              IF(PH(J).LT.PHMIN) GO TO 500
              IF(PH(J).GT.PHMAX) GO TO 600
              VAR=EXP((CE3-PH(J))/(C*CE4))
              XV=CE2/(VAR+1) - CE1
              DIFF=X(J)-XV
              SUMSQ(I)=SUMSQ(I)+DIFF**2
      500     CONTINUE
      600     CONTINUE
      C
      C
      C       CALCULATE THE AMOUNT OF THE CORRECTION TO BE MADE WHICH WILL
      C       YIELD THE LOWEST SUM OF SQUARES.
```

```
PAGE   5    08/09/77      VORTEX    CTUF                    831 HOURS

    233     C      SOLUTION TO QUADRATIC EQUATION GIVES AMOUNT TO APPLY.
    234     C
    235     C
    236            VMIN=0.5/Y+0.25/Y*(CF0-SUMSQ (2))/(SUMSQ (2)-2.*SUMSQ (1)+CF0)
    237     C
    238     C      IF CALCULATED VMIN IS LESS THAN 0  GO BACK AND DO THE
    239     C      CALCULATIONS AGAIN ONLY HALVE THE INTERVAL OVER WHICH
    240     C      THE CALCULATIONS ARE MADE.
    241     C
    242     C
    243            IF(VMIN.LT.0.) GO TO 700
    244            SUMSQ0=CF0
    245            C1=C1+VMIN*D1
    246            C2=C2+VMIN*D2
    247            C3=C3+VMIN*D3
    248            C4=C4+VMIN*D4
    249            GO TO 150
    250     700    Y=Y*2.
    251     C
    252     C     ONLY ALLOW THIS SHORTENING OF THE INTERVAL TO GO SO FAR
    253     C
    254            IF(Y.GT.130.) GO TO 1000
    255            GO TO 400
    256     1000   WRITE(LISTLU,1001) K
    257     1001   FORMAT('0CONVERGENCE CRITERION MET    NUMBER OF ITERATIONS=',I4)
    258     C#################################################################
    259     C      WRITE TO DISC THE MODEL CURVE AND RESIDUALS
    260     C            LUN=23      FILE=IBINRY
    261     C            SECT 4   MODEL CALCULATIONS
    262     C            SECT 8   RESIDUALS
    263     C#################################################################
    264            IF(IDISC.NE.1) GO TO 1200
    265            IERROR=0
    266     1009   DO 1100 I=1,NUMBER
    267            VAR=EXP((C3-PH(I))/(C*C4))
    268            AMODEL(I)=C2/(VAR+1)-C1
    269            ADIFF(I)=X(I)-AMODEL(I)
    270     1100   CONTINUE
    271            IFCBUD(4)=4
    272            WRITE(13) AMODEL
    273            IFCBUD(4)=8
    274            WRITE(13) ADIFF
    275     1200   CALL V$CLOS(13,IREW)
    276     C#################################################################
    277     C#################################################################
    278     C
    279     C      OUTPUT FINAL PARAMETERS
    280     C
    281     C
    282            WRITE(LISTLU,1002) C1
    283     1002   FORMAT('0  C1= ',F8.4)
    284            WRITE(LISTLU,1003) C2
    285     1003   FORMAT('   C2= ',F8.4)
    286            WRITE(LISTLU,1004) C3
    287     1004   FORMAT('   PK= ',F8.4)
    288            WRITE(LISTLU,1005) C4
    289     1005   FORMAT('    N= ',F8.4)
    290            WRITE(LISTLU,1006) CF0
```

```
 291     1006  FORMAT(' SUM OF SQUARES = ',1PE13.6)
 292           WRITE(LISTLU,1008) NUMBER
 293     1008   FORMAT(1X,'# OF POINTS IS ',I4)
 294           WRITE(LISTLU,1007)
 295           WRITE(IOLUN,1007)
 296     1007  FORMAT('     ****NLNOM BYE****')
 297           END
```

Copy of cards used to run the SAS 76 NLIN program for non-linear least squares model of combined titration curves.

```
1                                   S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

NOTE: THE JOB ABC HAS BEEN RUN UNDER RELEASE 76.5 OF SAS AT THE UNIVERSITY OF RHODE ISLAND.


1                   DATA HH;
2                   INPUT PH Y;
3                   CARDS;

NOTE: DATA SET WORK.HH HAS 31 OBSERVATIONS AND 2 VARIABLES.
NOTE: THE DATA STATEMENT USED 0.35 SECONDS AND 94K.

35                  PROC PRINT;
35

NOTE: THE PROCEDURE PRINT USED 0.41 SECONDS AND 102K AND PRINTED PAGE 1.

36                  PROC NLIN METHOD=MARQUARDT;
37                  PARAMETERS    TCOOH=10.0
38                                PKA=3.5
39                                N=1.5
40                                C=1.0;
41                  BOUNDS        TCOOH>=0.
42                                PKA>=0.
43                                N>=0.
44                                -10.<C<10.   ;
45                   A=0.434294;
46                   AN=N*A;
47                  MODEL     Y=TCOOH/(EXP((PKA-PH)/AN)+1)-C;
48                  DER.TCOOH=(EXP((PKA-PH)/AN)+1)**(-1);
49                  DER.PKA=-TCOOH*EXP((PKA-PH)/AN)/(AN*(EXP((PKA-PH)/AN)+1)**2);
50                  DER.N=TCOOH*(PKA-PH)/A*EXP((PKA-PH)/AN)/(N*(EXP((PKA-PH)/AN)+1))**2;
51                  DER.C=-1.;
52                  OUTPUT OUT=DATA PREDICTED=P RESIDUAL=R;
53

NOTE: DATA SET WORK.DATA HAS 31 OBSERVATIONS AND 4 VARIABLES.
NOTE: THE PROCEDURE NLIN USED 2.32 SECONDS AND 156K AND PRINTED PAGES 2 TO 3.

53                  PROC PRINT;
54                  VAR P R;

NOTE: THE PROCEDURE PRINT USED 0.48 SECONDS AND 102K AND PRINTED PAGE 4.
NOTE: SAS USED 154K MEMORY.

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

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Protonation equilibria

author's

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This data report is a supplemental record of data and calculations related to the M.S. thesis of Douglas L. Huizenga, "Protonation Characteristics of the Dissolved Organic Matter in Seawater" (University of Rhode Island, 1977). The individual fraction titration data, calculated organic matter titration curves, model parameters, and copies of computer programs are presented.

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