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LRTAP INTERLABORATORY STUDY L-36 FOR MAJOR IONS AND NUTRIENTS

by

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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

September 14th, 1994

Dear Participant:

Re: LRTAP Interlaboratory Comparability Study L-36

Selected Major Ions, Nutrients and Physical Measurements in Water.

The LRTAP Quality Assurance Subgroup of the RMCC has now completed its thirty sixth 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-36 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,

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 #36

SAMPLE IDENTIFICATION LIST

SAMPLE NO.	SAMPLE IDENTIFICATION	Sample Description	Sample Previous Usage
1	GRM-05	Grimsby Rainwater, 1993	none
2	GRM-06	Grimsby Rainwater, 1993	none
3	AES-02	Pooled Rainwater, 1993	none
4	AES-01	Pooled Rainwater, 1993	none
5	DD-12	Dickie Lake, 1993	none
6	DD-11	Bog water, 1993	none
7	TS4B	Turkey Lakes	L31
8	TRKY-S2A	Turkey Stream	L28,L34
9	TRKY-S2B	Turkey Stream	L28,L32
10	AUD-06	Eagle Lake (EAGLE-01)	L20,L22

TABLE 2

SUMMARY OF INTERLABORATORY MEDIAN VALUES FOR LRTAP STUDY 0036

PARAMETER		SAMPLE NUMBER						
		GRM-05 SAMPLE 1	GRM-06 SAMPLE 2	AES-02 SAMPLE 3	AES-01 SAMPLE 4	DD-12 SAMPLE 5	DD-11 SAMPLE 6	TS4B SAMPLE 7
Colour	HAZEN UNIT	2.5000	3.2650	1.0000	1.8000	27.000	600.000	5.9000
Specific Conductance	UMHO/CM	22.700	38.000	16.350	14.400	33.500	47.000	45.000
ACIDITY TO PH 8.3	MG/LCACO3	1.7550	1.2600	3.2500	2.9040	2.1650	25.015	1.6800
pH	PH UNITS	6.8600	7.4200	4.5500	4.6500	6.1200	4.1700	7.2300
Diss Organic Carbon	MG C/L	.5300	1.2300	.3040	.5000	5.1000	58.955	1.9800
ALKALINITY-FIXED ENDPT. PH4.5	MG/L CACO3	7.9250	11.830	.1000	.4900	3.6000	0.0000	14.050
ALKALINITY-GRAN, INFLEC, EXTRAP	MG/L CACO3	6.4000	10.300	-1.3600	-1.2000	2.1000	-4.7600	12.800
GRAN TITRA ALK	MG/LCAC03	6.5000	10.365	-1.6200	-1.2050	2.2735	-4.0900	13.040
Diss Inorg Carbon	MG C/L	1.8300	2.5050	.3100	.3400	.8500	1.3500	3.2300
Nitrate + Nitrite	MG N/L	.3970	.3540	.2400	.2100	.0090	.0150	.1990
Nitrate-IC	mgN/L	.4000	.3470	.2375	.2110	.0065	.0055	.2000
Ammonia	MG N/L	.0650	.1580	.1800	.2145	.1200	.0890	.0050
Total Kjeldahl N	MG N/L	.1000	.2850	.2000	.2250	.3420	1.4500	.1075
Sodium	MG/L	.1100	.4160	.0650	.0965	1.7600	.9250	.8210
Magnesium	MG/L	.5915	1.4110	.0300	.0300	.6600	.5900	.6300
Aluminum	MG/L	.0079	.0435	.0120	.0090	.0510	.5700	.0097
REACTIVE SILICA	MG SI/L	.2105	.1700	.0135	.0080	.0200	2.5280	1.7700
SULFATE, IC METHOD	MG/L	1.8665	4.3580	1.8000	1.5475	5.7620	.9920	5.8560
SULFATE NON IC METHODS	MG/L	1.8000	4.4350	1.7000	1.4000	6.1850	22.585	6.0250
CHLORIDE IC	MG/L	.2045	.7770	.1200	.1880	3.0200	.9300	.4615
CHLORIDE NON IC METHODS	MG/L	.2640	.7900	.2000	.2450	3.2000	3.6600	.5500
Potassium	MG/L	.1790	.2270	.0300	.0300	.3690	.4195	.3120
Calcium	MG/L	2.8530	3.9855	.1650	.1545	2.6550	2.8000	6.5150

PARAMETER		SAMPLE NUMBER		
		TRKY-S2A SAMPLE 8	TRKY-S2B SAMPLE 9	AUD-06 SAMPLE 10
Colour	HAZEN UNIT	8.5500	7.9300	6.2000
Specific Conductance	UMHO/CM	47.300	48.000	53.100
ACIDITY TO PH 8.3	MG/LCACO3	1.5350	1.3950	1.4100
pH	PH UNITS	7.2900	7.3350	7.3400
Diss Organic Carbon	MG C/L	2.3210	2.1750	2.8000
ALKALINITY-FIXED ENDPT. PH4.5	MG/L CACO3	15.925	16.050	14.550
ALKALINITY-GRAN, INFLEC, EXTRAP	MG/L CACO3	14.320	14.900	13.100
GRAN TITRA ALK	MG/LCAC03	14.504	14.740	13.390
Diss Inorg Carbon	MG C/L	3.6000	3.6400	3.2700
Nitrate + Nitrite	MG N/L	.0680	.1070	.0870
Nitrate-IC	mgN/L	.0680	.1070	.0860
Ammonia	MG N/L	.0140	.0080	.0500
Total Kjeldahl N	MG N/L	.1500	.1300	.1890
Sodium	MG/L	.8470	.8800	1.0000
Magnesium	MG/L	.7400	.7565	1.6300
Aluminum	MG/L	.0110	.0100	.0090
REACTIVE SILICA	MG SI/L	1.6510	1.6600	1.0550
SULFATE, IC METHOD	MG/L	6.3345	6.2850	8.3435
SULFATE NON IC METHODS	MG/L	6.5100	6.5500	8.7100
CHLORIDE IC	MG/L	.2955	.3000	.9600
CHLORIDE NON IC METHODS	MG/L	.4000	.4050	1.0000
Potassium	MG/L	.2400	.2430	.7360
Calcium	MG/L	6.9410	7.0400	5.8400

TABLE 3

COMPARISON OF LABORATORY PERFORMANCE (STUDY 0036)

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	6	37.50	141	20	14.18	51.68
L003	11	3	27.27	102	22	21.57	48.84
L005	4	1	25.00	37	1	2.70	27.70
L006	17	3	17.65	170	15	8.82	26.47
L007	9	4	44.44	86	16	18.60	63.05
L008	11	6	54.55	110	42	38.18	92.73
L010	14	2	14.29	124	9	7.26	21.54
L011	9	1	11.11	84	9	10.71	21.83
L013	6	2	33.33	55	8	14.55	47.88
L013C	9	0	0.00	76	3	3.95	3.95
L014	12	4	33.33	120	17	14.17	47.50
L021	10	3	30.00	98	17	17.35	47.35
L023	17	2	11.76	132	18	13.64	25.40
L024	15	3	20.00	139	13	9.35	29.35
L025	20	4	20.00	191	17	8.90	28.90
L029	16	2	12.50	156	7	4.49	16.99
L030	14	2	14.29	140	25	17.86	32.14
L031	18	5	27.78	179	25	13.97	41.74
L032	15	1	6.67	150	15	10.00	16.67
L033	14	3	21.43	110	18	16.36	37.79
L034	8	2	25.00	80	18	22.50	47.50
L047	12	9	75.00	112	71	63.39	138.39
L049	16	8	50.00	160	68	42.50	92.50
L057	9	3	33.33	89	27	30.34	63.67
L061	10	0	0.00	98	3	3.06	3.06
L063	16	3	18.75	157	36	22.93	41.68
L073	7	0	0.00	68	3	4.41	4.41
L078	2	1	50.00	20	0	0.00	50.00
L081	10	2	20.00	100	5	5.00	25.00
L082	15	3	20.00	149	8	5.37	25.37
L086	7	1	14.29	64	3	4.69	18.97
L088	13	4	30.77	130	22	16.92	47.69
L090	11	1	9.09	110	7	6.36	15.45
L090B	1	0	0.00	10	0	0.00	0.00
L091	15	2	13.33	150	11	7.33	20.67
L093	15	2	13.33	150	30	20.00	33.33
L094	10	2	20.00	100	17	17.00	37.00
L099	15	6	40.00	138	35	25.36	65.36
L102	16	2	12.50	153	20	13.07	25.57
L104	4	2	50.00	39	16	41.03	91.03
L109	8	1	12.50	78	6	7.69	20.19
L112	3	0	0.00	29	4	13.79	13.79
L114	11	2	18.18	95	41	43.16	61.34
L116	15	4	26.67	143	19	13.29	39.95
L119	10	1	10.00	93	14	15.05	25.05
L121	10	1	10.00	96	16	16.67	26.67
L122	10	1	10.00	92	56	60.87	70.87
L126	8	2	25.00	80	2	2.50	27.50
L128	18	6	33.33	178	49	27.53	60.86
L131	12	1	8.33	120	10	8.33	16.67

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	SO4-IC	CL-IC
Al	NO3	ACIDITY	ALKA-FE. P	ACIDITY	

THE FOLLOWING PARAMETERS WERE EXCLUDED

Colour

TABLE 3A

COMPARISON OF LABORATORY PERFORMANCE (STUDY 0036)

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
L090B	1	0	0.00	10	0	0.00	0.00
L061	10	0	0.00	98	3	3.06	3.06
L013C	9	0	0.00	76	3	3.95	3.95
L073	7	0	0.00	68	3	4.41	4.41
L112	3	0	0.00	29	4	13.79	13.79
L090	11	1	9.09	110	7	6.36	15.45
L032	15	1	6.67	150	15	10.00	16.67
L131	12	1	8.33	120	10	8.33	16.67
L029	16	2	12.50	156	7	4.49	16.99
L086	7	1	14.29	64	3	4.69	18.97
L109	8	1	12.50	78	6	7.69	20.19
L091	15	2	13.33	150	11	7.33	20.67
L010	14	2	14.29	124	9	7.26	21.54
L011	9	1	11.11	84	9	10.71	21.83
L081	10	2	20.00	100	5	5.00	25.00
L119	10	1	10.00	93	14	15.05	25.05
L082	15	3	20.00	149	8	5.37	25.37
L023	17	2	11.76	132	18	13.64	25.40
L102	16	2	12.50	153	20	13.07	25.57
L006	17	3	17.65	170	15	8.82	26.47
L121	10	1	10.00	96	16	16.67	26.67
L126	8	2	25.00	80	2	2.50	27.50
L005	4	1	25.00	37	1	2.70	27.70
L025	20	4	20.00	191	17	8.90	28.90
L024	15	3	20.00	139	13	9.35	29.35
L030	14	2	14.29	140	25	17.86	32.14
L093	15	2	13.33	150	30	20.00	33.33
L094	10	2	20.00	100	17	17.00	37.00
L033	14	3	21.43	110	18	16.36	37.79
L116	15	4	26.67	143	19	13.29	39.95
L063	16	3	18.75	157	36	22.93	41.68
L031	18	5	27.78	179	25	13.97	41.74
L021	10	3	30.00	98	17	17.35	47.35
L014	12	4	33.33	120	17	14.17	47.50
L034	8	2	25.00	80	18	22.50	47.50
L088	13	4	30.77	130	22	16.92	47.69
L013	6	2	33.33	55	8	14.55	47.88
L003	11	3	27.27	102	22	21.57	48.84
L078	2	1	50.00	20	0	0.00	50.00
L002	16	6	37.50	141	20	14.18	51.68
L128	18	6	33.33	178	49	27.53	60.86
L114	11	2	18.18	95	41	43.16	61.34
L007	9	4	44.44	86	16	18.60	63.05
L057	9	3	33.33	89	27	30.34	63.67
L099	15	6	40.00	138	35	25.36	65.36
L122	10	1	10.00	92	56	60.87	70.87
L104	4	2	50.00	39	16	41.03	91.03
L049	16	8	50.00	160	68	42.50	92.50
L008	11	6	54.55	110	42	38.18	92.73
L047	12	9	75.00	112	71	63.39	138.39

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	SO4-IC	CL-IC
Al	NO3	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 0022	0023	0024	0025	0026	0027	0028	0029	0030	0031	0032	0033	0034	0035	0036	MEDIAN SCORE	COMMENTS
L002	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	51.7	10.3	SATISFACTORY
L003	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	48.8	38.4	MODERATE
L004	79.6	50.3	-	71.4	57.1	12.0	30.1	10.7	16.0	23.4	8.7	13.1	30.1	-	-	26.7	MODERATE
L005	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	27.7	22.0	SATISFACTORY
L006	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	26.5	26.5	MODERATE
L007	35.4	-	43.1	36.8	30.8	43.4	45.8	94.0	78.2	64.9	-	50.5	68.4	75.8	63.0	50.5	MODERATE
L008	-	-	-	106.9	81.1	91.0	-	131.8	118.2	67.5	96.9	100.8	147.5	-	92.7	98.9	POOR
L010	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	21.5	54.6	MODERATE
L011	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	21.8	30.1	MODERATE
L013	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	47.9	3.8	SATISFACTORY, WELL DONE
L013C	-	-	-	-	-	-	-	-	-	-	48.4	7.9	3.9	15.1	3.9	7.9	SATISFACTORY, WELL DONE
L014	33.1	-	-	-	-	66.9	68.1	36.9	-	16.9	60.0	45.6	61.2	21.7	47.5	46.6	MODERATE
L019	30.0	15.1	22.3	17.9	20.7	20.9	30.8	5.4	11.7	60.0	-	-	-	-	-	20.8	SATISFACTORY
L021	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	47.3	25.8	MODERATE
L022	-	13.5	41.0	-	35.7	-	30.3	6.3	-	-	55.0	31.7	-	-	-	31.7	MODERATE
L023	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	25.4	46.1	MODERATE
L024	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	29.4	24.1	SATISFACTORY
L025	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	30.4	26.2	MODERATE
L029	15.2	46.8	31.0	-	-	33.8	42.2	-	60.8	30.9	26.9	14.0	35.6	38.2	17.0	32.4	MODERATE
L030	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	32.1	21.4	SATISFACTORY
L031	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	41.7	31.3	MODERATE
L032	-	63.3	-	67.9	102.2	57.5	44.5	25.5	-	50.9	37.7	25.7	41.7	66.3	17.9	47.7	MODERATE
L033	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	37.8	25.4	MODERATE
L034	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	47.5	27.0	MODERATE
L047	90.3	94.0	84.6	-	107.8	-	98.5	139.9	84.3	-	-	-	96.1	98.5	138.4	97.3	POOR
L048	77.8	12.4	-	33.5	3.9	50.8	56.2	16.2	21.2	27.7	67.1	107.9	53.9	-	-	42.1	MODERATE
L049	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	92.5	62.4	POOR
L057	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	63.7	45.6	MODERATE
L058	-	-	26.2	25.1	23.8	30.7	9.4	7.5	-	-	-	53.0	-	-	-	25.1	MODERATE
L061	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	3.1	2.2	SATISFACTORY, WELL DONE
L063	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	41.7	29.5	MODERATE
L073	0.0	10.0	0.0	18.6	1.0	5.8	0.0	0.0	2.2	0.0	-	0.0	-	11.1	4.4	1.0	SATISFACTORY, WELL DONE
L074	48.6	-	21.8	-	41.3	38.7	22.5	78.4	69.4	65.6	-	10.9	-	-	-	41.3	MODERATE
L078	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	50.0	5.0	SATISFACTORY, WELL DONE
L081	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	25.0	23.1	SATISFACTORY
L082	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	25.4	35.4	MODERATE
L083	-	-	-	-	-	-	-	-	-	96.6	89.7	92.3	-	-	-	92.3	POOR
L086	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	19.0	33.4	MODERATE
L088	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	47.7	31.0	MODERATE
L090	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	15.5	25.8	MODERATE
L091	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	20.7	26.9	MODERATE
L092	47.4	40.0	32.8	29.9	48.0	58.8	52.5	60.3	75.9	-	-	-	-	-	-	48.0	MODERATE
L093	19.3	40.7	36.4	25.3	-	-	-	-	-	73.8	53.8	54.0	27.4	38.7	33.3	37.5	MODERATE
L094	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	37.0	52.1	MODERATE
L095	20.0	23.0	34.5	-	13.0	26.4	32.5	12.6	26.2	45.3	74.0	36.6	-	-	-	26.4	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
L097	33.3	-	-	-	-	83.0	-	70.6	-	48.9	-	-	-	-	-	59.8	MODERATE
L099	-	-	-	-	-	-	-	-	-	25.7	33.0	29.4	19.1	73.5	65.4	31.2	MODERATE
L102	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	25.6	28.1	MODERATE
L104	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	91.0	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	20.2	4.4	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	13.8	16.9	SATISFACTORY
L114	-	-	-	-	76.0	46.7	91.1	10.0	54.0	85.0	76.4	54.3	66.1	42.0	61.3	61.3	POOR
L116	-	-	-	-	-	-	43.3	16.7	3.1	16.4	78.2	-	42.6	41.6	40.0	40.8	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	25.1	32.9	MODERATE
L120	-	-	-	-	-	-	66.8	33.3	81.7	46.7	57.0	42.4	-	-	-	51.9	MODERATE
L121	-	-	-	-	-	-	-	42.9	48.0	-	-	-	38.9	-	26.7	40.9	MODERATE
L122	-	-	-	-	-	-	-	-	105.5	49.2	-	86.1	38.0	29.8	70.9	60.0	POOR
L123	-	-	-	-	-	-	-	-	-	93.0	110.0	101.5	-	-	-	101.5	POOR
L125	-	-	-	-	-	-	-	-	-	15.0	11.1	-	-	-	-	13.1	SATISFACTORY
L126	-	-	-	-	-	-	-	-	-	-	-	-	20.0	17.8	27.5	20.0	SATISFACTORY
L127	-	-	-	-	-	-	-	-	-	-	42.7	26.2	22.4	19.8	-	24.3	SATISFACTORY
L128	-	-	-	-	-	-	-	-	-	-	-	-	64.8	48.0	60.9	60.9	POOR
L131	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.7	-	-
INTERLAB MEDIAN	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	32.1		

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

STUDY DATES: 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),0036(10-MAY-94),

TABLE 5

COMPARISON OF INTERLABORATORY MEDIAN VALUES BETWEEN STUDIES

		PREVIOUS DATA (STUDY NO./SAMPLE NUMBER)			
		LRTAP	TS4B		
		P A R A M E T E R			
	STUDY NO.	0031	0036	AVG.	STD.
	SAMPLE NO.	10	7	MED.	DEV.
Colour	HAZEN UNIT	5.450	5.900	5.675	-
Specific Conductance	UMHO/CM	45.500	45.000	45.250	-
ACIDITY TO PH 8.3	MG/LCACO3	2.550	1.680	2.115	-
pH	PH UNITS	7.125	7.230	7.177	-
Diss Organic Carbon	MG C/L	2.000	1.980	1.990	-
ALKALINITY-FIXED ENDPT. PH4.5	MG/L CACO3	14.100	14.050	14.075	-
ALKALINITY-GRAN,INFLEC,EXTRAP	MG/L CACO3	12.900	12.800	12.850	-
GRAN TITRA ALK	MG/LCACO3	13.035	13.040	13.038	-
Diss Inorg Carbon	MG C/L	3.580	3.230	3.405	-
Nitrate + Nitrite	MG N/L	.176	.199	.188	-
Nitrate-IC	mgN/L	.172	.200	.186	-
Ammonia	MG N/L	.008	.005	.007	-
Total Kjeldahl N	MG N/L	.110	.107	.109	-
Sodium	MG/L	.830	.821	.825	-
Magnesium	MG/L	.627	.630	.628	-
Aluminum	MG/L	.012	.010	.011	-
REACTIVE SILICA	MG SI/L	1.755	1.770	1.763	-
SULFATE,IC METHOD	MG/L	5.830	5.856	5.843	-
SULFATE NON IC METHODS	MG/L	6.095	6.025	6.060	-
CHLORIDE IC	MG/L	.430	.461	.446	-
CHLORIDE NON IC METHODS	MG/L	.514	.550	.532	-
Potassium	MG/L	.310	.312	.311	-
Calcium	MG/L	6.500	6.515	6.507	-

DATES: 0031(21-SEP-92), 0036(10-MAY-94),

TABLE 5A

COMPARISON OF INTERLABORATORY MEDIAN VALUES BETWEEN STUDIES

PREVIOUS DATA (STUDY NO./SAMPLE NUMBER)

LRTAP AUD-06

P A R A M E T E R

	STUDY NO.	0020	0022	0036	AVG.	STD.
	SAMPLE NO.	10	2	10	MED.	DEV.
Colour	HAZEN UNIT	8.000	7.500	6.200	7.233	.9292
Specific Conductance	UMHO/CM	53.100	52.600	53.100	52.933	.2887
GRAN ACIDITY	MG/LCACO3	1.040	.930	-	.985	-
ACIDITY TO PH 8.3	MG/LCACO3	2.230	1.590	1.410	1.743	.4310
pH	PH UNITS	7.189	7.160	7.340	7.230	.0966
Diss Organic Carbon	MG C/L	3.400	3.480	2.800	3.227	.3717
ALKALINITY-FIXED ENDPT. PH4.5	MG/L CACO3	13.800	14.190	14.550	14.180	.3751
ALKALINITY-GRAN,INFLEC,EXTRAP	MG/L CACO3	12.880	12.910	13.100	12.963	.1193
GRAN TITRA ALK	MG/LCACO3	12.880	12.865	13.390	13.045	.2989
Diss Inorg Carbon	MG C/L	3.295	3.340	3.270	3.302	.0355
Nitrate + Nitrite	MG N/L	.083	.086	.087	.085	.0021
Nitrate-IC	mgN/L	-	-	.086	.086	-
Ammonia	MG N/L	.022	.012	.050	.028	.0197
Total Kjeldahl N	MG N/L	.232	.200	.189	.207	.0223
Sodium	MG/L	.990	.997	1.000	.996	.0051
Magnesium	MG/L	1.613	1.620	1.630	1.621	.0085
Aluminum	MG/L	-	-	.009	.009	-
REACTIVE SILICA	MG SI/L	1.050	1.040	1.055	1.048	.0076
SULFATE,IC METHOD	MG/L	8.420	8.305	8.344	8.356	.0585
SULFATE NON IC METHODS	MG/L	8.600	8.415	8.710	8.575	.1491
CHLORIDE IC	MG/L	.940	.942	.960	.947	.0110
CHLORIDE NON IC METHODS	MG/L	.905	.990	1.000	.965	.0522
Potassium	MG/L	.730	.731	.736	.732	.0032
Calcium	MG/L	5.770	5.800	5.840	5.803	.0351

0020(JAN-89), 0022(12-JUN-89), 0036(10-MAY-94),

NATIONAL WATER RESEARCH INSTITUTE
Burlington, Ontario

LRTAP INTERLABORATORY STUDIES PROGRAM
LIST OF PARTICIPANTS
STUDY L36

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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

RESULTS REPORTED-INTERLABORATORY STUDY L-36

CONSTITUENT	Page No.
Colour	1
Specific Conductance	3
Gran Acidity	8
Acidity to pH 8.3	9
pH	11
Dissolved Organic Carbon	15
Alkalinity to fixed end point pH 4.5	17
Alkalinity (gran, extrapolation, inflection)	19
Alkalinity (gran)	21
Dissolved Inorganic Carbon	23
Nitrate + Nitrite	25
Nitrate - IC	29
Ammonia	32
TKN	35
Sodium	37
Magnesium	41
Aluminum	45
Reactive Silica	48
Sulphate (IC method)	51
Suphate (non-IC methods)	55
Chloride (IC method)	56
Chloride (non-IC methods)	60
Potassium	62
Calcium	66

PARAMETER: 00292 Colour HAZEN UNIT

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	30.	12.50	560.	4.00
L003		0.00		0.00		0.00		0.00	20.	3.50	520.	2.00
L005	5.W	0.00	5.W	0.00	5.W	0.00	5.W	0.00	25.	5.00	600.	7.00
L011	2.5	5.00	2.5	1.50	2.5	5.00	2.5	7.00	30.	12.50	600.	7.00
L023	5.W	0.00	5.W	0.00	5.W	0.00	5.W	0.00	25.W	0.00	>50.	0.00
L024	2.3T	4.00	3.7	7.00	.5T	3.00	1.8T	5.00	29.	10.50	690.	12.00
L025	1.4	2.00	4.	8.50	.2W	0.00	1.4	4.00	27.	7.00	654.	10.00
L030	2.6	6.00	3.2	5.00	1.0	4.00	1.0	2.50	27.4	9.00	525.	3.00
L047	5.W	0.00	5.W	0.00	5.W	0.00	5.W	0.00	14. VL	1.00	645.	9.00
L057	5.T	9.00	5.	10.00	5.T H	7.00	5.T H	9.00	27.	7.00	750. H	15.00
L063	4.0	8.00	4.0	8.50	3.0	6.00	3.5	8.00	32.5	15.00	736. H	14.00
L086	3.W	0.00	3.	3.50	3.W	0.00	3.W	0.00	27.	7.00	680.	11.00
L091	2.	3.00	3.	3.50	0.	1.50	1.	2.50	29.	10.50	715.	13.00
L099	0.	1.00	2.5	1.50	0.	1.50	0.	1.00	20.	3.50	600.	7.00
L112	2.95	7.00	3.33	6.00	.06W	0.00	1.82T	6.00	30.5	14.00	583.	5.00
L128	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	15. VL	2.00	500.	1.00
MEDIAN CONC.	2.5000		3.2650		1.0000		1.8000		27.0000		600.0000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00
L003		0.00	5.0	3.00		0.00		0.00
L005	5.W	0.00	7.5	4.00	7.5	3.50	5.W	0.00
L011	2.5 L	2.00	2.5 VL	1.50	7.5	3.50	2.5 L	1.50
L023	5.W	0.00	5.W	0.00	5.	2.00	5.W	0.00
L024	5.7	4.00	8.8	7.00	8.2	9.00	6.5	7.00
L025	5.8	5.00	8.2	5.00	7.6	5.00	6.2	6.00
L030	5.5	3.00	8.3	6.00	10.6	12.00	6.0	4.00
L047	5.W	0.00	5.W	0.00	5.W	0.00	10. H	11.00
L057	6.	6.50	12.	12.00	10.	11.00	6.	4.00
L063	7.8	10.00	9.0	9.00	9.0	10.00	8.0	10.00
L086	7.	9.00	9.	9.00	8.	7.50	7.	8.00
L091	6.	6.50	9.	9.00	8.	7.50	6.	4.00
L099	0. VL	1.00	2.5 VL	1.50	2.5 VL	1.00	2.5 L	1.50
L112	6.35	8.00	10.1	11.00	7.86	6.00	7.11	9.00
L128	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00
MEDIAN CONC.	5.9000		8.5500		7.9300		6.2000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	16.50	8.250	2		INSUFFICIENT DATA	
L003	8.50	2.833	3		INSUFFICIENT DATA	02011
L005	19.50	4.875	4		INSUFFICIENT DATA	
L011	46.50	4.650	10	L VL L		
L023	2.00	2.000	1		INSUFFICIENT DATA	Visual Comparison
L024	68.50	6.850	10			True Colour
L025	52.50	5.833	9			Colourimetry
L030	54.50	5.450	10			Colourimetry
L047	21.00	7.000	3	VL H	INSUFFICIENT DATA	Colorimetrie
L057	90.50	9.050	10	H H H		
L063	98.50	9.850	10	H	BIASED HIGH	Visual Comparison
L086	55.00	7.857	7			
L091	61.00	6.100	10			Colorimetric
L099	20.50	2.050	10	VLVLVLL	BIASED LOW	Hellige
L112	72.00	8.000	9			SPECTROPHOTOMETE
L128	3.00	1.500	2	VL	INSUFFICIENT DATA	Meter

OVERALL AVERAGE
RANK IS 6.273

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L128	3.00	1.500	2	VL	INSUFFICIENT DATA	Meter
L023	2.00	2.000	1		INSUFFICIENT DATA	Visual Comparison
L099	20.50	2.050	10	VLVLVLL	BIASED LOW	Hellige
L003	8.50	2.833	3		INSUFFICIENT DATA	02011
L011	46.50	4.650	10	LVLL		
L005	19.50	4.875	4		INSUFFICIENT DATA	
L030	54.50	5.450	10			Colourimetry
L025	52.50	5.833	9			Colourimetry
L091	61.00	6.100	10			Colorimetric
L024	68.50	6.850	10			True Colour
L047	21.00	7.000	3	VLH	INSUFFICIENT DATA	Colorimetrie
L086	55.00	7.857	7			
L112	72.00	8.000	9			SPECTROPHOTOMETE
L002	16.50	8.250	2		INSUFFICIENT DATA	
L057	90.50	9.050	10	HHH		
L063	98.50	9.850	10	H	BIASED HIGH	Visual Comparison

OVERALL AVERAGE
RANK IS 6.273

Colour

PARAMETER: 00392 Specific Conductance UMHO/CM

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	23.2	33.00	39.4	34.00	18.0 H	39.50	15.3	38.00	34.8	36.00	49.3 H	42.00
L003	22.8	24.50	38.6	32.00	17.2	31.00	14.9	32.00	34.2	33.00	48.0	35.00
L005	22.7	22.50	38.1	27.00	16.9	27.00	14.5	27.00	33.5	21.50	48.4	38.00
L006	23.0	29.00	37.9	20.50	17.7	35.00	15.6	39.00	33.7	26.00	48.1	36.50
L007	22.8	24.50	38.4	30.00	16.5	23.00	14.4	24.00	33.5	21.50	47.4	28.50
L008	23.6	35.50	34.0 VL	2.00	18.0 H	39.50	15.1	36.00	31.5 L	4.00	43.4 VL	4.00
L010	24.	38.00	40.	37.00	18. H	39.50	15.	33.50	35.	38.50	49.	40.00
L011	21.9	11.50	37.1	13.00	13.5 VL	6.00	11.3 EL	4.00	34.4	34.50	44.3 L	7.00
L014	23.	29.00	38.	24.00	15.	10.50	12. VL	6.00	33.	15.50	46.	14.50
L021	22.4	17.00	37.7	19.00	17.2	31.00	14.6	28.00	33.4	19.00	47.5	30.00
L023	24.50 H	39.00	40.10 H	39.00	19.00 VH	43.00	16.30 H	43.00	36.10 H	41.00	51.60 EH	44.00
L024	23.	29.00	38.	24.00	18. H	39.50	16. H	41.50	34.	30.50	49.	40.00
L025	21.5	6.00	36.5	7.00	15.	10.50	13.5	14.00	32.	6.00	45.5	12.00
L029	22.3	15.50	38.7	33.00	15.6	14.00	14.7	29.00	32.8	13.00	47.0	23.00
L030	24.6 H	40.00	40.4 H	40.00	11.6 EL	1.00	10.4 EL	2.50	35.8 H	40.00	44.4 L	8.00
L031	21.5	6.00	37.0	11.50	14.7 L	9.00	12.5 L	8.00	32.5	10.00	46.5	18.00
L032	23.1	32.00	40.0	37.00	17.2	31.00	14.8	30.50	34.0	30.50	48.1	36.50
L033	21.1	3.00	38.3	29.00	15.1	12.00	14.2	19.00	33.3	17.50	46.1	16.00
L034	23.	29.00	38.	24.00	14. VL	7.00	12. VL	6.00	34.	30.50	45.	10.00
L047	27.4 EH	43.00	45.3 EH	43.00	11.7 EL	2.00	13.2	11.00	39.4 EH	44.00	47.7	32.00
L049	20.2 L	1.00	32.5 EL	1.00	12.8 EL	4.00	10.4 EL	2.50	29.3 EL	2.00	40.5 EL	3.00
L057	26.3 EH	42.00	43.2 EH	42.00	18.0 H	39.50	15.9 H	40.00	38.7 EH	43.00	51.5 EH	43.00
L061	22.7	22.50	38.0	24.00	17.0	28.50	14.4	24.00	33.5	21.50	47.4	28.50
L063	23.70	37.00	39.55	35.00	16.60	24.50	14.40	24.00	35.00	38.50	47.25	27.00
L073	22.2	13.50	37.6	17.50	16.8	26.00	13.9	17.00	33.5	21.50	47.1	25.00
L078	23.3	34.00	38.5	31.00	17.5	34.00	14.8	30.50	34.9	37.00	49.0	40.00
L081	22.2	13.50	36.9	10.00	17.8	36.00	15.2	37.00	32.4	8.00	47.0	23.00
L082	21.9	11.50	36.7	8.00	15.7	15.00	13.6	15.00	32.4	8.00	45.6	13.00
L086	23.0	29.00	37.3	15.00	17.0	28.50	15.0	33.50	33.6	24.00	47.9	34.00
L088	21.86	10.00	36.79	9.00	17.35	33.00	15.02	35.00	32.69	11.00	46.84	21.00
L090	23.6	35.50	40.0	37.00	15.2	13.00	12.6 L	9.00	34.4	34.50	47.2	26.00
L091	21.5	6.00	36.1	5.00	16.1	20.50	13.7	16.00	31.7	5.00	44.7 L	9.00
L093	22.6	21.00	37.6	17.50	16.6	24.50	13.4	13.00	33.7	26.00	46.5	18.00
L094	22.5	19.50	38.2	28.00	16.2	22.00	14.4	24.00	33.0	15.50	47.6	31.00
L099	21.71	9.00	37.2	14.00	15.84	17.00	14.25	20.00	32.85	14.00	47.0	23.00
L102	25. H	41.00	42. VH	41.00	18. H	39.50	16. H	41.50	37. VH	42.00	46.	14.50
L109	22.5	19.50	37.9	20.50	13.4 VL	5.00	12.0 VL	6.00	33.9	28.00	43.7 VL	5.50
L112	22.3	15.50	37.4	16.00	15.8	16.00	14.3	21.00	33.3	17.50	46.7	20.00
L114	22.9	26.00	38.0	24.00	16.1	20.50	14.4	24.00	34.0	30.50	47.8	33.00
L116	21.60	8.00	36.30	6.00	16.00	18.50	13.30	12.00	32.70	12.00	45.30	11.00
L121	20.6 L	2.00	35.3 L	3.00	11.8 EL	3.00	10.2 EL	1.00	30.8 L	3.00	34.5 EL	2.00
L122	22.48	18.00	60.96 EH	44.00	25.9 EH	44.00	26.18 EH	44.00	21.59 EL	1.00	33.73 EL	1.00
L128	28.0 EH	44.00	35.5 L	4.00	14.6 L	8.00	12.7 L	10.00	32.4	8.00	43.7 VL	5.50
L131	21.4	4.00	37.0	11.50	16.0	18.50	14.0	18.00	33.7	26.00	46.5	18.00
MEDIAN CONC.	22.7000		38.0000		16.3500		14.4000		33.5000		47.0000	

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	46.3	38.00	48.7	35.50	49.5	36.50	54.6	35.00
L003	45.6	34.00	48.	32.50	48.6	32.00	53.9	32.00
L005	44.7	20.50	47.3	23.00	48.2	27.50	53.3	26.50
L006	45.0	24.50	47.3	23.00	52.7 EH	42.00	47.9 EL	3.00
L007	45.5	32.50	47.9	31.00	48.4	30.00	53.2	24.00
L008	40.2 EL	3.00	43.7 VL	4.00	45.1 L	4.00	49.6 VL	4.00
L010	47.	40.00	50. H	40.50	50.	38.00	55.	37.00
L011	45.1	28.00	46.3	11.00	48.0	22.50	50.7 L	8.00
L014	45.	24.50	47.	18.00	48.	22.50	53.	21.00
L021	44.7	20.50	47.0	18.00	47.6	14.00	52.7	16.50
L023	47.90 H	42.00	49.70 H	39.00	50.10	39.50	56.20 H	41.00
L024	45.	24.50	48.	32.50	48.	22.50	53.	21.00
L025	43.	7.50	46.5	12.00	47.5	11.00	52.	12.00
L029	45.7	35.00	48.8	37.00	48.8	34.00	54.0	33.00
L030	47.6 H	41.00	51.5 VH	43.00	52.0 VH	41.00	55.8 H	39.00
L031	44.5	17.50	47.1	21.00	48.0	22.50	51.	10.00
L032	45.5	32.50	47.6	28.50	48.6	32.00	53.6	30.00
L033	44.1	15.50	46.	9.00	48.2	27.50	53.3	26.50
L034	45.	24.50	47.	18.00	47.	9.00	53.	21.00
L047	43.9	12.00	51.3 VH	42.00	56.1 EH	44.00	62.8 EH	44.00
L049	39.5 EL	2.00	39.1 EL	3.00	42.3 EL	3.00	47.2 EL	2.00
L057	51.2 EH	43.00	52.9 EH	44.00	53.4 EH	43.00	57.3 VH	42.00
L061	45.2	29.50	47.5	26.00	48.0	22.50	53.2	24.00
L063	46.25	37.00	49.45	38.00	50.10	39.50	55.15	38.00
L073	44.5	17.50	46.8	15.00	47.6	14.00	52.9	19.00
L078	46.7	39.00	48.7	35.50	49.5	36.50	54.7	36.00
L081	43.8	11.00	45.8	8.00	47.2	10.00	50.9	9.00
L082	43.5	9.00	46.2	10.00	46.6	8.00	51.6	11.00
L086	45.0	24.50	47.3	23.00	47.9	19.00	52.8	18.00
L088	43.67	10.00	46.62	14.00	47.51	12.00	52.24	13.00
L090	45.9	36.00	48.1	34.00	48.3	29.00	54.4	34.00
L091	42.8 L	5.00	45.0 L	6.00	45.5 L	5.00	50.0 L	5.00
L093	45.0	24.50	47.6	28.50	47.8	17.50	52.6	15.00
L094	43.0	7.50	47.0	18.00	47.7	16.00	53.4	28.50
L099	44.1	15.50	46.6	13.00	47.6	14.00	52.7	16.50
L102	44.	13.50	50. H	40.50	49.	35.00	56. H	40.00
L109	45.2	29.50	47.5	26.00	48.1	26.00	53.4	28.50
L112	44.6	19.00	47.0	18.00	47.8	17.50	52.5	14.00
L114	45.3	31.00	47.8	30.00	48.6	32.00	53.2	24.00
L116	42.90	6.00	45.30	7.00	45.60 L	6.00	50.30 L	6.00
L121	32.3 EL	1.00	34.5 EL	2.00	35.0 EL	2.00	39.1 EL	1.00
L122	93.49 EH	44.00	8.28 EL	1.00	18.69 EL	1.00	61.18 EH	43.00
L128	42.7 L	4.00	44.9 L	5.00	45.8	7.00	50.6 L	7.00
L131	44.0	13.50	47.5	26.00	48.0	22.50	53.8	31.00
MEDIAN CONC.	45.0000		47.3000		48.0000		53.1000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	367.50	36.750	10	H H	BIASED HIGH	
L003	318.00	31.800	10			02041
L005	260.50	26.050	10			
L006	278.50	27.850	10	EHEL		Radiometer
L007	269.00	26.900	10			
L008	136.00	13.600	10	VLH L VLELVLL VL		Meter
L010	382.00	38.200	10	H H	BIASED HIGH	Auto Cond. Meter
L011	145.50	14.550	10	VLEL L L		
L014	185.50	18.550	10	VL		
L021	213.00	21.300	10			Radiometer 25C
L023	410.50	41.050	10	H H VHH H EHH H H	BIASED HIGH	Electrometric
L024	305.00	30.500	10	H H		Cond. Meter
L025	98.00	9.800	10		BIASED LOW	25C/Radio
L029	266.50	26.650	10			
L030	295.50	29.550	10	H H ELELH L H VHVHH		Cond. Meter 25C
L031	133.50	13.350	10	L L		
L032	320.50	32.050	10			
L033	175.00	17.500	10			Conductivity Meter
L034	179.00	17.900	10	VLVL		At 25C
L047	317.00	31.700	10	EHEHEL EH VHEHEH		Conductivimetre
L049	23.50	2.350	10	L ELELELELELELELEL	BIASED LOW	Jenway 4101
L057	421.50	42.150	10	EHEHH H EHEHEHEHEHVH	BIASED HIGH	
L061	251.00	25.100	10			
L063	338.50	33.850	10			Electrometric
L073	186.00	18.600	10			
L078	353.50	35.350	10		BIASED HIGH	RADIOMETER
L081	165.50	16.550	10			
L082	108.50	10.850	10			Conductivimetrie
L086	248.50	24.850	10			
L088	168.00	16.800	10			Conductivity Meter
L090	288.00	28.800	10	L		Cond.Meter+Elec. 2
L091	82.50	8.250	10	L L L L L	BIASED LOW	Cond. Meter
L093	205.50	20.550	10			YSI Cond. Meter
L094	210.00	21.000	10			
L099	156.00	15.600	10			Meter
L102	348.50	34.850	10	H VHH H VH H H		Cond.Meter-Radiome
L109	194.50	19.450	10	VLVL VL		
L112	174.50	17.450	10			
L114	275.00	27.500	10			VWR
L116	92.50	9.250	10	L L	BIASED LOW	Electropotentiomet
L121	20.00	2.000	10	L L ELELL ELELELELEL	BIASED LOW	Conductivity cup
L122	241.00	24.100	10	EHEHEHELELEHELELEH		
L128	102.50	10.250	10	EHL L L VLL L L		Cond. Meter
L131	189.00	18.900	10			YSI Meter

OVERALL AVERAGE RANK IS 22.500

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L121	20.00	2.000	10	LLELELLELELELELEL	BIASED LOW	Conductivity cup
L049	23.50	2.350	10	LELELELELELELELELEL	BIASED LOW	Jenway 4101
L091	82.50	8.250	10	LLLLL	BIASED LOW	Cond. Meter
L116	92.50	9.250	10	LL	BIASED LOW	Electropotentiomet
L025	98.00	9.800	10		BIASED LOW	25C/Radio
L128	102.50	10.250	10	EHLLLVLLLL		Cond. Meter
L082	108.50	10.850	10			Conductivimetrie
L031	133.50	13.350	10	LL		
L008	136.00	13.600	10	VLHLVLELVLLVL		Meter
L011	145.50	14.550	10	VLELLL		
L099	156.00	15.600	10			Meter
L081	165.50	16.550	10			
L088	168.00	16.800	10			Conductivity Meter
L112	174.50	17.450	10			
L033	175.00	17.500	10			Conductivity Meter
L034	179.00	17.900	10	VLVL		At 25C
L014	185.50	18.550	10	VL		
L073	186.00	18.600	10			
L131	189.00	18.900	10			YSI Meter
L109	194.50	19.450	10	VLVLVL		
L093	205.50	20.550	10			YSI Cond. Meter
L094	210.00	21.000	10			
L021	213.00	21.300	10			Radiometer 25C
L122	241.00	24.100	10	EHEHEHELELEHELELEH		
L086	248.50	24.850	10			
L061	251.00	25.100	10			
L005	260.50	26.050	10			
L029	266.50	26.650	10			
L007	269.00	26.900	10			
L114	275.00	27.500	10			VWR
L006	278.50	27.850	10	EHEL		Radiometer
L090	288.00	28.800	10	L		Cond.Meter+Elec. 2
L030	295.50	29.550	10	HHELELHLHVHVHH		Cond. Meter 25C
L024	305.00	30.500	10	HH		Cond. Meter
L047	317.00	31.700	10	EHEHELEHVHEHEH		Conductivimetre
L003	318.00	31.800	10			02041
L032	320.50	32.050	10			
L063	338.50	33.850	10			Electrometric
L102	348.50	34.850	10	HVHHHVHHH		Cond.Meter-Radiome
L078	353.50	35.350	10		BIASED HIGH	RADIOMETER
L002	367.50	36.750	10	HH	BIASED HIGH	
L010	382.00	38.200	10	HH	BIASED HIGH	Auto Cond. Meter
L023	410.50	41.050	10	HHVHHHEHHHH	BIASED HIGH	Electrometric
L057	421.50	42.150	10	EHEHHHEHEHEHEHEHVH	BIASED HIGH	

OVERALL AVERAGE
RANK IS 22.500

Specific Conductance

PARAMETER: 01089 GRAN ACIDITY MG/LCACO3

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	15.4	2.00	7.99	2.00	46.2	2.00	38.6	2.00	23.7	2.00	421.	2.00
L032	.92	1.00	1.02	1.00	2.54	1.00	2.48	1.00	1.85	1.00	21.98	1.00
MEDIAN CONC.												

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L025	8.5	2.00	8.1	2.00	8.15	2.00	7.48	2.00
L032	1.07	1.00	.93	1.00	.83	1.00	.79	1.00
MEDIAN CONC.								

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L025	20.00	2.000	10			Auto Titration
L032	10.00	1.000	10			
OVERALL AVERAGE RANK IS		1.500				

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L032	10.00	1.000	10			
L025	20.00	2.000	10			Auto Titration
OVERALL AVERAGE RANK IS		1.500				

GRAN ACIDITY

PARAMETER: 01090 ACIDITY TO PH 8.3 MG/LCACO3

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	1.71	4.00	1.07	3.00		0.00	2.68	4.00	1.95	4.00	22.8	2.00
L023	1.8	5.00	1.7	7.00	2.8	2.00	2.5	3.00	1.9	3.00	23.2	3.00
L025	.87 L	1.00	.67	1.00	2.33	1.00	1.96	1.00	1.15	1.00	20.48	1.00
L057	2.7 H	7.00	1.3	5.00	4.0	5.00	3.6	6.00	4.0 VH	7.00	25.3	5.00
L063	1.390	2.00	1.390	6.00	3.227	3.00	3.128	5.00	2.830	6.00	24.73	4.00
L082	1.42	3.00	1.22	4.00	3.25	4.00	2.09	2.00	1.79	2.00	27.00	6.00
L102	3.08 VH	8.00	.933	2.00	4.79	7.00	4.10	7.00	4.92 EH	8.00	35.7	8.00
L128	2.38	6.00	1.91 H	8.00	4.77	6.00	4.29	8.00	2.38	5.00	28.1	7.00
MEDIAN CONC.	1.7550		1.2600		3.2500		2.9040		2.1650		25.0150	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L011	1.46	4.00	.98	2.00	1.22	2.00	1.07	2.00
L023	1.4	2.00	1.6	5.00	12.4 EH	8.00	1.5	6.00
L025	.68 L	1.00	.57 L	1.00	.65 L	1.00	.57 L	1.00
L057	1.9	5.00	1.7	6.00	1.4	5.00	1.7	7.00
L063	2.631 H	8.00	1.192	3.00	1.291	3.00	1.390	4.00
L082	1.45	3.00	1.47	4.00	1.39	4.00	1.34	3.00
L102	2.02	6.00	1.80	7.00	1.57	7.00	1.81	8.00
L128	2.38	7.00	1.91	8.00	1.43	6.00	1.43	5.00
MEDIAN CONC.	1.6800		1.5350		1.3950		1.4100	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L011	27.00	3.000	9			
L023	44.00	4.400	10	EH		Potentiometric
L025	10.00	1.000	10	L L L L L	BIASED LOW	Auto Titration
L057	58.00	5.800	10	H VH		
L063	44.00	4.400	10	H		Electrometric
L082	35.00	3.500	10			Electropotentiomet
L102	68.00	6.800	10	VH EH	BIASED HIGH	
L128	66.00	6.600	10	H	BIASED HIGH	Titration

OVERALL AVERAGE RANK IS 4.456

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L025	10.00	1.000	10	LLLLL	BIASED LOW	Auto Titration
L011	27.00	3.000	9			
L082	35.00	3.500	10			Electropotentiomet
L063	44.00	4.400	10	H		Electrometric
L023	44.00	4.400	10	EH		Potentiometric
L057	58.00	5.800	10	HVH		
L128	66.00	6.600	10	H	BIASED HIGH	Titration
L102	68.00	6.800	10	VHEH	BIASED HIGH	

OVERALL AVERAGE
RANK IS 4.456

ACIDITY TO PH 8.3

PARAMETER: 01092 pH

PH UNITS

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	6.77	15.00	7.27	13.00	4.55	23.00	4.60	9.00	6.76 EH	46.00	4.15	14.50
L003	6.84	20.50	7.10 VL	5.00	4.63	42.00	4.69	37.00	6.22	33.50	4.11	10.00
L006	6.76	12.00	7.08 VL	4.00	4.53	16.00	4.60	9.00	6.17	27.00	4.13	11.50
L007	7.01	37.00	7.46	29.00	4.75 VH	46.00	4.73	43.50	6.33 H	38.00	4.23	45.00
L008	6.53 VL	2.00	7.52	33.50	4.43	4.00	4.52 L	4.00	5.98	8.50	4.06	7.00
L010	6.77	15.00	7.28	14.00	4.55	23.00	4.64	19.50	5.98	8.50	4.16	18.00
L011	6.87	25.00	7.57	39.50	4.54	19.00	4.70	39.50	6.18	30.00	3.98 VL	3.00
L013C		0.00		0.00	4.54	19.00	4.63	13.50		0.00	4.15	14.50
L014	7.29 EH	46.00	7.50	32.00	4.61	39.50	4.74	45.00	6.70 EH	45.00	4.14	13.00
L021	6.84	20.50	7.16 L	8.00	4.68 H	43.50	4.66	30.50	6.32 H	37.00	4.18	31.00
L023	6.79	17.00	7.56	37.50	4.52	12.00	4.62	11.00	6.00	14.00	4.17	24.00
L024	6.9	29.00	7.9 EH	45.00	4.5	7.50	4.6	9.00	6.0	14.00	4.2	38.50
L025	7.1 H	44.00	7.43	25.00	4.55	23.00	4.65	26.50	5.86 VL	2.00	4.17	24.00
L029	7.01	37.00	7.22	9.50	4.57	30.00	4.64	19.50	6.34 H	39.00	4.16	18.00
L030	6.77	15.00	7.68 H	43.00	4.36 VL	3.00	4.48 L	3.00	5.88 L	3.00	4.05	6.00
L031	6.64 L	5.00	7.71 H	44.00	4.52	12.00	4.63	13.50	6.06	20.00	4.13	11.50
L032	6.99	35.00	7.57	39.50	4.60	38.00	4.69	37.00	6.25	35.00	4.21	40.00
L033	7.09 H	43.00		0.00	4.57	30.00	4.68	35.00	6.37 H	40.00	4.19	35.00
L034	6.67	7.00	7.40	20.00	4.62	41.00	4.65	26.50	5.95 L	5.00	4.22	42.50
L047	6.65 L	6.00	6.95 EL	1.00	4.44	5.00	4.54	5.00	5.94 L	4.00	4.04 L	5.00
L049	6.70	8.00	7.26	12.00	4.13 EL	1.00	4.29 EL	1.00	6.18	30.00	3.73 EL	1.00
L057	6.9	29.00	7.6	42.00	4.7 H	45.00	4.7	39.50	6.1	22.00	4.2	38.50
L061	7.12 H	45.00	7.41	22.00	4.52	12.00	4.64	19.50	6.38 VH	41.00	4.17	24.00
L063	6.56 VL	3.00	7.03 VL	3.00	4.56	26.00	4.67	33.00	6.05	19.00	4.17	24.00
L073	7.03	39.00	7.42	23.00	4.58	34.00	4.67	33.00	6.40 VH	43.00	4.18	31.00
L078	6.75	11.00	7.43	25.00	4.53	16.00	4.64	19.50	5.97	6.50	4.17	24.00
L081	7.01	37.00	7.38	18.00	4.47	6.00	4.57	6.00	6.30 H	36.00	4.10	9.00
L082	6.93	32.00	7.47	30.00	4.57	30.00	4.65	26.50	6.22	33.50	4.18	31.00
L086	6.87	25.00	7.36	17.00	4.50	7.50	4.58	7.00	6.00	14.00	4.03 L	4.00
L088	6.766	13.00	7.234	11.00	4.582	36.00	4.741	46.00	6.003	17.00	4.271	46.00
L090	6.93	32.00	7.48	31.00	4.52	12.00	4.64	19.50	6.03	18.00	4.19	35.00
L090B	6.90	29.00	7.52	33.50	4.52	12.00	4.64	19.50	5.97	6.50	4.22	42.50
L091	6.85	22.50	7.15 L	7.00	4.58	34.00	4.66	30.50	6.17	27.00	4.22	42.50
L093	6.886	27.00	7.573	41.00	4.518	9.00	4.631	16.00	6.449 VH	44.00	4.156	16.00
L094	7.04	40.00	7.55	36.00	4.58	34.00	4.69	37.00	6.18	30.00	4.19	35.00
L099	6.94	34.00	7.53	35.00	4.54	19.00	4.65	26.50	6.13	24.00	4.17	24.00
L102	6.87	25.00	7.56	37.50	4.59	37.00	4.67	33.00	6.00	14.00	4.19	35.00
L109	7.06 H	41.00	7.35	16.00	4.61	39.50	4.72	42.00	6.39 VH	42.00	4.22	42.50
L112	6.74	9.50	7.22	9.50	4.56	26.00	4.65	26.50	6.16	25.00	4.17	24.00
L114	6.81	18.50	7.45	28.00	4.68 H	43.50	4.73	43.50	6.00	14.00	4.09	8.00
L116	6.93	32.00	7.44	27.00	4.57	30.00	4.71	41.00	6.20	32.00	4.17	24.00
L119	6.850	22.50	7.299	15.00	4.549	21.00	4.643	23.00	6.069	21.00	4.174	29.00
L121	6.81	18.50	7.43	25.00	4.57	30.00	4.63	13.50	5.99	10.50	4.17	24.00
L122	5.32 EL	1.00	7.11 L	6.00	5.25 EH	47.00	5.43 EH	47.00	6.11	23.00	6.69 EH	47.00
L126	7.08 H	42.00	7.40	20.00	4.56	26.00	4.65	26.50	6.17	27.00	4.19	35.00
L128	6.62 L	4.00	7.00 EL	2.00	4.25 EL	2.00	4.30 EL	2.00	5.82 VL	1.00	3.91 EL	2.00
L131	6.74	9.50	7.40	20.00	4.53	16.00	4.63	13.50	5.99	10.50	4.16	18.00
MEDIAN CONC.	6.8600		7.4200		4.5500		4.6500		6.1200		4.1700	

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	7.33	34.50	7.42	37.00	7.53	44.00	7.48	43.00
L003	7.14	12.50	7.21	12.00	7.26	10.00	7.21	11.00
L006	6.94 L	5.00	7.12	6.50	7.14	5.50	7.19	10.00
L007	7.38	41.00	7.51 H	45.00	7.55 H	45.00	7.47	42.00
L008	7.26	26.00	7.26	18.50	7.30	16.50	7.28	17.00
L010	7.15	14.00	7.22	13.00	7.27	11.50	7.25	12.50
L011	7.22	22.50	7.39	31.00	7.39	30.50	7.44	36.50
L013C		0.00		0.00		0.00		0.00
L014	7.58 VH	45.00	7.63 VH	46.00	7.65 VH	46.00	7.61 H	45.00
L021	7.02 L	6.00	7.14	9.00	7.28	13.50	7.18	9.00
L023	7.20	20.50	7.27	21.00	7.31	20.00		0.00
L024	7.3	31.50	7.4	33.50	7.4	32.00	7.4	30.50
L025	7.57 VH	44.00	7.47	42.50	7.49	39.00	7.45	38.50
L029	7.34	36.00	7.31	27.00	7.28	13.50	7.30	19.50
L030	7.24	24.50	7.27	21.00	7.34	24.50	7.32	21.00
L031	7.33	34.50	7.36	29.50	7.36	26.50	7.34	23.00
L032	7.36	39.00	7.45	40.50	7.44	37.00	7.46	40.50
L033	7.19	18.50	7.4	33.50	7.42	35.50	7.39	29.00
L034	7.09	9.00	7.13	8.00	7.14	5.50	7.14	6.00
L047	6.68 EL	2.00	6.94 VL	4.00	7.02 VL	3.00	7.03 L	3.50
L049	7.19	18.50	7.30	25.50	7.19	7.00	7.29	18.00
L057	7.1	10.00	7.4	33.50	7.5	40.50	7.5	44.00
L061	7.44 H	43.00	7.49	44.00	7.51	42.50	7.41	32.50
L063	6.77 EL	4.00	7.00 L	5.00	7.12 L	4.00	7.16	7.00
L073	7.29	30.00	7.44	39.00	7.36	26.50	7.46	40.50
L078	7.13	11.00	7.23	14.00	7.30	16.50	7.26	14.00
L081	7.39	42.00	7.47	42.50	7.51	42.50	7.45	38.50
L082	7.36	39.00	7.41	36.00	7.42	35.50	7.37	27.00
L086	7.22	22.50	7.29	23.50	7.30	16.50	7.25	12.50
L088	7.163	16.00	7.204	11.00	7.249	9.00	7.109 L	5.00
L090	7.28	28.50	7.40	33.50	7.41	33.50	7.36	26.00
L090B	7.14	12.50	7.24	15.50	7.37	28.00	7.41	32.50
L091	7.20	20.50	7.26	18.50	7.33	22.50	7.43	34.50
L093	7.303	33.00	7.353	28.00	7.388	29.00	7.359	25.00
L094	7.07	8.00	7.24	15.50	7.31	20.00	7.35	24.00
L099	7.36	39.00	7.45	40.50	7.50	40.50	7.40	30.50
L102	7.06	7.00	7.12	6.50	7.30	16.50	7.00 VL	1.50
L109	7.30	31.50	7.43	38.00	7.34	24.50	7.38	28.00
L112	6.71 EL	3.00	7.27	21.00	7.27	11.50	7.03 L	3.50
L114	7.24	24.50	7.30	25.50	7.39	30.50	7.33	22.00
L116	7.28	28.50	7.36	29.50	7.41	33.50	7.30	19.50
L119	7.164	17.00	7.190	10.00	7.200	8.00	7.165	8.00
L121	7.27	27.00	7.29	23.50	7.33	22.50	7.27	15.50
L122	7.78 EH	46.00	6.73 EL	1.00	6.36 EL	1.00	7.44	36.50
L126	7.35	37.00	6.76 EL	2.00	7.46	38.00	7.43	34.50
L128	6.67 EL	1.00	6.90 VL	3.00	7.00 VL	2.00	7.00 VL	1.50
L131	7.16	15.00	7.25	17.00	7.31	20.00	7.27	15.50
MEDIAN CONC.	7.2300		7.2900		7.3350		7.3400	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	279.00	27.900	10	EH		
L003	193.50	19.350	10	VL		10301, Stirred
L006	106.50	10.650	10	VL L		Radiometer, Stirre
L007	411.50	41.150	10	VH H H H	BIASED HIGH	
L008	137.00	13.700	10	VL L		Stirred
L010	149.00	14.900	10			Auto pH/Alk Sys.,S
L011	276.50	27.650	10	VL		
L013C	47.00	15.667	3		INSUFFICIENT DATA	
L014	402.50	40.250	10	EH EH VHVHVHH	BIASED HIGH	
L021	208.00	20.800	10	L H H L		Ross/Stirred
L023	177.00	19.667	9			Electrometric
L024	270.50	27.050	10	EH		Radiometer pH
L025	308.50	30.850	10	H VL VH		Radiometer/Stirred
L029	249.00	24.900	10	H		
L030	164.00	16.400	10	H VLL L		pH Meter/Stirred
L031	219.50	21.950	10	L H		Non Agite
L032	381.50	38.150	10		BIASED HIGH	
L033	299.50	33.278	9	H H		pH Meter
L034	170.50	17.050	10	L		Stirred
L047	38.50	3.850	10	L EL L L ELVLVLL	BIASED LOW	pH Metre/Agitez
L049	122.00	12.200	10	ELEL EL		Radiometer
L057	344.00	34.400	10	H		
L061	325.50	32.550	10	H VH H		
L063	128.00	12.800	10	VLVL ELL L		Electrode, Unstirr
L073	339.00	33.900	10	VH		
L078	157.50	15.750	10			
L081	277.50	27.750	10	H		
L082	320.50	32.050	10			Electropotentiomet
L086	149.50	14.950	10	L		
L088	210.00	21.000	10	L		Auto, Unstirred
L090	269.00	26.900	10			pH Meter+Elec. 25C
L090B	231.50	23.150	10			pH Meter+Elec. 25C
L091	259.50	25.950	10	L		Closed Cell
L093	268.00	26.800	10	VH		Meter+Electrode St
L094	279.50	27.950	10			
L099	313.00	31.300	10			Meter/Unstirred
L102	213.00	21.300	10	VL		Radiometer
L109	345.00	34.500	10	H VH		
L112	159.50	15.950	10	EL L		
L114	258.00	25.800	10	H		Fisher, Stirred
L116	297.00	29.700	10			Electropot., Agite
L119	174.50	17.450	10			Stirred
L121	210.00	21.000	10			Comb. Electrode/Un
L122	255.50	25.550	10	ELL EHEH EHEHELEL		
L126	288.00	28.800	10	H EL		
L128	20.50	2.050	10	L ELELELVLELELVLVLVL	BIASED LOW	pH Meter, Stirred
L131	155.00	15.500	10			Electrode/Unstirre

OVERALL AVERAGE RANK IS 23.555

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L128	20.50	2.050	10	LELELELVLELELVLVLVL	BIASED LOW	pH Meter, Stirred
L047	38.50	3.850	10	LELLLELVLVLL	BIASED LOW	pH Metre/Agitez
L006	106.50	10.650	10	VLL		Radiometer, Stirre
L049	122.00	12.200	10	ELELEL		Radiometer
L063	128.00	12.800	10	VLVLELLL		Electrode, Unstirr
L008	137.00	13.700	10	VLL		Stirred
L010	149.00	14.900	10			Auto pH/Alk Sys.,S
L086	149.50	14.950	10	L		
L131	155.00	15.500	10			Electrode/Unstirre
L013C	47.00	15.667	3		INSUFFICIENT DATA	
L078	157.50	15.750	10			
L112	159.50	15.950	10	ELL		
L030	164.00	16.400	10	HVLLL		pH Meter/Stirred
L034	170.50	17.050	10	L		Stirred
L119	174.50	17.450	10			Stirred
L003	193.50	19.350	10	VL		10301, Stirred
L023	177.00	19.667	9			Electrometric
L021	208.00	20.800	10	LHHL		Ross/Stirred
L088	210.00	21.000	10	L		Auto, Unstirred
L121	210.00	21.000	10			Comb. Electrode/Un
L102	213.00	21.300	10	VL		Radiometer
L031	219.50	21.950	10	LH		Non Agite
L090B	231.50	23.150	10			pH Meter+Elec. 25C
L029	249.00	24.900	10	H		
L122	255.50	25.550	10	ELLEHEHEHEHELEL		
L114	258.00	25.800	10	H		Fisher, Stirred
L091	259.50	25.950	10	L		Closed Cell
L093	268.00	26.800	10	VH		Meter+Electrode St
L090	269.00	26.900	10			pH Meter+Elec. 25C
L024	270.50	27.050	10	EH		Radiometer pH
L011	276.50	27.650	10	VL		
L081	277.50	27.750	10	H		
L002	279.00	27.900	10	EH		
L094	279.50	27.950	10			
L126	288.00	28.800	10	HEL		
L116	297.00	29.700	10			Electropot., Agite
L025	308.50	30.850	10	HVLVH		Radiometer/Stirred
L099	313.00	31.300	10			Meter/Unstirred
L082	320.50	32.050	10			Electropotentiomet
L061	325.50	32.550	10	HVHH		
L033	299.50	33.278	9	HH		pH Meter
L073	339.00	33.900	10	VH		
L057	344.00	34.400	10	H		
L109	345.00	34.500	10	HVH		
L032	381.50	38.150	10		BIASED HIGH	
L014	402.50	40.250	10	EHEHVHVHVHH	BIASED HIGH	
L007	411.50	41.150	10	VHHHH	BIASED HIGH	

OVERALL AVERAGE
RANK IS 23.555

pH

PARAMETER: 06002 Diss Organic Carbon MG C/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	6.00	.7 L	1.00	<.1	0.00	<.1	0.00	4.1 VL	1.00	26.9 EL	1.00
L005	.598	13.00	1.23	10.00	.292	8.00	.375	5.00	4.98	7.00	53.2 EL	5.00
L006	.399	8.00	1.07	6.00	.308	10.00	.389	6.50	5.02	9.00	59.8	11.00
L014	.600	14.00	1.440	14.00	.480	15.00	.600	13.50	5.760 H	17.00	70.800 EH	20.00
L023	5.0W	0.00	5.0W	0.00	5.0W	0.00	5.0W	0.00	5.0W	0.00	67.5 EH	19.00
L025	.5	9.00	1.1	7.00	.2T	5.50	.4T	8.00	5.	8.00	53. EL	4.00
L029	.530	10.00	1.547	15.00	.443	14.00	.568	11.00	5.462	12.00	61.58 H	14.00
L031	.3	6.00	.9	3.00	.2T	5.50	.2T	3.50	4.8	4.50	52. EL	3.00
L032	.20	4.00	1.20	8.00	0.00	2.00	.20	3.50	5.10	10.00	58.	9.00
L033	.3	6.00	1.4	13.00	.3	9.00	.6	13.50	5.5	13.00	55.2 VL	7.00
L049	.901	16.00	1.225	9.00	.350	11.00	.389	6.50	4.675	2.00	51.56 EL	2.00
L063	3.86 EH	19.00	6.67 EH	19.00	4.06 EH	18.00	8.52 EH	17.00	6.56 EH	18.00	66.4 EH	18.00
L082	.13	1.00	.82	2.00	.18	4.00	0.W	1.00	4.76	3.00	64.0 EH	17.00
L088	.19	3.00	1.03	5.00	-.03	1.00	.12	2.00	5.24	11.00	62.41 H	15.00
L091	.58	12.00	1.36	12.00	.40	12.00	.50	9.00	4.92	6.00	55.6 L	8.00
L093	.565	11.00	1.335	11.00	.260	7.00	.565	10.00	5.580	14.00	62.705 VH	16.00
L094	1.00	17.00	2.44 EH	18.00	.905 H	17.00	1.15 H	16.00	8.64 EH	19.00	53.9 EL	6.00
L099	.72	15.00	1.60	16.00	.41	13.00	.57	12.00	5.70	16.00	58.11	10.00
L116	.17	2.00	.91	4.00	.15	3.00		0.00	4.80	4.50	61.4 H	13.00
L128	1.04 H	18.00	1.76 H	17.00	.63	16.00	.76	15.00	5.62	15.00	61.2	12.00
MEDIAN CONC.	.5300		1.2300		.3040		.5000		5.1000		58.9550	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	1.8	5.50	1.9	4.00	2.1	8.00	2.3	3.00
L005	1.95	9.00	2.35	12.00	2.16	9.00	2.74	7.50
L006	1.98	10.00	2.14	8.00	1.98	6.00	2.56	4.00
L014	2.040	11.50	2.400	14.00	2.280	15.00	3.120	15.00
L023	5.0W	0.00	5.0W	0.00	5.0W	0.00	5.0W	0.00
L025	1.8	5.50	2.2	9.00	2.	7.00	2.6	5.00
L029	2.26	15.00	2.33	11.00	2.471	17.00	3.057	13.00
L031	1.6	3.00	1.8	1.00	1.8	2.00	24. EH	19.00
L032	2.10	13.00	2.10	6.50	1.80	2.00	3.30	17.00
L033	1.9	8.00	2.1	6.50	2.2	12.00	2.8	10.00
L049	1.672	4.00	2.321	10.00	2.246	13.00	2.751	9.00
L063	1.84	7.00	5.64 EH	19.00	5.32 EH	19.00	3.70 VH	18.00
L082	1.30 L	1.00	1.84	2.00	1.80	2.00	2.23 L	2.00
L088	2.04	11.50	1.97	5.00	1.86	4.00	2.64	6.00
L091	2.60 H	17.00	2.48	15.50	2.25	14.00	2.74	7.50
L093	2.575 H	16.00	2.395	13.00	2.175	10.00	2.865	11.00
L094	3.60 EH	18.50	2.48	15.50	2.19	11.00	3.06	14.00
L099	3.60 EH	18.50	2.97 H	18.00	2.51	18.00	3.20	16.00
L116	1.36 L	2.00	1.87	3.00	1.94	5.00	2.18 L	1.00
L128	2.13	14.00	2.51	17.00	2.36	16.00	2.99	12.00

MEDIAN CONC.	1.9800	2.3210	2.1750	2.8000

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	29.50	3.688	8	L VLEL	BIASED LOW	Infrared UV Dig.
L005	85.50	8.550	10	EL		
L006	78.50	7.850	10			Autoanalyser
L014	149.00	14.900	10	H EH		
L023	19.00	19.000	1	EH	INSUFFICIENT DATA	Infrared Analyzer
L025	68.00	6.800	10	EL		Colourimetry
L029	132.00	13.200	10	H		Oxidation/IR
L031	50.50	5.050	10	EL EH	BIASED LOW	Conductivimetrie
L032	75.00	7.500	10			
L033	98.00	9.800	10	VL		Auto UV Color
L049	82.50	8.250	10	EL		Technicon auto
L063	172.00	17.200	10	EHEHEHEHEHEH EHEHVH	BIASED HIGH	UV Dohrman
L082	35.00	3.500	10	EHL L	BIASED LOW	Conductivimetrie
L088	63.50	6.350	10	H		UV Persulfate/Oxid
L091	113.00	11.300	10	L H		Persulf. Oxid. IR
L093	119.00	11.900	10	VHH		Dohrmann
L094	152.00	15.200	10	EHH H EHELEH	BIASED HIGH	
L099	152.50	15.250	10	EHH	BIASED HIGH	Instrumental
L116	37.50	4.167	9	H L L	BIASED LOW	Auto Analyseur
L128	152.00	15.200	10	H H	BIASED HIGH	TOC Analyzer

OVERALL AVERAGE RANK IS 9.915

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L082	35.00	3.500	10	EHLL	BIASED LOW	Conductivimetrie
L002	29.50	3.688	8	LVLEL	BIASED LOW	Infrared UV Dig.
L116	37.50	4.167	9	HLL	BIASED LOW	Auto Analyseur
L031	50.50	5.050	10	ELEH	BIASED LOW	Conductivimetrie
L088	63.50	6.350	10	H		UV Persulfate/Oxid
L025	68.00	6.800	10	EL		Colourimetry
L032	75.00	7.500	10			
L006	78.50	7.850	10			Autoanalyser
L049	82.50	8.250	10	EL		Technicon auto
L005	85.50	8.550	10	EL		
L033	98.00	9.800	10	VL		Auto UV Color
L091	113.00	11.300	10	LH		Persulf. Oxid. IR
L093	119.00	11.900	10	VHH		Dohrmann
L029	132.00	13.200	10	H		Oxidation/IR
L014	149.00	14.900	10	HEH		
L094	152.00	15.200	10	EHHHEHELEH	BIASED HIGH	
L128	152.00	15.200	10	HH	BIASED HIGH	TOC Analyzer
L099	152.50	15.250	10	EHH	BIASED HIGH	Instrumental
L063	172.00	17.200	10	EHEHEHEHEHEHEHEHVH	BIASED HIGH	UV Dohrman
L023	19.00	19.000	1	EH	INSUFFICIENT DATA	Infrared Analyzer

OVERALL AVERAGE RANK IS 9.915

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. 36 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	7.74	6.00	11.1	3.00	1.00W	0.00	1.00W	0.00	3.58	6.00		0.00
L024	8.1	9.00	12.	9.50		0.00	.49	6.00	3.9	9.50		0.00
L025	7.91	7.00	11.6	6.00	.31T	7.00	.46T	5.00	3.6	7.00		0.00
L029	11.23 EH	14.00	12.6	12.00	.4W	0.00	.45W	0.00	3.7W	0.00	.4W	0.00
L030	7.51	5.00	11.3	5.00	0.	2.50	0.	2.50	3.28	3.00	0.	3.50
L033	8.35	11.00	12.16	11.00	.05W	0.00	.54	7.00	4.13	12.00		0.00
L047	10. EH	13.00	16. EH	14.00	3. EH	10.00		0.00	6. EH	13.00		0.00
L049	7.	3.00	13. H	13.00	1.T H	9.00	1.T	11.00	4.	11.00	1.T H	6.00
L057	7.2	4.00	11.9	8.00	.7	8.00	.8	10.00	3.7	8.00	.5W	0.00
L082	8.2	10.00	12.0	9.50	.1	5.50	.6	8.00	3.9	9.50	0.0	3.50
L086	7.94	8.00	11.76	7.00	.02	4.00	.24	4.00	3.50	4.50	0.	3.50
L116	8.41	12.00	11.23	4.00	.1	5.50	.7	9.00	3.5	4.50		0.00
L128	6.86 L	2.00	10.8	2.00	0.	2.50	0.	2.50	2.94	2.00	0.	3.50
L131	6.34 VL	1.00	10.12 VL	1.00	-1.66 EL	1.00	-1.19 VL	1.00	2.02 VL	1.00	-4.24 EL	1.00
MEDIAN CONC.	7.9250		11.8300		.1000		.4900		3.6000		0.0000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L023	14.0	5.50	15.4	4.00	15.4	3.00	14.4	5.00
L024	14.	5.50	16.	9.50	16.	6.50	15.	12.00
L025	14.1	8.50	15.9	7.00	16.1	8.50	14.7	10.00
L029	16.0 VH	14.00	15.95	8.00	16.27	11.00	14.5	7.00
L030	14.0	5.50	15.5	5.00	15.7	4.00	14.2	4.00
L033	14.82	12.00	16.37	13.00	16.54	13.00	15.12	13.00
L047	15.	13.00	18. VH	14.00	20. EH	14.00	18. EH	14.00
L049	14.	5.50	16.	9.50	16.	6.50	13. L	2.00
L057	14.1	8.50	15.1	3.00	16.1	8.50	14.6	8.50
L082	14.6	11.00	16.1	11.00	16.3	12.00	14.9	11.00
L086	14.23	10.00	15.70	6.00	15.97	5.00	14.45	6.00
L116	13.67	2.00	16.30	12.00	16.18	10.00	14.60	8.50
L128	13.7	3.00	13.7 VL	1.00	14.7 L	2.00	13.7	3.00
L131	12.68 L	1.00	14.21 L	2.00	14.43 L	1.00	12.96 L	1.00
MEDIAN CONC.	14.0500		15.9250		16.0500		14.5500	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L023	32.50	4.643	7			Potentiometric
L024	67.50	8.438	8			Auto Titration
L025	66.00	7.333	9			Auto Titration
L029	66.00	11.000	6	EH VH	BIASED HIGH	Autotitrator
L030	40.00	4.000	10			Auto Micro Comp
L033	92.00	11.500	8		BIASED HIGH	Auto Titrator
L047	105.00	13.125	8	EHEHEH EH VHEHEH	BIASED HIGH	Titration
L049	76.50	7.650	10	H H H L		Titration
L057	66.50	7.389	9			
L082	91.00	9.100	10			Electropotentiomet
L086	58.00	5.800	10			
L116	67.50	7.500	9			Electropotentiomet
L128	23.50	2.350	10	L VLL	BIASED LOW	Titration
L131	11.00	1.100	10	VLVLELVLVLELL L L L	BIASED LOW	HCl Titrate 4.5-4.

OVERALL AVERAGE
RANK IS 6.960

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L131	11.00	1.100	10	VLVLELVLVLELLLLL	BIASED LOW	HCl Titrate 4.5-4.
L128	23.50	2.350	10	LVLL	BIASED LOW	Titration
L030	40.00	4.000	10			Auto Micro Comp
L023	32.50	4.643	7			Potentiometric
L086	58.00	5.800	10			
L025	66.00	7.333	9			Auto Titration
L057	66.50	7.389	9			
L116	67.50	7.500	9			Electropotentiomet
L049	76.50	7.650	10	HHHL		Titration
L024	67.50	8.438	8			Auto Titration
L082	91.00	9.100	10			Electropotentiomet
L029	66.00	11.000	6	EHVH	BIASED HIGH	Autotitrator
L033	92.00	11.500	8		BIASED HIGH	Auto Titrator
L047	105.00	13.125	8	EHEHEHEHVHEHEH	BIASED HIGH	Titration

OVERALL AVERAGE
RANK IS 6.960

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. 36 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	6.3	1.00	11.1 VH	8.00		0.00		0.00	2.0	3.00		0.00
L006	6.3450	2.00	10.0600	2.00	-1.39T	2.00	-1.215T	1.00	1.665 L	1.00	-5.10T	2.00
L010	6.4	4.50	10.3	5.00	<.5	0.00	<.5	0.00	2.1	4.50	<.5	0.00
L011	6.59	7.00	10.6	7.00	.50W	0.00	.50W	0.00	2.16	6.00	.50W	0.00
L014	6.4	4.50	10.2	4.00	-1.6	1.00	-1.2	3.00	2.2	7.00	-5.2 L	1.00
L031	6.5	6.00	10.5	6.00	.1T EH	4.00	.1T EH	5.00	2.1	4.50	.1T EH	4.00
L063	7.21 EH	9.00	9.90	1.00		0.00		0.00	1.88	2.00		0.00
L102	6.88 H	8.00	11.9 EH	9.00	-1.36	3.00	-1.07	4.00	2.58 H	9.00	-4.42	3.00
L112	6.39	3.00	10.1	3.00	.634 EH	5.00	-1.21	2.00	2.42	8.00		0.00
MEDIAN CONC.	6.4000		10.3000		-1.3600		-1.2000		2.1000		-4.7600	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	13.7 EH	9.00	14.6	7.00	14.9	5.00	13.8 VH	7.50
L006	12.365	2.00	14.320	5.00	13.035 EL	1.00	14.530 EH	9.00
L010	12.8	4.50	14.3	4.00	14.5	3.00	13.1	5.50
L011	13.6 VH	8.00	14.2	2.50	15.0	6.00	12.8	2.00
L014	12.8	4.50	14.4	6.00	14.6	4.00	13.1	5.50
L031	13.4 H	7.00	15.0 H	8.00	15.3	8.50	13.8 VH	7.50
L063	12.97	6.00	13.75 L	1.00	15.30	8.50	13.00	4.00
L102	11.84 EL	1.00	15.77 EH	9.00	15.02	7.00	11.22 EL	1.00
L112	12.6	3.00	14.2	2.50	14.4 L	2.00	12.9	3.00
MEDIAN CONC.	12.8000		14.3200		14.9000		13.1000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	40.50	5.786	7	VH EH VH		
L006	27.00	2.700	10	L ELEH	BIASED LOW	Titroprocessor
L010	31.00	4.429	7			Auto Titration
L011	38.50	5.500	7	VH		
L014	40.50	4.050	10	L		
L031	60.50	6.050	10	EHEH EHH H VH		Titration conduct.
L063	31.50	4.500	7	EH L		INF-Electrometric
L102	54.00	5.400	10	H EH H ELEH EL		Electron Gran
L112	31.50	3.500	9	EH L		
OVERALL AVERAGE						

RANK IS 4.610

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L006	27.00	2.700	10	LELEH	BIASED LOW	Titroprocessor
L112	31.50	3.500	9	EHL		
L014	40.50	4.050	10	L		
L010	31.00	4.429	7			Auto Titration
L063	31.50	4.500	7	EHL		INF-Electrometric
L102	54.00	5.400	10	HEHHELEHEL		Electron Gran
L011	38.50	5.500	7	VH		
L002	40.50	5.786	7	VHEHVH		
L031	60.50	6.050	10	EHEHEHHHVH		Titration conduct.

OVERALL AVERAGE
RANK IS 4.610

ALKALINITY-GRAN, INFLEC, EXTRAP

PARAMETER: 06282 GRAN TITRA ALK MG/LCAC03

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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		0.00	-.80 EH	14.00	-1.2	9.50		0.00	-3.5 VH	12.00
L003	5.7 EL	2.00	9.6 VL	2.00	-1.3	12.00	-1.6 L	2.00	2.2	4.50	-3.9	9.00
L014	6.4	6.00	10.2	5.00	-1.6	9.00	-1.2	9.50	2.2	4.50	-5.2 EL	2.00
L024	6.12	4.00	9.95	3.00	-1.71	5.00	-1.31	4.00	2.05	2.00	-4.48 L	4.50
L025	6.52	8.00	10.27	6.00	-1.13 H	13.00	-1.02	13.00	2.21	6.00	-3.74 H	10.00
L030	6.34	5.00	10.1	4.00	-1.7	6.00	-1.3	5.00	2.12	3.00	-4.2	6.00
L032	6.48	7.00	10.33	7.00	-1.87	2.00	-.84 H	14.00	3.13 EH	13.00	-4.09	8.00
L081	6.58	11.00	10.7	12.00	-1.83	3.00	-1.36	3.00	2.38	10.00	-4.48 L	4.50
L088	6.56	9.00	10.805 H	13.00	-1.53	10.00	-1.205	8.00	2.308	8.00	2.00 EH	14.00
L090	6.57	10.00	10.53	10.00	-1.62	8.00	-1.17	11.00	2.33	9.00	-4.19	7.00
L091	6.60	12.00	10.4	8.00	-1.35	11.00	-1.095	12.00	2.47	11.00	-3.46 VH	13.00
L093	6.038 L	3.00	9.574 VL	1.00	-1.699	7.00	-1.266	7.00	2.239	7.00	-3.699 H	11.00
L094	6.63	13.00	10.6	11.00	-1.78	4.00	-1.29	6.00	2.59	12.00	-5.19 EL	3.00
L099	129. EH	14.00	209. EH	14.00	-35.1 EL	1.00	-28.1 EL	1.00	45.5 EH	14.00	-66.9 EL	1.00
L122	.23 EL	1.00	10.52	9.00	.06 EH	15.00	.17 EH	15.00	1.06 EL	1.00	4.13 EH	15.00
MEDIAN CONC.	6.5000		10.3650		-1.6200		-1.2050		2.2735		-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	12.4 L	1.00	14.1	3.00	14.0 VL	3.00	12.6 VL	3.00
L014	12.8	5.50	14.4	5.50	14.6	5.50	13.1	4.00
L024	12.48 L	3.00	13.96 L	2.00	14.11 L	4.00	7.37 EL	1.00
L025	12.77	4.00	14.53	8.00	14.68	7.00	13.29	6.00
L030	12.8	5.50	14.4	5.50	14.6	5.50	13.2	5.00
L032	13.28	11.00	15.62 EH	13.00	15.98 EH	13.00	14.85 EH	12.00
L081	13.2	8.50	14.8	11.00	15.1	11.00	13.5	9.00
L088	12.88	7.00	14.478	7.00	14.802	9.00	14.09 VH	11.00
L090	13.23	10.00	14.69	9.00	14.94	10.00	13.38	7.00
L091	13.2	8.50	14.7	10.00	14.8	8.00	13.4	8.00
L093	12.462 L	2.00	14.139	4.00	13.869 VL	2.00	12.580 VL	2.00
L094	13.4	12.00	15.0 H	12.00	15.2 H	12.00	13.7	10.00
L099	262. EH	14.00	296. EH	14.00	298. EH	14.00	269. EH	14.00
L122	36.91 EH	13.00	3.20 EL	1.00	2.20 EL	1.00	19.35 EH	13.00
MEDIAN CONC.	13.0400		14.5040		14.7400		13.3900	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	35.50	11.833	3	EH VH	INSUFFICIENT DATA	
L003	41.50	4.150	10	ELVL L L VLVL		10110
L014	56.50	5.650	10	EL		
L024	32.50	3.250	10	L L L L EL	BIASED LOW	Gran-titration
L025	81.00	8.100	10	H H		Auto Titration
L030	50.50	5.050	10			Auto Micro Comp
L032	100.00	10.000	10	H EH EHEHEH		
L081	83.00	8.300	10	L		
L088	96.00	9.600	10	H EH VH		Radiometer
L090	91.00	9.100	10			Endpt. 3.5-3.6
L091	101.50	10.150	10	VH		Gran Titration
L093	46.00	4.600	10	L VL H L VLVL		Titration
L094	95.00	9.500	10	EL H H		
L099	101.00	10.100	10	EHEHELELEHELEHEHEHEH		Auto Titration
L122	84.00	8.400	10	EL EHEHELEHEHELELEH		

OVERALL AVERAGE RANK IS 7.657

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L024	32.50	3.250	10	LLLLEL	BIASED LOW	Gran-titration
L003	41.50	4.150	10	ELVLLLVLVL		10110
L093	46.00	4.600	10	LVLHLVLVL		Titration
L030	50.50	5.050	10			Auto Micro Comp
L014	56.50	5.650	10	EL		
L025	81.00	8.100	10	HH		Auto Titration
L081	83.00	8.300	10	L		
L122	84.00	8.400	10	ELEHEHELEHEHELELEH		
L090	91.00	9.100	10			Endpt. 3.5-3.6
L094	95.00	9.500	10	ELHH		
L088	96.00	9.600	10	HEHVH		Radiometer
L032	100.00	10.000	10	HEHEHEHEH		
L099	101.00	10.100	10	EHEHELELEHELEHEHEHEH		Auto Titration
L091	101.50	10.150	10	VH		Gran Titration
L002	35.50	11.833	3	EHVH	INSUFFICIENT DATA	

OVERALL AVERAGE RANK IS 7.657

GRAN TITRA ALK

PARAMETER: 06592 Diss Inorg Carbon MG C/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	1.6	4.50	2.3	3.00	<.1	0.00	<.1	0.00	.4 L	1.00	<.1 EL	0.00
L006	1.86	9.00	2.40	4.50	.398	8.00	.350	8.00	1.10	11.50	2.25 EH	10.00
L014	1.560	3.00	2.160	2.00	.240	6.00	.120	2.00	.840	6.50	-.120 EL	1.00
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	1.6	4.50	2.4	4.50	.2T	4.00	.2T	4.00	.8T	4.00	1.4	7.00
L029	1.673	6.00	2.530	9.00	.116T	2.00	.103T	1.00	.460 L	2.00	.218T EL	2.00
L030	1.97	12.00	2.51	8.00	.51	11.00	.44	12.00	1.18 H	13.00	2.72 EH	11.00
L031	1.9	11.00	2.5	6.50	.4	9.00	.3	6.00	.9	10.00		0.00
L033	1.1 EL	1.00		0.00	.5W	0.00	.5W	0.00	.5W	0.00	1.3	6.00
L063	1.88	10.00	2.97 H	14.00	.41	10.00	.43	11.00	.86	8.50	.55 EL	4.00
L091	1.83	8.00	2.65	10.00	.31	7.00	.34	7.00	.86	8.50	1.16	5.00
L093	2.26 H	14.00	2.87	12.50	.54	12.00	.41	9.00	1.10	11.50	1.74 H	9.00
L094	1.53	2.00	1.40 EL	1.00	.181	3.00	.428	10.00	.838	5.00	1.65	8.00
L099	2.30 H	15.00	2.87	12.50	.67 H	13.00	.69 H	13.00	1.55 EH	14.00	3.33 EH	12.00
L116	2.02	13.00	2.69	11.00	.02T	1.00	.17	3.00	.84	6.50		0.00
L128	1.68	7.00	2.50	6.50	.21	5.00	.27	5.00	.57	3.00	.31 EL	3.00
MEDIAN CONC.	1.8300		2.5050		.3100		.3400		.8500		1.3500	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	3.1	5.00	3.4	4.00	3.4	4.50	3.1	4.00
L006	3.23	8.00	3.62	10.00	3.65	9.00	3.24	7.00
L014	2.880	2.00	3.120 L	2.00	3.120 L	3.00	2.880	3.00
L023	5.0W	0.00	5.0W	0.00	5.0W	0.00	5.0W	0.00
L025	3.	4.00	3.4	4.00	3.4	4.50	3.2	5.00
L029	3.213	7.00	3.566	7.00	3.611	7.00	3.213	6.00
L030	3.38	12.00	3.77	11.50	3.87	13.00	3.35	11.00
L031	3.3	10.50	3.6	8.50	3.7	10.00	3.3	9.50
L033	2.9	3.00	3.4	4.00	3.0 L	2.00	2.7 L	2.00
L063	3.49	14.00	3.82	13.00	3.81	12.00	3.40	12.00
L091	3.30	10.50	3.60	8.50	3.64	8.00	3.27	8.00
L093	3.47	13.00	3.77	11.50	3.80	11.00	3.48	13.00
L094	2.64 L	1.00	2.10 EL	1.00	2.81 VL	1.00	1.54 EL	1.00
L099	3.90 VH	15.00	4.17 H	15.00	4.15 H	15.00	3.76 H	15.00
L116	3.28	9.00	3.91	14.00	3.89	14.00	3.50	14.00
L128	3.11	6.00	3.52	6.00	3.57	6.00	3.30	9.50
MEDIAN CONC.	3.2300		3.6000		3.6400		3.2700	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	26.00	3.714	7	L EL	BIASED LOW	Infrared Detection
L006	85.00	8.500	10	EH		Autoanalyser
L014	30.50	3.050	10	EL L L	BIASED LOW	
L023	0.00	*******	0		INSUFFICIENT DATA	Infrared Analyzer
L025	45.50	4.550	10			Colourimetry
L029	49.00	4.900	10	L EL		Acid/IR
L030	114.50	11.450	10	H EH	BIASED HIGH	Colourimetry
L031	81.00	9.000	9			Titration conduct.
L033	18.00	3.000	6	EL L L	BIASED LOW	Auto Analyzer
L063	108.50	10.850	10	H EL		UV Dohrman
L091	80.50	8.050	10			IR
L093	116.50	11.650	10	H H	BIASED HIGH	Dohrmann
L094	33.00	3.300	10	EL L ELVLEL	BIASED LOW	
L099	139.50	13.950	10	H H H EHEHVHH H H	BIASED HIGH	Instrumental
L116	85.50	9.500	9			Electropotentiomet
L128	57.00	5.700	10	EL		TOC Analyzer

OVERALL AVERAGE
RANK IS 7.589

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L023	0.00	*******	0		INSUFFICIENT DATA	Infrared Analyzer
L033	18.00	3.000	6	ELLL	BIASED LOW	Auto Analyzer
L014	30.50	3.050	10	ELLL	BIASED LOW	
L094	33.00	3.300	10	ELLELVLEL	BIASED LOW	
L002	26.00	3.714	7	LEL	BIASED LOW	Infrared Detection
L025	45.50	4.550	10			Colourimetry
L029	49.00	4.900	10	LEL		Acid/IR
L128	57.00	5.700	10	EL		TOC Analyzer
L091	80.50	8.050	10			IR
L006	85.00	8.500	10	EH		Autoanalyser
L031	81.00	9.000	9			Titration conduct.
L116	85.50	9.500	9			Electropotentiomet
L063	108.50	10.850	10	HEL		UV Dohrman
L030	114.50	11.450	10	HEH	BIASED HIGH	Colourimetry
L093	116.50	11.650	10	HH	BIASED HIGH	Dohrmann
L099	139.50	13.950	10	HHHEHEHVHHHH	BIASED HIGH	Instrumental

OVERALL AVERAGE
RANK IS 7.589

Diss Inorg Carbon

PARAMETER: 07092 Nitrate + Nitrite MG N/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	.413	23.50	.365	20.50	.243	17.50	.206	8.00	<.005	0.00	.018	13.00
L003	.39	9.50	.35	10.00	.23	6.50	.210	12.00		0.00		0.00
L005	.404	21.00	.366	22.00	.253	25.50	.220	21.50	.01T	12.00	.01W	0.00
L006	.400	17.00	.362	19.00	.243	17.50	.216	18.00	.004	2.00	.004	2.50
L010	.398	15.00	.365	20.50	.244	19.50	.214	16.00	.006	6.00	.006	5.50
L014	.429	27.00	.390	27.00	.259	27.00	.229	27.00	.007	8.00	.015	11.00
L023	.39	9.50	.35	10.00	.23	6.50	.20	6.00	.01W	0.00		0.00
L024	.401	19.00	.361	18.00	.241	15.50	.218	20.00	.01W	0.00	.03T	16.00
L025	.405	22.00	.355	16.00	.24	12.00	.22	21.50	.005T	3.50	.025	14.00
L029	.418	26.00	.354	14.00	.239	9.00	.224	23.50	.011	14.50	.016	12.00
L030	.397	13.50	.357	17.00	.241	15.50	.215	17.00	.006T	6.00	.030	16.00
L031	.38	5.50	.34	6.50	.24	12.00	.21	12.00	.01T	12.00	.04	19.00
L032	.38	5.50	.34	6.50	.24	12.00	.21	12.00	.02	17.00	.03	16.00
L033	.397	13.50	.354	14.00	.236	8.00	.209	9.00	.005	3.50	.010	8.50
L034	.40	17.00	.37	24.00	.25	24.00	.21	12.00	.05T H	19.00	.05T H	20.00
L047	.27 EL	2.00	.26 EL	3.00	.14 EL	2.00	.11 EL	2.00	.05W	0.00	.11 EH	21.00
L049	.416	25.00	.375	25.00	.248	23.00	.225	25.00	.021	18.00	.032	18.00
L063	.413	23.50	.385	26.00	.247	22.00	.224	23.50	.014	16.00	.006	5.50
L082	.40	17.00	.33	4.00	.24	12.00	.20	6.00	0.W	1.00	0.W	1.00
L086	.386	7.00	.352	12.00	.246	21.00	.217	19.00	.006	6.00	.011	10.00
L094	.394	12.00	.354	14.00	.244	19.50	.213	15.00	.011	14.50	.004	2.50
L102	.39	9.50	.35	10.00	.24	12.00	.21	12.00	.02W	0.00	.02W	0.00
L104	.18 EL	1.00	.15 EL	1.00	.11 EL	1.00	.10 EL	1.00	.01T	12.00	.01T	8.50
L114	.31 VL	3.00	.25 EL	2.00	.15T EL	3.00	.16T L	3.00	.02W	0.00	.03W	0.00
L119	.390	9.50	.345	8.00	.227	5.00	.200	6.00		0.00		0.00
L126	.373	4.00	.332	5.00	.221	4.00	.196	4.00	.008	9.00	.006	5.50
L128	.403	20.00	.369	23.00	.253	25.50	.227	26.00	.009	10.00	.006	5.50
MEDIAN CONC.	.3970		.3540		.2400		.2100		.0090		.0150	

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	.191	8.00	.067	10.50	.108	16.50	.083	9.50
L003	.20	16.50	.07	19.50	.110	21.00	.08	6.00
L005	.205	22.50	.072	24.00	.112	23.00	.090	22.50
L006	.202	19.50	.067	10.50	.108	16.50	.087	13.50
L010	.195	11.00	.069	15.50	.106	12.50	.088	17.00
L014	.202	19.50	.069	15.50	.109	19.00	.087	13.50
L023	.20	16.50	.06	3.50	.10	6.50	.08	6.00
L024	.204	21.00	.066	8.50	.107	14.00	.087	13.50
L025	.205	22.50	.07	19.50	.11	21.00	.09	22.50
L029	.206	24.00	.068	13.00	.108	16.50	.084	11.00
L030	.216	27.00	.071	23.00	.105	11.00	.088	17.00
L031	.19	6.50	.06	3.50	.10	6.50	.08	6.00
L032	.20	16.50	.07	19.50	.12	26.00	.09	22.50
L033	.194	10.00	.062	7.00	.102	9.00	.083	9.50
L034	.21	26.00	.07	19.50	.11	21.00	.09	22.50
L047	.10 EL	3.00	.07	19.50	.03T EL	2.00	.02T EL	1.00
L049	.209	25.00	.076	25.00	.125	27.00	.105	26.00
L063	.192	9.00	.068	13.00	.114	24.00	.088	17.00
L082	.20	16.50	.06	3.50	.10	6.50	.08	6.00
L086	.189	5.00	.068	13.00	.106	12.50	.087	13.50
L094	.196	12.00	.070	19.50	.108	16.50	.089	19.50
L102	.19	6.50	.06	3.50	.10	6.50	.08	6.00
L104	.09 EL	2.00	.03T L	1.00	.05T VL	3.00	.04T VL	2.00
L114	.03W EL	1.00	.03W	0.00	.02W EL	1.00	.02W	0.00
L119	.197	13.00	.066	8.50	.103	10.00	.089	19.50
L126	.182	4.00	.061	6.00	.098	4.00	.078	3.00
L128	.199	14.00	.079	26.00	.115	25.00	.093	25.00
MEDIAN CONC.	.1990		.0680		.1070		.0870	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	127.00	14.111	9			Traacs
L003	101.00	12.625	8			07315
L005	194.00	21.556	9		BIASED HIGH	
L006	136.00	13.600	10			Autoanalyser
L010	138.50	13.850	10			Auto Cd Reduction
L014	194.50	19.450	10			
L023	64.50	8.063	8			Cd Reduction FIA
L024	145.50	16.167	9			Auto-Colorimetric
L025	174.50	17.450	10			Colourimetry
L029	163.50	16.350	10			Colorimetry
L030	163.00	16.300	10			Colourimetry
L031	89.50	8.950	10			Hydrazine Sulfate
L032	153.50	15.350	10			
L033	92.00	9.200	10			Auto Cd Reduction

L034	205.00	20.500	10	H H	BIASED HIGH	Traacs
L047	55.50	6.167	9	ELELELEL EHEL ELEL	BIASED LOW	Reduction Cadmium
L049	237.00	23.700	10		BIASED HIGH	Lachat auto
L063	179.50	17.950	10			Colorimetric
L082	73.50	7.350	10			C.I.
L086	119.00	11.900	10			
L094	145.00	14.500	10			
L102	66.00	8.250	8			Auto Cd Reduction
L104	32.50	3.250	10	ELELELEL ELL VLVL	BIASED LOW	
L114	13.00	2.167	6	VLELELL EL EL	BIASED LOW	C.I. Waters
L119	79.50	9.938	8			IC Dionex
L126	48.50	4.850	10		BIASED LOW	
L128	200.00	20.000	10			Autoanalyzer

OVERALL AVERAGE
RANK IS 13.350

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L114	13.00	2.167	6	VLELELLELEL	BIASED LOW	C.I. Waters
L104	32.50	3.250	10	ELELELELELLVLVL	BIASED LOW	
L126	48.50	4.850	10		BIASED LOW	
L047	55.50	6.167	9	ELELELELEHELELEL	BIASED LOW	Reduction Cadmium
L082	73.50	7.350	10			C.I.
L023	64.50	8.063	8			Cd Reduction FIA
L102	66.00	8.250	8			Auto Cd Reduction
L031	89.50	8.950	10			Hydrazine Sulfate
L033	92.00	9.200	10			Auto Cd Reduction
L119	79.50	9.938	8			IC Dionex
L086	119.00	11.900	10			
L003	101.00	12.625	8			07315
L006	136.00	13.600	10			Autoanalyser
L010	138.50	13.850	10			Auto Cd Reduction
L002	127.00	14.111	9			Traacs
L094	145.00	14.500	10			
L032	153.50	15.350	10			
L024	145.50	16.167	9			Auto-Colorimetric
L030	163.00	16.300	10			Colourimetry
L029	163.50	16.350	10			Colorimetry
L025	174.50	17.450	10			Colourimetry
L063	179.50	17.950	10			Colorimetric
L014	194.50	19.450	10			
L128	200.00	20.000	10			Autoanalyzer
L034	205.00	20.500	10	HH	BIASED HIGH	Traacs
L005	194.00	21.556	9		BIASED HIGH	
L049	237.00	23.700	10		BIASED HIGH	Lachat auto

OVERALL AVERAGE
RANK IS 13.350

Nitrate + Nitrite

PARAMETER: 07093 Nitrate-IC mgN/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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
L007	.41	26.50	.36	27.50	.25	28.00	.22	26.00	.03W	0.00	.03W	0.00
L008	.38	4.00	.34	9.50	.21	3.00	.19	4.00	0.00T	2.50	0.00T	2.50
L010	.392	10.50	.348	19.00	.234	13.00	.208	9.50	.005	7.50	<.002	0.00
L011	.40	19.50	.34	9.50	.22	5.50	.21	13.00	.02W	0.00	.02W	0.00
L013	.412	28.00	.350	24.50	.244	26.00	.215	21.50	.007W	0.00	.007W	0.00
L013C	.386	6.00	.330	5.00	.235	14.50	.207	7.50	.007W	0.00	.007W	0.00
L021	.398	15.00	.350	24.50	.237	16.00	.210	13.00	.005	7.50	.008	11.50
L024	.40	19.50	.348	19.00	.239	20.50	.217	23.50	.01W	0.00	.01W	0.00
L025	.4	19.50	.35	24.50	.24	23.50	.22	26.00	.01W	0.00	.01W	0.00
L029	.390	8.00	.343	14.50	.238	18.00	.207	7.50	.009T	14.50	.009T	13.00
L031	.41	26.50	.34	9.50	.24	23.50	.21	13.00	.02T	18.00	.02T	17.00
L049	.416	29.00	.375	31.00	.248	27.00	.225	30.50	.021	19.00	.032	18.00
L061	.40	19.50	.34	9.50	.24	23.50	.21	13.00	.005T	7.50	.004T	7.00
L063	.405	25.00	.366	30.00	.239	20.50	.217	23.50	.006	10.00	.005	8.50
L073	.432	32.50	.349	21.50	.280 H	31.00	.223	29.00	0.W	0.00	0.W	0.00
L081	.385	5.00	.326	4.00	.231	11.00	.208	9.50	.008T	12.50	.008T	11.50
L088	.402	23.00	.343	14.50	.235	14.50	.212	18.50	0.0T	2.50	0.0T	2.50
L090	.398	15.00	.347	17.00	.225	7.00	.027 EL	1.00	.004T	5.00	.001T	5.00
L091	.395	12.00	.340	9.50	.230	9.50	.211	16.50	0.0	2.50	0.0	2.50
L093	.419	30.00	.365	29.00	.253	30.00	.225	30.50	0.000	2.50	0.000	2.50
L094	.404	24.00	.348	19.00	.252	29.00	.230	32.00	.005	7.50	.002	6.00
L099	.432	32.50	.381	32.00	.296 VH	32.00	.211	16.50	.007T	11.00	.003W	0.00
L102	.397	13.00	.349	21.50	.238	18.00	.213	20.00	.065 VH	20.00	.01T	15.00
L104	.18 EL	1.00	.15 EL	1.00	.11 EL	1.00	.10 EL	2.00	.01T	16.50	.01T	15.00
L109	.426	31.00	.350	24.50	.217	4.00	.221	28.00	0.W	0.00	0.W	0.00
L114	.31 EL	2.00	.20 EL	2.00	.15T EL	2.00	.16T L	3.00	.02W	0.00	.02W	0.00
L116	.40	19.50	.36	27.50	.24	23.50	.22	26.00	.01T	16.50	.01T	15.00
L119	.390	8.00	.333	6.00	.227	8.00	.200	6.00		0.00		0.00
L121	.39	8.00	.34	9.50	.23	9.50	.21	13.00	.10W	0.00	.10W	0.00
L122	.40	19.50	1.16 EH	33.00		0.00		0.00		0.00		0.00
L126	.373	3.00	.320	3.00	.220	5.50	.195	5.00	.008	12.50	.006	10.00
L128	.392	10.50	.342	13.00	.238	18.00	.215	21.50	<.01	0.00	<.01	0.00
L131	.398	15.00	.344	16.00	.232	12.00	.212	18.50	.009	14.50	.005	8.50
MEDIAN CONC.	.4000		.3470		.2375		.2110		.0065		.0055	

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
L007	.21	30.50	.09	30.00	.13	31.00	.10	27.00
L008	.18	3.00	.04T	2.00	.08	3.00	.05 L	2.00
L010	.198	14.50	.067	13.50	.105	11.00	.085	12.00
L011	.19	6.00	.06	4.50	.10	6.50	.09	20.50
L013	.199	16.00	.069	17.50	.110	21.50	.89 EH	31.00
L013C	.194	7.00	.066	11.00	.103	9.00	.083	7.00
L021	.206	26.50	.068	15.50	.112	25.50	.089	17.50
L024	.203	22.50	.065	8.50	.106	13.00	.086	15.50
L025	.2	18.50	.07	20.50	.11	21.50	.09	20.50
L029	.197	12.50	.065	8.50	.106	13.00	.084	9.00
L031	.21	30.50	.08	28.00	.11	21.50	.08	4.50
L049	.206	26.50	.076	27.00	.125	30.00	.105	28.00
L061	.20	18.50	.07	20.50	.11	21.50	.09	20.50
L063	.204	24.00	.075	25.50	.116	29.00	.093	25.00
L073	.188	5.00	.075	25.50	.103	9.00	.085	12.00
L081	.196	10.00	.059	3.00	.100	6.50	.78 EH	30.00
L088	.207	28.00	.073	24.00	.107	16.00	.086	15.50
L090	.198	14.50	.069	17.50	.115	28.00	.085	12.00
L091	.196	10.00	.067	13.50	.107	16.00	.083	7.00
L093	.209	29.00	.070	20.50	.112	25.50	.091	23.00
L094	.217	32.00	.102 H	31.00	.135	32.00	.117 H	29.00
L099	.205	25.00	.063	7.00	.096	4.00	.085	12.00
L102	.203	22.50	.071	23.00	.108	18.00	.092	24.00
L104	.09 EL	2.00	.03T L	1.00	.05T VL	2.00	.04T VL	1.00
L109	.196	10.00	.066	11.00	.106	13.00	.085	12.00
L114	.03W EL	1.00	.03W	0.00	.02W EL	1.00	.04W	0.00
L116	.20	18.50	.06	4.50	.11	21.50	.08	4.50
L119	.197	12.50	.066	11.00	.103	9.00	.089	17.50
L121	.20	18.50	.07T	20.50	.11	21.50	.09T	20.50
L122	.27 VH	33.00		0.00	.23 EH	33.00		0.00
L126	.182	4.00	.061	6.00	.098	5.00	.078	3.00
L128	.201	21.00	.086	29.00	.113	27.00	.094	26.00
L131	.195	8.00	.068	15.50	.107	16.00	.083	7.00
MEDIAN CONC.	.2000		.0680		.1070		.0860	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L007	226.50	28.313	8		BIASED HIGH	
L008	35.50	3.550	10	L	BIASED LOW	IC
L010	110.50	12.278	9			Dionex
L011	85.00	10.625	8			
L013	186.00	23.250	8	EH		
L013C	67.00	8.375	8			
L021	172.50	17.250	10			IC
L024	142.00	17.750	8			Auto-Colorimetric
L025	174.50	21.813	8			Auto IC
L029	118.50	11.850	10			IC - Cond. Det.
L031	192.00	19.200	10			C.I.
L049	266.00	26.600	10		BIASED HIGH	Waters-I.C.
L061	161.00	16.100	10			
L063	221.00	22.100	10			Ion Chrom-AS4
L073	165.50	20.688	8	H		
L081	103.00	10.300	10	EH		
L088	159.00	15.900	10			Dionex
L090	122.00	12.200	10	EL		Dionex IC
L091	99.00	9.900	10			

L093	222.50	22.250	10			Dionex IC
L094	241.50	24.150	10	H H		
L099	172.00	19.111	9	VH		IC
L102	195.00	19.500	10	VH		IC
L104	42.50	4.250	10	ELELELEL ELL VLVL	BIASED LOW	
L109	133.50	16.688	8			
L114	11.00	1.833	6	ELELELL EL EL	BIASED LOW	C.I. Waters
L116	177.00	17.700	10			C.I.
L119	78.00	9.750	8			IC Dionex
L121	121.00	15.125	8			I.C.
L122	118.50	29.625	4	EH VH EH	INSUFFICIENT DATA	
L126	57.00	5.700	10		BIASED LOW	
L128	166.00	20.750	8			IC
L131	131.00	13.100	10			Dionex IC

OVERALL AVERAGE
RANK IS 15.787

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L114	11.00	1.833	6	ELELELLELEL	BIASED LOW	C.I. Waters
L008	35.50	3.550	10	L	BIASED LOW	IC
L104	42.50	4.250	10	ELELELELELLVLVL	BIASED LOW	
L126	57.00	5.700	10		BIASED LOW	
L013C	67.00	8.375	8			
L119	78.00	9.750	8			IC Dionex
L091	99.00	9.900	10			
L081	103.00	10.300	10	EH		
L011	85.00	10.625	8			
L029	118.50	11.850	10			IC - Cond. Det.
L090	122.00	12.200	10	EL		Dionex IC
L010	110.50	12.278	9			Dionex
L131	131.00	13.100	10			Dionex IC
L121	121.00	15.125	8			I.C.
L088	159.00	15.900	10			Dionex
L061	161.00	16.100	10			
L109	133.50	16.688	8			
L021	172.50	17.250	10			IC
L116	177.00	17.700	10			C.I.
L024	142.00	17.750	8			Auto-Colorimetric
L099	172.00	19.111	9	VH		IC
L031	192.00	19.200	10			C.I.
L102	195.00	19.500	10	VH		IC
L073	165.50	20.688	8	H		
L128	166.00	20.750	8			IC
L025	174.50	21.813	8			Auto IC
L063	221.00	22.100	10			Ion Chrom-AS4
L093	222.50	22.250	10			Dionex IC
L013	186.00	23.250	8	EH		
L094	241.50	24.150	10	HH		
L049	266.00	26.600	10		BIASED HIGH	Waters-I.C.
L007	226.50	28.313	8		BIASED HIGH	
L122	118.50	29.625	4	EHVHEH	INSUFFICIENT DATA	

OVERALL AVERAGE RANK IS 15.787

Nitrate-IC

PARAMETER: 07192 Ammonia MG N/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	<.001 EL	0.00	.126 L	1.00	.171	8.00	.201	8.00	.092	1.50	.050 L	2.00
L005	.059	7.50	.155	16.00	.168	3.00	.210	13.00	.117	15.50	.075	4.00
L006	.0632	15.00	.1529	13.00	.1776	14.00	.2134	16.00	.1158	13.00	.0818	11.00
L008	.08T	30.00	.23 EH	34.00	.22 H	32.00	.26 H	33.00	.21 EH	34.00	1.08 EH	34.00
L010	.056	5.50	.149	8.00	.194	28.00	.218	23.00	.131	28.50	.124 H	26.00
L013	.096 H	33.00	.182	32.00	.234 VH	33.00	.268 VH	34.00	.116	14.00	.073	3.00
L013C	.064	16.00	.159	18.00	.173	9.50	.208	11.00	.120	18.50	.126 H	28.00
L014	.07	24.00	.17	27.50	.19	26.00	.23	28.50	.14	32.00	.13 H	29.50
L021	.068	21.00	.164	25.00	.186	24.00	.214	17.00	.128	24.50	.083	15.00
L023	.090	31.00	.180	31.00	.191	27.00	.225	26.50	.135	31.00	.125 H	27.00
L024	.066	19.50	.161	24.00	.180	18.50	.215	19.50	.124	22.00	.112	22.00
L025	.026 L	1.00	.13	2.00	.17	6.00	.194	3.00	.092	1.50	.076	5.00
L029	.055	3.50	.138	3.00	.169	4.00	.203	10.00	.108	5.00	.078	7.00
L030	.063	14.00	.148	6.50	.175	12.00	.215	19.50	.115	11.00	.085	16.00
L031	.05	2.00	.14	4.00	.16	1.00	.18 L	1.00	.095	3.00	.08	9.00
L032	.073	27.00	.170	27.50	.182	22.00	.220	24.50	.130	26.50	.180 EH	31.00
L033	.065	17.50	.16	21.00	.177	13.00	.196	4.00	.117	15.50	.082	13.00
L049	.071	26.00	.167	26.00	.203	30.00	.235	30.50	.126	23.00	.268 EH	33.00
L061	.07	24.00	.16	21.00	.18	18.50	.21	13.00	.12	18.50	.11	21.00
L063	.066	19.50	.148	6.50	.180	18.50	.215	19.50	.115	11.00	.082	13.00
L082	.06	10.50	.15	10.00	.17	6.00	.20	6.00	.12	18.50	.12 H	25.00
L086	.06	10.50	.16	21.00	.21	31.00	.23	28.50	.11	7.00	.09	18.50
L091	.06	10.50	.16	21.00	.17	6.00	.20	6.00	.11	7.00	.09	18.50
L093	.065	17.50	.157	17.00	.173	9.50	.200	6.00	.122	21.00	.113	23.00
L094	.076	28.00	.151	12.00	.185	23.00	.212	15.00	.128	24.50	.210 EH	32.00
L099	.078	29.00	.183	33.00	.188	25.00	.225	26.50	.131	28.50	.117	24.00
L102	.059	7.50	.145	5.00	.165	2.00	.202	9.00	.110	7.00	.109	20.00
L104	.07T	24.00	.15T	10.00	.18T	18.50	.22	24.50	.12T	18.50	.08T	9.00
L116	.069	22.00	.173	29.00	.195	29.00	.237	32.00	.132	30.00	.130 H	29.50
L119	.062	13.00	.154	15.00	.180	18.50	.215	19.50	.114	9.00	.082	13.00
L121	.06T	10.50	.16	21.00	.18	18.50	.21	13.00	.10T	4.00	.08T	9.00
L126	.056	5.50	.15	10.00	.174	11.00	.193	2.00	.130	26.50	.077	6.00
L128	.095 H	32.00	.178	30.00	.239 VH	34.00	.235	30.50	.161 H	33.00	.007 EL	1.00
L131	.055	3.50	.153	14.00	.179	15.00	.217	22.00	.115	11.00	.088	17.00
MEDIAN CONC.	.0650		.1580		.1800		.2145		.1200		.0890	

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	5.00	.012	9.50	.001	5.00	.051	19.50
L005	.005W	0.00	.012	9.50	.005W	0.00	.043	7.00
L006	.0008	4.00	.0119	6.00	.0004	4.00	.0479	9.00
L008	0.00T	2.00	.02T	25.50	0.00T	2.00	.11 EH	34.00
L010	<.002	0.00	.011	4.50	<.002	0.00	.051	19.50
L013	.023W	0.00	.030	30.50	.023W	0.00	.065	32.00
L013C	.005W	0.00	.012	9.50	.005W	0.00	.050	15.50
L014	.01	17.50	.03	30.50	.01	19.00	.06	30.00
L021	.008W	0.00	.013	13.50	.008W	0.00	.054	23.50
L023	.005	10.00	.017	21.00	.009	15.50	.063	31.00
L024	.01W	0.00	.016T	19.50	.01W	0.00	.056	26.50
L025	.002W	0.00	.012	9.50	.002T	7.00	.048	11.00
L029	.008T	13.00	.014	16.50	.009T	15.50	.036	1.00
L030	.002T	6.00	.014	16.50	.002T	7.00	.052	21.00
L031	.01T	17.50	.01	2.50	.01T	19.00	.04	2.50
L032	.008	13.00	.023	28.00	.008	12.50	.059	29.00
L033	.003	7.50	.013	13.50	.002	7.00	.048	11.00
L049	.01T	17.50	.018	22.00	.020	23.00	.042	6.00
L061	.02W	0.00	.02	25.50	.02W	0.00	.05	15.50
L063	.005	10.00	.020	25.50	.007	11.00	.054	23.50
L082	.003	7.50	.014	16.50	.003	9.00	.05	15.50
L086	.02W	0.00	.02W	0.00	.02W	0.00	.05	15.50
L091	0.0	2.00	0.0	1.00	0.0	2.00	.04	2.50
L093	0.000	2.00	.011	4.50	0.000	2.00	.046	8.00
L094	.021	21.00	.028	29.00	.017	22.00	.053	22.00
L099	.016T	20.00	.034	32.00	.016T	21.00	.071	33.00
L102	.005W	0.00	.012	9.50	.005W	0.00	.048	11.00
L104	.01W	0.00	.02T	25.50	.01T	19.00	.05T	15.50
L116	.005	10.00	.014	16.50	.004	10.00	.057	28.00
L119		0.00		0.00		0.00	.041	4.50
L121	.12W	0.00	.01T	2.50	.12W	0.00	.05T	15.50
L126	.008T	13.00	.016	19.50	.008T	12.50	.055	25.00
L128	.009	15.00	.019	23.00	.009	15.50	.056	26.50
L131	.010	17.50	.012	9.50	.009	15.50	.041	4.50
MEDIAN CONC.	.0050		.0140		.0080		.0500	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	59.50	6.611	9	ELL L	BIASED LOW	Traacs
L005	75.50	9.438	8			
L006	105.00	10.500	10			Autoanalyser
L008	260.50	26.050	10	EHH H EHEH EH	BIASED HIGH	Technicon autoa.
L010	143.00	17.875	8	H		Auto Phenol Hypoch
L013	211.50	26.438	8	H VHVH	BIASED HIGH	
L013C	126.00	15.750	8	H		
L014	264.50	26.450	10	H	BIASED HIGH	
L021	163.50	20.438	8			IC
L023	251.00	25.100	10	H		Auto Phenate
L024	171.50	21.438	8			Auto-Colorimetric
L025	46.00	5.111	9	L	BIASED LOW	Colourimetry
L029	78.50	7.850	10		BIASED LOW	Colorimetry
L030	129.50	12.950	10			Colourimetry
L031	61.50	6.150	10	L	BIASED LOW	Berthelot
L032	241.00	24.100	10	EH		
L033	123.00	12.300	10			Auto Color
L049	237.00	23.700	10	EH		Technicon auto
L061	157.00	19.625	8			

L063	158.00	15.800	10			Colorimetric
L082	124.50	12.450	10	H		Colorimetrie
L086	132.00	18.857	7			
L091	76.50	7.650	10		BIASED LOW	Colorimetric
L093	110.50	11.050	10			Technicon
L094	228.50	22.850	10	EH		
L099	272.00	27.200	10		BIASED HIGH	ICP
L102	71.00	8.875	8			Auto Berthelot
L104	164.50	18.278	9			
L116	236.00	23.600	10	H		F.I.A.
L119	92.50	13.214	7			IC Dionex
L121	94.00	11.750	8			I.C.
L126	131.00	13.100	10			
L128	240.50	24.050	10	H VH H EL		Autoanalyzer
L131	129.50	12.950	10			Colorimetric AA

OVERALL AVERAGE
RANK IS 16.505

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L025	46.00	5.111	9	L	BIASED LOW	Colourimetry
L031	61.50	6.150	10	L	BIASED LOW	Berthelot
L002	59.50	6.611	9	ELLL	BIASED LOW	Traacs
L091	76.50	7.650	10		BIASED LOW	Colorimetric
L029	78.50	7.850	10		BIASED LOW	Colorimetry
L102	71.00	8.875	8			Auto Berthelot
L005	75.50	9.438	8			
L006	105.00	10.500	10			Autoanalyser
L093	110.50	11.050	10			Technicon
L121	94.00	11.750	8			I.C.
L033	123.00	12.300	10			Auto Color
L082	124.50	12.450	10	H		Colorimetrie
L030	129.50	12.950	10			Colourimetry
L131	129.50	12.950	10			Colorimetric AA
L126	131.00	13.100	10			
L119	92.50	13.214	7			IC Dionex
L013C	126.00	15.750	8	H		
L063	158.00	15.800	10			Colorimetric
L010	143.00	17.875	8	H		Auto Phenol Hypoch
L104	164.50	18.278	9			
L086	132.00	18.857	7			
L061	157.00	19.625	8			
L021	163.50	20.438	8			IC
L024	171.50	21.438	8			Auto-Colorimetric
L094	228.50	22.850	10	EH		
L116	236.00	23.600	10	H		F.I.A.
L049	237.00	23.700	10	EH		Technicon auto
L128	240.50	24.050	10	HVHHEL		Autoanalyzer
L032	241.00	24.100	10	EH		
L023	251.00	25.100	10	H		Auto Phenate
L008	260.50	26.050	10	EHHHEHEHEH	BIASED HIGH	Technicon autoa.
L013	211.50	26.438	8	HVHVH	BIASED HIGH	
L014	264.50	26.450	10	H	BIASED HIGH	
L099	272.00	27.200	10		BIASED HIGH	ICP

OVERALL AVERAGE
RANK IS 16.505

Ammonia

PARAMETER: 07392 Total Kjeldahl N MG N/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	.065	1.00	.279	4.00	.164	1.00	.217	3.00	.344	6.50	1.65 VH	8.00
L014	.07	2.00	.23	2.00	.18	2.50	.19	1.00	.40	8.00	1.58 H	7.00
L023	.2W	0.00	.29	6.50	.24	9.00	.24	7.50	.44 H	9.00	1.46	6.00
L024	.138	7.00	.309	9.00	.215	8.00	.24	7.50	.344	6.50	1.35	4.00
L025	.1	4.50	.28	5.00	.2	5.50	.22	4.50	.34	4.50	1.69 EH	9.00
L032	.09	3.00	.30	8.00	.20	5.50	.20	2.00	.27 L	2.00	1.44	5.00
L033	.10	4.50	.29	6.50	.18	2.50	.23	6.00	.34	4.50	1.79 EH	10.00
L049	.140	8.00	.221	1.00	.203	7.00	.247	9.00	.223 VL	1.00	.913 EL	1.00
L102	.13	6.00	.27	3.00	.19	4.00	.22	4.50	.33	3.00	1.34	3.00
L128	.525 EH	9.00	.809 EH	10.00	.393 EH	10.00	.374 EH	10.00	.525 EH	10.00	.980 EL	2.00
MEDIAN CONC.	.1000		.2850		.2000		.2250		.3420		1.4500	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.093	2.00	.120	1.00	.142	8.00	.178	3.00
L014	.09	1.00	.15	4.50	.13	5.50	.19	7.00
L023	.22 VH	9.00	.20W	0.00	.20W	0.00	.20W	0.00
L024	.11	7.00	.145	3.00	.128	4.00	.189	5.00
L025	.1	3.50	.16	6.50	.14	7.00	.18	4.00
L032	.10	3.50	.16	6.50	.13	5.50	.14	1.00
L033	.11	7.00	.14	2.00	.12	2.50	.19	7.00
L049	.105	5.00	.181	8.00	.099	1.00	.156	2.00
L102	.11	7.00	.15	4.50	.12	2.50	.19	7.00
L128	.292 EH	10.00	.360 EH	9.00	.386 EH	9.00	.341 EH	9.00
MEDIAN CONC.	.1075		.1500		.1300		.1890	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	37.50	3.750	10	VH		Block Digestion
L014	40.50	4.050	10	H		
L023	47.00	7.833	6	H VH		Auto Phenate
L024	61.00	6.100	10			Dig/Colorimetric
L025	54.00	5.400	10	EH		Digest/Colour
L032	42.00	4.200	10	L		
L033	52.50	5.250	10	EH		Auto Color
L049	43.00	4.300	10	VLEL		Lachat auto
L102	44.50	4.450	10			HgSO4-Dig. Auto Co
L128	88.00	8.800	10	EHEHEHEHEHELEHEHEHEH	BIASED HIGH	Dig'n-Autoanalyzer

OVERALL AVERAGE RANK IS 5.313

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	37.50	3.750	10	VH		Block Digestion
L014	40.50	4.050	10	H		
L032	42.00	4.200	10	L		
L049	43.00	4.300	10	VLEL		Lachat auto
L102	44.50	4.450	10			HgSO4-Dig. Auto Co
L033	52.50	5.250	10	EH		Auto Color
L025	54.00	5.400	10	EH		Digest/Colour
L024	61.00	6.100	10			Dig/Colorimetric
L023	47.00	7.833	6	HVH		Auto Phenate
L128	88.00	8.800	10	EHEHEHEHEHELEHEHEHEH	BIASED HIGH	Dig'n-Autoanalyzer

OVERALL AVERAGE RANK IS 5.313

Total Kjeldahl N

PARAMETER: 11091 Sodium MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	.13	33.50	.43	31.00	.05	6.00	.09	12.50	1.73	13.00	.96	31.50
L003	.12	28.00	.43	31.00	.06	14.00	.10	26.50	1.84	35.00	.95	29.50
L006	.121	31.00	.422	26.00	.077	31.00	.105	32.00	1.777	24.00	.964	33.00
L007	.15	37.00	.45	36.50	.10	36.50	.12	38.50	1.76	20.50	1.11 EH	40.00
L008	.05	1.50	.36	3.00	0.00T	1.00	.04	1.50	1.74	15.00	.94	25.50
L010	.1	11.00	.4	16.00	<.1	0.00	<.1	0.00	1.7	8.00	.9	11.50
L011	.09	5.00	.34	1.50	.05	6.00	.08	7.50	1.76	20.50	.86	3.00
L013	.11	21.00	.385	8.00	.060	14.00	.092	15.50	1.764	22.00	.882	6.00
L013C	.105	16.00	.403	18.00	.057	10.00	.087	10.50	1.732	14.00	.907	13.00
L021	.130	33.50	.432	34.00	.082	35.00	.117	37.00	1.840	35.00	.980	37.50
L023	.11	21.00	.42	24.00	.08	33.00	.10	26.50	1.75	17.50	.93	22.00
L024	.12T	28.00	.43	31.00	.07T	24.50	.10T	26.50	1.9 H	39.50	1.0	39.00
L025	.201 H	41.00	.424	27.00	.073	27.50	.095	19.00	1.83	32.50	.933	23.00
L029	.119	25.00	.427	28.00	.068	22.00	.100	26.50	1.75	17.50	.925	20.00
L030	.157	38.00	.394	14.00	.060	14.00	.091	14.00	1.78	25.50	.966	34.00
L031	.09	5.00	.39	10.00	.05	6.00	.07	4.00	1.7	8.00	.85	2.00
L032	.16	39.50	.63 EH	41.00	.16 H	39.00	.13	40.00	1.78	25.50	.94	25.50
L033	.13	33.50	.46	38.00	.06	14.00	.10	26.50	1.72	12.00	.96	31.50
L034	.1	11.00	.4	16.00	.1T	36.50	.1T	26.50	1.7	8.00	.9	11.50
L047	.05	1.50	.34	1.50	.01T	2.00	.04T	1.50	1.62 L	2.50	.87	4.50
L049	.16	39.50	.45	36.50	.08	33.00	.11	34.00	1.75	17.50	.94	25.50
L057	.12	28.00	.42	24.00	.11	38.00	.10	26.50	1.79	29.50	.97	35.50
L061	.112	24.00	.416	21.50	.065	20.50	.097	21.00	1.783	28.00	.910	15.50
L063	.136	36.00	.490	39.50	.074	29.50	.113	36.00	1.782	27.00	.925	20.00
L081	.10	11.00	.38	6.00	.06	14.00	.09	12.50	.34 EL	1.00	.89	8.50
L082	.10	11.00	.38	6.00	.05	6.00	.07	4.00	1.67	4.00	.87	4.50
L088	.10	11.00	.39	10.00	.06	14.00	.08	7.50	1.70	8.00	.89	8.50
L090	.11	21.00	.42	24.00	.07	24.50	.11	34.00	2.00 EH	41.00	.94	25.50
L091	.12	28.00	.43	31.00	.07	24.50	.10	26.50	1.79	29.50	.95	29.50
L093	.100	11.00	.370	4.00	.060	14.00	.120	38.50	1.80	31.00	.83 L	1.00
L099	.11	21.00	.43	31.00	.07	24.50	.10	26.50	1.85	37.00	.97	35.50
L102	.13	33.50	.44	35.00	.073	27.50	.11	34.00	1.84	35.00	.98	37.50
L109	.105	16.00	.391	12.00	.061	18.50	.087	10.50	1.70	8.00	.885	7.00
L114	.09T	5.00	.49	39.50	.04W	0.00	.07T	4.00	1.88 H	38.00	1.15 EH	41.00
L116	.09	5.00	.39	10.00	.05	6.00	.08	7.50	1.68	5.00	.92	17.50
L119	.105	16.00	.393	13.00	.061	18.50	.094	17.50	1.709	11.00	.909	14.00
L121	.09	5.00	.38	6.00	.04T	3.00	.08	7.50	1.90 H	39.50	.91	15.50
L122	.12	28.00	.41	19.00	.08	33.00	.10	26.50	1.62 L	2.50	.92	17.50
L126	.100	11.00	.412	20.00	.056	9.00	.092	15.50	1.830	32.50	.944	28.00
L128	.11	21.00	.40	16.00	.074	29.50	.096	20.00	1.75	17.50	.895	10.00
L131	.108	18.00	.416	21.50	.065	20.50	.094	17.50	1.766	23.00	.925	20.00
MEDIAN CONC.	.1100		.4160		.0650		.0965		1.7600		.9250	

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	.86	37.50	.89	34.00	.88	23.00	1.02	30.00
L003	.88	41.00	.89	34.00	.90	36.00	1.06	38.00
L006	.830	24.50	.886	31.00	.879	20.00	1.015	27.50
L007	.87	39.50	.90	37.00	.90	36.00	1.02	30.00
L008	.79	8.50	.80	3.00	.80	2.00	.91	2.00
L010	.8	13.50	.8	3.00	.9	36.00	1.	21.00
L011	.77	2.50	.80	3.00	.81	3.50	.96	9.50
L013	.783	6.00	.809	5.00	.825	7.00	.954	5.00
L013C	.811	17.00	.838	17.00	.845	13.00	.967	13.00
L021	.847	31.50	.904	39.00	.887	28.00	1.015	27.50
L023	.84	28.00	.87	26.00	.88	23.00	1.05	36.00
L024	.87	39.50	.91	40.50	.92	40.00	1.1 H	40.50
L025	.837	26.00	.877	29.50	.895	32.00	1.007	23.00
L029	.79	8.50	.82	10.50	.83	9.50	.950	4.00
L030	.847	31.50	.877	29.50	.883	27.00	1.04	34.00
L031	.79	8.50	.82	10.50	.82	5.50	.92	3.00
L032	.80	13.50	.84	18.50	1.23 EH	41.00	1.02	30.00
L033	.82	19.00	.86	23.00	.89	30.00	1.06	38.00
L034	.8	13.50	.9	37.00	.9	36.00	1.0	21.00
L047	.77	2.50	.82	10.50	.81	3.50	1.00	21.00
L049	.84	28.00	.86	23.00	.88	23.00	.99	18.00
L057	.83	24.50	.90	37.00	.89	30.00	1.10 H	40.50
L061	.821	21.00	.847	21.00	.854	15.00	.959	6.50
L063	.841	30.00	.889	32.00	.898	33.00	.976	15.00
L081	.78	4.50	.82	10.50	.83	9.50	.97	14.00
L082	.78	4.50	.82	10.50	.82	5.50	.96	9.50
L088	.79	8.50	.81	6.00	.83	9.50	.96	9.50
L090	.82	19.00	.86	23.00	.87	19.00	1.01	25.00
L091	.85	34.00	.87	26.00	.88	23.00	1.01	25.00
L093	.73 L	1.00	.74 L	1.00	.75 L	1.00	.86 VL	1.00
L099	.86	37.50	.91	40.50	.91	39.00	1.04	34.00
L102	.85	34.00	.89	34.00	.90	36.00	1.04	34.00
L109	.795	11.00	.816	7.00	.832	12.00	.959	6.50
L114	.82	19.00	.83	15.50	.88	23.00	.99	18.00
L116	.84	28.00	.84	18.50	.85	14.00	1.06	38.00
L119	.823	22.50	.828	14.00	.866	18.00	.963	12.00
L121	.81	16.00	.83	15.50	.86	16.00	.99	18.00
L122	.85	34.00	.87	26.00	.89	30.00	1.01	25.00
L126	.852	36.00	.876	28.00	.881	26.00	1.022	32.00
L128	.80	13.50	.82	10.50	.83	9.50	.96	9.50
L131	.823	22.50	.846	20.00	.863	17.00	.980	16.00
MEDIAN CONC.	.8210		.8470		.8800		1.0000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	252.00	25.200	10			
L003	313.00	31.300	10			11103
L006	280.00	28.000	10			Flame AA
L007	351.50	35.150	10	EH	BIASED HIGH	
L008	63.00	6.300	10		BIASED LOW	ICP-MS
L010	120.00	15.000	8			ICP
L011	62.00	6.200	10		BIASED LOW	
L013	109.50	10.950	10			
L013C	141.50	14.150	10			
L021	338.00	33.800	10		BIASED HIGH	IC
L023	257.00	25.700	10			Flame AA/ICP
L024	349.00	34.900	10	H H	BIASED HIGH	ICP
L025	280.50	28.050	10	H		Flame AA
L029	171.50	17.150	10			AAS - Flame
L030	261.50	26.150	10			AAS
L031	62.50	6.250	10		BIASED LOW	ICAP
L032	313.50	31.350	10	EHH EH		
L033	265.50	26.550	10			Auto Flame
L034	217.00	21.700	10			ICP
L047	51.00	5.100	10	L	BIASED LOW	ICP
L049	278.00	27.800	10			Atomic Absorption
L057	313.50	31.350	10	H		
L061	194.00	19.400	10			
L063	298.00	29.800	10			Atomic Absorption
L081	91.50	9.150	10	EL	BIASED LOW	
L082	65.50	6.550	10		BIASED LOW	Plasma
L088	92.50	9.250	10		BIASED LOW	Flame AA
L090	256.00	25.600	10	EH		Flame AAS
L091	277.00	27.700	10			Flame AA
L093	103.50	10.350	10	L L L L VL		AA 2380 Flame
L099	326.50	32.650	10		BIASED HIGH	ICP
L102	340.50	34.050	10		BIASED HIGH	ICP
L109	108.50	10.850	10			
L114	203.00	22.556	9	H EH		I.C.P.
L116	149.50	14.950	10			ICP
L119	156.50	15.650	10			IC Dionex
L121	142.00	14.200	10	H		I.C.
L122	241.50	24.150	10	L		
L126	238.00	23.800	10			
L128	157.00	15.700	10			ICP
L131	196.00	19.600	10			Flame AA

OVERALL AVERAGE RANK IS 20.855

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L047	51.00	5.100	10	L	BIASED LOW	ICP
L011	62.00	6.200	10		BIASED LOW	
L031	62.50	6.250	10		BIASED LOW	ICAP
L008	63.00	6.300	10		BIASED LOW	ICP-MS
L082	65.50	6.550	10		BIASED LOW	Plasma
L081	91.50	9.150	10	EL	BIASED LOW	
L088	92.50	9.250	10		BIASED LOW	Flame AA
L093	103.50	10.350	10	LLLLVL		AA 2380 Flame
L109	108.50	10.850	10			
L013	109.50	10.950	10			
L013C	141.50	14.150	10			
L121	142.00	14.200	10	H		I.C.
L116	149.50	14.950	10			ICP
L010	120.00	15.000	8			ICP
L119	156.50	15.650	10			IC Dionex
L128	157.00	15.700	10			ICP
L029	171.50	17.150	10			AAS - Flame
L061	194.00	19.400	10			
L131	196.00	19.600	10			Flame AA
L034	217.00	21.700	10			ICP
L114	203.00	22.556	9	HEH		I.C.P.
L126	238.00	23.800	10			
L122	241.50	24.150	10	L		
L002	252.00	25.200	10			
L090	256.00	25.600	10	EH		Flame AAS
L023	257.00	25.700	10			Flame AA/ICP
L030	261.50	26.150	10			AAS
L033	265.50	26.550	10			Auto Flame
L091	277.00	27.700	10			Flame AA
L049	278.00	27.800	10			Atomic Absorption
L006	280.00	28.000	10			Flame AA
L025	280.50	28.050	10	H		Flame AA
L063	298.00	29.800	10			Atomic Absorption
L003	313.00	31.300	10			11103
L032	313.50	31.350	10	EHHEH		
L057	313.50	31.350	10	H		
L099	326.50	32.650	10		BIASED HIGH	ICP
L021	338.00	33.800	10		BIASED HIGH	IC
L102	340.50	34.050	10		BIASED HIGH	ICP
L024	349.00	34.900	10	HH	BIASED HIGH	ICP
L007	351.50	35.150	10	EH	BIASED HIGH	

OVERALL AVERAGE RANK IS 20.855

Sodium

PARAMETER: 12091 Magnesium MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	.58	10.50	1.41	17.00	.03	14.00	.03	20.50	.65	12.00	.58	11.50
L003	.59	16.50	1.43	24.00	.022	3.00	.022	6.50	.65	12.00	.59	19.00
L006	.604	29.50	1.411	19.50	.034	22.00	.034	31.00	.678	27.00	.613	29.00
L007	.62	33.50	1.39	9.00	.04	29.00	.02	3.00	.69	29.50	.63 H	32.00
L008	.07 EL	1.00	1.70 EH	37.00	.04	29.00	.03	20.50	.79 EH	38.00	.70 EH	38.00
L010	.6	25.50	1.4	12.00	<.1	0.00	<.1	0.00	.7 H	33.00	.6	24.50
L013C	.592	20.00	1.523 VH	33.00	.036	24.50	.031	28.00	.658	17.00	.588	16.50
L021	.645 H	38.00	1.496 H	32.00	.030	14.00	.035	32.00	.714 H	35.00	.626	31.00
L023	.60	25.50	1.44	26.00	.035	23.00	.030	20.50	.66	19.50	.59	19.00
L024	.60	25.50	1.44	26.00	.03T	14.00	.03T	20.50	.69	29.50	.62	30.00
L025	.6	25.50	1.41	17.00	.03	14.00	.029	11.50	.67	25.50	.61	27.50
L029	.58	10.50	1.38	8.00	.03	14.00	.03	20.50	.666	24.00	.595	21.50
L030	.615	32.00	1.46	30.00	.045	33.00	.044	36.00	.721 VH	36.00	.661 VH	37.00
L031	.54 L	3.50	1.3 VL	2.00	.04	29.00	.03	20.50	.61 L	2.50	.55 L	4.50
L032	.60	25.50	1.40	12.00	.04	29.00	.04	34.00	.66	19.50	.59	19.00
L034	.54 L	3.50	1.4	12.00	.05T	35.00	.05T	37.00	.62 L	4.00	.56	7.00
L047	.64 H	37.00	1.53 VH	34.00	.03T	14.00	.03T	20.50	.70 H	33.00	.65 VH	35.50
L049	.447 EL	2.00	1.056 EL	1.00	.158 EH	37.00	.018	1.00	.539 EL	1.00	.519 VL	2.00
L057	.59	16.50	1.40	12.00	.06 H	36.00	.04	34.00	.65	12.00	.60	24.50
L061	.588	13.50	1.413	21.00	.028	7.00	.029	11.50	.650	12.00	.581	14.00
L063	.629 H	35.00	1.550 EH	35.00	.036	24.50	.032	29.50	.700 H	33.00	.637 H	33.00
L073	.591	19.00	1.404	15.00	.030	14.00	.030	20.50	.662	22.00	.588	16.50
L081	.604	29.50	1.45	28.00	.027	5.50	.027	8.50	.692	31.00	.600	24.50
L082	.56	6.00	1.37	6.50	.03	14.00	.03	20.50	.64	8.00	.58	11.50
L088	.58	10.50	1.36	4.50	.04	29.00	.03	20.50	.65	12.00	.56	7.00
L090	.595	21.00	1.42	22.50	.030	14.00	.032	29.50	.665	23.00	.490 EL	1.00
L091	.57	8.00	1.36	4.50	.03	14.00	.03	20.50	.64	8.00	.58	11.50
L093	.560	6.00	1.34 L	3.00	.04	29.00	.04	34.00	.63	6.00	.56	7.00
L099	.59	16.50	1.40	12.00	.02	2.00	.02	3.00	.66	19.50	.58	11.50
L102	.600	25.50	1.44	26.00	.032	20.00	.027	8.50	.670	25.50	.600	24.50
L109	.596	22.00	1.41	17.00	.029	8.00	.029	11.50	.656	15.50	.595	21.50
L114	.580	10.50	1.453	29.00	.027T	5.50	.021T	5.00	.622	5.00	.649 VH	34.00
L116	.56	6.00	1.37	6.50	.03	14.00	.03	20.50	.64	8.00	.55 L	4.50
L119	.634 H	36.00	1.495 H	31.00	.047	34.00	.029	11.50	.686	28.00	.546 L	3.00
L121	.61	31.00	1.60 EH	36.00	.01T	1.00	.02T	3.00	.73 VH	37.00	.65 VH	35.50
L122	.62	33.50		0.00	.04	29.00	.03	20.50	.61 L	2.50	.57	9.00
L128	.59	16.50	1.42	22.50	.024	4.00	.022	6.50	.66	19.50	.61	27.50
L131	.588	13.50	1.411	19.50	.033	21.00	.030	20.50	.656	15.50	.586	15.00
MEDIAN CONC.	.5915		1.4110		.0300		.0300		.6600		.5900	

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	.63	19.50	.74	18.00	.75	13.00	1.62	12.50
L003	.62	13.00	.74	18.00	.75	13.00	1.63	17.00
L006	.635	23.00	.766	29.00	.791	32.00	1.617	9.00
L007	.68 H	36.00	.80 H	35.00	.81 H	35.50	1.63	17.00
L008	.74 EH	38.00	.88 EH	38.00	.89 EH	38.00	1.93 EH	37.00
L010	.6	5.50	.7	4.00	.8 H	33.50	1.7	29.50
L013C	.625	16.00	.743	22.00	.751	16.50	1.685	27.00
L021	.664	35.00	.778	34.00	.790	30.50	1.710 H	31.00
L023	.63	19.50	.75	24.50	.75	13.00	1.69	28.00
L024	.65	32.00	.77	31.50	.79	30.50	1.7	29.50
L025	.64	26.00	.75	24.50	.77	25.50	1.63	17.00
L029	.63	19.50	.745	23.00	.755	18.50	1.62	12.50
L030	.693 VH	37.00	.819 VH	36.00	.831 VH	37.00	1.80 EH	34.00
L031	.60	5.50	.72	7.00	.73	7.00	1.54 L	4.00
L032	.63	19.50	.74	18.00	.75	13.00	1.60	7.00
L034	.59 L	3.50	.71	6.00	.73	7.00	1.6	7.00
L047	.64	26.00	.82 VH	37.00	.80 H	33.50	1.75 VH	33.00
L049	.523 EL	1.00	.626 EL	1.00	.623 EL	1.00	1.381 EL	1.00
L057	.64	26.00	.73	9.50	.76	22.50	1.62	12.50
L061	.618	8.50	.730	9.50	.738	9.00	1.630	17.00
L063	.661	34.00	.771	33.00	.782	29.00	1.814 EH	35.00
L073	.630	19.50	.739	14.00	.755	18.50	1.630	17.00
L081	.642	29.00	.755	27.00	.778	27.00	1.67	25.50
L082	.62	13.00	.74	18.00	.75	13.00	1.64	21.00
L088	.62	13.00	.73	9.50	.72	4.00	1.62	12.50
L090	.650	32.00	.755	27.00	.770	25.50	1.66	23.50
L091	.62	13.00	.73	9.50	.73	7.00	1.60	7.00
L093	.59 L	3.50	.70	4.00	.72	4.00	1.50 VL	2.00
L099	.64	26.00	.74	18.00	.76	22.50	1.64	21.00
L102	.630	19.50	.755	27.00	.758	20.00	1.64	21.00
L109	.618	8.50	.736	13.00	.749	10.00	1.66	23.50
L114	.559 VL	2.00	.692 L	2.00	.693 L	2.00	1.513 VL	3.00
L116	.61	7.00	.70	4.00	.72	4.00	1.57	5.00
L119	.647	30.00	.767	30.00	.780	28.00	1.711 H	32.00
L121	.65	32.00	.77	31.50	.81 H	35.50	1.82 EH	36.00
L122	.64	26.00	.74	18.00	.76	22.50		0.00
L128	.62	13.00	.74	18.00	.76	22.50	1.67	25.50
L131	.619	10.00	.732	12.00	.751	16.50	1.618	10.00
MEDIAN CONC.	.6300		.7400		.7565		1.6300	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	148.50	14.850	10			
L003	142.00	14.200	10			12107
L006	251.00	25.100	10			Flame AA
L007	259.50	25.950	10	H H H H		
L008	314.50	31.450	10	ELEH EHEHEHEHEHEH	BIASED HIGH	ICP-MS
L010	167.50	20.938	8	H H		ICP
L013C	220.50	22.050	10	VH		
L021	312.50	31.250	10	H H H H	BIASED HIGH	IC
L023	218.50	21.850	10			Flame AA/ICP
L024	269.00	26.900	10			ICP
L025	214.00	21.400	10			Flame AA
L029	172.00	17.200	10			AAS - Flame
L030	348.00	34.800	10	VHVHVHVHVHEH	BIASED HIGH	AAS
L031	85.50	8.550	10	L VL L L L	BIASED LOW	ICAP
L032	196.50	19.650	10			
L034	122.00	12.200	10	L L L		ICP
L047	303.50	30.350	10	H VH H VH VHH VH	BIASED HIGH	ICP
L049	48.00	4.800	10	ELELEH ELVLELELELEL	BIASED LOW	I.C.P.
L057	205.50	20.550	10	H		
L061	123.00	12.300	10			
L063	321.00	32.100	10	H EH H H EH	BIASED HIGH	Atomic Absorption
L073	176.00	17.600	10			
L081	235.50	23.550	10			
L082	131.50	13.150	10			Plasma
L088	122.50	12.250	10			Flame AA
L090	219.00	21.900	10	EL		Flame AAS
L091	103.00	10.300	10			Flame AA
L093	98.50	9.850	10	L L VL		AA 2380 Flame
L099	152.00	15.200	10			ICP
L102	217.50	21.750	10			ICP
L109	150.50	15.050	10			
L114	98.00	9.800	10	VHVLL L VL		I.C.P.
L116	79.50	7.950	10	L	BIASED LOW	ICP
L119	263.50	26.350	10	H H L H		IC Dionex
L121	278.50	27.850	10	EH VHVH H EH		I.C.
L122	161.00	20.125	8	L		
L128	175.50	17.550	10			ICP
L131	153.50	15.350	10			Flame AA

OVERALL AVERAGE RANK IS 19.303

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L049	48.00	4.800	10	ELELEHELVLELELELEL	BIASED LOW	I.C.P.
L116	79.50	7.950	10	L	BIASED LOW	ICP
L031	85.50	8.550	10	LVLLLL	BIASED LOW	ICAP
L114	98.00	9.800	10	VHVLLLVL		I.C.P.
L093	98.50	9.850	10	LLVL		AA 2380 Flame
L091	103.00	10.300	10			Flame AA
L034	122.00	12.200	10	LLL		ICP
L088	122.50	12.250	10			Flame AA
L061	123.00	12.300	10			
L082	131.50	13.150	10			Plasma
L003	142.00	14.200	10			12107
L002	148.50	14.850	10			
L109	150.50	15.050	10			
L099	152.00	15.200	10			ICP
L131	153.50	15.350	10			Flame AA
L029	172.00	17.200	10			AAS - Flame
L128	175.50	17.550	10			ICP
L073	176.00	17.600	10			
L032	196.50	19.650	10			
L122	161.00	20.125	8	L		
L057	205.50	20.550	10	H		
L010	167.50	20.938	8	HH		ICP
L025	214.00	21.400	10			Flame AA
L102	217.50	21.750	10			ICP
L023	218.50	21.850	10			Flame AA/ICP
L090	219.00	21.900	10	EL		Flame AAS
L013C	220.50	22.050	10	VH		
L081	235.50	23.550	10			
L006	251.00	25.100	10			Flame AA
L007	259.50	25.950	10	HHHH		
L119	263.50	26.350	10	HHLH		IC Dionex
L024	269.00	26.900	10			ICP
L121	278.50	27.850	10	EHVHVHHEH		I.C.
L047	303.50	30.350	10	HVHHVHVHHVH	BIASED HIGH	ICP
L021	312.50	31.250	10	HHHH	BIASED HIGH	IC
L008	314.50	31.450	10	ELEHEHEHEHEHEHEH	BIASED HIGH	ICP-MS
L063	321.00	32.100	10	HEHHHEH	BIASED HIGH	Atomic Absorption
L030	348.00	34.800	10	VHVHVHVHVHEH	BIASED HIGH	AAS

OVERALL AVERAGE RANK IS 19.303

Magnesium

PARAMETER: 13091 Aluminum MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	.0068	9.00	.0418	10.00	.0142	16.00	.0063	6.00	.0521	14.00	.4807 EL	1.00
L008	.01	13.00	.05	18.00	.01	5.50	.01T	12.50	.05	8.00	.61 H	18.50
L010	.004	5.00	.041	9.00	.011	10.00	<.002	0.00	.053	15.50	.57	11.00
L023	.01W	0.00	.040	7.50	.010	5.50	.010W	0.00	.052	13.00	.570	11.00
L029	0.0T	1.00	.03	4.00	.02	19.00	.01	12.50	.05	8.00	.58	14.50
L030	.010	13.00	.046	14.00	.014	14.50	.008T	7.50	.055	19.00	.575	13.00
L031	.01T	13.00	.34 EH	22.00	.01T	5.50	.01	12.50	.05	8.00	.54	7.50
L032	.0059	8.00	.0487	16.00	.0166	17.00	.0092	10.00	.0535	17.00	5.56 EH	22.00
L047	.02T	17.00	.04T	7.50	.01T	5.50	.01T	12.50	.06	21.00	.61 H	18.50
L049	.02T	17.00	.02T L	2.00	.02T	19.00	.02T	17.00	.08 H	22.00	.52 L	3.00
L057	.010T	13.00	.06	21.00	.022T	21.00	-.008T	1.00	.045T	4.50	.57	11.00
L081	.009T	10.00	.045	13.00	.014	14.50	.009T	9.00	.051	11.50	.525 L	5.50
L082	.001	2.00	.02 L	2.00	.01	5.50	.002	2.00	.04	3.00	.55	9.00
L088	.020	17.00	.054	20.00	.027	22.00	.011	15.00	.054	18.00	.597	17.00
L090	.010	13.00	.050	18.00	.012	12.00	.012	16.00	.050	8.00	.540	7.50
L091	.002	3.00	.044	12.00	.012	12.00	.004	5.00	.051	11.50	.525 L	5.50
L093	.003	4.00	.050	18.00	.012	12.00	.003	3.00	.056	20.00	.613 H	20.00
L099	.020W	0.00	.048T	15.00	.020T	19.00	.020W	0.00	.053T	15.50	.580	14.50
L102	.01W	0.00	.034	6.00	.010	5.50	.01W	0.00	.038	2.00	.524 L	4.00
L114	.0044T	6.00	.0319	5.00	.0089T	1.00	.0037T	4.00	.0355	1.00	.6410 VH	21.00
L116		0.00	.02 L	2.00	.01	5.50		0.00	.05	8.00	.51 VL	2.00
L128	.005	7.00	.043	11.00	.010	5.50	.008	7.50	.045	4.50	.586	16.00
MEDIAN CONC.	.0079		.0435		.0120		.0090		.0510		.5700	

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	.0071	8.00	.0123	13.00	.0125	15.00	.0086	9.00
L008	.01T	12.50	.01T	6.50	.01	9.00	.01T	13.50
L010	.005	3.50	.009	3.00	.009	4.50	.005	3.50
L023	.010W	0.00	.010W	0.00	.010W	0.00	.010W	0.00
L029	-.01T	1.00	.01	6.50	.01	9.00	-.01T	1.00
L030	.005T	3.50	.006T	1.00	.006T	1.00	.003T	2.00
L031	.01T	12.50	.01	6.50	.01	9.00	.02	18.50
L032	.0097	10.00	.0143	15.00	.0101	13.00	.0066	6.00
L047	.04T VH	19.00	.04T H	19.00	.04T H	20.00	.04T VH	20.00
L049	.02T	16.50	.02T	16.00	.02T	17.00	.02T	18.50
L057	.020T	16.50	.009T	3.00	.015T	16.00	.008T	8.00
L081	.009T	9.00	.009T	3.00	.009T	4.50	.009T	10.50
L082	.01	12.50	.01	6.50	.01	9.00	.01	13.50
L088	.039 H	18.00	.036 H	18.00	.039 H	19.00	.017	17.00

L090	.005T	3.50	.011	11.00	.010	9.00	.009	10.50
L091	.005	3.50	.011	11.00	.008	3.00	.005	3.50
L093	.007	7.00	.011	11.00	.010	9.00	.010	13.50
L099	.020W	0.00	.020W	0.00	.020W	0.00	.020W	0.00
L102	.010	12.50	.013	14.00	.012	14.00	.007	7.00
L114	.0052T	6.00	.0102	9.00	.0073T	2.00	.0060T	5.00
L116		0.00		0.00	.01	9.00	.01	13.50
L128	.011	15.00	.034 H	17.00	.024	18.00	.013	16.00
MEDIAN CONC.	.0097		.0110		.0100		.0090	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L006	101.00	10.100	10	EL		Graphite Furnace
L008	117.00	11.700	10	H		ICP-MS
L010	65.00	7.222	9			GF, ICP-6
L023	37.00	9.250	4		INSUFFICIENT DATA	GFAA
L029	76.50	7.650	10			ICP
L030	88.50	8.850	10			Colourimetry
L031	115.00	11.500	10	EH		ICAP
L032	134.00	13.400	10	EH		
L047	160.00	16.000	10	H VHH H VH		ICP
L049	148.00	14.800	10	L H L		I.C.P.
L057	115.00	11.500	10			
L081	90.50	9.050	10	L		
L082	65.00	6.500	10	L		Plasma
L088	181.00	18.100	10	H H H	BIASED HIGH	Graphite Furnace A
L090	108.50	10.850	10			Furnace
L091	70.00	7.000	10	L		GFAAS
L093	117.50	11.750	10	H		HGA 300 Furnace
L099	64.00	16.000	4		INSUFFICIENT DATA	ICP
L102	65.00	8.125	8	L		GFAA, ICP-6
L114	60.00	6.000	10	VH		A.A.G.F.
L116	40.00	6.667	6	L VL		ICP
L128	117.50	11.750	10	H		GFAA

OVERALL AVERAGE RANK IS 10.627

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L114	60.00	6.000	10	VH		A.A.G.F.
L082	65.00	6.500	10	L		Plasma
L116	40.00	6.667	6	LVL		ICP
L091	70.00	7.000	10	L		GFAAS
L010	65.00	7.222	9			GF, ICP-6
L029	76.50	7.650	10			ICP
L102	65.00	8.125	8	L		GFAA, ICP-6
L030	88.50	8.850	10			Colourimetry
L081	90.50	9.050	10	L		
L023	37.00	9.250	4		INSUFFICIENT DATA	GFAA
L006	101.00	10.100	10	EL		Graphite Furnace
L090	108.50	10.850	10			Furnace
L031	115.00	11.500	10	EH		ICAP
L057	115.00	11.500	10			
L008	117.00	11.700	10	H		ICP-MS
L093	117.50	11.750	10	H		HGA 300 Furnace
L128	117.50	11.750	10	H		GFAA
L032	134.00	13.400	10	EH		
L049	148.00	14.800	10	LHL		I.C.P.
L099	64.00	16.000	4		INSUFFICIENT DATA	ICP
L047	160.00	16.000	10	HVHHHVH		ICP
L088	181.00	18.100	10	HHH	BIASED HIGH	Graphite Furnace A

OVERALL AVERAGE
RANK IS 10.627

Aluminum

PARAMETER: 14092 REACTIVE SILICA MG SI/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	.207	4.50	.160	7.50	.014	10.00	.009	9.00	.028	11.00		0.00
L003	.308 EH	22.00	.256 VH	22.00	.102 EH	17.00	.102 EH	15.00	.121 EH	18.00	3.12 EH	21.00
L006	.219	14.00	.170	14.00	.022	15.00	.014	10.00	.031	14.00	2.60	14.50
L010	.21	9.00	.17	14.00	<.05	0.00	<.05	0.00	<.05	0.00	2.42	4.50
L014	.211	13.00	.160	7.50	-.005	3.00	-.005	3.00	.011	5.00	2.680 H	18.00
L023	.28 H	21.00	.19	19.00	.1W	0.00	.1W	0.00	.1W	0.00	2.66 H	17.00
L024	.21	9.00	.16	7.50	.02W	0.00	.02W	0.00	.02W	0.00	2.50	10.50
L025	.2	2.00	.16	7.50	.02W	0.00	.02W	0.00	.02T	9.00	2.46	6.50
L029	.220	16.00	.170	14.00	.013	9.00	.005	7.00	.017	6.50	2.357 L	1.00
L031	.21	9.00	.16	7.50	.02T	13.00	.02T	12.00	.02	9.00	2.6	14.50
L033	.41 EH	23.00	.30 EH	23.00	.05W	0.00	.05W	0.00	.05W	0.00	5.59 EH	23.00
L047	.21	9.00	.17	14.00	.01T	8.00	.05W	0.00	.02T	9.00	2.42	4.50
L049	.60 EH	24.00	.60 EH	24.00	.5T EH	18.00	.5T EH	16.00	.5T EH	19.00	5.10 EH	22.00
L063	.174	1.00	.119 L	1.00	-.052T VL	1.00	-.059T VL	1.00	-.043T VL	1.00	2.646	16.00
L082	.21	9.00	.16	7.50	.02	13.00	.02	12.00	.03	12.50	2.41	3.00
L088	.26 H	20.00	.23 H	21.00	.09 VH	16.00	.08 VH	14.00	.04	16.00	2.76 VH	19.00
L091	.22	16.00	.16	7.50	0.0	4.50	0.0	4.50	0.0	2.00	2.54	13.00
L093	.228	19.00	.199	20.00	0.000	4.50	0.000	4.50	.052	17.00	2.978 EH	20.00
L094	.203	3.00	.157	3.00	.004	6.00	.003	6.00	.009	4.00	2.46	6.50
L099	.21	9.00	.16	7.50	.02W	0.00	.02W	0.00	.02W	0.00	2.5	10.50
L102	.225	18.00	.173	17.00	.006T	7.00	.006W	0.00	.017	6.50	2.48	8.50
L116	.21	9.00	.17	14.00	.02	13.00	.02	12.00	.03	12.50	2.37 L	2.00
L128	.22	16.00	.18	18.00	.016	11.00	.007	8.00	.036	15.00	2.48	8.50
L131	.207	4.50	.137	2.00	-.007	2.00	-.019	2.00	.007	3.00	2.528	12.00
MEDIAN CONC.	.2105		.1700		.0135		.0080		.0200		2.5280	

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	1.77	13.00	1.65	11.50	1.66	12.50	1.05	12.00
L003	1.86	18.50	1.77 H	21.00	1.78 H	21.00	1.19 VH	22.00
L006	1.77	13.00	1.67	15.00	1.67	14.00	1.06	13.00
L010	1.7	4.00	1.59	2.50	1.63	7.50	1.07	14.00
L014	1.860	18.50	1.740	18.00	1.740	20.00	1.100	17.50
L023	1.87	21.00	1.73	17.00	1.73	19.00	1.12	19.00
L024	1.80	16.00	1.70	16.00	1.70	17.00	1.10	17.50
L025	1.74	9.50	1.62	8.00	1.62	5.50	1.02	5.00
L029	1.716	7.00	1.596	4.00	1.620	5.50	1.014	4.00
L031	1.05 EL	1.00	1.65	11.50	1.65	10.00	1.04	10.00
L033	3.63 EH	23.00	3.39 EH	23.00	19.99 EH	24.00	3.41 EH	24.00
L047	1.69	2.00	1.60	5.50	1.57	1.50	1.03	7.00
L049	4.10 EH	24.00	3.80 EH	24.00	3.70 EH	23.00	2.60 EH	23.00
L063	1.830	17.00	1.766 H	20.00	1.721	18.00	1.077	15.00
L082	1.70	4.00	1.59	2.50	1.59	3.00	1.00	2.50
L088	1.94 VH	22.00	1.82 VH	22.00	1.84 VH	22.00	1.18 VH	21.00
L091	1.76	11.00	1.66	14.00	1.66	12.50	1.04	10.00
L093	1.863	20.00	1.745	19.00	1.693	16.00	1.147 H	20.00
L094	1.74	9.50	1.62	8.00	1.64	9.00	1.03	7.00
L099	1.7	4.00	1.6	5.50	1.6	4.00	1.0	2.50
L102	1.77	13.00	1.64	10.00	1.68	15.00	1.03	7.00
L116	1.73	8.00	1.55 L	1.00	1.57	1.50	.99	1.00
L128	1.71	6.00	1.62	8.00	1.63	7.50	1.09	16.00
L131	1.774	15.00	1.652	13.00	1.651	11.00	1.040	10.00
MEDIAN CONC.	1.7700		1.6510		1.6600		1.0550	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	91.00	10.111	9			
L003	197.50	19.750	10	EHVHEHEHEHEH H H VH	BIASED HIGH	14109
L006	136.50	13.650	10			Autoanalyser
L010	55.50	7.929	7			ICP
L014	123.50	12.350	10	H		
L023	133.00	19.000	7	H H	BIASED HIGH	Auto Molyb.
L024	93.50	13.357	7			Molybdate
L025	53.00	6.625	8			Colourimetry
L029	74.00	7.400	10	L		Colorimetry
L031	97.50	9.750	10	EL		Colorimetrie
L033	163.00	23.286	7	EHEH EHEHEHEHEH	BIASED HIGH	Auto Color
L047	60.50	6.722	9			ICP
L049	217.00	21.700	10	EHEHEHEHEHEHEHEHEHEH	BIASED HIGH	Technicon auto
L063	91.00	9.100	10	L VLVLVL H		Colorimetric
L082	69.00	6.900	10			Colorimetrie
L088	193.00	19.300	10	H H VHVH VHVHVHVHVH	BIASED HIGH	Molybdate FIA
L091	95.00	9.500	10			Colorimetric
L093	160.00	16.000	10	EH H		Technicon
L094	62.00	6.200	10			
L099	43.00	6.143	7			Colorimetric
L102	102.00	11.333	9			Auto Molybdate Blu
L116	74.00	7.400	10	L L		F.I.A.
L128	114.00	11.400	10			ICP
L131	74.50	7.450	10			Colorimetric AA

OVERALL AVERAGE
RANK IS 11.695

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L099	43.00	6.143	7			Colorimetric
L094	62.00	6.200	10			
L025	53.00	6.625	8			Colourimetry
L047	60.50	6.722	9			ICP
L082	69.00	6.900	10			Colorimetrie
L029	74.00	7.400	10	L		Colorimetry
L116	74.00	7.400	10	LL		F.I.A.
L131	74.50	7.450	10			Colorimetric AA
L010	55.50	7.929	7			ICP
L063	91.00	9.100	10	LVLVLVLH		Colorimetric
L091	95.00	9.500	10			Colorimetric
L031	97.50	9.750	10	EL		Colorimetrie
L002	91.00	10.111	9			
L102	102.00	11.333	9			Auto Molybdate Blu
L128	114.00	11.400	10			ICP
L014	123.50	12.350	10	H		
L024	93.50	13.357	7			Molybdate
L006	136.50	13.650	10			Autoanalyser
L093	160.00	16.000	10	EHH		Technicon
L023	133.00	19.000	7	HH	BIASED HIGH	Auto Molyb.
L088	193.00	19.300	10	HHVHVHVHVHVHVHVH	BIASED HIGH	Molybdate FIA
L003	197.50	19.750	10	EHVHEHEHEHEHHHVH	BIASED HIGH	14109
L049	217.00	21.700	10	EHEHEHEHEHEHEHEHEHEH	BIASED HIGH	Technicon auto
L033	163.00	23.286	7	EHEHEHEHEHEHEH	BIASED HIGH	Auto Color

OVERALL AVERAGE
RANK IS 11.695

REACTIVE SILICA

PARAMETER: 16000 SULFATE, IC METHOD MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	1.95	33.00	4.46	33.00	1.85	27.00	1.58	28.00	6.0	36.50	1.13	36.00
L006	1.847	13.00	4.358	21.00	1.773	10.00	1.517	12.00	5.762	21.00	.970	14.00
L007	1.83	12.00	4.24	11.00	1.78	13.50	1.55	21.50	5.65	8.00	1.02	28.00
L008	2.16 H	39.00	4.89 VH	38.00	2.12 H	38.00	1.73	37.00	6.34 VH	39.00	1.00	23.50
L010	1.86	17.50	4.32	17.50	1.79	17.50	1.53	17.00	5.76	19.00	1.05	32.50
L011	1.80	7.50	4.22	10.00	1.80	21.50	1.57	25.00	5.73	14.50	.99	18.50
L013	1.923	31.00	4.430	31.00	1.833	24.00	1.583	30.00	5.763	22.00	.991	20.00
L013C	1.864	19.00	4.272	12.50	1.756	7.00	1.529	15.00	5.726	13.00	.948	8.00
L014	1.79	6.00	4.20	7.50	1.64	2.00	1.44	5.00	5.71	11.00	.92	5.50
L021	1.907	28.00	4.364	22.00	1.841	25.00	1.587	31.00	5.811	27.00	1.039	31.00
L024	1.90T	26.50	4.50	35.00	1.80T	21.50	1.50T	10.50	6.00	36.50	1.00T	23.50
L025	1.88	23.50	4.37	23.00	1.78	13.50	1.53	17.00	5.64	7.00	.98	16.50
L029	1.91	29.00	4.19	6.00	1.97	33.00	1.68	36.00	5.57	4.00	.993	21.00
L030	1.95	33.00	4.45	32.00	1.85	27.00	1.60	33.50	5.85	30.00	.95	9.00
L031	1.9	26.50	4.2	7.50	1.8	21.50	1.5	10.50	5.6	6.00	1.0	23.50
L032	1.95	33.00	4.48	34.00	1.88	31.00	1.60	33.50	6.02	38.00	1.02	28.00
L033		0.00	3.8 EL	1.00		0.00		0.00	5.4 L	2.00		0.00
L034	1.6 L	1.00	3.9 VL	2.00	1.6	1.00	1.4	3.00	5.2 VL	1.00	.85	3.00
L049	2.	35.50	5. EH	39.00	2.T	34.00	2.T EH	38.00	7. EH	41.00	6. EH	39.00
L061	1.92	30.00	4.33	19.00	1.85	27.00	1.58	28.00	5.79	23.00	1.02	28.00
L063	1.866	20.00	4.272	12.50	1.777	11.00	1.527	14.00	5.549	3.00	.969	13.00
L073	1.85	14.50	4.32	17.50	2.01	35.00	1.58	28.00	5.80	24.50	1.22 H	38.00
L081	1.85	14.50	4.34	20.00	1.78	13.50	1.53	17.00	5.84	29.00	.98	16.50
L082	1.82	11.00	4.18	4.00	1.78	13.50	1.47	7.00	5.71	11.00	.93	7.00
L088	1.882	25.00	4.292	14.00	1.77	8.50	1.576	26.00	5.760	19.00	1.000	23.50
L090	1.80	7.50	4.18	4.00	1.72	4.00	1.42	4.00	5.71	11.00	.92	5.50
L091	1.86	17.50	4.41	28.00	1.77	8.50	1.56	23.50	5.95	35.00	.974	15.00
L093	1.785	5.00	4.205	9.00	1.680	3.00	1.470	7.00	5.740	16.00	.965	12.00
L094	2.01	37.00	4.31	15.00	1.86	29.50	1.60	33.50	5.68	9.00	1.05	32.50
L099	2.15 H	38.00	4.83 VH	37.00	2.11 H	37.00	.940 EL	1.00	5.94	34.00	.590 EL	1.00
L102	1.87	22.00	4.39	25.00	1.80	21.50	1.55	21.50	5.81	26.00	1.01	26.00
L104	2.0	35.50	4.4	26.50	1.9	32.00	1.6	33.50	5.8	24.50	1.1	34.50
L109	1.88	23.50	4.38	24.00	1.86	29.50	1.473	9.00	5.73	14.50	1.10	34.50
L114	1.775	4.00	5.017 EH	40.00	2.149 VH	39.00	1.396	2.00	5.596	5.00	.718T L	2.00
L116	1.81	9.00	4.42	30.00	1.75	6.00	1.56	23.50	5.76	19.00	.91	4.00
L119	1.851	16.00	4.319	16.00	1.784	16.00	1.533	19.00	5.752	17.00	.956	11.00
L121	1.75	2.00	4.18	4.00	1.79	17.50	1.47	7.00	5.88	32.00	.99	18.50
L122	5.04 EH	40.00	8.07 EH	41.00	2.08 H	36.00	2.12 EH	39.00	5.82	28.00	6.44 EH	40.00
L126	1.867	21.00	4.414	29.00	1.796	19.00	1.545	20.00	5.921	33.00	1.029	30.00
L128	1.76	3.00	4.77 VH	36.00	2.98 EH	40.00	2.30 EH	40.00	6.48 EH	40.00	1.20 H	37.00
L131	1.811	10.00	4.400	26.50	1.727	5.00	1.523	13.00	5.870	31.00	.953	10.00
MEDIAN CONC.	1.8665		4.3580		1.8000		1.5475		5.7620		.9920	

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	6.0	34.50	6.51	36.00	6.48	36.00	8.44	28.00
L006	5.830	16.00	6.266	14.00	6.267	15.00	8.345	21.00
L007	5.65	6.00	6.18	10.00	6.14	7.00	8.29	15.00
L008	6.51 EH	39.00	7.27 EH	40.00	7.15 EH	40.00	9.40 EH	40.00
L010	5.73	8.00	6.34	23.00	6.33	25.00	8.49	33.00
L011	5.69	7.00	6.15	9.00	6.20	9.50	8.29	15.00
L013	5.834	17.00	6.351	25.00	6.325	24.00	8.365	22.00
L013C	5.799	14.00	6.257	13.00	6.272	18.00	8.334	18.00
L014	5.75	10.00	6.19	11.00	6.18	8.00	8.20	11.00
L021	5.886	24.00	6.339	21.00	6.338	26.00	8.342	20.00
L024	6.10	37.00	6.40	29.50	6.40	32.50	8.40	26.00
L025	5.74	9.00	6.3	17.00	6.27	16.50	8.12	8.00
L029	5.62	5.00	6.11	8.00	6.06	6.00	8.13	9.00
L030	5.95	31.00	6.45	33.50	6.40	32.50	8.65	35.50
L031	5.9	26.50	6.1	7.00	6.2	9.50	8.0	5.00
L032	5.92	30.00	6.45	33.50	6.36	28.00	8.28	13.00
L033		0.00		0.00		0.00		0.00
L034	5.2 EL	2.00	5.6 EL	2.00	5.6 EL	2.00	7.5 EL	2.00
L049	7. EH	40.00	7. EH	39.00	7. EH	39.00	9. VH	38.00
L061	5.87	23.00	6.38	27.50	6.37	29.00	8.48	32.00
L063	5.580	3.00	6.041	5.00	5.939 L	4.00	7.523 EL	3.00
L073	5.60	4.00	6.46	35.00	6.21	11.00	8.20	11.00
L081	6.01	36.00	6.33	20.00	6.25	14.00	8.34	19.00
L082	5.79	13.00	6.09	6.00	6.24	13.00	8.08	6.00
L088	5.852	19.50	6.308	19.00	6.279	19.00	8.476	31.00
L090	5.86	21.50	6.40	29.50	6.38	30.50	8.11	7.00
L091	6.00	34.50	6.38	27.50	6.38	30.50	8.45	30.00
L093	5.995	32.00	6.445	32.00	6.520	37.00	8.410	27.00
L094	5.77	12.00	6.25	12.00	6.28	20.00	8.39	25.00
L099	5.90	26.50	6.30	17.00	6.35	27.00	8.33	17.00
L102	5.89	25.00	6.34	23.00	6.23	12.00	8.38	24.00
L104	5.8	15.00	6.3	17.00	6.3	22.00	8.2	11.00
L109	5.76	11.00	6.37	26.00	6.29	21.00	8.29	15.00
L114	5.906	28.00	5.636 EL	3.00	5.714 VL	3.00	8.689	37.00
L116	5.86	21.50	5.89 L	4.00	6.05	5.00	7.91 L	4.00
L119	5.852	19.50	6.340	23.00	6.309	23.00	8.372	23.00
L121	5.84	18.00	6.27	15.00	6.27	16.50	8.65	35.50
L122	3.46 EL	1.00	.25 EL	1.00	3.23 EL	1.00	7.07 EL	1.00
L126	5.999	33.00	6.527	37.00	6.479	35.00	8.548	34.00
L128	6.35 VH	38.00	6.86 VH	38.00	6.85 VH	38.00	9.18 EH	39.00
L131	5.912	29.00	6.403	31.00	6.424	34.00	8.443	29.00
MEDIAN CONC.	5.8560		6.3345		6.2850		8.3435	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L003	328.00	32.800	10		BIASED HIGH	16309
L006	157.00	15.700	10			Dionex
L007	132.00	13.200	10			
L008	373.50	37.350	10	H VHH VH EHEHEHEH	BIASED HIGH	IC
L010	210.00	21.000	10			Dionex
L011	137.50	13.750	10			
L013	246.00	24.600	10			
L013C	137.50	13.750	10			
L014	77.00	7.700	10		BIASED LOW	
L021	255.00	25.500	10			IC
L024	278.50	27.850	10			IC
L025	151.00	15.100	10			Auto IC
L029	157.00	15.700	10			IC - Cond. Det.
L030	297.00	29.700	10			IC
L031	143.50	14.350	10			C.I.
L032	302.00	30.200	10			
L033	3.00	1.500	2	EL L	INSUFFICIENT DATA	
L034	19.00	1.900	10	L VL VL ELELELEL	BIASED LOW	
L049	382.50	38.250	10	EH EHEHEHEHEHEHVH	BIASED HIGH	Waters-I.C.
L061	266.50	26.650	10			
L063	88.50	8.850	10	L EL	BIASED LOW	Ion Chrom-AS4
L073	218.50	21.850	10	H		
L081	199.50	19.950	10			
L082	91.50	9.150	10		BIASED LOW	C.I.
L088	204.50	20.450	10			Dionex
L090	124.50	12.450	10			Dionex IC
L091	250.00	25.000	10			
L093	180.00	18.000	10			Dionex IC
L094	225.50	22.550	10			
L099	235.50	23.550	10	H VHH EL EL		IC
L102	226.00	22.600	10			IC
L104	251.50	25.150	10			
L109	208.00	20.800	10			
L114	163.00	16.300	10	EHVH L ELVL		C.I. Waters
L116	126.00	12.600	10	L L		C.I.
L119	183.50	18.350	10			IC Dionex
L121	166.00	16.600	10			I.C.
L122	228.00	22.800	10	EHEHH EH EHELELELEL		
L126	291.00	29.100	10			
L128	349.00	34.900	10	VHEHEHEHH VHVHVHEH	BIASED HIGH	IC
L131	218.50	21.850	10			Dionex IC

OVERALL AVERAGE RANK IS 20.602

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L033	3.00	1.500	2	ELL	INSUFFICIENT DATA	
L034	19.00	1.900	10	LVLVLELELELEL	BIASED LOW	
L014	77.00	7.700	10		BIASED LOW	
L063	88.50	8.850	10	LEL	BIASED LOW	Ion Chrom-AS4
L082	91.50	9.150	10		BIASED LOW	C.I.
L090	124.50	12.450	10			Dionex IC
L116	126.00	12.600	10	LL		C.I.
L007	132.00	13.200	10			
L013C	137.50	13.750	10			
L011	137.50	13.750	10			
L031	143.50	14.350	10			C.I.
L025	151.00	15.100	10			Auto IC
L029	157.00	15.700	10			IC - Cond. Det.
L006	157.00	15.700	10			Dionex
L114	163.00	16.300	10	EHVHLELVL		C.I. Waters
L121	166.00	16.600	10			I.C.
L093	180.00	18.000	10			Dionex IC
L119	183.50	18.350	10			IC Dionex
L081	199.50	19.950	10			
L088	204.50	20.450	10			Dionex
L109	208.00	20.800	10			
L010	210.00	21.000	10			Dionex
L073	218.50	21.850	10	H		
L131	218.50	21.850	10			Dionex IC
L094	225.50	22.550	10			
L102	226.00	22.600	10			IC
L122	228.00	22.800	10	EHEHHEHEHELELELEL		
L099	235.50	23.550	10	HVHHELEL		IC
L013	246.00	24.600	10			
L091	250.00	25.000	10			
L104	251.50	25.150	10			
L021	255.00	25.500	10			IC
L061	266.50	26.650	10			
L024	278.50	27.850	10			IC
L126	291.00	29.100	10			
L030	297.00	29.700	10			IC
L032	302.00	30.200	10			
L003	328.00	32.800	10		BIASED HIGH	16309
L128	349.00	34.900	10	VHEHEHEHHVHVHVHEH	BIASED HIGH	IC
L008	373.50	37.350	10	HVHHVHEHEHEHEH	BIASED HIGH	IC
L049	382.50	38.250	10	EHEHEHEHEHEHEHVH	BIASED HIGH	Waters-I.C.

OVERALL AVERAGE RANK IS 20.602

SULFATE, IC METHOD

PARAMETER: 16001 SULFATE NON IC METHODS MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	1.9	5.00	4.5	5.00	1.8	4.00	1.5	4.00	6.7	5.00		0.00
L006	1.680	2.00	4.48	4.00	1.56	1.00	1.38	2.00	6.42	4.00	27.57 H	3.00
L023	1.89	4.00	4.39	3.00	1.89	5.00	1.57	5.00	5.95	3.00	46. EH	4.00
L031	1.8	3.00	4.3	2.00	1.7	3.00	1.4	3.00	5.6	1.00	.6 EL	1.00
L047	5.W	0.00	5.7 VH	6.00	5.W	0.00	5.W	0.00	11.2 EH	6.00	5.W	0.00
L086	1.6	1.00	3.9	1.00	1.6	2.00	1.3	1.00	5.8	2.00	17.6 L	2.00
MEDIAN CONC.	1.8000		4.4350		1.7000		1.4000		6.1850		22.5850	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	6.4	5.00	6.9	5.00	6.8	5.00	8.9	5.00
L006	6.10	4.00	6.62	4.00	6.60	4.00	8.82	4.00
L023	5.95	3.00	6.34	2.00	6.39	2.00	8.29	2.00
L031	5.6	1.00	6.1	1.00	6.0	1.00	7.8	1.00
L047	9.1 EH	6.00	11.3 EH	6.00	11.7 EH	6.00	10.3	6.00
L086	5.9	2.00	6.4	3.00	6.5	3.00	8.6	3.00
MEDIAN CONC.	6.0250		6.5100		6.5500		8.7100	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	43.00	4.778	9		BIASED HIGH	
L006	32.00	3.200	10	H		Autoanalyser
L023	33.00	3.300	10	EH		Ba Sulphate FIA
L031	17.00	1.700	10	EL	BIASED LOW	Calmagite
L047	36.00	6.000	6	VH EH EHEHEH	BIASED HIGH	Turbidimetrie
L086	20.00	2.000	10	L	BIASED LOW	

OVERALL AVERAGE RANK IS 3.291

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L031	17.00	1.700	10	EL	BIASED LOW	Calmagite
L086	20.00	2.000	10	L	BIASED LOW	
L006	32.00	3.200	10	H		Autoanalyser
L023	33.00	3.300	10	EH		Ba Sulphate FIA
L002	43.00	4.778	9		BIASED HIGH	
L047	36.00	6.000	6	VHEHEHEHEH	BIASED HIGH	Turbidimetrie

OVERALL AVERAGE
RANK IS 3.291

PARAMETER: 17000 CHLORIDE IC MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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		0.00	.90 H	32.00		0.00		0.00	3.0	17.00	1.07 H	32.00
L006	.1590	3.00	.7490	9.00	.0870	5.00	.1395	4.00	2.945	12.00	.8375	5.00
L007	.23	25.00	.76	11.00	.18	29.00	.24	30.00	3.16	34.00	.91	13.00
L008	.17	6.00	.81	29.00	0.00T L	1.00	.07 L	1.00	3.15	33.00	2.29 EH	35.00
L010	.21	21.50	.80	27.00	.14	25.00	.20	24.50	3.09	29.50	.94	21.00
L011	.34 H	34.00	.77	17.00	.10	7.50	.53 EH	32.00	2.81 L	6.00	.91	13.00
L013	.183	8.00	.789	22.00	.114	12.00	.176	12.00	2.843	8.00	.875	8.00
L013C	.203	17.50	.764	13.00	.121	20.00	.194	22.00	2.876	9.00	.852	6.00
L014	.19	9.50	.74	5.50	.12	18.00	.18	15.00	3.02	19.50	.94	21.00
L021	.209	20.00	.800	27.00	.112	11.00	.186	18.00	3.046	25.00	1.598 EH	34.00
L025	.32 H	33.00	.77	17.00	.11	10.00	.17	9.50	2.92	11.00	.93	18.50
L029	.196	12.00	.746	8.00	.108	9.00	.165	7.00	2.99	14.50	.864	7.00
L030	.22	24.00	.79	23.50	.12	18.00	.18	15.00	3.0	17.00	.93	18.50
L031	.2	14.50	.7	1.50	.1	7.50	.2	24.50	2.9	10.00	.8 L	2.50
L032	.248	28.00	1.06 EH	35.00	.205	32.00	.212	27.00	3.10	32.00	.973	27.00
L034	.2	14.50	.7	1.50	.2T	31.00	.2T	24.50	2.6 EL	4.00	.8 L	2.50
L049	1.T EH	36.00	1.T EH	34.00	1.T EH	34.00	1.T EH	34.00	2. EL	2.00	3. EH	36.00
L061	.20	14.50	.77	17.00	.12	18.00	.17	9.50	2.99	14.50	.92	16.50
L063	.203	17.50	.788	21.00	.117	15.50	.184	17.00	2.962	13.00	.912	15.00
L073	.161	5.00	.740	5.50	.05T	2.00	.157	6.00	3.09	29.50	.879	9.00
L081	.24	26.50	.73	3.50	.15	26.50	.23	29.00	3.03	21.00	.92	16.50
L082	.24	26.50	.79	23.50	.19	30.00	.19	19.00	3.06	26.00	.99	29.00
L088	.253	29.00	.800	27.00	.158	28.00	.214	28.00	3.035	22.50	.940	21.00
L090	.200	14.50	.768	15.00	.124	21.00	.192	21.00	3.04	24.00	.963	26.00
L091	.274	31.00	.763	12.00	.128	22.00	.243	31.00	3.09	29.50	.980	28.00
L093	.190	9.50	.765	14.00	.115	13.00	.170	9.50	2.735 VL	5.00	.910	13.00
L099	.281	32.00	.928 VH	33.00	.218	33.00	54.3 EH	36.00	58.1 EH	37.00	44.0 EH	37.00
L102	.217	23.00	.842	30.00	.136	24.00	.191	20.00	3.035	22.50	.962	25.00
L109	.160	4.00	.743	7.00	.057	3.00	.135	3.00	3.02	19.50	.819 L	4.00
L114	.075T L	1.00	5.840 EH	37.00	8.432 EH	36.00	.683 EH	33.00	3.552 EH	36.00	.764 VL	1.00
L116	.26	30.00	.85	31.00	.15	26.50	.20	24.50	2.59 EL	3.00	1.06 H	31.00
L119	.195	11.00	.793	25.00	.117	15.50	.170	9.50	3.258 H	35.00	1.027	30.00
L121	.21	21.50	.73	3.50	.13	23.00	.18	15.00	3.00	17.00	.95	23.00
L122	.42 EH	35.00	2.06 EH	36.00	4.50 EH	35.00	4.79 EH	35.00	.33 EL	1.00	1.18 EH	33.00
L126	.206	19.00	.777	19.00	.116	14.00	.178	13.00	3.066	27.00	.897	11.00
L128	.133	2.00	.751	10.00	.075	4.00	.114	2.00	3.09	29.50	.880	10.00
L131	.178	7.00	.785	20.00	.094	6.00	.149	5.00	2.842	7.00	.953	24.00
MEDIAN CONC.	.2045		.7770		.1200		.1880		3.0200		.9300	

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		0.00		0.00		0.00	.99	30.00
L006	.3820	2.00	.2295	3.00	.2315	3.00	.8580	4.00
L007	.49	26.50	.36	32.00	.36	32.00	.96	19.00
L008	.48	22.50	.32	27.50	.34	30.00	1.08 H	35.00
L010	.48	22.50	.32	27.50	.33	27.50	.99	30.00
L011	.53	32.50	.28	10.00	.28	8.50	.98	26.50
L013	.443	11.00	.295	17.50	.290	14.50	.941	12.00
L013C	.445	12.00	.291	16.00	.284	12.00	.940	11.00
L014	.44	9.50	.28	10.00	.28	8.50	.93	9.00
L021	.482	25.00	.295	17.50	.308	24.00	.956	16.50
L025	.45	16.50	.28	10.00	.28	8.50	.95	14.00
L029	.452	18.00	.298	20.00	.304	22.00	.929	8.00
L030	.48	22.50	.30	23.00	.31	25.00	.99	30.00
L031	.4	3.50	.3	23.00	.3	19.00	.8 VL	1.50
L032	.495	29.00	.286	13.00	.330	27.50	.962	21.00
L034	.4	3.50	.3	23.00	.3	19.00	.8 VL	1.50
L049	1.T EH	34.00	1.T EH	35.00	1.T EH	35.00	1.T	32.50
L061	.44	9.50	.29	15.00	.29	14.50	.96	19.00
L063	.448	14.00	.300	23.00	.298	17.00	.954	15.00
L073	.405	5.00	.253	6.00	.244	5.00	.98	26.50
L081	.49	26.50	.34	30.50	.34	30.00	.91	6.00
L082	.50	30.00	.34	30.50	.34	30.00	1.00	32.50
L088	.492	28.00	.333	29.00	.325	26.00	.967	23.00
L090	.449	15.00	.296	19.00	.281	11.00	.960	19.00
L091	.522	31.00	.387	33.00	.440 H	34.00	.966	22.00
L093	.435	8.00	.270	7.00	.280	8.50	.903	5.00
L099	46.4 EH	36.00	20.8 EH	36.00	16.0 EH	36.00	21.1 EH	37.00
L102	.471	19.50	.277	8.00	.306	23.00	.982	28.00
L109	.409	6.00	.251	5.00	.250	6.00	.931	10.00
L114	.342 L	1.00	.134 VL	2.00	.208	2.00	.840 L	3.00
L116	.53	32.50	.47 VH	34.00	.38	33.00	1.01	34.00
L119	.480	22.50	.289	14.00	.292	16.00	.975	25.00
L121	.45	16.50	.30	23.00	.30	19.00	.97	24.00
L122	1.45 EH	35.00	.08 EL	1.00	.19 L	1.00	1.63 EH	36.00
L126	.471	19.50	.311	26.00	.303	21.00	.911	7.00
L128	.412	7.00	.236	4.00	.241	4.00	.948	13.00
L131	.447	13.00	.285	12.00	.287	13.00	.956	16.50
MEDIAN CONC.	.4615		.2955		.3000		.9600	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L003	111.00	27.750	4	H H	INSUFFICIENT DATA	17209
L006	50.00	5.000	10		BIASED LOW	Dionex
L007	251.50	25.150	10			
L008	220.00	22.000	10	L L EH H		IC
L010	256.00	25.600	10			Dionex
L011	187.00	18.700	10	H EHL		
L013	125.00	12.500	10			
L013C	138.50	13.850	10			
L014	125.50	12.550	10			
L021	218.00	21.800	10	EH		IC
L025	148.00	14.800	10	H		Auto IC
L029	125.50	12.550	10			IC - Cond. Det.
L030	216.50	21.650	10			IC
L031	107.50	10.750	10	L VL		C.I.
L032	271.50	27.150	10	EH		
L034	125.00	12.500	10	ELL VL		
L049	312.50	31.250	10	EHEHEHEHELEHEHEHEH	BIASED HIGH	Waters-I.C.
L061	148.00	14.800	10			
L063	168.00	16.800	10			Ion Chrom-AS4
L073	99.50	9.950	10			
L081	216.00	21.600	10			
L082	277.00	27.700	10			C.I.
L088	261.50	26.150	10			Dionex
L090	185.50	18.550	10			Dionex IC
L091	273.50	27.350	10	H		
L093	92.50	9.250	10	VL		Dionex IC
L099	353.00	35.300	10	VH EHEHEHEHEHEHEH	BIASED HIGH	IC
L102	223.00	22.300	10			IC
L109	67.50	6.750	10	L	BIASED LOW	
L114	152.00	15.200	10	L EHEHEHEHVLL VL L		C.I. Waters
L116	279.50	27.950	10	ELH VH		C.I.
L119	203.50	20.350	10	H		IC Dionex
L121	185.50	18.550	10			I.C.
L122	248.00	24.800	10	EHEHEHEHELEHEHELL EH		
L126	176.50	17.650	10			
L128	85.50	8.550	10			IC
L131	123.50	12.350	10			Dionex IC

OVERALL AVERAGE RANK IS 18.703

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L006	50.00	5.000	10		BIASED LOW	Dionex
L109	67.50	6.750	10	L	BIASED LOW	
L128	85.50	8.550	10			IC
L093	92.50	9.250	10	VL		Dionex IC
L073	99.50	9.950	10			
L031	107.50	10.750	10	LVL		C.I.
L131	123.50	12.350	10			Dionex IC
L034	125.00	12.500	10	ELLVL		
L013	125.00	12.500	10			
L029	125.50	12.550	10			IC - Cond. Det.
L014	125.50	12.550	10			
L013C	138.50	13.850	10			
L061	148.00	14.800	10			
L025	148.00	14.800	10	H		Auto IC
L114	152.00	15.200	10	LEHEHEHEHVLLVLL		C.I. Waters
L063	168.00	16.800	10			Ion Chrom-AS4
L126	176.50	17.650	10			
L090	185.50	18.550	10			Dionex IC
L121	185.50	18.550	10			I.C.
L011	187.00	18.700	10	HEHL		
L119	203.50	20.350	10	H		IC Dionex
L081	216.00	21.600	10			
L030	216.50	21.650	10			IC
L021	218.00	21.800	10	EH		IC
L008	220.00	22.000	10	LLEHH		IC
L102	223.00	22.300	10			IC
L122	248.00	24.800	10	EHEHEHEHELEHEHELLEH		
L007	251.50	25.150	10			
L010	256.00	25.600	10			Dionex
L088	261.50	26.150	10			Dionex
L032	271.50	27.150	10	EH		
L091	273.50	27.350	10	H		
L082	277.00	27.700	10			C.I.
L003	111.00	27.750	4	HH	INSUFFICIENT DATA	17209
L116	279.50	27.950	10	ELHVH		C.I.
L049	312.50	31.250	10	EHEHEHEHELEHEHEHEH	BIASED HIGH	Waters-I.C.
L099	353.00	35.300	10	VHEHEHEHEHEHEHEH	BIASED HIGH	IC

OVERALL AVERAGE
RANK IS 18.703

CHLORIDE IC

PARAMETER: 17001 CHLORIDE NON IC METHODS MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	.18	1.00	.79	5.00	.2	4.00	.29	4.00	3.22	7.00	.99 EL	2.00
L006	.228	3.00	.768	4.00	.100	2.00	.152	2.00	3.12	4.00	3.66	4.00
L023	.4	5.00	.9	7.50	.2	4.00	.3	5.00	3.3	8.00	4.8 EH	5.00
L024	.20T	2.00	.75	3.00	.09T	1.00	.12T	1.00	3.10	2.00		0.00
L025	.2W	0.00	.7T	1.50	.2W	0.00	.2W	0.00	3.1	2.00	1.7 EL	3.00
L031	.3	4.00	.9	7.50	.2	4.00	.2	3.00	3.2	5.50	.9 EL	1.00
L033	.5W	0.00	.8	6.00	.5W	0.00	.5W	0.00	3.2	5.50		0.00
L047	1.5 EH	6.00	1.5 VH	9.00	1. VH	6.00	1. VH	6.00	3.5	9.00	5.0 EH	7.00
L086	.3W	0.00	.7	1.50	.3W	0.00	.3W	0.00	3.1	2.00	4.9 EH	6.00
MEDIAN CONC.	.2640		.7900		.2000		.2450		3.2000		3.6600	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.6	5.50	.47	6.00	.41	5.00	1.03	7.00
L006	.438	3.00	.350	3.00	.348	3.00	.960	2.50
L023	.6	5.50	.4	4.50	.4	4.00	1.1	8.00
L024	.42	2.00	.27	2.00	.26	2.00	.96	2.50
L025	.2W	1.00	.2W	1.00	.2W	1.00	.9T	1.00
L031	.5	4.00	.4	4.50	.5	6.50	1.0	5.00
L033	.5W	0.00	.5W	0.00	.5W	0.00	1.0	5.00
L047	1.5 EH	8.00	1.5 EH	8.00	1. H	8.00	1.5 H	9.00
L086	.7	7.00	.5	7.00	.5	6.50	1.0	5.00
MEDIAN CONC.	.5500		.4000		.4050		1.0000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	METHOD CODING
L002	46.50	4.650	10		EL		
L006	30.50	3.050	10				Autoanalyser
L023	56.50	5.650	10		EH		Thiocyanate FIA
L024	17.50	1.944	9			BIASED LOW	Thiocyanate
L025	10.50	1.500	7		EL	BIASED LOW	Colourimetry
L031	45.00	4.500	10		EL		Titration conduct.
L033	16.50	5.500	3			INSUFFICIENT DATA	Auto Color
L047	76.00	7.600	10	EHVHVHVH	EHEHEHH H	BIASED HIGH	Titrage
L086	35.00	5.000	7		EH		
OVERALL AVERAGE							

RANK IS 4.395

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING
L025	10.50	1.500	7	EL
L024	17.50	1.944	9	
L006	30.50	3.050	10	
L031	45.00	4.500	10	EL
L002	46.50	4.650	10	EL
L086	35.00	5.000	7	EH
L033	16.50	5.500	3	
L023	56.50	5.650	10	EH
L047	76.00	7.600	10	EHVHVHVHEHEHEHHH

OVERALL AVERAGE
RANK IS 4.395

BIAS STATEMENT	METHOD CODING
BIASED LOW	Colourimetry
BIASED LOW	Thiocyanate
	Autoanalyser
	Titration conduct.
INSUFFICIENT DATA	Auto Color
	Thiocyanate FIA
BIASED HIGH	Titrage

CHLORIDE NON IC METHODS

PARAMETER: 19091 Potassium MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	.20	32.00	.27 H	34.00	.07 H	30.50	.06	30.00	.39	33.00	.44	30.00
L003	.23 H	37.00	.29 VH	37.00	.09 VH	33.00	.08 VH	31.00	.40	35.00	.46	32.00
L006	.174	16.00	.226	19.00	.022	11.00	.020	5.00	.361	18.00	.406	12.50
L007	.10 EL	2.00	.17 VL	1.00	.02W	0.00	.02W	0.00	.29 VL	2.00	.32 EL	1.00
L008	.15	6.00	.20	5.00	0.00T	1.50	0.00T	1.00	.32 L	4.50	.39	4.00
L010	.2	32.00	.2	5.00	<.1	0.00	<.1	0.00	.3 VL	3.00	.4	7.50
L011	.16	7.50	.21	10.50	.02	7.00	.02	5.00	.36	14.00	.40	7.50
L013	.227 H	35.00	.250	31.00	.019	4.00	.018W	0.00	.410	36.00	.500 VH	34.00
L013C	.179	19.50	.23	24.00	.028	15.50	.026	10.50	.368	19.00	.413	17.00
L021	.180	24.00	.229	21.00	.032	24.00	.029	15.50	.376	24.00	1.170 EH	38.00
L023	.18	24.00	.23	24.00	.03	20.50	.03	20.00	.36	14.00	.42	21.50
L024	.12 VL	3.00	.18 L	2.50	.04T	28.00	.04T	25.50	.35	9.50	.42	21.50
L025	.228 H	36.00	.218	16.00	.038	27.00	.027	12.50	.374	23.00	.422	24.00
L029	.177	17.50	.220	17.50	.025	13.00	.026	10.50	.360	14.00	.417	18.00
L030	.171	14.00	.212	15.00	.021	10.00	.022	9.00	.379	26.00	.470 H	33.00
L031	.18	24.00	.21	10.50	.02	7.00	.03	20.00	.35	9.50	.41	15.00
L032	.20	32.00	.31 EH	38.00	.06	29.00	.04	25.50	.37	21.50	.43	25.50
L033	.18	24.00	.21	10.50	.03	20.50	.03	20.00	.42 H	37.00		0.00
L047	.26 EH	38.00	.25	31.00	.12 EH	34.00	.11 EH	32.00	.46 EH	38.00	.51 VH	35.00
L049	.18	24.00	.24	29.00	.03	20.50	.03	20.00	.37	21.50	.42	21.50
L057	.46 EH	39.00	.25	31.00	.25 EH	35.00	.29 EH	33.00	.25 EL	1.00	.56 EH	36.00
L061	.184	28.50	.234	28.00	.027	14.00	.027	12.50	.377	25.00	.419	19.00
L063	.200	32.00	.272 H	35.00	.028	15.50	.029	15.50	.398	34.00	.432	27.00
L081	.17	11.00	.21	10.50	.02	7.00	.02	5.00	.34	7.50	.40	7.50
L082	.14 L	5.00	.20	5.00	.07 H	30.50		0.00	.33	6.00	.40	7.50
L088	.17	11.00	.21	10.50	.02	7.00	.02	5.00	.36	14.00	.40	7.50
L090	.180	24.00	.230	24.00	.033	25.00	.054	29.00	.382	30.00	.442	31.00
L091	.18	24.00	.23	24.00	.03	20.50	.03	20.00	.38	28.00	.43	25.50
L093	.13 L	4.00	.18 L	2.50	0.00	1.50	.05	27.50	.32 L	4.50	.37 L	2.00
L099	.16	7.50	.22	17.50	.05W	0.00	.05W	0.00	.36	14.00	.40	7.50
L102	.173	15.00	.289 VH	36.00	.016	3.00	.01T	2.00	.380	28.00	.437	29.00
L114	.03W EL	1.00	.33W	0.00	.10W	0.00	.04W	0.00	.52T EH	39.00	.61T EH	37.00
L116	.17	11.00	.21	10.50	.03	20.50	.03	20.00	.36	14.00	.38	3.00
L119	.179	19.50	.232	27.00	.023	12.00	.021	8.00	.385	32.00	.433	28.00
L121	.17	11.00	.21	10.50	.02T	7.00	.02T	5.00	.34	7.50	.41	15.00
L122	.20	32.00	.26	33.00	.08 VH	32.00	.05	27.50	.38	28.00	.41	15.00
L126	.177	17.50	.230	24.00	.029	17.00	.028	14.00	.384	31.00	.403	11.00
L128	.17	11.00	.21	10.50	.03	20.50	.03	20.00	.36	14.00	.42	21.50
L131	.184	28.50	.228	20.00	.035	26.00	.034	24.00	.369	20.00	.406	12.50
MEDIAN CONC.	.1790		.2270		.0300		.0300		.3690		.4195	

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	.33	33.00	.27	36.00	.26	33.00	.72	15.50
L003	.32	27.00	.26	32.00	.24	17.00	.79	33.00
L006	.302	16.00	.232	15.00	.232	14.00	.712	12.00
L007	.25 VL	1.00	.18 VL	1.00	.18 VL	1.00	.73	19.00
L008	.28	2.50	.21	5.00	.20 L	3.50	.62 EL	1.50
L010	.3	12.50	.2 L	3.00	.2 L	3.50	.7	5.00
L011	.31	18.00	.23	11.00	.23	11.50	.70	5.00
L013	.355 H	36.00	.278	37.00	.279	37.00	.869 EH	38.00
L013C	.314	20.50	.240	19.50	.226	9.00	.737	21.00
L021	.310	18.00	.239	16.00	.243	19.50	.736	20.00
L023	.32	27.00	.24	19.50	.24	17.00	.74	23.50
L024	.29	6.50	.21	5.00	.20 L	3.50	.72	15.50
L025	.321	30.50	.251	30.00	.264	35.00	.74	23.50
L029	.300	12.50	.230	11.00	.235	15.00	.727	18.00
L030	.316	22.00	.240	19.50	.240	17.00	.781	32.00
L031	.29	6.50	.23	11.00	.23	11.50	.71	9.00
L032	.32	27.00	.25	28.50	.25	27.00	.72	15.50
L033	.29	6.50	.23	11.00	.25	27.00	.70	5.00
L047	.57 EH	37.00	.26	32.00	.25	27.00	.82 H	36.00
L049	.32	27.00	.25	28.50	.25	27.00	.74	23.50
L057	.59 EH	38.00	.50 EH	38.00	.32 EH	38.00	.98 EH	39.00
L061	.319	24.00	.246	26.00	.248	22.00	.758	29.00
L063	.333	35.00	.262	34.50	.270	36.00	.749	27.00
L081	.29	6.50	.21	5.00	.22	7.00	.71	9.00
L082	.30	12.50	.24	19.50	.26	33.00	.71	9.00
L088	.30	12.50	.23	11.00	.22	7.00	.72	15.50
L090	.314	20.50	.262	34.50	.257	31.00	.762	30.00
L091	.32	27.00	.24	19.50	.25	27.00	.75	28.00
L093	.28	2.50	.19 L	2.00	.20 L	3.50	.62 EL	1.50
L099	.30	12.50	.23	11.00	.22	7.00	.71	9.00
L102	.330	33.00	.249	27.00	.250	27.00	.802 H	34.00
L114	.36W	0.00	.40W	0.00	.24W	0.00	.77T	31.00
L116	.29	6.50	.22	7.00	.25	27.00	.71	9.00
L119	.321	30.50	.244	25.00	.249	23.00	.807 H	35.00
L121	.29	6.50	.24	19.50	.23	11.50	.69	3.00
L122	.33	33.00	.26	32.00	.26	33.00	.84 VH	37.00
L126	.318	23.00	.242	23.00	.244	21.00	.745	26.00
L128	.30	12.50	.23	11.00	.23	11.50	.74	23.50
L131	.310	18.00	.243	24.00	.243	19.50	.718	13.00
MEDIAN CONC.	.3120		.2400		.2430		.7360	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	307.00	30.700	10	H H	BIASED HIGH	
L003	314.00	31.400	10	H VHVHVH	BIASED HIGH	19103
L006	138.50	13.850	10			Flame AA
L007	28.00	3.500	8	ELVL VLELVLVLVL	BIASED LOW	
L008	34.50	3.450	10	L L EL	BIASED LOW	ICP-MS
L010	71.50	8.938	8	VL L L		ICP
L011	97.00	9.700	10			
L013	288.00	32.000	9	H VHH EH	BIASED HIGH	
L013C	175.50	17.550	10			
L021	220.00	22.000	10	EH		IC
L023	211.00	21.100	10			Flame AA
L024	120.50	12.050	10	VLL L		AAS
L025	257.50	25.750	10	H		Flame AA
L029	147.00	14.700	10			AAS - Flame
L030	197.50	19.750	10	H		AAS
L031	124.00	12.400	10			ICAP
L032	269.50	26.950	10	EH		
L033	161.50	17.944	9	H		Auto Flame
L047	340.00	34.000	10	EH EHEHEHVHEH H	BIASED HIGH	ICP
L049	242.50	24.250	10			Atomic Absorption
L057	328.00	32.800	10	EH EHEHELEHEHEHEHEH	BIASED HIGH	
L061	228.00	22.800	10			
L063	291.50	29.150	10	H		Atomic Absorption
L081	76.00	7.600	10		BIASED LOW	
L082	128.00	14.222	9	L H		Plasma
L088	101.00	10.100	10			Flame AA
L090	279.00	27.900	10			Flame AAS
L091	243.50	24.350	10			Flame AA
L093	51.50	5.150	10	L L L L L L EL	BIASED LOW	AA 2380 Flame
L099	86.00	10.750	8			ICP
L102	234.00	23.400	10	VH H		IC
L114	108.00	27.000	4	EL EHEH	INSUFFICIENT DATA	I.C.P.
L116	128.50	12.850	10			ICP
L119	240.00	24.000	10	H		IC Dionex
L121	96.50	9.650	10			I.C.
L122	302.50	30.250	10	VH VH	BIASED HIGH	
L126	207.50	20.750	10			
L128	156.00	15.600	10			AE
L131	205.50	20.550	10			Flame AA

OVERALL AVERAGE RANK IS 19.296

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L008	34.50	3.450	10	LLEL	BIASED LOW	ICP-MS
L007	28.00	3.500	8	ELVLVLELVLVLVL	BIASED LOW	
L093	51.50	5.150	10	LLLLLLEL	BIASED LOW	AA 2380 Flame
L081	76.00	7.600	10		BIASED LOW	
L010	71.50	8.938	8	VLLL		ICP
L121	96.50	9.650	10			I.C.
L011	97.00	9.700	10			
L088	101.00	10.100	10			Flame AA
L099	86.00	10.750	8			ICP
L024	120.50	12.050	10	VLLL		AAS
L031	124.00	12.400	10			ICAP
L116	128.50	12.850	10			ICP
L006	138.50	13.850	10			Flame AA
L082	128.00	14.222	9	LH		Plasma
L029	147.00	14.700	10			AAS - Flame
L128	156.00	15.600	10			AE
L013C	175.50	17.550	10			
L033	161.50	17.944	9	H		Auto Flame
L030	197.50	19.750	10	H		AAS
L131	205.50	20.550	10			Flame AA
L126	207.50	20.750	10			
L023	211.00	21.100	10			Flame AA
L021	220.00	22.000	10	EH		IC
L061	228.00	22.800	10			
L102	234.00	23.400	10	VHH		IC
L119	240.00	24.000	10	H		IC Dionex
L049	242.50	24.250	10			Atomic Absorption
L091	243.50	24.350	10			Flame AA
L025	257.50	25.750	10	H		Flame AA
L032	269.50	26.950	10	EH		
L114	108.00	27.000	4	ELEHEH	INSUFFICIENT DATA	I.C.P.
L090	279.00	27.900	10			Flame AAS
L063	291.50	29.150	10	H		Atomic Absorption
L122	302.50	30.250	10	VHVH	BIASED HIGH	
L002	307.00	30.700	10	HH	BIASED HIGH	
L003	314.00	31.400	10	HVHVHVH	BIASED HIGH	19103
L013	288.00	32.000	9	HVHHEH	BIASED HIGH	
L057	328.00	32.800	10	EHEHEHELEHEHEHEHEH	BIASED HIGH	
L047	340.00	34.000	10	EHEHEHEHVHEHH	BIASED HIGH	ICP

OVERALL AVERAGE
RANK IS 19.296

Potassium

PARAMETER: 20091 Calcium MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP STUDY NO. 36 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	2.87	23.50	3.99	21.00	.16	13.50	.16	27.00	2.66	20.50	2.79	17.00
L003	2.85	18.50	4.0	22.50	.15	5.50	.15	15.50	2.65	17.50	2.85	27.00
L006	2.94	30.00	4.17	32.00	.20	32.50	.20	36.50	2.80	34.50	2.98 H	34.00
L007	2.83	16.00	3.89	11.00	.18	28.00	.16	27.00	2.65	17.50	2.81	22.00
L008	2.76	10.00	3.90	13.00	.14	4.00	.13	6.00	2.58	11.00	3.05 H	36.50
L010	2.7	4.50	3.7 L	4.00	.1	2.00	.1	2.00	2.5	4.50	2.7	8.00
L013C	2.773	13.00	2.877 EL	2.00	.162	18.00	.155	20.00	2.713	29.00	2.758	12.00
L021	3.466 EH	38.00	4.499 EH	37.00	.176	26.00	.186	34.00	3.154 EH	38.00	2.897	30.00
L023	2.87	23.50	3.98	17.50	.17	22.50	.16	27.00	2.70	27.50	2.83	25.00
L024	2.9	26.50	4.0	22.50	.16T	13.50	.15T	15.50	2.7	27.50	2.9	31.00
L025	2.91	28.50	4.02	24.50	.154	8.00	.14	8.50	2.66	20.50	2.96	33.00
L029	2.90	26.50	4.10	31.00	.16	13.50	.15	15.50	2.69	25.00	2.80	19.00
L030	2.96	31.00	4.09	29.50	.171	25.00	.154	19.00	2.75	32.50	3.05 H	36.50
L031	2.6 L	2.00	3.8	6.00	.20	32.50	.15	15.50	2.5	4.50	2.7	8.00
L032	2.81	15.00	4.05	27.00	.20	32.50	.19	35.00	2.75	32.50	2.88	29.00
L033	3.16 VH	36.00	4.02	24.50	.18	28.00	.18	33.00	2.69	25.00	2.77	13.50
L034	2.7	4.50	3.9	13.00	.2	32.50	.2	36.50	2.6	12.00	2.8	19.00
L047	3.0	32.00	4.3 H	36.00	.18	28.00	.16	27.00	2.94 VH	37.00	3.03 H	35.00
L049	1.929 EL	1.00	2.926 EL	3.00	.158	10.00	.103	3.00	2.166 EL	2.00	2.377 EL	2.00
L057	2.80	14.00	3.81	8.00	.16	13.50	.14	8.50	2.47 L	3.00	2.70	8.00
L061	2.856	20.00	3.988	20.00	.167	20.00	.158	22.00	2.667	22.00	2.786	16.00
L063	2.703	6.00	1.999 EL	1.00	.152	7.00	.139	7.00	2.579	10.00	2.724	11.00
L073	2.84	17.00	3.96	15.50	.17	22.50	.16	27.00	2.64	14.50	2.80	19.00
L082	2.67 L	3.00	3.81	8.00	.21	35.50	.15	15.50	2.55	7.00	2.71	10.00
L088	3.06 H	33.50	4.20	34.00	.21	35.50	.21	38.00	2.80	34.50	2.94	32.00
L090	3.06 H	33.50	4.19	33.00	.185	30.00	.178	32.00	2.74	31.00	2.83	25.00
L091	2.77	11.50	3.85	10.00	.17	22.50	.16	27.00	2.56	8.50	2.86	28.00
L093	2.86	21.00	3.96	15.50	.16	13.50	.16	27.00	2.72	30.00	2.78	15.00
L099	2.77	11.50	3.81	8.00	.161	17.00	.148	11.50	2.56	8.50	2.68	6.00
L102	2.85	18.50	3.98	17.50	.157	9.00	.148	11.50	2.63	13.00	2.77	13.50
L109	2.75	8.50	4.09	29.50	.130	3.00	.125	5.00	2.65	17.50	2.81	22.00
L114	2.75	8.50	3.90	13.00	.03W VL	1.00	.06W L	1.00	2.64	14.50	3.09 VH	38.00
L116	2.72	7.00	3.78	5.00	.15	5.50	.16	27.00	2.51	6.00	2.64	4.00
L119	3.375 EH	37.00	4.554 EH	38.00	.212	37.00	.157	21.00	2.878 H	36.00	2.581 L	3.00
L121	2.89	25.00	4.04	26.00	.16	13.50	.12T	4.00	2.69	25.00	2.67	5.00
L122	3.09 H	35.00	4.26 H	35.00	.22	38.00	.15	15.50	1.55 EL	1.00	1.75 EL	1.00
L128	2.91	28.50	4.08	28.00	.17	22.50	.16	27.00	2.68	23.00	2.83	25.00
L131	2.863	22.00	3.983	19.00	.163	19.00	.147	10.00	2.650	17.50	2.810	22.00
MEDIAN CONC.	2.8530		3.9855		.1650		.1545		2.6550		2.8000	

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	6.51	17.50	6.96	20.00	7.04	18.50	5.84	18.50
L003	6.50	15.00	7.0	25.50	7.0	14.50	5.8	15.50
L006	6.95 H	33.00	7.40 H	32.50	7.43 H	31.00	6.13 H	31.00
L007	6.45	7.00	6.82	10.00	6.86	6.00	5.71	8.00
L008	6.63	25.00	7.00	25.50	7.10	21.50	6.09	30.00
L010	6.5	15.00	6.8	8.00	6.9	7.50	5.7	6.50
L013C		0.00		0.00		0.00	5.848	21.00
L021	7.320 EH	35.00	7.676 EH	35.00	7.782 EH	35.00	6.487 EH	37.00
L023	6.51	17.50	7.18	29.50	7.27	26.00	6.05	27.00
L024	6.6	22.00	7.0	25.50	7.1	21.50	5.9	25.00
L025	6.52	19.50	6.91	17.00	7.01	16.50	5.87	23.00
L029	6.67	26.00	6.97	21.00	7.12	23.50	6.02	26.00
L030	6.83 H	29.00	7.25	31.00	7.35	29.00	6.07	28.00
L031	6.3	4.00	6.8	8.00	6.9	7.50	5.7	6.50
L032	6.61	24.00	6.98	22.50	7.58 VH	33.00	6.24 H	34.00
L033		0.00		0.00		0.00		0.00
L034	6.5	15.00	6.9	16.00	7.0	14.50	5.8	15.50
L047	6.90 H	31.00	7.59 VH	34.00	7.63 VH	34.00	6.26 H	35.00
L049	5.422 EL	1.00	5.609 EL	1.00	5.667 EL	1.00	4.727 EL	1.00
L057	6.48	10.50	6.64	3.00	6.62 L	2.00	5.49 L	3.00
L061	6.498	13.00	6.849	13.00	6.944	10.00	5.798	14.00
L063	6.875 H	30.00	6.980	22.50	7.395 H	30.00	5.195 EL	2.00
L073	6.52	19.50	6.85	14.00	6.99	13.00	5.79	13.00
L082	6.41	6.00	6.84	12.00	6.95	11.00	5.83	17.00
L088	6.97 H	34.00	7.40 H	32.50	7.54 VH	32.00	6.17 H	32.00
L090	6.94 H	32.00	7.18	29.50	7.29	28.00	6.21 H	33.00
L091	6.36	5.00	6.71	5.00	6.82	5.00	5.68	5.00
L093	6.47	8.00	6.79	6.00	6.98	12.00	5.77	11.50
L099	6.29	3.00	6.68	4.00	6.76	4.00	5.66	4.00
L102	6.48	10.50	6.80	8.00	6.91	9.00	5.76	10.00
L109	6.58	21.00	6.83	11.00	7.01	16.50	5.74	9.00
L114	6.48	10.50	6.89	15.00	7.12	23.50	5.85	22.00
L116	6.20 L	2.00	6.40 VL	2.00	6.64 L	3.00	5.77	11.50
L119	7.356 EH	36.00	7.725 EH	36.00	7.831 EH	36.00	6.465 EH	36.00
L121	6.76	28.00	7.17	28.00	7.28	27.00	5.89	24.00
L122	6.75	27.00	7.00	25.50	7.04	18.50	5.84	18.50
L128	6.48	10.50	6.94	18.00	7.15	25.00	6.08	29.00
L131	6.603	23.00	6.942	19.00	7.043	20.00	5.841	20.00
MEDIAN CONC.	6.5150		6.9410		7.0400		5.8400	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L002	197.00	19.700	10			
L003	177.00	17.700	10			20110
L006	327.00	32.700	10	H H H H H	BIASED HIGH	Flame AA
L007	152.50	15.250	10			
L008	182.50	18.250	10	H		ICP-MS
L010	62.00	6.200	10	L	BIASED LOW	ICP
L013C	115.00	16.429	7	EL		
L021	345.00	34.500	10	EHEH EH EHEHEHEH	BIASED HIGH	IC
L023	243.00	24.300	10			Flame AA/ICP
L024	230.50	23.050	10			ICP
L025	199.00	19.900	10			Flame AA
L029	227.00	22.700	10			AAS - Flame
L030	290.50	29.050	10	H H		AAS
L031	94.50	9.450	10	L		ICAP
L032	284.50	28.450	10	VHH		
L033	160.00	26.667	6	VH		Auto Flame
L034	178.50	17.850	10			ICP
L047	329.00	32.900	10	H VHH H VHVHH	BIASED HIGH	ICP
L049	25.00	2.500	10	ELEL ELELELELELEL	BIASED LOW	I.C.P.
L057	73.50	7.350	10	L L L	BIASED LOW	
L061	170.00	17.000	10			
L063	126.50	12.650	10	EL H H EL		Atomic Absorption
L073	175.00	17.500	10			
L082	125.00	12.500	10	L		Plasma
L088	338.00	33.800	10	H H H VHH	BIASED HIGH	Flame AA
L090	307.00	30.700	10	H H H	BIASED HIGH	Flame AAS
L091	127.50	12.750	10			Flame AA
L093	159.50	15.950	10			AA 2380 Flame
L099	77.50	7.750	10		BIASED LOW	ICP
L102	120.50	12.050	10			ICP
L109	143.00	14.300	10			
L114	147.00	14.700	10	VLL VH		I.C.P.
L116	73.00	7.300	10	L VLL	BIASED LOW	ICP
L119	316.00	31.600	10	EHEH H L EHEHEHEH	BIASED HIGH	IC Dionex
L121	205.50	20.550	10			I.C.
L122	215.00	21.500	10	H H ELEL		
L128	236.50	23.650	10			ICP
L131	191.50	19.150	10			Flame AA

OVERALL AVERAGE RANK IS 19.161

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
L049	25.00	2.500	10	ELELELELELELELEL	BIASED LOW	I.C.P.
L010	62.00	6.200	10	L	BIASED LOW	ICP
L116	73.00	7.300	10	LVLL	BIASED LOW	ICP
L057	73.50	7.350	10	LLL	BIASED LOW	
L099	77.50	7.750	10		BIASED LOW	ICP
L031	94.50	9.450	10	L		ICAP
L102	120.50	12.050	10			ICP
L082	125.00	12.500	10	L		Plasma
L063	126.50	12.650	10	ELHHEL		Atomic Absorption
L091	127.50	12.750	10			Flame AA
L109	143.00	14.300	10			
L114	147.00	14.700	10	VLLVH		I.C.P.
L007	152.50	15.250	10			
L093	159.50	15.950	10			AA 2380 Flame
L013C	115.00	16.429	7	EL		
L061	170.00	17.000	10			
L073	175.00	17.500	10			
L003	177.00	17.700	10			20110
L034	178.50	17.850	10			ICP
L008	182.50	18.250	10	H		ICP-MS
L131	191.50	19.150	10			Flame AA
L002	197.00	19.700	10			
L025	199.00	19.900	10			Flame AA
L121	205.50	20.550	10			I.C.
L122	215.00	21.500	10	HHELEL		
L029	227.00	22.700	10			AAS - Flame
L024	230.50	23.050	10			ICP
L128	236.50	23.650	10			ICP
L023	243.00	24.300	10			Flame AA/ICP
L033	160.00	26.667	6	VH		Auto Flame
L032	284.50	28.450	10	VHH		
L030	290.50	29.050	10	HH		AAS
L090	307.00	30.700	10	HHH	BIASED HIGH	Flame AAS
L119	316.00	31.600	10	EHEHHLEHEHEHEH	BIASED HIGH	IC Dionex
L006	327.00	32.700	10	HHHHH	BIASED HIGH	Flame AA
L047	329.00	32.900	10	HVHHHVHVHH	BIASED HIGH	ICP
L088	338.00	33.800	10	HHHVHH	BIASED HIGH	Flame AA
L021	345.00	34.500	10	EHEHEHEHEHEHEH	BIASED HIGH	IC

OVERALL AVERAGE
RANK IS 19.161

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