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Ecosystem Interlaboratory QA Program, Study FP66 for a Variety of Trace Metals in Water (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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Environnement Canada Conservation et Protection
Environment Canada 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:
Ecosystems Interlaboratory Quality Assurance Program

Re: Final Report for FP/GLAP Study FP66 - Trace Metals Portion

Dear Participant,

The Institute is pleased to distribute this final report to the FP/GLAP participant laboratories. This report includes results for a unique series of 10 samples which were analyzed in January and February of this year. 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 the 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, Ecosystems QA Pgm

Attachment: Individual Laboratory Appraisal

AQUATIC ECOSYSTEM PROTECTION BRANCH

FINAL REPORT

REPORT NO. AEPB-TN-94-10

ECOSYSTEM INTERLABORATORY QUALITY ASSURANCE PROGRAM

FP/GLAP STUDY 66

for January & February 1995

An Interlaboratory Quality Assurance Study

for a Variety of Trace Metals in Water *

by

H. Alkema

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

March 1995

* the companion study for Major Ions & Nutrients and Total P is Report AEPB-TN-94-09

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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 2 COMPARISON OF LABORATORY PERFORMANCE (STUDY FP66)

Trace Metals

	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
F076	21	0	0.00	196	1	.51	.51
F032	15	0	0.00	140	0	0.00	0.00
F013	8	0	0.00	44	2	4.55	4.55
F001	21	1	4.76	204	1	.49	5.25
F003	19	1	5.26	187	0	0.00	5.26
F015	19	0	0.00	120	7	5.83	5.83
F008	13	0	0.00	104	7	6.73	6.73
F042	1	0	0.00	10	1	10.00	10.00
F011	21	2	9.52	206	6	2.91	12.44
F046	21	2	9.52	192	9	4.69	14.21
F024	14	1	7.14	131	10	7.63	14.78
F088	18	3	16.67	180	3	1.67	18.33
F051	19	2	10.53	188	17	9.04	19.57
F038	20	3	15.00	168	9	5.36	20.36
F069	21	4	19.05	184	3	1.63	20.68
F080	21	3	14.29	167	18	10.78	25.06
F068	3	0	0.00	19	5	26.32	26.32
F035	19	2	10.53	132	27	20.45	30.98
F010	19	3	15.79	176	28	15.91	31.70
F025	20	4	20.00	164	20	12.20	32.20
F031	12	3	25.00	115	11	9.57	34.57
F030	19	5	26.32	154	14	9.09	35.41
F014	12	2	16.67	120	25	20.83	37.50
F048	3	1	33.33	24	1	4.17	37.50
F009	16	3	18.75	157	31	19.75	38.50
F033	16	6	37.50	150	2	1.33	38.83
F020	19	6	31.58	145	21	14.48	46.06
F059	17	4	23.53	144	38	26.39	49.92
F043	21	9	42.86	198	16	8.08	50.94
F019	15	4	26.67	117	32	27.35	54.02
F091	20	5	25.00	137	41	29.93	54.93
F089	14	4	28.57	136	39	28.68	57.25
F071	10	3	30.00	100	29	29.00	59.00
F061	15	6	40.00	107	63	58.88	98.88
F016	20	13	65.00	164	110	67.07	132.07

THE FOLLOWING PARAMETERS WERE USED IN THE ANALYSIS:

Al	V	Cr	Mn	Fe	Co
Ni	Cu	Zn	As	Se	Sr
Mo	Ag	Cd	Sb	Ba	Pb
U	Li	Be			

THE FOLLOWING PARAMETERS WERE EXCLUDED: Bi

Table 3 SUMMARY OF STUDY TO STUDY PERFORMANCE - Study FP66

Trace Metals

LAB CODE	%BIAS AND %FLAGS ON STUDIES 0062	0063	0064	0065	0066	MEDIAN SCORE	COMMENTS
F001	9.8	1.5	4.8	19.0	5.0	5.0	WELL DONE
F002	20.0	5.3	0.0	1.1	-	3.2	WELL DONE
F003	1.2	7.1	0.0	10.0	5.3	5.3	WELL DONE
F005	-	-	6.7	16.5	-	11.6	SATISFACTORY
F008	28.2	15.6	7.3	25.1	6.7	15.6	SATISFACTORY
F009	-	79.3	82.4	34.4	38.5	58.9	MODERATE
F010	25.4	12.1	19.2	18.1	31.7	19.2	SATISFACTORY
F011	5.2	38.7	6.7	28.6	16.4	16.4	SATISFACTORY
F013	14.3	31.1	25.0	33.7	4.5	25.0	MODERATE
F014	63.2	28.7	48.0	35.9	37.5	37.5	MODERATE
F015	6.9	8.9	11.9	4.5	5.8	6.9	WELL DONE
F016	38.2	17.4	65.8	58.1	129.4	58.1	MODERATE
F019	-	-	-	-	54.0	-	-
F020	9.4	50.3	48.2	25.4	46.1	46.1	MODERATE
F023	-	31.0	-	-	-	-	-
F024	55.0	28.0	23.0	15.1	14.8	23.0	SATISFACTORY
F025	31.8	14.0	42.3	36.3	32.2	32.2	MODERATE
F026	25.5	70.8	16.0	35.0	-	30.2	MODERATE
F030	26.0	34.5	38.7	-	35.4	35.0	MODERATE
F031	-	51.4	33.8	34.1	34.6	34.3	MODERATE
F032	131.3	0.0	-	57.5	0.0	28.7	MODERATE
F033	11.7	60.7	82.5	11.1	38.8	38.8	MODERATE
F035	-	88.2	39.9	53.3	31.0	46.6	MODERATE
F036	-	64.3	36.9	-	-	50.6	MODERATE
F037	95.0	62.5	50.2	64.1	-	63.3	POOR
F038	10.3	39.1	10.6	55.6	19.6	19.6	SATISFACTORY
F039	27.7	-	-	-	-	-	-
F040	38.0	-	-	-	-	-	-
F042	0.0	0.0	50.0	-	10.0	5.0	WELL DONE
F043	42.9	41.0	-	-	53.7	42.9	MODERATE
F044	12.0	14.0	-	-	-	13.0	SATISFACTORY
F045	33.3	-	-	-	-	-	-
F046	21.0	26.4	2.1	27.3	14.2	21.0	SATISFACTORY
F047	59.2	38.6	-	-	-	48.9	MODERATE
F048	-	60.6	21.1	23.0	37.5	30.3	MODERATE
F050	-	-	-	81.7	-	-	-
F051	-	-	-	17.8	19.6	18.7	SATISFACTORY
F052	-	-	-	48.0	-	-	-
F055	62.1	103.0	-	117.3	-	103.0	POOR
F059	-	-	-	56.7	49.9	53.3	MODERATE
F060	-	44.4	71.8	-	-	58.1	MODERATE
F061	-	-	-	-	98.9	-	-
F062	-	65.3	-	59.8	-	62.5	POOR
F063	-	-	95.3	-	-	-	-
F064	-	-	122.7	-	-	-	-
F065	-	-	100.9	-	-	-	-
F066	-	-	74.4	7.0	-	40.7	MODERATE
F067	-	-	41.6	-	-	-	-
F068	-	-	95.8	52.4	26.3	52.4	MODERATE
F069	-	-	16.6	6.9	20.7	16.6	SATISFACTORY
F071	-	-	-	-	59.0	-	-
F072	-	-	-	37.0	-	-	-
F075	-	-	24.9	-	-	-	-
F076	-	-	.6	-	.5	.5	WELL DONE
F077	-	-	64.0	-	-	-	-
F078	-	-	-	49.7	-	-	-
F080	-	-	-	37.3	23.9	30.6	MODERATE
F081	-	-	-	20.5	-	-	-
F082	-	-	-	14.2	-	-	-
F083	-	-	-	45.0	-	-	-
F088	-	-	-	31.2	18.3	24.8	SATISFACTORY
F089	-	-	-	-	57.2	-	-
F091	-	-	-	-	62.8	-	-
INTERLAB MEDIAN	26.0	34.5	36.9	34.1	31.0		

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

Table 4

Sample Design - FP/GLAP 66 - January '95

Trace Metals

Sample No.	Sample Name	Type (DA/Low)	Cu Conc'n (Expected)
1	TM-32	Low	0.001
2	TM-28	Low	0.006
3	TM-27	Low	0.035
4	TM-23	Low	0.009
5	TM-26	Low	0.014
6	TMDA-51/3	DA*	0.022
7	TMDA-52/3	DA	0.10
8	TMDA-51	DA	0.067
9	TMDA-54/3	DA	0.14
10	TMDA-52	DA	0.30

* Direct Aspiration

Table 5 Summary of Interlaboratory MEDIAN VALES for Trace Metals - STUDY FP66

PARAMETER		TM-GEG SAMPLE 1	TM-28 SAMPLE 2	TM-27 SAMPLE 3	TM-23 SAMPLE 4	TM-26 SAMPLE 5	TMDA-51-3 SAMPLE 6	TMDA-52-3 SAMPLE 7
Aluminum	MG/L	.1970	.0847	.0647	.0390	.0700	.0290	.1100
Vanadium	mg/L	.0006	.0006	.0007	.0022	.0120	.0276	.0500
Chromium	mg/L	.0006	.0010	.0026	.0086	.0167	.0200	.0589
Manganese	MG/L	.0500	.0070	.0026	.0080	.0110	.0119	.1160
Iron	MG/L	.6340	.0338	.0320	.0171	.0220	.0460	.1551
Cobalt	mg/L	.0004	.0030	.0040	.0080	.0037	.0249	.0900
Nickel	mg/L	.0011	.0193	.0030	.0087	.0180	.0280	.0510
Copper	mg/L	.0010	.0060	.0360	.0091	.0141	.0220	.0995
Zinc	mg/L	.0040	.0190	.0230	.0060	.0243	.0310	.0840
Arsenic	ug/L	104.100	3.2600	2.3300	10.000	4.6600	5.3000	9.4000
Selenium	ug/L	-	5.0500	4.0000	1.3200	7.5000	3.5000	7.7000
Strontium	mg/L	.0190	.1045	.0490	.0460	.4370	.0400	.0995
Molybdenum	mg/L	.0005	.0024	.0022	.0060	.0180	.0300	.1155
Silver	ug/L	-	2.4700	.9000	3.3800	8.2000	5.8000	10.550
Cadmium	mg/L	.0001	.0012	.0010	.0028	.0160	.0120	.0320
Antimony	ug/L	.1460	3.9900	3.0900	4.6150	1.6000	4.4000	6.6000
Barium	MG/L	.0030	.0150	.0080	.0130	.0300	.0260	.0530
Lead	mg/L	.0010	.0030	.0050	.0035	.0140	.0225	.1250
Bismuth	ug/L	-	.9410	1.5400	4.0600	5.3000	1.6500	7.2000
Uranium	ug/L	-	1.9900	3.1000	.1000	.1000	8.9650	4.9300
Lithium	ug/L	1.0000	7.0000	4.5500	3.0000	10.000	5.2000	7.7400
Berylium	ug/L	-	1.5500	1.0100	.5240	3.5200	8.4000	6.0000

PARAMETER		TMDA-51 SAMPLE 8	TMDA-54-3 SAMPLE 9	TMDA-52 SAMPLE 10
Aluminum	MG/L	.0870	.1600	.3240
Vanadium	mg/L	.0800	.1100	.1500
Chromium	mg/L	.0607	.1495	.1750
Manganese	MG/L	.0350	.0747	.3545
Iron	MG/L	.1500	.0950	.4700
Cobalt	mg/L	.0740	.1300	.2760
Nickel	mg/L	.0820	.1240	.1550
Copper	mg/L	.0660	.1490	.2970
Zinc	mg/L	.0930	.1820	.2545
Arsenic	ug/L	15.900	7.8000	27.900
Selenium	ug/L	10.000	13.100	22.400
Strontium	mg/L	.1205	.2090	.2940
Molybdenum	mg/L	.0935	.1540	.3500
Silver	ug/L	17.400	12.250	30.450
Cadmium	mg/L	.0360	.0588	.0955
Antimony	ug/L	14.600	13.000	20.000
Barium	MG/L	.0797	.0910	.1600
Lead	mg/L	.0650	.1840	.3800
Bismuth	ug/L	5.7500	6.4000	20.550
Uranium	ug/L	31.100	20.500	14.900
Lithium	ug/L	15.800	12.000	22.700
Berylium	ug/L	25.900	12.000	18.000

Appendix A

Glossary of Terms

GLOSSARY OF TERMS

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

Trace Metals

PARAMETER: 13091 Aluminum MG/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0075 BASIC ACCEPTABLE ERROR= .0075 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	.195	14.00	.085	17.00	.066	20.50	.039	14.50	.069	14.00	.029	13.50
F003	.201	23.00	.091	23.00	.068	22.00	.041	17.50	.075	21.00	.031	19.50
F008	.192	13.00	.082	13.50	.066	20.50	.039	14.50	.073	19.00	.028	10.00
F009	.19	10.00	.10	27.00	.08 H	28.00	.06 VH	26.00	.076	22.00	.044 H	22.50
F010	.21	25.50	.14 EH	31.00	.073	24.00	.057 VH	25.00	.088 H	28.00	.044 H	22.50
F011	.199	18.00	.0769	7.00	.0601	12.00	.0326	8.00	.0639	9.00	.0241	3.00
F014	.17	4.50	.098	26.00	.080 H	28.00	.045	20.50	.085	27.00	.029	13.50
F015	.21	25.50	.09	20.50	.06	10.00	<.05	0.00	.08	25.00	<.05	0.00
F016	.22	27.00	.12 EH	30.00	.18 EH	31.00	.05	23.00	.09 H	29.00	.06 EH	25.00
F019	.17	4.50	.06 L	1.50	.05 L	5.00	<.02 VL	0.00	.04 VL	2.50	<.02	0.00
F020	.15 VL	1.00	.06 L	1.50	.04 VL	4.00	.02 VL	2.00	.05 L	4.50	<.02	0.00
F024	.20	20.50	.092	25.00	.065	17.50	.045	20.50	.066	10.50	.028	10.00
F025	.20	20.50	.07	4.50	.03 EL	1.50	.03	6.00	.04 VL	2.50	<.01 VL	0.00
F030	.20	20.50	.09	20.50	.07	23.00	.05	23.00	.07	15.50	.03	16.50
F031	.16 L	2.00	.08	10.50	.06	10.00	.03	6.00	.07	15.50	.03	16.50
F032	.202	24.00	.082	13.50	.064	15.00	.039	14.50	.080	25.00	.029	13.50
F033	.198	17.00	.0833	15.00	.0644	16.00	.0375	11.00	.0673	13.00	.0260	6.00
F035	.27 EH	30.00	.08	10.50	.03 EL	1.50	.09 EH	28.00	.06	8.00	<.06	0.00
F038	.200	20.50	.081	12.00	.035 EL	3.00	.017 VL	1.00	.033 EL	1.00	.025	4.50
F042	.178	7.00	.088	19.00	.065	17.50	.038	12.00	.072	17.50	.028	10.00
F043		0.00	.087	18.00	.074	25.00	.041	17.50	.072	17.50	.029	13.50
F046	.19	10.00	.067 L	3.00	.051	6.00	.026 L	3.00	.055	7.00	.024	2.00
F051	.1970	16.00	.0845	16.00	.0659	19.00	.0418	19.00	.0739	20.00	.0307	18.00
F059	.223	28.00	.091	23.00	.076	26.00	.050	23.00	.080	25.00	.058 EH	24.00
F061	.179	8.00	.117 VH	29.00	.061	14.00	.149 EH	29.00	.194 EH	31.00	.065 EH	26.00
F069	.177	6.00	.079	9.00	.059	8.00	.035	9.00	.067	12.00	.025	4.50
F071	.257 VH	29.00	.102 H	28.00	.085 H	30.00	.064 EH	27.00	.093 VH	30.00	.031	19.50
F076	.191	12.00	.0787	8.00	.0602	13.00	.0353	10.00	.0660	10.50	.0276	7.00
F080	.196	15.00	.091	23.00	.080 H	28.00	.039	14.50	.079	23.00	.038	21.00
F088	.168	3.00	.0767	6.00	.0524	7.00	.0298	4.00	.0522 L	6.00	.0277	8.00
F089	.19	10.00	.07	4.50	.06	10.00	.03T	6.00	.05 L	4.50	.01T VL	1.00
F091	.3 EH	31.00	.2 EH	32.00	.2 EH	32.00	.2 EH	30.00	<.2	0.00	<.2	0.00
MEDIAN CONC.	.1970		.0847		.0647		.0390		.0700		.0290	

PARAMETER: 13091 Aluminum MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.106	14.00	.084	12.50	.158	13.00	.306	8.00
F003	.119	21.00	.084	12.50	.161	21.00	.332	22.50
F008	.104	11.50	.086	14.50	.159	14.00	.322	16.00
F009	.12	23.50	.11 H	28.00	.18	27.50	.36	28.50
F010	.13	27.50	.10	25.00	.17	25.00	.34	24.50
F011	.0948	7.00	.0751	6.00	.1480	9.00	.2830	3.00
F014	.132 H	29.00	.106 H	27.00	.160	17.50	.33	19.00
F015	.12	23.50	.08	10.00	.16	17.50	.33	19.00
F016	.13	27.50	.17 EH	30.00	.22 EH	31.00	.36	28.50
F019	.08 L	1.50	.06 VL	2.00	.13 L	3.50	.30	6.00
F020	.08 L	1.50	.06 VL	2.00	.14	6.00	.28	1.50
F024	.12	23.50	.094	23.50	.18	27.50	.35	26.00
F025	.09	4.50	.06 VL	2.00	.14	6.00	.32	14.50
F030	.12	23.50	.09	19.00	.16	17.50	.31	10.00
F031	.10	8.50	.08	10.00	.14	6.00	.28	1.50
F032	.111	18.50	.087	16.00	.167	24.00	.332	22.50
F033	.105	13.00	.0920	21.50	.163	23.00	.318	13.00
F035	<.06 EL	0.00	<.06 VL	0.00	.09 EL	1.00	.34	24.50
F038	.091	6.00	.074	5.00	.150	11.00	.291	4.00
F042	.110	16.50	.094	23.50	.113 VL	2.00	.310	10.00
F043	.11	16.50	.086	14.50	.16	17.50	.33	19.00
F046	.085 L	3.00	.070	4.00	.16	17.50	.32	14.50
F051	.1095	15.00	.0880	18.00	.1621	22.00	.3103	12.00
F059	.104	11.50	.092	21.50	.197 H	29.00	.357	27.00
F061	.145 VH	30.00	.154 EH	29.00	.204 VH	30.00	.375 H	30.00
F069	.100	8.50	.076	7.00	.153	12.00	.302	7.00
F071	.111	18.50	.104	26.00	.147	8.00	.389 H	31.00
F076	.101	10.00	.0787	8.00	.149	10.00	.296	5.00
F080	.125	26.00	.091	20.00	.177	26.00	.326	17.00
F088	.115	20.00	.0873	17.00	.160	17.50	.331	21.00
F089	.09	4.50	.08	10.00	.13 L	3.50	.31	10.00
F091	.2 EH	31.00	.2 EH	31.00	.3 EH	32.00	.4 VH	32.00
MEDIAN CONC.	.1100		.0870		.1600		.3240	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	141.00	14.100	10			ICPMS
F003	203.00	20.300	10			ICP
F008	146.50	14.650	10			GFAA
F009	243.00	24.300	10	H VH H H		ICP(5)
F010	258.00	25.800	10	EH VHH H	BIASED HIGH	ICP
F011	82.00	8.200	10			
F014	212.00	21.200	10	H H H		
F015	151.00	18.875	8			ICP/GFAAS
F016	282.00	28.200	10	EHEH H EH EHEH	BIASED HIGH	ICP
F019	26.50	3.313	8	L L VLVL L VLL	BIASED LOW	ICP
F020	24.00	2.667	9	VLL VLVLL L VL	BIASED LOW	ICP
F024	204.50	20.450	10			ICP-AES
F025	62.00	6.889	9	EL VLVL VL	BIASED LOW	ICP
F030	189.00	18.900	10			ICP
F031	86.50	8.650	10	L		GFAAS
F032	186.50	18.650	10			ICP-AES(20)
F033	148.50	14.850	10			ICP/DIG HNO3
F035	103.50	14.786	7	EH ELEH ELVLEL		ICP-AES
F038	68.00	6.800	10	ELVLEL	BIASED LOW	ICP
F042	135.00	13.500	10	VL		GFAAS
F043	159.00	17.667	9			ICPMS
F046	70.00	7.000	10	L L L	BIASED LOW	ICP/GFAA
F051	175.00	17.500	10			ICP-MS
F059	238.00	23.800	10	EH H		ICP
F061	256.00	25.600	10	VH EHEHEHVHEHVHH	BIASED HIGH	ICP
F069	83.00	8.300	10			ICP/MS
F071	247.00	24.700	10	VHH H EHVH H	BIASED HIGH	FURNACE-AA
F076	93.50	9.350	10			ICP-MS
F080	213.50	21.350	10	H		ICP(6)
F088	109.50	10.950	10	L		ICP-MS
F089	64.00	6.400	10	L VL L	BIASED LOW	ICP
F091	251.00	31.375	8	EHEHEHEH EHEHEHVH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 15.948

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F020	24.00	2.667	9	VLLVLVLLLVL	BIASED LOW	ICP
F019	26.50	3.313	8	LLVLVLLVLL	BIASED LOW	ICP
F089	64.00	6.400	10	LVLL	BIASED LOW	ICP
F038	68.00	6.800	10	ELVLEL	BIASED LOW	ICP
F025	62.00	6.889	9	ELVLVLVL	BIASED LOW	ICP
F046	70.00	7.000	10	LLL	BIASED LOW	ICP/GFAA
F011	82.00	8.200	10			ICP/MS
F069	83.00	8.300	10			GFAAS
F031	86.50	8.650	10	L		ICP-MS
F076	93.50	9.350	10			ICP-MS
F088	109.50	10.950	10	L		GFAAS
F042	135.00	13.500	10	VL		ICPMS
F001	141.00	14.100	10			GFAA
F008	146.50	14.650	10			ICP-AES
F035	103.50	14.786	7	EHELEHELVLEL		ICP/DIG HNO3
F033	148.50	14.850	10			ICP-MS
F051	175.00	17.500	10			ICPMS
F043	159.00	17.667	9			ICP-AES(20)
F032	186.50	18.650	10			ICP/GFAAS
F015	151.00	18.875	8			ICP
F030	189.00	18.900	10			ICP
F003	203.00	20.300	10			ICP-AES
F024	204.50	20.450	10			
F014	212.00	21.200	10	HHH		ICP(6)
F080	213.50	21.350	10	H		ICP
F059	238.00	23.800	10	EHH		ICP(5)
F009	243.00	24.300	10	HVHHH	BIASED HIGH	FURNACE-AA
F071	247.00	24.700	10	VHHHEHVHH	BIASED HIGH	ICP
F061	256.00	25.600	10	VHEHEHEHVHEHVHH	BIASED HIGH	ICP
F010	258.00	25.800	10	EHVHHH	BIASED HIGH	ICP
F016	282.00	28.200	10	EHEHHEHEHEH	BIASED HIGH	ICP
F091	251.00	31.375	8	EHEHEHEHEHEHEHVH		

OVERALL AVERAGE RANK IS 15.948

Aluminum

PARAMETER: 23091 Vanadium mg/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0020 BASIC ACCEPTABLE ERROR= .0020 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	.0005	2.50	.0006	5.00	.0006	3.50	.0023	11.00	.012	15.00	.028	16.00
F003	.0004	1.00	.0006	5.00	.0006	3.50	.0021	8.00	.0115	11.00	.029	19.50
F009	.002	8.00	.003 H	10.00	.0025	10.00	.0003	1.00	.011	7.50	.024	2.00
F010	<.001	0.00	<.001	0.00	.001	8.50	.004	16.00	.018 VH	24.00	.031	24.50
F011	.0006	4.50	.0007	7.00	.0007	5.00	.0022	9.00	.0121	18.00	.0276	14.00
F015	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	.01	3.50	.03	22.00
F016	.01 EH	9.00		0.00		0.00		0.00	.02 EH	25.50	.02 VL	1.00
F019	<.002	0.00	<.002	0.00	<.002	0.00	.004	16.00	.011	7.50	.033 H	26.00
F020	<.003	0.00	<.003	0.00	<.003	0.00	<.003	0.00	.011	7.50	.027	11.00
F024	<.001	0.00	<.001	0.00	<.001	0.00	.002	5.50	.011	7.50	.027	11.00
F025	<.002	0.00	<.002	0.00	<.002	0.00	.002	5.50	.011	7.50	.025	4.00
F030	<.002	0.00	<.002	0.00	<.002	0.00	<.002	0.00	.012	15.00	.026	8.00
F032	<.001	0.00	<.001	0.00	<.001	0.00	.001	2.00	.012	15.00	.026	8.00
F033	<.0005	0.00	.0005	2.00	<.0005	0.00	.0020	3.00	.0116	12.00	.0256	6.00
F035	<.002	0.00	<.002	0.00	<.002	0.00	.002	5.50	.009	1.50	.025	4.00
F038	<.005	0.00	<.005	0.00	<.005	0.00	<.005	0.00	.010	3.50	.028	16.00
F043	.0005	2.50	.0006	5.00	.0008	6.50	.0024	12.00	.013	22.00	.030	22.00
F046	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	.012	15.00	.027	11.00
F051	.0006	4.50	.0003	1.00	.0002	1.00	.0020	5.50	.0127	21.00	.0280	16.00
F059	.001	7.00	.001	9.00	.001	8.50	.003	14.00	.014	23.00	.031	24.50
F061	<.005	0.00	<.005	0.00		0.00	.004	16.00	.009	1.50	.029	19.50
F069	<.006	0.00	<.006	0.00	<.006	0.00	<.006	0.00	.011	7.50	.025	4.00
F076	<.0005	0.00	.0006	3.00	.0006	2.00	.0023	10.00	.0126	20.00	.0281	18.00
F080	<.005	0.00	<.005	0.00	<.005	0.00	<.005	0.00	.012	15.00	.026	8.00
F088	.0008	6.00	.0008	8.00	.0008	6.50	.0026	13.00	.0123	19.00	.0275	13.00
F091	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	.02 EH	25.50	.03	22.00
MEDIAN CONC.	.0006		.0006		.0007		.0022		.0120		.0275	

PARAMETER: 23091 Vanadium mg/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.052	17.00	.083	18.00	.115	19.00	.155	17.00
F003	.053	18.50	.086	23.00	.116	20.00	.160	21.50
F009	.050	13.00	.077	4.00	.11	11.50	.15	13.00
F010	.054	21.00	.084	21.00	.17 EH	26.00	.16	21.50
F011	.0482	7.00	.0789	9.00	.108	6.00	.141	2.50
F015	.05	13.00	.08	12.50	.11	11.50	.15	13.00
F016	.05	13.00	.08	12.50	.11	11.50	.15	13.00
F019	.060 H	25.50	.102 EH	26.00	.142 EH	25.00	.194 EH	26.00
F020	.055	23.00	.082	15.50	.114	18.00	.165	24.00
F024	.048	6.00	.076	2.50	.11	11.50	.15	13.00
F025	.046	2.50	.080	12.50	.104	3.00	.148	7.00
F030	.047	4.50	.074	1.00	.10	1.00	.14	1.00
F032	.049	9.50	.078	6.00	.109	8.00	.146	5.50
F033	.0486	8.00	.0783	8.00	.105	4.00	.145	4.00
F035	.047	4.50	.078	6.00	.111	15.00	.146	5.50
F038	.054	21.00	.084	21.00	.121	22.50	.156	19.50
F043	.056	24.00	.087	24.00	.12	21.00	.17 H	25.00
F046	.051	15.00	.082	15.50	.11	11.50	.155	17.00
F051	.0512	16.00	.0829	17.00	.1118	16.00	.1492	10.00
F059	.060 H	25.50	.088	25.00	.121	22.50	.156	19.50
F061	.054	21.00	.084	21.00	.132 VH	24.00	.161	23.00
F069	.046	2.50	.076	2.50	.102	2.00	.141	2.50
F076	.053	18.50	.0838	19.00	.113	17.00	.155	17.00
F080	.049	9.50	.078	6.00	.108	6.00	.149	8.50
F088	.0499	11.00	.0792	10.00	.108	6.00	.149	8.50
F091	.04 L	1.00	.08	12.50	.11	11.50	.15	13.00
MEDIAN CONC.	.0500		.0800		.1100		.1500	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	124.00	12.400	10			ICPMS
F003	131.00	13.100	10			ICP
F009	80.00	8.000	10	H		ICP(5)
F010	162.50	20.313	8	VH EH	BIASED HIGH	ICP
F011	82.00	8.200	10			
F015	75.50	12.583	6			ICP
F016	85.50	12.214	7	EH EHVL		ICP
F019	152.00	21.714	7	H H EHEHEH	BIASED HIGH	ICP
F020	99.00	16.500	6			ICP
F024	57.00	8.143	7			ICP-AES
F025	42.00	6.000	7			ICP
F030	30.50	5.083	6		BIASED LOW	ICP
F032	54.00	7.714	7			ICP-AES(20)
F033	47.00	5.875	8		BIASED LOW	ICP/DIG HNO3
F035	42.00	6.000	7			ICP-AES
F038	103.50	17.250	6			ICP
F043	164.00	16.400	10	H		ICPMS
F046	85.00	14.167	6			ICP
F051	108.00	10.800	10			ICP-MS
F059	178.50	17.850	10	H		GFAA
F061	126.00	18.000	7	VH		ICP
F069	21.00	3.500	6		BIASED LOW	ICP
F076	124.50	13.833	9			ICP-MS
F080	53.00	8.833	6			ICP(6)
F088	101.00	10.100	10			ICP-MS
F091	85.50	14.250	6	EH L		ICP

OVERALL AVERAGE
RANK IS 11.950

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F069	21.00	3.500	6		BIASED LOW	ICP
F030	30.50	5.083	6		BIASED LOW	ICP
F033	47.00	5.875	8		BIASED LOW	ICP/DIG HNO3
F025	42.00	6.000	7			ICP
F035	42.00	6.000	7			ICP-AES
F032	54.00	7.714	7			ICP-AES(20)
F009	80.00	8.000	10	H		ICP(5)
F024	57.00	8.143	7			ICP-AES
F011	82.00	8.200	10			
F080	53.00	8.833	6			ICP(6)
F088	101.00	10.100	10			ICP-MS
F051	108.00	10.800	10			ICP-MS
F016	85.50	12.214	7	EHEHVL		ICP
F001	124.00	12.400	10			ICPMS
F015	75.50	12.583	6			ICP
F003	131.00	13.100	10			ICP
F076	124.50	13.833	9			ICP-MS
F046	85.00	14.167	6			ICP
F091	85.50	14.250	6	EHL		ICP
F043	164.00	16.400	10	H		ICPMS
F020	99.00	16.500	6			ICP
F038	103.50	17.250	6			ICP
F059	178.50	17.850	10	H		GFAA
F061	126.00	18.000	7	VH		ICP
F010	162.50	20.313	8	VHEH	BIASED HIGH	ICP
F019	152.00	21.714	7	HHEHEHEH	BIASED HIGH	ICP

OVERALL AVERAGE
RANK IS 11.950

PARAMETER: 24091 Chromium mg/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0020 BASIC ACCEPTABLE ERROR= .0020 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	.0004	3.50	.0008	5.50	.0027	15.00	.0083	13.00	.016	12.00	.020	17.50
F003	.0004	3.50	.0007	4.00	.0025	12.00	.0076	7.00	.0171	21.00	.021	24.50
F008	<.002	0.00	<.002	0.00	.003	18.00	.009	18.50	.018	24.50	.013 VL	2.50
F009	.0003	1.50	.0027	14.00	.0023	8.50	.010	23.00	.016	12.00	.018	7.50
F010	.002	11.00	.004 H	15.00	.006 VH	22.00	.012 H	26.00	.021 H	30.00	.025 H	29.00
F011	.0011	10.00	.0013	13.00	.0033	21.00	.0088	16.50	.017	19.00	.021	24.50
F013	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00
F014	.0005	5.50	.0008	5.50	.0027	15.00	.0086	15.00	.0172	22.00	.02	17.50
F015	<.005	0.00	<.005	0.00	.014 EH	24.00	.012 H	26.00	.02	28.00	.024 H	28.00
F016		0.00		0.00		0.00		0.00	.01 VL	2.00		0.00
F019	<.004	0.00	<.004	0.00	<.004	0.00	.010	23.00	.014	6.50	.020	17.50
F020	<.002	0.00	<.002	0.00	.002	4.00	.008	10.50	.016	12.00	.019	11.00
F024	<.001	0.00	.001	10.50	.002	4.00	.006	2.50	.012 L	4.00	.018	7.50
F025	<.002	0.00	<.002	0.00	<.002	0.00	.012 H	26.00	.020	28.00	.02	17.50
F030	<.002	0.00	<.002	0.00	.002	4.00	.007	5.50	.012 L	4.00	.017	4.50
F031	.0003	1.50	.0006	1.00	.0023	8.50	.0065	4.00	.014	6.50	.018	7.50
F032	<.001	0.00	.001	10.50	.002	4.00	.008	10.50	.015	8.00	.019	11.00
F033	<.0002	0.00	.0007	3.00	.0024	10.00	.0076	8.00	.0153	9.00	.0191	13.00
F035	<.002	0.00	<.002	0.00	<.002	0.00	.003 EL	1.00	.018	24.50	.017	4.50
F038	<.001	0.00	<.001	0.00	.003	18.00	.006	2.50	.012 L	4.00	.013 VL	2.50
F043	.0005	5.50	.0009	7.50	.0032	20.00	.0091	20.00	.018	24.50	.023	27.00
F046	<.001	0.00	<.001	0.00	.002	4.00	.007	5.50	.016	12.00	.020	17.50
F051	.0007	8.00	.0009	7.50	.0027	15.00	.0088	16.50	.0167	16.00	.0196	14.00
F059	<.001	0.00	.001	10.50	.003	18.00	.010	23.00	.018	24.50	.021	24.50
F061	.059 EH	14.00	.052 EH	17.00		0.00	.059 EH	29.00	.009 EL	1.00	.012 EL	1.00
F069	<.001	0.00	<.001	0.00	.002	4.00	.008	10.50	.017	19.00	.018	7.50
F071	.001	9.00	.001	10.50	.002	4.00	.009	18.50	.017	19.00	.021	24.50
F076	<.001	0.00	<.001	0.00	.0026	13.00	.0086	14.00	.0168	17.00	.0204	21.50
F080	.006 EH	12.00	<.003	0.00	<.003	0.00	.008	10.50	.016	12.00	.019	11.00
F088	.0005	7.00	.0006	2.00	.0025	11.00	.0094	21.00	.0164	15.00	.0204	21.50
F089	.02 EH	13.00	.01 EH	16.00	.009T EH	23.00	.02 EH	28.00	.03 EH	31.00	.03 EH	30.00
F091	<.020	0.00	<.020	0.00	<.020	0.00	<.020	0.00	.020	28.00	.020	17.50
MEDIAN CONC.	.0006		.0010		.0026		.0086		.0167		.0200	

PARAMETER: 24091 Chromium mg/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.058	13.00	.060	12.50	.149	15.00	.175	15.50
F003	.060	21.00	.063	22.00	.154	23.00	.182	24.50
F008	.059	17.50	.062	20.00	.14	4.00	.17	10.00
F009	.070 H	29.50	.070 H	28.50	.14	4.00	.195 H	29.00
F010	.063	27.00	.065	26.00	.15	18.50	.18	21.00
F011	.0559	7.00	.0589	9.00	.144	10.00	.161	2.00
F013	.058	13.00	.062	20.00	.148	13.00	.170	10.00
F014	.06	21.00	.06	12.50	.15	18.50	.17	10.00
F015	.06	21.00	.055	2.50	.156	25.00		0.00
F016	.05 L	1.00	.04 EL	1.00	.11 EL	1.00	.15 L	1.00
F019	.053	2.00	.056	4.00	.133	2.00	.164	3.00
F020	.057	10.00	.060	12.50	.146	11.50	.171	13.00
F024	.060	21.00	.062	20.00	.16	27.00	.18	21.00
F025	.062	25.50	.061	17.00	.149	15.00	.180	21.00
F030	.055	3.50	.073 VH	31.00	.14	4.00	.17	10.00
F031	.055	3.50	.06	12.50	.15	18.50	.17	10.00
F032	.056	8.00	.057	5.50	.143	7.50	.168	6.00
F033	.0551	5.00	.0584	8.00	.143	7.50	.166	5.00
F035	.062	25.50	.058	7.00	.161	29.00	.182	24.50
F038	.058	13.00	.060	12.50	.151	21.50	.175	15.50
F043	.064	28.00	.065	26.00	.16	27.00	.19	28.00
F046	.061	24.00	.064	23.00	.16	27.00	.188	27.00
F051	.0558	6.00	.0611	18.00	.1438	9.00	.1698	7.00
F059	.071 VH	31.00	.072 H	30.00	.180 VH	32.00	.206 VH	31.00
F061	.074 VH	32.00	.74 EH	32.00	.166	30.00	.197 H	30.00
F069	.057	10.00	.057	5.50	.149	15.00	.178	17.00
F071	.059	17.50	.065	26.00	.155	24.00	.187	26.00
F076	.0589	16.00	.0605	16.00	.146	11.50	.173	14.00
F080	.057	10.00	.055	2.50	.142	6.00	.165	4.00
F088	.0585	15.00	.0641	24.00	.151	21.50	.179	18.00
F089	.07 H	29.50	.07 H	28.50	.17 H	31.00	.18	21.00
F091	.060	21.00	.060	12.50	.150	18.50	.180	21.00
MEDIAN CONC.	.0589		.0607		.1495		.1750	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	122.50	12.250	10			ICPMS
F003	162.50	16.250	10			ICP
F008	115.00	14.375	8	VL		FLAME/GFAA
F009	157.50	15.750	10	H H H		ICP(5)
F010	225.50	22.550	10	H VHH H H		ICP
F011	132.00	13.200	10			
F013	56.00	14.000	4		INSUFFICIENT DATA	ICP
F014	142.50	14.250	10			
F015	154.50	22.071	7	EHH H		ICP
F016	6.00	1.200	5	VL L ELELL	BIASED LOW	ICP
F019	58.00	8.286	7			ICP
F020	84.50	10.563	8			ICP
F024	117.50	13.056	9	L		ICP-AES
F025	150.00	21.429	7	H		ICP
F030	66.50	8.313	8	L VH		ICP
F031	73.50	7.350	10		BIASED LOW	GFAAS
F032	71.00	7.889	9			ICP-AES(20)
F033	68.50	7.611	9			ICP/DIG HNO3
F035	116.00	16.571	7	EL		ICP-AES
F038	89.50	11.188	8	L VL		GFAAS
F043	213.50	21.350	10			ICPMS
F046	140.00	17.500	8			ICP/GFAA
F051	117.00	11.700	10			ICP-MS
F059	224.50	24.944	9	VHH VHVH	BIASED HIGH	GFAA
F061	186.00	20.667	9	EHEH EHELELVHEH H		ICP
F069	88.50	11.063	8			ICP/MS
F071	179.00	17.900	10			FURNACE-AA
F076	123.00	15.375	8			ICP-MS
F080	68.00	8.500	8	EH		ICP(6)
F088	156.00	15.600	10			ICP-MS
F089	251.00	25.100	10	EHEHEHEHEHEHH H H	BIASED HIGH	ICP
F091	118.50	19.750	6			ICP

OVERALL AVERAGE RANK IS 14.831

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F016	6.00	1.200	5	VLLELELL	BIASED LOW	ICP
F031	73.50	7.350	10		BIASED LOW	GFAAS
F033	68.50	7.611	9			ICP/DIG HNO3
F032	71.00	7.889	9			ICP-AES(20)
F019	58.00	8.286	7			ICP
F030	66.50	8.313	8	LVH		ICP
F080	68.00	8.500	8	EH		ICP(6)
F020	84.50	10.563	8			ICP
F069	88.50	11.063	8			ICP/MS
F038	89.50	11.188	8	LVL		GFAAS
F051	117.00	11.700	10			ICP-MS
F001	122.50	12.250	10			ICPMS
F024	117.50	13.056	9	L		ICP-AES
F011	132.00	13.200	10			
F013	56.00	14.000	4		INSUFFICIENT DATA	ICP
F014	142.50	14.250	10			
F008	115.00	14.375	8	VL		FLAME/GFAA
F076	123.00	15.375	8			ICP-MS
F088	156.00	15.600	10			ICP-MS
F009	157.50	15.750	10	HHH		ICP(5)
F003	162.50	16.250	10			ICP
F035	116.00	16.571	7	EL		ICP-AES
F046	140.00	17.500	8			ICP/GFAA
F071	179.00	17.900	10			FURNACE-AA
F091	118.50	19.750	6			ICP
F061	186.00	20.667	9	EHEHEHELELVHEHH		ICP
F043	213.50	21.350	10			ICPMS
F025	150.00	21.429	7	H		ICP
F015	154.50	22.071	7	EHHH		ICP
F010	225.50	22.550	10	HVHHHH		ICP
F059	224.50	24.944	9	VHHVHVH	BIASED HIGH	GFAA
F089	251.00	25.100	10	EHEHEHEHEHEHHHH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 14.831

PARAMETER: 25091 Manganese MG/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0015 BASIC ACCEPTABLE ERROR= .0015 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	.050	19.50	.0074	17.00	.0026	12.00	.0084	20.00	.011	15.50	.012	21.50
F003	.0485	15.00	.0068	4.50	.0024	9.00	.0077	5.00	.0104	7.00	.0119	15.50
F008	.05	19.50	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00
F009	.045	3.00	.008	23.00	.0030	19.50	.0076	3.00	.011	15.50	.012	21.50
F010	.048	12.00	.008	23.00	.003	19.50	.009	24.50	.012	27.00	.012	21.50
F011	.0518	27.00	.0074	16.00	.0027	14.00	.0081	19.00	.0111	22.00	.0119	15.50
F013	.054	31.50	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00
F014	.05	19.50	.01 H	28.00	0.0T VL	1.00	.01	29.50	.01	3.50	.01	3.00
F015	.05	19.50	.007	10.00	.003	19.50	.009	24.50	.011	15.50	.012	21.50
F016	.05	19.50		0.00		0.00	.01	29.50	.01	3.50	.01	3.00
F019	.050	19.50	.007	10.00	<.001	0.00	.008	12.50	.011	15.50	.011	10.00
F020	.048	12.00	.007	10.00	.002	4.00	.008	12.50	.011	15.50	.011	10.00
F024	.048	12.00	.007	10.00	.003	19.50	.008	12.50	.009	1.00	.010	3.00
F025	.052	28.00	.008	23.00	.002	4.00	.008	12.50	.011	15.50	.012	21.50
F030	.047	6.00	.007	10.00	.003	19.50	.008	12.50	.010	3.50	.012	21.50
F031	.051	24.50	.0085	27.00	.0028	15.00	.010	29.50	.010	3.50	.011	10.00
F032	.048	12.00	.007	10.00	.003	19.50	.008	12.50	.011	15.50	.012	21.50
F033	.0468	4.00	.0067	3.00	.0024	7.00	.0077	4.00	.0102	6.00	.0109	7.00
F035	.053	30.00	.005	2.00	<.002	0.00	.006	1.00	.012	27.00	<.004 EL	0.00
F038	.051	24.50	.008	23.00	<.005	0.00	.008	12.50	.011	15.50	.012	21.50
F043	.055	33.00	.008	23.00	.003	19.50	.009	24.50	.012	27.00	.013	29.00
F046	.050	19.50	.008	23.00	.002	4.00	.008	12.50	.011	15.50	.012	21.50
F048	.0445	2.00	.0068	4.50	.0024	9.00	.0085	21.00	.0107	8.00	.0105	6.00
F051	.0512	26.00	.0077	18.00	.0024	9.00	.0086	22.00	.0117	24.00	.0121	27.00
F059	.05	19.50	<.01	0.00	<.01	0.00	.01	29.50	.02 EH	31.00	.01	3.00
F061	.047	6.00	.003 VL	1.00		0.00	.008	12.50	.012	27.00	.012	21.50
F069	.0478	8.00	.007	10.00	.002	4.00	.007	2.00	.011	15.50	.010	3.00
F071	.044	1.00	.008	23.00	.003	19.50	.009	24.50	.012	27.00	.013	29.00
F076	.0479	9.00	.0070	15.00	.0025	11.00	.0079	6.00	.0108	9.00	.0116	14.00
F080	.047	6.00	.007	10.00	<.001	0.00	.008	12.50	.011	15.50	.011	10.00
F088	.0522	29.00	.0077	19.00	.0027	13.00	.0090	27.00	.0116	23.00	.0113	13.00
F089	.048	12.00	.007	10.00	.002	4.00	.008	12.50	.011	15.50	.011	10.00
F091	.054	31.50	.011 VH	29.00	<.005	0.00	.008	12.50	.013	30.00	.013	29.00
MEDIAN CONC.	.0500		.0070		.0026		.0080		.0110		.0119	

PARAMETER: 25091 Manganese MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.117	19.00	.036	24.50	.076	23.50	.353	15.00
F003	.117	19.00	.0354	21.00	.0749	18.00	.371	29.00
F008	.11	5.50	.03 L	2.00	.07	4.50	.34	9.00
F009	.115	13.50	.034	11.50	.073	12.50	.34	9.00
F010	.12	25.50	.036	24.50	.074	15.50	.35	13.50
F011	.109	2.00	.0341	14.00	.0724	10.00	.314 L	1.00
F013	.127	29.50	.032	5.50	.082	33.00	.376	30.00
F014	.11	5.50	.04 H	33.00	.07	4.50	.36	21.00
F015	.116	16.50	.036	24.50	.075	20.00	.354	16.00
F016	.13 H	32.00	.03 L	2.00	.07	4.50	.38	31.00
F019	.109	2.00	.033	7.50	.070	4.50	.337	7.00
F020	.114	11.50	.035	17.50	.074	15.50	.346	12.00
F024	.12	25.50	.035	17.50	.076	23.50	.35	13.50
F025	.118	21.00	.038	30.50	.076	23.50	.365	26.00
F030	.112	9.00	.034	11.50	.073	12.50	.34	9.00
F031	.115	13.50	.035	17.50	.070	4.50	.36	21.00
F032	.119	23.00	.036	24.50	.077	26.50	.355	17.00
F033	.109	2.00	.0330	7.50	.0702	8.00	.325	3.50
F035	.119	23.00	.038	30.50	.080	30.50	.361	23.50
F038	.116	16.50	.035	17.50	.076	23.50	.357	19.00
F043	.13 H	32.00	.038	30.50	.079	29.00	.37	28.00
F046	.117	19.00	.035	17.50	.075	20.00	.356	18.00
F048	.1095	4.00	.0312	4.00	.0671	1.00		0.00
F051	.1153	15.00	.0360	24.50	.0747	17.00	.3250	3.50
F059	.13 H	32.00	.03 L	2.00	.08	30.50	.36	21.00
F061	.127	29.50	.038	30.50	.081	32.00	.384	32.00
F069	.114	11.50	.034	11.50	.073	12.50	.345	11.00
F071	.121	27.50	.035	17.50	.077	26.50	.361	23.50
F076	.112	9.00	.0333	9.00	.0712	9.00	.324	2.00
F080	.111	7.00	.032	5.50	.070	4.50	.327	5.00
F088	.121	27.50	.0369	28.00	.0789	28.00	.366	27.00
F089	.112	9.00	.034	11.50	.073	12.50	.336	6.00
F091	.119	23.00	.036	24.50	.075	20.00	.362	25.00
MEDIAN CONC.	.1160		.0350		.0747		.3545	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	187.50	18.750	10			ICPMS
F003	143.00	14.300	10			ICP
F008	40.50	8.100	5	L		ICP
F009	132.00	13.200	10			ICP(5)
F010	206.50	20.650	10			ICP
F011	140.50	14.050	10	L		
F013	129.50	25.900	5			ICP
F014	148.50	14.850	10	H VL H		
F015	187.50	18.750	10			ICP
F016	125.00	15.625	8	H L		ICP
F019	88.50	9.833	9			ICP
F020	120.50	12.050	10			ICP
F024	138.00	13.800	10			ICP-AES
F025	205.50	20.550	10			ICP
F030	115.00	11.500	10			ICP
F031	166.00	16.600	10			GFAAS
F032	182.00	18.200	10			ICP-AES(20)
F033	52.00	5.200	10		BIASED LOW	ICP/DIG HNO3
F035	167.50	20.938	8	EL		ICP-AES
F038	173.50	19.278	9			ICP
F043	275.50	27.550	10	H	BIASED HIGH	ICPMS
F046	170.50	17.050	10			ICP
F048	59.50	6.611	9		BIASED LOW	GFAAS
F051	186.00	18.600	10			ICP-MS
F059	168.50	21.063	8	EH H L		ICP
F061	192.00	21.333	9	VL		ICP
F069	89.00	8.900	10			ICP/MS
F071	219.00	21.900	10			FURNACE-AA
F076	93.00	9.300	10			ICP-MS
F080	76.00	8.444	9			ICP(6)
F088	234.50	23.450	10			ICP-MS
F089	103.00	10.300	10			ICP
F091	224.50	24.944	9	VH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 16.039

PARAMETER: 26091 Iron MG/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

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	.672	28.00	.030	7.50		0.00	.011	3.00	.022	14.50	.035 L	9.00
F003	.632	16.00	.0341	17.00	.0301	11.00	.0134	8.00	.0242	20.00	.050	23.50
F008	.62	10.00	.04	23.50	.03	8.50	.02	19.50	.02	10.00	.03 VL	5.50
F009	.62	10.00	.041	26.00	.037	23.00	.025 H	27.00	.030 H	25.50	.056 H	30.00
F010	.62	10.00	.037	20.00	.033	18.50	.018	15.50	.026	24.00	.033 L	7.50
F011	.732 H	32.00	.029	6.00	.029	5.50	.012	4.50	.021	12.00	.024 EL	2.00
F013	.661	24.00	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00
F014	.62	10.00	.04	23.50	.03	8.50	.02	19.50	0.0T EL	1.00	.04	12.50
F015	.642	19.00	.033	12.50	.032	14.00	.017	13.00	.012 L	4.00	.051	28.00
F016	.65	21.00	.07 EH	30.00	.07 EH	27.00	.02	19.50	.05 EH	28.00	.04	12.50
F019	.647	20.00	.025 L	5.00	.023 L	4.00	.005 VL	1.50	.005 EL	2.00	.038	11.00
F020	.599	3.00	.023 L	4.00	.021 L	3.00	.005 VL	1.50	.013 L	5.00	.037	10.00
F024	.60	4.00	.033	12.50	.032	14.00	.014	10.00	.011 VL	3.00	.028 VL	3.50
F025	.70	31.00	.04	23.50	.03	8.50	.02	19.50	.02	10.00	.05	23.50
F030	.63	14.50	.033	12.50	.036	22.00	.022	25.50	.022	14.50	.028 VL	3.50
F031	.62	10.00	.012 EL	1.00	.04 H	26.00	.022	25.50	.025	21.50	.041	14.00
F032	.613	6.00	.033	12.50	.032	14.00	.016	12.00	.025	21.50	.050	23.50
F033	.627	13.00	.0336	15.00	.0326	17.00	.0136	9.00	.0221	16.00	.0478	17.00
F035	.63	14.50	.02 VL	2.00	<.01 EL	0.00	<.01 L	0.00	<.01 VL	0.00	.05	23.50
F038	.641	18.00	<.030	0.00	<.030	0.00	<.030	0.00	<.030	0.00	.046	16.00
F043	.67	26.50	.03	7.50	.03	8.50	.02	19.50	.02	10.00	.05	23.50
F046	.68	30.00	.035	18.50	.032	14.00	.013	6.50	.023	17.50	.033 L	7.50
F051	.5846	1.00	.0459 VH	27.00	.0372	24.00	.0214	24.00	.0193	8.00	.0567 H	31.00
F059	.59	2.00	.034	16.00	.033	18.50	.018	15.50	.015 L	6.00	.049	18.50
F061	.668	25.00	.021 VL	3.00		0.00	<.005 VL	0.00	.016	7.00	.030 VL	5.50
F069	.609	5.00	.031	9.00	.029	5.50	.013	6.50	.023	17.50	.050	23.50
F071	.654	22.00	.032	10.00	.032	14.00	.015	11.00	.024	19.00	.054	29.00
F076	.614	7.00	.035	18.50	.0356	21.00	.0171	14.00	.0258	23.00	.0238 EL	1.00
F080	.679	29.00	.048 VH	28.00	.039	25.00	.021	23.00	.034 VH	27.00	.049	18.50
F088	.636	17.00	.0373	21.00	.0345	20.00	.012	4.50	.0217	13.00	.0447	15.00
F089	.66	23.00	.04	23.50	.02 VL	1.50	.02	19.50	.03 H	25.50	.05	23.50
F091	.67	26.50	.06 EH	29.00	.02 VL	1.50	<.02	0.00	<.02	0.00	.05	23.50
MEDIAN CONC.	.6340		.0338		.0320		.0171		.0220		.0460	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F033	52.00	5.200	10		BIASED LOW	ICP/DIG HNO3
F048	59.50	6.611	9		BIASED LOW	GFAAS
F008	40.50	8.100	5	L		ICP
F080	76.00	8.444	9			ICP(6)
F069	89.00	8.900	10			ICP/MS
F076	93.00	9.300	10			ICP-MS
F019	88.50	9.833	9			ICP
F089	103.00	10.300	10			ICP
F030	115.00	11.500	10			ICP
F020	120.50	12.050	10			ICP
F009	132.00	13.200	10			ICP(5)
F024	138.00	13.800	10			ICP-AES
F011	140.50	14.050	10	L		
F003	143.00	14.300	10			ICP
F014	148.50	14.850	10	HVLH		
F016	125.00	15.625	8	HL		ICP
F031	166.00	16.600	10			GFAAS
F046	170.50	17.050	10			ICP
F032	182.00	18.200	10			ICP-AES(20)
F051	186.00	18.600	10			ICP-MS
F001	187.50	18.750	10			ICPMS
F015	187.50	18.750	10			ICP
F038	173.50	19.278	9			ICP
F025	205.50	20.550	10			ICP
F010	206.50	20.650	10			ICP
F035	167.50	20.938	8	EL		ICP-AES
F059	168.50	21.063	8	EHHL		ICP
F061	192.00	21.333	9	VL		ICP
F071	219.00	21.900	10			FURNACE-AA
F088	234.50	23.450	10			ICP-MS
F091	224.50	24.944	9	VH	BIASED HIGH	ICP
F013	129.50	25.900	5			ICP
F043	275.50	27.550	10	H	BIASED HIGH	ICPMS

OVERALL AVERAGE RANK IS 16.039

Manganese

PARAMETER: 26091 Iron MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.158	19.00	.152	22.00	.094	13.50	.477	23.50
F003	.156	18.00	.151	20.50	.094	13.50	.474	21.00
F008	.15	7.00	.14	4.00	.09	6.00	.46	9.50
F009	.162	27.00	.193 EH	32.00	.098	22.00	.48	25.50
F010	.15	7.00	.15	15.50	.094	13.50	.46	9.50
F011	.154	13.50	.148	9.00	.094	13.50	.517	31.00
F013	.161	26.00	.155	24.00	.098	22.00	.476	22.00
F014	.15	7.00	.15	15.50	.09	6.00	.47	17.00
F015	.155	15.50	.15	15.50	.096	18.50	.477	23.50
F016	.17	29.50	.16	27.00	.11 H	31.00	.52	32.00
F019	.141	3.00	.130 L	2.00	.095	16.50	.458	7.00
F020	.140	1.50	.135	3.00	.080 L	3.00	.442	3.00
F024	.16	22.50	.15	15.50	.096	18.50	.47	17.00
F025	.16	22.50	.16	27.00	.10	26.00	.50	28.00
F030	.17	29.50	.15	15.50	.097	20.00	.47	17.00
F031	.195 VH	32.00	.180 VH	31.00	.130 EH	32.00	.460	9.50
F032	.155	15.50	.147	7.00	.095	16.50	.464	13.00
F033	.152	11.00	.146	5.00	.0908	8.00	.449	4.00
F035	.16	22.50	.16	27.00	.10	26.00	.47	17.00
F038	.153	12.00	.151	20.50	.091	9.00	.480	25.50
F043	.16	22.50	.16	27.00	.10	26.00	.50	28.00
F046	.16	22.50	.16	27.00	.098	22.00	.50	28.00
F051	.1552	17.00	.1526	23.00	.1011	29.00	.4553	6.00
F059	.14	1.50	.17 H	30.00	.10	26.00	.44	2.00
F061	.147	4.00	.147	7.00	.077 L	1.00	.501	30.00
F069	.151	10.00	.149	10.50	.092	11.00	.462	12.00
F071	.183 H	31.00	.104 EL	1.00	.078 L	2.00	.401 L	1.00
F076	.150	7.00	.149	10.50	.0872	4.00	.453	5.00
F080	.169	28.00	.150	15.50	.109	30.00	.470	17.00
F088	.154	13.50	.147	7.00	.0917	10.00	.460	9.50
F089	.16	22.50	.15	15.50	.10	26.00	.47	17.00
F091	.15	7.00	.15	15.50	.09	6.00	.47	17.00
MEDIAN CONC.	.1551		.1500		.0950		.4700	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	140.00	15.556	9	L		ICP5x/ICPMS
F003	168.50	16.850	10			ICP
F008	103.50	10.350	10	VL		ICP
F009	248.00	24.800	10	H H H EH	BIASED HIGH	ICP(5)
F010	141.00	14.100	10	L		ICP
F011	129.00	12.900	10	H EL		
F013	118.00	23.600	5			ICP
F014	120.50	12.050	10	EL		
F015	163.50	16.350	10	L		ICP
F016	257.50	25.750	10	EHEH EH H	BIASED HIGH	ICP
F019	72.00	7.200	10	L L VLEL L	BIASED LOW	ICP
F020	37.00	3.700	10	L L VLL L	BIASED LOW	ICP
F024	120.50	12.050	10	VLVL		ICP-AES
F025	219.50	21.950	10			ICP
F030	174.50	17.450	10	VL		ICP
F031	202.50	20.250	10	ELH VHVHEH		GFAAS
F032	141.50	14.150	10			ICP-AES(20)
F033	115.00	11.500	10			ICP/DIG HNO3
F035	132.50	18.929	7	VLELL VL		ICP-AES
F038	101.00	16.833	6			ICP
F043	199.00	19.900	10			ICPES
F046	193.50	19.350	10	L		ICP
F051	190.00	19.000	10	VH H		ICP-MS
F059	136.00	13.600	10	L H		GFAA / ICP
F061	82.50	10.313	8	VL VL VL L		ICP
F069	110.50	11.050	10			ICP
F071	140.00	14.000	10	H ELL L		FURNACE-AA
F076	111.00	11.100	10	EL		ICP-MS
F080	241.00	24.100	10	VH VH		ICP(6)
F088	130.50	13.050	10			ICP-OES
F089	197.50	19.750	10	VL H		ICP
F091	126.00	15.750	8	EHVL		ICP

OVERALL AVERAGE RANK IS 15.719

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F020	37.00	3.700	10	LLVLLL	BIASED LOW	ICP
F019	72.00	7.200	10	LLVLELL	BIASED LOW	ICP
F061	82.50	10.313	8	VLVLVLL		ICP
F008	103.50	10.350	10	VL		ICP
F069	110.50	11.050	10			ICP
F076	111.00	11.100	10	EL		ICP-MS
F033	115.00	11.500	10			ICP/DIG HNO3
F014	120.50	12.050	10	EL		
F024	120.50	12.050	10	VLVL		ICP-AES
F011	129.00	12.900	10	HEL		
F088	130.50	13.050	10			ICP-OES
F059	136.00	13.600	10	LH		GFAA / ICP
F071	140.00	14.000	10	HELLL		FURNACE-AA
F010	141.00	14.100	10	L		ICP
F032	141.50	14.150	10			ICP-AES(20)
F001	140.00	15.556	9	L		ICP5x/ICPMS
F091	126.00	15.750	8	EHVL		ICP
F015	163.50	16.350	10	L		ICP
F038	101.00	16.833	6			ICP
F003	168.50	16.850	10			ICP
F030	174.50	17.450	10	VL		ICP
F035	132.50	18.929	7	VLELLVL		ICP-AES
F051	190.00	19.000	10	VHH		ICP-MS
F046	193.50	19.350	10	L		ICP
F089	197.50	19.750	10	VLH		ICP
F043	199.00	19.900	10			ICPES
F031	202.50	20.250	10	ELHVHVHEH		GFAAS
F025	219.50	21.950	10			ICP
F013	118.00	23.600	5			ICP
F080	241.00	24.100	10	VHVH		ICP(6)
F009	248.00	24.800	10	HHHEH	BIASED HIGH	ICP(5)
F016	257.50	25.750	10	EHEHEHH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 15.719

Iron

PARAMETER: 27091 Cobalt mg/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0020 BASIC ACCEPTABLE ERROR= .0020 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	.0003	1.50	.003	11.00	.004	12.00	.008	16.50	.0037	11.00	.025	16.00
F003	.0004	5.00	.0027	3.50	.0036	6.50	.0071	9.00	.0033	8.00	.025	16.00
F008	<.005	0.00	<.005	0.00	<.005	0.00	.008	16.50	<.005	0.00	.026	20.50
F009	<.001	0.00	.0033	16.00	.0036	6.50	.0077	11.50	.0039	14.00	.024	12.00
F010	.003 H	8.00	.007 VH	18.00	.008 VH	20.00	.012 VH	25.00	.009 EH	20.50	.030 H	26.00
F011	.0004	5.00	.003	11.00	.004	12.00	.0077	11.50	.0036	9.00	.0249	14.00
F015	<.005	0.00	<.005	0.00	<.005	0.00	.006	3.00	<.005	0.00	.027	23.00
F016		0.00		0.00		0.00		0.00	.01 EH	22.00		0.00
F019	<.003	0.00	<.003	0.00	.006	19.00	.011 H	24.00	.007 VH	19.00	.023	7.50
F020	<.003	0.00	<.003	0.00	.005	17.50	.008	16.50	.005	18.00	.025	16.00
F024	<.001	0.00	.002	2.00	.003	4.00	.007	6.00	.003	4.00	.023	7.50
F025	<.003	0.00	<.003	0.00	<.003	0.00	.003 VL	1.50	<.003	0.00	.020 L	2.00
F030	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	.02 L	2.00
F032	<.001	0.00	.003	11.00	.004	12.00	.008	16.50	.003	4.00	.024	12.00
F033	<.0005	0.00	.0027	3.50	.0037	8.00	.0074	10.00	.0033	7.00	.0233	10.00
F035	<.005	0.00	<.005	0.00	<.005	0.00	<.005 L	0.00	<.005	0.00	<.01 EL	0.00
F038	<.001	0.00	.003	11.00	.004	12.00	.008	16.50	.003	4.00	.024	12.00
F043	.0004	5.00	.003	11.00	.005	17.50	.008	16.50	.004	16.00	.028	24.50
F046	<.001	0.00	.003	11.00	.003	4.00	.007	6.00	.003	4.00	.022	4.50
F051	.0003	1.50	.0029	5.00	.0039	9.00	.0080	16.50	.0037	11.00	.0252	19.00
F059	<.001	0.00	.003	11.00	.004	12.00	.009	21.50	.004	16.00	.028	24.50
F061	<.005	0.00	<.005	0.00	<.005	0.00	.009	21.50	.009 EH	20.50	.043 EH	27.00
F069	<.001	0.00	.003	11.00	.003	4.00	.007	6.00	.003	4.00	.023	7.50
F071	.001	7.00	.001	1.00	.002	1.50	.007	6.00	.002	1.00	.023	7.50
F076	<.0005	0.00	.0030	11.00	.0040	15.00	.008	16.50	.0037	11.00	.0261	22.00
F080	<.002	0.00	<.002	0.00	<.002	0.00	.007	6.00	<.002	0.00	.022	4.50
F088	.0004	3.00	.0029	6.00	.0042	16.00	.0091	23.00	.0038	13.00	.0251	18.00
F089	.001W	0.00	.006 H	17.00	.002T	1.50	.003T VL	1.50	.004T	16.00	.026	20.50
F091	<.01	0.00	<.01	0.00	.02 EH	21.00	.02 EH	26.00	<.01	0.00	.02 L	2.00
MEDIAN CONC.	.0004		.0030		.0040		.0080		.0037		.0249	

PARAMETER: 27091 Cobalt mg/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.091	18.00	.074	15.50	.131	19.50	.273	12.00
F003	.093	21.50	.074	15.50	.133	22.50	.276	15.50
F008	.099	25.00	.086 H	26.00	.13	14.50	.28	20.50
F009	.090	14.00	.073	12.50	.130	14.50	.27	10.00
F010	.094	23.00	.078	23.00	.13	14.50	.28	20.50
F011	.0856	5.00	.0715	8.00	.125	5.50	.248	1.50
F015	.09	14.00	.073	12.50	.13	14.50	.274	13.00
F016	.04 EL	2.00	.03 EL	1.00	.11 L	2.00	.29	26.00
F019	.089	9.50	.072	10.00	.124	3.50	.263	6.00
F020	.091	18.00	.076	20.00	.133	22.50	.277	17.00
F024	.090	14.00	.076	20.00	.13	14.50	.28	20.50
F025	.093	21.50	.071	7.00	.130	14.50	.275	14.00
F030	.09	14.00	.07	5.00	.13	14.50	.27	10.00
F032	.089	9.50	.072	10.00	.128	9.00	.266	7.00
F033	.0863	6.00	.0707	6.00	.125	5.50	.258	3.50
F035	.10	26.50	.08	24.50	.14	27.00	.28	20.50
F038	.096	24.00	.076	20.00	.139	25.00	.296	27.00
F043	.010 EL	1.00	.080	24.50	.14	27.00	.30	28.00
F046	.090	14.00	.075	18.00	.13	14.50	.28	20.50
F051	.0891	11.00	.0738	14.00	.1269	7.00	.2580	3.50
F059	.117 EH	29.00	.091 VH	28.00	.124	3.50	.288	25.00
F061	.109 VH	28.00	.093 EH	29.00	.160 EH	29.00	.319 H	29.00
F069	.091	18.00	.072	10.00	.129	10.00	.270	10.00
F071	.087	7.00	.069	4.00	.134	24.00	.283	24.00
F076	.0929	20.00	.0742	17.00	.131	19.50	.269	8.00
F080	.085	4.00	.065	2.00	.070 EL	1.00	.248	1.50
F088	.0807	3.00	.0763	22.00	.132	21.00	.276	15.50
F089	.088	8.00	.067	3.00	.127	8.00	.260	5.00
F091	.10	26.50	.09 VH	27.00	.14	27.00	.28	20.50
MEDIAN CONC.	.0900		.0740		.1300		.2760	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	133.00	13.300	10			ICPMS
F003	123.00	12.300	10			ICP
F008	123.00	20.500	6	H		FLAME/GFAA
F009	111.00	12.333	9			ICP(5)
F010	198.50	19.850	10	H VHVHVHEHH		ICP
F011	82.50	8.250	10			
F015	80.00	13.333	6			ICP
F016	53.00	10.600	5	EH ELELL		ICP
F019	98.50	12.313	8	H VH		ICP
F020	145.50	18.188	8			ICP
F024	92.50	10.278	9			ICP-AES
F025	60.50	10.083	6	VL L		ICP
F030	45.50	9.100	5	L		ICP
F032	91.00	10.111	9			ICP-AES(20)
F033	59.50	6.611	9		BIASED LOW	ICP/DIG HNO3
F035	98.50	24.625	4	L EL	INSUFFICIENT DATA	ICP-AES
F038	151.50	16.833	9			GFAAS
F043	171.00	17.100	10	EL		ICPMS
F046	96.50	10.722	9			ICP/GFAA
F051	97.50	9.750	10			ICP-MS
F059	170.50	18.944	9	EHVH		GFAA
F061	184.00	26.286	7	EHEHVHEHEHH	BIASED HIGH	ICP
F069	80.50	8.944	9			ICP/MS
F071	83.00	8.300	10			FURNACE-AA
F076	140.00	15.556	9			ICP-MS
F080	19.00	3.167	6	EL	BIASED LOW	ICP(6)
F088	140.50	14.050	10			ICP-MS
F089	80.50	8.944	9	H VL		ICP
F091	150.00	21.429	7	EHEH L VH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 13.277

PARAMETER: 28091 Nickel mg/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0020 BASIC ACCEPTABLE ERROR= .0020 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	.0010	4.50	.021	23.50	.0025	6.00	.0087	13.00	.0195	20.00	.028	14.00
F003	.0009	1.00	.0171	5.00	.0023	5.00	.0074	3.00	.0182	15.00	.028	14.00
F008	<.005	0.00	.019	11.00	<.005	0.00	.008	6.00	.018	11.50	.028	14.00
F009	<.001	0.00	.020	19.00	.0033	17.00	.0081	9.00	.022 H	25.00	.032	25.50
F010	.002	12.00	.021	23.50	.005	18.00	.012 H	23.00	.023 H	26.00	.031	24.00
F011	.0011	8.00	.0189	8.00	.0026	7.00	.0082	11.00	.0179	8.00	.0275	10.00
F013	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00
F014	.01T EH	13.50	.02	19.00	.01T EH	21.50	.01T	20.50	.04 EH	27.00	.03	22.50
F015	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	.03	22.50
F016	.01 EH	13.50	.02	19.00	.01 EH	21.50	.02 EH	24.00	.01 EL	3.00	.04 EH	27.00
F019	<.005	0.00	.016	3.00	.007 VH	20.00	.010	20.50	.020	22.00	.028	14.00
F020	<.008	0.00	.018	6.50	<.008	0.00	.011	22.00	.016	4.00	.026	5.50
F024	<.001	0.00	.020	19.00	.003	13.00	.009	16.00	.018	11.50	.027	7.50
F025	<.005	0.00	.015 L	2.00	<.005	0.00	<.005 L	0.00	.005 EL	1.50	.021 VL	2.00
F030	<.002	0.00	.019	11.00	.002	2.50	.007	2.00	.019	18.50	.026	5.50
F032	<.001	0.00	.018	6.50	.002	2.50	.008	6.00	.017	6.00	.027	7.50
F033	<.001	0.00	.0219	26.00	.0028	9.00	.0081	10.00	.0177	7.00	.0272	9.00
F035	<.01	0.00	<.01 EL	0.00	<.01	0.00	<.01	0.00	<.01 EL	0.00	<.02 VL	0.00
F038	.001	4.50	.021	23.50	.003	13.00	.009	16.00	.020	22.00	.029	19.00
F043	.001	4.50	.021	23.50	.003	13.00	.009	16.00	.021	24.00	.032	25.50
F046	.001	4.50	.019	11.00	.003	13.00	.008	6.00	.018	11.50	.029	19.00
F051	.0017	11.00	.0194	15.00	.0031	16.00	.0090	16.00	.0188	17.00	.0279	11.00
F059	.001	4.50	.019	11.00	.003	13.00	.009	16.00	.019	18.50	.029	19.00
F061	.029 EH	15.00	.001 EL	1.00	.024 EH	23.00	.030 EH	25.00	.005 EL	1.50	.060 EH	28.00
F069	<.001	0.00	.019	11.00	.002	2.50	.008	6.00	.018	11.50	.025	3.00
F071	.001	4.50	.020	19.00	.002	2.50	.008	6.00	.018	11.50	.029	19.00
F076	.0011	9.00	.0193	14.00	.0027	8.00	.0086	12.00	.0187	16.00	.029	19.00
F080	<.009	0.00	.017	4.00	<.009	0.00	<.009	0.00	.018	11.50	.028	14.00
F088	.0014	10.00	.0199	16.00	.0030	10.00	.0090	19.00	.0165	5.00	.0257	4.00
F089	.001W	0.00	.03 EH	27.00	.006T H	19.00	-.003T EL	1.00	.02	22.00	.02 VL	1.00
F091	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02 VL	0.00
MEDIAN CONC.	.0011		.0193		.0030		.0087		.0180		.0280	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F080	19.00	3.167	6	EL	BIASED LOW	ICP(6)
F033	59.50	6.611	9		BIASED LOW	ICP/DIG HNO3
F011	82.50	8.250	10			
F071	83.00	8.300	10			FURNACE-AA
F069	80.50	8.944	9			ICP/MS
F089	80.50	8.944	9	HVL		ICP
F030	45.50	9.100	5	L		ICP
F051	97.50	9.750	10			ICP-MS
F025	60.50	10.083	6	VLL		ICP
F032	91.00	10.111	9			ICP-AES(20)
F024	92.50	10.278	9			ICP-AES
F016	53.00	10.600	5	EHELELL		ICP
F046	96.50	10.722	9			ICP/GFAA
F003	123.00	12.300	10			ICP
F019	98.50	12.313	8	HVH		ICP
F009	111.00	12.333	9			ICP(5)
F001	133.00	13.300	10			ICPMS
F015	80.00	13.333	6			ICP
F088	140.50	14.050	10			ICP-MS
F076	140.00	15.556	9			ICP-MS
F038	151.50	16.833	9			GFAAS
F043	171.00	17.100	10	EL		ICPMS
F020	145.50	18.188	8			ICP
F059	170.50	18.944	9	EHVH		GFAA
F010	198.50	19.850	10	HVHVHVHEHH		ICP
F008	123.00	20.500	6	H		FLAME/GFAA
F091	150.00	21.429	7	EHEHLVH	BIASED HIGH	ICP
F035	98.50	24.625	4	LEL	INSUFFICIENT DATA	ICP-AES
F061	184.00	26.286	7	EHEHVHEHEHH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 13.277

Cobalt

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	147.00	14.700	10			ICP5x/ICPMS
F003	133.00	13.300	10			ICP
F008	135.50	16.938	8			ICP/GFAA
F009	156.00	17.333	9	H		ICP(5)
F010	218.00	21.800	10	H H		ICP
F011	69.00	6.900	10		BIASED LOW	
F013	77.00	19.250	4		INSUFFICIENT DATA	ICP
F014	162.00	16.200	10	EH EH EH VL		
F015	88.00	17.600	5			ICP
F016	161.50	16.150	10	EH EHEHELEHH		ICP
F019	101.50	11.278	9	VH VL		ICP
F020	100.00	12.500	8			ICP
F024	174.50	19.389	9	H H		ICP-AES
F025	36.50	5.214	7	L L ELVLL L	BIASED LOW	ICP
F030	66.50	7.389	9			ICP
F032	68.00	7.556	9			ICP-AES(20)
F033	101.00	11.222	9			ICP/DIG HNO3
F035	49.00	12.250	4	EL ELVL EL	INSUFFICIENT DATA	ICP-AES
F038	210.00	21.000	10	VH		GFAAS
F043	215.00	21.500	10			ICPMS
F046	149.50	14.950	10			ICP/GFAA
F051	129.00	12.900	10			ICP-MS
F059	184.00	18.400	10			GFAA
F061	211.50	21.150	10	EHELEHEHELEHVHVHH		ICP
F069	73.00	8.111	9			ICP/MS
F071	163.50	16.350	10	H		FURNACE-AA
F076	149.50	14.950	10			ICP-MS
F080	76.00	10.857	7			ICP(6)
F088	86.00	8.600	10			ICP-MS
F089	154.50	17.167	9	EHH EL VLH		ICP
F091	21.50	5.375	4	VLVL	INSUFFICIENT DATA	ICP

OVERALL AVERAGE RANK IS 14.375

PARAMETER: 28091 Nickel mg/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.051	15.50	.0824	18.00	.125	17.50	.154	15.00
F003	.053	21.00	.085	22.00	.129	20.00	.162	27.00
F008	.054	23.00	.088	25.00	.13	23.50	.16	21.50
F009	.050	11.50	.082	15.50	.124	16.00	.156	17.50
F010	.055	24.50	.085	22.00	.13	23.50	.16	21.50
F011	.0476	6.00	.0793	7.00	.119	3.00	.139	1.00
F013	.055	24.50	.085	22.00	.122	13.00	.156	17.50
F014	.04 VL	2.50	.08	10.00	.13	23.50	.14	2.00
F015	.05	11.50	.09	26.50	.12	6.00	.16	21.50
F016	.06 H	29.50	.08	10.00	.12	6.00	.15	8.00
F019	.039 VL	1.00	.075	3.00	.120	6.00	.152	12.00
F020	.051	15.50	.082	15.50	.126	19.00	.152	12.00
F024	.056	26.50	.092 H	29.00	.14 H	30.50	.16	21.50
F025	.044 L	4.00	.071 L	2.00	.122	13.00	.152	12.00
F030	.048	7.00	.078	6.00	.12	6.00	.15	8.00
F032	.050	11.50	.080	10.00	.122	13.00	.149	5.00
F033	.0493	9.00	.0809	13.00	.122	13.00	.149	5.00
F035	.05	11.50	.06 EL	1.00	.12	6.00	.17	30.50
F038	.056	26.50	.097 VH	30.00	.133	27.50	.164	28.00
F043	.057	28.00	.090	26.50	.13	23.50	.17	30.50
F046	.052	17.50	.085	22.00	.13	23.50	.16	21.50
F051	.0504	14.00	.0822	17.00	.1206	9.00	.1475	3.00
F059	.053	21.00	.091	28.00	.133	27.50	.161	25.50
F061	.063 VH	31.00	.099 VH	31.00	.140 H	30.50	.161	25.50
F069	.049	8.00	.077	4.00	.122	13.00	.153	14.00
F071	.053	21.00	.085	22.00	.139 H	29.00	.169	29.00
F076	.0522	19.00	.0839	19.00	.125	17.50	.155	16.00
F080	.052	17.50	.081	14.00	.121	10.00	.149	5.00
F088	.0467	5.00	.0778	5.00	.118	2.00	.151	10.00
F089	.06 H	29.50	.08	10.00	.13	23.50	.16	21.50
F091	.04 VL	2.50	.08	10.00	.11	1.00	.15	8.00
MEDIAN CONC.	.0510		.0820		.1240		.1550	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F025	36.50	5.214	7	LLELVLLL	BIASED LOW	ICP
F091	21.50	5.375	4	VLVL	INSUFFICIENT DATA	ICP
F011	69.00	6.900	10		BIASED LOW	
F030	66.50	7.389	9			ICP
F032	68.00	7.556	9			ICP-AES(20)
F069	73.00	8.111	9			ICP/MS
F088	86.00	8.600	10			ICP-MS
F080	76.00	10.857	7			ICP(6)
F033	101.00	11.222	9			ICP/DIG HNO3
F019	101.50	11.278	9	VHVL		ICP
F035	49.00	12.250	4	ELELVLEL	INSUFFICIENT DATA	ICP-AES
F020	100.00	12.500	8			ICP
F051	129.00	12.900	10			ICP-MS
F003	133.00	13.300	10			ICP
F001	147.00	14.700	10			ICP5x/ICPMS
F046	149.50	14.950	10			ICP/GFAA
F076	149.50	14.950	10			ICP-MS
F016	161.50	16.150	10	EHEHEHELEHH		ICP
F014	162.00	16.200	10	EHEHEHVL		
F071	163.50	16.350	10	H		FURNACE-AA
F008	135.50	16.938	8			ICP/GFAA
F089	154.50	17.167	9	EHHELVLH		ICP
F009	156.00	17.333	9	H		ICP(5)
F015	88.00	17.600	5			ICP
F059	184.00	18.400	10			GFAA
F013	77.00	19.250	4		INSUFFICIENT DATA	ICP
F024	174.50	19.389	9	HH		ICP-AES
F038	210.00	21.000	10	VH		GFAAS
F061	211.50	21.150	10	EHELEHEHELEHVHVHH		ICP
F043	215.00	21.500	10			ICPMS
F010	218.00	21.800	10	HH		ICP

OVERALL AVERAGE
RANK IS 14.375

Nickel

PARAMETER: 29091 Copper mg/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0020 BASIC ACCEPTABLE ERROR= .0020 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	.0017	13.00	.0066	19.00	.036	18.00	.0092	16.00	.0145	17.50	.023	20.00
F003	.0009	3.50	.0062	18.00	.0360	18.00	.0094	18.00	.0145	17.50	.022	14.50
F008	<.01	0.00	<.01	0.00	.03 L	2.50	.01	21.00	.01 L	1.50	.02	5.50
F009	.008 EH	18.00	.016 EH	28.00	.053 EH	31.00	.029 EH	30.00	.025 EH	29.00	.030 VH	29.00
F010	<.001	0.00	.006	11.00	.035	12.00	.010	21.00	.015	21.50	.022	14.50
F011	.0033 H	15.00	.008	23.50	.0366	23.00	.0104	24.00	.0153	25.00	.0235	22.00
F013	<.02	0.00	<.02	0.00	.038	25.00	<.02	0.00	.016	26.50	.025	24.50
F014	.0009	3.50	.006	11.00	.03 L	2.50	.0087	5.00	.0141	16.00	.02	5.50
F015	<.005	0.00	.006	11.00	.036	18.00	.01	21.00	.015	21.50	.024	23.00
F016	.01 EH	19.00	.01 VH	26.00	.05 EH	30.00	.02 EH	28.00	.03 EH	30.00	.04 EH	31.00
F019	.006 EH	17.00	.008	23.50	.041	28.00	.013 H	27.00	.016	26.50	.026	27.00
F020	<.001	0.00	.005	3.00	.035	12.00	.009	11.00	.014	13.50	.022	14.50
F024	<.001	0.00	.006	11.00	.035	12.00	.008	2.50	.012	3.50	.019	3.00
F025	<.001	0.00	.005	3.00	.034	9.00	.009	11.00	.012	3.50	.020	5.50
F030	.002	14.00	.007	21.00	.036	18.00	.011	25.50	.015	21.50	.023	20.00
F031	.0008	2.00	.0055	5.00	.0325	6.00	.008	2.50	.0135	10.00	.020	5.50
F032	.001	8.50	.006	11.00	.034	9.00	.009	11.00	.013	7.50	.021	10.00
F033	.0007	1.00	.0060	11.00	.0338	7.00	.0085	4.00	.0130	7.50	.0207	8.00
F035	<.004	0.00	.007	21.00	.037	24.00	.009	11.00	.015	21.50	.026	27.00
F038	.001	8.50	.006	11.00	.036	18.00	.009	11.00	.014	13.50	.023	20.00
F043	.001	8.50	.007	21.00	.042 H	29.00	.010	21.00	.015	21.50	.025	24.50
F046	.001	8.50	.006	11.00	.036	18.00	.009	11.00	.014	13.50	.022	14.50
F051	.0010	8.50	.0061	16.00	.0355	14.00	.0089	6.00	.0138	11.00	.0224	17.00
F059	<.001	0.00	.006	11.00	.031	5.00	.009	11.00	.013	7.50	.016 L	1.00
F061	.023 EH	21.00	<.005	0.00		0.00	.024 EH	29.00	<.005 EL	0.00	.031 EH	30.00
F069	<.001	0.00	.005	3.00	.034	9.00	.009	11.00	.013	7.50	.021	10.00
F071	.001	8.50	.003 L	1.00	.030 L	2.50	.007	1.00	.010 L	1.50	.018	2.00
F076	.0009	5.00	.0062	17.00	.0361	22.00	.0094	17.00	.014	13.50	.0228	18.00
F080	.013 EH	20.00	.012 EH	27.00	.040	27.00	.011	25.50	.018 H	28.00	.026	27.00
F088	.0011	12.00	.0060	6.00	.0392	26.00	.010	21.00	.0126	5.00	.0214	12.00
F089	.004 H	16.00	.009 H	25.00	.036	18.00	.009	11.00	.015	21.50	.021	10.00
F091	<.01	0.00	<.01	0.00	.03 L	2.50	<.01	0.00	<.01 L	0.00	<.01 EL	0.00
MEDIAN CONC.	.0010		.0060		.0360		.0091		.0141		.0220	

PARAMETER: 29091 Copper mg/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.102	22.00	.066	18.00	.151	24.00	.306	24.00
F003	.103	25.50	.068	23.50	.153	25.00	.312	27.00
F008	.10	18.00	.06	4.50	.15	20.50	.29	10.50
F009	.107	28.00	.086 EH	31.00	.16	28.50	.29	10.50
F010	.094	6.00	.063	10.50	.14	2.50	.29	10.50
F011	.0924	3.00	.0627	9.00	.140	2.50	.264 L	1.00
F013	.102	22.00	.069	26.00	.150	20.50	.296	15.50
F014	.10	18.00	.06	4.50	.15	20.50	.30	19.50
F015	.099	15.50	.066	18.00	.149	16.50	.298	17.00
F016	.11	30.00	.09 EH	32.00	.18 VH	32.00	.33 H	29.00
F019	.110	30.00	.071	27.50	.159	27.00	.320	28.00
F020	.099	15.50	.066	18.00	.148	13.50	.299	18.00
F024	.10	18.00	.066	18.00	.15	20.50	.29	10.50
F025	.097	9.50	.066	18.00	.145	9.00	.301	21.50
F030	.097	9.50	.056 L	3.00	.14	2.50	.29	10.50
F031	.095	7.00	.055 L	2.00	.14	2.50	.30	19.50
F032	.096	8.00	.063	10.50	.143	6.00	.287	7.00
F033	.0939	5.00	.0635	12.00	.141	5.00	.282	6.00
F035	.103	25.50	.068	23.50	.149	16.50	.305	23.00
F038	.101	20.00	.068	23.50	.155	26.00	.311	25.50
F043	.11	30.00	.071	27.50	.16	28.50	.34 H	31.00
F046	.103	25.50	.068	23.50	.15	20.50	.311	25.50
F051	.0973	11.00	.0655	15.00	.1439	7.00	.2817	5.00
F059	.098	12.50	.061	6.50	.148	13.50	.280	2.50
F061	.116 H	32.00	.078 H	30.00	.169 H	31.00	.348 VH	32.00
F069	.093	4.00	.062	8.00	.144	8.00	.290	10.50
F071	.092	2.00	.061	6.50	.163	30.00	.334 H	30.00
F076	.102	22.00	.0649	14.00	.147	11.00	.296	15.50
F080	.103	25.50	.072	29.00	.146	10.00	.281	4.00
F088	.0985	14.00	.0663	21.00	.148	13.50	.301	21.50
F089	.098	12.50	.064	13.00	.148	13.50	.293	14.00
F091	.09	1.00	.04 EL	1.00	.15	20.50	.28	2.50
MEDIAN CONC.	.0995		.0660		.1490		.2970	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	191.50	19.150	10			ICPMS
F003	190.50	19.050	10			ICP
F008	84.00	10.500	8	L L		ICP
F009	263.00	26.300	10	EHEHEHEHEHVH EH	BIASED HIGH	ICP(5)
F010	109.50	12.167	9			ICP
F011	148.00	14.800	10	H L		
F013	160.00	22.857	7			ICP
F014	106.00	10.600	10	L		
F015	161.50	17.944	9			ICP
F016	287.00	28.700	10	EHVHEHEHEHEH EHVHH	BIASED HIGH	ICP
F019	261.50	26.150	10	EH H	BIASED HIGH	ICP
F020	119.00	13.222	9			ICP
F024	99.00	11.000	9			ICP-AES
F025	90.00	10.000	9			ICP
F030	145.50	14.550	10	L		ICP
F031	62.00	6.200	10	L	BIASED LOW	GFAAS
F032	88.50	8.850	10			ICP-AES(20)
F033	66.50	6.650	10		BIASED LOW	ICP/DIG HNO3
F035	193.00	21.444	9			ICP-AES
F038	177.00	17.700	10			GFAAS
F043	242.50	24.250	10	H H	BIASED HIGH	ICPMS
F046	171.50	17.150	10			ICP/GFAA
F051	110.50	11.050	10			ICP-MS
F059	70.50	7.833	9	L		GFAA
F061	205.00	29.286	7	EH EHELEHH H H VH	BIASED HIGH	ICP
F069	71.00	7.889	9			ICP/MS
F071	85.00	8.500	10	L L L H		FURNACE-AA
F076	155.00	15.500	10			ICP-MS
F080	223.00	22.300	10	EHEH H		ICP(6)
F088	152.00	15.200	10			ICP-MS
F089	154.50	15.450	10	H H		ICP
F091	27.50	5.500	5	L L EL EL	BIASED LOW	ICP

OVERALL AVERAGE RANK IS 15.622

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F091	27.50	5.500	5	LLELEL	BIASED LOW	ICP
F031	62.00	6.200	10	L	BIASED LOW	GFAAS
F033	66.50	6.650	10		BIASED LOW	ICP/DIG HNO3
F059	70.50	7.833	9	L		GFAA
F069	71.00	7.889	9			ICP/MS
F071	85.00	8.500	10	LLLH		FURNACE-AA
F032	88.50	8.850	10			ICP-AES(20)
F025	90.00	10.000	9			ICP
F008	84.00	10.500	8	LL		ICP
F014	106.00	10.600	10	L		
F024	99.00	11.000	9			ICP-AES
F051	110.50	11.050	10			ICP-MS
F010	109.50	12.167	9			ICP
F020	119.00	13.222	9			ICP
F030	145.50	14.550	10	L		ICP
F011	148.00	14.800	10	HL		
F088	152.00	15.200	10			ICP-MS
F089	154.50	15.450	10	HH		ICP
F076	155.00	15.500	10			ICP-MS
F046	171.50	17.150	10			ICP/GFAA
F038	177.00	17.700	10			GFAAS
F015	161.50	17.944	9			ICP
F003	190.50	19.050	10			ICP
F001	191.50	19.150	10			ICPMS
F035	193.00	21.444	9			ICP-AES
F080	223.00	22.300	10	EHEHH		ICP(6)
F013	160.00	22.857	7			ICP
F043	242.50	24.250	10	HH	BIASED HIGH	ICPMS
F019	261.50	26.150	10	EHH	BIASED HIGH	ICP
F009	263.00	26.300	10	EHEHEHEHEHVHEH	BIASED HIGH	ICP(5)
F016	287.00	28.700	10	EHVHEHEHEHEHEHVHH	BIASED HIGH	ICP
F061	205.00	29.286	7	EHEHELEHHHHVH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 15.622

Copper

PARAMETER: 30091 Zinc mg/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0030 BASIC ACCEPTABLE ERROR= .0030 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	.004	10.50	.020	24.00	.023	19.00	.007	20.00	.025	19.50	.032	22.00
F003	.0034	6.00	.0202	29.00	.0236	24.50	.0051	8.00	.0258	22.00	.033	25.00
F008	<.01	0.00	.02	24.00	.02	4.00	<.01	0.00	.02	2.00	.03	11.50
F009	.011 EH	23.00	.029 EH	31.00	.036 EH	30.00	.018 EH	25.00	.038 EH	30.00	.039 H	31.00
F010	.005	17.50	.019	13.00	.022	12.00	.006	14.00	.025	19.50	.031	17.50
F011	.0047	16.00	.0196	18.00	.0236	24.50	.0059	11.00	.025	19.50	.0336	27.00
F013	<.02	0.00	.018	6.00	.022	12.00	<.02	0.00	.030 H	29.00	.034	29.00
F014	.0024	1.00	.02	24.00	.02	4.00	.003	1.50	.022	5.50	.03	11.50
F015	.004	10.50	.019	13.00	.022	12.00	.005	5.50	.024	13.00	.031	17.50
F016	.02 EH	24.00	.04 EH	32.00	.06 EH	31.00	.02 EH	26.00	.04 EH	31.50	.06 EH	32.00
F019	<.002	0.00	.020	24.00	.023	19.00	.003	1.50	.023	8.50	.025 L	2.00
F020	.004	10.50	.019	13.00	.023	19.00	.005	5.50	.024	13.00	.031	17.50
F024	.004	10.50	.019	13.00	.023	19.00	.006	14.00	.022	5.50	.028	3.00
F025	.007	21.50	.020	24.00	.022	12.00	.005	5.50	.024	13.00	.030	11.50
F030	.006	20.00	.018	6.00	.023	19.00	.007	20.00	.023	8.50	.029	5.50
F031	<.01	0.00	.02	24.00	.02	4.00	<.01	0.00	.02	2.00	.03	11.50
F032	.003	3.50	.019	13.00	.022	12.00	.006	14.00	.025	19.50	.031	17.50
F033	.0036	7.00	.0177	4.00	.0213	9.00	.0053	9.00	.0230	8.50	.0297	8.00
F035	<.005	0.00	.017	3.00	.020	4.00	<.005	0.00	.021	4.00	.03	11.50
F038	<.005	0.00	.019	13.00	.023	19.00	.007	20.00	.027	27.50	.031	17.50
F043	.004	10.50	.020	24.00	.025	28.00	.007	20.00	.040 EH	31.50	.033	25.00
F046	.005	17.50	.018	6.00	.020	4.00	<.005	0.00	.023	8.50	.030	11.50
F051	.0042	14.50	.0188	8.00	.0225	15.00	.0069	17.00	.0241	16.00	.0310	17.50
F059	.003	3.50	.019	13.00	.023	19.00	.007	20.00	.026	24.00	.032	22.00
F061	<.005	0.00	.015	2.00		0.00	.008	24.00	.027	27.50	.033	25.00
F069	.003	3.50	.019	13.00	.021	7.50	.006	14.00	.024	13.00	.029	5.50
F071	.003	3.50	.010 VL	1.00	.017 L	1.00	.005	5.50	.020	2.00	.023 L	1.00
F076	.0042	14.50	.0198	19.00	.0232	23.00	.0059	10.00	.0261	26.00	.0338	28.00
F080	.007	21.50	.020	24.00	.024	26.50	.006	14.00	.026	24.00	.036	30.00
F088	.0052	19.00	.0219	30.00	.0273	29.00	.0075	23.00	.0246	17.00	.032	22.00
F089	.004	10.50	.019	13.00	.021	7.50	.004	3.00	.024	13.00	.029	5.50
F091	<.005	0.00	.020	24.00	.024	26.50	<.005	0.00	.026	24.00	.029	5.50
MEDIAN CONC.	.0040		.0190		.0230		.0060		.0243		.0310	

PARAMETER: 30091 Zinc mg/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.087	24.00	.096	24.50	.184	19.00	.258	20.50
F003	.089	28.00	.100	30.00	.192	28.50	.271	31.00
F008	.08	6.00	.09	9.50	.18	11.50	.24	4.00
F009	.090	29.00	.095	21.50	.20	31.00	.255	17.00
F010	.082	13.00	.092	14.00	.18	11.50	.25	10.00
F011	.082	13.00	.0933	18.00	.182	16.50	.242	5.00
F013	.087	24.00	.096	24.50	.188	23.50	.259	22.00
F014	.08	6.00	.09	9.50	.18	11.50	.25	10.00
F015	.084	17.00	.093	16.50	.182	16.50	.254	16.00
F016	.11 EH	32.00	.16 EH	32.00	.23 EH	32.00	.27	29.50
F019	.081	10.50	.092	14.00	.180	11.50	.258	20.50
F020	.085	20.00	.095	21.50	.183	18.00	.253	14.50
F024	.085	20.00	.098	28.50	.19	26.00	.26	24.00
F025	.082	13.00	.094	19.00	.180	11.50	.260	24.00
F030	.080	6.00	.087	2.00	.17	2.00	.25	10.00
F031	.08	6.00	.09	9.50	.18	11.50	.25	10.00
F032	.085	20.00	.093	16.50	.186	21.00	.256	18.50
F033	.0791	3.00	.0889	5.00	.172	3.00	.237	3.00
F035	.08	6.00	.09	9.50	.18	11.50	.25	10.00
F038	.088	26.00	.098	28.50	.192	28.50	.269	28.00
F043	.087	24.00	.092	14.00	.18	11.50	.27	29.50
F046	.084	17.00	.095	21.50	.191	27.00	.267	27.00
F051	.0802	9.00	.0899	7.00	.1750	4.00	.2336	2.00
F059	.083	15.00	.095	21.50	.186	21.00	.256	18.50
F061	.091	30.00	.101	31.00	.198	30.00	.278	32.00
F069	.081	10.50	.088	3.50	.178	7.00	.253	14.50
F071	.066 VL	1.00	.063 EL	1.00	.009 EL	1.00	.008 EL	1.00
F076	.0889	27.00	.097	26.00	.188	23.50	.262	26.00
F080	.084	17.00	.089	6.00	.177	6.00	.245	7.00
F088	.0913	31.00	.0971	27.00	.186	21.00	.260	24.00
F089	.078	2.00	.088	3.50	.176	5.00	.243	6.00
F091	.086	22.00	.091	12.00	.189	25.00	.251	13.00
MEDIAN CONC.	.0840		.0930		.1820		.2545	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	203.00	20.300	10			ICPMS
F003	232.00	23.200	10			ICP
F008	72.50	9.063	8			ICP
F009	268.50	26.850	10	EHEHEHEHEHH	BIASED HIGH	ICP(5)
F010	142.00	14.200	10			ICP
F011	168.50	16.850	10			
F013	170.00	21.250	8	H		ICP
F014	84.50	8.450	10			
F015	137.50	13.750	10			ICP
F016	302.00	30.200	10	EHEHEHEHEHEHEHEHEH	BIASED HIGH	ICP
F019	111.50	12.389	9	L		ICP
F020	152.50	15.250	10			ICP
F024	163.50	16.350	10			ICP-AES
F025	155.00	15.500	10			ICP
F030	99.00	9.900	10			ICP
F031	78.50	9.813	8			AAS FLAME
F032	155.50	15.550	10			ICP-AES(20)
F033	59.50	5.950	10		BIASED LOW	ICP/DIG HNO3
F035	59.50	7.438	8			ICP-AES
F038	208.00	23.111	9			ICP
F043	218.00	21.800	10	EH		ICPMS
F046	140.00	15.556	9			ICP
F051	110.00	11.000	10			ICP-MS
F059	177.50	17.750	10			FAA
F061	201.50	25.188	8		BIASED HIGH	ICP
F069	92.00	9.200	10			ICP/MS
F071	18.00	1.800	10	VLL L VLELELEL	BIASED LOW	FURNACE-AA
F076	223.00	22.300	10			ICP-MS
F080	176.00	17.600	10			ICP(6)
F088	243.00	24.300	10			ICP-MS
F089	69.00	6.900	10		BIASED LOW	ICP
F091	152.00	19.000	8			ICP

OVERALL AVERAGE RANK IS 15.879

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F071	18.00	1.800	10	VLLLVLELELEL	BIASED LOW	FURNACE-AA
F033	59.50	5.950	10		BIASED LOW	ICP/DIG HNO3
F089	69.00	6.900	10		BIASED LOW	ICP
F035	59.50	7.438	8			ICP-AES
F014	84.50	8.450	10			
F008	72.50	9.063	8			ICP
F069	92.00	9.200	10			ICP/MS
F031	78.50	9.813	8			AAS FLAME
F030	99.00	9.900	10			ICP
F051	110.00	11.000	10			ICP-MS
F019	111.50	12.389	9	L		ICP
F015	137.50	13.750	10			ICP
F010	142.00	14.200	10			ICP
F020	152.50	15.250	10			ICP
F025	155.00	15.500	10			ICP
F032	155.50	15.550	10			ICP-AES(20)
F046	140.00	15.556	9			ICP
F024	163.50	16.350	10			ICP-AES
F011	168.50	16.850	10			
F080	176.00	17.600	10			ICP(6)
F059	177.50	17.750	10			FAA
F091	152.00	19.000	8			ICP
F001	203.00	20.300	10			ICPMS
F013	170.00	21.250	8	H		ICP
F043	218.00	21.800	10	EH		ICPMS
F076	223.00	22.300	10			ICP-MS
F038	208.00	23.111	9			ICP
F003	232.00	23.200	10			ICP
F088	243.00	24.300	10			ICP-MS
F061	201.50	25.188	8		BIASED HIGH	ICP
F009	268.50	26.850	10	EHEHEHEHEHH	BIASED HIGH	ICP(5)
F016	302.00	30.200	10	EHEHEHEHEHEHEHEHEH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 15.879

Zinc

PARAMETER: 38091 Strontium mg/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

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	.019	9.50	.105	14.00	.048	7.00	.046	13.00	.447	15.00	.041	18.00
F003	.0183	5.00	.103	11.00	.0485	10.00	.0455	11.00	.437	12.50	.0418	22.00
F009	.018	3.00	.106	16.00	.050	17.50	.047	16.50	.45	16.00	.041	18.00
F010	.016	1.00	.094	1.00	.043	2.00	.041	2.00	.40	3.00	.035	2.00
F011	.0192	13.00	.104	12.00	.0488	11.00	.0454	10.00	.404	4.00	.0393	8.00
F015	.02	16.50	.109	19.50	.051	20.00	.047	16.50	.459	19.00	.041	18.00
F016	.03 VH	22.50	.13 VH	23.00	.07 EH	23.50	.07 EH	23.50	.55 EH	23.00	.06 EH	24.00
F020	.018	3.00	.101	8.00	.046	4.00	.043	3.50	.417	8.00	.038	4.50
F024	.019	9.50	.10	5.00	.048	7.00	.046	13.00	.38 L	2.00	.036	3.00
F025	.020	16.50	.108	17.50	.049	13.50	.047	16.50	.443	14.00	.040	12.50
F030	.019	9.50	.10	5.00	.049	13.50	.045	7.00	.043 EL	1.00	.041	18.00
F032	.019	9.50	.105	14.00	.048	7.00	.045	7.00	.415	6.00	.040	12.50
F033	.0190	9.50	.101	8.00	.0476	5.00	.0447	5.00	.416	7.00	.0392	7.00
F035	.020	16.50	.105	14.00	.049	13.50	.045	7.00	.437	12.50	.039	6.00
F038	.023	21.00	.109	19.50	.053	22.00	.050	21.00	.457	18.00	.043	23.00
F043	.02	16.50	.11	21.00	.05	17.50	.05	21.00	.46	20.00	.04	12.50
F046	.020	16.50	.108	17.50	.050	17.50	.047	16.50	.453	17.00	.041	18.00
F059	.02	16.50	.10	5.00	.05	17.50	.04	1.00	.42	9.00	.04	12.50
F068		0.00	.098	2.00	.042	1.00	.050	21.00	.490 H	22.00	.024 VL	1.00
F069	.018	3.00	.099	3.00	.045	3.00	.043	3.50	.427	10.00	.038	4.50
F076	.0189	6.00	.102	10.00	.0483	9.00	.0453	9.00	.410	5.00	.0395	9.00
F080	.019	9.50	.101	8.00	.049	13.50	.046	13.00	.431	11.00	.040	12.50
F088	.021	20.00	.111	22.00	.0517	21.00	.0483	19.00	.465	21.00	.0415	21.00
F091	.03 VH	22.50	.15 EH	24.00	.07 EH	23.50	.07 EH	23.50	.64 EH	24.00	.04	12.50
MEDIAN CONC.	.0190		.1045		.0490		.0460		.4370		.0400	

PARAMETER: 38091 Strontium mg/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.101	18.00	.119	8.50	.207	10.00	.296	14.00
F003	.102	20.00	.125	18.00	.215	18.50	.309	19.00
F009	.100	15.00	.121	13.00	.21	14.50	.30	15.00
F010	.088	1.00	.11	1.00	.19	1.00	.27	2.00
F011	.0939	3.00	.118	5.50	.197	2.00	.272	3.00
F015	.102	20.00	.125	18.00	.215	18.50	.307	18.00
F016	.13 EH	24.00	.16 EH	24.00	.26 EH	24.00	.38 EH	23.50
F020	.094	4.00	.116	2.50	.200	5.50	.284	5.50
F024	.096	7.00	.12	11.00	.20	5.50	.28	4.00
F025	.099	12.00	.122	14.00	.208	12.00	.301	16.00
F030	.097	9.50	.12	11.00	.21	14.50	.29	9.50
F032	.098	11.00	.118	5.50	.207	10.00	.293	11.50
F033	.0958	6.00	.118	5.50	.203	8.00	.288	7.00
F035	.097	9.50	.119	8.50	.207	10.00	.295	13.00
F038	.102	20.00	.125	18.00	.218	20.00	.312	21.00
F043	.10	15.00	.12	11.00	.21	14.50	.31	20.00
F046	.100	15.00	.124	15.50	.213	17.00	.304	17.00
F059	.09	2.00	.14 H	22.00	.21	14.50	.29	9.50
F068	.116 H	23.00	.127	20.00	.251 VH	23.00	.244 L	1.00
F069	.095	5.00	.116	2.50	.200	5.50	.289	8.00
F076	.0963	8.00	.118	5.50	.198	3.00	.284	5.50
F080	.100	15.00	.124	15.50	.200	5.50	.293	11.50
F088	.103	22.00	.128	21.00	.221	21.00	.316	22.00
F091	.10	15.00	.15 VH	23.00	.25 VH	22.00	.38 EH	23.50
MEDIAN CONC.	.0995		.1205		.2090		.2940	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	127.00	12.700	10			ICPMS
F003	147.00	14.700	10			ICP
F009	144.50	14.450	10			ICP(5)
F010	16.00	1.600	10		BIASED LOW	ICP
F011	71.50	7.150	10			
F015	184.00	18.400	10			ICP
F016	235.00	23.500	10	VHVHEHEHEHEHEHEHEHEH	BIASED HIGH	ICP
F020	48.50	4.850	10		BIASED LOW	ICP
F024	67.00	6.700	10	L		ICP-AES
F025	144.50	14.450	10			ICP
F030	98.50	9.850	10	EL		ICP
F032	94.00	9.400	10			ICP-AES(20)
F033	68.00	6.800	10			ICP/DIG HNO3
F035	110.50	11.050	10			ICP-AES
F038	203.50	20.350	10		BIASED HIGH	ICP
F043	169.00	16.900	10			ICPES
F046	167.50	16.750	10			ICP
F059	109.50	10.950	10	H		ICP
F068	114.00	12.667	9	H VLH VHL.		IC
F069	48.00	4.800	10		BIASED LOW	ICP
F076	70.00	7.000	10			ICP-MS
F080	115.00	11.500	10			ICP(6)
F088	210.00	21.000	10		BIASED HIGH	ICP-MS
F091	213.50	21.350	10	VHEHEHEHEH VHVHEH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 12.452

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F010	16.00	1.600	10		BIASED LOW	ICP
F069	48.00	4.800	10		BIASED LOW	ICP
F020	48.50	4.850	10		BIASED LOW	ICP
F024	67.00	6.700	10	L		ICP-AES
F033	68.00	6.800	10			ICP/DIG HNO3
F076	70.00	7.000	10			ICP-MS
F011	71.50	7.150	10			
F032	94.00	9.400	10			ICP-AES(20)
F030	98.50	9.850	10	EL		ICP
F059	109.50	10.950	10	H		ICP
F035	110.50	11.050	10			ICP-AES
F080	115.00	11.500	10			ICP(6)
F068	114.00	12.667	9	HVLHVHL		IC
F001	127.00	12.700	10			ICPMS
F025	144.50	14.450	10			ICP
F009	144.50	14.450	10			ICP(5)
F003	147.00	14.700	10			ICP
F046	167.50	16.750	10			ICP
F043	169.00	16.900	10			ICPES
F015	184.00	18.400	10			ICP
F038	203.50	20.350	10		BIASED HIGH	ICP
F088	210.00	21.000	10		BIASED HIGH	ICP-MS
F091	213.50	21.350	10	VHEHEHEHEHVHVHEH	BIASED HIGH	ICP
F016	235.00	23.500	10	VHVHEHEHEHEHEHEHEHEH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 12.452

Strontium

PARAMETER: 42091 Molybdenum mg/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0020 BASIC ACCEPTABLE ERROR= .0020 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	.0005	4.00	.0027	13.50	.0023	9.00	.006	12.50	.019	17.50	.032	22.00
F003	.0005	4.00	.0024	8.50	.0022	8.00	.0054	3.50	.0176	9.00	.032	22.00
F009	.0011	6.00	.0025	11.50	.0015	1.00	.0055	5.50	.019	17.50	.030	14.00
F010	<.001	0.00	.002	4.00	.003	13.00	.006	12.50	.017	7.50	.029	10.00
F011	.0005	4.00	.0025	11.50	.0024	10.00	.0058	8.00	.0188	15.00	.0307	18.00
F015	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	.02	21.00	.03	14.00
F016		0.00	.01 EH	18.00		0.00		0.00	.01 EL	1.00	.01 EL	2.00
F019	<.005	0.00	<.005	0.00	<.005	0.00	<.005	0.00	.016	5.00	.027	8.50
F020	<.004	0.00	<.004	0.00	<.004	0.00	<.004	0.00	.014 L	3.00	.024 L	6.00
F024	<.001	0.00	.002	4.00	.003	13.00	.006	12.50	.018	12.00	.038 VH	25.00
F025	<.003	0.00	.005 H	16.00	<.003	0.00	.006	12.50	.018	12.00	.030	14.00
F030	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	.02	21.00	.03	14.00
F032	<.001	0.00	.002	4.00	.002	3.50	.006	12.50	.019	17.50	.031	19.00
F033	.0004	1.00	.0024	8.50	.0020	6.00	.0054	3.50	.0177	10.00	.0303	17.00
F035	<.003	0.00	<.003	0.00	<.003	0.00	<.003 L	0.00	.016	5.00	.020 EL	4.50
F038	<.001	0.00	.002	4.00	.002	3.50	.005	2.00	.016	5.00	.026	7.00
F043	.055 EH	8.00	.008 EH	17.00	.003	13.00	.009 H	18.00	.012 VL	2.00	.013 EL	3.00
F046	<.001	0.00	.002	4.00	<.001	0.00	.004	1.00	.018	12.00	.032	22.00
F051	.0025	7.00	.0047 H	15.00	.0041	15.00	.0071	17.00	.0201	23.00	.0319	20.00
F059	<.001	0.00	.002	4.00	.002	3.50	.006	12.50	.026 EH	24.00	.043 EH	26.00
F061	<.05	0.00	<.05	0.00		0.00	<.05	0.00	<.05	0.00	.006 EL	1.00
F069	<.001	0.00	.002	4.00	.002	3.50	.006	12.50	.019	17.50	.027	8.50
F076	<.001	0.00	.0027	13.50	.0024	11.00	.0058	7.00	.0186	14.00	.0326	24.00
F080	<.005	0.00	<.005	0.00	<.005	0.00	.006	12.50	.020	21.00	.030	14.00
F088	.0005	2.00	.0024	10.00	.0021	7.00	.0055	5.50	.017	7.50	.0295	11.00
F091	<.01	0.00	.03 EH	19.00	<.01	0.00	.02 EH	19.00	<.01 EL	0.00	.02 EL	4.50
MEDIAN CONC.	.0005		.0024		.0022		.0060		.0180		.0300	

PARAMETER: 42091 Molybdenum mg/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.118	18.00	.096	20.00	.156	16.00	.361	19.00
F003	.120	21.00	.101	24.00	.145	8.00	.374	22.00
F009	.115	12.50	.094	14.50	.158	19.00	.34	7.50
F010	.11	7.50	.094	14.50	.15	10.00	.35	14.00
F011	.112	11.00	.0944	16.00	.153	13.00	.337	6.00
F015	.11	7.50	.09	7.50	.13 L	4.50	.35	14.00
F016	.09 VL	2.00	.07 EL	3.00	.13 L	4.50	.34	7.50
F019	.116	14.50	.093	12.50	.152	12.00	.351	16.00
F020	.096 L	3.00	.085	4.00	.137	6.00	.319	3.00
F024	.12	21.00	.10	22.00	.17	24.00	.37	21.00
F025	.116	14.50	.095	18.00	.157	18.00	.364	20.00
F030	.11	7.50	.09	7.50	.16	21.00	.35	14.00
F032	.117	16.50	.093	12.50	.156	16.00	.347	11.00
F033	.110	7.50	.0923	11.00	.128 VL	3.00	.304 L	2.00
F035	.121	23.00	.091	10.00	.155	14.00	.376	23.00
F038	.124	24.00	.098	21.00	.156	16.00	.349	12.00
F043	.13 H	25.00	.038 EL	1.00	.080 EL	1.00		0.00
F046	.12	21.00	.095	18.00	.16	21.00	.36	17.50
F051	.1199	19.00	.1007	23.00	.1621	23.00	.1248 EL	1.00
F059	.144 EH	26.00	.126 EH	26.00	.218 EH	26.00	.381	24.00
F061	.086 EL	1.00	.067 EL	2.00	.125 VL	2.00	.329	4.00
F069	.105	4.00	.095	18.00	.160	21.00	.360	17.50
F076	.115	12.50	.0909	9.00	.149	9.00	.343	10.00
F080	.117	16.50	.088	6.00	.151	11.00	.341	9.00
F088	.110	7.50	.0863	5.00	.144	7.00	.334	5.00
F091	.11	7.50	.11 H	25.00	.18 VH	25.00	.39 H	25.00
MEDIAN CONC.	.1155		.0935		.1540		.3500	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	151.50	15.150	10			ICPMS
F003	130.00	13.000	10			ICP
F009	109.00	10.900	10			ICP(5)
F010	93.00	10.333	9			ICP
F011	112.50	11.250	10			
F015	68.50	11.417	6	L		ICP
F016	38.00	5.429	7	EH ELELVLELL	BIASED LOW	ICP
F019	68.50	11.417	6			ICP
F020	25.00	4.167	6	L L L	BIASED LOW	ICP
F024	154.50	17.167	9	VH		ICP-AES
F025	125.00	15.625	8	H		ICP
F030	85.00	14.167	6			ICP
F032	112.50	12.500	9			ICP-AES(20)
F033	69.50	6.950	10	VLL		ICP/DIG HNO3
F035	79.50	13.250	6	L EL		ICP-AES
F038	94.50	10.500	9			GFAAS
F043	88.00	9.778	9	EHEH H VLELH ELEL		ICPMS
F046	116.50	14.563	8			ICP/GFAA
F051	163.00	16.300	10	H EL		ICP-MS
F059	172.00	19.111	9	EHEHEHEHEH	BIASED HIGH	GFAA
F061	10.00	2.000	5	ELELELVL	BIASED LOW	ICP
F069	106.50	11.833	9			ICP/MS
F076	110.00	12.222	9			ICP-MS
F080	90.00	12.857	7			ICP(6)
F088	67.50	6.750	10			ICP-MS
F091	125.00	17.857	7	EH EHELEL H VHH		ICP

OVERALL AVERAGE
RANK IS 11.986

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F061	10.00	2.000	5	ELELELVL	BIASED LOW	ICP
F020	25.00	4.167	6	LLL	BIASED LOW	ICP
F016	38.00	5.429	7	EHELELVLELL	BIASED LOW	ICP
F088	67.50	6.750	10			ICP-MS
F033	69.50	6.950	10	VLL		ICP/DIG HNO3
F043	88.00	9.778	9	EHEHHVLELHELEL		ICPMS
F010	93.00	10.333	9			ICP
F038	94.50	10.500	9			GFAAS
F009	109.00	10.900	10			ICP(5)
F011	112.50	11.250	10			
F019	68.50	11.417	6			ICP
F015	68.50	11.417	6	L		ICP
F069	106.50	11.833	9			ICP/MS
F076	110.00	12.222	9			ICP-MS
F032	112.50	12.500	9			ICP-AES(20)
F080	90.00	12.857	7			ICP(6)
F003	130.00	13.000	10			ICP
F035	79.50	13.250	6	LEL		ICP-AES
F030	85.00	14.167	6			ICP
F046	116.50	14.563	8			ICP/GFAA
F001	151.50	15.150	10			ICPMS
F025	125.00	15.625	8	H		ICP
F051	163.00	16.300	10	HEL		ICP-MS
F024	154.50	17.167	9	VH		ICP-AES
F091	125.00	17.857	7	EHEHELELHVHH		ICP
F059	172.00	19.111	9	EHEHEHEHEH	BIASED HIGH	GFAA

OVERALL AVERAGE
RANK IS 11.986

PARAMETER: 48091 Cadmium mg/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0015 BASIC ACCEPTABLE ERROR= .0015 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	.0001	4.00	.0012	13.00	.0009	5.50	.0024	10.00	.016	14.00	.012	18.00
F003	.0001	4.00	.0010	5.00	.0008	2.00	.0021	8.00	.0168	19.00	.013	24.50
F008	<.001	0.00	.001	5.00	.001	11.00	.003	19.50	.017	23.50	.013	24.50
F009	.0001	4.00	.0014	17.50	.0010	11.00	.0029	15.50	.018	28.50	.012	18.00
F010	<.002	0.00	.002	21.00	.002	19.50	.004	25.50	.017	23.50	.013	24.50
F011	.0004	9.00	.0013	16.00	.001	11.00	.0026	13.00	.0167	18.00	.0118	12.50
F013	<.005	0.00	<.005	0.00	<.005	0.00	.005 H	27.00	.017	23.50	.014	29.00
F014	0.0T	2.00	.001	5.00	.0008	2.00	.0027	14.00	.0178	27.00	.0129	22.00
F015	<.005	0.00	<.005	0.00	<.005	0.00	<.005	0.00	.017	23.50	.012	18.00
F016	.01 EH	11.00	.01 EH	23.00	.01 EH	22.00	.01 EH	28.00	.03 EH	33.00	.02 EH	32.00
F019	<.002	0.00	<.002	0.00	<.005	0.00	<.002	0.00	.016	14.00	.010	3.00
F020	<.002	0.00	<.002	0.00	<.002	0.00	<.002	0.00	.016	14.00	.011	7.00
F024	<.001	0.00	.001	5.00	.001	11.00	.003	19.50	.014	3.00	.010	3.00
F025	<.003	0.00	<.003	0.00	<.003	0.00	.004	25.50	.014	3.00	.012	18.00
F030	<.002	0.00	<.002	0.00	<.002	0.00	.002	4.50	.015	5.50	.011	7.00
F031	<.0002	0.00	.0011	10.00	.0008	2.00	.0017	1.00	.0015 EL	1.00	.012	18.00
F032	<.0005	0.00	.0012	13.00	.0010	11.00	.0023	9.00	.0155	8.50	.0116	11.00
F033	<.0002	0.00	.0013	15.00	.0011	17.00	.0025	11.00	.0152	7.00	.0114	10.00
F035	<.002	0.00	<.002	0.00	<.002	0.00	.002	4.50	.016	14.00	<.004 EL	0.00
F038	<.0002	0.00	.0016	20.00	.0012	18.00	.0033	23.00	.0156	10.00	.0112	9.00
F043	<.0005	0.00	.001	5.00	.001	11.00	.003	19.50	.018	28.50	.013	24.50
F046	<.001	0.00	.001	5.00	.002	19.50	.003	19.50	.017	23.50	.014	29.00
F048	.0002	7.50	.0014	17.50	.0010	11.00	.0030	19.50	.0215 VH	32.00	.0132	27.00
F051	.0002	7.50	.0012	13.00	.0009	5.50	.0035	24.00	.0155	8.50	.0109	5.00
F059	<.001	0.00	.001	5.00	.001	11.00	.002	4.50	.015	5.50	.012	18.00
F061	<.005	0.00	.003 H	22.00		0.00	.002	4.50	.016	14.00	.009 L	1.00
F069	<.001	0.00	.001	5.00	<.001	0.00	.002	4.50	.016	14.00	.011	7.00
F071	.001	10.00	.001	5.00	.001	11.00	.002	4.50	.019 H	30.00	.016 VH	31.00
F076	<.0001	0.00	.0012	11.00	.0009	4.00	.0025	12.00	.0169	20.00	.0119	14.00
F080	<.002	0.00	<.002	0.00	<.002	0.00	<.002	0.00	.016	14.00	.012	18.00
F088	.0001	6.00	.0014	19.00	.0010	16.00	.0029	15.50	.017	23.50	.0118	12.50
F089	-.002T L	1.00	.001W	0.00	.003T H	21.00	.003T	19.50	.02 H	31.00	.01	3.00
F091	<.004	0.00	<.004	0.00	<.004	0.00	<.004	0.00	.014	3.00	.014	29.00
MEDIAN CONC.	.0001		.0012		.0010		.0028		.0160		.0120	

PARAMETER: 48091 Cadmium mg/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.032	16.00	.036	18.50	.059	18.00	.094	11.00
F003	.034	24.00	.039	26.50	.062	25.00	.100	25.00
F008	.032	16.00	.039	26.50	.06	21.50	.09	5.00
F009	.033	20.00	.042 H	31.00	.057	9.00	.093	8.00
F010	.031	11.00	.035	10.00	.056	7.00	.094	11.00
F011	.0309	8.00	.0359	14.00	.0573	11.00	.0946	14.00
F013	.033	20.00	.035	10.00	.057	9.00	.098	21.00
F014	.038 H	31.00	.041 H	30.00	.066	30.50	.107 H	31.00
F015	.033	20.00	.036	18.50	.059	18.00	.097	19.00
F016	.04 VH	32.00	.05 EH	32.00	.07 VH	32.00	.11 H	32.00
F019	.031	11.00	.036	18.50	.059	18.00	.101	28.00
F020	.031	11.00	.035	10.00	.057	9.00	.094	11.00
F024	.034	24.00	.036	18.50	.060	21.50	.099	22.50
F025	.030	5.00	.036	18.50	.058	14.50	.099	22.50
F030	.028	1.00	.032	3.00	.051 L	2.00	.084 L	2.00
F031	.035	27.50	.0375	24.00	.05 L	1.00	.10	25.00
F032	.0314	14.00	.0345	7.00	.0574	12.00	.0942	13.00
F033	.0300	5.00	.0339	6.00	.0548	4.00	.0894	3.00
F035	.031	11.00	.016 EL	2.00	.062	25.00	.095	15.50
F038	.0300	5.00	.0360	18.50	.0576	13.00	.101	28.00
F043	.035	27.50	.039	26.50	.062	25.00	.10	25.00
F046	.035	27.50	.039	26.50	.063	27.50	.104	30.00
F048		0.00		0.00		0.00		0.00
F051	.0295	2.00	.0330	4.50	.0529	3.00	.0238 EL	1.00
F059	.037 H	30.00	.012 EL	1.00	.065	29.00	.096	17.00
F061	.034	24.00	.036	18.50	.063	27.50	.101	28.00
F069	.030	5.00	.036	18.50	.055	5.50	.093	8.00
F071	.032	16.00	.035	10.00	.066	30.50	.095	15.50
F076	.0325	18.00	.0356	13.00	.0587	16.00	.0971	20.00
F080	.031	11.00	.033	4.50	.055	5.50	.090	5.00
F088	.0335	22.00	.0367	23.00	.058	14.50	.0969	18.00
F089	.03	5.00	.04	29.00	.06	21.50	.09	5.00
F091	.035	27.50	.035	10.00	.060	21.50	.093	8.00
MEDIAN CONC.	.0320		.0360		.0588		.0955	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	128.00	12.800	10			ICPMS
F003	163.00	16.300	10			ICP
F008	152.50	16.944	9			FLAME AA/GF
F009	162.50	16.250	10	H		GF
F010	153.00	17.000	9			ICP
F011	126.50	12.650	10			
F013	139.50	19.929	7	H		ICP
F014	194.50	19.450	10	H H H		
F015	117.00	19.500	6			ICP
F016	277.00	27.700	10	EHEHEHEHEHEHVHEHVHH	BIASED HIGH	ICP
F019	92.50	15.417	6			ICP
F020	62.00	10.333	6			ICP
F024	128.00	14.222	9			ICP-AES
F025	107.00	15.286	7			ICP
F030	25.00	3.571	7	L L	BIASED LOW	ICP
F031	109.50	12.167	9	EL L		GFAAS
F032	98.50	10.944	9			ICP-AES(20)
F033	78.00	8.667	9			ICP/DIG HNO3
F035	72.00	12.000	6	EL EL		ICP-AES
F038	144.50	16.056	9			GFAAS
F043	192.50	21.389	9			ICPMS
F046	208.00	23.111	9			ICP/GFAA
F048	114.50	19.083	6	VH		GFAAS
F051	74.00	7.400	10	EL	BIASED LOW	ICP-MS
F059	121.00	13.444	9	H EL		GFAA
F061	139.50	17.438	8	H L		ICP
F069	67.50	8.438	8			ICP/MS
F071	163.50	16.350	10	H VH		FURNACE-AA
F076	128.00	14.222	9			ICP-MS
F080	58.00	9.667	6			ICP(6)
F088	170.00	17.000	10			ICP-MS
F089	136.00	15.111	9	L H H		ICP
F091	99.00	16.500	6			ICP

OVERALL AVERAGE RANK IS 15.170

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F030	25.00	3.571	7	LL	BIASED LOW	ICP
F051	74.00	7.400	10	EL	BIASED LOW	ICP-MS
F069	67.50	8.438	8			ICP/MS
F033	78.00	8.667	9			ICP/DIG HNO3
F080	58.00	9.667	6			ICP(6)
F020	62.00	10.333	6			ICP
F032	98.50	10.944	9			ICP-AES(20)
F035	72.00	12.000	6	ELEL		ICP-AES
F031	109.50	12.167	9	ELL		GFAAS
F011	126.50	12.650	10			
F001	128.00	12.800	10			ICPMS
F059	121.00	13.444	9	HEL		GFAA
F024	128.00	14.222	9			ICP-AES
F076	128.00	14.222	9			ICP-MS
F089	136.00	15.111	9	LHH		ICP
F025	107.00	15.286	7			ICP
F019	92.50	15.417	6			ICP
F038	144.50	16.056	9			GFAAS
F009	162.50	16.250	10	H		GF
F003	163.00	16.300	10			ICP
F071	163.50	16.350	10	HVH		FURNACE-AA
F091	99.00	16.500	6			ICP
F008	152.50	16.944	9			FLAME AA/GF
F010	153.00	17.000	9			ICP
F088	170.00	17.000	10			ICP-MS
F061	139.50	17.438	8	HL		ICP
F048	114.50	19.083	6	VH		GFAAS
F014	194.50	19.450	10	HHH		
F015	117.00	19.500	6			ICP
F013	139.50	19.929	7	H		ICP
F043	192.50	21.389	9			ICPMS
F046	208.00	23.111	9			ICP/GFAA
F016	277.00	27.700	10	EHEHEHEHEHEHVHEHVHH	BIASED HIGH	ICP

OVERALL AVERAGE
RANK IS 15.170

Cadmium

PARAMETER: 56091 Barium MG/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0030 BASIC ACCEPTABLE ERROR= .0030 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	.003	13.50	.015	19.00	.0085	17.50	.013	12.50	.029	8.50	.026	15.50
F003	.0028	7.00	.0150	19.00	.0085	17.50	.0134	17.00	.0302	17.00	.0264	18.00
F008	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00
F009	.003	13.50	.014	7.00	.009	20.50	.014	23.00	.032	23.50	.027	21.00
F010	.003	13.50	.015	19.00	.008	9.00	.014	23.00	.030	13.00	.026	15.50
F011	.0029	8.00	.0141	11.00	.008	9.00	.0124	7.00	.0284	6.00	.0245	5.00
F014	0.00T	1.00	.015T	19.00	.008T	9.00	.014T	23.00	.03T	13.00	.025T	8.00
F015	.003	13.50	.015	19.00	.009	20.50	.014	23.00	.031	20.50	.027	21.00
F016	.01 EH	21.00	.02 H	28.50	.01	24.00	.02 VH	29.00	.04 VH	29.00	.03	26.00
F019	<.002	0.00	.015	19.00	.010	24.00	.014	23.00	.032	23.50	.028	23.00
F020	.002	3.00	.013	2.00	.007	3.50	.012	4.50	.027	2.00	.023	2.00
F024	.003	13.50	.014	7.00	.008	9.00	.013	12.50	.024 L	1.00	.023	2.00
F025	<.01	0.00	.02 H	28.50	<.01	0.00	.01	1.00	.03	13.00	.03	26.00
F030	.006	20.00	.017	26.50	.009	20.50	.013	12.50	.039 VH	28.00	.030	26.00
F031	.003	13.50	.014	7.00	.008	9.00	.014	23.00	.032	23.50	.024	4.00
F032	.003	13.50	.015	19.00	.008	9.00	.013	12.50	.028	4.00	.025	8.00
F033	.0028	6.00	.0145	12.00	.0082	15.00	.0129	9.00	.0290	8.50	.0253	11.00
F035	<.002	0.00	.013	2.00	<.002 VL	0.00	.012	4.50	.028	4.00	.034 VH	29.00
F038	<.010	0.00	.014	7.00	<.010	0.00	.014	23.00	.032	23.50	.027	21.00
F043	.003	13.50	.017	26.50	.010	24.00	.014	23.00	.034	26.00	.030	26.00
F046	.003	13.50	.015	19.00	.009	20.50	.013	12.50	.030	13.00	.025	8.00
F051	.0032	19.00	.0157	24.00	.0067	2.00	.0139	18.00	.0302	17.00	.0258	13.00
F059	<.01	0.00	.013	2.00	<.01	0.00	.012	4.50	.030	13.00	.026	15.50
F061	<.005	0.00	.015	19.00	.008	9.00	.015	28.00	.036 H	27.00	.030	26.00
F068		0.00		0.00		0.00		0.00		0.00		0.00
F069	.003	13.50	.014	7.00	.008	9.00	.012	4.50	.029	8.50	.026	15.50
F076	.0027	4.00	.0147	13.00	.0084	16.00	.0131	16.00	.0302	17.00	.0255	12.00
F080	<.002	0.00	.014	7.00	.008	9.00	.013	12.50	.029	8.50	.025	8.00
F088	.0028	5.00	.0149	14.00	.0081	14.00	.0126	8.00	.0304	19.00	.0265	19.00
F089	.001T	2.00	.016	25.00	.007	3.50	.011	2.00	.028	4.00	.023	2.00
F091	<.003	0.00	.014	7.00	.006	1.00	.014	23.00	.031	20.50	.025	8.00
MEDIAN CONC.	.0030		.0150		.0080		.0130		.0300		.0260	

PARAMETER: 56091 Barium MG/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.053	17.50	.080	20.00	.092	18.00	.163	19.00
F003	.0568	28.00	.0797	16.50	.0947	21.00	.163	19.00
F008	.05	6.00	.08	20.00	.09	12.00	.16	15.50
F009	.054	22.00	.081	23.50	.090	12.00	.159	13.00
F010	.052	13.50	.077	12.00	.090	12.00	.16	15.50
F011	.0482	2.00	.0735	4.00	.0847	3.00	.144	2.00
F014	.054	22.00	.082	26.50	.096	25.50	.166	25.00
F015	.054	22.00	.08	20.00	.094	20.00	.163	19.00
F016	.06	30.00	.09	30.00	.10	30.00	.19 VH	31.00
F019	.054	22.00	.078	14.50	.093	19.00	.166	25.00
F020	.048	1.00	.072	2.00	.084	1.50	.145	3.50
F024	.050	6.00	.074	5.00	.090	12.00	.15	5.00
F025	.05	6.00	.08	20.00	.09	12.00	.16	15.50
F030	.053	17.50	.076	9.00	.089	8.00	.16	15.50
F031	.050	6.00	.076	9.00	.084	1.50	.145	3.50
F032	.051	10.00	.075	6.50	.090	12.00	.154	8.50
F033	.0514	12.00	.0797	16.50	.0911	17.00	.156	12.00
F035	.053	17.50	.087	29.00	.099	29.00	.168	28.00
F038	.055	26.50	.082	26.50	.096	25.50	.166	25.00
F043	.058	29.00	.085	28.00	.098	28.00	.17	29.00
F046	.051	10.00	.076	9.00	.090	12.00	.155	10.50
F051	.0510	10.00	.0768	11.00	.0885	6.00	.0246 EL	1.00
F059	.055	26.50	.080	20.00	.096	25.50	.167	27.00
F061	.061	31.00	.091 H	31.00	.106 H	31.00	.184 H	30.00
F068	.049	3.00	.072	2.00	.088	4.50	.153	7.00
F069	.053	17.50	.078	14.50	.095	22.00	.164	22.00
F076	.0521	15.00	.0772	13.00	.0889	7.00	.155	10.50
F080	.052	13.50	.072	2.00	.088	4.50	.152	6.00
F088	.0542	25.00	.0811	25.00	.0956	23.00	.164	22.00
F089	.050	6.00	.075	6.50	.091	16.00	.154	8.50
F091	.054	22.00	.081	23.50	.096	25.50	.164	22.00
MEDIAN CONC.	.0530		.0797		.0910		.1600	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	161.00	16.100	10			ICPMS
F003	180.00	18.000	10			ICP
F008	53.50	13.375	4		INSUFFICIENT DATA	ICP
F009	179.00	17.900	10			ICP(5)
F010	146.00	14.600	10			ICP
F011	57.00	5.700	10		BIASED LOW	
F014	172.00	17.200	10			ICP
F015	198.50	19.850	10		BIASED HIGH	ICP
F016	278.50	27.850	10	EHH VHVH VH		ICP
F019	193.00	21.444	9		BIASED LOW	ICP
F020	25.00	2.500	10		BIASED LOW	ICP-AES
F024	73.00	7.300	10	L		ICP
F025	122.00	15.250	8	H		ICP
F030	183.50	18.350	10	VH		GFAAS
F031	100.00	10.000	10			ICP-AES(20)
F032	103.00	10.300	10			ICP/DIG HNO3
F033	119.00	11.900	10			ICP-AES
F035	143.00	17.875	8	VL VH		ICP
F038	178.00	22.250	8		BIASED HIGH	ICPMS
F043	253.00	25.300	10			ICP
F046	128.00	12.800	10			ICP-MS
F051	121.00	12.100	10	EL		ICP
F059	134.00	16.750	8		BIASED HIGH	ICP
F061	232.00	25.778	9	H H H H	INSUFFICIENT DATA	IC
F068	16.50	4.125	4			ICP/MS
F069	134.00	13.400	10			ICP-MS
F076	123.50	12.350	10			ICP(6)
F080	71.00	7.889	9			ICP-MS
F088	174.00	17.400	10			ICP
F089	75.50	7.550	10			ICP
F091	152.50	16.944	9			

OVERALL AVERAGE RANK IS 14.965

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F020	25.00	2.500	10		BIASED LOW	ICP
F068	16.50	4.125	4		INSUFFICIENT DATA	IC
F011	57.00	5.700	10		BIASED LOW	
F024	73.00	7.300	10	L	BIASED LOW	ICP-AES
F089	75.50	7.550	10			ICP
F080	71.00	7.889	9			ICP(6)
F031	100.00	10.000	10			GFAAS
F032	103.00	10.300	10			ICP-AES(20)
F033	119.00	11.900	10			ICP/DIG HNO3
F051	121.00	12.100	10	EL		ICP-MS
F076	123.50	12.350	10			ICP-MS
F046	128.00	12.800	10			ICP
F008	53.50	13.375	4		INSUFFICIENT DATA	ICP
F069	134.00	13.400	10			ICP/MS
F010	146.00	14.600	10			ICP
F025	122.00	15.250	8	H		ICP
F001	161.00	16.100	10			ICPMS
F059	134.00	16.750	8			ICP
F091	152.50	16.944	9			ICP
F014	172.00	17.200	10			
F088	174.00	17.400	10			ICP-MS
F035	143.00	17.875	8	VLVH		ICP-AES
F009	179.00	17.900	10			ICP(5)
F003	180.00	18.000	10			ICP
F030	183.50	18.350	10	VH		ICP
F015	198.50	19.850	10			ICP
F019	193.00	21.444	9			ICP
F038	178.00	22.250	8			ICP
F043	253.00	25.300	10		BIASED HIGH	ICPMS
F061	232.00	25.778	9	HHHH	BIASED HIGH	ICP
F016	278.50	27.850	10	EHHVHVHVH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 14.965

Barium

PARAMETER: 82091 Lead mg/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .0020 BASIC ACCEPTABLE ERROR= .0020 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	.0011	14.00	.003	12.00	.0045	8.50	.0034	11.00	.013	5.00	.022	10.00
F003	.0009	1.00	.0024	5.00	.0042	6.00	.0027	4.00	.0128	4.00	.024	18.50
F008	<.002	0.00	.0025	6.00	.0045	8.50	.0030	7.00	.0140	11.50	.0225	12.50
F009	.001	7.00	.003	12.00	.005	14.00	.004	18.50	.015	19.00	.024	18.50
F010	.0010	7.00	.0028	7.00	.0042	6.00	.0031	10.00	.014	11.50	.10 EH	25.00
F011	.0011	14.00	.0032	18.00	.0052	18.00	.0038	15.50	.015	19.00	.0225	12.50
F013	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00
F014	.001T	7.00	.0040	20.50	.0056	19.00	.0040	18.50	.0145	16.00	.0231	16.00
F015	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00
F016	.01 EH	18.00	.01 EH	23.00	.02 EH	23.00	.02 EH	22.50	.03 EH	25.00	.04 EH	23.50
F019	<.03	0.00	<.03	0.00	<.03	0.00	<.03	0.00	<.03	0.00	<.03	0.00
F020	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	.02 VH	22.50	.024	18.50
F024	.001	7.00	.004	20.50	.007	21.50	.005	21.00	.022 EH	24.00	.033 EH	22.00
F025	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00
F030	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	.02 VH	22.50	<.02	0.00
F031	.001	7.00	.003	12.00	.005	14.00	.004	18.50	.014	11.50	.025	21.00
F032	<.002	0.00	.005	22.00	.007	21.50	.003	7.00	.014	11.50	.023	14.50
F033	<.002	0.00	.0029	8.00	.0042	6.00	<.002	0.00	.0141	15.00	.0199	3.00
F035	<.03	0.00	<.03	0.00	<.03	0.00	<.03	0.00	<.03	0.00	<.06	0.00
F038	.001	7.00	.003	12.00	.005	14.00	.003	7.00	.015	19.00	.023	14.50
F043	.001	7.00	.003	12.00	.006	20.00	.004	18.50	.015	19.00	.024	18.50
F046	.001	7.00	.003	12.00	.005	14.00	.003	7.00	.015	19.00	.020	5.50
F048	.0012	16.50	.0032	18.00	.0051	17.00	.0038	15.50	.0140	11.50	.0200	5.50
F051	.0012	16.50	.0032	18.00	.0050	14.00	.0037	14.00	.0133	7.00	.0214	8.00
F059	.001	7.00	.002	3.00	.004	3.00	.002	2.50	.010 L	2.00	.018 L	1.50
F061	<.05	0.00	<.05	0.00		0.00	<.05	0.00	.055 EH	27.00	<.05	0.00
F069	<.001	0.00	.002	3.00	.004	3.00	.002	2.50	.011	3.00	.020	5.50
F071	.001	7.00	.001	1.00	.002 L	1.00	.001 L	1.00	.001 EL	1.00	.020	5.50
F076	.0010	7.00	.0030	12.00	.0049	11.00	.0035	13.00	.0137	8.00	.0218	9.00
F080	<.002	0.00	.002	3.00	.004	3.00	.003	7.00	.014	11.50	.018 L	1.50
F088	.0011	14.00	.0030	16.00	.0046	10.00	.0035	12.00	.0132	6.00	.0222	11.00
F089	.03T EH	19.00	.02T EH	24.00	.03T EH	24.00	.02T EH	22.50	.04T EH	26.00	.04T EH	23.50
F091	<.07	0.00	<.07	0.00	<.07	0.00	<.07	0.00	<.07	0.00	<.07	0.00
MEDIAN CONC.	.0010		.0030		.0050		.0035		.0140		.0225	

PARAMETER: 82091 Lead mg/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.123	13.50	.065	15.00	.184	17.00	.379	14.50
F003	.135	29.00	.070	22.50	.196	28.00	.398	25.00
F008	.12	9.50	.066	17.00	.19	22.50	.38	17.50
F009	.11 L	3.00	.065	15.00	.180	12.50	.34 L	5.00
F010	.15 VH	32.00	.083 EH	29.00	.21 H	31.50	.41	30.50
F011	.124	15.50	.0684	20.00	.186	18.00	.370	10.50
F013	.134	28.00	.070	22.50	.192	26.00	.380	17.50
F014	.146 H	31.00	.075 H	25.50	.181	14.50	.383	20.00
F015	.13	24.50	.08 VH	27.50	.18	12.50	.37	10.50
F016	.14 H	30.00	.10 EH	30.00	.22 VH	33.00	.40	27.50
F019	.13	24.50	.07	22.50	.17	6.00	.35	6.00
F020	.12	9.50	.06	6.50	.19	22.50	.38	17.50
F024	.12	9.50	.060	6.50	.19	22.50	.39	22.50
F025	.12	9.50	.06	6.50	.17	6.00	.38	17.50
F030	.13	24.50	.06	6.50	.19	22.50	.37	10.50
F031	.125	17.50	.075 H	25.50	.19	22.50	.39	22.50
F032	.129	21.00	.065	15.00	.194	27.00	.385	21.00
F033	.116	5.00	.0615	10.00	.173	8.50	.351	7.00
F035	.07 EL	1.00	<.06	0.00	.15 VL	3.00	.30 EL	3.00
F038	.125	17.50	.064	12.00	.170	6.00	.379	14.50
F043	.13	24.50	.070	22.50	.20	29.50	.41	30.50
F046	.13	24.50	.067	19.00	.200	29.50	.40	27.50
F048	.1148	4.00	.0598	3.00	.1793	11.00		0.00
F051	.1179	7.00	.0620	11.00	.1690	4.00	.0473 EL	2.00
F059	.127	20.00	.052 VL	2.00	.109 EL	1.00	.305 VL	4.00
F061	.173 EH	33.00	.145 EH	31.00	.190	22.50	<.05 EL	0.00
F069	.117	6.00	.060	6.50	.177	10.00	.372	13.00
F071	.124	15.50	.014 EL	1.00	.181	14.50	.018 EL	1.00
F076	.126	19.00	.0666	18.00	.182	16.00	.369	8.00
F080	.122	12.00	.060	6.50	.173	8.50	.370	10.50
F088	.123	13.50	.0647	13.00	.187	19.00	.395	24.00
F089	.13	24.50	.08 VH	27.50	.21 H	31.50	.40	27.50
F091	.10 VL	2.00	<.07	0.00	.14 EL	2.00	.40	27.50
MEDIAN CONC.	.1250		.0650		.1840		.3800	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	120.50	12.050	10			ICPMS
F003	143.00	14.300	10			ICP
F008	112.00	12.444	9			FLAME AA/GF
F009	124.50	12.450	10	L L		GF
F010	189.50	18.950	10	EHVHEHH		GFA-11-16,ICP-17-2
F011	161.00	16.100	10			
F013	94.00	23.500	4		INSUFFICIENT DATA	ICP
F014	188.00	18.800	10	H H		
F015	75.00	18.750	4	VH	INSUFFICIENT DATA	ICP
F016	255.50	25.550	10	EHEHEHEHEHEHH EHVH	BIASED HIGH	ICP
F019	59.00	14.750	4		INSUFFICIENT DATA	ICP
F020	97.00	16.167	6	VH		ICP
F024	177.00	17.700	10	EHEH		ICP-AES
F025	39.50	9.875	4		INSUFFICIENT DATA	ICP
F030	86.50	17.300	5	VH		AA
F031	172.00	17.200	10	H		GFAAS
F032	160.50	17.833	9			ICP-AES(20)
F033	62.50	7.813	8			ICP/DIG HNO3
F035	7.00	2.333	3	EL VLEL	INSUFFICIENT DATA	ICP-AES
F038	123.50	12.350	10			GFAAS
F043	202.00	20.200	10			ICPMS
F046	165.00	16.500	10			ICP/GFAA
F048	102.00	11.333	9			GFAAS
F051	101.50	10.150	10	EL		ICP-MS
F059	46.00	4.600	10	L L VLELVL	BIASED LOW	GFAA
F061	113.50	28.375	4	EH EHEH EL	INSUFFICIENT DATA	ICP
F069	52.50	5.833	9		BIASED LOW	ICP/MS
F071	48.50	4.850	10	L L EL EL EL	BIASED LOW	FURNACE-AA
F076	121.00	12.100	10			ICP-MS
F080	63.50	7.056	9	L	BIASED LOW	AA(6)
F088	138.50	13.850	10			ICP-MS
F089	250.00	25.000	10	EHEHEHEHEHEH VHH	BIASED HIGH	ICP
F091	31.50	10.500	3	VL EL	INSUFFICIENT DATA	ICP

OVERALL AVERAGE RANK IS 14.381

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F035	7.00	2.333	3	ELVLEL	INSUFFICIENT DATA	ICP-AES
F059	46.00	4.600	10	LLVLELVL	BIASED LOW	GFAA
F071	48.50	4.850	10	LLELELEL	BIASED LOW	FURNACE-AA
F069	52.50	5.833	9		BIASED LOW	ICP/MS
F080	63.50	7.056	9	L	BIASED LOW	AA(6)
F033	62.50	7.813	8			ICP/DIG HNO3
F025	39.50	9.875	4		INSUFFICIENT DATA	ICP
F051	101.50	10.150	10	EL		ICP-MS
F091	31.50	10.500	3	VLEL	INSUFFICIENT DATA	ICP
F048	102.00	11.333	9			GFAAS
F001	120.50	12.050	10			ICPMS
F076	121.00	12.100	10			ICP-MS
F038	123.50	12.350	10			GFAAS
F008	112.00	12.444	9			FLAME AA/GF
F009	124.50	12.450	10	LL		GF
F088	138.50	13.850	10			ICP-MS
F003	143.00	14.300	10			ICP
F019	59.00	14.750	4		INSUFFICIENT DATA	ICP
F011	161.00	16.100	10			
F020	97.00	16.167	6	VH		ICP
F046	165.00	16.500	10			ICP/GFAA
F031	172.00	17.200	10	H		GFAAS
F030	86.50	17.300	5	VH		AA
F024	177.00	17.700	10	EHEH		ICP-AES
F032	160.50	17.833	9			ICP-AES(20)
F015	75.00	18.750	4	VH	INSUFFICIENT DATA	ICP
F014	188.00	18.800	10	HH		
F010	189.50	18.950	10	EHVHEHH		GFA-11-16,ICP-17-2
F043	202.00	20.200	10			ICPMS
F013	94.00	23.500	4		INSUFFICIENT DATA	ICP
F089	250.00	25.000	10	EHEHEHEHEHEHVHH	BIASED HIGH	ICP
F016	255.50	25.550	10	EHEHEHEHEHEHHEHVH	BIASED HIGH	ICP
F061	113.50	28.375	4	EHEHEHEL	INSUFFICIENT DATA	ICP

OVERALL AVERAGE RANK IS 14.381

Lead

PARAMETER: 33095 Arsenic ug/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= 1.0000 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
F001	103.	11.00	3.3	12.00	2.3	9.50	9.7	7.00	4.4	9.00	4.9	4.00
F003	105.	14.00	3.9	17.00	2.4	12.50	9.6	6.00	4.6	10.00	5.1	9.50
F008	95.	6.00	3.0	6.50	2.0	6.00	10.	12.00	5.	16.00	5.	7.00
F009	9.3 EL	1.00	3.0	6.50	1.5	3.00	8.5	3.00	5.5	21.00	5.0	7.00
F010	105.	14.00	3.6	14.00	2.4	12.50	10.	12.00	4.8	12.00	5.3	12.00
F011	109.0	17.00	3.4	13.00	2.6	16.00	10.0	12.00	4.9	14.00	5.4	14.00
F014	89.0	4.00	0.0T EL	1.00	0.0T VL	1.00	3.6 EL	1.00	1.4T EL	1.00	3.7	1.00
F015	110.	18.50	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00
F016	105.	14.00	5.84 VH	21.00	2.24	8.00	11.4	19.00	5.33	20.00	6.09	22.00
F020	100.	8.00		0.00		0.00		0.00		0.00	5.4	14.00
F025	96.	7.00	3.	6.50	2.7	17.00	11.1	18.00	5.1	18.00	5.6	17.50
F030	110.	18.50	3.	6.50	3.	21.00	10.	12.00	4.	5.00	6.	20.00
F031	9.8 EL	2.00	2.4	3.00	1.7	4.00	8.6	4.00	3.2	2.00	4.5	3.00
F035	92.2	5.00	2.7	4.00	2.	6.00	8.3	2.00	3.9	3.00	5.	7.00
F038	133. VH	23.00	3.1	9.50	2.3	9.50	10.8	15.00	4.3	7.00	5.1	9.50
F043	120.	21.00	3.8	15.00	2.9	20.00	11.0	17.00	5.3	19.00	6.0	20.00
F046	107.	16.00	4.0	18.50	2.	6.00	12.0	20.00	5.0	16.00	6.0	20.00
F051	103.2	12.00	3.88	16.00	2.74	18.00	9.57	5.00	4.66	11.00	5.15	11.00
F069	39. EL	3.00	4.0	18.50	2.5	14.50	10.9	16.00	4.0	5.00	5.4	14.00
F076	102.	10.00	3.26	11.00	2.33	11.00	9.82	9.00	4.31	8.00	4.93	5.00
F080	114.	20.00	<7.	0.00	<7.	0.00	<7. L	0.00	<7.	0.00	11.7 EH	23.00
F088	141. EH	24.00	4.40	20.00	2.79	19.00	12.6 H	21.00	4.89	13.00	5.42	16.00
F089	121. H	22.00	2.T	2.00	1.T L	2.00	10.	12.00	5.	16.00	4.	2.00
F091	101.5	9.00	3.1	9.50	2.5	14.50	9.8	8.00	4.0	5.00	5.6	17.50
MEDIAN CONC.	104.1000		3.2600		2.3300		10.0000		4.6600		5.3000	

PARAMETER: 33095 Arsenic ug/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	9.4	12.00	15.3	10.00	7.4	6.00	27.0	7.00
F003	9.3	9.00	16.0	13.50	7.5	8.00		0.00
F008	10.	16.50	15.	8.50	13. EH	22.00	27.	7.00
F009	9.0	6.00	14.5	5.50	8.0	15.00	26.	5.00
F010	10.	16.50	16.	13.50	8.1	17.00	27.	7.00
F011	9.4	12.00	17.4	20.00	7.5	8.00	33.6 H	22.00
F014	8.6	2.00	12.5 L	1.00	6.5	2.00	28.5	13.00
F015	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00
F016	11.8 H	23.00	30.3 EH	23.00	7.93	13.00	32.9	19.00
F020	.9 EL	1.00	16.6	16.00	7.9	12.00	23.1	3.00
F025	10.5	20.00	14.5	5.50	7.5	8.00	28.	12.00
F030	10.	16.50	17.	18.00	9.	20.00	24.	4.00
F031	9.	6.00	14.	3.00	8.	15.00	30.	16.00
F035	8.9	4.00	13.8	2.00	6.	1.00	29.2	15.00
F038	10.3	19.00	21.1 VH	22.00	10.5 H	21.00	32.1	18.00
F043	11.0	22.00	17.0	18.00	8.5	19.00	33.0 H	20.50
F046	10.0	16.50	17.0	18.00	8.0	15.00	29.0	14.00
F051	9.33	10.00	15.0	8.50	7.56	10.00	12.8 EL	1.00
F069	8.7	3.00	15.5	11.00	6.7	3.00	18.0 VL	2.00
F076	9.12	8.00	14.9	7.00	7.11	5.00	27.3	9.50
F080	9.9	14.00	14.4	4.00	<7.	0.00	27.3	9.50
F088	10.6	21.00	16.4	15.00	8.27	18.00	31.0	17.00
F089	9.	6.00	19.	21.00	7.	4.00	33. H	20.50
F091	9.4	12.00	15.9	12.00	7.7	11.00	27.8	11.00
MEDIAN CONC.	9.4000		15.9000		7.8000		27.9000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	87.50	8.750	10			ICPMS
F003	99.50	11.056	9			ICP
F008	107.50	10.750	10	EH		HYDRIDE AA
F009	73.00	7.300	10	EL		AA-HYD
F010	130.50	13.050	10			Hydrure A.A.
F011	148.00	14.800	10	H		
F014	27.00	2.700	10	ELVLELEL L	BIASED LOW	
F015	18.50	18.500	1		INSUFFICIENT DATA	ICP
F016	182.00	18.200	10	VH H EH	BIASED HIGH	HYDRIDE
F020	54.00	9.000	6	EL		HYDRIDE FAA
F025	129.50	12.950	10			AA
F030	141.50	14.150	10			AA
F031	58.00	5.800	10	EL	BIASED LOW	HGAAS
F035	49.00	4.900	10		BIASED LOW	Hydride AAS
F038	153.50	15.350	10	VH VHH		HVAAS
F043	191.50	19.150	10	H	BIASED HIGH	ICPMS
F046	160.00	16.000	10			GFAA
F051	102.50	10.250	10	EL		ICP-MS
F069	90.00	9.000	10	EL VL		HYDRIDE
F076	83.50	8.350	10			ICP-MS
F080	70.50	14.100	5	L EH		HG-ICP
F088	184.00	18.400	10	EH H	BIASED HIGH	ICP-MS
F089	107.50	10.750	10	H L H		GF
F091	109.50	10.950	10			AUTOMATED HYDRIDE

OVERALL AVERAGE RANK IS 11.575

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F014	27.00	2.700	10	ELVLELELL	BIASED LOW	
F035	49.00	4.900	10		BIASED LOW	Hydride AAS
F031	58.00	5.800	10	EL	BIASED LOW	HGAAS
F009	73.00	7.300	10	EL		AA-HYD
F076	83.50	8.350	10			ICP-MS
F001	87.50	8.750	10			ICPMS
F020	54.00	9.000	6	EL		HYDRIDE FAA
F069	90.00	9.000	10	ELVL		HYDRIDE
F051	102.50	10.250	10	EL		ICP-MS
F008	107.50	10.750	10	EH		HYDRIDE AA
F089	107.50	10.750	10	HLH		GF
F091	109.50	10.950	10			AUTOMATED HYDRIDE
F003	99.50	11.056	9			ICP
F025	129.50	12.950	10			AA
F010	130.50	13.050	10			Hydrure A.A.
F080	70.50	14.100	5	LEH		HG-ICP
F030	141.50	14.150	10			AA
F011	148.00	14.800	10	H		
F038	153.50	15.350	10	VHVHH		HVAAS
F046	160.00	16.000	10			GFAA
F016	182.00	18.200	10	VHHEH	BIASED HIGH	HYDRIDE
F088	184.00	18.400	10	EHH	BIASED HIGH	ICP-MS
F015	18.50	18.500	1		INSUFFICIENT DATA	ICP
F043	191.50	19.150	10	H	BIASED HIGH	ICPMS

OVERALL AVERAGE RANK IS 11.575

Arsenic

PARAMETER: 34095 Selenium ug/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= 1.0000 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
F001	<.1	0.00	4.8	3.50	3.8	3.50	1.1	3.50	7.6	12.00	3.3	8.00
F003	.1	1.50	4.8	3.50	3.9	6.50	1.2	6.00	6.4	2.00	3.1	6.50
F008	<1.	0.00	5.	8.00	4.	11.00	2.	14.50	8.	15.50	3.	3.00
F009	<1.	0.00	6.0	19.00	6.5 VH	20.00	2.0	14.50	9.0	19.00	4.0	16.00
F010	<.5	0.00	4.9	5.00	4.0	11.00	1.2	6.00	7.7	13.50	3.0	3.00
F011	<1.	0.00	5.2	13.00	3.8	3.50	1.5	12.00	7.2	7.50	3.4	9.50
F015	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00
F016	.1	1.50	4.38	1.00	4.96	17.00	.95	1.00	8.4	17.00	7.17 EH	21.00
F020		0.00		0.00		0.00		0.00		0.00	4.5	19.00
F025	<.2	0.00	4.4	2.00	3.7	2.00	1.2	6.00	6.4	2.00	3.0	3.00
F030	<2.	0.00	6.	19.00	4.	11.00	<2.	0.00	7.	6.00	3.	3.00
F031	<.2	0.00	5.0	8.00	4.0	11.00	1.5	12.00	7.5	10.00	4.0	16.00
F035	<.2	0.00	5.2	13.00	4.2	14.00	1.5	12.00	7.5	10.00	3.7	14.00
F038	<.5	0.00	5.2	13.00	3.9	6.50	1.1	3.50	7.5	10.00	3.4	9.50
F043	<2.	0.00	5.	8.00	4.	11.00	<2.	0.00	8.	15.50	3.	3.00
F046	<1.	0.00	5.0	8.00	5.0	18.00	1.0	2.00	9.0	19.00	5.0 H	20.00
F051	<1.	0.00	5.36	16.00	4.61	16.00	1.34	9.00	6.90	5.00	3.59	13.00
F069	<1.	0.00	5.0	8.00	3.3	1.00	1.4	10.00	6.8	4.00	3.5	11.00
F076	<2.00	0.00	5.30	15.00	4.23	15.00	<2.00	0.00	7.70	13.50	3.51	12.00
F080	<3.	0.00	5.1	11.00	3.9	6.50	<3.	0.00	7.2	7.50	4.2	18.00
F089	1.T	3.00	6.	19.00	6. H	19.00	3.T VH	16.00	9.	19.00	4.T	16.00
F091	<.2	0.00	5.6	17.00	3.9	6.50	1.3	8.00	6.4	2.00	3.1	6.50
MEDIAN OR CONC.	*TARGET *.1000		5.0500		4.0000		1.3200		7.5000		3.5000	

PARAMETER: 34095 Selenium ug/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	7.2	7.50	11.1	19.00	13.5	13.00	22.5	12.00
F003	6.8	4.00	9.0	3.50	12.4	5.00	21.4	9.50
F008	8.	17.00	10.	10.50	14.	16.50	23.	14.00
F009	9.0	20.00	9.0	3.50	13.5	13.00	20.	6.00
F010	7.1	6.00	9.8	7.00	12.	3.50	19.	3.50
F011	7.2	7.50	10.2	15.50	12.8	9.00	20.8	7.50
F015	<50.	0.00	<50.	0.00	<50.	0.00	50. EH	22.00
F016	7.74	13.00	16.9 EH	21.00	17.3 H	21.00	20.8	7.50
F020	9.1	21.00	3.8 EL	1.00	14.4	18.00	21.4	9.50
F025	5.6 L	1.00	7.2 L	2.00	9.7 L	1.00	9.3 EL	1.00
F030	7.	5.00	10.	10.50	12.	3.50	19.	3.50
F031	8.	17.00	10.	10.50	15.	19.50	25.	20.00
F035	7.7	11.00	9.7	6.00	12.7	8.00	19.8	5.00
F038	7.9	14.00	10.8	18.00	13.9	15.00	22.3	11.00
F043	8.	17.00	10.	10.50	15.	19.50	24.	18.50
F046	8.0	17.00	12.0	20.00	14.0	16.50	23.0	14.00
F051	7.60	9.50	10.0	10.50	13.1	11.00	23.9	17.00
F069	6.5	3.00	10.1	14.00	11.6	2.00	26.0	21.00
F076	7.72	12.00	10.7	17.00	13.5	13.00	23.3	16.00
F080	7.6	9.50	10.2	15.50	12.5	6.50	23.0	14.00
F089	8.	17.00	10.	10.50	13.	10.00	24.	18.50
F091	6.4	2.00	9.5	5.00	12.5	6.50	17.2 L	2.00
MEDIAN OR *TARGET CONC.	7.7000		10.0000		13.1000		22.4000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	82.00	9.111	9			HGAAS/ICPMS
F003	48.00	4.800	10		BIASED LOW	ICP
F008	110.00	12.222	9			HYDRIDE AA
F009	131.00	14.556	9	VH		AA-HYD
F010	58.50	6.500	9			Hydrure A.A.
F011	85.00	9.444	9			
F015	22.00	22.000	1	EH	INSUFFICIENT DATA	ICP
F016	121.00	12.100	10	EH EHH		HYDRIDE
F020	68.50	13.700	5	EL		HYDRIDE FAA
F025	20.00	2.222	9	L L L EL	BIASED LOW	AA
F030	61.50	7.688	8			AA
F031	124.00	13.778	9			HGAAS
F035	93.00	10.333	9			Hydride AAS
F038	100.50	11.167	9			HVAAS
F043	103.00	12.875	8			ICPMS
F046	134.50	14.944	9	H		GFAA
F051	107.00	11.889	9			ICP-MS
F069	74.00	8.222	9			HYDRIDE
F076	113.50	14.188	8			ICP-MS
F080	88.50	11.063	8			HG-ICP
F089	148.00	14.800	10	H VH		GF
F091	55.50	6.167	9	L		AUTOMATED HYDRIDE

OVERALL AVERAGE RANK IS 10.535

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F025	20.00	2.222	9	LLLEL	BIASED LOW	AA
F003	48.00	4.800	10		BIASED LOW	ICP
F091	55.50	6.167	9	L		AUTOMATED HYDRIDE
F010	58.50	6.500	9			Hydrure A.A.
F030	61.50	7.688	8			AA
F069	74.00	8.222	9			HYDRIDE
F001	82.00	9.111	9			HGAAS/ICPMS
F011	85.00	9.444	9			
F035	93.00	10.333	9			Hydride AAS
F080	88.50	11.063	8			HG-ICP
F038	100.50	11.167	9			HVAAS
F051	107.00	11.889	9			ICP-MS
F016	121.00	12.100	10	EHEHH		HYDRIDE
F008	110.00	12.222	9			HYDRIDE AA
F043	103.00	12.875	8			ICPMS
F020	68.50	13.700	5	EL		HYDRIDE FAA
F031	124.00	13.778	9			HGAAS
F076	113.50	14.188	8			ICP-MS
F009	131.00	14.556	9	VH		AA-HYD
F089	148.00	14.800	10	HVH		GF
F046	134.50	14.944	9	H		GFAA
F015	22.00	22.000	1	EH	INSUFFICIENT DATA	ICP

OVERALL AVERAGE RANK IS 10.535

Selenium

PARAMETER: 47095 Silver ug/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
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NWRI Ecosystem Interlab QA for Trace Metals

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

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	0.00	2.7	10.00	.93	8.00	3.5	9.50	8.2	8.50	5.8	6.50
F003	<.1	0.00	2.5	8.00	.9	5.50	3.4	8.00	8.2	8.50	5.8	6.50
F011	<.1	0.00	2.60	9.00	.90	5.50	3.50	9.50	8.40	11.00	5.70	4.00
F015	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00
F016		0.00		0.00		0.00		0.00		0.00		0.00
F020		0.00		0.00		0.00		0.00		0.00	6.2	13.00
F025	<2.	0.00	2.	1.50	<2.	0.00	3.	3.00	8.	6.50	6.	11.00
F030	<2.	0.00	<2.	0.00	<2.	0.00	2.	1.00	6.	2.00	<2. L	0.00
F033	<.5	0.00	2.47	7.00	.69	2.50	3.05	4.00	7.87	3.00	5.38	2.00
F035	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	<20.	0.00
F038	<.1	0.00	2.0	1.50	.8	4.00	2.5	2.00	8.0	6.50	5.8	6.50
F043	<.2	0.00	2.8	12.00	1.0	10.50	3.6	12.00	8.7	12.00	6.4	14.00
F046	<1.	0.00	3.0	13.00	1.0	10.50	4.0	14.00	10.0	15.00	8.0	15.00
F051	.1504	2.00	2.35	6.00	.92	7.00	3.25	5.00	7.92	4.00	5.83	9.00
F059	<1.	0.00	<1.	0.00	<1.	0.00	<1.	0.00	1. VL	1.00	1. VL	1.00
F061	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00
F069	<1.	0.00	2.32	4.00	<1.	0.00	3.34	6.00	8.93	14.00	5.80	6.50
F076	<.10	0.00	2.34	5.00	.690	2.50	3.36	7.00	8.28	10.00	5.51	3.00
F080	<1.	0.00	2.20	3.00	.51	1.00	3.52	11.00	7.99	5.00	5.93	10.00
F088	.002	1.00	2.75	11.00	.978	9.00	3.86	13.00	8.83	13.00	6.01	12.00
F091	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00
MEDIAN OR *TARGET CONC.	*.0020		2.4700		.9000		3.3800		8.2000		5.8000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	10.7	12.00	17.1	6.00	12.7	12.00	27.6	5.00
F003	10.6	10.50	17.0	4.00	12.0	6.00	32.0	17.00
F011	10.30	6.00	17.40	9.00	12.20	8.50	31.00	12.00
F015	10.	3.50	20.	16.00	10.	3.50	30.	9.00
F016	20. EH	18.00	20.	16.00	10.	3.50	10. VL	2.00
F020	10.4	7.50	19.4	14.00	13.1	17.00	28.1	8.00
F025	10.	3.50	16.	2.00	12.	6.00	32.	17.00
F030	8.	2.00	13.	1.00	8.	2.00	9. EL	1.00
F033	10.4	7.50	17.2	7.50	12.0	6.00	31.0	12.00
F035	<20.	0.00	<20.	0.00	<20.	0.00	<20.	0.00
F038	11.0	14.00	18.0	10.50	14.0	18.00	28.0	6.50
F043	12.0	16.00	19.	13.00	13.0	15.50	32.0	17.00
F046	13.0	17.00	20.0	16.00	13.0	15.50	31.0	12.00
F051	10.60	10.50	17.0	4.00	12.3	10.00	25.5	4.00
F059	1. EL	1.00	<1. EL	0.00	3. VL	1.00	28.	6.50
F061	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00
F069	10.8	13.00	18.0	10.50	12.5	11.00	30.9	10.00
F076	10.5	9.00	17.2	7.50	12.2	8.50	31.7	14.00
F080	10.2	5.00	17.0	4.00	12.8	13.50	21.4	3.00
F088	11.5	15.00	18.4	12.00	12.8	13.50	31.9	15.00
F091	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00
MEDIAN OR *TARGET CONC.	10.5500		17.4000		12.2500		30.4500	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	77.50	8.611	9			ICPMS
F003	74.00	8.222	9			AA
F011	74.50	8.278	9			
F015	32.00	8.000	4		INSUFFICIENT DATA	ICP
F016	39.50	9.875	4	EH VL	INSUFFICIENT DATA	ICP
F020	59.50	11.900	5			GFAA
F025	50.50	6.313	8			ICP
F030	9.00	1.500	6	L EL	BIASED LOW	ICP
F033	51.50	5.722	9			ICP/DIG HNO3
F035	0.00	-	0		INSUFFICIENT DATA	ICP-AES
F038	69.50	7.722	9			GFAAS
F043	122.00	13.556	9		BIASED HIGH	ICPMS
F046	128.00	14.222	9		BIASED HIGH	GFAA
F051	61.50	6.150	10			ICP-MS
F059	10.50	2.100	5	VLVLELELVL	BIASED LOW	GFAA
F061	0.00	-	0		INSUFFICIENT DATA	ICP
F069	75.00	9.375	8			ICP/MS
F076	66.50	7.389	9			ICP-MS
F080	55.50	6.167	9			AA(6)
F088	114.50	11.450	10			ICP-MS
F091	0.00	-	0		INSUFFICIENT DATA	ICP

OVERALL AVERAGE
RANK IS 8.305

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F035	0.00	-	0		INSUFFICIENT DATA	ICP-AES
F061	0.00	-	0		INSUFFICIENT DATA	ICP
F091	0.00	-	0		INSUFFICIENT DATA	ICP
F030	9.00	1.500	6	LEL	BIASED LOW	ICP
F059	10.50	2.100	5	VLVLELELVL	BIASED LOW	GFAA
F033	51.50	5.722	9			ICP/DIG HNO3
F051	61.50	6.150	10			ICP-MS
F080	55.50	6.167	9			AA(6)
F025	50.50	6.313	8			ICP
F076	66.50	7.389	9			ICP-MS
F038	69.50	7.722	9			GFAAS
F015	32.00	8.000	4		INSUFFICIENT DATA	ICP
F003	74.00	8.222	9			AA
F011	74.50	8.278	9			
F001	77.50	8.611	9			ICPMS
F069	75.00	9.375	8			ICP/MS
F016	39.50	9.875	4	EHVL	INSUFFICIENT DATA	ICP
F088	114.50	11.450	10			ICP-MS
F020	59.50	11.900	5			GFAA
F043	122.00	13.556	9		BIASED HIGH	ICPMS
F046	128.00	14.222	9		BIASED HIGH	GFAA

OVERALL AVERAGE
RANK IS 8.305

PARAMETER: 51095 Antimony ug/L

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NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.5000 BASIC ACCEPTABLE ERROR= 1.5000 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	.14	3.00	3.8	7.00	2.9	6.00	4.3	6.00	1.5	6.00	4.2	5.50
F011	<.5	0.00	4.3	11.00	3.4	12.00	4.9	11.00	1.7	10.50	4.8	13.00
F014	0.0T	1.00	3.0	3.00	2.0T	1.00	4.5	7.00	0.0T L	1.00	4.2	5.50
F015	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00
F016		0.00	30. EH	16.00	50. EH	17.00	10. EH	16.00		0.00		0.00
F020		0.00		0.00		0.00		0.00		0.00	6.	15.00
F025	<.2	0.00	2.9	2.00	3.8	13.00	4.6	8.00	1.6	8.00	4.4	8.50
F031	.1	2.00	4.2	10.00	3.0	7.50		0.00	1.7	10.50	4.5	11.00
F035	.3	6.00	3.5	6.00	2.7	5.00	4.1	5.00	1.4	5.00	3.5	2.00
F038	.2	5.00	3.3	4.50	2.5	3.00	3.9	4.00	1.3	3.50	4.0	3.50
F043	<.2	0.00	4.8	13.00	4.0	14.50	5.2	14.00	1.8	13.00	5.3	14.00
F046	<1.	0.00	9.0 EH	15.00	3.0	7.50	5.0	13.00	1.0	2.00	7.0 H	16.00
F051	.3459	7.00	6.91 VH	14.00	4.69	16.00	8.06 VH	15.00	2.63	15.00	7.43 VH	17.00
F059	<1.	0.00	<1. VL	0.00	4.	14.50	2. L	2.00	2.	14.00	4.	3.50
F069	<1.	0.00	3.97	8.00	3.32	10.00	4.63	9.50	1.77	12.00	4.72	12.00
F076	<.500	0.00	4.01	9.00	3.09	9.00	4.63	9.50	1.68	9.00	4.46	10.00
F080	<.5	0.00	1.6 L	1.00	2.1	2.00	1.8 L	1.00	<.5	0.00	2.2 L	1.00
F088	.146	4.00	4.40	12.00	3.39	11.00	4.96	12.00	1.53	7.00	4.23	7.00
F091	<.5	0.00	3.3	4.50	2.6	4.00	3.8	3.00	1.3	3.50	4.4	8.50
MEDIAN CONC.	.1460		3.9900		3.0900		4.6150		1.6000		4.4000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	6.0	5.00	13.3	6.00	12.0	6.50	19.9	8.00
F011	6.6	9.50	14.6	9.00	13.0	9.00	20.1	12.00
F014	4.8	2.00	10.3 L	2.00	9.8	2.00	15.6 L	2.00
F015	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00
F016		0.00		0.00		0.00		0.00
F020	8.	15.00	22. EH	15.50	18. VH	16.00	29. EH	16.00
F025	6.9	11.00	17.5	14.00	14.5	14.00	20.	10.00
F031	7.	12.50	15.	11.00	13.	9.00	20.	10.00
F035	5.2	3.00	12.4	5.00	11.7	5.00	17.6	5.00
F038	5.3	4.00	11.6	3.00	10.2	3.00	15.8	3.00
F043	7.3	14.00	15.5	12.00	14.0	13.00	21.5	13.00
F046	7.0	12.50	16.0	13.00	15.0	15.00	22.0	14.00
F051	10.20 VH	16.00	22.0 EH	15.50	19.6 EH	17.00	80.4 EH	17.00
F059	12. EH	17.00	23. EH	17.00	13.	9.00	27. VH	15.00
F069	6.39	8.00	14.5	8.00	13.4	11.50	19.3	7.00
F076	6.30	7.00	13.5	7.00	12.0	6.50	18.8	6.00
F080	3.4 L	1.00	7.2 EL	1.00	6.3 EL	1.00	10.5 EL	1.00
F088	6.09	6.00	12.3	4.00	11.4	4.00	16.8	4.00
F091	6.6	9.50	14.9	10.00	13.4	11.50	20.0	10.00
MEDIAN CONC.	6.6000		14.6000		13.0000		20.0000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	59.00	5.900	10			HGAAS/ICPMS
F011	97.00	10.778	9			
F014	26.50	2.650	10	L L L	BIASED LOW	
F015	0.00	-	0		INSUFFICIENT DATA	ICP
F016	49.00	16.333	3	EHEHEH	INSUFFICIENT DATA	HYDRIDE
F020	77.50	15.500	5	EHVHEH	BIASED HIGH	GFAA
F025	88.50	9.833	9			AA
F031	83.50	9.278	9			HGAAS
F035	47.00	4.700	10		BIASED LOW	Hydride AAS
F038	36.50	3.650	10		BIASED LOW	HVAAS
F043	120.50	13.389	9		BIASED HIGH	ICPMS
F046	108.00	12.000	9	EH H		GFAA
F051	149.50	14.950	10	VH VH VHVHEHEHEH	BIASED HIGH	ICP-MS
F059	92.00	11.500	8	VL L EHEH VH		GFAA
F069	86.00	9.556	9			ICP/MS
F076	73.00	8.111	9			ICP-MS
F080	9.00	1.125	8	L L L L ELELEL	BIASED LOW	HG-ICP
F088	71.00	7.100	10			ICP-MS
F091	64.50	7.167	9			AUTOMATED HYDRIDE

OVERALL AVERAGE
RANK IS 8.577

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F015	0.00	-	0		INSUFFICIENT DATA	ICP
F080	9.00	1.125	8	LLLLELELEL	BIASED LOW	HG-ICP
F014	26.50	2.650	10	LLL	BIASED LOW	
F038	36.50	3.650	10		BIASED LOW	HVAAS
F035	47.00	4.700	10		BIASED LOW	Hydride AAS
F001	59.00	5.900	10			HGAAS/ICPMS
F088	71.00	7.100	10			ICP-MS
F091	64.50	7.167	9			AUTOMATED HYDRIDE
F076	73.00	8.111	9			ICP-MS
F031	83.50	9.278	9			HGAAS
F069	86.00	9.556	9			ICP/MS
F025	88.50	9.833	9			AA
F011	97.00	10.778	9			
F059	92.00	11.500	8	VLLEHEHVH		GFAA
F046	108.00	12.000	9	EHH		GFAA
F043	120.50	13.389	9		BIASED HIGH	ICPMS
F051	149.50	14.950	10	VHVHVHVHEHEHEH	BIASED HIGH	ICP-MS
F020	77.50	15.500	5	EHVHEH	BIASED HIGH	GFAA
F016	49.00	16.333	3	EHEHEH	INSUFFICIENT DATA	HYDRIDE

OVERALL AVERAGE
RANK IS 8.577

PARAMETER: 83095 Bismuth ug/L

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BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 2.0000 BASIC ACCEPTABLE ERROR= 2.0000 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
F001	.01	1.00	1.5	4.00	.92	1.00	4.6	4.00	6.7	5.00	1.6	3.00
F011	.10	2.00	.70	1.00	1.50	3.00	3.50	2.00	5.30	4.00	1.70	4.00
F016		0.00		0.00		0.00		0.00	.01 EL	1.00		0.00
F038	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00
F043	<.2	0.00	.8	2.00	1.2	2.00	2.5	1.00	4.0	2.00	.7	2.00
F076	<.100	0.00	.941	3.00	1.58	4.00	3.52	3.00	5.22	3.00	.684	1.00
F080	<2.	0.00	<2.	0.00	2.9	5.00	5.0	5.00	6.9	6.00	2.4	5.00
F091	<50.	0.00	60. EH	5.00	70. EH	6.00	80. EH	6.00	70. EH	7.00	80. EH	6.00
MEDIAN OR *TARGET CONC.	*.0100		.9410		1.5400		4.0600		5.3000		1.6500	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	7.2	4.00	6.2	5.00	7.7	5.00	21.3	4.00
F011	4.90	2.00	5.50	3.00	5.80	2.00	17.70	2.00
F016	60. EH	6.00		0.00		0.00		0.00
F038	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00
F043	3.8 L	1.00	3.4	1.00	4.2	1.00	16.0	1.00
F076	5.68	3.00	4.90	2.00	5.90	3.00	19.8	3.00
F080	8.8	5.00	6.0	4.00	6.9	4.00	22.6	5.00
F091	70. EH	7.00	70. EH	6.00	70. EH	6.00	100. EH	6.00
MEDIAN OR *TARGET CONC.	7.2000		5.7500		6.4000		20.5500	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	36.00	3.600	10			ICPMS
F011	25.00	2.500	10		BIASED LOW	
F016	7.00	3.500	2	EL EH	INSUFFICIENT DATA	ICP
F038	0.00	-	0		INSUFFICIENT DATA	ICP
F043	13.00	1.444	9	L	BIASED LOW	ICPMS
F076	25.00	2.778	9			ICP-MS
F080	39.00	4.875	8			HG-ICP
F091	55.00	6.111	9	EHEHEHEHEHEHEHEHEH	BIASED HIGH	AA

OVERALL AVERAGE RANK IS 3.509

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F038	0.00	-	0		INSUFFICIENT DATA	ICP
F043	13.00	1.444	9	L	BIASED LOW	ICPMS
F011	25.00	2.500	10		BIASED LOW	
F076	25.00	2.778	9			ICP-MS
F016	7.00	3.500	2	ELEH	INSUFFICIENT DATA	ICP
F001	36.00	3.600	10			ICPMS
F080	39.00	4.875	8			HG-ICP
F091	55.00	6.111	9	EHEHEHEHEHEHEHEHEH	BIASED HIGH	AA

OVERALL AVERAGE
RANK IS 3.509

Bismuth

PARAMETER: 92095 Uranium ug/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 2.0000 BASIC ACCEPTABLE ERROR= 2.0000 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
F001	<.01	0.00	1.98	4.00		0.00	.088	1.00	.092	2.00	8.8	4.50
F010	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	8.	3.00
F011	<.1	0.00	1.9	2.00	3.0	3.00	.1	3.00	.1	3.00	6.9	1.00
F043	<.2	0.00	2.3	9.00	3.9	8.00	<.2	0.00	<.2	0.00	12.5 H	10.00
F046	<.05	0.00	2.1	7.00	3.3	6.00	.12	4.00	.09	1.00	8.8	4.50
F051	.1583	2.00	2.16	8.00	3.10	4.50	.1274	5.00	.1100	4.00	10.30	9.00
F069	<1.	0.00	1.83	1.00	2.72	1.00	<1.	0.00	<1.	0.00	9.13	6.00
F076	<.100	0.00	1.99	5.00	3.10	4.50	<.100	0.00	<.100	0.00	7.08	2.00
F080	<.2	0.00	2.0	6.00	3.5	7.00	<.2	0.00	<.2	0.00	9.4	8.00
F088	.010	1.00	1.96	3.00	2.99	2.00	.099	2.00	.117	5.00	9.18	7.00
MEDIAN OR *TARGET CONC.	*.0100		1.9900		3.1000		.1000		.1000		8.9650	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	4.9	5.00	32.7	8.00	21.9	7.00	14.8	5.00
F010	7.	10.00	31.	4.00	18.	1.00	15.	6.00
F011	4.6	3.00	31.2	6.50	20.4	4.50	14.1	3.00
F043	5.7	9.00	36.	10.00	24.	10.00	17.	9.00
F046	5.2	7.00	33.	9.00	22.	8.00	16.	7.00
F051	4.81	4.00	31.0	4.00	20.4	4.50	114.6 EH	10.00
F069	4.26	1.00	27.8	1.00	19.9	3.00	14.0	2.00
F076	4.96	6.00	31.2	6.50	20.6	6.00	14.7	4.00
F080	5.5	8.00	31.0	4.00	23.0	9.00	16.9	8.00
F088	4.54	2.00	28.9	2.00	18.8	2.00	13.4	1.00
MEDIAN OR *TARGET CONC.	4.9300		31.1000		20.5000		14.9000	

PARAMETER: 93095 Lithium ug/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.5000 BASIC ACCEPTABLE ERROR= 1.5000 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	.6	1.00	6.3	4.00	4.3	5.00	2.4	3.00	8.4	2.00	4.9	2.00
F003	.9	3.00	8.2	13.00	4.7	7.00	3.4	7.00	10.6	10.00	5.	4.50
F010	5. EH	8.00	8.	12.00	8. VH	11.00	4.	8.00	10.	8.50	7.	11.50
F011	1.00	4.50	6.80	7.00	4.40	6.00	2.70	5.00	9.80	6.00	5.50	9.00
F016	10. EH	9.00	10. H	15.00	10. EH	12.00	10. EH	10.00	20. EH	14.00	20. EH	14.00
F019	3.8 VH	7.00	6.6	5.50	7.1 H	10.00	17.8 EH	11.00	23.4 EH	15.00	16.9 EH	13.00
F025	<1.	0.00	7.	9.00	4.	2.50	2.	2.00	8.	1.00	5.	4.50
F030	<4.	0.00	6.	3.00	4.	2.50	<4.	0.00	9.	3.00	5.	4.50
F038	<15.	0.00	<15.	0.00	<15.	0.00	<15.	0.00	<15.	0.00	<15.	0.00
F043	2.	6.00	5.	2.00	3.5	1.00	1.5	1.00	10.	8.50	3.5	1.00
F046	1.0	4.50	9.0	14.00	6.0	9.00	5.0 H	9.00	13.0 H	13.00	7.0	11.50
F059	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00
F068		0.00	7.7	11.00		0.00		0.00	9.3	5.00		0.00
F069	<4.0	0.00	4.10 L	1.00	<4.	0.00	<4.	0.00	9.94	7.00	5.20	7.50
F076	.8	2.00	6.6	5.50	4.2	4.00	2.6	4.00	9.2	4.00	5.2	7.50
F080	<2.	0.00	7.0	9.00	5.0	8.00	3.0	6.00	11.0	11.50	6.0	10.00
F091	<5.	0.00	7.	9.00	<5.	0.00	<5.	0.00	11.	11.50	5.	4.50
MEDIAN CONC.	1.0000		7.0000		4.5500		3.0000		10.0000		5.2000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	7.4	4.50	15.3	4.50	11.	3.50	21.5	3.00
F003	8.	10.00	16.	10.00	12.	9.00	24.	13.50
F010	11. H	14.00	20. H	15.50	15.	13.00	22.	5.50
F011	7.40	4.50	15.50	7.00	11.50	7.00	21.70	4.00
F016	20. EH	15.00	20. H	15.50	20. EH	15.00	40. EH	16.00
F019	8.9	12.00	16.4	12.00	15.9 H	14.00	15.9 L	1.00
F025	7.	2.50	14.	1.50	10.	1.00	21.	2.00
F030	7.	2.50	15.	3.00	11.	3.50	22.	5.50
F038	<15.	0.00	17.	13.50	<15.	0.00	23.	10.50
F043	6.	1.00	14.	1.50	10.5	2.00	23.	10.50
F046	9.0	13.00	17.0	13.50	14.0	12.00	24.0	13.50
F059	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00
F068	7.5	6.00	15.3	4.50	11.3	5.50	22.6	8.00
F069	7.74	8.00	15.6	8.00	12.2	11.00	22.8	9.00
F076	7.7	7.00	15.4	6.00	11.3	5.50	22.5	7.00
F080	8.0	10.00	16.0	10.00	12.0	9.00	24.0	13.50
F091	8.	10.00	16.	10.00	12.	9.00	24.	13.50
MEDIAN CONC.	7.7400		15.8000		12.0000		22.7000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING			BIAS STATEMENT	METHOD CODING
F001	36.50	4.563	8					ICPMS
F010	24.00	4.800	5					ICP
F011	29.00	3.222	9					
F043	65.00	9.286	7		H		BIASED HIGH	ICPMS
F046	53.50	5.944	9					ICP-MS
F051	55.00	5.500	10			EH		ICP-MS
F069	15.00	2.143	7				BIASED LOW	ICP/MS
F076	34.00	4.857	7					ICP-MS
F080	50.00	7.143	7					SCINTREX
F088	27.00	2.700	10				BIASED LOW	ICP-MS

OVERALL AVERAGE RANK IS 4.924

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F069	15.00	2.143	7		BIASED LOW	ICP/MS
F088	27.00	2.700	10		BIASED LOW	ICP-MS
F011	29.00	3.222	9			
F001	36.50	4.563	8			ICPMS
F010	24.00	4.800	5			ICP
F076	34.00	4.857	7			ICP-MS
F051	55.00	5.500	10	EH		ICP-MS
F046	53.50	5.944	9			ICP-MS
F080	50.00	7.143	7			SCINTREX
F043	65.00	9.286	7	H	BIASED HIGH	ICPMS

OVERALL AVERAGE RANK IS 4.924

Uranium

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	32.50	3.250	10		BIASED LOW	ICPMS
F003	87.00	8.700	10			ICP
F010	107.00	10.700	10	EH VH H H		A.A.
F011	60.00	6.000	10			
F016	135.50	13.550	10	EHH EHEHEHEHEHH EHEH	BIASED HIGH	ICP
F019	100.50	10.050	10	VH H EHEHEH H L		ICP
F025	26.00	2.889	9		BIASED LOW	ICP
F030	27.50	3.438	8		BIASED LOW	ICP
F038	24.00	12.000	2		INSUFFICIENT DATA	ICP
F043	34.50	3.450	10		BIASED LOW	ICP-ES
F046	113.00	11.300	10	H H		AA
F059	0.00	-	0		INSUFFICIENT DATA	ICP
F068	40.00	6.667	6			IC
F069	51.50	7.357	7	L		ICP
F076	52.50	5.250	10			ICP-MS
F080	87.00	9.667	9			AA
F091	67.50	9.643	7			AA

OVERALL AVERAGE
RANK IS 7.580

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F059	0.00	-	0		INSUFFICIENT DATA	ICP
F025	26.00	2.889	9		BIASED LOW	ICP
F001	32.50	3.250	10		BIASED LOW	ICPMS
F030	27.50	3.438	8		BIASED LOW	ICP
F043	34.50	3.450	10		BIASED LOW	ICP-ES
F076	52.50	5.250	10			ICP-MS
F011	60.00	6.000	10			
F068	40.00	6.667	6			IC
F069	51.50	7.357	7	L		ICP
F003	87.00	8.700	10			ICP
F091	67.50	9.643	7			AA
F080	87.00	9.667	9			AA
F019	100.50	10.050	10	VHHEHEHEHHL		ICP
F010	107.00	10.700	10	EHVHHH		A.A.
F046	113.00	11.300	10	HH		AA
F038	24.00	12.000	2		INSUFFICIENT DATA	ICP
F016	135.50	13.550	10	EHHEHEHEHEHEHHEHEH	BIASED HIGH	ICP

OVERALL AVERAGE
RANK IS 7.580

PARAMETER: 94095 Berylium ug/L

AQUATIC ECOSYSTEM PROTECTION BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Trace Metals

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= 1.0000 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
F001	<.1	0.00	1.6	9.50	1.1	8.00	.43	1.00	3.5	9.00	8.4	12.50
F003	<.05	0.00	1.43	6.00	1.01	5.50	.46	2.00	3.19	7.00	8.6	14.00
F010	<1.	0.00	1.	1.50	<1.	0.00	<1.	0.00	3.	4.00	8.	7.00
F011	.1	1.00	1.7	11.00	1.3	10.00	.6	8.00	3.8	13.00	9.2	21.00
F015	<1.	0.00	2.	14.00	<1.	0.00	<1.	0.00	4.	16.50	9.	19.00
F016		0.00		0.00		0.00		0.00		0.00	10.	22.50
F019	<2.	0.00	<2.	0.00	<2.	0.00	<2.	0.00	<2. L	0.00	8.	7.00
F020	<1.	0.00	2.	14.00	1.	2.50	<1.	0.00	3.	4.00	8.	7.00
F025	<1.	0.00	2.	14.00	<1.	0.00	<1.	0.00	2. L	1.50	8.	7.00
F030	<1.	0.00	<1.	0.00	<1.	0.00	<1.	0.00	2. L	1.50	7.	2.50
F032	<.5	0.00	1.5	8.00	1.0	2.50	.5	4.50	3.3	8.00	8.3	11.00
F033	<.1	0.00	1.42	5.00	1.01	5.50	.47	3.00	3.14	6.00	7.90	4.00
F035	<.2	0.00	1.6	9.50	1.4	11.00	.5	4.50	3.6	11.00	8.4	12.50
F038	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	9.	19.00
F043	<1.	0.00	2.	14.00	1.	2.50	<1.	0.00	4.	16.50	10.	22.50
F046	<1.0	0.00	1.0	1.50	<1.0	0.00	<1.0	0.00	3.0	4.00	7.0	2.50
F051	<.5	0.00	1.40	4.00	1.08	7.00	.58	7.00	3.64	12.00	8.10	10.00
F061	7.6	2.00	<5.	0.00		0.00	7.7 EH	10.00	<5.	0.00	5.3 L	1.00
F069	<1.	0.00	1.38	3.00	<1.	0.00	<1.	0.00	3.95	14.00	8.90	17.00
F076	<.100	0.00	1.49	7.00	1.12	9.00	.548	6.00	3.54	10.00	8.81	16.00
F080	<7.	0.00	<7.	0.00	<7.	0.00	<7.	0.00	<7.	0.00	8.8	15.00
F089	.5W	0.00	2.	14.00	1.	2.50	1.	9.00	4.	16.50	8.	7.00
F091	<2.	0.00	<2.	0.00	<2.	0.00	<2.	0.00	4.	16.50	9.	19.00
MEDIAN CONC.			1.5500		1.0100		.5240		3.5200		8.4000	

PARAMETER: 94095 Berylium ug/L

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	6.0	10.00	25.3	11.00	11.8	8.00	17.1	6.00
F003	6.1	16.00	26.2	18.00	12.1	18.50	18.4	17.00
F010	6.	10.00	24.	4.50	11.	6.50	17.	4.50
F011	6.3	17.50	26.4	20.00	12.5	21.00	17.8	8.50
F015	6.	10.00	26.	14.50	12.	14.00	19.	19.00
F016	10. EH	21.00	30.	22.50	10.	3.00	20.	21.00
F019	6.	10.00	25.	9.00	12.	14.00	19.	19.00
F020	6.	10.00	25.	9.00	12.	14.00	18.	13.00
F025	6.	10.00	26.	14.50	12.	14.00	18.	13.00
F030	4. L	1.00	22.	2.00	10.	3.00	17.	4.50
F032	5.9	4.00	24.9	7.00	11.9	9.50	17.9	10.00
F033	5.48	2.00	23.8	3.00	11.0	6.50	16.5	3.00
F035	6.	10.00	26.1	17.00	11.9	9.50	18.2	16.00
F038	6.	10.00	26.	14.50	12.	14.00	18.	13.00
F043	7.	20.00	30.	22.50	14.	23.00	21.	22.00
F046	6.0	10.00	24.0	4.50	10.0	3.00	18.0	13.00
F051	5.70	3.00	24.2	6.00	12.2	20.00	23.8 VH	23.00
F061	<5.	0.00	28.6	21.00	8.3 L	1.00	14.3 L	1.00
F069	6.61	19.00	26.3	19.00	13.0	22.00	17.8	8.50
F076	6.30	17.50	25.9	12.00	12.1	18.50	17.5	7.00
F080	<7.	0.00	21.5	1.00	10.1	5.00	15.5	2.00
F089	6.	10.00	25.	9.00	12.	14.00	18.	13.00
F091	6.	10.00	26.	14.50	12.	14.00	19.	19.00
MEDIAN CONC.	6.0000		25.9000		12.0000		18.0000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	75.00	8.333	9			ICPMS
F003	104.00	11.556	9			ICP
F010	38.00	5.429	7			ICP
F011	131.00	13.100	10			
F015	107.00	15.286	7			ICP
F016	90.00	18.000	5	EH	BIASED HIGH	ICP
F019	59.00	11.800	5	L		ICP
F020	73.50	9.188	8			ICP
F025	74.00	10.571	7	L		ICP
F030	14.50	2.417	6	L L	BIASED LOW	ICP
F032	64.50	7.167	9			ICP-AES(20)
F033	38.00	4.222	9		BIASED LOW	ICP/DIG HNO3
F035	101.00	11.222	9			ICP-AES
F038	70.50	14.100	5			ICP
F043	143.00	17.875	8		BIASED HIGH	ICPMS
F046	38.50	5.500	7			ICP
F051	92.00	10.222	9	VH		ICP-MS
F061	36.00	6.000	6	EH L L L		ICP
F069	102.50	14.643	7			ICP/MS
F076	103.00	11.444	9			ICP-MS
F080	23.00	5.750	4		INSUFFICIENT DATA	ICP(6)
F089	95.00	10.556	9			ICP
F091	93.00	15.500	6			ICP

OVERALL AVERAGE RANK IS 10.388

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F030	14.50	2.417	6	LL	BIASED LOW	ICP
F033	38.00	4.222	9		BIASED LOW	ICP/DIG HNO3
F010	38.00	5.429	7			ICP
F046	38.50	5.500	7			ICP
F080	23.00	5.750	4		INSUFFICIENT DATA	ICP(6)
F061	36.00	6.000	6	EHLLL		ICP
F032	64.50	7.167	9			ICP-AES(20)
F001	75.00	8.333	9			ICPMS
F020	73.50	9.188	8			ICP
F051	92.00	10.222	9	VH		ICP-MS
F089	95.00	10.556	9			ICP
F025	74.00	10.571	7	L		ICP
F035	101.00	11.222	9			ICP-AES
F076	103.00	11.444	9			ICP-MS
F003	104.00	11.556	9			ICP
F019	59.00	11.800	5	L		ICP
F011	131.00	13.100	10			
F038	70.50	14.100	5			ICP
F069	102.50	14.643	7			ICP/MS
F015	107.00	15.286	7			ICP
F091	93.00	15.500	6			ICP
F043	143.00	17.875	8		BIASED HIGH	ICPMS
F016	90.00	18.000	5	EH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 10.388

Berylium

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