NWRI TECHNICAL NOTES
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LRTAP INTERLABORATORY STUDY L-35 FOR MAJOR IONS AND NUTRIENTS

by

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Environnement Canada Conservation et Protection
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LE PLAN VERT DU CANADA
CANADA'S GREEN PLAN

Canada Centre for Inland Waters
P.O. Box 5050, 867 Lakeshore Road
Burlington, Ontario
L7R 4A6

28 April 1994

Dear Participant:

Re: LRTAP Interlaboratory Comparability Study L-35

Selected Major Ions, Nutrients and Physical Measurements in Water.

The LRTAP Quality Assurance Subgroup of the RMCC has now completed its thirty fifth round robin. Enclosed are the results reported by all participants accompanied by our evaluation.

The evaluation was made from summary sheets on which results are ranked and flagged. Copies of these sheets are enclosed. From them you can compare your results with those of other Laboratories.

Medians were used as target values in flagging results. This is because true values are unknown, and a panel of reference laboratories using proven bias-free methods, is not available.

A glossary of terms used in our evaluation of results is enclosed. It is designated Appendix A.

We would like to thank all participants in Study L-35 for their cooperation. Participants should recognize that their laboratory codes are confidential. Access to these codes is possible but only with the permission of the relevant laboratory head or program authority. Laboratory heads are encouraged to discuss the attached report openly with those who manage their programs and those who use their laboratory data.

Should you have any questions or comments regarding this study, please direct them to Nabil Arafat at the National Water Research Institute, telephone (905)336-4645.

In particular we urge any laboratory experiencing difficulty with a measurement to contact Nabil Arafat for referral to a laboratory which has demonstrated satisfactory performance.

The comments specific to your laboratory's performance are on the attached page.

Sincerely yours,

N. Chafat for

John Lawrence Co-Chairman

Serge Villard Co-Chairman

Attachments:
(1) Laboratory Appraisal
(2) Table 1 List of Samples
(3) Table 2 Summary of Interlaboratory Medians
(4) Table 3 Comparison of Laboratory Performance
(5) Table 4 Relative Performance
(6) Table 5 Comparison of Interlaboratory Median Values Between Studies
(7) List of Participants
(8) Appendix A Glossary of Terms
(9) Appendix 1 Laboratory data

TABLE 1

LRTAP STUDY #35

SAMPLE IDENTIFICATION LIST

SAMPLE NO.	SAMPLE IDENTIFICATION	Sample Description	Sample Previous Usage
1	BMOOS-01	Big Moose Lake	L31,L33
2	GRM-04C	Grimsby Rainwater, 1993	L33
3	MERSEY-02	Mersey River, outflow	New
4	MERSEY-01	Mersey River, inflow	New
5	AUD-01	Plastic Lake	L21,L22,L31
6	AUD-02	Harp Lake	L19,L22,L30
7	SUPER-01	Lake Superior, 1992	L33
8	SUPER-04	Lake Superior modified	New
9	ELA 114	E-114	L25,L27
10	TS2	Turkey Stream + 5% L. Ont.	L34

TABLE 2

SUMMARY OF INTERLABORATORY MEDIAN VALUES FOR LRTAP STUDY 0035

PARAMETER		SAMPLE NUMBER						
		BMOOS-01 SAMPLE 1	GRM-04C SAMPLE 2	MERSEY-02 SAMPLE 3	MERSEY-01 SAMPLE 4	AUD-01 SAMPLE 5	AUD-02 SAMPLE 6	SUPER-01 SAMPLE 7
Colour	HAZEN UNIT	9.9500	2.9000	51.000	54.000	3.5500	10.500	2.2000
Specific Conductance	UMHO/CM	23.300	62.250	26.000	26.900	21.900	34.400	95.950
ACIDITY TO PH 8.3	MG/LCACO3	3.4800	1.9000	3.1780	2.9000	1.4400	1.5390	1.1900
pH	PH UNITS	5.3300	6.9900	5.2200	5.3900	6.0855	6.5500	7.7700
Diss Organic Carbon	MG C/L	4.0050	1.1600	4.7700	4.8100	2.0600	5.6200	2.0050
ALKALINITY-FIXED ENDPT. PH4.5	MG/L CACO3	1.8000	11.600	1.5400	1.8900	2.4000	5.4000	42.500
ALKALINITY-GRAN, INFLEC, EXTRAP	MG/L CACO3	.1000	9.7575	.1225	.5000	.8050	3.7000	41.000
GRAN TITRA ALK	MG/LCACO3	.1950	10.160	.0910	.4440	.9050	4.0900	41.800
Diss Inorg Carbon	MG C/L	.3350	2.7300	.4300	.5500	.5500	1.1200	10.195
Nitrate + Nitrite	MG N/L	.4100	1.2395	.0100	.0030	.0020	.0020	.3200
Nitrate-IC	mgN/L	.4105	1.1900	.0100	.0010	.0010	.0010	.3130
Ammonia	MG N/L	.0245	.7520	.0280	.0146	.0040	.0030	.0020
Total Kjeldahl N	MG N/L	.1730	.8710	.1745	.1470	.1200	.2200	.0810
Sodium	MG/L	.6000	1.1500	2.7600	2.9300	.4970	1.2300	1.3760
Magnesium	MG/L	.3100	1.5150	.3900	.3900	.4870	.9330	2.7920
Aluminum	MG/L	.2300	.0161	.1160	.1070	.0130	.0200	.0050
REACTIVE SILICA	MG SI/L	1.9400	.1500	1.5300	1.0600	.3100	1.0500	1.1300
SULFATE, IC METHOD	MG/L	5.4000	8.8500	2.1915	2.2165	6.3340	7.4677	3.5000
SULFATE NON IC METHODS	MG/L	5.5000	8.7930	3.3500	3.4000	6.4310	7.6500	3.4970
CHLORIDE IC	MG/L	.4400	2.1500	4.4555	4.6800	.4000	1.2645	1.4172
CHLORIDE NON IC METHODS	MG/L	.5000	2.2000	4.6000	4.8000	.4160	1.3300	1.5000
Potassium	MG/L	.4100	.2750	.2600	.2900	.2120	.5500	.5050
Calcium	MG/L	1.9300	6.1350	.6500	.8100	2.0500	3.0300	13.400

PARAMETER		SAMPLE NUMBER		
		SUPER-04 SAMPLE 8	ELA-114 SAMPLE 9	TS2 SAMPLE 10
Colour	HAZEN UNIT	1.7500	7.2000	9.6000
Specific Conductance	UMHO/CM	7.7900	19.000	63.000
ACIDITY TO PH 8.3	MG/LCACO3	1.1900	1.3400	1.3410
pH	PH UNITS	6.8100	6.4200	7.4140
Diss Organic Carbon	MG C/L	.1900	4.6000	2.3550
ALKALINITY-FIXED ENDPT. PH4.5	MG/L CACO3	4.4200	3.6000	20.200
ALKALINITY-GRAN, INFLEC, EXTRAP	MG/L CACO3	3.1775	1.9900	18.950
GRAN TITRA ALK	MG/LCACO3	3.0600	2.2000	19.300
Diss Inorg Carbon	MG C/L	1.0600	.7300	4.7550
Nitrate + Nitrite	MG N/L	.0250	.2360	.0685
Nitrate-IC	mgN/L	.0250	.2390	.0700
Ammonia	MG N/L	.0020	.0285	.0285
Total Kjeldahl N	MG N/L	.0230	.2500	.1610
Sodium	MG/L	.0940	.5425	1.4595
Magnesium	MG/L	.2020	.5760	1.1400
Aluminum	MG/L	.0040	.0090	.0160
REACTIVE SILICA	MG SI/L	.0800	.2875	1.6000
SULFATE, IC METHOD	MG/L	.2500	3.3000	7.4200
SULFATE NON IC METHODS	MG/L	.3200	3.2640	7.6300
CHLORIDE IC	MG/L	.1100	.2165	1.5530
CHLORIDE NON IC METHODS	MG/L	.1685	.2950	1.6400
Potassium	MG/L	.0400	.4980	.3115
Calcium	MG/L	.9700	1.5500	8.5830

TABLE 3

COMPARISON OF LABORATORY PERFORMANCE (STUDY 0035)

LRTAP

	BIAS			FLAGS			
LAB CODE	NO. OF PARAMETERS ANALYZED	NO. OF PARAMETERS BIASED	PERCENTAGE OF PARAMETERS BIASED (%)	NO. OF RESULTS RANKED	NO. OF FLAGS ASSIGNED	PERCENTAGE OF RESULTS FLAGGED (%)	SUM OF % BIAS AND % FLAGS SCORE
L002	16	3	18.75	138	18	13.04	31.79
L003	13	6	46.15	120	38	31.67	77.82
L005	5	1	20.00	45	6	13.33	33.33
L006	18	1	5.56	180	13	7.22	12.78
L007	9	4	44.44	86	27	31.40	75.84
L010	13	3	23.08	130	24	18.46	41.54
L011	7	2	28.57	65	7	10.77	39.34
L013	6	0	0.00	52	1	1.92	1.92
L013C	9	1	11.11	76	3	3.95	15.06
L014	12	1	8.33	120	16	13.33	21.67
L021	10	2	20.00	94	12	12.77	32.77
L023	17	4	23.53	133	23	17.29	40.82
L024	14	3	21.43	128	6	4.69	26.12
L025	20	3	15.00	193	14	7.25	22.25
L029	18	4	22.22	169	27	15.98	38.20
L030	14	2	14.29	140	10	7.14	21.43
L031	18	8	44.44	163	29	17.79	62.24
L032	15	6	40.00	138	30	21.74	61.74
L033	12	2	16.67	104	7	6.73	23.40
L034	10	4	40.00	81	17	20.99	60.99
L047	14	7	50.00	136	66	48.53	98.53
L049	17	3	17.65	168	45	26.79	44.43
L057	9	8	88.89	90	35	38.89	127.78
L061	10	0	0.00	94	2	2.13	2.13
L063	16	3	18.75	150	11	7.33	26.08
L073	10	1	10.00	91	1	1.10	11.10
L078	2	0	0.00	20	0	0.00	0.00
L081	13	2	15.38	130	10	7.69	23.08
L082	15	3	20.00	139	10	7.19	27.19
L086	7	0	0.00	55	1	1.82	1.82
L088	13	5	38.46	130	30	23.08	61.54
L090	11	0	0.00	107	10	9.35	9.35
L090B	1	1	100.00	6	3	50.00	150.00
L091	15	1	6.67	141	4	2.84	9.50
L093	15	4	26.67	150	18	12.00	38.67
L094	14	5	35.71	140	23	16.43	52.14
L099	15	8	53.33	134	27	20.15	73.48
L102	16	4	25.00	153	24	15.69	40.69
L104	4	0	0.00	32	0	0.00	0.00
L109	9	1	11.11	86	1	1.16	12.27
L112	3	1	33.33	30	11	36.67	70.00
L114	10	2	20.00	82	18	21.95	41.95
L116	13	3	23.08	124	23	18.55	41.63
L119	9	2	22.22	75	8	10.67	32.89
L122	10	1	10.00	96	19	19.79	29.79
L126	8	1	12.50	76	4	5.26	17.76
L127	14	2	14.29	128	7	5.47	19.75
L128	18	4	22.22	167	43	25.75	47.97

THE FOLLOWING PARAMETERS WERE USED IN THE ANALYSIS

Cond	pH	DOC	ALKA-GR,IN	GRAN ALK	DIC
NO3 /2	NH3	TKN	Na	Mg	REAC SI
SO4 (NON-I	CL (NON-IC	K	Ca	NO3	SO4-IC
CL-IC	Al	ACIDITY	ALKA-FE. P	ACIDITY	

THE FOLLOWING PARAMETERS WERE EXCLUDED

Colour

TABLE 3A

COMPARISON OF LABORATORY PERFORMANCE (STUDY 0035)

LRTAP

	BIAS				FLAGS		
LAB CODE	NO. OF PARAMETERS ANALYZED	NO. OF PARAMETERS BIASED	PERCENTAGE OF PARAMETERS BIASED (%)	NO. OF RESULTS RANKED	NO. OF FLAGS ASSIGNED	PERCENTAGE OF RESULTS FLAGGED (%)	SUM OF % BIAS AND % FLAGS SCORE
L078	2	0	0.00	20	0	0.00	0.00
L104	4	0	0.00	32	0	0.00	0.00
L086	7	0	0.00	55	1	1.82	1.82
L013	6	0	0.00	52	1	1.92	1.92
L061	10	0	0.00	94	2	2.13	2.13
L090	11	0	0.00	107	10	9.35	9.35
L091	15	1	6.67	141	4	2.84	9.50
L073	10	1	10.00	91	1	1.10	11.10
L109	9	1	11.11	86	1	1.16	12.27
L006	18	1	5.56	180	13	7.22	12.78
L013C	9	1	11.11	76	3	3.95	15.06
L126	8	1	12.50	76	4	5.26	17.76
L127	14	2	14.29	128	7	5.47	19.75
L030	14	2	14.29	140	10	7.14	21.43
L014	12	1	8.33	120	16	13.33	21.67
L025	20	3	15.00	193	14	7.25	22.25
L081	13	2	15.38	130	10	7.69	23.08
L033	12	2	16.67	104	7	6.73	23.40
L063	16	3	18.75	150	11	7.33	26.08
L024	14	3	21.43	128	6	4.69	26.12
L082	15	3	20.00	139	10	7.19	27.19
L122	10	1	10.00	96	19	19.79	29.79
L002	16	3	18.75	138	18	13.04	31.79
L021	10	2	20.00	94	12	12.77	32.77
L119	9	2	22.22	75	8	10.67	32.89
L005	5	1	20.00	45	6	13.33	33.33
L029	18	4	22.22	169	27	15.98	38.20
L093	15	4	26.67	150	18	12.00	38.67
L011	7	2	28.57	65	7	10.77	39.34
L102	16	4	25.00	153	24	15.69	40.69
L023	17	4	23.53	133	23	17.29	40.82
L010	13	3	23.08	130	24	18.46	41.54
L116	13	3	23.08	124	23	18.55	41.63
L114	10	2	20.00	82	18	21.95	41.95
L049	17	3	17.65	168	45	26.79	44.43
L128	18	4	22.22	167	43	25.75	47.97
L094	14	5	35.71	140	23	16.43	52.14
L034	10	4	40.00	81	17	20.99	60.99
L088	13	5	38.46	130	30	23.08	61.54
L032	15	6	40.00	138	30	21.74	61.74
L031	18	8	44.44	163	29	17.79	62.24
L112	3	1	33.33	30	11	36.67	70.00
L099	15	8	53.33	134	27	20.15	73.48
L007	9	4	44.44	86	27	31.40	75.84
L003	13	6	46.15	120	38	31.67	77.82
L047	14	7	50.00	136	66	48.53	98.53
L057	9	8	88.89	90	35	38.89	127.78
L090B	1	1	100.00	6	3	50.00	150.00

THE FOLLOWING PARAMETERS WERE USED IN THE ANALYSIS

Cond	pH	DOC	ALKA-GR,IN	GRAN ALK	DIC
NO3 /2	NH3	TKN	Na	Mg	REAC SI
SO4 (NON-I	CL (NON-IC	K	Ca	NO3	SO4-IC
CL-IC	Al	ACIDITY	ALKA-FE. P	ACIDITY	

THE FOLLOWING PARAMETERS WERE EXCLUDED

Colour

TABLE 4

SUMMARY OF STUDY TO STUDY PERFORMANCE

LAB CODE	%BIAS AND %FLAGS ON STUDIES 0021	0022	0023	0024	0025	0026	0027	0028	0029	0030	0031	0032	0033	0034	0035	MEDIAN SCORE	COMMENTS
L002	27.7	1.3	10.3	9.5	5.0	2.5	5.2	2.6	2.6	24.8	39.3	32.2	30.4	20.6	31.8	10.3	SATISFACTORY
L002C	11.1	0.0	0.0	0.0	3.6	1.1	12.3	32.2	23.3	1.2	8.9	5.6	-	-	-	4.6	SATISFACTORY, WELL DONE
L003	11.1	40.4	4.5	21.4	19.4	25.0	40.1	20.2	36.7	-	57.4	54.5	64.9	27.4	77.8	32.1	MODERATE
L004	68.7	79.6	50.3	-	71.4	57.1	12.0	30.1	10.7	16.0	23.4	8.7	13.1	30.1	-	30.1	MODERATE
L005	15.9	24.4	22.0	33.3	15.5	30.6	32.5	11.1	10.2	3.4	10.6	6.5	15.6	32.4	33.3	15.9	SATISFACTORY
L006	14.4	20.0	27.1	13.1	46.5	30.0	44.1	47.1	25.9	28.8	24.7	14.1	15.6	27.2	12.8	25.9	MODERATE
L007	36.2	35.4	-	43.1	36.8	30.8	43.4	45.8	94.0	78.2	64.9	-	50.5	68.4	75.8	45.8	MODERATE
L008	83.3	-	-	-	106.9	81.1	91.0	-	131.8	118.2	67.5	96.9	100.8	147.5	-	98.9	POOR
L010	48.0	37.9	60.0	34.2	82.0	116.4	63.1	42.7	62.5	59.2	54.6	58.5	43.2	32.3	41.5	54.6	MODERATE
L011	0.0	30.1	12.0	69.2	33.0	32.1	21.4	48.7	15.4	40.8	31.1	21.0	24.3	24.6	39.3	30.1	MODERATE
L013	3.8	0.0	1.9	3.6	4.0	3.6	20.4	5.7	7.5	31.5	3.8	1.9	3.6	7.0	1.9	3.8	SATISFACTORY, WELL DONE
L013C	-	-	-	-	-	-	-	-	-	-	-	48.4	7.9	3.9	15.1	11.5	SATISFACTORY
L014	12.5	33.1	-	-	-	-	66.9	68.1	36.9	-	16.9	60.0	45.6	61.2	21.7	41.2	MODERATE
L019	17.6	30.0	15.1	22.3	17.9	20.7	20.9	30.8	5.4	11.7	60.0	-	-	-	-	20.7	SATISFACTORY
L021	4.4	5.4	16.2	13.1	10.3	16.2	64.2	37.2	15.3	33.7	25.8	53.4	33.7	10.3	32.8	16.2	SATISFACTORY
L022	21.0	-	13.5	41.0	-	35.7	-	30.3	6.3	-	-	55.0	31.7	-	-	31.0	MODERATE
L023	31.9	72.4	29.6	82.5	73.3	53.0	49.1	36.0	46.1	44.4	55.8	29.5	25.0	51.6	40.8	46.1	MODERATE
L024	14.7	39.0	20.7	16.7	49.3	36.0	29.3	22.7	22.8	24.1	17.6	6.0	26.1	4.3	26.1	22.8	SATISFACTORY
L025	42.2	30.7	27.0	14.0	30.0	23.2	14.9	31.4	24.8	24.7	29.2	38.4	7.4	26.2	23.4	26.2	MODERATE
L029	41.5	15.2	46.8	31.0	-	-	33.8	42.2	-	60.8	30.9	26.9	14.0	35.6	38.2	34.7	MODERATE
L030	1.1	22.2	22.2	13.4	69.1	31.0	3.4	13.3	3.8	2.6	56.7	1.3	0.0	22.5	21.4	13.4	SATISFACTORY
L031	15.0	28.1	34.7	18.8	15.0	42.9	-	23.9	34.4	35.0	23.3	23.9	22.2	35.7	62.2	26.0	MODERATE
L032	60.0	-	63.3	-	67.9	102.2	57.5	44.5	25.5	-	50.9	37.7	25.7	41.7	66.3	54.2	MODERATE
L033	4.8	27.0	28.9	7.5	15.2	9.1	25.4	50.9	56.6	37.8	20.3	15.7	4.3	38.3	23.4	23.4	SATISFACTORY
L034	11.1	21.1	12.4	2.2	61.4	27.0	24.6	70.9	25.8	63.0	41.6	25.7	20.5	77.0	61.0	25.8	MODERATE
L047	66.9	90.3	94.0	84.6	-	107.8	-	98.5	139.9	84.3	-	-	-	96.1	98.5	95.0	POOR
L048	29.8	77.8	12.4	-	33.5	3.9	50.8	56.2	16.2	21.2	27.7	67.1	107.9	53.9	-	33.5	MODERATE
L049	69.6	72.9	90.1	45.9	110.3	37.2	92.8	36.1	62.4	77.0	58.3	85.3	45.0	34.6	44.4	62.4	POOR
L052	15.7	-	18.5	34.4	69.8	64.3	37.0	52.8	35.1	59.1	75.5	57.1	-	-	-	52.8	MODERATE
L053	-	1.9	-	-	17.6	-	-	5.5	-	1.4	4.6	15.7	-	42.0	-	5.5	SATISFACTORY, WELL DONE
L057	55.7	28.8	29.0	25.0	63.7	-	54.0	12.5	37.2	83.5	17.8	36.7	70.0	84.2	127.8	45.6	MODERATE
L058	17.7	-	-	26.2	25.1	23.8	30.7	9.4	7.5	-	-	-	53.0	-	-	24.5	SATISFACTORY
L061	0.0	1.1	0.0	10.0	2.0	12.1	20.4	2.2	13.2	17.4	2.1	1.0	1.0	3.1	2.1	2.1	SATISFACTORY, WELL DONE
L063	27.9	29.5	12.3	30.1	23.4	38.3	10.8	17.4	41.8	30.2	31.5	25.0	22.6	40.6	26.1	27.9	MODERATE
L067	30.8	11.9	1.9	19.3	36.4	21.6	36.8	24.2	31.3	22.3	21.5	54.5	-	-	-	23.3	SATISFACTORY
L073	0.0	0.0	10.0	0.0	18.6	1.0	5.8	0.0	0.0	2.2	0.0	-	0.0	-	11.1	0.0	SATISFACTORY, WELL DONE
L074	40.6	48.6	-	21.8	-	41.3	38.7	22.5	78.4	69.4	65.6	-	10.9	-	-	40.9	MODERATE
L078	0.0	0.0	0.0	0.0	55.0	5.0	0.0	5.0	5.0	0.0	10.0	20.0	0.0	10.0	0.0	0.0	SATISFACTORY, WELL DONE
L081	11.1	13.8	31.6	48.4	5.7	4.4	3.4	29.2	4.2	36.7	19.2	33.8	23.7	3.8	23.1	19.2	SATISFACTORY
L082	10.1	49.9	42.9	21.9	54.1	67.0	38.5	36.7	24.7	24.0	15.4	35.4	37.9	6.9	27.2	35.4	MODERATE
L083	-	-	-	-	-	-	-	-	-	-	96.6	89.7	92.3	-	-	92.3	POOR
L086	78.4	59.8	-	56.3	9.7	47.9	25.8	39.7	52.8	33.6	33.2	34.9	25.2	31.0	1.8	34.2	MODERATE
L088	29.0	16.6	2.7	3.4	42.3	31.3	29.3	30.8	27.3	35.9	82.5	70.0	17.3	-	61.5	30.1	MODERATE
L090	1.8	4.6	4.2	-	42.7	26.8	40.0	25.8	25.8	11.7	7.5	44.5	29.1	33.6	9.3	25.8	MODERATE
L091	27.9	26.9	37.6	28.9	31.6	39.1	35.1	38.0	13.6	1.4	16.6	24.9	19.5	28.9	9.5	27.9	MODERATE
L092	51.0	47.4	40.0	32.8	29.9	48.0	58.8	52.5	60.3	75.9	-	-	-	-	-	49.5	MODERATE
L093	11.4	19.3	40.7	36.4	25.3	-	-	-	-	-	73.8	53.8	54.0	27.4	38.7	37.5	MODERATE
L094	28.6	16.4	24.7	55.7	40.9	44.5	29.3	55.6	58.7	84.4	53.3	74.0	70.0	37.7	52.1	52.1	MODERATE
L095	22.7	20.0	23.0	34.5	-	13.0	26.4	32.5	12.6	26.2	45.3	74.0	36.6	-	-	26.3	MODERATE
L096	-	60.0	61.2	-	65.0	78.0	67.5	95.8	113.3	112.2	87.8	175.0	170.0	-	-	87.8	POOR
L099	21.0	-	-	-	-	-	-	-	-	-	25.7	33.0	29.4	19.1	73.5	27.5	MODERATE
L102	51.4	1.8	27.7	39.5	25.8	15.4	43.6	33.2	30.8	43.6	23.8	29.0	13.3	28.1	40.7	29.0	MODERATE
L103	3.3	10.0	75.0	0.0	-	200.0	32.5	13.3	69.0	56.7	13.3	43.3	-	-	-	32.5	MODERATE
L104	12.5	0.0	0.0	0.0	20.8	12.5	3.6	36.1	0.0	25.0	0.0	102.8	132.1	0.0	0.0	3.6	SATISFACTORY, WELL DONE
L105	-	89.2	49.5	70.2	58.8	49.4	79.2	75.7	38.1	53.2	65.6	47.5	96.0	53.6	-	58.8	MODERATE
L108	-	-	-	63.0	68.4	52.5	64.0	-	63.7	39.4	28.6	49.0	-	51.5	-	52.5	MODERATE
L109	-	-	-	0.0	1.0	1.1	3.2	11.8	3.2	4.2	10.0	4.4	5.0	5.1	12.3	4.3	SATISFACTORY, WELL DONE
L110	-	-	-	32.2	51.8	56.8	29.3	50.6	36.6	-	34.5	70.5	128.9	-	-	50.6	MODERATE
L112	-	-	-	-	57.3	10.0	13.3	20.0	13.3	26.7	26.7	0.0	13.3	21.4	70.0	20.0	SATISFACTORY
L113	-	-	-	-	90.4	105.3	74.3	47.1	67.9	93.8	53.4	-	-	-	-	74.3	POOR
L114	-	-	-	-	-	76.0	46.7	91.1	10.0	54.0	85.0	76.4	54.3	66.1	42.0	60.2	POOR
L116	-	-	-	-	-	-	-	43.3	16.7	3.1	16.4	78.2	-	42.6	41.6	41.6	MODERATE
L118	-	-	-	-	-	-	-	12.9	56.0	77.8	51.6	86.1	48.6	-	-	53.8	MODERATE
L119	-	-	-	-	-	-	-	-	35.9	39.7	33.9	13.2	-	21.5	32.9	33.4	MODERATE
L120	-	-	-	-	-	-	-	66.8	33.3	81.7	46.7	57.0	42.4	-	-	51.9	MODERATE
L121	-	-	-	-	-	-	-	-	42.9	48.0	-	-	-	38.9	-	42.9	MODERATE
L122	-	-	-	-	-	-	-	-	-	105.5	49.2	-	86.1	38.0	29.8	49.2	MODERATE
L123	-	-	-	-	-	-	-	-	-	-	93.0	110.0	101.5	-	-	101.5	POOR
L125	-	-	-	-	-	-	-	-	-	-	15.0	11.1	-	-	-	13.1	SATISFACTORY
L126	-	-	-	-	-	-	-	-	-	-	-	-	-	20.0	17.8	18.9	SATISFACTORY
L127	-	-	-	-	-	-	-	-	-	-	-	42.7	26.2	22.4	19.8	24.3	SATISFACTORY
L128	-	-	-	-	-	-	-	-	-	-	-	-	-	64.8	48.0	56.4	MODERATE
INTERLAB MEDIAN	17.7	27.0	22.2	22.3	36.4	32.1	32.5	33.2	27.3	35.9	30.9	38.4	26.2	31.0	32.9		

THE FOLLOWING CODES WERE EXCLUDED
00292 01089 16092 17092 56091 09092 20292 01091 06192

CODES INCLUDED FOR STUDY 0021
13081 24081 25081 26081 27081 28081 29081 30081 48081 82081
23081 42081

CODES INCLUDED FOR STUDY 0022
00392 01092 06002 07092 07392 11091 12091 14092 19091 20091
06592

CODES INCLUDED FOR STUDY 0023
00392 01092 07092 11091 12091 14092 19091 20091

CODES INCLUDED FOR STUDY 0024
00392 01092 07092 07392 11091 12091 14092 16001 17001 19091
20091 16000 17000 06002 06282

CODES INCLUDED FOR STUDY 0025
00392 01092 07092 11091 12091 14092 16001 17001 19091 20091
06282 16000 17000

CODES INCLUDED FOR STUDY 0026
00392 01092 07092 11091 12091 14092 16001 17001 19091 20091
06282 16000 17000

CODES INCLUDED FOR STUDY 0027
13081 23081 24081 25081 26081 27081 28081 29081 30081 48081
82081 42081

CODES INCLUDED FOR STUDY 0028
00392 01090 01092 07092 11091 12091 14092 16000 17000 19091
20091 16001 17001 06282 06002

CODES INCLUDED FOR STUDY 0029
00392 01090 01092 07092 07192 07392 11091 12091 14092 16000
16001 17000 17001 19091 20091 06282

CODES INCLUDED FOR STUDY 0030
00392 01090 01092 06194 07092 07192 07392 11091 12091 14092
16000 17000 19091 20091 16001 17001 06193

CODES INCLUDED FOR STUDY 0031
00392 01090 01092 06194 07092 07192 07392 11091 12091 14092
16001 17001 19091 20091 16000 17000 06193

CODES INCLUDED FOR STUDY 0032
00392 01090 01092 06194 07092 07192 07392 11091 12091 14092
16001 17001 19091 20091 16000 17000 06193 06282

CODES INCLUDED FOR STUDY 0033
13082

CODES INCLUDED FOR STUDY 0034
13081 13082 13083 13086 13084 13085 13089 13087 13088

CODES INCLUDED FOR STUDY 0035
13080

STUDY DATES: 0021(11-APR-89),0022(12-JUN-89),0023(16-JAN-90),0024(16-MAY-90),0025(21-SEP-90),0026(21-JAN-91),
0027(21-MAY-91),0028(12-DEC-91),0029(18-FEB-92),0030(13-MAY-92),0031(21-SEP-92),0032(28-JAN-93),
0033(19-MAY-93),0034(19-SEP-93),0035(21-JAN-94),

TABLE 5

COMPARISON OF INTERLABORATORY MEDIAN VALUES BETWEEN STUDIES

PARAMETER		PREVIOUS DATA (STUDY NO./SAMPLE NUMBER)				
				LRTAP	BMOOS-01	
	STUDY NO.	0031	0033	0035	AVG.	STD.
	SAMPLE NO.	1	2	1	MED.	DEV.
Colour	HAZEN UNIT	10.000	8.395	9.950	9.448	.9126
Specific Conductance	UMHO/CM	23.000	23.200	23.300	23.167	.1528
ACIDITY TO PH 8.3	MG/LCACO3	3.890	3.490	3.480	3.620	.2339
pH	PH UNITS	5.385	5.370	5.330	5.362	.0284
Diss Organic Carbon	MG C/L	3.100	3.800	4.005	3.635	.4745
ALKALINITY-FIXED ENDPT. PH4.5	MG/L CACO3	1.740	1.680	1.800	1.740	.0600
ALKALINITY-GRAN,INFLEC,EXTRAP	MG/L CACO3	.206	.255	.100	.187	.0792
GRAN TITRA ALK	MG/LCAC03	.290	.223	.195	.236	.0489
Diss Inorg Carbon	MG C/L	.300	.215	.335	.283	.0617
Nitrate + Nitrite	MG N/L	.410	.410	.410	.410	0.0000
Nitrate-IC	mgN/L	.417	.410	.411	.412	.0039
Ammonia	MG N/L	.029	.027	.024	.027	.0023
Total Kjeldahl N	MG N/L	.170	.190	.173	.178	.0108
Sodium	MG/L	.600	.590	.600	.597	.0058
Magnesium	MG/L	.310	.310	.310	.310	0.0000
Aluminum	MG/L	.226	.228	.230	.228	.0020
REACTIVE SILICA	MG SI/L	1.925	1.940	1.940	1.935	.0087
SULFATE,IC METHOD	MG/L	5.380	5.400	5.400	5.393	.0115
SULFATE NON IC METHODS	MG/L	5.640	5.600	5.500	5.580	.0721
CHLORIDE IC	MG/L	.420	.430	.440	.430	.0100
CHLORIDE NON IC METHODS	MG/L	.490	.480	.500	.490	.0100
Potassium	MG/L	.404	.408	.410	.407	.0031
Calcium	MG/L	1.935	1.925	1.930	1.930	.0050

DATES: 0031(21-SEP-92), 0033(19-MAY-93), 0035(21-JAN-94),

TABLE 5A

COMPARISON OF INTERLABORATORY MEDIAN VALUES BETWEEN STUDIES

PARAMETER		PREVIOUS DATA (STUDY NO./SAMPLE NUMBER)					
				LRTAP	AUD-02		
	STUDY NO. / SAMPLE NO.	0019 / 9	0022 / 7	0030 / 5	0035 / 6	AVG. MED.	STD. DEV.
Colour	HAZEN UNIT	14.000	11.500	11.200	10.500	11.800	1.5253
Specific Conductance	UMHO/CM	34.300	34.300	34.700	34.400	34.425	.1893
GRAN ACIDITY	MG/LCACO3	1.600	1.770	-	-	1.685	-
ACIDITY TO PH 8.3	MG/LCACO3	1.680	1.557	1.814	1.539	1.647	.1275
pH	PH UNITS	6.700	6.660	6.550	6.550	6.615	.0768
Diss Organic Carbon	MG C/L	3.900	4.200	6.190	5.620	4.977	1.1028
ALKALINITY-FIXED ENDPT. PH4.5	MG/L CACO3	4.830	5.500	5.190	5.400	5.230	.2963
ALKALINITY-GRAN,INFLEC,EXTRAP	MG/L CACO3	3.815	4.060	3.531	3.700	3.776	.2221
GRAN TITRA ALK	MG/LCAC03	3.780	4.135	3.840	4.090	3.961	.1773
Diss Inorg Carbon	MG C/L	1.000	1.205	.725	1.120	1.012	.2093
Nitrate + Nitrite	MG N/L	.020	.009	.005	.002	.009	.0079
Nitrate-IC	mgN/L	-	-	.007	.001	.004	-
Ammonia	MG N/L	.014	.009	.006	.003	.008	.0047
Total Kjeldahl N	MG N/L	.220	.210	.212	.220	.215	.0053
Sodium	MG/L	1.240	1.220	1.240	1.230	1.232	.0096
Magnesium	MG/L	.915	.915	.930	.933	.923	.0096
Aluminum	MG/L	-	-	.022	.020	.021	-
REACTIVE SILICA	MG SI/L	1.032	1.028	1.070	1.050	1.045	.0192
SULFATE,IC METHOD	MG/L	7.400	7.406	7.500	7.468	7.443	.0486
SULFATE NON IC METHODS	MG/L	7.650	7.700	7.595	7.650	7.649	.0429
CHLORIDE IC	MG/L	1.250	1.230	1.250	1.264	1.249	.0142
CHLORIDE NON IC METHODS	MG/L	1.255	1.200	1.300	1.330	1.271	.0566
Potassium	MG/L	.544	.540	.543	.550	.544	.0042
Calcium	MG/L	2.988	2.995	3.005	3.030	3.004	.0184

DATES: 0019(24-AUG-88), 0022(12-JUN-89), 0030(13-MAY-92), 0035(21-JAN-94),

NATIONAL WATER RESEARCH INSTITUTE
Burlington, Ontario

LRTAP INTERLABORATORY STUDIES PROGRAM
LIST OF PARTICIPANTS
STUDY L35

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continued

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NORWAY

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Appendix A
Glossary of Terms

GLOSSARY OF TERMS USED IN THE

EVALUATION OF INTERLABORATORY RESULTS

Satisfactory: Quite acceptable, "good results".
Erratic: A set of results for a given characteristic is deemed erratic when both high and low flags are assigned.
Out of Control: An analytical system is said to be out of control when it has demonstrated the ability to perform adequately and produces an extreme result or results. For an example, consider this set of results obtained by laboratory #3 on total phosphorus for Study #24.

Sample No.	Report Value	Median	Difference
1	9	9.5	-0.5
2	5	4.5	0.5
3	2T	3	-1
4	8	8	0
5	2T	2.5	-0.5
6	9	8	1
7	28	28	0
8	18	17	1
9	23	23.7	-0.7
10	16	15	1
11	35	35.8	-0.8
12	75	78.7	-3.8
13	58	59	-1
14	110	90	20

Given the excellent results obtained on samples 1 through 13, the result on sample 14 indicates that the analytical system was out of control.

Bias: A set of results is said to be biased when the set exhibits a tendency to be either higher or lower than some standard- the standard which has been used in the analysis of our studies thus far has been the performance of all other participating laboratories. The ranking procedure employed in testing for bias is described in W.J. Youden's paper, "Ranking Laboratories by Round-Robin Tests" from $Precision Measurement and Calibration$, H.H. Ku, Editor, NBS Special Publication 300-Volume 1, U.S. Government Printing Office, Washington, D.C., 1969. In this paper, Youden established the rationale for evaluating laboratories' performance by ranking results. In our use of the procedure there is about 1 chance in 20 of deeming a set of results biased when in fact it is not, that is, =0.05

W: A "W" code is used with a reported result when no measurement was possible due to no response of the instrument to the sample. The "W" is preceded by the smallest determinative division that can be used in the units used in reporting.

T: The "T" code is used with values between the Criterion of Detection and the "W" value. The Criterion of Detection is commonly thought of by many as the limit of detection.

Lower Limit for Use of Basic Acceptable Error, Basic Acceptable Error, and Concentration Error Increment:

These terms define the acceptable differences from median of results (target value) that is allowed without a result being flagged either low or high. For a sample whose target value is at or below the lower limit for use of basic acceptable error, the basic acceptable is used to determine the range of acceptable deviations.

For example: Suppose that the lower limit for use of basic acceptable error has been set a 10 ug/L and the basic acceptable error is 1.0 ug/L, if a target (median) value for a sample is 5 ug/L, then any reported result within the range 5+ 1.0 or 4.0 to 6.0 ug/L would be considered acceptable.

Since for almost all substances it appears that the variability of results increases in concentration, an allowance is made for the increased variability for those samples whose

target values are above the lower limit for use of basic acceptable error. The allowance is added to the basic acceptable error, and it is calculated by multiplying the $concentration error increment$ by the difference between the target value and the lower limit for use of basic acceptable error.

For example: If a target value for a sample is 21 ug/L, and the lower limit for use of basic accepteble error is 10 ug/L, the difference between them is 21-10=11 ug/L. Multiplying the difference by the concentration increment, 11 ug/L x 0.10, gives 1.1 ug/L to determine the acceptable difference 21.0 +2.1 or 18.9 to 23.1 ug/L would be considered acceptable and would not be flagged.

In general, the values chosen for the basic acceptable error and the concentration error increment are selected so than several of the participating laboratories will have demonstrated the ability to do the analyses satisfactorily. In a sense these values represent state of the art for analysis of the Round-Robin samples.

Flag: A result is flagged H high when its value is greater than the median (target) value plus the acceptable difference but not greater than the median plus 1.5 times; a result greater then 1.5 times the acceptable difference is flagged with VH (very high). Similarly, a result less than the median minus 1.5 times the acceptable difference is flagged L (low). A lower result is flagged VL (very low).

Acceptable Difference of Acceptable Deviation: The absolute values of the maximun difference between a result and the target value which will not be flagged.

APPENDIX A: GLOSSARY OF TERMS

Reference: 1983 ASTM Volume 11.01 water 1, Section II,pg D4210-83

Appendix 1
Laboratory Data

RESULTS REPORTED-INTERLABORATORY STUDY L-35

CONSTITUENT	Page No.
Colour	1
Specific Conductance	3
Gran Acidity	7
Acidity to pH 8.3	8
pH	10
Dissolved Organic Carbon	14
Alkalinity to fixed end point pH 4.5	17
Alkalinity (gran, extrapolation, inflection)	19
Alkalinity (gran)	21
Dissolved Inorganic Carbon	23
Nitrate + Nitrite	25
Ammonia	33
TKN	37
Sodium	40
Magnesium	44
Aluminum	48
Reactive Silica	51
Sulphate (IC method)	54
Suphate (non-IC methods)	58
Chloride (IC method)	60
Chloride (non-IC methods)	64
Potassium	66
Calcium	70

PARAMETER: 00292 Colour HAZEN UNIT

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 5.0000 BASIC ACCEPTABLE ERROR= 3.0000 CONCENTRATION ERROR INCREMENT= .2000

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	5. L	3.50	5.	13.00	40.	2.00	40. L	2.00	5.	13.00	5. L	2.50
L003	10.	11.00		0.00	55.	13.50	55.	10.00		0.00	12.	11.50
L005	5. L	3.50	5.W	0.00	45.	3.50	45.	3.50	5.W	0.00	7.5	5.50
L011	7.5	6.00	2.5	6.00	55.	13.50	60.	16.50	5.	13.00	7.5	5.50
L023	5. L	3.50	5.W	0.00	>50.	0.00	>50.	0.00	5.W	0.00	5. L	2.50
L024	9.9	9.00	2.4T	3.50	52.	10.00	54.	9.00	3.2	6.00	12.	11.50
L025	10.4	14.00	2.4	3.50	47.4	5.00	51.	6.00	3.8	9.00	12.4	14.00
L030	10.2	13.00	3.3	8.00	49.6	6.00	51.4	7.00	4.4	11.00	12.4	14.00
L047	3.5T VL	1.00	5.0W	0.00	9.8 EL	1.00	19.3 EL	1.00	.4T L	1.00	4.6T L	1.00
L049	5.T L	3.50	5.T	13.00	58.6	17.00	55.9	11.00	5.T	13.00	7.3	4.00
L057	12.	18.00	2.T	1.50	45.	3.50	45.	3.50	3.T	4.50	10.	8.00
L063	11.5	16.00	4.0	9.50	55.0	13.50	57.0	13.00	3.5	7.00	13.7	17.00
L086	8.	7.00	2.	1.50	51.	9.00	53.	8.00	3.	4.50	11.	10.00
L091	9.	8.00	4.	9.50	58.	16.00	59.	15.00	4.	10.00	14.	18.00
L099	10.	11.00	2.5	6.00	50.	7.50	50.	5.00	2.5	2.00	10.	8.00
L112	11.3	15.00	4.09	11.00	55.0	13.50	58.1	14.00	2.58	3.00	12.4	14.00
L127	11.9	17.00	2.5	6.00	54.5	11.00	56.1	12.00	3.6	8.00	13.6	16.00
L128	10.	11.00	5.	13.00	50.	7.50	60.	16.50	5.W	0.00	10.	8.00
MEDIAN CONC.	9.9500		2.9000		51.0000		54.0000		3.5500		10.5000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	5.	12.50	5. H	9.00	5.	3.00	5. L	4.50
L003		0.00		0.00	6.	6.00	9.	8.00
L005	5.W	0.00	5.W	0.00	5.W	0.00	5. L	4.50
L011	2.5	8.50	0.	2.50	5.	3.00	2.5 VL	1.50
L023	5.W	0.00	5.W	0.00	5.W	0.00	5. L	4.50
L024	1.4T	4.00	.5W	0.00	7.4	9.00	10.	11.50
L025	1.6	5.00	.2W	0.00	7.8	12.00	9.6	9.00
L030	2.2	7.00	.9	4.00	8.2	16.00	10.1	14.50
L047	.4T	1.00	5.0W	0.00	2.5T L	1.00	2.5T VL	1.50
L049		0.00	5.T H	9.00	5.5	5.00	5.T L	4.50
L057	3.T	10.50	2.T	6.00	8.	14.50	8.	7.00
L063	3.0	10.50	1.5	5.00	7.5	10.50		0.00
L086	2.W	0.00	2.W	0.00	7.	8.00	10.	11.50
L091	2.	6.00	0.	2.50	8.	14.50	12.	17.00
L099	2.5	8.50	2.5	7.00	7.5	10.50	10.	11.50
L112	1.07T	2.00	-.44W	1.00	6.35	7.00	10.1	14.50
L127	1.3	3.00	<1.	0.00	7.9	13.00	10.8	16.00
L128	5.	12.50	5. H	9.00	5.	3.00	10.	11.50
MEDIAN								

CONC. 2.2000 1.7500 7.2000 9.6000

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L002	65.00	6.500	10	L L L H L			
L003	60.00	10.000	6			02011	
L005	20.50	4.100	5	L L			
L011	76.00	7.600	10	VL			
L023	10.50	3.500	3	L L L	INSUFFICIENT DATA	VISUAL COMPARISON	
L024	73.50	8.167	9			TRUE COLOUR	
L025	77.50	8.611	9				
L030	100.50	10.050	10				
L047	8.50	1.063	8	VL ELELL L L VL	BIASED LOW	COLORIMETRIE	
L049	80.00	8.889	9	L H L		VISUAL COMPARISON	
L057	77.00	7.700	10				
L063	102.00	11.333	9				
L086	59.50	7.438	8				
L091	116.50	11.650	10			COLORIMETRIC	
L099	77.00	7.700	10			HELLIGE	
L112	95.00	9.500	10				
L127	102.00	11.333	9			SPECTROPHOTOM.,410	
L128	92.00	10.222	9	H		METER	

OVERALL AVERAGE
RANK IS 8.396

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L047	8.50	1.063	8	VLELELLLLVL	BIASED LOW	COLORIMETRIE	
L023	10.50	3.500	3	LLL	INSUFFICIENT DATA	VISUAL COMPARISON	
L005	20.50	4.100	5	LL			
L002	65.00	6.500	10	LLLHL			
L086	59.50	7.438	8				
L011	76.00	7.600	10	VL			
L057	77.00	7.700	10				
L099	77.00	7.700	10			HELLIGE	
L024	73.50	8.167	9			TRUE COLOUR	
L025	77.50	8.611	9				
L049	80.00	8.889	9	LHL		VISUAL COMPARISON	
L112	95.00	9.500	10				
L003	60.00	10.000	6			02011	
L030	100.50	10.050	10				
L128	92.00	10.222	9	H		METER	
L063	102.00	11.333	9				
L127	102.00	11.333	9			SPECTROPHOTOM.,410	
L091	116.50	11.650	10			COLORIMETRIC	

OVERALL AVERAGE
RANK IS 8.396

Colour

PARAMETER: 00392 Specific Conductance UMHO/CM

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR=10.0000 BASIC ACCEPTABLE ERROR= 1.4000 CONCENTRATION ERROR INCREMENT= .0215

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	23.8	31.00	63.4	32.50	28.0 H	39.00	27.4	31.00	22.3	32.50	35.0	31.50
L003	22.	4.00	56. EL	1.00	24. L	3.00	25. L	3.00	19.3 VL	3.00	31. VL	4.00
L005	23.4	25.00	63.9	34.50	26.5	29.00	27.1	28.00	21.9	21.50	35.2	35.00
L006	25.1 H	41.50	62.3	23.50	26.2	25.00	26.9	21.50	22.1	28.50	34.6	25.00
L007	24.4	38.00	64.9 H	39.00	71.5 EH	42.00	33.9 EH	42.00	26.2 EH	42.00	40.6 EH	42.00
L010	24.9	39.00	67.1 VH	42.00	27.8 H	38.00	28.8 H	39.00	23.4	40.00	36.9 H	41.00
L011	24.0	35.00	64.4	37.00	27.1	36.50	27.7	35.00	22.6	36.00	36.0	40.00
L014	23.	15.00	62.	16.00	25.	7.50	26.	7.50	22.	25.00	34.	14.50
L021	23.2	19.00	63.4	32.50	25.8	16.50	26.6	14.50	21.8	20.00	34.8	26.50
L023	25.10 H	41.50	66.10 VH	41.00	28.70 VH	40.00	29.40 H	41.00	23.80 H	41.00	3.73 EL	1.00
L024	23.	15.00	62.	16.00	27.	34.50	27.	25.00	22.	25.00	35.	31.50
L025	22.5	6.50	61.	8.00	25.5	12.00	26.	7.50	21.	7.00	34.	14.50
L029	23.4	25.00	61.8	10.50	25.3	9.00	26.6	14.50	21.6	14.50	34.2	17.50
L030	23.3	21.50	62.9	28.00	25.8	16.50	26.7	17.50	21.7	18.00	35.1	34.00
L031	22.7	10.00	60.	5.50	24.8	6.00	25.5	6.00	20.4	4.00	33.5	7.00
L032	23.3	21.50	63.9	34.50	26.8	32.00	28.1	37.50	22.4	34.00	35.3	36.00
L033	23.8	31.00	62.0	16.00	26.6	31.00	27.5	32.50	22.2	30.50	34.4	22.50
L034	23.	15.00	62.	16.00	25.	7.50	27.	25.00	23.	38.00	35.	31.50
L047	22.7	10.00	62.3	23.50	25.5	12.00	26.7	17.50	21.5	12.00	34.4	22.50
L049	21.9	3.00	59.8	4.00	24.7	5.00	25.3	4.50	20.9	6.00	33.0	5.00
L057	20. VL	2.00	58. VL	2.00	21. EL	2.00	21. EL	2.00	18. EL	2.00	24. EL	3.00
L061	23.6	28.00	63.2	30.50	26.5	29.00	26.8	19.50	21.9	21.50	34.9	28.50
L063	24.30	37.00	64.65	38.00	28.75 VH	41.00	28.10	37.50	22.60	36.00	35.60	38.00
L073	23.2	19.00	62.4	27.00	26.4	26.00	26.9	21.50	22.0	25.00	34.9	28.50
L078	23.6	28.00	64.2	36.00	27.1	36.50	27.6	34.00	22.2	30.50	35.4	37.00
L081	24.1	36.00	62.0	16.00	25.4	10.00	26.5	12.00	21.5	12.00	34.0	14.50
L082	22.7	10.00	61.8	10.50	25.6	14.00	26.1	9.00	21.4	9.50	33.7	8.50
L086	23.9	33.50	60.8	7.00	26.0	20.00	27.1	28.00	21.7	18.00	33.7	8.50
L088	23.15	17.00	62.30	23.50	26.0	20.00	26.62	16.00	21.68	16.00	34.40	22.50
L090	22.8	12.50	62.3	23.50	26.1	23.50	26.5	12.00	21.7	18.00	33.9	11.50
L091	22.1	5.00	60.0	5.50	24.6	4.00	25.3	4.50	20.6	5.00	33.1	6.00
L093	23.80	31.00	63.00	29.00	26.00	20.00	27.00	25.00	22.10	28.50	34.40	22.50
L094	23.9	33.50	65.0 H	40.00	26.9	33.00	29.0 H	40.00	23.3	39.00	35.9	39.00
L099	23.2	19.00	61.9	12.00	26.0	20.00	27.1	28.00	21.5	12.00	34.3	19.50
L102	25. H	40.00	62.	16.00	27.	34.50	28.	36.00	22.	25.00	34.	14.50
L109	23.6	28.00	62.2	21.00	26.0	20.00	27.2	30.00	22.6	36.00	35.0	31.50
L112	22.8	12.50	62.1	20.00	26.1	23.50	26.8	19.50	21.4	9.50	34.3	19.50
L114	23.4	25.00	63.2	30.50	26.5	29.00	27.5	32.50	22.0	25.00	34.8	26.50
L116	22.60	8.00	61.3	9.00	25.70	15.00	26.40	10.00	21.60	14.50	33.90	11.50
L122	23.31	23.00	62.36	26.00	26.49	27.00	26.96	23.00	22.30	32.50	33.88	10.00
L127	22.5	6.50	62.0	16.00	25.5	12.00	26.5	12.00	21.3	8.00	34.2	17.50
L128	17.7 EL	1.00	59.5 L	3.00	18.7 EL	1.00	18.8 EL	1.00	17.0 EL	1.00	19.6 EL	2.00
MEDIAN CONC.	23.3000		62.2500		26.0000		26.9000		21.9000		34.4000	

PARAMETER: 00392 Specific Conductance UMHO/CM

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	96.8	27.00	7.9	27.00	19.4	32.00	64.0	30.50
L003	86. EL	2.00	6.8	3.00	16.8 L	2.00	56. EL	2.00
L005	98.2	35.00	7.90	27.00	19.3	29.00	64.4	33.00
L006	94.5	13.00	7.98	31.00	19.4	32.00	62.7	14.50
L007	99.4 H	39.00	11.0 EH	41.00	24.3 EH	42.00	67.6 VH	41.50
L010	101. VH	42.00	8.7	38.00	20.6 H	39.00	67.3 VH	40.00
L011	100.3 H	41.00	7.88	25.00	19.4	32.00	65.1	37.00
L014	95.	15.50	8.	33.50	19.	20.50	63.	20.50
L021	97.4	31.00	7.60	13.50	18.8	15.00	64.0	30.50
L023	99.80 H	40.00	8.62	37.00	20.80 H	40.00	67.60 VH	41.50
L024	95.	15.50	7.8	23.00	19.	20.50	63.	20.50
L025	88.5 EL	3.00	7.	5.00	18.5	8.00	64.	30.50
L029	98.0	33.50	7.62	15.00	19.3	29.00	64.0	30.50
L030	97.3	30.00	6.9	4.00	18.9	18.00	63.6	27.50
L031	94.	10.00	6.3 L	1.50	17.9	3.00	61.	5.50
L032	97.8	32.00	7.94	29.00	19.3	29.00	64.6	35.00
L033	93.7	8.00	9.09	40.00	19.6	35.50	62.1	11.00
L034	98.	33.50	8.	33.50	20.	38.00	63.	20.50
L047	94.6	14.00	7.3	6.50	18.5	8.00	61.1	7.00
L049	89.2 EL	4.00	7.8	23.00	18.6	10.50	58.3 VL	3.00
L057	76. EL	1.00	8.	33.50	18.	4.00	52. EL	1.00
L061	97.1	29.00	7.6	13.50	18.8	15.00	63.6	27.50
L063	98.75	37.00	7.96	30.00	19.45	34.00	64.55	34.00
L073	96.3	23.00	7.73	18.50	19.2	26.00	63.3	23.00
L078	98.7	36.00	7.70	17.00	19.2	26.00	64.9	36.00
L081	95.7	19.00	7.4	8.00	18.7	12.50	63.5	25.00
L082	94.1	11.00	7.73	18.50	18.4	6.00	61.8	9.00
L086	91.5 L	5.00	8.6	36.00	19.0	20.50	61.5	8.00
L088	96.62	25.00	7.52	10.00	18.81	17.00	62.82	16.00
L090	95.9	20.50	7.55	12.00	18.7	12.50	63.0	20.50
L091	92.1 L	6.00	7.3	6.50	18.2	5.00	61.0	5.50
L093	96.90	28.00	7.78	20.50	19.20	26.00	63.50	25.00
L094	98.9	38.00	8.92	39.00	21.1 H	41.00	66.2 H	39.00
L099	95.2	17.00	7.90	27.00	19.01	23.00	62.9	17.50
L102	96.	22.00	8.	33.50	19.	20.50	66. H	38.00
L109	96.5	24.00	7.78	20.50	19.6	35.50	62.5	12.00
L112	95.3	18.00	7.54	11.00	18.6	10.50	62.7	14.50
L114	96.7	26.00	7.67	16.00	19.7	37.00	63.5	25.00
L116	94.30	12.00	7.42	9.00	18.50	8.00	61.90	10.00
L122	93.83	9.00	11.69 EH	42.00	19.08	24.00	62.68	13.00
L127	95.9	20.50	7.8	23.00	18.8	15.00	62.9	17.50
L128	92.3 L	7.00	6.30 L	1.50	15.2 EL	1.00	59.7 L	4.00
MEDIAN CONC.	95.9500		7.7900		19.0000		63.0000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	314.00	31.400	10	H		
L003	27.00	2.700	10	ELL L VLVLEL L ELBIASED LOW	02041	
L005	297.00	29.700	10			
L006	255.50	25.550	10	H		
L007	408.50	40.850	10	H EHEHEHEHH EHEHVHBIASED HIGH		
L010	398.00	39.800	10	VHH H H VH H VHBIASED HIGH	AUTO COND. METER	
L011	354.50	35.450	10	H BIASED HIGH		
L014	175.50	17.550	10			
L021	219.00	21.900	10			
L023	364.00	36.400	10	H VHVHH H ELH H VHBIASED HIGH	ELECTROMETRIC	
L024	226.50	22.650	10		COND. METER	
L025	102.00	10.200	10	EL		
L029	.00	19.900	10			
L030	215.00	21.500	10			
L031	58.50	5.850	10	L BIASED LOW		
L032	320.50	32.050	10			
L033	258.00	25.800	10			
L034	258.50	25.850	10			
L047	133.00	13.300	10		CONDUCTIVIMETRE	
L049	68.00	6.800	10	EL VLBIASED LOW	JENWAY 4101	
L057	52.50	5.250	10	VLVLELELELELEL ELBIASED LOW		
L061	242.00	24.200	10		BRIDGE AND CELL	
L063	362.50	36.250	10	VH BIASED HIGH		
L073	237.50	23.750	10		MICROCELL	
L078	317.00	31.700	10			
L081	165.00	16.500	10			
L082	106.00	10.600	10		ELECTROPOTENTIOMET	
L086	184.50	18.450	10	L		
L088	183.00	18.300	10		CONDUCTANCE METER	
L090	166.50	16.650	10		COND. METER & ELEC	
L091	53.00	5.300	10	L BIASED LOW	CONDUCTIVITY METER	
L093	255.50	25.550	10		YSI COND. METER	
L094	381.50	38.150	10	H H H H BIASED HIGH	CONDUCTANCE METER	
L099	195.00	19.500	10		METER	
L102	280.00	28.000	10	H H	METER, RADIOMETER,	
L109	258.50	25.850	10		RADIOMETER	
L112	158.50	15.850	10			
L114	272.50	27.250	10		VWR	
L116	107.00	10.700	10		ELECTRO. POTEN.	
L122	229.50	22.950	10	EH		
L127	148.00	14.800	10		AT 25C	
L128	22.50	2.250	10	ELL ELELELELL L ELL BIASED LOW	METER	

OVERALL AVERAGE
RANK IS 21.500

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L128	22.50	2.250	10	ELLELELELELLLELL	BIASED LOW	METER	
L003	27.00	2.700	10	ELLLVLVLELLEL	BIASED LOW	02041	
L057	52.50	5.250	10	VLVLELELELELELEL	BIASED LOW		
L091	53.00	5.300	10	L	BIASED LOW	CONDUCTIVITY METER	
L031	58.50	5.850	10	L	BIASED LOW		
L049	68.00	6.800	10	ELVL	BIASED LOW	JENWAY 4101	
L025	102.00	10.200	10	EL			
L082	106.00	10.600	10			ELECTROPOTENTIOMET	
L116	107.00	10.700	10			ELECTRO. POTEN.	
L047	133.00	13.300	10			CONDUCTIVIMETRE	
L127	148.00	14.800	10			AT 25C	
L112	158.50	15.850	10				
L081	165.00	16.500	10				
L090	166.50	16.650	10			COND. METER & ELEC	
L014	175.50	17.550	10				
L088	183.00	18.300	10			CONDUCTANCE METER	
L086	184.50	18.450	10	L			
L099	195.00	19.500	10			METER	
L029	.00	19.900	10				
L030	215.00	21.500	10				
L021	219.00	21.900	10				
L024	226.50	22.650	10			COND. METER	
L122	229.50	22.950	10	EH			
L073	237.50	23.750	10			MICROCELL	
L061	242.00	24.200	10			BRIDGE AND CELL	
L006	255.50	25.550	10	H			
L093	255.50	25.550	10			YSI COND. METER	
L033	258.00	25.800	10				
L034	258.50	25.850	10				
L109	258.50	25.850	10			RADIOMETER	
L114	272.50	27.250	10			VWR	
L102	280.00	28.000	10	HH		METER, RADIOMETER,	
L005	297.00	29.700	10				
L002	314.00	31.400	10	H			
L078	317.00	31.700	10				
L032	320.50	32.050	10				
L011	354.50	35.450	10	H	BIASED HIGH		
L063	362.50	36.250	10	VH	BIASED HIGH		
L023	364.00	36.400	10	HVHVHHHELHHVH	BIASED HIGH	ELECTROMETRIC	
L094	381.50	38.150	10	HHHH	BIASED HIGH	CONDUCTANCE METER	
L010	398.00	39.800	10	VHHHHVHHVH	BIASED HIGH	AUTO COND. METER	
L007	408.50	40.850	10	HEHEHEHEHHEHEHVH	BIASED HIGH		

OVERALL AVERAGE
RANK IS 21.500

Specific Conductance

PARAMETER: 01089 GRAN ACIDITY MG/LCACO3

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.8000 BASIC ACCEPTABLE ERROR= .4400 CONCENTRATION ERROR INCREMENT= .1320

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L025	42.9	2.00	9.46	2.00	39.7	2.00	41.9	2.00	17.8	2.00	15.8	2.00
L032	2.55	1.00	.97	1.00	2.98	1.00	2.38	1.00	.85	1.00	1.10	1.00
MEDIAN CONC.												

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L025	1.W	0.00	12.	2.00	15.6	2.00	8.55	2.00
L032	.16	1.00	.66	1.00	.83	1.00	.50	1.00
MEDIAN CONC.								

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L025	18.00	2.000	9			
L032	10.00	1.000	10			
OVERALL AVERAGE RANK IS		1.474				

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L032	10.00	1.000	10			
L025	18.00	2.000	9			
OVERALL AVERAGE RANK IS		1.474				

GRAN ACIDITY

PARAMETER: 01090 ACIDITY TO PH 8.3 MG/LCACO3

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= .5000 CONCENTRATION ERROR INCREMENT= .5000

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L011	3.48	5.00	1.99	6.00	3.68	7.00	3.48	7.00	2.19 H	8.00	1.49	4.00
L023	3.5	6.00	1.9	5.00	3.6	6.00	2.9	5.00	1.6	6.00	2.1	6.00
L025	2.33	2.00	.71 L	1.00	2.04	2.00	2.12	3.00	.93	2.00	.92	2.00
L029	.04W VL	1.00	17.36 EH	9.00	.04W VL	1.00	.04W VL	1.00	.04W VL	1.00	.04W VL	1.00
L057	4.4	8.00	2.7	7.00	5.5 H	8.00	5.1 VH	8.00	2.0	7.00	3.1 EH	9.00
L063	3.476	4.00	1.490	2.00	3.178	5.00	2.979	6.00	1.440	5.00	1.539	5.00
L082	2.88	3.00	1.51	3.00	2.61	3.00	2.01	2.00	1.39	4.00	1.45	3.00
L102	3.80	7.00	3.22 H	8.00	5.72 VH	9.00	6.99 EH	9.00	2.28 H	9.00	3.06 VH	8.00
L128	22.9 EH	9.00	1.53	4.00	2.86	4.00	2.67	4.00	1.14	3.00	2.29	7.00
MEDIAN CONC.	3.4800		1.9000		3.1780		2.9000		1.4400		1.5390	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L011	1.19	5.00	.8	3.00	1.59	6.00	1.69	6.00
L023	1.7	6.00	1.6	7.00	2.3 H	9.00	2.0	7.00
L025	.41 L	1.00	.67	2.00	.85	2.00	.73	1.00
L029	.64	2.00	.04W VL	1.00	.04W VL	1.00	1.24	2.00
L057	2.6 EH	9.00	1.3	6.00	1.9	7.00	2.2 H	9.00
L063	1.043	3.00	1.092	4.00	1.291	4.00	1.341	5.00
L082	1.08	4.00	1.19	5.00	1.34	5.00	1.31	3.00
L102	1.92 H	8.00	1.69	8.00	2.12 H	8.00	2.15 H	8.00
L128	1.72	7.00	2.29 VH	9.00	1.14	3.00	1.33	4.00
MEDIAN CONC.	1.1900		1.1900		1.3400		1.3410	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L011	57.00	5.700	10	H		
L023	63.00	6.300	10	H	POTENTIOMETRIC	
L025	18.00	1.800	10	L L BIASED LOW		
L029	20.00	2.000	10	VLEHVLVLVLVL VLVL BIASED LOW		
L057	78.00	7.800	10	H VH EHEH H BIASED HIGH		
L063	43.00	4.300	10			
L082	35.00	3.500	10		ELECTROPOTENTIOMET	
L102	82.00	8.200	10	H VHEHH VHH H H BIASED HIGH	ELECTROMETER/GRANS	

L128	54.00	5.400	10	EH	VH	TITRATION

OVERALL AVERAGE
RANK IS 5.000

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L025	18.00	1.800	10	LL	BIASED LOW	
L029	20.00	2.000	10	VLEHVLVLVLVLVLVL	BIASED LOW	
L082	35.00	3.500	10			ELECTROPOTENTIOMET
L063	43.00	4.300	10			
L128	54.00	5.400	10	EHVH		TITRATION
L011	57.00	5.700	10	H		
L023	63.00	6.300	10	H		POTENTIOMETRIC
L057	78.00	7.800	10	HVHEHEHH	BIASED HIGH	
L102	82.00	8.200	10	HVHEHHVHHHH	BIASED HIGH	ELECTROMETER/GRANS

OVERALL AVERAGE
RANK IS 5.000

ACIDITY TO PH 8.3

PARAMETER: 01092 pH PH UNITS

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 4.5000 BASIC ACCEPTABLE ERROR= .1200 CONCENTRATION ERROR INCREMENT= .0307

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	5.41	41.00	6.98	19.50	5.15	11.00	5.39	23.50	6.20	34.00	6.72	36.00
L003	5.21	6.00	7.12	31.00	5.07 L	5.00	5.25	6.00	6.01	10.50	6.58	27.00
L005	5.51 H	44.00	7.21 H	37.00	5.37 H	41.00	5.57 H	43.50	6.53 EH	43.00	6.65	31.00
L006	5.05 VL	2.50	6.78 L	5.00	5.25	29.50	5.45	32.00	5.99	5.50	6.55	21.50
L007	5.14 L	4.00	7.33 VH	42.00	4.91 EL	1.00	5.14 VL	1.00	6.05	14.50	6.73	37.00
L010	5.40	39.50	6.99	22.00	5.25	29.50	5.37	18.00	6.07	19.00	6.52	18.50
L011	5.75 EH	45.00	7.07	28.00	5.21	19.50	5.42	28.50	6.22	37.00	6.99 EH	42.00
L013C	5.34	27.00		0.00	5.31	38.00	5.42	28.50		0.00		0.00
L014	5.40	39.50	7.65 EH	44.00	5.43 H	43.00	5.78 EH	46.00	6.57 EH	44.00	7.18 EH	43.00
L021	5.32	17.50	6.96	17.50	5.33	39.50	5.46	35.00	6.10	24.50	6.61	28.50
L023	5.33	22.50	6.86	9.50	5.14	9.00	5.30	10.50	6.06	16.50	6.39	4.00
L024	5.35	29.50	7.1	29.50	5.2	17.50	5.41	26.50	6.15	28.00	6.56	23.50
L025	5.33	22.50	7.37 VH	43.00	5.29	35.50	5.45	32.00	6.25	39.50	6.89 VH	41.00
L029	5.50 H	43.00	7.03	24.00	5.56 EH	46.00	5.55 H	41.50	6.13	27.00	6.65	31.00
L030	5.33	22.50	6.84	8.00	5.16	12.50	5.37	18.00	6.06	16.50	6.44	8.50
L031	5.33	22.50	7.05	26.50	5.17	14.50	5.31	12.50	6.05	14.50	6.43	7.00
L032	5.37	37.00	7.16	34.50	5.22	23.00	5.41	26.50	6.18	30.00	6.65	31.00
L033	5.36	32.00		0.00	5.22	23.00	5.37	18.00	5.99	5.50		0.00
L034	5.25	8.00	7.10	29.50	5.33	39.50	5.55 H	41.50	6.20	34.00	6.68	33.00
L047	5.05 VL	2.50	6.62 VL	1.00	5.10	7.00	5.18 L	3.00	5.80 VL	1.00	6.38	3.00
L049	5.18 L	5.00	6.99	22.00	5.06 L	3.50	5.26	7.00	6.09	23.00	6.50	16.00
L057	5.3	16.00	6.8	6.00	5.2	17.50	5.3	10.50	6.0	7.50	6.4	5.00
L061	5.34	27.00	7.23 H	39.00	5.27	31.50	5.51	39.50	6.22	37.00	6.8 H	40.00
L063	5.324	19.00	6.828	7.00	5.234	28.00	5.456	34.00	6.079	20.00	6.470	13.00
L073	5.33	22.50	6.98	19.50	5.27	31.50	5.47	36.00	6.19	31.50	6.57	25.00
L078	5.33	22.50	6.94	16.00	5.17	14.50	5.35	16.00	6.04	12.50	6.48	14.00
L081	5.34	27.00	7.15	33.00	5.22	23.00	5.45	32.00	6.22	37.00	6.77 H	39.00
L082	5.36	32.00	7.24 H	40.00	5.38 H	42.00	5.57 H	43.50	6.25	39.50	6.74 H	38.00
L086	5.32	17.50	6.96	17.50	5.09	6.00	5.28	8.50	6.00	7.50	6.45	11.00
L088	5.242	7.00	6.878	11.00	5.306	37.00	5.449	30.00	6.003	9.00	6.497	15.00
L090	5.28	13.00	6.90	13.50	5.05 L	2.00	5.23 L	5.00	5.94	3.00	6.44	8.50
L090B	5.26	9.50	6.72 L	4.00	5.06 L	3.50	5.16 VL	2.00		0.00		0.00
L091	5.37	37.00	6.93	15.00	5.21	19.50	5.34	14.50	6.04	12.50	6.46	12.00
L093	5.365	35.00	7.036	25.00	5.212	21.00	5.389	22.00	6.066	18.00	6.522	20.00
L094	5.44	42.00	7.05	26.50	5.28	33.50	5.38	21.00	6.11	26.00	6.52	18.50
L099	5.27	11.00	7.16	34.50	5.23	26.50	5.40	25.00	6.16	29.00	6.56	23.50
L102	5.28	13.00	6.68 VL	2.50	5.14	9.00	5.28	8.50	5.98	4.00	6.42	6.00
L109	5.35	29.50	6.99	22.00	5.28	33.50	5.48	37.00	6.10	24.50	6.55	21.50
L112	5.36	32.00	6.90	13.50	5.16	12.50	5.34	14.50	6.30 H	42.00	6.51	17.00
L114	5.28	13.00	6.68 VL	2.50	5.14	9.00	5.19 L	4.00	6.08	21.00	6.30 L	1.00
L116	5.37	37.00	7.22 H	38.00	5.29	35.50	5.49	38.00	6.20	34.00	6.70	34.00
L119	5.290	15.00	6.896	12.00	5.221	25.00	5.390	23.50	6.081	22.00	6.448	10.00
L122	5.26	9.50	6.86	9.50	5.23	26.50	5.31	12.50	5.91 L	2.00	6.31 L	2.00
L126	5.362	34.00	7.127	32.00	5.182	16.00	5.372	20.00	6.273 H	41.00	6.579	26.00
L127	5.76 EH	46.00	7.18	36.00	5.50 VH	44.50	5.51	39.50	6.01	10.50	6.61	28.50
L128	4.78 EL	1.00	7.25 H	41.00	5.50 VH	44.50	5.59 H	45.00	6.19	31.50	6.71	35.00

MEDIAN CONC.	5.3300	6.9900	5.2200	5.3900	6.0855	6.5500

PARAMETER: 01092 pH PH UNITS

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	7.79	25.50	6.83	27.00	6.40	17.00	7.43	25.50
L003	7.77	21.50	6.72	12.50	6.34	9.50	7.42	23.50
L005	7.80	27.00	6.85	30.50	6.65 H	42.50	7.47	31.00
L006	7.38 VL	2.00	6.94	37.00	6.34	9.50	7.10 L	4.50
L007	7.91	36.50	7.05 H	42.00	6.36	13.00	7.58	41.00
L010	7.75	17.00	6.79	17.50	6.47	27.50	7.34	13.50
L011	7.95	39.00	6.90	35.50	6.57	36.50	7.60	42.00
L013C		0.00		0.00		0.00		0.00
L014	8.31 EH	43.00	7.20 EH	43.00	6.95 EH	45.00	7.97 EH	44.00
L021	7.79	25.50	6.54 L	2.00	6.37	14.00	7.25	8.00
L023	7.76	19.00	6.77	16.00	6.46	26.00	7.34	13.50
L024	7.83	29.50	6.72	12.50	6.42	22.50	7.53	35.00
L025	7.97	41.00	6.83	27.00	6.58	38.50	7.57	40.00
L029	8.13 VH	42.00	7.30 EH	44.00	6.80 EH	44.00	7.62	43.00
L030	7.64	8.00	6.61 L	4.00	6.40	17.00	7.17 L	6.00
L031	7.83	29.50	6.75	14.50	6.47	27.50	7.54	37.50
L032	7.95	39.00	6.87	33.50	6.58	38.50	7.53	35.00
L033		0.00	6.37 EL	1.00	6.21 L	2.50		0.00
L034	7.90	34.50	6.75	14.50	6.30	6.50	7.55	39.00
L047	7.40 VL	3.00	6.90	35.50	6.10 VL	1.00	7.00 VL	1.00
L049	7.73	16.00	6.80	19.00	6.38	15.00	7.40	20.00
L057	7.6	7.00	6.7	8.50	6.4	17.00	7.1 L	4.50
L061	7.89	32.50	6.81	22.00	6.57	36.50	7.53	35.00
L063	7.352 VL	1.00	6.964	39.00	6.496	29.00	7.004 VL	2.00
L073	7.77	21.50	6.81	22.00	6.44	24.50	7.47	31.00
L078	7.70	12.50	6.99	40.00	6.50	30.00	7.36	15.50
L081	7.95	39.00	6.81	22.00	6.51	31.00	7.37	17.00
L082	7.90	34.50	6.85	30.50	6.59	40.00	7.52	33.00
L086	7.78	24.00	6.64	6.00	6.30	6.50	7.43	25.50
L088	7.642	9.00	6.712	11.00	6.419	21.00	7.310	12.00
L090	7.70	12.50	6.87	33.50	6.41	19.50	7.38	18.00
L090B		0.00		0.00	6.32	8.00	7.28	9.00
L091	7.67	10.50	6.62	5.00	6.25	4.00	7.30	10.00
L093	7.701	14.00	6.691	7.00	6.349	11.00	7.408	22.00
L094	7.72	15.00	6.82	25.00	6.55	35.00	7.40	20.00
L099	7.89	32.50	6.86	32.00	6.54	33.00	7.54	37.50
L102	7.50 L	4.00	6.71	10.00	6.35	12.00	7.08 VL	3.00
L109	7.76	19.00	6.79	17.50	6.41	19.50	7.44	27.00
L112	7.76	19.00	6.81	22.00	6.65 H	42.50	7.36	15.50
L114	7.59	6.00	6.70	8.50	6.44	24.50	7.40	20.00
L116	7.85	31.00	6.81	22.00	6.42	22.50	7.42	23.50
L119	7.772	23.00	7.043 H	41.00	6.612 H	41.00	7.301	11.00
L122	7.53 L	5.00	6.57 L	3.00	6.21 L	2.50	7.19 L	7.00
L126	7.810	28.00	6.836	29.00	6.299	5.00	7.453	28.00
L127	7.67	10.50	6.83	27.00	6.54	33.00	7.46	29.00
L128	7.91	36.50	6.96	38.00	6.54	33.00	7.47	31.00
MEDIAN CONC.	7.7700		6.8100		6.4200		7.4140	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	260.00	26.000	10			
L003	152.50	15.250	10	L	10301/STIRRED	
L005	370.50	37.050	10	H H H H EH H BIASED HIGH		
L006	149.00	14.900	10	VLL VL L		
L007	232.00	23.200	10	L VHELVL H	UNSTIRRED	
L010	222.00	22.200	10		AUTO PH/ALK SYSTEM	
L011	353.00	35.300	10	EH EH	STIRRED	
L013C	93.50	31.167	3	INSUFFICIENT DATA		
L014	434.50	43.450	10	EHH EHEHEHEHEHEHEHBIASED HIGH		
L021	212.00	21.200	10	L		
L023	146.50	14.650	10		POTENTIOMETRIC	
L024	254.00	25.400	10		RADIOMETER PH/STIR	
L025	360.00	36.000	10	VH VH BIASED HIGH		
L029	385.50	38.550	10	H EHH VHEHEH BIASED HIGH		
L030	121.00	12.100	10	L L		
L031	206.50	20.650	10			
L032	328.00	32.800	10			
L033	82.00	13.667	6	ELL		
L034	280.00	28.000	10	H		
L047	58.00	5.800	10	VLVL L VL VL VLVLBIASED LOW	PH METRE/AGITEZ	
L049	146.50	14.650	10	L L	RADIOMETER	
L057	99.50	9.950	10	L BIASED LOW		
L061	340.00	34.000	10	H H	METER & ELECTRODE/	
L063	192.00	19.200	10	VL VL		
L073	265.00	26.500	10		COMBINED ELECTRODE	
L078	193.50	19.350	10			
L081	300.00	30.000	10	H		
L082	373.00	37.300	10	H H H H BIASED HIGH	ELECTROPOTENT./AGI	
L086	130.00	13.000	10			
L088	162.00	16.200	10		ORION/ROSS PROBE/U	
L090	128.50	12.850	10	L L	PH METER & ELECTRO	
L090B	36.00	6.000	6	L L VL BIASED LOW	PH METER & ELECTRO	
L091	140.00	14.000	10		CLOSED CELL PH	
L093	195.00	19.500	10		METER & ELECTRODE/	
L094	262.50	26.250	10		IONALYZER/UNSTIRRE	
L099	284.50	28.450	10		METER/UNSTIRRED	
L102	72.00	7.200	10	VL L VLBIASED LOW	ORION ROSS ELECTRO	
L109	251.00	25.100	10		COMBINED ELEC./UNS	
L112	230.50	23.050	10	H H		
L114	109.50	10.950	10	VL L L	FISHER	
L116	315.50	31.550	10	H	ELECTRO. POTEN./AG	
L119	223.50	22.350	10	H H		
L122	79.50	7.950	10	L L L L L L BIASED LOW	STIRRED	
L126	259.00	25.900	10	H		
L127	304.50	30.450	10	EH VH	UNSTIRRED	
L128	336.50	33.650	10	ELH VHH	PH METER STIRRED	

OVERALL AVERAGE RANK IS 22.764

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L047	58.00	5.800	10	VLVLLVLVLVLVL	BIASED LOW	PH METRE/AGITEZ
L090B	36.00	6.000	6	LLVL	BIASED LOW	PH METER & ELECTRO
L102	72.00	7.200	10	VLLVL	BIASED LOW	ORION ROSS ELECTRO
L122	79.50	7.950	10	LLLLLL	BIASED LOW	STIRRED
L057	99.50	9.950	10	L	BIASED LOW	
L114	109.50	10.950	10	VLLL		FISHER
L030	121.00	12.100	10	LL		
L090	128.50	12.850	10	LL		PH METER & ELECTRO
L086	130.00	13.000	10			
L033	82.00	13.667	6	ELL		
L091	140.00	14.000	10			CLOSED CELL PH
L049	146.50	14.650	10	LL		RADIOMETER
L023	146.50	14.650	10			POTENTIOMETRIC
L006	149.00	14.900	10	VLLVLL		
L003	152.50	15.250	10	L		10301/STIRRED
L088	162.00	16.200	10			ORION/ROSS PROBE/U
L063	192.00	19.200	10	VLVL		
L078	193.50	19.350	10			
L093	195.00	19.500	10			METER & ELECTRODE/
L031	206.50	20.650	10			
L021	212.00	21.200	10	L		
L010	222.00	22.200	10			AUTO PH/ALK SYSTEM
L119	223.50	22.350	10	HH		
L112	230.50	23.050	10	HH		
L007	232.00	23.200	10	LVHELVLH		UNSTIRRED
L109	251.00	25.100	10			COMBINED ELEC./UNS
L024	254.00	25.400	10			RADIOMETER PH/STIR
L126	259.00	25.900	10	H		
L002	260.00	26.000	10			
L094	262.50	26.250	10			IONALYZER/UNSTIRRE
L073	265.00	26.500	10			COMBINED ELECTRODE
L034	280.00	28.000	10	H		
L099	284.50	28.450	10			METER/UNSTIRRED
L081	300.00	30.000	10	H		
L127	304.50	30.450	10	EHVH		UNSTIRRED
L013C	93.50	31.167	3		INSUFFICIENT DATA	
L116	315.50	31.550	10	H		ELECTRO. POTEN./AG
L032	328.00	32.800	10			
L128	336.50	33.650	10	ELHVHH		PH METER STIRRED
L061	340.00	34.000	10	HH		METER & ELECTRODE/
L011	353.00	35.300	10	EHEH		STIRRED
L025	360.00	36.000	10	VHVH	BIASED HIGH	
L005	370.50	37.050	10	HHHHEHH	BIASED HIGH	
L082	373.00	37.300	10	HHHH	BIASED HIGH	ELECTROPOTENT./AGI
L029	385.50	38.550	10	HEHHVHEHEH	BIASED HIGH	
L014	434.50	43.450	10	EHHEHEHEHEHEHEHEH	BIASED HIGH	

OVERALL AVERAGE
RANK IS 22.764

pH

PARAMETER: 06002 Diss Organic Carbon MG C/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .7000 BASIC ACCEPTABLE ERROR= .5000 CONCENTRATION ERROR INCREMENT= .0321

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	3.0 VL	1.00	.8	3.00	3.6 VL	2.00	3.9 L	3.00	1.8	2.00	4.6 VL	2.00
L003	4.9 H	19.00	1.4	17.50	5.6 H	20.00	5.9 VH	21.00	2.6	19.00	6.8 VH	19.00
L005	3.87	7.00	1.11	9.00	4.50	7.00	4.74	8.00	2.00	6.50	5.54	9.00
L006	3.94	9.00	1.00	7.00	4.77	11.00	4.97	13.00	2.04	9.00	5.64	11.00
L014	3.720	3.50	1.200	13.00	4.560	8.00	4.800	9.50	2.160	14.00	5.160	4.00
L023	5.0W	0.00	5.0W	0.00	.5W EL	1.00	.5W EL	1.00	5.0W	0.00	1.5W EL	1.00
L025	3.8	5.50	.9	5.00	4.4	5.00	4.8	9.50	1.9	4.00	5.6	10.00
L029	4.54	18.00	1.60	20.00	5.27	19.00	5.50 H	20.00	2.73 H	20.00	6.39 H	17.00
L031	3.8	5.50	.8	3.00	4.4	5.00	4.6	6.00	1.8	2.00	5.5	7.50
L032	3.9	8.00	1.3	15.00	4.7	10.00	4.6	6.00	2.0	6.50	5.5	7.50
L033	4.1	13.00	1.5	19.00	5.2	16.00	5.2	17.00	2.5	18.00	6.1	15.00
L049	5.96 EH	20.00	.3T VL	1.00	6.30 EH	21.00	4.03 L	4.00	2.15	12.50	7.64 EH	20.00
L063	4.42	17.00	1.16	10.50	5.22	17.00	5.34	18.00	2.19	15.00	6.06	14.00
L081	3.6	2.00	.8	3.00	3.7 VL	3.00	3.8 VL	2.00	2.0	6.50	5.1	3.00
L082	4.0	10.00	1.2	13.00	4.4	5.00	4.6	6.00	1.8	2.00	5.4	5.00
L088	4.26	15.00	.97	6.00	4.97	14.00	5.19	16.00	2.07	11.00	6.18	16.00
L091	3.72	3.50	1.16	10.50	4.57	9.00	4.81	11.00	2.05	10.00	5.41	6.00
L093	4.35	16.00	1.07	8.00	4.79	12.00	5.01	14.00	2.15	12.50	5.91	12.00
L099	4.01	11.00	1.40	17.50	5.25	18.00	5.49 H	19.00	2.40	17.00		0.00
L127	4.2	14.00	1.2	13.00	4.8	13.00	4.9	12.00	2.0	6.50	6.5 H	18.00
L128	4.08	12.00	1.32	16.00	5.04	15.00	5.18	15.00	2.24	16.00	5.96	13.00
MEDIAN CONC.	4.0050		1.1600		4.7700		4.8100		2.0600		5.6200	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	2.1	12.00	20.1 EH	17.00	3.3 EL	1.00	1.9	1.00
L003	1.2 L	1.00		0.00	5.1	19.00	2.3	7.50
L005	2.21	15.00	.160	7.50	4.49	7.00	2.30	7.50
L006	2.00	9.00	.055	3.00	4.48	5.50	2.25	6.00
L014	1.920	6.00	.480	12.00	4.680	12.00	2.400	13.00
L023	5.0W	0.00	5.0W	0.00		0.00	5.0W	0.00
L025	1.9	4.00	.1T	5.00	4.4	3.50	2.2	5.00
L029	2.72 H	19.00	.484	13.00	4.90	17.00	2.72	18.00
L031	1.8	2.00	<.2	0.00	4.4	3.50	2.0	2.00
L032	2.5	18.00	<1.0	0.00	4.5	8.50	2.6	17.00
L033	2.0	9.00	.4	11.00	4.7	13.00	2.1	3.50
L049	2.91 VH	20.00	2.80 EH	16.00	5.72 VH	20.00	3.91 EH	20.00
L063	2.23	16.50	.15	6.00	4.72	14.00	2.37	11.00

L081	1.9	4.00	.5T	14.00	4.2	2.00	2.1	3.50
L082	1.9	4.00	0.	1.50	4.6	10.50	2.4	13.00
L088	2.23	16.50	0.00	1.50	4.73	15.50	2.44	15.50
L091	2.01	11.00	.19	9.50	4.50	8.50	2.34	9.50
L093	2.18	14.00	.08	4.00	4.73	15.50	2.44	15.50
L099	2.16	13.00	.53	15.00	4.98	18.00	2.75	19.00
L127	2.0	9.00	.16	7.50	4.6	10.50	2.4	13.00
L128	1.99	7.00	.190	9.50	4.48	5.50	2.34	9.50
MEDIAN CONC.	2.0050		.1900		4.6000		2.3550	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L002	44.00	4.400	10	VL VLL VL EHEL	BIASED LOW		
L003	143.00	15.889	9	H H VH VHL		SHIMADZU EXPT'L 00	
L005	83.50	8.350	10				
L006	83.50	8.350	10				
L014	95.00	9.500	10				
L023	3.00	1.000	3	ELEL EL	INSUFFICIENT DATA	CALCULATION	
L025	56.50	5.650	10				
L029	181.00	18.100	10	H H H H	BIASED HIGH		
L031	36.50	4.056	9		BIASED LOW	CONDUCTIVIMETRIE	
L032	96.50	10.722	9				
L033	134.50	13.450	10				
L049	154.50	15.450	10	EHVLEHL EHVHEHVHEH		AUTOANALYZER-TECHN	
L063	139.00	13.900	10				
L081	43.00	4.300	10	VLVL	BIASED LOW		
L082	70.00	7.000	10			TECHNICON	
L088	127.00	12.700	10			UV PERSULFATE OXID	
L091	88.50	8.850	10			PERSULFATE OXIDAT.	
L093	123.50	12.350	10			DOHRMANN	
L099	147.50	16.389	9	H	BIASED HIGH	INSTRUMENTAL	
L127	116.50	11.650	10	H		UV/S208 (ASTRO 200	
L128	118.50	11.850	10			TOC ANALYZER	

OVERALL AVERAGE RANK IS 10.477

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L023	3.00	1.000	3	ELELEL	INSUFFICIENT DATA	CALCULATION	
L031	36.50	4.056	9		BIASED LOW	CONDUCTIVIMETRIE	
L081	43.00	4.300	10	VLVL	BIASED LOW		
L002	44.00	4.400	10	VLVLLVLEHEL	BIASED LOW		
L025	56.50	5.650	10				
L082	70.00	7.000	10			TECHNICON	
L005	83.50	8.350	10				
L006	83.50	8.350	10				
L091	88.50	8.850	10			PERSULFATE OXIDAT.	
L014	95.00	9.500	10				
L032	96.50	10.722	9				
L127	116.50	11.650	10	H		UV/S208 (ASTRO 200	
L128	118.50	11.850	10			TOC ANALYZER	
L093	123.50	12.350	10			DOHRMANN	
L088	127.00	12.700	10			UV PERSULFATE OXID	
L033	134.50	13.450	10				
L063	139.00	13.900	10				
L049	154.50	15.450	10	EHVLEHLEHVHEHVHEH		AUTOANALYZER-TECHN	
L003	143.00	15.889	9	HHVHVHL		SHIMADZU EXPT'L 00	

L099	147.50	16.389	9	H	BIASED HIGH	INSTRUMENTAL
L029	181.00	18.100	10	HHHH	BIASED HIGH	

OVERALL AVERAGE
RANK IS 10.477

Diss Organic Carbon

PARAMETER: 06193 ALKALINITY-FIXED ENDPT. PH4.5 MG/L CACO3

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.5000 BASIC ACCEPTABLE ERROR= .8500 CONCENTRATION ERROR INCREMENT= .0231

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L023	2.02	11.50	11.4	5.50	1.4	4.50	2.12	11.00	2.53	11.00	5.39	7.00
L024	1.64	4.00	11.6	8.50	1.54	8.00	1.89	7.50	2.4	8.00	5.4	8.50
L025	2.25	14.00	11.6	8.50	1.69	12.00	1.87	6.00	2.44	9.00	5.4	8.50
L029	2.02	11.50	11.82	12.00	1.78	13.50	2.02	10.00	2.07	3.00	5.54	12.00
L030	1.99	9.00	11.7	11.00	1.78	13.50	2.13	12.00	2.63	14.00	5.59	13.00
L033	2.1	13.00	12.3	14.00	2.0	15.00	2.4	13.00	3.2	15.00	6.0	14.00
L047	4.4 EH	15.00	13.2 H	15.00	1.1	3.00	5.5 EH	15.00	2.2	5.00	6.6 H	15.00
L049	1.	2.00	9. EL	1.00	1.	2.00	1. L	2.00	2.	2.00	4. L	2.00
L057	1.8	8.00	9.2 EL	2.00	1.4	4.50	1.4	3.00	2.1	4.00	5.0	4.00
L082	1.73	6.00	11.45	7.00	1.59	10.00	1.89	7.50	2.57	12.00	5.47	11.00
L086	1.77	7.00	11.65	10.00	1.44	7.00	1.77	4.00	2.32	6.00	5.37	6.00
L112	.29 VL	1.00	9.95 VL	4.00	-.06 VL	1.00	.32 VL	1.00	1.13 L	1.00	3.75 VL	1.00
L116	1.63T	3.00	12.01	13.00	1.41T	6.00	1.95T	9.00	2.61	13.00	5.44	10.00
L127	1.65	5.00	11.4	5.50	1.55	9.00	1.85	5.00	2.35	7.00	5.35	5.00
L128	2.0	10.00	9.9 VL	3.00	1.6	11.00	2.5	14.00	2.5	10.00	4.8	3.00
MEDIAN CONC.	1.8000		11.6000		1.5400		1.8900		2.4000		5.4000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L023	42.9	10.00	4.33	5.00	3.54	6.00	20.2	8.50
L024	43.	11.50	4.3	3.50	3.5	4.00	20.	6.00
L025	43.1	13.00	4.56	12.00	4.61 H	14.00	20.7	13.00
L029	43.0	11.50	4.54	11.00	5.26 VH	15.00	20.84	14.00
L030	42.5	8.00	4.68	14.00	3.84	10.50	20.6	11.00
L033	43.6	14.00	5.2	15.00	4.3	12.00	21.2	15.00
L047	41.8	5.00	4.4	6.50	4.4	13.00	19.8	4.00
L049	4. EL	1.00	4.	2.00	3.	2.00	19.	3.00
L057	33.1 EL	2.00	4.3	3.50	3.3	3.00	16.1 EL	1.00
L082	42.04	7.00	4.63	13.00	3.77	9.00	20.18	7.00
L086	43.66	15.00	4.42	8.00	3.51	5.00	20.67	12.00
L112	41.2	4.00	3.03 VL	1.00	2.00 VL	1.00	18.9 L	2.00
L116	41.95	6.00	4.51	10.00	3.84	10.50	20.38	10.00
L127	42.6	9.00	4.45	9.00	3.55	7.00	20.2	8.50
L128	40.2 L	3.00	4.4	6.50	3.6	8.00	19.9	5.00
MEDIAN CONC.	42.5000		4.4200		3.6000		20.2000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L023	80.00	8.000	10		POTENTIOMETRIC	
L024	69.50	6.950	10		AUTO-TITRATION	
L025	110.00	11.000	10	H		
L029	113.50	11.350	10	VH		
L030	116.00	11.600	10			
L033	140.00	14.000	10	BIASED HIGH		
L047	96.50	9.650	10	EHH EH H	TITRATION	
L049	19.00	1.900	10	EL L L EL BIASED LOW	TITRATION	
L057	35.00	3.500	10	EL EL ELBIASED LOW		
L082	89.50	8.950	10		ELECTROPOTENTIOMET	
L086	80.00	8.000	10			
L112	17.00	1.700	10	VLVLVLVLL VL VLVLL BIASED LOW		
L116	90.50	9.050	10		ELECTRO. POTEN.	
L127	70.00	7.000	10		POTENT. TITRN.	
L128	73.50	7.350	10	VL L	TITRATION	

OVERALL AVERAGE
RANK IS 8.000

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L112	17.00	1.700	10	VLVLVLVLLVLVLVLL BIASED LOW		
L049	19.00	1.900	10	ELLLEL BIASED LOW	TITRATION	
L057	35.00	3.500	10	ELELEL BIASED LOW		
L024	69.50	6.950	10		AUTO-TITRATION	
L127	70.00	7.000	10		POTENT. TITRN.	
L128	73.50	7.350	10	VLL	TITRATION	
L086	80.00	8.000	10			
L023	80.00	8.000	10		POTENTIOMETRIC	
L082	89.50	8.950	10		ELECTROPOTENTIOMET	
L116	90.50	9.050	10		ELECTRO. POTEN.	
L047	96.50	9.650	10	EHHEHH	TITRATION	
L025	110.00	11.000	10	H		
L029	113.50	11.350	10	VH		
L030	116.00	11.600	10			
L033	140.00	14.000	10	BIASED HIGH		

OVERALL AVERAGE
RANK IS 8.000

ALKALINITY-FIXED ENDPT. PH4.5

PARAMETER: 06194 ALKALINITY-GRAN,INFLEC,EXTRAP MG/L CACO3

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= .3500 CONCENTRATION ERROR INCREMENT= .0080

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002		0.00	9.0 VL	3.00		0.00		0.00		0.00	3.4	2.50
L006	.0400	1.00	9.7150	4.00	.1050	3.00	.1450 L	1.00	.8100	4.00	3.3000 L	1.00
L010	.5T H	5.00	9.8	5.00	.5T H	5.50	.5T	4.00	.5T	1.00	3.4	2.50
L011	.5W	0.00	10.98 EH	8.00	.5T H	5.50	.5T	4.00	1.0	5.00	3.7	4.00
L014	.1	2.50	10.0	6.00	0.0	1.00	.3	2.00	.8	2.50	3.9	6.50
L031	.1	2.50	10.2 H	7.00	.1	2.00	.5	4.00	.8	2.50	3.9	6.50
L063		0.00	7.86 EL	2.00		0.00		0.00		0.00		0.00
L102	.48 H	4.00	6.98 EL	1.00	.14	4.00	.51	6.00	1.42 VH	6.00	3.87	5.00
MEDIAN CONC.	.1000		9.7575		.1225		.5000		.8050		3.7000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	41.0	3.50	3.5	6.50	1.6 L	2.50	18.2 VL	2.00
L006	41.865 H	5.00	3.135	4.00	1.425 VL	1.00	19.045	6.00
L010	41.	3.50	2.7 L	1.00	1.6 L	2.50	18.7	3.00
L011	40.7	2.00	3.5	6.50	1.99	4.00	18.9	4.00
L014	40.2 L	1.00	3.0	2.00	2.0	5.00	19.0	5.00
L031	42. H	6.00	3.1	3.00	2.2	7.00	20. EH	7.00
L063		0.00	43.13 EH	8.00		0.00	13.46 EL	1.00
L102	42.60 EH	7.00	3.22	5.00	2.05	6.00	20.40 EH	8.00
MEDIAN CONC.	41.0000		3.1775		1.9900		18.9500	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	20.00	3.333	6	VL L VL		
L006	30.00	3.000	10	L L H VL		
L010	33.00	3.300	10	H H L L	AUTO TITRATION	
L011	43.00	4.778	9	EHH		
L014	33.50	3.350	10	L		
L031	47.50	4.750	10	H H EH	TITRATION CONDUCTI	
L063	11.00	3.667	3	EL EH ELINSUFFICIENT DATA		
L102	52.00	5.200	10	H EL VH EH EH	ELECTROMETER/GRAN	

OVERALL AVERAGE

RANK IS 3.971

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L006	30.00	3.000	10	LLHVL			
L010	33.00	3.300	10	HHLL		AUTO TITRATION	
L002	20.00	3.333	6	VLLVL			
L014	33.50	3.350	10	L			
L063	11.00	3.667	3	ELEHEL	INSUFFICIENT DATA		
L031	47.50	4.750	10	HHEH		TITRATION CONDUCTI	
L011	43.00	4.778	9	EHH			
L102	52.00	5.200	10	HELVHEHEH		ELECTROMETER/GRAN	

OVERALL AVERAGE
RANK IS 3.971

ALKALINITY-GRAN,INFLEC,EXTRAP

PARAMETER: 06282 GRAN TITRA ALK MG/LCAC03

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= .3500 CONCENTRATION ERROR INCREMENT= .0080

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.2	8.00		0.00	-.4 L	1.00	.4	5.00	.9	7.00		0.00
L003	-.09	1.00	9.3 EL	2.00	.07	6.00	-.013 L	1.00	.59	2.00	3.86	2.00
L014	.1	6.00	10.0	6.00	0.0	4.00	.3	4.00	.8	5.00	3.9	3.50
L025	.78 VH	14.00	10.2	8.50	.25	12.00	.48	10.00	.91	8.00	4.09	7.00
L030	.05	2.00	8.7 EL	1.00	-.19	2.00	.24	3.00	.58	1.00	3.82	1.00
L032	.09	4.00	9.97	5.00	.51 H	14.00	1.93 EH	14.00	.61	3.00	4.41	13.00
L081	.34	11.50	10.2	8.50	.17	9.00	.47	9.00	1.01	12.50	4.35	12.00
L088	.06	3.00	9.43 VL	3.00	-.03	3.00	.15	2.00	.65	4.00	3.90	3.50
L090	.34	11.50	10.38	11.00	.22	10.50	.44	7.00	1.04	14.00	4.23	11.00
L091	.267	10.00	10.50	13.00	.079	7.00	.448	8.00	.941	10.00	4.112	8.00
L093	.24	9.00	10.16	7.00	.30	13.00	.60	13.00	1.01	12.50	4.21	10.00
L094	.099	5.00	10.26	10.00	.103	8.00	.502	11.00	.874	6.00	3.999	6.00
L099	.35	13.00	10.45	12.00	.22	10.50	.52	12.00	1.00	11.00	4.19	9.00
L122	.19	7.00	9.92	4.00	.06	5.00	.42	6.00	.92	9.00	3.92	5.00
MEDIAN CONC.	.1950		10.1600		.0910		.4440		.9050		4.0900	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002		0.00		0.00		0.00		0.00
L003	39.9 EL	3.00	3.07	8.00	1.91	1.00	18.85	5.00
L014	40.2 EL	4.00	3.0	5.00	2.0	4.50	19.0	6.00
L025	41.8	7.00	3.03	6.00	3.18 EH	12.00	19.3	7.00
L030	40.8 L	5.00	2.53 L	2.00	1.94	2.00	18.7 L	4.00
L032	42.5 H	9.00	2.76	3.00	1.99	3.00	19.6	11.00
L081	43.2 EH	13.00	3.06	7.00	2.25	8.00	19.8 H	13.00
L088	39.74 EL	2.00	2.79	4.00	2.00	4.50	18.41 VL	2.00
L090	42.19	8.00	3.16	12.00	2.35	11.00	19.49	8.00
L091	43.08 VH	12.00	3.10	10.00	2.29	9.00	19.58	9.00
L093	38.18 EL	1.00	1.58 EL	1.00	8.70 EH	13.00	14.09 EL	1.00
L094	42.79 H	11.00	3.122	11.00	2.149	6.00	19.59	10.00
L099	42.75 H	10.00	3.09	9.00	2.30	10.00	19.7	12.00
L122	40.92 L	6.00	3.35	13.00	2.20	7.00	18.63 L	3.00
MEDIAN CONC.	41.8000		3.0600		2.2000		19.3000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L002	21.00	5.250	4	L	INSUFFICIENT DATA		
L003	31.00	3.100	10	EL L	EL BIASED LOW	10110	
L014	48.00	4.800	10		EL		
L025	91.50	9.150	10	VH	EH		
L030	23.00	2.300	10	EL	L L L BIASED LOW		
L032	79.00	7.900	10	H EH	H		
L081	103.50	10.350	10		EH H		
L088	31.00	3.100	10	VL	EL VLBIASED LOW	RADIOMETER TIT.	
L090	104.00	10.400	10			ENDPT OF 3.5-3.6	
L091	96.00	9.600	10		VH	GRAN TITRATION	
L093	80.50	8.050	10		ELELEHEL	TITRATION	
L094	84.00	8.400	10		H	AUTOMATIC TITRATOR	
L099	108.50	10.850	10		H BIASED HIGH	AUTO-TITRATION	
L122	65.00	6.500	10		L L		

OVERALL AVERAGE RANK IS 7.209

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L030	23.00	2.300	10	ELLLL	BIASED LOW		
L003	31.00	3.100	10	ELLEL	BIASED LOW	10110	
L088	31.00	3.100	10	VLELVL	BIASED LOW	RADIOMETER TIT.	
L014	48.00	4.800	10	EL			
L002	21.00	5.250	4	L	INSUFFICIENT DATA		
L122	65.00	6.500	10	LL			
L032	79.00	7.900	10	HEHH			
L093	80.50	8.050	10	ELELEHEL		TITRATION	
L094	84.00	8.400	10	H		AUTOMATIC TITRATOR	
L025	91.50	9.150	10	VHEH			
L091	96.00	9.600	10	VH		GRAN TITRATION	
L081	103.50	10.350	10	EHH			
L090	104.00	10.400	10			ENDPT OF 3.5-3.6	
L099	108.50	10.850	10	H	BIASED HIGH	AUTO-TITRATION	

OVERALL AVERAGE RANK IS 7.209

GRAN TITRA ALK

PARAMETER: 06592 Diss Inorg Carbon MG C/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .5000 BASIC ACCEPTABLE ERROR= .3000 CONCENTRATION ERROR INCREMENT= .0439

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	<.1	0.00	2.8	9.50	.6	9.00	.9 H	13.00	<.1 L	0.00	.8	2.00
L003		0.00	3.0	13.00		0.00	.6	8.50	.6	9.00	1.3	13.00
L006	.326	5.00	2.73	8.00	.385	5.00	.450	5.00	.487	5.00	1.12	7.00
L014	.480	10.50	2.880	12.00	.480	8.00	.600	8.50	.600	9.00	1.200	9.00
L023	5.0W	0.00	5.0W	0.00	5.0W	0.00	5.0W	0.00	5.0W	0.00	5.0W	0.00
L025	.2T	3.00	2.6	5.00	.2T	1.00	.2T L	1.00	.4T	3.50	1.	4.50
L029	.350	8.00	2.67	6.00	.350	3.00	.310	3.00	.345	1.00	.876	3.00
L030	.29	4.00	2.52	3.00	.87 H	12.00	.80	12.00	.51	6.00	1.27	11.00
L031	.1	1.00	2.7	7.00	.4	6.00	.5	7.00	.4	3.50	1.0	4.50
L033	.5W	0.00	2.4	2.00	.5W	0.00	.5W	0.00	.5W	0.00	.5W	0.00
L063	.48	10.50	2.55	4.00	.38	4.00	.43	4.00	.60	9.00	1.17	8.00
L091	.33	6.00	2.81	11.00	.43	7.00	.47	6.00	.61	11.00	1.10	6.00
L093	.64 H	12.00	3.05	14.00	.68	10.00	.76	11.00	.71	13.00	1.28	12.00
L094	.171	2.00	1.804 EL	1.00	.209	2.00	.302	2.00	.347	2.00	.435 EL	1.00
L099	.44	9.00	3.17 H	15.00	1.14 EH	13.00	1.28 EH	14.00	.68	12.00		0.00
L128	.34	7.00	2.80	9.50	.71	11.00	.64	10.00	.55	7.00	1.22	10.00
MEDIAN CONC.	.3350		2.7300		.4300		.5500		.5500		1.1200	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	9.5	3.00	.5 VL	2.00	<.1 EL	0.00	4.6	6.00
L003	11.5 VH	15.00	1.5 H	15.00	.80	12.00	5.3 H	16.00
L006	10.39	9.00	1.11	10.00	.740	8.50	4.88	10.00
L014	11.640 VH	16.00	1.200	13.00	.720	7.00	5.280 H	15.00
L023	10.0	7.00	5.0W	0.00	5.0W	0.00	5.0	12.00
L025	10.	7.00	.8T	4.00	.4T L	2.50	4.4	4.00
L029	10.5	13.00	.876	6.00	.507	4.00	4.67	7.00
L030	9.91	5.00	.91	7.00	.59	5.00	4.38	3.00
L031	10.4	10.50	.8	4.00	.4 L	2.50	4.8	9.00
L033	10.0	7.00	.8	4.00	.6	6.00	4.1 L	2.00
L063	9.25 L	2.00	1.13	11.00	.79	10.50	4.53	5.00
L091	10.4	10.50	1.06	8.50	.74	8.50	4.95	11.00
L093	10.48	12.00	1.31	14.00	.92	14.00	5.12	13.00
L094	9.113 L	1.00	.274 EL	1.00	.255 VL	1.00	3.691 EL	1.00
L099	10.99 H	14.00	1.16	12.00	.83	13.00	5.19	14.00
L128	9.84	4.00	1.06	8.50	.79	10.50	4.71	8.00
MEDIAN CONC.	10.1950		1.0600		.7300		4.7550	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	44.50	6.357	7	H L VLEL		
L003	101.50	12.688	8	VHH H	BIASED HIGH	SHIMADZU EXPT'L 00
L006	72.50	7.250	10			
L014	108.00	10.800	10	VH H		
L023	19.00	9.500	2		INSUFFICIENT DATA	IR ANALYZER
L025	35.50	3.550	10	L L	BIASED LOW	
L029	54.00	5.400	10			
L030	68.00	6.800	10	H		
L031	55.00	5.500	10	L		CONDUCTIVIMETRIE
L033	21.00	4.200	5	L		
L063	68.00	6.800	10	L		
L091	85.50	8.550	10			PERSULFATE OXIDAT.
L093	125.00	12.500	10	H	BIASED HIGH	DOHRMANN
L094	14.00	1.400	10	EL ELL ELVLEL	BIASED LOW	CO2 GENERATION
L099	116.00	12.889	9	H EHEH H	BIASED HIGH	INSTRUMENTAL
L128	85.50	8.550	10			TOC ANALYZER

OVERALL AVERAGE RANK IS 7.610

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L094	14.00	1.400	10	ELELLELVLEL	BIASED LOW	CO2 GENERATION
L025	35.50	3.550	10	LL	BIASED LOW	
L033	21.00	4.200	5	L		
L029	54.00	5.400	10			
L031	55.00	5.500	10	L		CONDUCTIVIMETRIE
L002	44.50	6.357	7	HLVLEL		
L030	68.00	6.800	10	H		
L063	68.00	6.800	10	L		
L006	72.50	7.250	10			
L091	85.50	8.550	10			PERSULFATE OXIDAT.
L128	85.50	8.550	10			TOC ANALYZER
L023	19.00	9.500	2		INSUFFICIENT DATA	IR ANALYZER
L014	108.00	10.800	10	VHH		
L093	125.00	12.500	10	H	BIASED HIGH	DOHRMANN
L003	101.50	12.688	8	VHHH	BIASED HIGH	SHIMADZU EXPT'L 00
L099	116.00	12.889	9	HEHEHH	BIASED HIGH	INSTRUMENTAL

OVERALL AVERAGE RANK IS 7.610

Diss Inorg Carbon

PARAMETER: 07092 Nitrate + Nitrite MG N/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0800 BASIC ACCEPTABLE ERROR= .0300 CONCENTRATION ERROR INCREMENT= .0444

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.395	2.00	1.12 L	3.00	.011	14.00	<.005	0.00	<.005	0.00	<.005	0.00
L005	.413	16.50	1.28	26.00	.01T	9.00	.01T	12.00	.01W	0.00	.01W	0.00
L006	.420	20.50	1.26	23.50	.010	9.00	.002	4.00	0.000	2.00	.001	2.50
L010	.402	10.00	1.23	11.00	.009	3.50	.002T	4.00	.002T	4.00	.002T	5.00
L011	.4	7.00	1.18	4.00	.02W	0.00	.02W	0.00	.02W	0.00	.02W	0.00
L014	.410	13.50	1.260	23.50	.010	9.00	.003	7.00	-.002	1.00	-.002	1.00
L023	.41	13.50	1.24	15.50	.01W	0.00	.01W	0.00	.01W	0.00	.01W	0.00
L024	.428	25.00	1.25	20.00	.013T	17.50	.01W	0.00	.01W	0.00	.01W	0.00
L025	.42	20.50	1.25	20.00	.01T	9.00	.005T	9.00	.005T	7.00	.01T	8.50
L029	.429	26.00	1.29	27.00	.017	21.00	.007T	10.00	.001W	0.00	.002T	5.00
L030	.420	20.50	1.25	20.00	.010	9.00	.002	4.00	.002	4.00	.002	5.00
L031	.40	7.00	1.07 EL	2.00	.010	9.00	<.010	0.00	<.010	0.00	<.010	0.00
L032	.38	1.00	1.06 EL	1.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00
L033	.405	11.00	1.22	9.00	.008	1.50	.005W	0.00	.005W	0.00	.005W	0.00
L034	.41	13.50	1.27	25.00	.05W	0.00	.05W	0.00	.05W	0.00	.05W	0.00
L047	.43	27.50	1.60 EH	28.00	.02T	22.00	.03T	14.00	.05W	0.00	.03T	10.00
L049	.410	13.50	1.246	17.00	.01T	9.00	.01T	12.00	.01T	8.00	.01T	8.50
L063	.421	23.00	1.239	13.50	.012	15.00	.003	7.00	.002	4.00	.001	2.50
L086	.415	18.00	1.25	20.00	.013	17.50	.004W	0.00	.004W	0.00	.004W	0.00
L094	.398	3.00	1.250	20.00	.013	17.50	.003	7.00	.004	6.00	.003	7.00
L102	.400	7.00	1.20	6.00	.02W	0.00	.02W	0.00	.02W	0.00	.02W	0.00
L104	.40	7.00	1.24	15.50	.01T	9.00	.01T	12.00	.01W	0.00	.01W	0.00
L114	.430	27.50	1.237	12.00	.063W	0.00	.044W	0.00	.020W	0.00	.04W	0.00
L116	.40	7.00	1.21	8.00	.013T	17.50	0.W	0.00	0.W	0.00	0.W	0.00
L119	.399	4.00	1.239	13.50	.016	20.00		0.00		0.00		0.00
L126	.427	24.00	1.221	10.00	.008	1.50	-.001W	1.00	-.001W	0.00	-.001W	0.00
L127	.42	20.50	1.20	6.00	.009	3.50	.001	2.00	<.001	0.00	<.001	0.00
L128	.413	16.50	1.20	6.00	.010	9.00	.01W	0.00	.01W	0.00	.01W	0.00
MEDIAN CONC.	.4100		1.2395		.0100		.0030		.0020		.0020	

PARAMETER: 07092 Nitrate + Nitrite MG N/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK

L002	.305	6.00	.020	2.50	.224	3.00	.066	9.50
L005	.324	17.00	.024	8.50	.244	24.00	.073	24.50
L006	.326	18.00	.026	16.00	.244	24.00	.072	22.50
L010	.314	9.50	.022	5.50	.232	9.00	.065	7.00
L011	.30	3.50	.02	2.50	.21	1.50	.05	1.50
L014	.330	20.50	.025	12.00	.240	18.50	.068	13.50
L023	.32	14.00	.03	23.00	.24	18.50	.07	17.00
L024	.331	23.00	.026T	16.00	.245	26.00	.071	20.00
L025	.33	20.50	.03	23.00	.25	27.00	.075	26.00
L029	.330	20.50	.027	19.50	.244	24.00	.068	13.50
L030	.32	14.00	.024	8.50	.235	13.50	.073	24.50
L031	.27 L	1.00	.020	2.50	.225	4.00	.055	3.00
L032	.28	2.00	<.05	0.00	.21	1.50	.05	1.50
L033	.319	12.00	.024	8.50	.238	16.00	.066	9.50
L034	.33	20.50	.05W	0.00	.24	18.50	.08	27.00
L047	.34	25.00	.05W	0.00	.29 H	28.00	.13 EH	28.00
L049	.314	9.50	.029	21.00	.228	5.00	.071	20.00
L063	.320	14.00	.026	16.00	.237	15.00	.072	22.50
L086	.333	24.00	.026	16.00	.230	6.50	.071	20.00
L094	.308	7.00	.025	12.00	.232	9.00	.067	12.00
L102	.300	3.50	.027	19.50	.230	6.50	.063	6.00
L104	.35	26.00	.03T	23.00	.24	18.50	.07T	17.00
L114	.667 EH	27.00	.029W	0.00	.242	21.00	.058	4.00
L116	.31	8.00	.02T	2.50	.233	11.00	.061	5.00
L119	.303	5.00	.024	8.50	.232	9.00	.066	9.50
L126	.318W	0.00	.022	5.50	.234	12.00	.066	9.50
L127	.315	11.00	.026	16.00	.235	13.50	.069	15.00
L128	.322	16.00	.025	12.00	.243	22.00	.070	17.00
MEDIAN CONC.	.3200		.0250		.2360		.0685	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING			BIAS STATEMENT	METHOD CODING
L002	40.00	5.714	7	L		BIASED LOW		
L005	137.50	17.188	8					
L006	142.00	14.200	10					
L010	68.50	6.850	10				AUTO CD REDUCTION	
L011	20.00	3.333	6			BIASED LOW		
L014	119.50	11.950	10					
L023	101.50	16.917	6				AUTO CADMIUM REDUC	
L024	147.50	21.071	7			BIASED HIGH	AUTO COLORIMETRIC	
L025	170.50	17.050	10					
L029	166.50	18.500	9					
L030	123.00	12.300	10					
L031	28.50	4.071	7	EL	L	BIASED LOW	COLOR. HYD. SULFAT	
L032	7.00	1.400	5	EL		BIASED LOW		
L033	67.50	9.643	7					
L034	104.50	20.900	5			BIASED HIGH		
L047	182.50	22.813	8	EH	H EH	BIASED HIGH	REDUCTION CADMIUM	
L049	123.50	12.350	10				AUTOANALYZER-LACHA	
L063	132.50	13.250	10					
L086	122.00	17.429	7					
L094	100.50	10.050	10				COLORIMETRIC	
L102	48.50	8.083	6				AUTO CD REDUC.	
L104	128.00	16.000	8					
L114	91.50	18.300	5		EH		C.I. WATERS	
L116	59.00	8.429	7				CHROMATO. IONIQUE	
L119	69.50	9.929	7					
L126	63.50	9.071	7					
L127	87.50	10.938	8				CD REDUCTION, AUTO	
L128	98.50	14.071	7				AUTOANALYZER	

OVERALL AVERAGE RANK IS 12.677

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L032	7.00	1.400	5	EL	BIASED LOW		
L011	20.00	3.333	6		BIASED LOW		
L031	28.50	4.071	7	ELL	BIASED LOW	COLOR. HYD. SULFAT	
L002	40.00	5.714	7	L	BIASED LOW		
L010	68.50	6.850	10			AUTO CD REDUCTION	
L102	48.50	8.083	6			AUTO CD REDUC.	
L116	59.00	8.429	7			CHROMATO. IONIQUE	
L126	63.50	9.071	7				
L033	67.50	9.643	7				
L119	69.50	9.929	7				
L094	100.50	10.050	10			COLORIMETRIC	
L127	87.50	10.938	8			CD REDUCTION, AUTO	
L014	119.50	11.950	10				

L030	123.00	12.300	10			
L049	123.50	12.350	10			AUTOANALYZER-LACHA
L063	132.50	13.250	10			
L128	98.50	14.071	7			AUTOANALYZER
L006	142.00	14.200	10			
L104	128.00	16.000	8			
L023	101.50	16.917	6			AUTO CADMIUM REDUC
L025	170.50	17.050	10			
L005	137.50	17.188	8			
L086	122.00	17.429	7			
L114	91.50	18.300	5	EH		C.I. WATERS
L029	166.50	18.500	9			
L034	104.50	20.900	5		BIASED HIGH	
L024	147.50	21.071	7		BIASED HIGH	AUTO COLORIMETRIC
L047	182.50	22.813	8	EHHEH	BIASED HIGH	REDUCTION CADMIUM

OVERALL AVERAGE
RANK IS 12.677

Nitrate + Nitrite

PARAMETER: 07093 Nitrate-IC mgN/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0800 BASIC ACCEPTABLE ERROR= .0300 CONCENTRATION ERROR INCREMENT= .0444

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L003	.43	27.00	1.23	26.00		0.00		0.00		0.00		0.00
L007	.38	2.00	1.13	4.00	.03W	0.00	.03W	0.00	.03W	0.00	.03W	0.00
L013	.414	17.00	1.163	8.50	.012	15.50	.007W	0.00	.007W	0.00	.007W	0.00
L013C	.40	9.00	1.17	12.00	.01	11.00	.01W	0.00	.01W	0.00	.01W	0.00
L021	.415	18.50	1.177	13.00	.008	5.50	.002W	0.00	.002W	0.00	.002W	0.00
L024	.427	25.50	1.21	23.50	.011T	13.50	.01W	0.00	.01W	0.00	.01W	0.00
L025	.42	21.00	1.28 H	29.00	.02T	18.00	.01W	0.00	.01W	0.00	.02T	7.00
L029	.395	5.00	1.15	7.00	.012	15.50	.005W	0.00	.005W	0.00	.005W	0.00
L031	.41	14.50	1.09 L	1.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00
L034	.4	9.00	1.1 L	2.00	.1W	0.00	.1W	0.00	.1W	0.00	.1W	0.00
L049	.39	4.00	1.27 H	28.00	.08T EH	21.00	.08T EH	9.00	.08T EH	7.00	.08T EH	8.00
L061	.41	14.50	1.20	20.50	.01	11.00	.002T	6.00	.002W	0.00	.002W	0.00
L063	.422	22.50	1.168	10.50	.021	19.00	.01W	0.00	.01W	0.00	.01W	0.00
L073	.437	28.50	1.19	16.50	.001W	0.00	.001W	0.00	.001W	0.00	.001W	0.00
L081	.408	13.00	1.20	20.50	.009	8.00	.008T	7.00	.008T	6.00	.008T	6.00
L082	.40	9.00	1.19	16.50	.009T	8.00	0.W	0.00	0.W	0.00	0.W	0.00
L088	.422	22.50	1.168	10.50	0.	1.00	0.	2.50	0.	2.50	0.	2.50
L090	.31 EL	1.00	1.22	25.00	.003T	3.50	.001W	0.00	.001W	0.00	.001W	0.00
L091	.403	12.00	1.19	16.50	.009	8.00	0.	2.50	0.	2.50	0.	2.50
L093	.411	16.00	1.163	8.50	.011	13.50	.001	4.50	.001	4.50	.001	4.50
L094	.415	18.50	1.136	5.00	.001	2.00	.001	4.50	.001	4.50	.001	4.50
L099	.448	30.00	1.38 EH	30.00	.051 H	20.00		0.00	.003W	0.00	.003W	0.00
L102	.416	20.00	1.19	16.50	.003	3.50	.002W	0.00	.002W	0.00	.002W	0.00
L104	.40	9.00	1.18	14.00	.01T	11.00	.01T	8.00	.01W	0.00	.01W	0.00
L109	.437	28.50	1.21	23.50	.001W	0.00	.001W	0.00	.001W	0.00	.001W	0.00
L114	.425	24.00	1.231	27.00	.063W	0.00	.044W	0.00	.020W	0.00	.04W	0.00
L119	.399	6.00	1.207	22.00	.016	17.00		0.00		0.00		0.00
L122	.40	9.00	1.14	6.00		0.00		0.00		0.00		0.00
L126	.427	25.50	1.191	19.00	.008	5.50	-.001W	1.00	-.001W	1.00	-.001W	1.00
L128	.386	3.00	1.12	3.00	.01W	0.00	.01W	0.00	.01W	0.00	.01W	0.00
MEDIAN CONC.	.4105		1.1900		.0100		.0010		.0010		.0010	

PARAMETER: 07093 Nitrate-IC mgN/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L003	.32	19.50	.02	4.50	.25	23.50	.07	16.00
L007	.31	11.00	.05	26.00	.23	4.50	.09	27.00
L013	.305	6.00	.017	2.00	.245	22.00	.081	26.00
L013C	.31	11.00	.02	4.50	.24	18.00	.07	16.00
L021	.310	11.00	.022	7.50	.234	10.50	.067	7.50
L024	.327	25.00	.025T	13.50	.244	21.00	.07	16.00
L025	.32	19.50	.03T	21.00	.25	23.50	.08	24.50
L029	.310	11.00	.026	16.00	.239	15.00	.066	5.00
L031	.29	2.00	.04	24.50	.28 H	29.00	.08	24.50
L034	.30	3.50	.1W	0.00	.21	2.00	.1W	0.00
L049	.31	11.00	.03	21.00	.17 VL	1.00	.07	16.00
L061	.31	11.00	.03	21.00	.23	4.50	.07	16.00
L063	.325	24.00	.025	13.50	.254	25.00	.070	16.00
L073	.330	27.50	.04T	24.50	.285 H	30.00	.077	23.00
L081	.316	16.00	.024	11.50	.239	15.00	.068	9.50
L082	.30	3.50	.02	4.50	.23	4.50	.07	16.00
L088	.323	22.50	.026	16.00	.241	20.00	.064	2.00
L090	.32	19.50	.02	4.50	.24	18.00	.07	16.00
L091	.307	7.00	.023	9.50	.231	7.50	.067	7.50
L093	.313	15.00	.026	16.00	.237	12.00	.068	9.50
L094	.323	22.50	.001	1.00	.259	26.00	.105 H	28.00
L099	.355 H	29.00	.063 H	27.00	.279 H	27.50	.107 H	29.00
L102	.320	19.50	.027	18.00	.239	15.00	.065	3.00
L104	.33	27.50	.03T	21.00	.24	18.00	.07T	16.00
L109	.329	26.00	.023T	9.50	.279 H	27.50	.075	22.00
L114	.318	17.00	.029W	0.00	.231	7.50	.052	1.00
L119	.303	5.00	.024	11.50	.232	9.00	.066	5.00
L122	.31	11.00	.03	21.00	.23	4.50	.07	16.00
L126	.309W	0.00	.022	7.50	.234	10.50	.066	5.00
L128	.281	1.00	.01W	0.00	.238	13.00	.070	16.00
MEDIAN CONC.	.3130		.0250		.2390		.0700	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L003	116.50	19.417	6		D7315	
L007	74.50	12.417	6			
L013	97.00	13.857	7			
L013C	81.50	11.643	7			
L021	73.50	10.500	7			
L024	138.00	19.714	7		AUTO COLORIMETRIC	
L025	163.50	20.438	8	H		
L029	74.50	10.643	7		IC	
L031	95.50	15.917	6	L H		
L034	16.50	4.125	4	L INSUFFICIENT DATA		
L049	126.00	12.600	10	H EHEHEHEH VL	WATERS-I.C.	
L061	104.50	13.063	8		I.C.	
L063	130.50	18.643	7			
L073	150.00	25.000	6	H BIASED HIGH	WATERS	
L081	112.50	11.250	10			
L082	62.00	8.857	7		CI	
L088	102.00	10.200	10		DIONEX	
L090	87.50	12.500	7	EL	DIONEX - IC	
L091	75.50	7.550	10		IC	
L093	104.00	10.400	10		DIONEX IC	
L094	116.50	11.650	10	H	ION CHROMATOGRAPHY	
L099	192.50	27.500	7	EHH H H H H BIASED HIGH	IC	
L102	95.50	13.643	7		IC	
L104	124.50	15.563	8			
L109	137.00	22.833	6	H BIASED HIGH	WATERS IC	
L114	76.50	15.300	5		C.I. WATERS	
L119	75.50	10.786	7			
L122	67.50	11.250	6		IC	
L126	76.00	8.444	9			
L128	36.00	7.200	5		IC	

OVERALL AVERAGE RANK IS 13.559

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L034	16.50	4.125	4	L	INSUFFICIENT DATA		
L128	36.00	7.200	5			IC	
L091	75.50	7.550	10			IC	
L126	76.00	8.444	9				
L082	62.00	8.857	7			CI	
L088	102.00	10.200	10			DIONEX	
L093	104.00	10.400	10			DIONEX IC	
L021	73.50	10.500	7				
L029	74.50	10.643	7			IC	
L119	75.50	10.786	7				
L081	112.50	11.250	10				
L122	67.50	11.250	6			IC	
L013C	81.50	11.643	7				
L094	116.50	11.650	10	H		ION CHROMATOGRAPHY	
L007	74.50	12.417	6				
L090	87.50	12.500	7	EL		DIONEX - IC	
L049	126.00	12.600	10	HEHEHEHEHVL		WATERS-I.C.	
L061	104.50	13.063	8			I.C.	
L102	95.50	13.643	7			IC	
L013	97.00	13.857	7				
L114	76.50	15.300	5			C.I. WATERS	
L104	124.50	15.563	8				
L031	95.50	15.917	6	LH			
L063	130.50	18.643	7				
L003	116.50	19.417	6			D7315	
L024	138.00	19.714	7			AUTO COLORIMETRIC	
L025	163.50	20.438	8	H			
L109	137.00	22.833	6	H	BIASED HIGH	WATERS IC	
L073	150.00	25.000	6	H	BIASED HIGH	WATERS	
L099	192.50	27.500	7	EHHHHHH	BIASED HIGH	IC	

OVERALL AVERAGE
RANK IS 13.559

Nitrate-IC

PARAMETER: 07192 Ammonia MG N/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0050 BASIC ACCEPTABLE ERROR= .0250 CONCENTRATION ERROR INCREMENT= .0424

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.017	3.00	.752	18.00	.017	3.00	.006	1.00	<.001	0.00	<.001	0.00
L005	.021	7.50	.770	24.00	.025	11.00	.013	11.00	.005W	0.00	.005W	0.00
L006	.0213	10.00	.7890	31.00	.0258	13.00	.0141	15.00	.0003	3.00	.0007	3.00
L010	.025	18.00	.726	5.00	.04	31.00	.03	29.00	.002	6.00	.004	10.50
L013	.030	28.50	.744	14.00	.033	26.00	.023W	0.00	.023W	0.00	.023W	0.00
L013C	.026	21.00	.771	26.00	.029	20.00	.016	19.00	.005W	0.00	.005W	0.00
L014	.03	28.50	.78	28.50	.04	31.00	.02	25.00	.01	15.50	.01	15.50
L021	.022	11.50	.813 H	35.00	.028	17.50	.014	13.00	.008W	0.00	.008W	0.00
L023	.029	26.00	.791	33.00	.035	28.00	.021	27.00	.005	11.50	.003	8.50
L024	.03T	28.50	.77	24.00	.03T	22.50	.02T	25.00	.01W	0.00	.01W	0.00
L025	.026	21.00	.76	19.00	.028	17.50	.018	22.00	.002T	6.00	.004T	10.50
L029	.027	23.50	.696	1.00	.024	8.00	.016	19.00	.007T	14.00	.009T	14.00
L030	.025	18.00	.780	28.50	.028	17.50	.014	13.00	.002	6.00	.002	5.50
L031	.015	1.50	.73	6.00	.015	1.00	.010	6.50	<.010	0.00	<.010	0.00
L032	.028	25.00	.77	24.00	.035	28.00	.022	28.00	<.01	0.00	<.01	0.00
L033	.024	15.00	.80	34.00	.028	17.50	.014	13.00	.001	4.00	.002	5.50
L047	.04T	31.50	.74	11.50	.04T	31.00	.04T H	30.00	.08T EH	17.00	.06T EH	17.00
L049	.027	23.50	.763	20.00	.035	28.00	.018	22.00	.01T	15.50	.01T	15.50
L061	.02	4.50	.75	16.00	.03	22.50	.02	25.00	.02W	0.00	.02W	0.00
L063	.024	15.00	.741	13.00	.027	14.50	.015	16.50	.003	8.00	.003	8.50
L073	.023	13.00	.736	7.00	.023	5.50	.009T	3.50	.001W	0.00	.001W	0.00
L081	.021	7.50	.706	2.00	.021	4.00	.008	2.00	.005T	11.50	.005T	12.50
L082	.015	1.50	.765	21.50	.023	5.50	.01	6.50	.003W	0.00	.004W	0.00
L086	.02W	0.00	.75	16.00	.02W	0.00	.02W	0.00	.02W	0.00	.02W	0.00
L091	.038W	0.00	.75	16.00	.038W	0.00	.038W	0.00	.038W	0.00	.038W	0.00
L093	.022	11.50	.710	3.50	.024	8.00	.009	3.50	0.000	1.50	0.000	2.00
L094	.026	21.00	.738	9.50	.032	25.00	.016	19.00	.004	9.00	.002	5.50
L099	.025	18.00	.738	9.50	.024	8.00	.012T	9.50	.005W	0.00	.005W	0.00
L102	.021	7.50	.737	8.00	.027	14.50	.015	16.50	.005T	11.50	.005T	12.50
L104	.04T	31.50	.79	32.00	.03T	22.50	.01T	6.50	.01W	0.00	.01W	0.00
L116	.021	7.50	.778	27.00	.025	11.00	.01T	6.50	.005T	11.50	.002T	5.50
L119		0.00	.765	21.50		0.00		0.00		0.00		0.00
L126	.020	4.50	.784	30.00	.030	22.50	.018	22.00	0.000T	1.50	-.002W	1.00
L127	.024	15.00	.710	3.50	.025	11.00	.012	9.50	<.005	0.00	<.005	0.00
L128	.03	28.50	.74	11.50	.016	2.00	.01W	0.00	.01W	0.00	.01W	0.00
MEDIAN CONC.	.0245		.7520		.0280		.0146		.0040		.0030	

PARAMETER: 07192 Ammonia MG N/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	<.001	0.00	<.001	0.00	<.001 L	0.00	.022	4.50
L005	.005W	0.00	.005T	12.00	.030	19.50	.028	15.00
L006	.0010	4.50	.0006	4.00	.0272	14.00	.0270	12.00
L010	.002T	8.00	.002T	8.50	.023	5.50	.023	6.50
L013	.023W	0.00	.023W	0.00	.025	9.00	.028	15.00
L013C	.005W	0.00	.005W	0.00	.031	23.00	.030	20.50
L014	0.00	1.50	.01	15.50	.04	29.00	.04	29.50
L021	.008W	0.00	0.000T	2.50	.026	10.50	.028	15.00
L023	.003	10.00	.002	8.50	.036	26.50	.033	24.00
L024	.01W	0.00	.01W	0.00	.03T	19.50	.03T	20.50
L025	.004T	11.00	.008T	14.00	.036	26.50	.036	26.50
L029	.001W	0.00	.001W	0.00	.024	7.50	.011	2.00
L030	.002	8.00	.002	8.50	.031	23.00	.036	26.50
L031	<.010	0.00	<.010	0.00	.020	3.00	.020	3.00
L032	<.01	0.00	<.01	0.00	.035	25.00	.032	23.00
L033	.001	4.50	.001	5.50	.030	19.50	.030	20.50
L047	.02T	15.00	.02T	17.00	.05T	30.00	.05T	31.00
L049	.01T	14.00	.01T	15.50	.031	23.00	.037	28.00
L061	.02W	0.00	.02W	0.00	.02	3.00	.03	20.50
L063	.002	8.00	.002	8.50	.029	16.50	.029	17.50
L073	.001W	0.00	.001W	0.00	.001W	0.00	.026	9.50
L081	.005T	12.50	.005T	12.00	.026	10.50	.029	17.50
L082	0.W	0.00	.007W	0.00	.024	7.50	.022	4.50
L086	.02W	0.00	.02W	0.00	.02W	0.00	.02W	0.00
L091	.038W	0.00	.038W	0.00	.038W	0.00	.038W	0.00
L093	0.000	1.50	0.000	2.50	.023	5.50	.024	8.00
L094	.001	4.50	.001	5.50	.038	28.00	.023	6.50
L099	.005W	0.00	.005W	0.00	.028	15.00	.027	12.00
L102	.005T	12.50	.005T	12.00	.027	12.50	.026	9.50
L104	.01W	0.00	.01W	0.00	.02T	3.00	.01T	1.00
L116	0.W	0.00	0.W	0.00	.029	16.50	.034	25.00
L119		0.00		0.00		0.00		0.00
L126	.001T	4.50	-.001T	1.00	.001T L	1.00	.056 H	32.00
L127	<.005	0.00	<.005	0.00	.027	12.50	.027	12.00
L128	.01W	0.00	.01W	0.00	.03	19.50	.04	29.50
MEDIAN CONC.	.0020		.0020		.0285		.0285	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L002	29.50	5.900	5		L	BIASED LOW	
L005	100.00	14.286	7				
L006	109.50	10.950	10				
L010	128.00	12.800	10				AUTO PHENOL HYPOCH
L013	92.50	18.500	5				
L013C	129.50	21.583	6				
L014	219.50	21.950	10				
L021	105.00	15.000	7	H			
L023	203.00	20.300	10				AUTO PHENATE
L024	140.00	23.333	6				AUTO COLORIMETRIC
L025	174.00	17.400	10				
L029	89.00	11.125	8				
L030	154.50	15.450	10				
L031	21.00	3.500	6			BIASED LOW	COLOR. BERTHELOT
L032	153.00	25.500	6			BIASED HIGH	
L033	139.00	13.900	10				
L047	231.00	23.100	10	H EHEH		BIASED HIGH	FIASTAR
L049	205.00	20.500	10				AUTOANALYZER-TECHN
L061	91.50	15.250	6				PHENATE A.C.
L063	126.00	12.600	10				
L073	38.50	7.700	5				WATERS
L081	92.00	9.200	10				
L082	47.00	7.833	6				FIA
L086	16.00	16.000	1			INSUFFICIENT DATA	
L091	16.00	16.000	1			INSUFFICIENT DATA	COLORIMETRIC AA
L093	47.50	4.750	10			BIASED LOW	TECHNICON
L094	133.50	13.350	10				COLORIMETRIC
L099	72.00	12.000	6				ICP
L102	117.00	11.700	10				AUTOMATED BERTHELO
L104	96.50	16.083	6				
L116	110.50	13.813	8				COLORIMETRIE
L119	21.50	21.500	1			INSUFFICIENT DATA	
L126	120.00	12.000	10		L H		
L127	63.50	10.583	6				INDOPHENOL BLUE
L128	91.00	18.200	5				AUTOANALYZER

OVERALL AVERAGE RANK IS 14.486

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L031	21.00	3.500	6	BIASED LOW	COLOR. BERTHELOT	
L093	47.50	4.750	10	BIASED LOW	TECHNICON	
L002	29.50	5.900	5	L BIASED LOW		
L073	38.50	7.700	5		WATERS	
L082	47.00	7.833	6		FIA	
L081	92.00	9.200	10			
L127	63.50	10.583	6		INDOPHENOL BLUE	
L006	109.50	10.950	10			
L029	89.00	11.125	8			
L102	117.00	11.700	10		AUTOMATED BERTHELO	
L099	72.00	12.000	6		ICP	
L126	120.00	12.000	10	LH		
L063	126.00	12.600	10			
L010	128.00	12.800	10		AUTO PHENOL HYPOCH	
L094	133.50	13.350	10		COLORIMETRIC	
L116	110.50	13.813	8		COLORIMETRIE	
L033	139.00	13.900	10			
L005	100.00	14.286	7			
L021	105.00	15.000	7	H		
L061	91.50	15.250	6		PHENATE A.C.	
L030	154.50	15.450	10			
L086	16.00	16.000	1	INSUFFICIENT DATA		
L091	16.00	16.000	1	INSUFFICIENT DATA	COLORIMETRIC AA	
L104	96.50	16.083	6			
L025	174.00	17.400	10			
L128	91.00	18.200	5		AUTOANALYZER	
L013	92.50	18.500	5			
L023	203.00	20.300	10		AUTO PHENATE	
L049	205.00	20.500	10		AUTOANALYZER-TECHN	
L119	21.50	21.500	1	INSUFFICIENT DATA		
L013C	129.50	21.583	6			
L014	219.50	21.950	10			
L047	231.00	23.100	10	HEHEH BIASED HIGH	FIASTAR	
L024	140.00	23.333	6		AUTO COLORIMETRIC	
L032	153.00	25.500	6	BIASED HIGH		

OVERALL AVERAGE RANK IS 14.486

Ammonia

PARAMETER: 07392 Total Kjeldahl N MG N/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .1000 BASIC ACCEPTABLE ERROR= .0600 CONCENTRATION ERROR INCREMENT= .0384

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.158	5.00	.891	9.00	.163	5.00	.138	3.00	.111	5.00	.240	7.50
L006	.192	8.00	.860	6.00	.208	8.00	.144	6.00	.120	6.50	.241	9.00
L014	.09 L	2.00	.64 EL	1.00	.18	7.00	.15	7.50	.13	8.00	.19	4.00
L023	.2W	0.00	.72 VL	3.00	.2W	0.00	.2W	0.00	.2W	0.00	.2W	0.00
L024	.151	4.00	.871	7.00	.109 L	2.00	.09	2.00	.075	2.00	.156	2.00
L025	.18	7.00	.9	10.00	.16	3.50	.14	4.50	.1	3.00	.2	5.50
L029	.062 VL	1.00	.70 VL	2.00	.054 VL	1.00	.018T EL	1.00	.066	1.00	.074 EL	1.00
L032	.28 VH	10.00	1.06 EH	13.00	.36 EH	11.00	.27 VH	11.00	.30 EH	11.00	.40 EH	11.00
L033	.15	3.00	.83	4.00	.16	3.50	.15	7.50	.12	6.50	.20	5.50
L047	.33 EH	12.00	1.04 VH	12.00	.52 EH	12.00	.45 EH	12.00	.32 EH	12.00	.46 EH	12.00
L049	.268 VH	9.00	.885	8.00	.244 H	10.00	.259 VH	10.00	.219 VH	10.00	.307 H	10.00
L102	.166	6.00	.849	5.00	.169	6.00	.140	4.50	.110	4.00	.172	3.00
L128	.32 EH	11.00	.94	11.00	.21	9.00	.25 VH	9.00	.16	9.00	.24	7.50
MEDIAN CONC.	.1730		.8710		.1745		.1470		.1200		.2200	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.143 H	8.00	<.014	0.00	.235	5.00	.146	3.00
L006	.071	4.00	.023	5.00	.214	3.00	.162	7.00
L014	.02 L	1.00	.02	3.00	.20	2.00	.16	5.00
L023	.2W	0.00	.30 EH	9.00	.25	7.50	.2W	0.00
L024	.066	3.00	.01W	0.00	.221	4.00	.126	2.00
L025	.08T	5.50	.02W	0.00	.28	9.00	.16	5.00
L029	.028T	2.00	.001W	1.00	.026T EL	1.00	.046T VL	1.00
L032	.20 VH	9.00	<.2	0.00	.44 EH	12.00	.40 EH	12.00
L033	.08	5.50	.02	3.00	.25	7.50	.16	5.00
L047	.21T EH	11.00	.22T EH	8.00	.59 EH	13.00	.33 EH	11.00
L049	.207 EH	10.00	.02T	3.00	.317 H	10.00	.233 H	10.00
L102	.082	7.00	.04T	6.00	.239	6.00	.166	8.00
L128	.23 EH	12.00	.09 H	7.00	.41 EH	11.00	.23 H	9.00
MEDIAN CONC.	.0810		.0230		.2500		.1610	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	50.50	5.611	9	H		
L006	62.50	6.250	10			
L014	40.50	4.050	10	L EL L		
L023	19.50	6.500	3	VL EH INSUFFICIENT DATA	AUTO PHENATE	
L024	28.00	3.111	9	L BIASED LOW	DIG/COLORIMETRIC	
L025	53.00	5.889	9			
L029	12.00	1.200	10	VLVLVLEL EL ELVLBIASED LOW		
L032	100.00	11.111	9	VHEHEHVHEHEHVH EHEHBIASED HIGH		
L033	51.00	5.100	10			
L047	115.00	11.500	10	EHVHEHEHEHEHEHEHEHEHBIASED HIGH	FIASTAR	
L049	90.00	9.000	10	VH H VHVHH EH H H	AUTOANALYZER-LACHA	
L102	55.50	5.550	10		HGSO4 DIG., AUTO	
L128	95.50	9.550	10	EH VH EHH EHH	DISTILLATION-AUTO	

OVERALL AVERAGE
RANK IS 6.496

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L029	12.00	1.200	10	VLVLVLELELELVL BIASED LOW		
L024	28.00	3.111	9	L BIASED LOW	DIG/COLORIMETRIC	
L014	40.50	4.050	10	LELL		
L033	51.00	5.100	10			
L102	55.50	5.550	10		HGSO4 DIG., AUTO	
L002	50.50	5.611	9	H		
L025	53.00	5.889	9			
L006	62.50	6.250	10			
L023	19.50	6.500	3	VLEH INSUFFICIENT DATA	AUTO PHENATE	
L049	90.00	9.000	10	VHHVHVHHEHHH	AUTOANALYZER-LACHA	
L128	95.50	9.550	10	EHVHEHHEHH	DISTILLATION-AUTO	
L032	100.00	11.111	9	VHEHEHVHEHEHVHEHEH BIASED HIGH		
L047	115.00	11.500	10	EHVHEHEHEHEHEHEHEHEHBIASED HIGH	FIASTAR	

OVERALL AVERAGE
RANK IS 6.496

Total Kjeldahl N

PARAMETER: 11091 Sodium MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .2000 BASIC ACCEPTABLE ERROR= .0700 CONCENTRATION ERROR INCREMENT= .0286

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.65	39.00	1.20	31.50	2.71	14.00	2.87	12.00	.49	14.00	1.25	23.00
L003	.61	32.50	1.2	31.50	2.9	38.50	3.0	31.00	.51	29.50	1.3	36.00
L006	.616	35.00	1.206	35.00	2.773	24.00	2.970	25.50	.511	32.00	1.274	33.00
L007	.61	32.50	1.17	24.00	2.67	10.00	2.83	9.50	.54	38.00	1.23	19.50
L010	.6	24.00	1.2	31.50	2.8	28.00	3.0	31.00	.5	24.50	1.1 L	3.50
L013	.576	7.00	1.128	11.00	2.731	17.00	2.920	19.00	.497	20.50	1.202	14.00
L013C	.60	24.00	1.12	9.00	2.66	9.00	2.88	13.00	.49	14.00	1.22	16.00
L021	.632	36.00	1.236	37.00	2.930 H	40.00	3.142 H	38.00	.531	36.00	1.327	38.00
L023	.60	24.00		0.00	2.53 VL	5.00	2.74 L	5.50	.50	24.50	1.18	10.00
L024	.64	37.00	1.20	31.50	2.9	38.50	3.1 H	37.00	.54	38.00	1.30	36.00
L025	.604	30.00	1.16	21.50	2.82	30.50	3.	31.00	.516	34.00	1.26	26.00
L029	.60	24.00	1.14	12.50	2.80	28.00	2.90	16.50	.50	24.50	1.22	16.00
L030	.594	17.00	1.20	31.50	2.82	30.50	3.03	34.50	.496	19.00	1.27	31.00
L031	.58	9.50	1.15	17.00	2.61 L	8.00	2.74 L	5.50	.46	5.00	1.16	9.00
L032	.61	32.50	1.21	36.00	2.80	28.00	2.99	29.00	.54	38.00	1.27	31.00
L033	.61	32.50	1.15	17.00	2.78	25.50	2.97	25.50	.51	29.50	1.26	26.00
L034	.6	24.00	1.2	31.50	2.7	13.00	2.9	16.50	.5	24.50	1.3	36.00
L047	.49 L	2.00	1.06	5.50	2.76	21.00	2.93	20.50	.40 L	2.00	1.09 L	2.00
L049	.59	15.50	1.15	17.00	2.69	12.00	2.86	11.00	.49	14.00	1.23	19.50
L057	.56	4.00	1.04 L	2.50	2.53 VL	5.00	2.64 VL	3.00	.47	6.50	1.10 L	3.50
L061	.600	24.00	1.171	26.00	2.767	23.00	2.945	23.00	.504	28.00	1.259	24.00
L063	.603	29.00	1.332 VH	38.00	2.845	34.00	3.068	36.00	.511	32.00	1.386 VH	40.00
L073	.589	14.00	1.15	17.00	2.76	21.00	2.93	20.50	.492	17.00	1.23	19.50
L081	.58	9.50	1.05 L	4.00	2.58 L	7.00	2.79	7.00	.47	6.50	1.15	7.50
L082	.59	15.50	1.16	21.50	2.68	11.00	2.82	8.00	.48	9.00	1.27	31.00
L088	.45 VL	1.00	.91 EL	1.00	2.38 EL	2.00	2.54 EL	2.00	.37 VL	1.00	.99 EL	1.00
L090	.596	19.00	1.12	9.00	2.84	33.00	2.98	27.50	.493	18.00	1.22	16.00
L091	.60	24.00	1.15	17.00	2.73	15.50	2.94	22.00	.50	24.50	1.24	22.00
L093	.55	3.00	1.04 L	2.50	2.78	25.50	2.98	27.50	.45	3.50	1.15	7.50
L094	.645	38.00	1.411 EH	39.00	2.879	36.00	3.238 EH	39.00	.511	32.00	1.339 H	39.00
L099	.60	24.00	1.15	17.00	2.73	15.50	2.89	14.00	.52	35.00	1.26	26.00
L102	.57	5.50	1.06	5.50	2.53 VL	5.00	2.69 VL	4.00	.45	3.50	1.14	6.00
L109	.585	12.00	1.15	17.00	2.76	21.00	2.90	16.50	.490	14.00	1.23	19.50
L114	.77 EH	40.00	1.14	12.50	2.89	37.00	3.24 EH	40.00	.70 EH	40.00	1.19	11.00
L116	.57	5.50	1.17	24.00	2.52 VL	3.00	2.83	9.50	.48	9.00	1.20	12.50
L119	.587	13.00	1.107	7.00	2.732	18.00	2.950	24.00	.483	11.00	1.262	28.00
L122	.58	9.50	1.17	24.00	2.10 EL	1.00	2.22 EL	1.00	.48	9.00	1.11 L	5.00
L126	.595	18.00	1.180	27.50	2.832	32.00	3.013	33.00	.497	20.50	1.269	29.00
L127	.60	24.00	1.18	27.50	2.87	35.00	3.03	34.50	.49	14.00	1.29	34.00
L128	.58	9.50	1.12	9.00	2.74	19.00	2.90	16.50	.50	24.50	1.20	12.50
MEDIAN CONC.	.6000		1.1500		2.7600		2.9300		.4970		1.2300	

PARAMETER: 11091 Sodium MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	1.38	22.00	.08	7.00	.55	28.00	1.45	17.00
L003	1.5 H	37.00	.09	12.50	.59	38.50	1.6 H	38.50
L006	1.396	26.00	.106	37.00	.569	35.00	1.499	30.00
L007	1.35	15.50	.09	12.50	.54	18.50	1.46	23.00
L010	1.4	28.50	.1T	29.50	.5	6.00	1.2 EL	2.00
L013	1.328	10.00	.094	20.00	.531	13.50	1.459	20.00
L013C	1.34	12.50	.10	29.50	.55	28.00	1.44	13.50
L021	1.450	34.00	.102	35.00	.580	36.50	1.570 H	36.00
L023	1.28	7.00	.10	29.50	.55	28.00	1.35 L	5.50
L024	1.50 H	37.00	.10T	29.50	.58	36.50	1.60 H	38.50
L025	1.39	24.50	.098	22.50	.56	33.50	1.48	27.50
L029	1.31	8.00	.07	4.50	.55	28.00	1.38	7.00
L030	1.40	28.50	.091	16.00	.545	21.00	1.51	32.00
L031	1.34	12.50	.09	12.50	.50	6.00	1.42	11.00
L032	1.39	24.50	.16	38.00	.59	38.50	1.58 H	37.00
L033	1.40	28.50	.10	29.50	.54	18.50	1.48	27.50
L034	1.5 H	37.00	.1	29.50	.5	6.00	1.5	31.00
L047	1.26 L	6.00	.05W	1.00	.44 L	2.00	1.45	17.00
L049	1.37	19.00	.09	12.50	.53	12.00	1.46	23.00
L057	1.24 L	4.50	.06	2.50	.49	3.50	1.33 L	3.50
L061	1.380	22.00	.098	22.50	.558	32.00	1.494	29.00
L063	1.552 VH	39.00	.099	24.00	.546	22.00	1.621 VH	40.00
L073	1.34	12.50	.092	17.50	.535	16.00	1.45	17.00
L081	1.24 L	4.50	.08	7.00	.51	8.50	1.35 L	5.50
L082	1.42	33.00	.093	19.00	.55	28.00	1.39	8.00
L088	1.09 EL	1.00	.06	2.50	.40 VL	1.00	1.17 EL	1.00
L090	1.36	17.50	.096	21.00	.547	23.50	1.46	23.00
L091	1.36	17.50	.10	29.50	.54	18.50	1.46	23.00
L093	1.22 VL	2.00	.08	7.00	.49	3.50	1.40	9.50
L094	1.494 H	35.00	.170 H	39.00	.605	40.00	1.524	35.00
L099	1.34	12.50	.09	12.50	.55	28.00	1.44	13.50
L102	1.23 L	3.00	.10	29.50	.51	8.50	1.33 L	3.50
L109	1.35	15.50	.092	17.50	.531	13.50	1.45	17.00
L114	1.68 EH	40.00	.08W	0.00	.55	28.00	1.46	23.00
L116	1.38	22.00	.09	12.50	.52	10.50	1.45	17.00
L119	1.372	20.00	.104	36.00	.532	15.00	1.476	26.00
L122	1.40	28.50	.10	29.50	.52	10.50	1.40	9.50
L126	1.406	31.00	.082	9.00	.547	23.50	1.511	33.00
L127	1.41	32.00	.07	4.50	.56	33.50	1.52	34.00
L128	1.32	9.00	.10	29.50	.54	18.50	1.43	12.00
MEDIAN CONC:	1.3760		.0940		.5425		1.4595	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	207.50	20.750	10			
L003	325.50	32.550	10	H H BIASED HIGH		11103
L006	312.50	31.250	10			
L007	203.00	20.300	10			
L010	208.50	20.850	10	L EL		ICP
L013	152.00	15.200	10			
L013C	168.50	16.850	10			
L021	366.50	36.650	10	H H H BIASED HIGH		
L023	139.00	15.444	9	VLL L		ICP/FAA
L024	359.50	35.950	10	H H H BIASED HIGH		ICP
L025	281.00	28.100	10			
L029	169.00	16.900	10			
L030	261.00	26.100	10			
L031	96.00	9.600	10	L L		ICP
L032	332.50	33.250	10	H BIASED HIGH		
L033	260.00	26.000	10			
L034	249.00	24.900	10	H		
L047	79.00	7.900	10	L L L L L L BIASED LOW		ICP
L049	155.50	15.550	10			ATOMIC ABSORPTION
L057	38.50	3.850	10	L VLVL L L L BIASED LOW		
L061	253.50	25.350	10			FLAME AA
L063	334.00	33.400	10	VH VHVH VHBIASED HIGH		
L073	172.00	17.200	10			WATERS
L081	67.00	6.700	10	L L L L BIASED LOW		
L082	184.00	18.400	10			ICP
L088	13.50	1.350	10	VLELELELVLELEL VLELBIASED LOW		AA-FLAME
L090	207.50	20.750	10			FLAME AAS
L091	213.50	21.350	10			FLAME AA
L093	91.50	9.150	10	L VL		AA 2380 FLAME
L094	372.00	37.200	10	EH EH H H H BIASED HIGH		FLAME AA
L099	198.00	19.800	10			ICP
L102	74.00	7.400	10	VLVL L L BIASED LOW		IC
L109	163.50	16.350	10			WATERS IC
L114	271.50	30.167	9	EH EHEH EH		I.C.P.
L116	125.50	12.550	10	VL		SEAP
L119	198.00	19.800	10			
L122	127.50	12.750	10	ELEL L		AA - FLAME
L126	256.50	25.650	10			
L127	273.00	27.300	10			ICP
L128	160.00	16.000	10			ICP

OVERALL AVERAGE RANK IS 20.402

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L088	13.50	1.350	10	VLELELELVLELELVLEL	BIASED LOW	AA-FLAME	
L057	38.50	3.850	10	LVLVLLLL	BIASED LOW		
L081	67.00	6.700	10	LLLL	BIASED LOW		
L102	74.00	7.400	10	VLVLLL	BIASED LOW	IC	
L047	79.00	7.900	10	LLLLL	BIASED LOW	ICP	
L093	91.50	9.150	10	LVL		AA 2380 FLAME	
L031	96.00	9.600	10	LL		ICP	
L116	125.50	12.550	10	VL		SEAP	
L122	127.50	12.750	10	ELELL		AA - FLAME	
L013	152.00	15.200	10				
L023	139.00	15.444	9	VLLL		ICP/FAA	
L049	155.50	15.550	10			ATOMIC ABSORPTION	
L128	160.00	16.000	10			ICP	
L109	163.50	16.350	10			WATERS IC	
L013C	168.50	16.850	10				
L029	169.00	16.900	10				
L073	172.00	17.200	10			WATERS	
L082	184.00	18.400	10			ICP	
L099	198.00	19.800	10			ICP	
L119	198.00	19.800	10				
L007	203.00	20.300	10				
L002	207.50	20.750	10				
L090	207.50	20.750	10			FLAME AAS	
L010	208.50	20.850	10	LEL		ICP	
L091	213.50	21.350	10			FLAME AA	
L034	249.00	24.900	10	H			
L061	253.50	25.350	10			FLAME AA	
L126	256.50	25.650	10				
L033	260.00	26.000	10				
L030	261.00	26.100	10				
L127	273.00	27.300	10			ICP	
L025	281.00	28.100	10				
L114	271.50	30.167	9	EHEHEHEH		I.C.P.	
L006	312.50	31.250	10				
L003	325.50	32.550	10	HH	BIASED HIGH	11103	
L032	332.50	33.250	10	H	BIASED HIGH		
L063	334.00	33.400	10	VHVHVHVH	BIASED HIGH		
L024	359.50	35.950	10	HHH	BIASED HIGH	ICP	
L021	366.50	36.650	10	HHH	BIASED HIGH		
L094	372.00	37.200	10	EHEHHHH	BIASED HIGH	FLAME AA	

OVERALL AVERAGE
RANK IS 20.402

Sodium

PARAMETER: 12091 Magnesium MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .1000 BASIC ACCEPTABLE ERROR= .0200 CONCENTRATION ERROR INCREMENT= .0354

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.31	20.50	1.51	17.00	.39	17.00	.39	18.00	.48	13.50	.93	15.00
L003	.30	8.00	1.60 H	30.00	.40	27.50	.40	26.00	.50	28.50	1.0 H	32.50
L006	.326	33.00	1.624 VH	33.00	.400	27.50	.402	30.50	.495	22.00	.970	30.00
L007	.35 H	37.00	1.65 VH	35.00	.42	36.00	.41	34.00	.51	34.00	.94	22.00
L010	.3	8.00	1.6 H	30.00	.4	27.50	.4	26.00	.5	28.50	.9	6.00
L013C	.33	35.00	1.64 VH	34.00	.40	27.50	.40	26.00	.50	28.50	.97	30.00
L021	.310	20.50	1.507	15.00	.390	17.00	.393	22.00	.483	17.00	.944	24.00
L023	.32	29.50		0.00	.41	33.00	.41	34.00	.51	34.00	1.00 H	32.50
L024	.32	29.50	1.50	12.00	.39	17.00	.40	26.00	.49	21.00	.95	25.50
L025	.319	26.00	1.52	20.00	.393	22.00	.39	18.00	.496	23.00	.93	15.00
L029	.31	20.50	1.50	12.00	.38	7.00	.38	7.50	.48	13.50	.93	15.00
L030	.312	25.00	1.59 H	27.00	.400	27.50	.402	30.50	.498	25.00	.957	27.00
L031	.30	8.00	1.48	7.50	.39	17.00	.38	7.50	.46	4.50	.88 L	2.50
L032	.31	20.50	1.53	22.50	.39	17.00	.39	18.00	.48	13.50	.94	22.00
L034	.3	8.00	1.6 H	30.00	.4	27.50	.4	26.00	.5	28.50	.9	6.00
L047	.31	20.50	1.55	25.00	.39	17.00	.39	18.00	.50	28.50	1.08 EH	37.00
L049	.333	36.00	1.656 EH	36.00	.415	35.00	.421 H	36.00	.515	36.00	1.015 VH	34.00
L057	.29	1.50	1.44 L	3.00	.36	1.00	.36	1.00	.46	4.50	.88 L	2.50
L061	.320	29.50	1.569	26.00	.399	23.00	.400	26.00	.497	24.00	.950	25.50
L063	.327	34.00	1.468	5.00	.410	33.00	.406	32.00	.503	32.00	.911	10.00
L073	.307	13.00	1.545	24.00	.386	12.00	.385	13.00	.487	19.00	.934	20.00
L081	.309	15.50	1.51	17.00	.384	10.00	.390	18.00	.486	18.00	.933	18.50
L082	.296	4.00	1.49	9.00	.39	17.00	.37	3.50	.45 L	2.00	.90	6.00
L088	.31	20.50	1.48	7.50	.38	7.00	.38	7.50	.48	13.50	.91	9.00
L090	.310	20.50	1.14 EL	1.00	.385	11.00	.385	13.00	.476	10.00	.940	22.00
L091	.30	8.00	1.50	12.00	.38	7.00	.38	7.50	.47	7.50	.90	6.00
L093	.32	29.50	1.52	20.00	.40	27.50	.40	26.00	.50	28.50	.96	28.00
L094	.29	1.50	1.45	4.00	.37	3.50	.37	3.50	.46	4.50	.92	11.50
L099	.30	8.00	1.50	12.00	.39	17.00	.38	7.50	.47	7.50	.93	15.00
L102	.31	20.50	1.50	12.00	.40	27.50	.39	18.00	.48	13.50	.93	15.00
L109	.309	15.50	1.53	22.50	.382	9.00	.382	11.00	.489	20.00	.933	18.50
L114	.304	12.00	1.475	6.00	.378	5.00	.385	13.00	.474	9.00	.970	30.00
L116	.30	8.00	1.52	20.00	.37	3.50	.38	7.50	.46	4.50	.90	6.00
L119	.308	14.00	1.593 H	28.00	.428 H	37.00	.432 H	37.00	.535 H	37.00	1.020 VH	35.00
L122	.32	29.50	1.61 H	32.00	.41	33.00	.41	34.00	.51	34.00	1.03 VH	36.00
L127	.32	29.50	1.51	17.00	.39	17.00	.39	18.00	.48	13.50	.92	11.50
L128	.294	3.00	1.39 VL	2.00	.365	2.00	.366	2.00	.446 L	1.00	.858 VL	1.00
MEDIAN CONC.	.3100		1.5150		.3900		.3900		.4870		.9330	

PARAMETER: 12091 Magnesium MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	2.80	21.50	.20	12.00	.57	17.00	1.14	18.50
L003	2.9	33.50	.20	12.00	.60	33.00	1.1	6.00
L006	2.792	19.00	.215	33.00	.586	25.00	1.158	24.00
L007	3.05 EH	37.00	.30 EH	37.00	.59	29.00	1.14	18.50
L010	2.6 VL	2.00	.2	12.00	.5 EL	1.50	1.0 EL	1.00
L013C	2.98 VH	36.00	.21	26.50	.59	29.00	1.18	28.00
L021	2.743	8.00	.231 H	36.00	.583	24.00	1.116	10.00
L023	2.95 H	35.00	.21	26.50	.61	34.00	1.19	30.50
L024	2.8	21.50	.21	26.50	.58	22.00	1.20 H	34.00
L025	2.8	21.50	.2	12.00	.56	12.00	1.15	22.00
L029	2.75	10.50	.20	12.00	.57	17.00	1.12	12.00
L030	2.74	7.00	.205	21.50	.588	27.00	1.20 H	34.00
L031	2.77	14.50	.19	3.00	.53 L	4.50	1.13	15.00
L032	2.75	10.50	.21	26.50	.58	22.00	1.13	15.00
L034	2.9	33.50	.2	12.00	.5 EL	1.50	1.2 H	34.00
L047	2.81	24.00	.20	12.00	.56	12.00	1.16	25.50
L049	2.860	28.50	.218	34.00	.611	35.00	1.230 VH	37.00
L057	2.63 L	4.00	.19	3.00	.53 L	4.50	1.08 L	4.50
L061	2.881	31.00	.210	26.50	.594	32.00	1.185	29.00
L063	2.677	5.00	.214	32.00	.593	31.00	1.190	30.50
L073	2.77	14.50	.203	20.00	.578	20.00	1.15	22.00
L081	2.78	16.00	.202	18.50	.565	15.00	1.06 L	3.00
L082	2.82	26.00	.19	3.00	.54	7.00	1.11	8.00
L088	1.39 EL	1.00	.20	12.00	.56	12.00	1.11	8.00
L090	2.76	13.00	.205	21.50	.562	14.00	1.14	18.50
L091	2.88	30.00	.20	12.00	.55	9.50	1.12	12.00
L093	2.86	28.50	.21	26.50	.59	29.00	1.16	25.50
L094	2.68	6.00	.19	3.00	.54	7.00	1.08 L	4.50
L099	2.84	27.00	.21	26.50	.58	22.00	1.13	15.00
L102	2.79	17.50	.20	12.00	.55	9.50	1.11	8.00
L109	2.80	21.50	.202	18.50	.576	19.00	1.14	18.50
L114	2.814	25.00	.213	31.00	.587	26.00	1.177	27.00
L116	2.79	17.50	.19	3.00	.54	7.00	1.15	22.00
L119	2.884	32.00	.224	35.00	.665 EH	37.00	1.191	32.00
L122	2.75	10.50	.20	12.00	.64 VH	36.00	1.21 H	36.00
L127	2.75	10.50	.21	26.50	.57	17.00	1.12	12.00
L128	2.61 VL	3.00	.198	6.00	.524 L	3.00	1.04 VL	2.00
MEDIAN CONC.	2.7920		.2020		.5760		1.1400	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	170.00	17.000	10			
L003	237.00	23.700	10	H H		12107
L006	277.00	27.700	10	VH		
L007	319.50	31.950	10	H VH EHEH	BIASED HIGH	
L010	142.50	14.250	10	H VL ELEL		ICP
L013C	300.50	30.050	10	VH VH	BIASED HIGH	
L021	193.50	19.350	10	H		
L023	289.00	32.111	9	H H	BIASED HIGH	ICP/FAA
L024	235.00	23.500	10	H		ICP
L025	191.50	19.150	10			
L029	127.00	12.700	10			
L030	251.50	25.150	10	H H		
L031	84.00	8.400	10	L L	BIASED LOW	ICP
L032	187.50	18.750	10			
L034	207.00	20.700	10	H ELH		
L047	219.50	21.950	10	EH		ICP
L049	347.50	34.750	10	EH H VH VH	BIASED HIGH	ICP
L057	29.50	2.950	10	L L L L L	BIASED LOW	
L061	272.50	27.250	10			FLAME AA
L063	244.50	24.450	10			
L073	177.50	17.750	10			AA - FLAME
L081	149.50	14.950	10	L		
L082	85.50	8.550	10	L		ICP
L088	98.00	9.800	10	EL		AA-FLAME
L090	144.50	14.450	10	EL		FLAME AAS
L091	111.50	11.150	10			FLAME AA
L093	269.00	26.900	10			AA 2380 FLAME
L094	49.00	4.900	10	L	BIASED LOW	FLAME AA
L099	157.50	15.750	10			ICP
L102	153.50	15.350	10			ICP
L109	174.00	17.400	10			AA - FLAME
L114	184.00	18.400	10			I.C.P.
L116	99.00	9.900	10			SEAP
L119	324.00	32.400	10	H H H H VH EH	BIASED HIGH	
L122	293.00	29.300	10	H VH VHH		AA - FLAME
L127	172.50	17.250	10			ICP
L128	25.00	2.500	10	VL L VLVL L VL	BIASED LOW	ICP

OVERALL AVERAGE RANK IS 18.951

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L128	25.00	2.500	10	VLLVLVLLVL	BIASED LOW	ICP	
L057	29.50	2.950	10	LLLLL	BIASED LOW		
L094	49.00	4.900	10	L	BIASED LOW	FLAME AA	
L031	84.00	8.400	10	LL	BIASED LOW	ICP	
L082	85.50	8.550	10	L		ICP	
L088	98.00	9.800	10	EL		AA-FLAME	
L116	99.00	9.900	10			SEAP	
L091	111.50	11.150	10			FLAME AA	
L029	127.00	12.700	10				
L010	142.50	14.250	10	HVLELEL		ICP	
L090	144.50	14.450	10	EL		FLAME AAS	
L081	149.50	14.950	10	L			
L102	153.50	15.350	10			ICP	
L099	157.50	15.750	10			ICP	
L002	170.00	17.000	10				
L127	172.50	17.250	10			ICP	
L109	174.00	17.400	10			AA - FLAME	
L073	177.50	17.750	10			AA - FLAME	
L114	184.00	18.400	10			I.C.P.	
L032	187.50	18.750	10				
L025	191.50	19.150	10				
L021	193.50	19.350	10	H			
L034	207.00	20.700	10	HELH			
L047	219.50	21.950	10	EH		ICP	
L024	235.00	23.500	10	H		ICP	
L003	237.00	23.700	10	HH		12107	
L063	244.50	24.450	10				
L030	251.50	25.150	10	HH			
L093	269.00	26.900	10			AA 2380 FLAME	
L061	272.50	27.250	10			FLAME AA	
L006	277.00	27.700	10	VH			
L122	293.00	29.300	10	HVHVHH		AA - FLAME	
L013C	300.50	30.050	10	VHVH	BIASED HIGH		
L007	319.50	31.950	10	HVHEHEH	BIASED HIGH		
L023	289.00	32.111	9	HH	BIASED HIGH	ICP/FAA	
L119	324.00	32.400	10	HHHHVHEH	BIASED HIGH		
L049	347.50	34.750	10	EHHVHVH	BIASED HIGH	ICP	

OVERALL AVERAGE RANK IS 18.951

Magnesium

PARAMETER: 13091 Aluminum MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0100 BASIC ACCEPTABLE ERROR= .0200 CONCENTRATION ERROR INCREMENT= .0300

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L006	.2403	18.00	.0161	12.00	.1303	21.00	.1052	10.00	.0143	13.00	.0257	16.00
L010	.23	10.50	.019	16.00	.088 L	2.00	.085	3.00	.006	3.00	.012	5.00
L023	.235	13.00		0.00	.126	18.00	.115	15.00	.010W	0.00	.018	7.00
L029	.25	21.00	.01	6.50	.12	15.00	.12	17.50	.01W	0.00	.02	11.00
L030	.230	10.50	.018	15.00	.095	4.00	.090	4.00	.009	4.50	.021	14.00
L031	.204	6.00	.007	4.50	.116	12.00	.107	12.00	.010	6.50	.014	6.00
L032	.26 H	22.00	.027	21.00	.15 H	23.00	.15 VH	23.00	.013	10.00	.033	18.50
L047	.23	10.50	.06 EH	22.00	.11	8.50	.12	17.50	.05W	0.00	.02T	11.00
L049	.19 VL	3.50	.02T	17.50	.10	6.50	.10	7.50	.02T	16.00	.02T	11.00
L057	.21	7.00	.002T	1.00	.12	15.00	.10	7.50	.014T	12.00	.009T	2.50
L081	.246	19.00	.016	10.50	.119	13.00	.113	14.00	.013	10.00	.022	15.00
L082	.19 VL	3.50	.006T	3.00	.09 L	3.00	.08 L	2.00	.014W	0.00	.009T	2.50
L088	.240	16.00	.015	8.50	.124	17.00	.125	20.00	.015	14.00	.033	18.50
L090	.230	10.50	.016	10.50	.128	19.00	.116	16.00	.011	8.00	.020	11.00
L091	.247	20.00	.017	13.50	.112	10.00	.106	11.00	.009	4.50	.019	8.00
L093	.240	16.00	.015	8.50	.134	22.00	.124	19.00	.013	10.00	.027	17.00
L094	.236	14.00	.020	17.50	.115	11.00	.133 H	21.00	.026	17.00	.041 H	20.00
L099	.240	16.00	.023T	19.00	.130	20.00	.140 H	22.00	.035T H	18.00	.044T H	21.00
L102	.20 L	5.00	.01T	6.50	.11	8.50	.11	13.00	.01	6.50	.02	11.00
L114	.2695 H	23.00	.0056T	2.00	.0986	5.00	.0955	5.00	.0031T	2.00	.0097T	4.00
L116	.18 VL	2.00	.007T	4.50	.10	6.50	.096	6.00	0.W	1.00	.004T	1.00
L127	.179 VL	1.00	.017	13.50	.063 EL	1.00	.058 EL	1.00	<.010	0.00	<.010	0.00
L128	.214	8.00	.025	20.00	.120	15.00	.101	9.00	.018	15.00	.045 H	22.00
MEDIAN CONC.	.2300		.0161		.1160		.1070		.0130		.0200	

PARAMETER: 13091 Aluminum MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L006	.0046	7.00	.0029	6.00	.0138	16.00	.0183	11.00
L010	.002T	4.00	.002T	4.00	.005	3.00	.01	4.50
L023	.010W	0.00	.010W	0.00	.010W	0.00	.013	7.00
L029	.01W	0.00	.01W	0.00	.01W	0.00	.01W	0.00
L030	.004	6.00	.002	4.00	.009	9.50	.033	18.00
L031	<.010	0.00	<.010	0.00	<.010	0.00	<.010	0.00
L032	.010	14.00	<.002	0.00	.008	7.00	.047 VH	19.00
L047	.03T H	17.00	.05W	0.00	.01T	12.00	.01T	4.50
L049	.02T	16.00	.02T	12.00	.02T	17.00	.02T	13.00
L057	-.007T	1.00	-.011T	1.00	.007T	5.00	.003T	1.00
L081	.009T	11.50	.009T	10.00	.009T	9.50	.022	15.00
L082	.0003T	2.00	.008W	0.00	.002W	0.00	.003W	0.00
L088	.005	8.50	.004	7.00	.006	4.00	.020	13.00
L090	.005T	8.50	.005T	8.50	.008	7.00	.016	10.00
L091	.002	4.00	0.	2.00	.008	7.00	.015	8.50
L093	.006	10.00	.002	4.00	.011	14.00	.020	13.00
L094	.009	11.50	.070 EH	13.00	.022	18.00	.026	16.00
L099	.020W	0.00	.020W	0.00	.020W	0.00	.028W	0.00
L102	.01T	14.00	.01T	11.00	.01	12.00	.01	4.50
L114	.0002W	0.00	.0008W	0.00	.0025T	2.00	.0080T	2.00
L116	.002T	4.00	0.W	0.00	.002T	1.00	.015	8.50
L127	<.010	0.00	<.010	0.00	.010	12.00	.010	4.50
L128	.010	14.00	.005	8.50	.012	15.00	.030	17.00
MEDIAN CONC.	.0050		.0040		.0090		.0160	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L006	130.00	13.000	10				
L010	55.00	5.500	10	L	BIASED LOW	ICP#1/GFAA#2-10	
L023	60.00	12.000	5			GFAA	
L029	71.00	14.200	5				
L030	89.50	8.950	10				
L031	47.00	7.833	6			ICP	
L032	157.50	17.500	9	H H VH	VHBIASED HIGH		
L047	103.00	12.875	8	EH H		ICP	
L049	120.00	12.000	10	VL		ICP	
L057	53.00	5.300	10		BIASED LOW		
L081	127.50	12.750	10				
L082	16.00	2.667	6	VL L L	BIASED LOW	ICP	
L088	126.50	12.650	10			AA-FURNACE	
L090	109.00	10.900	10			FURNACE	
L091	88.50	8.850	10			GFAAS	
L093	133.50	13.350	10			HGA 300 FURNACE	
L094	159.00	15.900	10	H H EH		FURNACE AA	
L099	116.00	19.333	6	H H H	BIASED HIGH	ICP	
L102	92.00	9.200	10	L		ICP OR GFAA	
L114	45.00	5.625	8	H		A.A.G.F.	
L116	34.50	3.833	9	VL	BIASED LOW	SEAP	
L127	33.00	5.500	6	VL ELEL		PVC AUTO	
L128	143.50	14.350	10	H		GFAA	

OVERALL AVERAGE
RANK IS 10.657

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L082	16.00	2.667	6	VLLL	BIASED LOW	ICP
L116	34.50	3.833	9	VL	BIASED LOW	SEAP
L057	53.00	5.300	10		BIASED LOW	
L010	55.00	5.500	10	L	BIASED LOW	ICP#1/GFAA#2-10
L127	33.00	5.500	6	VLELEL		PVC AUTO
L114	45.00	5.625	8	H		A.A.G.F.
L031	47.00	7.833	6			ICP
L091	88.50	8.850	10			GFAAS
L030	89.50	8.950	10			
L102	92.00	9.200	10	L		ICP OR GFAA
L090	109.00	10.900	10			FURNACE
L023	60.00	12.000	5			GFAA
L049	120.00	12.000	10	VL		ICP
L088	126.50	12.650	10			AA-FURNACE
L081	127.50	12.750	10			
L047	103.00	12.875	8	EHH		ICP
L006	130.00	13.000	10			
L093	133.50	13.350	10			HGA 300 FURNACE
L029	71.00	14.200	5			
L128	143.50	14.350	10	H		GFAA
L094	159.00	15.900	10	HHEH		FURNACE AA
L032	157.50	17.500	9	HHVHVH	BIASED HIGH	
L099	116.00	19.333	6	HHH	BIASED HIGH	ICP

OVERALL AVERAGE
RANK IS 10.657

Aluminum

PARAMETER: 14092 REACTIVE SILICA MG SI/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0100 BASIC ACCEPTABLE ERROR= .0400 CONCENTRATION ERROR INCREMENT= .0354

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	1.96	14.00	.146	11.00	1.53	13.50	1.08	15.50	.31	12.00	1.06	15.50
L003	1.93	11.00	.152	17.00	1.51	11.00	1.06	12.00	.32	16.50	1.05	13.00
L006	2.0163	22.00	.1542	19.00	1.5792	21.00	1.1092	23.00	.3281	20.00	1.0763	20.00
L010	1.91	8.00	.16	21.00	1.53	13.50	1.06	12.00	.34	22.00	1.06	15.50
L014	1.980	15.50	.152	17.00	1.560	19.00	1.100	21.50	.324	19.00	1.080	21.50
L023	2.01	20.50	.14	8.00	1.59	22.00	1.08	15.50	.28	3.00	1.08	21.50
L024	2.0	18.50	.15	13.50	1.50	9.00	1.10	21.50	.31	12.00	1.10	23.00
L025	1.94	12.50	.14	8.00	1.52	12.00	1.06	12.00	.32	16.50	1.04	12.00
L029	1.94	12.50	.15	13.50	1.54	15.50	1.08	15.50	.32	16.50	1.06	15.50
L031	2.01	20.50	.15	13.50	1.54	15.50	1.09	18.50	.33	21.00	1.07	18.50
L033	1.92	9.50	.05 EL	2.00	1.50	9.00	1.03	7.50	.23 VL	2.00	.98	5.00
L034	1.6 EL	2.00	.1W	0.00	1.2 EL	2.00	.8 EL	2.00	.1W	0.00	.8 EL	2.00
L047	2.02	23.00	.16	21.00	1.38 VL	3.00	1.00	4.50	.31	12.00	.96 L	4.00
L049	1.79 L	4.00	.13	4.00	1.61	23.00	1.00	4.50	.30	8.50	1.03	10.50
L063	1.993	17.00	.118	3.00	1.544	17.00	1.093	20.00	.289	4.00	1.016	8.00
L082	1.98	15.50	.14	8.00	1.56	19.00	1.08	15.50	.30	8.50	1.07	18.50
L088	2.234 EH	25.00	.218 VH	24.00	1.761 EH	24.00	1.224 EH	24.00	.359	23.00	1.208 EH	24.00
L091	2.00	18.50	.16	21.00	1.56	19.00	1.09	18.50	.32	16.50	1.06	15.50
L093	2.13 VH	24.00	.20 H	23.00	1.78 EH	25.00	1.33 EH	25.00	.39 VH	24.00	1.28 EH	25.00
L094	1.893	7.00	.137	5.00	1.482	7.00	1.042	10.00	.297	6.00	1.010	7.00
L099	1.77 VL	3.00	.14	8.00	1.40 L	4.00	.98 L	3.00	.30	8.50	.93 VL	3.00
L102	1.86	5.00	.15	13.50	1.45	5.00	1.04	9.00	.30	8.50	1.00	6.00
L116	.013T EL	1.00	.001T EL	1.00	.01T EL	1.00	.007T EL	1.00	.003T EL	1.00	.007T EL	1.00
L127	1.92	9.50	.14	8.00	1.50	9.00	1.03	7.50	.29	5.00	1.03	10.50
L128	1.892	6.00	.152	17.00	1.460	6.00	1.026	6.00	.313	14.00	1.028	9.00
MEDIAN CONC.	1.9400		.1500		1.5300		1.0600		.3100		1.0500	

PARAMETER: 14092 REACTIVE SILICA MG SI/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	1.13	13.00	.085	15.00	.296	15.00	1.61	16.00
L003	1.13	13.00	.112	22.00	.308	21.00	1.59	11.50
L006	1.1515	21.00	.0907	20.00	.2999	16.00	1.6450	21.00
L010	1.15	20.00	.08	9.50	.27	6.00	1.56	9.00
L014	1.140	16.50	.085	15.00	.310	22.00	1.610	16.00
L023	1.22 H	23.00	.09W	0.00	.28	10.00	1.68	22.50
L024	1.10	9.00	.07T	3.50	.29	13.50	1.60	13.50
L025	1.12	11.00	.08T	9.50	.3	18.50	1.58	10.00
L029	1.16	22.00	.085	15.00	.30	18.50	1.64	19.50
L031	1.14	16.50	.09	18.00	.30	18.50	1.61	16.00
L033	1.08	6.00	.05W	0.00	.19 VL	2.00	1.54	6.00
L034	.8 EL	2.00	.1W	0.00	.1W	0.00	1.3 EL	2.00
L047	1.05 L	4.00	.08	9.50	.27	6.00	1.52	5.00
L049	1.14	16.50	.08	9.50	.26	3.00	1.68	22.50
L063	1.143	19.00	.057	2.00	.264	4.00	1.600	13.50
L082	1.13	13.00	.08	9.50	.30	18.50	1.64	19.50
L088	1.271 VH	24.00	.108	21.00	.333	23.00	1.832 EH	25.00
L091	1.14	16.50	.09	18.00	.29	13.50	1.62	18.00
L093	1.30 EH	25.00	.09	18.00	.38 VH	24.00	1.75 VH	24.00
L094	1.080	6.00	.073	5.00	.271	8.00	1.543	7.00
L099	1.03 L	3.00	.08	9.50	.28	10.00	1.49 L	3.00
L102	1.08	6.00	.075	6.00	.27	6.00	1.51	4.00
L116	.007T EL	1.00	.001T VL	1.00	.005T EL	1.00	.012T EL	1.00
L127	1.09	8.00	.07	3.50	.28	10.00	1.59	11.50
L128	1.106	10.00	.084	13.00	.285	12.00	1.55	8.00
MEDIAN CONC.	1.1300		.0800		.2875		1.6000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	140.50	14.050	10			
L003	148.00	14.800	10		14109	
L006	203.00	20.300	10	BIASED HIGH		
L010	136.50	13.650	10		ICP	
L014	183.00	18.300	10			
L023	146.00	16.222	9	H	AUTO MOLYBDOSILICA	
L024	137.00	13.700	10		MOLYBDATE	
L025	122.00	12.200	10			
L029	164.00	16.400	10		COLORIMETRIC	
L031	176.50	17.650	10		COLORIMETRIE	
L033	49.00	5.444	9	EL VL VL BIASED LOW		
L034	12.00	2.000	6	EL ELEL ELEL ELBIASED LOW		
L047	92.00	9.200	10	VL L L	ICP	
L049	106.00	10.600	10	L	AUTOANALYZER-TECHN	
L063	107.50	10.750	10			
L082	145.50	14.550	10		FIA	
L088	237.00	23.700	10	EHVHEHEH EHVH EHBIASED HIGH	FIA-MOLYBDATE	
L091	175.00	17.500	10		COLORIMETRIC AA	

L093	237.00	23.700	10	VHH EHEHVHEHEH VHVHBIASED HIGH	TECHNICON
L094	68.00	6.800	10		COLORIMETRIC
L099	55.00	5.500	10	VL L L VLL L BIASED LOW	COLORIMETRIC
L102	69.00	6.900	10		AUTO MOLYBDATE BLU
L116	10.00	1.000	10	ELELELELELELELVLELELBIASED LOW	COLORIMETRIE
L127	82.50	8.250	10		AUTO MOLYBDATE
L128	101.00	10.100	10		ICP

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OVERALL AVERAGE
RANK IS 12.717

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L116	10.00	1.000	10	ELELELELELELELVLELELBIASED LOW	COLORIMETRIE	
L034	12.00	2.000	6	ELELELELELEL BIASED LOW		
L033	49.00	5.444	9	ELVLVL BIASED LOW		
L099	55.00	5.500	10	VLLLVLLL BIASED LOW	COLORIMETRIC	
L094	68.00	6.800	10		COLORIMETRIC	
L102	69.00	6.900	10		AUTO MOLYBDATE BLU	
L127	82.50	8.250	10		AUTO MOLYBDATE	
L047	92.00	9.200	10	VLLL	ICP	
L128	101.00	10.100	10		ICP	
L049	106.00	10.600	10	L	AUTOANALYZER-TECHN	
L063	107.50	10.750	10			
L025	122.00	12.200	10			
L010	136.50	13.650	10		ICP	
L024	137.00	13.700	10		MOLYBDATE	
L002	140.50	14.050	10			
L082	145.50	14.550	10		FIA	
L003	148.00	14.800	10		14109	
L023	146.00	16.222	9	H	AUTO MOLYBDOSILICA	
L029	164.00	16.400	10		COLORIMETRIC	
L091	175.00	17.500	10		COLORIMETRIC AA	
L031	176.50	17.650	10		COLORIMETRIE	
L014	183.00	18.300	10			
L006	203.00	20.300	10	BIASED HIGH		
L088	237.00	23.700	10	EHVHEHEHEHVHEH BIASED HIGH	FIA-MOLYBDATE	
L093	237.00	23.700	10	VHHEHEHVHEHEHVHVH BIASED HIGH	TECHNICON	

OVERALL AVERAGE
RANK IS 12.717

REACTIVE SILICA

PARAMETER: 16000 SULFATE, IC METHOD MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= .2000 CONCENTRATION ERROR INCREMENT= .0219

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L003	5.7 H	35.00	9.4 H	36.00	2.3	31.00	2.4	33.50	6.6	34.50	8.0 VH	36.00
L006	5.3600	14.50	8.9300	22.00	2.1620	12.00	2.2165	18.00	6.3380	19.00	7.4685	19.00
L007	5.19	5.00	8.85	18.50	2.07	2.50	2.13	5.50	6.10	3.50	7.43	15.00
L011	5.31	11.00	8.73	10.50	2.07	2.50	2.27	26.00	6.2	7.00	7.31	9.00
L013	5.390	17.00	9.079	28.00	2.182	17.00	2.180	9.00	6.367	20.00	7.467	18.00
L013C	5.42	23.00	8.91	21.00	2.20	21.50	2.30	29.00	6.31	15.50	7.39	13.00
L014	5.43	25.00	8.76	12.50	2.20	21.50	2.26	25.00	6.42	26.00	7.57	25.50
L024	5.40	20.00	9.0	25.50	2.20T	21.50	2.30T	29.00	6.40	24.50	7.70	31.00
L025	5.45	28.00	9.12	30.00	2.21	24.50	2.19	11.00	6.48	29.00	7.72	33.00
L029	5.20	6.50	8.58	6.00	2.23	28.00	2.23	20.50	6.10	3.50	7.13	3.00
L030	5.35	13.00	9.20	32.50	2.15	10.50	2.20	14.00	6.45	27.00	7.70	31.00
L031	5.1 L	4.00	8.0 EL	1.50	2.1	5.50	2.2	14.00	5.7 EL	2.00	7.2	5.00
L032	4.65 EL	2.00	8.00 EL	1.50	2.17	14.50	2.20	14.00	6.67 H	36.00	7.94 H	35.00
L034	5.4	20.00	8.8	16.50	2.3	31.00	2.2	14.00	6.2	7.00	7.3	8.00
L049	5.73 H	36.00	8.73	10.50	2.13	8.50	1.95 L	2.00	6.52	32.00	7.65	29.00
L061	5.43	25.00	8.94	23.50	2.17	14.50	2.23	20.50	6.31	15.50	7.42	14.00
L063	5.442	27.00	8.782	15.00	2.366	34.00	2.343	31.00	6.589	33.00	7.500	22.50
L073	5.40	20.00	8.59	7.00	2.30	31.00	2.18	9.00	6.50	30.00	7.51	24.00
L081	5.46	30.50	8.80	16.50	2.13	8.50	2.18	9.00	6.33	17.50	7.35	11.00
L082	5.49	33.00	8.94	23.50	2.17	14.50	2.21	17.00	6.39	23.00	7.57	25.50
L088	5.487	32.00	9.232 H	34.00	2.294	29.00	2.386	32.00	6.386	22.00	7.700	31.00
L090	3.98 EL	1.00	8.64	9.00	2.21	24.50	1.18 EL	1.00	6.21	9.00	6.78 EL	2.00
L091	5.33	12.00	9.0	25.50	2.11	7.00	2.14	7.00	6.24	10.00	7.46	17.00
L093	5.29	9.50	8.31 L	3.00	2.08	4.00	2.13	5.50	6.29	13.00	7.21	6.00
L094	5.271	8.00	8.773	14.00	2.197	19.00	2.242	22.00	6.275	11.00	7.389	12.00
L099	5.29	9.50	8.85	18.50	2.17	14.50		0.00	6.19	5.00	7.33	10.00
L102	5.36	14.50	8.86	20.00	2.38	35.00	2.43	35.00	6.33	17.50	7.44	16.00
L104	5.4	20.00	9.1	29.00	2.2	21.50	2.3	29.00	6.4	24.50	7.5	22.50
L109	5.46	30.50	8.60	8.00	2.31	33.00	2.25	23.00	6.47	28.00	7.47	20.00
L114	5.2	6.50	8.5	5.00	2.4	36.00	2.4	33.50	6.3	14.00	6.7 EL	1.00
L116	5.37	16.00	9.07	27.00	2.15	10.50	2.20	14.00	6.37	21.00	7.49	21.00
L119	5.454	29.00	9.137	31.00	2.215	26.00	2.256	24.00	6.506	31.00	7.638	28.00
L122	5.43	25.00	8.76	12.50	2.22	27.00	2.28	27.00	6.28	12.00	7.26	7.00
L126	5.601	34.00	9.334 H	35.00	2.186	18.00	2.2238	19.00	6.600	34.50	7.798	34.00
L127	5.4	20.00	9.2	32.50	2.1	5.50	2.1	4.00	6.2	7.00	7.6	27.00
L128	4.99 L	3.00	8.37 L	4.00	1.96 L	1.00	2.07	3.00	5.16 EL	1.00	7.16	4.00
MEDIAN CONC.	5.4000		8.8500		2.1915		2.2165		6.3340		7.4677	

PARAMETER: 16000 SULFATE, IC METHOD MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L003	3.6	31.50		0.00	3.4	27.50	7.9 H	35.00
L006	3.4710	17.00	.2300	7.00	3.2920	16.00	7.4490	22.00
L007	3.39	8.00	.36	30.00	3.18	3.00	7.41	18.00
L011	3.39	8.00	.22	4.50	3.23	9.00	7.33	15.50
L013	3.338	4.00	.254	19.00	3.341	21.00	7.293	12.00
L013C	3.42	12.50	.26	20.00	3.41	29.00	7.24	9.00
L014	3.63	34.00	.29	25.00	3.38	26.00	7.57	29.00
L024	3.50	20.50	.50W	0.00	3.40	27.50	7.50	26.00
L025	3.46	16.00	.25T	15.50	3.43	31.00	7.77 H	34.00
L029	3.34	5.00	.22	4.50	3.21	7.00	7.16	5.00
L030	3.60	31.50	.20	2.00	3.30	18.00	7.65	32.00
L031	3.5	20.50	.2	2.00	3.3	18.00	7.1	3.50
L032	2.65 EL	1.00	.31	27.00	4.18 EH	36.00	8.06 VH	36.00
L034	3.4	10.50	1.0W	0.00	3.2	5.00	7.2	6.00
L049	3.86 H	35.00	.20T	2.00	3.30	18.00	6.92 L	1.00
L061	3.54	27.00	.25	15.50	3.35	22.50	7.43	19.50
L063	3.515	24.00	.253	18.00	3.360	25.00	7.460	23.00
L073	3.59	30.00	.24T	9.00	3.48	34.00	7.54	28.00
L081	3.50	20.50	.28	23.00	3.32	20.00	7.30	13.00
L082	3.52	25.00	.25	15.50	3.35	22.50	7.44	21.00
L088	3.565	29.00	.335	29.00	3.411	30.00	7.714	33.00
L090	3.45	15.00	.33	28.00	3.28	14.50	7.25	10.50
L091	3.38	6.00	.240	9.00	3.24	10.50	7.49	24.00
L093	3.32	3.00	.28	23.00	3.16	2.00	7.21	7.00
L094	3.390	8.00	.371	31.00	3.257	12.00	7.352	17.00
L099	3.42	12.50	.28	23.00	3.24	10.50	7.23	8.00
L102	3.62	33.00	.247	13.00	3.46	33.00	7.32	14.00
L104	3.5	20.50	.3T	26.00	3.2	5.00	7.5	26.00
L109	3.56	28.00	.245T	11.00	3.44	32.00	7.43	19.50
L114	3.5	20.50	.340W	0.00	3.5	35.00	7.1	3.50
L116	3.40	10.50	.24	9.00	3.26	13.00	7.33	15.50
L119	3.524	26.00	.246	12.00	3.351	24.00	7.586	30.00
L122	3.50	20.50	.25	15.50	3.28	14.50	7.25	10.50
L126	3.432	14.00	.227	6.00	3.224	8.00	7.609	31.00
L127	4.4 EH	36.00	<.2	0.00	3.2	5.00	7.5	26.00
L128	2.88 EL	2.00	.267	21.00	3.04 L	1.00	7.05 L	2.00
MEDIAN CONC.	3.5000		.2500		3.3000		7.4200	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L003	300.00	33.333	9	H H VH H BIASED HIGH	16309	
L006	166.50	16.650	10			
L007	109.00	10.900	10			
L011	103.00	10.300	10			
L013	165.00	16.500	10			
L013C	193.50	19.350	10			
L014	249.50	24.950	10			
L024	225.50	25.056	9		IC	
L025	252.00	25.200	10	H		
L029	89.00	8.900	10		IC	
L030	211.50	21.150	10			
L031	76.00	7.600	10	L EL EL BIASED LOW		
L032	203.00	20.300	10	ELEL H H EL EHVH		
L034	118.00	13.111	9			
L049	174.00	17.400	10	H L H L	WATERS-I.C.	
L061	197.50	19.750	10		I.C.	
L063	252.50	25.250	10			
L073	222.00	22.200	10		WATERS	
L081	169.50	16.950	10			
L082	220.50	22.050	10		CI	
L088	301.00	30.100	10	H BIASED HIGH	DIONEX	
L090	114.50	11.450	10	EL EL EL	DIONEX - IC	
L091	128.00	12.800	10		IC	
L093	76.00	7.600	10	L BIASED LOW	DIONEX - IC	
L094	154.00	15.400	10		ION CHROMATOGRAPHY	
L099	111.50	12.389	9		IC	
L102	231.00	23.100	10		IC	
L104	224.00	22.400	10			
L109	233.00	23.300	10		WATERS IC	
L114	155.00	17.222	9	EL	C.I. WATERS	
L116	157.50	15.750	10		CHROMATO. IONIQUE	
L119	261.00	26.100	10			
L122	171.50	17.150	10		IC	
L126	233.50	23.350	10	H		
L127	163.00	18.111	9	EH	WATERS ION CHR.	
L128	42.00	4.200	10	L L L EL EL L L BIASED LOW	IC	

OVERALL AVERAGE
RANK IS 18.232

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L128	42.00	4.200	10	LLLELELLL	BIASED LOW	IC	
L031	76.00	7.600	10	LELEL	BIASED LOW		
L093	76.00	7.600	10	L	BIASED LOW	DIONEX - IC	
L029	89.00	8.900	10			IC	
L011	103.00	10.300	10				
L007	109.00	10.900	10				
L090	114.50	11.450	10	ELELEL		DIONEX - IC	
L099	111.50	12.389	9			IC	
L091	128.00	12.800	10			IC	
L034	118.00	13.111	9				
L094	154.00	15.400	10			ION CHROMATOGRAPHY	
L116	157.50	15.750	10			CHROMATO. IONIQUE	
L013	165.00	16.500	10				
L006	166.50	16.650	10				
L081	169.50	16.950	10				
L122	171.50	17.150	10			IC	
L114	155.00	17.222	9	EL		C.I. WATERS	
L049	174.00	17.400	10	HLHL		WATERS-I.C.	
L127	163.00	18.111	9	EH		WATERS ION CHR.	
L013C	193.50	19.350	10				
L061	197.50	19.750	10			I.C.	
L032	203.00	20.300	10	ELELHHELEHVH			
L030	211.50	21.150	10				
L082	220.50	22.050	10			CI	
L073	222.00	22.200	10			WATERS	
L104	224.00	22.400	10				
L102	231.00	23.100	10			IC	
L109	233.00	23.300	10			WATERS IC	
L126	233.50	23.350	10	H			
L014	249.50	24.950	10				
L024	225.50	25.056	9			IC	
L025	252.00	25.200	10	H			
L063	252.50	25.250	10				
L119	261.00	26.100	10				
L088	301.00	30.100	10	H	BIASED HIGH	DIONEX	
L003	300.00	33.333	9	HHVHH	BIASED HIGH	16309	

OVERALL AVERAGE
RANK IS 18.232

SULFATE, IC METHOD

PARAMETER: 16001 SULFATE NON IC METHODS MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 2.0000 BASIC ACCEPTABLE ERROR= .3000 CONCENTRATION ERROR INCREMENT= .2000

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	5.5	4.50	8.9	6.00	3.4	6.00	3.5	5.00	6.5	6.00	7.6	4.00
L006	5.73	7.00	8.96	7.00	3.34	4.00	3.30	4.00	6.45	5.00	7.71	6.00
L010	5.5	4.50	8.7	4.00	3.5	7.00	3.9	7.00	6.6	8.00	7.7	5.00
L021	5.486	3.00	8.886	5.00	2.228 VL	2.00	2.281 VL	2.00	6.412	4.00	7.464	3.00
L023	5.97	8.00	9.25	8.00	3.36	5.00	3.53	6.00	6.51	7.00	8.13	7.00
L031	4.8	1.00	8.2	2.00	1.8 EL	1.00	1.9 EL	1.00	5.7	1.00	6.9	1.00
L047	5.7	6.00	7.7	1.00	4.0 H	8.00	4.1 H	8.00	5.9	2.00	8.5	8.00
L086	5.2	2.00	8.3	3.00	2.8	3.00	2.9	3.00	6.1	3.00	7.2	2.00
MEDIAN CONC.	5.5000		8.7930		3.3500		3.4000		6.4310		7.6500	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	3.49	4.00	.32	4.00	3.4	6.00	7.9	7.00
L006	3.72	8.00	.168	1.00	3.56	7.00	7.86	5.00
L010	3.6	6.00	1.0T EH	6.00	3.2	3.50	7.1	2.00
L021	3.504	5.00	.243	3.00	3.328	5.00	7.394	3.00
L023	3.64	7.00	.62	5.00	3.58	8.00	7.88	6.00
L031	3.2	2.00	.2	2.00	3.1	2.00	6.8	1.00
L047	1.9 EL	1.00	1.7 EH	7.00	2.6 L	1.00	10.3 VH	8.00
L086	3.4	3.00	.5W	0.00	3.2	3.50	7.4	4.00
MEDIAN CONC.	3.4970		.3200		3.2640		7.6300	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	52.50	5.250	10			
L006	54.00	5.400	10			
L010	53.00	5.300	10	EH	AUTO METHYL THYMOL	
L021	35.00	3.500	10	VLVL		
L023	67.00	6.700	10	BIASED HIGH	AUTO MEHTYLTHYMOL	
L031	14.00	1.400	10	ELEL BIASED LOW	CALMAGITE	
L047	50.00	5.000	10	H H ELEHL VH	TURBIDIMETRIE	
L086	26.50	2.944	9			

OVERALL AVERAGE
RANK IS 4.456

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L031	14.00	1.400	10	ELEL	BIASED LOW	CALMAGITE
L086	26.50	2.944	9			
L021	35.00	3.500	10	VLVL		
L047	50.00	5.000	10	HHELEHLVH		TURBIDIMETRIE
L002	52.50	5.250	10			
L010	53.00	5.300	10	EH		AUTO METHYL THYMOL
L006	54.00	5.400	10			
L023	67.00	6.700	10		BIASED HIGH	AUTO MEHTYLTHYMOL

OVERALL AVERAGE
RANK IS 4.456

SULFATE NON IC METHODS

PARAMETER: 17000 CHLORIDE IC MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .8710 BASIC ACCEPTABLE ERROR= .1000 CONCENTRATION ERROR INCREMENT= .0377

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L003	.6 VH	33.50	2.2	28.50	4.7 H	32.50	4.9	31.50	.6 EH	33.00	1.4 H	30.50
L006	.4005	4.00	2.1940	26.00	4.4720	20.00	4.7200	20.50	.3750	6.50	1.2645	18.00
L007	.39	2.00	1.77 EL	1.00	4.24	3.00	4.20 VL	2.00	.20 EL	1.00	1.20	5.00
L011	.43	11.50	2.14	14.50	4.21 L	2.00	4.6	11.50	.38	8.00	1.24	11.00
L013	.412	5.00	2.174	20.00	4.305	8.00	4.488	6.00	.354	2.00	1.175	2.00
L013C	.43	11.50	2.15	17.50	4.26	5.50	4.43 L	4.00	.41	23.50	1.25	13.50
L014	.43	11.50	2.21	31.50	4.25	4.00	4.44	5.00	.39	10.50	1.30	26.00
L021	.442	19.00	2.056	3.00	4.412	15.00	4.712	19.00	.386	9.00	1.252	15.00
L025	.44	16.50	2.25	33.00	4.47	19.00	4.8	25.50	.4	15.00	1.62 EH	35.00
L029	.44	16.50	2.07	4.50	4.51	22.50	4.73	22.00	.41	23.50	1.20	5.00
L030	.44	16.50	2.16	19.00	4.52	24.00	4.86	27.50	.40	15.00	1.27	20.00
L031	.5	30.50	2.2	28.50	4.4	13.50	4.6	11.50	.5	32.00	1.3	26.00
L032	.42	6.50	2.21	31.50	4.68	31.00	4.86	27.50	.41	23.50	1.26	16.50
L034	.6 VH	33.50	2.2	28.50	4.6	27.00	4.8	25.50	.6W	0.00	1.4 H	30.50
L049	.498	29.00	2.279	34.00	<.537 EL	0.00	4.749	23.00	.452	30.00	1.413 H	33.00
L061	.44	16.50	2.15	17.50	4.36	10.50	4.60	11.50	.36	3.50	1.26	16.50
L063	.452	23.50	2.107	9.00	4.617	29.00	4.525	8.00	.422	27.00	1.248	12.00
L073	.423	8.00	2.12	11.00	4.51	22.50	4.67	16.50	.366	5.00	1.319	28.00
L081	.45	21.50	2.11	10.00	4.32	9.00	4.50	7.00	.41	23.50	1.20	5.00
L082	.48	27.00	2.18	21.50	4.62	30.00	4.90	31.50	.43	28.00	1.33	29.00
L088	.477	26.00	2.104	8.00	4.496	21.00	4.781	24.00	.434	29.00	1.205	7.00
L090	.32 L	1.00	2.08	6.00	4.30	7.00	2.23 EL	1.00	.40	15.00	1.12 L	1.00
L091	.444	20.00	2.18	21.50	4.38	12.00	4.58	9.00	.408	20.00	1.22	9.00
L093	.43	11.50	2.07	4.50	4.59	25.00	4.65	15.00	.39	10.50	1.28	21.50
L094	.565 H	32.00	2.014	2.00	4.461	18.00	4.720	20.50	.402	19.00	1.283	23.00
L099	.452	23.50	2.30 H	35.00	4.26	5.50		0.00	.400	15.00	1.18	3.00
L102	.453	25.00	2.13	12.50	4.45	17.00	4.69	18.00	.410	23.50	1.25	13.50
L109	.420	6.50	2.14	14.50	4.43	16.00	4.61	14.00	.360	3.50	1.28	21.50
L114	.468W	0.00	2.2	28.50	4.7 H	32.50	5.3 EH	34.00	.509W	0.00	1.6 EH	34.00
L116	.49	28.00	2.19	24.00	5.05 EH	34.00	5.05 VH	33.00	.46	31.00	1.41 H	32.00
L119	.397	3.00	2.148	16.00	4.604	28.00	4.893	30.00	.375	6.50	1.227	10.00
L122	.45	21.50	2.13	12.50	4.36	10.50	4.67	16.50	.41	23.50	1.21	8.00
L126	.439	14.00	2.181	23.00	4.594	26.00	4.881	29.00	.400	15.00	1.292	24.00
L127	.5	30.50	2.1	7.00	4.4	13.50	4.6	11.50	.4	15.00	1.3	26.00
L128	.427	9.00	2.193	25.00	4.010 VL	1.00	4.305 VL	3.00	.400	15.00	1.267	19.00
MEDIAN CONC.	.4400		2.1500		4.4555		4.6800		.4000		1.2645	

PARAMETER: 17000 CHLORIDE IC MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L003	1.6 VH	33.00		0.00		0.00	1.6	28.50
L006	1.4145	17.00	.0650	1.00	.1790	1.00	1.5495	16.00
L007	1.16 EL	1.00	.14	26.50	.26	26.00	1.36 VL	1.00
L011	1.40	12.00	.09	6.00	.20	7.50	1.50	7.00
L013	1.435	20.00	.102	12.00	.190	3.00	1.554	19.00
L013C	1.42	18.00	.11	17.00	.22	18.50	1.52	9.00
L014	1.52	31.00	.11	17.00	.21	12.00	1.62	31.00
L021	1.359	7.00	.113	20.00	.218	17.00	1.525	11.00
L025		0.00	.11	17.00	.21	12.00	1.59	26.00
L029	1.33	5.00	.104	13.00	.22	18.50	1.48	3.00
L030	1.45	23.00	.10	10.50	.20	7.50	1.56	21.00
L031	1.5	29.50	.1	10.50	.3	31.00	1.6	28.50
L032	1.40	12.00	1.84 EH	31.00	.26	26.00	1.73 H	34.00
L034	1.5	29.50	.6W	0.00	.6W	0.00	1.6	28.50
L049	1.480	27.50	.08T	3.00	.397 VH	32.00	1.584	25.00
L061	1.47	26.00	.11	17.00	.20	7.50	1.53	12.00
L063	1.407	15.00	.109	14.00	.238	22.00	1.553	18.00
L073	1.327	4.00	.08T	3.00	.	5.00	1.50	7.00
L081	1.41	16.00	.14	26.50	.23	21.00	1.49	4.50
L082	1.45	23.00	.14	26.50	.25	24.00	1.75 VH	35.00
L088	1.364	8.00	.150	29.00	.273	29.00	1.567	23.00
L090	1.48	27.50	.12	22.00	.21	12.00	1.56	21.00
L091	1.44	21.00	.124	23.00	.249	23.00	1.54	15.00
L093	1.46	25.00	.11	17.00	.21	12.00	1.58	24.00
L094	1.402	14.00	.128	24.00	.295	30.00	1.521	10.00
L099	1.26 L	3.00	.085	5.00	.214	15.00	1.39 L	2.00
L102	1.45	23.00	.118	21.00	.226	20.00	1.49	4.50
L109	1.37	9.00	.094T	8.50	.191	4.00	1.55	17.00
L114	1.9 EH	34.00	.072W	0.00	.209W	0.00	1.6	28.50
L116	1.57 H	32.00	.14	26.50	.26	26.00	1.71 H	33.00
L119	1.378	10.00	.091	7.00	.183	2.00	1.533	13.00
L122	1.25 L	2.00	.08	3.00	.21	12.00	1.56	21.00
L126	1.422	19.00	.094	8.50	.215	16.00	1.536	14.00
L127	1.4	12.00	<.2	0.00	.2	7.50	1.5	7.00
L128	1.344	6.00	.198	30.00	.269	28.00	1.700 H	32.00
MEDIAN CONC.	1.4172		.1100		.2165		1.5530	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L003	251.00	31.375	8	VH H EHH VH	BIASED HIGH	17209
L006	130.00	13.000	10			
L007	68.50	6.850	10	EL VLEL EL	VLBIASED LOW	
L011	91.00	9.100	10	L		
L013	97.00	9.700	10			
L013C	138.00	13.800	10	L		
L014	179.50	17.950	10			
L021	135.00	13.500	10			
L025	.00	22.111	9	EH		
L029	133.50	13.350	10		IC	
L030	184.00	18.400	10			
L031	241.50	24.150	10			
L032	239.50	23.950	10	EH H		
L034	203.00	29.000	7	VH H	BIASED HIGH	
L049	236.50	26.278	9	EL H VH	WATERS-I.C.	
L061	138.50	13.850	10		I.C.	
L063	177.50	17.750	10			
L073	110.00	11.000	10		WATERS	
L081	144.00	14.400	10			
L082	275.50	27.550	10	VHBIASED HIGH	CI	
L088	204.00	20.400	10		DIONEX	
L090	113.50	11.350	10	L EL L	DIONEX - IC	
L091	173.50	17.350	10		IC	
L093	166.00	16.600	10		DIONEX - IC	
L094	192.50	19.250	10	H	ION CHROMATOGRAPHY	
L099	107.00	11.889	9	H L L	IC	
L102	178.00	17.800	10		IC	
L109	114.50	11.450	10		WATERS IC	
L114	191.50	31.917	6	H EH EHEH	BIASED HIGH	C.I. WATERS
L116	299.50	29.950	10	EHVH H H H	BIASED HIGH	CHROMATO. IONIQUE
L119	125.50	12.550	10			
L122	130.50	13.050	10	L		IC
L126	188.50	18.850	10			
L127	130.00	14.444	9			WATERS ION CHR.
L128	168.00	16.800	10	VLVL H		IC

OVERALL AVERAGE
RANK IS 17.374

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L007	68.50	6.850	10	ELVLELELVL	BIASED LOW		
L011	91.00	9.100	10	L			
L013	97.00	9.700	10				
L073	110.00	11.000	10			WATERS	
L090	113.50	11.350	10	LELL		DIONEX - IC	
L109	114.50	11.450	10			WATERS IC	
L099	107.00	11.889	9	HLL		IC	
L119	125.50	12.550	10				
L006	130.00	13.000	10				
L122	130.50	13.050	10	L		IC	
L029	133.50	13.350	10			IC	
L021	135.00	13.500	10				
L013C	138.00	13.800	10	L			
L061	138.50	13.850	10			I.C.	
L081	144.00	14.400	10				
L127	130.00	14.444	9			WATERS ION CHR.	
L093	166.00	16.600	10			DIONEX - IC	
L128	168.00	16.800	10	VLVLH		IC	
L091	173.50	17.350	10			IC	
L063	177.50	17.750	10				
L102	178.00	17.800	10			IC	
L014	179.50	17.950	10				
L030	184.00	18.400	10				
L126	188.50	18.850	10				
L094	192.50	19.250	10	H		ION CHROMATOGRAPHY	
L088	204.00	20.400	10			DIONEX	
L025	.00	22.111	9	EH			
L032	239.50	23.950	10	EHH			
L031	241.50	24.150	10				
L049	236.50	26.278	9	ELHVH		WATERS-I.C.	
L082	275.50	27.550	10	VH	BIASED HIGH	CI	
L034	203.00	29.000	7	VHH	BIASED HIGH		
L116	299.50	29.950	10	EHVHHHH	BIASED HIGH	CHROMATO. IONIQUE	
L003	251.00	31.375	8	VHHEHHVH	BIASED HIGH	17209	
L114	191.50	31.917	6	HEHEHEH	BIASED HIGH	C.I. WATERS	

OVERALL AVERAGE
RANK IS 17.374

CHLORIDE IC

PARAMETER: 17001 CHLORIDE NON IC METHODS MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .8700 BASIC ACCEPTABLE ERROR= .4000 CONCENTRATION ERROR INCREMENT= .0377

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.48	5.00	2.23	8.00	4.54	3.00	4.88	9.00	.42	6.00	1.33	6.00
L006	.510	9.00	2.14	3.00	3.80 L	1.00	3.95 VL	1.00	.412	5.00	1.34	7.00
L010	.2	1.00	2.1	2.00	4.6	5.50	4.8	7.00	.2	1.00	1.2	2.00
L023	.6	10.00	2.2	5.50	4.8	9.00	5.0	10.00	.5	9.00	1.4	8.50
L024	.46	4.00	2.3	10.00	4.6	5.50	4.8	7.00	.46	7.00	1.40	8.50
L025	.4T	2.50	2.2	5.50	4.6	5.50	4.8	7.00	.3T	2.00	1.3	4.50
L031	.5	6.50	2.0	1.00	4.3	2.00	4.5	2.00	.4	3.50	1.2	2.00
L033	.5	6.50	2.2	5.50	4.6	5.50	4.6	3.00	.5W	0.00	1.2	2.00
L047	1.1 VH	11.00	3.2 EH	11.00	5.9 EH	10.00	5.9 EH	11.00	6.9 EH	10.00	2.4 EH	11.00
L049	.507	8.00	2.234	9.00	<.545 EL	0.00	4.797	5.00	.478	8.00	1.424	10.00
L086	.4	2.50	2.2	5.50	4.7	8.00	4.7	4.00	.4	3.50	1.3	4.50
MEDIAN CONC.	.5000		2.2000		4.6000		4.8000		.4160		1.3300	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	1.46	3.50	.22	5.00	.30	5.50	1.64	6.00
L006	1.46	3.50	.137	3.00	.290	4.00	1.60	4.00
L010	1.4	1.50	.2T	4.00	.2T	1.50	1.7	8.50
L023	1.6	9.00	.2W	0.00	.3	5.50	1.7	8.50
L024	1.60	9.00	.10T	1.50	.21T	3.00	1.70	8.50
L025	1.5	6.50	.2W	0.00	.2W	0.00	1.6	4.00
L031	1.6	9.00	<.1	0.00	.2	1.50	1.4	1.00
L033	1.5	6.50	.5W	0.00	.5W	0.00	1.6	4.00
L047	2.4 EH	11.00	.1	1.50	1.3 EH	8.00	2.4 VH	11.00
L049	1.471	5.00	.50T	6.00	.387	7.00	1.598	2.00
L086	1.4	1.50	.3W	0.00	.3W	0.00	1.7	8.50
MEDIAN CONC.	1.5000		.1685		.2950		1.6400	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	57.00	5.700	10			
L006	40.50	4.050	10	L VL		
L010	34.00	3.400	10		AUTO THIOCYANATE	

L023	75.00	8.333	9			FERRIC THIOCYANATE
L024	64.00	6.400	10			THIOCYANATE
L025	37.50	4.688	8			
L031	28.50	3.167	9			TITRATION CONDUCT
L033	33.00	4.714	7			
L047	95.50	9.550	10	VHEHEHEHEHEHEH	EHVHBIASED HIGH	TITRAGE
L049	60.00	6.667	9	EL		AUTOANALYZER-LACHA
L086	38.00	4.750	8			

1

OVERALL AVERAGE
RANK IS 5.630

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L031	28.50	3.167	9			TITRATION CONDUCT	
L010	34.00	3.400	10			AUTO THIOCYANATE	
L006	40.50	4.050	10	LVL			
L025	37.50	4.688	8				
L033	33.00	4.714	7				
L086	38.00	4.750	8				
L002	57.00	5.700	10				
L024	64.00	6.400	10			THIOCYANATE	
L049	60.00	6.667	9	EL		AUTOANALYZER-LACHA	
L023	75.00	8.333	9			FERRIC THIOCYANATE	
L047	95.50	9.550	10	VHEHEHEHEHEHEHEHVH	BIASED HIGH	TITRAGE	

OVERALL AVERAGE
RANK IS 5.630

CHLORIDE NON IC METHODS

PARAMETER: 19091 Potassium MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .1000 BASIC ACCEPTABLE ERROR= .0330 CONCENTRATION ERROR INCREMENT= .0384

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.43	31.50	.28	25.00	.26	22.00	.29	17.00	.21	16.50	.51	5.50
L003	.41	20.50	.33 H	37.00	.29	35.00	.31	30.00	.23	33.00	.55	18.50
L006	.406	16.00	.265	9.00	.253	16.00	.282	11.00	.208	13.00	.545	16.00
L007	.42	27.00	.28	25.00	.26	22.00	.29	17.00	.22	26.50	.55	18.50
L010	.4	11.50	.3	33.50	.3 H	36.00	.3	25.50	.2	9.00	.6	37.50
L013	.338 VL	1.00	.276	20.00	.257	18.00	.311	32.00	.197	7.00	.543	15.00
L013C	.41	20.50	.27	12.50	.25	10.50	.29	17.00	.21	16.50	.54	11.50
L021	.404	15.00	.272	16.00	.256	17.00	.292	22.50	.214	20.00	.550	18.50
L023	.41	20.50		0.00	.26	22.00	.30	25.50	.23	33.00	.56	25.50
L024	.43	31.50	.28	25.00	.26	22.00	.28	8.00	.22	26.50	.56	25.50
L025	.416	25.00	.274	17.50	.252	15.00	.292	22.50	.219	24.00	.563	28.00
L029	.40	11.50	.26	7.00	.25	10.50	.28	8.00	.20	9.00	.54	11.50
L030	.436	36.00	.296	32.00	.269	27.50	.304	28.00	.223	30.50	.595	35.00
L031	.35 L	3.50	.23 L	2.50	.21 L	2.50	.26	2.00	.18	4.00	.47 VL	2.00
L032	.43	31.50	.31	35.50	.32 VH	37.00	.33	37.00	.25 H	37.50	.57	30.50
L033	.40	11.50	.27	12.50	.26	22.00	.29	17.00	.25 H	37.50	.53	7.50
L047	.35 L	3.50	.10 EL	1.00	.12 EL	1.00	.35 H	38.00	.07 EL	1.00	.50	3.50
L049	.40	11.50	.27	12.50	.25	10.50	.28	8.00	.20	9.00	.54	11.50
L057	.41	20.50	.26	7.00	.26	22.00	.29	17.00	.17 L	2.50	.57	30.50
L061	.424	29.00	.280	25.00	.266	26.00	.300	25.50	.222	29.00	.568	29.00
L063	.431	34.00	.292	30.00	.272	33.00	.313	34.50	.234	35.00	.571	32.00
L073	.413	24.00	.275	19.00	.269	27.50	.285	13.00	.215	21.50	.556	22.50
L081	.42	27.00	.27	12.50	.25	10.50	.29	17.00	.21	16.50	.54	11.50
L082	.37	5.00	.26	7.00	.23	5.00	.27	4.00	.21	16.50	.53	7.50
L088	.34 VL	2.00	.23 L	2.50	.21 L	2.50	.24 L	1.00	.17 L	2.50	.44 EL	1.00
L090	.410	20.50	.270	12.50	.251	14.00	.291	21.00	.215	21.50	.556	22.50
L091	.42	27.00	.29	29.00	.27	30.50	.31	30.00	.22	26.50	.56	25.50
L093	.40	11.50	.27	12.50	.25	10.50	.29	17.00	.21	16.50	.54	11.50
L094	.437	37.00	.277	21.00	.351 EH	38.00	.325	36.00	.204	11.00	.600	37.50
L099	.38	7.00	.24	4.00	.25	10.50	.28	8.00	.19	5.50	.50	3.50
L102	.4	11.50	.28	25.00	.24	6.50	.28	8.00	.21	16.50	.54	11.50
L109	.409	17.00	.274	17.50	.270	30.50	.284	12.00	.207	12.00	.555	21.00
L116	.38	7.00	.31	35.50	.22 L	4.00	.27	4.00	.23	33.00	.55	18.50
L119	.446	38.00	.280	25.00	.270	30.50	.312	33.00	.223	30.50	.599	36.00
L122	.41	20.50	.30	33.50	.28	34.00	.31	30.00	.24	36.00	.56	25.50
L126	.433	35.00	.294	31.00	.270	30.50	.313	34.50	.218	23.00	.587	34.00
L127	.38	7.00	.25	5.00	.24	6.50	.27	4.00	.19	5.50	.51	5.50
L128	.43	31.50	.28	25.00	.26	22.00	.30	25.50	.22	26.50	.58	33.00
MEDIAN CONC.	.4100		.2750		.2600		.2900		.2120		.5500	

PARAMETER: 19091 Potassium MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.46	5.00	.05	30.00	.46	8.50	.30	10.50
L003	.48	10.50	.07	33.50	.52	34.00	.34	35.00
L006	.508	21.00	.025	4.50	.482	17.00	.306	14.00
L007	.51	23.00	.04	21.50	.50	22.50	.32	26.50
L010	.5	16.00	.1T VH	37.00	.5	22.50	.3	10.50
L013	.474	9.00	.025	4.50	.507	28.00	.310	17.00
L013C	.50	16.00	.04	21.50	.48	14.50	.31	17.00
L021	.512	25.00	.032	12.00	.501	26.00	.318	25.00
L023	.53	33.50	.04	21.50	.50	22.50	.32	26.50
L024	.52	28.50	.03T	9.00	.50	22.50	.27 L	4.00
L025	.518	26.00	.039	15.50	.496	19.00	.315	22.50
L029	.49	12.50	.04	21.50	.48	14.50	.30	10.50
L030	.548	38.00	.040	21.50	.516	31.00	.315	22.50
L031	.44 L	3.00	.02	2.00	.41 VL	2.00	.26 L	3.00
L032	.52	28.50	.08 H	35.50	.52	34.00	.34	35.00
L033	.47	7.00	.04	21.50	.45	5.00	.30	10.50
L047	.33 EL	1.00	.07	33.50	.51	29.50	.15 EL	1.00
L049	.50	16.00	.02	2.00	.46	8.50	.30	10.50
L057	.47	7.00	.08T H	35.50	.45	5.00	.39 VH	38.00
L061	.525	31.00	.040	21.50	.510	29.50	.331	31.00
L063	.529	32.00	.046	27.00	.504	27.00	.337	33.00
L073	.506	20.00	.037T	14.00	.517	32.00	.313	20.50
L081	.49	12.50	.04	21.50	.48	14.50	.31	17.00
L082	.52	28.50	.02	2.00	.46	8.50	.29	6.00
L088	.40 EL	2.00	.03	9.00	.37 EL	1.00	.25 L	2.00
L090	.510	23.00	.047	28.00	.478	12.00	.317	24.00
L091	.54	36.00	.04	21.50	.50	22.50	.33	29.50
L093	.50	16.00	.03	9.00	.47	11.00	.31	17.00
L094	.510	23.00	.068	32.00	.520	34.00	.343	37.00
L099	.48	10.50	.05W	0.00	.45	5.00	.29	6.00
L102	.50	16.00	.05	30.00	.48	14.50	.30	10.50
L109	.504	19.00	.039T	15.50	.525	37.00	.313	20.50
L116	.45 L	4.00	.03	9.00	.44 L	3.00	.31	17.00
L119	.544	37.00	.029	6.00	.526	38.00	.327	28.00
L122	.52	28.50	.05	30.00	.49	18.00	.34	35.00
L126	.539	35.00	.035	13.00	.524	36.00	.336	32.00
L127	.47	7.00	.03	9.00	.46	8.50	.29	6.00
L128	.53	33.50	.04	21.50	.50	22.50	.33	29.50
MEDIAN CONC.	.5050		.0400		.4980		.3115	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	171.50	17.150	10			
L003	287.00	28.700	10	H	19103	
L006	137.50	13.750	10			
L007	229.50	22.950	10			
L010	239.00	23.900	10	H VH	ICP	
L013	151.50	15.150	10	VL		
L013C	157.50	15.750	10			
L021	197.00	19.700	10			
L023	230.50	25.611	9		FAA	
L024	202.50	20.250	10	L	AAS	
L025	215.00	21.500	10			
L029	116.50	11.650	10			
L030	302.00	30.200	10	BIASED HIGH		
L031	26.50	2.650	10	L L L VLL VLL BIASED LOW	A.A.	
L032	342.00	34.200	10	VH H H BIASED HIGH		
L033	152.00	15.200	10	H		
L047	113.00	11.300	10	L ELELH EL EL EL	ICP	
L049	100.00	10.000	10		ATOMIC ABSORPTION	
L057	185.00	18.500	10	L H VH		
L061	276.50	27.650	10		FLAME AA	
L063	317.50	31.750	10	BIASED HIGH		
L073	214.00	21.400	10		WATERS	
L081	160.50	16.050	10			
L082	90.00	9.000	10		ICP	
L088	25.50	2.550	10	VLL L L L ELEL ELL BIASED LOW	AA-FLAME	
L090	.00	19.900	10		FLAME AAS	
L091	278.00	27.800	10		FLAME AA	
L093	132.50	13.250	10		AA 2380 FLAME	
L094	306.50	30.650	10	EH BIASED HIGH	FLAME AA	
L099	60.00	6.667	9	BIASED LOW	ICP	
L102	150.00	15.000	10		IC	
L109	202.00	20.200	10		WATERS IC	
L116	135.00	13.500	10	L L L	SEAP	
L119	302.00	30.200	10	BIASED HIGH		
L122	291.00	29.100	10		AA - FLAME	
L126	304.00	30.400	10	BIASED HIGH		
L127	64.00	6.400	10	BIASED LOW	FAAS	
L128	270.50	27.050	10		AE	

OVERALL AVERAGE
RANK IS 19.402

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L088	25.50	2.550	10	VLLLLLELELELL	BIASED LOW	AA-FLAME	
L031	26.50	2.650	10	LLLVLLVLL	BIASED LOW	A.A.	
L127	64.00	6.400	10		BIASED LOW	FAAS	
L099	60.00	6.667	9		BIASED LOW	ICP	
L082	90.00	9.000	10			ICP	
L049	100.00	10.000	10			ATOMIC ABSORPTION	
L047	113.00	11.300	10	LELELHELELEL		ICP	
L029	116.50	11.650	10				
L093	132.50	13.250	10			AA 2380 FLAME	
L116	135.00	13.500	10	LLL		SEAP	
L006	137.50	13.750	10				
L102	150.00	15.000	10			IC	
L013	151.50	15.150	10	VL			
L033	152.00	15.200	10	H			
L013C	157.50	15.750	10				
L081	160.50	16.050	10				
L002	171.50	17.150	10				
L057	185.00	18.500	10	LHVH			
L021	197.00	19.700	10				
L090	.00	19.900	10			FLAME AAS	
L109	202.00	20.200	10			WATERS IC	
L024	202.50	20.250	10	L		AAS	
L073	214.00	21.400	10			WATERS	
L025	215.00	21.500	10				
L007	229.50	22.950	10				
L010	239.00	23.900	10	HVH		ICP	
L023	230.50	25.611	9			FAA	
L128	270.50	27.050	10			AE	
L061	276.50	27.650	10			FLAME AA	
L091	278.00	27.800	10			FLAME AA	
L003	287.00	28.700	10	H		19103	
L122	291.00	29.100	10			AA - FLAME	
L030	302.00	30.200	10		BIASED HIGH		
L119	302.00	30.200	10		BIASED HIGH		
L126	304.00	30.400	10		BIASED HIGH		
L094	306.50	30.650	10	EH	BIASED HIGH	FLAME AA	
L063	317.50	31.750	10		BIASED HIGH		
L032	342.00	34.200	10	VHHH	BIASED HIGH		

OVERALL AVERAGE
RANK IS 19.402

Potassium

PARAMETER: 20091 Calcium MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 35 MAJOR IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .1900 BASIC ACCEPTABLE ERROR= .0800 CONCENTRATION ERROR INCREMENT= .0364

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	1.94	20.50	6.16	19.00	.7	32.00	.79	14.00	2.04	17.00	3.02	16.00
L003	1.9	12.50	6.4	30.00	.60	3.00	.70 L	1.50	2.0	13.00	3.2	30.50
L006	1.78 L	1.00	6.10	14.00	.62	10.50	.84	30.00	1.99	10.00	2.88	7.00
L007	2.03	31.50	6.51 H	32.00	.67	26.00	.84	30.00	2.06	21.00	3.08	23.00
L010	1.8	3.50	5.9	6.00	.6	3.00	.7 L	1.50	2.0	13.00	2.8 L	1.50
L013C	2.07	34.50	6.43	31.00	.65	18.00	.83	26.00	2.10	27.00	3.05	20.00
L021	1.927	16.00	6.292	27.00	.700	32.00	.882	34.00	2.222 H	35.00	3.344 VH	34.00
L023	1.84	6.00		0.00	.60	3.00	.77	9.00	1.88 L	2.00	2.94	10.50
L024	2.0	27.50	6.2	22.00	.65	18.00	.83	26.00	2.1	27.00	3.1	24.50
L025	1.92	14.50	6.18	20.50	.614	9.00	.76	6.00	2.	13.00	3.02	16.00
L029	1.90	12.50	6.08	12.50	.65	18.00	.74	3.00	1.94	6.00	2.95	12.00
L030	1.88	10.50	6.23	24.00	.613	8.00	.773	11.00	2.00	13.00	2.97	13.00
L031	1.79	2.00	5.81 L	3.50	.77 H	34.00	.79	14.00	1.88 L	2.00	2.80 L	1.50
L032	1.93	17.50	6.15	18.00	.69	30.00	.86	33.00	2.03	16.00	3.01	14.00
L034	2.0	27.50	6.6 VH	33.00	.7	32.00	.8	16.50	2.1	27.00	3.1	24.50
L047	2.05	33.00	6.22	23.00	.80 VH	35.00	.95 H	35.00	2.17	34.00	3.47 EH	35.00
L049	1.98	25.50	6.25	25.00	.65	18.00	.83	26.00	2.08	24.00	3.16	28.00
L057	1.82	5.00	5.74 L	2.00	.60	3.00	.76	6.00	1.96	8.00	2.84 L	4.00
L061	1.937	19.00	6.117	16.00	.647	15.00	.817	21.00	2.055	19.00	3.079	22.00
L063	2.018	29.00	6.283	26.00	.611	7.00	.756	4.00	2.145	33.00	3.119	26.00
L073	1.92	14.50	6.08	12.50	.64	14.00	.81	18.50	2.00	13.00	3.02	16.00
L081	1.95	22.50	5.95	8.50	.63	13.00	.80	16.50	2.06	21.00	3.04	19.00
L082	1.87	9.00	5.93	7.00	.66	22.50	.76	6.00	1.88 L	2.00	2.92	9.00
L088	1.95	22.50	6.12	17.00	.67	26.00	.82	22.00	2.06	21.00	3.06	21.00
L090	1.94	20.50	5.98	10.00	.66	22.50	.83	26.00	2.05	18.00	2.94	10.50
L091	1.80	3.50	5.95	8.50	.65	18.00	.81	18.50	1.96	8.00	2.81 L	3.00
L093	1.86	7.50	5.81 L	3.50	.60	3.00	.78	12.00	1.96	8.00	2.86	5.50
L099	1.97	24.00	6.18	20.50	.652	21.00	.828	23.00	2.13	31.00	3.20	30.50
L102	1.86	7.50	5.86	5.00	.61	6.00	.77	9.00	1.92	4.50	2.91	8.00
L109	1.93	17.50	6.05	11.00	.629	12.00	.814	20.00	2.07	23.00	3.03	18.00
L114	2.07	34.50	6.64 VH	34.00	.67T	26.00	.83T	26.00	2.10	27.00	3.26 H	33.00
L116	1.88	10.50	6.11	15.00	.62	10.50	.77	9.00	1.92	4.50	2.86	5.50
L122	1.98	25.50	5.67 VL	1.00	.67	26.00	.79	14.00	2.10	27.00	3.14	27.00
L127	2.02	30.00	6.34	28.00	.67	26.00	.84	30.00	2.13	31.00	3.17	29.00
L128	2.03	31.50	6.35	29.00	.675	29.00	.853	32.00	2.13	31.00	3.22 H	32.00
MEDIAN CONC.	1.9300		6.1350		.6500		.8100		2.0500		3.0300	

PARAMETER: 20091 Calcium MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	13.2	10.50	.98	20.50	1.53	14.00	8.60	19.50
L003	14.0 H	29.00	.90	6.00	1.4 L	2.50	9.0 H	30.00
L006	13.73	25.00	.89	4.00	1.48	10.50	8.67	23.00
L007	14.05 H	30.00	1.14 VH	34.00	1.59	24.50	9.08 H	31.00
L010	12.9	5.50	.9	6.00	1.4 L	2.50	8.2	4.00
L013C	13.52	20.00	1.02	29.50	1.59	24.50	8.68	25.00
L021	13.629	24.00	1.157 VH	35.00	1.719 H	35.00	8.519	14.00
L023	12.9	5.50	.93	12.00	1.49	12.00	8.16 L	2.50
L024	13.	7.00	.99	24.00	1.60	27.00	8.6	19.50
L025	13.5	19.00	.369 EL	1.00	1.47	8.00	8.64	22.00
L029	2.68 EL	1.00	.96	16.00	1.55	18.50	8.40	9.50
L030	12.3 VL	2.50	.867	3.00	1.48	10.50	8.68	25.00
L031	13.08	9.00	.92	10.50	1.47	8.00	8.23	5.00
L032	13.3	13.00	.97	17.50	1.55	18.50	8.51	13.00
L034	15. EH	35.00	1.0	27.50	1.6	27.00	9.3 VH	33.00
L047	14.3 VH	32.00	1.00	27.50	1.68 H	33.00	9.62 EH	34.50
L049	13.84	26.00	.99	24.00	1.55	18.50	8.68	25.00
L057	12.3 VL	2.50	.90	6.00	1.46	6.00	8.16 L	2.50
L061	13.569	21.00	.991	26.00	1.576	23.00	8.583	18.00
L063	13.89	27.00	.919	9.00	1.624	30.00	8.853	27.00
L073	13.26	12.00	.98	20.50	1.55	18.50	8.58	17.00
L081	13.4	16.50	.98	20.50	1.55	18.50	8.45	11.00
L082	13.59	23.00	.97	17.50	1.51	13.00	8.32	6.50
L088	13.39	14.00	.99	24.00	1.57	22.00	8.62	21.00
L090	13.2	10.50	.98	20.50	1.54	15.00	8.48	12.00
L091	13.4	16.50	.94	13.50	1.37 L	1.00	8.40	9.50
L093	13.57	22.00	.94	13.50	1.47	8.00	8.33	8.00
L099	14.7 EH	34.00	1.07	33.00	1.70 H	34.00	9.28 VH	32.00
L102	13.04	8.00	.92	10.50	1.44	5.00	8.09 L	1.00
L109	13.40	16.50	.950	15.00	1.55	18.50	8.54	15.00
L114	14.62 EH	33.00	1.03	31.50	1.60	27.00	9.62 EH	34.50
L116	13.40	16.50	.84 L	2.00	1.42 L	4.00	8.57	16.00
L122	12.40 VL	4.00	.91	8.00	1.67	32.00	8.32	6.50
L127	13.9	28.00	1.02	29.50	1.63	31.00	8.86	28.00
L128	14.1 H	31.00	1.03	31.50	1.61	29.00	8.94	29.00
MEDIAN CONC.	13.4000		.9700		1.5500		8.5830	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	183.00	18.300	10			
L003	158.00	15.800	10	L H L H		20110
L006	135.00	13.500	10	L		
L007	283.00	28.300	10	H H VH H	BIASED HIGH	
L010	46.50	4.650	10	L L L	BIASED LOW	ICP
L013C	255.50	25.550	10			
L021	286.00	28.600	10	H VH VHH	BIASED HIGH	
L023	62.50	6.944	9	L L	BIASED LOW	FAA/ICP
L024	222.50	22.250	10			ICP
L025	129.00	12.900	10	EL		
L029	109.00	10.900	10	EL		
L030	120.50	12.050	10	VL		
L031	89.50	8.950	10	L H L L		ICP
L032	190.50	19.050	10			
L034	283.00	28.300	10	VH EH	VHBIASED HIGH	
L047	322.00	32.200	10	VHH EHVH H	EHBIASED HIGH	ICP
L049	240.00	24.000	10			ICP
L057	45.00	4.500	10	L L VL L	BIASED LOW	
L061	200.00	20.000	10			FLAME AA
L063	218.00	21.800	10			
L073	156.50	15.650	10			AA - FLAME
L081	167.00	16.700	10			
L082	115.50	11.550	10	L		ICP
L088	210.50	21.050	10			AA-FLAME
L090	165.50	16.550	10			FLAME AAS
L091	100.00	10.000	10	L L		FLAME AA
L093	91.00	9.100	10	L		AA 2380 FLAME
L099	283.00	28.300	10	EH H	VHBIASED HIGH	ICP
L102	64.50	6.450	10	L	BIASED LOW	ICP
L109	166.50	16.650	10			AA - FLAME
L114	306.50	30.650	10	VH H EH	EHBIASED HIGH	I.C.P.
L116	93.50	9.350	10	L L		SEAP
L122	171.00	17.100	10	VL VL		AA - FLAME
L127	290.50	29.050	10		BIASED HIGH	ICP
L128	305.00	30.500	10	H H	BIASED HIGH	ICP

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LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L057	45.00	4.500	10	LLVLL	BIASED LOW		
L010	46.50	4.650	10	LLL	BIASED LOW	ICP	
L102	64.50	6.450	10	L	BIASED LOW	ICP	
L023	62.50	6.944	9	LL	BIASED LOW	FAA/ICP	
L031	89.50	8.950	10	LHLL		ICP	
L093	91.00	9.100	10	L		AA 2380 FLAME	
L116	93.50	9.350	10	LL		SEAP	
L091	100.00	10.000	10	LL		FLAME AA	
L029	109.00	10.900	10	EL			
L082	115.50	11.550	10	L		ICP	
L030	120.50	12.050	10	VL			
L025	129.00	12.900	10	EL			
L006	135.00	13.500	10	L			
L073	156.50	15.650	10			AA - FLAME	
L003	158.00	15.800	10	LHLH		20110	
L090	165.50	16.550	10			FLAME AAS	
L109	166.50	16.650	10			AA - FLAME	
L081	167.00	16.700	10				
L122	171.00	17.100	10	VLVL		AA - FLAME	
L002	183.00	18.300	10				
L032	190.50	19.050	10				
L061	200.00	20.000	10			FLAME AA	
L088	210.50	21.050	10			AA-FLAME	
L063	218.00	21.800	10				
L024	222.50	22.250	10			ICP	
L049	240.00	24.000	10			ICP	
L013C	255.50	25.550	10				
L099	283.00	28.300	10	EHHVH	BIASED HIGH	ICP	
L034	283.00	28.300	10	VHEHVH	BIASED HIGH		
L007	283.00	28.300	10	HHVHH	BIASED HIGH		
L021	286.00	28.600	10	HVHVHH	BIASED HIGH		
L127	290.50	29.050	10		BIASED HIGH	ICP	
L128	305.00	30.500	10	HH	BIASED HIGH	ICP	
L114	306.50	30.650	10	VHHEHEH	BIASED HIGH	I.C.P.	
L047	322.00	32.200	10	VHHEHVHHEH	BIASED HIGH	ICP	

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