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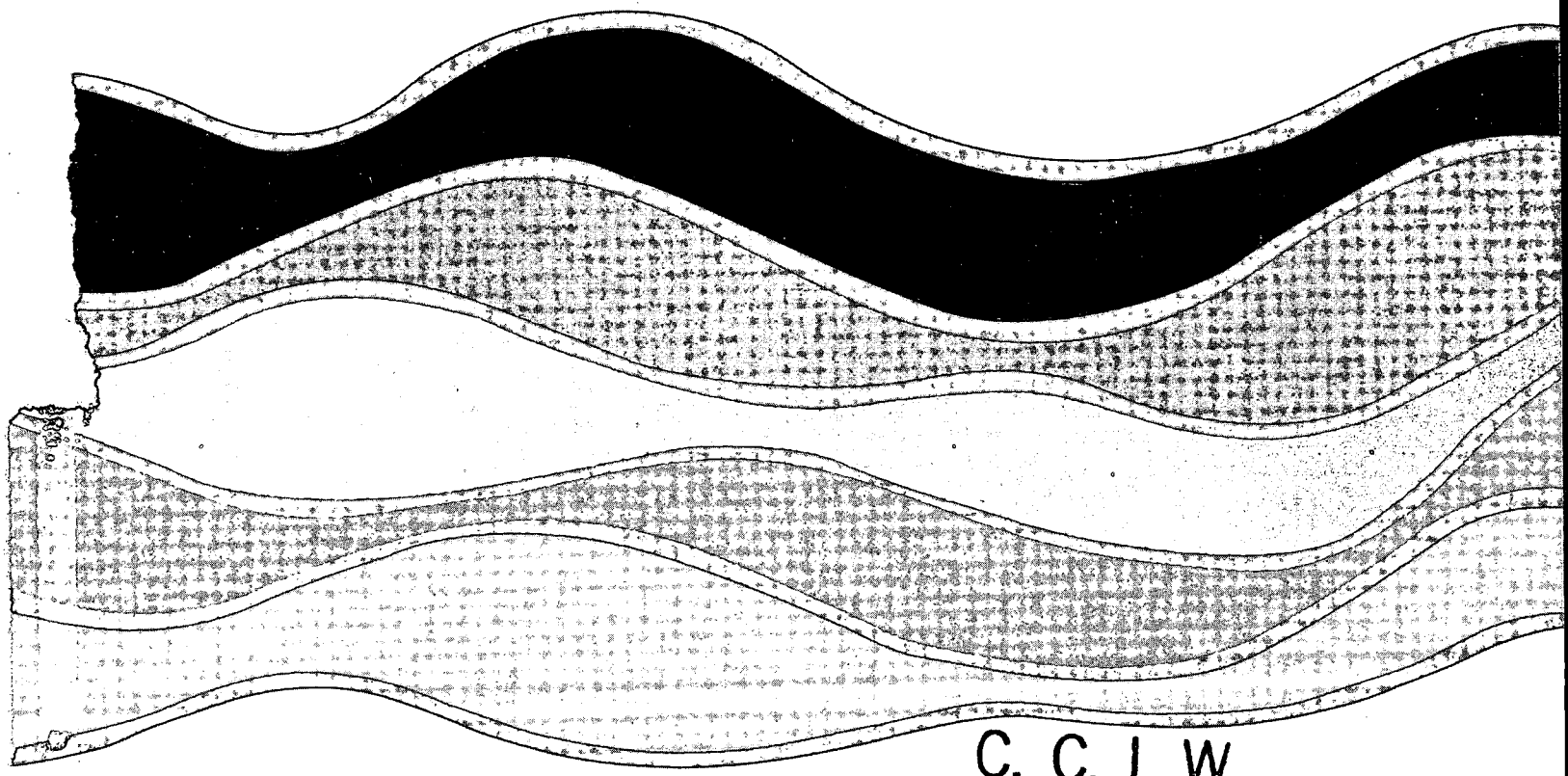

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Ecosystem Interlaboratory QA Program, Study FP66 for Major Ions & Nutrients and Total Phosphorus in Surface Waters. (Jan & Feb 1995)

H. Alkema

Aquatic Ecosystem Protection Branch
National Water Research Institute
867 Lakeshore Rd, Burlington, ON
Canada L7R 4A6

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Conservation et Protection / Conservation and Protection

LE PLAN VERT DU CANADA
CANADA'S GREEN PLAN

National Water Research Institute
867 Lakeshore Road
Burlington, Ontario
L7R 4A6

31 March 1995

To: Participants & Managers in the:
Ecosystem Interlaboratory Quality Assurance Program

Re: Final Report for FP/GLAP Study FP66 - Major Ions & Nutrients and Total P Portion

Dear Participant,

The Institute is pleased to distribute this final report to the FP/GLAP participant laboratories. This report includes results and evaluations for two unique series of samples - one for Major Ions & Nutrients and another for Total Phosphorus. The evaluation of results includes an evaluation for systematic bias as well as for precision (flagged results). A complete listing of all laboratory results is included so that each laboratory can compare its results and evaluations with other laboratories. For details concerning these evaluations please refer to the attached Appendix A: Glossary of Terms, or to the Research & Applications Branch QA Manual.

We would like to thank all participants for their cooperation and prompt responses. In return it is the aim of the quality assurance group to give prompt evaluations and reports and effective remedial assistance.

The laboratories listed in this report submitted their data with a confidential laboratory code. This confidentiality is fully respected by our staff. Access to these codes is possible through the relevant laboratories or program authorities.

Laboratory heads are encouraged to discuss the attached report openly with those who manage their programs and those who use their laboratory data. In addition, if any laboratory is experiencing difficulties or is reviewing a methodology, I can make a referral to a laboratory which has demonstrated good performance. Also, to assist in *improving* or *confirming accuracy* of analysis, our Institute is able to provide a wide variety of reference waters for a cost recovery fee.

Should you have any questions or comments regarding this study, please contact me - phone 905-336-4929 or fax 336-4989.

Yours truly,

Harry A.

H. Alkema
QA Chemist, Ecosystem QA Pgm.

Attachment: Individual Laboratory Appraisal

AQUATIC ECOSYSTEM PROTECTION BRANCH

FINAL REPORT

REPORT NO. AEPB-TN-94-09

ECOSYSTEM INTERLABORATORY QUALITY ASSURANCE PROGRAM

FP/GLAP STUDY 66

for January & February 1995

An Interlaboratory Quality Assurance Study

for Major Ions & Nutrients and Total Phosphorus in Surface Waters *

by

H. Alkema

Environmental Standards & Statistics
Aquatic Ecosystem Protectio Branch
National Water Research Institute
Burlington, Ontario

March 1995

* the companion study for Trace Metals is Report AEPB-TN-94-10

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Table 1

ENVIRONMENT CANADA
National Water Research Institute

Ecosystem Interlaboratory Quality Assurance Program
PARTICIPATION LIST - Study FP/GLAP 66 (Jan & Feb '95)

AGRA E&E
AECL Research (Chalk R. ON)
Alberta Environmental Centre
ASL Analytical Service Lab Ltd.
Can Test Ltd.
Chemex Labs Alberta Inc.
Chemical & Geological Laboratories Inc.
City of Calgary
Edmonton Public Works
Enviro Science & Engineering Inc. FL
Environment Canada - Atlantic Region
Environment Canada - Centre St. Laurent
Environment Canada - NLET
Environment Canada - Pacific Environmental Science Centre
Environment Canada - WQB, Western & Northern Region
Environment Canada - WQB, Prairie & Northern Region
Environment Canada - River Road, Ottawa
Environment Manitoba
Environment New Brunswick
ERRI, Penn State U.
Forestry Canada - Sault Ste Marie
Freshwater Institute, Winnipeg MN
Geological Surveys Canada
Geological Surveys Canada, Glaciology
Health Canada, Ottawa ON
Indian & Northern Affairs Canada
Ministère de l'Environnement du Québec - Laval
Ministère de l'Environnement du Québec - Ste. Foy
Metallurgie Noranda, PQ
Norwest Labs (Winnipeg)
NWQL USGS, Arvada, CO
Ontario Ministry of Agriculture & Foods, Guelph, ON
Ontario Ministry of Environment - Dorset
Ontario Ministry of Environment - Etobicoke
Ontario Ministry of Environment - Kingston
Ontario Ministry of Environment - London
Ontario Ministry of Environment - Thunder Bay
PEI Agriculture
Rockcliff Research Management Inc. (WTC)
Saskatchewan Health, SK
Saskatchewan Research Council, SK
Sawyer Environmental Laboratory - University of Maine
Shell Calgary Research Centre, AB
Standards & Calibration, NWRI
Suncor Inc. OSG, AB
University of Wisconsin, Madison
Zenon Environmental Inc., BC

Table 2a COMPARISON OF LABORATORY PERFORMANCE (STUDY FP66)

Major Ions & Nutrients

	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
F004	7	0	0.00	57	1	1.75	1.75
F001	17	0	0.00	166	3	1.81	1.81
F003	19	1	5.26	185	7	3.78	9.05
F079	2	0	0.00	20	2	10.00	10.00
F008	19	1	5.26	155	15	9.68	14.94
F026	15	2	13.33	150	3	2.00	15.33
F036	14	1	7.14	138	13	9.42	16.56
F009	8	1	12.50	80	4	5.00	17.50
F007	11	1	9.09	101	12	11.88	20.97
F080	14	1	7.14	128	18	14.06	21.21
F013	12	2	16.67	108	6	5.56	22.22
F002	13	2	15.38	114	10	8.77	24.16
F015	17	3	17.65	169	12	7.10	24.75
F038	20	3	15.00	178	20	11.24	26.24
F057	5	0	0.00	41	11	26.83	26.83
F033	16	4	25.00	138	4	2.90	27.90
F032	18	4	22.22	177	11	6.21	28.44
F091	20	3	15.00	182	25	13.74	28.74
F042	16	4	25.00	158	8	5.06	30.06
F031	14	2	14.29	129	21	16.28	30.56
F020	17	4	23.53	147	15	10.20	33.73
F035	13	2	15.38	127	24	18.90	34.28
F046	20	4	20.00	181	32	17.68	37.68
F074	14	3	21.43	140	28	20.00	41.43
F025	19	6	31.58	177	22	12.43	44.01
F068	8	3	37.50	66	6	9.09	46.59
F069	17	6	35.29	159	18	11.32	46.61
F016	18	4	22.22	179	44	24.58	46.80
F014	16	5	31.25	159	27	16.98	48.23
F011	15	4	26.67	142	32	22.54	49.20
F010	18	6	33.33	169	29	17.16	50.49
F006	15	4	26.67	136	33	24.26	50.93
F030	20	4	20.00	172	57	33.14	53.14
F061	15	4	26.67	140	39	27.86	54.52
F048	14	4	28.57	137	38	27.74	56.31
F059	12	5	41.67	113	20	17.70	59.37
F090	2	1	50.00	18	2	11.11	61.11
F089	13	7	53.85	119	21	17.65	71.49
F034	14	7	50.00	128	43	33.59	83.59
F071	14	7	50.00	140	52	37.14	87.14
F043	7	4	57.14	63	19	30.16	87.30
F019	15	8	53.33	134	60	44.78	98.11

THE FOLLOWING PARAMETERS WERE USED IN THE ANALYSIS:

Cond	pH	B	DOC	ALK	DIC
NO3 /2	NH3	TKN	F	HARD	Na
Mg	Si	Cl	K	Ca	Colour
Tot N	SO4				

THE FOLLOWING PARAMETERS WERE EXCLUDED:

Turb

Table 2b COMPARISON OF LABORATORY PERFORMANCE (STUDY FP66)

Total Phosphorus

	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
F001	1	0	0.00	10	0	0.00	0.00
F003	1	0	0.00	10	0	0.00	0.00
F004	1	0	0.00	10	0	0.00	0.00
F007	1	0	0.00	10	0	0.00	0.00
F010	1	0	0.00	8	0	0.00	0.00
F013	1	0	0.00	10	0	0.00	0.00
F015	1	0	0.00	10	0	0.00	0.00
F025	1	0	0.00	9	0	0.00	0.00
F026	1	0	0.00	10	0	0.00	0.00
F033	1	0	0.00	8	0	0.00	0.00
F042	1	0	0.00	10	0	0.00	0.00
F059	1	0	0.00	0	4	0.00	0.00
F032	1	0	0.00	10	1	10.00	10.00
F089	1	0	0.00	10	1	10.00	10.00
F008	1	0	0.00	10	2	20.00	20.00
F034	1	0	0.00	10	2	20.00	20.00
F080	1	0	0.00	10	2	20.00	20.00
F030	1	0	0.00	7	2	28.57	28.57
F002	1	0	0.00	10	3	30.00	30.00
F014	1	0	0.00	10	3	30.00	30.00
F046	1	0	0.00	10	3	30.00	30.00
F048	1	0	0.00	10	3	30.00	30.00
F074	1	0	0.00	10	3	30.00	30.00
F016	1	0	0.00	7	3	42.86	42.86
F038	1	1	100.00	10	0	0.00	100.00
F091	1	1	100.00	10	3	30.00	130.00
F011	1	1	100.00	10	6	60.00	160.00
F020	1	1	100.00	8	6	75.00	175.00
F019	1	1	100.00	10	8	80.00	180.00
F006	1	1	100.00	7	6	85.71	185.71

Table 3a SUMMARY OF STUDY TO STUDY PERFORMANCE - Study FP66

Major Ions & Nutrients

LAB CODE	%BIAS AND %FLAGS ON STUDIES 0062	0063	0064	0065	0066	MEDIAN SCORE	COMMENTS
F001	25.0	21.8	15.3	16.7	1.8	16.7	SATISFACTORY
F002	33.4	30.8	30.8	33.8	24.2	30.8	MODERATE
F003	10.1	13.2	11.1	15.0	9.0	11.1	SATISFACTORY
F004	30.2	46.3	0.0	10.9	1.8	10.9	SATISFACTORY
F006	33.9	39.1	70.9	26.6	50.9	39.1	MODERATE
F007	22.3	38.3	10.9	-	21.0	21.6	SATISFACTORY
F008	29.1	31.4	21.7	35.0	14.9	29.1	MODERATE
F009	14.6	31.9	60.2	56.7	17.5	31.9	MODERATE
F010	40.2	35.2	40.0	35.0	50.5	40.0	MODERATE
F011	35.0	117.6	71.5	24.4	49.2	49.2	MODERATE
F013	39.1	57.0	25.1	29.5	22.2	29.5	MODERATE
F014	47.4	41.6	47.3	63.7	48.2	47.4	MODERATE
F015	43.5	29.3	21.1	18.9	24.7	24.7	SATISFACTORY
F016	76.0	46.6	62.9	62.1	46.8	62.1	POOR
F019	-	-	-	-	98.1	-	-
F020	21.1	28.3	6.8	39.4	33.7	28.3	MODERATE
F023	-	55.6	-	-	-	-	-
F025	39.5	40.1	16.1	25.4	44.0	39.5	MODERATE
F026	22.1	38.0	6.3	10.0	15.3	15.3	SATISFACTORY
F030	81.3	54.8	87.8	-	53.1	68.0	POOR
F031	-	14.0	7.0	46.5	30.6	22.3	SATISFACTORY
F032	16.7	9.6	7.8	12.6	28.4	12.6	SATISFACTORY
F033	26.8	48.0	40.8	39.6	27.9	39.6	MODERATE
F034	63.4	41.7	63.1	55.3	83.6	63.1	POOR
F035	57.4	16.6	26.8	30.7	34.3	30.7	MODERATE
F036	-	20.0	12.3	-	16.6	16.6	SATISFACTORY
F037	133.0	47.3	76.0	34.7	-	61.6	POOR
F038	48.9	35.0	22.4	15.9	26.2	26.2	MODERATE
F039	52.8	-	-	-	-	-	-
F040	-	-	22.0	-	-	-	-
F042	22.8	17.1	15.4	26.3	30.1	22.8	SATISFACTORY
F043	97.0	16.7	-	-	87.3	87.3	POOR
F046	75.1	35.3	28.2	24.7	37.7	35.3	MODERATE
F048	-	19.2	16.1	52.1	56.3	35.7	MODERATE
F049	-	-	-	64.4	-	-	-
F052	-	-	-	140.2	-	-	-
F055	39.1	-	-	-	-	-	-
F056	52.0	-	-	-	-	-	-
F057	79.7	-	57.9	67.8	26.8	62.8	POOR
F059	-	84.9	63.3	61.3	59.4	62.3	POOR
F060	-	108.8	72.0	-	-	90.4	POOR
F061	-	99.0	-	54.3	54.5	54.5	MODERATE
F062	-	62.6	-	51.6	-	57.1	MODERATE
F063	-	-	22.7	-	-	-	-
F064	-	-	130.0	-	-	-	-
F066	-	-	71.6	16.6	-	44.1	MODERATE
F067	-	-	21.3	-	-	-	-
F068	-	-	2.4	37.2	46.6	37.2	MODERATE
F069	-	-	24.7	13.1	46.6	24.7	SATISFACTORY
F071	-	-	41.5	-	87.1	64.3	POOR
F072	-	-	-	52.2	-	-	-
F073	-	-	49.1	-	-	-	-
F074	-	-	-	54.4	41.4	47.9	MODERATE
F075	-	-	29.4	-	-	-	-
F079	-	-	-	143.3	10.0	76.7	POOR
F080	-	-	-	21.7	21.2	21.5	SATISFACTORY
F089	-	-	-	-	71.5	-	-
F090	-	-	-	-	61.1	-	-
F091	-	-	-	-	28.7	-	-
INTERLAB MEDIAN	39.1	38.0	26.8	35.0	34.3		

THE FOLLOWING CODES WERE EXCLUDED: 00192

STUDY DATES: 0062(11-JAN-93), 0063(05-JUL-93), 0064(07-JAN-94), 0065(07-JUL-94), 0066(01-MAR-95),

Table 3b SUMMARY OF STUDY TO STUDY PERFORMANCE - Study FP66

Total Phosphorus

LAB CODE	%BIAS AND %FLAGS ON STUDIES 0062	0063	0064	0065	0066	MEDIAN SCORE	COMMENTS
F001	0.0	0.0	0.0	0.0	0.0	0.0	WELL DONE
F002	20.0	30.0	111.1	22.2	30.0	30.0	MODERATE
F003	0.0	0.0	0.0	0.0	0.0	0.0	WELL DONE
F004	110.0	0.0	0.0	130.0	0.0	0.0	WELL DONE
F006	180.0	75.0	175.0	114.3	185.7	175.0	POOR
F007	0.0	10.0	11.1	-	0.0	5.0	WELL DONE
F008	180.0	0.0	30.0	0.0	20.0	20.0	SATISFACTORY
F009	-	-	180.0	187.5	-	183.7	POOR
F010	10.0	0.0	0.0	20.0	0.0	0.0	WELL DONE
F011	20.0	0.0	0.0	0.0	160.0	0.0	WELL DONE
F013	10.0	0.0	0.0	0.0	0.0	0.0	WELL DONE
F014	20.0	0.0	0.0	20.0	30.0	20.0	SATISFACTORY
F015	20.0	0.0	100.0	0.0	0.0	0.0	WELL DONE
F016	-	30.0	200.0	-	42.9	42.9	MODERATE
F019	-	-	-	-	180.0	-	-
F020	10.0	40.0	0.0	11.1	175.0	11.1	SATISFACTORY
F025	50.0	-	0.0	12.5	0.0	6.3	WELL DONE
F026	0.0	10.0	0.0	0.0	0.0	0.0	WELL DONE
F030	190.0	150.0	0.0	-	28.6	89.3	POOR
F032	0.0	171.4	0.0	12.5	10.0	10.0	WELL DONE
F033	0.0	120.0	140.0	0.0	0.0	0.0	WELL DONE
F034	-	10.0	-	50.0	20.0	20.0	SATISFACTORY
F035	0.0	30.0	10.0	0.0	-	5.0	WELL DONE
F036	-	0.0	140.0	0.0	-	0.0	WELL DONE
F038	50.0	50.0	0.0	0.0	100.0	50.0	MODERATE
F039	90.0	-	-	-	-	-	-
F042	0.0	20.0	10.0	0.0	0.0	0.0	WELL DONE
F046	50.0	190.0	50.0	55.6	30.0	50.0	MODERATE
F048	-	-	0.0	100.0	30.0	30.0	MODERATE
F052	-	-	-	200.0	-	-	-
F055	188.9	-	-	-	-	-	-
F059	-	-	-	200.0	0.0	100.0	POOR
F061	-	-	-	100.0	-	-	-
F062	-	190.0	-	42.9	-	116.4	POOR
F063	-	-	0.0	-	-	-	-
F064	-	-	200.0	-	-	-	-
F069	-	-	10.0	-	-	-	-
F072	-	-	-	0.0	-	-	-
F074	-	-	-	-	30.0	-	-
F075	-	-	20.0	-	-	-	-
F080	-	-	-	0.0	20.0	10.0	WELL DONE
F089	-	-	-	-	10.0	-	-
F091	-	-	-	-	130.0	-	-
INTERLAB MEDIAN	20.0	10.0	10.0	12.5	20.0		

STUDY DATES: 0062(11-JAN-93), 0063(05-JUL-93), 0064(07-JAN-94), 0065(07-JUL-94), 0066(03-JAN-95)

Table 4a

Sample Design - FP/GLAP 66 - January '95

Major Ions & Nutrients

Sample No.	Sample Name	Source (Prov)	Conductance (Expected)
1	AUD-03	Dorset (ON)	60.
2	Celgar-01	Celgar L. (BC)	122.
3	Ion-20	Lake Ontario (dil'n)	172.
4	Erie-01	Lake Erie	280.
5	Deer-01	Deer River (MN)	305.
6	Atha-01	Athabaska R. (AB)	345.
7	Sour-01	Souris R. (MN)	485.
8	Spen-01	Spencer Cr. (ON)	557.
9	Wattap-03	Tapwater (Waterloo, ON)	588.
10	Wattap-01	Tapwater (Waterloo, ON)	1070.

Table 4b

Sample Design - FP/GLAP 66 - January '95

Total Phosphorus

Sample No.	Sample Name	Conc'n (expected)
1	TROIS-01	0.005
2	SYNTP-14	0.007
3	SYNTP-09	0.010
4	SYNTP-15	0.047
5	SYNTP-11	0.073
6	SYNTP-16	0.094
7	SYNTP-12	0.115
8	SYNTP-17	0.170
9	SYNTP-18	0.210
10	SYNTP-19	0.280

Table 5a Summary of Interlaboratory MEDIAN VALES for Major Ions & Nutrients - STUDY FP66

PARAMETER		AUD-03 SAMPLE 1	CELGAR-01 SAMPLE 2	ION-20 SAMPLE 3	ERIE-01 SAMPLE 4	DEER-01 SAMPLE 5	ATHA-01 SAMPLE 6	SOUR-01 SAMPLE 7
Turbidity	JTU	.1000	.1300	.1000	.0900	.1500	.1000	.1000
Colour	HAZEN UNIT	6.2000	4.5200	4.0000	2.0000	33.000	12.800	9.0400
Specific Conductance	UMHO/CM	60.000	126.750	175.000	275.000	301.000	338.000	492.000
pH	PH UNITS	7.0450	7.8400	7.4800	8.0800	8.2900	8.1100	8.3750
Boron	MG/L	.0084	.0020	.0063	.0212	.0238	.0190	.0780
Diss Organic Carbon	MG C/L	3.3250	.9000	.4400	1.6100	11.300	4.2400	5.6850
Total Alkalinity	MG/LCACO3	14.600	52.910	23.400	89.000	139.000	129.000	168.000
Diss Inorg Carbon	MG C/L	3.5000	12.500	5.6500	21.500	33.000	30.800	39.800
Nitrate + Nitrite	MG N/L	.0050	.1350	.0420	.2800	.0065	.0600	.0320
Ammonia	MG N/L	.0250	.0060	.0060	.0035	.0100	.0050	.0270
Total N	mg N/L	.2000	.1675	.0850	.3865	.3920	.1725	.4155
Total Kjeldahl N	MG N/L	.2100	.0650	.0700	.1600	.4025	.1435	.4405
Fluoride	MG/L	.0600	.0700	.0310	.1200	.1000	.1200	.1300
Total Hardness	mg/L	23.000	62.000	47.970	119.000	153.000	152.000	167.000
Sodium	MG/L	1.5900	1.2000	13.600	8.6500	5.7500	12.750	41.200
Magnesium	MG/L	1.5000	3.7000	2.9000	8.5000	13.600	11.730	20.000
Silicates	mg SiO2/L	2.1800	3.6500	1.4500	.6200	5.3000	3.9300	.2600
Sulfate (All Methods)	MG/L	8.9000	9.3400	29.800	24.000	18.300	38.887	65.140
Chloride (All Methods)	MG/L	2.1000	.6000	16.600	15.000	2.5080	5.8000	17.200
Potassium	MG/L	.7300	.6200	1.2200	1.4000	2.3900	.9700	6.3000
Calcium	MG/L	6.6400	18.400	14.200	33.000	38.900	41.070	33.300

PARAMETER		SPEN-01 SAMPLE 8	WATTAP-03 SAMPLE 9	WATTAP-01 SAMPLE 10
Turbidity	JTU	.8900	.0840	.1200
Colour	HAZEN UNIT	33.400	1.5100	1.6000
Specific Conductance	UMHO/CM	537.000	460.000	1067.000
pH	PH UNITS	8.6000	8.2300	8.2000
Boron	MG/L	.0100	.0130	.0700
Diss Organic Carbon	MG C/L	8.5500	.8350	2.2300
Total Alkalinity	MG/LCACO3	207.000	142.000	128.700
Diss Inorg Carbon	MG C/L	47.160	34.100	30.000
Nitrate + Nitrite	MG N/L	.6825	3.4100	1.6340
Ammonia	MG N/L	.0960	.0150	.0160
Total N	mg N/L	1.1050	3.5000	1.7500
Total Kjeldahl N	MG N/L	.5225	.1400	.2000
Fluoride	MG/L	.2000	.2000	.8500
Total Hardness	mg/L	287.000	221.100	470.300
Sodium	MG/L	10.800	9.8800	48.450
Magnesium	MG/L	29.900	25.400	43.500
Silicates	mg SiO2/L	6.5800	12.580	14.900
Sulfate (All Methods)	MG/L	51.400	52.000	290.000
Chloride (All Methods)	MG/L	27.100	22.200	94.900
Potassium	MG/L	1.6000	1.6000	2.4000
Calcium	MG/L	66.070	45.700	115.000

Table 5b Summary of Interlaboratory MEDIAN VALES for Total Phoshporus - STUDY FP66

PARAMETER		TROIS-02 SAMPLE 1	SYNTP-14 SAMPLE 2	SYNTP-09 SAMPLE 3	SYNTP-15 SAMPLE 4	SYNTP-11 SAMPLE 5	SYNTP-16 SAMPLE 6	SYNTP-12 SAMPLE 7
Total Phosphorus	MG P/L	.0050	.0070	.0108	.0480	.0740	.0960	.1200

PARAMETER		SYNTP-17 SAMPLE 8	SYNTP-18 SAMPLE 9	SYNTP-19 SAMPLE 10
Total Phosphorus	MG P/L	.1720	.2174	.2840

Appendix A

Glossary of Terms

GLOSSARY OF TERMS

Appendix A:

Used for 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 a set of results obtained by a laboratory on Vanadium in Study FP62:

Sample No.	Result	Median	Difference
1	0.21	0.2010	-0.009
2	0.13	0.1300	0.0
3	0.49	0.4800	-0.01
4	0.091	0.8505	0.7595
5	0.22	0.2065	-0.013
6	0.005	0.0050	0.0
7	0.002	0.0022	0.0002
8	0.016	0.0151	-0.0009
9	0.007	0.0069	-0.0001
10	0.012	0.0123	0.0003

Given the excellent results obtained on samples 1 through 10, the result on sample 4 indicates that the analytical system was out of control.

Bias: A set of results is said to be biased when that set exhibits a tendency to be either higher or lower than some standard. 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, (α=0.05).

W or T Code: A "W" or "T" code may be used with a reported result as also described in ASTM. In the FP/GLAP studies, these may result in flagging difficulties. "Less than" values or negative results are are also legitimate when reporting the results.

LLBAE Lower Limit for Use of Basic Acceptable Error, Basic Acceptable Error, and **BAE**

CEI: 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 error is used to determine the range of acceptable deviations.

For example: Suppose that the lower limit for use of the basic acceptable error has been set as 10 µg/L and the basic acceptable error is 1.0 µg/L, if a target (median) value for a sample is 5 µg/L, then any reported result within the range 5 ± 1.0 or 4.0 to 6.0 µg/L would be considered acceptable. The BAE would define the acceptable result within the 0-10 µg/L range.

For results above the *lower limit for use of basic acceptable error*, an allowance is made for the increased variability due to concentration. (For almost all substances it appears that the variability of results increases with concentration.) The allowance is added to the *basic acceptable error*. It is calculated by multiplying the *concentration error increment* (as a percentage) 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 µg/L, and the *lower limit for use of basic acceptable error* is 10 µg/L, the difference between them is 21-10 = 11 µg/L. Multiplying the difference by the *concentration increment*, say 0.10, which gives 11 µg/L x 0.10, resulting in 1.1 µg/L to determine the acceptable difference 21.0 ± 2.1. Thus the range 18.9 to 23.1 µg/L would be considered acceptable and would not be flagged.

In general, for the FP/GLAP studies, the values chosen for the *basic acceptable error* and the *concentration error increment* are selected so that good precision may be inferred. Historically, for the FP QA Program, for moderate ranges, this has been achieved with the 10% Deviation Rule. To be consistent in the FP/GLAP studies, Performance Ratings with the Youden evaluation program should generally remain the same; eg. Very Good = approximately 5% of data flagged. We are pleased that these evaluations rate laboratories objectively and provide an appropriate diagnostic tool.

Flag: A result is flagged high ("H") 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 than 1.5 times the acceptable difference is flagged very high ("VH"). Similarly, a result lower than the median by the acceptable difference (but not minus 1.5 times the acceptable difference) is flagged low ("L"). A still lower result is flagged very low ("VL"). Extremely different values are those that deviate more than twice the acceptable difference from the median. These results are flagged - "EL" or "EH".

Acceptable Difference: The absolute value of the maximum difference between a result and (or Acceptable Deviation) the target value which will not be flagged.

March, 1995

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

Appendix B

Laboratory Results

Major Ions & Nutrients

Total Phosphorus

FPMI STUDY 0066 DATA SUMMARY 1995-04-03 PAGE 1

PARAMETER: 00392 Specific Conductance UMHO/CM

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= 2.0000 CONCENTRATION ERROR INCREMENT= .0500

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
F001	58.7	10.00	125.	14.00	174.	17.00	271.	16.00	299.	15.50	334.	14.50
F002		0.00	124.	12.00	172.	12.50	270.	14.50	299.	15.50	336.	16.50
F003	60.8	28.00	128.	29.00	176.	27.50	276.	27.00	304.	27.50	338.	19.50
F004	59.7	15.50	126.8	19.00	175.	21.50	274.	18.00	302.	21.00	339.	23.00
F006	62.	30.50	127.	23.00	177.	30.50	275.	21.00	303.	24.50	339.	23.00
F007	57.4	6.00	121.	7.50	171.	10.50	266.	11.00	292.	9.50	331.	12.00
F008	59.3	13.00	128.	29.00	181.	36.00	277.	31.00	304.	27.50	341.	29.00
F009	60.	20.50	127.	23.00	173.	14.50	275.	21.00	300.	17.00	338.	19.50
F010	58.	7.00	130.	32.50	170.	8.50	260.	4.00	290.	5.50	330.	9.00
F011	68.8 VH	36.00	138. H	36.00	187. H	37.00	287.	37.00	316.	37.00	352.	37.00
F014	59.3	13.00	128.	29.00	175.	21.50	276.	27.00	302.	21.00	340.	26.00
F015	60.7	27.00	128.	29.00	176.	27.50	276.	27.00	303.	24.50	338.	19.50
F016	20.9 EL	1.00	89.9 EL	2.00	146. EL	2.00	256. L	3.00	287.	3.50	330.	9.00
F019	60.	20.50	126.	15.50	175.	21.50	276.	27.00	303.	24.50	343.	31.50
F020	62.	30.50	127.	23.00	176.	27.50	272.	17.00	301.	18.50	336.	16.50
F025	59.9	17.00	127.	23.00	175.	21.50	276.	27.00	305.	30.00	340.	26.00
F026	58.3	8.00	121.6	9.00	171.0	10.50	264.0	10.00	291.0	7.50	325.0	5.00
F030	50.6 VL	2.00	108. EL	4.00	149. EL	3.00	234. EL	2.00	260. EL	2.00	288. EL	2.00
F031	59.	11.00	127.	23.00	175.	21.50	275.	21.00	303.	24.50	340.	26.00
F032	60.	20.50	127.	23.00	178.	32.00	277.	31.00	307.	33.00	344.	33.00
F033	57.	4.00	119.	5.00	167.	4.50	263.	8.50	291.	7.50	326.	6.00
F034	65. H	35.00	122.	10.00	168.	6.00	261.	5.00	287.	3.50	322.	3.00
F036	62.6	33.00	131.	34.00	173.	14.50	270.	14.50	295.	11.50	334.	14.50
F038	60.1	24.00	128.	29.00	177.	30.50	278.	33.50	305.	30.00	341.	29.00
F042	57.2	5.00	121.	7.50	167.	4.50	262.	6.50	290.	5.50	324.	4.00
F046	58.5	9.00	124.	12.00	170.	8.50	268.	12.00	295.	11.50	331.	12.00
F048	59.7	15.50	126.7	17.50	175.	21.50	275.	21.00	302.	21.00	339.	23.00
F057	60.0	20.50	120.9	6.00	168.7	7.00	262.0	6.50	292.0	9.50	330.0	9.00
F059	61.6	29.00	126.7	17.50	173.3	16.00	275.2	24.00	297.6	14.00	326.3	7.00
F061	60.	20.50	12.8 EL	1.00	175.	21.50	275.	21.00	301.	18.50	341.	29.00
F069	60.3	25.00	124.	12.00	176.	27.50	263.	8.50	306.	32.00	343.	31.50
F071	51.8 VL	3.00	102. EL	3.00	132. EL	1.00	181. EL	1.00	179. EL	1.00	204. EL	1.00
F074	60.	20.50	126.	15.50	172.	12.50	269.	13.00	296.	13.00	331.	12.00
F080	60.6	26.00	130.	32.50	179.	33.00	281.	35.00	309.	35.00	345.	34.50
F089	63.	34.00	132.	35.00	180.	34.50	277.	31.00	305.	30.00	338.	19.50
F090	62.3	32.00		0.00	180.0	34.50	285.0	36.00	314.0	36.00	348.0	36.00
F091	59.3	13.00	127.	23.00	175.	21.50	278.	33.50	308.	34.00	345.	34.50
MEDIAN CONC.	60.0000		126.7500		175.0000		275.0000		301.0000		338.0000	

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
F001	488.	15.00	561.	29.00	460.	18.00	1077.	28.00
F002	488.	15.00	571. H	37.00	457.	13.50	1060.	14.00
F003	495.	25.00	566. H	32.50	464.	23.50	1074.	26.00
F004	495.	25.00	567. H	34.50	464.	23.50	1076.	27.00
F006	491.	17.50	441. EL	5.00	463.	20.50	1059.	12.00
F007	484.	12.00	500. L	11.00	454.	11.00	1062.	17.00
F008	494.	21.00	551.	26.00	458.	15.00	1060.	14.00
F009	492.	19.00	570. H	36.00	460.	18.00	1070.	22.50
F010	480.	8.00	430. EL	4.00	450.	7.50	1040.	8.00
F011	506.	36.00	466. EL	7.00	476.	37.00	1070.	22.50
F014	495.	25.00	537.	20.00	464.	23.50	1072.	24.50
F015	496.	28.50	527.	17.00	466.	27.00	1061.	16.00
F016	502.	33.50	424. EL	1.50	467.	29.00	1150. VH	37.00
F019	495.	25.00	566. H	32.50	472.	35.00	1093.	35.50
F020	488.	15.00	564. H	30.50	459.	16.00	1067.	19.50
F025	498.	31.00	550.	25.00	463.	20.50	1080.	31.50
F026	470.0	4.00	524.0	14.00	441.0	4.00	1009. L	4.00
F030	418. EL	2.00	493. L	8.50	393. EL	1.00	910. EL	1.00
F031	496.	28.50	542.	21.00	468.	31.50	1084.	34.00
F032	502.	33.50	567. H	34.50	470.	33.50	1080.	31.50
F033	474.	5.00	521.	13.00	446.	5.00	1030.	7.00
F034	465. L	3.00	493. L	8.50	440.	3.00	993. L	3.00
F036	481.	9.50	535.	19.00	450.	7.50	1050.	9.50
F038	498.	31.00	526.	16.00	468.	31.50	1080.	31.50
F042	478.	6.00	516.	12.00	448.	6.00	1022.	6.00
F046	481.	9.50	426. EL	3.00	452.	9.00	1054.	11.00
F048	494.	21.00	424. EL	1.50	464.	23.50	1078.	29.00
F057	479.0	7.00	560.0	27.50	460.0	18.00	1019.	5.00
F059	482.5	11.00	549.8	24.00	455.6	12.00	1065.	18.00
F061	491.	17.50	560.	27.50	467.	29.00	1072.	24.50
F069	498.	31.00	533.	18.00	467.	29.00	1069.	21.00
F071	285. EL	1.00	496. L	10.00	428. L	2.00	954. EL	2.00
F074	487.	13.00	525.	15.00	453.	10.00	1050.	9.50
F080	503.	35.00	544.	22.00	474.	36.00	1080.	31.50
F089	494.	21.00	564. H	30.50	465.	26.00	1067.	19.50
F090	507.0	37.00	459.0 EL	6.00	470.0	33.50	1093.0	35.50
F091	495.	25.00	547.	23.00	457.	13.50	1060.	14.00
MEDIAN CONC.	492.0000		535.0000		460.0000		1067.0000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	177.00	17.700	10			Cond Meter
F002	150.50	16.722	9	H		02041
F003	265.50	26.550	10	H		Cond.Cell
F004	228.00	22.800	10	H		02041
F006	207.50	20.750	10	EL		ELECTRODE
F007	107.50	10.750	10	L		
F008	241.50	24.150	10			ELECTROMETRIC
F009	211.00	21.100	10	H		25 C
F010	94.00	9.400	10	EL		
F011	322.50	32.250	10	VHH H EL	BIASED HIGH	
F014	230.50	23.050	10			
F015	243.00	24.300	10			Meter
F016	121.50	12.150	10	ELELELL EL VH		METER
F019	268.50	26.850	10	H		Cond Meter
F020	214.00	21.400	10	H		
F025	252.50	25.250	10			Meter
F026	76.00	7.600	10	L	BIASED LOW	meter
F030	27.50	2.750	10	VLELELELELELELL ELEL	BIASED LOW	Meter
F031	242.00	24.200	10			Cond Meter
F032	305.50	30.550	10	H	BIASED HIGH	
F033	65.50	6.550	10		BIASED LOW	COND. METER
F034	80.00	8.000	10	H L L L	BIASED LOW	Probe
F036	167.50	16.750	10			Meter
F038	286.00	28.600	10			Meter
F042	63.00	6.300	10		BIASED LOW	Meter
F046	97.50	9.750	10	EL		Meter
F048	194.50	19.450	10	EL		Meter
F057	116.00	11.600	10			
F059	172.50	17.250	10			conductivity meter
F061	210.00	21.000	10	EL		Meter
F069	235.50	23.550	10			Wheatstone
F071	25.00	2.500	10	VLELELELELELELL L EL	BIASED LOW	CONDUCTANCE METER
F074	134.00	13.400	10			Meter
F080	320.50	32.050	10		BIASED HIGH	Cond. Cell
F089	281.00	28.100	10	H		Conduct.
F090	286.50	31.833	9	EL	BIASED HIGH	COND-25
F091	235.00	23.500	10			CONDUCTANCE METER

OVERALL AVERAGE RANK IS 18.902

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F071	25.00	2.500	10	VLELELELELELELLLEL	BIASED LOW	CONDUCTANCE METER
F030	27.50	2.750	10	VLELELELELELELLLELEL	BIASED LOW	Meter
F042	63.00	6.300	10		BIASED LOW	Meter
F033	65.50	6.550	10		BIASED LOW	COND. METER
F026	76.00	7.600	10	L	BIASED LOW	meter
F034	80.00	8.000	10	HLLL	BIASED LOW	Probe
F010	94.00	9.400	10	EL		
F046	97.50	9.750	10	EL		Meter
F007	107.50	10.750	10	L		
F057	116.00	11.600	10			
F016	121.50	12.150	10	ELELELLELVH		METER
F074	134.00	13.400	10			Meter
F002	150.50	16.722	9	H		02041
F036	167.50	16.750	10			Meter
F059	172.50	17.250	10			conductivity meter
F001	177.00	17.700	10			Cond Meter
F048	194.50	19.450	10	EL		Meter
F006	207.50	20.750	10	EL		ELECTRODE
F061	210.00	21.000	10	EL		Meter
F009	211.00	21.100	10	H		25 C
F020	214.00	21.400	10	H		
F004	228.00	22.800	10	H		02041
F014	230.50	23.050	10			
F091	235.00	23.500	10			CONDUCTANCE METER
F069	235.50	23.550	10			Wheatstone
F008	241.50	24.150	10			ELECTROMETRIC
F031	242.00	24.200	10			Cond Meter
F015	243.00	24.300	10			Meter
F025	252.50	25.250	10			Meter
F003	265.50	26.550	10	H		Cond.Cell
F019	268.50	26.850	10	H		Cond Meter
F089	281.00	28.100	10	H		Conduct.
F038	286.00	28.600	10			Meter
F032	305.50	30.550	10	H	BIASED HIGH	
F090	286.50	31.833	9	EL	BIASED HIGH	COND-25
F080	320.50	32.050	10		BIASED HIGH	Cond. Cell
F011	322.50	32.250	10	VHHHEL	BIASED HIGH	

OVERALL AVERAGE
RANK IS 18.902

Specific Conductance

PARAMETER: 00192 Turbidity JTU

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .2000 BASIC ACCEPTABLE ERROR= .2500 CONCENTRATION ERROR INCREMENT= .1000

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
F004	.04	4.00	.08	8.00	.06	5.50	0.00	1.50	.13	9.50	.07	6.50
F006	.05	5.00	.05	4.50	.02	2.00	.03	3.00	.07	4.00	.04	4.00
F008	.13	12.50	.12	9.00	.10	9.50	.09	9.50	.23	18.00	.12	11.00
F010	.2	15.00	.2	13.50	.2	13.00	.2	15.00	.2	16.50	.2	14.00
F011	.4 H	16.50	.2	13.50	.1	9.50	.2	15.00	.3	20.00	.4 H	17.50
F014	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.50	0.00	1.00	0.00	1.00
F016	.08	9.00	.13	10.50	.06	5.50	.08	7.50	.55 VH	22.00	.13	12.50
F019	<1.	0.00	<1.	0.00	<1.	0.00	<1.	0.00	<1.	0.00	<1.	0.00
F020	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00	.10	7.50	<.1	0.00
F030	.40 H	16.50	.30	16.50	.30	15.00	.20	15.00	.30	20.00	.30	15.00
F031	.03	2.50	.03	2.50	<.02	0.00	.07	6.00	.08	5.50	.07	6.50
F032	.03T	2.50	.03T	2.50	.01W	0.00	.01W	0.00	.04T	2.00	.02T	2.00
F033		0.00		0.00		0.00		0.00	.13	9.50		0.00
F034	<.10	0.00	<.10	0.00	<.10	0.00	<.10	0.00	.15	12.00	<.10	0.00
F035	.124	11.00	.070	6.50	.089	7.00	.043	5.00	.065	3.00	.032	3.00
F038	.19	14.00	.30	16.50	.10	9.50	.13	13.00	.17	14.00	.37 H	16.00
F042	.10	10.00	.15	12.00	.10	9.50	.10	11.00	.15	12.00	.10	9.00
F046	.13	12.50	.13	10.50	.12	12.00	.12	12.00	.19	15.00	.13	12.50
F048	.06	7.00	.05	4.50	.04	4.00	.04	4.00	.15	12.00	.06	5.00
F061	.6 EH	19.00	.4 H	18.00	.4 H	16.00	.3	17.00	.3	20.00	.4 H	17.50
F071	.50 VH	18.00	.50 H	19.00	.60 EH	17.00	.45 H	18.00	.20	16.50	.75 EH	19.00
F089	.06	7.00	.07	6.50	.03	3.00	.08	7.50	.08	5.50	.10	9.00
F091	.06	7.00	.21	15.00	.26	14.00	.09	9.50	.10	7.50	.10	9.00
MEDIAN CONC.	.1000		.1300		.1000		.0900		.1500		.1000	

PARAMETER: 00192 Turbidity JTU

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F004	.05	5.00	1.68 EH	16.00	.02	2.00	.01	1.50
F006	.06	6.00	.30 VL	2.00	.03	3.00	.05	3.50
F008	.12	13.00	2.4 EH	19.00	.07	7.50	.12	11.50
F010	.2	17.00	.7	9.00	.2	12.50	.2	16.00
F011	.4 H	19.00	6.4 EH	22.00	.3	14.50	3.0 EH	21.00
F014	0.00	1.00	1.00	13.50	0.00	1.00	.10	7.00
F016	.15	16.00	.83	10.00	.07	7.50	.16	15.00
F019	<1.	0.00	<1.	0.00	<1.	0.00	<1.	0.00
F020	.10	10.00	.5 L	4.00	<.1	0.00	.1	7.00
F030	.30	18.00	.90	12.00	.20	12.50	1.2 EH	18.00
F031	.04	4.00	.52 L	5.00	.05	4.00	.07	5.00
F032	.02T	2.00	.66	7.00	.01W	0.00	.01T	1.50
F033		0.00	.88	11.00		0.00		0.00
F034	.10	10.00	1.0	13.50	<.1	0.00	.15	13.50
F035	.037	3.00	.672	8.00	.098	9.00	.107	9.00
F038	.13	14.00	2.30 EH	18.00	<.10	0.00	1.25 EH	19.00
F042	.10	10.00	2.60 EH	20.00	.10	10.00	.15	13.50
F046	.14	15.00	1.8 EH	17.00	<.1	0.00	.11	10.00
F048	.08	8.00	.24 EL	1.00	.06	5.50	.05	3.50
F061	.5 VH	20.00	3.0 EH	21.00	.3	14.50	.4 H	17.00
F071	.95 EH	21.00	1.60 EH	15.00	1.50 EH	16.00	2.00 EH	20.00
F089	.11	12.00	.60	6.00	.14	11.00	.12	11.50
F091	.07	7.00	.47 L	3.00	.06	5.50	.10	7.00
MEDIAN CONC.	.1000		.8900		.0840		.1200	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F004	59.50	5.950	10	EH		02081
F006	37.00	3.700	10	VL	BIASED LOW	NTU
F008	120.50	12.050	10	EH		TURBIDIMETRY
F010	141.50	14.150	10			
F011	168.50	16.850	10	H H H EH EH	BIASED HIGH	
F014	29.00	2.900	10		BIASED LOW	
F016	115.50	11.550	10	VH		METER
F019	0.00	*******	0		INSUFFICIENT DATA	Neph
F020	28.50	7.125	4	L	INSUFFICIENT DATA	
F030	158.50	15.850	10	H EH	BIASED HIGH	Neph
F031	41.00	4.556	9	L	BIASED LOW	meter, NTU
F032	19.50	2.786	7		BIASED LOW	
F033	20.50	10.250	2		INSUFFICIENT DATA	NEPHELOMETRY
F034	49.00	12.250	4		INSUFFICIENT DATA	Meter
F035	64.50	6.450	10			Nephlo
F038	134.00	14.889	9	H EH EH		Meter
F042	117.00	11.700	10	EH		Neph.
F046	116.50	12.944	9	EH		Meter
F048	54.50	5.450	10	EL	BIASED LOW	Neph.
F061	180.00	18.000	10	EHH H H VHEH H	BIASED HIGH	Meter
F071	179.50	17.950	10	VHH EHH EHEHEHEHEH	BIASED HIGH	TURBIDIMETER
F089	79.00	7.900	10			Turbid.
F091	84.50	8.450	10	L		TURBIDIMETER

OVERALL AVERAGE RANK IS 10.299

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F019	0.00	*******	0		INSUFFICIENT DATA	Neph
F032	19.50	2.786	7		BIASED LOW	
F014	29.00	2.900	10		BIASED LOW	
F006	37.00	3.700	10	VL	BIASED LOW	NTU
F031	41.00	4.556	9	L	BIASED LOW	meter, NTU
F048	54.50	5.450	10	EL	BIASED LOW	Neph.
F004	59.50	5.950	10	EH		02081
F035	64.50	6.450	10			Nephlo
F020	28.50	7.125	4	L	INSUFFICIENT DATA	
F089	79.00	7.900	10			Turbid.
F091	84.50	8.450	10	L		TURBIDIMETER
F033	20.50	10.250	2		INSUFFICIENT DATA	NEPHELOMETRY
F016	115.50	11.550	10	VH		METER
F042	117.00	11.700	10	EH		Neph.
F008	120.50	12.050	10	EH		TURBIDIMETRY
F034	49.00	12.250	4		INSUFFICIENT DATA	Meter
F046	116.50	12.944	9	EH		Meter
F010	141.50	14.150	10			
F038	134.00	14.889	9	HEHEH		Meter
F030	158.50	15.850	10	HEH	BIASED HIGH	Neph
F011	168.50	16.850	10	HHHEHEH	BIASED HIGH	
F071	179.50	17.950	10	VHHEHHEHEHEHEHEH	BIASED HIGH	TURBIDIMETER
F061	180.00	18.000	10	EHHHHVHEHH	BIASED HIGH	Meter

OVERALL AVERAGE RANK IS 10.299

Turbidity

PARAMETER: 00292 Colour HAZEN UNIT

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 5.0000 BASIC ACCEPTABLE ERROR= 5.0000 CONCENTRATION ERROR INCREMENT= .1500

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
F002	5.0	4.50		0.00		0.00		0.00	25.0	1.00	5.0 L	1.00
F003	5.	4.50	5.	11.00	5.	10.50	<5.	0.00	30.	5.50	10.	6.00
F004	<5.0	0.00	<5.0	0.00	<5.0	0.00	<5.0	0.00	35.0	14.00	7.5	3.00
F007	6.	8.00	<5.	0.00	<5.	0.00	<5.	0.00	32.	9.00	13.	11.50
F008	5.	4.50	<5.	0.00	<5.0	0.00	<5.	0.00	30.	5.50	10.	6.00
F010	4.	2.00	2.	1.00	1.	1.50	1.	1.00	26.	2.00	10.	6.00
F011	5.	4.50	<5.	0.00	5.	10.50	<5.	0.00	30.	5.50	10.	6.00
F016	7.91	15.00	4.52	7.00	3.77	5.00	1.51	3.00	31.3	8.00	12.8	10.00
F030	10.	16.00	5.	11.00	5.	10.50	5.	10.00	35.	14.00	15.	16.00
F031	7.	12.50	4.	6.00	4.	7.50	2.	5.50	40.	18.00	16.	17.50
F032	6.8	10.00	4.6	8.00	3.8	6.00	3.2	9.00	37.8	16.00	14.2	15.00
F034	7.	12.50	5.	11.00	5.	10.50		0.00	42.	19.00	18.	19.00
F035	5.7	7.00	2.6	2.00	2.0	3.50	1.2	2.00	34.2	12.00	12.7	9.00
F036	6.4	9.00	3.6	5.00	7.6	13.00	2.2	8.00	33.4	11.00	13.0	11.50
F038	<5.	0.00	5.	11.00	<5.	0.00	<5.	0.00	28.	3.00	10.	6.00
F042	7.	12.50	5.	11.00	4.	7.50	2.	5.50	38.	17.00	16.	17.50
F046	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	30.	5.50	7.	2.00
F089	3.T	1.00	3.T	3.50	1.T	1.50	2.T	5.50	33.	10.00	14.	13.50
F091	7.	12.50	3.	3.50	2.	3.50	2.	5.50	35.	14.00	14.	13.50
MEDIAN CONC.	6.2000		4.5200		4.0000		2.0000		33.0000		12.8000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	5.0	2.50	25.0	4.00		0.00		0.00
F003	10.	12.50	40.	16.50	<5.	0.00	<5.	0.00
F004	7.5	5.00	35.0	12.50	<5.0	0.00	<5.0	0.00
F007	9.	8.50	29.	6.00	<5.	0.00	<5.	0.00
F008	5.	2.50	30.	7.50	<5.0	0.00	<5.0	0.00
F010	8.	6.50	22. L	2.00	<1.	0.00	<1.	0.00
F011	5.	2.50	30.	7.50	<5.	0.00	<5.	0.00
F016	9.04	10.00	23.4 L	3.00	1.51	5.00	.38	1.00
F030	15. H	19.00	40.	16.50	0.	1.00	5.	10.00
F031	12.	16.50	37.	14.50	1.	2.50	2.	7.00
F032	11.4	15.00	37.	14.50	2.2	9.00	.8T	2.00
F034	13.	18.00	42.	18.00	2.	7.00	3.	9.00
F035	9.9	11.00	34.9	11.00	<.5	0.00	1.1	4.00
F036	10.4	14.00	33.4	10.00	1.2	4.00	1.2	5.00
F038	8.	6.50	28.	5.00	<5.	0.00	<5.	0.00
F042	12.	16.50	43. H	19.00	1.	2.50	2.	7.00
F046	5.	2.50	20. L	1.00	<5.	0.00	<5.	0.00
F089	9.0	8.50	32.	9.00	2.T	7.00	2.T	7.00
F091	10.	12.50	35.	12.50	2.	7.00	1.	3.00
MEDIAN CONC.	9.0400		33.4000		1.5100		1.6000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F002	13.00	2.600	5	L	BIASED LOW	02011
F003	66.50	9.500	7			Comparison
F004	34.50	8.625	4		INSUFFICIENT DATA	02021
F007	43.00	8.600	5			
F008	26.00	5.200	5			VISUAL
F010	22.00	2.750	8	L	BIASED LOW	400 um
F011	36.50	6.083	6			
F016	67.00	6.700	10	L		
F030	124.00	12.400	10	H		Visual
F031	107.50	10.750	10			Spec. 450 nm
F032	104.50	10.450	10			
F034	124.00	13.778	9		BIASED HIGH	Spec.
F035	61.50	6.833	9			Colour
F036	90.50	9.050	10			Colour
F038	31.50	6.300	5			Meter
F042	116.00	11.600	10	H		Colrimetric
F046	11.00	2.750	4	L	INSUFFICIENT DATA	Meter
F089	66.50	6.650	10			Visual
F091	87.50	8.750	10			VISUAL METHOD

OVERALL AVERAGE
RANK IS 8.388

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F002	13.00	2.600	5	L	BIASED LOW	02011
F010	22.00	2.750	8	L	BIASED LOW	400 um
F046	11.00	2.750	4	L	INSUFFICIENT DATA	Meter
F008	26.00	5.200	5			VISUAL
F011	36.50	6.083	6			
F038	31.50	6.300	5			Meter
F089	66.50	6.650	10			Visual
F016	67.00	6.700	10	L		
F035	61.50	6.833	9			Colour
F007	43.00	8.600	5			
F004	34.50	8.625	4		INSUFFICIENT DATA	02021
F091	87.50	8.750	10			VISUAL METHOD
F036	90.50	9.050	10			Colour
F003	66.50	9.500	7			Comparison
F032	104.50	10.450	10			
F031	107.50	10.750	10			Spec. 450 nm
F042	116.00	11.600	10	H		Colrimetric
F030	124.00	12.400	10	H		Visual
F034	124.00	13.778	9		BIASED HIGH	Spec.

OVERALL AVERAGE
RANK IS 8.388

Colour

PARAMETER: 01092 pH PH UNITS

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 5.5000 BASIC ACCEPTABLE ERROR= .2500 CONCENTRATION ERROR INCREMENT= 0.0000

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
F001	6.91	11.00	7.82	18.00	7.43	19.00	8.12	26.50	8.33	29.00	7.95	8.00
F002	7.12	25.00	7.89	24.50	7.62	28.00	8.07	20.00	8.29	20.00	8.04	12.50
F003	7.66 EH	39.00	7.84	19.50	7.40	14.50	8.01	17.50	8.18	9.00	8.04	12.50
F004	7.23	32.50	7.95	32.00	7.53	22.00	7.97	11.00	8.33	29.00	8.13	24.00
F006	6.8	8.50	7.6	8.00	7.3	8.00	7.9	7.00	8.1	8.00	8.0	9.00
F007	7.33 H	37.00	7.84	19.50	7.42	17.50	8.00	14.50	8.20	10.00	8.11	20.50
F008	7.03	19.50	7.95	32.00	7.66	31.00	8.18	31.50	8.34	31.50	8.16	29.00
F009	7.23	32.50	7.93	29.00	7.65	30.00	8.09	21.50	8.29	20.00	8.11	20.50
F010	7.14	26.00	7.95	32.00	7.76 H	34.00	8.17	30.00	8.35	33.00	8.19	32.00
F011	6.99	16.00	7.89	24.50	7.71	32.00	8.09	21.50	8.29	20.00	8.11	20.50
F013	6.96	14.00	7.79	16.00	7.54	23.00	7.99	12.00	8.21	11.00	8.01	10.00
F014	7.00	17.00	7.64	10.00	7.40	14.50	8.21	37.00	8.34	31.50	8.29	36.00
F015	7.01	18.00	7.85	21.50	7.60	25.50	8.00	14.50	8.23	14.50	8.08	16.00
F016	6.26 EL	3.00	7.15 EL	5.00	6.89 EL	5.00	7.65 VL	5.00	7.85 VL	3.00	7.80 L	5.00
F019	7.10	23.00	7.74	14.00	7.40	14.50	7.91	8.50	8.07	7.00	7.89	6.00
F020	6.50 EL	6.00	6.96 EL	4.00	6.65 EL	4.00	7.37 EL	4.00	7.93 L	5.00	7.78 L	4.00
F025	6.06 EL	1.00	6.42 EL	1.00	6.14 EL	1.00	7.25 EL	3.00	7.87 VL	4.00	7.59 EL	3.00
F026	6.93	12.00	7.65	11.00	7.32	9.50	8.00	14.50	8.23	14.50	8.11	20.50
F030	6.2 EL	2.00	6.8 EL	2.00	6.6 EL	2.00	7.2 EL	2.00	7.5 EL	2.00	7.5 EL	2.00
F031	6.74 L	7.00	7.67	12.00	7.08 VL	6.00	8.22	38.00	8.36	34.00	8.22	35.00
F032	7.58 EH	38.00	8.08	38.00	7.77 H	35.00	8.27	39.00	8.43	39.00	8.41 H	39.00
F033	7.2	29.50	7.9	26.50	7.8 H	37.00	8.2	34.50	8.4	37.00	8.2	33.50
F034	7.1	23.00	7.8	17.00	7.4	14.50	8.1	24.00	8.3	23.00	8.1	17.50
F036	7.03	19.50	7.85	21.50	7.39	12.00	8.12	26.50	8.33	29.00	8.15	27.00
F038	6.38 EL	4.50	6.90 EL	3.00	6.62 EL	3.00	7.03 EL	1.00	7.12 EL	1.00	7.30 EL	1.00
F042	7.17	27.00	7.87	23.00	7.60	25.50	8.10	24.00	8.28	18.00	8.16	29.00
F043	7.3 H	35.00	8.0	35.00	7.8 H	37.00	8.2	34.50	8.4	37.00	8.3	37.50
F046	7.18	28.00	7.94	30.00	8.24 EH	40.00	8.18	31.50	8.38	35.00	8.17	31.00
F048	7.10	23.00	7.54 L	6.50	7.32	9.50	8.00	14.50	8.31	25.50	8.03	11.00
F057	6.38 EL	4.50	7.61	9.00	7.60	25.50	7.92	10.00	8.22	12.50	8.05	14.00
F059	6.8	8.50	7.9	26.50	7.5	21.00	8.1	24.00	8.3	23.00	8.1	17.50
F061	7.2	29.50	8.01	37.00	7.73	33.00	8.15	29.00	8.31	25.50	8.16	29.00
F068	6.942	13.00	7.913	28.00	7.648	29.00	8.135	28.00	8.321	27.00	8.138	26.00
F069	7.22	31.00	7.54 L	6.50	7.42	17.50	7.82 L	6.00	8.00 L	6.00	7.91	7.00
F071	7.06	21.00	7.73	13.00	7.23	7.00	8.04	19.00	8.26	16.00	8.13	24.00
F074	7.67 EH	40.00	8.25 VH	39.00	7.90 VH	39.00	8.48 VH	40.00	8.64 H	40.00	8.61 VH	40.00
F080	6.97	15.00	7.77	15.00	7.46	20.00	8.01	17.50	8.22	12.50	8.07	15.00
F089	7.3 H	35.00	8.0	35.00	7.60	25.50	8.20	34.50	8.30	23.00	8.20	33.50
F090	6.88	10.00		0.00	7.37	11.00	7.91	8.50	8.27	17.00	8.13	24.00
F091	7.3 H	35.00	8.0	35.00	7.8 H	37.00	8.2	34.50	8.4	37.00	8.3	37.50
MEDIAN CONC.	7.0450		7.8400		7.4800		8.0800		8.2900		8.1100	

PARAMETER: 01092 pH PH UNITS

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	8.40	27.00	8.63	22.50	8.28	27.50	8.23	30.00
F002	8.25	11.00	8.56	13.00	8.24	22.50	8.20	21.00
F003	8.16	9.00	8.38	4.00	8.19	10.50	8.03	8.00
F004	8.41	30.50	8.60	20.00	8.22	18.50	8.22	27.00
F006	8.2	10.00	8.7	29.00	8.1	7.00	8.1	10.50
F007	8.29	13.00	8.58	17.00	8.19	10.50	8.12	12.00
F008	8.43	34.50	8.67	24.00	8.23	20.50	8.25	34.00
F009	8.38	22.00	8.60	20.00	8.20	14.00	8.22	27.00
F010	8.43	34.50	8.92 H	39.00	8.30	34.00	8.24	32.50
F011	8.38	22.00	8.82	35.00	8.25	24.00	8.22	27.00
F013	8.27	12.00	8.52	9.00	8.16	9.00	8.15	14.50
F014	8.45	36.00	8.58	17.00	8.41	38.00	8.32	38.00
F015	8.32	17.00	8.55	11.00	8.14	8.00	8.18	17.00
F016	8.04 L	3.00	8.36	3.00	7.97 L	4.00	8.01	6.50
F019	8.06 L	5.00	8.44	5.00	8.28	27.50	8.07	9.00
F020	8.13	7.50	8.49	6.00	8.01	5.50	7.99	5.00
F025	8.05 L	4.00	8.50	7.00	7.91 L	3.00	7.92 L	3.00
F026	8.31	15.50	8.53	10.00	8.20	14.00	8.18	17.00
F030	7.7 EL	2.00	8.0 EL	1.00	7.6 EL	2.00	7.6 EL	2.00
F031	8.09 L	6.00	8.56	13.00	8.27	26.00	8.01	6.50
F032	8.5	38.00	8.56	13.00	8.44	39.00	8.36	39.00
F033	8.5	38.00	8.9 H	38.00	8.3	34.00	8.3	36.50
F034	8.4	27.00	8.7	29.00	8.3	34.00	8.2	21.00
F036	8.42	33.00	8.84	36.00	8.29	30.00	8.24	32.50
F038	7.62 EL	1.00	8.13 VL	2.00	7.35 EL	1.00	7.02 EL	1.00
F042	8.36	19.00	8.75	33.00	8.29	30.00	8.23	30.00
F043	8.4	27.00	8.7	29.00	8.4	37.00	8.1	10.50
F046	8.39	24.00	8.88 H	37.00	8.29	30.00	8.23	30.00
F048	8.41	30.50	8.73	32.00	8.24	22.50	8.26	35.00
F057	8.34	18.00	8.58	17.00	8.22	18.50	8.18	17.00
F059	8.4	27.00	8.6	20.00	8.2	14.00	8.2	21.00
F061	8.38	22.00	8.63	22.50	8.20	14.00	8.20	21.00
F068	8.411	32.00	8.684	26.00	8.252	25.00	8.201	24.00
F069	8.13	7.50	8.51	8.00	8.01	5.50	7.97	4.00
F071	8.31	15.50	8.57	15.00	8.20	14.00	8.14	13.00
F074	8.72 H	40.00	8.78	34.00	8.66 VH	40.00	8.59 VH	40.00
F080	8.30	14.00	8.68	25.00	8.21	17.00	8.21	25.00
F089	8.40	27.00	8.70	29.00	8.30	34.00	8.20	21.00
F090	8.37	20.00	8.93 H	40.00	8.23	20.50	8.15	14.50
F091	8.5	38.00	8.7	29.00	8.3	34.00	8.3	36.50
MEDIAN CONC.	8.3750		8.6000		8.2300		8.2000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	218.50	21.850	10			pH Meter
F002	197.50	19.750	10			10301
F003	143.50	14.350	10	EH		ISFET PROBE
F004	246.50	24.650	10			10301
F006	105.00	10.500	10			STIRRED
F007	171.50	17.150	10	H		Stirred
F008	287.50	28.750	10			ELECTROMETRIC
F009	236.50	23.650	10			Stirred
F010	327.00	32.700	10	H H	BIASED HIGH	
F011	242.50	24.250	10			
F013	130.50	13.050	10			pH stirred
F014	275.00	27.500	10			
F015	163.00	16.300	10			pH Meter
F016	42.50	4.250	10	ELELELVLVLL L L	BIASED LOW	METER
F019	119.50	11.950	10	L		stirred
F020	51.00	5.100	10	ELELELELL L	BIASED LOW	Meter
F025	30.00	3.000	10	ELELELELVLELL L L	BIASED LOW	Meter
F026	138.50	13.850	10			stirred
F030	19.00	1.900	10	ELELELELELELELELELEL	BIASED LOW	pH Meter
F031	183.50	18.350	10	L VL L		Stirred
F032	357.00	35.700	10	EH H H	BIASED HIGH	
F033	344.50	34.450	10	H H	BIASED HIGH	RADIOMETER PH, STI
F034	230.00	23.000	10			Probe
F036	267.00	26.700	10			Meter
F038	18.50	1.850	10	ELELELELELELELVLELEL	BIASED LOW	Meter
F042	258.50	25.850	10			pH Meter
F043	319.50	31.950	10	H H	BIASED HIGH	Pot
F046	316.50	31.650	10	EH H		stirred
F048	210.00	21.000	10	L		
F057	146.00	14.600	10	EL		STIRRED
F059	202.50	20.250	10			stirred
F061	262.50	26.250	10			Stirred
F068	258.00	25.800	10			STIRRED
F069	99.00	9.900	10	L L L		Electromet.
F071	157.50	15.750	10			IONALYZER
F074	392.00	39.200	10	EHVHVHVHH VHH VHVH	BIASED HIGH	Meter
F080	176.00	17.600	10			pH Meter
F089	297.50	29.750	10	H		pH Meter
F090	165.50	18.389	9	H		UNSTIRRED
F091	353.50	35.350	10	H H	BIASED HIGH	ELECTRODE

OVERALL AVERAGE RANK IS 20.451

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F038	18.50	1.850	10	ELELELELELELELVLELEL	BIASED LOW	Meter
F030	19.00	1.900	10	ELELELELELELELELELEL	BIASED LOW	pH Meter
F025	30.00	3.000	10	ELELELELVLELLLL	BIASED LOW	Meter
F016	42.50	4.250	10	ELELELVLVLLLL	BIASED LOW	METER
F020	51.00	5.100	10	ELELELELLL	BIASED LOW	Meter
F069	99.00	9.900	10	LLL		Electromet.
F006	105.00	10.500	10			STIRRED
F019	119.50	11.950	10	L		stirred
F013	130.50	13.050	10			pH stirred
F026	138.50	13.850	10			stirred
F003	143.50	14.350	10	EH		ISFET PROBE
F057	146.00	14.600	10	EL		STIRRED
F071	157.50	15.750	10			IONALYZER
F015	163.00	16.300	10			pH Meter
F007	171.50	17.150	10	H		Stirred
F080	176.00	17.600	10			pH Meter
F031	183.50	18.350	10	LVLL		Stirred
F090	165.50	18.389	9	H		UNSTIRRED
F002	197.50	19.750	10			10301
F059	202.50	20.250	10			stirred
F048	210.00	21.000	10	L		
F001	218.50	21.850	10			pH Meter
F034	230.00	23.000	10			Probe
F009	236.50	23.650	10			Stirred
F011	242.50	24.250	10			
F004	246.50	24.650	10			10301
F068	258.00	25.800	10			STIRRED
F042	258.50	25.850	10			pH Meter
F061	262.50	26.250	10			Stirred
F036	267.00	26.700	10			Meter
F014	275.00	27.500	10			
F008	287.50	28.750	10			ELECTROMETRIC
F089	297.50	29.750	10	H		pH Meter
F046	316.50	31.650	10	EHH		stirred
F043	319.50	31.950	10	HH	BIASED HIGH	Pot
F010	327.00	32.700	10	HH	BIASED HIGH	
F033	344.50	34.450	10	HH	BIASED HIGH	RADIOMETER PH, STI
F091	353.50	35.350	10	HH	BIASED HIGH	ELECTRODE
F032	357.00	35.700	10	EHHH	BIASED HIGH	
F074	392.00	39.200	10	EHVHVHVHHVHHVHVH	BIASED HIGH	Meter

OVERALL AVERAGE RANK IS 20.451

pH

PARAMETER: 05091 Boron MG/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0050 BASIC ACCEPTABLE ERROR= .0050 CONCENTRATION ERROR INCREMENT= .1000

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
F001	.007	2.00	.002	3.00	.006	2.50	.020	3.00	.024	6.00	.017	2.50
F008	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00
F010	.007	2.00	.002	3.00	.008	5.00	.030 H	9.00	.037 VH	9.00	.029 VH	8.00
F014	.01T	6.50	0.0T	1.00	0.0T L	1.00	.02T	3.00	.02T	2.00	.04T EH	9.00
F019	<.01	0.00	<.01	0.00	.02 EH	7.00	.01 VL	1.00	.01 EL	1.00	.01 L	1.00
F020	.009	5.00	<.008	0.00	<.008	0.00	.022	6.00	.021	3.00	.017	2.50
F025	.01	6.50	<.01	0.00	.01	6.00	.02	3.00	.03	7.50	.02	6.00
F030	<.03	0.00	<.03	0.00	<.03	0.00	<.03	0.00	<.03	0.00	<.03	0.00
F033	.0078	4.00	.0032	5.00	.0063	4.00	.0212	5.00	.0236	5.00	.0189	4.00
F038	<.10	0.00	<.10	0.00	<.10	0.00	<.10	0.00	<.10	0.00	<.10	0.00
F043	<.016	0.00	<.016	0.00	<.016	0.00	<.016	0.00	<.016 L	0.00	<.016	0.00
F046	.007	2.00	.002	3.00	.006	2.50	.023	7.50	.023	4.00	.019	5.00
F059	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.05 EH	10.00	<.05	0.00
F069	.013	8.00	<.01	0.00	<.01	0.00	.023	7.50	.030	7.50	.022	7.00
F091	<.01	0.00	<.01	0.00	<.01	0.00	<.01 VL	0.00	<.01 EL	0.00	<.01 L	0.00
MEDIAN CONC.	.0084		.0020		.0063		.0212		.0238		.0190	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.075	5.50	.011	5.00	.011	2.50	.074	10.00
F008	.08	10.00	<.05	0.00	<.05	0.00	<.05 VL	0.00
F010	.095 H	14.00	.040 EH	7.00	.038 EH	9.00	.12 EH	13.00
F014	.08T	10.00	.01T	3.00	.02T H	7.50	.07T	7.00
F019	.05 EL	1.00	<.01	0.00	<.01	0.00	.05 VL	1.00
F020	.072	4.00	.010	3.00	.009	1.00	.068	5.00
F025	.08	10.00	.01	3.00	.02 H	7.50	.08	11.50
F030	.08	10.00	<.03	0.00	<.03	0.00	.07	7.00
F033	.0685	3.00	.0097	1.00	.0119	4.00	.0677	4.00
F038	<.10	0.00	<.10	0.00	<.10	0.00	<.10	0.00
F043	.058 VL	2.00	<.016	0.00	.016	6.00	.062	2.00
F046	.075	5.50	.013	6.00	.013	5.00	.073	9.00
F059	.09	13.00	<.05	0.00	<.05	0.00	.07	7.00
F069	.076	7.00	<.01	0.00	.011	2.50	.066	3.00
F091	.08	10.00	<.01	0.00	<.01	0.00	.08	11.50
MEDIAN CONC.	.0780		.0100		.0130		.0700	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	42.00	4.200	10			ICP5x/ICPMS
F008	10.00	10.000	1	VL	INSUFFICIENT DATA	AUTO
F010	79.00	7.900	10	H VHVHH EHEHEH		ICP
F014	50.00	5.000	10	L EH H		
F019	12.00	2.000	6	EHVLELL EL VL	BIASED LOW	ICP-aes
F020	29.50	3.688	8		BIASED LOW	ICP
F025	61.00	6.778	9	H		ICP
F030	17.00	8.500	2		INSUFFICIENT DATA	ICP
F033	39.00	3.900	10		BIASED LOW	ICP/DIRECT
F038	0.00	*******	0		INSUFFICIENT DATA	ICP
F043	10.00	3.333	3	L VL	INSUFFICIENT DATA	ICP
F046	49.50	4.950	10			ICP
F059	30.00	10.000	3	EH	INSUFFICIENT DATA	ICP
F069	42.50	6.071	7			Dcp
F091	21.50	10.750	2	VLELL	INSUFFICIENT DATA	ICP

OVERALL AVERAGE
RANK IS 5.418

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F038	0.00	*******	0		INSUFFICIENT DATA	ICP
F019	12.00	2.000	6	EHVLELLELVL	BIASED LOW	ICP-aes
F043	10.00	3.333	3	LVL	INSUFFICIENT DATA	ICP
F020	29.50	3.688	8		BIASED LOW	ICP
F033	39.00	3.900	10		BIASED LOW	ICP/DIRECT
F001	42.00	4.200	10			ICP5x/ICPMS
F046	49.50	4.950	10			ICP
F014	50.00	5.000	10	LEHH		
F069	42.50	6.071	7			Dcp
F025	61.00	6.778	9	H		ICP
F010	79.00	7.900	10	HVHVHHEHEHEH		ICP
F030	17.00	8.500	2		INSUFFICIENT DATA	ICP
F059	30.00	10.000	3	EH	INSUFFICIENT DATA	ICP
F008	10.00	10.000	1	VL	INSUFFICIENT DATA	AUTO
F091	21.50	10.750	2	VLELL	INSUFFICIENT DATA	ICP

OVERALL AVERAGE
RANK IS 5.418

PARAMETER: 06002 Diss Organic Carbon MG C/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 2.0000 BASIC ACCEPTABLE ERROR= .8000 CONCENTRATION ERROR INCREMENT= .1000

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
F001	3.5	14.50	.9	10.00	.4	7.00	1.7	13.50	12.	18.00	4.4	14.00
F002	3.6	17.00		0.00		0.00		0.00	7.0 EL	1.00	.60 EL	1.00
F003	3.0	6.50	1.0	13.50	.40	7.00	1.70	13.50	10.2	4.00	4.30	12.50
F004	3.31	11.00	1.00	13.50	.492	11.00	1.76	15.00	11.6	15.00	4.63	17.00
F006	4.0	20.50	1.3	17.00	.6	13.50	2.2	19.00	13.6 H	21.00	4.9	20.00
F008	7.2 EH	24.00	<1.0	0.00	<1.0	0.00	<1.0	0.00	11.8	17.00	<1.0 EL	0.00
F010	2.9	3.50	.6	3.50	.3	4.50	1.4	4.50	10.9	7.50	4.0	8.00
F014	3.6	17.00	1.0	13.50	0.0T	1.00	1.6	9.50	12.3	19.00	4.6	16.00
F015	4.9 VH	23.00	3.7 EH	20.00	2.5 EH	19.00	3.9 EH	20.00	18.4 EH	23.00	9.3 EH	22.00
F016	3.33	13.00	.84	7.00	.72	16.00	1.89	16.00	119. EH	24.00	4.88	19.00
F020	2.83	2.00	<1.0	0.00	<1.0	0.00	<1.0	0.00	9.6	3.00	3.08 L	4.00
F025	2.9	3.50	.6	3.50	.2	2.00	1.1	2.00	10.9	7.50	3.7	5.00
F026	2.93	5.00	.838	6.00	.428	9.00	1.418	6.00	11.17	10.00	3.970	7.00
F030	3.6	17.00	.26	2.00	<.10	0.00	1.5	7.50	17.3 EH	22.00	6.0 VH	21.00
F032	3.0	6.50	.9	10.00	.5	12.00	1.6	9.50	11.3	12.00	4.1	9.50
F035	3.1	9.00	.08 L	1.00	.3	4.50	1.4	4.50	11.3	12.00	4.1	9.50
F038	3.32	12.00	1.06	16.00	.66	15.00	1.62	11.00	12.7	20.00	4.30	12.50
F042	3.27	10.00	.88	8.00	.44	10.00	1.65	12.00	11.5	14.00	4.18	11.00
F046	4.19	22.00	3.09 EH	19.00	1.02	18.00	.42 L	1.00	7.45 EL	2.00	1.81 EL	2.00
F048	3.016	8.00	.698	5.00	.289	3.00	1.979	17.00	10.35	5.00		0.00
F061	4.0	20.50	<1.0	0.00	<1.0	0.00	<1.0	0.00	10.5	6.00	3.0 L	3.00
F069	3.5	14.50	.9	10.00	.4	7.00	1.5	7.50	11.	9.00	4.5	15.00
F074	3.96	19.00	1.44	18.00	.84	17.00	2.04	18.00	11.76	16.00	4.68	18.00
F091	2.7	1.00	1.0	13.50	.6	13.50	1.3	3.00	11.3	12.00	3.8	6.00
MEDIAN CONC.	3.3250		.9000		.4400		1.6100		11.3000		4.2400	

PARAMETER: 06002 Diss Organic Carbon MG C/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	6.0	17.00	8.9	15.50	.6	3.50	2.2	8.50
F002	.60 EL	1.00		0.00		0.00		0.00
F003	5.7	13.50	8.1	7.00	1.4	16.00	2.6	13.00
F004	6.35	20.00	9.40	19.00	1.26	14.00	2.89	15.00
F006	7.1 H	22.00	10.5 H	21.00	1.3	15.00	4.1 EH	18.00
F008	5.0	5.00	7.2	3.00	<1.0	0.00	<1.0 L	0.00
F010	5.4	7.50	7.1	2.00	.5	2.00	1.9	3.00
F014	6.4	21.00	10.3 H	20.00	1.0	12.00		0.00
F015	18.2 EH	24.00	26.0 EH	23.00	11.0 EH	18.00	12.7 EH	19.00
F016	6.06	18.00	8.21	10.00	.81	9.00	2.72	14.00
F020	4.02 L	4.00	7.41	4.00	<1.0	0.00	<1.0 L	0.00
F025	5.3	6.00	8.0	5.00	.3	1.00	1.8	1.50
F026	5.670	12.00	8.006	6.00	.796	8.00	1.973	4.00
F030	8.7 EH	23.00	15.4 EH	22.00	1.7 H	17.00	3.3 H	17.00
F032	5.5	9.50	8.2	8.50	.7	5.50	1.8	1.50
F035	5.4	7.50	8.9	15.50	.6	3.50	2.2	8.50
F038	5.92	16.00	8.55	12.00	.86	10.00	2.23	10.00
F042	5.79	15.00	8.69	13.00	.72	7.00	2.43	11.00
F046	1.86 EL	2.00	4.16 EL	1.00	<.01 L	0.00	2.08	5.00
F048	5.571	11.00	8.766	14.00		0.00	2.174	7.00
F061	3.0 EL	3.00	8.2	8.50	<1.0	0.00	<1.0 L	0.00
F069	5.7	13.50	8.4	11.00	.7	5.50	2.5	12.00
F074	6.24	19.00	9.12	18.00	1.20	13.00	3.00	16.00
F091	5.5	9.50	9.0	17.00	.9	11.00	2.1	6.00
MEDIAN CONC.	5.6850		8.5500		.8350		2.2300	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	121.50	12.150	10			Auto UV Color
F002	20.00	5.000	4	ELELEL	INSUFFICIENT DATA	Shimadzu
F003	106.50	10.650	10			Uvir detection
F004	150.50	15.050	10			06104
F006	187.00	18.700	10	H H H EH	BIASED HIGH	UV PERSULPHATE
F008	49.00	12.250	4	EH EL L	INSUFFICIENT DATA	AUTO
F010	46.00	4.600	10		BIASED LOW	Conduct.
F014	129.00	14.333	9	H		
F015	211.00	21.100	10	VHEHEHEHEHEHEHEHEHEH	BIASED HIGH	Auto Carbon Analyz
F016	146.00	14.600	10	EH		
F020	17.00	3.400	5	L L L	BIASED LOW	
F025	37.00	3.700	10		BIASED LOW	IR
F026	73.00	7.300	10			AA
F030	148.50	16.500	9	EHVHEHEHH H		UV/Persulfate
F032	84.50	8.450	10			
F035	75.50	7.550	10	L		Colour
F038	134.50	13.450	10			Meter
F042	111.00	11.100	10			IR
F046	72.00	8.000	9	EH L ELELELELL		TOC
F048	70.00	8.750	8			NDIR
F061	41.00	8.200	5	L EL L		TOC
F069	105.00	10.500	10			Wet Oxide.
F074	172.00	17.200	10			Per. IR
F091	92.50	9.250	10			AUTOMATED COLOUR

OVERALL AVERAGE RANK IS 11.268

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F020	17.00	3.400	5	LLL	BIASED LOW	
F025	37.00	3.700	10		BIASED LOW	IR
F010	46.00	4.600	10		BIASED LOW	Conduct.
F002	20.00	5.000	4	ELELEL	INSUFFICIENT DATA	Shimadzu
F026	73.00	7.300	10			AA
F035	75.50	7.550	10	L		Colour
F046	72.00	8.000	9	EHLELELELELL		TOC
F061	41.00	8.200	5	LELL		TOC
F032	84.50	8.450	10			
F048	70.00	8.750	8			NDIR
F091	92.50	9.250	10			AUTOMATED COLOUR
F069	105.00	10.500	10			Wet Oxide.
F003	106.50	10.650	10			Uvir detection
F042	111.00	11.100	10			IR
F001	121.50	12.150	10			Auto UV Color
F008	49.00	12.250	4	EHELL	INSUFFICIENT DATA	AUTO
F038	134.50	13.450	10			Meter
F014	129.00	14.333	9	H		
F016	146.00	14.600	10	EH		
F004	150.50	15.050	10			06104
F030	148.50	16.500	9	EHVHEHEHHH		UV/Persulfate
F074	172.00	17.200	10			Per. IR
F006	187.00	18.700	10	HHHEH	BIASED HIGH	UV PERSULPHATE
F015	211.00	21.100	10	VHEHEHEHEHEHEHEHEHEH	BIASED HIGH	Auto Carbon Analyz

OVERALL AVERAGE RANK IS 11.268

Diss Organic Carbon

PARAMETER: 06592 Diss Inorg Carbon MG C/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .5000 BASIC ACCEPTABLE ERROR= .5000 CONCENTRATION ERROR INCREMENT= .1250

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
F001	3.1	4.00	11.9	4.00	4.9	4.00	20.8	6.50	31.9	4.00	30.5	8.50
F003	3.6	13.50	12.3	7.50	5.5	8.50	20.9	8.00	32.4	6.00	30.3	7.00
F008	2.4 L	3.00	10.7	2.00	3.8 VL	3.00	19.5	2.00	32.5	7.00	29.2	4.00
F010	3.5	10.50	12.5	10.00	5.5	8.50	20.5	3.00	33.	11.00	31.	12.50
F015	3.5	10.50	12.1	6.00	5.7	12.50	21.5	10.00	33.1	13.50	31.6	16.00
F016	3.55	12.00	13.4	15.50	5.68	11.00	22.0	14.00	33.2	15.00	31.1	14.00
F025	3.2	5.50	13.7	17.00	5.7	12.50	23.3	17.00	36.5	17.00	33.8	17.00
F026	3.36	9.00	12.33	9.00	5.44	7.00	20.61	5.00	30.96	2.00	28.95	3.00
F030	4.7 H	18.00	18.3 EH	19.00	7.3 H	19.00	32. EH	19.00	47. EH	19.00	45. EH	19.00
F032	3.2	5.50	12.	5.00	5.4	6.00	20.8	6.50	32.	5.00	29.8	6.00
F036	3.94	17.00	15.47 H	18.00	5.75	14.00	24.23	18.00	36.58	18.00	34.20	18.00
F038	2.3 L	2.00	11.2	3.00	3.1 EL	2.00	22.5	16.00	34.6	16.00	21.2 EL	1.00
F042	3.92	16.00	13.4	15.50	5.88	16.50	22.0	14.00	33.1	13.50	31.2	15.00
F046	3.30	8.00	13.2	14.00	5.65	10.00	21.5	10.00	33.0	11.00	30.5	8.50
F061	1.1 EL	1.00	7.3 EL	1.00	2.3 EL	1.00	14.5 EL	1.00	23.9 VL	1.00	21.6 EL	2.00
F069	3.8	15.00	13.0	13.00	5.8	15.00	22.	14.00	33.	11.00	31.	12.50
F071	3.24	7.00	12.3	7.50	5.35	5.00	20.6	4.00	31.6	3.00	29.4	5.00
F074	3.60	13.50	12.84	11.00	5.88	16.50	21.72	12.00	32.76	9.00	30.96	11.00
F091	6.0 EH	19.00	12.9	12.00	7.0 H	18.00	21.5	10.00	32.6	8.00	30.8	10.00
MEDIAN CONC.	3.5000		12.5000		5.6500		21.5000		33.0000		30.8000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	39.6	8.50	50.1	15.00	34.5	12.00	29.8	7.50
F003	39.0	5.00	50.2	16.00	33.8	7.50	30.0	10.50
F008	39.6	8.50	46.8	9.00	30.5	2.00	28.9	4.00
F010	41.	16.00	32. EL	3.00	35.	14.50	32.	16.00
F015	40.6	15.00	50.4	18.00	32.6	4.00	28.0	3.00
F016	40.1	12.00	28.0 EL	1.00	34.1	10.00	30.7	14.00
F025	44.4	18.00	49.8	14.00	37.6	17.00	33.1	17.00
F026	37.21	3.00	45.15	7.00	30.98	3.00	29.05	5.00
F030	56. EH	19.00	73. EH	19.00	51. EH	19.00	42. EH	19.00
F032	39.2	6.00	48.	12.00	33.2	6.00	29.8	7.50
F036	43.71	17.00	50.36	17.00	37.05	16.00	33.25	18.00
F038	26.2 EL	1.00	35.8 VL	4.00	40.7 H	18.00	23.3 VL	2.00
F042	39.8	10.00	45.4	8.00	34.8	13.00	30.8	15.00
F046	39.4	7.00	29.8 EL	2.00	33.8	7.50	29.9	9.00
F061	29.8 VL	2.00	36.3 VL	5.00	25.3 VL	1.00	21.0 EL	1.00
F069	40.	11.00	45.	6.00	35.	14.50	30.	10.50
F071	38.6	4.00	47.3	11.00	33.0	5.00	29.4	6.00
F074	40.44	14.00	47.16	10.00	34.20	11.00	30.36	13.00
F091	40.4	13.00	49.6	13.00	33.9	9.00	30.2	12.00
MEDIAN CONC.	39.8000		47.1600		34.1000		30.0000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	74.00	7.400	10			Auto Color
F003	89.50	8.950	10			IR Detec.
F008	44.50	4.450	10	L VL	BIASED LOW	AUTO
F010	105.00	10.500	10	EL		Conductivimetrie
F015	108.50	10.850	10			Auto Color
F016	118.50	11.850	10	EL		
F025	152.00	15.200	10		BIASED HIGH	IR
F026	53.00	5.300	10			AA
F030	189.00	18.900	10	H EHH EHEHEHEHEHEHEH	BIASED HIGH	UV/Pers.
F032	65.50	6.550	10			
F036	171.00	17.100	10	H	BIASED HIGH	Colour
F038	65.00	6.500	10	L EL ELELVLH VL		Dig-Colour
F042	136.50	13.650	10			IR
F046	87.00	8.700	10	EL		TOC
F061	16.00	1.600	10	ELELELELVLELVLVLVLEL	BIASED LOW	TOC
F069	122.50	12.250	10			Acid Purge
F071	57.50	5.750	10			CO2 GENERATION
F074	121.00	12.100	10			IR
F091	124.00	12.400	10	EH H		AUTOMATED COLOUR

OVERALL AVERAGE RANK IS 10.000

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F061	16.00	1.600	10	ELELELELVLELVLVLVLEL	BIASED LOW	TOC
F008	44.50	4.450	10	LVL	BIASED LOW	AUTO
F026	53.00	5.300	10			AA
F071	57.50	5.750	10			CO2 GENERATION
F038	65.00	6.500	10	LELELELVLHVL		Dig-Colour
F032	65.50	6.550	10			
F001	74.00	7.400	10			Auto Color
F046	87.00	8.700	10	EL		TOC
F003	89.50	8.950	10			IR Detec.
F010	105.00	10.500	10	EL		Conductivimetrie
F015	108.50	10.850	10			Auto Color
F016	118.50	11.850	10	EL		
F074	121.00	12.100	10			IR
F069	122.50	12.250	10			Acid Purge
F091	124.00	12.400	10	EHH		AUTOMATED COLOUR
F042	136.50	13.650	10			IR
F025	152.00	15.200	10		BIASED HIGH	IR
F036	171.00	17.100	10	H	BIASED HIGH	Colour
F030	189.00	18.900	10	HEHHEHEHEHEHEHEHEH	BIASED HIGH	UV/Pers.

OVERALL AVERAGE RANK IS 10.000

Diss Inorg Carbon

PARAMETER: 06192 Total Alkalinity MG/LCACO3

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= .5000 CONCENTRATION ERROR INCREMENT= .0700

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
F001	16.	26.50	54.	26.50	24.	24.00	91.	27.50	141.	23.50	129.	17.00
F003	13.4	5.50	50.2	5.00	21.7	3.00	89.0	16.50	139.	17.00	129.	17.00
F006	16.	26.50	54.	26.50	25.	30.50	91.	27.50	140.	20.00	130.	23.50
F007	14.1	14.50	53.2	22.00	22.8	13.50	90.2	24.00	141.	23.50	130.	23.50
F008	15.1	19.00	53.7	24.50	23.4	18.00	88.6	12.50	138.	13.50	128.	13.50
F009	15.	18.00	53.	20.00	23.	16.50	89.	16.50	139.	17.00	127.	10.00
F010	13.4	5.50	51.	10.50	22.	6.50	86.	4.00	137.	9.50	127.	10.00
F011	13.9	11.50	50.8	8.00	26.3 H	34.00	96.1 H	35.00	157. VH	35.00	144. VH	35.00
F013	14.17	16.00	50.6	6.00	21.76	4.00	87.03	5.00	136.62	8.00	125.99	3.00
F014	15.15	20.00	50.71	7.00	23.56	19.00	89.09	19.00	139.	17.00	128.	13.50
F015	13.7	8.00	51.6	13.00	22.2	9.00	88.0	8.50	138.	13.50	127.	10.00
F016	14.	13.00	49.	2.00	22.	6.50	85.	3.00	136.	6.00	125.	2.00
F019	13. L	3.50	50.	3.50	22.	6.50	84.	2.00	134.	2.50	132.	29.00
F020	12.10 VL	1.00	55.3	33.00	18.8 EL	1.00	90.0	22.50	141.	23.50	129.	17.00
F025	15.9	24.00	54.4	29.50	24.4	26.00	92.2	32.00	142.	27.00	132.	29.00
F026	13.61	7.00	52.52	17.00	22.29	10.00	89.64	21.00	141.0	23.50	129.8	21.00
F030	18.0 EH	33.00	50.0	3.50	24.5	27.00	89.0	16.50	135.	4.00	124.	1.00
F031	13. L	3.50	51.	10.50	24.	24.00	89.	16.50	134.	2.50	132.	29.00
F032	15.8	23.00	54.4	29.50	24.6	28.00	91.7	30.00	144.	31.50	133.	32.50
F033	16.	26.50	53.	20.00	24.	24.00	88.	8.50	140.	20.00	130.	23.50
F034	17.0 VH	31.00	54.6	31.00	24.9	29.00	92.0	31.00	143.2	30.00	132.4	31.00
F035		0.00	56.4	34.00	25.7 H	32.00	89.5	20.00	145.	33.00	133.	32.50
F036	15.45	21.00	52.91	18.00	23.65	21.00	88.76	14.00	137.7	11.00	126.7	7.00
F038	13.8	9.50	53.4	23.00	22.9	15.00	91.1	29.00	142.	27.00	129.	17.00
F042	14.2	17.00	53.0	20.00	22.8	13.50	90.3	25.00	142.	27.00	131.	27.00
F046	17.3 VH	32.00	50.9	9.00	23.0	16.50	88.3	11.00	136.	6.00	127.	10.00
F048	16.88 VH	30.00	54.31	28.00	26.27 H	33.00	93.65	33.00	142.13	29.00	130.71	26.00
F059	19.6 EH	34.00	58.6 H	35.00	28.1 EH	35.00	95.4	34.00	147.	34.00	135.	34.00
F061	16.4 H	29.00	52.2	16.00	23.6	20.00	87.4	6.00	136.	6.00	126.	5.00
F069	15.5	22.00	53.7	24.50	23.8	22.00	90.6	26.00	140.	20.00	129.	17.00
F071	13.9	11.50	51.3	12.00	22.4	11.50	87.7	7.00	137.	9.50	126.	5.00
F074	13.8	9.50	52.0	15.00	22.4	11.50	88.6	12.50	138.0	13.50	129.2	20.00
F080	12.2 VL	2.00	51.8	14.00	21.2 L	2.00	88.2	10.00	138.	13.50	127.	10.00
F089	14.1	14.50	47. L	1.00	22.	6.50	80. L	1.00	124. L	1.00	126.	5.00
F091	16.	26.50	55.	32.00	25.	30.50	90.	22.50	144.	31.50	130.	23.50
MEDIAN CONC.	14.6000		52.9100		23.4000		89.0000		139.0000		129.0000	

PARAMETER: 06192 Total Alkalinity MG/LCACO3

SAMPLE LAB NO	7 REPORTED VALUE	7 RANK	8 REPORTED VALUE	8 RANK	9 REPORTED VALUE	9 RANK	10 REPORTED VALUE	10 RANK
F001	169.	21.50	218.	30.00	144.	24.50	129.	20.00
F003	170.	25.00	214.	26.00	140.	7.50	127.	13.50
F006	169.	21.50	140. EL	4.00	144.	24.50	130.	26.00
F007	170.	25.00	184. VL	6.00	145.	28.00	129.	20.00
F008	168.	17.00	208.	19.00	141.	15.00	128.	16.00
F009	167.	13.00	220.	31.00	142.	17.50	128.	16.00
F010	167.	13.00	134. EL	3.00	140.	7.50	130.	26.00
F011	184. H	35.00	154. EL	5.00	165. EH	35.00	130.	26.00
F013	164.96	5.00	212.52	25.00	140.16	12.00	124.98	6.00
F014	167.	13.00	198.	10.50	142.	17.50	127.	13.50
F015	165.	7.00	221.	32.50	141.	15.00	125.	8.50
F016	178.	34.00	103. EL	1.00	139.	2.50	122.	2.00
F019	160.	1.00	196.	7.00	140.	7.50	125.	8.50
F020	168.	17.00	217.	28.50	143.	19.50	128.	16.00
F025	171.	27.00	211.	24.00	145.	28.00	130.	26.00
F026	168.8	19.00	209.6	21.00	143.7	22.00	128.7	18.00
F030	167.	13.00	221.	32.50	139.	2.50	124.	4.50
F031	166.	10.00	207.	17.00	140.	7.50	137.	35.00
F032	173.	31.00	217.	28.50	148.	32.00	131.	30.00
F033	165.	7.00	200.	14.00	140.	7.50	130.	26.00
F034	172.8	30.00	197.9	8.00	147.2	30.00	131.5	31.00
F035	175.	33.00	227. H	35.00	148.	32.00	133.	33.00
F036	164.7	4.00	202.9	15.00	140.0	7.50	125.5	12.00
F038	172.	29.00	198.	10.50	145.	28.00	130.	26.00
F042	170.	25.00	207.	17.00	144.	24.50	132.	32.00
F046	169.	21.50	128. EL	2.00	138.	1.00	124.	4.50
F048	171.31	28.00	209.38	20.00	143.65	21.00	129.44	22.00
F059	174.	32.00	224. H	34.00	149.	34.00	134.	34.00
F061	164.	3.00	210.	22.50	140.	7.50	103. EL	1.00
F069	169.	21.50	198.	10.50	144.	24.50	129.	20.00
F071	165.	7.00	207.	17.00	140.	7.50	125.	8.50
F074	165.7	9.00	199.3	13.00	140.6	13.00	125.2	11.00
F080	167.	13.00	198.	10.50	141.	15.00	125.	8.50
F089	162.	2.00	210.	22.50	148.	32.00	123.	3.00
F091	168.	17.00	216.	27.00	143.	19.50	130.	26.00
MEDIAN CONC.	168.0000		207.0000		142.0000		128.7000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	241.00	24.100	10			Auto Titration
F003	136.00	13.600	10			Potentiometric
F006	230.50	23.050	10	EL		0.02 H2SO4 TITRATI
F007	200.00	20.000	10	VL		
F008	168.00	16.800	10			POTENTIOMETER
F009	175.50	17.550	10			Titration
F010	95.50	9.550	10	EL		Titration conducti
F011	259.50	25.950	10	H H VHVHH ELEH		
F013	90.00	9.000	10			Titr.
F014	150.00	15.000	10			
F015	125.00	12.500	10			Titration
F016	72.00	7.200	10	EL	BIASED LOW	
F019	71.00	7.100	10	L	BIASED LOW	Titrn
F020	179.00	17.900	10	VL EL		Auto.
F025	272.50	27.250	10			Titration
F026	179.50	17.950	10			Titro
F030	137.50	13.750	10	EH		Titn
F031	155.50	15.550	10	L		Titration
F032	296.00	29.600	10		BIASED HIGH	
F033	177.00	17.700	10			AUTO-TITRATION
F034	282.00	28.200	10	VH	BIASED HIGH	Titrimetric
F035	284.50	31.611	9	H H	BIASED HIGH	Colour
F036	130.50	13.050	10			Titr'n
F038	214.00	21.400	10			Titrimetric
F042	228.00	22.800	10			ANC
F046	113.50	11.350	10	VH EL		Tit.
F048	270.00	27.000	10	VH H		Titration
F059	340.00	34.000	10	EHH EH H	BIASED HIGH	Titration/calc.
F061	116.00	11.600	10	H EL		Titration
F069	208.00	20.800	10			Fixed End Pt.
F071	96.50	9.650	10			AUTO TITRATOR
F074	128.00	12.800	10			Gran
F080	98.50	9.850	10	VL L		Titration
F089	88.50	8.850	10	L L L		End Pt.4.5
F091	256.00	25.600	10			TITRATION

OVERALL AVERAGE RANK IS 17.951

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F019	71.00	7.100	10	L	BIASED LOW	Titrn
F016	72.00	7.200	10	EL	BIASED LOW	
F089	88.50	8.850	10	LLL		End Pt.4.5
F013	90.00	9.000	10			Titr.
F010	95.50	9.550	10	EL		Titration conducti
F071	96.50	9.650	10			AUTO TITRATOR
F080	98.50	9.850	10	VLL		Titration
F046	113.50	11.350	10	VHEL		Tit.
F061	116.00	11.600	10	HEL		Titration
F015	125.00	12.500	10			Titration
F074	128.00	12.800	10			Gran
F036	130.50	13.050	10			Titr'n
F003	136.00	13.600	10			Potentiometric
F030	137.50	13.750	10	EH		Titn
F014	150.00	15.000	10			
F031	155.50	15.550	10	L		Titration
F008	168.00	16.800	10			POTENTIOMETER
F009	175.50	17.550	10			Titration
F033	177.00	17.700	10			AUTO-TITRATION
F020	179.00	17.900	10	VLEL		Auto.
F026	179.50	17.950	10			Titro
F007	200.00	20.000	10	VL		
F069	208.00	20.800	10			Fixed End Pt.
F038	214.00	21.400	10			Titrimetric
F042	228.00	22.800	10			ANC
F006	230.50	23.050	10	EL		0.02 H2SO4 TITRATI
F001	241.00	24.100	10			Auto Titration
F091	256.00	25.600	10			TITRATION
F011	259.50	25.950	10	HHVHVHHELEH		
F048	270.00	27.000	10	VHH		Titration
F025	272.50	27.250	10			Titration
F034	282.00	28.200	10	VH	BIASED HIGH	Titrimetric
F032	296.00	29.600	10		BIASED HIGH	
F035	284.50	31.611	9	HH	BIASED HIGH	Colour
F059	340.00	34.000	10	EHHEHH	BIASED HIGH	Titration/calc.

OVERALL AVERAGE RANK IS 17.951

Total Alkalinity

PARAMETER: 07092 Nitrate + Nitrite MG N/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0200 BASIC ACCEPTABLE ERROR= .0200 CONCENTRATION ERROR INCREMENT= .0800

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
F001	<.005	0.00	.133	12.00	.040	8.50	.281	23.50	<.005	0.00	.061	22.00
F002		0.00	.13	9.50	.06	26.50	.23 L	4.50		0.00		0.00
F003	<.005	0.00	.134	13.50	.042	14.50	.262	8.00	<.005	0.00	.047	7.00
F004	<.01	0.00	.138	22.00	.045	19.00	.287	25.00	<.01	0.00	.060	16.50
F006	<.02	0.00	.12	5.00	.03	2.00	.22 L	2.50	<.02	0.00	<.02 VL	0.00
F007	<.05	0.00	.14	26.00	<.05	0.00	.29	27.00	<.05	0.00	.05	8.50
F008	<.01	0.00	.14	26.00	.05	23.50	.28	19.50	<.01	0.00	.07	27.50
F010	<.010	0.00	.11	2.50	.035	4.50	.22 L	2.50	<.010	0.00	.025 VL	1.00
F011	<.008	0.00	.130	9.50	.054	25.00	.268	11.00	<.008	0.00	.026 L	2.50
F013	<.1	0.00	.22 EH	35.00	.11 EH	31.00	.35 VH	35.00	<.1	0.00	.18 EH	32.00
F014	0.0T	1.00	.14	26.00	.04T	8.50	.30	28.50	0.0T	1.00	.06	16.50
F015	.005	4.50	.136	19.00	.043	17.50	.278	16.00	.006	5.00	.062	24.00
F016	.01	7.50	.12	5.00	.04	8.50	.27	13.00		0.00	.04	5.50
F019	<.02	0.00	.12	5.00	.03	2.00	.24	6.00	<.02	0.00	.03 L	4.00
F020	<.02	0.00	.123	7.00	.035	4.50	.255	7.00	<.02	0.00	.026 L	2.50
F025	<.003	0.00	.135	16.00	.042	14.50	.280	19.50	<.003	0.00	.061	22.00
F026	.005	4.50	.136	19.00	.046	20.50	.274	15.00	.007	6.00	.060	16.50
F030	.01	7.50	.14	26.00	.04	8.50	.28	19.50	.03 H	10.00	.07	27.50
F031	<.01	0.00	.13	9.50	.03	2.00	.27	13.00	<.01	0.00	.05	8.50
F032	.005T	4.50	.140	26.00	.040	8.50	.280	19.50	.005T	3.50	.040	5.50
F033		0.00	.14	26.00		0.00	.289	26.00		0.00	.067	26.00
F034	<.02	0.00	.16	32.50	.06	26.50	.32	32.50	<.02	0.00	.06	16.50
F035	.08 EH	11.00	.19 VH	34.00	.10 EH	30.00	.31	30.50	.06 EH	11.00	.17 EH	31.00
F036	<.003	0.00	.152	31.00	.049	22.00	.300	28.50	<.004	0.00	.073	30.00
F038	<.005	0.00	.135	16.00	.042	14.50	.280	19.50	<.005	0.00	.061	22.00
F042	<.005	0.00	.136	19.00	.043	17.50	.281	23.50	<.005	0.00	.060	16.50
F046	<.02	0.00	.15	30.00	.068 H	29.00	.31	30.50	.023	8.00	.066	25.00
F048	.020	9.00	.095 L	1.00	.062	28.00	.351 VH	36.00	.029 H	9.00	.072	29.00
F061	<.05	0.00	.11	2.50	<.05	0.00	.32	32.50	<.05	0.00	<.05	0.00
F068		0.00	.137	21.00	.042	14.50	.263	9.50		0.00	.053	11.00
F069	.029 H	10.00	.130	9.50	.046	20.50	.263	9.50	.010	7.00	.051	10.00
F071	.005	4.50	.135	16.00	.040	8.50	.280	19.50	.005	3.50	.058	12.00
F074	.001	2.00	.134	13.50	.041	12.00	.125 EL	1.00	.004	2.00	.060	16.50
F080	<.06	0.00	.14	26.00	<.06	0.00	.27	13.00	<.06	0.00	.06	16.50
F089	.1W	0.00	.1W	0.00	.1W	0.00	.23 L	4.50	.1W	0.00	.1W	0.00
F091	<.05	0.00	.16	32.50	.05	23.50	.33 H	34.00	<.05	0.00	.06	16.50
MEDIAN CONC.	.0050		.1360		.0420		.2800		.0070		.0600	

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
F001	.032	12.00	.694	24.00	3.46	23.50	1.63	16.50
F002		0.00	.68	16.00	3.25	6.00	1.72	28.00
F003	.026	4.00	.481 EL	1.00	3.04 L	3.00	1.59	10.00
F004	.033	17.00	.708	28.00	3.50	27.50	1.64	19.00
F006	<.02	0.00	.52 EL	2.00	3.4	16.50	1.04 EL	1.00
F007	<.05	0.00	.67	11.50	3.65	35.00	1.77	30.00
F008	.04	20.50	.70	25.50	3.49	25.00	1.68	24.00
F010	.010 L	1.00	.55 VL	4.00	2.9 VL	2.00	1.2 EL	2.00
F011	.033	17.00	.706	27.00	5.25 EH	36.00	3.49 EH	35.00
F013	.12 EH	27.00	.73	31.00	3.31	8.00	1.70	26.00
F014	.03T	6.50	.76 H	34.50	3.6	34.00	1.7	26.00
F015	.033	17.00	.672	14.00	3.34	9.00	1.57	7.00
F016	.03	6.50	.68	16.00	3.37	11.00	1.58	8.00
F019	<.02	0.00	.67	11.50	3.39	14.00	1.59	10.00
F020	<.02	0.00	.670	11.50	3.15	4.00	1.50	3.50
F025	.032	12.00	.700	25.50	3.45	22.00	1.61	14.00
F026	.035	19.00	.655	6.00	3.30	7.00	1.63	16.50
F030	.05	23.00	.66	8.50	3.40	16.50	1.84 H	32.00
F031	.02	2.50	.71	29.00	3.36	10.00	1.56	6.00
F032	.030	6.50	.690	21.00	3.43	21.00	1.59	10.00
F033		0.00	.685	18.00	3.50	27.50	1.61	14.00
F034	.02	2.50	.76 H	34.50	3.50	27.50	1.86 H	33.00
F035	.13 EH	28.00	.75	32.50	3.4	16.50	1.6	12.00
F036	.040	20.50	.691	22.00	3.500	27.50	1.650	21.00
F038	.032	12.00	.693	23.00	3.42	19.50	1.61	14.00
F042	.032	12.00	.687	19.00	3.38	12.50	1.65	21.00
F046	.047	22.00	.67	11.50	3.54	32.00	1.81 H	31.00
F048	.053 H	24.00	.761 H	36.00	2.490 EL	1.00	1.878 VH	34.00
F061	<.05	0.00	.66	8.50	3.57	33.00	1.52	5.00
F068	.032	12.00	.680	16.00	3.501	30.00	1.638	18.00
F069	.032	12.00	.656	7.00	3.46	23.50	1.65	21.00
F071	.030	6.50	.688	20.00	3.42	19.50	1.66	23.00
F074	.032	12.00	.712	30.00	3.505	31.00	1.738	29.00
F080	.06 H	25.50	.61 L	5.00	3.38	12.50	21.8 EH	36.00
F089	.1W	0.00	.53 EL	3.00	3.4	16.50	1.50	3.50
F091	.06 H	25.50	.75	32.50	3.24	5.00	1.70	26.00
MEDIAN CONC.	.0320		.6860		3.4100		1.6390	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	142.00	17.750	8			Cd Redn Auto Color
F002	90.50	15.083	6	L		07315
F003	61.00	7.625	8	ELL	BIASED LOW	Cd Coil
F004	174.00	21.750	8			07110
F006	29.00	4.833	6	L VL EL EL	BIASED LOW	AUTO ANAL II
F007	138.00	23.000	6			
F008	191.50	23.938	8			FIA
F010	19.50	2.438	8	L VLL VLVLEL	BIASED LOW	Hydrazine SO4
F011	163.00	20.375	8	L EHEH		
F013	225.00	28.125	8	EHEHVH EHEH	BIASED HIGH	AA2 CD
F014	182.50	18.250	10	H		
F015	133.00	13.300	10			IC
F016	81.00	9.000	9			AA
F019	52.50	7.500	7	L		IC
F020	40.00	5.714	7	L	BIASED LOW	Auto Cd
F025	145.50	18.188	8			Colorimetric
F026	130.00	13.000	10			AA
F030	179.00	17.900	10	H H		Auto cd
F031	80.50	10.063	8			IC
F032	126.00	12.600	10			
F033	137.50	22.917	6			AUTO-COLOURIMETRIC
F034	205.50	25.688	8	H H		Colourimetric
F035	236.50	23.650	10	EHVHEH EHEHEH		Colour
F036	202.50	25.313	8			Colour
F038	140.50	17.563	8			Colour
F042	141.00	17.625	8			IC
F046	219.00	24.333	9	H H		AA
F048	207.00	20.700	10	L VHH H H ELVH		Auto.
F061	81.50	16.300	5			ION Chrom.
F068	132.00	16.500	8			IC
F069	130.00	13.000	10	H		Color
F071	133.00	13.300	10			COLORIMETRIC
F074	149.00	14.900	10	EL		AA
F080	134.50	19.214	7	H L EH		IC + Color
F089	27.50	6.875	4	L EL	INSUFFICIENT DATA	Colorim.
F091	195.50	24.438	8	H H		AUTOMATED COLOUR

OVERALL AVERAGE RANK IS 16.630

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F010	19.50	2.438	8	LVLLVLVLEL	BIASED LOW	Hydrazine SO4
F006	29.00	4.833	6	LVLELEL	BIASED LOW	AUTO ANAL II
F020	40.00	5.714	7	L	BIASED LOW	Auto Cd
F089	27.50	6.875	4	LEL	INSUFFICIENT DATA	Colorim.
F019	52.50	7.500	7	L		IC
F003	61.00	7.625	8	ELL	BIASED LOW	Cd Coil
F016	81.00	9.000	9			AA
F031	80.50	10.063	8			IC
F032	126.00	12.600	10			
F026	130.00	13.000	10			AA
F069	130.00	13.000	10	H		Color
F015	133.00	13.300	10			IC
F071	133.00	13.300	10			COLORIMETRIC
F074	149.00	14.900	10	EL		AA
F002	90.50	15.083	6	L		07315
F061	81.50	16.300	5			ION Chrom.
F068	132.00	16.500	8			IC
F038	140.50	17.563	8			Colour
F042	141.00	17.625	8			IC
F001	142.00	17.750	8			Cd Redn Auto Color
F030	179.00	17.900	10	HH		Auto cd
F025	145.50	18.188	8			Colorimetric
F014	182.50	18.250	10	H		
F080	134.50	19.214	7	HLEH		IC + Color
F011	163.00	20.375	8	LEHEH		
F048	207.00	20.700	10	LVHHHHELVH		Auto.
F004	174.00	21.750	8			07110
F033	137.50	22.917	6			AUTO-COLOURIMETRIC
F007	138.00	23.000	6			
F035	236.50	23.650	10	EHVHEHEHEHEH		Colour
F008	191.50	23.938	8			FIA
F046	219.00	24.333	9	HH		AA
F091	195.50	24.438	8	HH		AUTOMATED COLOUR
F036	202.50	25.313	8			Colour
F034	205.50	25.688	8	HH		Colourimetric
F013	225.00	28.125	8	EHEHVHEHEH	BIASED HIGH	AA2 CD

OVERALL AVERAGE RANK IS 16.630

Nitrate + Nitrite

PARAMETER: 07192 Ammonia MG N/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0050 BASIC ACCEPTABLE ERROR= .0050 CONCENTRATION ERROR INCREMENT= .1500

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
F001	.024	11.00	<.001	0.00	.003	3.50	<.001	0.00	.010	10.00	.002	5.00
F003	.022	8.00	.003	3.50	.004	5.00	.003	6.50	.010	10.00	.002	5.00
F004	.024	11.00	<.005	0.00	<.005	0.00	<.005	0.00	.007	4.00	<.005	0.00
F006	.04 VH	21.50	<.02	0.00	<.02	0.00	<.02	0.00	.02 VH	17.50	<.02	0.00
F008	.025	13.50	<.002	0.00	.007	9.00	.004	8.00	.009	8.00	.003	7.00
F010	.020	4.50	<.010	0.00	<.010	0.00	<.010	0.00	.010	10.00	<.010	0.00
F011	.023	9.00	<.002	0.00	.002	2.00	.003	6.50	.016 H	14.00	.010 H	11.50
F013	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00
F014	.026	15.50	.006T	6.50	.006T	8.00	.002T	4.50	.008T	6.50	.001T	2.50
F015	.026	15.50	.003	3.50	.005	6.50	.002	4.50	.011	12.00	.002	5.00
F016	.05 EH	23.00	.02 EH	10.50	.02 EH	13.50	.02 EH	12.50	.02 VH	17.50	.01 H	11.50
F019	.04 VH	21.50	.02 EH	10.50	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00
F020	.020	4.50	<.005	0.00	<.005	0.00	<.005	0.00	.008	6.50	<.005	0.00
F025	<.01 VL	0.00	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00
F026	.021	7.00	.001	2.00	.003	3.50	.001	2.50	.007	4.00	.001	2.50
F030	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00
F031	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00
F032	.018	2.00	.006T	6.50	.008T	10.00	.006T	9.00	.012	13.00	.002W	0.00
F033		0.00		0.00		0.00		0.00		0.00		0.00
F034	.03	18.00	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	.01 H	11.50
F035	.13 EH	26.00	.05 EH	13.00	.03 EH	15.00	.03 EH	14.00	.03 EH	21.00	.04 EH	15.00
F036	.035 H	20.00	.007	8.00	.009	11.00	.007	10.00	.017 H	15.00	.007	9.00
F038	.020	4.50	<.005	0.00	<.005	0.00	<.005	0.00	.007	4.00	<.005	0.00
F042	.02	4.50	0.00	1.00	0.00 L	1.00	0.00	1.00	0.00 VL	1.00	0.00	1.00
F046	.030	18.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00
F057	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00
F061	.06 EH	24.50	.03 EH	12.00	.02 EH	13.50	.02 EH	12.50	.02 VH	17.50	.02 EH	14.00
F068		0.00		0.00		0.00		0.00		0.00		0.00
F069	.024	11.00	<.002	0.00	<.002	0.00	<.002	0.00	.006	2.00	<.002	0.00
F071	.025	13.50	.005	5.00	.005	6.50	.001	2.50	.025 EH	20.00	.005	8.00
F074	.03	18.00	.01 H	9.00	.01	12.00	.01 H	11.00	.02 VH	17.50	.01 H	11.50
F080	<.014 L	0.00	<.014	0.00	<.014	0.00	<.014	0.00	<.014	0.00	<.014	0.00
F089	.06 EH	24.50	.01W	0.00	.01W	0.00	.01W	0.00	.01W	0.00	.01W	0.00
F091	.013 L	1.00	<.005	0.00	<.005	0.00	<.005	0.00	<.005	0.00	<.005	0.00
MEDIAN OR *TARGET CONC.	.0250		*.0040		.0060		.0035		.0100		*.0030	

PARAMETER: 07192 Ammonia MG N/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.027	12.50	.105	27.00	.004	3.50	.010	6.50
F003	.025	11.00	.099	19.00	.005	6.00	.014	10.00
F004	.023	10.00	.096	17.50	<.005	0.00	.016	11.50
F006	.03	16.00	.10	22.50	<.02	0.00	.02 H	15.50
F008	.027	12.50	.107	28.00	.004	3.50	.012	9.00
F010	<.010 EL	0.00	.075 L	4.00	<.010	0.00	<.010	0.00
F011	.010 EL	4.50	.109	29.00	<.002	0.00	.011	8.00
F013	<.1	0.00	.11	30.00	<.1	0.00	<.1	0.00
F014	.020	9.00	.094	16.00	.004T	3.50	.008T	3.00
F015	.031	19.50	.104	26.00	.009	7.00	.016	11.50
F016	.03	16.00	.096	17.50	.02 EH	12.00	.03 EH	18.00
F019	<.02	0.00	.04 EL	2.50	<.02	0.00	<.02	0.00
F020	<.005 EL	0.00	.088	12.00	<.005	0.00	<.005 L	0.00
F025	<.01 EL	0.00	.04 EL	2.50	<.01	0.00	<.01	0.00
F026	.001 EL	2.00	.079	6.00	.001	1.00	.009	5.00
F030	<.05	0.00	.08	8.00	<.05	0.00	<.05	0.00
F031	<.05	0.00	.09	14.00	<.05	0.00	<.05	0.00
F032	.002W	0.00	.100	22.50	.004T	3.50	.008T	3.00
F033		0.00	.10	22.50		0.00		0.00
F034	.03	16.00	.10	22.50	<.01	0.00	.01	6.50
F035	.13 EH	23.00	.08	8.00	.07 EH	16.00	.06 EH	22.00
F036	.030	16.00	.100	22.50	.015 VH	9.50	.018	13.00
F038	.019	7.50	.084	10.00	<.005	0.00	.008	3.00
F042	0.00 EL	1.00	.03 EL	1.00	.11 EH	17.00	0.00 VL	1.00
F046	.031	19.50	.090	14.00	<.02	0.00	.034 EH	19.00
F057	<.1	0.00	.142 EH	34.00	<.1	0.00	<.1	0.00
F061	.03	16.00	.08	8.00	.02 EH	12.00	.02 H	15.50
F068		0.00	.124 VH	32.00		0.00		0.00
F069	.019	7.50	.135 EH	33.00	.020 EH	12.00	.091 EH	23.00
F071	.010 EL	4.50	.085	11.00	.015 VH	9.50	.020 H	15.50
F074	.04 VH	21.50	.10	22.50	.01	8.00	.02 H	15.50
F080	.015 L	6.00	.115 H	31.00	.025 EH	14.00	.035 EH	20.00
F089	.04 VH	21.50	.09	14.00	.05 EH	15.00	.04 EH	21.00
F091	.009 EL	3.00	.078	5.00	<.005	0.00	<.005 L	0.00
MEDIAN OR CONC.	*TARGET .0270		.0960		*.0050		*.0120	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	79.00	9.875	8			Auto Color
F003	84.00	8.400	10			Phenate Method
F004	54.00	10.800	5			07540
F006	93.00	18.600	5	VH VH H		AUTO ANAL II
F008	98.50	10.944	9			PHENATE
F010	18.50	6.167	3	ELL	INSUFFICIENT DATA	Colorim. Berthelot
F011	84.50	10.563	8	H H EL		
F013	30.00	30.000	1		INSUFFICIENT DATA	NH3 Tot.
F014	75.00	7.500	10		BIASED LOW	
F015	111.00	11.100	10			Auto Color
F016	152.00	15.200	10	EHEHEHEHVHH EHEH		
F019	34.50	11.500	3	VHEH EL	INSUFFICIENT DATA	Auto Phenate
F020	23.00	7.667	3	EL L	INSUFFICIENT DATA	Auto. Berth.
F025	2.50	2.500	1	VL ELEL	INSUFFICIENT DATA	Colorimetric
F026	35.50	3.550	10	EL	BIASED LOW	AA
F030	8.00	8.000	1		INSUFFICIENT DATA	Colorimetric
F031	14.00	14.000	1		INSUFFICIENT DATA	ISE
F032	69.50	8.688	8			
F033	22.50	22.500	1		INSUFFICIENT DATA	AUTO-COLOURIMETRIC
F034	74.50	14.900	5	H		Colorimetric
F035	173.00	17.300	10	EHEHEHEHEHEHEH EHEH		Colour
F036	134.00	13.400	10	H H VH		Colour
F038	29.00	5.800	5		BIASED LOW	SIE
F042	29.50	2.950	10	L VL ELELEHVL	BIASED LOW	Color
F046	70.50	17.625	4	EH	INSUFFICIENT DATA	AA
F057	34.00	34.000	1	EH	INSUFFICIENT DATA	
F061	145.50	14.550	10	EHEHEHEHVHEH EHH		Colorimetric
F068	32.00	32.000	1	VH	INSUFFICIENT DATA	IC
F069	88.50	14.750	6	EHEHEH		Color
F071	96.00	9.600	10	EH EL VHH		COLORIMETRIC
F074	146.50	14.650	10	H H VHH VH H		AA
F080	71.00	17.750	4	L L H EHEH	INSUFFICIENT DATA	Color
F089	96.00	19.200	5	EH VH EHEH	BIASED HIGH	Sp. ion meter
F091	9.00	3.000	3	L EL L	INSUFFICIENT DATA	AUTOMATED COLOUR

OVERALL AVERAGE RANK IS 11.532

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F025	2.50	2.500	1	VLELEL	INSUFFICIENT DATA	Colorimetric
F042	29.50	2.950	10	LVLELELEHVL	BIASED LOW	Color
F091	9.00	3.000	3	LELL	INSUFFICIENT DATA	AUTOMATED COLOUR
F026	35.50	3.550	10	EL	BIASED LOW	AA
F038	29.00	5.800	5		BIASED LOW	SIE
F010	18.50	6.167	3	ELL	INSUFFICIENT DATA	Colorim. Berthelot
F014	75.00	7.500	10		BIASED LOW	
F020	23.00	7.667	3	ELL	INSUFFICIENT DATA	Auto. Berth.
F030	8.00	8.000	1		INSUFFICIENT DATA	Colorimetric
F003	84.00	8.400	10			Phenate Method
F032	69.50	8.688	8			
F071	96.00	9.600	10	EHELVHH		COLORIMETRIC
F001	79.00	9.875	8			Auto Color
F011	84.50	10.563	8	HHEL		
F004	54.00	10.800	5			07540
F008	98.50	10.944	9			PHENATE
F015	111.00	11.100	10			Auto Color
F019	34.50	11.500	3	VHEHEL	INSUFFICIENT DATA	Auto Phenate
F036	134.00	13.400	10	HHVH		Colour
F031	14.00	14.000	1		INSUFFICIENT DATA	ISE
F061	145.50	14.550	10	EHEHEHEHVHEHEHH		Colorimetric
F074	146.50	14.650	10	HHVHHVHH		AA
F069	88.50	14.750	6	EHEHEH		Color
F034	74.50	14.900	5	H		Colorimetric
F016	152.00	15.200	10	EHEHEHEHVHHEHEH		
F035	173.00	17.300	10	EHEHEHEHEHEHEHEHEH		Colour
F046	70.50	17.625	4	EH	INSUFFICIENT DATA	AA
F080	71.00	17.750	4	LLHEHEH	INSUFFICIENT DATA	Color
F006	93.00	18.600	5	VHVHH		AUTO ANAL II
F089	96.00	19.200	5	EHVHEHEH	BIASED HIGH	Sp. ion meter
F033	22.50	22.500	1		INSUFFICIENT DATA	AUTO-COLOURIMETRIC
F013	30.00	30.000	1		INSUFFICIENT DATA	NH3 Tot.
F068	32.00	32.000	1	VH	INSUFFICIENT DATA	IC
F057	34.00	34.000	1	EH	INSUFFICIENT DATA	

OVERALL AVERAGE RANK IS 11.532

Ammonia

PARAMETER: 07293 Total N mg N/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
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BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0500 BASIC ACCEPTABLE ERROR= .0500 CONCENTRATION ERROR INCREMENT= .1500

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
F002	.10 L	3.00	.16	6.00	.05	2.00	.35	5.00	.15 EL	2.00	.11	3.00
F003	.199	6.00	.213	13.00	.078	7.00	.383	7.00	.387	7.00	.224	11.50
F004	.218	9.00	.160	6.00	.073	6.00	.396	9.00	.397	8.00	.175	8.00
F010	.13	4.00	.13	1.00	.06	3.00	.33	3.00	.20 VL	3.00	.12	4.00
F013	.22	10.50	.14	2.50	.10	11.00	.34	4.00	.36	4.00	.17	6.50
F015	.22	10.50	.18	9.00	.07	5.00	.39	8.00	.41	9.00	.17	6.50
F025	.24	13.50	.21	12.00	.11	12.00	.43	11.00	.50 H	14.00	.22	10.00
F026	.195	5.00	.159	4.00	.064	4.00	.378	6.00	.374	5.00	.169	5.00
F030	.01 EL	2.00	.14	2.50	.04	1.00	.30	2.00	.43	11.00	.07 L	1.00
F038	.200	7.50	.195	11.00	.092	8.00	.450	12.00	.420	10.00	.231	13.00
F042	.236	12.00	.193	10.00	.098	10.00	.427	10.00	.434	12.00	.224	11.50
F046	.24	13.50	.29 VH	14.00	1.17 EH	14.00	.48	13.50	.46	13.00	.24	14.00
F071	.001 EL	1.00	.175	8.00	.093	9.00	.296	1.00	.001 EL	1.00	.103 L	2.00
F091	.20	7.50	.16	6.00	.18 VH	13.00	.48	13.50	.38	6.00	.21	9.00
MEDIAN CONC.	.2000		.1675		.0850		.3865		.3920		.1725	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	.22 EL	3.00	.90	2.50	3.40	4.00	1.60	2.00
F003	.417	7.00	1.11	8.50	3.66	12.00	1.69	6.00
F004	.467	8.00	1.11	8.50	3.44	6.00	1.68	5.00
F010	.26 VL	4.00	1.1	6.50	3.5	7.50	1.8	8.50
F013	.34	5.00	1.03	4.00	3.37	2.00	1.66	4.00
F015	.5	10.00	1.1	6.50	3.5	7.50	1.7	7.00
F025	.47	9.00	1.29	11.50	3.60	10.00	1.86	12.00
F026	.414	6.00	1.08	5.00	3.36	1.00	1.62	3.00
F030	.15 EL	2.00	1.2	10.00	3.4	4.00	1.8	8.50
F038	.552 H	13.00	1.29	11.50	3.57	9.00	1.82	10.00
F042	.512	11.00	1.31	13.00	3.96	14.00	2.04	14.00
F046	.66 EH	14.00	.90	2.50	3.72	13.00	2.03	13.00
F071	.085 EL	1.00	.657 EL	1.00	3.64	11.00	1.54	1.00
F091	.52	12.00	1.48 VH	14.00	3.40	4.00	1.85	11.00
MEDIAN CONC.	.4420		1.1050		3.5000		1.7500	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F002	32.50	3.250	10	L EL EL	BIASED LOW	07601
F003	85.00	8.500	10			Auto.
F004	73.50	7.350	10			07657
F010	44.50	4.450	10	VL VL		Hydrazine
F013	53.50	5.350	10			AA2 CO
F015	79.00	7.900	10			Auto Color, Block
F025	115.00	11.500	10	H	BIASED HIGH	Calc'n
F026	44.00	4.400	10			autoclave
F030	44.00	4.400	10	EL L EL		Calcn.
F038	105.00	10.500	10	H		Colour
F042	117.50	11.750	10		BIASED HIGH	Pers.Dig.
F046	124.50	12.450	10	VHEH EH	BIASED HIGH	Calcn.
F071	36.00	3.600	10	EL ELL ELEL	BIASED LOW	ION CHROMATOGRAPH
F091	96.00	9.600	10	VH VH		CALCULATION

OVERALL AVERAGE RANK IS 7.500

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F002	32.50	3.250	10	LELEL	BIASED LOW	07601
F071	36.00	3.600	10	ELELLELEL	BIASED LOW	ION CHROMATOGRAPH
F026	44.00	4.400	10			autoclave
F030	44.00	4.400	10	ELLEL		Calcn.
F010	44.50	4.450	10	VLVL		Hydrazine
F013	53.50	5.350	10			AA2 CO
F004	73.50	7.350	10			07657
F015	79.00	7.900	10			Auto Color, Block
F003	85.00	8.500	10			Auto.
F091	96.00	9.600	10	VHVH		CALCULATION
F038	105.00	10.500	10	H		Colour
F025	115.00	11.500	10	H	BIASED HIGH	Calc'n
F042	117.50	11.750	10		BIASED HIGH	Pers.Dig.
F046	124.50	12.450	10	VHEHEH	BIASED HIGH	Calcn.

OVERALL AVERAGE RANK IS 7.500

Total N

PARAMETER: 07392 Total Kjeldahl N MG N/L

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NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0500 BASIC ACCEPTABLE ERROR= .0500 CONCENTRATION ERROR INCREMENT= .1500

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
F001	.20	6.00	.02	3.00	.04	5.50	.13	5.50	.44	14.50	.14	8.00
F003	.226	12.00	.014	1.00	.017	2.00	.096	4.00	.395	7.00	.137	6.00
F006	.4 EH	17.00	.2 EH	13.50	.2 EH	14.00	.2	13.50	.6 VH	19.00	.3 EH	17.00
F008	.62 EH	18.00	<.20	0.00	<.20	0.00	<.20	0.00	.33	1.00	<.20	0.00
F014	.20	6.00	.20 EH	13.50	0.0T L	1.00	.16T	9.00	.40	9.00	.14T	8.00
F016	.30 H	15.50	.13 H	9.50	.14 H	12.00	.21	15.00	.48	16.50	.19	15.00
F019	.17	2.00	.02	3.00	.08	9.00	.09 L	3.00	.35	3.00	.09	2.00
F020	.210	10.00	.056	6.00	<.04	0.00	.188	12.00	.405	11.00	.147	10.00
F025	.24	13.50	.07	8.00	.07	8.00	.15	7.50	.50	18.00	.16	12.00
F030	<.1 L	0.00	<.1	0.00	<.1	0.00	<.1	0.00	.4	9.00	<.1	0.00
F032	.20	6.00	.02W	0.00	.02T	3.50	.08T L	2.00	.40	9.00	.12	3.50
F033	.21	10.00		0.00		0.00	.13	5.50	.39	5.50	.13	5.00
F034	.20	6.00	.04	5.00	.04	5.50		0.00	.39	5.50	.14	8.00
F035	.30 H	15.50	.13 H	9.50	.12	10.00	.22	16.00	.48	16.50	.28 EH	16.00
F038	.20	6.00	.06	7.00	.05	7.00	.17	10.50	.42	12.50	.17	13.50
F046	.24	13.50	.14 H	11.00	1.10 EH	15.00	.17	10.50	.44	14.50	.17	13.50
F069	.127 L	1.00	<.20	0.00	<.20	0.00	.035 VL	1.00	.335	2.00	.039 VL	1.00
F074	.21	10.00	.02	3.00	.02	3.50	.25 H	17.00	.42	12.50	.12	3.50
F080	.70 EH	19.00	.16 VH	12.00	.18 EH	13.00	.20	13.50	.65 EH	20.00	.35 EH	18.00
F091	.19	3.00	<.05	0.00	.13 H	11.00	.15	7.50	.38	4.00	.15	11.00
MEDIAN CONC.	.2100		.0650		.0700		.1600		.4025		.1435	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.47	15.50	.52	9.50	.08	5.00	.18	6.00
F003	.449	12.00	.525	11.00	.075 L	4.00	.200	8.50
F006	.6 H	19.00	.6	17.50	.1	6.00	.3 H	17.00
F008	.40	4.50	.53	12.50	<.20	0.00	<.20	0.00
F014	.43	9.00	.54	15.00	.06T L	2.50	.28 H	16.00
F016	.47	15.50	.53	12.50	.18	12.50	.26	15.00
F019	.36	3.00	.51	7.50	<.02 VL	0.00	.15	3.50
F020	.441	11.00	.535	14.00	.124	7.00	.158	5.00
F025	.44	10.00	.59	16.00	.15	9.50	.25	13.50
F030	.1 EL	1.00	.5	6.00	<.1	0.00	<.1 L	0.00
F032	.42	7.50	.52	9.50	.06T L	2.50	.12 L	2.00
F033	.42	7.50	.51	7.50	.23 H	14.00	.20	8.50
F034	.41	6.00	.46	5.00	.14	8.00	.19	7.00
F035	.55 H	18.00	.63	19.00		0.00	.24	12.00
F038	.52	17.00	.60	17.50	.15	9.50	.21	10.00
F046	.61 VH	20.00	.23 EL	1.00	.18	12.50	.22	11.00
F069	.354	2.00	.371 L	2.00	<.02 VL	0.00	<.02 EL	0.00
F074	.40	4.50	.45	3.50	-.08 EL	1.00	-.02 EL	1.00
F080	.45	13.50	.45	3.50	.35 EH	15.00	.25	13.50
F091	.45	13.50	.65 H	20.00	.16	11.00	.15	3.50
MEDIAN CONC.	.4405		.5225		.1400		.2000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	78.50	7.850	10			Auto Color, Block
F003	67.50	6.750	10	L		Block Dig.
F006	153.50	15.350	10	EHEHEH VHEHH H	BIASED HIGH	AUTO ANAL DIG
F008	36.00	9.000	4	EH	INSUFFICIENT DATA	DIG PHENATE
F014	89.00	8.900	10	EHL L H		
F016	139.00	13.900	10	H H H		AA
F019	36.00	4.000	9	L VL	BIASED LOW	Auto Color
F020	86.00	9.556	9			Block Dig.
F025	116.00	11.600	10			Colorimetric
F030	16.00	5.333	3	L EL L	INSUFFICIENT DATA	Colorimetric
F032	45.50	5.056	9	L L L		
F033	63.50	7.938	8	H		DIG/COLOURIMETRIC
F034	56.00	6.222	9			Blk Dig Color
F035	132.50	14.722	9	H H EHH	BIASED HIGH	Colour
F038	110.50	11.050	10			Dig-Colour
F046	122.50	12.250	10	H EH VHEL		Dig-Color
F069	9.00	1.500	6	L VL VL L VLEL	BIASED LOW	Color
F074	59.50	5.950	10	H ELEL		UV AA
F080	141.00	14.100	10	EHVHEH EHEH EH		Dig.Dist.
F091	84.50	9.389	9	H H		AUTOMATED COLOUR

OVERALL AVERAGE RANK IS 9.383

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F069	9.00	1.500	6	LVLVLLVLEL	BIASED LOW	Color
F019	36.00	4.000	9	LVL	BIASED LOW	Auto Color
F032	45.50	5.056	9	LLL		
F030	16.00	5.333	3	LELL	INSUFFICIENT DATA	Colorimetric
F074	59.50	5.950	10	HELEL		UV AA
F034	56.00	6.222	9			Blk Dig Color
F003	67.50	6.750	10	L		Block Dig.
F001	78.50	7.850	10			Auto Color, Block
F033	63.50	7.938	8	H		DIG/COLOURIMETRIC
F014	89.00	8.900	10	EHLLH		
F008	36.00	9.000	4	EH	INSUFFICIENT DATA	DIG PHENATE
F091	84.50	9.389	9	HH		AUTOMATED COLOUR
F020	86.00	9.556	9			Block Dig.
F038	110.50	11.050	10			Dig-Colour
F025	116.00	11.600	10			Colorimetric
F046	122.50	12.250	10	HEHVHEL		Dig-Color
F016	139.00	13.900	10	HHH		AA
F080	141.00	14.100	10	EHVHEHEHEHEH		Dig.Dist.
F035	132.50	14.722	9	HHEHH	BIASED HIGH	Colour
F006	153.50	15.350	10	EHEHEHVHEHHH	BIASED HIGH	AUTO ANAL DIG

OVERALL AVERAGE RANK IS 9.383

PARAMETER: 09092 Fluoride MG/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
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NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0300 BASIC ACCEPTABLE ERROR= .0300 CONCENTRATION ERROR INCREMENT= .1000

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
F001	.05	7.50	.06	8.00	.02	3.50	.11	11.50	.09	6.50	.11	11.00
F003	.08	15.00	.07	11.00	.03	6.00	.12	15.50	.12	17.00	.13	19.00
F006	.06	10.50	.07	11.00	<.05	0.00	.12	15.50	.1	10.00	.12	14.50
F008	<.10	0.00	<.10	0.00	<.10	0.00	.10	7.00	<.10	0.00	.10	6.00
F010	.05	7.50	.05	5.00	.03	6.00	.13	20.50	.10	10.00	.10	6.00
F011	.04	3.00	.05	5.00	.03	6.00	.12	15.50	.10	10.00	.12	14.50
F014	.10T H	18.00	.11 H	18.50	.08T VH	15.00	.15	24.00	.13	20.50	.14	22.50
F015	.04	3.00	.04	3.00	<.01	0.00	.09	3.00	.07	2.00	.07 L	1.00
F016	.068	12.00	.070	11.00	.031	8.00	.120	15.50	.125	19.00	.141	24.00
F019	.08	15.00	.03 L	2.00	<.02	0.00	.11	11.50	.09	6.50	.11	11.00
F020	<.1	0.00	<.1	0.00	<.1	0.00	.10	7.00	<.1	0.00	.1	6.00
F025	.08	15.00	.08	14.50	<.05	0.00	.13	20.50	.12	17.00	.12	14.50
F030	<.1	0.00	<.1	0.00	<.1	0.00	.1	7.00	.1	10.00	.1	6.00
F031	.05	7.50	.09	16.50	.04	10.00	.12	15.50	.11	14.00	.13	19.00
F032	.05	7.50	.05	5.00	.05	12.00	.12	15.50	.08	4.00	.11	11.00
F033		0.00		0.00		0.00		0.00		0.00		0.00
F034	<.1	0.00	<.1	0.00	<.1	0.00	.16 H	25.00	.14 H	22.50	.17 H	25.00
F036	.0425	5.00	.055	7.00	.0191	2.00	.108	10.00	.0887	5.00	.107	9.00
F038	.06	10.50	.07	11.00	.04	10.00	.14	23.00	.11	14.00	.12	14.50
F046	<.05	0.00	<.05	0.00	<.05	0.00	.069 L	1.00	<.05 L	0.00	<.05 VL	0.00
F048	.04	3.00	.07	11.00	.02	3.50	.10	7.00	.13	20.50	.10	6.00
F061	.08	15.00	.08	14.50	.04	10.00	.13	20.50	.11	14.00	.13	19.00
F068		0.00		0.00		0.00	.098	4.00	.073	3.00	.090	3.00
F069	.016 L	1.00	.027 L	1.00	0.00 L	1.00	.084	2.00	.064	1.00	.081 L	2.00
F080	<.05	0.00	<.05	0.00	<.05	0.00	.10	7.00	.10	10.00	.13	19.00
F089	.14 EH	19.00	.11 H	18.50	.07 H	13.50	.19 VH	26.00	.14 H	22.50	.14	22.50
F091	.08	15.00	.09	16.50	.07 H	13.50	.13	20.50	.12	17.00	.13	19.00
MEDIAN CONC.	.0600		.0700		.0310		.1200		.1000		.1200	

PARAMETER: 09092 Fluoride MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.13	13.00	.21	16.50	.19	12.00	.85	15.50
F003	.14	18.50	.22	20.50	.21	21.00	.84	11.50
F006	.13	13.00	.2	13.00	.2	15.00	.88	20.50
F008	.13	13.00	.20	13.00	.20	15.00	.88	20.50
F010	.12	9.00	.21	16.50	.20	15.00	.89	22.50
F011	.12	9.00	.19	7.50	.18	8.50	.80	5.00
F014	.15	22.00	.22	20.50	.21	21.00	.83	8.50
F015	.10	4.00	.20	13.00	.14 L	1.00	.75	2.00
F016	.158	23.00	.165	1.00	.205	18.00	.833	10.00
F019	.12	9.00	.27 H	26.00	.18	8.50	1.24 EH	27.00
F020	.11	6.00	.19	7.50	.18	8.50	.84	11.50
F025	.14	18.50	.23	24.00	.23	25.00	.86	18.00
F030	.1	4.00	.2	13.00	.2	15.00	.8	5.00
F031	.13	13.00	.22	20.50	.21	21.00	.83	8.50
F032	.13	13.00	.19	7.50	.17	6.00	.82	7.00
F033		0.00	.17	3.00	.16	3.00	.85	15.50
F034	.20 VH	25.00	.29 VH	27.00	.28 VH	27.00	1.03 VH	26.00
F036	.119	7.00	.193	10.00	.185	11.00	.850	15.50
F038	.14	18.50	.22	20.50	.21	21.00	1.01 H	25.00
F046	.092	1.00	.179	5.00	.161	4.00	.760	3.00
F048	.14	18.50	.19	7.50	.18	8.50	.87	19.00
F061	.14	18.50	.22	20.50	.22	24.00	.92	24.00
F068	.100	4.00	.166	2.00	.153 L	2.00	.736 L	1.00
F069	.096	2.00	.174	4.00	.169	5.00	.849	13.00
F080	.25 EH	26.00	.22	20.50	.21	21.00	.80	5.00
F089	.17	24.00	.26 H	25.00	.24	26.00	.89	22.50
F091	.14	18.50	.20	13.00	.20	15.00	.85	15.50
MEDIAN CONC.	.1300		.2000		.2000		.8500	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	105.00	10.500	10			Select Ion Electro
F003	155.00	15.500	10			Tech. ISE
F006	123.00	13.667	9			ELECTRODE
F008	74.50	12.417	6			FIA
F010	118.00	11.800	10			Alizarin
F011	84.00	8.400	10			
F014	190.50	19.050	10	H H VH		
F015	32.00	3.556	9	L L	BIASED LOW	SIE
F016	141.50	14.150	10			
F019	116.50	12.944	9	L H EH		IC
F020	46.50	7.750	6			ISE
F025	167.00	18.556	9			Titration
F030	60.00	8.571	7			ISE
F031	145.50	14.550	10			ISE
F032	88.50	8.850	10			
F033	21.50	7.167	3		INSUFFICIENT DATA	ION ELECTRODE
F034	177.50	25.357	7	H H H VHVHVHVH	BIASED HIGH	SIE
F036	81.50	8.150	10			SIE
F038	168.00	16.800	10	H		SIE
F046	14.00	2.800	5	L L VL	BIASED LOW	IC
F048	104.50	10.450	10			SIE
F061	180.00	18.000	10			SIE
F068	19.00	2.714	7	L L	BIASED LOW	IC
F069	32.00	3.200	10	L L L L	BIASED LOW	ISE
F080	108.50	15.500	7	EH		IC
F089	219.50	21.950	10	EHH H VHH H	BIASED HIGH	Sp. ion meter
F091	163.50	16.350	10	H		ISE

OVERALL AVERAGE
RANK IS 12.551

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F068	19.00	2.714	7	LL	BIASED LOW	IC
F046	14.00	2.800	5	LLVL	BIASED LOW	IC
F069	32.00	3.200	10	LLLL	BIASED LOW	ISE
F015	32.00	3.556	9	LL	BIASED LOW	SIE
F033	21.50	7.167	3		INSUFFICIENT DATA	ION ELECTRODE
F020	46.50	7.750	6			ISE
F036	81.50	8.150	10			SIE
F011	84.00	8.400	10			
F030	60.00	8.571	7			ISE
F032	88.50	8.850	10			
F048	104.50	10.450	10			SIE
F001	105.00	10.500	10			Select Ion Electro
F010	118.00	11.800	10			Alizarin
F008	74.50	12.417	6			FIA
F019	116.50	12.944	9	LHEH		IC
F006	123.00	13.667	9			ELECTRODE
F016	141.50	14.150	10			
F031	145.50	14.550	10			ISE
F003	155.00	15.500	10			Tech. ISE
F080	108.50	15.500	7	EH		IC
F091	163.50	16.350	10	H		ISE
F038	168.00	16.800	10	H		SIE
F061	180.00	18.000	10			SIE
F025	167.00	18.556	9			Titration
F014	190.50	19.050	10	HHVH		
F089	219.50	21.950	10	EHHHVHHH	BIASED HIGH	Sp. ion meter
F034	177.50	25.357	7	HHHVHVHVHVH	BIASED HIGH	SIE

OVERALL AVERAGE RANK IS 12.551

PARAMETER: 10692 Total Hardness mg/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= 1.0000 CONCENTRATION ERROR INCREMENT= .0700

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
F001	21.	4.00	57.	1.00	45.	5.00	114.	4.50	151.	9.00	149.	7.00
F003	22.8	10.50	60.6	10.00	46.9	10.00	116.	8.50	150.	7.50	148.	4.50
F006	30. EH	24.00	65.	22.00	53. H	24.00	119.	13.50	156.	17.00	156.	19.00
F008	23.1	14.50	59.2	6.00	45.8	7.00	115.	6.50	148.	3.50	148.	4.50
F011	18.8 VL	1.00	58.0	3.00	44.8	3.00	115.	6.50	149.	5.50	149.	7.00
F013	23.29	17.00	62.04	14.00	47.97	13.00	119.24	15.00	152.36	11.00	151.01	11.00
F014	23.8	19.00	65.6	24.00	50.8	23.00	129.1 H	25.00	164.6	23.00	166.8 H	25.00
F015	21.9	6.00	58.8	4.00	45.1	6.00	114.	4.50	148.	3.50	145.	3.00
F016	24.	21.00	64.	21.00	48.	14.00	120.	18.00	150.	7.50	154.	15.50
F019	22.	7.00	59.	5.00	44.	2.00	110.	1.00	142.	1.00	133. VL	1.00
F020	22.2	8.00	59.9	8.00	45.9	8.50	118.	12.00	153.	12.50	150.	9.00
F025	20.8	2.50	57.1	2.00	43.9	1.00	111.	2.00	146.	2.00	139. L	2.00
F030	23.1	14.50	63.5	19.00	48.1	15.00	121.	20.00	157.	18.50	156.	19.00
F031	28. VH	23.00	66.	25.00	50.	20.00	117.	10.00	152.	10.00	151.	10.00
F032	21.2	5.00	59.6	7.00	44.9	4.00	113.	3.00	149.	5.50	149.	7.00
F033	22.8	10.50	62.4	16.00	47.9	12.00	122.	21.00	159.	20.00	157.	21.00
F034	30.1 EH	25.00	63.1	18.00	54.1 H	25.00	117.9	11.00	167.8 H	25.00	161.6	23.00
F035	23.	12.50	62.	13.00	49.	18.50	120.	18.00	157.	18.50	152.	13.00
F038	23.2	16.00	62.2	15.00	48.3	16.00	120.	18.00	154.	14.50	152.	13.00
F046	22.6	9.00	61.6	12.00	47.1	11.00	116.	8.50	153.	12.50	152.	13.00
F048	24.1	22.00	61.5	11.00	50.3	21.00	119.8	16.00	154.4	16.00	154.4	17.00
F059	23.4	18.00	63.7	20.00	48.9	17.00	124.	22.00	161.	21.50	156.	19.00
F061	23.9	20.00	65.5	23.00	50.6	22.00	128.	24.00	165. H	24.00	164. H	24.00
F080	20.8	2.50	60.3	9.00	45.9	8.50	119.	13.50	154.	14.50	154.	15.50
F091	23.	12.50	63.	17.00	49.	18.50	125.	23.00	161.	21.50	161.	22.00
MEDIAN CONC.	23.0000		62.0000		47.9700		119.0000		153.0000		152.0000	

PARAMETER: 10692 Total Hardness mg/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	164.	10.00	288.	13.00	214.	5.50	458.	7.00
F003	164.	10.00	293.	15.00	216.	8.00	456.	6.00
F006	168.	15.50	216. EL	2.00	223.	15.00	474.	18.00
F008	162.	5.00		0.00	214.	5.50	431. L	3.00
F011	164.	10.00	221. EL	3.00	216.	8.00	459.	9.00
F013	163.49	7.00	295.82	16.00	220.63	12.00	464.72	10.00
F014	181.5 H	25.00	298.2	17.00	240.5 H	25.00	511. H	25.00
F015	158.	3.00	290.	14.00	210.	3.00	443.	4.00
F016	168.	15.50	202. EL	1.00	222.	14.00	474.	18.00
F019	146. VL	1.00	236. EL	5.00	182. EL	1.00	398. EL	1.00
F020	162.	5.00	299.	18.00	213.	4.00	472.	15.00
F025	157.	2.00	273.	6.00	208.	2.00	423. L	2.00
F030	173.	20.00	310. H	23.00	225.	16.00	481.	21.00
F031	174.	21.00	283.	10.00	220.	11.00	470.	12.00
F032	162.	5.00	282.	8.00	217.	10.00	467.	11.00
F033	172.	19.00	301.	19.50	234.	21.00	483.	22.50
F034	171.5	18.00	282.1	9.00	239.9 H	24.00	458.2	8.00
F035	167.	13.00	307.	21.50	230.	19.00	472.	15.00
F038	164.	10.00	279.	7.00	216.	8.00	452.	5.00
F046	164.	10.00	230. EL	4.00	226.	17.50	474.	18.00
F048	167.6	14.00	283.8	11.00	221.1	13.00	470.3	13.00
F059	175.	22.00	307.	21.50	237.	23.00	472.	15.00
F061	176.	23.50	313. H	24.00	235.	22.00	491.	24.00
F080	170.	17.00	286.	12.00	226.	17.50	483.	22.50
F091	176.	23.50	301.	19.50	232.	20.00	476.	20.00
MEDIAN CONC.	167.0000		287.0000		221.1000		470.3000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	66.00	6.600	10			Calculated
F003	90.00	9.000	10			Calc.
F006	170.00	17.000	10	EH H EL		CALC.
F008	55.50	6.167	9	L		CALCULATED
F011	56.00	5.600	10	VL EL	BIASED LOW	
F013	126.00	12.600	10			Calc'd
F014	231.00	23.100	10	H H H H H	BIASED HIGH	
F015	51.00	5.100	10		BIASED LOW	Colour
F016	145.50	14.550	10	EL		
F019	25.00	2.500	10	VLVLELELEL	BIASED LOW	Calcd
F020	100.00	10.000	10			Calc'd
F025	23.50	2.350	10	L L	BIASED LOW	Calc'n
F030	186.00	18.600	10	H		Calc.
F031	152.00	15.200	10	VH		Titration
F032	65.50	6.550	10			
F033	182.50	18.250	10			ICP/CALC.
F034	186.00	18.600	10	EH H H H		Calcn.
F035	162.00	16.200	10			Calcd
F038	122.50	12.250	10			Calc'n
F046	115.50	11.550	10	EL		ICP
F048	154.00	15.400	10			EDTA
F059	199.00	19.900	10		BIASED HIGH	ICP/calc
F061	230.50	23.050	10	H H H	BIASED HIGH	Calculation
F080	132.50	13.250	10			Titration
F091	197.50	19.750	10			TITRATION

OVERALL AVERAGE
RANK IS 12.952

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F025	23.50	2.350	10	LL	BIASED LOW	Calc'n
F019	25.00	2.500	10	VLVLELELEL	BIASED LOW	Calcd
F015	51.00	5.100	10		BIASED LOW	Colour
F011	56.00	5.600	10	VLEL	BIASED LOW	
F008	55.50	6.167	9	L		CALCULATED
F032	65.50	6.550	10			
F001	66.00	6.600	10			Calculated
F003	90.00	9.000	10			Calc.
F020	100.00	10.000	10			Calc'd
F046	115.50	11.550	10	EL		ICP
F038	122.50	12.250	10			Calc'n
F013	126.00	12.600	10			Calc'd
F080	132.50	13.250	10			Titration
F016	145.50	14.550	10	EL		
F031	152.00	15.200	10	VH		Titration
F048	154.00	15.400	10			EDTA
F035	162.00	16.200	10			Calcd
F006	170.00	17.000	10	EHHEL		CALC.
F033	182.50	18.250	10			ICP/CALC.
F034	186.00	18.600	10	EHHHH		Calcn.
F030	186.00	18.600	10	H		Calc.
F091	197.50	19.750	10			TITRATION
F059	199.00	19.900	10		BIASED HIGH	ICP/calc
F061	230.50	23.050	10	HHH	BIASED HIGH	Calculation
F014	231.00	23.100	10	HHHHH	BIASED HIGH	

OVERALL AVERAGE
RANK IS 12.952

Total Hardness

PARAMETER: 11091 Sodium MG/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= .5000 CONCENTRATION ERROR INCREMENT= .0800

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
F001	1.7	32.50	1.2	20.50	13.	6.00	8.4	13.00	5.7	14.00	12.7	16.50
F002	1.6	24.50	1.2	20.50	13.6	19.50	8.8	25.50	5.8	22.50	12.8	20.50
F003	1.65	31.00	1.29	30.00	13.4	16.00	8.65	19.50	5.73	18.00	12.9	23.50
F006	1. L	1.00	1.	2.00	14.	27.50	9.	28.50	6.	28.00	12.	5.00
F007	1.56	16.00	1.14	10.50	13.2	11.50	8.65	19.50	5.87	24.00	13.0	26.50
F008	1.59	20.00	1.17	14.50	13.4	16.00	8.48	14.00	5.75	19.50	12.5	12.00
F009	1.6	24.50	1.3	31.50	14.3	33.50	9.3	35.00	6.4	34.00	14.0	35.50
F010	1.5	10.00	1.1	6.00	13.	6.00	8.3	8.50	5.5	4.00	12.	5.00
F011	1.50	10.00	1.12	8.00	13.86	23.00	9.03	30.50	5.70	14.00	13.23	29.00
F013	1.70	32.50	1.27	29.00	14.26	31.00	9.03	30.50	6.04	31.00	13.29	30.00
F014	1.63	30.00	1.35	33.00	14.27	32.00	9.18	32.00	6.02	30.00	13.65	34.00
F015	1.5	10.00	1.1	6.00	13.1	9.00	8.3	8.50	5.6	10.50	12.3	9.50
F016	1.6	24.50	1.23	28.00	14.4	35.00	8.99	27.00	6.00	28.00	13.5	33.00
F019	3.41 EH	37.00	2.02 VH	36.00	15.1	37.00	9.95 H	37.00	7.03 H	36.00	14.3 H	37.00
F020	1.61	28.50	1.20	20.50	13.7	21.00	8.75	24.00	5.88	25.00	12.9	23.50
F025	1.60	24.50	1.19	16.00	13.1	9.00	8.53	16.00	5.72	17.00	12.4	11.00
F026	1.59	20.00	1.20	20.50	14.20	30.00	8.37	11.00	5.58	8.50	13.01	28.00
F030	2.	35.00	3.5 EH	38.00	13.	6.00	9.2	33.50	7.4 VH	37.00	13.	26.50
F031	3.00 EH	36.00	2.54 EH	37.00	27.4 EH	38.00	15.5 EH	38.00	8.45 EH	38.00	26.8 EH	38.00
F032	1.61	28.50	1.21	25.00	13.4	16.00	8.57	17.00	5.75	19.50	12.7	16.50
F033	1.56	16.00	1.22	26.50	13.5	18.00	8.66	21.00	5.77	21.00	12.7	16.50
F034	4.7 EH	38.00	1.6	35.00	13.6	19.50	9.0	28.50	6.3	33.00	12.7	16.50
F035	1.5	10.00	1.2	20.50	13.8	22.00	8.5	15.00	5.7	14.00	12.7	16.50
F036	1.59	20.00	1.20	20.50	13.9	24.50	8.58	18.00	5.68	12.00	12.7	16.50
F038	1.47	5.00	1.13	9.00	14.1	29.00	7.86	2.00	5.52	5.00	12.9	23.50
F042	1.56	16.00	1.17	14.50	13.3	13.00	8.35	10.00	5.71	16.00	12.6	13.00
F043	1.5	10.00	1.0	2.00	15.0	36.00	9.2	33.50	6.0	28.00	14.0	35.50
F046	1.49	6.00	1.15	13.00	12.8	4.00	8.21	6.50	5.43	3.00	12.2	7.00
F048	1.42	4.00	1.22	26.50	13.37	14.00	8.18	4.00	5.58	8.50	11.35	2.00
F059	1.6	24.50	1.3	31.50	14.0	27.50	8.7	22.50	6.1	32.00	12.8	20.50
F061	1.4	3.00	1.2	20.50	13.9	24.50	8.8	25.50	5.9	26.00	12.9	23.50
F068	1.791	34.00	1.418	34.00	13.985	26.00	9.464	36.00	6.607	35.00	13.391	32.00
F069	1.538	14.00	1.145	12.00	12.74	3.00	8.188	5.00	5.562	6.00	12.27	8.00
F071	1.50	10.00	1.03	4.00	13.2	11.50	8.21	6.50	5.29	2.00	11.2 L	1.00
F074	1.50	10.00	1.14	10.50	11.60 L	1.00	8.00	3.00	5.60	10.50	12.00	5.00
F080	1.58	18.00	1.20	20.50	13.1	9.00	8.38	12.00	5.57	7.00	12.3	9.50
F089	1.30	2.00	1.00	2.00	12.4	2.00	7.84	1.00	5.26	1.00	11.9	3.00
F091	1.6	24.50	1.1	6.00	14.3	33.50	8.7	22.50	5.8	22.50	13.3	31.00
MEDIAN CONC.	1.5900		1.2000		13.6000		8.6500		5.7500		12.7500	

PARAMETER: 11091 Sodium MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	40.9	16.00	10.6	13.50	9.8	16.00	48.3	18.00
F002	43.0	29.00	11.0	25.50	10.1	27.00	50.0	29.50
F003	41.5	22.00	10.6	13.50	9.96	22.00	49.0	23.50
F006	41.	17.50	11.	25.50	10.	24.00	48.	17.00
F007	42.0	25.50	11.0	25.50	9.94	21.00	48.4	19.00
F008	41.1	19.00	10.7	16.50	9.75	14.00	48.7	21.00
F009	45. H	36.00	11.7	35.00	10.5	35.00	52.	35.00
F010	39.	4.00	11.	25.50	9.6	11.00	46.	4.00
F011	42.83	28.00	11.32	31.00	10.38	33.00	51.32	32.00
F013	41.92	24.00	11.10	29.00	10.28	32.00	49.54	28.00
F014	44.47	35.00	11.33	32.00	10.43	34.00	52.44	36.00
F015	40.2	10.00	10.5	9.50	9.5	8.00	47.7	15.00
F016	43.9	33.00	11.7	35.00	10.2	30.00	47.0	8.50
F019	43.6	31.00	12.2 H	37.00	11.2 H	37.00	51.4	33.00
F020	41.4	21.00	10.7	16.50	9.85	18.00	48.9	22.00
F025	40.3	11.50	10.5	9.50	9.77	15.00	48.5	20.00
F026	42.28	27.00	10.51	11.00	9.67	12.00	49.28	26.00
F030	39.6	7.00	11.	25.50	10.	24.00	47.	8.50
F031	70.9 EH	38.00	18.0 EH	38.00	16.7 EH	38.00	77.4 EH	38.00
F032	40.3	11.50	10.8	19.50	9.83	17.00	47.6	13.50
F033	41.6	23.00	10.8	19.50	9.86	19.00	49.1	25.00
F034	40.7	13.50	11.7	35.00	10.1	27.00	49.	23.50
F035	40.8	15.00	11.5	33.00	10.1	27.00	49.5	27.00
F036	39.9	8.50	10.6	13.50	9.72	13.00	47.1	10.00
F038	41.3	20.00	10.2	4.00	9.11	2.00	47.9	16.00
F042	41.0	17.50	10.6	13.50	9.54	10.00	47.3	11.00
F043	44.0	34.00	11.0	25.50	10.0	24.00	51.5	34.00
F046	39.5	6.00	10.4	7.00	9.44	6.50	47.6	13.50
F048	35.91 L	2.00	9.85	3.00	9.16	4.00	45.95	3.00
F059	43.2	30.00	11.2	30.00	10.2	30.00	50.0	29.50
F061	42.	25.50	10.9	21.50	9.9	20.00	46.7	7.00
F068	48.036 VH	37.00	10.786	18.00	10.742	36.00	55.345 VH	37.00
F069	39.41	5.00	10.23	5.00	9.440	6.50	46.13	5.00
F071	39.9	8.50	8.67 VL	1.00	8.97	1.00	41.0 VL	1.00
F074	14.80 EL	1.00	10.40	7.00	9.40	5.00	46.50	6.00
F080	40.7	13.50	10.4	7.00	9.53	9.00	47.5	12.00
F089	38.7	3.00	9.80	2.00	9.14	3.00	44.4	2.00
F091	43.8	32.00	10.9	21.50	10.2	30.00	50.6	31.00
MEDIAN CONC.	41.2000		10.8000		9.8800		48.4500	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	166.00	16.600	10			Auto FAES
F002	244.00	24.400	10			11103
F003	219.00	21.900	10			Flame Photo.
F006	176.00	17.600	10	L		ATOMIC ABS.
F007	199.00	19.900	10			
F008	166.50	16.650	10			ICAP
F009	335.00	33.500	10	H	BIASED HIGH	ICP
F010	84.00	8.400	10		BIASED LOW	ICP
F011	238.50	23.850	10			
F013	297.00	29.700	10			ICP
F014	328.00	32.800	10		BIASED HIGH	
F015	96.00	9.600	10			ICP
F016	282.00	28.200	10			AA
F019	358.00	35.800	10	EHVH H H H H H	BIASED HIGH	ICP
F020	220.00	22.000	10			ICP
F025	149.50	14.950	10			Flame Photom
F026	194.00	19.400	10			AAS
F030	241.00	24.100	10	EH VH		Flame
F031	377.00	37.700	10	EHEHEHEHEHEHEHEHEHEH	BIASED HIGH	AAS Flame
F032	184.00	18.400	10			
F033	205.50	20.550	10			ICP/DIRECT
F034	269.50	26.950	10	EH		AA
F035	200.00	20.000	10			ICP-AES
F036	156.50	15.650	10			AAS
F038	115.50	11.550	10			ICP
F042	134.50	13.450	10			AA
F043	262.50	26.250	10			ICP
F046	72.50	7.250	10		BIASED LOW	ICP
F048	71.00	7.100	10	L	BIASED LOW	IC
F059	278.00	27.800	10			ICP
F061	197.00	19.700	10			ICP
F068	325.00	32.500	10	VH VH	BIASED HIGH	IC
F069	69.50	6.950	10		BIASED LOW	ICP
F071	46.50	4.650	10	L VL VL	BIASED LOW	FLAME-AA
F074	59.00	5.900	10	L EL	BIASED LOW	IC
F080	117.50	11.750	10			AA
F089	21.00	2.100	10		BIASED LOW	ICP
F091	254.50	25.450	10			ICP

OVERALL AVERAGE RANK IS 19.500

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F089	21.00	2.100	10		BIASED LOW	ICP
F071	46.50	4.650	10	LVLVL	BIASED LOW	FLAME-AA
F074	59.00	5.900	10	LEL	BIASED LOW	IC
F069	69.50	6.950	10		BIASED LOW	ICP
F048	71.00	7.100	10	L	BIASED LOW	IC
F046	72.50	7.250	10		BIASED LOW	ICP
F010	84.00	8.400	10		BIASED LOW	ICP
F015	96.00	9.600	10			ICP
F038	115.50	11.550	10			ICP
F080	117.50	11.750	10			AA
F042	134.50	13.450	10			AA
F025	149.50	14.950	10			Flame Photom
F036	156.50	15.650	10			AAS
F001	166.00	16.600	10			Auto FAES
F008	166.50	16.650	10			ICAP
F006	176.00	17.600	10	L		ATOMIC ABS.
F032	184.00	18.400	10			
F026	194.00	19.400	10			AAS
F061	197.00	19.700	10			ICP
F007	199.00	19.900	10			
F035	200.00	20.000	10			ICP-AES
F033	205.50	20.550	10			ICP/DIRECT
F003	219.00	21.900	10			Flame Photo.
F020	220.00	22.000	10			ICP
F011	238.50	23.850	10			
F030	241.00	24.100	10	EHVH		Flame
F002	244.00	24.400	10			11103
F091	254.50	25.450	10			ICP
F043	262.50	26.250	10			ICP
F034	269.50	26.950	10	EH		AA
F059	278.00	27.800	10			ICP
F016	282.00	28.200	10			AA
F013	297.00	29.700	10			ICP
F068	325.00	32.500	10	VHVH	BIASED HIGH	IC
F014	328.00	32.800	10		BIASED HIGH	
F009	335.00	33.500	10	H	BIASED HIGH	ICP
F019	358.00	35.800	10	EHVHHHHHH	BIASED HIGH	ICP
F031	377.00	37.700	10	EHEHEHEHEHEHEHEHEHEH	BIASED HIGH	AAS Flame

OVERALL AVERAGE
RANK IS 19.500

Sodium

PARAMETER: 12091 Magnesium MG/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .5000 BASIC ACCEPTABLE ERROR= .2000 CONCENTRATION ERROR INCREMENT= .0800

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
F001	1.5	19.50	3.5	4.00	2.8	7.50	8.5	18.00	13.9	23.00	12.1	25.50
F002	1.5	19.50	3.7	20.00	3.0	30.50	8.8	25.50	13.9	23.00	12.4	28.50
F003	1.50	19.50	3.68	15.50	2.89	16.00	8.50	18.00	13.4	14.00	11.6	14.50
F006	2. VH	37.00	4.	34.50	3.	30.50	8.	3.00	13.	5.00	11.	4.50
F007	1.49	14.50	3.59	8.50	2.85	12.00	8.22	8.50	13.4	14.00	11.6	14.50
F008	1.59	32.50	3.70	20.00	2.87	14.00	8.47	15.00	13.3	11.00	11.6	14.50
F009	1.4	4.00	3.8	24.00	2.9	20.00	9.0	30.50	14.4	30.00	12.4	28.50
F010	1.4	4.00	3.6	11.00	2.9	20.00	8.6	23.00	14.	25.00	12.	23.50
F011	1.46	10.00	3.60	11.00	2.81	9.00	8.40	13.00	13.5	16.50	11.8	20.00
F013	1.57	29.00	3.85	27.50	2.96	26.00	8.64	24.00	13.72	21.00	11.90	21.50
F014	1.54	25.50	3.98	33.00	3.11	35.00	9.30	34.50	14.51	32.00	12.84 H	36.00
F015	1.5	19.50	3.6	11.00	2.8	7.50	8.5	18.00	13.3	11.00	11.4	10.00
F016	1.58	31.00	3.97	32.00	3.15	36.00	9.24	33.00	14.4	30.00	12.8	34.00
F019	1.39	2.00	3.47	3.00	2.60	1.00	7.65 L	1.00	12.1 L	1.00	10.0 VL	1.00
F020	1.48	11.50	3.68	15.50	2.85	12.00	8.56	21.00	13.6	19.00	11.7	17.50
F025	1.40	4.00	3.80	24.00	2.90	20.00	8.20	6.50	13.5	16.50	11.0	4.50
F026	1.49	14.50	3.63	13.50	2.82	10.00	8.37	11.50	14.07	26.00	11.73	19.00
F030	1.56	27.00	3.85	27.50	2.95	24.50	8.90	29.00	14.2	27.50	12.3	27.00
F031	1.49	14.50	3.55	6.00	2.76	5.50	8.37	11.50	13.2	8.00	11.4	10.00
F032	1.49	14.50	3.69	17.00	2.90	20.00	8.31	10.00	13.3	11.00	11.5	12.00
F033	1.51	23.00	3.87	30.00	3.00	30.50	9.00	30.50	14.7	34.50	12.8	34.00
F034	1.7	35.50	3.7	20.00	3.0	30.50	8.2	6.50	15.7 VH	37.00	12.7	32.00
F035	1.5	19.50	3.7	20.00	2.9	20.00	8.5	18.00	13.9	23.00	12.0	23.50
F036	1.57	29.00	1.98 EL	1.00	2.76	5.50	8.57	22.00	12.80	2.50	11.20	6.00
F038	1.54	25.50	3.85	27.50	2.99	27.50	8.84	27.00	13.7	20.00	11.9	21.50
F042	1.48	11.50	3.63	13.50	2.85	12.00	8.45	14.00	13.2	8.00	11.6	14.50
F043	1.7	35.50	4.1	37.00	3.2	37.00	9.4 H	37.00	15.0 H	36.00	13.0 H	37.00
F046	1.42	6.00	3.59	8.50	2.75	4.00	8.22	8.50	13.4	14.00	11.7	17.50
F048	1.33	1.00	3.39	2.00	2.88	15.00	7.94	2.00	13.59	18.00	10.52 L	2.00
F059	1.5	19.50	3.7	20.00	2.9	20.00	8.5	18.00	14.2	27.50	12.1	25.50
F061	1.6	34.00	4.0	34.50	3.1	33.50	9.3	34.50	14.7	34.50	12.8	34.00
F069	1.439	8.00	3.561	7.00	2.716	3.00	8.198	5.00	13.11	6.00	11.30	7.50
F071	1.53	24.00	3.91	31.00	2.99	27.50	9.37 H	36.00	14.6	33.00	12.6	30.50
F074	1.59	32.50	3.80	24.00	2.90	20.00	8.80	25.50	12.80	2.50	10.80	3.00
F080	1.45	9.00	3.85	27.50	2.95	24.50	8.89	28.00	13.2	8.00	11.4	10.00
F089	1.43	7.00	3.54	5.00	2.68	2.00	8.04	4.00	12.9	4.00	11.3	7.50
F091	1.57	29.00	4.02	36.00	3.10	33.50	9.23	32.00	14.4	30.00	12.6	30.50
MEDIAN CONC.	1.5000		3.7000		2.9000		8.5000		13.6000		11.7300	

PARAMETER: 12091 Magnesium MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	20.2	23.00	30.4	26.00	25.2	17.00	44.4	24.00
F002	20.0	20.50	30.0	20.50	25.3	18.00	43.8	22.00
F003	19.7	16.00	30.3	24.50	25.1	15.50	43.5	20.00
F006	19.	6.50	28.	5.50	25.	12.50	42.	9.50
F007	19.4	9.50	28.9	10.00	25.1	15.50	43.2	16.00
F008	19.5	12.00	29.1	12.00	24.8	8.50	41.1	5.00
F009	20.7	28.00	32.	29.50	26.	24.50	45.	28.50
F010	20.	20.50	28.	5.50	26.	24.50	45.	28.50
F011	20.0	20.50	28.9	10.00	25.7	20.50	43.5	20.00
F013	19.38	8.00	30.11	23.00	25.75	22.00	43.32	18.00
F014	21.64	35.00	32.26	32.00	27.68 H	35.00	47.71 H	37.00
F015	19.6	14.50	30.3	24.50	24.5	7.00	42.7	14.00
F016	21.9 H	36.00	26.7 L	3.00	26.9	28.00	41.5	8.00
F019	16.9 VL	1.00	23.5 EL	1.00	20.3 EL	1.00	35.0 EL	1.00
F020	19.5	12.00	29.6	15.00	24.9	10.00	42.5	11.00
F025	20.0	20.50	30.0	20.50	25.0	12.50	42.0	9.50
F026	20.37	25.00	29.41	13.00	25.86	23.00	44.60	25.50
F030	21.1	31.00	31.6	27.00	26.6	27.00	45.9	31.00
F031	20.4	26.00	29.9	18.50	25.4	19.00	43.5	20.00
F032	19.5	12.00	29.6	15.00	25.0	12.50	44.0	23.00
F033	21.1	31.00	32.5 H	34.00	27.4	33.00	46.1	33.00
F034	20.6	27.00	29.9	18.50	28.4 H	36.00	41.3	7.00
F035	20.3	24.00	32.3	33.00	27.1	30.50	45.0	28.50
F036	18.80	4.00	34.4 VH	37.00	25.7	20.50	47.4 H	35.50
F038	19.8	17.50	29.6	15.00	25.0	12.50	42.6	12.50
F042	19.4	9.50	28.9	10.00	24.0	4.00	42.6	12.50
F043	21.0	29.00	32.0	29.50	27.0	29.00	46.0	32.00
F046	19.6	14.50	29.8	17.00	26.3	26.00	45.0	28.50
F048	17.83 L	3.00	27.42	4.00	23.49	3.00	39.93	3.00
F059	21.1	31.00	32.1	31.00	28.6 H	37.00	43.1	15.00
F061	21.3	33.00	32.6 H	35.00	27.3	32.00	46.2	34.00
F069	18.93	5.00	28.27	7.00	24.21	6.00	41.22	6.00
F071	22.1 H	37.00	33.1 H	36.00	27.5	34.00	47.4 H	35.50
F074	17.40 L	2.00	25.80 VL	2.00	21.60 VL	2.00	37.80 VL	2.00
F080	19.8	17.50	30.1	22.00	24.8	8.50	43.3	17.00
F089	19.0	6.50	28.8	8.00	24.2	5.00	40.4	4.00
F091	21.5	34.00	31.8	28.00	27.1	30.50	44.6	25.50
MEDIAN CONC.	20.0000		29.9000		25.4000		43.5000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	187.50	18.750	10			Auto FAAS
F002	228.00	22.800	10			12107
F003	173.50	17.350	10			AA
F006	148.50	14.850	10	VH		ATOMIC ABS.
F007	123.00	12.300	10			
F008	144.50	14.450	10			ICAP
F009	247.50	24.750	10			ICP
F010	185.50	18.550	10			ICP
F011	150.50	15.050	10			
F013	220.00	22.000	10			ICP
F014	335.00	33.500	10	H H H	BIASED HIGH	
F015	137.00	13.700	10			ICP
F016	271.00	27.100	10	H L		AA
F019	13.00	1.300	10	L L VLVLELELEL	BIASED LOW	ICP
F020	144.50	14.450	10			ICP
F025	138.50	13.850	10			AA
F026	181.00	18.100	10			AAS
F030	278.50	27.850	10			ICP
F031	139.00	13.900	10			AAS Flame
F032	147.00	14.700	10			
F033	313.50	31.350	10	H	BIASED HIGH	ICP/DIRECT
F034	250.00	25.000	10	VH H		AA
F035	240.00	24.000	10			ICP-AES
F036	163.00	16.300	10	EL VH H		AAS
F038	206.50	20.650	10			ICP
F042	109.50	10.950	10			AA
F043	339.00	33.900	10	H H H	BIASED HIGH	ICP
F046	144.50	14.450	10			ICP
F048	53.00	5.300	10	L L	BIASED LOW	IC
F059	244.50	24.450	10	H		ICP
F061	339.00	33.900	10	H	BIASED HIGH	ICP
F069	60.50	6.050	10		BIASED LOW	ICP
F071	324.50	32.450	10	H H H H	BIASED HIGH	FLAME-AA
F074	115.50	11.550	10	L VLVLVL		IC
F080	172.00	17.200	10			ICP
F089	53.00	5.300	10		BIASED LOW	ICP
F091	309.00	30.900	10		BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 19.000

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F019	13.00	1.300	10	LLVLVLELELEL	BIASED LOW	ICP
F048	53.00	5.300	10	LL	BIASED LOW	IC
F089	53.00	5.300	10		BIASED LOW	ICP
F069	60.50	6.050	10		BIASED LOW	ICP
F042	109.50	10.950	10			AA
F074	115.50	11.550	10	LVLVLVL		IC
F007	123.00	12.300	10			
F015	137.00	13.700	10			ICP
F025	138.50	13.850	10			AA
F031	139.00	13.900	10			AAS Flame
F020	144.50	14.450	10			ICP
F046	144.50	14.450	10			ICP
F008	144.50	14.450	10			ICAP
F032	147.00	14.700	10			
F006	148.50	14.850	10	VH		ATOMIC ABS.
F011	150.50	15.050	10			
F036	163.00	16.300	10	ELVHH		AAS
F080	172.00	17.200	10			ICP
F003	173.50	17.350	10			AA
F026	181.00	18.100	10			AAS
F010	185.50	18.550	10			ICP
F001	187.50	18.750	10			Auto FAAS
F038	206.50	20.650	10			ICP
F013	220.00	22.000	10			ICP
F002	228.00	22.800	10			12107
F035	240.00	24.000	10			ICP-AES
F059	244.50	24.450	10	H		ICP
F009	247.50	24.750	10			ICP
F034	250.00	25.000	10	VHH		AA
F016	271.00	27.100	10	HL		AA
F030	278.50	27.850	10			ICP
F091	309.00	30.900	10		BIASED HIGH	ICP
F033	313.50	31.350	10	H	BIASED HIGH	ICP/DIRECT
F071	324.50	32.450	10	HHHH	BIASED HIGH	FLAME-AA
F014	335.00	33.500	10	HHH	BIASED HIGH	
F043	339.00	33.900	10	HHH	BIASED HIGH	ICP
F061	339.00	33.900	10	H	BIASED HIGH	ICP

OVERALL AVERAGE
RANK IS 19.000

Magnesium

PARAMETER: 14091 Silicates mg SiO2/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .1000 BASIC ACCEPTABLE ERROR= .0250 CONCENTRATION ERROR INCREMENT= .0800

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
F001	2.3	19.50	3.7	16.00	1.5	16.00	.73 VH	21.00	5.3	11.00	4.0	16.00
F002	2.177	11.00	3.6	8.00	1.395	7.00	.665	19.00	5.306	13.00	3.90	10.00
F003	2.33	21.00	3.77	18.00	1.55	18.00	.62	11.50	5.25	9.00	4.03	18.00
F008	2.4 H	22.00	3.9	21.50	1.5	16.00	.6	6.50	5.6	20.50	4.2	20.00
F010	2.2	14.00	3.7	16.00	1.4	8.50	.62	11.50	5.3	11.00	4.0	16.00
F011	2.54 VH	23.00	3.89	20.00	1.45	12.50	.643	16.00	5.07	4.00	3.87	7.50
F015	2.09	4.00	3.51	5.50	1.35	3.00	.62	11.50	5.13	5.50	3.87	7.50
F016	2.29	18.00	3.96 H	23.00	1.56	19.00	.70 H	20.00	5.77 H	23.00	4.28 H	21.00
F020	2.2	14.00	3.7	16.00	1.4	8.50	.6	6.50	5.3	11.00	3.9	10.00
F025	2.25	17.00	3.65	12.50	1.45	12.50	.65	17.00	5.35	14.50	4.00	16.00
F026	2.16	10.00	3.65	12.50	1.88 EH	22.00	.663	18.00	5.38	16.50	3.97	13.00
F030	2.14	8.50	3.64	10.50	1.93 EH	23.00	.64	14.50	5.35	14.50	4.07	19.00
F032	2.10	5.00	3.51	5.50	1.37	6.00	.60	6.50	5.14	7.00	3.85	5.50
F033	2.14	8.50	3.64	10.50	1.41	10.00	.64	14.50	5.13	5.50	3.85	5.50
F038	2.18	12.00	3.61	9.00	1.49	14.00	.58	3.00	5.41	18.00	3.93	12.00
F042	2.23	16.00	3.68	14.00	1.44	11.00	.62	11.50	5.38	16.50	3.98	14.00
F043	1.88 VL	1.00	3.21 L	1.00	1.20 VL	1.00	.55 L	1.50	4.71 L	1.00	3.53 L	1.00
F046	2.06	3.00	3.53	7.00	1.36	5.00	.59	4.00	5.02	2.00	3.75	3.00
F048	2.13	7.00	3.35	2.00	1.30 L	2.00	.55 L	1.50	5.48	19.00	3.82	4.00
F059	2.0	2.00	3.5	4.00	1.5	16.00	.6	6.50	5.2	8.00	3.9	10.00
F069	2.102	6.00	3.475	3.00	1.352	4.00	.607	9.00	5.045	3.00	3.747	2.00
F071	2.30	19.50	3.85	19.00	1.60 H	20.00	8.65 EH	23.00	5.67	22.00	4.30 H	22.00
F091	2.2	14.00	3.9	21.50	1.7 VH	21.00	.9 EH	22.00	5.6	20.50	4.5 VH	23.00
MEDIAN CONC.	2.1800		3.6500		1.4500		.6200		5.3000		3.9300	

PARAMETER: 14091 Silicates mg SiO2/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.36 EH	20.00	6.5	9.50	12.6	13.00	14.9	12.50
F002	.305 H	17.00	6.492	8.00	12.49	10.00	14.54	7.00
F003	.26	11.50	6.39	5.00	13.40	21.50	15.5	18.00
F008	.2 VL	1.50	7.2 H	20.00	13.3	20.00	15.8	20.00
F010	.25	7.00	6.7	17.50	13.	19.00	15.	15.50
F011	.26	11.50	6.58	12.00	12.7	14.50	14.9	12.50
F015	.28	16.00	6.70	17.50	12.26	8.00	14.72	10.00
F016	.32 VH	18.00	7.70 EH	22.00	14.4 VH	23.00	16.9 VH	23.00
F020	<.5	0.00	6.6	13.50	12.5	11.00	14.7	9.00
F025	.25	7.00	6.50	9.50	12.7	14.50	14.8	11.00
F026	.270	14.50	6.75	19.00	12.58	12.00	14.96	14.00
F030	.21 L	3.50	6.63	15.00	12.8	16.50	15.0	15.50
F032	.21 L	3.50	6.38	4.00	12.2	6.50	14.3	4.50
F033	.26	11.50	6.20	2.00	12.19	5.00	14.55	8.00
F038	.26	11.50	6.67	16.00	12.9	18.00	15.2	17.00
F042	.24	5.00	6.60	13.50	12.8	16.50	15.6	19.00
F043	.27	14.50	6.0 L	1.00	11.1 L	2.00	13.3 L	1.00
F046	.25	7.00	6.49	7.00	12.2	6.50	14.3	4.50
F048	.40 EH	21.00	6.54	11.00	11.46 L	3.00	13.63 L	2.00
F059	.2 VL	1.50	6.4	6.00	12.3	9.00	14.5	6.00
F069	.252	9.00	6.281	3.00	11.96	4.00	14.10	3.00
F071	.35 EH	19.00	7.90 EH	23.00	11.0 VL	1.00	16.2 H	22.00
F091	.6 EH	22.00	7.4 VH	21.00	13.4	21.50	16.0	21.00
MEDIAN CONC.	.2600		6.5800		12.5800		14.9000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	154.50	15.450	10	VH EH		Auto Color
F002	110.00	11.000	10	H		14109
F003	151.50	15.150	10			Colorimetric
F008	168.00	16.800	10	H VLH		MOLYBDENUM
F010	136.00	13.600	10			ICP
F011	133.50	13.350	10	VH		
F015	88.50	8.850	10			ICP
F016	210.00	21.000	10	H H H H VHEHVHVH	BIASED HIGH	ICP
F020	99.50	11.056	9			Auto. Moly
F025	131.50	13.150	10			HB
F026	151.50	15.150	10	EH		AA
F030	140.50	14.050	10	EH L		ICP
F032	54.00	5.400	10	L	BIASED LOW	
F033	81.00	8.100	10			MOLYBDATE
F038	130.50	13.050	10			Colour
F042	137.00	13.700	10			AA
F043	25.00	2.500	10	VLL VLL L L L L L	BIASED LOW	ICP
F046	49.00	4.900	10		BIASED LOW	ICP
F048	72.50	7.250	10	L L EH L L		AA
F059	69.00	6.900	10	VL		ICP
F069	46.00	4.600	10		BIASED LOW	ICP
F071	190.50	19.050	10	H EH H EHEHVLH	BIASED HIGH	COLORIMETRIC
F091	207.50	20.750	10	VHEH VHEHVH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 11.952

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F043	25.00	2.500	10	VLLVLLLLLLL	BIASED LOW	ICP
F069	46.00	4.600	10		BIASED LOW	ICP
F046	49.00	4.900	10		BIASED LOW	ICP
F032	54.00	5.400	10	L	BIASED LOW	
F059	69.00	6.900	10	VL		ICP
F048	72.50	7.250	10	LLEHLL		AA
F033	81.00	8.100	10			MOLYBDATE
F015	88.50	8.850	10			ICP
F002	110.00	11.000	10	H		14109
F020	99.50	11.056	9			Auto. Moly
F038	130.50	13.050	10			Colour
F025	131.50	13.150	10			HB
F011	133.50	13.350	10	VH		
F010	136.00	13.600	10			ICP
F042	137.00	13.700	10			AA
F030	140.50	14.050	10	EHL		ICP
F003	151.50	15.150	10			Colorimetric
F026	151.50	15.150	10	EH		AA
F001	154.50	15.450	10	VHEH		Auto Color
F008	168.00	16.800	10	HVLH		MOLYBDENUM
F071	190.50	19.050	10	HEHHEHEHVLH	BIASED HIGH	COLORIMETRIC
F091	207.50	20.750	10	VHEHVHEHVH	BIASED HIGH	ICP
F016	210.00	21.000	10	HHHHVHEHVHVH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 11.952

Silicates

PARAMETER: 16092 Sulfate (All Methods) MG/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= .5000 CONCENTRATION ERROR INCREMENT= .0800

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
F002	8.9	20.00	9.3	15.50	29.0	10.50	23.4	10.50	18.3	18.50	38.7	16.50
F003	9.6	29.00	9.9	29.50	30.0	21.50	25.0	28.00	20.1	30.50	31.6 EL	1.00
F006	10.	33.50	<10.	0.00	29.	10.50	22.	3.00	14. EL	2.00	34. L	2.00
F007	8.40	5.00	8.70	2.00	28.3	7.50	23.4	10.50	18.2	17.00	37.3	8.00
F008	9.16	27.00	9.68	27.00	28.0	5.00	23.0	8.00	16.9	6.00	44.0 H	32.50
F009	8.4	5.00	8.9	5.00	30.	21.50	24.	17.50	17.9	13.50	40.	25.50
F010	8.5	10.00	9.0	7.50	29.	10.50	24.	17.50	18.	15.00	38.	12.00
F011	10.0	33.50	11.0 H	33.50	32.0	31.50	27.0 H	33.50	21.0 H	34.00	49.0 EH	37.00
F013	8.60	11.50	9.05	10.50	27.99	4.00	22.07	4.00	17.22	8.00	36.53	4.00
F014	8.61	13.50	10.05	31.00	31.27	28.00	24.88	25.00	4.08 EL	1.00	40.99	28.00
F015	8.8	16.00	9.3	15.50	30.3	24.00	24.2	21.50	18.3	18.50	39.7	23.00
F016	8.22	3.00	9.03	9.00	25.8 L	1.00	23.4	10.50	16.5	5.00	38.7	16.50
F019	9.0	24.00	9.5	22.50	29.8	19.50	24.2	21.50	18.5	23.00	39.7	23.00
F020	9.12	26.00	9.57	25.00	29.7	17.50	24.0	17.50	19.0	27.50	39.3	20.50
F025	9.1	25.00	9.3	15.50	29.0	10.50	23.6	13.00	17.6	11.00	37.6	9.00
F026	8.843	18.00	9.624	26.00	29.65	16.00	22.87	7.00	17.40	9.00	37.22	7.00
F030	8.61	13.50	9.08	12.00	28.2	6.00	22.8	6.00	18.5	23.00	37.1	6.00
F031	9.79	31.00	9.54	24.00	32.0	31.50	23.7	14.00	17.8	12.00	38.1	13.00
F032	7.8	2.00	8.0 L	1.00	27.0	2.00	20.7 L	1.00	15.9 L	4.00	35.8	3.00
F033	8.9	20.00	9.3	15.50	31.	26.00	24.	17.50	19.	27.50	40.	25.50
F035	9.7	30.00	10.7 H	32.00	31.6	29.00	25.8	30.00	20.2 H	32.00	41.7	30.00
F036	8.45	8.00	9.05	10.50	29.10	13.00	23.80	15.00	17.50	10.00	38.70	16.50
F038	8.6	11.50	9.0	7.50	29.8	19.50	24.9	26.50	20.1	30.50	39.7	23.00
F042	8.81	17.00	9.40	20.00	29.5	15.00	23.4	10.50	17.9	13.50	38.2	14.00
F046	8.73	15.00	9.16	13.00	32.0	31.50	26.1	32.00	18.1	16.00	38.7	16.50
F048	10.80 VH	36.00	11.06 H	35.00	37.52 EH	36.00	32.28 EH	37.00		0.00	47.40 EH	36.00
F057	11.46 EH	37.00	11.47 VH	36.00	29.21	14.00	24.27	23.00	18.86	25.00	37.67	10.00
F059	10.	33.50	11. H	33.50	39. EH	37.00	28. VH	35.00	24. EH	36.00	45. VH	34.00
F061	7.5 L	1.00	9.5	22.50	33.4 H	34.00	28.1 VH	36.00	20.6 H	33.00	41.1	29.00
F068	8.940	23.00	9.310	18.00	30.280	23.00	24.147	20.00	18.314	20.00	38.887	19.00
F069	8.47	9.00	8.74	3.00	28.3	7.50	22.7	5.00	17.2	7.00	37.8	11.00
F071	8.90	20.00	9.41	21.00	34.2 VH	35.00	27.0 H	33.50	19.8	29.00	46.3 EH	35.00
F074	9.40	28.00	8.81	4.00	27.60	3.00	21.50 L	2.00	15.48 L	3.00	36.80	5.00
F079	8.44	7.00	8.93	6.00	30.97	25.00	25.16	29.00	18.46	21.00	40.64	27.00
F080	8.92	22.00	9.39	19.00	29.7	17.50	24.3	24.00	18.5	23.00	39.3	20.50
F089	10.	33.50	9.8	28.00	32.	31.50	26.	31.00	23. EH	35.00	44. H	32.50
F091	8.4	5.00	9.9	29.50	31.2	27.00	24.9	26.50	18.9	26.00	42.9 H	31.00
MEDIAN CONC.	8.9000		9.3500		29.8000		24.0000		18.3000		38.8870	

PARAMETER: 16092 Sulfate (All Methods) MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	63.2	13.50	50.1	14.00	52.0	19.00	290.0	19.50
F003	68.7	32.00	52.0	24.50	51.6	17.00	283.	10.50
F006	58. L	2.00	47.	5.00	50.	8.50	281.	9.00
F007	62.0	8.00	48.7	10.00	50.2	11.50	280.	7.50
F008	73.0 H	35.00	41.0 EL	1.00	55.0	31.50	297.	23.50
F009	68.	30.00	53.	27.50	53.	24.50	531. EH	37.00
F010	63.	12.00	48.	7.00	49.	6.00	280.	7.50
F011	75.0 VH	36.00	61.0 EH	36.00	61.0 VH	35.00	304.	29.00
F013	60.90	4.50	46.93	4.00	48.34	2.00	279.4	6.00
F014	65.14	19.00	53.32	29.00	53.17	26.00	244. VL	2.00
F015	65.3	21.50	51.2	18.00	50.1	10.00	298.	25.00
F016	61.3	6.00	48.4	8.50	48.4	3.00	284.	12.50
F019	64.4	17.00	54.2	32.00	55.2	33.00	297.	23.50
F020	65.9	24.50	51.8	22.00	52.5	22.50	283.	10.50
F025	62.6	10.00	48.8	11.00	50.2	11.50	278.	5.00
F026	65.75	23.00	51.75	21.00	51.91	18.00	292.0	21.00
F030	62.2	9.00	49.3	12.00	49.5	7.00	311.	30.00
F031	60.9	4.50	50.4	16.00	50.7	13.50	298.9	26.00
F032	67.1	28.00	51.9	23.00	52.5	22.50	289.	17.00
F033	67.	27.00	52.	24.50	53.	24.50	300.	27.00
F035	64.8	18.00	52.8	26.00	54.2	29.00	303.	28.00
F036	66.00	26.00	45.30 L	2.00	47.20 L	1.00	267.0	4.00
F038	65.3	21.50	55.0	33.00	53.7	28.00	290.	19.50
F042	62.7	11.00	48.4	8.50	50.0	8.50	284.	12.50
F046	63.2	13.50	50.5	17.00	51.2	16.00	287.	15.00
F048	67.32	29.00	58.98 VH	34.00	61.35 EH	36.00	327.78 VH	33.00
F057	59.43 L	3.00	49.95	13.00	50.93	15.00	244.1 VL	3.00
F059	72. H	34.00	59. VH	35.00	58. H	34.00	337. VH	35.00
F061	54.1 VL	1.00	46.6 L	3.00	48.8	4.00	329. VH	34.00
F068	65.148	20.00	51.529	20.00	52.238	21.00	286.67	14.00
F069	64.0	15.50	50.3	15.00	50.7	13.50	289.	17.00
F071	80.6 EH	37.00	62.5 EH	37.00	63.4 EH	37.00	400. EH	36.00
F074	61.70	7.00	47.4	6.00	48.90	5.00	295.0	22.00
F079	68.57	31.00	53.52	31.00	53.38	27.00	242.25 EL	1.00
F080	65.9	24.50	51.4	19.00	52.1	20.00	289.	17.00
F089	64.	15.50	53.	27.50	55.	31.50	318. H	32.00
F091	70.8 H	33.00	53.4	30.00	54.9	30.00	315. H	31.00
MEDIAN CONC.	65.1400		51.4000		52.0000		290.0000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F002	157.50	15.750	10			16309
F003	223.50	22.350	10	EL		Colorimetric
F006	75.50	8.389	9	ELL L		AUTO ANAL.
F007	87.00	8.700	10			
F008	196.50	19.650	10	H H EL		METHYL THYMOL
F009	207.00	20.700	10	EH		Dionex
F010	105.00	10.500	10			Calmagite
F011	339.00	33.900	10	H H H EHVHEHVH	BIASED HIGH	
F013	58.50	5.850	10		BIASED LOW	ICP
F014	202.50	20.250	10	EL VL		
F015	193.00	19.300	10			IC
F016	75.00	7.500	10	L	BIASED LOW	IC
F019	239.00	23.900	10			IC
F020	213.50	21.350	10			Auto.
F025	121.50	12.150	10			MB
F026	166.00	16.600	10			IC
F030	124.50	12.450	10			IC
F031	185.50	18.550	10			IC
F032	103.50	10.350	10	L L L		
F033	235.00	23.500	10			IC
F035	284.00	28.400	10	H H		Colour
F036	106.00	10.600	10	L L		IC
F038	220.50	22.050	10			Turbid
F042	130.50	13.050	10			IC
F046	185.50	18.550	10			IC
F048	312.00	34.667	9	VHH EHEH EH VHEHVH	BIASED HIGH	IC
F057	179.00	17.900	10	EHVH L VL		
F059	347.00	34.700	10	H EHVHEHVHH VHH VH	BIASED HIGH	IC
F061	197.50	19.750	10	L H VHH VLL VH		IC
F068	198.00	19.800	10			IC
F069	103.50	10.350	10			IC
F071	320.50	32.050	10	VHH EHEHEHEHEH	BIASED HIGH	ION CHROMATOGRAPH
F074	85.00	8.500	10	L L	BIASED LOW	IC
F079	205.00	20.500	10	EL		Dionex IC
F080	206.50	20.650	10			IC
F089	298.00	29.800	10	EHH H	BIASED HIGH	Turb.
F091	269.00	26.900	10	H H H		ICP

OVERALL AVERAGE RANK IS 18.902

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F013	58.50	5.850	10		BIASED LOW	ICP
F016	75.00	7.500	10	L	BIASED LOW	IC
F006	75.50	8.389	9	ELLL		AUTO ANAL.
F074	85.00	8.500	10	LL	BIASED LOW	IC
F007	87.00	8.700	10			
F032	103.50	10.350	10	LLL		
F069	103.50	10.350	10			IC
F010	105.00	10.500	10			Calmagite
F036	106.00	10.600	10	LL		IC
F025	121.50	12.150	10			MB
F030	124.50	12.450	10			IC
F042	130.50	13.050	10			IC
F002	157.50	15.750	10			16309
F026	166.00	16.600	10			IC
F057	179.00	17.900	10	EHVHLVL		
F031	185.50	18.550	10			IC
F046	185.50	18.550	10			IC
F015	193.00	19.300	10			IC
F008	196.50	19.650	10	HHEL		METHYL THYMOL
F061	197.50	19.750	10	LHVHHVLLVH		IC
F068	198.00	19.800	10			IC
F014	202.50	20.250	10	ELVL		
F079	205.00	20.500	10	EL		Dionex IC
F080	206.50	20.650	10			IC
F009	207.00	20.700	10	EH		Dionex
F020	213.50	21.350	10			Auto.
F038	220.50	22.050	10			Turbid
F003	223.50	22.350	10	EL		Colorimetric
F033	235.00	23.500	10			IC
F019	239.00	23.900	10			IC
F091	269.00	26.900	10	HHH		ICP
F035	284.00	28.400	10	HH		Colour
F089	298.00	29.800	10	EHHH	BIASED HIGH	Turb.
F071	320.50	32.050	10	VHHEHEHEHEHEH	BIASED HIGH	ION CHROMATOGRAPH
F011	339.00	33.900	10	HHHEHVHEHVH	BIASED HIGH	
F048	312.00	34.667	9	VHHEHEHEHVHEHVH	BIASED HIGH	IC
F059	347.00	34.700	10	HEHVHEHVHHVHHVH	BIASED HIGH	IC

OVERALL AVERAGE
RANK IS 18.902

Sulfate (All Methods)

PARAMETER: 17092 Chloride (All Methods) MG/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= .5000 CONCENTRATION ERROR INCREMENT= .0800

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
F001	2.1	21.50	1.3 H	35.00	16.5	17.50	15.0	20.00	2.4	15.00	5.70	13.00
F002	2.1	21.50	.6	17.00	16.5	17.50	15.2	22.50	2.3	8.00	5.75	16.00
F003	2.31	32.00	.7	26.50	16.6	20.00	15.2	22.50	3.26 H	34.00	6.04	29.00
F006	<2.	0.00	<2.	0.00	16.	10.50	14.	4.00	<2.	0.00	4. EL	1.00
F007	2.07	14.00	.63	24.00	16.9	27.50	15.4	26.00	2.64	25.00	5.70	13.00
F008	2.0	8.00	.6	17.00	17.0	30.00	16.	32.50	2.7	27.00	5.9	24.50
F009	2.0	8.00	.54	6.00	15.9	7.00	14.4	7.00	2.2	4.50	5.4	5.00
F010	2.4	33.00	1.0	33.50	17.	30.00	16.	32.50	3.3 H	35.00	9.5 EH	39.00
F011	1.90	1.50	.50	3.50	18.1	37.00	17.4 H	37.00	2.50	18.00	6.10	30.00
F013	2.7 H	36.00	<1.0	0.00	16.9	27.50	15.6	30.00	3.1	33.00	5.8	19.00
F014	2.17	29.00	.62	23.00	16.11	14.00	14.49	10.50	2.40	15.00	5.67	10.00
F015	2.09	16.00	.70	26.50	16.80	25.50	15.25	24.00	2.61	23.00	5.96	26.00
F016	2.30	31.00	.81	31.00	16.0	10.50	14.9	18.00	3.04	32.00	6.21	33.00
F019	2.02	11.00	.43	1.00	14.9	3.00	13.0 L	1.00	2.29	6.00	5.77	17.00
F020	1.92	3.00	.550	8.00	16.6	20.00	15.4	26.00	2.74	28.00	5.63	9.00
F025	2.10	21.50	.58	11.50	16.0	10.50	14.6	12.50	2.30	8.00	5.40	5.00
F026	2.048	12.00	.542	7.00	17.55	35.00	14.48	9.00	2.516	20.00	5.09	3.00
F030	1.90	1.50	.60	17.00	14.2 L	1.00	13.4	2.00	2.14	1.50	5.58	7.00
F031	2.1	21.50	.83	32.00	16.0	10.50	14.8	16.00	2.62	24.00	6.12	31.00
F032	2.1	21.50	.6T	17.00	16.7	23.00	14.4	7.00	2.5	18.00	5.7	13.00
F033	2.1	21.50	.56	9.00	17.	30.00	15.	20.00	2.3	8.00	5.7	13.00
F034	3.7 EH	37.00	2.8 EH	36.00	17.7	36.00	16.9 H	36.00	5.0 EH	36.00	8.5 EH	38.00
F035	2.0	8.00	.8	29.50	16.0	10.50	14.4	7.00	2.2	4.50	5.0	2.00
F036	2.09	16.00	.61	21.50	15.8	6.00	15.7	31.00	2.50	18.00	5.80	19.00
F038	2.2	30.00	.8	29.50	16.3	15.00	15.0	20.00	2.9	30.00	6.0	27.50
F042	1.98	4.00	.536	5.00	16.6	20.00	14.8	16.00	2.16	3.00	5.40	5.00
F046	2.48	34.00	.60	17.00	14.5 L	2.00	14.7	14.00	2.79	29.00	6.26	34.00
F048	2.13	27.00	.73	28.00	15.60	4.50	14.49	10.50	5.66 EH	37.00	5.88	22.50
F057	5.49 EH	38.00	4.49 EH	37.00	16.80	25.50	15.55	29.00	5.77 EH	38.00	8.23 EH	37.00
F059	2.	8.00	1.	33.50	19. H	38.00	18. VH	38.00	3.	31.00	6.	27.50
F061	2.0	8.00	.6	17.00	15.6	4.50	14.0	4.00	2.4	15.00	5.9	24.50
F068	2.141	28.00	.632	25.00	17.013	32.00	16.042	34.00	2.685	26.00	6.779 H	36.00
F069	2.09	16.00	.599	13.00	16.4	16.00	14.8	16.00	2.38	12.00	5.62	8.00
F071	2.12	26.00	.561	10.00	20.3 EH	39.00	18.5 EH	39.00	2.14	1.50	6.46	35.00
F074	2.06	13.00	.58	11.50	17.10	33.00	14.60	12.50	2.37	11.00	5.70	13.00
F079	1.99	5.00	.48	2.00	17.40	34.00	16.10	35.00	2.36	10.00	5.87	21.00
F080	2.10	21.50	.61	21.50	16.7	23.00	15.5	28.00	2.39	13.00	5.88	22.50
F089	2.6	35.00	.5	3.50	16.0	10.50	14.0	4.00	2.6	21.50	6.2	32.00
F091	2.1	21.50	.6	17.00	16.7	23.00	15.4	26.00	2.6	21.50	5.8	19.00
MEDIAN CONC.	2.1000		.6000		16.6000		15.0000		2.5080		5.8000	

PARAMETER: 17092 Chloride (All Methods) MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	16.9	16.00	27.1	19.50	22.3	23.00	94.3	18.00
F002	17.2	19.50	27.7	28.50	22.7	29.50	96.0	26.00
F003	17.4	23.00	27.6	25.50	22.6	27.50	89.0	7.00
F006	16.	4.00	27.	15.50	22.	14.50	97.	29.00
F007	17.6	27.50	27.3	23.00	22.6	27.50	92.4	13.00
F008	18.	33.50	29.	35.00	24.	36.00	90.	9.50
F009	16.2	6.50	26.2	7.00	21.3	6.00	154. EH	39.00
F010	20. VH	38.00	30. H	37.50	23.	32.00	110. VH	37.00
F011	18.7	35.00	29.5	36.00	23.9	35.00	97.6	32.00
F013	17.5	26.00	27.2	21.50	21.8	11.50	94.4	19.00
F014	17.72	31.00	27.67	27.00	22.29	21.00	96.61	27.00
F015	17.68	30.00	28.58	34.00	22.37	25.00	94.23	17.00
F016	17.4	23.00	20.5 EL	1.00	28.0 EH	39.00	96.9	28.00
F019	14.7 L	2.00	28.4	33.00	22.5	26.00	107. VH	36.00
F020	17.4	23.00	27.7	28.50	20.5	2.50	87.5	6.00
F025	16.7	13.50	26.6	10.50	21.8	11.50	94.0	16.00
F026	16.94	17.00	26.80	13.00	21.75	10.00	95.90	25.00
F030	14.6 L	1.00	24.2 L	3.00	19.5 L	1.00	97.2	30.00
F031	16.8	15.00	26.6	10.50	22.0	14.50	90.3	11.00
F032	17.1	18.00	27.2	21.50	22.1	16.50	93.6	15.00
F033	18.	33.50	28.	30.50	23.	32.00	95.	22.00
F034	19.5 H	37.00	30.0 H	37.50	24.4 H	37.00	95.	22.00
F035	16.5	9.00	27.1	19.50	21.6	8.00	95.3	24.00
F036	16.6	11.00	23.7 L	2.00	20.5	2.50	86.2 L	4.00
F038	17.4	23.00	27.4	24.00	22.3	23.00	93.2	14.00
F042	16.0	4.00	25.3	4.00	21.1	4.50	90.0	9.50
F046	16.7	13.50	28.2	32.00	22.7	29.50	70.7 EL	2.00
F048	16.68	12.00	26.22	8.00	21.69	9.00	84.61 L	3.00
F057	16.57	10.00	25.98	6.00	21.82	13.00	86.75 L	5.00
F059	19. H	36.00	28.	30.50	23.	32.00	99.	35.00
F061	16.	4.00	26.4	9.00	21.1	4.50	89.1	8.00
F068	17.618	29.00	26.772	12.00	22.154	18.00	98.272	34.00
F069	16.3	8.00	25.8	5.00	21.4	7.00	97.5	31.00
F071	20.9 EH	39.00	34.4 EH	39.00	27.8 EH	38.00	130. EH	38.00
F074	16.20	6.50	27.0	15.50	22.20	19.50	97.80	33.00
F079	17.81	32.00	27.05	18.00	23.04	34.00	55.98 EL	1.00
F080	17.4	23.00	27.6	25.50	22.2	19.50	94.9	20.00
F089	17.6	27.50	27.	15.50	22.3	23.00	92.	12.00
F091	17.2	19.50	27.0	15.50	22.1	16.50	95.0	22.00
MEDIAN CONC.	17.2000		27.1000		22.2000		94.9000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	198.50	19.850	10	H		Auto Color
F002	206.00	20.600	10			17209
F003	247.00	24.700	10	H		Colorimetric
F006	78.50	11.214	7	EL		AGNO3 TITRATION
F007	220.50	22.050	10			
F008	253.00	25.300	10			THIOCYANATE
F009	96.00	9.600	10	EH		Dionex
F010	347.50	34.750	10	H EHVHH VH	BIASED HIGH	Tritation conducti
F011	265.00	26.500	10	H		
F013	223.50	24.833	9	H		AA-Hg
F014	207.50	20.750	10			
F015	247.00	24.700	10			Auto Color
F016	246.50	24.650	10	ELEH		IC
F019	136.00	13.600	10	L L VH		IC
F020	154.00	15.400	10			Auto
F025	120.50	12.050	10			Ferric Thio
F026	151.00	15.100	10			IC
F030	65.00	6.500	10	L L L L	BIASED LOW	IC
F031	186.00	18.600	10			IC
F032	170.50	17.050	10			
F033	219.50	21.950	10			THIOCYANATE
F034	352.50	35.250	10	EHEH H EHEHH H H	BIASED HIGH	Titrimetric
F035	122.00	12.200	10			Colour
F036	131.00	13.100	10	L L		IC
F038	236.00	23.600	10			Colour
F042	75.00	7.500	10		BIASED LOW	IC
F046	207.00	20.700	10	L EL		IC
F048	161.50	16.150	10	EH L		IC
F057	238.50	23.850	10	EHEH EHEH L		
F059	309.50	30.950	10	H VH H	BIASED HIGH	IC
F061	98.50	9.850	10			IC
F068	274.00	27.400	10	H		IC
F069	132.00	13.200	10			IC
F071	304.50	30.450	10	EHEH EHEHEHEH		ION CHROMATOGRAPH
F074	168.50	16.850	10			IC
F079	192.00	19.200	10	EL		Dionex IC
F080	217.50	21.750	10			IC
F089	184.50	18.450	10			Titration
F091	201.50	20.150	10			AUTOMATED COLOUR

OVERALL AVERAGE RANK IS 19.806

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F030	65.00	6.500	10	LLLL	BIASED LOW	IC
F042	75.00	7.500	10		BIASED LOW	IC
F009	96.00	9.600	10	EH		Dionex
F061	98.50	9.850	10			IC
F006	78.50	11.214	7	EL		AGNO3 TITRATION
F025	120.50	12.050	10			Ferric Thio
F035	122.00	12.200	10			Colour
F036	131.00	13.100	10	LL		IC
F069	132.00	13.200	10			IC
F019	136.00	13.600	10	LLVH		IC
F026	151.00	15.100	10			IC
F020	154.00	15.400	10			Auto
F048	161.50	16.150	10	EHL		IC
F074	168.50	16.850	10			IC
F032	170.50	17.050	10			
F089	184.50	18.450	10			Titration
F031	186.00	18.600	10			IC
F079	192.00	19.200	10	EL		Dionex IC
F001	198.50	19.850	10	H		Auto Color
F091	201.50	20.150	10			AUTOMATED COLOUR
F002	206.00	20.600	10			17209
F046	207.00	20.700	10	LEL		IC
F014	207.50	20.750	10			
F080	217.50	21.750	10			IC
F033	219.50	21.950	10			THIOCYANATE
F007	220.50	22.050	10			
F038	236.00	23.600	10			Colour
F057	238.50	23.850	10	EHEHEHEHL		
F016	246.50	24.650	10	ELEH		IC
F003	247.00	24.700	10	H		Colorimetric
F015	247.00	24.700	10			Auto Color
F013	223.50	24.833	9	H		AA-Hg
F008	253.00	25.300	10			THIOCYANATE
F011	265.00	26.500	10	H		
F068	274.00	27.400	10	H		IC
F071	304.50	30.450	10	EHEHEHEHEHEH		ION CHROMATOGRAPH
F059	309.50	30.950	10	HVHH	BIASED HIGH	IC
F010	347.50	34.750	10	HEHVHHVH	BIASED HIGH	Tritation conducti
F034	352.50	35.250	10	EHEHHEHEHHHH	BIASED HIGH	Titrimetric

OVERALL AVERAGE RANK IS 19.806

PARAMETER: 19091 Potassium MG/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .5000 BASIC ACCEPTABLE ERROR= .2000 CONCENTRATION ERROR INCREMENT= .0800

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
F001	.7	11.00	.6	12.00	1.2	13.50	1.3	5.50	2.3	8.00	.9	4.50
F002	.71	13.50	.6	12.00	1.20	13.50	1.40	23.50	2.40	22.50	.92	8.50
F003	.73	20.00	.62	18.50	1.20	13.50	1.35	12.50	2.32	13.50	.97	18.50
F006	.8	30.50	.7	32.50	1.3	30.50	1.4	23.50	2.4	22.50	1.	25.00
F007	.799	29.00	.810	36.00	1.65 VH	36.00	2.04 EH	35.00	6.05 EH	37.00	1.28 H	36.00
F008	.72	16.50	.60	12.00	1.2	13.50	1.4	23.50	2.4	22.50	.92	8.50
F010	.72	16.50	.61	16.00	1.2	13.50	1.3	5.50	2.3	8.00	.95	15.50
F011	.72	16.50	.59	8.00	1.22	19.50	2.09 EH	36.00	2.42	27.00	.99	21.50
F013	.72	16.50	.62	18.50	1.23	22.00	1.40	23.50	2.44	29.00	1.10	33.00
F014	.75	23.50	.64	24.50	1.20	13.50	1.32	8.50	2.20	3.00	.93	11.50
F015	.7	11.00	.6	12.00	1.2	13.50	1.4	23.50	2.4	22.50	.9	4.50
F016	.83	33.00	.69	29.50	1.30	30.50	1.38	17.00	2.42	27.00	1.01	28.00
F019	2.96 EH	37.00	1.83 EH	37.00	3.25 EH	37.00	2.95 EH	37.00	3.75 EH	36.00	2.19 EH	37.00
F020	.6	4.00	.7	32.50	1.2	13.50	1.4	23.50	2.3	8.00	.9	4.50
F025	.80	30.50	.60	12.00	1.20	13.50	1.36	14.50	2.31	11.50	.94	13.50
F026	.73	20.00	.64	24.50	1.23	22.00	1.36	14.50	2.45	30.50	.95	15.50
F030	.9	35.00	.8	35.00	1.3	30.50	1.6	34.00	2.3	8.00	1.1	33.00
F031	.93	36.00	.73	34.00	1.33	33.50	1.53	32.00	2.39	18.50	1.04	29.00
F032	.76	25.50	.64	24.50	1.24	24.50	1.39	18.00	2.40	22.50	.97	18.50
F033	.71	13.50	.61	16.00	1.19	7.50	1.43	29.00	2.57	34.00	1.16	35.00
F034	.4 VL	1.00	.3 VL	1.00	.6 EL	1.00	.6 EL	1.00	1.3 EL	1.00	.5 VL	1.00
F035	.81	32.00	.69	29.50	1.22	19.50	1.30	5.50	2.39	18.50	.93	11.50
F036	.77	27.50	.654	28.00	1.23	22.00	1.33	10.00	2.35	16.00	.975	20.00
F038	.76	25.50	.64	24.50	1.33	33.50	1.46	30.00	2.42	27.00	1.07	31.00
F042	.69	8.50	.59	8.00	1.27	28.00	1.40	23.50	2.34	15.00	.99	21.50
F043	.77	27.50	.64	24.50	1.25	26.00	1.40	23.50	2.5	32.50	1.0	25.00
F046	.74	22.00	.64	24.50	1.26	27.00	1.37	16.00	2.37	17.00	1.00	25.00
F048	.66	6.00	.61	16.00	1.24	24.50	1.35	12.50	2.28	5.00	.92	8.50
F059	.75	23.50	.63	20.50	1.3	30.50	1.5	31.00	2.5	32.50	1.1	33.00
F061	.5 L	2.00	.5	3.50	1.0	3.00	1.4	23.50	2.3	8.00	1.0	25.00
F068	.843	34.00	.699	31.00	1.373	35.00	1.531	33.00	2.708	35.00	1.064	30.00
F069	.69	8.50	.56	5.00	1.15	5.00	1.30	5.50	2.31	11.50	.92	8.50
F071	.538	3.00	.494	2.00	.866 L	2.00	.956 VL	2.00	2.45	30.50	.706 L	2.00
F074	.68	7.00	.58	6.00	1.18	6.00	1.32	8.50	2.22	4.00	.94	13.50
F080	.73	20.00	.63	20.50	1.19	7.50	1.34	11.00	2.32	13.50	.96	17.00
F089	.64	5.00	.59	8.00	1.14	4.00	1.22	3.00	2.13	2.00	.90	4.50
F091	.7	11.00	.5	3.50	1.2	13.50	1.4	23.50	2.4	22.50	1.0	25.00
MEDIAN CONC.	.7300		.6200		1.2200		1.4000		2.3900		.9700	

PARAMETER: 19091 Potassium MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	6.0	8.00	1.6	16.00	1.5	5.50	2.3	6.00
F002	6.40	24.50	1.70	26.50	1.60	19.50	2.60	28.00
F003	6.32	21.00	1.60	16.00	1.61	26.00	2.35	11.50
F006	6.2	15.50	1.7	26.50	1.6	19.50	2.4	16.00
F007	7.07 H	36.00	2.53 EH	36.00	2.59 EH	36.00	4.08 EH	37.00
F008	6.2	15.50	1.6	16.00	1.6	19.50	2.3	6.00
F010	5.8	5.00	1.6	16.00	1.5	5.50	2.2	3.00
F011	6.78	34.00	2.19 EH	35.00	1.60	19.50	2.55	25.00
F013	6.46	28.00	1.88	34.00	1.69	33.00	2.60	28.00
F014	6.12	11.00	1.56	6.00	1.53	9.00	2.22	4.00
F015	6.3	19.50	1.6	16.00	1.6	19.50	2.4	16.00
F016	6.37	23.00	1.73	30.00	1.76	35.00	2.47	21.50
F019	7.80 EH	37.00	3.16 EH	37.00	2.80 EH	37.00	4.01 EH	36.00
F020	6.3	19.50	1.5	3.50	1.6	19.50	2.3	6.00
F025	5.91	6.00	1.58	10.50	1.63	29.00	2.32	8.00
F026	6.07	9.50	1.69	23.50	1.64	30.00	2.47	21.50
F030	5.6 L	3.00	1.7	26.50	1.6	19.50	2.4	16.00
F031	6.55	29.00	1.57	8.50	1.50	5.50	2.40	16.00
F032	6.13	12.00	1.66	22.00	1.60	19.50	2.42	20.00
F033	6.44	27.00	1.78	32.00	1.55	12.00	2.65	31.00
F034	4.4 EL	1.00	.9 EL	1.00	.7 EL	1.00	1.3 EL	1.00
F035	6.07	9.50	1.64	21.00	1.65	31.00	2.50	23.00
F036	6.35	22.00	1.57	8.50	1.54	10.50	2.34	10.00
F038	6.43	26.00	1.74	31.00	1.68	32.00	2.77 H	35.00
F042	6.90	35.00	1.71	29.00	1.62	27.50	2.73	34.00
F043	6.4	24.50	1.6	16.00	1.6	19.50	2.4	16.00
F046	6.22	18.00	1.69	23.50	1.62	27.50	2.66	32.00
F048	5.58 L	2.00	1.58	10.50	1.49	3.00	2.52	24.00
F059	6.6	30.50	1.7	26.50	1.6	19.50	2.7	33.00
F061	6.2	15.50	1.5	3.50	1.6	19.50	2.4	16.00
F068	6.696	33.00	1.818	33.00	1.742	34.00	2.596	26.00
F069	6.16	13.00	1.59	12.00	1.51	8.00	2.35	11.50
F071	6.62	32.00	1.56	6.00	1.54	10.50	2.64	30.00
F074	6.60	30.50	1.56	6.00	1.50	5.50	2.40	16.00
F080	5.96	7.00	1.62	20.00	1.57	13.00	2.33	9.00
F089	5.76	4.00	1.45	2.00	1.48	2.00	2.17	2.00
F091	6.2	15.50	1.6	16.00	1.6	19.50	2.6	28.00
MEDIAN CONC.	6.3000		1.6000		1.6000		2.4000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	90.00	9.000	10			Auto FAES
F002	192.00	19.200	10			19103
F003	171.00	17.100	10			FP
F006	242.00	24.200	10			ATOMIC ABS.
F007	354.00	35.400	10	VHEHEHH H EHEHEH	BIASED HIGH	
F008	153.50	15.350	10			AA
F010	104.50	10.450	10			ICP
F011	242.00	24.200	10	EH EH		
F013	265.50	26.550	10			ICP
F014	114.50	11.450	10			
F015	158.00	15.800	10			ICP
F016	274.50	27.450	10			AA
F019	368.00	36.800	10	EHEHEHEHEHEHEHEHEHEH	BIASED HIGH	ICP
F020	134.50	13.450	10			ICP
F025	149.00	14.900	10			Flame Photo
F026	211.50	21.150	10			AAS
F030	240.50	24.050	10	L		Flame
F031	242.00	24.200	10			AAS Flame
F032	207.00	20.700	10			
F033	237.00	23.700	10			ICP/DIRECT
F034	10.00	1.000	10	VLVLELELELVLELELELEL	BIASED LOW	AA
F035	201.00	20.100	10			ICP-AES
F036	174.50	17.450	10			AAS
F038	295.50	29.550	10	H	BIASED HIGH	ICP
F042	230.00	23.000	10			AA
F043	235.00	23.500	10			ICP
F046	232.50	23.250	10			AE
F048	112.00	11.200	10	L		IC
F059	280.50	28.050	10			FAE
F061	119.50	11.950	10	L		ICP
F068	324.00	32.400	10		BIASED HIGH	IC
F069	88.50	8.850	10			Flame AA
F071	120.00	12.000	10	L VL L		FLAME-AA
F074	103.00	10.300	10			IC
F080	138.50	13.850	10			AA
F089	36.50	3.650	10		BIASED LOW	ICP
F091	178.00	17.800	10			FLAME PHOTOMETER

OVERALL AVERAGE
RANK IS 19.000

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F034	10.00	1.000	10	VLVLELELELVLELELELEL	BIASED LOW	AA
F089	36.50	3.650	10		BIASED LOW	ICP
F069	88.50	8.850	10			Flame AA
F001	90.00	9.000	10			Auto FAES
F074	103.00	10.300	10			IC
F010	104.50	10.450	10			ICP
F048	112.00	11.200	10	L		IC
F014	114.50	11.450	10			
F061	119.50	11.950	10	L		ICP
F071	120.00	12.000	10	LVLL		FLAME-AA
F020	134.50	13.450	10			ICP
F080	138.50	13.850	10			AA
F025	149.00	14.900	10			Flame Photo
F008	153.50	15.350	10			AA
F015	158.00	15.800	10			ICP
F003	171.00	17.100	10			FP
F036	174.50	17.450	10			AAS
F091	178.00	17.800	10			FLAME PHOTOMETER
F002	192.00	19.200	10			19103
F035	201.00	20.100	10			ICP-AES
F032	207.00	20.700	10			
F026	211.50	21.150	10			AAS
F042	230.00	23.000	10			AA
F046	232.50	23.250	10			AE
F043	235.00	23.500	10			ICP
F033	237.00	23.700	10			ICP/DIRECT
F030	240.50	24.050	10	L		Flame
F011	242.00	24.200	10	EHEH		
F006	242.00	24.200	10			ATOMIC ABS.
F031	242.00	24.200	10			AAS Flame
F013	265.50	26.550	10			ICP
F016	274.50	27.450	10			AA
F059	280.50	28.050	10			FAE
F038	295.50	29.550	10	H	BIASED HIGH	ICP
F068	324.00	32.400	10		BIASED HIGH	IC
F007	354.00	35.400	10	VHEHEHHHEHEHEH	BIASED HIGH	
F019	368.00	36.800	10	EHEHEHEHEHEHEHEHEHEH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 19.000

Potassium

PARAMETER: 20091 Calcium MG/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= .2000 CONCENTRATION ERROR INCREMENT= .0800

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
F001	6.7	22.50	18.4	19.50	14.2	20.00	32.5	13.50	37.9	11.00	40.1	9.00
F002	6.5	14.00	17.0	5.00	13.4	9.50	32.0	10.00	37.8	9.50	39.8	8.00
F003	6.64	18.50	18.2	16.00	14.0	15.50	32.5	13.50	38.1	12.00	40.2	10.50
F006	9. EH	36.00	20. H	36.50	16. H	36.00	34.	28.50	41.	29.50	44.	32.00
F007	6.76	26.00	18.4	19.50	14.4	24.00	33.0	18.50	39.5	22.00	42.0	24.00
F008	6.64	18.50	17.6	9.00	13.6	12.00	32.1	11.00	37.4	6.50	40.2	10.50
F009	6.4	10.00	18.5	21.50	14.1	17.50	34.	28.50	40.	26.00	43.	28.00
F010	6.1	6.00	18.	14.00	14.	15.50	33.	18.50	39.	21.00	42.	24.00
F011	5.11 EL	1.00	17.3	6.00	13.3	7.00	32.4	12.00	37.6	8.00	40.3	12.00
F013	6.74	24.50	18.50	21.50	14.33	22.00	33.51	23.00	38.40	15.00	40.86	15.00
F014	7.01	33.00	19.12	31.00	15.21	33.00	36.35 H	36.00	41.99	36.00	45.62 H	36.00
F015	6.5	14.00	17.8	10.50	13.4	9.50	32.6	15.00	38.2	13.00	40.5	13.00
F016	6.5	14.00	18.3	17.50	15.1	31.50	31.6	8.00	37.4	6.50	38.5	5.00
F019	5.84 L	3.00	16.5 L	3.00	12.2 VL	2.00	28.8 VL	1.00	33.9 VL	1.00	33.9 EL	1.00
F020	6.45	11.00	17.9	12.50	13.7	13.00	33.1	20.00	38.9	19.50	40.9	16.50
F025	6.00	4.00	16.6 L	4.00	12.8 L	4.00	30.8	4.00	36.0	2.00	37.5 L	3.00
F026	6.78	27.00	18.17	15.00	13.88	14.00	32.95	17.00	41.56	33.00	41.07	19.00
F030	6.68	21.00	19.1	30.00	14.4	24.00	33.6	24.00	39.6	23.00	42.2	26.00
F031	8.33 EH	35.00	19.2	32.50	15.3	34.00	36.2 H	35.00	41.0	29.50	48.3 EH	37.00
F032	6.05	5.00	17.8	10.50	13.2	6.00	31.5	7.00	37.8	9.50	40.6	14.00
F033	6.63	16.50	18.6	24.00	14.2	20.00	33.9	26.50	39.7	24.00	42.0	24.00
F034	9.2 EH	37.00	19.2	32.50	16.6 VH	37.00	36.8 H	37.00	41.3	32.00	43.8	31.00
F035	6.8	28.00	18.9	28.50	15.0	29.50	33.9	26.50	39.8	25.00	41.0	18.00
F036	6.94	31.00	9.16 EL	1.00	12.5 L	3.00	30.9	5.00	36.3	3.00	38.3	4.00
F038	6.74	24.50	18.6	24.00	14.4	24.00	33.7	25.00	38.9	19.50	41.3	20.50
F042	6.49	12.00	17.9	12.50	15.4	35.00	33.3	21.00	38.6	17.00	43.3	29.00
F043	7.2	34.00	20.0 H	36.50	15.0	29.50	36.0 H	34.00	42.0	37.00	45.0 H	35.00
F046	6.65	20.00	18.6	24.00	14.2	20.00	32.7	16.00	38.6	17.00	41.3	20.50
F048	5.82 L	2.00	16.13 L	2.00	13.52	11.00	30.21 L	2.00	38.36	14.00	36.39 L	2.00
F059	6.9	29.50	19.4	34.00	14.8	28.00	35.8 H	32.00	41.2	31.00	42.3	27.00
F061	6.9	29.50	19.7	35.00	15.1	31.50	35.9 H	33.00	41.9	34.50	44.5 H	33.00
F069	6.342	9.00	17.57	8.00	13.37	8.00	31.76	9.00	37.22	5.00	39.48	7.00
F071	6.95	32.00	18.9	28.50	14.6	26.00	35.0	31.00	41.9	34.50	44.9 H	34.00
F074	6.63	16.50	18.70	26.50	12.10 VL	1.00	31.00	6.00	40.30	27.00	41.80	22.00
F080	6.26	7.00	18.3	17.50	14.1	17.50	33.4	22.00	38.6	17.00	40.9	16.50
F089	6.34	8.00	17.5	7.00	13.1	5.00	30.7	3.00	36.9	4.00	39.0	6.00
F091	6.7	22.50	18.7	26.50	14.7	27.00	34.9	30.00	40.7	28.00	43.6	30.00
MEDIAN CONC.	6.6400		18.4000		14.2000		33.0000		38.9000		41.0700	

PARAMETER: 20091 Calcium MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	33.3	18.00	67.8	23.50	44.1	8.50	112.	13.50
F002	32.1	9.00	67.8	23.50	44.2	10.00	111.4	11.00
F003	33.4	20.00	67.4	22.00	45.1	16.00	111.	9.00
F006	36.	34.00	40. EL	3.00	48.	29.00	120.	32.00
F007	33.8	23.00	46.8 EL	6.00	46.6	22.50	115.	20.00
F008	32.6	11.00		0.00	44.9	13.00	105. L	4.50
F009	34.	25.50	71.	32.50	45.	14.50	112.	13.50
F010	34.	25.50	39. EL	2.00	47.	24.00	120.	32.00
F011	32.8	14.00	40.9 EL	4.00	44.0	6.50	112.	13.50
F013	33.53	22.00	68.84	26.00	45.91	20.00	114.7	18.00
F014	36.99 H	35.00	66.24	19.00	50.67 H	36.00	126. H	35.00
F015	32.4	10.00	69.3	27.00	44.7	12.00	113.	16.00
F016	31.2	4.00	34.0 EL	1.00	44.0	6.50	107.	6.00
F019	28.0 VL	1.00	51.1 EL	7.00	36.0 EL	1.00	93.3 EL	1.00
F020	32.8	14.00	70.8	31.00	44.3	11.00	119.	29.00
F025	30.0 L	2.00	60.0 L	10.50	42.0	3.00	100. VL	2.00
F026	31.97	8.00	62.39	14.00	47.39	26.00	117.0	24.50
F030	34.6	27.00	71.9 H	35.00	46.6	22.50	117.	24.50
F031	42.7 EH	37.00	69.6	28.50	53.2 VH	37.00	127.5 H	36.00
F032	32.8	14.00	64.1	17.00	45.7	19.00	115.	20.00
F033	33.9	24.00	67.1	21.00	48.6	31.00	117.	24.50
F034	34.7	28.00	63.8	16.00	49.3	34.00	115.5	22.00
F035	33.3	18.00	69.6	28.50	47.3	25.00	114.	17.00
F036	31.3	5.00	62.0	13.00	44.1	8.50	115.0	20.00
F038	33.3	18.00	62.9	15.00	45.3	17.00	111.	9.00
F042	37.9 VH	36.00	66.6	20.00	47.8	28.00	119.	29.00
F043	35.0	29.50	71.0	32.50	49.0	32.00	120.	32.00
F046	32.7	12.00	41.9 EL	5.00	46.3	21.00	144. EH	37.00
F048	30.04 L	3.00	56.08 VL	8.00	41.28 L	2.00	103.71 L	3.00
F059	35.2	31.00	69.9	30.00	47.6	27.00	118.	27.00
F061	35.4	32.00	71.6 H	34.00	49.1	33.00	121.	34.00
F069	31.73	7.00	56.92 VL	9.00	43.48	5.00	107.4	7.00
F071	35.7	33.00	78.1 EH	36.00	50.4 H	35.00	112.	13.50
F074	33.50	21.00	61.50	12.00	45.50	18.00	119.0	29.00
F080	33.0	16.00	60.0 L	10.50	45.0	14.50	111.	9.00
F089	31.7	6.00	65.9	18.00	43.0	4.00	105. L	4.50
F091	35.0	29.50	68.3	25.00	48.4	30.00	117.	24.50
MEDIAN CONC.	33.3000		66.0700		45.7000		115.0000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	159.00	15.900	10			Auto FAAS/ICPMS
F002	109.50	10.950	10			20110
F003	153.00	15.300	10			AA
F006	296.50	29.650	10	EHH H EL	BIASED HIGH	EDTA TITRATION
F007	205.50	20.550	10	EL		
F008	96.00	10.667	9	L		ICAP
F009	217.50	21.750	10			Icp
F010	182.50	18.250	10	EL		ICP
F011	84.00	8.400	10	EL EL	BIASED LOW	
F013	207.00	20.700	10			ICP
F014	330.00	33.000	10	H H H H H	BIASED HIGH	
F015	140.00	14.000	10			ICP
F016	100.00	10.000	10	EL		AA
F019	21.00	2.100	10	L L VLVLVLELVLELELEL	BIASED LOW	ICP
F020	177.50	17.750	10			ICP
F025	38.50	3.850	10	L L L L L L VL	BIASED LOW	AAS
F026	197.50	19.750	10			AAS
F030	257.00	25.700	10	H		ICP
F031	341.50	34.150	10	EH H EHEH VHH	BIASED HIGH	AAS Flame
F032	122.00	12.200	10			
F033	235.50	23.550	10			ICP/DIRECT
F034	306.50	30.650	10	EH VHH	BIASED HIGH	AA
F035	244.00	24.400	10			ICP-AES
F036	93.50	9.350	10	ELL		AAS
F038	196.50	19.650	10			ICP
F042	239.50	23.950	10	VH		AA
F043	332.00	33.200	10	H H H	BIASED HIGH	ICP
F046	192.50	19.250	10	EL EH		ICP
F048	49.00	4.900	10	L L L L L VLL L	BIASED LOW	IC
F059	296.50	29.650	10	H	BIASED HIGH	ICP
F061	329.50	32.950	10	H H H	BIASED HIGH	ICP
F069	74.00	7.400	10	VL	BIASED LOW	ICP
F071	303.50	30.350	10	H EHH	BIASED HIGH	FLAME-AA
F074	179.00	17.900	10	VL		IC
F080	147.50	14.750	10	L		ICP
F089	65.50	6.550	10	L	BIASED LOW	ICP
F091	273.00	27.300	10			ICP

OVERALL AVERAGE
RANK IS 18.951

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F019	21.00	2.100	10	LLVLVLVLELVLELELEL	BIASED LOW	ICP
F025	38.50	3.850	10	LLLLLVL	BIASED LOW	AAS
F048	49.00	4.900	10	LLLLLVLLL	BIASED LOW	IC
F089	65.50	6.550	10	L	BIASED LOW	ICP
F069	74.00	7.400	10	VL	BIASED LOW	ICP
F011	84.00	8.400	10	ELEL	BIASED LOW	
F036	93.50	9.350	10	ELL		AAS
F016	100.00	10.000	10	EL		AA
F008	96.00	10.667	9	L		ICAP
F002	109.50	10.950	10			20110
F032	122.00	12.200	10			
F015	140.00	14.000	10			ICP
F080	147.50	14.750	10	L		ICP
F003	153.00	15.300	10			AA
F001	159.00	15.900	10			Auto FAAS/ICPMS
F020	177.50	17.750	10			ICP
F074	179.00	17.900	10	VL		IC
F010	182.50	18.250	10	EL		ICP
F046	192.50	19.250	10	ELEH		ICP
F038	196.50	19.650	10			ICP
F026	197.50	19.750	10			AAS
F007	205.50	20.550	10	EL		
F013	207.00	20.700	10			ICP
F009	217.50	21.750	10			Icp
F033	235.50	23.550	10			ICP/DIRECT
F042	239.50	23.950	10	VH		AA
F035	244.00	24.400	10			ICP-AES
F030	257.00	25.700	10	H		ICP
F091	273.00	27.300	10			ICP
F059	296.50	29.650	10	H	BIASED HIGH	ICP
F006	296.50	29.650	10	EHHHEL	BIASED HIGH	EDTA TITRATION
F071	303.50	30.350	10	HEHH	BIASED HIGH	FLAME-AA
F034	306.50	30.650	10	EHVHH	BIASED HIGH	AA
F061	329.50	32.950	10	HHH	BIASED HIGH	ICP
F014	330.00	33.000	10	HHHHH	BIASED HIGH	
F043	332.00	33.200	10	HHH	BIASED HIGH	ICP
F031	341.50	34.150	10	EHHEHEHVHH	BIASED HIGH	AAS Flame

OVERALL AVERAGE RANK IS 18.951

PARAMETER: 15092 Total Phosphorus MG P/L

AQUATIC ECOSYSTEM PROTECTIons BRANCH
NATIonsAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Total P

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0040 BASIC ACCEPTABLE ERROR= .0040 CONCENTRATIons ERROR INCREMENT= .1000

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
F001	.005	12.00	.008	15.50	.012	19.00	.047	11.00	.074	15.00	.096	14.00
F002	.005	12.00	.0057	3.00	.0097	5.00	.0455	7.00	.0783	26.00	.1016	25.00
F003	.0038	5.00	.0068	9.00	.0107	13.00	.0484	17.00	.0737	12.00	.0965	16.00
F004	.003	3.50	.006	5.50	.010	9.00	.048	14.50	.075	17.50	.097	17.50
F006	<.02	0.00	<.02	0.00	<.02	0.00	.04	4.00	.06 L	3.00	.08 L	3.00
F007	.004	7.50	.006	5.50	.010	9.00	.047	11.00	.070	6.50	.090	7.50
F008	.004	7.50	.008	15.50	.013	23.00	.052	26.00	.078	23.50	.106	26.00
F010	<.010	0.00	<.010	0.00	.010	9.00	.045	6.00	.070	6.50	.090	7.50
F011	.005	12.00	.007	11.00	.012	19.00	.055	29.00	.085 H	29.00	.110 H	28.00
F013	.004	7.50	.007	11.00	.012	19.00	.050	21.50	.075	17.50	.097	17.50
F014	0.0T L	1.00	.002T L	1.00	.008	2.50	.046	8.50	.076	20.00	.100	23.00
F015	.004	7.50	.0062	8.00	.012	19.00	.048	14.50	.072	10.50	.094	10.00
F016		0.00		0.00		0.00	.03 EL	1.50	.07	6.50	.11 H	28.00
F019	.01 H	19.00	.01	18.50	.01	9.00	.03 EL	1.50	.04 EL	1.00	.06 EL	1.00
F020	<.003	0.00	<.003	0.00	.004 L	1.00	.033 VL	3.00	.050 EL	2.00	.074 VL	2.00
F025	<.003	0.00	.006	5.50	.010	9.00	.048	14.50	.072	10.50	.096	14.00
F026	.0043	10.00	.0078	13.00	.0109	14.00	.0521	27.00	.0738	13.00	.0942	11.00
F030	<.01	0.00	<.01	0.00	<.01	0.00	.05	21.50	.07	6.50	.09	7.50
F032	.006T	15.00	.008T	15.50	.012	19.00	.050	21.50	.074	15.00	.100	23.00
F033		0.00		0.00	.008	2.50	.043	5.00	.067	4.00	.090	7.50
F034	.006	15.00	.008	15.50	.012	19.00	.048	14.50	.076	20.00	.096	14.00
F038	.003	3.50	.006	5.50	.010	9.00	.046	8.50	.071	9.00	.089	4.50
F042	.0016	2.00	.0039	2.00	.0081	4.00	.049	18.50	.084	28.00	.098	19.50
F046	.010 H	19.00	.013 H	21.00	.018 VH	25.00	.047	11.00	.078	23.50	.095	12.00
F048	.006	15.00	.007	11.00	.011	15.00	.049	18.50	.078	23.50	.110 H	28.00
F059	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00
F074	.010 H	19.00	.013 H	21.00	.017 H	24.00	.053	28.00	.078	23.50	.098	19.50
F080	.010 H	19.00	.013 H	21.00	.012	19.00	.051	24.50	.074	15.00	.089	4.50
F089	.01 H	19.00	.01	18.50	.01	9.00	.05	21.50	.08	27.00	.10	23.00
F091	.012 VH	22.00	.014 VH	23.00	.037 EH	26.00	.051	24.50	.076	20.00	.099	21.00
MEDIAN CONC.	.0050		.0070		.0108		.0480		.0740		.0960	

PARAMETER: 15092 Total Phosphorus MG P/L

SAMPLE LAB NO	7 REPORTED VALUE	7 RANK	8 REPORTED VALUE	8 RANK	9 REPORTED VALUE	9 RANK	10 REPORTED VALUE	10 RANK
F001	.116	10.00	.173	17.00	.206	8.00	.291	21.00
F002	.1312	27.00	.1975 H	28.00	.2487 H	26.00	.3425 VH	29.00
F003	.1172	12.00	.1731	19.00	.2174	15.00	.2890	17.00
F004	.122	21.50	.185	25.00	.220	18.00	.302	23.00
F006	.10 L	3.00	.15 L	3.00	.28 EH	27.00	.20 EL	1.00
F007	.113	7.00	.169	11.00	.211	9.00	.284	15.50
F008	.134	28.00	.191	26.00	.331 EH	28.00	.230 VL	2.00
F010	.12	17.50	.17	13.00	.22	18.00	.29	19.00
F011	.138 H	29.00	.205 VH	29.00	.245 H	24.00	.326 H	28.00
F013	.117	11.00	.168	10.00	.216	12.50	.278	10.00
F014	.12	17.50	.16	6.00	.19 L	4.00	.27	6.50
F015	.115	8.00	.17	13.00	.216	12.50	.28	11.50
F016	.13	26.00	.18	22.50	.23	22.00	.32 H	26.00
F019	.08 EL	2.00	.13 EL	2.00	.17 VL	1.00	.24 L	3.00
F020	.104 L	4.00	.155	4.00	.187 L	3.00	.265	4.00
F025	.118	13.50	.174	20.50	.212	10.00	.283	14.00
F026	.1154	9.00	.1583	5.00	.2012	5.00	.2709	8.00
F030	.04 EL	1.00	.04 EL	1.00	.22	18.00	.29	19.00
F032	.120	17.50	.174	20.50	.180 L	2.00	.280	11.50
F033	.112	5.50	.164	7.00	.220	18.00	.270	6.50
F034	.126	24.00	.180	22.50	.350 EH	29.00	.320 H	26.00
F038	.112	5.50	.165	8.00	.204	7.00	.268	5.00
F042	.120	17.50	.173	17.00	.225	21.00	.284	15.50
F046	.120	17.50	.172	15.00	.217	14.00	.294	22.00
F048	.127	25.00	.192	27.00	.246 H	25.00	.320 H	26.00
F059	<.1 L	0.00	<.1 EL	0.00	<.1 EL	0.00	<.1 EL	0.00
F074	.118	13.50	.173	17.00	.215	11.00	.282	13.00
F080	.124	23.00	.166	9.00	.203	6.00	.273	9.00
F089	.12	17.50	.17	13.00	.22	18.00	.29	19.00
F091	.122	21.50	.184	24.00	.242	23.00	.308	24.00
MEDIAN CONC.	.1200		.1720		.2174		.2840	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	142.50	14.250	10			Auto Color, Block
F002	188.00	18.800	10	H H VH		15413
F003	135.00	13.500	10			
F004	155.00	15.500	10			15423
F006	44.00	6.286	7	L L L L EHEL	BIASED LOW	AUTO II BLOCK DIG
F007	89.50	8.950	10			
F008	205.50	20.550	10	EHVL		MOLYBDENUM
F010	96.50	12.063	8			Colorimetrie
F011	238.00	23.800	10	H H H VHH H	BIASED HIGH	
F013	137.50	13.750	10			15406
F014	90.00	9.000	10	L L L		
F015	114.50	11.450	10			AA
F016	132.50	18.929	7	EL H H		
F019	58.00	5.800	10	H ELELELELVLL	BIASED LOW	Persulfate
F020	23.00	2.875	8	L VLELVLL L	BIASED LOW	Autoclave
F025	111.50	12.389	9			Ascorbic Acid
F026	115.00	11.500	10			Autoclave, AA
F030	74.50	10.643	7	ELEL		Spec.
F032	160.50	16.050	10	L		
F033	56.00	7.000	8			COLOURIMETRIC
F034	199.50	19.950	10	EHH		Dig.-Color
F038	65.50	6.550	10		BIASED LOW	Colour
F042	145.00	14.500	10			Pers.Dig.
F046	180.00	18.000	10	H H VH		Dig.- Color
F048	214.00	21.400	10	H H H		Dig. Auto
F059	0.00	-	0	L ELELEL	INSUFFICIENT DATA	ICP
F074	189.50	18.950	10	H H H		UV, Colour
F080	150.00	15.000	10	H H		Dig.-color
F089	185.50	18.550	10	H		Colorimeter
F091	229.00	22.900	10	VHVHEH	BIASED HIGH	AUTOMATED COLOUR

OVERALL AVERAGE RANK IS 14.325

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F059	0.00	-	0	LELELEL	INSUFFICIENT DATA	ICP
F020	23.00	2.875	8	LVLELVLLL	BIASED LOW	Autoclave
F019	58.00	5.800	10	HELELELELELVLL	BIASED LOW	Persulfate
F006	44.00	6.286	7	LLLLEHEL	BIASED LOW	AUTO II BLOCK DIG
F038	65.50	6.550	10		BIASED LOW	Colour
F033	56.00	7.000	8			COLOURIMETRIC
F007	89.50	8.950	10			
F014	90.00	9.000	10	LLL		
F030	74.50	10.643	7	ELEL		Spec.
F015	114.50	11.450	10			AA
F026	115.00	11.500	10			Autoclave, AA
F010	96.50	12.063	8			Colorimetrie
F025	111.50	12.389	9			Ascorbic Acid
F003	135.00	13.500	10			
F013	137.50	13.750	10			15406
F001	142.50	14.250	10			Auto Color, Block
F042	145.00	14.500	10			Pers.Dig.
F080	150.00	15.000	10	HH		Dig.-color
F004	155.00	15.500	10			15423
F032	160.50	16.050	10	L		
F046	180.00	18.000	10	HHVH		Dig.- Color
F089	185.50	18.550	10	H		Colorimeter
F002	188.00	18.800	10	HHVH		15413
F016	132.50	18.929	7	ELHH		
F074	189.50	18.950	10	HHH		UV, Colour
F034	199.50	19.950	10	EHH		Dig.-Color
F008	205.50	20.550	10	EHVL		MOLYBDENUM
F048	214.00	21.400	10	HHH		Dig. Auto
F091	229.00	22.900	10	VHVHEH	BIASED HIGH	AUTOMATED COLOUR
F011	238.00	23.800	10	HHHVHHH	BIASED HIGH	

OVERALL AVERAGE RANK IS 14.325

Total Phosphorus

R755
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