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Ecosystems Interlaboratory QA Program, Study FP63 for a Variety of Trace Metals in Water (July & August 1993)

H. Alkema

Research and Applications Branch
National Water Research Institute
867 Lakeshore Rd, Burlington, ON
Canada L7R 4A6

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National Water Research Institute
867 Lakeshore Road, P.O. Box 5050
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Your file Votre référence

Our file Notre référence

6 October 1993

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

Re: Final Report for FP/GLAP Study FP63 - 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 analysed in January and February of this year. The evaluation of results is in the LRTAP style, giving 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 the future, now that all evaluation programs have been adapted to the FP/GLAP format, reports will be prompt.

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

Canada

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Table 1

ENVIRONMENT CANADA
National Water Research Institute

Ecosystems Interlaboratory Quality Assurance Program
PARTICIPATION LIST - Study FP/GLAP 63 (July & Aug '93)

Alberta Environmental Centre
ASL Analytical Service Lab Ltd.
Barringer Laboratories Ltd.
Can Test Ltd.
Chemex Labs Alberta Inc.
Chemical & Geological Laboratories Inc.
City of Calgary
Edmonton Public Works
Environment Canada - Atlantic Region
Environment Canada - Centre St. Laurent
Environment Canada - NLET
Environment Canada - Pacific & Yukon Region
Environment Canada - Western & Northern Region
Environment Canada - WQB, Western & Northern Region
Environment Manitoba
Environment New Brunswick
Environmental Services Lab, NS
Elemental Research Inc.
Forestry Canada - Sault Ste Marie
Geological Survey of Canada - Ottawa (I)
Geological Survey of Canada - Ottawa (II)
HBT Agra Ltd
Illinois State Water Survey
Indian & Northern Affairs Canada
Laboratoire de Santé, Publique du Québec
Ministère de l'Environnement du Québec - Laval
Ministère de l'Environnement du Québec - Ste. Foy
Ontario Ministry of Environment - Dorset
Ontario Ministry of Environment - Etobicoke
Ontario Ministry of Environment - Kingston
Ontario Ministry of Environment - London
Ontario Ministry of Environment - Thunder Bay
PEI Agriculture
Rockcliff Research Management Inc. (WTC)
Saskatchewan Health
Saskatchewan Research Council
Sawyer Environmental Laboratory - University of Maine
Shell Calgary Research Centre
Sodexen Inc
USEPA, Region 5 - Chicago
Zenon Environmental Inc., BC

Table 2

COMPARISON OF LABORATORY PERFORMANCE (STUDY 0063)

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
F042	1	0	0.00	10	0	0.00	0.00
F001	21	0	0.00	194	3	1.55	1.55
F002	8	0	0.00	76	4	5.26	5.26
F003	14	1	7.14	140	0	0.00	7.14
F015	14	1	7.14	113	2	1.77	8.91
F010	19	1	5.26	162	11	6.79	12.05
F044	10	1	10.00	100	4	4.00	14.00
F025	20	0	0.00	171	24	14.04	14.04
F008	15	1	6.67	112	10	8.93	15.60
F016	16	1	6.25	108	12	11.11	17.36
F046	21	4	19.05	177	13	7.34	26.39
F024	14	3	21.43	136	9	6.62	28.05
F014	9	1	11.11	74	13	17.57	28.68
F023	21	1	4.76	145	38	26.21	30.97
F013	7	2	28.57	40	1	2.50	31.07
F030	20	3	15.00	174	34	19.54	34.54
F047	21	6	28.57	189	19	10.05	38.62
F011	10	1	10.00	94	27	28.72	38.72
F038	21	6	28.57	161	17	10.56	39.13
F043	17	5	29.41	155	18	11.61	41.02
F060	15	4	26.67	113	20	17.70	44.37
F020	20	8	40.00	165	17	10.30	50.30
F031	7	2	28.57	70	16	22.86	51.43
F033	19	10	52.63	179	9	5.03	57.66
F048	6	2	33.33	44	12	27.27	60.61
F037	10	3	30.00	80	26	32.50	62.50
F058	7	2	28.57	70	25	35.71	64.29
F062	19	5	26.32	136	53	38.97	65.29
F036	12	4	33.33	120	45	37.50	70.83
F009	14	6	42.86	129	47	36.43	79.29
F035	18	13	72.22	150	24	16.00	88.22
F055	21	12	57.14	181	83	45.86	103.00

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			

THE FOLLOWING PARAMETERS WERE EXCLUDED:

Ti

Table 3

SUMMARY OF STUDY TO STUDY PERFORMANCE

Trace Metals

LAB CODE	%BIAS AND %FLAGS ON STUDIES 0062	0063	MEDIAN SCORE	COMMENTS
F001	9.8	1.5	5.7	SATISFACTORY, WELL DONE
F002	20.0	5.3	12.6	SATISFACTORY
F003	1.2	7.1	4.2	SATISFACTORY, WELL DONE
F008	28.2	15.6	21.9	SATISFACTORY
F009	-	79.3	-	-
F010	25.4	12.1	18.7	SATISFACTORY
F011	5.2	38.7	21.9	SATISFACTORY
F013	14.3	31.1	22.7	SATISFACTORY
F014	63.2	28.7	45.9	MODERATE
F015	6.9	8.9	7.9	SATISFACTORY, WELL DONE
F016	38.2	17.4	27.8	MODERATE
F020	9.4	50.3	29.8	MODERATE
F023	-	31.0	-	-
F024	55.0	28.0	41.5	MODERATE
F025	31.8	14.0	22.9	SATISFACTORY
F030	26.0	34.5	30.3	MODERATE
F031	-	51.4	-	-
F032	131.3	-	-	-
F033	11.7	57.7	34.7	MODERATE
F035	-	88.2	-	-
F036	25.5	70.8	48.1	MODERATE
F037	95.0	62.5	78.7	POOR
F038	10.3	39.1	24.7	SATISFACTORY
F039	27.7	-	-	-
F040	38.0	-	-	-
F042	0.0	0.0	0.0	SATISFACTORY, WELL DONE
F043	42.9	41.0	41.9	MODERATE
F044	12.0	14.0	13.0	SATISFACTORY
F045	33.3	-	-	-
F046	21.0	26.4	23.7	SATISFACTORY
F047	59.2	38.6	48.9	MODERATE
F048	-	60.6	-	-
F055	62.1	103.0	82.5	POOR
F058	-	64.3	-	-
F060	-	44.4	-	-
F062	-	65.3	-	-
INTERLAB MEDIAN	26.0	38.6		

THE FOLLOWING CODES WERE EXCLUDED
22095

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

Table 4

Sample Design - FP/GLAP 63 - July '93

Trace Metals

Sample No.	Sample Name	Type (DA/Low)	Cu Conc'n (Study 63)
1	NAT-01	Low	0.0026
2	TM-27	Low	0.0060
3	TM-22	Low	0.0140
4	TM-24	Low	0.0077
5	TM-25	Low	0.0270
6	TMDA-51	DA*	0.0670
7	TMDA-52	DA	0.300
8	TMDA-53	DA	0.201
9	TMDA-54	DA	0.443
10	TM-93	DA	0.100

* Direct Aspiration

Table 5 SUMMARY of Interlaboratory MEDIAN VALUES for Trace Metals - STUDY 63

PARAMETER		SAMPLE NUMBER						
		NAT-01 SAMPLE 1	TM-27 SAMPLE 2	TM-22 SAMPLE 3	TM-24 SAMPLE 4	TM-25 SAMPLE 5	TMDA-51 SAMPLE 6	TMDA-52 SAMPLE 7
Aluminum	MG/L	.2680	.0920	.0590	.0204	.0574	.0840	.3200
Vanadium	mg/L	.0003	.0100	.0107	.0064	.0150	.0800	.1510
Chromium	mg/L	.0010	.0050	.0130	.0057	.0039	.0610	.1750
Manganese	MG/L	.0840	.0053	.0120	.0030	.0182	.0350	.3490
Iron	MG/L	.1320	.0111	.0293	.0060	.0100	.1500	.4520
Cobalt	mg/L	.0010	.0025	.0110	.0190	.0130	.0737	.2745
Nickel	mg/L	.0053	.0040	.0124	.0030	.0100	.0820	.1515
Copper	mg/L	.0026	.0060	.0140	.0080	.0271	.0670	.3000
Zinc	mg/L	.0334	.0055	.0160	.0140	.0079	.0950	.2500
Arsenic	ug/L	.2850	-	.2400	2.7000	1.0000	14.760	27.000
Selenium	ug/L	1.0000	-	.7500	3.8500	2.0000	10.000	21.130
Strontium	mg/L	.0160	.0050	.3610	.1100	.2335	.1190	.2910
Molybdenum	mg/L	.0007	.0036	.0128	.0040	.0086	.0908	.3415
Silver	ug/L	-	-	-	.4800	2.4000	18.300	30.000
Cadmium	mg/L	.0002	.0013	.0108	.0130	.0075	.0355	.0952
Antimony	ug/L	-	-	-	15.000	8.0000	13.450	18.720
Barium	MG/L	.0220	.0100	.0535	.0090	.0640	.0785	.1575
Lead	mg/L	.0030	.0030	.0103	.0072	.0220	.0650	.3770
Bismuth	ug/L	-	-	-	2.4000	8.6000	5.6000	19.300
Lithium	ug/L	.7400	2.7500	-	4.4000	6.0000	14.350	21.000
Berylium	ug/L	-	-	-	1.5500	7.0000	25.000	17.000

PARAMETER		TMDA-53 SAMPLE 8	TMDA-54 SAMPLE 9	TM-93 SAMPLE 10
Aluminum	MG/L	.2400	.4800	1.0000
Vanadium	mg/L	.4415	.3320	.9580
Chromium	mg/L	.3680	.4420	.1000
Manganese	MG/L	.1440	.2220	.1000
Iron	MG/L	.3270	.2810	.5020
Cobalt	mg/L	.1725	.3905	.2875
Nickel	mg/L	.3400	.3700	.4830
Copper	mg/L	.2000	.4430	.1000
Zinc	mg/L	.1770	.5420	.1060
Arsenic	ug/L	41.400	21.000	9.8700
Selenium	ug/L	32.000	37.900	9.6300
Strontium	mg/L	.3905	.6160	.3625
Molybdenum	mg/L	.2020	.4605	.9550
Silver	ug/L	20.540	28.000	.3550
Cadmium	mg/L	.2700	.1700	.0965
Antimony	ug/L	25.500	36.025	.3000
Barium	MG/L	.3415	.2745	.9800
Lead	mg/L	.2200	.5500	.4700
Bismuth	ug/L	24.000	21.000	.5300
Lithium	ug/L	33.500	32.000	2.0500
Berylium	ug/L	12.500	34.000	1.0000

Appendix A

Glossary of Terms

GLOSSARY OF TERMS

Appendix A:

Used for the Evaluation of Interlaboratory Results

Satisfactory: Quite acceptable, "good results".

Erratic: A set of results for a given characteristic is deemed erratic when both high and low flags are assigned.

Out of Control: An analytical system is said to be out of control when it has demonstrated the ability to perform adequately and produces an extreme result or results. For an example, consider a set of results obtained by 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. The use of these codes is discouraged in the FP/GLAP context, as incorrect flagging of results can occur. "Less than" values are normally used when reporting FP/GLAP data.

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

PARAMETER: 13091 Aluminum MG/L

RESEARCH AND APPLICATIONS BRANCH
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FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.266	14.00	.104	24.50	.058	12.50	.032 H	22.00	.057	13.50	.084	15.00
F002	.25	9.00	.090	11.50	.058	12.50	.020	12.00	.053	11.00	.080	12.00
F003	.271	20.00	.099	19.00	.066	21.00	.023	18.00	.061	23.00	.090	19.50
F008	.268	15.00	.092	14.50	.056	11.00	.018	9.00	.052	9.50	.078	10.00
F009	.28	23.00	.12 VH	27.00	.10 EH	28.50	.05 EH	26.00	.10 EH	28.50	.14 EH	29.00
F010	.26	11.00	.09	11.50	.06	17.00	.03 H	21.00	.06	20.00	.08	12.00
F014	.28	23.00	.10	21.00	.048	8.50	.024	20.00	.059	17.00	.10	27.00
F015	.27	17.50	.1	21.00	.07	24.00	<.05	0.00	.06	20.00	.09	19.50
F016	.337 VH	28.00	.133 EH	28.00	.065	19.50	.023	18.00	.062	24.00	.093	23.00
F020	.221 L	3.00	.076	2.00	.047	7.00	.014	7.00	.039 L	6.00	.063 L	5.00
F023	.272	21.00	.103	23.00	.084 VH	27.00	.044 EH	24.00	.093 EH	27.00	.091	22.00
F024	.26	11.00	.092	14.50	.070	24.00	.040 EH	23.00	.075 H	25.00	.085	16.00
F025	.28	23.00	.11	26.00	.08 VH	26.00	.05 EH	26.00	.08 VH	26.00	.07	7.00
F030	.30	26.00	.10	21.00	.07	24.00	.05 EH	26.00	.06	20.00	.10	27.00
F031	.240	6.00	.085	6.50	.046	5.50	.012	3.50	.025 EL	2.00	.050 VL	3.00
F033	.26	11.00	.094	16.00	.059	15.00	.02T	12.00	.057	13.50	.082	14.00
F035	.232	4.00	.085	6.50	.052	10.00	.020	12.00	.051	8.00	.076	8.00
F036	.2700	17.50	.0962	18.00	.0585	14.00	.0208	15.00	.0574	15.00	.0859	17.00
F037	.325 H	27.00	.0896	9.00	.0432 L	4.00	.0111 L	2.00	.0379 L	5.00	.0768	9.00
F038	.247	7.00	.068 L	1.00	.038 VL	3.00	.013	5.00	.030 VL	4.00	.059 L	4.00
F042	.291	25.00	.104	24.50	.067	22.00	.021	16.00	.058	16.00	.090	19.50
F043	.27	17.50	.09	11.50	.06	17.00	.02	12.00	.06	20.00	.09	19.50
F044	.249	8.00	.095	17.00	.065	19.50	.023	18.00	.055	12.00	.095	25.00
F046	.235	5.00	.080	4.00	.025 EL	1.00	.012	3.50	.024 EL	1.00	.035 EL	1.00
F047	.22 L	2.00	.079	3.00	.046	5.50	.014	7.00	.047	7.00	.066 L	6.00
F055	.35 EH	29.00	.15 EH	29.00	.10 EH	28.50	.10 EH	28.00	.10 EH	28.50	.10	27.00
F058	.265	13.00	.086	8.00	.048	8.50	.014	7.00	.052	9.50	.094	24.00
F060	.207 VL	1.00	.082	5.00	.029 EL	2.00	.010 L	1.00	.026 EL	3.00	.047 EL	2.00
F062	.27	17.50	.09	11.50	.06	17.00	.02	12.00	.06	20.00	.08	12.00
MEDIAN CONC.	.2680		.0920		.0590		.0204		.0574		.0840	

PARAMETER: 13091 Aluminum 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	.320	14.50	.240	13.00	.490	18.00	1.04	21.00
F002	.31	9.50	.23	9.50	.50	22.00	1.1	27.00
F003	.340	25.50	.243	17.00	.504	25.00	1.10	27.00
F008	.332	23.00	.244	18.00	.519	27.00	1.02	18.00
F009	.40 VH	29.00	.35 EH	29.00	.54	28.00	1.1	27.00
F010	.32	14.50	.24	13.00	.46	7.50	.95	9.00
F014	.33	21.00	.24	13.00	.49	18.00	1.04	21.00
F015	.32	14.50	.24	13.00	.48	14.00	1.04	21.00
F016	.330	21.00	.249	20.00	.486	16.00	1.00	13.50
F020	.297	6.50	.216	7.00	.454	6.00	1.002	16.00
F023	.318	12.00	.211	6.00	.464	9.00	.922	8.00
F024	.31	9.50	.25	22.50	.47	11.50	1.0	13.50
F025	.31	9.50	.26	26.00	.48	14.00	1.06	25.00
F030	.32	14.50	.24	13.00	.48	14.00	.92	7.00
F031	.265 L	3.00	.178 VL	2.00	.432	4.00	.765 VL	3.00
F033	.31	9.50	.23	9.50	.46	7.50	1.0	13.50
F035	.292	5.00	.208	5.00	.405 L	3.00	.842 L	4.00
F036	.3291	19.00	.2452	19.00	.4934	20.00	.6772 EL	2.00
F037	.322	18.00	.242	16.00	.583 VH	29.00	1.148 H	29.00
F038	.269 L	4.00	.203 L	4.00	.501	24.00	1.04	21.00
F042	.342	27.00	.250	22.50	.511	26.00	.956	10.00
F043	.34	25.50	.25	22.50	.49	18.00	1.05	24.00
F044	.338	24.00	.295 VH	27.00	.468	10.00	.872	5.00
F046	.297	6.50	.224	8.00	.451	5.00	1.01	17.00
F047	.26 L	2.00	.2 L	3.00	.38 VL	2.00	.88	6.00
F055	.35	28.00	.30 VH	28.00	.50	22.00	1.00	13.50
F058	.321	17.00	.257	25.00	.470	11.50	.980	11.00
F060	.215 EL	1.00	.115 EL	1.00	.290 EL	1.00	.272 EL	1.00
F062	.33	21.00	.25	22.50	.50	22.00	1.04	21.00
MEDIAN CONC.	.3200		.2400		.4800		1.0000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	168.00	16.800	10	H		SEAAS
F002	136.00	13.600	10			AAS
F003	215.00	21.500	10			ICP
F008	155.00	15.500	10			AAS
F009	275.00	27.500	10	VHEHEHEHEHVHEH	BIASED HIGH	ICP
F010	136.50	13.650	10	H		ICAP
F014	189.50	18.950	10			
F015	164.50	18.278	9			ICP
F016	211.00	21.100	10	VHEH		ICP 3X
F020	65.50	6.550	10	L L L	BIASED LOW	13111/13105
F023	179.00	17.900	10	VHEHEH		-
F024	170.50	17.050	10	EHH		ICP-AES
F025	208.50	20.850	10	VHEHVH		ICP
F030	192.50	19.250	10	EH		Naquadat 13009
F031	38.50	3.850	10	ELVLL VL VL	BIASED LOW	GFAAS, Direct
F033	121.50	12.150	10			
F035	65.50	6.550	10	L L	BIASED LOW	
F036	156.50	15.650	10	EL		I.C.P.
F037	148.00	14.800	10	H L L L VHH		Furnace
F038	77.00	7.700	10	L VL VLL L L		ICP/GFAAS
F042	208.50	20.850	10			
F043	187.50	18.750	10			ICP-MS
F044	165.50	16.550	10	VH		ICP-MS CHELATION
F046	52.00	5.200	10	EL ELEL	BIASED LOW	ICP + GFAA
F047	43.50	4.350	10	L L L L VL	BIASED LOW	ICPMS 1X Conc.
F055	261.50	26.150	10	EHEHEHEHEH VH	BIASED HIGH	FLAME AA
F058	134.50	13.450	10			Colorimetric
F060	18.00	1.800	10	VL ELL ELELELELELEL	BIASED LOW	GFAA - Direct
F062	176.50	17.650	10			ICP

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F060	18.00	1.800	10	VLELLELELELELELEL	BIASED LOW	GFAA - Direct
F031	38.50	3.850	10	ELVLLVLVL	BIASED LOW	GFAAS, Direct
F047	43.50	4.350	10	LLLLVL	BIASED LOW	ICPMS 1X Conc.
F046	52.00	5.200	10	ELELEL	BIASED LOW	ICP + GFAA
F020	65.50	6.550	10	LLL	BIASED LOW	13111/13105
F035	65.50	6.550	10	LL	BIASED LOW	
F038	77.00	7.700	10	LVLVLLLL		ICP/GFAAS
F033	121.50	12.150	10			
F058	134.50	13.450	10			Colorimetric
F002	136.00	13.600	10			AAS
F010	136.50	13.650	10	H		ICAP
F037	148.00	14.800	10	HLLLVHH		Furnace
F008	155.00	15.500	10			AAS
F036	156.50	15.650	10	EL		I.C.P.
F044	165.50	16.550	10	VH		ICP-MS CHELATION
F001	168.00	16.800	10	H		SEAAS
F024	170.50	17.050	10	EHH		ICP-AES
F062	176.50	17.650	10			ICP
F023	179.00	17.900	10	VHEHEH		-
F015	164.50	18.278	9			ICP
F043	187.50	18.750	10			ICP-MS
F014	189.50	18.950	10			
F030	192.50	19.250	10	EH		Naquadat 13009
F025	208.50	20.850	10	VHEHVH		ICP
F042	208.50	20.850	10			
F016	211.00	21.100	10	VHEH		ICP 3X
F003	215.00	21.500	10			ICP
F055	261.50	26.150	10	EHEHEHEHEHVH	BIASED HIGH	FLAME AA
F009	275.00	27.500	10	VHEHEHEHEHVHEH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 14.952

PARAMETER: 23091 Vanadium mg/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	3.50	.0103	14.00	.0118	12.00	.0067	10.00	.0149	6.00	.0796	9.00
F003	.0003	3.50	.0102	13.00	.0110	10.50	.0065	9.00	.0154	11.00	.081	13.00
F008	<.2	0.00	<.2	0.00	<.2	0.00	<.2	0.00	<.2	0.00	.2 EH	22.00
F009	<.01	0.00	.02 EH	17.00	.02 EH	16.50	.01 H	14.00	.03 EH	19.00	.09 H	20.50
F010	<.005	0.00	.010	9.00	.014 H	15.00	.013 EH	15.00	.018	15.00	.082	14.50
F015	<.01	0.00	<.01	0.00	.01	6.50	<.01	0.00	.02 VH	16.50	.08	11.00
F016	<.015	0.00	<.015	0.00	<.015	0.00	<.015	0.00	.016	12.00	.082	14.50
F020	<.003	0.00	.010	9.00	.011	10.50	.0073	13.00	.0162	13.00	.088	18.50
F023	.011 EH	7.00	.018 EH	16.00	.023 EH	18.00	.029 EH	16.00	.021 VH	18.00	.09 H	20.50
F024	<.001	0.00	.010	9.00	.010	6.50	.006	4.50	.015	8.50	.079	7.50
F025	<.002	0.00	.010	9.00	.009	2.50	.007	11.50	.015	8.50	.083	16.00
F030	.002	6.00	.010	9.00	.009	2.50	.006	4.50	.013	2.50	.078	5.50
F033	.002W	0.00	.0094T	4.00	.01	6.50	.0063T	8.00	.015	8.50	.078	5.50
F035	<.0025	0.00	.0098	5.00	.0105	9.00	.0062	7.00	.0146	5.00	.0764	4.00
F038	<.030	0.00	<.030	0.00	<.030	0.00	<.030	0.00	<.030	0.00	.085	17.00
F043	.0003	3.50	.011	15.00	.012	13.00	.007	11.50	.017	14.00	.088	18.50
F044	.0003	3.50	.009	3.00	.010	6.50	.006	4.50	.014	4.00	.075	3.00
F046	<.001	0.00	.007 L	1.00	.007 L	1.00	.004	1.00	.012	1.00	.079	7.50
F047	.0003	1.00	.0088	2.00	.0095	4.00	.0055	2.00	.013	2.50	.073	2.00
F055	<.04	0.00	<.04	0.00	<.04	0.00	<.04	0.00	<.04	0.00	.08	11.00
F060	<.003	0.00	.010	9.00	.013	14.00	.006	4.50	.015	8.50	.080	11.00
F062	<.01	0.00	.01	9.00	.02 EH	16.50	<.01	0.00	.02 VH	16.50	.07 L	1.00
MEDIAN CONC.	.0003		.0100		.0107		.0064		.0150		.0800	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.151	11.00	.442	12.00	.334	14.00	.970	14.00
F003	.152	13.00	.444	13.50	.334	14.00	.990	16.00
F008	.2 EH	22.00	.5 H	22.00	.3	2.00	1.0	18.00
F009	.17 H	20.00	.47	19.00	.36	21.00	1.0	18.00
F010	.151	11.00	.445	15.00	.326	8.00	.925	6.00
F015	.16	18.00	.44	9.50	.33	10.00	.95	9.00
F016	.151	11.00	.439	7.50	.331	11.00	.946	7.00
F020	.176 H	21.00	.460	18.00	.369 H	22.00	1.033	21.00
F023	.159	16.00	.444	13.50	.334	14.00	.956	11.00
F024	.15	9.00	.43	5.50	.32	5.50	.92	4.50
F025	.144	6.00	.441	11.00	.327	9.00	.947	8.00
F030	.148	7.00	.428	4.00	.324	7.00	.879	1.00
F033	.14	2.00	.42	2.00	.31	3.00	.91	3.00
F035	.143	4.50	.426	3.00	.313	4.00	.881	2.00
F038	.155	14.00	.477	20.00	.354	19.50	1.02	20.00
F043	.16	18.00	.45	16.00	.34	16.50	1.0	18.00
F044	.143	4.50	.489 H	21.00	.354	19.50	1.055	22.00
F046	.149	8.00	.439	7.50	.333	12.00	.952	10.00
F047	.14	2.00	.41	1.00	.28 L	1.00	.92	4.50
F055	.16	18.00	.44	9.50	.34	16.50	.96	12.50
F060	.156	15.00	.452	17.00	.345	18.00	.978	15.00
F062	.14	2.00	.43	5.50	.32	5.50	.96	12.50
MEDIAN CONC.	.1510		.4415		.3320		.9580	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	105.50	10.550	10			ICP5x
F003	116.50	11.650	10			ICP
F008	86.00	17.200	5	EHEHH	BIASED HIGH	AAS
F009	165.00	18.333	9	EHEHH EHH H	BIASED HIGH	ICP
F010	108.50	12.056	9	H EH		ICAP
F015	80.50	11.500	7	VH		ICP
F016	63.00	10.500	6			ICP 3X
F020	146.00	16.222	9	H H	BIASED HIGH	23111
F023	150.00	15.000	10	EHEHEHEHVHH		-
F024	60.50	6.722	9			ICP-AES
F025	81.50	9.056	9			ICP
F030	49.00	4.900	10		BIASED LOW	Naquadat 23009
F033	42.50	4.722	9		BIASED LOW	
F035	43.50	4.833	9		BIASED LOW	
F038	90.50	18.100	5		BIASED HIGH	ICP
F043	144.00	14.400	10			ICP-MS
F044	91.50	9.150	10	H		ICP-MS CHELATION
F046	49.00	5.444	9	L L		ICP + GFAA
F047	22.00	2.200	10	L	BIASED LOW	ICPMS 1X Conc.
F055	67.50	13.500	5			FLAME AA
F060	112.00	12.444	9			ICP - Direct
F062	68.50	8.563	8	EH VHL		ICP

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F047	22.00	2.200	10	L	BIASED LOW	ICPMS 1X Conc.
F033	42.50	4.722	9		BIASED LOW	
F035	43.50	4.833	9		BIASED LOW	
F030	49.00	4.900	10		BIASED LOW	Naquadat 23009
F046	49.00	5.444	9	LL		ICP + GFAA
F024	60.50	6.722	9			ICP-AES
F062	68.50	8.563	8	EHVHL		ICP
F025	81.50	9.056	9			ICP
F044	91.50	9.150	10	H		ICP-MS CHELATION
F016	63.00	10.500	6			ICP 3X
F001	105.50	10.550	10			ICP5x
F015	80.50	11.500	7	VH		ICP
F003	116.50	11.650	10			ICP
F010	108.50	12.056	9	HEH		ICAP
F060	112.00	12.444	9			ICP - Direct
F055	67.50	13.500	5			FLAME AA
F043	144.00	14.400	10			ICP-MS
F023	150.00	15.000	10	EHEHEHEHVHH		-
F020	146.00	16.222	9	HH	BIASED HIGH	23111
F008	86.00	17.200	5	EHEHH	BIASED HIGH	AAS
F038	90.50	18.100	5		BIASED HIGH	ICP
F009	165.00	18.333	9	EHEHHEHHH	BIASED HIGH	ICP

CVERALL AVERAGE RANK IS 10.390

Vanadium

PARAMETER: 24091 Chromium mg/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.0006	1.00	.0046	8.50	.0129	7.00	.0056	9.50	.0039	9.50	.0598	8.00
F003	.0006	2.00	.0046	8.50	.0127	6.00	.0052	7.00	.0034	6.00	.060	10.50
F008	<.002	0.00	.005	13.50	.015	19.00	.006	14.00	.004	13.50	.059	6.00
F009	.001	6.00	.005	13.50	.016	21.50	.007	17.00	.005	17.50	.07 H	22.50
F010	.002	8.50	.003	1.00	.015	19.00	.008	18.50	.004	13.50	.062	14.50
F011	.001	6.00	.004	3.50	.017 H	23.50	.005	4.50	.003	3.00	.062	14.50
F013	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.061	13.00
F015	<.005	0.00	<.005	0.00	.013	11.00	.005	4.50	<.005	0.00	.064	17.00
F016	<.015	0.00	<.015	0.00	<.015	0.00	<.015	0.00	<.015	0.00	.060	10.50
F020	<.002	0.00	.004	3.50	.012	4.00	.005	4.50	.0025	1.00	.0592	7.00
F023	.005 VH	11.00	.008 H	21.00	.013	11.00	.008	18.50	.007 H	19.50	.065	18.00
F024	<.001	0.00	.004	3.50	.011	2.00	.004	1.00	.003	3.00	.058	4.50
F025	.002	8.50	.006	17.50	.012	4.00	.010 VH	21.00	.004	13.50	.066	19.00
F030	.003	10.00	.005	13.50	.013	11.00	.006	14.00	.004	13.50	.59 EH	25.00
F031	.001	6.00	.005	13.50	.013	11.00	.006	14.00	.003	3.00	.006 EL	1.00
F033	.001W	0.00	.0042T	6.00	.012	4.00	.0048T	2.00	.0033T	5.00	.056	2.50
F035	<.005	0.00	<.005	0.00	.013	11.00	<.005	0.00	<.005	0.00	.056	2.50
F037	<.001	0.00	.0047	10.00	.0135	16.00	.0056	9.50	.0036	8.00	.0636	16.00
F038	<.001	0.00	.004	3.50	.013	11.00	.005	4.50	.004	13.50	.070 H	22.50
F043		0.00	.006	17.50	.015	19.00	.006	14.00	.005	17.50	.067	20.50
F046	<.001	0.00	.005	13.50	.014	17.00	.006	14.00	.004	13.50	.058	4.50
F047	.0007	3.00	.0044	7.00	.013	11.00	.0057	11.00	.0039	9.50	.06	10.50
F048	.0008	4.00	.0050	13.50	.0134	15.00	.0053	8.00	.0035	7.00		0.00
F055	<.001	0.00	.007	19.50	.016	21.50	.009 H	20.00	.007 H	19.50	.079 EH	24.00
F060	<.005	0.00	.007	19.50	.017 H	23.50	<.005	0.00	<.005	0.00	.067	20.50
F062	<.01	0.00	<.01	0.00	.01	1.00	<.01	0.00	<.01	0.00	.06	10.50
MEDIAN CONC.	.0010		.0050		.0130		.0057		.0039		.0610	

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	.175	12.50	.366	11.00	.442	13.00	.101	14.50
F003	.171	7.00	.364	10.00	.434	8.00	.101	14.50
F008	.18	18.50	.41 H	25.00	.47	21.00	.12 VH	24.00
F009	.19	24.00	.40	23.00	.46	19.00	.11	22.50
F010	.182	21.00	.389	21.00	.450	15.00	.107	19.00
F011	.174	10.00	.347	3.00	.417	3.00	.098	8.50
F013	.171	7.00	.355	5.00	.431	7.00	.088 L	2.50
F015	.175	12.50	.375	15.00	.451	16.00	.093	7.00
F016	.070 EL	1.00	.363	9.00	.440	11.00	.086 L	1.00
F020	.171	7.00	.362	8.00	.436	9.00	.098	8.50
F023	.176	15.50	.373	14.00	.445	14.00	.104	16.00
F024	.17	4.50	.35	4.00	.43	5.50	.088 L	2.50
F025	.180	18.50	.368	12.50	.428	4.00	.100	11.50
F030	.176	15.50	.368	12.50	.441	12.00	.091	5.00
F031	.190	24.00	.380	16.50	.480	23.00	.100	11.50
F033	.16	2.00	.34	2.00	.40	1.00	.089	4.00
F035	.164	3.00	.333	1.00	.401	2.00	.092	6.00
F037	.1733	9.00	.3617	7.00	.4378	10.00	.1041	17.00
F038	.185	22.00	.386	20.00	.463	20.00	.108	20.00
F043	.19	24.00	.40	23.00	.48	23.00	.10	11.50
F046	.175	12.50	.381	18.00	.455	17.00	.105	18.00
F047	.17	4.50	.36	6.00	.43	5.50	.1	11.50
F048		0.00		0.00		0.00		0.00
F055	.180	18.50	.385	19.00	.499 H	25.00	.135 EH	25.00
F060	.175	12.50	.380	16.50	.458	18.00	.109	21.00
F062	.18	18.50	.40	23.00	.48	23.00	.11	22.50
MEDIAN CONC.	.1750		.3680		.4420		.1000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	94.50	9.450	10			ICP5x/ICPMS
F003	79.50	7.950	10			ICP
F008	154.50	17.167	9	H VH		ICAP / GF
F009	186.50	18.650	10	H	BIASED HIGH	ICP/AA Furnace
F010	151.00	15.100	10			ICAP
F011	79.50	7.950	10	H		DIG,APDC/SE;12X Co
F013	34.50	6.900	5	L		ICP
F015	83.00	11.857	7			ICP
F016	32.50	6.500	5	EL L		ICP 3X
F020	52.50	5.833	9		BIASED LOW	24111
F023	158.50	15.850	10	VHH H		-
F024	30.50	3.389	9	L	BIASED LOW	ICP-AES
F025	130.00	13.000	10	VH		ICP
F030	132.00	13.200	10	EH		Naquadat 24009
F031	123.50	12.350	10	EL		GFAAS, Direct
F033	28.50	3.167	9		BIASED LOW	
F035	25.50	4.250	6		BIASED LOW	
F037	102.50	11.389	9			Furnace
F038	137.00	15.222	9	H		ICP/GFAAS
F043	170.00	18.889	9		BIASED HIGH	ICP-MS
F046	128.00	14.222	9			ICP + GFAA
F047	79.50	7.950	10			ICPMS 1X Conc.
F048	47.50	9.500	5			Varian GFAA
F055	192.00	21.333	9	H H EH H EH	BIASED HIGH	FLAME AA
F060	131.50	18.786	7	H		ICP - Direct
F062	98.50	16.417	6			ICP

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F033	28.50	3.167	9		BIASED LOW	
F024	30.50	3.389	9	L	BIASED LOW	ICP-AES
F035	25.50	4.250	6		BIASED LOW	
F020	52.50	5.833	9		BIASED LOW	24111
F016	32.50	6.500	5	ELL		ICP 3X
F013	34.50	6.900	5	L		ICP
F011	79.50	7.950	10	H		DIG,APDC/SE;12X Co
F003	79.50	7.950	10			ICP
F047	79.50	7.950	10			ICPMS 1X Conc.
F001	94.50	9.450	10			ICP5x/ICPMS
F048	47.50	9.500	5			Varian GFAA
F037	102.50	11.389	9			Furnace
F015	83.00	11.857	7			ICP
F031	123.50	12.350	10	EL		GFAAS, Direct
F025	130.00	13.000	10	VH		ICP
F030	132.00	13.200	10	EH		Naquadat 24009
F046	128.00	14.222	9			ICP + GFAA
F010	151.00	15.100	10			ICAP
F038	137.00	15.222	9	H		ICP/GFAAS
F023	158.50	15.850	10	VHHH		-
F062	98.50	16.417	6			ICP
F008	154.50	17.167	9	HVH		ICAP / GF
F009	186.50	18.650	10	H	BIASED HIGH	ICP/AA Furnace
F060	131.50	18.786	7	H		ICP - Direct
F043	170.00	18.889	9		BIASED HIGH	ICP-MS
F055	192.00	21.333	9	HHEHHEH	BIASED HIGH	FLAME AA

OVERALL AVERAGE RANK IS 11.995

Chromium

PARAMETER: 25091 Manganese MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.0815	12.00	.0054	13.50	.0117	9.00	.0030	12.00	.0183	15.50	.0347	13.00
F002	.084	15.00		0.00	.013	21.00		0.00	.019	19.00	.037	21.50
F003	.0806	9.00	.0054	13.50	.0116	8.00	.0029	5.50	.0180	8.00	.0344	11.00
F008	.08	6.50	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	.03 L	2.00
F009	.08	6.50	.007	20.00	.01	1.00	.004	19.00	.02	24.50	.04 H	28.00
F010	.080	6.50	.005	7.00	.012	14.00	.004	19.00	.019	19.00	.035	16.00
F011	.081	10.50	<.006	0.00	.012	14.00	<.006	0.00	.020	24.50	.039	25.00
F013	.089	25.50	<.02	0.00	<.02	0.00	<.02	0.00	.020	24.50	.036	19.50
F014	.085	17.00	<.010	0.00	.013	21.00	<.010	0.00	.019	19.00	.038	23.00
F015	.085	17.00	.005	7.00	.012	14.00	.003	12.00	.018	8.00	.035	16.00
F016	.081	10.50	<.015	0.00	<.015	0.00	<.015	0.00	.018	8.00	.035	16.00
F020	.083	14.00	.005	7.00	.012	14.00	.003	12.00	.0183	15.50	.0345	12.00
F023	.085	17.00	.010 EH	22.00	.017 VH	25.00	.024 EH	21.00	.008 EL	1.00	.039	25.00
F024	.077	1.50	.004	2.00	.011	4.50	.002	2.50	.018	8.00	.034	8.00
F025	.086	19.50	.006	17.00	.013	21.00	.003	12.00	.021	28.00	.035	16.00
F030	.082	13.00	.006	17.00	.012	14.00	.003	12.00	.018	8.00	.034	8.00
F031	.087	21.50	.005	7.00	.011	4.50	.003	12.00	.018	8.00	.034	8.00
F033	.08	6.50	.005	7.00	.011	4.50	.003T	12.00	.018	8.00	.034	8.00
F035	.0785	3.00	.0053	11.50	.0110	4.50	.0028	4.00	.0174	2.00	.0330	3.50
F036	.0908	29.00	.0055	15.00	.0119	10.00	.0030	12.00	.0182	14.00	.0335	5.00
F038	.088	23.50	.007	20.00	.013	21.00	<.005	0.00	.020	24.50	.037	21.50
F043	.09	27.50	.006	17.00	.013	21.00	.003	12.00	.020	24.50	.039	25.00
F044	.088	23.50	.005	7.00	.012	14.00	.003	12.00	.019	19.00	.034	8.00
F046	.079	4.00	.005	7.00	.011	4.50	.003	12.00	.018	8.00	.033	3.50
F047	.077	1.50	.0053	11.50	.012	14.00	.0029	5.50	.018	8.00	.035	16.00
F055	.087	21.50	.004	2.00	.013	21.00	.002	2.50	.018	8.00	.024 EL	1.00
F058	.086	19.50	.007	20.00	.013	21.00	.004	19.00	.019	19.00	.040 H	28.00
F060	.089	25.50	.004	2.00	.011	4.50	.001 L	1.00	.018	8.00	.036	19.50
F062	.09	27.50	<.01	0.00	.13 EH	26.00	<.01	0.00	.02	24.50	.04 H	28.00
MEDIAN CONC.	.0840		.0053		.0120		.0030		.0182		.0350	

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	.344	13.00	.143	13.50	.221	14.00	.0968	8.00
F002	.356	20.00	.144	15.00	.231	23.50	.109	27.00
F003	.339	8.00	.142	11.00	.217	8.00	.0986	11.00
F008	.35	16.50	.14	7.00	.22	11.50	.10	17.00
F009	.33	5.00	.14	7.00	.22	11.50	.10	17.00
F010	.341	12.00	.145	17.00	.216	7.00	.096	6.50
F011	.272 EL	1.00	.148	21.00	.228	19.00	.105	26.00
F013	.352	19.00	.145	17.00	.227	18.00	.097	9.50
F014	.359	23.00	.149	22.00	.230	21.50	.101	23.00
F015	.358	21.50	.147	20.00	.231	23.50	.1	17.00
F016	.351	18.00	.142	11.00	.222	15.50	.099	12.50
F020	.345	14.00	.143	13.50	.222	15.50	.097	9.50
F023	.339	8.00	.145	17.00	.219	9.00	.100	17.00
F024	.34	10.50	.14	7.00	.22	11.50	.095	5.00
F025	.349	15.00	.146	19.00	.225	17.00	.099	12.50
F030	.339	8.00	.134	3.00	.211	6.00	.088 L	1.00
F031	.350	16.50	.130	2.00	.210	4.00	.100	17.00
F033	.33	5.00	.14	7.00	.21	4.00	.093	4.00
F035	.322	3.00	.128 L	1.00	.206	1.00	.092	3.00
F036	.3166	2.00	.1568	26.00	.2283	20.00	.1003	21.00
F038	.368	26.00	.156	25.00	.238	25.00	.104	25.00
F043	.36	24.00	.15	23.00	.23	21.50	.10	17.00
F044	.362	25.00	.138	4.00	.208	2.00	.089	2.00
F046	.340	10.50	.142	11.00	.220	11.50	.096	6.50
F047	.33	5.00	.14	7.00	.21	4.00	.1	17.00
F055	.370	28.50	.163 H	28.00	.246 H	28.00	.101	23.00
F058	.358	21.50	.167 H	29.00	.250 H	29.00	.145 EH	29.00
F060	.369	27.00	.153	24.00	.239	26.00	.101	23.00
F062	.37	28.50	.16 H	27.00	.24	27.00	.11	28.00
MEDIAN CONC.	.3490		.1440		.2220		.1000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	123.50	12.350	10			ICP5x
F002	162.00	20.250	8			AAS
F003	93.00	9.300	10			ICP
F008	60.50	10.083	6	L		ICAP
F009	139.50	13.950	10	H		ICP
F010	124.00	12.400	10			ICAP
F011	141.00	17.625	8	EL		DIG,APDC/SE;12X Co
F013	133.00	19.000	7			ICP
F014	169.50	21.188	8			
F015	156.00	15.600	10			ICP
F016	91.50	13.071	7			ICP 3X
F020	127.00	12.700	10			25111
F023	162.00	16.200	10	EHVHEHEL		-
F024	60.50	6.050	10		BIASED LOW	ICP-AES
F025	177.00	17.700	10			ICP
F030	90.00	9.000	10	L		Naquadat 25010
F031	100.50	10.050	10			GFAAS, Direct
F033	66.00	6.600	10		BIASED LOW	
F035	36.50	3.650	10	L	BIASED LOW	
F036	154.00	15.400	10			
F038	211.50	23.500	9		BIASED HIGH	ICP
F043	212.50	21.250	10			ICP-MS
F044	116.50	11.650	10			ICP-MS CHELATION
F046	78.50	7.850	10			ICP
F047	89.50	8.950	10			ICPMS 1X Conc.
F055	163.50	16.350	10	EL H H		FLAME AA
F058	235.00	23.500	10	H H H EH	BIASED HIGH	Colorimetric
F060	160.50	16.050	10	L		ICP - Direct
F062	216.50	27.063	8	EH H H	BIASED HIGH	ICP

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F035	36.50	3.650	10	L	BIASED LOW	
F024	60.50	6.050	10		BIASED LOW	ICP-AES
F033	66.00	6.600	10		BIASED LOW	
F046	78.50	7.850	10			ICP
F047	89.50	8.950	10			ICPMS 1X Conc.
F030	90.00	9.000	10	L		Naquadat 25010
F003	93.00	9.300	10			ICP
F031	100.50	10.050	10			GFAAS, Direct
F008	60.50	10.083	6	L		ICAP
F044	116.50	11.650	10			ICP-MS CHELATION
F001	123.50	12.350	10			ICP5x
F010	124.00	12.400	10			ICAP
F020	127.00	12.700	10			25111
F016	91.50	13.071	7			ICP 3X
F009	139.50	13.950	10	H		ICP
F036	154.00	15.400	10			
F015	156.00	15.600	10			ICP
F060	160.50	16.050	10	L		ICP - Direct
F023	162.00	16.200	10	EHVHEHEL		-
F055	163.50	16.350	10	ELHH		FLAME AA
F011	141.00	17.625	8	EL		DIG,APDC/SE;12X Co
F025	177.00	17.700	10			ICP
F013	133.00	19.000	7			ICP
F002	162.00	20.250	8			AAS
F014	169.50	21.188	8			
F043	212.50	21.250	10			ICP-MS
F058	235.00	23.500	10	HHHEH	BIASED HIGH	Colorimetric
F038	211.50	23.500	9		BIASED HIGH	ICP
F062	216.50	27.063	8	EHHH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 14.210

PARAMETER: 26091 Iron MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.127	6.00	.007	2.50	.029	12.00	.017 EH	18.00	.015	18.00	.150	15.00
F002	.132	15.50	.0103	11.00	.031	18.50	.0052	7.00	.010	10.00	.150	15.00
F003	.133	17.00	.0111	12.50	.0292	13.00	.0055	8.00	.0097	6.00	.157	22.00
F008	.13	12.00	<.02	0.00	.02 L	1.00	<.02	0.00	<.02	0.00	.15	15.00
F009	.10 VL	1.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.15	15.00
F010	.127	6.00	.009	6.00	.030	16.00	.006	10.50	.010	10.00	.146	8.00
F011	.146	26.00	.026 EH	23.00	.031	18.50	.006	10.50	.012	16.00	.174 H	27.00
F013	.149	27.00	<.1	0.00	<.1	0.00	<.1	0.00	<.1	0.00	.159	24.00
F014	.129	9.00	<.010	0.00	.026	4.50	<.010	0.00	<.010	0.00	.147	9.00
F015	.13	12.00	.009	6.00	.027	7.00	.006	10.50	.010	10.00	.148	10.00
F016	.139	21.00	.020 VH	20.50	.040 H	22.50	<.015	0.00	<.015	0.00	.158	23.00
F020	.127	6.00	.007	2.50	.024	2.00	.005	5.00	.005	2.00	.142	3.00
F023	.140	23.50	.014	17.50	.035	20.00	.009	15.00	.011	14.50	.15	15.00
F024	.13	12.00	.010	9.00	.028	9.50	.004	1.50	.009	5.00	.15	15.00
F025	.14	23.50	.01	9.00	.03	16.00	.03 EH	20.00	.02 VH	19.00	.15	15.00
F030	.137	20.00	.014	17.50	.036	21.00	.011	17.00	.013	17.00	.145	6.50
F031	.171 EH	29.00	.012	15.50	.044 VH	25.00	.005	5.00	.011	14.50	.156	21.00
F033	.130	12.00	.01T	9.00	.027	7.00	.007T	13.50	.041 EH	21.00	.15	15.00
F035	.122	3.50	.0078	4.00	.0248	3.00	<.0025	0.00	.0065	3.00	.137	2.00
F036	.1358	19.00	.0115	14.00	.0295	14.00	.0048	3.00	.0105	13.00	.1448	5.00
F038	.128	8.00	<.030	0.00	<.030	0.00	<.030	0.00	<.030	0.00	.144	4.00
F044	.122	3.50	.012	15.50	.028	9.50	.007	13.50	.010	10.00	.162	26.00
F046	.132	15.50	.009	6.00	.027	7.00	.006	10.50	.007	4.00	.145	6.50
F047	.14	23.50	.015	19.00	.07 EH	26.00	.087 EH	21.00	.11 EH	22.00	.25 EH	29.00
F048	.1338	18.00	.0111	12.50	.0284	11.00	.0050	5.00	.0099	7.00	.1760 H	28.00
F055	.110 L	2.00	.022 VH	22.00	.041 VH	24.00	.020 EH	19.00	.028 EH	20.00	.128 L	1.00
F058	.130	12.00	.006	1.00	.026	4.50	.004	1.50	.004 L	1.00	.152	20.00
F060	.14	23.50	<.02	0.00	.03	16.00	<.02	0.00	<.02	0.00	.15	15.00
F062	.15 H	28.00	.02 VH	20.50	.04 H	22.50	.01	16.00	.01	10.00	.16	25.00
MEDIAN CONC.	.1320		.0111		.0293		.0060		.0100		.1500	

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	.452	15.00	.328	17.00	.278	8.50	.513	19.50
F002	.463	20.00	.330	19.50	.280	12.00	.545	26.00
F003	.456	16.00	.328	17.00	.281	15.00	.515	21.00
F008	.46	19.00	.32	10.50	.29	22.50	.49	11.00
F009	.47	24.00	.33	19.50	.29	22.50	.53	23.00
F010	.442	9.50	.323	13.00	.270	6.00	.484	8.00
F011	.466	22.00	.339	23.00	.292	25.00	.513	19.50
F013	.470	24.00	.362	26.00	.294	26.00	.498	12.00
F014	.451	13.50	.322	12.00	.280	12.00	.509	17.00
F015	.459	17.50	.328	17.00	.289	20.00	.501	14.00
F016	.459	17.50	.325	14.00	.283	17.00	.502	15.00
F020	.442	9.50	.315	7.00	.273	7.00	.488	10.00
F023	.441	8.00	.318	8.00	.282	16.00	.506	16.00
F024	.45	12.00	.31	5.50	.28	12.00	.44 L	1.00
F025	.44	7.00	.32	10.50	.28	12.00	.50	13.00
F030	.434	6.00	.305	4.00	.265	4.00	.454	3.00
F031	.510 H	29.00	.410 EH	29.00	.280	12.00	.540	24.50
F033	.43	4.00	.31	5.50	.26	3.00	.46	4.50
F035	.426	3.00	.294	3.00	.258	2.00	.460	4.50
F036	.3927 L	1.00	.2881 L	2.00	.2863	19.00	.4755	7.00
F038	.443	11.00	.319	9.00	.278	8.50	.486	9.00
F044	.432	5.00	.369 H	27.00	.267	5.00	.463	6.00
F046	.451	13.50	.332	21.00	.286	18.00	.550	27.00
F047	.5	28.00	.4 VH	28.00	.3	27.00	.63 EH	29.00
F048	.4788	26.00	.3270	15.00	.3013	28.00	.5188	22.00
F055	.406	2.00	.277 L	1.00	.240 L	1.00	.443 L	2.00
F058	.465	21.00	.336	22.00	.290	22.50	.540	24.50
F060	.47	24.00	.34	24.00	.29	22.50	.51	18.00
F062	.48	27.00	.36	25.00	.31	29.00	.57 H	28.00
MEDIAN CONC.	.4520		.3270		.2810		.5020	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	131.50	13.150	10	EH		ICP
F002	154.50	15.450	10			AAS
F003	147.50	14.750	10			ICP
F008	91.00	13.000	7	L		ICAP
F009	105.00	17.500	6	VL		ICP
F010	93.00	9.300	10			ICAP
F011	210.50	21.050	10	EH H		DIG,APDC/SE;12X Co
F013	139.00	23.167	6		BIASED HIGH	ICP
F014	77.00	11.000	7			
F015	124.00	12.400	10			ICP
F016	150.50	18.813	8	VHH		ICP 3X
F020	54.00	5.400	10		BIASED LOW	26111
F023	153.50	15.350	10			-
F024	82.50	8.250	10	L		ICP-AES
F025	145.00	14.500	10	EHVH		ICP
F030	116.00	11.600	10			Naquadat 26009
F031	204.50	20.450	10	EH VH H EH		GFAAS, Direct
F033	94.50	9.450	10	EH		
F035	28.00	3.111	9		BIASED LOW	
F036	97.00	9.700	10	L L		GRAPHITE FURNACE
F038	49.50	8.250	6			ICP
F044	121.00	12.100	10	H		ICP-MS CHELATION
F046	129.00	12.900	10			ICP
F047	252.50	25.250	10	EHEHEHEH VH EH	BIASED HIGH	ICPMS 1X Conc.
F048	172.50	17.250	10	H		Varian GFAA
F055	94.00	9.400	10	L VHVHEHEHL L L L		FLAME AA
F058	130.00	13.000	10	L		Colorimetric
F060	143.00	20.429	7			ICP - Direct
F062	231.00	23.100	10	H VHH H	BIASED HIGH	ICP

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F035	28.00	3.111	9		BIASED LOW	
F020	54.00	5.400	10		BIASED LOW	26111
F024	82.50	8.250	10	L		ICP-AES
F038	49.50	8.250	6			ICP
F010	93.00	9.300	10			ICAP
F055	94.00	9.400	10	LVHVHEHEHLLLL		FLAME AA
F033	94.50	9.450	10	EH		
F036	97.00	9.700	10	LL		GRAPHITE FURNACE
F014	77.00	11.000	7			
F030	116.00	11.600	10			Naquadat 26009
F044	121.00	12.100	10	H		ICP-MS CHELATION
F015	124.00	12.400	10			ICP
F046	129.00	12.900	10			ICP
F008	91.00	13.000	7	L		ICAP
F058	130.00	13.000	10	L		Colorimetric
F001	131.50	13.150	10	EH		ICP
F025	145.00	14.500	10	EHVH		ICP
F003	147.50	14.750	10			ICP
F023	153.50	15.350	10			-
F002	154.50	15.450	10			AAS
F048	172.50	17.250	10	H		Varian GFAA
F009	105.00	17.500	6	VL		ICP
F016	150.50	18.813	8	VHH		ICP 3X
F060	143.00	20.429	7			ICP - Direct
F031	204.50	20.450	10	EHVHHEH		GFAAS, Direct
F011	210.50	21.050	10	EHH		DIG,APDC/SE;12X Co
F062	231.00	23.100	10	HVHHH	BIASED HIGH	ICP
F013	139.00	23.167	6		BIASED HIGH	ICP
F047	252.50	25.250	10	EHEHEHEHVHEH	BIASED HIGH	ICPMS 1X Conc.

OVERALL AVERAGE RANK IS 13.989

PARAMETER: 27091 Cobalt mg/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.0006	1.00	.0023	7.00	.0116	17.00	.0194	15.00	.0130	12.50	.0732	11.00
F003	.0007	3.50	.0025	9.50	.0104	5.00	.0182	4.00	.0121	7.00	.072	5.50
F008	<.005	0.00	<.005	0.00	.011	12.00	.021	20.50	.014	18.00	.079	20.00
F009	.006 EH	10.00	.008 EH	17.00	.02 EH	22.00	.03 EH	24.00	.02 EH	22.00	.08	21.00
F010	.005 VH	9.00	<.005	0.00	.014 H	21.00	.022	22.00	.014	18.00	.075	15.50
F011	.001	6.50	.002	3.50	.012	19.00	.020	17.50	.014	18.00	.076	18.00
F015	<.005	0.00	<.005	0.00	.011	12.00	.019	9.50	.011	1.00	.073	9.00
F016	<.015	0.00	<.015	0.00	<.015	0.00	.019	9.50	<.015	0.00	.076	18.00
F020	<.001	0.00	.002	3.50	.0098	1.00	.0180	2.00	.0114	2.00	.0735	12.00
F023	<.01	0.00	<.01	0.00	.011	12.00	.018	2.00	.013	12.50	.074	13.00
F024	<.001	0.00	.002	3.50	.010	3.00	.019	9.50	.012	4.50	.072	5.50
F025	<.003	0.00	.003	13.50	.011	12.00	.020	17.50	.013	12.50	.076	18.00
F030	.002	8.00	.003	13.50	.011	12.00	.020	17.50	.014	18.00	.072	5.50
F033	.001W	0.00	.0025T	9.50	.01	3.00	.018	2.00	.012	4.50	.07	2.50
F035	<.0025	0.00	<.0025	0.00	.0108	7.00	.0187	5.00	.0126	8.00	.0689	1.00
F036	.0009	5.00	.0025	11.00	.0107	6.00	.0191	14.00	.0127	9.00	.0749	14.00
F038	<.001	0.00	.003	13.50	.011	12.00	.024 H	23.00	.013	12.50	.085 H	23.00
F043	.0007	3.50	.003	13.50	.012	19.00	.021	20.50	.014	18.00	.082	22.00
F044	.001	6.50	.002	3.50	.011	12.00	.019	9.50	.013	12.50	.073	9.00
F046	<.001	0.00	.002	3.50	.011	12.00	.019	9.50	.015	21.00	.075	15.50
F047	.0007	2.00	.0024	8.00	.011	12.00	.019	9.50	.012	4.50	.073	9.00
F055	.008 EH	11.00	.004	16.00	.012	19.00	.019	9.50	.012	4.50	.102 EH	24.00
F060	<.001	0.00	.002	3.50	.010	3.00	.019	9.50	.013	12.50	.072	5.50
F062	<.01	0.00	<.01	0.00	<.01	0.00	.02	17.50	<.01	0.00	.07	2.50
MEDIAN CONC.	.0010		.0025		.0110		.0190		.0130		.0737	

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	.270	8.50	.172	11.50	.390	11.00	.279	6.00
F003	.266	5.00	.167	4.00	.376	4.00	.282	8.00
F008	.28	19.50	.17	8.50	.40	17.00	.31	22.00
F009	.28	19.50	.18	20.50	.40	17.00	.30	19.00
F010	.272	11.00	.176	17.00	.382	7.00	.276	5.00
F011	.257	2.00	.169	5.00	.360	2.50	.297	15.00
F015	.275	13.50	.173	13.00	.391	13.00	.287	12.00
F016	.279	17.00	.179	18.50	.394	14.00	.288	13.00
F020	.270	8.50	.170	8.50	.390	11.00	.286	11.00
F023	.268	6.00	.174	14.00	.395	15.00	.285	10.00
F024	.28	19.50	.17	8.50	.39	11.00	.28	7.00
F025	.274	12.00	.172	11.50	.383	8.00	.284	9.00
F030	.264	4.00	.164	3.00	.378	5.00	.262	4.00
F033	.25	1.00	.16	2.00	.36	2.50	.26	2.00
F035	.259	3.00	.153 L	1.00	.349 L	1.00	.261	3.00
F036	.2752	15.00	.1696	6.00	.3898	9.00	.1787 EL	1.00
F038	.297	23.00	.180	20.50	.420	21.50	.299	17.00
F043	.280	19.50	.181	22.00	.400	17.00	.300	19.00
F044	.270	8.50	.175	15.50	.436 H	23.00	.298	16.00
F046	.278	16.00	.175	15.50	.403	19.00	.291	14.00
F047	.27	8.50	.17	8.50	.38	6.00	.3	19.00
F055	.320 VH	24.00	.190	23.50	.452 VH	24.00	.366 EH	24.00
F060	.275	13.50	.179	18.50	.418	20.00	.310	22.00
F062	.29	22.00	.19	23.50	.42	21.50	.31	22.00
MEDIAN CONC.	.2745		.1725		.3905		.2875	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	100.50	10.050	10			ICP5x
F003	55.50	5.550	10		BIASED LOW	ICP
F008	137.50	17.188	8			AAS-GF
F009	192.00	19.200	10	EHEHEHEHEH	BIASED HIGH	ICP
F010	125.50	13.944	9	VH H		ICAP
F011	107.00	10.700	10			DIG,APDC/SE;12X Co
F015	83.00	10.375	8			ICP
F016	90.00	15.000	6			ICP 3X
F020	59.50	6.611	9			27111/27107
F023	84.50	10.563	8			-
F024	72.00	8.000	9			ICP-AES
F025	114.00	12.667	9			ICP
F030	90.50	9.050	10			Naquadat 27009
F033	29.00	3.222	9		BIASED LOW	
F035	29.00	3.625	8	L L	BIASED LOW	
F036	90.00	9.000	10	EL		I.C.P.
F038	166.00	18.444	9	H H	BIASED HIGH	ICP/GFAAS
F043	174.00	17.400	10			ICP-MS
F044	116.00	11.600	10	H		ICP-MS CHELATION
F046	126.00	14.000	9			ICP + GFAA
F047	87.00	8.700	10			ICPMS 1X Conc.
F055	179.50	17.950	10	EH EHVH VHEH	BIASED HIGH	FLAME AA
F060	108.00	12.000	9			GFAA - Direct
F062	109.00	18.167	6			ICP

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F033	29.00	3.222	9		BIASED LOW	
F035	29.00	3.625	8	LL	BIASED LOW	
F003	55.50	5.550	10		BIASED LOW	ICP
F020	59.50	6.611	9			27111/27107
F024	72.00	8.000	9			ICP-AES
F047	87.00	8.700	10			ICPMS 1X Conc.
F036	90.00	9.000	10	EL		I.C.P.
F030	90.50	9.050	10			Naquadat 27009
F001	100.50	10.050	10			ICP5x
F015	83.00	10.375	8			ICP
F023	84.50	10.563	8			-
F011	107.00	10.700	10			DIG,APDC/SE;12X Co
F044	116.00	11.600	10	H		ICP-MS CHELATION
F060	108.00	12.000	9			GFAA - Direct
F025	114.00	12.667	9			ICP
F010	125.50	13.944	9	VHH		ICAP
F046	126.00	14.000	9			ICP + GFAA
F016	90.00	15.000	6			ICP 3X
F008	137.50	17.188	8			AAS-GF
F043	174.00	17.400	10			ICP-MS
F055	179.50	17.950	10	EHEHVHVHEH	BIASED HIGH	FLAME AA
F062	109.00	18.167	6			ICP
F038	166.00	18.444	9	HH	BIASED HIGH	ICP/GFAAS
F009	192.00	19.200	10	EHEHEHEHEH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 11.690

PARAMETER: 28091 Nickel mg/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.0054	13.00	.0037	6.00	.0128	13.00	.0035	12.00	.0098	9.00	.0810	13.00
F002	.0060	17.00	.0045	17.00	.0135	19.00	.0037	13.00	.011	16.50	.083	16.50
F003	.0054	13.00	.0040	12.00	.0118	7.00	.0029	5.00	.0093	8.00	.080	7.00
F008	.006	17.00	<.005	0.00	.012	9.50	<.005	0.00	.010	12.00	.088	22.00
F009	.01 VH	20.50	.008 VH	20.00	.02 EH	23.00	<.01	0.00	.02 EH	23.00	.08	7.00
F010	.010 VH	20.50	.004	12.00	.016 H	22.00	.006 H	16.00	.012	19.50	.083	16.50
F011	.006	17.00	.004	12.00	.013	16.00	.003	8.50	.010	12.00	.060 EL	1.00
F013	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.085	19.50
F014	<.010	0.00	<.010	0.00	.011	5.00	<.010	0.00	.014 H	21.00	.086	21.00
F015	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	.09	24.00
F016	<.015	0.00	<.015	0.00	<.015	0.00	<.015	0.00	<.015	0.00	.083	16.50
F020	.0054	13.00	.0037	6.00	.0124	12.00	.0040	14.50	.0088	6.00	.0807	11.00
F023	<.005	0.00	<.005	0.00	.009 L	2.00	<.005	0.00	.008	2.00	.080	7.00
F024	.005	7.00	.003	2.00	.013	16.00	.003	8.50	.009	7.00	.081	13.00
F025	.005	7.00	.005	18.50	.013	16.00	<.005	0.00	.011	16.50	.092 H	26.00
F030	.006	17.00	.004	12.00	.013	16.00	.003	8.50	.008	2.00	.080	7.00
F033	.005T	7.00	.004T	12.00	.012	9.50	.003T	8.50	.01	12.00	.077	3.00
F035	.0041	2.00	.0031	3.00	.0088 L	1.00	.0027	3.00	<.0025 EL	0.00	.0804	10.00
F036	.0053	11.00	.0037	6.00	.0115	6.00	.0017	1.00	.0086	5.00	.0793	4.00
F038	.005	7.00	.004	12.00	.013	16.00	.003	8.50	.011	16.50	.085	19.50
F043	.006	17.00	.004	12.00	.014	20.00	.004	14.50	.012	19.50	.093 H	27.00
F044	.005	7.00	.004	12.00	.012	9.50	.003	8.50	.010	12.00	.083	16.50
F046	.005	7.00	.004	12.00	.010	3.50	.002	2.00	.011	16.50	.080	7.00
F047	.0034	1.00	.0029	1.00	.012	9.50	<.0009 L	0.00	.0082	4.00	.081	13.00
F048	.0046	3.00	.0035	4.00	.0100	3.50	.0028	4.00	.0080	2.00	.0756	2.00
F055	.005	7.00	.005	18.50	.015	21.00	<.005	0.00	.015 VH	22.00	.165 EH	28.00
F060	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	.09	24.00
F062	.03 EH	22.00	<.01	0.00	<.01	0.00	<.01	0.00	.01	12.00	.09	24.00
MEDIAN CONC.	.0053		.0040		.0124		.0030		.0100		.0820	

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	.153	16.00	.339	12.50	.374	17.00	.472	10.00
F002	.149	8.50	.340	15.50	.37	13.50	.55 H	25.00
F003	.147	5.50	.325	5.00	.354	7.00	.468	8.00
F008	.15	11.50	.33	7.50	.37	13.50	.49	16.50
F009	.16	22.50	.34	15.50	.37	13.50	.50	19.50
F010	.152	15.00	.340	15.50	.357	8.00	.458	6.00
F011	.111 EL	1.00	.297 L	1.00	.308 VL	1.00	.424 L	2.00
F013	.156	19.50	.341	18.00	.379	19.00	.460	7.00
F014	.155	18.00	.352	23.00	.387	23.00	.510	21.50
F015	.16	22.50	.35	21.00	.38	20.50	.49	16.50
F016	.156	19.50	.340	15.50	.372	16.00	.483	14.00
F020	.150	11.50	.336	10.00	.364	10.00	.472	10.00
F023	.147	5.50	.324	4.00	.35	5.50	.488	15.00
F024	.15	11.50	.33	7.50	.36	9.00	.45	5.00
F025	.161	25.00	.339	12.50	.370	13.50	.472	10.00
F030	.151	14.00	.329	6.00	.385	22.00	.448	4.00
F033	.14	2.00	.31	3.00	.34	2.00	.44	3.00
F035	.145	4.00	.305	2.00	.344	3.00	.418 L	1.00
F036	.1480	7.00	.3355	9.00	.3444	4.00	.4732	12.00
F038	.160	22.50	.360	24.50	.400	24.50	.512	23.00
F043	.16	22.50	.35	21.00	.38	20.50	.52	24.00
F044	.154	17.00	.343	19.00	.377	18.00	.497	18.00
F046	.149	8.50	.338	11.00	.369	11.00	.476	13.00
F047	.15	11.50	.35	21.00	.35	5.50	.51	21.50
F048	.1406	3.00		0.00		0.00		0.00
F055	.235 EH	28.00	.465 EH	27.00	.500 EH	27.00	.630 EH	27.00
F060	.17 H	26.50	.36	24.50	.40	24.50	.50	19.50
F062	.17 H	26.50	.40 VH	26.00	.44 VH	26.00	.56 VH	26.00
MEDIAN CONC.	.1515		.3400		.3700		.4830	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	121.50	12.150	10			ICP5x/ICPMS
F002	161.50	16.150	10	H		AAS
F003	77.50	7.750	10			ICP
F008	109.50	13.688	8			AAS-GF
F009	164.50	18.278	9	VHVHEH EH		ICP
F010	151.00	15.100	10	VH H H		ICAP
F011	71.50	7.150	10	ELELL VLL		DIG,APDC/SE;12X Co
F013	83.00	16.600	5			ICP
F014	132.50	18.929	7	H		
F015	104.50	20.900	5			ICP
F016	81.50	16.300	5			ICP 3X
F020	104.00	10.400	10			28111/28107
F023	41.00	5.857	7	L	BIASED LOW	-
F024	86.50	8.650	10			ICP-AES
F025	145.00	16.111	9	H		ICP
F030	108.50	10.850	10			Naquadat 28091
F033	62.00	6.200	10		BIASED LOW	
F035	29.00	3.222	9	L EL L	BIASED LOW	
F036	65.00	6.500	10		BIASED LOW	GRAPHITE FURNACE
F038	174.00	17.400	10			ICP/GFAAS
F043	198.00	19.800	10	H	BIASED HIGH	ICP-MS
F044	137.50	13.750	10			ICP-MS CHELATION
F046	91.50	9.150	10			ICP + GFAA
F047	88.00	9.778	9	L		ICPMS 1X Conc.
F048	21.50	3.071	7		BIASED LOW	Varian GFAA
F055	205.50	22.833	9	VHEHEHEHEHEH	BIASED HIGH	FLAME AA
F060	119.00	23.800	5	H	BIASED HIGH	ICP - Direct
F062	162.50	23.214	7	EH H VHVHVH	BIASED HIGH	ICP

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F048	21.50	3.071	7		BIASED LOW	Varian GFAA
F035	29.00	3.222	9	LELL	BIASED LOW	
F023	41.00	5.857	7	L	BIASED LOW	-
F033	62.00	6.200	10		BIASED LOW	
F036	65.00	6.500	10		BIASED LOW	GRAPHITE FURNACE
F011	71.50	7.150	10	ELELLVLL		DIG,APDC/SE;12X Co
F003	77.50	7.750	10			ICP
F024	86.50	8.650	10			ICP-AES
F046	91.50	9.150	10			ICP + GFAA
F047	88.00	9.778	9	L		ICPMS 1X Conc.
F020	104.00	10.400	10			28111/28107
F030	108.50	10.850	10			Naquadat 28091
F001	121.50	12.150	10			ICP5x/ICPMS
F008	109.50	13.688	8			AAS-GF
F044	137.50	13.750	10			ICP-MS CHELATION
F010	151.00	15.100	10	VHHH		ICAP
F025	145.00	16.111	9	H		ICP
F002	161.50	16.150	10	H		AAS
F016	81.50	16.300	5			ICP 3X
F013	83.00	16.600	5			ICP
F038	174.00	17.400	10			ICP/GFAAS
F009	164.50	18.278	9	VHVHEHEH		ICP
F014	132.50	18.929	7	H		
F043	198.00	19.800	10	H	BIASED HIGH	ICP-MS
F015	104.50	20.900	5			ICP
F055	205.50	22.833	9	VHEHEHEHEHEH	BIASED HIGH	FLAME AA
F062	162.50	23.214	7	EHHVHVHVH	BIASED HIGH	ICP
F060	119.00	23.800	5	H	BIASED HIGH	ICP - Direct

OVERALL AVERAGE RANK IS 12.851

PARAMETER: 29091 Copper mg/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.0026	11.50	.0056	7.50	.0145	17.00	.0073	10.00	.0269	13.00	.0656	12.00
F002	.0025	8.50	.0058	10.00	.014	14.50	.0074	11.00	.027	14.50	.067	16.00
F003	.0026	11.50	.0057	9.00	.0136	12.00	.0081	18.00	.0271	16.00	.065	10.00
F008	<.01	0.00	<.01	0.00	.01 L	1.00	<.01	0.00	.03	23.00	.07	22.50
F009	.04 EH	21.50	.04 EH	24.00	.04 EH	27.00	.02 EH	24.00	.05 EH	29.00	.08 VH	28.00
F010	.004	18.50	.006	13.50	.015	19.50	.009	19.50	.028	17.50	.065	10.00
F011	.136 EH	23.00	.109 EH	26.00	.115 EH	29.00	.109 EH	26.00	.124 EH	31.00	.095 EH	31.00
F013	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	.031	25.50	.070	22.50
F014	.0012	1.00	.018 EH	22.00	.016	22.00	.018 EH	23.00	.029	20.00	.083 VH	29.00
F015	<.005	0.00	<.005	0.00	.015	19.50	.009	19.50	.029	20.00	.068	19.00
F016	<.015	0.00	<.015	0.00	.017	24.00	<.015	0.00	.030	23.00	.067	16.00
F020	<.001	0.00	.0049	2.00	.0129	6.50	.0066	3.00	.0268	12.00	.0661	14.00
F023	.031 EH	20.00	.028 EH	23.00	.033 EH	26.00	.022 EH	25.00	.038 EH	28.00	.072	25.00
F024	.002	4.50	.005	3.50	.013	9.50	.006	1.00	.026	10.00	.064	8.00
F025	.003	15.50	.007	18.50	.017	24.00	.010	21.50	.033 H	27.00	.067	16.00
F030	.004	18.50	.007	18.50	.014	14.50	.008	14.50	.028	17.50	.066	13.00
F031	.002	4.50	.006	13.50	.015	19.50	.008	14.50	.027	14.50	.070	22.50
F033	.0026	11.50	.0056	7.50	.013	9.50	.0068	5.00	.026	10.00	.061	3.00
F035	<.005	0.00	.006	13.50	.012	3.50	.007	6.50	.026	10.00	.065	10.00
F036	.0013	2.00	.0051	5.00	.0122	5.00	.0067	4.00	.0248	6.00	.0497 EL	1.00
F037	<.01	0.00	<.01	0.00	<.01 L	0.00	<.01	0.00	.013 EL	1.00	.052 VL	2.00
F038	.002	4.50	.006	13.50	.015	19.50	.008	14.50	.031	25.50	.068	19.00
F043	.003	15.50	.007	18.50	.017	24.00	.008	14.50	.030	23.00	.074	27.00
F044	.002	4.50	.006	13.50	.014	14.50	.008	14.50	.029	20.00	.068	19.00
F046	.003	15.50	.007	18.50	.013	9.50	.008	14.50	.024	4.50	.063	6.50
F047	.0025	8.50	.0055	6.00	.013	9.50	.0071	8.00	.025	7.00	.063	6.50
F048	.0021	7.00	.0044	1.00	.0102 L	2.00	.0062	2.00	.0219 L	3.00	.0736	26.00
F055	<.005	0.00	.005	3.50	.014	14.50	.010	21.50	.020 VL	2.00	.070	22.50
F058	.0026	11.50	.0077	21.00	.0129	6.50	.0072	9.00	.0259	8.00	.0615	4.00
F060	.003	15.50	.006	13.50	.012	3.50	.007	6.50	.024	4.50	.062	5.00
F062	.04 EH	21.50	.05 EH	25.00	.05 EH	28.00	<.01	0.00	.06 EH	30.00	.09 EH	30.00
MEDIAN CONC.	.0026		.0060		.0140		.0080		.0271		.0670	

PARAMETER: 29091 Copper 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	.298	12.00	.201	18.50	.444	17.00	.0993	12.00
F002	.30	17.00	.205	23.50	.45	20.50	.12 VH	27.00
F003	.299	13.00	.201	18.50	.443	16.00	.097	8.00
F008	.30	17.00	.20	13.50	.45	20.50	.10	15.00
F009	.28	5.50	.20	13.50	.40	3.50	.10	15.00
F010	.281	7.00	.196	8.50	.416	6.00	.095	6.00
F011	.314	28.00	.225 H	30.00	.511 H	30.00	.127 EH	28.00
F013	.313	27.00	.209	26.00	.467	28.00	.101	19.00
F014	.323	30.00	.204	22.00	.454	23.00	.102	21.00
F015	.304	24.00	.195	7.00	.435	12.00	.097	8.00
F016	.303	22.00	.201	18.50	.449	19.00	.098	10.50
F020	.300	17.00	.200	13.50	.447	18.00	.098	10.50
F023	.292	9.00	.20	13.50	.431	11.00	.101	19.00
F024	.30	17.00	.20	13.50	.43	10.00	.090	4.00
F025	.297	11.00	.202	21.00	.442	14.50	.100	15.00
F030	.294	10.00	.196	8.50	.442	14.50	.093	5.00
F031	.300	17.00	.210	27.50	.420	7.00	.110	23.50
F033	.27	3.00	.19	5.50	.40	3.50	.92 EH	31.00
F035	.300	17.00	.199	10.00	.454	23.00	.078 VL	1.00
F036	.2483 VL	1.00	.1475 EL	1.00	.3755 L	2.00	.0885	3.00
F037	.278	4.00	.171 L	2.00	.424	8.00	.143 EH	30.00
F038	.307	25.00	.205	23.50	.455	25.00	.105	22.00
F043	.30	17.00	.20	13.50	.44	13.00	.097	8.00
F044	.303	22.00	.206	25.00	.458	26.00	.101	19.00
F046	.303	22.00	.201	18.50	.454	23.00	.100	15.00
F047	.28	5.50	.19	5.50	.41	5.00	.1	15.00
F048	.2606 L	2.00	.1720 L	3.00	.3560 VL	1.00	.1164 H	26.00
F055	.310	26.00	.210	27.50	.480	29.00	.110	23.50
F058	.3202	29.00	.2112	29.00	.4596	27.00	.1111	25.00
F060	.288	8.00	.183	4.00	.427	9.00	.083 L	2.00
F062	.34 H	31.00	.25 EH	31.00	.53 VH	31.00	.14 EH	29.00
MEDIAN CONC.	.3000		.2000		.4430		.1000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	130.50	13.050	10			ICP5x
F002	162.50	16.250	10	VH		AAS
F003	132.00	13.200	10			ICP
F008	112.50	16.071	7	L		ICAP
F009	191.00	19.100	10	EHEHEHEHEHVH		ICP
F010	126.00	12.600	10			ICAP
F011	282.00	28.200	10	EHEHEHEHEHEH H H EH	BIASED HIGH	DIG,APDC/SE;12X Co
F013	148.00	24.667	6		BIASED HIGH	ICP
F014	213.00	21.300	10	EH EH VH		
F015	129.00	16.125	8			ICP
F016	133.00	19.000	7			ICP 3X
F020	96.50	10.722	9			29111
F023	199.50	19.950	10	EHEHEHEHEH		-
F024	81.00	8.100	10			ICP-AES
F025	184.00	18.400	10	H		ICP
F030	134.50	13.450	10			Naquadat 29091
F031	164.00	16.400	10			GFAAS, Direct
F033	89.50	8.950	10	EH		
F035	94.50	10.500	9	VL		
F036	30.00	3.000	10	ELVLELL	BIASED LOW	GRAPHITE FURNACE
F037	47.00	7.833	6	L ELVL L EH		I.C.P.
F038	192.00	19.200	10			ICP/GFAAS
F043	174.00	17.400	10			ICP-MS
F044	178.00	17.800	10			ICP-MS CHELATION
F046	147.50	14.750	10			ICP + GFAA
F047	76.50	7.650	10			ICPMS 1X Conc.
F048	73.00	7.300	10	L L L L VLH	BIASED LOW	Varian GFAA
F055	170.00	18.889	9	VL		FLAME AA
F058	170.00	17.000	10			GFAAS
F060	71.50	7.150	10	L	BIASED LOW	GFAA - Direct
F062	256.50	28.500	9	EHEHEH EHEHH EHVHEH	BIASED HIGH	ICP

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F036	30.00	3.000	10	ELVLELL	BIASED LOW	GRAPHITE FURNACE
F060	71.50	7.150	10	L	BIASED LOW	GFAA - Direct
F048	73.00	7.300	10	LLLLVLH	BIASED LOW	Varian GFAA
F047	76.50	7.650	10			ICPMS 1X Conc.
F037	47.00	7.833	6	LELVLLEH		I.C.P.
F024	81.00	8.100	10			ICP-AES
F033	89.50	8.950	10	EH		
F035	94.50	10.500	9	VL		
F020	96.50	10.722	9			29111
F010	126.00	12.600	10			ICAP
F001	130.50	13.050	10			ICP5x
F003	132.00	13.200	10			ICP
F030	134.50	13.450	10			Naquadat 29091
F046	147.50	14.750	10			ICP + GFAA
F008	112.50	16.071	7	L		ICAP
F015	129.00	16.125	8			ICP
F002	162.50	16.250	10	VH		AAS
F031	164.00	16.400	10			GFAAS, Direct
F058	170.00	17.000	10			GFAAS
F043	174.00	17.400	10			ICP-MS
F044	178.00	17.800	10			ICP-MS CHELATION
F025	184.00	18.400	10	H		ICP
F055	170.00	18.889	9	VL		FLAME AA
F016	133.00	19.000	7			ICP 3X
F009	191.00	19.100	10	EHEHEHEHEHVH		ICP
F038	192.00	19.200	10			ICP/GFAAS
F023	199.50	19.950	10	EHEHEHEHEH		-
F014	213.00	21.300	10	EHEHVH		
F013	148.00	24.667	6		BIASED HIGH	ICP
F011	282.00	28.200	10	EHEHEHEHEHEHHHEH	BIASED HIGH	DIG,APDC/SE;12X Co
F062	256.50	28.500	9	EHEHEHEHEHHEHVHEH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 15.134

PARAMETER: 30091 Zinc mg/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.0334	15.00	.0065	15.00	.0178	18.00	.0151	19.00	.0093	17.00	.0949	12.00
F002	.036	23.50		0.00	.019	22.50	.015	16.50	.011	20.00	.099	20.50
F003	.0327	12.00	.0055	11.50	.0154	11.00	.0137	9.00	.0077	11.00	.096	16.50
F008	.03	5.50	<.01	0.00	.01 L	1.00	.01	3.50	<.01	0.00	.09	6.00
F009	.04 H	27.00	.01 H	19.00	.02	24.50	.02 H	23.00	.01	18.50	.10	23.00
F010	.031	7.50	.005	6.50	.016	14.50	.014	12.00	.008	14.00	.093	9.00
F011	.034	18.50	.113 EH	22.00	.013	3.50	.003 EL	1.00	.010	18.50	.060 EL	2.00
F013	.037	25.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	.100	23.00
F014	.035	21.50	.0047	4.00	.018	20.00	.016	20.00	.0046	2.00	.104	25.00
F015	.034	18.50	.005	6.50	.015	9.50	.014	12.00	.007	8.50	.093	9.00
F016	.035	21.50	<.015	0.00	.018	20.00	<.015	0.00	<.015	0.00	.095	14.00
F020	.0337	16.00	.0054	10.00	.0158	12.00	.0150	16.50	.0075	10.00	.095	14.00
F023	.069 EH	29.00	.057 EH	21.00	.049 EH	27.00	.075 EH	25.00	.044 EH	23.00	.108 H	28.00
F024	.031	7.50	.004	3.00	.014	5.50	.012	7.50	.006	5.00	.091	7.00
F025	.034	18.50	.008	18.00	.022 H	26.00	.019 H	22.00	.025 EH	22.00	.093	9.00
F030	.053 EH	28.00	.013 EH	20.00	.018	20.00	.026 EH	24.00	.014 VH	21.00	.097	18.00
F033	.032	10.50	.006	13.50	.016	14.50	.014	12.00	.008	14.00	.094	11.00
F035	.028	3.00	.003	2.00	.013	3.50	.011	6.00	.005	3.50	.083	4.00
F036	.0329	13.00	.0052	9.00	.0141	7.50	.0101	5.00	.0063	6.00	.1079 H	27.00
F037	.027 L	2.00	<.01	0.00	.012	2.00	<.01	0.00	<.01	0.00	.084	5.00
F038	.039	26.00	.007	17.00	.019	22.50	.017	21.00	.009	16.00	.106	26.00
F043	.036	23.50	.005	6.50	.016	14.50	.015	16.50	.008	14.00	.110 H	29.00
F044	.033	14.00	.006	13.50	.014	5.50	.012	7.50	.005	3.50	.096	16.50
F046	.032	10.50	.005	6.50	.015	9.50	.014	12.00	.007	8.50	.095	14.00
F047	.034	18.50	.0055	11.50	.016	14.50	.015	16.50	.0079	12.00	.099	20.50
F055	.029	4.00	.002 L	1.00	.017	17.00	.014	12.00	.003 L	1.00	.098	19.00
F058	.0314	9.00	.0067	16.00	.0141	7.50	.0096 L	2.00	.0064	7.00	.0493 EL	1.00
F060	.023 VL	1.00	<.005	0.00	<.005 EL	0.00	<.005 EL	0.00	<.005	0.00	.082 L	3.00
F062	.03	5.50	<.01	0.00	.02	24.50	.01	3.50	<.01	0.00	.10	23.00
MEDIAN CONC.	.0334		.0055		.0160		.0140		.0079		.0950	

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	.250	14.00	.177	14.00	.544	16.00	.105	13.00
F002	.250	14.00	.177	14.00	.532	12.00	.117	24.00
F003	.254	19.50	.181	20.00	.542	15.00	.113	21.00
F008	.25	14.00	.17	5.00	.54	14.00	.10	6.00
F009	.26	22.00	.18	18.50	.55	20.00	.11	17.50
F010	.241	7.00	.173	8.00	.520	8.00	.100	6.00
F011	.111 EL	2.00	.297 EH	28.00	.308 EL	1.00	.424 EH	29.00
F013	.263	24.00	.185	23.00	.572	25.00	.099	4.00
F014	.264	25.00	.184	21.50	.568	24.00	.110	17.50
F015	.253	18.00	.177	14.00	.549	18.00	.102	8.00
F016	.250	14.00	.174	9.50	.531	11.00	.106	14.50
F020	.254	19.50	.177	14.00	.551	22.00	.104	11.50
F023	.248	10.00	.167	3.00	.501	5.50	.121 H	26.00
F024	.24	5.50	.17	5.00	.52	8.00	.080 VL	1.00
F025	.247	9.00	.174	9.50	.529	10.00	.103	9.50
F030	.246	8.00	.172	7.00	.478 L	2.00	.115	23.00
F033	.24	5.50	.17	5.00	.52	8.00	.10	6.00
F035	.230	4.00	.154 L	2.00	.485 L	3.00	.088 L	2.50
F036	.2795 H	28.00	.3115 EH	29.00	.6500 VH	29.00	.1234 H	27.00
F037	.229	3.00	.152 L	1.00	.501	5.50	.088 L	2.50
F038	.28 H	29.00	.196	27.00	.606 H	27.00	.113	21.00
F043	.260	22.00	.18	18.50	.55	20.00	.12 H	25.00
F044	.250	14.00	.175	11.00	.539	13.00	.106	14.50
F046	.252	17.00	.177	14.00	.548	17.00	.104	11.50
F047	.26	22.00	.19	25.50	.5	4.00	.11	17.50
F055	.267	26.00	.186	24.00	.605 H	26.00	.103	9.50
F058	.0264 EL	1.00	.178	17.00	.550	20.00	.408 EH	28.00
F060	.249	11.00	.184	21.50	.564	23.00	.113	21.00
F062	.27	27.00	.19	25.50	.61 H	28.00	.11	17.50
MEDIAN CONC.	.2500		.1770		.5420		.1060	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	153.00	15.300	10			ICP5x
F002	167.00	18.556	9			AAS
F003	146.50	14.650	10			ICP
F008	55.00	6.875	8	L		ICAP
F009	213.00	21.300	10	H H H		ICP
F010	92.50	9.250	10			ICAP
F011	125.50	12.550	10	EH EL ELELEHELEH		DIG,APDC/SE;12X Co
F013	124.00	20.667	6			ICP
F014	180.50	18.050	10			ICP
F015	122.00	12.200	10			ICP 3X
F016	104.50	14.929	7			30111
F020	145.50	14.550	10			-
F023	197.50	19.750	10	EHEHEHEHEHH H		ICP-AES
F024	55.00	5.500	10	VL	BIASED LOW	ICP
F025	153.50	15.350	10	H H EH		Naquadat 30091
F030	171.00	17.100	10	EHEH EHVH L		
F033	100.00	10.000	10		BIASED LOW	
F035	33.50	3.350	10	L L L		GRAPHITE FURNACE
F036	180.50	18.050	10	H H EHVHH	BIASED LOW	I.C.P.
F037	21.00	3.000	7	L L L	BIASED HIGH	ICP
F038	232.50	23.250	10	H H		ICP-MS
F043	189.50	18.950	10	H H		ICP-MS CHELATION
F044	113.00	11.300	10			ICP
F046	120.50	12.050	10			ICPMS 1X Conc.
F047	162.50	16.250	10			FLAME AA
F055	139.50	13.950	10	L L H		GFAAS
F058	108.50	10.850	10	L ELEL EH		ICP - Direct
F060	80.50	13.417	6	VL ELEL L		ICP
F062	154.50	19.313	8	H		

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F037	21.00	3.000	7	LLL	BIASED LOW	I.C.P.
F035	33.50	3.350	10	LLL	BIASED LOW	
F024	55.00	5.500	10	VL	BIASED LOW	ICP-AES
F008	55.00	6.875	8	L		ICAP
F010	92.50	9.250	10			ICAP
F033	100.00	10.000	10			
F058	108.50	10.850	10	LELELEH		GFAAS
F044	113.00	11.300	10			ICP-MS CHELATION
F046	120.50	12.050	10			ICP
F015	122.00	12.200	10			ICP
F011	125.50	12.550	10	EHELELELEHELEH		DIG,APDC/SE;12X Co
F060	80.50	13.417	6	VLELELL		ICP - Direct
F055	139.50	13.950	10	LLH		FLAME AA
F020	145.50	14.550	10			30111
F003	146.50	14.650	10			ICP
F016	104.50	14.929	7			ICP 3X
F001	153.00	15.300	10			ICP5x
F025	153.50	15.350	10	HHEH		ICP
F047	162.50	16.250	10			ICPMS 1X Conc.
F030	171.00	17.100	10	EHEHEHVHL		Naquadat 30091
F014	180.50	18.050	10			
F036	180.50	18.050	10	HHEHVHH		GRAPHITE FURNACE
F002	167.00	18.556	9			AAS
F043	189.50	18.950	10	HH		ICP-MS
F062	154.50	19.313	8	H		ICP
F023	197.50	19.750	10	EHEHEHEHEHHH		-
F013	124.00	20.667	6			ICP
F009	213.00	21.300	10	HHH		ICP
F038	232.50	23.250	10	HH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 14.177

PARAMETER: 38091 Strontium mg/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.0172	13.00	.0055	12.00	.352	7.00	.114	16.00	.240	12.00	.124	16.00
F003	.0163	10.00	.0054	11.00	.375	14.50	.111	13.00	.242	13.00	.123	13.50
F009	.02	16.00	.005	6.00	.37	11.50	.10	2.50	.23	7.00	.12	10.50
F010	<.01	0.00	<.01	0.00	.35	5.00	.10	2.50	.21	2.00	.11	3.00
F015	.016	8.50	.005	6.00	.377	16.00	.113	14.50	.244	14.50	.124	16.00
F016	.017	11.50	<.015	0.00	.375	14.50	.110	10.50	.236	10.50	.121	12.00
F020	.0152	7.00	.0044	1.00	.357	8.00	.106	6.00	.231	9.00	.116	7.00
F023	.015	4.00	.005	6.00	.333	1.00	.220 EH	18.00	.102 EL	1.00	.111	5.00
F024	.015	4.00	.005	6.00	.35	5.00	.11	10.50	.23	7.00	.12	10.50
F025	.017	11.50	.006	13.00	.373	13.00	.110	10.50	.246	16.00	.124	16.00
F030	.018	14.50	.005	6.00	.362	10.00	.107	7.00	.230	7.00	.117	8.00
F033	.015	4.00	.005	6.00	.34	2.50	.10	2.50	.22	4.50	.11	3.00
F035	.015	4.00	<.005	0.00	.350	5.00	.102	5.00	.216	3.00	.112	6.00
F038	.014	1.00	.005	6.00	.378	17.00	.113	14.50	.244	14.50	.123	13.50
F046	.016	8.50	.005	6.00	.360	9.00	.108	8.00	.236	10.50	.118	9.00
F047	.015	4.00	.005	6.00	.34	2.50	.1	2.50	.22	4.50	.11	3.00
F055	.018	14.50	.007	14.00	.384	18.00	.118	17.00	.251	18.00	.126	18.00
F062	<.01	0.00	<.01	0.00	.37	11.50	.11	10.50	.25	17.00	.07 EL	1.00
MEDIAN CONC.	.0160		.0050		.3610		.1100		.2335		.1190	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.303	17.00	.375	6.00	.633	13.00	.381	16.00
F003	.301	14.00	.413	16.00	.635	14.00	.378	14.50
F009	.30	13.00	.40	12.00	.63	12.00	.37	12.50
F010	.27	2.50	.36	2.00	.60	6.00	.35	6.50
F015	.298	12.00	.413	16.00	.637	16.00	.378	14.50
F016	.303	17.00	.416	18.00	.636	15.00	.370	12.50
F020	.286	7.00	.391	10.00	.608	8.00	.351	8.00
F023	.271	4.00	.373	5.00	.565	3.00	.329	3.00
F024	.29	9.00	.39	8.50	.61	9.00	.32 L	2.00
F025	.297	11.00	.409	14.00	.627	11.00	.365	10.00
F030	.289	8.00	.390	8.50	.605	7.00	.341	5.00
F033	.27	2.50	.38	7.00	.58	4.50	.33	4.00
F035	.282	6.00	.362	3.00	.580	4.50	.407 H	18.00
F038	.302	15.00	.413	16.00	.643	17.50	.368	11.00
F046	.292	10.00	.399	11.00	.622	10.00	.360	9.00
F047	.28	5.00	.37	4.00	.53 L	2.00	.35	6.50
F055	.303	17.00	.407	13.00	.643	17.50	.392	17.00
F062	.22 EL	1.00	.22 EL	1.00	.44 EL	1.00	.07 EL	1.00
MEDIAN CONC.	.2910		.3905		.6160		.3625	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	128.00	12.800	10			ICPMS
F003	133.50	13.350	10			ICP
F009	103.00	10.300	10			ICP
F010	29.50	3.688	8		BIASED LOW	AAS
F015	134.00	13.400	10			ICP
F016	121.50	13.500	9			ICP 3X
F020	71.00	7.100	10			38109
F023	50.00	5.000	10	EHEL		-
F024	71.50	7.150	10	L		ICP-AES
F025	126.00	12.600	10			ICP
F030	81.00	8.100	10			Naquadat 38091
F033	40.50	4.050	10		BIASED LOW	
F035	54.50	6.056	9	H		
F038	126.00	12.600	10			ICP
F046	91.00	9.100	10			ICP
F047	40.00	4.000	10	L	BIASED LOW	ICPMS 1X Conc.
F055	164.00	16.400	10		BIASED HIGH	FLAME AA
F062	44.00	5.500	8	ELELELELEL		ICP

OVERALL AVERAGE RANK IS 9.247

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F010	29.50	3.688	8		BIASED LOW	AAS
F047	40.00	4.000	10	L	BIASED LOW	ICPMS 1X Conc.
F033	40.50	4.050	10		BIASED LOW	
F023	50.00	5.000	10	EHEL		-
F062	44.00	5.500	8	ELELELELEL		ICP
F035	54.50	6.056	9	H		
F020	71.00	7.100	10			38109
F024	71.50	7.150	10	L		ICP-AES
F030	81.00	8.100	10			Naquadat 38091
F046	91.00	9.100	10			ICP
F009	103.00	10.300	10			ICP
F038	126.00	12.600	10			ICP
F025	126.00	12.600	10			ICP
F001	128.00	12.800	10			ICPMS
F003	133.50	13.350	10			ICP
F015	134.00	13.400	10			ICP
F016	121.50	13.500	9			ICP 3X
F055	164.00	16.400	10		BIASED HIGH	FLAME AA

OVERALL AVERAGE RANK IS 9.247

Strontium

PARAMETER: 42091 Molybdenum mg/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	0.00	.0031	5.00	.0119	3.00	.0033	3.50	.0086	9.00	.0938	14.00
F003	.0001	1.00	.0037	8.00	.0128	8.00	.0037	5.00	.0086	9.00	.094	15.50
F009	<.01	0.00	.01 EH	12.50	.02 EH	14.50	.01 EH	12.50	.01	14.50	.10	17.50
F010	<.005	0.00	<.005	0.00	.013	10.00	<.005	0.00	.006	2.00	.087	2.50
F015	<.01	0.00	<.01	0.00	.01	2.00	<.01	0.00	<.01	0.00	.1	17.50
F016	<.015	0.00	<.015	0.00	<.015	0.00	<.015	0.00	<.015	0.00	.109 VH	20.00
F020	<.004	0.00	<.004	0.00	.0121	6.50	.0045	11.00	.0080	4.50	.0916	11.00
F023	<.005	0.00	<.005	0.00	<.005 EL	0.00	<.005	0.00	<.005 L	0.00	.087	2.50
F024	.001	3.00	.004	10.00	.012	4.50	.004	8.50	.008	4.50	.092	12.00
F025	<.003	0.00	.004	10.00	<.003 EL	0.00	.003	1.50	.003 EL	1.00	.088	4.00
F030	<.004	0.00	.003	3.50	.014	13.00	.003	1.50	.009	11.50	.089	5.50
F033	.0005W	0.00	.0033	6.00	.012	4.50	.0033	3.50	.0082	6.50	.09	9.00
F035	<.0025	0.00	.0026	2.00	.0121	6.50	<.0025	0.00	.0082	6.50	.0895	7.00
F036	.0007	2.00	.0040	10.00	.0137	12.00	.0040	8.50	.0094	13.00	.1055 H	19.00
F038	<.001	0.00	.003	3.50	.013	10.00	.004	8.50	.009	11.50	.094	15.50
F046	<.001	0.00	.002	1.00	.008 VL	1.00	.004	8.50	.007	3.00	.089	5.50
F047	<.0003	0.00	.0036	7.00	.013	10.00	.0039	6.00	.0086	9.00	.093	13.00
F055	<.01	0.00	.01 EH	12.50	.02 EH	14.50	.01 EH	12.50	.01	14.50	.09	9.00
F060	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	.09	9.00
F062	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	<.01	0.00	.07 VL	1.00
MEDIAN CONC.	.0007		.0036		.0128		.0040		.0086		.0908	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.352	16.00	.197	5.00	.477	13.00	.951	9.00
F003	.348	12.00	.203	12.00	.465	12.00	.955	10.50
F009	.35	14.00	.21	15.50	.49	16.00	1.0	18.00
F010	.338	7.00	.202	10.50	.458	9.00	.957	12.00
F015	.35	14.00	.21	15.50	.49	16.00	1.01	19.00
F016	.374	19.00	.219	18.00	.498	18.00	.988	17.00
F020	.342	11.00	.199	7.00	.461	11.00	.939	7.00
F023	.341	10.00	.205	13.00	.46	10.00	.955	10.50
F024	.34	8.50	.19	2.50	.45	6.50	.90	4.00
F025	.337	6.00	.202	10.50	.457	8.00	.934	6.00
F030	.336	5.00	.188	1.00	.439	2.50	.845 L	3.00
F033	.32	2.50	.19	2.50	.35 EL	1.00	.81 L	2.00
F035	.335	4.00	.193	4.00	.439	2.50	.902	5.00
F036	.3959 VH	20.00	.2246 H	20.00	.5313 H	19.00	.6736 EL	1.00
F038	.355	17.00	.201	9.00	.489	14.00	.970	14.50
F046	.320	2.50	.198	6.00	.440	4.50	.942	8.00
F047	.35	14.00	.21	15.50	.45	6.50	.97	14.50
F055	.31	1.00	.20	8.00	.44	4.50	.96	13.00
F060	.36	18.00	.21	15.50	.49	16.00	.98	16.00
F062	.34	8.50	.22	19.00	.55 VH	20.00	1.2 EH	20.00
MEDIAN CONC.	.3415		.2020		.4605		.9550	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	77.50	8.611	9			ICP5x
F003	93.00	9.300	10			ICP
F009	135.00	15.000	9	EHEHEH	BIASED HIGH	ICP
F010	53.00	7.571	7			ICAP
F015	84.00	14.000	6			ICP
F016	92.00	18.400	5	VH	BIASED HIGH	ICP 3X
F020	69.00	8.625	8			42111
F023	46.00	9.200	5	EL L		-
F024	64.00	6.400	10			ICP-AES
F025	47.00	5.875	8	EL EL		ICP
F030	46.50	5.167	9	L		Naquadat 42091
F033	37.50	4.167	9	ELL	BIASED LOW	
F035	37.50	4.688	8		BIASED LOW	
F036	124.50	12.450	10	H VHH H EL		I.C.P.
F038	103.50	11.500	9			ICP/GFAAS
F046	40.00	4.444	9	VL	BIASED LOW	ICP + GFAA
F047	95.50	10.611	9			ICPMS 1X Conc.
F055	89.50	9.944	9	EHEHEH		FLAME AA
F060	74.50	14.900	5			ICP - Direct
F062	68.50	13.700	5	VL VHEH		ICP

OVERALL AVERAGE RANK IS 9.296

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F033	37.50	4.167	9	ELL	BIASED LOW	
F046	40.00	4.444	9	VL	BIASED LOW	ICP + GFAA
F035	37.50	4.688	8		BIASED LOW	
F030	46.50	5.167	9	L		Naquadat 42091
F025	47.00	5.875	8	ELEL		ICP
F024	64.00	6.400	10			ICP-AES
F010	53.00	7.571	7			ICAP
F001	77.50	8.611	9			ICP5x
F020	69.00	8.625	8			42111
F023	46.00	9.200	5	ELL		-
F003	93.00	9.300	10			ICP
F055	89.50	9.944	9	EHEHEH		FLAME AA
F047	95.50	10.611	9			ICPMS 1X Conc.
F038	103.50	11.500	9			ICP/GFAAS
F036	124.50	12.450	10	HVHHHEL		I.C.P.
F062	68.50	13.700	5	VLVHEH		ICP
F015	84.00	14.000	6			ICP
F060	74.50	14.900	5			ICP - Direct
F009	135.00	15.000	9	EHEHEH	BIASED HIGH	ICP
F016	92.00	18.400	5	VH	BIASED HIGH	ICP 3X

OVERALL AVERAGE RANK IS 9.296

Molybdenum

PARAMETER: 48091 Cadmium mg/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.0002	2.50	.0013	12.00	.0108	15.00	.0120	10.50	.0069	5.50	.0348	8.00
F002		0.00	.0014	16.00	.0113	21.00	.0130	16.50	.0076	16.00	.038	19.50
F003	.0002	6.00	.0013	12.00	.0100	9.00	.0116	6.50	.0069	5.50	.036	16.50
F008	<.001	0.00	.002	22.50	.011	18.00	.014	22.00	.008	20.00	.04	24.00
F009	<.001	0.00	.002	22.50	.015 VH	28.00	.018 VH	27.00	.010 H	26.00	.04	24.00
F010	<.0003	0.00	.0013	12.00	.012	24.50	.014	22.00	.008	20.00	.035	11.50
F011	<.0002	0.00	.0009	2.00	.0115	22.00	.0136	19.00	.0080	20.00	.0381	21.00
F014	<.0005	0.00	.0008	1.00	.012	24.50	.010 L	3.50	.0075	14.50	<.10	0.00
F015	<.005	0.00	<.005	0.00	.011	18.00	.014	22.00	.008	20.00	.035	11.50
F016	<.015	0.00	<.015	0.00	<.015	0.00	<.015	0.00	<.015	0.00	.036	16.50
F020	.0002	2.50	.0011	7.00	.0100	9.00	.013	16.50	.0070	9.00	.035	11.50
F023	<.001	0.00	<.001	0.00	.010	9.00	.012	10.50	.007	9.00	.036	16.50
F024	<.001	0.00	.001	4.00	.010	9.00	.012	10.50	.008	20.00	.034	6.50
F025	<.003	0.00	<.003	0.00	.011	18.00	.013	16.50	.008	20.00	.035	11.50
F030	<.002	0.00	.002	22.50	.010	9.00	.014	22.00	.008	20.00	.035	11.50
F031	.0002	6.00	.0014	16.00	.010	9.00	.011	5.00	.007	9.00	.0036 EL	1.00
F033	.0003T	9.50	.0013	12.00	.01	9.00	.012	10.50	.0074	12.50	.034	6.50
F035	<.0005	0.00	.0011	7.00	.0102	14.00	.0124	14.00	.0074	12.50	.0329	4.00
F036	.0002	6.00	.0015	18.50	.0081 L	1.00	.0081 VL	1.00	.0055	2.00	.0287 L	2.00
F037	<.001	0.00	.0014	16.00	.0208 EH	29.00	.0258 EH	29.00	.0165 EH	28.00	.0468 EH	28.00
F038	<.0002	0.00	.0010	4.00	.0088	3.00	.0120	10.50	.0057	3.00	.0422 H	27.00
F043	.0002	6.00	.002	22.50	.012	24.50	.015	25.50	.009	24.50	.042 H	26.00
F044	.0002	6.00	.001	4.00	.010	9.00	.012	10.50	.007	9.00	.033	5.00
F046	.0005	12.00	.002	22.50	.012	24.50	.015	25.50	.009	24.50	.036	16.50
F047	.0003	11.00	.0013	12.00	.011	18.00	.013	16.50	.0075	14.50	.035	11.50
F048	.0003	9.50	.0015	18.50	.0148 VH	27.00	.0197 EH	28.00	.0113 VH	27.00		0.00
F055	<.001	0.00	.002	22.50	.011	18.00	.014	22.00	.007	9.00	.038	19.50
F058	.0001	1.00	.0011	7.00	.0082 L	2.00	.0086 VL	2.00	.0049 L	1.00	.0383	22.00
F060	<.0002	0.00	.0012	9.00	.0092	4.00	.0116	6.50	.0064	4.00	.0296 L	3.00
F062	<.01	0.00	<.01	0.00	.01	9.00	.01 L	3.50	<.01	0.00	.04	24.00
MEDIAN CONC.	.0002		.0013		.0108		.0130		.0075		.0355	

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	.093	10.50	.271	19.00	.174	18.00	.0942	10.00
F002	.095	14.00	.27	16.50	.17	13.50	.12 EH	26.00
F003	.094	12.50	.266	11.50	.169	10.50	.097	16.00
F008	.10	21.00	.27	16.50	.18	21.50	.10	21.50
F009	.12 EH	26.50	.27	16.50	.20 VH	27.00	.12 EH	26.00
F010	.093	10.50	.267	13.00	.166	6.00	.091	7.00
F011	.092	7.50	.263	8.50	.170	13.50	.092	8.00
F014	.11 H	25.00	.29	25.50	.19 H	25.00	.12 EH	26.00
F015	.097	17.00	.274	20.00	.173	16.50	.096	14.00
F016	.094	12.50	.263	8.50	.168	8.50	.095	12.00
F020	.0952	15.00	.269	14.00	.173	16.50	.095	12.00
F023	.092	7.50	.266	11.50	.169	10.50	.095	12.00
F024	.092	7.50	.26	6.50	.17	13.50	.080 L	2.00
F025	.089	2.50	.264	10.00	.167	7.00	.099	18.00
F030	.092	7.50	.254	5.00	.168	8.50	.088	4.00
F031	.100	21.00	.280	22.50	.190 H	25.00	.090	6.00
F033	.089	2.50	.25	3.00	.16	3.00	.089	5.00
F035	.0897	4.00	.249	2.00	.158	2.00	.084 L	3.00
F036	.0725 EL	1.00	.1966 EL	1.00	.1215 EL	1.00	.0794 VL	1.00
F037	.1327 EH	28.00	.4314 EH	29.00	.2385 EH	29.00	.2154 EH	29.00
F038	.107 H	23.00	.284	24.00	.178	19.00	.0997	19.00
F043	.12 EH	26.50	.27	16.50	.18	21.50	.10	21.50
F044	.090	5.00	.252	4.00	.164	5.00	.094	9.00
F046	.099	19.00	.279	21.00	.179	20.00	.098	17.00
F047	.096	16.00	.28	22.50	.17	13.50	.1	21.50
F048		0.00		0.00		0.00		0.00
F055	.108 H	24.00	.306 H	28.00	.188	23.00	.113 VH	24.00
F058	.1344 EH	29.00	.3016 H	27.00	.2032 VH	28.00	.1360 EH	28.00
F060	.0975	18.00	.260	6.50	.163	4.00	.0965	15.00
F062	.10	21.00	.29	25.50	.19 H	25.00	.10	21.50
MEDIAN CONC.	.0952		.2700		.1700		.0965	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	111.00	11.100	10			ICP5x/ICPMS
F002	159.00	17.667	9	EH		AAS
F003	106.00	10.600	10			ICP
F008	187.00	20.778	9			GF
F009	223.50	24.833	9	VHVHH EH VHEH	BIASED HIGH	ICP/ AA Furnace
F010	126.50	14.056	9			GFA 1,2; ICAP 3-10
F011	121.50	13.500	9			DIG,APDC/SE;12X Co
F014	145.00	18.125	8	L H H EH		
F015	139.00	17.375	8			ICP
F016	58.00	11.600	5			ICP 3X
F020	113.00	11.300	10			48111/48103
F023	86.50	10.813	8			-
F024	79.50	8.833	9	L		ICP-AES
F025	103.50	12.938	8			ICP
F030	110.00	12.222	9			Naquadat 48009
F031	120.50	12.050	10	EL H		GFAAS, Direct
F033	73.50	7.350	10			
F035	62.50	6.944	9	L	BIASED LOW	
F036	34.50	3.450	10	L VL L ELELELVL	BIASED LOW	GRAPHITE FURNACE
F037	245.00	27.222	9	EHEHEHEHEHEHEHEH	BIASED HIGH	Furnace
F038	132.50	14.722	9	H H		ICP/GFAAS
F043	215.00	21.500	10	H EH		ICP-MS
F044	66.50	6.650	10		BIASED LOW	ICP-MS CHELATION
F046	202.50	20.250	10			ICP + GFAA
F047	157.00	15.700	10			ICPMS 1X Conc.
F048	110.00	22.000	5	VHEHVH		Varian GFAA
F055	190.00	21.111	9	H H VH		FLAME AA
F058	147.00	14.700	10	L VLL EHH VHEH		GFAAS
F060	70.00	7.778	9	L		GFAA - Direct
F062	129.50	18.500	7	L H		ICP

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F036	34.50	3.450	10	LVLLELELELVL	BIASED LOW	GRAPHITE FURNACE
F044	66.50	6.650	10		BIASED LOW	ICP-MS CHELATION
F035	62.50	6.944	9	L	BIASED LOW	
F033	73.50	7.350	10			
F060	70.00	7.778	9	L		GFAA - Direct
F024	79.50	8.833	9	L		ICP-AES
F003	106.00	10.600	10			ICP
F023	86.50	10.813	8			-
F001	111.00	11.100	10			ICP5x/ICPMS
F020	113.00	11.300	10			48111/48103
F016	58.00	11.600	5			ICP 3X
F031	120.50	12.050	10	ELH		GFAAS, Direct
F030	110.00	12.222	9			Naquadat 48009
F025	103.50	12.938	8			ICP
F011	121.50	13.500	9			DIG,APDC/SE;12X Co
F010	126.50	14.056	9			GFA 1,2; ICAP 3-10
F058	147.00	14.700	10	LVLLEHHVHEH		GFAAS
F038	132.50	14.722	9	HH		ICP/GFAAS
F047	157.00	15.700	10			ICPMS 1X Conc.
F015	139.00	17.375	8			ICP
F002	159.00	17.667	9	EH		AAS
F014	145.00	18.125	8	LHHEH		
F062	129.50	18.500	7	LH		ICP
F046	202.50	20.250	10			ICP + GFAA
F008	187.00	20.778	9			GF
F055	190.00	21.111	9	HHVH		FLAME AA
F043	215.00	21.500	10	HEH		ICP-MS
F048	110.00	22.000	5	VHEHVH		Varian GFAA
F009	223.50	24.833	9	VHVHHEHVHEH	BIASED HIGH	ICP/ AA Furnace
F037	245.00	27.222	9	EHEHEHEHEHEHEHEH	BIASED HIGH	Furnace

OVERALL AVERAGE RANK IS 14.326

PARAMETER: 56091 Barium MG/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.0228	12.50	.0102	12.00	.0551	18.00	.0094	12.00	.0644	13.00	.0774	9.00
F003	.0228	12.50	.0105	13.00	.0546	13.00	.0092	11.00	.0652	15.00	.0769	7.00
F008	<.05	0.00	<.05	0.00	.05	4.00	<.05	0.00	.06	3.00	.08	16.50
F009	.02	3.50	.01	7.50	.06	20.50	.01	13.50	.06	3.00	.08	16.50
F010	.02	3.50	.01	7.50	.05	4.00	<.01	0.00	.06	3.00	.08	16.50
F015	.024	17.50	.011	15.00	.055	15.50	.009	7.00	.067	16.50	.08	16.50
F016	.022	9.00	<.015	0.00	.055	15.50	<.015	0.00	.064	11.00	.078	10.50
F020	.0216	6.00	.0098	3.00	.0506	6.00	.0085	4.00	.061	5.50	.073	2.50
F023	.026	19.50	.013	18.00	.055	15.50	.011	15.00	.067	16.50	.080	16.50
F024	.022	9.00	.010	7.50	.051	7.50	.009	7.00	.063	8.00	.077	8.00
F025	.02	3.50	.01	7.50	.06	20.50	.01	13.50	.07	20.50	.08	16.50
F030	.024	17.50	.011	15.00	.053	10.50	.009	7.00	.064	11.00	.076	5.50
F033	.022	9.00	.01	7.50	.051	7.50	.009	7.00	.061	5.50	.073	2.50
F035	.022	9.00	.010	7.50	.048	1.00	.008	2.50	.057	1.00	.071	1.00
F037	.017 L	1.00	.005 L	1.00	.049	2.00	.006	1.00	.063	8.00	.074	4.00
F038	.023	15.00	<.010	0.00	.055	15.50	<.010	0.00	.068	18.00	.080	16.50
F043	.026	19.50	.012	17.00	.058	19.00	.099 EH	17.00	.069	19.00	.084	21.00
F046	.022	9.00	.009	2.00	.052	9.00	.008	2.50	.063	8.00	.076	5.50
F047	.023	15.00	.011	15.00	.054	12.00	.0091	10.00	.065	14.00	.079	12.00
F055	.03 VH	21.00	.02 EH	19.00	.07 EH	22.00	.02 EH	16.00	.08 VH	22.00	.10 EH	22.00
F060	.023	15.00	.010	7.50	.053	10.50	.009	7.00	.064	11.00	.078	10.50
F062	.02	3.50	.01	7.50	.05	4.00	<.01	0.00	.07	20.50	.08	16.50
MEDIAN CONC.	.0220		.0100		.0535		.0090		.0640		.0785	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	.156	9.00	.344	14.00	.274	10.00	.971	10.00
F003	.157	10.50	.341	10.50	.274	10.00	.991	14.00
F008	.16	16.50	.35	17.50	.28	17.50	.98	11.50
F009	.14	1.00	.34	7.00	.28	17.50	1.0	19.00
F010	.15	4.50	.34	7.00	.26	3.50	.94	6.00
F015	.165	22.00	.356	20.00	.289	21.00	1.02	21.00
F016	.160	16.50	.341	10.50	.274	10.00	1.00	19.00
F020	.147	3.00	.321	3.00	.257	2.00	.920	3.00
F023	.158	12.00	.344	14.00	.278	13.50	.967	8.00
F024	.16	16.50	.34	7.00	.28	17.50	.90	1.00
F025	.16	16.50	.34	7.00	.27	6.50	.97	9.00
F030	.154	7.00	.335	4.00	.270	6.50	.934	5.00
F033	.15	4.50	.32	2.00	.26	3.50	.91	2.00
F035	.146	2.00	.301 L	1.00	.249	1.00	.994	15.00
F037	.152	6.00	.342	12.00	.275	12.00	.931	4.00
F038	.162	21.00	.352	19.00	.283	20.00	.999	17.00
F043	.16	16.50	.35	17.50	.28	17.50	1.00	19.00
F046	.155	8.00	.344	14.00	.278	13.50	.996	16.00
F047	.16	16.50	.36	21.00	.27	6.50	.99	13.00
F055	.16	16.50	.41 VH	22.00	.35 EH	22.00	1.21 EH	22.00
F060	.157	10.50	.345	16.00	.279	15.00	.961	7.00
F062	.16	16.50	.34	7.00	.27	6.50	.98	11.50
MEDIAN CONC.	.1575		.3415		.2745		.9800	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	119.50	11.950	10			ICP5x
F003	116.50	11.650	10			ICP
F008	86.50	12.357	7			ICAP
F009	109.00	10.900	10			ICP
F010	55.50	6.167	9			ICAP
F015	172.00	17.200	10		BIASED HIGH	ICP
F016	102.00	12.750	8			ICP 3X
F020	38.00	3.800	10		BIASED LOW	56109
F023	148.50	14.850	10			-
F024	89.00	8.900	10			ICP-AES
F025	121.00	12.100	10			ICP
F030	89.00	8.900	10			Naquadat 56009
F033	51.00	5.100	10		BIASED LOW	
F035	41.00	4.100	10	L	BIASED LOW	
F037	51.00	5.100	10	L L	BIASED LOW	ICP
F038	142.00	17.750	8		BIASED HIGH	ICP
F043	183.00	18.300	10	EH	BIASED HIGH	ICP-MS
F046	87.50	8.750	10			ICP
F047	135.00	13.500	10			ICPMS 1X Conc.
F055	204.50	20.450	10	VHEHEHEHVHEH VHEHEH	BIASED HIGH	FLAME AA
F060	110.00	11.000	10			ICP - Direct
F062	93.50	10.389	9			ICP

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F020	38.00	3.800	10		BIASED LOW	56109
F035	41.00	4.100	10	L	BIASED LOW	
F033	51.00	5.100	10		BIASED LOW	
F037	51.00	5.100	10	LL	BIASED LOW	ICP
F010	55.50	6.167	9			ICAP
F046	87.50	8.750	10			ICP
F024	89.00	8.900	10			ICP-AES
F030	89.00	8.900	10			Naquadat 56009
F062	93.50	10.389	9			ICP
F009	109.00	10.900	10			ICP
F060	110.00	11.000	10			ICP - Direct
F003	116.50	11.650	10			ICP
F001	119.50	11.950	10			ICP5x
F025	121.00	12.100	10			ICP
F008	86.50	12.357	7			ICAP
F016	102.00	12.750	8			ICP 3X
F047	135.00	13.500	10			ICPMS 1X Conc.
F023	148.50	14.850	10			-
F015	172.00	17.200	10		BIASED HIGH	ICP
F038	142.00	17.750	8		BIASED HIGH	ICP
F043	183.00	18.300	10	EH	BIASED HIGH	ICP-MS
F055	204.50	20.450	10	VHEHEHEHVHEHVHEHEH	BIASED HIGH	FLAME AA

OVERALL AVERAGE RANK IS 11.114

PARAMETER: 82091 Lead mg/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.0029	9.00	.0030	13.50	.0104	13.50	.0073	14.50	.0224	15.00	.0642	13.00
F002	.0030	15.50	.0026	8.00	.012	20.00	.0072	12.00	.022	11.00	.067	18.50
F003	.0029	10.50	.0028	10.00	.0103	12.00	.0068	5.00	.0220	11.00	.066	16.50
F008	.0025	6.50	.0030	13.50	.0100	8.50	.0075	17.00	.0225	16.00	.0680	21.00
F010	.0030	15.50	.0026	8.00	.0106	15.00	.0072	12.00	.0252	18.00	.071	24.00
F011	.0041	20.00	.0012	1.00	.0115	19.00	.0086	20.00	.0255	19.00	.065	15.00
F013	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.059	7.00
F014	.003	15.50	<.003	0.00	.011	17.00	.0082	19.00	.030 VH	23.50	.074 H	25.00
F015	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.06	8.00
F016	<.015	0.00	<.015	0.00	<.015	0.00	<.015	0.00	.023	17.00	.062	9.00
F020	.0025	6.50	.0026	8.00	.0096	5.00	.0072	12.00	.0210	6.00	.0648	14.00
F023	<.04	0.00	<.04	0.00	<.04	0.00	<.04	0.00	<.04	0.00	<.04 EL	0.00
F024	.002	3.00	.003	13.50	.010	8.50	.007	8.00	.022	11.00	.068	21.00
F025	<.02	0.00	<.02	0.00	<.02	0.00	<.02	0.00	.03 VH	23.50	.05 VL	2.00
F030	.02 EH	23.00	.02 EH	22.00	.02 EH	23.50	.01 H	21.50	.03 VH	23.50	.09 EH	29.00
F031	.003	15.50	.003	13.50	.014 H	21.00	.010 H	21.50	.026	20.00	.069	23.00
F033	.003T	15.50	.002T	4.00	.011	17.00	.007T	8.00	.022	11.00	.063	10.00
F035	<.01	0.00	<.01	0.00	.010	8.50	<.01	0.00	<.01 EL	0.00	.054 L	3.00
F036	.0027	8.00	.0032	18.50	.0061 L	2.00	.0038 L	2.00	.0131 EL	2.00	.0567 L	6.00
F037	.0023	5.00	.0025	6.00	.0092	4.00	.0064	4.00	.0209	5.00	.0660	16.50
F038	.002	3.00	.002	4.00	.010	8.50	.007	8.00	.018	3.50	.056 L	4.50
F043	.002	3.00	.002	4.00	.010	8.50	.007	8.00	.022	11.00	.068	21.00
F044	.003	15.50	.003	13.50	.010	8.50	.007	8.00	.022	11.00	.064	11.50
F046	.005	21.50	.005	20.50	.016 VH	22.00	.008	18.00	.028 H	21.00	.056 L	4.50
F047	.0029	10.50	.0031	17.00	.011	17.00	.0073	14.50	.022	11.00	.067	18.50
F048	.0030	15.50	.0032	18.50	.0104	13.50	.0074	16.00	.0214	7.00	.0787 VH	27.00
F055	.005	21.50	.005	20.50	.020 EH	23.50	.015 EH	23.00	.030 VH	23.50	.075 H	26.00
F058	.0008 L	1.00	.0016	2.00	.0022 EL	1.00	.0013 EL	1.00	.0047 EL	1.00	.0371 EL	1.00
F060	.003	15.50	.003	13.50	.008	3.00	.005	3.00	.018	3.50	.064	11.50
F062	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	<.05	0.00	.08 VH	28.00
MEDIAN CONC.	.0030		.0030		.0103		.0072		.0220		.0650	

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	.367	10.00	.213	10.00	.543	11.50	.475	17.00
F002	.37	11.50	.22	14.50	.56	20.00	.54 H	27.00
F003	.374	14.00	.220	14.50	.544	13.00	.478	18.00
F008	.380	18.50	.210	7.50	.560	20.00	.490	21.00
F010	.403	25.50	.235	23.00	.570	22.00	.492	23.00
F011	.400	24.00	.231	22.00	.587	26.00	.434	5.00
F013	.394	23.00	.224	19.00	.585	25.00	.466	12.00
F014	.39	21.50	.25 H	25.00	.59	27.00	.56 VH	29.00
F015	.35	4.00	.19 L	3.00	.53	8.50	.46	9.50
F016	.371	13.00	.226	20.00	.543	11.50	.461	11.00
F020	.377	15.00	.221	17.00	.558	18.00	.468	13.50
F023	.363	7.00	.20	5.00	.528	7.00	.449	7.00
F024	.38	18.50	.22	14.50	.55	15.00	.40 L	2.50
F025	.36	5.50	.23	21.00	[illegible]	5.00	.46	9.50
F030	.38	18.50	.21	7.50	.56	20.00	.44	6.00
F031	.420 H	27.50	.260 VH	27.00	.580	24.00	.510	25.00
F033	.36	5.50	.21	7.50	.52	6.00	.45	8.00
F035	.346	3.00	.196 L	4.00	.485 L	3.00	.400 L	2.50
F036	.3366 L	2.00	.1683 EL	2.00	.5028	4.00	.4172 L	4.00
F037	.379	16.00	.220	14.50	.553	16.00	.491	22.00
F038	.390	21.50	.223	18.00	.556	17.00	.488	20.00
F043	.37	11.50	.21	7.50	.53	8.50	.47	15.50
F044	.365	8.00	.214	11.00	.576	23.00	.502	24.00
F046	.366	9.00	.218	12.00	.548	14.00	.468	13.50
F047	.38	18.50	.24	24.00	.54	10.00	.47	15.50
F048		0.00	.2520 H	26.00		0.00		0.00
F055	.500 EH	29.00	.280 EH	29.50	.595	28.00	.530 H	26.00
F058	.0927 EL	1.00	.0093 EL	1.00	.0077 EL	1.00	.0887 EL	1.00
F060	.403	25.50	.270 EH	28.00	.430 EL	2.00	.480	19.00
F062	.42 H	27.50	.28 EH	29.50	.66 VH	29.00	.55 VH	28.00
MEDIAN CONC.	.3770		.2200		.5500		.4700	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	127.00	12.700	10			ICP5x/ICPMS
F002	158.00	15.800	10	H		AAS
F003	124.50	12.450	10			ICP
F008	149.50	14.950	10			ICAP
F010	186.00	18.600	10			GFA
F011	171.00	17.100	10			DIG,APDC/SE;12X Co
F013	86.00	17.200	5			ICP
F014	202.50	22.500	9	VHH H VH	BIASED HIGH	
F015	33.00	6.600	5	L		ICP
F016	81.50	13.583	6			ICP 3X
F020	115.00	11.500	10			82111/82104
F023	26.00	6.500	4	EL	INSUFFICIENT DATA	-
F024	115.50	11.550	10	L		ICP-AES
F025	66.50	11.083	6	VHVL		ICP
F030	194.50	19.450	10	EHEHEHH VHEH		Naquadat 82009
F031	218.00	21.800	10	H H H VH	BIASED HIGH	GFAAS, Direct
F033	92.50	9.250	10			
F035	24.00	4.000	6	ELL L L L	BIASED LOW	
F036	50.50	5.050	10	L L ELL L EL L	BIASED LOW	GRAPHITE FURNACE
F037	109.00	10.900	10			Furnace
F038	108.00	10.800	10	L		ICP/GFAAS
F043	98.50	9.850	10			ICP-MS
F044	134.00	13.400	10			ICP-MS CHELATION
F046	156.00	15.600	10	VH H L		ICP
F047	156.50	15.650	10			ICPMS 1X Conc.
F048	123.50	17.643	7	VH H		Varian GFAA
F055	250.50	25.050	10	EHEHVHH EHEH H	BIASED HIGH	FLAME AA
F058	11.00	1.100	10	L ELELELELELELELEL	BIASED LOW	GFAAS
F060	124.50	12.450	10	EHEL		GFAA - Direct
F062	142.00	28.400	5	VHH EHVHVH	BIASED HIGH	ICP

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F058	11.00	1.100	10	LELELELELELELELEL	BIASED LOW	GFAAS
F035	24.00	4.000	6	ELLLLL	BIASED LOW	
F036	50.50	5.050	10	LLELLLELL	BIASED LOW	GRAPHITE FURNACE
F023	26.00	6.500	4	EL	INSUFFICIENT DATA	-
F015	33.00	6.600	5	L		ICP
F033	92.50	9.250	10			
F043	98.50	9.850	10			ICP-MS
F038	108.00	10.800	10	L		ICP/GFAAS
F037	109.00	10.900	10			Furnace
F025	66.50	11.083	6	VHVL		ICP
F020	115.00	11.500	10			82111/82104
F024	115.50	11.550	10	L		ICP-AES
F003	124.50	12.450	10			ICP
F060	124.50	12.450	10	EHEL		GFAA - Direct
F001	127.00	12.700	10			ICP5x/ICPMS
F044	134.00	13.400	10			ICP-MS CHELATION
F016	81.50	13.583	6			ICP 3X
F008	149.50	14.950	10			ICAP
F046	156.00	15.600	10	VHHL		ICP
F047	156.50	15.650	10			ICPMS 1X Conc.
F002	158.00	15.800	10	H		AAS
F011	171.00	17.100	10			DIG,APDC/SE;12X Co
F013	86.00	17.200	5			ICP
F048	123.50	17.643	7	VHH		Varian GFAA
F010	186.00	18.600	10			GFA
F030	194.50	19.450	10	EHEHEHHVHEH		Naquadat 82009
F031	218.00	21.800	10	HHHVH	BIASED HIGH	GFAAS, Direct
F014	202.50	22.500	9	VHHHVH	BIASED HIGH	
F055	250.50	25.050	10	EHEHVHHEHEHH	BIASED HIGH	FLAME AA
F062	142.00	28.400	5	VHHEHVHVH	BIASED HIGH	ICP

OVERALL AVERAGE RANK IS 13.821

PARAMETER: 22095 Titanium ug/L

RESEARCH AND APPLICATIONS BRANCH
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 3.0000 BASIC ACCEPTABLE ERROR= 3.0000 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
F033	4.T	1.00	1.W	1.00	1.W	1.00	1.W	1.00	2.T	1.00	16.	2.00
F035	4.1	2.00	<1.0	0.00	<1.0	0.00	1.2	2.00	2.3	2.00	15.9	1.00
MEDIAN CONC.												

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F033	18.	2.00	25.	2.00	35.	1.00	19.	2.00
F035	17.8	1.00	24.4	1.00	38.2	2.00	17.8	1.00
MEDIAN CONC.								

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F033	14.00	1.400	10			
F035	12.00	1.500	8			NOTFOUND
OVERALL AVERAGE RANK IS		1.444				

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F033	14.00	1.400	10			
F035	12.00	1.500	8			NOTFOUND
OVERALL AVERAGE RANK IS		1.444				

Titanium

PARAMETER: 33095 Arsenic ug/L

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BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.12	2.00	.03	1.00	.13	2.00	2.69	10.00	.99	6.00	15.2	13.00
F008	<1.	0.00	<1.	0.00	<1.	0.00	3.	14.00	1.	10.50	14.	9.50
F009	<1.	0.00	<1.	0.00	<1.	0.00	3.	14.00	1.	10.50	13.	6.50
F010	<1.	0.00	<1.	0.00	<1.	0.00	4. H	20.00	1.	10.50	16.	14.50
F011	<.3	0.00	<.3	0.00	<.3	0.00	2.7	11.50	.7	1.50	16.5	16.00
F014	<3.0	0.00	<3.0	0.00	<3.0	0.00	<3.0	0.00	<3.0	0.00	13.9	8.00
F016	<1.	0.00	<1.	0.00	<1.	0.00	2.7	11.50	1.0	10.50	12.0	4.00
F020	<1.	0.00	<1.	0.00	<1.	0.00	2.	1.50	1.	10.50	13.	6.50
F023	<.05	0.00	<.05	0.00	<.05	0.00	2.3	4.50	<.05	0.00	11.7	2.00
F025	<.2	0.00	<.2	0.00	<.2	0.00	2.6	8.50	1.0	10.50	21.0 EH	19.00
F030	<.4	0.00	<.4	0.00	<.4	0.00	3.0	14.00	.9	4.50	95. EH	21.00
F033	.2	3.00	.2W	0.00	.3T	4.00	2.4	6.00	.9T	4.50	12.0	4.00
F035	<.4	0.00	<.4	0.00	<.4	0.00	2.6	8.50	.7	1.50	14.0	9.50
F036	5.570 EH	6.00	1.530	3.00	1.720 H	5.00	2.300	4.50	2.660 VH	18.00	20.350 VH	18.00
F037	1.33 H	5.00	<1.	0.00	<1.	0.00	2.47	7.00	1.37	15.00	14.51	11.00
F038	<.1	0.00	<.1	0.00	<.1	0.00	3.1	16.50	1.0	10.50	15.0	12.00
F043	.37	4.00	.05	2.00	.24	3.00	3.5	18.50	1.4	16.00	19. H	17.00
F046	<1.	0.00	<1.	0.00	<1.	0.00	2.	1.50	<1.	0.00	12.	4.00
F047	<1.	0.00	<1.	0.00	<1.	0.00	3.1	16.50	1.7	17.00	16.	14.50
F055	<1.0	0.00	<1.0	0.00	<1.0	0.00	3.5	18.50	1.0	10.50	10.5 L	1.00
F062	.10	1.00	<.10	0.00	.10	1.00	2.10	3.00	.85	3.00	85.0 EH	20.00
MEDIAN CONC.	.2850				.2400		2.6950		1.0000		14.5100	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	28.7	15.00	45.8	16.00	23.3	18.00	10.8	14.00
F008	26.	10.00	41.	10.50	20.	9.50	11.	15.00
F009	15. EL	2.00	23. EL	2.00	11. EL	1.00	5. EL	1.00
F010	27.	12.00	41.	10.50	21.	12.50	12.	17.50
F011	35.4 VH	20.00	49.5 H	18.00	21.3	14.00	9.0	9.00
F014	26.2	11.00	37.8	7.00	19.9	8.00	6.5 L	4.00
F016	10.7 EL	1.00	10.5 EL	1.00	12.8 EL	2.00	8.3	7.00
F020	25.	8.50	40.	9.00	20.	9.50	10.	12.50
F023	23.4	7.00	39.0	8.00	23.2	17.00	9.19	10.00
F025	34.0 VH	18.00	51.0 H	19.00	27.0 VH	19.00	10.0	12.50
F030	16. EL	3.00	24. EL	3.00	14. VL	3.00	8.0	6.00
F033	20.0 L	6.00	32.0 L	4.00	17.0	6.50	8.8	8.00
F035	27.9	14.00	41.4	12.00	16.6 L	5.00	5.7 VL	2.00
F036	39.240 EH	21.00	65.070 EH	21.00	45.170 EH	21.00	39.980 EH	21.00
F037	27.70	13.00	44.04	15.00	20.90	11.00	11.23	16.00
F038	29.0	16.00	43.0	13.00	21.0	12.50	9.7	11.00
F043	35. VH	19.00	55. VH	20.00	28. VH	20.00	13. H	19.00
F046	25.	8.50	44.	14.00	22.	15.50	12.	17.50
F047	30.	17.00	48.	17.00	22.	15.50	15. EH	20.00
F055	18.0 VL	5.00	34.0	5.00	15.0 L	4.00	7.0 L	5.00
F062	17.50 VL	4.00	36.50	6.00	17.00	6.50	6.40 L	3.00
MEDIAN CONC.	26.2000		41.0000		20.9000		9.7000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	97.00	9.700	10			Hydride AAS
F008	79.00	11.286	7			Hyd. AAS
F009	37.00	5.286	7	ELELELEL		AA Hydride
F010	97.50	13.929	7	H		Hyd. AAS
F011	90.00	12.857	7	VHH		HYDRIDE/AA
F014	38.00	7.600	5	L		
F016	37.00	5.286	7	ELELEL		Hyd. AAS
F020	58.00	8.286	7			33108/33008
F023	48.50	8.083	6			-
F025	106.50	15.214	7	EHVHH VH		Hydride-AA
F030	54.50	7.786	7	EHELELVL		Naquadat 33004
F033	46.00	5.111	9	L L	BIASED LOW	
F035	52.50	7.500	7	L VL		
F036	138.50	13.850	10	EH H VHVHEHEHEHEH		I.C.P.
F037	93.00	11.625	8	H		Furnace
F038	91.50	13.071	7			Hydride AAS
F043	138.50	13.850	10	H VHVHVHH		ICP-MS
F046	61.00	10.167	6			AA - Furnace
F047	117.50	16.786	7	EH	BIASED HIGH	ICPMS 1X Conc.
F055	49.00	7.000	7	L VL L L		HYDRIDE AA
F062	47.50	5.278	9	EHVL L		Hydride

OVERALL AVERAGE RANK IS 10.051

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F033	46.00	5.111	9	LL	BIASED LOW	
F062	47.50	5.278	9	EHVLL		Hydride
F009	37.00	5.286	7	ELELELEL		AA Hydride
F016	37.00	5.286	7	ELELEL		Hyd. AAS
F055	49.00	7.000	7	LVLLL		HYDRIDE AA
F035	52.50	7.500	7	LVL		
F014	38.00	7.600	5	L		
F030	54.50	7.786	7	EHELELVL		Naquadat 33004
F023	48.50	8.083	6			-
F020	58.00	8.286	7			33108/33008
F001	97.00	9.700	10			Hydride AAS
F046	61.00	10.167	6			AA - Furnace
F008	79.00	11.286	7			Hyd. AAS
F037	93.00	11.625	8	H		Furnace
F011	90.00	12.857	7	VHH		HYDRIDE/AA
F038	91.50	13.071	7			Hydride AAS
F043	138.50	13.850	10	HVHVHVHH		ICP-MS
F036	138.50	13.850	10	EHHVHVHEHEHEHEH		I.C.P.
F010	97.50	13.929	7	H		Hyd. AAS
F025	106.50	15.214	7	EHVHHVH		Hydride-AA
F047	117.50	16.786	7	EH	BIASED HIGH	ICPMS 1X Conc.

OVERALL AVERAGE RANK IS 10.051

PARAMETER: 34095 Selenium ug/L

RESEARCH AND APPLICATIONS BRANCH
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BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.12	1.00	<.1	0.00	<.1	0.00	3.94	11.00	1.79	2.00	10.0	9.50
F008	<1.	0.00	<1.	0.00	<1.	0.00	4.	12.00	2.	9.00	10.	9.50
F010	<1.	0.00	<1.	0.00	<1.	0.00	3.	3.00	2.	9.00	10.	9.50
F016	<1.	0.00	<1.	0.00	<1.	0.00	2.8	1.00	1.8	4.00	10.5	13.00
F020	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	5. EL	1.00
F023	<.05	0.00	<.05	0.00	<.05	0.00	3.39	7.00	1.53	1.00	8.62	4.00
F025	<.2	0.00	<.2	0.00	<.2	0.00	3.2	5.00	1.8	4.00	16.0 EH	17.00
F030	<.4	0.00	<.4	0.00	<.4	0.00	4.3	13.00	2.2	12.00	9.9	7.00
F033	.2W	0.00	.2W	0.00	.2W	1.00	3.8	8.50	1.9	6.00	10.0	9.50
F035	<.6	0.00	<.6	0.00	<.6	0.00	3.9	10.00	2.0	9.00	10.2	12.00
F036	1.140	3.00	.180	1.00	2.930 EH	4.00	5.960 VH	15.00	3.620 H	14.00	9.610	6.00
F037	<2.	0.00	<2.	0.00	<2.	0.00	3.22	6.00	<2.	0.00	8.72	5.00
F038	<.5	0.00	<.5	0.00	<.5	0.00	3.8	8.50	1.8	4.00	12.4 H	15.00
F046	<1.	0.00	<1.	0.00	<1.	0.00	3.	3.00	2.	9.00	8.	3.00
F047	<5.	0.00	<5.	0.00	<5.	0.00	6.7 EH	16.00	<5.	0.00	12.	14.00
F055	1.0	2.00	1.0	2.00	1.0	3.00	3.0	3.00	2.0	9.00	7.0 L	2.00
F062	<.50	0.00	<.50	0.00	.50	2.00	5.50 H	14.00	2.95	13.00	13.00 H	16.00
MEDIAN CONC.	1.0000				.7500		3.8000		2.0000		10.0000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	22.1	12.00	33.8	12.00	41.2	14.00	10.7	12.00
F008	23.	13.00	33.	11.00	40.	12.00	11.	13.50
F010	19.	5.50	29.	5.50	32.	5.50	4. EL	2.00
F016	20.0	8.00	24.4 L	4.00	30.4 L	3.00	9.9	9.00
F020	8. EL	1.50	16. EL	1.00	14. EL	2.00	7. L	4.00
F023	19.8	7.00	30.1	8.00	37.9	9.00	8.96	7.00
F025	22.0	11.00	40.0 VH	16.00	38.0	10.00	8.7	6.00
F030	15. L	3.00	22. VL	3.00	32.	5.50	9.0	8.00
F033	21.0	9.00	32.0	10.00	39.0	11.00	11.0	13.50
F035	24.8	16.00	35.8	14.00	44.0	16.00	10.5	11.00
F036	15.070 L	4.00	30.800	9.00	31.470	4.00	-1.530 EL	1.00
F037	21.13	10.00	30.04	7.00	36.80	8.00	7.88	5.00
F038	24.6	15.00	34.2	13.00	41.4	15.00	22.4 EH	17.00
F046	19.	5.50	29.	5.50	33.	7.00	10.	10.00
F047	24.	14.00	38. H	15.00	41.	13.00	15. EH	16.00
F055	8.0 EL	1.50	16.5 EL	2.00	10.5 EL	1.00	12.0	15.00
F062	31.00 EH	17.00	42.00 EH	17.00	53.50 EH	17.00	4.75 EL	3.00
MEDIAN CONC.	21.0000		30.8000		37.9000		9.9000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	73.50	9.188	8			Hydride AAS
F008	80.00	11.429	7			Hyd. AAS
F010	40.00	5.714	7	EL		Hyd. AAS
F016	42.00	6.000	7	L L		Hyd. AAS
F020	9.50	1.900	5	ELELELELL	BIASED LOW	34008
F023	43.00	6.143	7			-
F025	69.00	9.857	7	EH VH		Hydride-AA
F030	51.50	7.357	7	L VL		Naquadat 34005
F033	68.50	8.563	8			
F035	88.00	12.571	7			
F036	61.00	6.100	10	EHVHH L EL		I.C.P.
F037	41.00	6.833	6			Furnace
F038	87.50	12.500	7	H EH		Hydride AAS
F046	43.00	6.143	7			AA - Furnace
F047	88.00	14.667	6	EH H EH	BIASED HIGH	ICPMS 1X Conc.
F055	40.50	4.050	10	L ELELEL	BIASED LOW	HYDRIDE AA
F062	99.00	12.375	8	H H EHEHEHEL		Hydride

OVERALL AVERAGE RANK IS 8.266

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F020	9.50	1.900	5	ELELELELL	BIASED LOW	34008
F055	40.50	4.050	10	LELELEL	BIASED LOW	HYDRIDE AA
F010	40.00	5.714	7	EL		Hyd. AAS
F016	42.00	6.000	7	LL		Hyd. AAS
F036	61.00	6.100	10	EHVHHLEL		I.C.P.
F023	43.00	6.143	7			-
F046	43.00	6.143	7			AA - Furnace
F037	41.00	6.833	6			Furnace
F030	51.50	7.357	7	LVL		Naquadat 34005
F033	68.50	8.563	8			
F001	73.50	9.188	8			Hydride AAS
F025	69.00	9.857	7	EHVH		Hydride-AA
F008	80.00	11.429	7			Hyd. AAS
F062	99.00	12.375	8	HHEHEHEHEL		Hydride
F038	87.50	12.500	7	HEH		Hydride AAS
F035	88.00	12.571	7			
F047	88.00	14.667	6	EHHEH	BIASED HIGH	ICPMS 1X Conc.

OVERALL AVERAGE RANK IS 8.266

Selenium

PARAMETER: 47095 Silver ug/L

RESEARCH AND APPLICATIONS BRANCH
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BURLINGTON ONTARIO

FP/GLAP INTERLAB STUDY 63 - TM Portion

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	<.05	0.00	<.05	0.00	<.05	0.00	.45	4.00	2.3	4.50	18.3	8.00
F008	<20.	0.00	<20.	0.00	<20.	0.00	<20.	0.00	<20.	0.00	20.	13.00
F010	.2	1.00	<.1	0.00	<.1	0.00	.4	3.00	2.3	4.50	19.	9.50
F020	<.1	0.00	<.1	0.00	<.1	0.00	6.6 EH	9.00	3.1	11.00	19.	9.50
F023	<40.	0.00	<40.	0.00	<40.	0.00	<40.	0.00	<40.	0.00	<40.	0.00
F025	<2.	0.00	<2.	0.00	<2.	0.00	<2.	0.00	2.	3.00	16.	3.00
F030	<2.	0.00	<2.	0.00	<2.	0.00	<2.	0.00	<2.	0.00	11. VL	2.00
F033	.5W	0.00	.5W	1.00	.5W	1.00	.5W	0.00	2.4T	6.50	17.0	5.00
F035	<1.	0.00	1.	2.00	<1.	0.00	2.	8.00	3.	9.50	20.	13.00
F037	<1.	0.00	<1.	0.00	<1.	0.00	<1.	0.00	2.65	8.00	19.14	11.00
F038	<.1	0.00	<.1	0.00	<.1	0.00	.3	2.00	1.7	1.50	17.0	5.00
F043	<.05	0.00	<.05	0.00	<.05	0.00	.12	1.00	1.7	1.50	17.	5.00
F046	<1.	0.00	<1.	0.00	<1.	0.00	1.	7.00	3.	9.50	20.	13.00
F047	<.05	0.00	<.05	0.00	<.05	0.00	.48	5.00	2.4	6.50	18.	7.00
F055	<.5	0.00	<.5	0.00	<.5	0.00	.5	6.00	3.5	12.00	7.5 EL	1.00
F060	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00
F062	<10.00	0.00	<10.00	0.00	<10.00	0.00	<10.00	0.00	<10.00	0.00	21.50	15.00
MEDIAN CONC.							.4800		2.4000		18.3000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	34.8	12.00	20.2	7.00	53.6 EH	15.00	<.05	0.00
F008	30.	7.00	20.	5.50	40. EH	11.00	<20.	0.00
F010	27.	4.00	22.	13.00	25.	7.00	.8	4.00
F020	30.	7.00	19.6	4.00	15. EL	3.00	<.1	0.00
F023	<40.	0.00	<40.	0.00	<40.	0.00	<40.	0.00
F025	31.	9.00	21.	10.00	39. VH	10.00	<2.	0.00
F030	30.	7.00	18.	2.00	17. VL	4.00	<2.	0.00
F033	28.0	5.00	19.0	3.00	28.0	8.00	.5W	0.00
F035	36.	14.00	22.	13.00	42. EH	12.50	<1.	0.00
F037	24.24	2.00	20.54	8.00	18.36 VL	5.00	<1.	0.00
F038	33.0	11.00	22.0	13.00	37.0 VH	9.00	.2	2.00
F043	26.	3.00	21.	10.00	14. EL	2.00	.51	3.00
F046	35.	13.00	23.	15.00	42. EH	12.50	<1.	0.00
F047	32.	10.00	20.	5.50	19. VL	6.00	.15	1.00
F055	8.0 EL	1.00	3.0 EL	1.00	3.0 EL	1.00	<.5	0.00
F060	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00
F062	41.00 VH	15.00	21.00	10.00	44.00 EH	14.00	<10.00	0.00
MEDIAN CONC.	30.0000		20.5400		28.0000		.3550	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	50.50	8.417	6	EH		ICPMS
F008	36.50	9.125	4	EH	INSUFFICIENT DATA	AAS
F010	46.00	5.750	8			GFA
F020	43.50	7.250	6	EH EL		47005
F023	0.00	*******	0		INSUFFICIENT DATA	-
F025	35.00	7.000	5	VH		ICP
F030	15.00	3.750	4	VL VL	INSUFFICIENT DATA	Naquadat ICP-AES
F033	29.50	4.214	7			
F035	72.00	10.286	7	EH		
F037	34.00	6.800	5	VL		Furnace
F038	43.50	6.214	7	VH		ICP/GFAAS
F043	25.50	3.643	7	EL	BIASED LOW	ICP-MS
F046	70.00	11.667	6	EH	BIASED HIGH	AA - Furnace
F047	41.00	5.857	7	VL		ICPMS 1X Conc.
F055	22.00	3.667	6	ELELELEL	BIASED LOW	FLAME AA
F060	0.00	*******	0		INSUFFICIENT DATA	ICP - Direct
F062	54.00	13.500	4	VH EH	INSUFFICIENT DATA	ICP

OVERALL AVERAGE RANK IS 6.944

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F023	0.00	*******	0		INSUFFICIENT DATA	-
F060	0.00	*******	0		INSUFFICIENT DATA	ICP - Direct
F043	25.50	3.643	7	EL	BIASED LOW	ICP-MS
F055	22.00	3.667	6	ELELELEL	BIASED LOW	FLAME AA
F030	15.00	3.750	4	VLVL	INSUFFICIENT DATA	Naquadat ICP-AES
F033	29.50	4.214	7			
F010	46.00	5.750	8			GFA
F047	41.00	5.857	7	VL		ICPMS 1X Conc.
F038	43.50	6.214	7	VH		ICP/GFAAS
F037	34.00	6.800	5	VL		Furnace
F025	35.00	7.000	5	VH		ICP
F020	43.50	7.250	6	EHEL		47005
F001	50.50	8.417	6	EH		ICPMS
F008	36.50	9.125	4	EH	INSUFFICIENT DATA	AAS
F035	72.00	10.286	7	EH		
F046	70.00	11.667	6	EH	BIASED HIGH	AA - Furnace
F062	54.00	13.500	4	VHEH	INSUFFICIENT DATA	ICP

OVERALL AVERAGE RANK IS 6.944

Silver

PARAMETER: 51095 Antimony ug/L

RESEARCH AND APPLICATIONS BRANCH
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FP/GLAP INTERLAB STUDY 63 - TM Portion

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	<.07	0.00	<.07	0.00	.095	2.00	15.0	6.00	8.2	6.50	14.2	10.00
F020	<5.	0.00	<5.	0.00	<5.	0.00	10. L	3.00	7.	3.00	10. L	3.00
F023	<150.	0.00	<150.	0.00	<150.	0.00	<150.	0.00	<150.	0.00	<150.	0.00
F025	<.2	0.00	<.2	0.00	<.2	0.00	11.0 L	4.00	11.0 H	10.00	14.0	8.00
F030	<.2	0.00	<.2	0.00	<.2	0.00	6.8 EL	2.00	3.7 VL	1.00	8.8 L	2.00
F033	.2W	1.00	.2W	1.00	.2W	0.00	15.0	6.00	7.7	4.00	13.0	4.00
F038	<.1	0.00	<.1	0.00	<.1	0.00	16.0	8.50	7.9	5.00	13.2	5.00
F043	<.05	0.00	<.05	0.00	.05	1.00	16.	8.50	8.3	8.00	15.	11.00
F046	<1.	0.00	<1.	0.00	<1.	0.00	20. H	10.00	10.	9.00	14.	8.00
F047	<.1	0.00	<.1	0.00	<.1	0.00	15.	6.00	8.2	6.50	14.	8.00
F055	<1.0	0.00	<1.0	0.00	<1.0	0.00	6.0 EL	1.00	3.8 VL	2.00	6.5 EL	1.00
F062	10.00	2.00	<10.00	0.00	<10.00	0.00	<10.00 L	0.00	<10.00	0.00	13.50	6.00
MEDIAN CONC.							15.0000		8.0500		13.5000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	19.1	6.00	25.8	6.00	37.4	6.00	.31	5.00
F020	15.	3.00	20. L	3.00	30. L	2.00	<5.	0.00
F023	<150.	0.00	<150.	0.00	<150.	0.00	<150.	0.00
F025	20.0	9.50	25.0	5.00	42.0	11.00	1.10	6.00
F030	10. EL	2.00	17. VL	2.00	35.	4.50	<.2	0.00
F033	17.0	5.00	23.0	4.00	33.0	3.00	.3T	4.00
F038	19.5	7.00	27.7	8.00	38.5	8.00	.2	1.00
F043	20.	9.50	28.	9.50	40.	10.00	.29	2.50
F046	20.	9.50	28.	9.50	38.	7.00	<1.	0.00
F047	20.	9.50	27.	7.00	35.	4.50	.29	2.50
F055	9.0 EL	1.00	13.0 EL	1.00	19.0 EL	1.00	<1.0	0.00
F062	16.50	4.00	52.50 EH	11.00	39.00	9.00	<10.00	0.00
MEDIAN CONC.	19.1000		25.8000		37.4000		.2950	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	47.50	5.938	8			Hydride AAS
F020	17.00	2.833	6	L L L L	BIASED LOW	51008
F023	0.00	*******	0		INSUFFICIENT DATA	-
F025	53.50	7.643	7	L H		HYdride-AA
F030	13.50	2.250	6	ELVLL ELVL	BIASED LOW	Naquadat 51003
F033	32.00	3.556	9			
F038	42.50	6.071	7			Hydride AAS
F043	60.00	7.500	8			ICP-MS
F046	53.00	8.833	6	H	BIASED HIGH	AA - Furnace
F047	44.00	6.286	7			ICPMS 1X Conc.
F055	7.00	1.167	6	ELVLELELELEL	BIASED LOW	HYDRIDE AA
F062	32.00	6.400	5	L EH		ICP

OVERALL AVERAGE RANK IS 5.360

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F023	0.00	*******	0		INSUFFICIENT DATA	-
F055	7.00	1.167	6	ELVLELELELEL	BIASED LOW	HYDRIDE AA
F030	13.50	2.250	6	ELVLLELVL	BIASED LOW	Naquadat 51003
F020	17.00	2.833	6	LLLL	BIASED LOW	51008
F033	32.00	3.556	9			
F001	47.50	5.938	8			Hydride AAS
F038	42.50	6.071	7			Hydride AAS
F047	44.00	6.286	7			ICPMS 1X Conc.
F062	32.00	6.400	5	LEH		ICP
F043	60.00	7.500	8			ICP-MS
F025	53.50	7.643	7	LH		HYdride-AA
F046	53.00	8.833	6	H	BIASED HIGH	AA - Furnace

OVERALL AVERAGE RANK IS 5.360

Antimony

PARAMETER: 83095 Bismuth ug/L

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FP/GLAP INTERLAB STUDY 63 - TM Portion

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	<.1	0.00	<.1	0.00	<.1	0.00	2.9	4.00	9.8	4.00	5.5	2.00
F020	<20.	0.00	<20.	0.00	<20.	0.00	<20.	0.00	<20.	0.00	<20.	0.00
F023	<250.	0.00	<250.	0.00	<250.	0.00	<250.	0.00	<250.	0.00	<250.	0.00
F038	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00
F043	<.05	0.00	<.05	0.00	<.05	0.00	2.8	3.00	9.2	3.00	5.9	4.00
F046	<500.	0.00	<500.	0.00	<500.	0.00	<500.	0.00	<500.	0.00	<500.	0.00
F047	<.05	0.00	<.05	0.00	<.05	0.00	2.4	2.00	8.6	2.00	5.6	3.00
F055	<1.0	0.00	<1.0	0.00	<1.0	0.00	2.0	1.00	6.0	1.00	3.0 L	1.00
MEDIAN CONC.							2.6000		8.9000		5.5500	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	19.3	2.00	28.7	4.00	20.5	2.00	.27	2.00
F020	<20.	0.00	20. L	2.00	<20.	0.00	<20.	0.00
F023	<250.	0.00	<250.	0.00	<250.	0.00	<250.	0.00
F038	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00
F043	22.	4.00	31.	5.00	23.	4.00	.09	1.00
F046	<500.	0.00	<500.	0.00	<500.	0.00	<500.	0.00
F047	20.	3.00	28.	3.00	21.	3.00	.53	3.00
F055	12.0 VL	1.00	17.0 VL	1.00	13.5 VL	1.00	1.0	4.00
MEDIAN CONC.	19.6500		28.0000		20.7500		.4000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	20.00	2.857	7			ICPMS
F020	2.00	2.000	1	L	INSUFFICIENT DATA	ICP
F023	0.00	*******	0		INSUFFICIENT DATA	-
F038	0.00	*******	0		INSUFFICIENT DATA	ICP
F043	24.00	3.429	7			ICP-MS
F046	0.00	*******	0		INSUFFICIENT DATA	ICP
F047	19.00	2.714	7			ICPMS 1X Conc.
F055	10.00	1.429	7	L VLVLVL	BIASED LOW	HYDRIDE AA

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F023	0.00	*******	0		INSUFFICIENT DATA	-
F038	0.00	*******	0		INSUFFICIENT DATA	ICP
F046	0.00	*******	0		INSUFFICIENT DATA	ICP
F055	10.00	1.429	7	LVLVLVL	BIASED LOW	HYDRIDE AA
F020	2.00	2.000	1	L	INSUFFICIENT DATA	ICP
F047	19.00	2.714	7			ICPMS 1X Conc.
F001	20.00	2.857	7			ICPMS
F043	24.00	3.429	7			ICP-MS

OVERALL AVERAGE RANK IS 2.586

Bismuth

PARAMETER: 93095 Lithium ug/L

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FP/GLAP INTERLAB STUDY 63 - TM Portion

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	.62	2.00	2.3	2.00	.57	2.00	4.4	4.00	6.3	5.00	14.7	6.00
F010	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	10. L	2.00
F023	<5.0	0.00	<5.0	0.00	<5.0	0.00	<5.0	0.00	<5.0	0.00	8.0 VL	1.00
F025	1.	4.00	4.	6.00	<1.	0.00	5.	5.00	6.	3.50	15.	7.50
F030	<4.	0.00	<4.	0.00	<4.	0.00	4.	3.00	5.	1.00	13.	4.00
F038	<15.	0.00	<15.	0.00	<15.	0.00	<15.	0.00	<15.	0.00	15.	7.50
F043	<1.	0.00	1. L	1.00	<1.	0.00	2. L	1.00	6.	3.50	16.	9.00
F046	<1.	0.00	3.	4.50	5.	3.00	7. H	7.00	9. H	7.00	12.	3.00
F047	.86	3.00	2.5	3.00	.51	1.00	3.8	2.00	5.4	2.00	14.	5.00
F055	.5	1.00	3.0	4.50	<.5	0.00	5.5	6.00	7.5	6.00	16.5	10.00
MEDIAN CONC.	.7400		2.7500				4.4000		6.0000		14.3500	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	21.	5.00	34.2	7.00	32.7	7.00	1.88	2.00
F010	20.	3.00	30.	2.50	30.	2.00	<10.	0.00
F023	15.0 L	1.00	29.0	1.00	26.0	1.00	<5.0	0.00
F025	22.	8.50	34.	6.00	32.	5.50	2.	3.00
F030	19.	2.00	33.	4.50	32.	5.50	<4.	0.00
F038	22.	8.50	36.	8.50	34.	8.00	<15.	0.00
F043	22.	8.50	36.	8.50	35.	9.00	1.	1.00
F046	21.	5.00	30.	2.50	31.	3.50	3.	6.00
F047	21.	5.00	33.	4.50	31.	3.50	2.1	4.00
F055	22.0	8.50	39.0	10.00	37.0	10.00	2.5	5.00
MEDIAN CONC.	21.0000		33.5000		32.0000		2.0500	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	42.00	4.200	10			ICPMS
F010	9.50	2.375	4	L	INSUFFICIENT DATA	AAS
F023	4.00	1.000	4	VLL	INSUFFICIENT DATA	-
F025	49.00	5.444	9			ICP
F030	20.00	3.333	6			ICP-AES
F038	32.50	8.125	4		INSUFFICIENT DATA	ICP
F043	41.50	5.188	8	L L		GFAAS
F046	41.50	4.611	9	H H		AA
F047	33.00	3.300	10			ICPMS 1X Conc.
F055	61.00	6.778	9		BIASED HIGH	FLAME AA

OVERALL AVERAGE RANK IS 4.575

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F023	4.00	1.000	4	VLL	INSUFFICIENT DATA	-
F010	9.50	2.375	4	L	INSUFFICIENT DATA	AAS
F047	33.00	3.300	10			ICPMS 1X Conc.
F030	20.00	3.333	6			ICP-AES
F001	42.00	4.200	10			ICPMS
F046	41.50	4.611	9	HH		AA
F043	41.50	5.188	8	LL		GFAAS
F025	49.00	5.444	9			ICP
F055	61.00	6.778	9		BIASED HIGH	FLAME AA
F038	32.50	8.125	4		INSUFFICIENT DATA	ICP

OVERALL AVERAGE RANK IS 4.575

Lithium

PARAMETER: 94095 Berylium ug/L

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FP/GLAP INTERLAB STUDY 63 - TM Portion

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= 1.0000 CONCENTRATION ERROR INCREMENT= .1500

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	<.1	0.00	<.1	0.00	<.1	0.00	1.4	3.00	7.5	12.00	23.9	6.00
F010	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	7.	8.00	25.	9.00
F020	<1.	0.00	<1.	0.00	<1.	0.00	1.3	1.50	6.	3.00	23.	4.00
F023	<1.	0.00	<1.	0.00	<1.	0.00	6.0 EH	11.00	1.0 EL	1.00	23.0	4.00
F025	<1.	0.00	<1.	0.00	<1.	0.00	2.	9.50	7.	8.00	25.	9.00
F030	<1.	0.00	<1.	0.00	<1.	0.00	<1.	0.00	5. L	2.00	19. L	1.00
F033	1.0W	1.00	1.0W	1.00	1.0W	1.00	1.5T	5.00	6.5	5.00	23.0	4.00
F035	<.2	0.00	<.2	0.00	<.2	0.00	1.3	1.50	6.2	4.00	22.8	2.00
F038	<5.	0.00	<5.	0.00	<5.	0.00	<5.	0.00	7.	8.00	26.	12.00
F043	<.05	0.00	<.05	0.00	<.05	0.00	1.8	8.00	8.0	13.00	30. H	15.00
F046	<1.	0.00	<1.	0.00	<1.	0.00	1.5	5.00	7.0	8.00	25.0	9.00
F047	<.1	0.00	<.1	0.00	<.1	0.00	1.6	7.00	7.4	11.00	27.	14.00
F055	<.5	0.00	<.5	0.00	<.5	0.00	1.5	5.00	9.0 H	14.00	26.0	12.00
F060	<1.	0.00	<1.	0.00	<1.	0.00	2.	9.50	7.	8.00	26.	12.00
F062	<10.00	0.00	<10.00	0.00	<10.00	0.00	<10.00	0.00	<10.00	0.00	24.50	7.00
MEDIAN CONC.							1.5000		7.0000		25.0000	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F001	17.	8.00	12.	7.00	33.8	6.00	<.1	0.00
F010	17.	8.00	13.	11.00	34.	8.50	<5.	0.00
F020	16.	3.50	11.	3.50	32.	4.00	<1.	0.00
F023	16.0	3.50	12.0	7.00	33.0	5.00	<1.0	0.00
F025	17.	8.00	13.	11.00	34.	8.50	1.	3.50
F030	13. L	2.00	8. VL	2.00	29.	2.00	8. EH	6.00
F033	.016 EL	1.00	.011 EL	1.00	.032 EL	1.00	.001W	1.00
F035	16.2	5.00	11.7	5.00	29.2	3.00	7.2 EH	5.00
F038	18.	11.00	14.	14.00	37.	13.50	<5.	0.00
F043	21. H	15.00	15. H	15.00	42. H	15.00	<.05	0.00
F046	18.0	11.00	13.0	11.00	35.0	11.50	1.0	3.50
F047	18.	11.00	13.	11.00	35.	11.50	.16	2.00
F055	18.5	13.00	12.0	7.00	34.0	8.50	<.5	0.00
F060	19.	14.00	13.	11.00	37.	13.50	<1.	0.00
F062	16.50	6.00	11.00	3.50	34.00	8.50	<10.00	0.00
MEDIAN CONC.	17.0000		12.0000		34.0000		1.0000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F001	42.00	7.000	6			ICP5x
F010	44.50	8.900	5			ICAP
F020	19.50	3.250	6		BIASED LOW	ICP
F023	31.50	5.250	6	EHEL		-
F025	57.50	8.214	7			ICP
F030	15.00	2.500	6	L L L VL EH	BIASED LOW	Naquadat 04009
F033	21.00	2.100	10	ELELEL	BIASED LOW	
F035	25.50	3.643	7	EH	BIASED LOW	
F038	58.50	11.700	5		BIASED HIGH	ICP
F043	81.00	13.500	6	H H H H	BIASED HIGH	ICP-MS
F046	59.00	8.429	7			ICP
F047	67.50	9.643	7			ICPMS 1X Conc.
F055	59.50	9.917	6	H		FLAME AA
F060	68.00	11.333	6		BIASED HIGH	ICP - Direct
F062	25.00	6.250	4		INSUFFICIENT DATA	ICP

OVERALL AVERAGE RANK IS 7.181

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	METHOD CODING
F033	21.00	2.100	10	ELELEL	BIASED LOW	
F030	15.00	2.500	6	LLLVLEH	BIASED LOW	Naquadat 04009
F020	19.50	3.250	6		BIASED LOW	ICP
F035	25.50	3.643	7	EH	BIASED LOW	
F023	31.50	5.250	6	EHEL		-
F062	25.00	6.250	4		INSUFFICIENT DATA	ICP
F001	42.00	7.000	6			ICP5x
F025	57.50	8.214	7			ICP
F046	59.00	8.429	7			ICP
F010	44.50	8.900	5			ICAP
F047	67.50	9.643	7			ICPMS 1X Conc.
F055	59.50	9.917	6	H		FLAME AA
F060	68.00	11.333	6		BIASED HIGH	ICP - Direct
F038	58.50	11.700	5		BIASED HIGH	ICP
F043	81.00	13.500	6	HHHH	BIASED HIGH	ICP-MS

OVERALL AVERAGE RANK IS 7.181

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