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Ecosystems Interlaboratory QA Program, Study FP64 for a Variety of Trace Metals in Water (Jan & Feb 1994)

H. Alkema

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

RESEARCH & APPLICATIONS BRANCH

FINAL REPORT

REPORT NO. AEPB-TN-94-02

ECOSYSTEMS INTERLABORATORY QUALITY ASSURANCE PROGRAM

FP/GLAP STUDY 64

for January and February 1994

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

April 1994

* the companion study (FP64) for Major Ions & Nutrients and Total P is Report AEPB-TN-94-01

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, P.O. Box 5050
Burlington, Ontario
L7R 4A6

15 April 1994

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

Re: Final Report for FP/GLAP Study FP64 - 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. (Please note that our area code is now 905.)

Yours truly,

Harry A.

H. Alkema
QA Chemist, Ecosystems QA Pgm

Attachment: Individual Laboratory Appraisal

Table of Contents

Table 1

ENVIRONMENT CANADA
National Water Research Institute

Ecosystem Interlaboratory Quality Assurance Program
PARTICIPATION LIST - Study FP/GLAP 64 (Jan & Feb '94)

Accutest Labs Ltd.
Alberta Environmental Centre
ASL Analytical Service Lab Ltd.
Barringer Laboratories Ltd.
Battelle Marine Sciences Lab
Can Test Ltd.
Chalk River Laboratories
Chemex Labs Alberta Inc.
Chemical & Geological Laboratories Inc.
City of Calgary
Edmonton Public Works
Elliot Lake Research Stn
Enviro Science & Engineering Inc. FL
Environment Canada - Atlantic Region
Environment Canada - Centre St. Laurent
Environment Canada - NLET
Environment Canada - Pacific & Yukon Region
Environment Canada - WQB, Western & Northern Region
Environment Canada - River Road, Ottawa
Environment Manitoba
Environment New Brunswick
Forestry Canada - Sault Ste Marie
Illinois State Water Survey (HWRIC)
Indian & Northern Affairs Canada
Lab Elite Ltée, PQ
Laboratoire de Santé, Publique du Québec
Ministère de l'Environnement du Québec - Laval
Ministère de l'Environnement du Québec - Ste. Foy
Norwest Labs (Edmonton)
NWQL USGS, Arvada, CO
Ontario Ministry of Environment - Dorset
Ontario Ministry of Environment - Rexdale
Ontario Ministry of Environment - Kingston
Ontario Ministry of Environment - London
Ontario Ministry of Environment - Thunder Bay
Ortech Intl., ON
PEI Agriculture
Penn State University, PA
Rockcliff Research Management Inc. (WTC)
Saskatchewan Health, SK
Saskatchewan Research Council, SK
Sawyer Environmental Laboratory - University of Maine
Shell Calgary Research Centre, AB
Suncor Inc. OSG, AB
VG Hospital, NS
Zenon Environmental Inc., BC

Table 2

COMPARISON OF LABORATORY PERFORMANCE (STUDY 0064)

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
F002	10	0	0.00	85	0	0.00	0.00
F003	20	0	0.00	198	0	0.00	0.00
F076	19	0	0.00	175	0	0.00	0.00
F046	20	0	0.00	188	4	2.13	2.13
F001	21	1	4.76	207	0	0.00	4.76
F011	18	1	5.56	174	2	1.15	6.70
F008	14	0	0.00	110	8	7.27	7.27
F038	21	1	4.76	170	10	5.88	10.64
F015	14	1	7.14	106	5	4.72	11.86
F036	10	1	10.00	100	6	6.00	16.00
F069	20	2	10.00	181	12	6.63	16.63
F010	19	2	10.53	172	15	8.72	19.25
F048	6	1	16.67	45	2	4.44	21.11
F024	14	3	21.43	128	2	1.56	22.99
F075	19	3	15.79	164	15	9.15	24.94
F013	8	2	25.00	46	0	0.00	25.00
F031	12	1	8.33	114	29	25.44	33.77
F035	19	4	21.05	159	28	17.61	38.66
F030	20	5	25.00	175	24	13.71	38.71
F067	21	6	28.57	153	20	13.07	41.64
F025	20	4	20.00	184	41	22.28	42.28
F014	10	2	20.00	82	23	28.05	48.05
F020	20	8	40.00	159	13	8.18	48.18
F042	1	0	0.00	10	5	50.00	50.00
F037	10	3	30.00	84	17	20.24	50.24
F077	19	5	26.32	167	62	37.13	63.44
F016	21	8	38.10	191	53	27.75	65.84
F060	18	10	55.56	142	23	16.20	71.75
F066	21	10	47.62	153	41	26.80	74.42
F009	16	9	56.25	126	33	26.19	82.44
F033	19	14	73.68	182	16	8.79	82.48
F068	4	2	50.00	24	11	45.83	95.83
F063	19	11	57.89	155	59	38.06	95.96
F065	19	13	68.42	185	58	31.35	99.77
F064	9	5	55.56	73	49	67.12	122.68

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
Bi	Li	Be			

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 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 is used with a reported result as also described in ASTM. These codes may be used in the FP/GLAP studies, but may result in flagging difficulties. "Less than" values are normally used when reporting the results.

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

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 LRTAP type evaluation program should generally remain the same; eg. Very Good = approximately 5% of data flagged. In a sense these evaluations represent state of the art for analysis of the Round-Robin samples.

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.

Sept, 1993

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

Appendix B

Laboratory Results

Table 3

SUMMARY OF STUDY TO STUDY PERFORMANCE

Trace Metals

LAB CODE	%BIAS AND %FLAGS ON STUDIES 0062	0063	0064	MEDIAN SCORE	COMMENTS
F001	9.8	1.5	4.8	4.8	SATISFACTORY, WELL DONE
F002	20.0	5.3	0.0	5.3	SATISFACTORY, WELL DONE
F003	1.2	7.1	0.0	1.2	SATISFACTORY, WELL DONE
F008	28.2	15.6	7.3	15.6	SATISFACTORY
F009	-	79.3	82.4	80.9	POOR
F010	25.4	12.1	19.2	19.2	SATISFACTORY
F011	5.2	38.7	6.7	6.7	SATISFACTORY, WELL DONE
F013	14.3	31.1	25.0	25.0	MODERATE
F014	63.2	28.7	48.0	48.0	MODERATE
F015	6.9	8.9	11.9	8.9	SATISFACTORY, WELL DONE
F016	38.2	17.4	65.8	38.2	MODERATE
F020	9.4	50.3	48.2	48.2	MODERATE
F023	-	31.0	-	-	-
F024	55.0	28.0	23.0	28.0	MODERATE
F025	31.8	14.0	42.3	31.8	MODERATE
F030	26.0	34.5	38.7	34.5	MODERATE
F031	-	51.4	33.8	42.6	MODERATE
F032	131.3	0.0	-	65.7	POOR
F033	11.7	60.7	82.5	60.7	POOR
F035	-	88.2	38.7	63.4	POOR
F036	25.5	70.8	16.0	25.5	MODERATE
F037	95.0	62.5	50.2	62.5	POOR
F038	10.3	39.1	10.6	10.6	SATISFACTORY
F039	27.7	-	-	-	-
F040	38.0	-	-	-	-
F042	0.0	0.0	50.0	0.0	SATISFACTORY
F043	42.9	41.0	-	41.9	MODERATE
F044	12.0	14.0	-	13.0	SATISFACTORY
F045	33.3	-	-	-	-
F046	21.0	26.4	2.1	21.0	SATISFACTORY
F047	59.2	38.6	-	48.9	MODERATE
F048	-	60.6	21.1	40.9	MODERATE
F055	62.1	103.0	-	82.5	POOR
F058	-	64.3	36.9	50.6	MODERATE
F060	-	44.4	71.8	58.1	MODERATE
F062	-	65.3	-	-	-
F063	-	-	96.0	-	-
F064	-	-	122.7	-	-
F065	-	-	99.8	-	-
F066	-	-	74.4	-	-
F067	-	-	41.6	-	-
F068	-	-	95.8	-	-
F069	-	-	16.6	-	-
F075	-	-	24.9	-	-
F076	-	-	0.0	-	-
F077	-	-	63.4	-	-
INTERLAB MEDIAN	26.0	34.5	38.7		

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

Table 4

Sample Design - FP/GLAP 64 - Jan '94

Trace Metals

Sample No.	Sample Name	Type (DA/Low)	Cu Conc'n (Expected)
1	L.O.	Low	0.0014
2	TM-23	Low	0.009
3	TM-26	Low	0.014
4	TM-27	Low	0.035
5	TM-28	Low	0.006
6	TM-52/2	DA*	0.15
7	TM-53/2	DA	0.10
8	TM-52+53	DA	0.25
9	TM-52+54	DA	0.37
10	TMDA-54	DA	0.44

* Direct Aspiration

Appendix A

Glossary of Terms

Table 5 SUMMARY of Interlaboratory MEDIAN VALUES for Trace Metals - STUDY 64

PARAMETER		SAMPLE NUMBER						
		TM-LO SAMPLE 1	TM-23 SAMPLE 2	TM-26 SAMPLE 3	TM-27 SAMPLE 4	TM-28 SAMPLE 5	TM-52-2 SAMPLE 6	TM-53-2 SAMPLE 7
Aluminum	MG/L	.0100	.0400	.0705	.0650	.0827	.1600	.1201
Titanium	ug/L	.0007	.0035	.0140	.0049	.0030	.1865	.1096
Vanadium	mg/L	.0013	.0022	.0130	.0030	.0020	.0760	.2210
Chromium	mg/L	.0022	.0080	.0163	.0026	.0008	.0874	.1850
Manganese	MG/L	.0010	.0087	.0113	.0025	.0077	.1740	.0730
Iron	MG/L	.0040	.0148	.0233	.0266	.0303	.2300	.1650
Cobalt	mg/L	.0020	.0080	.0039	.0040	.0030	.1365	.0875
Nickel	mg/L	.0020	.0088	.0190	.0028	.0200	.0770	.1720
Copper	mg/L	.0018	.0091	.0140	.0350	.0060	.1500	.1000
Zinc	mg/L	.0020	.0060	.0249	.0220	.0193	.1261	.0900
Arsenic	ug/L	.6000	10.000	4.5000	2.2000	3.0000	14.000	22.000
Selenium	ug/L	.3000	1.1500	7.2700	4.0000	4.9500	11.000	16.015
Strontium	mg/L	.1770	.0470	.4420	.0500	.1060	.1505	.2035
Molybdenum	mg/L	.0013	.0060	.0192	.0024	.0027	.1758	.1003
Silver	ug/L	.4100	3.3850	8.0500	1.0100	2.5350	15.850	9.5000
Cadmium	mg/L	.0001	.0025	.0170	.0010	.0012	.0486	.1370
Antimony	ug/L	.7000	4.6000	1.6000	3.1300	3.9000	9.6500	13.000
Barium	MG/L	.0220	.0131	.0304	.0084	.0150	.0800	.1720
Lead	mg/L	.0007	.0035	.0140	.0049	.0030	.1865	.1096
Bismuth	ug/L	-	4.5000	7.9350	-	-	11.285	12.540
Lithium	ug/L	3.6000	3.0000	9.0700	4.4200	6.6750	10.300	18.000
Berylium	ug/L	-	.5300	3.4900	1.0000	1.5400	9.0500	6.8000

PARAMETER		TM-52-53 SAMPLE 8	TM-52-54 SAMPLE 9	TMDA-54 SAMPLE 10
Aluminum	MG/L	.2890	.4100	.4900
Titanium	ug/L	.2955	.4700	.5556
Vanadium	mg/L	.2970	.2403	.3310
Chromium	mg/L	.2700	.3037	.4390
Manganese	MG/L	.2455	.2860	.2230
Iron	MG/L	.3950	.3740	.2810
Cobalt	mg/L	.2216	.3300	.3900
Nickel	mg/L	.2491	.2620	.3710
Copper	mg/L	.2445	.3690	.4400
Zinc	mg/L	.2150	.4000	.5474
Arsenic	ug/L	35.000	25.000	21.000
Selenium	ug/L	26.000	30.685	38.870
Strontium	mg/L	.3545	.4615	.6224
Molybdenum	mg/L	.2770	.4155	.4800
Silver	ug/L	23.750	26.500	29.165
Cadmium	mg/L	.1850	.1370	.1750
Antimony	ug/L	22.160	28.800	38.200
Barium	MG/L	.2530	.2180	.2770
Lead	mg/L	.2955	.4700	.5556
Bismuth	ug/L	23.900	20.405	22.785
Lithium	ug/L	29.450	28.700	33.350
Berylium	ug/L	16.000	27.400	36.400

PARAMETER: 13091 Aluminum MG/L

RESEARCH AND APPLICATIONS 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	.0051	4.50	.0410	21.00	.0721	22.00	.0663	20.00	.0836	18.00	.1575	10.00
F002		0.00	.039	13.00	.066	11.00	.065	15.50	.082	15.00	.160	15.00
F003	.015	19.00	.042	22.50	.077	26.00	.070	23.50	.091	26.00	.172	25.50
F005	.0047	1.50	.0386	11.00	.0716	19.00	.0650	15.50	.0824	16.00	.1566	9.00
F008	.014	18.00	.040	17.50	.072	20.50	.066	18.50	.085	19.50	.170	23.00
F009	<.01	0.00	.02 VL	2.50	.07	15.00	.06	10.00	.03 EL	1.00	.14	5.00
F010	.04 EH	21.00	.05	27.50	.09 H	29.00	.08 H	27.50	.10 H	28.00	.16	15.00
F011	.0131	17.00	.0399	14.00	.0738	23.50	.0656	17.00	.0857	21.00	.163	21.00
F014	.010	12.50	.042	22.50	.064	10.00	.049 L	6.00	.073	8.00	.138	4.00
F015	<.05	0.00	<.05	0.00	.05 L	5.00	<.05 L	0.00	.06 L	5.00	.13 L	3.00
F016	.040 EH	21.00	.012 EL	1.00		0.00		0.00		0.00	.059 EL	1.00
F020	.01	12.50	.044	26.00	.071	17.00	.067	21.00	.085	19.50	.158	11.00
F024	.007	7.00	.036	9.00	.067	12.50	.062	12.00	.079	10.00	.17	23.00
F025	.05 EH	23.00	.097 EH	30.00	.13 EH	32.00	.12 EH	31.00	.15 EH	32.00	.20 VH	32.00
F030	.040 EH	21.00	.080 EH	29.00	.117 EH	31.00	.099 EH	30.00	.122 EH	30.00	.196 H	31.00
F031	.013	16.00	.020 VL	2.50	.024 EL	1.00	.048 L	5.00	.081	14.00	.159	12.00
F033	.012	14.50	.040	17.50	.070	15.00	.064	14.00	.080	12.00	.16	15.00
F035	.064 EH	24.00	<.015 EL	0.00	.030 EL	2.00	.026 EL	1.00	.136 EH	31.00	.114 VL	2.00
F036	.0047	1.50	.0313	7.00	.0509 L	6.00	.0545	7.00	.0705	6.00	.1609	18.00
F037	.0051	4.50	.0220 VL	4.00	.0481 L	4.00	.0456 L	3.00	.0574 L	3.00	.1493	7.00
F038	.008	8.50	.023 L	5.00	.04 VL	3.00	.046 L	4.00	.047 EL	2.00	.177	27.00
F042	.006	6.00	.040	17.50	.072	20.50	.091 VH	29.00	.103 H	29.00	.201 VH	33.00
F046	.009	10.50	.038	10.00	.052 L	7.00	.066	18.50	.083	17.00	.161	19.00
F058	.008T	8.50	.033	8.00	.067	12.50	.063	13.00	.078	9.00	.155	8.00
F060	<.04	0.00	<.04	0.00	.06	9.00	.06	10.00	.08	12.00	.16	15.00
F063	<.03	0.00	.04	17.50	.07	15.00	.07	23.50	.08	12.00	.16	15.00
F065	.012	14.50	.043	25.00	.076	25.00	.071	25.00	.090	24.00	.170	23.00
F066	<.03	0.00	.04	17.50	.09 H	29.00	.06	10.00	.09	24.00	.18	28.00
F067	<.05	0.00	.05	27.50	.09 H	29.00	.08 H	27.50	.09	24.00	.19 H	30.00
F069	<.01	0.00	.031	6.00	.055 L	8.00	.045 L	2.00	.058 L	4.00	.149	6.00
F075	.009	10.50	.040	17.50	.078	27.00	.073	26.00	.092	27.00	.172	25.50
F076	<.025	0.00	.0421	24.00	.0738	23.50	.0677	22.00	.0859	22.00	.162	20.00
F077	.0050	3.00	.0387	12.00	.0713	18.00	.0588	8.00	.0713	7.00	.1862	29.00
MEDIAN CONC.	.0100		.0400		.0705		.0650		.0827		.1600	

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	.1201	17.00	.2732	6.00	.4126	18.00	.4735	10.00
F002	.113	9.50	.275	10.00	.380	5.00	.49	16.00
F003	.114	11.00	.290	20.00	.426	24.00	.518	29.00
F005	.1165	13.00	.2661	4.00	.3758	3.00	.4419	2.00
F008	.126	21.50	.304	27.00	.436	28.00	.543	31.00
F009	.10	3.50	.28	13.50	.37	2.00	.45	3.00
F010	.13	25.00	.29	20.00	.40	12.50	.48	13.50
F011	.124	20.00	.274	8.00	.389	7.50	.459	5.00
F014	.106	6.00	.270	5.00	.398	11.00	.474	11.00
F015	.1	3.50	.26	2.50	.38	5.00	.46	6.50
F016	.482 EH	33.00	.646 EH	33.00	.523 VH	32.00	.704 EH	33.00
F020	.1197	14.00	.2767	11.00	.3903	9.00	.4719	8.00
F024	.12	15.50	.30	26.00	.41	17.00	.50	22.00
F025	.16 VH	30.00	.33	30.00	.44	29.00	.51	26.00
F030	.147 H	29.00	.314	29.00	.430	26.00	.508	25.00
F031	.115	12.00	.258	1.00	.352 L	1.00	.453	4.00
F033	.11	7.50	.26	2.50	.38	5.00	.46	6.50
F035	.085 VL	1.00	.356 VH	32.00	.389	7.50	.428	1.00
F036	.1218	18.00	.2795	12.00	.4020	14.00	.4924	18.00
F037	.0942 L	2.00	.2982	25.00	.5448 EH	33.00	.4944	19.00
F038	.122	19.00	.354 VH	31.00	.500 VH	31.00	.526	30.00
F042	.191 EH	32.00	.274	8.00	.442	30.00	.628 EH	32.00
F046	.113	9.50	.289	17.00	.420	20.50	.499	20.00
F058	.130	25.00	.282	15.50	.397	10.00	.475	12.00
F060	.11	7.50	.28	13.50	.40	12.50	.48	13.50
F063	.12	15.50	.29	20.00	.42	20.50	.50	22.00
F065	.126	21.50	.298	24.00	.425	23.00	.517	28.00
F066	.13	25.00	.29	20.00	.42	20.50	.50	22.00
F067	.14	28.00	.29	20.00	.42	20.50	.49	16.00
F069	.105	5.00	.274	8.00	.405	16.00	.472	9.00
F075	.132	27.00	.293	23.00	.428	25.00	.516	27.00
F076	.129	23.00	.282	15.50	.404	15.00	.490	16.00
F077	.1888 EH	31.00	.3050	28.00	.4325	27.00	.507	24.00
MEDIAN CONC.	.1201		.2890		.4100		.4900	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	146.50	14.650	10			ICPMS
F002	110.00	12.222	9			13305-02
F003	226.50	22.650	10			ICP
F005	94.00	9.400	10			ICPMS
F008	224.50	22.450	10			AAS
F009	55.50	6.167	9	VL EL	BIASED LOW	ICP
F010	219.00	21.900	10	EH H H H		ICP
F011	154.00	15.400	10			
F014	96.00	9.600	10	L		
F015	30.50	4.357	7	L L L L	BIASED LOW	ICP
F016	154.00	22.000	7	EHEL ELEHEHVHEH		ICP
F020	149.00	14.900	10			13111 (ICP)
F024	154.00	15.400	10			ICP 5X
F025	295.00	29.500	10	EHEHEHEHEHVHVH	BIASED HIGH	ICP 5X
F030	281.00	28.100	10	EHEHEHEHEHH H	BIASED HIGH	ICP 5X
F031	68.50	6.850	10	VLELL L	BIASED LOW	GFAAS
F033	109.50	10.950	10			ICP
F035	101.50	11.278	9	EHELELELEHVLVLVH		ICP-AES
F036	107.50	10.750	10	L		ICP / GF
F037	104.50	10.450	10	VLL L L L EH		GFAAS
F038	160.50	16.050	10	L VLL EL VHVH		GFAAS
F042	237.00	23.700	10	VHH VHEH EH		FURNACE AA
F046	149.00	14.900	10	L		ICP / GF
F058	121.50	12.150	10			COLORIMETRIC
F060	93.00	11.625	8			ICP, DISSOLVED
F063	161.00	17.889	9			ICP
F065	233.00	23.300	10			ICPMS
F066	196.00	21.778	9	H		ICP
F067	222.50	24.722	9	H H H		ICAP
F069	64.00	7.111	9	L L L	BIASED LOW	DCP
F075	235.50	23.550	10			ICP/AA-HGA
F076	181.00	20.111	9			ICPMS
F077	187.00	18.700	10	EH		AA, 8X CONC'N

OVERALL AVERAGE RANK IS 16.312

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F015	30.50	4.357	7	LLLL	BIASED LOW	ICP
F009	55.50	6.167	9	VLEL	BIASED LOW	ICP
F031	68.50	6.850	10	VLELLL	BIASED LOW	GFAAS
F069	64.00	7.111	9	LLL	BIASED LOW	DCP
F005	94.00	9.400	10			ICPMS
F014	96.00	9.600	10	L		
F037	104.50	10.450	10	VLLLLLEH		GFAAS
F036	107.50	10.750	10	L		ICP / GF
F033	109.50	10.950	10			ICP
F035	101.50	11.278	9	EHELELELEHVLVLVH		ICP-AES
F060	93.00	11.625	8			ICP, DISSOLVED
F058	121.50	12.150	10			COLORIMETRIC
F002	110.00	12.222	9			13305-02
F001	146.50	14.650	10			ICPMS
F046	149.00	14.900	10	L		ICP / GF
F020	149.00	14.900	10			13111 (ICP)
F024	154.00	15.400	10			ICP 5X
F011	154.00	15.400	10			
F038	160.50	16.050	10	LVLLELVHVH		GFAAS
F063	161.00	17.889	9			ICP
F077	187.00	18.700	10	EH		AA, 8X CONC'N
F076	181.00	20.111	9			ICPMS
F066	196.00	21.778	9	H		ICP
F010	219.00	21.900	10	EHHHH		ICP
F016	154.00	22.000	7	EHELELEHEHVHEH		ICP
F008	224.50	22.450	10			AAS
F003	226.50	22.650	10			ICP
F065	233.00	23.300	10			ICPMS
F075	235.50	23.550	10			ICP/AA-HGA
F042	237.00	23.700	10	VHHVHEHEH		FURNACE AA
F067	222.50	24.722	9	HHH		ICAP
F030	281.00	28.100	10	EHEHEHEHEHHH	BIASED HIGH	ICP 5X
F025	295.00	29.500	10	EHEHEHEHEHVHVH	BIASED HIGH	ICP 5X

OVERALL AVERAGE RANK IS 16.312

Aluminum

PARAMETER: 23091 Vanadium mg/L

RESEARCH AND APPLICATIONS 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	2.00	.0022	6.00	.0124	9.50	.0005	2.00	.0006	3.50	.0748	7.00
F003	.0003	1.00	.0022	6.00	.0122	8.00	.0007	5.00	.0006	3.50	.079	20.00
F005	.0004	3.50	.0023	8.00	.0125	11.00	.0006	3.50	.0006	1.50	.0760	13.00
F008	<.2	0.00	<.2	0.00	<.2	0.00	<.2	0.00	<.2	0.00	<.2	0.00
F009	<.01	0.00	<.01	0.00	.01	3.00	<.01	0.00	.02 EH	11.00	.12 EH	25.00
F010	<.005	0.00	<.005	0.00	.014	18.00	.005 VH	9.00	<.005	0.00	.075	9.00
F011	.0003	3.50	.0022	6.00	.0124	9.50	.0006	3.50	.0006	1.50	.0758	11.00
F015	<.01	0.00	<.01	0.00	.01	3.00	<.01	0.00	<.01	0.00	.07	1.50
F016	.037 EH	10.00	.012 EH	13.50	.026 EH	23.00	.007 EH	10.00	.008 EH	9.00	.078	17.00
F020	<.003	0.00	<.003	0.00	.011	5.00	<.003	0.00	<.003	0.00	.073	3.00
F024	<.001	0.00	<.001	0.00	.010	3.00	<.001	0.00	<.001	0.00	.078	17.00
F025	<.002	0.00	.002	3.50	.014	18.00	<.002	0.00	<.002	0.00	.077	14.50
F030	<.002	0.00	.002	3.50	.012	6.50	<.002	0.00	<.002	0.00	.075	9.00
F033	.0005	5.00	.0024	9.00	.012	6.50	.0005	1.00	.0007	5.00	.070	1.50
F035	.005 VH	7.00	.005 H	12.00	.015	20.50	.003	6.50	.003	7.00	.074	5.00
F038	<.030	0.00	<.030	0.00	<.030	0.00	<.030	0.00	<.030	0.00	.074	5.00
F046	.001W	0.00	.001W	1.00	.013	13.00	.001W	0.00	.001W	0.00	.078	17.00
F060	<.003	0.00	<.003	0.00	.014	18.00	.004 H	8.00	.007 EH	8.00	.083	23.00
F063	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	.08	21.00
F065	.002	6.00	.004	11.00	.015	20.50	.003	6.50	.002	6.00	.082	22.00
F066	.013 EH	9.00	.012 EH	13.50	.024 EH	22.00	.008 EH	11.00	.011 EH	10.00	.090 H	24.00
F067	<.005	0.00	<.005	0.00	.013	13.00	<.005	0.00	<.005	0.00	.074	5.00
F069	<.006	0.00	<.006	0.00	.0134	16.00	<.006	0.00	<.006	0.00	.0759	12.00
F075	.006 EH	8.00	.003	10.00	.013	13.00	<.002	0.00	<.002	0.00	.077	14.50
F076	<.005	0.00	<.005	0.00	.0131	15.00	<.005	0.00	<.005	0.00	.0781	19.00
F077		0.00	.0011	2.00	.0094 L	1.00		0.00		0.00	.0750	9.00
MEDIAN OR *TARGET CONC.	.0013		.0022		.0130		*.0010		.0020		.0760	

PARAMETER: 23091 Vanadium mg/L

SAMPLE LAB NO	7 REPORTED VALUE	7 RANK	8 REPORTED VALUE	8 RANK	9 REPORTED VALUE	9 RANK	10 REPORTED VALUE	10 RANK
F001	.2223	16.00	.2883	5.00	.2406	14.00	.3321	16.00
F003	.230	20.50	.312	22.00	.252	20.00	.348	20.00
F005	.2193	11.00	.2970	13.50	.2376	9.00	.321	7.00
F008	.2	1.50	.2 EL	1.00	.2 VL	1.00	.2 EL	1.00
F009	.25 H	26.00	.30	17.50	.26	23.50	.35	22.00
F010	.214	5.50	.289	6.00	.237	7.00	.323	8.00
F011	.220	12.50	.297	13.50	.247	17.00	.329	9.50
F015	.22	12.50	.3	17.50	.24	12.50	.33	12.00
F016	.214	5.50	.293	8.50	.236	5.00	.318	5.00
F020	.204	3.00	.280	3.00	.233	4.00	.3179	4.00
F024	.23	20.50	.30	17.50	.24	12.50	.33	12.00
F025	.219	10.00	.287	4.00	.237	7.00	.332	14.50
F030	.216	7.00	.294	10.00	.238	10.00	.320	6.00
F033	.20	1.50	.27	2.00	.22	2.00	.30	2.00
F035	.207	4.00	.293	8.50	.231	3.00	.313	3.00
F038	.222	14.50	.297	13.50	.245	16.00	.338	18.00
F046	.225	18.00	.300	17.50	.250	19.00	.344	19.00
F060	.231	22.00	.311	21.00	.260	23.50	.350	22.00
F063	.24	24.00	.32	24.50	.28 VH	26.00	.35	22.00
F065	.234	23.00	.314	23.00	.259	22.00	.355	24.00
F066	.241	25.00	.320	24.50	.265	25.00	.360	25.00
F067	.217	8.50	.291	7.00	.239	11.00	.329	9.50
F069	.222	14.50	.297	13.50	.237	7.00	.33	12.00
F075	.217	8.50	.295	11.00	.241	15.00	.332	14.50
F076	.226	19.00	.305	20.00	.248	18.00	.335	17.00
F077	.2233	17.00	.3300 H	26.00	.2583	21.00	.368 H	26.00
MEDIAN OR *TARGET CONC.	.2210		.2970		.2403		.3310	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	81.00	8.100	10			ICPMS
F003	126.00	12.600	10			ICP
F005	81.00	8.100	10			ICPMS
F008	4.50	1.125	4	ELVLEL	INSUFFICIENT DATA	AAS
F009	128.00	18.286	7	EHEHH	BIASED HIGH	ICP
F010	62.50	8.929	7	VH		ICP
F011	87.50	8.750	10			
F015	59.00	9.833	6			ICP
F016	106.50	10.650	10	EHEHEHEHEH		ICP
F020	22.00	3.667	6		BIASED LOW	23111
F024	82.50	13.750	6			ICP 5X
F025	71.50	10.214	7			ICP 5X
F030	52.00	7.429	7			ICP 5X
F033	35.50	3.550	10		BIASED LOW	ICP
F035	76.50	7.650	10	VHH		ICP-AES
F038	67.00	13.400	5			ICP
F046	104.50	14.929	7			ICP / GF
F060	145.50	18.188	8	H EH	BIASED HIGH	ICP, DISSOLVED
F063	117.50	23.500	5	VH	BIASED HIGH	ICP
F065	164.00	16.400	10			ICPMS
F066	189.00	18.900	10	EHEHEHEHEHH	BIASED HIGH	ICP
F067	54.00	9.000	6			ICAP
F069	75.00	12.500	6			ICP
F075	94.50	11.813	8	EH		AA-HGA
F076	108.00	18.000	6			ICPMS
F077	102.00	14.571	7	L H H		AA, 6X CONC'N

OVERALL AVERAGE
RANK IS 11.601

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F008	4.50	1.125	4	ELVLEL	INSUFFICIENT DATA	AAS
F033	35.50	3.550	10		BIASED LOW	ICP
F020	22.00	3.667	6		BIASED LOW	23111
F030	52.00	7.429	7			ICP 5X
F035	76.50	7.650	10	VHH		ICP-AES
F005	81.00	8.100	10			ICPMS
F001	81.00	8.100	10			ICPMS
F011	87.50	8.750	10			
F010	62.50	8.929	7	VH		ICP
F067	54.00	9.000	6			ICAP
F015	59.00	9.833	6			ICP
F025	71.50	10.214	7			ICP 5X
F016	106.50	10.650	10	EHEHEHEHEH		ICP
F075	94.50	11.813	8	EH		AA-HGA
F069	75.00	12.500	6			ICP
F003	126.00	12.600	10			ICP
F038	67.00	13.400	5			ICP
F024	82.50	13.750	6			ICP 5X
F077	102.00	14.571	7	LHH		AA, 6X CONC'N
F046	104.50	14.929	7			ICP / GF
F065	164.00	16.400	10			ICPMS
F076	108.00	18.000	6			ICPMS
F060	145.50	18.188	8	HEH	BIASED HIGH	ICP, DISSOLVED
F009	128.00	18.286	7	EHEHH	BIASED HIGH	ICP
F066	189.00	18.900	10	EHEHEHEHEHH	BIASED HIGH	ICP
F063	117.50	23.500	5	VH	BIASED HIGH	ICP

OVERALL AVERAGE
RANK IS 11.601

PARAMETER: 24091 Chromium mg/L

RESEARCH AND APPLICATIONS 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	.0023	12.00	.0083	16.00	.0163	14.50	.0026	13.00	.0008	2.50	.0844	9.00
F002	.0028	17.00	.0093	23.50		0.00	.0030	19.00	.0008	5.50		0.00
F003	.0020	7.00	.0070	7.50	.0158	10.00	.0026	11.50	.0008	5.50	.090	22.50
F005	.0020	7.00	.0088	19.00	.0172	17.00	.0027	14.00	.0009	8.00	.0866	12.00
F008	<.002	0.00	.008	13.00	.016	12.00	.003	19.00	<.002	0.00	.090	22.50
F009	<.01	0.00	<.01	0.00	.02 H	28.00	<.01	0.00	.01 EH	13.00	.10 H	30.00
F010	.003	19.00	.010	25.50	.020 H	28.00	.004	23.00	.004 VH	12.00	.088	17.50
F011	.0024	13.00	.0087	18.00	.0171	16.00	.0026	11.50	.0008	2.50	.0875	16.00
F013	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.083	7.00
F014	.0017	3.00	.0062	4.00	.015	6.50	.0011	2.00	<.001	0.00		0.00
F015	<.005	0.00	.008	13.00	.019	24.00	.007 EH	25.00	<.005	0.00	.085	10.50
F016		0.00	.005 L	3.00	.018	20.00	.003	19.00		0.00	.090	22.50
F020	.0025	15.00	.0074	10.00	.0150	6.50	.002	5.00	<.002	0.00	.0814	6.00
F024	.002	7.00	.007	7.50	.016	12.00	.002	5.00	<.001	0.00	.090	22.50
F025	.002	7.00	.009	21.50	.019	24.00	<.002	0.00	<.002	0.00	.088	17.50
F030	<.002	0.00	.007	7.50	.015	6.50	.002	5.00	<.002	0.00	.081	5.00
F031	.0026	16.00	.0065	5.00	.014	2.50	.0022	9.00	.0006	1.00	.085	10.50
F033	.0013	1.00	.0078	11.00	.015	6.50	.0022	9.00	.0008	5.50	.077	3.50
F035	.002	7.00	.004 VL	2.00	.015	6.50	<.001	0.00	<.001	0.00	.084	8.00
F037	.0014	2.00	.0082	15.00	.0163	14.50	.0022	9.00	<.001	0.00	.0873	15.00
F038	.004	21.50	.01	25.50	.018	20.00	.003	19.00	.001	10.00	.091	26.00
F046	.002	7.00	.008	13.00	.016	12.00	.002	5.00	.001W	0.00	.095	28.50
F048	.0030	19.00	.0084	17.00	.0191	26.00	.0032	22.00	.0008	5.50		0.00
F060	.003	19.00	.007	7.50	.014	2.50	.002	5.00	<.001	0.00	.056 EL	1.00
F063	<.01	0.00	<.01	0.00	<.01 VL	0.00	<.01	0.00	<.01	0.00	.09	22.50
F064	<.002	0.00	<.002 EL	0.00	<.002 EL	0.00	<.002	0.00	<.002	0.00	.077	3.50
F065	.004	21.50	.012 VH	27.00	.019	24.00	.005 H	24.00	.002	11.00	.094	27.00
F066	<.01	0.00	<.01	0.00	.015	6.50	<.01	0.00	<.01	0.00	.087	13.50
F067	<.01	0.00	<.01	0.00	.02 H	28.00	<.01	0.00	<.01	0.00	.09	22.50
F069	.0022	11.00	.0093	23.50	.0182	22.00	.0028	15.00	.0009	9.00	.095	28.50
F075	.002	7.00	.009	21.50	.018	20.00	.003	19.00	<.002	0.00	.087	13.50
F076	.0025	14.00	.0090	20.00	.0176	18.00	.0028	16.00	<.001	0.00	.0890	19.00
F077		0.00	.0017 EL	1.00	.0088 EL	1.00	.0010	1.00		0.00	.0572 EL	2.00
MEDIAN CONC.	.0022		.0080		.0163		.0026		.0008		.0874	

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	.1819	10.00	.2622	10.00	.3034	14.50	.4338	12.00
F002		0.00		0.00		0.00		0.00
F003	.188	18.00	.279	22.00	.311	22.00	.45	20.50
F005	.1822	11.00	.2675	12.00	.3034	14.50	.4288	11.00
F008	.19	22.50	.28	24.50	.31	21.00	.45	20.50
F009	.21 H	30.00	.28	24.50	.33	29.00	.47	28.00
F010	.184	14.00	.270	15.00	.305	17.00	.438	15.00
F011	.183	12.50	.272	17.00	.307	18.00	.437	14.00
F013	.176	6.00	.257	9.00	.293	11.00	.422	9.00
F014		0.00		0.00		0.00		0.00
F015	.189	19.00	.273	18.50	.315	24.00	.456	23.00
F016	.179	7.50	.265	11.00	.304	16.00	.435	13.00
F020	.172	4.00	.253	8.00	.287	7.00	.415	6.00
F024	.20	28.50	.27	15.00	.30	12.50	.42	8.00
F025	.193	25.50	.279	22.00	.308	19.50	.445	19.00
F030	.173	5.00	.294	30.00	.238 EL	3.00	.403	5.00
F031	.185	15.50	.25	5.00	.29	9.00	.44	16.50
F033	.16 L	3.00	.24 L	3.00	.27 L	6.00	.38 L	2.00
F035	.179	7.50	.273	18.50	.292	10.00	.427	10.00
F037	.1894	20.00	.2527	7.00	.2892	8.00	.4195	7.00
F038	.190	22.50	.279	22.00	.318	25.00	.459	24.00
F046	.200	28.50	.292	29.00	.333	30.00	.476	30.00
F048		0.00		0.00		0.00		0.00
F060	.157 L	2.00	.244	4.00	.269 L	5.00	.381 L	3.00
F063	.19	22.50	.29	27.50	.32	26.00	.46	25.50
F064	.183	12.50	.177 EL	1.00	.177 EL	1.00	.353 VL	1.00
F065	.199	27.00	.290	27.50	.326	28.00	.473	29.00
F066	.193	25.50	.284	26.00	.324	27.00	.467	27.00
F067	.18	9.00	.27	15.00	.30	12.50	.44	16.50
F069	.19	22.50	.252	6.00	.235 EL	2.00	.46	25.50
F075	.185	15.50	.269	13.00	.308	19.50	.451	22.00
F076	.187	17.00	.275	20.00	.313	23.00	.443	18.00
F077	.1328 EL	1.00	.2168 VL	2.00	.2467 VL	4.00	.3898 L	4.00
MEDIAN CONC.	.1850		.2700		.3037		.4390	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	113.50	11.350	10			ICPMS
F002	65.00	16.250	4		INSUFFICIENT DATA	24004
F003	146.50	14.650	10			ICP
F005	125.50	12.550	10			ICPMS
F008	155.00	19.375	8			GFAAS
F009	182.50	26.071	7	H EHH H	BIASED HIGH	
F010	186.00	18.600	10	H VH		ICP
F011	138.50	13.850	10			
F013	42.00	8.400	5			ICP
F014	15.50	3.875	4		INSUFFICIENT DATA	
F015	157.00	19.625	8	EH		ICP
F016	112.00	14.000	8	L		ICP
F020	67.50	7.500	9		BIASED LOW	24111
F024	118.00	13.111	9			ICP 5X
F025	156.00	19.500	8			ICP 5X
F030	67.00	8.375	8	EL		ICP 5X
F031	90.00	9.000	10			GFAAS
F033	50.50	5.050	10	L L L L	BIASED LOW	ICP
F035	69.50	8.688	8	VL		ICP-AES
F037	97.50	10.833	9			GFAAS
F038	215.50	21.550	10			GFAAS
F046	183.00	20.333	9			ICP / GF
F048	89.50	17.900	5			GFAA
F060	49.00	5.444	9	ELL L L	BIASED LOW	GFAA, DISSOLVED
F063	124.00	24.800	5	VL	BIASED HIGH	ICP
F064	19.00	3.800	5	ELEL ELELVL	BIASED LOW	AAS
F065	246.00	24.600	10	VH H	BIASED HIGH	ICPMS
F066	125.50	20.917	6			ICP
F067	103.50	17.250	6	H		ICAP
F069	165.00	16.500	10	EL		GFAA
F075	151.00	16.778	9			ICP/AA-HGA
F076	165.00	18.333	9			ICPMS
F077	16.00	2.000	8	ELEL ELELVLVLL	BIASED LOW	AA, 8X CONC'N

OVERALL AVERAGE RANK IS 14.312

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F077	16.00	2.000	8	ELELELELVLVLL	BIASED LOW	AA, 8X CONC'N
F064	19.00	3.800	5	ELELELELVL	BIASED LOW	AAS
F014	15.50	3.875	4		INSUFFICIENT DATA	
F033	50.50	5.050	10	LLLL	BIASED LOW	ICP
F060	49.00	5.444	9	ELLLL	BIASED LOW	GFAA, DISSOLVED
F020	67.50	7.500	9		BIASED LOW	24111
F030	67.00	8.375	8	EL		ICP 5X
F013	42.00	8.400	5			ICP
F035	69.50	8.688	8	VL		ICP-AES
F031	90.00	9.000	10			GFAAS
F037	97.50	10.833	9			GFAAS
F001	113.50	11.350	10			ICPMS
F005	125.50	12.550	10			ICPMS
F024	118.00	13.111	9			ICP 5X
F011	138.50	13.850	10			
F016	112.00	14.000	8	L		ICP
F003	146.50	14.650	10			ICP
F002	65.00	16.250	4		INSUFFICIENT DATA	24004
F069	165.00	16.500	10	EL		GFAA
F075	151.00	16.778	9			ICP/AA-HGA
F067	103.50	17.250	6	H		ICAP
F048	89.50	17.900	5			GFAA
F076	165.00	18.333	9			ICPMS
F010	186.00	18.600	10	HVH		ICP
F008	155.00	19.375	8			GFAAS
F025	156.00	19.500	8			ICP 5X
F015	157.00	19.625	8	EH		ICP
F046	183.00	20.333	9			ICP / GF
F066	125.50	20.917	6			ICP
F038	215.50	21.550	10			GFAAS
F065	246.00	24.600	10	VHH	BIASED HIGH	ICPMS
F063	124.00	24.800	5	VL	BIASED HIGH	ICP
F009	182.50	26.071	7	HEHHH	BIASED HIGH	

OVERALL AVERAGE RANK IS 14.312

PARAMETER: 25091 Manganese MG/L

RESEARCH AND APPLICATIONS 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	.0006	1.50	.0085	11.00	.0111	14.00	.0025	12.00	.0073	10.00	.1752	19.00
F002		0.00		0.00	.011	10.00		0.00		0.00	.187	30.50
F003	.0006	1.50	.0078	3.00	.0106	6.00	.0025	9.00	.0069	3.00	.179	25.00
F005	.0007	4.00	.0087	14.00	.0117	20.00	.0028	14.00	.0077	15.00	.1793	26.00
F008	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	.17	9.50
F009	<.01	0.00	<.01	0.00	.01	3.50	<.01	0.00	<.01	0.00	.19	33.00
F010	.001	8.00	.009	20.00	.011	10.00	.003	17.00	.008	19.50	.172	14.00
F011	.0007	5.00	.0085	12.00	.0115	17.50	.0025	9.00	.0075	13.00	.173	15.50
F013	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	.174	17.50
F014	<.01	0.00	.011 H	26.50	.013	29.50	<.01	0.00	.011 VH	28.00	.177	22.00
F015	<.001	0.00	.008	5.50	.011	10.00	.001	2.00	.007	6.00	.177	22.00
F016		0.00	.009	20.00	.012	24.50	.003	17.00	.008	19.50	.177	22.00
F020	<.002	0.00	.0083	9.50	.0111	13.00	.0025	9.00	.0073	11.00	.1718	13.00
F024	<.001	0.00	.008	5.50	.011	10.00	.002	4.00	.007	6.00	.17	9.50
F025	.005 EH	13.00	.010	25.00	.013	29.50	.008 EH	22.00	.010 H	26.00	.174	17.50
F030	.001	8.00	.009	20.00	.012	24.50	.003	17.00	.008	19.50	.170	9.50
F031	.0008	6.00	.0089	15.00	.012	24.50	.0024	7.00	.0072	9.00	.165	5.00
F033	<.001	0.00	.008	5.50	.011	10.00	.002	4.00	.007	6.00	.16	3.00
F035	<.001	0.00	.008	5.50	.010	3.50	.002	4.00	.007	6.00	.168	6.00
F036	.0017	11.00	.0071	2.00	.0107	7.00	.0005 L	1.00	.0060	2.00	.1730	15.50
F038	<.005	0.00	.009	20.00	.012	24.50	<.005	0.00	.008	19.50	.183	29.00
F046	.001	8.00	.0082	8.00	.0113	16.00	.0023	6.00	.0074	12.00	.169	7.00
F058	.001W	0.00	.009	20.00	.012	24.50	.003T	17.00	.010 H	26.00	.180	27.50
F060	<.003	0.00	.009	20.00	.012	24.50	<.003	0.00	.008	19.50	.191	34.00
F063	<.01	0.00	<.01	0.00	.01	3.50	<.01	0.00	.01 H	26.00	.18	27.50
F064	<.001	0.00	.0047 VL	1.00	.0075 VL	1.00	<.001	0.00	.0038 VL	1.00	.131 EL	2.00
F065	.003 H	12.00	.011 H	26.50	.014 H	31.00	.004	21.00	.009	24.00	.188	32.00
F066	<.005	0.00	.009	20.00	.012	24.50	<.005	0.00	.007	6.00	.187	30.50
F067	<.01	0.00	<.01	0.00	.01	3.50	<.01	0.00	<.01	0.00	.17	9.50
F068		0.00		0.00		0.00		0.00		0.00	.101 EL	1.00
F069	<.001	0.00	.0083	9.50	.0112	15.00	.0025	11.00	.0076	14.00	.171	12.00
F075	<.002	0.00	.009	20.00	.012	24.50	.003	17.00	.008	19.50	.178	24.00
F076	.0007	3.00	.0086	13.00	.0116	19.00	.0027	13.00	.0079	16.00	.176	20.00
F077	.0015	10.00	.0090	20.00	.0115	17.50	.0038	20.00	.0082	23.00	.1616	4.00
MEDIAN CONC.	.0010		.0087		.0113		.0025		.0077		.1740	

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	.0738	19.00	.2425	12.00	.2866	19.00	.2254	21.00
F002	.075	24.50	.250	23.00	.295	24.00	.236	27.00
F003	.074	21.00	.252	26.00	.291	22.00	.228	23.50
F005	.0748	23.00	.2484	20.00	.2902	21.00	.2244	20.00
F008	.07	6.00	.24	9.00	.28	10.50	.22	11.00
F009	.08	31.50	.26	28.00	.31	33.00	.25 H	34.00
F010	.072	15.00	.240	9.00	.281	13.00	.219	8.00
F011	.0717	13.00	.244	15.00	.284	15.00	.222	15.50
F013	.072	15.00	.245	16.50	.286	17.50	.223	17.50
F014	.077	27.00	.248	19.00	.289	20.00	.223	17.50
F015	.074	21.00	.251	25.00	.292	23.00	.228	23.50
F016	.073	17.00	.250	23.00	.302	29.00	.220	11.00
F020	.0712	11.00	.243	13.50	.284	15.00	.222	15.50
F024	.072	15.00	.24	9.00	.28	10.50	.22	11.00
F025	.070	6.00	.245	16.50	.284	15.00	.220	11.00
F030	.071	9.50	.243	13.50	.279	7.00	.213	6.00
F031	.075	24.50	.25	23.00	.30	27.50	.23	25.50
F033	.066	2.00	.22	3.00	.26	3.00	.20	3.00
F035	.068	3.00	.249	21.00	.271	5.00	.209	4.00
F036	.0716	12.00	.2353	5.00	.2793	8.00	.2213	14.00
F038	.077	27.00	.261	30.50	.305	30.00	.239	28.50
F046	.071	9.50	.239	6.00	.280	10.50	.227	22.00
F058	.081	33.00	.261	30.50	.298	25.50	.240	31.00
F060	.078	29.00	.268	34.00	.314	34.00	.242	33.00
F063	.08	31.50	.26	28.00	.30	27.50	.24	31.00
F064	.047 EL	1.00	.197 VL	2.00	.206 EL	2.00	.188 L	2.00
F065	.079	30.00	.262	32.50	.308	32.00	.240	31.00
F066	.077	27.00	.262	32.50	.306	31.00	.239	28.50
F067	.07	6.00	.24	9.00	.28	10.50	.22	11.00
F068		0.00	.091 EL	1.00	.091 EL	1.00	.069 EL	1.00
F069	.0709	8.00	.24	9.00	.277	6.00	.216	7.00
F075	.074	21.00	.260	28.00	.298	25.50	.230	25.50
F076	.0737	18.00	.246	18.00	.286	17.50	.224	19.00
F077	.0683	4.00	.2285	4.00	.2627	4.00	.2108	5.00
MEDIAN CONC.	.0730		.2455		.2860		.2230	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	138.50	13.850	10			ICPMS
F002	139.00	23.167	6			25304
F003	140.00	14.000	10			ICP
F005	177.00	17.700	10			ICPMS
F008	46.00	9.200	5			ICP
F009	163.00	27.167	6	H	BIASED HIGH	ICP
F010	133.50	13.350	10			ICP
F011	130.50	13.050	10			
F013	84.00	16.800	5			ICP
F014	189.50	23.688	8	H VH		
F015	138.00	15.333	9			ICP
F016	183.00	20.333	9			ICP
F020	110.50	12.278	9			25111
F024	80.50	8.944	9			ICP 5X
F025	181.50	18.150	10	EH EHH		AAS
F030	134.50	13.450	10			ICP 5X
F031	167.00	16.700	10			GFAAS
F033	39.50	4.389	9		BIASED LOW	ICP
F035	58.00	6.444	9		BIASED LOW	ICP-AES
F036	77.50	7.750	10	L	BIASED LOW	ICP / GF
F038	209.00	26.125	8		BIASED HIGH	ICP
F046	105.00	10.500	10			ICP
F058	235.00	26.111	9	H	BIASED HIGH	COLORIMETRIC
F060	228.00	28.500	8		BIASED HIGH	ICP, DISSOLVED
F063	175.00	25.000	7	H		ICP
F064	12.00	1.500	8	VLVL VLELELVLELL	BIASED LOW	AAS
F065	272.00	27.200	10	H H H	BIASED HIGH	ICPMS
F066	200.00	25.000	8		BIASED HIGH	ICP
F067	49.50	8.250	6			ICAP
F068	4.00	1.000	4	EL ELELEL	INSUFFICIENT DATA	IC
F069	91.50	10.167	9			ICP
F075	205.00	22.778	9			ICP/AA-HGA
F076	156.50	15.650	10			ICPMS
F077	111.50	11.150	10			AA, 8X CONC'N

OVERALL AVERAGE RANK IS 15.741

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F068	4.00	1.000	4	ELELELEL	INSUFFICIENT DATA	IC
F064	12.00	1.500	8	VLVLVLELELVLELL	BIASED LOW	AAS
F033	39.50	4.389	9		BIASED LOW	ICP
F035	58.00	6.444	9		BIASED LOW	ICP-AES
F036	77.50	7.750	10	L	BIASED LOW	ICP / GF
F067	49.50	8.250	6			ICAP
F024	80.50	8.944	9			ICP 5X
F008	46.00	9.200	5			ICP
F069	91.50	10.167	9			ICP
F046	105.00	10.500	10			ICP
F077	111.50	11.150	10			AA, 8X CONC'N
F020	110.50	12.278	9			25111
F011	130.50	13.050	10			
F010	133.50	13.350	10			ICP
F030	134.50	13.450	10			ICP 5X
F001	138.50	13.850	10			ICPMS
F003	140.00	14.000	10			ICP
F015	138.00	15.333	9			ICP
F076	156.50	15.650	10			ICPMS
F031	167.00	16.700	10			GFAAS
F013	84.00	16.800	5			ICP
F005	177.00	17.700	10			ICPMS
F025	181.50	18.150	10	EHEHH		AAS
F016	183.00	20.333	9			ICP
F075	205.00	22.778	9			ICP/AA-HGA
F002	139.00	23.167	6			25304
F014	189.50	23.688	8	HVH		
F066	200.00	25.000	8		BIASED HIGH	ICP
F063	175.00	25.000	7	H		ICP
F058	235.00	26.111	9	H	BIASED HIGH	COLORIMETRIC
F038	209.00	26.125	8		BIASED HIGH	ICP
F009	163.00	27.167	6	H	BIASED HIGH	ICP
F065	272.00	27.200	10	HHH	BIASED HIGH	ICPMS
F060	228.00	28.500	8		BIASED HIGH	ICP, DISSOLVED

OVERALL AVERAGE RANK IS 15.741

Manganese

PARAMETER: 26091 Iron MG/L

RESEARCH AND APPLICATIONS 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	.0034	6.00	.016	19.50	.0237	16.00	.0266	16.00	.0312	19.00	.210	3.00
F002	.0022	2.00	.0150	16.00	.025	20.00	.028	21.00	.032	21.50	.216	6.00
F003	.0028	4.00	.0148	14.00	.0242	19.00	.0271	20.00	.0280	5.50	.237	24.50
F005	.0038	7.00	.0175	21.00	.0262	21.00	.0299	22.00	.0333	25.00	.2398	28.00
F008	<.02	0.00	.020	25.00	.03	23.50	.03	24.00	.03	12.50	.23	16.50
F009	<.01	0.00	<.01	0.00	.02	6.00	.02	2.00	.03	12.50	.24	29.00
F010	.004	8.50	.014	12.00	.023	13.00	.026	11.00	.029	7.50	.219	8.00
F011	<.02	0.00	<.02	0.00	<.02	0.00	.026	11.00	.026	2.50	.252	31.00
F013	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00	.238	26.00
F014	.017 EH	14.00	.018	22.00	.029	22.00	.043 EH	30.00	.041 H	30.00	.235	23.00
F015	<.005	0.00	.014	12.00	.023	13.00	.027	18.00	.03	12.50	.232	20.00
F016		0.00	.011	3.00	.023	13.00	.031	26.50	.034	26.00	.258 H	32.00
F020	<.003	0.00	.0099	2.00	.0189	3.00	.0225	5.00	.0264	4.00	.2178	7.00
F024	.003	5.00	.013	7.00	.022	10.00	.026	11.00	.030	12.50	.23	16.50
F025	.02 EH	16.00	.02	25.00	.02	6.00	.02	2.00	.03	12.50	.21	3.00
F030	.006	12.00	.019	23.00	.032 H	25.00	.031	26.50	.037	27.00	.228	13.00
F031	.004	8.50	.015	16.00	.041 EH	28.00	.041 EH	29.00	.049 EH	31.00	.211	5.00
F033	<.005	0.00	.014	12.00	.022	10.00	.025	8.00	.028	5.50	.21	3.00
F035	<.005	0.00	.009	1.00	.017	1.50	.024	7.00	.033	23.50	.226	11.00
F036	.0046	10.00	.0152	18.00	.0432 EH	29.00	.0263	15.00	.0310	18.00	.2319	19.00
F038	<.030	0.00	<.030	0.00	<.030	0.00	<.030	0.00	.033	23.50	.230	16.50
F046	.005	11.00	.015	16.00	.024	18.00	.026	11.00	.032	21.50	.239	27.00
F048	.0027	3.00	.0138	9.50	.0238	17.00	.0261	14.00	.0316	20.00	.2370	24.50
F058	.002W	0.00	.012	5.00	.017	1.50	.021	4.00	.026	2.50	.228	13.00
F060	<.02	0.00	<.02	0.00	<.02	0.00	.02	2.00	.02 L	1.00	.23	16.50
F063	.02 EH	16.00	.03 EH	27.00	.04 EH	27.00	.04 VH	28.00	.05 EH	32.00	.26 H	33.00
F064	.012 VH	13.00	.016	19.50	.034 VH	26.00	.088 EH	31.00	.038 H	28.00	.199 L	1.00
F066	<.02	0.00	<.02	0.00	.02	6.00	.03	24.00	.03	12.50	.25	30.00
F067	.02 EH	16.00	.02	25.00	.03	23.50	.03	24.00	.03	12.50	.22	9.00
F069	<.003	0.00	.0138	9.50	.0233	15.00	.0270	18.00	.0307	17.00	.224	10.00
F075	.002	1.00	.013	7.00	.022	10.00	.027	18.00	.030	12.50	.233	21.00
F076	<.010	0.00	.013	7.00	.021	8.00	.026	11.00	.029	7.50	.228	13.00
F077		0.00	.0111	4.00	.0195	4.00	.0239	6.00	.0391 H	29.00	.2338	22.00
MEDIAN CONC.	.0040		.0148		.0233		.0266		.0303		.2300	

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	.152	5.00	.361	4.00	.342	3.00	.264	4.00
F002	.151	4.00	.373	6.00	.346	4.00	.251	2.00
F003	.165	17.00	.406	26.00	.385	24.00	.289	23.00
F005	.1691	26.00	.3997	21.00	.3864	25.00	.2774	11.00
F008	.16	11.50	.38	10.50	.37	16.00	.28	14.00
F009	.17	28.00	.39	14.50	.39	27.00	.29	24.00
F010	.155	7.00	.371	5.00	.354	6.00	.268	5.00
F011	.168	22.50	.425	29.00	.401	31.00	.301	30.00
F013	.169	24.50	.403	25.00	.384	23.00	.291	25.00
F014	.166	18.50	.392	16.00	.376	18.00	.283	19.00
F015	.167	20.50	.395	17.50	.381	21.50	.286	21.00
F016	.174	31.00	.522 EH	33.00	.400	29.50	.303	31.00
F020	.1528	6.00	.3753	7.00	.3567	7.00	.2692	6.00
F024	.16	11.50	.39	14.50	.36	9.50	.27	7.00
F025	.14 L	1.00	.36	2.50	.35	5.00	.28	14.00
F030	.167	20.50	.388	12.00	.363	11.00	.275	9.00
F031	.159	8.00	.445 H	31.00	.520 EH	33.00	.420 EH	33.00
F033	.15	3.00	.36	2.50	.34	2.00	.26	3.00
F035	.170	28.00	.413	28.00	.367	13.00	.280	14.00
F036	.1628	15.00	.3770	8.00	.3680	14.00	.2819	18.00
F038	.166	18.50	.395	17.50	.374	17.00	.285	20.00
F046	.169	24.50	.408	27.00	.392	28.00	.300	28.50
F048	.1704	30.00	.3968	19.00	.3696	15.00	.2767	10.00
F058	.160	11.50	.399	20.00	.379	19.00	.287	22.00
F060	.16	11.50	.40	23.00	.38	20.00	.28	14.00
F063	.20 VH	33.00	.46 H	32.00	.43 H	32.00	.33 VH	32.00
F064	.142 L	2.00	.321 VL	1.00	.301 VL	1.00	.199 EL	1.00
F066	.17	28.00	.43	30.00	.40	29.50	.30	28.50
F067	.16	11.50	.38	10.50	.36	9.50	.28	14.00
F069	.16	11.50	.379	9.00	.357	8.00	.271	8.00
F075	.168	22.50	.400	23.00	.388	26.00	.299	27.00
F076	.163	16.00	.400	23.00	.381	21.50	.281	17.00
F077	.1983 VH	32.00	.3898	13.00	.3661	12.00	.292	26.00
MEDIAN CONC.	.1650		.3950		.3740		.2810	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	95.50	9.550	10			ICP5X
F002	102.50	10.250	10			26305-04
F003	177.00	17.700	10			ICP
F005	207.00	20.700	10			ICP5X
F008	153.50	17.056	9			ICP
F009	143.00	17.875	8			ICP
F010	83.00	8.300	10			ICP
F011	157.00	22.429	7			
F013	123.50	24.700	5			ICP
F014	212.50	21.250	10	EH EHH		
F015	156.00	17.333	9			ICP
F016	225.00	25.000	9	H EH	BIASED HIGH	ICP
F020	47.00	5.222	9		BIASED LOW	26111
F024	104.50	10.450	10			ICP 5X
F025	87.00	8.700	10	EH L		AAS
F030	179.00	17.900	10	H		ICP 5X
F031	222.50	22.250	10	EHEHEH H EHEH		GFAAS
F033	49.00	5.444	9		BIASED LOW	ICP
F035	127.00	14.111	9			ICP-AES
F036	164.00	16.400	10	EH		ICP
F038	113.00	18.833	6			ICP
F046	212.50	21.250	10			ICP / GF
F048	162.00	16.200	10			GFAA
F058	98.50	10.944	9			COLORIMETRIC
F060	88.00	12.571	7	L		ICP, DISSOLVED
F063	292.00	29.200	10	EHEHEHVHEHH VHH H VH	BIASED HIGH	ICP
F064	123.50	12.350	10	VH VHEHH L L VLVLEL		AAS
F066	188.50	23.563	8			ICP
F067	155.50	15.550	10	EH		ICAP
F069	106.00	11.778	9			ICP
F075	168.00	16.800	10			ICP/AA-HGA
F076	124.00	13.778	9			ICP
F077	148.00	16.444	9	H VH		AA, 8X CONC'N

OVERALL AVERAGE RANK IS 15.930

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F020	47.00	5.222	9		BIASED LOW	26111
F033	49.00	5.444	9		BIASED LOW	ICP
F010	83.00	8.300	10			ICP
F025	87.00	8.700	10	EHL		AAS
F001	95.50	9.550	10			ICP5X
F002	102.50	10.250	10			26305-04
F024	104.50	10.450	10			ICP 5X
F058	98.50	10.944	9			COLORIMETRIC
F069	106.00	11.778	9			ICP
F064	123.50	12.350	10	VHVHEHHLLVLVLEL		AAS
F060	88.00	12.571	7	L		ICP, DISSOLVED
F076	124.00	13.778	9			ICP
F035	127.00	14.111	9			ICP-AES
F067	155.50	15.550	10	EH		ICAP
F048	162.00	16.200	10			GFAA
F036	164.00	16.400	10	EH		ICP
F077	148.00	16.444	9	HVH		AA, 8X CONC'N
F075	168.00	16.800	10			ICP/AA-HGA
F008	153.50	17.056	9			ICP
F015	156.00	17.333	9			ICP
F003	177.00	17.700	10			ICP
F009	143.00	17.875	8			ICP
F030	179.00	17.900	10	H		ICP 5X
F038	113.00	18.833	6			ICP
F005	207.00	20.700	10			ICP5X
F014	212.50	21.250	10	EHEHH		
F046	212.50	21.250	10			ICP / GF
F031	222.50	22.250	10	EHEHEHHEHEH		GFAAS
F011	157.00	22.429	7			
F066	188.50	23.563	8			ICP
F013	123.50	24.700	5			ICP
F016	225.00	25.000	9	HEH	BIASED HIGH	ICP
F063	292.00	29.200	10	EHEHEHVHEHHVHHHVH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 15.930

Iron

PARAMETER: 27091 Cobalt mg/L

RESEARCH AND APPLICATIONS 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	.0001	3.00	.0080	16.00	.0036	6.50	.0040	6.00	.0030	10.50	.1367	15.00
F003	.0001	4.00	.0073	7.00	.0034	4.50	.0037	2.00	.0027	5.00	.136	11.50
F005	.0000	1.00	.0079	11.00	.0037	8.00	.0040	12.00	.0031	14.00	.1343	7.50
F008	<.005	0.00	.008	14.00	<.005	0.00	<.005	0.00	<.005	0.00	.13	3.50
F009	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	.15	27.00
F010	<.005	0.00	.010	21.00	.008 VH	20.00	.007 H	19.50	.007 VH	21.00	.138	16.50
F011	<.0001	0.00	.0081	17.00	.0037	9.50	.0039	5.00	.0030	10.50	.135	9.00
F015	<.005	0.00	.006	2.50	<.005	0.00	<.005	0.00	<.005	0.00	.136	11.50
F016	.008 EH	9.00	.018 EH	24.00	.013 EH	21.00	.005	16.50	.005	18.50	.141	20.50
F020	<.001	0.00	.0071	6.00	.005	15.50	<.004	0.00	.005	18.50	.1353	10.00
F024	<.001	0.00	.007	4.50	.003	2.00	.003	1.00	.002	1.50	.13	3.50
F025	.002	5.50	.007	4.50	.003	2.00	.004	9.00	.003	10.50	.143	22.50
F030	<.002	0.00	.006	2.50	.005	15.50	.004	9.00	.002	1.50	.134	6.00
F033	<.0005	0.00	.0076	8.50	.0034	4.50	.0038	4.00	.0029	7.00	.13	3.50
F035	<.0025	0.00	<.0025 EL	0.00	<.0025	0.00	.0045	15.00	<.0025	0.00	.1363	13.00
F036	.0000T	2.00	.0078	10.00	.0036	6.50	.0037	3.00	.0029	6.00	.1364	14.00
F038	<.001	0.00	.008	14.00	.004	12.50	.004	9.00	.003	10.50	.139	18.00
F046	.001W	0.00	.010	21.00	.006	18.00	.005	16.50	.003	10.50	.141	20.50
F060	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	.15	27.00
F063	<.0004	0.00	.0058	1.00	.0030	2.00	.0042	13.00	.0025	3.50	.144	24.00
F064	.0020	5.50	.0079	12.00	.0060	18.00	.0099 EH	21.00	.0040	16.00	.115 L	1.00
F065	.003	7.00	.011 H	23.00	.006	18.00	.007 H	19.50	.006 H	20.00	.147	25.00
F066	<.01	0.00	.01	21.00	<.01	0.00	<.01	0.00	<.01	0.00	.15	27.00
F067	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	.13	3.50
F069	<.001	0.00	.0076	8.50	.0037	9.50	.004	9.00	.0025	3.50	.14	19.00
F075	<.002	0.00	.008	14.00	.004	12.50	.004	9.00	.003	10.50	.138	16.50
F076	<.0005	0.00	.0086	18.00	.0039	11.00	.0043	14.00	.0032	15.00	.143	22.50
F077	.0032	8.00	.0088	19.00	.0048	14.00	.0059	18.00	.0049	17.00	.1343	7.50
MEDIAN CONC.	.0020		.0080		.0039		.0040		.0030		.1365	

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	.0888	18.00	.2107	6.00	.3222	8.00	.3759	6.00
F003	.085	10.00	.219	11.00	.328	13.00	.385	11.00
F005	.0871	14.00	.2165	9.00	.3147	5.00	.3717	5.00
F008	.08	3.50	.21	4.00	.33	15.00	.39	14.50
F009	.10 H	26.50	.23	20.00	.36	27.00	.42	26.50
F010	.088	16.00	.225	17.00	.327	11.50	.384	10.00
F011	.0849	8.50	.220	12.50	.326	10.00	.382	9.00
F015	.088	16.00	.224	16.00	.337	19.00	.398	18.00
F016	.088	16.00	.229	19.00	.336	18.00	.388	13.00
F020	.0869	12.00	.2222	15.00	.3344	17.00	.3958	17.00
F024	.084	7.00	.21	4.00	.32	7.00	.38	7.00
F025	.096	25.00	.237	24.50	.347	23.00	.404	22.00
F030	.082	5.00	.210	4.00	.314	4.00	.367	4.00
F033	.078	2.00	.20	2.00	.30	2.00	.36	3.00
F035	.0833	6.00	.2326	21.00	.3190	6.00	.3812	8.00
F036	.0849	8.50	.2134	8.00	.3233	9.00	.3870	12.00
F038	.087	13.00	.233	22.00	.345	22.00	.407	23.00
F046	.091	21.00	.228	18.00	.341	20.00	.401	20.50
F060	.10 H	26.50	.24	27.00	.36	27.00	.43	28.00
F063	.093	23.00	.234	23.00	.342	21.00	.418	25.00
F064	.075 L	1.00	.199	1.00	.219 EL	1.00	.338 L	1.00
F065	.094	24.00	.237	24.50	.355	25.00	.416	24.00
F066	.09	19.50	.24	27.00	.36	27.00	.42	26.50
F067	.08	3.50	.22	12.50	.33	15.00	.39	14.50
F069	.09	19.50	.24	27.00	.35	24.00	.4	19.00
F075	.086	11.00	.217	10.00	.330	15.00	.395	16.00
F076	.0911	22.00	.221	14.00	.327	11.50	.401	20.50
F077	.842 EH	28.00	.2131	7.00	.3091	3.00	.356	2.00
MEDIAN CONC.	.0875		.2216		.3300		.3900	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	95.00	9.500	10			ICPMS
F003	79.00	7.900	10			ICP
F005	86.50	8.650	10			ICPMS
F008	54.50	9.083	6			GFAAS
F009	127.00	25.400	5	H	BIASED HIGH	ICP
F010	152.50	16.944	9	VHH VH		ICP
F011	91.00	10.111	9			
F015	83.00	13.833	6			ICP
F016	175.50	17.550	10	EHEHEH		ICP
F020	111.00	13.875	8			27111 / 27107
F024	37.50	4.167	9		BIASED LOW	ICP 5X
F025	148.50	14.850	10			ICP / AAS
F030	51.50	5.722	9		BIASED LOW	ICP 5X
F033	36.50	4.056	9		BIASED LOW	ICP
F035	69.00	11.500	6	EL		ICP-AES
F036	79.00	7.900	10			ICP
F038	144.00	16.000	9			GFAAS
F046	166.00	18.444	9			ICP / GF
F060	135.50	27.100	5	H	BIASED HIGH	ICP, DISSOLVED
F063	135.50	15.056	9			GFAA / ICP
F064	77.50	7.750	10	EH L L ELL		AAS
F065	210.00	21.000	10	H H H	BIASED HIGH	ICPMS
F066	148.00	24.667	6		BIASED HIGH	ICP
F067	49.00	9.800	5			ICAP
F069	139.00	15.444	9			GFAA
F075	114.50	12.722	9			ICP/AA-HGA
F076	148.50	16.500	9			ICPMS
F077	123.50	12.350	10	EH		AA, 8X CONC'N

OVERALL AVERAGE RANK IS 13.000

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F033	36.50	4.056	9		BIASED LOW	ICP
F024	37.50	4.167	9		BIASED LOW	ICP 5X
F030	51.50	5.722	9		BIASED LOW	ICP 5X
F064	77.50	7.750	10	EHLLELL		AAS
F003	79.00	7.900	10			ICP
F036	79.00	7.900	10			ICP
F005	86.50	8.650	10			ICPMS
F008	54.50	9.083	6			GFAAS
F001	95.00	9.500	10			ICPMS
F067	49.00	9.800	5			ICAP
F011	91.00	10.111	9			
F035	69.00	11.500	6	EL		ICP-AES
F077	123.50	12.350	10	EH		AA, 8X CONC'N
F075	114.50	12.722	9			ICP/AA-HGA
F015	83.00	13.833	6			ICP
F020	111.00	13.875	8			27111 / 27107
F025	148.50	14.850	10			ICP / AAS
F063	135.50	15.056	9			GFAA / ICP
F069	139.00	15.444	9			GFAA
F038	144.00	16.000	9			GFAAS
F076	148.50	16.500	9			ICPMS
F010	152.50	16.944	9	VHHVH		ICP
F016	175.50	17.550	10	EHEHEH		ICP
F046	166.00	18.444	9			ICP / GF
F065	210.00	21.000	10	HHH	BIASED HIGH	ICPMS
F066	148.00	24.667	6		BIASED HIGH	ICP
F009	127.00	25.400	5	H	BIASED HIGH	ICP
F060	135.50	27.100	5	H	BIASED HIGH	ICP, DISSOLVED

OVERALL AVERAGE RANK IS 13.000

Cobalt

PARAMETER: 28091 Nickel mg/L

RESEARCH AND APPLICATIONS 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	.0027	13.00	.0085	10.00	.0183	9.00	.0026	5.00	.0187	6.00	.0771	17.00
F002	.0019	6.00	.0083	8.00	.0190	13.50	.0027	8.50	.0193	13.00	.075	7.00
F003	.0014	2.50	.0077	3.00	.0166	1.00	.0025	4.00	.0172	4.00	.077	15.00
F005	.0014	2.50	.0091	20.00	.0195	17.00	.0028	10.00	.0209	20.00	.0818	27.00
F008	<.005	0.00	.008	5.50	.018	5.50	<.005	0.00	.019	9.00	.079	21.00
F009	<.01	0.00	<.01	0.00	.02	21.50	<.01	0.00	.02	15.00	.07	4.00
F010	<.004	0.00	.011	22.50	.022	25.00	.005 H	17.00	.023	24.00	.077	15.00
F011	.0020	9.00	.0087	11.50	.0185	10.00	.0026	6.50	.0191	12.00	.0758	9.00
F013	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.076	10.50
F014	<.01	0.00	<.01	0.00	<.01 EL	0.00	<.01	0.00	<.01 EL	0.00	.067 L	3.00
F015	<.02	0.00	<.02	0.00	.02	21.50	<.02	0.00	<.02	0.00	.08	24.50
F016	.003	15.00	.009	16.50	.018	5.50		0.00	.019	9.00	.080	24.50
F020	<.008	0.00	.0087	11.50	.0196	18.50	<.005	0.00	.0201	17.00	.0763	12.00
F024	<.001	0.00	.009	16.50	.018	5.50	.003	13.50	.017	2.50	.064 L	2.00
F025	<.001	0.00	.005 L	2.00	.024 H	26.50	.024 EH	19.00	.026 VH	26.00	.084	29.00
F030	.002	9.00	.009	16.50	.020	21.50	.002	2.50	.020	15.00	.075	7.00
F033	.002	9.00	.009	16.50	.018	5.50	.002	2.50	.018	5.00	.075	7.00
F035	<.005	0.00	<.005 L	0.00	.017	2.00	<.005	0.00	.005 EL	1.00	.077	15.00
F036	.0024	12.00	.0080	5.50	.0196	18.50	.0014	1.00	.0208	19.00	.0790	21.00
F038	.002	9.00	.009	16.50	.018	5.50	.003	13.50	.019	9.00	.082	28.00
F046	.002	9.00	.009	16.50	.019	13.50	.003	13.50	.019	9.00	.076	10.50
F048	.0016	4.50	.0080	5.50	.0188	11.00	.0026	6.50	.0204	18.00	.0769	13.00
F060	<.02	0.00	<.02	0.00	.03 EH	28.00	<.02	0.00	.03 EH	27.50	.09 H	31.50
F063	<.01	0.00	<.01	0.00	<.01 EL	0.00	<.01	0.00	.03 EH	27.50	.09 H	31.50
F064	<.002	0.00	.0039 VL	1.00	.019	13.50	<.002	0.00	.017	2.50	.014 EL	1.00
F065	.004	16.00	.011	22.50	.020	21.50	.006 VH	18.00	.022	21.00	.079	21.00
F066	<.01	0.00	.012 H	24.00	.024 H	26.50	<.01	0.00	.025 H	25.00	.087 H	30.00
F067	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.08	24.50
F069	.0016	4.50	.0085	9.00	.019	13.50	.0027	8.50	.02	15.00	.08	24.50
F075	<.002	0.00	.008	5.50	.018	5.50	.003	13.50	.019	9.00	.078	18.00
F076	.0028	14.00	.0092	21.00	.0195	16.00	.0029	11.00	.0226	23.00	.0789	19.00
F077	.0007	1.00	.0089	13.00	.0217	24.00	.0033	16.00	.0223	22.00	.0721	5.00
MEDIAN CONC.	.0020		.0088		.0190		.0028		.0200		.0770	

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	.1699	11.00	.2409	8.00	.2603	14.00	.3659	9.00
F002	.170	13.00	.247	14.00	.260	12.00	.370	13.50
F003	.172	17.00	.248	15.00	.262	16.00	.371	16.50
F005	.1799	26.00	.2580	24.50	.2723	26.00	.3753	20.00
F008	.16	4.50	.24	6.50	.25	4.00	.37	13.50
F009	.18	27.50	.25	18.50	.26	12.00	.37	13.50
F010	.168	9.00	.241	9.00	.254	6.00	.359	5.50
F011	.169	10.00	.246	12.00	.257	9.00	.368	10.00
F013	.172	17.00	.246	12.00	.263	17.00	.371	16.50
F014	.156	3.00	.229	2.00	.245	2.00	.354	4.00
F015	.17	13.00	.25	18.50	.27	24.50	.38	23.50
F016	.172	17.00	.251	21.50	.269	22.00	.380	23.50
F020	.1732	19.00	.2491	16.00	.2651	19.00	.3770	21.00
F024	.15 L	2.00	.23	3.50	.25	4.00	.36	7.50
F025	.181	29.00	.262	27.00	.269	22.00	.383	25.00
F030	.165	7.00	.242	10.00	.256	7.50	.351	3.00
F033	.16	4.50	.23	3.50	.25	4.00	.35	2.00
F035	.164	6.00	.253	23.00	.256	7.50	.359	5.50
F036	.1703	15.00	.2397	5.00	.2575	10.00	.3698	11.00
F038	.178	25.00	.251	21.50	.261	15.00	.387	26.00
F046	.175	21.50	.250	18.50	.269	22.00	.379	22.00
F048	.1678	8.00		0.00		0.00		0.00
F060	.19	30.00	.27	28.00	.29	28.00	.40	27.00
F063	.20 H	32.00	.28 H	31.00	.30 H	30.00	.43 VH	31.00
F064	.015 EL	1.00	.225	1.00	.219 VL	1.00	.322 L	1.00
F065	.176	23.00	.258	24.50	.278	27.00	.402	28.00
F066	.192 H	31.00	.275	30.00	.291 H	29.00	.412 H	29.00
F067	.17	13.00	.24	6.50	.26	12.00	.36	7.50
F069	.18	27.50	.26	26.00	.27	24.50	.37	13.50
F075	.174	20.00	.250	18.50	.268	20.00	.375	19.00
F076	.175	21.50	.246	12.00	.265	18.00	.372	18.00
F077	.1776	24.00	.2739	29.00	.3021 H	31.00	.426 H	30.00
MEDIAN CONC.	.1720		.2491		.2620		.3710	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	102.00	10.200	10			ICPMS
F002	108.50	10.850	10			28302-01
F003	94.00	9.400	10			ICP
F005	193.00	19.300	10			ICPMS
F008	69.50	8.688	8			GFAAS
F009	112.00	16.000	7			ICP
F010	133.00	14.778	9	H		ICP
F011	99.00	9.900	10			
F013	73.00	14.600	5			ICP
F014	14.00	2.800	5	EL ELL	BIASED LOW	
F015	125.50	20.917	6			ICP
F016	154.50	17.167	9			ICP
F020	134.00	16.750	8			28111 / 28107
F024	57.00	6.333	9	L L	BIASED LOW	ICP 5X
F025	205.50	22.833	9	L H EHVH	BIASED HIGH	ICP / AAS
F030	99.00	9.900	10			ICP 5X
F033	59.50	5.950	10		BIASED LOW	ICP
F035	60.00	8.571	7	L EL		ICP-AES
F036	118.00	11.800	10			ICP / GF
F038	169.00	16.900	10			GFAAS
F046	156.00	15.600	10			ICP / GF
F048	66.50	9.500	7			GFAA
F060	200.00	28.571	7	EH EHH	BIASED HIGH	ICP, DISSOLVED
F063	183.00	30.500	6	EL EHH H H H VH	BIASED HIGH	ICP
F064	22.00	2.750	8	VL ELEL VLL	BIASED LOW	AAS
F065	222.50	22.250	10	VH		ICPMS
F066	224.50	28.063	8	H H H H H H H	BIASED HIGH	ICP
F067	63.50	12.700	5			ICAP
F069	166.50	16.650	10			GFAA
F075	129.00	14.333	9			AA-HGA
F076	173.50	17.350	10			ICPMS
F077	195.00	19.500	10	H H		AA, 8X CONC'N

OVERALL AVERAGE RANK IS 14.640

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F064	22.00	2.750	8	VLELELVLL	BIASED LOW	AAS
F014	14.00	2.800	5	ELELL	BIASED LOW	
F033	59.50	5.950	10		BIASED LOW	ICP
F024	57.00	6.333	9	LL	BIASED LOW	ICP 5X
F035	60.00	8.571	7	LEL		ICP-AES
F008	69.50	8.688	8			GFAAS
F003	94.00	9.400	10			ICP
F048	66.50	9.500	7			GFAA
F030	99.00	9.900	10			ICP 5X
F011	99.00	9.900	10			
F001	102.00	10.200	10			ICPMS
F002	108.50	10.850	10			28302-01
F036	118.00	11.800	10			ICP / GF
F067	63.50	12.700	5			ICAP
F075	129.00	14.333	9			AA-HGA
F013	73.00	14.600	5			ICP
F010	133.00	14.778	9	H		ICP
F046	156.00	15.600	10			ICP / GF
F009	112.00	16.000	7			ICP
F069	166.50	16.650	10			GFAA
F020	134.00	16.750	8			28111 / 28107
F038	169.00	16.900	10			GFAAS
F016	154.50	17.167	9			ICP
F076	173.50	17.350	10			ICPMS
F005	193.00	19.300	10			ICPMS
F077	195.00	19.500	10	HH		AA, 8X CONC'N
F015	125.50	20.917	6			ICP
F065	222.50	22.250	10	VH		ICPMS
F025	205.50	22.833	9	LHEHVH	BIASED HIGH	ICP / AAS
F066	224.50	28.063	8	HHHHHHH	BIASED HIGH	ICP
F060	200.00	28.571	7	EHEHH	BIASED HIGH	ICP, DISSOLVED
F063	183.00	30.500	6	ELEHHHHHVH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 14.640

PARAMETER: 29091 Copper mg/L

RESEARCH AND APPLICATIONS 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	.0018	13.00	.0088	10.00	.0138	15.00	.0349	16.00	.0059	11.00	.1492	14.00
F002	.0017	11.00	.009	12.50	.0140	18.00	.036	23.00	.0057	9.00	.150	19.50
F003	.0016	9.00	.0092	16.00	.0143	22.00	.0342	14.50	.0064	18.00	.156	29.00
F005	.0014	7.00	.0095	17.00	.0141	21.00	.0368	28.00	.0063	17.00	.1495	16.00
F008	<.01	0.00	.01	22.50	.01 L	4.00	.03	5.50	<.01	0.00	.15	19.50
F009	<.01	0.00	<.01	0.00	<.01 L	0.00	.02 EL	3.00	<.01	0.00	.14	5.50
F010	.003	18.00	.011	27.50	.016	28.00	.036	23.00	.008	24.50	.143	7.00
F011	.0014	6.00	.0091	15.00	.0140	18.00	.0342	14.50	.0060	14.00	.149	12.50
F013	<.02	0.00	<.02	0.00	.015	24.50	.036	23.00	<.02	0.00	.160	30.00
F014	<.0005	0.00	.006 L	1.00	.010 L	4.00	.031	7.50	.004	2.00	.155	27.00
F015	<.005	0.00	.01	22.50	.015	24.50	.036	23.00	.007	21.50	.152	23.50
F016	.006 EH	21.00	.013 H	29.00	.021 EH	31.00	.044 VH	34.00	.014 EH	26.00	.179 VH	34.00
F020	.0012	2.50	.0083	8.00	.0133	13.00	.034	13.00	.0055	7.00	.1447	9.00
F024	.001	1.00	.008	5.00	.012	7.00	.035	17.50	.006	14.00	.15	19.50
F025	.003	18.00	.008	5.00	.013	11.00	.036	23.00	.006	14.00	.149	12.50
F030	.002	14.50	.010	22.50	.014	18.00	.033	11.00	.005	3.50	.145	10.00
F031	.0015	8.00	.010	22.50	.014	18.00	.036	23.00	.008	24.50	.150	19.50
F033	.0013	4.50	.009	12.50	.013	11.00	.031	7.50	.0054	6.00	.14	5.50
F035	<.002	0.00	.008	5.00	.012	7.00	.032	9.00	.005	3.50	.135	4.00
F036	.0018	12.00	.0082	7.00	.0123	9.00	.0334	12.00	.0056	8.00	.1494	15.00
F037	<.01	0.00	.010	22.50	<.01 L	0.00	.010 EL	1.00	<.01	0.00	.131 L	3.00
F038	.002	14.50	.01	22.50	.014	18.00	.035	17.50	.007	21.50	.148	11.00
F046	.003	18.00	.009	12.50	.013	11.00	.036	23.00	.006	14.00	.152	23.50
F048	.0012	2.50	.0079	3.00	.0120	7.00	.0326	10.00	.0052	5.00	.1435	8.00
F060	<.02	0.00	<.02	0.00	<.02	0.00	.04	32.50	<.02	0.00	.17 H	32.50
F063	<.01	0.00	.01	22.50	.02 VH	30.00	.04	32.50	<.01	0.00	.17 H	32.50
F064	.0022	16.00	.0076	2.00	.0097 L	2.00	.027 VL	4.00	.0032 L	1.00	.076 EL	1.00
F065	.004 H	20.00	.011	27.50	.016	28.00	.038	31.00	.007	21.50	.161	31.00
F066	.007 EH	22.00	.010	22.50	.016	28.00	.036	23.00	.006	14.00	.154	25.00
F067	<.01	0.00	<.01	0.00	.01 L	4.00	.03	5.50	<.01	0.00	.15	19.50
F069	.0013	4.50	.0086	9.00	.0137	14.00	.036	23.00	.0058	10.00	.15	19.50
F075	<.002	0.00	.009	12.50	.015	24.50	.037	30.00	.007	21.50	.155	27.00
F076	.0016	10.00	.0096	18.00	.015	24.50	.0369	29.00	.0064	19.00	.155	27.00
F077		0.00		0.00	.0002 EL	1.00	.0187 EL	2.00		0.00	.1177 VL	2.00
MEDIAN CONC.	.0018		.0091		.0140		.0350		.0060		.1500	

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	.0995	16.00	.2364	9.00	.3568	9.00	.4261	12.00
F002	.104	26.50	.254	23.00	.374	20.50	.450	22.00
F003	.103	23.50	.260	28.00	.383	25.00	.462	29.00
F005	.0973	11.00	.2387	11.00	.3535	8.00	.4104	8.00
F008	.10	18.50	.24	12.50	.36	10.50	.44	17.50
F009	.09	5.50	.19 EL	2.00	.30 VL	2.00	.38 L	3.00
F010	.097	10.00	.236	8.00	.352	7.00	.419	9.00
F011	.0985	14.00	.249	19.50	.368	17.00	.437	16.00
F013	.107	29.00	.262	30.00	.391	31.00	.464	30.00
F014	.104	26.50	.245	18.00	.364	14.00	.428	13.00
F015	.101	21.00	.252	22.00	.375	22.00	.451	24.00
F016	.115 H	33.00	.273 H	34.00	.406	33.00	.473	33.00
F020	.0964	9.00	.2411	15.00	.3611	12.00	.4332	15.00
F024	.10	18.50	.26	28.00	.39	30.00	.45	22.00
F025	.098	12.50	.242	16.00	.366	16.00	.442	20.00
F030	.098	12.50	.244	17.00	.360	10.50	.420	10.00
F031	.125 EH	34.00	.225	6.00	.370	18.50	.410	7.00
F033	.088 L	3.50	.22	4.00	.33 L	5.50	.39 L	4.00
F035	.088 L	3.50	.234	7.00	.330 L	5.50	.396	6.00
F036	.0990	15.00	.2405	14.00	.3642	15.00	.4411	19.00
F037	.090	5.50	.238	10.00	.362	13.00	.426	11.00
F038	.096	8.00	.249	19.50	.374	20.50	.450	22.00
F046	.103	23.50	.256	24.00	.384	26.50	.459	26.00
F048	.0910	7.00	.2231	5.00	.3177 L	4.00	.3796 L	2.00
F060	.11	31.50	.27	32.50	.41 H	34.00	.49 H	34.00
F063	.11	31.50	.27	32.50	.38	23.50	.47	31.00
F064	.073 EL	1.00	.162 EL	1.00	.248 EL	1.00	.313 EL	1.00
F065	.108	30.00	.264	31.00	.395	32.00	.472	32.00
F066	.103	23.50	.257	25.00	.386	28.50	.460	27.00
F067	.10	18.50	.25	21.00	.37	18.50	.44	17.50
F069	.10	18.50	.24	12.50	.38	23.50	.43	14.00
F075	.105	28.00	.260	28.00	.384	26.50	.461	28.00
F076	.103	23.50	.259	26.00	.386	28.50	.456	25.00
F077	.0750 EL	2.00	.2064 L	3.00	.3091 VL	3.00	.393 L	5.00
MEDIAN CONC.	.1000		.2445		.3690		.4400	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	125.00	12.500	10			ICPMS
F002	185.00	18.500	10			29305-06
F003	214.00	21.400	10			ICP
F005	144.00	14.400	10			ICPMS
F008	110.50	13.813	8	L		ICP
F009	21.00	3.500	6	L EL ELVLL	BIASED LOW	ICP
F010	162.00	16.200	10			ICP
F011	146.50	14.650	10			
F013	197.50	28.214	7		BIASED HIGH	ICP
F014	113.00	12.556	9	L L		
F015	204.00	22.667	9			ICP
F016	308.00	30.800	10	EHH EHVHEHVHH H	BIASED HIGH	ICP
F020	103.50	10.350	10			29111
F024	162.50	16.250	10			ICP 5X
F025	148.00	14.800	10			ICP / AAS
F030	129.50	12.950	10			ICP 5X
F031	181.00	18.100	10	EH		GFAAS
F033	64.00	6.400	10	L L L	BIASED LOW	ICP
F035	50.50	5.611	9	L L	BIASED LOW	ICP-AES
F036	126.00	12.600	10			ICP / GF
F037	66.00	9.429	7	L EL L		ICP
F038	175.00	17.500	10			GFAAS
F046	202.00	20.200	10			ICP / GF
F048	53.50	5.350	10	L L	BIASED LOW	GFAA
F060	197.00	32.833	6	H H H	BIASED HIGH	ICP, DISSOLVED
F063	236.00	29.500	8	VH H	BIASED HIGH	ICP
F064	30.00	3.000	10	L VLL ELELELELEL	BIASED LOW	AAS
F065	284.00	28.400	10	H	BIASED HIGH	ICPMS
F066	238.50	23.850	10	EH		ICP
F067	104.50	14.929	7	L		ICAP
F069	148.50	14.850	10			GFAA
F075	226.00	25.111	9			ICP/AA-HGA
F076	230.50	23.050	10			ICPMS
F077	18.00	2.571	7	ELEL VLELL VLL	BIASED LOW	AA, 8X CONC'N

OVERALL AVERAGE RANK IS 16.362

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F077	18.00	2.571	7	ELELVLELLVLL	BIASED LOW	AA, 8X CONC'N
F064	30.00	3.000	10	LVLLELELELELEL	BIASED LOW	AAS
F009	21.00	3.500	6	LELELVLL	BIASED LOW	ICP
F048	53.50	5.350	10	LL	BIASED LOW	GFAA
F035	50.50	5.611	9	LL	BIASED LOW	ICP-AES
F033	64.00	6.400	10	LLL	BIASED LOW	ICP
F037	66.00	9.429	7	LELL		ICP
F020	103.50	10.350	10			29111
F001	125.00	12.500	10			ICPMS
F014	113.00	12.556	9	LL		
F036	126.00	12.600	10			ICP / GF
F030	129.50	12.950	10			ICP 5X
F008	110.50	13.813	8	L		ICP
F005	144.00	14.400	10			ICPMS
F011	146.50	14.650	10			
F025	148.00	14.800	10			ICP / AAS
F069	148.50	14.850	10			GFAA
F067	104.50	14.929	7	L		ICAP
F010	162.00	16.200	10			ICP
F024	162.50	16.250	10			ICP 5X
F038	175.00	17.500	10			GFAAS
F031	181.00	18.100	10	EH		GFAAS
F002	185.00	18.500	10			29305-06
F046	202.00	20.200	10			ICP / GF
F003	214.00	21.400	10			ICP
F015	204.00	22.667	9			ICP
F076	230.50	23.050	10			ICPMS
F066	238.50	23.850	10	EH		ICP
F075	226.00	25.111	9			ICP/AA-HGA
F013	197.50	28.214	7		BIASED HIGH	ICP
F065	284.00	28.400	10	H	BIASED HIGH	ICPMS
F063	236.00	29.500	8	VHH	BIASED HIGH	ICP
F016	308.00	30.800	10	EHHEHVHEHVHHH	BIASED HIGH	ICP
F060	197.00	32.833	6	HHH	BIASED HIGH	ICP, DISSOLVED

OVERALL AVERAGE RANK IS 16.362

Copper

PARAMETER: 30091 Zinc mg/L

RESEARCH AND APPLICATIONS 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	.0012	4.00	.0059	10.00	.0249	17.00	.0223	20.00	.0193	17.50	.1225	10.00
F002		0.00		0.00	.026	21.00	.023	23.50	.020	22.00	.127	18.00
F003	.0013	6.00	.0058	8.00	.0244	15.00	.0215	14.00	.0192	15.50	.135	29.50
F005	.0022	12.00	.0063	17.00	.0246	16.00	.0221	19.00	.0192	14.00	.1208	7.00
F008	.01 EH	18.00	.01 H	23.00	.03	29.50	.03 VH	31.00	.02	22.00	.13	24.00
F009	<.01	0.00	<.01	0.00	.02	3.50	.02	8.50	.02	22.00	.13	24.00
F010	.002	10.00	.006	13.50	.024	12.00	.022	16.50	.019	10.50	.122	8.50
F011	.0012	5.00	.0060	13.50	.0267	22.00	.0235	25.00	.0210	27.50	.130	24.00
F013	<.02	0.00	<.02	0.00	.022	6.00	.022	16.50	.020	22.00	.129	20.00
F014	.0017	8.00	.0067	18.00	.017 VL	1.00	.017 L	2.50	.014 L	2.00	.123	12.50
F015	<.002	0.00	.005	3.50	.024	12.00	.022	16.50	.019	10.50	.129	20.00
F016	.002	10.00	.006	13.50	.028	25.50	.024	27.00	.019	10.50	.136	31.00
F020	<.002	0.00	.0059	9.00	.0253	19.00	.0225	21.00	.0191	13.00	.1261	17.00
F024	<.001	0.00	.005	3.50	.024	12.00	.020	8.50	.018	7.50	.13	24.00
F025	.001	3.00	.005	3.50	.037 EH	32.00	.031 VH	32.00	.020	22.00	.129	20.00
F030	.015 EH	19.00	.025 EH	24.00	.063 EH	33.00	.037 EH	33.00	.030 EH	32.50	.133	27.50
F031	.0006	1.00	.005	3.50	.021	5.00	.017 L	2.50	.015	3.00	.35 EH	33.00
F033	.002	10.00	.006	13.50	.024	12.00	.020	8.50	.017	5.00	.12	5.00
F035	<.0025	0.00	<.0025 L	0.00	.0172 L	2.00	.0183	4.00	.0132 L	1.00	.1110	2.00
F036	.0009	2.00	.0046	1.00	.0225	7.00	.0249	29.00	.0170	5.00	.1230	12.50
F037	<.01	0.00	<.01	0.00	.020	3.50	.013 VL	1.00	.017	5.00	.120	5.00
F038	<.005	0.00	<.005	0.00	.027	23.50	.02	8.50	.022	30.50	.122	8.50
F046	.003	13.50	.008	21.00	.029	27.00	.024	27.00	.021	27.50	.126	16.00
F060	<.005	0.00	.007	19.00	.028	25.50	.025	30.00	.021	27.50	.135	29.50
F063	<.01	0.00	<.01	0.00	.03	29.50	.02	8.50	.03 EH	32.50	.13	24.00
F064	.0045	16.00	.0075	20.00	.023	8.00	.023	23.50	.022	30.50	.117	3.00
F065	.007 VH	17.00	.006	13.50	.027	23.50	.024	27.00	.021	27.50	.133	27.50
F066	<.01	0.00	<.01	0.00	.03	29.50	.02	8.50	.02	22.00	.14	32.00
F067	<.01	0.00	<.01	0.00	.03	29.50	.02	8.50	.02	22.00	.12	5.00
F069	.0038	15.00	.0051	6.00	.025	18.00	.02	8.50	.018	7.50	.123	12.50
F075	.003	13.50	.009	22.00	.024	12.00	.022	16.50	.019	10.50	.123	12.50
F076	.0016	7.00	.006	13.50	.0254	20.00	.0228	22.00	.0192	15.50	.125	15.00
F077		0.00	.0052	7.00	.0235	9.00	.0214	13.00	.0193	17.50	.1022 VL	1.00
MEDIAN CONC.	.0020		.0060		.0249		.0220		.0193		.1261	

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	.0886	16.00	.2106	15.00	.4008	18.00	.5384	13.00
F002	.090	21.00	.218	20.50	.400	16.50	.550	19.50
F003	.095	27.50	.229	29.00	.414	25.00	.569	25.00
F005	.0847	7.00	.1991	4.00	.3701	5.00	.4974	4.00
F008	.09	21.00	.22	24.00	.40	16.50	.55	19.50
F009	.09	21.00	.22	24.00	.43	30.00	.58	28.00
F010	.085	8.00	.205	8.50	.380	8.50	.520	7.00
F011	.0884	14.50	.224	27.00	.419	26.00	.571	26.00
F013	.090	21.00	.217	19.00	.403	19.00	.547	16.00
F014	.861 EH	33.00	.208	12.00	.388	11.00	.526	9.00
F015	.092	26.00	.219	22.00	.406	21.00	.558	21.00
F016	.097	31.00	.232	33.00	.431	32.00	.589	30.00
F020	.0884	14.50	.2137	16.00	.3994	15.00	.5474	17.00
F024	.088	12.50	.22	24.00	.41	23.00	.56	23.00
F025	.088	12.50	.218	20.50	.411	24.00	.564	24.00
F030	.096	29.50	.222	26.00	.390	12.00	.531	12.00
F031	.21 EH	32.00	.20	5.00	.55 EH	33.00	2.0 EH	33.00
F033	.080	3.00	.19 L	3.00	.36	4.00	.50	5.00
F035	.0750 L	2.00	.2031	7.00	.3594	3.00	.4955	2.00
F036	.0852	9.00	.2015	6.00	.3797	7.00	.5286	10.00
F037	.086	10.00	.207	11.00	.384	10.00	.522	8.00
F038	.083	5.00	.215	17.00	.405	20.00	.548	18.00
F046	.090	21.00	.216	18.00	.407	22.00	.559	22.00
F060	.096	29.50	.231	32.00	.426	27.50	.576	27.00
F063	.09	21.00	.23	30.50	.43	30.00	.60	31.50
F064	.083	5.00	.176 VL	1.00	.352 L	2.00	.497	3.00
F065	.095	27.50	.227	28.00	.426	27.50	.587	29.00
F066	.09	21.00	.23	30.50	.43	30.00	.60	31.50
F067	.09	21.00	.21	14.00	.38	8.50	.53	11.00
F069	.09	21.00	.209	13.00	.376	6.00	.515	6.00
F075	.083	5.00	.205	8.50	.393	13.00	.540	14.50
F076	.0871	11.00	.206	10.00	.395	14.00	.540	14.50
F077	.0695 VL	1.00	.1875 L	2.00	.3475 L	1.00	.488 L	1.00
MEDIAN CONC.	.0900		.2150		.4000		.5474	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	140.50	14.050	10			ICPMS
F002	162.00	20.250	8			30304
F003	194.50	19.450	10			ICP
F005	105.00	10.500	10			ICPMS
F008	228.50	22.850	10	EHH VH		ICP
F009	161.00	20.125	8			ICP
F010	103.00	10.300	10			ICP
F011	210.50	21.050	10			
F013	139.50	17.438	8			ICP
F014	109.00	10.900	10	VLL L EH		
F015	152.50	16.944	9			ICP
F016	243.50	24.350	10			ICP
F020	141.50	15.722	9			30111
F024	138.00	15.333	9			ICP 5X
F025	193.50	19.350	10	EHVH		ICP / AAS
F030	248.50	24.850	10	EHEHEHEHEH		ICP 5X
F031	151.00	15.100	10	L EHEH EHEH		GFAAS
F033	69.00	6.900	10	L	BIASED LOW	ICP
F035	23.00	2.875	8	L L L L	BIASED LOW	ICP-AES
F036	88.50	8.850	10			ICP / GF
F037	53.50	6.688	8	VL	BIASED LOW	ICP
F038	131.00	16.375	8			ICP
F046	215.00	21.500	10			ICP
F060	247.50	27.500	9		BIASED HIGH	ICP, DISSOLVED
F063	207.50	25.938	8	EH	BIASED HIGH	ICP
F064	112.00	11.200	10	VLL		AAS
F065	248.00	24.800	10	VH		ICPMS
F066	205.00	25.625	8		BIASED HIGH	ICP
F067	119.50	14.938	8			ICAP
F069	113.50	11.350	10			ICP
F075	128.00	12.800	10			AA-HGA
F076	142.50	14.250	10			ICPMS
F077	52.50	5.833	9	VLVLL L L	BIASED LOW	AA, 8X CONC'N

OVERALL AVERAGE RANK IS 16.215

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F035	23.00	2.875	8	LLLL	BIASED LOW	ICP-AES
F077	52.50	5.833	9	VLVLLLL	BIASED LOW	AA, 8X CONC'N
F037	53.50	6.688	8	VL	BIASED LOW	ICP
F033	69.00	6.900	10	L	BIASED LOW	ICP
F036	88.50	8.850	10			ICP / GF
F010	103.00	10.300	10			ICP
F005	105.00	10.500	10			ICPMS
F014	109.00	10.900	10	VLLLEH		
F064	112.00	11.200	10	VLL		AAS
F069	113.50	11.350	10			ICP
F075	128.00	12.800	10			AA-HGA
F001	140.50	14.050	10			ICPMS
F076	142.50	14.250	10			ICPMS
F067	119.50	14.938	8			ICAP
F031	151.00	15.100	10	LEHEHEHEH		GFAAS
F024	138.00	15.333	9			ICP 5X
F020	141.50	15.722	9			30111
F038	131.00	16.375	8			ICP
F015	152.50	16.944	9			ICP
F013	139.50	17.438	8			ICP
F025	193.50	19.350	10	EHVH		ICP / AAS
F003	194.50	19.450	10			ICP
F009	161.00	20.125	8			ICP
F002	162.00	20.250	8			30304
F011	210.50	21.050	10			
F046	215.00	21.500	10			ICP
F008	228.50	22.850	10	EHHVH		ICP
F016	243.50	24.350	10			ICP
F065	248.00	24.800	10	VH		ICPMS
F030	248.50	24.850	10	EHEHEHEHEH		ICP 5X
F066	205.00	25.625	8		BIASED HIGH	ICP
F063	207.50	25.938	8	EH	BIASED HIGH	ICP
F060	247.50	27.500	9		BIASED HIGH	ICP, DISSOLVED

OVERALL AVERAGE RANK IS 16.215

Zinc

PARAMETER: 38091 Strontium mg/L

RESEARCH AND APPLICATIONS 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	.1740	8.00	.0471	15.50	.4337	10.00	.0478	7.00	.1019	7.00	.1514	15.00
F003	.178	14.00	.0471	15.50	.439	11.00	.0521	21.00	.105	11.00	.154	18.00
F005	.1758	9.00	.0476	17.00	.4558	18.00	.0515	19.00	.1106	18.00	.1519	16.00
F009	.18	17.00	.05	20.00	.45	17.00	.05	14.50	.11	17.00	.16	21.00
F010	.16	2.50	.04	2.00	.41	2.50	.05	14.50	.10	5.00	.14	4.50
F011	.177	12.00	.0468	11.00	.416	6.00	.0485	9.00	.103	9.50	.149	10.50
F015	.177	12.00	.047	13.00	.447	15.00	.05	14.50	.107	14.50	.15	12.00
F016	.181	19.00	.049	18.50	.474	20.50	.051	18.00	.112	19.00	.156	19.00
F020	.164	4.00	.043	3.50	.415	5.00	.046	4.00	.0996	3.00	.139	3.00
F024	.18	17.00	.045	6.50	.43	9.00	.046	4.00	.10	5.00	.16	21.00
F025	.218 VH	23.00	.058 H	21.00	.554 EH	24.00	.057	22.00	.134 VH	22.00	.151	13.50
F030	.171	7.00	.046	8.50	.428	8.00	.050	14.50	.103	9.50	.144	7.50
F033	.16	2.50	.043	3.50	.41	2.50	.046	4.00	.096	2.00	.14	4.50
F035	.165	5.00	.045	6.50	.409	1.00	.048	8.00	.100	5.00	.144	7.50
F038	.177	12.00	.046	8.50	.444	13.00	.049	10.00	.106	12.50	.148	9.00
F046	.179	15.00	.0462	10.00	.445	14.00	.0491	11.00	.106	12.50	.149	10.50
F063	.18	17.00	.01 EL	1.00	.46	19.00	.04 L	2.00		0.00	.12 VL	1.00
F065	.189	21.00	.049	18.50	.474	20.50	.052	20.00	.114	20.00	.161	23.00
F066	.21 H	22.00	.08 EH	22.00	.51 H	22.00	.06 H	23.00	.13 VH	21.00	.16	21.00
F067	.169	6.00	.044	5.00	.425	7.00	.047	6.00	.102	8.00	.141	6.00
F068	.081 EL	1.00		0.00	.411	4.00	.030 EL	1.00	.080 VL	1.00	.125 L	2.00
F069	.176	10.00	.047	13.00	.449	16.00	.05	14.50	.107	14.50	.151	13.50
F075	.25 EH	24.00	.11 EH	23.00	.52 VH	23.00	<.1	0.00	.16 EH	23.00	.22 EH	24.00
F076	.182	20.00	.047	13.00	.440	12.00	.050	14.50	.109	16.00	.152	17.00
MEDIAN CONC.	.1770		.0470		.4420		.0500		.1060		.1505	

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	.1954	9.00	.3576	15.00	.4624	13.00	.6204	12.00
F003	.207	16.00	.363	19.50	.471	20.00	.614	9.00
F005	.2070	16.00	.3569	14.00	.4607	12.00	.6244	13.00
F009	.21	19.50	.35	9.00	.47	18.50	.64	20.00
F010	.19	5.00	.33	5.00	.43	4.00	.59	3.50
F011	.199	10.00	.350	9.00	.455	10.00	.618	10.00
F015	.205	14.00	.355	13.00	.466	15.00	.635	18.00
F016	.212	21.00	.364	21.00	.476	21.00	.646	21.50
F020	.189	4.00	.329	4.00	.434	6.00	.593	5.00
F024	.21	19.50	.36	18.00	.47	18.50	.63	15.00
F025	.207	16.00	.358	16.50	.469	17.00	.637	19.00
F030	.195	8.00	.341	7.00	.449	9.00	.594	6.00
F033	.18	3.00	.32	3.00	.42	2.00	.58	2.00
F035	.192	6.00	.352	11.00	.440	7.00	.603	8.00
F038	.200	11.00	.350	9.00	.459	11.00	.632	16.50
F046	.204	13.00	.354	12.00	.465	14.00	.632	16.50
F063	.17 L	2.00	.30 L	2.00	.43	4.00	.59	3.50
F065	.215	22.00	.376	22.00	.494	23.00	.677	23.00
F066	.23 H	23.00	.40 H	23.00	.43	4.00	.62	11.00
F067	.193	7.00	.338	6.00	.441	8.00	.602	7.00
F068	.149 EL	1.00	.279 VL	1.00	.414	1.00	.563	1.00
F069	.203	12.00	.358	16.50	.467	16.00	.627	14.00
F075	.25 VH	24.00	.43 VH	24.00	.53 H	24.00	.72 H	24.00
F076	.209	18.00	.363	19.50	.479	22.00	.646	21.50
MEDIAN CONC.	.2035		.3545		.4615		.6224	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	111.50	11.150	10			ICPMS
F003	155.00	15.500	10			ICP
F005	152.00	15.200	10			ICPMS
F009	173.50	17.350	10			ICP
F010	48.50	4.850	10		BIASED LOW	ICP
F011	97.00	9.700	10			
F015	141.00	14.100	10			ICP
F016	198.50	19.850	10		BIASED HIGH	ICP
F020	41.50	4.150	10		BIASED LOW	38109
F024	133.50	13.350	10			ICP 5X
F025	194.00	19.400	10	VHH EH VH	BIASED HIGH	ICP
F030	85.00	8.500	10			ICP 5X
F033	29.00	2.900	10		BIASED LOW	ICP
F035	65.00	6.500	10			ICP-AES
F038	112.50	11.250	10			ICP
F046	128.50	12.850	10			ICP
F063	51.50	5.722	9	EL L VLL L	BIASED LOW	ICP
F065	213.00	21.300	10		BIASED HIGH	ICPMS
F066	192.00	19.200	10	H EHH H VH H H	BIASED HIGH	ICP
F067	66.00	6.600	10			ICAP
F068	13.00	1.444	9	EL ELVLL ELVL	BIASED LOW	IC
F069	140.00	14.000	10			ICP
F075	213.00	23.667	9	EHEHVH EHEHVHVHH H	BIASED HIGH	AA
F076	173.50	17.350	10			ICPMS

OVERALL AVERAGE RANK IS 12.354

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F068	13.00	1.444	9	ELELVLLELVL	BIASED LOW	IC
F033	29.00	2.900	10		BIASED LOW	ICP
F020	41.50	4.150	10		BIASED LOW	38109
F010	48.50	4.850	10		BIASED LOW	ICP
F063	51.50	5.722	9	ELLVLLL	BIASED LOW	ICP
F035	65.00	6.500	10			ICP-AES
F067	66.00	6.600	10			ICAP
F030	85.00	8.500	10			ICP 5X
F011	97.00	9.700	10			
F001	111.50	11.150	10			ICPMS
F038	112.50	11.250	10			ICP
F046	128.50	12.850	10			ICP
F024	133.50	13.350	10			ICP 5X
F069	140.00	14.000	10			ICP
F015	141.00	14.100	10			ICP
F005	152.00	15.200	10			ICPMS
F003	155.00	15.500	10			ICP
F009	173.50	17.350	10			ICP
F076	173.50	17.350	10			ICPMS
F066	192.00	19.200	10	HEHHHVHHH	BIASED HIGH	ICP
F025	194.00	19.400	10	VHHEHVH	BIASED HIGH	ICP
F016	198.50	19.850	10		BIASED HIGH	ICP
F065	213.00	21.300	10		BIASED HIGH	ICPMS
F075	213.00	23.667	9	EHEHVHEHEHVHVHHH	BIASED HIGH	AA

OVERALL AVERAGE RANK IS 12.354

Strontium

PARAMETER: 42091 Molybdenum mg/L

RESEARCH AND APPLICATIONS 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	.0012	3.00	.0056	7.00	.0183	11.00	.0022	6.00	.0025	6.00	.1767	14.00
F003	.0012	4.00	.0054	6.00	.0181	10.00	.0020	4.00	.0024	5.00	.180	20.50
F005	.0013	5.50	.0061	12.00	.0196	14.00	.0026	9.00	.0027	9.00	.1852	24.00
F009	<.01	0.00	<.01	0.00	.02	17.00	<.01	0.00	.01 EH	15.00	.18	20.50
F010	<.005	0.00	<.005	0.00	.016	3.00	.005 H	14.00	<.005	0.00	.166	7.00
F011	.0013	5.50	.0058	8.00	.0188	12.00	.0023	7.00	.0025	7.00	.175	13.00
F015	<.01	0.00	<.01	0.00	.02	17.00	<.01	0.00	<.01	0.00	.18	20.50
F016		0.00	.013 EH	16.00	.021	19.00	.004	12.50	.002	2.50	.194	26.00
F020	<.004	0.00	<.004	0.00	.0150 L	2.00	<.004	0.00	<.004	0.00	.156 L	4.00
F024	<.001	0.00	.004	2.50	.017	4.50	.001	1.00	.001	1.00	.17	9.50
F025	<.003	0.00	.007	14.00	.023 H	22.00	<.003	0.00	.003	11.00	.178	17.00
F030	<.004	0.00	.004	2.50	.020	17.00	<.004	0.00	<.004	0.00	.169	8.00
F033	.0008	1.00	.0052	5.00	.017	4.50	.0018	2.00	.0021	4.00	.16	5.00
F035	<.0015	0.00	.0032 L	1.00	.0171	6.00	<.0015	0.00	<.0015	0.00	.1743	12.00
F036	.0015	8.00	.0062	13.00	.0198	15.00	.0028	10.00	.0032	13.00	.1843	23.00
F038	.001	2.00	.005	4.00	.018	8.00	.002	4.00	.003	11.00	.173	11.00
F046	.002	9.50	.006	10.00	.024 H	23.00	.002	4.00	.002	2.50	.178	17.00
F060	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	.18	20.50
F063	<.01	0.00	.02 EH	17.00	.03 EH	24.00	.02 EH	15.00	.02 EH	16.00	.05 EL	1.00
F065	.004 H	11.00	.008	15.00	.022	20.00	.004	12.50	.004	14.00	.190	25.00
F066	<.005	0.00	<.005	0.00	.018	8.00	<.005	0.00	<.005	0.00	.178	17.00
F067	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.12 EL	2.00
F069	<.01	0.00	<.01	0.00	.012 VL	1.00	<.01	0.00	<.01	0.00	.165	6.00
F075	.002	9.50	.006	10.00	.018	8.00	.003	11.00	.003	11.00	.170	9.50
F076	.0014	7.00	.0060	10.00	.0196	13.00	.0024	8.00	.0026	8.00	.177	15.00
F077		0.00		0.00	.0229	21.00		0.00		0.00	.1341 EL	3.00
MEDIAN CONC.	.0013		.0060		.0192		.0024		.0027		.1758	

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	.1007	14.00	.2872	21.00	.4273	20.00	.4782	12.00
F003	.104	16.50	.285	19.50	.42	17.00	.482	16.00
F005	.1067	21.00	.2882	22.00	.4272	19.00	.4822	17.00
F009	.11	24.00	.27	9.00	.42	17.00	.48	14.00
F010	.105	18.50	.278	14.00	.418	15.00	.488	18.00
F011	.100	12.00	.276	13.00	.410	11.50	.471	9.50
F015	.1	12.00	.28	15.00	.42	17.00	.49	20.50
F016	.112	26.00	.301	26.00	.454	26.00	.505	24.00
F020	.091	4.00	.250	4.00	.376	3.00	.430 L	3.00
F024	.092	6.00	.26	6.00	.40	7.50	.45	6.00
F025	.105	18.50	.281	16.50	.432	24.00	.489	19.00
F030	.099	10.00	.271	10.00	.391	5.00	.436	4.00
F033	.091	4.00	.24 L	3.00	.35 VL	2.00	.39 VL	2.00
F035	.0979	9.00	.2896	23.00	.4051	10.00	.4653	8.00
F036	.1056	20.00	.2825	18.00	.4274	21.00	.5019	23.00
F038	.095	8.00	.274	11.00	.416	14.00	.480	14.00
F046	.103	15.00	.264	7.00	.400	7.50	.457	7.00
F060	.11	24.00	.29	24.00	.43	22.50	.49	20.50
F063	.06 EL	1.00	.13 EL	1.00	.25 EL	1.00	.30 EL	1.00
F065	.110	24.00	.300	25.00	.448	25.00	.513	25.00
F066	.108	22.00	.285	19.50	.43	22.50	.500	22.00
F067	.08 VL	2.00	.23 VL	2.00	.38	4.00	.44	5.00
F069	.091	4.00	.268	8.00	.403	9.00	.471	9.50
F075	.100	12.00	.275	12.00	.410	11.50	.480	14.00
F076	.104	16.50	.281	16.50	.415	13.00	.476	11.00
F077	.0934	7.00	.2502	5.00	.3924	6.00	.559 VH	26.00
MEDIAN CONC.	.1003		.2770		.4155		.4800	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	114.00	11.400	10			ICPMS
F003	118.50	11.850	10			ICP
F005	152.50	15.250	10			ICPMS
F009	116.50	16.643	7	EH		ICP
F010	89.50	12.786	7	H		ICP
F011	98.50	9.850	10			
F015	102.00	17.000	6			ICP
F016	178.00	19.778	9	EH	BIASED HIGH	ICP
F020	20.00	3.333	6	L L L	BIASED LOW	42111
F024	44.00	4.889	9		BIASED LOW	ICP 5X
F025	142.00	17.750	8	H		ICP
F030	56.50	8.071	7			ICP 5X
F033	32.50	3.250	10	L VLVL	BIASED LOW	ICP
F035	69.00	9.857	7	L		ICP-AES
F036	164.00	16.400	10			ICP
F038	87.00	8.700	10			ICP
F046	102.50	10.250	10	H		ICP / GF
F060	111.50	22.300	5		BIASED HIGH	ICP, DISSOLVED
F063	77.00	8.556	9	EHEHEHEHELELELELEL		ICP
F065	196.50	19.650	10	H	BIASED HIGH	ICPMS
F066	111.00	18.500	6			ICP
F067	15.00	3.000	5	ELVLVL	BIASED LOW	ICAP
F069	37.50	6.250	6	VL		ICP
F075	108.50	10.850	10			ICP-MS
F076	118.00	11.800	10			ICPMS
F077	68.00	11.333	6	EL VH		AA, 6X CONC'N

OVERALL AVERAGE
RANK IS 11.878

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F067	15.00	3.000	5	ELVLVL	BIASED LOW	ICAP
F033	32.50	3.250	10	LVLVL	BIASED LOW	ICP
F020	20.00	3.333	6	LLL	BIASED LOW	42111
F024	44.00	4.889	9		BIASED LOW	ICP 5X
F069	37.50	6.250	6	VL		ICP
F030	56.50	8.071	7			ICP 5X
F063	77.00	8.556	9	EHEHEHEHELELELELEL		ICP
F038	87.00	8.700	10			ICP
F011	98.50	9.850	10			
F035	69.00	9.857	7	L		ICP-AES
F046	102.50	10.250	10	H		ICP / GF
F075	108.50	10.850	10			ICP-MS
F077	68.00	11.333	6	ELVH		AA, 6X CONC'N
F001	114.00	11.400	10			ICPMS
F076	118.00	11.800	10			ICPMS
F003	118.50	11.850	10			ICP
F010	89.50	12.786	7	H		ICP
F005	152.50	15.250	10			ICPMS
F036	164.00	16.400	10			ICP
F009	116.50	16.643	7	EH		ICP
F015	102.00	17.000	6			ICP
F025	142.00	17.750	8	H		ICP
F066	111.00	18.500	6			ICP
F065	196.50	19.650	10	H	BIASED HIGH	ICPMS
F016	178.00	19.778	9	EH	BIASED HIGH	ICP
F060	111.50	22.300	5		BIASED HIGH	ICP, DISSOLVED

OVERALL AVERAGE
RANK IS 11.878

PARAMETER: 48091 Cadmium mg/L

RESEARCH AND APPLICATIONS 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	6.50	.0025	17.00	.0169	15.00	.0009	5.00	.0013	16.50	.0468	11.00
F002		0.00	.0026	18.50	.017	18.00	.0010	15.50	.0012	11.00	.048	14.50
F003	.0001	3.00	.0023	9.50	.0156	6.00	.0010	15.50	.0011	7.50	.051	25.00
F005	.0001	6.50	.0026	20.00	.0181	27.00	.0011	19.00	.0013	16.50	.0516	27.00
F008	<.001	0.00	.002	4.00	.016	9.00	.001	15.50	.001	3.50	.046	8.00
F009	.002 H	12.50	.003	23.00	.017	18.00	.001	15.50	.002	21.00	.05	22.50
F010	<.0003	0.00	.0027	21.00	.016	9.00	.0010	15.50	.0014	19.00	.045	6.00
F011	.0002	9.00	.0025	14.50	.0168	14.00	.0009	9.00	.0013	16.50	.0474	12.00
F013	<.005	0.00	<.005	0.00	.017	18.00	<.005	0.00	<.005	0.00	.046	8.00
F014	.0001	3.00	.0022	7.50	.016	9.00	.0008	3.00	.0011	7.50	<.1	0.00
F015	<.005	0.00	<.005	0.00	.017	18.00	<.005	0.00	<.005	0.00	.049	19.00
F016		0.00		0.00	.018	24.00	.004 EH	23.00	.003 H	22.50	.054	30.00
F020	.0001	3.00	.0024	11.50	.0166	12.50	.0009	9.00	.0012	11.00	.0476	13.00
F024	<.001	0.00	.003	23.00	.018	24.00	<.001	0.00	.001	3.50	.049	19.00
F025	<.001	0.00	<.001	0.00	.021 H	32.00	<.001	0.00	<.001	0.00	.049	19.00
F030	<.002	0.00	.002	4.00	.016	9.00	.002	20.00	<.002	0.00	.046	8.00
F031	<.0002	0.00	.0019	1.50	.018	24.00	.0009	9.00	.0018	20.00	.055 H	31.00
F033	<.0002	0.00	.0024	11.50	.015	4.00	.0008	3.00	.0013	16.50	.044	5.00
F035	<.001	0.00	<.001	0.00	.016	9.00	<.001	0.00	<.001	0.00	.048	14.50
F036	.0001	3.00	.0019	1.50	.0106 EL	1.00	.0008	3.00	.0010	3.50	.0490	19.00
F037	<.0005	0.00	.0025	14.50	.0203 H	31.00	.0009	9.00	.0012	11.00	.0591 VH	32.00
F038	<.0002	0.00	.0021	6.00	.015	4.00	.001	15.50	.001	3.50	.0462	10.00
F046	.001W	0.00	.003	23.00	.019	29.00	.001W	0.00	.001	3.50	.051	25.00
F048	.0002	9.00	.0034	25.00	.0190	29.00	.0009	9.00	.0012	11.00		0.00
F060	<.0005	0.00	.0023	9.50	.0166	12.50	.0007	1.00	.0010	3.50	.0383 VL	2.00
F063	.0002	9.00	.0025	14.50	.032 EH	34.00	.032 EH	24.00	.017 EH	25.00	.051	25.00
F064	<.001	0.00	<.001	0.00	.011 VL	2.00	<.001	0.00	<.001	0.00	.042 L	3.00
F065	.002 H	12.50	.004	26.00	.019	29.00	.003 H	22.00	.003 H	22.50	.053	29.00
F066	<.005	0.00	<.005	0.00	.018	24.00	<.005	0.00	<.005	0.00	.052	28.00
F067	<.005	0.00	<.005	0.00	.015	4.00	<.005	0.00	<.005	0.00	.043	4.00
F069	.0001	3.00	.0025	14.50	.022 VH	33.00	.0009	9.00	.0012	11.00	.049	19.00
F075	<.002	0.00	.002	4.00	.018	24.00	<.002	0.00	<.002	0.00	.050	22.50
F076	<.0005	0.00	.0026	18.50	.0170	18.00	.0009	9.00	.0012	14.00	.0482	16.00
F077	.0012	11.00	.0022	7.50	.0172	21.00	.0025 H	21.00	.0032 H	24.00	.0377 VL	1.00
MEDIAN CONC.	.0001		.0025		.0170		.0010		.0012		.0486	

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	.1338	12.00	.1808	10.00	.1358	15.00	.1747	15.00
F002	.135	15.00	.182	13.00	.136	16.00	.175	17.00
F003	.141	23.50	.193	26.50	.14	21.00	.183	25.50
F005	.1383	21.00	.1862	19.00	.1378	18.00	.1779	19.00
F008	.14	22.00	.19	23.00	.14	21.00	.18	21.50
F009	.15	30.50	.20	31.00	.15	31.00	.19	32.00
F010	.128	4.00	.174	4.00	.128	4.50	.165	7.00
F011	.133	10.00	.183	14.00	.135	13.50	.175	17.00
F013	.133	10.00	.178	6.00	.128	4.50	.163	5.00
F014	.15	30.50	.18	8.50	.14	21.00	.17	9.50
F015	.137	17.00	.184	15.50	.135	13.50	.175	17.00
F016	.145	26.50	.193	26.50	.144	26.50	.183	25.50
F020	.1343	13.00	.1818	12.00	.1331	11.00	.1728	14.00
F024	.13	5.50	.19	23.00	.14	21.00	.17	9.50
F025	.138	19.50	.185	17.00	.140	21.00	.181	23.00
F030	.131	7.00	.178	6.00	.131	8.00	.163	5.00
F031	.155 H	32.00	.22 VH	33.00	.17 EH	32.00	.23 EH	33.00
F033	.12 L	3.00	.16 L	3.00	.12 L	3.00	.16	3.00
F035	.133	10.00	.186	18.00	.129	6.50	.163	5.00
F036	.1377	18.00	.1813	11.00	.1370	17.00	.1783	20.00
F037	.1552 H	33.00	.2015	32.00	.1458	29.00	.1877	30.00
F038	.130	5.50	.184	15.50	.132	9.00	.172	13.00
F046	.141	23.50	.190	23.00	.141	24.00	.182	24.00
F048		0.00		0.00		0.00		0.00
F060	.138	19.50	.187	20.00	.133	10.00	.171	11.50
F063	.145	26.50	.195	28.50	.143	25.00	.186	29.00
F064	.111 VL	1.00	.148 VL	1.00	.099 EL	1.00	.139 VL	1.00
F065	.146	28.00	.195	28.50	.146	30.00	.185	27.50
F066	.147	29.00	.199	30.00	.145	28.00	.188	31.00
F067	.132	8.00	.180	8.50	.129	6.50	.169	8.00
F069	.135	15.00	.19	23.00	.18 EH	33.00	.18	21.50
F075	.143	25.00	.190	23.00	.144	26.50	.185	27.50
F076	.135	15.00	.178	6.00	.134	12.00	.171	11.50
F077	.1134 VL	2.00	.1592 L	2.00	.1154 L	2.00	.156 L	2.00
MEDIAN CONC.	.1370		.1850		.1370		.1750	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	123.00	12.300	10			ICPMS
F002	138.50	15.389	9			48302-01
F003	163.00	16.300	10			ICP
F005	193.00	19.300	10			ICPMS
F008	127.50	14.167	9			GFAAS
F009	237.00	23.700	10	H		
F010	90.00	10.000	9			1-5 GFA,6-10 ICP
F011	129.50	12.950	10			
F013	51.50	8.583	6			ICP
F014	99.50	11.056	9			
F015	100.00	16.667	6			ICP
F016	204.50	25.563	8	EHH	BIASED HIGH	ICP
F020	110.00	11.000	10			48111 / 48103
F024	128.50	16.063	8			ICP 5X
F025	131.50	21.917	6	H		ICP / AAS
F030	67.00	8.375	8			ICP 5X
F031	215.50	23.944	9	H H VHEHEH		GFAAS
F033	52.00	5.778	9	L L L	BIASED LOW	ICP
F035	63.00	10.500	6			ICP-AES
F036	97.00	9.700	10	EL		ICP / GF
F037	221.50	24.611	9	H VHH	BIASED HIGH	GFAAS
F038	82.00	9.111	9			GFAAS
F046	175.00	21.875	8			ICP / GF
F048	83.00	16.600	5			GFAA
F060	89.50	9.944	9	VL		GFAA, DISSOLVED
F063	240.50	24.050	10	EHEHEH	BIASED HIGH	GRAPHITE
F064	9.00	1.500	6	VL L VLVLELVL	BIASED LOW	AAS
F065	255.00	25.500	10	H H H	BIASED HIGH	ICPMS
F066	170.00	28.333	6		BIASED HIGH	ICP
F067	39.00	6.500	6		BIASED LOW	ICAP
F069	182.00	18.200	10	VH EH		GFAA
F075	152.50	21.786	7			AA-HGA
F076	120.00	13.333	9			ICPMS
F077	93.50	9.350	10	H H VLVLL L L		AA, 8X CONC'N

OVERALL AVERAGE RANK IS 15.503

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F064	9.00	1.500	6	VLLVLVLELVL	BIASED LOW	AAS
F033	52.00	5.778	9	LLL	BIASED LOW	ICP
F067	39.00	6.500	6		BIASED LOW	ICAP
F030	67.00	8.375	8			ICP 5X
F013	51.50	8.583	6			ICP
F038	82.00	9.111	9			GFAAS
F077	93.50	9.350	10	HHVLVLLLL		AA, 8X CONC'N
F036	97.00	9.700	10	EL		ICP / GF
F060	89.50	9.944	9	VL		GFAA, DISSOLVED
F010	90.00	10.000	9			1-5 GFA,6-10 ICP
F035	63.00	10.500	6			ICP-AES
F020	110.00	11.000	10			48111 / 48103
F014	99.50	11.056	9			
F001	123.00	12.300	10			ICPMS
F011	129.50	12.950	10			
F076	120.00	13.333	9			ICPMS
F008	127.50	14.167	9			GFAAS
F002	138.50	15.389	9			48302-01
F024	128.50	16.063	8			ICP 5X
F003	163.00	16.300	10			ICP
F048	83.00	16.600	5			GFAA
F015	100.00	16.667	6			ICP
F069	182.00	18.200	10	VHEH		GFAA
F005	193.00	19.300	10			ICPMS
F075	152.50	21.786	7			AA-HGA
F046	175.00	21.875	8			ICP / GF
F025	131.50	21.917	6	H		ICP / AAS
F009	237.00	23.700	10	H		
F031	215.50	23.944	9	HHVHEHEH		GFAAS
F063	240.50	24.050	10	EHEHEH	BIASED HIGH	GRAPHITE
F037	221.50	24.611	9	HVHH	BIASED HIGH	GFAAS
F065	255.00	25.500	10	HHH	BIASED HIGH	ICPMS
F016	204.50	25.563	8	EHH	BIASED HIGH	ICP
F066	170.00	28.333	6		BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 15.503

Cadmium

PARAMETER: 56091 Barium MG/L

RESEARCH AND APPLICATIONS 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	.0224	18.50	.0131	12.50	.0305	15.00	.0084	12.00	.0151	18.00	.0794	13.00
F003	.0221	16.00	.0131	12.50	.0297	6.00	.0083	9.50	.0147	6.00	.0791	11.50
F005	.0213	9.00	.0136	17.00	.0304	14.00	.0088	14.00	.0154	19.00	.0814	21.00
F008	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.08	16.00
F009	.02	3.50	.01	1.50	.03	10.00	<.01	0.00	.02 H	24.00	.08	16.00
F010	.02	3.50	.01	1.50	.03	10.00	<.01	0.00	.02 H	24.00	.08	16.00
F011	.0233	22.00	.0133	15.50	.0298	7.00	.0083	9.50	.0146	5.00	.0781	6.00
F015	.022	12.50	.013	8.00	.03	10.00	.008	4.50	.014	3.50	.079	9.00
F016	.022	12.50	.014	19.00	.032	21.00	.009	17.00	.016	20.00	.083	25.50
F020	.020	3.50	.012	3.50	.0279	2.00	.0077	1.00	.0137	2.00	.0728	2.00
F024	.020	3.50	.012	3.50	.029	4.00	.008	4.50	.015	12.50	.081	19.50
F025	.03 VH	25.00	.02 VH	24.50	.04 VH	25.00	.01	20.50	.02 H	24.00	.08	16.00
F030	.022	12.50	.014	19.00	.031	17.50	.009	17.00	.015	12.50	.083	25.50
F031	.029 H	23.50	.015	21.00	.030	10.00	.008	4.50	.015	12.50	.086	27.00
F033	.021	7.50	.013	8.00	.029	4.00	.008	4.50	.014	3.50	.078	4.00
F035	.021	7.50	.013	8.00	.029	4.00	.009	17.00	.013	1.00	.078	4.00
F037	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.079	9.00
F038	.023	20.50	.013	8.00	.033	23.00	<.010	0.00	.015	12.50	.082	23.00
F046	.0224	18.50	.0133	15.50	.0304	13.00	.0084	11.00	.0150	12.50	.0791	11.50
F060	.020	3.50	.013	8.00	.032	21.00	.008	4.50	.015	12.50	.082	23.00
F063	.02	3.50	.02 VH	24.50	.05 EH	26.00	.01	20.50	.02 H	24.00	.09	29.00
F065	.029 H	23.50	.018 H	23.00	.036	24.00	.013 H	23.00	.020 H	24.00	.088	28.00
F066	.022	12.50	.013	8.00	.031	17.50	.008	4.50	.015	12.50	.078	4.00
F067	.023	20.50	.014	19.00	.031	17.50	.009	17.00	.015	12.50	.080	16.00
F068		0.00		0.00		0.00		0.00		0.00	.079	9.00
F069	.022	12.50	.013	8.00	.031	17.50	.0087	13.00	.015	12.50	.081	19.50
F075	.022	12.50	.022 EH	26.00	.032	21.00	.009	17.00	.015	12.50	.082	23.00
F076	.0223	17.00	.0132	14.00	.030	10.00	.0082	8.00	.0149	7.00	.0782	7.00
F077	.0376 EH	26.00	.0163	22.00	.0278	1.00	.0105	22.00	.0179	21.00	.0719	1.00
MEDIAN CONC.	.0220		.0131		.0304		.0084		.0150		.0800	

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	.1682	8.00	.2482	9.00	.2120	9.50	.2749	13.00
F003	.171	13.00	.252	14.00	.217	13.00	.277	15.50
F005	.1711	14.00	.2530	15.50	.2176	14.00	.2720	10.50
F008	.17	10.50	.25	11.50	.22	19.00	.28	21.00
F009	.18	23.50	.25	11.50	.22	19.00	.28	21.00
F010	.17	10.50	.24	3.50	.21	5.00	.27	8.00
F011	.165	5.50	.248	8.00	.211	7.50	.272	10.50
F015	.174	18.50	.254	17.00	.219	17.00	.279	18.50
F016	.183	26.00	.268	25.00	.224	23.50	.275	14.00
F020	.1580	2.00	.2312	2.00	.2001	2.00	.2556	2.00
F024	.18	23.50	.26	22.50	.23	27.50	.28	21.00
F025	.17	10.50	.25	11.50	.22	19.00	.27	8.00
F030	.163	4.00	.244	6.00	.208	3.00	.256	3.00
F031	.18	23.50	.27	27.50	.21	5.00	.30	28.00
F033	.16	3.00	.24	3.50	.21	5.00	.26	5.00
F035	.166	7.00	.256	19.00	.212	9.50	.265	6.00
F037	.165	5.50	.244	6.00	.211	7.50	.257	4.00
F038	.175	20.00	.257	20.00	.223	22.00	.283	24.00
F046	.172	15.50	.253	15.50	.218	15.50	.277	15.50
F060	.178	21.00	.264	24.00	.224	23.50	.281	23.00
F063	.19	28.50	.27	27.50	.23	27.50	.29	25.50
F065	.185	27.00	.269	26.00	.236	29.00	.299	27.00
F066	.170	10.50	.250	11.50	.215	11.00	.273	12.00
F067	.173	17.00	.255	18.00	.218	15.50	.278	17.00
F068	.190	28.50	.281 H	29.00	.225	25.50	.306	29.00
F069	.174	18.50	.259	21.00	.222	21.00	.279	18.50
F075	.180	23.50	.260	22.50	.225	25.50	.290	25.50
F076	.172	15.50	.244	6.00	.216	12.00	.270	8.00
F077	.1501 L	1.00	.2216 L	1.00	.1975	1.00	.231 VL	1.00
MEDIAN CONC.	.1720		.2530		.2180		.2770	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	128.50	12.850	10			ICPMS
F003	117.00	11.700	10			ICP
F005	148.00	14.800	10			ICPMS
F008	78.00	15.600	5			ICP
F009	130.00	14.444	9	H		ICP
F010	82.00	9.111	9	H		ICP
F011	96.50	9.650	10			
F015	118.50	11.850	10			ICP
F016	203.50	20.350	10			ICP
F020	22.00	2.200	10		BIASED LOW	56109
F024	142.00	14.200	10			ICP 5X
F025	184.00	18.400	10	VHVHVH H		ICP
F030	120.00	12.000	10			ICP 5X
F031	182.50	18.250	10	H		GFAAS
F033	48.00	4.800	10		BIASED LOW	ICP
F035	83.00	8.300	10			ICP-AES
F037	32.00	6.400	5			ICP
F038	173.00	19.222	9			ICP
F046	144.00	14.400	10			ICP / GF
F060	164.00	16.400	10			ICP, DISSOLVED
F063	236.50	23.650	10	VHEH H	BIASED HIGH	ICP
F065	254.50	25.450	10	H H H H	BIASED HIGH	ICPMS
F066	104.00	10.400	10			ICP
F067	170.00	17.000	10			ICAP
F068	121.00	24.200	5	H	BIASED HIGH	IC
F069	162.00	16.200	10			ICP
F075	209.00	20.900	10	EH		ICP
F076	104.50	10.450	10			ICPMS
F077	97.00	9.700	10	EH L L VL		AA, 8X CONC'N

OVERALL AVERAGE RANK IS 14.173

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F020	22.00	2.200	10		BIASED LOW	56109
F033	48.00	4.800	10		BIASED LOW	ICP
F037	32.00	6.400	5			ICP
F035	83.00	8.300	10			ICP-AES
F010	82.00	9.111	9	H		ICP
F011	96.50	9.650	10			
F077	97.00	9.700	10	EHLLVL		AA, 8X CONC'N
F066	104.00	10.400	10			ICP
F076	104.50	10.450	10			ICPMS
F003	117.00	11.700	10			ICP
F015	118.50	11.850	10			ICP
F030	120.00	12.000	10			ICP 5X
F001	128.50	12.850	10			ICPMS
F024	142.00	14.200	10			ICP 5X
F046	144.00	14.400	10			ICP / GF
F009	130.00	14.444	9	H		ICP
F005	148.00	14.800	10			ICPMS
F008	78.00	15.600	5			ICP
F069	162.00	16.200	10			ICP
F060	164.00	16.400	10			ICP, DISSOLVED
F067	170.00	17.000	10			ICAP
F031	182.50	18.250	10	H		GFAAS
F025	184.00	18.400	10	VHVHVHH		ICP
F038	173.00	19.222	9			ICP
F016	203.50	20.350	10			ICP
F075	209.00	20.900	10	EH		ICP
F063	236.50	23.650	10	VHEHH	BIASED HIGH	ICP
F068	121.00	24.200	5	H	BIASED HIGH	IC
F065	254.50	25.450	10	HHHH	BIASED HIGH	ICPMS

OVERALL AVERAGE RANK IS 14.173

Barium

PARAMETER: 82091 Lead mg/L

RESEARCH AND APPLICATIONS 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	.0007	5.00	.0035	13.00	.0141	18.50	.0049	14.00	.0031	17.00	.1898	22.00
F002		0.00	.0036	16.00	.0135	13.00	.0050	18.00	.0028	7.00	.185	15.50
F003	.0003	2.00	.0030	7.00	.0128	8.00	.0046	10.00	.0029	9.50	.197	25.50
F005	.0006	4.00	.0033	9.00	.0127	7.00	.0046	9.00	.0028	8.00	.1795	5.00
F008	<.002	0.00	.003	7.00	.013	9.50	.004	5.50	.0025	4.50	.20	29.50
F009	.003 H	13.00	.012 EH	26.00	.037 EH	30.00	.016 EH	26.00	.010 EH	25.00	.26 EH	33.50
F010	.0005	3.00	.0027	4.00	.0125	6.00	.0043	8.00	.0025	4.50	.185	15.50
F011	.0007	8.50	.0034	11.00	.0136	14.00	.0047	11.50	.0029	9.50	.183	13.00
F013	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.198	27.00
F014	<.002	0.00	.0029	5.00	.016	22.00	.0050	18.00	.0026	6.00	.26 EH	33.50
F015	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.18	9.00
F016	.009 EH	16.00	.008 EH	24.50	.022 EH	27.50	.027 EH	27.00	.019 EH	26.00	.219 VH	32.00
F020	<.001	0.00	.004	18.50	.015	20.50	.005	18.00	.003	13.50	.188	20.00
F024	.001	11.50	.004	18.50	.015	20.50	.006	21.50	.004	22.00	.18	9.00
F025	<.002	0.00	<.002	0.00	.008 VL	2.00	.002 L	1.00	.002	3.00	.18	9.00
F030	<.010	0.00	<.010	0.00	.020 VH	25.50	<.010	0.00	<.010	0.00	.180	9.00
F031	.001	11.50	.004	18.50	.022 EH	27.50	.006	21.50	.004	22.00	.18	9.00
F033	<.002	0.00	.006 H	23.00	.013	9.50	.004	5.50	.003	13.50	.17	4.00
F035	<.015	0.00	<.015	0.00	.020 VH	25.50	<.015	0.00	<.015	0.00	.200	29.50
F036	.0001	1.00	.0010 L	1.00	.0076 EL	1.00	.0027	2.00	.0015	1.00	.1861	17.00
F037	<.001	0.00	.0022	3.00	.0097 L	3.00	.0032	3.00	.0017	2.00	.1626 L	1.00
F038	<.001	0.00	.004	18.50	.014	16.00	.005	18.00	.003	13.50	.184	14.00
F046	.001W	0.00	.005	21.00	.018 H	23.50	.007	24.00	.004	22.00	.188	20.00
F048	.0007	8.50	.0034	11.00	.0134	12.00	.0050	18.00	.0030	13.50	.1990	28.00
F060	<.001	0.00	.002	2.00	.011	5.00	.004	5.50	.003	13.50	.167	2.50
F063	.0007	8.50	.0034	11.00	.0133	11.00	.0048	13.00	.0034	20.00	.18	9.00
F064	<.005	0.00	<.005	0.00	.026 EH	29.00	<.005	0.00	<.005	0.00	.197	25.50
F065	.006 EH	15.00	.008 EH	24.50	.018 H	23.50	.010 EH	25.00	.008 EH	24.00	.205	31.00
F066	<.03	0.00	<.03	0.00	<.03	0.00	<.03	0.00	<.03	0.00	.19	23.50
F067	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.18	9.00
F069	.0007	8.50	.0035	14.00	.014	16.00	.0047	11.50	.0031	19.00	.19	23.50
F075	<.002	0.00	.003	7.00	.014	16.00	.004	5.50	.003	13.50	.188	20.00
F076	.0007	6.00	.0035	15.00	.0141	18.50	.0049	15.00	.0031	18.00	.187	18.00
F077	.0034 H	14.00	.0056	22.00	.0100 L	4.00	.0067	23.00	.0205 EH	27.00	.1670	2.50
MEDIAN CONC.	.0007		.0035		.0140		.0049		.0030		.1865	

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	.1092	16.50	.2859	10.00	.4349	5.00	.5528	16.00
F002	.112	25.50	.305	26.00	.47	18.00	.55	15.00
F003	.112	25.50	.306	27.50	.47	18.00	.563	21.00
F005	.1031	8.00	.2755	4.00	.4280	3.00	.5055	4.00
F008	.10	4.00	.33 H	34.00	.49	29.00	.56	19.00
F009	.13 VH	33.00	.28	6.00	.48	25.00	.61	31.00
F010	.121	31.50	.297	19.00	.478	22.00	.568	23.00
F011	.106	13.00	.288	11.00	.438	6.00	.514	5.00
F013	.115	29.00	.306	27.50	.485	27.50	.577	28.00
F014	.20 EH	34.00	.32	31.50	.53 H	33.00	.61	31.00
F015	.11	21.00	.29	13.00	.46	13.00	.57	25.00
F016	.107	14.00	.310	30.00	.506	31.00	.618 H	33.00
F020	.110	21.00	.301	22.50	.479	23.00	.5672	22.00
F024	.10	4.00	.28	6.00	.46	13.00	.54	9.50
F025	.11	21.00	.28	6.00	.48	25.00	.54	9.50
F030	.108	15.00	.283	8.50	.485	27.50	.528	6.00
F031	.104	11.50	.295	17.00	.47	18.00	.56	19.00
F033	.10	4.00	.27	3.00	.42 L	2.00	.50	3.00
F035	.103	7.00	.307	29.00	.445	7.00	.547	14.00
F036	.1092	16.50	.2937	16.00	.4734	20.00	.5756	27.00
F037	.1038	10.00	.2472 VL	2.00	.4536	11.00	.5556	17.00
F038	.110	21.00	.302	24.00	.469	16.00	.560	19.00
F046	.104	11.50	.304	25.00	.480	25.00	.569	24.00
F048	.1159	30.00	.3008	21.00		0.00		0.00
F060	.093 L	1.00	.244 VL	1.00	.434	4.00	.466 VL	2.00
F063	.10	4.00	.29	13.00	.37 EL	1.00	.40 EL	1.00
F064	.114	28.00	.301	22.50	.467	15.00	.571	26.00
F065	.121	31.50	.323	33.00	.505	30.00	.599	29.00
F066	.11	21.00	.32	31.50	.51	32.00	.61	31.00
F067	.10	4.00	.29	13.00	.46	13.00	.54	9.50
F069	.11	21.00	.3	20.00	.45	9.00	.545	13.00
F075	.113	27.00	.296	18.00	.475	21.00	.542	12.00
F076	.110	21.00	.283	8.50	.453	10.00	.533	7.00
F077	.1036	9.00	.2916	15.00	.4477	8.00	.540	9.50
MEDIAN CONC.	.1096		.2955		.4700		.5556	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	137.00	13.700	10			ICPMS
F002	154.00	17.111	9			82302-01
F003	154.00	15.400	10			ICP
F005	61.00	6.100	10		BIASED LOW	ICPMS
F008	142.00	15.778	9	H		ICP
F009	248.50	24.850	10	H EHEHEHEHEHVH	BIASED HIGH	
F010	136.50	13.650	10			1-5 GFA,6-10 ICP
F011	102.50	10.250	10			
F013	139.00	27.800	5		BIASED HIGH	ICP
F014	214.00	23.778	9	EHEH H		
F015	81.00	16.200	5			ICP
F016	261.00	26.100	10	EHEHEHEHEHVH H	BIASED HIGH	ICP
F020	179.00	19.889	9			82111 / 82104
F024	135.50	13.550	10			ICP 5X
F025	76.50	9.563	8	VLL		ICP / AAS
F030	91.50	15.250	6	VH		ICP 5X
F031	175.50	17.550	10	EH		GFAAS
F033	67.50	7.500	9	H L	BIASED LOW	ICP
F035	112.00	18.667	6	VH		ICP-AES
F036	102.50	10.250	10	L EL		ICP / GF
F037	52.00	5.778	9	L L VL	BIASED LOW	GFAAS
F038	160.00	17.778	9			GFAAS
F046	196.00	21.778	9	H		ICP / GF
F048	142.00	17.750	8			GFAA
F060	36.50	4.056	9	L VL VL	BIASED LOW	GFAA, DISSOLVED
F063	91.50	9.150	10	ELEL		GRAPHITE
F064	146.00	24.333	6	EH		AAS
F065	266.50	26.650	10	EHEHH EHEH	BIASED HIGH	ICPMS
F066	139.00	27.800	5		BIASED HIGH	ICP
F067	48.50	9.700	5			ICAP
F069	155.50	15.550	10			GFAA
F075	140.00	15.556	9			AA-HGA
F076	137.00	13.700	10			ICPMS
F077	134.00	13.400	10	H L EH		AA, 8X CONC'N

OVERALL AVERAGE RANK IS 15.697

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F060	36.50	4.056	9	LVLVL	BIASED LOW	GFAA, DISSOLVED
F037	52.00	5.778	9	LLVL	BIASED LOW	GFAAS
F005	61.00	6.100	10		BIASED LOW	ICPMS
F033	67.50	7.500	9	HL	BIASED LOW	ICP
F063	91.50	9.150	10	ELEL		GRAPHITE
F025	76.50	9.563	8	VLL		ICP / AAS
F067	48.50	9.700	5			ICAP
F011	102.50	10.250	10			
F036	102.50	10.250	10	LEL		ICP / GF
F077	134.00	13.400	10	HLEH		AA, 8X CONC'N
F024	135.50	13.550	10			ICP 5X
F010	136.50	13.650	10			1-5 GFA,6-10 ICP
F001	137.00	13.700	10			ICPMS
F076	137.00	13.700	10			ICPMS
F030	91.50	15.250	6	VH		ICP 5X
F003	154.00	15.400	10			ICP
F069	155.50	15.550	10			GFAA
F075	140.00	15.556	9			AA-HGA
F008	142.00	15.778	9	H		ICP
F015	81.00	16.200	5			ICP
F002	154.00	17.111	9			82302-01
F031	175.50	17.550	10	EH		GFAAS
F048	142.00	17.750	8			GFAA
F038	160.00	17.778	9			GFAAS
F035	112.00	18.667	6	VH		ICP-AES
F020	179.00	19.889	9			82111 / 82104
F046	196.00	21.778	9	H		ICP / GF
F014	214.00	23.778	9	EHEHH		
F064	146.00	24.333	6	EH		AAS
F009	248.50	24.850	10	HEHEHEHEHEHVH	BIASED HIGH	
F016	261.00	26.100	10	EHEHEHEHEHVHH	BIASED HIGH	ICP
F065	266.50	26.650	10	EHEHHEHEH	BIASED HIGH	ICPMS
F013	139.00	27.800	5		BIASED HIGH	ICP
F066	139.00	27.800	5		BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 15.697

Lead

PARAMETER: 33095 Arsenic ug/L

RESEARCH AND APPLICATIONS 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	.65	12.00	10.12	17.00	4.87	20.00	2.07	10.00	3.11	20.00	14.58	17.00
F002	.5	4.00	10.0	15.00	4.5	15.00	2.1	11.50	3.2	21.00	13.5	12.00
F003	.9	14.00	9.7	13.00	4.5	15.00	2.4	18.50	3.0	14.00	13.4	11.00
F008	1.	16.50	10.	15.00	5.	22.50	2.	7.50	3.	14.00	15.	19.50
F009	1.	16.50	11.	20.50	5.	22.50	3.	23.00	4.	25.00	17. H	25.00
F010	.6	9.50	11.	20.50	4.5	15.00	2.5	21.00	3.0	14.00	15.	19.50
F011	.5	4.00	9.2	10.50	4.8	19.00	2.4	18.50	3.0	14.00	15.7	22.00
F014	<3.0	0.00	14.6 VH	27.00	5.8	25.00	<3.0	0.00	3.6	23.00	17.2 H	26.00
F016	.5	4.00	11.7	24.00	4.4	13.00	2.2	14.50	3.1	18.50	15.9	23.50
F020	<1.	0.00	8.	4.00	3.	3.00	1. L	1.50	2.	4.00	11. L	3.00
F025	.6	9.50	7.2 L	2.00	4.3	12.00	2.2	14.50	3.0	14.00	15.0	19.50
F030	.6	9.50	11.	20.50	3.	3.00	2.	7.50	2.	4.00	1. EL	1.00
F031	<.04	0.00	9.02	9.00	2.5 L	1.00	1.3	3.00	1.6 L	2.00	14.0	13.50
F033	.3	1.00	8.2	5.00	4.0	8.50	2.0	7.50	3.1	18.50	12.	5.00
F035	.5	4.00	9.2	10.50	4.	8.50	2.1	11.50	2.8	8.00	12.9	9.00
F037	<1.	0.00	9.51	12.00	4.53	17.00	2.33	17.00	2.98	10.00	14.09	15.00
F038	.6	9.50	11.2	23.00	4.	8.50	2.2	14.50	2.9	9.00	15.9	23.50
F046	1.0	16.50	12.0	25.00	5.0	22.50	3.0	23.00	4.0	25.00	14.0	13.50
F060	.5	4.00	7.5 L	3.00	3.1	5.00	1.6	4.00	2.3	6.00	12.3	8.00
F063	<1.	0.00	9.	7.50	8. EH	26.00	1. L	1.50	2.	4.00	12.	5.00
F065	4.97 EH	20.00	14.3 VH	26.00	8.43 EH	27.00	6.26 EH	25.00	7.18 EH	27.00	17.7 H	27.00
F066	<1.	0.00	6. VL	1.00	3.	3.00	<1. L	0.00	1. VL	1.00	10. L	2.00
F067	.8	13.00	9.0	7.50	4.2	11.00	2.2	14.50	3.0	14.00	12.2	7.00
F069	1.	16.50	10.	15.00	4.	8.50	2.	7.50	3.	14.00	12.	5.00
F075	<2.	0.00	11.	20.50	5.	22.50	3.	23.00	4.	25.00	15.	19.50
F076	1.20	19.00	10.2	18.00	4.60	18.00	2.43	20.00	3.42	22.00	14.3	16.00
F077	.55	7.00	8.93	6.00	3.74	6.00	1.97	5.00	2.76	7.00	13.13	10.00
MEDIAN CONC.	.6000		10.0000		4.5000		2.2000		3.0000		14.0000	

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	22.3	16.00	37.4	22.00	26.62	21.00	23.39	23.00
F002	21.0	10.00	34.5	13.00	22.0	7.00	20.3	10.00
F003	20.7	7.00	33.8	11.00	24.6	13.00	21.1	15.00
F008	22.	14.00	37.	18.50	25.	15.00	23.	19.50
F009	26.	24.00	41.	25.00	29.	24.00	26. H	25.00
F010	23.	19.50	37.	18.50	25.	15.00	21.	13.00
F011	23.7	23.00	37.6	23.00	29.6 H	25.00	22.0	16.50
F014	29.2 VH	27.00	40.8	24.00	29.7 H	26.00	31.4 EH	27.00
F016	23.2	22.00	37.0	18.50	25.0	15.00	18.6	5.50
F020	18.	2.00	30.	3.00	21.	4.00	20.	8.00
F025	23.0	19.50	35.0	14.50	28.	23.00	23.	19.50
F030	21.	10.00	29.	2.00	21.	4.00	16. L	3.00
F031	21.0	10.00	36.0	16.00	26.0	17.50	23.0	19.50
F033	21.	10.00	32.	7.50	23.	11.00	20.	8.00
F035	21.1	13.00	32.8	9.00	23.3	12.00	17.9	4.00
F037	22.12	15.00	34.18	12.00	26.00	17.50	23.04	22.00
F038	28. H	26.00	44.7 VH	27.00	26.5	20.00	21.0	13.00
F046	23.0	19.50	31.0	5.00	22.0	7.00	22.0	16.50
F060	4.1 EL	1.00	27.9 L	1.00	17.4 VL	2.00	14.0 VL	2.00
F063	21.	10.00	32.	7.50	21.	4.00	20.	8.00
F065	26.1	25.00	41.7 H	26.00	30.1 H	27.00	27.7 VH	26.00
F066	19.	3.00	35.	14.50	22.	7.00	21.	13.00
F067	20.0	4.50	31.0	5.00	22.3	9.00	18.6	5.50
F069	20.	4.50	31.	5.00	15. EL	1.00	12. EL	1.00
F075	23.	19.50	37.	18.50	27.	22.00	24.	24.00
F076	22.6	17.00	37.3	21.00	26.2	19.00	23.0	19.50
F077	20.28	6.00	33.71	10.00	22.99	10.00	20.72	11.00
MEDIAN CONC.	22.0000		35.0000		25.0000		21.0000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	178.00	17.800	10			ICPMS-HYD AAS
F002	118.50	11.850	10			33007
F003	131.50	13.150	10			ICP-DIG
F008	162.00	16.200	10			HYD AAS
F009	230.50	23.050	10	H H	BIASED HIGH	AA HYDRIDE
F010	165.50	16.550	10			Hydrure A.A.
F011	175.50	17.550	10	H		
F014	205.00	25.625	8	VH H VH H EH	BIASED HIGH	
F016	158.50	15.850	10			ICP
F020	32.50	3.611	9	L L	BIASED LOW	33008
F025	148.00	14.800	10	L		HYD AAS
F030	64.50	6.450	10	EL L	BIASED LOW	ICP 5X
F031	91.50	10.167	9	L L		HYD AAS
F033	82.00	8.200	10			HYD AAS
F035	89.50	8.950	10			Hydride-AA
F037	137.50	15.278	9			GFAAS
F038	174.00	17.400	10	H VH		HVAAS
F046	173.50	17.350	10			GFAAS
F060	36.00	3.600	10	L ELL VLVL	BIASED LOW	AA-HYDRIDE
F063	73.50	8.167	9	EHL		HYDRIDE GEN. AA
F065	256.00	25.600	10	EHVHEHEHEHH H H VH	BIASED HIGH	ICPMS
F066	44.50	5.563	8	VL L VLL	BIASED LOW	HYD AAS
F067	91.00	9.100	10			HGAAS
F069	78.00	7.800	10	ELEL		AA HYDRIDE
F075	194.50	21.611	9		BIASED HIGH	AA-HGA
F076	189.50	18.950	10			ICPMS
F077	78.00	7.800	10			HYD. GEN., AA

OVERALL AVERAGE RANK IS 13.636

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F060	36.00	3.600	10	LELLVLVL	BIASED LOW	AA-HYDRIDE
F020	32.50	3.611	9	LL	BIASED LOW	33008
F066	44.50	5.563	8	VLLVLL	BIASED LOW	HYD AAS
F030	64.50	6.450	10	ELL	BIASED LOW	ICP 5X
F069	78.00	7.800	10	ELEL		AA HYDRIDE
F077	78.00	7.800	10			HYD. GEN., AA
F063	73.50	8.167	9	EHL		HYDRIDE GEN. AA
F033	82.00	8.200	10			HYD AAS
F035	89.50	8.950	10			Hydride-AA
F067	91.00	9.100	10			HGAAS
F031	91.50	10.167	9	LL		HYD AAS
F002	118.50	11.850	10			33007
F003	131.50	13.150	10			ICP-DIG
F025	148.00	14.800	10	L		HYD AAS
F037	137.50	15.278	9			GFAAS
F016	158.50	15.850	10			ICP
F008	162.00	16.200	10			HYD AAS
F010	165.50	16.550	10			Hydrure A.A.
F046	173.50	17.350	10			GFAAS
F038	174.00	17.400	10	HVH		HVAAS
F011	175.50	17.550	10	H		
F001	178.00	17.800	10			ICPMS-HYD AAS
F076	189.50	18.950	10			ICPMS
F075	194.50	21.611	9		BIASED HIGH	AA-HGA
F009	230.50	23.050	10	HH	BIASED HIGH	AA HYDRIDE
F065	256.00	25.600	10	EHVHEHEHEHHHHVH	BIASED HIGH	ICPMS
F014	205.00	25.625	8	VHHVHHEH	BIASED HIGH	

OVERALL AVERAGE RANK IS 13.636

Arsenic

PARAMETER: 34095 Selenium ug/L

RESEARCH AND APPLICATIONS 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	.18	2.00	1.25	14.00	8.86	22.00	3.82	6.00	4.69	7.00	10.64	10.00
F003	<.2	0.00	1.2	12.00	6.8	5.00	3.7	4.50	4.6	6.00	9.9	8.00
F008	<1.	0.00	1.	7.00	7.	8.00	4.	13.50	5.	16.00	11.	14.50
F009	<5.	0.00	<5.	0.00	7.	8.00	<5.	0.00	5.	16.00	8. L	3.00
F010	.4	4.00	1.5	16.50	8.	19.00	4.0	13.50	5.0	16.00	11.	14.50
F011	<1.	0.00	2.	19.00	8.	19.00	4.	13.50	5.	16.00	13.	22.50
F016	.1	1.00	1.1	10.00	7.3	13.00	3.9	7.50	5.2	20.50	10.5	9.00
F020	<30.	0.00	<30.	0.00	<30.	0.00	<30.	0.00	<30.	0.00	<30.	0.00
F025	.2	3.00	.9	4.00	5.1 L	3.00	4.2	20.00	4.8	9.00	7.3 L	2.00
F030	<.2	0.00	1.	7.00	7.	8.00	4.	13.50	5.	16.00	11.	14.50
F031	<.5	0.00	.7	3.00	8.0	19.00	2.0 L	1.00	2.4 VL	1.00	12.0	20.50
F033	<.2	0.00	1.3	15.00	7.4	14.00	3.9	7.50	4.9	11.00	11.	14.50
F035	1.2	6.00	1.5	16.50	8.0	19.00	4.5	21.00	5.6	22.00	11.0	14.50
F037	<2.	0.00	2.12	20.00	7.04	11.00	3.98	9.00	4.87	10.00	11.21	19.00
F038	<.5	0.00	1.2	12.00	7.6	15.00	4.	13.50	5.	16.00	13.	22.50
F046	1.W	0.00	1.0	7.00	7.0	8.00	4.0	13.50	4.0	4.50	9.0	5.00
F060	<.2	0.00	1.2	12.00	7.8	16.00	3.7	4.50	5.2	20.50	11.2	18.00
F063	<1.	0.00	1.	7.00	12. EH	23.00	5.	22.00	8. VH	23.00	21. EH	24.00
F065	<6.8	0.00	<6.8	0.00	<6.8	0.00	<6.8	0.00	<6.8	0.00	8.33 L	4.00
F066	<.5	0.00	.5	2.00	3.6 VL	1.00	2.3 L	2.00	3.0 L	2.00	3.9 EL	1.00
F067	<.5	0.00	.4	1.00	6.6	4.00	3.0	3.00	3.9	3.00	9.2	6.00
F069	<1.	0.00	1.	7.00	7.	8.00	4.	13.50	4.	4.50	11.	14.50
F075	<2.	0.00	<2.	0.00	8.	19.00	4.	13.50	5.	16.00	12.	20.50
F076	<2.	0.00	<2.	0.00	7.27	12.00	4.10	19.00	4.79	8.00	10.9	11.00
F077	.70	5.00	1.53	18.00	4.89 L	2.00	4.06	18.00	4.95	12.00	9.26	7.00
MEDIAN CONC.	.3000		1.1500		7.2700		4.0000		4.9500		11.0000	

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	15.49	9.00	25.6	11.00	31.6	15.00	40.6	16.00
F003	15.1	8.00	27.1	16.00	31.7	16.00	39.0	13.00
F008	16.	11.50	27.	15.00	29.	9.50	38.	9.50
F009	12. L	3.00	17. VL	2.00	16. EL	2.00	20. EL	2.00
F010	16.	11.50	26.	12.50	27.	6.50	40.	14.50
F011	20. H	22.00	29.	21.50	36.	21.00	45.	21.00
F016	16.8	17.00	29.0	21.50	26.0	5.00	38.0	9.50
F020	<30.	0.00	<30.	0.00	<30.	0.00	<30. L	0.00
F025	9.9 VL	2.00	21. L	3.50	33.	18.00	46. H	22.00
F030	17.	19.50	26.	12.50	29.	9.50	36.	5.00
F031	15.0	6.50	25.0	9.00	40.0 VH	23.00	50.0 VH	23.00
F033	15.	6.50	25.	9.00	30.	11.00	35.	4.00
F035	16.2	14.50	29.8	23.00	36.7 H	22.00	44.7	20.00
F037	16.03	13.00	28.74	20.00	30.96	14.00	40.72	17.00
F038	17.	19.50	27.3	18.00	32.	17.00	41.1	18.50
F046	14.0	5.00	24.0	6.00	27.0	6.50	40.0	14.50
F060	16.2	14.50	26.9	14.00	33.7	20.00	36.9	6.00
F063	31. EH	23.00	50. EH	24.00	53. EH	24.00	75. EH	24.00
F065	39.9 EH	24.00	24.6	7.00	33.3	19.00	41.1	18.50
F066	8.2 EL	1.00	3.3 EL	1.00	5.4 EL	1.00	13.9 EL	1.00
F067	13.6	4.00	22.2	5.00	25.2 L	4.00	37.1	8.00
F069	17.	19.50	25.	9.00	28.	8.00	37.	7.00
F075	17.	19.50	21. L	3.50	25. L	3.00	31. L	3.00
F076	16.7	16.00	27.5	19.00	30.7	13.00	38.6	11.00
F077	15.69	10.00	27.19	17.00	30.67	12.00	38.74	12.00
MEDIAN CONC.	16.0150		26.0000		30.6850		38.8700	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	112.00	11.200	10			ICPMS-HYD AAS
F003	88.50	9.833	9			ICP-DIG
F008	104.50	11.611	9			HYD AAS
F009	36.00	5.143	7	L L VLELEL	BIASED LOW	AA HYDRIDE
F010	128.50	12.850	10			Hydrure
F011	175.50	19.500	9	H	BIASED HIGH	
F016	114.00	11.400	10			ICP
F020	0.00	*******	0	L	INSUFFICIENT DATA	34008
F025	86.50	8.650	10	L L VLL H		HYD AAS
F030	105.50	11.722	9			ICP 5X
F031	106.00	11.778	9	L VL VHVH		HYD AAS
F033	92.50	10.278	9			HYD AAS
F035	178.50	17.850	10	H		Hydride-AA
F037	133.00	14.778	9			GFAAS
F038	152.00	16.889	9			HVAAS
F046	70.00	7.778	9			GFAAS
F060	125.50	13.944	9			AA-HYDRIDE
F063	194.00	21.556	9	EH VHEHEHEHEHEH	BIASED HIGH	HYDRIDE GEN. AA
F065	72.50	14.500	5	L EH		ICPMS
F066	12.00	1.333	9	VLL L ELELELELEL	BIASED LOW	HYD AAS
F067	38.00	4.222	9	L	BIASED LOW	HGAAS
F069	91.00	10.111	9			AA HYDRIDE
F075	98.00	12.250	8	L L L		AA-HGA
F076	109.00	13.625	8			ICPMS
F077	113.00	11.300	10	L		HYD. GEN., AA

OVERALL AVERAGE
RANK IS 11.850

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F020	0.00	*******	0	L	INSUFFICIENT DATA	34008
F066	12.00	1.333	9	VLLLELELELELEL	BIASED LOW	HYD AAS
F067	38.00	4.222	9	L	BIASED LOW	HGAAS
F009	36.00	5.143	7	LLVLELEL	BIASED LOW	AA HYDRIDE
F046	70.00	7.778	9			GFAAS
F025	86.50	8.650	10	LLVLLH		HYD AAS
F003	88.50	9.833	9			ICP-DIG
F069	91.00	10.111	9			AA HYDRIDE
F033	92.50	10.278	9			HYD AAS
F001	112.00	11.200	10			ICPMS-HYD AAS
F077	113.00	11.300	10	L		HYD. GEN., AA
F016	114.00	11.400	10			ICP
F008	104.50	11.611	9			HYD AAS
F030	105.50	11.722	9			ICP 5X
F031	106.00	11.778	9	LVLVHVH		HYD AAS
F075	98.00	12.250	8	LLL		AA-HGA
F010	128.50	12.850	10			Hydrure
F076	109.00	13.625	8			ICPMS
F060	125.50	13.944	9			AA-HYDRIDE
F065	72.50	14.500	5	LEH		ICPMS
F037	133.00	14.778	9			GFAAS
F038	152.00	16.889	9			HVAAS
F035	178.50	17.850	10	H		Hydride-AA
F011	175.50	19.500	9	H	BIASED HIGH	
F063	194.00	21.556	9	EHVHEHEHEHEHEH	BIASED HIGH	HYDRIDE GEN. AA

OVERALL AVERAGE
RANK IS 11.850

PARAMETER: 47095 Silver ug/L

RESEARCH AND APPLICATIONS BRANCH
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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= .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	<.02	0.00	3.37	9.00	8.27	12.00	1.02	8.00	2.65	11.00	15.53	9.00
F003	.1	1.50	3.1	7.00	7.4	4.00	1.0	6.50	2.3	4.50	15.5	8.00
F010	<.1	0.00	4.8	16.00	10.8	17.00	1.5	11.00	3.6	15.00	18.1	20.00
F016	3.0 H	6.00	12.0 EH	18.00	13.0 H	20.00	12.0 EH	14.00	3.0	12.50	16.0	12.50
F020	<.1	0.00	4.3	13.50	7.9	5.00	1.2	10.00	3.2	14.00	15.7	10.00
F025	<2.	0.00	4.	12.00	8.	8.50	<2.	0.00	2.	2.00	13.	4.00
F030	<2.	0.00	3.	4.00	7.	2.00	<2.	0.00	2.	2.00	7. L	1.00
F033	<.5	0.00	3.3	8.00	8.1	11.00	.9	5.00	2.4	7.00	15.	7.00
F035	<5.	0.00	6. H	17.00	11.	18.50	<5.	0.00	<5.	0.00	18.	18.50
F037	<1.	0.00	3.04	6.00	7.98	6.00	1.00	6.50	2.57	9.00	16.31	15.00
F038	<.1	0.00	2.3	2.00	8.	8.50	.7	1.00	2.	2.00	16.	12.50
F046	1.W	0.00	3.0	4.00	8.0	8.50	2.0	13.00	3.0	12.50	16.0	12.50
F063	.2	3.00	3.0	4.00	7.1	3.00	.8	2.00	2.3	4.50	11.0	2.00
F065	1.06	5.00	4.30	13.50	9.64	16.00	1.82	12.00	3.76	16.00	18.0	18.50
F066	<5.	0.00	<5.	0.00	9.	15.00	<5.	0.00	<5.	0.00	12.	3.00
F067	<5.	0.00	<5.	0.00	11.	18.50	<5.	0.00	<5.	0.00	16.	12.50
F069	.1	1.50	3.4	10.00	8.0	8.50	1.1	9.00	2.5	8.00	17.	17.00
F075	<2.	0.00	2.	1.00	6.	1.00	<2.	0.00	<2.	0.00	14.	5.00
F076	<.1	0.00	3.67	11.00	8.55	14.00	.816	3.00	2.59	10.00	16.8	16.00
F077	.62	4.00	4.50	15.00	8.50	13.00	.87	4.00	2.38	6.00	14.63	6.00
MEDIAN OR *TARGET CONC.	.4100		3.3850		8.0500		1.0100		2.5350		15.8500	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	9.49	9.00	22.17	8.00	22.31	7.00	27.33	10.00
F003	7.8	2.00	24.2	12.00	31.4	14.00	34.0	16.50
F010	12.2	19.00	28.5	19.00	25.0	10.00	16.9 L	5.00
F016	10.0	13.50	26.0	17.00	32.0	15.00	33.0	14.50
F020	9.7	11.00	25.	14.50	30.	12.00	32.	12.50
F025	8.	4.00	43. EH	20.00	34.	17.00	36.	18.00
F030	8.	4.00	5. EL	1.00	5. EL	1.00	5. EL	1.00
F033	8.8	6.00	23.	9.00	31.	13.00	32.	12.50
F035	12.	18.00	20.	5.00	15. L	4.00	14. VL	4.00
F037	9.99	12.00	25.22	16.00	18.56	5.00	18.60 L	6.00
F038	9.	7.50	22.	6.50	34.	17.00	33.	14.50
F046	11.0	16.50	24.0	11.00	35.0	19.00	34.0	16.50
F063	6.2	1.00	14.6 L	3.00	24.2	9.00	19.6 L	8.00
F065	11.0	16.50	23.5	10.00	22.4	8.00	19.4 L	7.00
F066	<5. L	0.00	15. L	4.00	13. VL	3.00	11. VL	3.00
F067	9.	7.50	11. L	2.00	12. VL	2.00	9. EL	2.00
F069	10.	13.50	25.	14.50	34.	17.00	37.	19.00
F075	8.	4.00	22.	6.50	28.	11.00	31.	11.00
F076	10.3	15.00	26.7	18.00	35.9	20.00	38.3	20.00
F077	9.50	10.00	24.63	13.00	21.12	6.00	24.63	9.00
MEDIAN OR *TARGET CONC.	9.5000		23.7500		*28.0000		*32.0000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	83.00	9.222	9			ICPMS
F003	76.00	7.600	10			AAS
F010	132.00	14.667	9	L		GFA
F016	143.00	14.300	10	H EHH EH		ICP
F020	102.50	11.389	9			47005
F025	85.50	10.688	8	EH		ICP
F030	16.00	2.000	8	L ELELEL	BIASED LOW	ICP 5X
F033	78.50	8.722	9			ICP
F035	85.00	12.143	7	H L VL		ICP-AES
F037	81.50	9.056	9	L		GFAAS
F038	71.50	7.944	9			GFAAS
F046	113.50	12.611	9			ICP / GF
F063	39.50	3.950	10	L L	BIASED LOW	GFAA
F065	122.50	12.250	10	L		ICPMS
F066	28.00	5.600	5	L L VLVL		ICP
F067	44.50	7.417	6	L VLEL		ICAP
F069	118.00	11.800	10			GFAA
F075	39.50	5.643	7			AA-HGA
F076	127.00	14.111	9			ICPMS
F077	86.00	8.600	10			AA, 8X CONC'N

OVERALL AVERAGE RANK IS 9.671

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F030	16.00	2.000	8	LELELEL	BIASED LOW	ICP 5X
F063	39.50	3.950	10	LL	BIASED LOW	GFAA
F066	28.00	5.600	5	LLVLVL		ICP
F075	39.50	5.643	7			AA-HGA
F067	44.50	7.417	6	LVLEL		ICAP
F003	76.00	7.600	10			AAS
F038	71.50	7.944	9			GFAAS
F077	86.00	8.600	10			AA, 8X CONC'N
F033	78.50	8.722	9			ICP
F037	81.50	9.056	9	L		GFAAS
F001	83.00	9.222	9			ICPMS
F025	85.50	10.688	8	EH		ICP
F020	102.50	11.389	9			47005
F069	118.00	11.800	10			GFAA
F035	85.00	12.143	7	HLVL		ICP-AES
F065	122.50	12.250	10	L		ICPMS
F046	113.50	12.611	9			ICP / GF
F076	127.00	14.111	9			ICPMS
F016	143.00	14.300	10	HEHHEH		ICP
F010	132.00	14.667	9	L		GFA

OVERALL AVERAGE RANK IS 9.671

Silver

PARAMETER: 51095 Antimony ug/L

RESEARCH AND APPLICATIONS BRANCH
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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	.28	3.00	4.59	9.00	1.52	7.00	3.04	8.00	4.06	13.00	9.5	8.00
F003	1.2	7.00	5.7	15.00	2.6	12.00	4.0	14.50	3.5	9.00	10.1	15.00
F016	87.0 EH	11.00	60.0 EH	19.00	55.5 EH	17.00	44.0 EH	18.00	22.0 EH	19.00	86.0 EH	19.00
F020	7. EH	9.00	12. EH	18.00	8. EH	16.00	9. EH	17.00	12. EH	18.00	10.	12.50
F025	.7	6.00	4.6	10.50	2.7	13.00	3.5	13.00	4.6	15.00	10.	12.50
F030	.6	4.50	2.9	2.00	1.1	3.00	1.3 L	1.00	2.4	4.00	10.	12.50
F031	.2	1.50	5.0	13.50	1.4	5.50	3.4	12.00	2.2	3.00	10.5	16.00
F033	.6	4.50	5.0	13.50	2.0	10.50	3.3	11.00	3.9	10.00	9.6	9.00
F035	<.2	0.00	4.1	7.00	1.2	4.00	2.4	3.00	3.2	7.00	8.4	4.00
F038	.2	1.50	4.5	8.00	1.6	9.00	3.1	9.00	.4 VL	1.00	9.3	7.00
F046	1.W	0.00	4.0	5.00	2.0	10.50	3.0	6.50	4.0	11.50	10.0	12.50
F060	<.5	0.00	4.6	10.50	1.4	5.50	2.8	5.00	3.4	8.00	9.2	6.00
F063	<1.	0.00	4.	5.00	<1.	0.00	2.	2.00	1. VL	2.00	7.	1.50
F065	4.58 EH	8.00	8.41 VH	17.00	4.82 EH	15.00	6.59 VH	16.00	7.40 VH	17.00	13.0 H	18.00
F066	<1.	0.00	4.	5.00	1.	2.00	3.	6.50	3.	6.00	9.	5.00
F067	<.5	0.00	3.5	3.00	.9	1.00	2.5	4.00	2.8	5.00	8.3	3.00
F069	<1.	0.00	7. H	16.00	3.	14.00	4.	14.50	5.	16.00	12.	17.00
F075	<2.	0.00	2. L	1.00	<2.	0.00	<2.	0.00	4.	11.50	7.	1.50
F076	<.5	0.00	4.73	12.00	1.56	8.00	3.16	10.00	4.13	14.00	9.65	10.00
F077	14.83 EH	10.00		0.00		0.00		0.00		0.00		0.00
MEDIAN CONC.	.7000		4.6000		1.6000		3.1300		3.9000		9.6500	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	13.	10.50	22.02	9.00	27.6	5.00	37.29	7.00
F003	13.0	10.50	21.0	5.00	28.0	7.00	36.5	4.00
F016	38.0 EH	19.00	40.0 EH	18.00	157. EH	19.00	64.0 EH	19.00
F020	17. H	17.00	31. VH	17.00	30.	12.50	45.	15.50
F025	16.	15.00	24.	13.00	32.	15.50	41.	12.50
F030	10.	2.00	20.	3.50	28.	7.00	54. EH	18.00
F031	15.0	14.00		0.00		0.00		0.00
F033	13.	10.50	23.	12.00	28.	7.00	37.	6.00
F035	12.4	6.50	19.1	2.00	22.7 L	2.00	28.3 L	1.00
F038	8.9 L	1.00	22.3	10.00	29.2	11.00	36.7	5.00
F046	13.0	10.50	22.0	7.00	27.0	4.00	35.0	3.00
F060	12.4	6.50	22.0	7.00	28.8	10.00	38.2	10.00
F063	12.	4.00	22.	7.00	31.	14.00	45.	15.50
F065	16.7 H	16.00	26.8 H	15.00	32.6	17.00	41.7	14.00
F066	12.	4.00	19.	1.00	35. H	18.00	38.	9.00
F067	12.6	8.00	20.0	3.50	24.2	3.00	34.7	2.00
F069	18. VH	18.00	30. VH	16.00	32.	15.50	40.	11.00
F075	12.	4.00	25.	14.00	30.	12.50	41.	12.50
F076	13.3	13.00	22.5	11.00	28.6	9.00	37.5	8.00
F077		0.00		0.00	6.67 EL	1.00	49.00 VH	17.00
MEDIAN CONC.	13.0000		22.1600		28.8000		38.2000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	79.50	7.950	10			ICPMS
F003	99.00	9.900	10			ICP-DIG
F016	178.00	17.800	10	EHEHEHEHEHEHEHEHEHEH	BIASED HIGH	ICP
F020	152.50	15.250	10	EHEHEHEHEH H VH	BIASED HIGH	51005
F025	126.00	12.600	10			HYD AAS
F030	57.50	5.750	10	L EH		ICP 5X
F031	65.50	9.357	7			HYD AAS
F033	94.00	9.400	10			HYD AAS
F035	36.50	4.056	9	L L	BIASED LOW	Hydride-AA
F038	62.50	6.250	10	VL L		HVAAS
F046	70.50	7.833	9			ICP / GF
F060	68.50	7.611	9			AA-HYDRIDE
F063	51.00	6.375	8	VL		HYDRIDE GEN. AA
F065	153.00	15.300	10	EHVHEHVHVHH H H	BIASED HIGH	ICPMS
F066	56.50	6.278	9	H		HYD AAS
F067	32.50	3.611	9		BIASED LOW	HGAAS
F069	138.00	15.333	9	H VHVH	BIASED HIGH	AA HYDRIDE
F075	57.00	8.143	7	L		AA-HGA
F076	95.00	10.556	9			ICPMS
F077	28.00	9.333	3	EH ELVH	INSUFFICIENT DATA	AA, 6X CONC'N

OVERALL AVERAGE RANK IS 9.556

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F067	32.50	3.611	9		BIASED LOW	HGAAS
F035	36.50	4.056	9	LL	BIASED LOW	Hydride-AA
F030	57.50	5.750	10	LEH		ICP 5X
F038	62.50	6.250	10	VLL		HVAAS
F066	56.50	6.278	9	H		HYD AAS
F063	51.00	6.375	8	VL		HYDRIDE GEN. AA
F060	68.50	7.611	9			AA-HYDRIDE
F046	70.50	7.833	9			ICP / GF
F001	79.50	7.950	10			ICPMS
F075	57.00	8.143	7	L		AA-HGA
F077	28.00	9.333	3	EHELVH	INSUFFICIENT DATA	AA, 6X CONC'N
F031	65.50	9.357	7			HYD AAS
F033	94.00	9.400	10			HYD AAS
F003	99.00	9.900	10			ICP-DIG
F076	95.00	10.556	9			ICPMS
F025	126.00	12.600	10			HYD AAS
F020	152.50	15.250	10	EHEHEHEHEHHVH	BIASED HIGH	51005
F065	153.00	15.300	10	EHVHEHVHVHHHH	BIASED HIGH	ICPMS
F069	138.00	15.333	9	HVHVH	BIASED HIGH	AA HYDRIDE
F016	178.00	17.800	10	EHEHEHEHEHEHEHEHEHEH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 9.556

PARAMETER: 83095 Bismuth ug/L

RESEARCH AND APPLICATIONS 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= .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	<.02	0.00	4.43	1.00	6.87	2.00	2.39	2.00	1.36	1.00	10.57	2.00
F016		0.00		0.00	9.0	3.00		0.00		0.00	12.0	3.00
F020	<20.	0.00	<20.	0.00	<20.	0.00	<20.	0.00	<20.	0.00	<20.	0.00
F038	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00
F066	<200.	0.00	<200.	0.00	<200.	0.00	<200.	0.00	<200.	0.00	<200.	0.00
F067	<.5	0.00	4.5	2.00	4.7 L	1.00	1.7	1.00	<.5	0.00	7.3 L	1.00
F077	13.92	1.00	14.75 EH	3.00	41.75 EH	4.00		0.00		0.00	64.94 EH	4.00
MEDIAN CONC.			4.5000		7.9350						11.2850	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	14.68	3.00	23.8	2.00	20.81	3.00	21.57	2.00
F016	8.0 L	1.00	24.0	3.00	20.0	2.00	24.0	3.00
F020	<20.	0.00	<20.	0.00	<20.	0.00	<20.	0.00
F038	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00
F066	<200.	0.00	<200.	0.00	<200.	0.00	<200.	0.00
F067	10.4	2.00	20.0	1.00	17.5	1.00	16.6 L	1.00
F077	56.06 EH	4.00	78.81 EH	4.00	74.44 EH	4.00	81.06 EH	4.00
MEDIAN CONC.	12.5400		23.9000		20.4050		22.7850	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	18.00	2.000	9		BIASED LOW	ICPMS
F016	15.00	2.500	6	L		ICP
F020	0.00	*******	0		INSUFFICIENT DATA	ICP
F038	0.00	*******	0		INSUFFICIENT DATA	ICP
F066	0.00	*******	0		INSUFFICIENT DATA	ICP
F067	10.00	1.250	8	L L L	BIASED LOW	HGAAS
F077	28.00	3.500	8	EHEH EHEHEHEHEH	BIASED HIGH	AA, 8X CONC'N

OVERALL AVERAGE RANK IS 2.290

PARAMETER: 93095 Lithium 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	2.3	3.00	2.38	2.00	9.04	7.00	4.24	4.00	6.06	5.00	10.9	9.00
F003	4.2	5.00	3.3	6.00	11.7	13.00	4.6	5.00	7.8	9.00	11.	10.00
F010	<5.	0.00	5. H	8.00	11.	11.50	<5.	0.00	6.	3.50	10.	4.50
F011	2.25	2.00	2.65	3.00	9.3	9.00	4.0	2.50	6.35	6.00	11.5	12.00
F016	5.0	6.50	4.0	7.00	11.0	11.50	8.0 VH	7.00	8.0	10.00	13.0	14.00
F025	3.	4.00	3.	4.50	8.	3.50	4.	2.50	7.	7.50	10.	4.50
F030	<4.	0.00	<4.	0.00	8.	3.50	<4.	0.00	6.	3.50	10.	4.50
F038	<15.	0.00	<15.	0.00	<15.	0.00	<15.	0.00	<15.	0.00	<15.	0.00
F046	5.0	6.50	3.0	4.50	1.2 EL	1.00	5.0	6.00	7.0	7.50	12.0	13.00
F060	<5.	0.00	<5.	0.00	9.	6.00	<5.	0.00	<5.	0.00	10.	4.50
F065	6.19 H	8.00	6.36 VH	9.00	13.4 VH	14.00	8.10 VH	8.00	10.5 VH	12.00	15.4 VH	15.00
F066	<10.	0.00	<10.	0.00	10.	10.00	<10.	0.00	10. H	11.00	10.	4.50
F067	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	10.	4.50
F068		0.00		0.00	8.9	5.00		0.00		0.00	10.3	8.00
F069	<4.	0.00	<4.	0.00	9.1	8.00	<4.	0.00	5.4	2.00	11.1	11.00
F077	.88 L	1.00	.88 L	1.00	6.50	2.00	1.13 VL	1.00	3.00 VL	1.00	9.13	1.00
MEDIAN CONC.	3.6000		3.0000		9.0700		4.4200		6.6750		10.3000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	17.4	6.50	28.36	6.00	26.29	4.00	31.38	5.00
F003	18.	9.50	30.	11.00	29.	10.50	35.	12.00
F010	18.	9.50	30.	11.00	28.	7.00	36.	13.00
F011	18.6	12.00	29.9	9.00	28.9	9.00	34.6	11.00
F016	16.0	3.50	28.0	4.50	31.0	14.50	32.0	6.50
F025	18.	9.50	27.	3.00	26.	3.00	31.	3.50
F030	16.	3.50	28.	4.50	27.	5.00	31.	3.50
F038	20.	14.50	29.	8.00	30.	12.50	32.	6.50
F046	18.0	9.50	32.0	15.00	31.0	14.50	38.0	15.00
F060	19.	13.00	31.	14.00	29.	10.50	33.	8.00
F065	21.5	16.00	32.7	16.00	31.9	16.00	37.8	14.00
F066	20.	14.50	30.	11.00	30.	12.50	40. H	16.00
F067	10. EL	1.00	20. VL	1.00	20. VL	1.00	20. EL	1.00
F068	17.3	5.00	28.8	7.00	27.4	6.00	34.1	10.00
F069	17.4	6.50	30.2	13.00	28.5	8.00	33.7	9.00
F077	14.63	2.00	23.50 L	2.00	22.50 L	2.00	26.25 L	2.00
MEDIAN CONC.	18.0000		29.4500		28.7000		33.3500	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F020	0.00	*******	0		INSUFFICIENT DATA	ICP
F038	0.00	*******	0		INSUFFICIENT DATA	ICP
F066	0.00	*******	0		INSUFFICIENT DATA	ICP
F067	10.00	1.250	8	LLL	BIASED LOW	HGAAS
F001	18.00	2.000	9		BIASED LOW	ICPMS
F016	15.00	2.500	6	L		ICP
F077	28.00	3.500	8	EHEHEHEHEHEHEH	BIASED HIGH	AA, 8X CONC'N

OVERALL AVERAGE RANK IS 2.290

Bismuth

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	51.50	5.150	10			ICPMS
F003	91.00	9.100	10			ICP
F010	68.00	8.500	8	H		A.A.
F011	75.50	7.550	10			
F016	85.00	8.500	10	VH		ICP
F025	45.50	4.550	10			ICP
F030	28.00	4.000	7			ICP 5X
F038	41.50	10.375	4		INSUFFICIENT DATA	ICP
F046	92.50	9.250	10	EL		AE
F060	56.00	9.333	6			ICP, DISSOLVED
F065	128.00	12.800	10	H VHVHVHVHVH	BIASED HIGH	ICPMS
F066	79.50	11.357	7	H H		ICP
F067	8.50	1.700	5	ELVLVLEL	BIASED LOW	FLAME AE
F068	41.00	6.833	6			IC
F069	57.50	8.214	7			ICP
F077	15.00	1.500	10	L L VLVL L L L	BIASED LOW	AA, 8X CONC'N

OVERALL AVERAGE RANK IS 7.415

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F077	15.00	1.500	10	LLVLVLLLL	BIASED LOW	AA, 8X CONC'N
F067	8.50	1.700	5	ELVLVLEL	BIASED LOW	FLAME AE
F030	28.00	4.000	7			ICP 5X
F025	45.50	4.550	10			ICP
F001	51.50	5.150	10			ICPMS
F068	41.00	6.833	6			IC
F011	75.50	7.550	10			
F069	57.50	8.214	7			ICP
F010	68.00	8.500	8	H		A.A.
F016	85.00	8.500	10	VH		ICP
F003	91.00	9.100	10			ICP
F046	92.50	9.250	10	EL		AE
F060	56.00	9.333	6			ICP, DISSOLVED
F038	41.50	10.375	4		INSUFFICIENT DATA	ICP
F066	79.50	11.357	7	HH		ICP
F065	128.00	12.800	10	HVHVHVHVHVH	BIASED HIGH	ICPMS

OVERALL AVERAGE RANK IS 7.415

PARAMETER: 94095 Berylium ug/L

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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	<.05	0.00	.52	4.00	3.50	9.50	1.22	12.00	1.56	8.00	9.24	14.00
F003	<.05	0.00	.47	2.00	3.21	4.00	1.02	9.00	1.44	4.00	9.1	11.00
F005	.02	1.00	.53	5.00	3.48	8.00	1.14	11.00	1.61	9.00	8.95	5.00
F010	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	8.	2.00
F011	<.1	0.00	.6	6.00	3.75	12.00	1.1	10.00	1.65	10.00	9.2	12.50
F016		0.00		0.00	8.0 EH	15.00		0.00		0.00	10.0	17.50
F020	<1.	0.00	<1.	0.00	3.	2.00	1.	5.00	2.	11.50	9.	8.00
F025	1.	2.00	1.	7.50	5. H	14.00	2.	13.00	3. H	13.00	12. H	19.00
F030	<1.	0.00	<1.	0.00	2. L	1.00	<1.	0.00	<1.	0.00	7.	1.00
F033	<.1	0.00	.5	3.00	3.2	3.00	1.0	5.00	1.4	2.00	8.3	3.00
F035	<.1	0.00	.4	1.00	3.3	5.00	1.0	5.00	1.4	2.00	9.0	8.00
F038	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	9.	8.00
F046	1.W	0.00	1.0	7.50	3.6	11.00	1.0	5.00	1.50	5.50	9.3	16.00
F060	<1.	0.00	<1.	0.00	4.	13.00	1.	5.00	2.	11.50	9.	8.00
F063	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00
F065	5.37	3.00	6.49 EH	9.00	9.07 EH	16.00	6.63 EH	14.00	7.26 EH	14.00	13.9 EH	20.00
F066	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	9.	8.00
F067	<.5	0.00	<.5	0.00	3.4	6.00	1.0	5.00	1.4	2.00	8.6	4.00
F069	<.5	0.00	<.5	0.00	3.5	9.50	.9	1.00	1.5	5.50	9.2	12.50
F075	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	10.	17.50
F076	<.5	0.00	<.5	0.00	3.42	7.00	1.00	5.00	1.52	7.00	9.27	15.00
MEDIAN CONC.			.5300		3.4900		1.0000		1.5400		9.0500	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	6.79	9.00	16.33	14.00	25.5	4.00	34.3	5.00
F003	6.9	12.00	16.3	13.00	27.5	12.50	37.	15.00
F005	6.51	7.00	15.64	8.00	26.57	7.00	34.82	6.00
F010	6.	4.00	14.	2.50	25.	3.00	33.	3.00
F011	6.8	10.50	16.0	10.50	28.0	15.00	36.8	13.00
F016	8.0	17.50	18.0	18.00	29.0	17.50	37.0	15.00
F020	7.	13.50	15.	5.50	26.	5.00	34.	4.00
F025	10. VH	19.50	19.	19.00	31.	20.00	40.	19.50
F030	5.	1.00	13.	1.00	24.	1.50	31.	1.00
F033	5.6	2.00	14.	2.50	24.	1.50	32.	2.00
F035	6.8	10.50	16.7	15.00	27.2	9.00	36.2	9.00
F038	6.	4.00	15.	5.50	28.	15.00	37.	15.00
F046	7.10	15.00	16.1	12.00	27.5	12.50	36.4	11.00
F060	6.	4.00	15.	5.50	27.	8.00	36.	8.00
F063	10. VH	19.50	20. H	20.50	30.	19.00	40.	19.50
F065	12.1 EH	21.00	20.0 H	20.50	32.5 H	21.00	42.6	21.00
F066	7.	13.50	16.	10.50	28.	15.00	38.	17.00
F067	6.3	6.00	15.0	5.50	26.4	6.00	35.6	7.00
F069	7.4	16.00	16.9	16.00	27.3	10.00	36.4	11.00
F075	8.	17.50	17.	17.00	29.	17.50	39.	18.00
F076	6.53	8.00	15.7	9.00	27.4	11.00	36.4	11.00
MEDIAN CONC.	6.8000		16.0000		27.4000		36.4000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	79.50	8.833	9			ICPMS
F003	82.50	9.167	9			ICP
F005	67.00	6.700	10			ICPMS
F010	14.50	2.900	5		BIASED LOW	ICP
F011	99.50	11.056	9			
F016	100.50	16.750	6	EH	BIASED HIGH	ICP
F020	54.50	6.813	8			ICP
F025	146.50	14.650	10	H H H VH	BIASED HIGH	ICP
F030	6.50	1.083	6	L	BIASED LOW	ICP 5X
F033	24.00	2.667	9		BIASED LOW	ICP
F035	64.50	7.167	9			ICP-AES
F038	47.50	9.500	5			ICP
F046	95.50	10.611	9			ICP
F060	63.00	7.875	8			ICP, DISSOLVED
F063	78.50	19.625	4	VHH	INSUFFICIENT DATA	ICP
F065	159.50	15.950	10	EHEHEHEHEHEHH H	BIASED HIGH	ICPMS
F066	64.00	12.800	5			ICP
F067	41.50	5.188	8			ICAP
F069	81.50	10.188	8			ICP
F075	87.50	17.500	5		BIASED HIGH	AA-HGA
F076	73.00	9.125	8			ICPMS

OVERALL AVERAGE RANK IS 9.569

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F030	6.50	1.083	6	L	BIASED LOW	ICP 5X
F033	24.00	2.667	9		BIASED LOW	ICP
F010	14.50	2.900	5		BIASED LOW	ICP
F067	41.50	5.188	8			ICAP
F005	67.00	6.700	10			ICPMS
F020	54.50	6.813	8			ICP
F035	64.50	7.167	9			ICP-AES
F060	63.00	7.875	8			ICP, DISSOLVED
F001	79.50	8.833	9			ICPMS
F076	73.00	9.125	8			ICPMS
F003	82.50	9.167	9			ICP
F038	47.50	9.500	5			ICP
F069	81.50	10.188	8			ICP
F046	95.50	10.611	9			ICP
F011	99.50	11.056	9			
F066	64.00	12.800	5			ICP
F025	146.50	14.650	10	HHHVH	BIASED HIGH	ICP
F065	159.50	15.950	10	EHEHEHEHEHEHHH	BIASED HIGH	ICPMS
F016	100.50	16.750	6	EH	BIASED HIGH	ICP
F075	87.50	17.500	5		BIASED HIGH	AA-HGA
F063	78.50	19.625	4	VHH	INSUFFICIENT DATA	ICP

OVERALL AVERAGE RANK IS 9.569

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