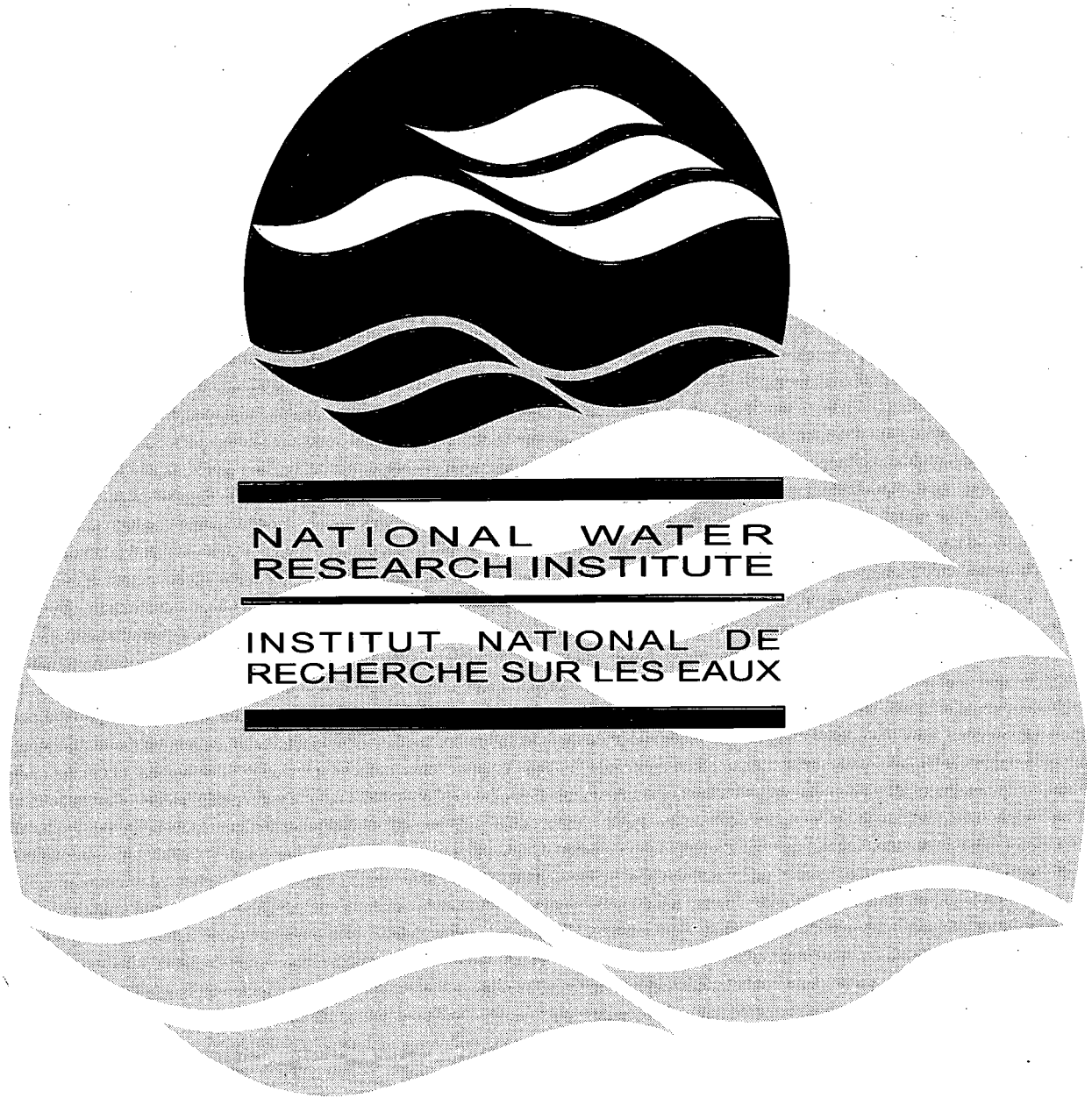

ECOSYSTEM INTERLABORATORY QA PROGRAM
STUDY FP 74 - TRACE METALS/ELEMENTS IN SURFACE WATERS (MARCH & APRIL 1999)

H. Alkema

NWRI Technical Report QA-99-03

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

June 15, 1999

To: Participants of the NWRI Ecosystem Interlaboratory QA Program

Re: Final Report for NWRI Study FP 74 - Trace Elements Portion

Dear Participant:

We would like to thank you for your co-operation and prompt responses during this study. In return, it is the aim of the quality assurance group to give prompt evaluations, reports, and effective remedial assistance to all of the participants.

The Institute is pleased to distribute this final report to the FP participant laboratories. This report includes results and evaluations for a unique series of samples: Trace Metals/Elements. The evaluation of results includes an evaluation for systematic bias and precision. The flagging criteria, used to assess precision, are open to change. In order to improve our data assessments and the quality of your data, you may find that these criteria change from study to study. This would be evident in Table 3 - Summary of Study-to-Study Performance. A complete listing of all laboratory results is included so that each laboratory can compare its results and evaluations with other laboratories. For details concerning these evaluations please refer to the attached appendix, Glossary of Terms, or to the Research & Applications Branch QA Manual.

In the data summary tables you will find the tabulation of the degree of bias. It has been difficult to quantify and determine its significance at low values. *In this report we have calculated bias in two components which relate directly to the chemical measurement.* Laboratory heads are encouraged to discuss the attached report openly with those who manage their programs and those who use their laboratory data.

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.

Should you have any questions or comments regarding this study, please do not hesitate to contact us.

Yours truly,

Harry A.

Harry Alkema
QA Specialist
NLET/NWRI

Interlaboratory QA Studies & CRMs
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Attachment: Individual Laboratory Appraisal

National Water Research Institute
National Laboratory for Environmental Testing

Report no. NWRI-QA-99-03

Ecosystem Interlaboratory Quality Assurance Program
Study FP 74 - Final Report

March and April, 1999

An Interlaboratory Quality Assurance Study for Trace Metals/Elements in Surface Waters*

by

H. Alkema

Environmental Standards and Reference Materials
Project Information & Quality Management
National Laboratory for Environmental Testing
National Water Research Institute
Burlington, Ontario

June 1999

* companion studies: Rain and Soft Waters; Report NWRI-QA-99-01 and Major Ions/Total P; Report NWRI-QA-99-02

NWRI Interlaboratory Quality Assurance Studies
for
Acid Rain and Surface Waters

Major Ions and Nutrients, Trace Metals, Total Phosphorus, and Mercury

The Institute's interlaboratory quality assurance (QA) studies support a core group of government labs and their QA requirements of various environmental programs. These programs include: acid rain research, Great Lakes trans-boundary issues, and issues involving provincial watershed/ecosystem research, monitoring, and jurisdiction. The QA program also addresses health issues, such as, toxic metal (lead, manganese, and mercury) contamination of drinking water.

The QA studies are executed twice a year and accommodate environmental programs in both Canada and the United States of America. The US Environmental Protection Agency, US Geological Survey, and numerous university acid rain programs show a continued interest in this program. More than 200 laboratories are invited to participate on a voluntary basis in each study. Currently, some 60 of these labs participate in the various study matrixes. One study consists of five (5) series of ten (10) samples each and includes numerous parameters for analysis. The primary feature of these studies is to report the quality of data produced by the participating laboratories. Laboratory performance is ranked in terms of the number of biased parameters (systematic bias) and flagged results (precision measurement). The reports produced from the client data provide a powerful tool for the diagnosis of problematic analysis. Environmental programs and data users are therefore encouraged to have their labs participate as a means of quantifying laboratory performance and data quality.

As the NWRI studies run on a voluntary and cost recovery basis, laboratories and program managers express an ongoing interest in study design and sample requirements. The program is open to international participation and contractually specialized studies are available.

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Table 1 List of participating† laboratories in the trace metals/elements portion of interlaboratory study FP 74 (March & April, 1999).

Accutest Laboratories Ltd.
Aqualta, Rossdale (Alberta)
ASL - Analytical Service Lab Ltd.
Can Test Ltd.
Chemex Environmental Services
City of Calgary - Waterworks
Entech Laboratories (Ontario)
Environment Canada - EPL, Prairie & Northern Region
Environment Canada - EQL, Atlantic
Environment Canada - NWRI, NLET
Environment Canada - Pacific Environmental Science Centre
Enviro-Test Laboratories, Edmonton
Enviro-Test Laboratories, Manitoba
Frontier Sciences Inc.
Fisheries and Oceans Canada - Freshwater Institute
Food Control S.A. (Argentina)
Hamilton-Wentworth Regional Laboratory, Ontario
Intemin - Segemar (Argentina)
Laboratoire de Santé Publique du Québec
Lakehead University Centre
Maxxam Analytics Inc.
Ministère de l'Environnement et de la Faune du Québec - Laval
Ministère de l'Environnement et de la Faune du Québec - Sainte-Foy
Natural Resources Canada - CFS, Atlantic Region
Natural Resources Canada - CFS, Ontario Region
New Brunswick Department of the Environment - ASL
Norwest Laboratories, Edmonton
Ontario Ministry of Environment and Energy - Dorset
Ontario Ministry of Environment and Energy - Etobicoke
Ontario Ministry of Northern Development and Mines - Geosciences Laboratory
Ottawa-Charlton Regional Municipality
Philip Analytical Services Corp.
Saskatchewan Research Council
TAIGA Environmental Laboratory
University of Maine

† Laboratories select their routine parameters for this study.

Table 2 Laboratory Performance Scores - Study 0074

Trace Elements in Water

	SYSTEMATIC BIAS			FLAGGED RESULTS			
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 & FLAGGED DATA % SCORE
F002	9	0	0.00	84	2	2.38	1.19
F014	16	0	0.00	146	6	4.11	2.05
F038	23	0	0.00	216	14	6.48	3.24
F138	21	1	4.76	210	10	4.76	4.76
F011	23	1	4.35	214	12	5.61	4.98
F015	19	1	5.26	169	13	7.69	6.48
F096	22	2	9.09	204	21	10.29	9.69
F024	15	1	6.67	138	18	13.04	9.86
F019	15	0	0.00	130	27	20.77	10.38
F010	18	2	11.11	169	21	12.43	11.77
F046	21	3	14.29	197	21	10.66	12.47
F155	21	2	9.52	154	24	15.58	12.55
F145	19	0	0.00	183	52	28.42	14.21
F153	22	2	9.09	184	40	21.74	15.42
F032b	15	3	20.00	150	19	12.67	16.33
F094	23	2	8.70	213	52	24.41	16.55
F042	9	1	11.11	76	18	23.68	17.40
F147	13	1	7.69	101	30	29.70	18.70
F022	21	1	4.76	210	80	38.10	21.43
F003	21	7	33.33	202	20	9.90	21.62
F048	22	5	22.73	197	41	20.81	21.77
F060	23	6	26.09	203	40	19.70	22.90
F037	12	3	25.00	115	24	20.87	22.93
F026	8	1	12.50	73	25	34.25	23.37
F135	9	1	11.11	57	21	36.84	23.98
F139	21	6	28.57	190	46	24.21	26.39
F025	22	4	18.18	195	85	43.59	30.89
F154	14	6	42.86	132	29	21.97	32.41
F009	18	7	38.89	169	44	26.04	32.46
F031	12	4	33.33	107	37	34.58	33.96
F133	22	8	36.36	211	72	34.12	35.24
F012	18	7	38.89	171	90	52.63	45.76
F032	18	12	66.67	169	69	40.83	53.75

Laboratory parameters are selected from:

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

Table 3 Summary of Study-to Study Performance

Trace Elements in Water

LAB CODE	% BIASED PARAMETERS & FLAGGED RESULTS ON STUDIES										MEDIAN SCORE	COMMENTS
	0065	0066	0067	0068	0069	0070	0071	0072	0073	0074		
F002	1.7	-	5.7	0.0	1.4	0.6	0.0	0.6	0.0	1.2	0.6	GOOD
F003	5.8	4.2	6.1	7.8	0.7	1.2	3.1	5.4	3.1	21.6	4.8	GOOD
F009	20.5	19.7	24.7	30.9	10.8	22.2	26.4	16.2	49.4	32.5	23.5	MODERATE
F010	13.4	19.5	25.0	12.5	-	20.2	9.6	19.7	10.3	11.8	13.4	MODERATE
F011	17.1	9.9	7.3	3.7	22.7	14.0	10.0	15.8	5.0	5.0	10.0	SATISFACTORY
F012	-	-	-	20.6	26.2	28.0	25.1	20.5	53.9	45.8	26.2	MODERATE
F014	25.3	26.2	27.3	26.9	30.9	9.6	19.0	15.1	14.0	2.1	22.2	MODERATE
F015	4.5	5.4	9.9	1.9	5.9	7.0	11.0	6.4	11.7	6.5	6.5	SATISFACTORY
F019	-	30.2	20.7	26.6	13.3	14.2	6.8	7.7	10.6	10.4	13.3	MODERATE
F022	-	-	-	28.2	-	-	34.3	12.6	-	21.4	24.8	MODERATE
F024	3.1	10.8	9.6	10.5	14.4	8.1	16.2	18.1	9.7	9.9	10.2	SATISFACTORY
F025	19.4	20.9	-	-	-	59.0	24.0	51.9	27.1	30.9	27.1	MODERATE
F026	15.5	-	35.5	14.7	28.5	22.2	13.6	8.1	27.2	23.4	22.2	MODERATE
F031	24.9	16.8	29.0	28.3	32.3	32.8	48.6	32.5	40.2	34.0	32.4	POOR
F032	8.0	0.7	1.4	9.4	13.0	3.1	21.8	5.5	1.7	53.7	6.7	SATISFACTORY
F032b	-	-	-	5.7	-	-	10.6	7.2	5.2	16.3	7.2	SATISFACTORY
F037	39.7	-	20.5	17.0	41.7	25.9	18.7	26.2	36.4	22.9	25.9	MODERATE
F038	28.1	10.4	9.7	4.0	5.4	5.3	4.2	4.2	1.9	3.2	4.7	GOOD
F042	-	5.0	0.0	-	-	-	-	-	-	17.4	5.0	SATISFACTORY
F046	17.8	10.4	21.3	15.0	15.4	17.4	12.7	15.5	12.9	12.5	15.2	MODERATE
F048	14.7	27.1	2.8	5.2	31.2	11.0	1.9	13.0	22.8	21.8	13.8	MODERATE
F060	-	-	-	7.7	-	9.3	4.0	13.1	11.6	22.9	10.5	SATISFACTORY
F094	-	-	45.8	37.3	4.8	6.5	9.8	14.0	11.6	16.6	12.8	MODERATE
F096	-	-	-	32.2	-	7.4	10.5	17.3	4.6	9.7	10.1	SATISFACTORY
F133	-	-	-	-	-	54.2	17.0	10.1	15.4	35.2	17.0	MODERATE
F135	-	-	-	-	-	-	-	57.2	54.0	24.0	54.0	POOR
F138	-	-	-	-	-	20.0	3.6	-	20.5	4.8	12.4	SATISFACTORY
F139	-	-	-	-	-	-	-	43.1	40.2	26.4	40.2	POOR
F145	-	-	-	-	-	-	-	-	8.9	14.2	11.6	SATISFACTORY
F147	-	-	-	-	-	-	-	-	-	18.7	-	-
F153	-	-	-	-	-	-	-	-	-	15.4	-	-
F154	-	-	-	-	-	-	-	-	-	32.4	-	-
F155	-	-	-	-	-	-	-	-	-	12.6	-	-
INTERLAB MEDIAN	17.1	10.8	20.5	14.7	14.4	14.0	11.0	15.1	11.7	17.4		

STUDY DATES: 0065(05-JUL-1994), 0066(04-JAN-1995), 0067(05-JUL-1995), 0068(01-MAR-1996), 0069(01-SEP-1996), 0070(03-MAR-1997), 0071(02-SEP-1997), 0072(02-MAR-1998), 0073(01-SEP-1998), 0074(01-MAR-1999)

Table 4 Sample design for the trace elements in water

Sample Number	Sample Name	Expected Copper concentration (µg/L)
FP74 TM-1	TM-25.2	12.
FP74 TM-2	TM-23.2	10.
FP74 TM-3	TMDA-54.3d	23.
FP74 TM-4	TM-FSWawa	32.
FP74 TM-5	TMDA-54a	63.
FP74 TM-6	TMDA-61	70.
FP74 TM-7	TMDA-62	107.
FP74 TM-8	TMDA-63	196.
FP74 TM-9	TMDA-64	293.
FP74 TM-10	TMDA-65	389.

Table 5 Summary of Interlaboratory Median Values for Trace Elements - Study 0074

PARAMETER		SAMPLE NUMBER					
		TM-25.2 SAMPLE 1	TM-23.2 SAMPLE 2	TM-54.3D SAMPLE 3	TM-FSWAWA SAMPLE 4	TM-54A SAMPLE 5	TMDA-61 SAMPLE 6
Aluminum	ug/L	51.560	94.485	21.000	12.300	30.150	58.240
Antimony	ug/L	2.0500	2.7000	1.3550	0.1500	1.0000	32.700
Arsenic	ug/L	7.0000	8.2000	2.4000	1.2000	2.3000	33.900
Barium	ug/L	5.8400	14.785	29.000	11.000	43.520	63.400
Beryllium	ug/L	2.8000	1.5900	1.0000	0.1500	0.7000	35.250
Bismuth	ug/L	4.7500	4.2150	1.0500	0.3000	0.7410	28.000
Cadmium	ug/L	8.8085	2.5000	7.9000	0.5000	5.5000	59.650
Chromium	ug/L	7.5000	6.5000	22.000	0.6210	15.000	69.000
Cobalt	ug/L	13.000	7.5000	15.900	0.0700	10.650	63.100
Copper	ug/L	12.200	9.8000	23.000	31.300	62.500	70.150
Iron	ug/L	18.000	12.750	23.800	10.000	138.500	84.550
Lead	ug/L	15.800	3.8900	27.444	0.1700	25.570	65.300
Lithium	ug/L	4.0000	3.8050	1.7500	0.5000	1.7700	34.670
Manganese	ug/L	14.950	8.2000	14.000	0.6000	25.000	75.950
Molybdenum	ug/L	7.3790	5.1900	15.000	0.2000	10.000	73.000
Nickel	ug/L	10.000	5.4000	18.100	0.6367	119.000	60.000
Selenium	ug/L	4.9500	4.3000	1.5500	0.4087	1.6000	36.000
Silver	ug/L	4.6000	3.9100	0.7095	0.2000	0.5000	23.000
Strontium	ug/L	140.000	60.025	30.800	57.650	79.600	68.750
Thallium	ug/L	6.6050	3.8450	1.3900	0.0050	0.9185	37.600
Uranium	ug/L	6.5000	5.8000	3.1850	0.0458	2.2900	36.950
Vanadium	ug/L	10.500	2.0000	17.650	0.3110	12.000	71.000
Zinc	ug/L	24.000	12.700	28.650	3.2000	32.000	70.200

		TMDA-62 SAMPLE 7	TMDA-63 SAMPLE 8	TMDA-64 SAMPLE 9	TMDA-65 SAMPLE 10
Aluminum	ug/L	92.840	166.000	268.900	363.000
Antimony	ug/L	57.750	102.000	129.000	198.500
Arsenic	ug/L	52.000	97.000	153.000	201.000
Barium	ug/L	116.000	196.000	305.000	408.780
Beryllium	ug/L	53.050	99.145	147.800	182.000
Bismuth	ug/L	55.720	97.500	148.000	181.000
Cadmium	ug/L	90.800	169.000	251.500	309.500
Chromium	ug/L	93.600	178.155	295.250	405.900
Cobalt	ug/L	100.000	194.550	273.314	388.696
Copper	ug/L	107.000	196.000	293.000	389.000
Iron	ug/L	120.500	209.000	322.000	419.000
Lead	ug/L	100.150	209.500	300.600	426.000
Lithium	ug/L	55.500	98.000	148.000	176.000
Manganese	ug/L	104.000	203.000	302.050	413.000
Molybdenum	ug/L	98.000	156.000	279.000	390.000
Nickel	ug/L	100.000	199.000	268.000	401.800
Selenium	ug/L	50.000	102.000	152.500	193.500
Silver	ug/L	17.900	31.300	30.800	29.000
Strontium	ug/L	119.480	201.950	270.450	391.500
Thallium	ug/L	51.700	102.700	151.000	203.500
Uranium	ug/L	53.000	96.150	140.650	208.000
Vanadium	ug/L	108.000	185.500	274.600	374.700
Zinc	ug/L	111.000	204.000	309.711	390.000

Appendix A

Glossary of Terms
Quantifying Bias in NWRI QA Studies

GLOSSARY OF TERMS

Used for the Evaluation of Interlaboratory Results

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

Bias: Results for a parameter are assessed to be biased by the procedure of Youden when they are consistently ranked to be either higher or lower than the median result. In these interlaboratory studies, for most parameters, a bias of greater than 5% is considered to be excessive. Biases of less than 5% are noted for caution and investigation.

Bias Blank: In the graph for bias % slope, the y-intercept for the laboratory results indicates a systematic blank of analysis. This is the second component of bias.

Bias % Slope: When laboratory results for a parameter are plotted against the target values, the slope as compared to the ideal results (no bias) is considered to be the major component of the degree of bias. For an explanation of Bias % Slope see the following explanation in "Quantifying Bias in NWRI QA Studies".

Erratic: Results for a parameter are evaluated as erratic when both high and low flags are assigned.

Flagged Result: A result is flagged when its value is beyond that of the median (target value) plus or minus the acceptable difference.

Isolated Outlier: A parameter analysis which performs satisfactorily but produces an extreme result. (formerly, 'out of control')

Satisfactory: Fully acceptable, 'good results'.

'W' or 'T' Code: A 'W' or 'T' code may be used with a reported result as described in ASTM. However, in the NWRI QA studies, these codes may result in flagging discrepancies. "Less than" values or negative results are also legitimate when reporting the results. Laboratories should use their usual data reporting protocols insofar as they are compatible with the other laboratories.

The following three terms define the acceptable differences from the median of results (**target value**) that is allowed without a result being flagged either low or high:

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

In general, for the NWRI QA 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 Federal-Provincial QA Program, for moderate ranges, this has been achieved with the 10% Deviation Rule.

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: A **target value** for a sample may be 21 µg/L, the **BAE** is 1.0, the **LLBAE** is 10 µg/L and the **CEI** 0.1. The acceptable difference is calculated by the equation: (**Target - LLBAE**) x **CEI** + **BAE**. For the figures mentioned the answer would be (21 - 10) x 0.10 + 1.0 = 2.1. Thus the range 18.9 to 23.1 µg/L would be considered acceptable and would not be flagged.

The calculated acceptable difference is termed **1 criteria** or **crit**. This value and the value of three standard deviations (**3SD**) are both action criteria in the determination of flags. When the **reported value** is subtracted from the **target value**, the difference is then divided by the **1 criteria** value. This produces the number of **1 crit** deviations. The assigned flag depends upon what range this number falls into.

1 Criteria Deviations	Assigned Flag
1 - 1.5	L or H
1.5 - 3SD	VL or VH
> 3SD	EL or EH

In cases where the **3SD** value is lower than that of **1 crit**, only extreme flags (EL or EH) are assigned. A minimum of 6 results are needed for the calculation of **3SD**, otherwise, 2 criteria deviations are used.

References:

1. ASTM, 1983, Volume 11.01, Water 1, Section II, pp. D4210-83.
2. Ranking Laboratories by Round-Robin Tests, W.J. Youden, Precision Measurement and Calibration, H.H. Ku, Editor, NBS Special Publication 300-Volume 1, U.S. Government Printing Office, Washington, D.C., 1969.

June 1996

Quantifying Bias in NWRI QA Studies

Introduction

Systematic bias as part of the QA data assessment is a major element in quantifying data quality. It is important in qualifying the accuracy of data in a general sense, when the entire set of analysis data may be affected by factors such as calibration, instrument setup, chemical reagent efficiency and purity of blank solutions. The absence of bias is not only very important when assessing data accuracy, but also when merging data sets from different times or locations.

Degree of Bias

In the NWRI QA studies with 10 sample series, systematic bias[1] is assessed non-parametrically by the procedure of Youden. The degree of bias is important in these interlaboratory studies for two reasons. When the degree of bias is small, it should not fault a laboratory's performance. On the other hand, when the degree is higher, it should be quanitified and remedial action undertaken. The degree of bias may be parametrically quantified by two parameters taken from the parameter performance chart, as in figure 1. When bias is indicated by the procedure of Youden, the slope and intercept, give the degree of bias. Incidentally, a complication arises from the high precision of methodologies and instrumentation like ICPMS. A very high precision of analysis may lead to an assessment of very low bias, e.g. 2 or 3%.

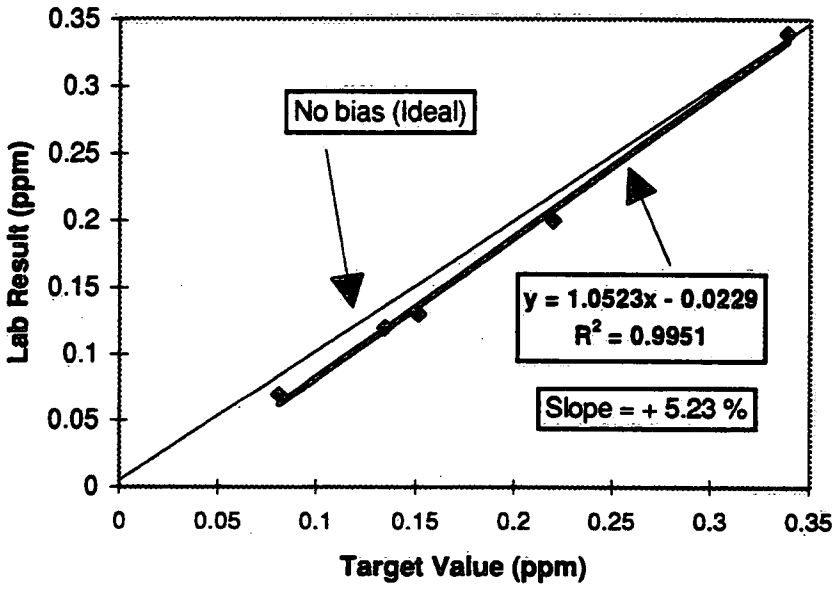
[1] Systematic bias is often identified with the comparison of data to a certified standard.

Parameter Performance Graph and Bias

The parameter performance graph, Figure 1, charts the laboratory results against the target values for a parameter. The ideal results, showing no bias and no deviating data, would fall on the 45° line labeled 'no bias (ideal)'. In this figure, the laboratory results have a very high degree of precision as indicated by the the correlation coefficient (R^2) of 0.9999. The slope of the regression line, as indicated by the equation was 0.9637 and as a percentage calculates to be -3.63%. This slope is one factor in evaluating the degree of bias.

The second contribution of bias, as indicated by the parameter performance graph, is the analysis blank. This blank value is given by the y-intercept, and in this case is indicated to be 0.0005 ppm. These two factors, slope and blank are considered to be the two important considerations in quantifying bias. Preliminary investigation indicates that the slope value is the most important factor and needs to be followed most closely. However, the blank may be contaminated (alternatively the standards) and become the larger factor of the two. The example in Figure 2 is a case in point.

Figure 2 **Parameter Performance**



In this parameter performance graph, we have a worst case situation. The Youden bias for this parameter is indicated as 'biased low'. However, the graph for this parameter and laboratory indicates a positive slope of 5.23%. Upon examining the graph, the regression line indicates a considerably large negative intercept or blank value. In this case it is the blank value that needs to be investigated.

Conclusion

Systematic bias as indicated in the NWRI interlaboratory study by the procedure of Youden has two distinct components. The regression equation as given in the performance graph can quantify these two important factors. Whereas the slope factor may be the most significant of the two, the blank bias factor should also be indicated for the cases where it may be the larger and more meaningful of the two.

June 1996

NWRI Ecosystem Interlaboratory QA Program

Bias Critical Values
Trace Metals/Elements

Parameter	%
Aluminum	5
Vanadium	5
Chromium	5
Manganese	5
Iron	5
Cobalt	5
Nickel	5
Copper	5
Zinc	5
Strontium	5
Molybdenum	5
Cadmium	5
Barium	5
Lead	5
Arsenic	10
Selenium	10
Silver	10
Antimony	10
Bismuth	25
Lithium	10
Beryllium	10
Uranium	10

June 1996

Appendix B

Data & Evaluation Summary

PARAMETER: 13095 Aluminum ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 5.0000 BASIC ACCEPTABLE ERROR= 5.0000 CONCENTRATION ERROR INCREMENT= 0.1000

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	53.0	20.00	97.0	21.00	21.0	15.00	11.0	9.00	40.0 H	27.00	62.0	24.00
F003	50.	10.50	93.	12.50	20.	9.00	12.	10.50	30.	13.00	55.	7.50
F009	52.	17.50	96.	19.00	21.	15.00	13.	17.00	39. H	25.00	59.	19.00
F010	41. L	3.50	82.	3.00	11. VL	2.00	5. L	1.00	26.	5.00	47. L	3.00
F011	48.7	8.00	90.5	10.00	<25.	0.00	<25.	0.00	27.3	6.00	56.1	12.00
F012	36. VL	1.00	96.	19.00	25.	25.00	22. VH	25.00	29.	9.00	56.	10.50
F014	56.1	24.00	102.	27.00	22.5	22.00	12.3	13.50	27.8	7.00	58.9	18.00
F015	46.	6.50	96.	19.00	17.	5.00	15.	21.00	38. H	23.50	63.	25.00
F019	70. VH	30.00	120. EH	31.00	30. H	26.50	20. H	24.00	50. VH	28.00	80. VH	30.50
F022	40. L	2.00	86.	4.50	14. L	3.00	10.	5.50	16. VL	1.00	51.	4.00
F024	50.	10.50	90.	8.50	20.	9.00	9.	2.50	30.	13.00	54.	6.00
F025	90. EH	31.00	80. L	2.00	20.	9.00	60. EH	27.00	70. EH	30.00	80. VH	30.50
F026	52.0	17.50	93.8	14.00	23.3	24.00	14.8	20.00	31.2	17.00	64.7	27.00
F031	46.	6.50	88.	6.50	<20.	0.00	<20.	0.00	24.	3.00	58.	15.00
F032	57.19	25.00	102.8	28.00	21.91	20.00	16.3	22.00	39.62 H	26.00	67.72	28.00
F032b	51.56	16.00	94.37	16.00	21.36	17.00	12.56	15.00	37.04	22.00	58.08	16.00
F037	52.62	19.00	101.	25.50	20.94	13.00	10.79	8.00	29.21	10.00	58.4	17.00
F038	50.	10.50	94.	15.00	21.	15.00	12.	10.50	30.	13.00	60.	21.00
F046	51.3	15.00	94.6	17.00	22.0	21.00	12.2	12.00	36.3	21.00	57.1	13.00
F048	53.7	21.00	98.62	22.00	22.56	23.00	13.08	18.00	32.18	19.00	60.68	23.00
F060	60.	26.50	103.	29.00	33. VH	28.00	47. EH	26.00	59. EH	29.00	74. VH	29.00
F094	50.	10.50	90.	8.50	20.	9.00	10.	5.50	30.	13.00	60.	21.00
F096	54.6	22.00	101.	25.50	21.6	18.00	13.4	19.00	32.1	18.00	63.8	26.00
F133	41. L	3.50	77. L	1.00	15.	4.00	9.	2.50	25.	4.00	45. L	1.00
F135	63. H	28.00	108.	30.00	30. H	26.50	18.	23.00	38. H	23.50	55.	7.50
F138	50.2	13.00	92.9	11.00	21.8	19.00	12.8	16.00	32.9	20.00	57.5	14.00
F139	42.6	5.00	88.	6.50	10.2 VL	1.00	<22.	0.00	20.9 L	2.00	45.9 L	2.00
F145	56.	23.00	100.	23.50	20.5	12.00	12.3	13.50	30.3	16.00	55.8	9.00
F147	64. H	29.00	121. EH	32.00	54. EH	29.00	<50.	0.00	<50.	0.00	92. EH	32.00
F153	51.	14.00	93.	12.50	19.	6.00	10.	5.50	28.	8.00	56.	10.50
F154	60.	26.50	100.	23.50	20.	9.00	10.	5.50	30.	13.00	60.	21.00
F155	<50.	0.00	86.	4.50	<50.	0.00	<50.	0.00	<50.	0.00	52.	5.00
MEDIAN	51.5600		94.4850		21.0000		12.3000		30.1500		58.2400	
1CRIT	9.6560		13.9485		6.6000		5.7300		7.5150		10.3240	
N	29		30		27		25		28		30	
MEAN	52.1921		95.2530		21.3137		14.3412		32.9589		59.5560	
3STDEV	20.5813		23.5434		13.4478		22.1681		23.2608		23.1761	

PARAMETER: 13095 Aluminum ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F002	109. H	31.00	180.	27.50	295.	29.00	400.	29.00
F003	90.	14.50	150.	4.50	250.	5.00	340.	6.00
F009	98.	21.50	163.	13.50	273.	18.00	362.	13.50
F010	86.	7.00	159.	8.50	264.	12.50	358.	11.00
F011	69.5 VL	1.00	147.	3.00	241.	3.00	334.	4.00
F012	87.	8.00	166.	16.00	264.	12.50	362.	13.50
F014	89.2	12.00	154.	7.00	263.	11.00	345.	7.50
F015	99.	24.00	168.	17.00	280.	24.00	370.	20.00
F019	110. H	32.00	170.	19.50	290.	27.50	370.	20.00
F022	89.	10.00	169.	18.00	280.	24.00	380.	24.50
F024	98.	21.50	160.	10.50	265.	15.00	365.	17.50
F025	80.	3.50	150.	4.50	310. H	31.00	390.	27.00
F026	98.4	23.00	170.2	21.00	260.3	10.00	334.7	5.00
F031	94.	18.00	171.	22.00	278.	21.00	387.	26.00
F032	107.07 H	30.00	187.8 H	30.00	303. H	30.00	410.2 H	30.00
F032b	96.81	19.00	174.6	26.00	264.19	14.00	358.6	12.00
F037	93.68	17.00	163.	13.50	260.	8.50	363.	15.50
F038	90.	14.50	160.	10.50	280.	24.00	370.	20.00
F046	89.4	13.00	164.	15.00	259.	7.00	365.	17.50
F048	97.66	20.00	171.13	23.00	273.5	19.00	376.9	22.00
F060	104.	29.00	181.	29.00	280.	24.00	363.	15.50
F094	100.	25.50	170.	19.50	260.	8.50	420. H	31.00
F096	102.3	27.00	172.	24.00	276.9	20.00	240. EL	1.00
F133	74. L	2.00	128. EL	1.00	215. EL	2.00	278. EL	2.00
F135	84.	6.00		0.00		0.00		0.00
F138	89.1	11.00	159.	8.50	256.	6.00	345.	7.50
F139	80.5	5.00	151.3	6.00	268.9	16.00	378.2	23.00
F145	88.8	9.00	173.2	25.00	193.2 EL	1.00	298.1 VL	3.00
F147	103.	28.00	194. H	31.00	290.	27.50	394.	28.00
F153	92.	16.00	162.	12.00	270.	17.00	346.	9.00
F154	100.	25.50	180.	27.50	280.	24.00	380.	24.50
F155	80.	3.50	142. L	2.00	249.	4.00	349.	10.00
MEDIAN	92.8400		166.0000		268.9000		363.0000	
1CRIT	13.7840		21.1000		31.3900		40.8000	
N	30		29		29		29	
MEAN	92.9973		165.1114		268.5789		361.1276	
3STDEV	25.2713		32.3034		51.6248		82.0745	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	232.50	23.250	10	H H				AAS
F003	93.00	9.300	10					ICP-OES
F009	179.00	17.900	10	H				ICP-MS
F010	56.50	5.650	10	L VLL L	BIASED LOW*	1.20	-9.3409	ICP-OES
F011	47.00	5.875	8	VL	BIASED LOW	-8.65	-1.7253	ICP-MS
F012	139.50	13.950	10	VL VH				ICP-MS
F014	149.00	14.900	10					ICP-MS
F015	185.00	18.500	10	H				GFAAS, ICP
F019	269.00	26.900	10	VHEHH H VHVHH	BIASED HIGH*	-1.28	16.6377	ICP
F022	96.50	9.650	10	L L VL				ICP-AES
F024	114.00	11.400	10					ICP-AES
F025	195.50	19.550	10	EHL EHEHVH H				ICP-AES
F026	178.50	17.850	10					ICP
F031	118.00	14.750	8					ICP
F032	269.00	26.900	10	H H H H H	BIASED HIGH	12.45	1.0918	ICP-AES
F032b	173.00	17.300	10					ICP-MS
F037	147.00	14.700	10					ICP-MS
F038	154.00	15.400	10					ICP-MS
F046	151.50	15.150	10					ICP-MS
F048	210.00	21.000	10					ICP
F060	265.00	26.500	10	VHEHEHVH	BIASED HIGH	-5.42	20.8322	
F094	152.00	15.200	10	H				ICP-MS
F096	200.50	20.050	10	EL				ICP-MS
F133	23.00	2.300	10	L L L L ELELEL	BIASED LOW	-22.50	0.9131	ICP-MS
F135	144.50	20.643	7	H H H				GFAAS
F138	126.00	12.600	10					ICP-MS
F139	66.50	7.389	9	VL L L				ICP-OES
F145	135.00	13.500	10	ELVL				ICP-AES
F147	236.50	29.562	8	H EHEH EH H	BIASED HIGH*	0.98	23.1228	ICP
F153	110.50	11.050	10					ICP-OES
F154	200.00	20.000	10					ICP-MS
F155	29.00	4.833	6	L	BIASED LOW*	-2.69	-9.5699	ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 15.837

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F133	23.00	2.300	10	LLLLELELEL	BIASED LOW	-22.50	0.9131	ICP-MS
F155	29.00	4.833	6	L	BIASED LOW*	-2.69	-9.5699	ICP
F010	56.50	5.650	10	LVLLL	BIASED LOW*	1.20	-9.3409	ICP-OES
F011	47.00	5.875	8	VL	BIASED LOW	-8.65	-1.7253	ICP-MS
F139	66.50	7.389	9	VLLL				ICP-OES
F003	93.00	9.300	10					ICP-OES
F022	96.50	9.650	10	LLVL				ICP-AES
F153	110.50	11.050	10					ICP-OES
F024	114.00	11.400	10					ICP-AES
F138	126.00	12.600	10					ICP-MS
F145	135.00	13.500	10	ELVL				ICP-AES
F012	139.50	13.950	10	VLVH				ICP-MS
F037	147.00	14.700	10					ICP-MS
F031	118.00	14.750	8					ICP
F014	149.00	14.900	10					ICP-MS
F046	151.50	15.150	10					ICP-MS
F094	152.00	15.200	10	H				ICP-MS
F038	154.00	15.400	10					ICP-MS
F032b	173.00	17.300	10					ICP-MS
F026	178.50	17.850	10					ICP
F009	179.00	17.900	10	H				ICP-MS
F015	185.00	18.500	10	H				GFAAS, ICP
F025	195.50	19.550	10	EHLEHEHVHH				ICP-AES
F154	200.00	20.000	10					ICP-MS
F096	200.50	20.050	10	EL				ICP-MS
F135	144.50	20.643	7	HHH				GFAAS
F048	210.00	21.000	10					ICP
F002	232.50	23.250	10	HH				AAS
F060	265.00	26.500	10	VHEHEHVH	BIASED HIGH	-5.42	20.8322	
F019	269.00	26.900	10	VHEHHHVHVHH	BIASED HIGH*	-1.28	16.6377	ICP
F032	269.00	26.900	10	HHHHH	BIASED HIGH	12.45	1.0918	ICP-AES
F147	236.50	29.562	8	HEHEHEHH	BIASED HIGH*	0.98	23.1228	ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 15.837

PARAMETER: 51095 Antimony ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.5000 BASIC ACCEPTABLE ERROR= 0.5000 CONCENTRATION ERROR INCREMENT= 0.0800

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	1.8	2.00	2.3	2.00	1.1	2.00	<0.2	0.00	0.8	2.00	30.2	7.00
F009	2.	9.50	2.7	9.50	1.3	7.50	<0.5	0.00	0.9	4.50	35.	18.50
F011	2.1	11.00	2.6	6.50	1.3	7.50	0.1	3.50	1.	10.50	32.	8.50
F012	3. VH	18.00	4. VH	18.50	2. H	17.00	<2.	0.00	4. VH	18.00	28. VL	4.00
F014	2.0	9.50	2.7	9.50	1.3	7.50	9.4 VH	7.00	3.6 VH	17.00	32.9	12.00
F015	2.3	15.00	3.1	14.00	1.8	16.00	<1.	0.00	1.6 H	16.00	33.6	15.00
F022	10. EH	20.00	10. EH	20.00	10. EH	20.00	10. VH	8.00	10. EH	19.00	32.	8.50
F025	1.8	2.00	2.7	9.50	1.3	7.50	<0.2	0.00	0.9	4.50	35.0	18.50
F031	4. EH	19.00	4. VH	18.50	4. EH	19.00	<3.	0.00	<3.	0.00	34.	16.00
F032	1.8	2.00	2.5	5.00	1.0	1.00	0.5W	0.00	0.6	1.00	26.4 VL	3.00
F038	1.87	4.00	2.49	4.00	1.31	10.00	0.10	3.50	0.98	9.00	30.1	6.00
F046	1.96	7.00	2.15	1.00	1.22	3.00	<0.2	0.00	0.90	4.50	29.0 L	5.00
F048	2.24	14.00	3.12	15.00	1.51	13.00	<1.0	0.00	1.25	13.00	34.96	17.00
F060	2.2	12.50	3.0	13.00	1.4	11.50	<0.3	0.00	0.9	4.50	32.7	11.00
F094	1.9	5.00	2.8	12.00	1.4	11.50	<0.8	0.00	1.	10.50	35.1	20.00
F096	2.7 H	17.00	3.63 H	17.00	2.08 H	18.00	<1.	0.00	1.47	15.00	37.8 VH	21.00
F133	2.20	12.50	2.40	3.00	1.65	15.00	0.20	5.00	1.05	12.00	22.6 EL	1.00
F138	1.93	6.00	2.70	9.50	1.26	4.50	0.092	2.00	0.952	8.00	33.1	13.00
F139	1.972	8.00	2.60	6.50	1.260	4.50	0.0619	1.00	0.944	7.00	33.26	14.00
F145	2.61	16.00	3.52 H	16.00	1.57	14.00	0.39	6.00	1.29	14.00	32.04	10.00
F153	<8.	0.00	<8.	0.00	<8.	0.00	<8.	0.00	<8.	0.00	24. VL	2.00
F155	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00
MEDIAN	2.0500		2.7000		1.3550		0.1500		1.0000		32.7000	
1CRIT	0.6240		0.6760		0.5684		0.5000		0.5400		3.0760	
N	19		18		18		6		17		19	
MEAN	2.2306		2.9367		1.5978		1.7137		1.3845		31.7558	
3STDEV	1.5760		1.5329		1.9172		10.3170		2.7286		9.0553	

PARAMETER: 51095 Antimony ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F003	56.8	10.00	105.	16.50	126.	10.00	205.	17.00
F009	63. H	18.50	109.	20.00	138.	19.00	216. H	20.00
F011	59.6	14.00	102.	11.50	129.	12.00	198.	10.50
F012	50. VL	3.00	84. VL	2.00	103. VL	2.00	148. EL	2.00
F014	59.4	13.00	104.	14.50	129.	12.00	198.	10.50
F015	55.8	9.00	100.	10.00	131.	16.00	200.	13.00
F022	60.	16.00	104.	14.50	133.	17.00	196.	9.00
F025	63.0 H	18.50	97.0	8.00	150. VH	21.00	210.	19.00
F031	58.	12.00	103.	13.00	129.	12.00	199.	12.00
F032	55.0	8.00	93.5	5.00	118.1 L	5.00	180.7 L	4.00
F038	61.5	17.00	105.	16.50	124.	7.50	188.	6.50
F046	54.0	6.00	95.7	7.00	120.	6.00	188.	6.50
F048	63.28 H	20.00	108.1	19.00	135.4	18.00	208.7	18.00
F060	54.5	7.00	89.4 L	4.00	114. L	3.00	185.	5.00
F094	53.9	5.00	97.1	9.00	124.	7.50	202.	15.50
F096	71.1 VH	22.00	127.4 EH	22.00	162.8 EH	22.00	248.7 EH	22.00
F133	41.0 EL	1.00	67.1 EL	1.00	88.2 EL	1.00	136.2 EL	1.00
F138	57.5	11.00	102.	11.50	125.	9.00	191.	8.00
F139	59.69	15.00	107.3	18.00	130.48	15.00	201.7	14.00
F145	70.16 VH	21.00	113.58 H	21.00	144.38 H	20.00	220.93 H	21.00
F153	47. VL	2.00	88. VL	3.00	118. L	4.00	178. L	3.00
F155	52. L	4.00	94.	6.00	130.	14.00	202.	15.50
MEDIAN	57.7500		102.0000		129.0000		198.5000	
1CRIT	5.0800		8.6200		10.7800		16.3400	
N	20		20		20		20	
MEAN	57.7065		100.0840		127.5680		195.8015	
3STDEV	15.4324		22.3463		30.5835		46.1486	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	68.50	7.611	9					Hydride, ICP-OES
F009	127.00	14.111	9	H H				ICP-MS
F011	95.50	9.550	10					ICP-MS
F012	84.50	9.389	9	VHVHH VHVLVLVLVLEL				ICP-MS
F014	112.50	11.250	10	VHVH				ICP-MS
F015	124.00	13.778	9	H				GFAAS, ICP
F022	152.00	15.200	10	EHEHEHVHEH				ICP-AES
F025	108.50	12.056	9	H VH				HAA
F031	121.50	15.188	8	EHVHEH				ICP
F032	34.00	3.778	9	VL L L	BIASED LOW	-8.49	-0.3037	Hydride gen.
F038	84.00	8.400	10					ICP-MS
F046	46.00	5.111	9	L	BIASED LOW	-5.57	-0.5285	ICP-MS
F048	147.00	16.333	9	H				ICP
F060	71.50	7.944	9	L L				
F094	96.00	10.667	9					ICP-MS
F096	176.00	19.556	9	H H H VHVHEHEHEH	BIASED HIGH	25.52	-0.4324	ICP-MS
F133	52.50	5.250	10	ELELELELEL	BIASED LOW	-32.06	0.4422	ICP-MS
F138	82.50	8.250	10					ICP-MS
F139	103.00	10.300	10					ICP-MS
F145	159.00	15.900	10	H VHH H H				HG AAS
F153	14.00	2.800	5	VLVLVLL L	BIASED LOW	-6.36	-6.3759	ICP-OES
F155	39.50	9.875	4	L	INSUFFICIENT DATA			ICP

OVERALL AVERAGE
RANK IS 10.709

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F153	14.00	2.800	5	VLVLVLLL	BIASED LOW	-6.36	-6.3759	ICP-OES
F032	34.00	3.778	9	VLLL	BIASED LOW	-8.49	-0.3037	Hydride gen.
F046	46.00	5.111	9	L	BIASED LOW	-5.57	-0.5285	ICP-MS
F133	52.50	5.250	10	ELELELELEL	BIASED LOW	-32.06	0.4422	ICP-MS
F003	68.50	7.611	9					Hydride, ICP-OES
F060	71.50	7.944	9	LL				
F138	82.50	8.250	10					ICP-MS
F038	84.00	8.400	10					ICP-MS
F012	84.50	9.389	9	VHVHHVHVLVLVLVLEL				ICP-MS
F011	95.50	9.550	10					ICP-MS
F155	39.50	9.875	4	L	INSUFFICIENT DATA			ICP
F139	103.00	10.300	10					ICP-MS
F094	96.00	10.667	9					ICP-MS
F014	112.50	11.250	10	VHVH				ICP-MS
F025	108.50	12.056	9	HVH				HAA
F015	124.00	13.778	9	H				GFAAS, ICP
F009	127.00	14.111	9	HH				ICP-MS
F031	121.50	15.188	8	EHVHEH				ICP
F022	152.00	15.200	10	EHEHEHVHEH				ICP-AES
F145	159.00	15.900	10	HVHHHH				HG AAS
F048	147.00	16.333	9	H				ICP
F096	176.00	19.556	9	HHHVHVHEHEHEH	BIASED HIGH	25.52	-0.4324	ICP-MS

OVERALL AVERAGE
RANK IS 10.709

PARAMETER: 33095 Arsenic ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.5000 BASIC ACCEPTABLE ERROR= 0.5000 CONCENTRATION ERROR INCREMENT= 0.0800

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	6.9	12.00	8.3	16.00	2.4	14.50	0.8	5.00	2.1	7.00	34.3	19.00
F003	6.4	6.50	7.9	10.00	2.3	9.00	0.7	2.50	1.9	4.00	32.6	9.00
F009	7.2	18.00	8.5	20.00	2.4	14.50	1.2	13.00	2.5	17.50	34.	16.50
F010	8.	24.00	8.5	20.00	2.5	19.50	1.	8.50	2.	5.50	34.	16.50
F011	7.	15.00	7.2	5.00	2.5	19.50	0.9	6.50	2.4	15.50	39.1 VH	26.00
F014	6.9	12.00	8.2	14.00	2.3	9.00	1.6	19.00	2.6	20.00	36.3	21.00
F015	7.3	19.50	8.5	20.00	2.3	9.00	1.2	13.00	2.2	9.00	33.	11.00
F019	10. EH	26.50	9.	23.00	4. VH	24.50	<1.	0.00	<1. EL	0.00	26. VL	2.00
F022	10. EH	26.50	10. VH	27.00	10. EH	26.00	10. EH	22.00	10. EH	23.00	40. VH	27.00
F025	6.4	6.50	7.4	6.00	2.0	4.00	0.7	2.50	1.8	3.00	31.0	7.00
F031	6.	3.00	7. L	3.50	<2.	0.00	<2.	0.00	<2.	0.00	29. VL	3.50
F032	5.1 VL	2.00	5.0 EL	1.00	1.2 VL	1.00	0.4 L	1.00	1.1 EL	1.00	14.4 EL	1.00
F037	8.059 H	25.00	9.25	24.00	2.791	23.00	1.638	20.00	2.982 H	21.00	37.54 H	24.00
F038	7.1	17.00	8.4	17.50	2.4	14.50	1.2	13.00	2.4	15.50	33.9	14.00
F042	7.0	15.00	8.1	13.00	2.0	4.00	2.0W	0.00	2.3	13.00	32.8	10.00
F046	6.86	9.50	8.01	12.00	2.24	7.00	1.20	13.00	2.27	11.00	32.2	8.00
F048	7.89	23.00	9.39 H	26.00	2.60	22.00	1.26	17.00	2.52	19.00	37.67 H	25.00
F060	7.3	19.50	8.4	17.50	2.5	19.50	0.9	6.50	2.3	13.00	35.5	20.00
F094	6.2	4.00	6.8 L	2.00	1.3 VL	2.00	<0.4 L	0.00	1.5 L	2.00	29.5 L	5.00
F096	6.86	9.50	8.25	15.00	2.22	6.00	1.23	16.00	2.3	13.00	33.4	12.00
F133	7.	15.00	8.	11.00	2.	4.00	1.	8.50	2.	5.50	34.	16.50
F135	6.9	12.00	7.8	9.00	2.5	19.50	<2.5	0.00	<2.5	0.00	29. VL	3.50
F138	6.53	8.00	7.44	7.00	2.34	11.00	0.752	4.00	2.11	8.00	33.5	13.00
F139	7.844	22.00	9.30	25.00	2.39	12.00	1.36	18.00	3.11 H	22.00	37.36 H	23.00
F145	6.38	5.00	7.73	8.00	2.45	17.00	1.02	10.00	2.26	10.00	30.25 L	6.00
F153	4. EL	1.00	7. L	3.50	4. VH	24.50	6. EH	21.00	<4.	0.00	34.	16.50
F154	7.5	21.00	8.8	22.00	2.4	14.50	1.2	13.00	2.5	17.50	36.4	22.00
F155	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00
MEDIAN	7.0000		8.2000		2.4000		1.2000		2.3000		33.9000	
1CRIT	1.0200		1.1160		0.6520		0.5560		0.6440		3.1720	
N	24		25		24		20		21		25	
MEAN	6.9426		8.1268		2.4513		1.3430		2.2882		33.4528	
3STDEV	2.0004		2.1274		1.6287		3.2977		1.0708		9.1936	

PARAMETER: 33095 Arsenic ug/L

SAMPLE	7 = TMDA-62		8 = TMDA-63		9 = TMDA-64		10 = TMDA-65	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	51.0	9.00	95.0	10.50	149.	11.00	210.	21.50
F003	50.9	8.00	92.4	9.00	151.	13.00	207.	18.50
F009	52.	13.50	97.	14.00	153.	14.50	204.	16.00
F010	53.	18.50	97.	14.00	156.	17.50	200.	13.50
F011	52.1	16.00	90.3	6.00	142.	7.00	184. L	5.00
F014	53.8	22.00	97.9	16.00	157.	19.00	207.	18.50
F015	52.	13.50	97.	14.00	155.	16.00	210.	21.50
F019	39. EL	2.00	63. EL	2.00	135. L	3.00	180. L	4.00
F022	69. EH	27.00	120. VH	27.00	189. EH	28.00	240. VH	28.00
F025	46.0 L	3.50	100.	20.00	134. L	2.00	144. EL	2.00
F031	47. L	5.00	88. L	4.00	139. L	5.00	186.	6.00
F032	28.6 EL	1.00	53.3 EL	1.00	85.9 EL	1.00	107.7 EL	1.00
F037	57.77 H	24.00	104.2	23.00	164.5	24.50	216.7	25.00
F038	52.0	13.50	95.	10.50	153.	14.50	192.	8.00
F042	51.6	11.00	92.0	8.00	148.	10.00	200.	13.50
F046	49.5	7.00	91.2	7.00	144.	8.00	196.	10.00
F048	58.65 H	26.00	106.8 H	25.00	165.3	26.00	215.9	24.00
F060	53.2	21.00	101.	21.00	160.	21.50	206.	17.00
F094	53.1	20.00	98.2	19.00	156.	17.50	187.	7.00
F096	51.4	10.00	95.2	12.00	149.2	12.00	198.2	12.00
F133	52.	13.50	98.	17.50	158.	20.00	202.	15.00
F135	46. L	3.50	83. VL	3.00	137.8 L	4.00	178.3 L	3.00
F138	49.2	6.00	89.4	5.00	145.	9.00	198.	11.00
F139	58.14 H	25.00	108.49 H	26.00	164.5	24.50	221.0 H	26.00
F145	52.91	17.00	105.6 H	24.00	167.15 H	27.00	226.08 VH	27.00
F153	53.	18.50	98.	17.50	162.	23.00	208.	20.00
F154	55.5	23.00	102.	22.00	160.	21.50	212.	23.00
F155	<100.	0.00	<100.	0.00	141.	6.00	193.	9.00
MEDIAN	52.0000		97.0000		153.0000		201.0000	
1CRIT	4.6200		8.2200		12.7000		16.5400	
N	25		25		26		26	
MEAN	51.6308		95.4276		151.7865		199.3146	
3STDEV	12.2318		26.6509		28.8308		49.1078	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	125.50	12.550	10					Hydride AAS
F003	89.50	8.950	10					Hydride, ICP-OES
F009	157.50	15.750	10					ICP-MS
F010	157.50	15.750	10					Hydride AAS
F011	121.50	12.150	10	VH L				ICP-MS
F014	170.50	17.050	10					ICP-MS
F015	146.50	14.650	10					GFAAS, ICP
F019	87.00	10.875	8	EH VH ELVLELELL L				Hydride AAS
F022	261.50	26.150	10	EHVHEHEHEHVHEHVHEHVH	BIASED HIGH	18.19	4.8477	ICP-AES
F025	56.50	5.650	10	L L EL	BIASED LOW	-21.21	3.3655	HAA
F031	30.00	4.286	7	L VLL L L	BIASED LOW	-7.49	-1.2459	ICP
F032	11.00	1.100	10	VLELVLL ELELELELELELEL	BIASED LOW	-45.45	-0.1684	Hydride gen.
F037	233.50	23.350	10	H H H H	BIASED HIGH	7.40	0.6129	ICP-MS
F038	138.00	13.800	10					ICP-MS
F042	97.50	10.833	9					GFAAS
F046	92.50	9.250	10					ICP-MS
F048	233.00	23.300	10	H H H H	BIASED HIGH	7.66	0.7230	ICP
F060	176.50	17.650	10					
F094	78.50	8.722	9	L VLL L L				ICP-MS
F096	117.50	11.750	10					ICP-MS
F133	126.50	12.650	10					ICP-MS
F135	57.50	7.188	8	VLL VLL L				AAS-HG
F138	82.00	8.200	10					HG AFS
F139	223.50	22.350	10	H H H H H	BIASED HIGH	9.23	0.4000	ICP-MS
F145	151.00	15.100	10	L H H VH				HG AAS
F153	145.50	16.167	9	ELL VHEH				GFAAS ICP-OES
F154	199.50	19.950	10					ICP-MS
F155	15.00	7.500	2		INSUFFICIENT DATA			ICP

OVERALL AVERAGE RANK IS 13.672

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F032	11.00	1.100	10	VLELVLLELELELELELEL	BIASED LOW	-45.45	-0.1684	Hydride gen.
F031	30.00	4.286	7	LVLLLL	BIASED LOW	-7.49	-1.2459	ICP
F025	56.50	5.650	10	LLEL	BIASED LOW	-21.21	3.3655	HAA
F135	57.50	7.188	8	VLLVLLL				AAS-HG
F155	15.00	7.500	2		INSUFFICIENT DATA			ICP
F138	82.00	8.200	10					HG AFS
F094	78.50	8.722	9	LVLLLL				ICP-MS
F003	89.50	8.950	10					Hydride, ICP-OES
F046	92.50	9.250	10					ICP-MS
F042	97.50	10.833	9					GFAAS
F019	87.00	10.875	8	EHVHELVLELELLL				Hydride AAS
F096	117.50	11.750	10					ICP-MS
F011	121.50	12.150	10	VHL				ICP-MS
F002	125.50	12.550	10					Hydride AAS
F133	126.50	12.650	10					ICP-MS
F038	138.00	13.800	10					ICP-MS
F015	146.50	14.650	10					GFAAS, ICP
F145	151.00	15.100	10	LHHVH				HG AAS
F009	157.50	15.750	10					ICP-MS
F010	157.50	15.750	10					Hydride AAS
F153	145.50	16.167	9	ELLVHEH				GFAAS ICP-OES
F014	170.50	17.050	10					ICP-MS
F060	176.50	17.650	10					
F154	199.50	19.950	10					ICP-MS
F139	223.50	22.350	10	HHHHH	BIASED HIGH	9.23	0.4000	ICP-MS
F048	233.00	23.300	10	HHHH	BIASED HIGH	7.66	0.7230	ICP
F037	233.50	23.350	10	HHHH	BIASED HIGH	7.40	0.6129	ICP-MS
F022	261.50	26.150	10	EHVHEHEHEHVHEHVHEHVH	BIASED HIGH	18.19	4.8477	ICP-AES

OVERALL AVERAGE
RANK IS 13.672

PARAMETER: 56095 Barium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.5000 BASIC ACCEPTABLE ERROR= 1.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	5.7	7.00	14.3	10.50	28.4	9.00	10.7	7.50	40.8	5.00	64.5	19.00
F009	5.8	12.00	15.	18.00	29.	13.00	11.	12.50	44.	18.00	64.	17.00
F010	5.7	7.00	14.2	8.50	27.	2.50	11.	12.50	39.8	2.00	59.	1.00
F011	5.7	7.00	14.4	12.00	27.7	4.50	10.5	5.00	41.1	7.00	64.2	18.00
F012	6.	18.50	15.	18.00	28.	7.00	12.	24.00	44.	18.00	63.	11.00
F014	6.0	18.50	15.	18.00	29.	13.00	11.	12.50	44.	18.00	66.	23.50
F015	7.	26.00	16.	25.50	30.	22.00	12.	24.00	45.	23.00	66.	23.50
F019	8. EH	27.00	16.	25.50	32.	27.00	12.	24.00	44.	18.00	62.	8.50
F022	5.	1.00	12. L	2.00	25. EL	1.00	9. EL	1.00	39. L	1.00	63.	11.00
F024	6.	18.50	13.	3.00	29.	13.00	10.	3.50	44.	18.00	65.	20.50
F025	<10.	0.00	10. EL	1.00	30.	22.00	<10.	0.00	40.	3.00	60.	2.50
F031	6.	18.50	14.	5.50	29.	13.00	10.	3.50	41.	6.00	61.	5.50
F032	6.358	24.00	16.13	27.00	33.23 EH	28.00	12.13	26.00	46.53	26.00	68.84 H	28.00
F032b	6.0839	22.00	15.4789	23.00	30.1924	24.00	11.9957	22.00	48.4352 H	28.00	66.9763	27.00
F037	6.862	25.00	15.45	22.00	29.49	19.00	11.43	19.00	43.14	14.00	63.11	13.00
F038	5.74	10.00	14.8	15.00	29.0	13.00	11.0	12.50	43.9	15.00	63.4	15.00
F046	5.57	4.00	14.0	5.50	27.7	4.50	10.6	6.00	41.3	8.00	60.9	4.00
F048	5.55	3.00	14.64	13.00	29.06	16.00	11.09	16.00	45.15	24.00	65.51	22.00
F060	5.7	7.00	14.3	10.50	28.	7.00	10.8	9.00	42.6	11.00	61.5	7.00
F094	5.7	7.00	16.6	28.00	31.1	26.00	11.5	20.00	45.9	25.00	77.4 EH	29.00
F096	5.5	2.00	14.2	8.50	28.5	10.00	10.7	7.50	42.4	10.00	62.	8.50
F133	6.20	23.00	15.65	24.00	29.6	20.00	12.35	27.00	46.8	27.00	66.1	25.00
F138	5.84	14.00	14.9	16.00	29.3	17.00	11.3	18.00	44.5	22.00	63.2	14.00
F139	5.80	12.00	14.77	14.00	29.34	18.00	11.25	17.00	42.71	12.00	63.49	16.00
F145	5.8	12.00	15.4	20.50	27.	2.50	9.3	2.00	40.3	4.00	60.	2.50
F147	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	65.	20.50
F153	6.	18.50	14.	5.50	30.	22.00	11.	12.50	43.	13.00	63.	11.00
F154	5.9	15.00	15.4	20.50	30.4	25.00	11.6	21.00	44.2	21.00	66.2	26.00
F155	6.	18.50	14.	5.50	28.	7.00	11.	12.50	42.	9.00	61.	5.50
MEDIAN	5.8400		14.7850		29.0000		11.0000		43.5200		63.4000	
1CRIT	1.7604		2.2971		3.1500		2.0700		4.0212		5.2140	
N	25		26		26		25		26		27	
MEAN	5.9402		14.6930		29.0686		11.0758		43.1589		63.6639	
3STDEV	1.0631		2.7504		3.5041		2.0435		5.7723		6.5821	

PARAMETER: 56095 Barium ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F003	110.	6.00	187.	5.50	290.	3.00	381. L	2.00
F009	115.	13.00	195.	14.00	304.	14.00	401.	10.00
F010	108.	1.00	180. L	1.50	281. L	1.00	370. L	1.00
F011	116.	15.00	193.	12.50	297.	10.00	395.	8.00
F012	113.	11.00	188.	7.50	293.	5.00	391.	4.00
F014	120.	22.00	203.	23.00	310.	19.00	412.	17.00
F015	121.	26.50	203.	23.00	320.	26.00	424.	25.00
F019	111.	8.00	188.	7.50	296.	8.50	394.	7.00
F022	120.	22.00	205.	26.50	324.	27.00	419.	21.00
F024	120.	22.00	205.	26.50	315.	22.00	420.	22.50
F025	110.	6.00	180. L	1.50	290.	3.00	400.	9.00
F031	114.	12.00	192.	10.50	296.	8.50	409.	16.00
F032	127.05 H	29.00	211.4 H	29.00	332.03 H	29.00	437.8 H	28.00
F032b	124.1298	28.00	207.534	28.00	309.8767	18.00	412.0202	18.00
F037	116.	15.00	192.	10.50	303.	13.00	402.	11.50
F038	118.	19.50	199.	18.00	319.	24.50	422.	24.00
F046	110.	6.00	187.	5.50	294.	6.50	392.	5.00
F048	120.21	24.00	201.4	21.00	316.0	23.00	425.2	26.00
F060	112.	9.00	196.	15.00	306.	16.00	406.	13.00
F094	109.	2.50	185.	3.00	294.	6.50	452. EH	29.00
F096	112.8	10.00	191.1	9.00	298.3	11.00	392.6	6.00
F133	120.5	25.00	204.	25.00	330. H	28.00	420.	22.50
F138	117.	17.00	198.	17.00	305.	15.00	408.	14.00
F139	117.09	18.00	200.84	20.00	306.9	17.00	408.78	15.00
F145	109.7	4.00	196.6	16.00	299.2	12.00	415.1	19.00
F147	118.	19.50	200.	19.00	313.	21.00	416.	20.00
F153	116.	15.00	193.	12.50	311.	20.00	402.	11.50
F154	121.	26.50	203.	23.00	319.	24.50	426.	27.00
F155	109.	2.50	186.	4.00	290.	3.00	385.	3.00
MEDIAN	116.0000		196.0000		305.0000		408.7800	
1CRIT	8.3700		13.1700		19.7100		25.9368	
N	27		26		27		27	
MEAN	115.5715		196.1336		305.5287		408.0185	
3STDEV	13.1434		20.1525		33.3708		41.2773	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	74.50	7.450	10	L				ICP-OES
F009	141.50	14.150	10					ICP-MS
F010	38.00	3.800	10	L L L	BIASED LOW	-9.11	1.1056	ICP-OES
F011	99.00	9.900	10					ICP-MS
F012	124.00	12.400	10					ICP-MS
F014	184.50	18.450	10					ICP-MS
F015	244.50	24.450	10		BIASED HIGH*	3.96	0.3438	ICP
F019	161.00	16.100	10	EH				ICP
F022	113.50	11.350	10	L ELELL				ICP-AES
F024	169.50	16.950	10					ICP-AES
F025	48.00	6.000	8	EL L	BIASED LOW*	-2.81	-2.9297	ICP-AES
F031	99.00	9.900	10					ICP
F032	274.00	27.400	10	EH H H H H H	BIASED HIGH	7.54	0.8191	ICP-AES
F032b	238.00	23.800	10	H	BIASED HIGH*	1.03	2.7162	ICP-MS
F037	162.00	16.200	10					ICP-MS
F038	166.50	16.650	10					ICP-MS
F046	55.00	5.500	10		BIASED LOW*	-3.95	-0.3071	ICP-MS
F048	188.00	18.800	10					ICP
F060	104.50	10.450	10					
F094	176.00	17.600	10	EH EH				ICP-MS
F096	82.50	8.250	10					ICP-AES
F133	246.50	24.650	10	H	BIASED HIGH*	4.39	0.5501	ICP-MS
F138	164.00	16.400	10					ICP-MS
F139	159.00	15.900	10					ICP-MS
F145	94.50	9.450	10					ICP-AES
F147	100.00	20.000	5					ICP
F153	141.50	14.150	10					ICP-OES
F154	229.50	22.950	10		BIASED HIGH*	4.32	-0.2166	ICP-MS
F155	70.50	7.050	10					ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 14.661

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F010	38.00	3.800	10	LLL	BIASED LOW	-9.11	1.1056	ICP-OES
F046	55.00	5.500	10		BIASED LOW*	-3.95	-0.3071	ICP-MS
F025	48.00	6.000	8	ELL	BIASED LOW*	-2.81	-2.9297	ICP-AES
F155	70.50	7.050	10					ICP
F003	74.50	7.450	10	L				ICP-OES
F096	82.50	8.250	10					ICP-AES
F145	94.50	9.450	10					ICP-AES
F031	99.00	9.900	10					ICP
F011	99.00	9.900	10					ICP-MS
F060	104.50	10.450	10					
F022	113.50	11.350	10	LELELL				ICP-AES
F012	124.00	12.400	10					ICP-MS
F009	141.50	14.150	10					ICP-MS
F153	141.50	14.150	10					ICP-OES
F139	159.00	15.900	10					ICP-MS
F019	161.00	16.100	10	EH				ICP
F037	162.00	16.200	10					ICP-MS
F138	164.00	16.400	10					ICP-MS
F038	166.50	16.650	10					ICP-MS
F024	169.50	16.950	10					ICP-AES
F094	176.00	17.600	10	EHEH				ICP-MS
F014	184.50	18.450	10					ICP-MS
F048	188.00	18.800	10					ICP
F147	100.00	20.000	5					ICP
F154	229.50	22.950	10		BIASED HIGH*	4.32	-0.2166	ICP-MS
F032b	238.00	23.800	10	H	BIASED HIGH*	1.03	2.7162	ICP-MS
F015	244.50	24.450	10		BIASED HIGH*	3.96	0.3438	ICP
F133	246.50	24.650	10	H	BIASED HIGH*	4.39	0.5501	ICP-MS
F032	274.00	27.400	10	EHHHHHH	BIASED HIGH	7.54	0.8191	ICP-AES

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 14.661

PARAMETER: 94095 Beryllium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.5000 BASIC ACCEPTABLE ERROR= 0.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	2.67	6.00	1.46	4.00	0.97	6.00	<0.05	0.00	0.61	5.00	33.3	3.00
F009	2.7	8.50	1.6	14.50	0.9	2.50	<0.5	0.00	0.7	11.50	35.	9.00
F010	2.8	13.00	1.6	14.50	0.9	2.50	0.1	3.00	0.5	1.50	35.2	11.50
F011	2.5	4.00	1.5	6.50	1.3	18.00	<0.1	0.00	0.6	3.50	34.6	8.00
F012	2. L	2.50	<2.	0.00	<2.	0.00	3. EH	5.00	2. EH	19.00	33.	2.00
F015	3.	17.00	1. L	2.50	<1.	0.00	<1.	0.00	<1.	0.00	37.	15.50
F019	3.	17.00	<1. L	0.00	1.	9.50	<1.	0.00	1.	16.00	34.	4.00
F022	5. EH	23.00	5. EH	21.00	5. EH	20.00	5. EH	6.00	5. EH	20.00	39. H	20.00
F025	3.6 H	22.00	1.6	14.50	1.1	15.50	0.2	4.00	1.4 H	18.00	39.6 VH	22.00
F032	3.032	20.00	1.723	19.00	1.147	17.00	<0.03	0.00	0.6919	9.00	38.14 H	19.00
F032b	3.0194	19.00	1.5634	10.00	1.0607	14.00	0.0164	2.00	0.6207	6.00	39.179 VH	21.00
F038	2.8	13.00	1.6	14.50	1.0	9.50	<0.5	0.00	0.7	11.50	36.	14.00
F046	2.70	8.50	1.52	9.00	0.96	5.00	<0.2	0.00	0.65	7.00	34.1	5.00
F048	3.26	21.00	2.04	20.00	1.43	19.00	<1.0	0.00	1.03	17.00	40.31 VH	23.00
F060	2.7	8.50	1.5	6.50	1.	9.50	<0.5	0.00	0.6	3.50	35.3	13.00
F094	2.8	13.00	1.6	14.50	1.	9.50	<0.5	0.00	0.7	11.50	37.1	17.00
F096	2.9	15.00	1.66	18.00	1.06	13.00	<1.	0.00	0.71	14.00	34.12	6.00
F133	3.0	17.00	1.5	6.50	1.0	9.50	<0.5	0.00	0.5	1.50	41.0 VH	24.00
F138	2.73	11.00	1.59	11.00	0.921	4.00	0.004	1.00	0.672	8.00	34.2	7.00
F139	1.965 L	1.00	0.623 EL	1.00	0.095 EL	1.00	<0.08	0.00	<0.08 L	0.00	30.53 VL	1.00
F145	2.7	8.50	1.5	6.50	1.	9.50	<0.2	0.00	0.8	15.00	35.2	11.50
F147	<6.	0.00	<6.	0.00	<6.	0.00	<6.	0.00	<6.	0.00	38. H	18.00
F153	2. L	2.50	1. L	2.50	<1.	0.00	<1.	0.00	<1.	0.00	37.	15.50
F155	2.6	5.00	1.6	14.50	1.1	15.50	<0.1	0.00	0.7	11.50	35.1	10.00
MEDIAN	2.8000		1.5900		1.0000		0.1500		0.7000		35.2500	
1CRIT	0.6380		0.5654		0.5300		0.5000		0.5120		2.5850	
N	21		19		18		4		17		22	
MEAN	2.7863		1.5345		1.0472		0.8291		0.8344		36.1113	
3STDEV	1.0457		0.6596		0.3953		-		1.0593		6.3439	

PARAMETER: 94095 Beryllium ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F003	49.5	3.00	102.	16.50	140.	4.00	168. L	3.00
F009	53.	11.50	97.	8.50	149.	15.00	179.	10.50
F010	52.4	8.00	96.8	7.00	147.	10.50	179.	10.50
F011	53.	11.50	99.8	14.00	143.	5.50	175.	6.00
F012	44. EL	1.00	88. VL	1.00	130. VL	2.00	155. VL	1.00
F015	55.	16.50	102.	16.50	156.	18.50	192.	19.00
F019	51.	4.00	93.	4.00	144.	7.00	176.	7.00
F022	58. H	21.00	106. H	21.00	160. H	21.00	193.	20.00
F025	61.3 VH	24.00	113. VH	24.00	120. EL	1.00	199. H	22.00
F032	57.83 H	20.00	105.06	20.00	160.41 H	22.00	194.6 H	21.00
F032b	56.923 H	19.00	98.989	12.00	145.603	9.00	177.575	8.00
F038	54.	15.00	103.	18.50	159. H	20.00	186.	15.50
F046	52.2	7.00	96.3	6.00	147.	10.50	181.	12.00
F048	60.34 VH	23.00	111.8 VH	23.00	164.6 VH	23.00	201.8 VH	23.00
F060	52.6	10.00	98.	11.00	153.	16.00	186.	15.50
F094	53.8	14.00	99.3	13.00	148.	13.00	183.	13.00
F096	52.41	9.00	93.89	5.00	144.09	8.00	174.77	5.00
F133	60.0 VH	22.00	111.0 VH	22.00	175.5 EH	24.00	208. VH	24.00
F138	51.3	5.00	92.0 L	3.00	143.	5.50	172.	4.00
F139	47.69 L	2.00	91.17 L	2.00	132.16 VL	3.00	163.4 VL	2.00
F145	51.9	6.00	101.2	15.00	148.5	14.00	189.7	17.00
F147	55.	16.50	103.	18.50	156.	18.50	191.	18.00
F153	56.	18.00	97.	8.50	154.	17.00	184.	14.00
F155	53.1	13.00	97.1	10.00	147.6	12.00	178.0	9.00
MEDIAN	53.0500		99.1445		147.8000		182.0000	
1CRIT	3.6530		6.4187		9.3380		11.3900	
N	22		22		22		22	
MEAN	53.9542		99.7913		148.7256		182.9020	
3STDEV	9.3844		16.0863		25.5943		28.9886	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	50.50	5.611	9	L	BIASED LOW	-5.81	0.6184	ICP-OES
F009	91.50	10.167	9					ICP-MS
F010	82.00	8.200	10					ICP-OES
F011	77.00	8.556	9					ICP-MS
F012	33.50	4.188	8	L EHEH ELVLVLVL	BIASED LOW	-14.45	1.4217	ICP-MS
F015	105.50	15.071	7	L				ICP
F019	68.50	8.562	8	L				ICP
F022	193.00	19.300	10	EHEHEHEHEHH H H H	BIASED HIGH*	4.55	3.3678	ICP-AES
F025	167.00	16.700	10	H H VHVHVHELH				ICP-MS
F032	167.00	18.556	9	H H H H	BIASED HIGH	7.32	0.1084	ICP-AES
F032b	120.00	12.000	10	VHH				ICP-MS
F038	131.50	14.611	9	H				ICP-MS
F046	70.00	7.778	9					ICP-MS
F048	192.00	21.333	9	VHVHVHVHVH	BIASED HIGH	11.00	0.6316	ICP
F060	93.50	10.389	9					
F094	118.50	13.167	9					ICP-MS
F096	93.00	10.333	9					ICP-AES
F133	150.50	16.722	9	VHVHVHEHVH				ICP-MS
F138	59.50	5.950	10	L				ICP-MS
F139	13.00	1.625	8	L ELEL L VLL L VLVL	BIASED LOW	-9.65	-0.5730	ICP-MS
F145	103.00	11.444	9					ICP-AES
F147	89.50	17.900	5	H				ICP
F153	78.00	11.143	7	L L				ICP-OES
F155	100.50	11.167	9					ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 11.657

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F139	13.00	1.625	8	LELELLVLLLVLVL	BIASED LOW	-9.65	-0.5730	ICP-MS
F012	33.50	4.188	8	LEHEHELVLVLVL	BIASED LOW	-14.45	1.4217	ICP-MS
F003	50.50	5.611	9	L	BIASED LOW	-5.81	0.6184	ICP-OES
F138	59.50	5.950	10	L				ICP-MS
F046	70.00	7.778	9					ICP-MS
F010	82.00	8.200	10					ICP-OES
F011	77.00	8.556	9					ICP-MS
F019	68.50	8.562	8	L				ICP
F009	91.50	10.167	9					ICP-MS
F096	93.00	10.333	9					ICP-AES
F060	93.50	10.389	9					
F153	78.00	11.143	7	LL				ICP-OES
F155	100.50	11.167	9					ICP
F145	103.00	11.444	9					ICP-AES
F032b	120.00	12.000	10	VHH				ICP-MS
F094	118.50	13.167	9					ICP-MS
F038	131.50	14.611	9	H				ICP-MS
F015	105.50	15.071	7	L				ICP
F025	167.00	16.700	10	HHVHVHVHELH				ICP-MS
F133	150.50	16.722	9	VHVHVHEHVH				ICP-MS
F147	89.50	17.900	5	H				ICP
F032	167.00	18.556	9	HHHH	BIASED HIGH	7.32	0.1084	ICP-AES
F022	193.00	19.300	10	EHEHEHEHEHHHHH	BIASED HIGH*	4.55	3.3678	ICP-AES
F048	192.00	21.333	9	VHVHVHVHVH	BIASED HIGH	11.00	0.6316	ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 11.657

PARAMETER: 83095 Bismuth ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.5000 BASIC ACCEPTABLE ERROR= 0.5000 CONCENTRATION ERROR INCREMENT= 0.0800

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F011	4.	4.00	4.4	5.00	0.8	3.00	0.3	3.00	0.7	2.50	27.8	4.00
F038	2.6 VL	2.00	2.8 VL	2.00	<0.5 L	0.00	<0.5	0.00	0.7	2.50	30.	6.00
F060	57. EH	9.00	<7.0	0.00	<7.0	0.00	<7.0	0.00	<7.0	0.00	21. VL	2.00
F094	4.82	6.00	4.01	3.00	1.05	4.00	0.18	2.00	0.75	5.00	25.6	3.00
F096	4.75	5.00	5.	6.00	1.15	5.00	<0.1	0.00	0.77	6.00	33.2 VH	8.00
F133	1.85 VL	1.00	1.90 VL	1.00	0.25 L	1.00	<0.05	0.00	0.60	1.00	9.55 EL	1.00
F139	3.58 L	3.00	4.03	4.00	0.395 L	2.00	0.018	1.00	0.732	4.00	31.00 H	7.00
F145	5.8 H	7.00	6.1 VH	7.00	1.53	6.00	0.37	4.00	1.27 H	7.00	40.17 EH	9.00
F153	12. VH	8.00	11. EH	8.00	5. EH	7.00	8. EH	5.00	6. EH	8.00	28.	5.00
F155	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00
MEDIAN	4.7500		4.2150		1.0500		0.3000		0.7410		28.0000	
1CRIT	0.8400		0.7972		0.5440		0.5000		0.5193		2.7000	
N	7		6		5		3		6		7	
MEAN	5.3643		4.3900		0.9850		0.2833		0.8203		28.0857	
3STDEV	8.6043		3.0245		-		-		0.6080		11.0396	

SAMPLE	7 = TMDA-62		8 = TMDA-63		9 = TMDA-64		10 = TMDA-65	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F011	53.	3.50	93.6	3.00	139.	2.00	177.	4.50
F038	59.	8.00	98.	6.00	152.	9.00	187.	8.00
F060	48. VL	2.00	91.	2.00	140.	3.00	177.	4.50
F094	56.1	6.00	107. H	8.00	150.	8.00	173.	2.00
F096	58.2	7.00	100.3	7.00	141.5	4.00	198.6 H	9.00
F133	15.50 EL	1.00	27.9 EL	1.00	43.2 EL	1.00	38.2 EL	1.00
F139	55.72	5.00	96.40	4.00	149.95	7.00	185.00	6.00
F145	73.3 EH	9.00	113. VH	10.00	184.7 EH	10.00	217.3 EH	10.00
F153	53.	3.50	97.	5.00	149.	6.00	186.	7.00
F155	<100.	0.00	108. H	9.00	147.	5.00	176.	3.00
MEDIAN	55.7200		97.5000		148.0000		181.0000	
1CRIT	4.9176		8.2600		12.3000		14.9400	
N	7		8		8		8	
MEAN	54.7171		98.9125		146.0562		182.4500	
3STDEV	10.4174		16.8226		14.3422		23.5019	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F011	34.50	3.450	10					ICP-MS
F038	43.50	5.438	8	VLVLL				ICP-MS
F060	22.50	3.750	6	EH VLVL				
F094	47.00	4.700	10	H				ICP-MS
F096	57.00	6.333	9	VH H				ICP-MS
F133	9.00	1.000	9	VLVLL ELELELELEL				ICP-MS
F139	43.00	4.300	10	L L H				ICP-MS
F145	79.00	7.900	10	H VH H EHEHVHEHEH				HG AAS
F153	62.50	6.250	10	VHEHEHEHEH				GFAAS
F155	17.00	5.667	3	H				ICP

NOTE: BIAS WAS NOT ASSESSED BECAUSE STATISTICS FOR FEWER THAN 10 LABS WERE AVAILABLE

OVERALL AVERAGE
RANK IS 4.882

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F133	9.00	1.000	9	VLVLLELELELELEL				ICP-MS
F011	34.50	3.450	10					ICP-MS
F060	22.50	3.750	6	EHVLVL				
F139	43.00	4.300	10	LLH				ICP-MS
F094	47.00	4.700	10	H				ICP-MS
F038	43.50	5.438	8	VLVLL				ICP-MS
F155	17.00	5.667	3	H				ICP
F153	62.50	6.250	10	VHEHEHEHEH				GFAAS
F096	57.00	6.333	9	VHH				ICP-MS
F145	79.00	7.900	10	HVHHEHEHVHEHEH				HG AAS

NOTE: BIAS WAS NOT ASSESSED BECAUSE STATISTICS FOR FEWER THAN 10 LABS WERE AVAILABLE

OVERALL AVERAGE
RANK IS 4.882

PARAMETER: 48095 Cadmium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= 1.0000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	8.9	20.00	2.5	13.50	8.0	19.50	<1.0	0.00	5.8	26.50	61.0	25.00
F003	8.2	7.00	2.3	5.50	7.9	15.50	<0.1	0.00	4.9	5.00	53. L	3.00
F009	8.1	6.00	2.4	8.50	7.6	9.00	<0.5	0.00	5.	8.00	55. L	7.00
F010	8.6	12.00	2.8	24.00	7.5	7.00	<0.3	0.00	5.8	26.50	56.	8.00
F011	8.7	14.50	2.5	13.50	7.8	11.00	<0.1	0.00	5.4	14.00	60.	18.50
F012	6. EL	2.00	4. H	29.00	5. EL	1.00	2. H	4.50	8. EH	32.00	52. VL	1.50
F014	8.6	12.00	2.5	13.50	7.9	15.50	<0.1	0.00	5.5	17.50	60.3	21.00
F015	8.3	8.00	2.4	8.50	7.8	11.00	<0.2	0.00	5.6	22.00	62.	28.00
F019	10.	31.50	<4.	0.00	8.	19.50	<4.	0.00	4. L	2.00	60.	18.50
F022	9.	23.00	3.	25.00	7.	3.50	2. H	4.50	5.	8.00	60.	18.50
F024	9.	23.00	<1. EL	0.00	7.	3.50	<1.	0.00	4. L	2.00	59.	14.50
F025	8.9	20.00	2.5	13.50	8.5	28.00	<0.2	0.00	5.6	22.00	60.5	22.50
F026	8.88	18.00	2.24	4.00	8.32	26.00	<2.0	0.00	5.30	13.00	57.3	10.00
F031	9.	23.00	4. H	29.00	8.	19.50	1.	3.00	6.	30.00	52. VL	1.50
F032	9.038	25.00	2.642	21.00	8.79	30.00	<0.6	0.00	5.88	28.00	61.62	26.00
F032b	9.0431	26.00	2.6595	22.00	8.3087	25.00	0.0145	1.00	5.7811	25.00	62.0217	29.00
F037	9.449	29.00	3.309	27.00	8.768	29.00	<1.0	0.00	5.966	29.00	60.88	24.00
F038	8.82	17.00	2.61	20.00	8.15	24.00	<0.05	0.00	5.54	20.00	60.5	22.50
F042	7.64	3.00	2.39	7.00	7.16	6.00	0.5W	0.00	4.98	6.00	54.8 L	6.00
F046	8.31	9.00	2.41	10.00	7.56	8.00	<0.04	0.00	5.12	10.00	58.9	13.00
F048	9.89	30.00	3.17	26.00	9.04	31.00	<1.0	0.00	6.40	31.00	66.36 H	32.00
F060	8.7	14.50	2.5	13.50	7.9	15.50	<0.5	0.00	5.5	17.50	59.3	16.00
F094	8.6	12.00	2.5	13.50	7.9	15.50	<0.1	0.00	5.5	17.50	57.8	11.00
F096	8.57	10.00	2.54	17.00	7.81	13.00	<0.1	0.00	5.44	15.00	58.6	12.00
F133	9.2	28.00	2.7	23.00	8.1	23.00	<0.1	0.00	5.6	22.00	61.9	27.00
F138	5.18 EL	1.00	1.47	1.00	7.80	11.00	0.024	2.00	5.19	11.00	54.7 L	5.00
F139	8.797	16.00	2.602	19.00	8.049	22.00	<2.0	0.00	5.752	24.00	62.60	30.00
F145	8.9	20.00	2.3	5.50	5.1 EL	2.00	<0.8	0.00	5.2	12.00	54.4 L	4.00
F147	10.	31.50	4. H	29.00	10. EH	32.00	<4.	0.00	4. L	2.00	60.	18.50
F153	8.	4.50	2.	3.00	8.	19.50	<1.	0.00	5.	8.00	59.	14.50
F154	9.1	27.00	2.6	18.00	8.4	27.00	<0.2	0.00	5.5	17.50	62.8	31.00
F155	8.0	4.50	1.6	2.00	7.1	5.00	<0.6	0.00	4.6	4.00	56.8	9.00
MEDIAN OR *TARGET CONC.	8.8085		2.5000		7.9000		*0.5000		5.5000		59.6500	
1CRIT	1.4685		1.0900		1.4140		1.0000		1.2700		4.5190	
N	29		29		30		2		31		29	
MEAN	8.6289		2.6784		7.8419		0.5120		5.3177		58.9904	
3STDEV	2.0303		1.6373		2.1152		-		1.7098		8.0003	

PARAMETER: 48095 Cadmium ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F002	92.0	20.50	171.	22.00	253.	18.00	310.	17.50
F003	82. L	3.00	150. VL	3.00	226. VL	2.00	267. VL	2.00
F009	85.	5.50	157. L	5.00	236.	6.00	289. L	9.00
F010	86.	7.00	159.	6.00	238.	7.00	287. L	7.00
F011	90.4	14.00	169.	17.50	245.	10.00	305.	13.50
F012	78. EL	1.50	149. VL	2.00	228. L	3.00	281. L	5.00
F014	91.4	18.00	168.	14.00	251.	15.00	303.	12.00
F015	95.	27.00	175.	27.00	265.	27.00	318.	26.00
F019	92.	20.50	170.	20.50	258.	21.50	313.	20.00
F022	94.	25.00	174.	26.00	261.	24.00	317.	24.00
F024	93.	23.00	170.	20.50	260.	23.00	315.	22.50
F025	97.1	31.00	173.	24.00	250.	12.50	285. L	6.00
F026	85.0	5.50	154.7 L	4.00	231.1 L	5.00	278.1 VL	4.00
F031	78. EL	1.50	140. EL	1.00	203. EL	1.00	242. EL	1.00
F032	95.72	29.00	176.2	29.00	265.9	29.00	320.1	27.00
F032b	97.0813	30.00	173.991	25.00	265.779	28.00	323.4126	28.00
F037	93.78	24.00	168.	14.00	254.5	19.00	310.	17.50
F038	91.9	19.00	169.	17.50	264.	25.50	315.	22.50
F042	84.0 L	4.00	169.	17.50	251.	15.00	341. VH	32.00
F046	90.6	16.00	168.	14.00	251.	15.00	309.	15.50
F048	101.4 VH	32.00	186.5 VH	32.00	273.8 H	32.00	332.8 H	31.00
F060	90.5	15.00	169.	17.50	258.	21.50	313.	20.00
F094	89.	12.50	166.	11.00	250.	12.50	309.	15.50
F096	88.4	11.00	164.9	9.00	243.1	9.00	291.5	10.00
F133	92.1	22.00	175.5	28.00	266.	30.00	313.	20.00
F138	86.1	8.00	161.	7.00	229. L	4.00	272. VL	3.00
F139	94.76	26.00	180.96 H	31.00	266.20	31.00	325.08	30.00
F145	86.9	9.00	171.3	23.00	252.	17.00	317.5	25.00
F147	91.	17.00	167.	12.00	249.	11.00	299.	11.00
F153	89.	12.50	165.	10.00	257.	20.00	305.	13.50
F154	95.7	28.00	177.	30.00	264.	25.50	325.	29.00
F155	87.5	10.00	162.3	8.00	242.6	8.00	288.4 L	8.00
MEDIAN OR *TARGET CONC.	90.8000		169.0000		251.5000		309.5000	
1CRIT	6.3880		11.0800		16.0300		19.5100	
N	29		30		30		30	
MEAN	90.5842		167.4617		251.0393		304.5631	
3STDEV	12.0026		22.6526		36.1904		50.1730	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	182.50	20.278	9					AAS
F003	46.00	5.111	9	L L VLVLVL	BIASED LOW	-12.47	1.0031	ICP-OES
F009	64.00	7.111	9	L L L	BIASED LOW	-6.49	-0.1445	ICP-MS
F010	104.50	11.611	9	L				ICP-OES
F011	126.50	14.056	9					ICP-MS
F012	81.50	8.150	10	ELH ELH EHVLELVLL L				ICP-MS
F014	138.50	15.389	9					ICP-MS
F015	184.50	20.500	9					GFAAS, ICP
F019	154.00	19.250	8	L				ICP
F022	181.50	18.150	10	H				ICP-AES
F024	132.00	16.500	8	EL L				ICP-AES
F025	179.50	19.944	9	L				ICP-MS
F026	89.50	9.944	9	L L VL				ICP
F031	110.50	11.050	10	H VLELELELEL				ICP
F032	244.00	27.111	9		BIASED HIGH*	4.24	0.2652	ICP-AES
F032b	239.00	23.900	10					ICP-MS
F037	212.50	23.611	9					ICP-MS
F038	188.00	20.889	9					ICP-MS
F042	96.50	10.722	9	L L VH				GFAAS
F046	110.50	12.278	9					ICP-MS
F048	277.00	30.778	9	H VHVHH H	BIASED HIGH	8.01	1.2979	ICP
F060	151.00	16.778	9					
F094	121.00	13.444	9					ICP-MS
F096	106.00	11.778	9					ICP-MS
F133	223.00	24.778	9					ICP-MS
F138	53.00	5.300	10	EL L L VL	BIASED LOW	-10.04	0.7275	ICP-MS
F139	229.00	25.444	9	H	BIASED HIGH	5.61	-0.1231	ICP-MS
F145	117.50	13.056	9	EL L				ICP-AES
F147	164.00	18.222	9	H EH L				ICP
F153	105.50	11.722	9					ICP-OES
F154	233.00	25.889	9		BIASED HIGH*	4.99	-0.0215	ICP-MS
F155	58.50	6.500	9	L	BIASED LOW	-5.29	0.1776	ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 16.165

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	46.00	5.111	9	LLVLVLVL	BIASED LOW	-12.47	1.0031	ICP-OES
F138	53.00	5.300	10	ELLLVL	BIASED LOW	-10.04	0.7275	ICP-MS
F155	58.50	6.500	9	L	BIASED LOW	-5.29	0.1776	ICP
F009	64.00	7.111	9	LLL	BIASED LOW	-6.49	-0.1445	ICP-MS
F012	81.50	8.150	10	ELHELHEHVLELVLLL				ICP-MS
F026	89.50	9.944	9	LLVL				ICP
F042	96.50	10.722	9	LLVH				GFAAS
F031	110.50	11.050	10	HVLELELELEL				ICP
F010	104.50	11.611	9	L				ICP-OES
F153	105.50	11.722	9					ICP-OES
F096	106.00	11.778	9					ICP-MS
F046	110.50	12.278	9					ICP-MS
F145	117.50	13.056	9	ELL				ICP-AES
F094	121.00	13.444	9					ICP-MS
F011	126.50	14.056	9					ICP-MS
F014	138.50	15.389	9					ICP-MS
F024	132.00	16.500	8	ELL				ICP-AES
F060	151.00	16.778	9					
F022	181.50	18.150	10	H				ICP-AES
F147	164.00	18.222	9	HEHL				ICP
F019	154.00	19.250	8	L				ICP
F025	179.50	19.944	9	L				ICP-MS
F002	182.50	20.278	9					AAS
F015	184.50	20.500	9					GFAAS, ICP
F038	188.00	20.889	9					ICP-MS
F037	212.50	23.611	9					ICP-MS
F032b	239.00	23.900	10					ICP-MS
F133	223.00	24.778	9					ICP-MS
F139	229.00	25.444	9	H	BIASED HIGH	5.61	-0.1231	ICP-MS
F154	233.00	25.889	9		BIASED HIGH*	4.99	-0.0215	ICP-MS
F032	244.00	27.111	9		BIASED HIGH*	4.24	0.2652	ICP-AES
F048	277.00	30.778	9	HVHVHHH	BIASED HIGH	8.01	1.2979	ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 16.165

PARAMETER: 24095 Chromium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.5000 BASIC ACCEPTABLE ERROR= 1.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	7.3	11.50	6.3	14.00	22.0	15.50	<0.2	0.00	14.2	11.00	72.	24.00
F009	6.5	6.00	5.9	8.00	20.	3.50	<0.5	0.00	14.	7.00	60. VL	1.00
F010	5.4 L	3.00	3.8 VL	3.00	20.	3.50	<1.	0.00	12. L	2.50	64.	5.00
F011	7.3	11.50	6.	10.50	21.2	8.00	<0.2	0.00	14.2	11.00	66.6	11.00
F012	7.	8.00	5.	5.50	20.	3.50	3. VH	5.00	14.	7.00	63. L	3.00
F014	8.2	25.50	7.0	24.00	23.0	24.00	<0.5	0.00	14.8	14.00	70.8	20.00
F015	7.6	16.00	6.6	17.00	20.	3.50	<0.5	0.00	15.	16.00	69.	15.50
F019	<6.	0.00	<6.	0.00	22.	15.50	<6.	0.00	12. L	2.50	65.	7.50
F022	6.	4.00	6.	10.50	22.	15.50	5. EH	6.00	14.	7.00	69.	15.50
F024	7.	8.00	4. L	4.00	22.	15.50	<1.	0.00	15.	16.00	70.	18.00
F025	8.	22.00	7.	24.00	22.	15.50	<1.	0.00	16.	23.50	76. H	30.00
F031	8.	22.00	6.	10.50	22.	15.50	<1.	0.00	15.	16.00	67.	13.00
F032	7.644	17.00	6.927	20.00	26.66 EH	30.00	<1.0	0.00	15.98	22.00	73.	25.50
F032b	7.4728	14.00	6.5958	16.00	24.0482	28.00	0.0844	2.00	15.8684	21.00	71.1591	23.00
F037	6.265	5.00	5.395	7.00	20.7	6.00	<1.0	0.00	13.1	4.00	64.29	6.00
F038	7.4	13.00	6.5	15.00	22.9	23.00	<0.5	0.00	15.4	18.00	71.	21.00
F042	8.28	27.00	7.32	28.00	23.2	26.00	0.00	1.00	18.8 VH	30.00	65.7	9.00
F046	7.19	10.00	6.17	13.00	21.8	10.00	<0.2	0.00	14.2	11.00	63.4 L	4.00
F048	7.74	18.50	6.69	18.00	23.10	25.00	<1.0	0.00	15.68	19.00	68.84	14.00
F060	8.3	28.00	7.1	27.00	24.9 H	29.00	<0.8	0.00	17.2	28.00	74.5	28.00
F094	2.7 EL	1.00	2. EL	1.00	18.7 L	1.00	<0.4	0.00	10.5 VL	1.00	62.4 L	2.00
F096	8.4	29.00	6.8	19.00	22.3	21.00	<2.	0.00	16.8	26.00	71.1	22.00
F133	7.5	15.00	6.0	10.50	24.0	27.00	<0.5	0.00	17.5 H	29.00	75.5 H	29.00
F135	8.	22.00	7.	24.00	22.	15.50	<2.	0.00	17.	27.00		0.00
F138	7.74	18.50	6.94	21.00	22.4	22.00	0.442	3.00	16.5	25.00	70.6	19.00
F139	<11.	0.00	<11.	0.00	21.68	9.00	<11.	0.00	14.32	13.00	69.7	17.00
F145	4. EL	2.00	3.5 VL	2.00	21.	7.00	0.8	4.00	15.8	20.00	66.8	12.00
F147	8.2	25.50	9.8 EH	29.00	26.7 EH	31.00	<5.	0.00	20.5 EH	31.00	74.	27.00
F153	7.	8.00	5.	5.50	22.	15.50	<2.	0.00	14.	7.00	65.	7.50
F154	8.	22.00	7.	24.00	22.	15.50	<1.	0.00	16.	23.50	73.	25.50
F155	8.	22.00	7.	24.00	22.	15.50	<1.	0.00	14.	7.00	66.	10.00
MEDIAN	7.5000		6.5000		22.0000		0.6210		15.0000		69.0000	
1CRIT	1.8600		1.8000		2.7300		1.5000		2.3100		5.5500	
N	27		27		29		4		29		28	
MEAN	7.2975		6.1310		22.1686		1.0816		15.1155		68.6567	
3STDEV	2.8803		3.1036		4.3752		-		4.6155		11.0549	

PARAMETER: 24095 Chromium ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F003	90.	11.00	174.	7.00	283.	7.00	381.	4.50
F009	82. VL	1.00	156. EL	1.00	265. VL	1.00	357. VL	1.00
F010	88.	3.50	174.	7.00	286.	8.50	390.	8.00
F011	90.4	13.00	177.	12.00	278.	3.00	381.	4.50
F012	87.	2.00	165. L	2.00	286.	8.50	382.	6.00
F014	93.4	15.00	177.	12.00	298.	18.00	410.	17.50
F015	99.	24.00	188.	23.00	298.	18.00	421.	25.00
F019	88.	3.50	174.	7.00	290.	11.00	396.	9.50
F022	96.	21.50	196. H	29.00	308.	25.00	417.	24.00
F024	96.	21.50	185.	18.00	305.	23.00	415.	22.00
F025	108. EH	30.00	178.	14.50	289.	10.00	398.	11.50
F031	90.	11.00	173.	4.00	281.	4.50	396.	9.50
F032	100.45	27.00	192.3 H	26.00	315.2 H	27.00	426.7	27.00
F032b	99.4922	25.00	195.3395 H	28.00	296.5007	16.00	411.189	19.00
F037	89.32	9.00	169.	3.00	270. L	2.00	384.	7.00
F038	95.	18.50	187.	21.00	311.	26.00	423.	26.00
F042	88.3	5.50	174.	7.00	281.	4.50	364. VL	2.00
F046	89.0	8.00	174.	7.00	300.	20.00	413.	20.00
F048	93.38	14.00	178.31	16.00	293.0	13.00	400.2	13.00
F060	101. H	28.50	197. VH	30.00	329. VH	30.00	448. VH	30.00
F094	88.3	5.50	177.	12.00	294.	15.00	398.	11.50
F096	96.6	23.00	186.8	20.00	305.3	24.00	413.6	21.00
F133	100.0	26.00	191.0 H	25.00	327. VH	29.00	434. H	28.50
F135		0.00		0.00		0.00		0.00
F138	95.8	20.00	189.	24.00	303.	22.00	409.	16.00
F139	94.3	17.00	180.5	17.00	292.	12.00	402.8	15.00
F145	88.7	7.00	187.2	22.00	293.1	14.00	415.4	23.00
F147	93.8	16.00	186.	19.00	302.	21.00	410.	17.50
F153	95.	18.50	178.	14.50	298.	18.00	401.	14.00
F154	101. H	28.50	195. H	27.00	319. H	28.00	434. H	28.50
F155	90.	11.00	175.	10.00	282.	6.00	378. L	3.00
MEDIAN	93.6000		178.1550		295.2504		405.9000	
1CRIT	7.0260		12.0993		19.1250		25.7640	
N	28		28		28		28	
MEAN	93.4729		181.3018		295.8607		403.7461	
3STDEV	13.4850		24.9227		38.6405		51.7867	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	105.50	11.722	9					ICP-OES
F009	29.50	3.278	9	VLVLELVLVL	BIASED LOW	-11.58	0.0078	ICP-MS
F010	44.00	4.889	9	L VL L	BIASED LOW*	-2.95	-1.9369	ICP-OES
F011	84.50	9.389	9					ICP-MS
F012	50.50	5.050	10	VH L L	BIASED LOW	-5.13	-0.5442	ICP-MS
F014	170.00	18.889	9					ICP-MS
F015	158.00	17.556	9					GFAAS, ICP
F019	56.50	8.071	7	L				ICP
F022	158.00	15.800	10	EH H				ICP-AES
F024	146.00	16.222	9	L				ICP-AES
F025	181.00	20.111	9	H EH				ICP-MS
F031	106.00	11.778	9					ICP
F032	221.50	24.611	9	EH H H	BIASED HIGH	5.54	1.2700	ICP-AES
F032b	192.00	19.200	10	H				ICP-MS
F037	49.00	5.444	9	L	BIASED LOW	-6.15	-0.3966	ICP-MS
F038	181.50	20.167	9					ICP-MS
F042	140.00	14.000	10	VH VL				GFAAS
F046	103.00	11.444	9	L				ICP-MS
F048	150.50	16.722	9					ICP
F060	258.50	28.722	9	H H VHVHVH	BIASED HIGH	10.73	-0.3524	
F094	50.00	5.556	9	ELELL VLL	BIASED LOW*	-0.10	-4.2458	ICP-MS
F096	205.00	22.778	9					ICP-AES
F133	219.00	24.333	9	H H H VHH	BIASED HIGH	8.06	0.1728	ICP-MS
F135	88.50	22.125	4		INSUFFICIENT DATA			GFAAS
F138	190.50	19.050	10					ICP-MS
F139	100.00	14.286	7					ICP-OES
F145	113.00	11.300	10	ELVL				ICP-AES
F147	217.00	24.111	9	EHEH EH	BIASED HIGH*	0.61	3.4943	ICP
F153	108.50	12.056	9					ICP-OES
F154	222.50	24.722	9	H H H H	BIASED HIGH	7.53	-0.0186	ICP-MS
F155	108.50	12.056	9	L				ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 15.246

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F009	29.50	3.278	9	VLVLELVLVL	BIASED LOW	-11.58	0.0078	ICP-MS
F010	44.00	4.889	9	LVLL	BIASED LOW*	-2.95	-1.9369	ICP-OES
F012	50.50	5.050	10	VHLL	BIASED LOW	-5.13	-0.5442	ICP-MS
F037	49.00	5.444	9	L	BIASED LOW	-6.15	-0.3966	ICP-MS
F094	50.00	5.556	9	ELELLVLL	BIASED LOW*	-0.10	-4.2458	ICP-MS
F019	56.50	8.071	7	L				ICP
F011	84.50	9.389	9					ICP-MS
F145	113.00	11.300	10	ELVL				ICP-AES
F046	103.00	11.444	9	L				ICP-MS
F003	105.50	11.722	9					ICP-OES
F031	106.00	11.778	9					ICP
F153	108.50	12.056	9					ICP-OES
F155	108.50	12.056	9	L				ICP
F042	140.00	14.000	10	VHVL				GFAAS
F139	100.00	14.286	7					ICP-OES
F022	158.00	15.800	10	EHH				ICP-AES
F024	146.00	16.222	9	L				ICP-AES
F048	150.50	16.722	9					ICP
F015	158.00	17.556	9					GFAAS, ICP
F014	170.00	18.889	9					ICP-MS
F138	190.50	19.050	10					ICP-MS
F032b	192.00	19.200	10	H				ICP-MS
F025	181.00	20.111	9	HEH				ICP-MS
F038	181.50	20.167	9					ICP-MS
F135	88.50	22.125	4		INSUFFICIENT DATA			GFAAS
F096	205.00	22.778	9					ICP-AES
F147	217.00	24.111	9	EHEHEH	BIASED HIGH*	0.61	3.4943	ICP
F133	219.00	24.333	9	HHHVHH	BIASED HIGH	8.06	0.1728	ICP-MS
F032	221.50	24.611	9	EHHH	BIASED HIGH	5.54	1.2700	ICP-AES
F154	222.50	24.722	9	HHHH	BIASED HIGH	7.53	-0.0186	ICP-MS
F060	258.50	28.722	9	HHVHVHVH	BIASED HIGH	10.73	-0.3524	

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 15.246

PARAMETER: 27095 Cobalt ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.5000 BASIC ACCEPTABLE ERROR= 1.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	12.7	6.50	7.3	10.50	16.1	16.50	<0.1	0.00	9.7	4.00	60.	4.50
F009	11.	1.00	7.	7.50	14.	2.50	<1.	0.00	9.	2.50	55. VL	2.50
F010	13.4	16.00	8.1	20.00	15.4	9.00	0.3	4.00	11.	18.00	61.2	8.00
F011	12.7	6.50	7.3	10.50	15.2	7.00	<0.1	0.00	10.	8.50	61.7	10.00
F012	12.	3.50	6.	1.50	12. EL	1.00	<2.	0.00	10.	8.50	55. VL	2.50
F015	15.	26.00	7.	7.50	16.	14.50	<5.	0.00	9.	2.50	66.	20.00
F019	12.	3.50	7.	7.50	14.	2.50	<5.	0.00	10.	8.50	60.	4.50
F022	13.	12.50	8.	18.00	15.	5.50	5. EH	5.00	10.	8.50	65.	19.00
F024	13.	12.50	6.	1.50	15.	5.50	<1.	0.00	10.	8.50	64.	16.00
F025	14.1	22.00	8.1	20.00	15.8	12.50	<0.3	0.00	10.7	14.00	66.5	22.00
F032	14.95	25.00	8.182	24.00	18.39 H	26.00	<2.3	0.00	11.71	23.00	67.51	24.00
F032b	13.8946	18.00	8.1239	22.00	16.8217	23.00	0.0216	2.00	11.781	24.00	66.391	21.00
F038	13.2	15.00	7.6	14.00	16.1	16.50	<0.1	0.00	10.5	12.00	64.2	18.00
F046	12.9	9.00	7.35	12.00	15.7	11.00	<0.2	0.00	9.93	5.00	60.5	6.00
F048	13.94	20.00	8.13	23.00	16.80	21.00	<1.0	0.00	11.11	21.00	64.10	17.00
F060	14.6	24.00	8.7	25.00	17.6	25.00	<0.7	0.00	12.4	25.00	68.	25.00
F094	14.1	22.00	7.4	13.00	16.8	21.00	<0.1	0.00	11.5	22.00	54.5 VL	1.00
F096	12.4	5.00	6.9	5.00	14.5	4.00	<3.	0.00	8.4 L	1.00	61.5	9.00
F133	12.90	9.00	7.70	17.00	16.20	18.50	0.02	1.00	10.96	16.00	60.64	7.00
F138	13.5	17.00	7.65	16.00	15.8	12.50	0.070	3.00	11.1	20.00	63.2	14.00
F139	13.00	12.50	7.603	15.00	15.62	10.00	<5.	0.00	10.88	15.00	63.37	15.00
F145	11.8	2.00	6.4	3.00	16.2	18.50	<0.5	0.00	11.	18.00	62.8	12.00
F147	13.9	19.00	10.4 EH	26.00	17.3	24.00	<5.	0.00	13. H	26.00	69.1 H	26.00
F153	13.	12.50	7.	7.50	16.	14.50	<1.	0.00	10.	8.50	63.	13.00
F154	14.1	22.00	8.1	20.00	16.8	21.00	<0.2	0.00	11.0	18.00	66.7	23.00
F155	12.9	9.00	6.8	4.00	15.3	8.00	<0.6	0.00	10.6	13.00	61.8	11.00
MEDIAN	13.0000		7.5000		15.9000		0.0700		10.6500		63.1000	
1CRIT	2.1900		1.8600		2.3640		1.5000		2.0490		5.1960	
N	24		23		24		3		24		24	
MEAN	13.2494		7.5408		15.8351		0.1305		10.5780		62.8380	
3STDEV	2.4073		1.6830		2.7622		-		2.4815		9.9774	

PARAMETER: 27095 Cobalt ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F003	94.	3.00	183.	3.00	256.	3.00	361. L	4.00
F009	86. EL	1.50	165. EL	1.00	241. VL	2.00	341. VL	2.00
F010	97.	5.00	186.	4.50	260.	4.50	368.	6.00
F011	99.6	12.00	186.	4.50	260.	4.50	365.	5.00
F012	86. EL	1.50	170. VL	2.00	239. VL	1.00	349. VL	3.00
F015	104.	20.00	202.	19.50	287.	20.50	399.	20.00
F019	98.	8.50	190.	9.00	269.	7.00	384.	9.00
F022	100.	14.00	194.	12.00	281.	19.00	394.	17.00
F024	100.	14.00	200.	17.00	280.	17.50	400.	21.00
F025	99.2	11.00	202.	19.50	349. EH	26.00	391.	15.00
F032	108.88 H	26.00	209.73 H	26.00	296.29 H	24.00	416.9 H	24.00
F032b	105.4359	22.00	202.1393	21.00	273.627	14.00	387.292	13.00
F038	100.	14.00	196.	16.00	279.	16.00	398.	19.00
F046	97.9	7.00	189.	7.00	273.	12.00	396.	18.00
F048	101.5	18.00	194.1	13.00	272.0	10.00	390.1	14.00
F060	107.	24.00	209. H	24.50	299. H	25.00	426. VH	26.00
F094	107.	24.00	203.	22.00	287.	20.50	328. EL	1.00
F096	99.	10.00	190.3	10.00	273.	12.00	385.7	11.00
F133	96.62	4.00	186.9	6.00	280.	17.50	392.	16.00
F138	101.	16.50	195.	14.00	273.	12.00	385.	10.00
F139	102.08	19.00	195.7	15.00	262.89	6.00	373.29	7.00
F145	97.2	6.00	201.2	18.00	270.9	9.00	401.7	22.00
F147	105.	21.00	205.	23.00	294. H	23.00	414. H	23.00
F153	101.	16.50	191.	11.00	278.	15.00	386.	12.00
F154	107.	24.00	209. H	24.50	292. H	22.00	417. H	25.00
F155	98.0	8.50	189.1	8.00	269.5	8.00	380.2	8.00
MEDIAN	100.0000		194.5500		273.3135		388.6960	
1CRIT	7.4100		13.0830		17.8088		24.7318	
N	23		24		24		24	
MEAN	100.7624		194.5600		275.3003		386.4659	
3STDEV	10.6752		26.6758		40.1364		57.0444	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	55.00	6.111	9	L	BIASED LOW	-7.00	0.8603	ICP-OES
F009	22.50	2.500	9	VLELELVLVL	BIASED LOW	-12.38	-0.6305	ICP-MS
F010	95.00	9.500	10					ICP-OES
F011	68.50	7.611	9					ICP-MS
F012	24.50	2.722	9	EL VLELVLVLVL	BIASED LOW	-10.84	-1.3426	ICP-MS
F015	150.50	16.722	9					ICP
F019	60.00	6.667	9					ICP
F022	130.50	13.050	10	EH				ICP-AES
F024	113.50	12.611	9					ICP-AES
F025	162.00	18.000	9	EH				ICP-MS
F032	222.00	24.667	9	H H H H H	BIASED HIGH	7.43	0.7359	ICP-AES
F032b	180.00	18.000	10					ICP-MS
F038	140.50	15.611	9					FAES
F046	87.00	9.667	9					ICP-MS
F048	157.00	17.444	9					ICP
F060	223.50	24.833	9	H H VH	BIASED HIGH	9.28	-0.3791	
F094	146.50	16.278	9	VL EL				ICP-MS
F096	67.00	7.444	9	L				ICP-AES
F133	112.00	11.200	10					ICP-MS
F138	135.00	13.500	10					ICP-MS
F139	114.50	12.722	9					ICP-MS
F145	108.50	12.056	9					ICP-AES
F147	211.00	23.444	9	EH H H H H	BIASED HIGH	6.32	0.8405	ICP
F153	110.50	12.278	9					ICP-OES
F154	199.50	22.167	9	H H H	BIASED HIGH	7.24	-0.2546	ICP-MS
F155	77.50	8.611	9					ICP

OVERALL AVERAGE
RANK IS 13.280

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F009	22.50	2.500	9	VLELELVLVL	BIASED LOW	-12.38	-0.6305	ICP-MS
F012	24.50	2.722	9	ELVLELVLVLVL	BIASED LOW	-10.84	-1.3426	ICP-MS
F003	55.00	6.111	9	L	BIASED LOW	-7.00	0.8603	ICP-OES
F019	60.00	6.667	9					ICP
F096	67.00	7.444	9	L				ICP-AES
F011	68.50	7.611	9					ICP-MS
F155	77.50	8.611	9					ICP
F010	95.00	9.500	10					ICP-OES
F046	87.00	9.667	9					ICP-MS
F133	112.00	11.200	10					ICP-MS
F145	108.50	12.056	9					ICP-AES
F153	110.50	12.278	9					ICP-OES
F024	113.50	12.611	9					ICP-AES
F139	114.50	12.722	9					ICP-MS
F022	130.50	13.050	10	EH				ICP-AES
F138	135.00	13.500	10					ICP-MS
F038	140.50	15.611	9					FAES
F094	146.50	16.278	9	VLEL				ICP-MS
F015	150.50	16.722	9					ICP
F048	157.00	17.444	9					ICP
F032b	180.00	18.000	10					ICP-MS
F025	162.00	18.000	9	EH				ICP-MS
F154	199.50	22.167	9	HHH	BIASED HIGH	7.24	-0.2546	ICP-MS
F147	211.00	23.444	9	EHHHHH	BIASED HIGH	6.32	0.8405	ICP
F032	222.00	24.667	9	HHHHH	BIASED HIGH	7.43	0.7359	ICP-AES
F060	223.50	24.833	9	HHVH	BIASED HIGH	9.28	-0.3791	

OVERALL AVERAGE RANK IS 13.280

Cobalt

PARAMETER: 29095 Copper ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.5000 BASIC ACCEPTABLE ERROR= 1.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	13.7	31.00	10.0	21.50	23.5	20.00	33.0	28.00	63.0	20.50	70.0	15.50
F003	12.6	22.00	9.5	13.00	22.6	15.00	28.9	6.00	58.1	6.00	73.0	30.50
F009	11.	8.50	9.	8.00	21.	3.50	28. L	3.00	56. L	3.00	62. L	2.50
F010	11.9	12.00	9.4	12.00	22.	7.50	30.	8.50	60.	11.50	67.	9.00
F011	11.9	12.00	9.3	9.00	22.	7.50	28.8	5.00	64.	25.50	69.6	14.00
F012	8. VL	2.00	10.	21.50	22.	7.50	35. H	31.50	59.	8.50	68.	12.00
F014	12.8	24.00	10.3	26.50	26.4 H	33.00	32.8	26.00	62.5	17.00	72.8	28.00
F015	12.3	18.00	9.6	14.50	22.	7.50	30.	8.50	64.	25.50	72.	24.50
F019	10. L	5.00	8.	4.00	24.	26.50	30.	8.50	60.	11.50	66.	7.00
F022	10. L	5.00	10.	21.50	23.	16.50	30.	8.50	66.	30.00	78. H	32.00
F024	13.	28.00	8.	4.00	22.	7.50	32.	22.00	65.	28.00	72.	24.50
F025	9. L	3.00	8.	4.00	19. L	2.00	28. L	3.00	54. VL	1.00	70.	15.50
F026	12.4	19.50	10.6	29.00	23.6	21.50	32.0	22.00	56.4 L	4.00	65.9	6.00
F031	14.	32.50	13. EH	33.00	26. H	32.00	37. EH	33.00	74. EH	32.00	64. L	4.00
F032	10.05 L	7.00	8.938	7.00	23.1	18.50	31.75	20.00	62.97	18.00	65.01	5.00
F032b	12.8204	25.00	10.3375	28.00	24.553	29.00	33.8688	29.00	63.5475	23.00	70.8546	20.00
F037	11.99	14.00	9.36	11.00	22.35	12.00	31.65	18.00	65.27	29.00	70.15	17.00
F038	12.1	16.00	9.7	16.00	23.1	18.50	30.9	12.50	59.1	10.00	70.6	18.00
F042	11.9	12.00	10.0	21.50	22.1	11.00	30.1	11.00	58.5	7.00	66.9	8.00
F046	12.7	23.00	9.92	19.00	23.6	21.50	32.0	22.00	59.0	8.50	69.4	13.00
F048	12.01	15.00	9.31	10.00	23.61	23.00	31.10	16.00	60.59	13.00	71.10	22.00
F060	13.	28.00	11.	31.00	23.	16.50	34.	30.00	67.	31.00	73.	30.50
F094	11.3	10.00	9.8	17.00	23.7	24.00	31.3	17.00	63.6	24.00	67.7	11.00
F096	13.	28.00	10.2	25.00	24.7	30.00	32.6	25.00	63.	20.50	72.	24.50
F133	12.2	17.00	9.6	14.50	22.4	13.00	30.9	12.50	61.8	14.00	67.1	10.00
F135	14.	32.50	11.	31.00	25.	31.00	35. H	31.50	87. EH	33.00	79. VH	33.00
F138	12.4	19.50	9.88	18.00	22.5	14.00	32.3	24.00	62.2	15.00	70.7	19.00
F139	12.55	21.00	10.12	24.00	23.74	25.00	31.73	19.00	64.55	27.00	72.97	29.00
F145	6. EL	1.00	7.8 L	1.00	14.7 EL	1.00	20.2 EL	1.00	54.9 L	2.00	55.6 EL	1.00
F147	13.	28.00	11.	31.00	24.	26.50	31.	14.50	63.	20.50	71.	21.00
F153	11.	8.50	8.	4.00	22.	7.50	31.	14.50	63.	20.50	72.	24.50
F154	13.0	28.00	10.3	26.50	24.4	28.00	32.9	27.00	62.4	16.00	72.6	27.00
F155	10. L	5.00	8.	4.00	21.	3.50	28. L	3.00	57. L	5.00	62. L	2.50
MEDIAN	12.2000		9.8000		23.0000		31.3000		62.5000		70.1500	
1CRIT	2.1420		1.9980		2.7900		3.2880		5.1600		5.6190	
N	30		31		31		31		31		31	
MEAN	11.7873		9.6182		22.9533		31.3096		61.9170		69.5285	
3STDEV	3.9792		2.6272		4.0536		5.5750		11.2506		10.4606	

PARAMETER: 29095 Copper ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F002	109.	22.00	199.	22.00	297.	21.00	395.	22.50
F003	103.	7.50	190.	11.00	284.	10.50	369.	8.00
F009	95. VL	3.00	173. VL	2.00	268. L	3.00	353. L	3.00
F010	102.	6.00	190.	11.00	282.	9.00	374.	11.50
F011	106.	14.50	194.	15.50	286.	12.50	376.	13.00
F012	108.	19.50	184.	5.00	287.	14.00	374.	11.50
F014	110.	25.50	201.	24.50	303.	25.00	389.	17.50
F015	113.	29.00	209.	29.50	311.	29.00	419. H	32.50
F019	104.	10.50	196.	17.50	294.	19.00	390.	19.00
F022	115. H	32.50	210. H	31.00	319. H	33.00	394.	21.00
F024	115. H	32.50	205.	28.00	305.	27.50	405.	30.00
F025	106.	14.50	190.	11.00	284.	10.50	385.	16.00
F026	97.3 L	4.00	174.3 VL	3.00	259.2 VL	2.00	323.2 EL	2.00
F031	88. EL	2.00	162. EL	1.00	228. EL	1.00	298. EL	1.00
F032	99.92	5.00	184.43	6.00	273.9 L	4.00	364.2 L	6.00
F032b	107.068	18.00	196.564	19.00	281.82	8.00	367.5437	7.00
F037	109.	22.00	193.	13.50	288.	15.00	379.	14.00
F038	108.	19.50	201.	24.50	305.	27.50	403.	28.00
F042	103.	7.50	186.	7.00	280.	7.00	371.	10.00
F046	106.	14.50	199.	22.00	298.	22.00	395.	22.50
F048	109.2	24.00	198.6	20.00	300.3	23.00	402.1	27.00
F060	111.	28.00	211. H	32.00	317. H	32.00	419. H	32.50
F094	104.	10.50	188.	8.50	286.	12.50	357. L	4.00
F096	110.3	27.00	204.5	27.00	304.9	26.00	404.2	29.00
F133	103.5	9.00	188.0	8.50	289.	16.00	360. L	5.00
F135	105.	12.00	193.	13.50	293.	17.50	392.	20.00
F138	107.	17.00	196.	17.50	293.	17.50	389.	17.50
F139	113.4	30.00	209.0	29.50	295.2	20.00	397.40	24.00
F145	87.5 EL	1.00	183.9	4.00	275.7	5.00	384.3	15.00
F147	109.	22.00	202.	26.00	301.	24.00	401.	26.00
F153	110.	25.50	199.	22.00	313. H	31.00	400.	25.00
F154	114.	31.00	212. H	33.00	312. H	30.00	418. H	31.00
F155	106.	14.50	194.	15.50	279.	6.00	370.	9.00
MEDIAN	107.0000		196.0000		293.0000		389.0000	
1CRIT	7.8300		13.1700		18.9900		24.7500	
N	30		31		31		30	
MEAN	105.8896		194.9127		291.8071		382.7314	
3STDEV	16.4057		28.4197		40.6464		58.3989	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	224.00	22.400	10					AAS
F003	129.50	12.950	10					ICP-OES
F009	39.50	3.950	10	L L L VLVLL L	BIASED LOW	-9.15	-0.8706	ICP-MS
F010	98.00	9.800	10					ICP-OES
F011	128.50	12.850	10					ICP-MS
F012	133.00	13.300	10	VL H				ICP-MS
F014	247.00	24.700	10	H				ICP-MS
F015	218.50	21.850	10	H				GFAAS, ICP
F019	128.50	12.850	10	L				ICP
F022	231.00	23.100	10	L H H H H				ICP-AES
F024	232.00	23.200	10	H				ICP-AES
F025	80.50	8.050	10	L L L VL				ICP-AES
F026	113.00	11.300	10	L L VLVLEL				ICP
F031	171.50	17.150	10	EHH EHEHL ELELELEL				ICP
F032	96.50	9.650	10	L L L				ICP-AES
F032b	206.00	20.600	10					ICP-MS
F037	165.50	16.550	10					ICP-MS
F038	190.50	19.050	10					ICP-MS
F042	102.00	10.200	10					GFAAS
F046	188.00	18.800	10					ICP-MS
F048	193.00	19.300	10					ICP
F060	291.50	29.150	10	H H H	BIASED HIGH	8.06	-1.1217	
F094	138.50	13.850	10	L				ICP-MS
F096	262.00	26.200	10		BIASED HIGH*	4.03	-0.2647	ICP-AES
F133	119.50	11.950	10	L				ICP-MS
F135	255.00	25.500	10	H EHVH				GFAAS AAS-FL
F138	179.00	17.900	10					ICP-MS
F139	248.50	24.850	10					ICP-MS
F145	32.00	3.200	10	ELL ELELL ELEL	BIASED LOW*	-0.74	-9.4533	ICP-AES
F147	239.50	23.950	10					ICP
F153	183.00	18.300	10	H				ICP-OES
F154	277.50	27.750	10	H H H	BIASED HIGH	7.56	-1.2626	ICP-MS
F155	68.00	6.800	10	L L L L	BIASED LOW*	-3.91	-1.2267	ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 17.000

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F145	32.00	3.200	10	ELLELELLELEL	BIASED LOW*	-0.74	-9.4533	ICP-AES
F009	39.50	3.950	10	LLLVLVLLL	BIASED LOW	-9.15	-0.8706	ICP-MS
F155	68.00	6.800	10	LLLL	BIASED LOW*	-3.91	-1.2267	ICP
F025	80.50	8.050	10	LLLVL				ICP-AES
F032	96.50	9.650	10	LLL				ICP-AES
F010	98.00	9.800	10					ICP-OES
F042	102.00	10.200	10					GFAAS
F026	113.00	11.300	10	LLVLVLEL				ICP
F133	119.50	11.950	10	L				ICP-MS
F011	128.50	12.850	10					ICP-MS
F019	128.50	12.850	10	L				ICP
F003	129.50	12.950	10					ICP-OES
F012	133.00	13.300	10	VLH				ICP-MS
F094	138.50	13.850	10	L				ICP-MS
F037	165.50	16.550	10					ICP-MS
F031	171.50	17.150	10	EHHEHEHLELELELEL				ICP
F138	179.00	17.900	10					ICP-MS
F153	183.00	18.300	10	H				ICP-OES
F046	188.00	18.800	10					ICP-MS
F038	190.50	19.050	10					ICP-MS
F048	193.00	19.300	10					ICP
F032b	206.00	20.600	10					ICP-MS
F015	218.50	21.850	10	H				GFAAS, ICP
F002	224.00	22.400	10					AAS
F022	231.00	23.100	10	LHHHH				ICP-AES
F024	232.00	23.200	10	H				ICP-AES
F147	239.50	23.950	10					ICP
F014	247.00	24.700	10	H				ICP-MS
F139	248.50	24.850	10					ICP-MS
F135	255.00	25.500	10	HEHVH				GFAAS AAS-FL
F096	262.00	26.200	10		BIASED HIGH*	4.03	-0.2647	ICP-AES
F154	277.50	27.750	10	HHH	BIASED HIGH	7.56	-1.2626	ICP-MS
F060	291.50	29.150	10	HHH	BIASED HIGH	8.06	-1.1217	

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 17.000

PARAMETER: 26095 Iron ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 2.0000 BASIC ACCEPTABLE ERROR= 2.0000 CONCENTRATION ERROR INCREMENT= 0.0800

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	18.7	16.00	12.9	13.00	23.8	13.50	8.8	7.50	142.	22.00	80.0	6.50
F003	17.7	10.00	12.6	12.00	23.5	12.00	8.8	7.50	128.	6.00	92.	25.50
F010	17.2	9.00	12.5	11.00	22.9	9.00	8.9	9.00	131.	9.00	78.	5.00
F011	<20.	0.00	<20.	0.00	20. L	5.00	<20.	0.00	140.	18.50	90.	22.50
F012	13. VL	3.00	7. VL	2.00	13. VL	1.00	8.	3.50	144.	23.00	84.	14.00
F014	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	136.	13.00	80.	6.50
F015	16.	6.00	12.	7.00	21.	7.00	8.	3.50	136.	13.00	83.	12.00
F019	24. VH	21.00	13.	14.00	25.	16.00	17. VH	16.00	146.	25.50	92.	25.50
F022	17.	8.00	12.	7.00	22.	8.00	8.	3.50	116. VL	3.00	88.	19.00
F024	18.	12.50	11.	5.00	24.	15.00	8.	3.50	140.	18.50	83.	12.00
F025	<10. VL	0.00	<10.	0.00	<10. EL	0.00	<10.	0.00	60. EL	1.00	10. EL	1.00
F026	11.2 VL	1.00	7.1 VL	3.00	20.9	6.00	<5.0 VL	0.00	110.3 VL	2.00	81.4	8.00
F031	15.	4.00	10.	4.00	23.	10.50	7. L	1.00	126.	5.00	76.	4.00
F032	18.31	14.00	13.76	16.00	27.44	20.00	9.125	10.00	148.58	27.00	86.98	17.00
F032b	20.6125	19.00	15.8898 H	18.00	29.6856 VH	22.00	12.853 H	14.00	145.3262	24.00	88.9638	20.00
F037	18.54	15.00	14.35	17.00	17.23 VL	3.00	27.43 VH	18.00	139.	16.00	85.6	16.00
F038	<30.	0.00	<30.	0.00	<30.	0.00	<30.	0.00	140.	18.50	90.	22.50
F046	19.1	18.00	16.4 H	20.00	23.8	13.50	<10.	0.00	136.	13.00	85.1	15.00
F048	<100.	0.00	<100.	0.00	<100.	0.00	<1.0 VL	0.00	129.4	8.00	<1.0 EL	0.00
F060	18.	12.50	12.	7.00	23.	10.50	10.	11.00	138.	15.00	82.	10.00
F094	50. EH	24.00	20. VH	22.00	40. EH	25.00	90. EH	21.00	210. EH	30.00	90.	22.50
F096	16.3	7.00	12.2	9.00	28.6 H	21.00	8.2	6.00	141.2	21.00	81.7	9.00
F133	40. EH	23.00	30. EH	23.50	30. VH	23.50	80. EH	20.00	170. VH	28.50	110. EH	27.50
F135	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	135.	10.50	<100.	0.00
F138	17.8	11.00	13.4	15.00	27.2	19.00	11.0	13.00	135.	10.50	83.0	12.00
F145	15.9	5.00	12.4	10.00	19.3 L	4.00	10.4	12.00	129.	7.00	74.5 L	2.00
F147	23. VH	20.00	18. VH	21.00	27.	17.50	13. H	15.00	140.	18.50	87.	18.00
F153	12. VL	2.00	5. VL	1.00	14. VL	2.00	<5. VL	0.00	125. L	4.00	75. L	3.00
F154	30. VH	22.00	30. EH	23.50	30. VH	23.50	50. VH	19.00	170. VH	28.50	110. EH	27.50
F155	19.	17.00	16. H	19.00	27.	17.50	25. VH	17.00	146.	25.50	90.	22.50
MEDIAN	18.0000		12.7500		23.8000		10.0000		138.5000		84.5500	
1CRIT	3.2800		2.8600		3.7440		2.6400		12.9200		8.6040	
N	22		21		23		19		28		25	
MEAN	19.3256		13.0714		23.9285		17.5004		137.9574		84.2897	
3STDEV	17.4381		9.1087		12.1381		53.5389		37.2595		15.3500	

PARAMETER: 26095 Iron ug/L

SAMPLE	7 = TMDA-62		8 = TMDA-63		9 = TMDA-64		10 = TMDA-65	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	121.	16.50	205.	13.00	313.	9.00	410.	10.00
F003	118.	11.00	202.	9.50	312.	8.00	404.	9.00
F010	114.	5.00	197.	6.00	303.	5.00	397.	6.00
F011	130.	23.50	210.	17.00	320.	15.00	420.	16.50
F012	119.	12.50	215.	22.50	357. H	28.00	470. H	29.00
F014	117.	9.50	192.	3.50	311.	7.00	390.	4.00
F015	120.	14.50	213.	20.50	329.	21.50	430.	22.50
F019	137. H	27.00	210.	17.00	329.	21.50	418.	15.00
F022	130.	23.50	225.	25.50	350. H	27.00	450.	27.00
F024	125.	20.00	215.	22.50	325.	17.00	435.	24.00
F025	40. EL	1.00	130. EL	1.00	240. EL	1.00	350. EL	1.00
F026	115.8	6.00	191.9	2.00	298.4	3.00	373.3 L	2.00
F031	111.	3.00	192.	3.50	298.	2.00	402.	8.00
F032	129.71	22.00	220.9	24.00	343.5	25.00	449.3	26.00
F032b	132.8012 H	25.00	229.562 H	27.00	345.7037	26.00	450.151	28.00
F037	126.	21.00	202.	9.50	315.	10.00	423.	20.00
F038	120.	14.50	210.	17.00	330.	23.00	390.	4.00
F046	116.	7.00	201.	8.00	316.	11.50	415.	13.00
F048	116.6	8.00	203.9	11.50	319.3	14.00	437.0	25.00
F060	119.	12.50	207.	14.00	326.	19.50	430.	22.50
F094	190. EH	30.00	280. EH	30.00	360. H	29.00	420.	16.50
F096	122.2	18.00	212.1	19.00	325.5	18.00	428.4	21.00
F133	140. VH	28.00	250. VH	28.00	340.	24.00	390.	4.00
F135	113.	4.00	193.	5.00	302.	4.00	399.	7.00
F138	123.	19.00	208.	15.00	316.	11.50	414.	11.50
F145	110.8	2.00	203.9	11.50	308.3	6.00	422.1	19.00
F147	121.	16.50	213.	20.50	319.	13.00	422.	18.00
F153	117.	9.50	200.	7.00	324.	16.00	417.	14.00
F154	160. EH	29.00	270. EH	29.00	390. EH	30.00	500. EH	30.00
F155	136. H	26.00	225.	25.50	326.	19.50	414.	11.50
MEDIAN	120.5000		209.0000		322.0000		419.0000	
1CRIT	11.4800		18.5600		27.6000		35.3600	
N	28		28		28		28	
MEAN	123.6040		211.3308		323.6323		418.5804	
3STDEV	31.2397		50.8025		49.0039		63.5246	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	127.00	12.700	10					AAS
F003	110.50	11.050	10					ICP-OES
F010	74.00	7.400	10					ICP-OES
F011	118.00	16.857	7	L				AAS
F012	138.50	13.850	10	VLVLVL H H				ICP-MS
F014	43.50	7.250	6					ICP-MS
F015	127.50	12.750	10					ICP
F019	198.50	19.850	10	VH VH H				ICP
F022	151.50	15.150	10	VL H				ICP-AES
F024	150.00	15.000	10					ICP-AES
F025	6.00	1.000	6	VL EL ELELELELELEL	BIASED LOW*	1.46	-80.3966	ICP-AES
F026	33.00	3.667	9	VLVL VLVL L	BIASED LOW	-9.01	-1.8105	ICP
F031	45.00	4.500	10	L	BIASED LOW*	-4.89	-3.1747	ICP
F032	201.00	20.100	10					ICP-AES
F032b	223.00	22.300	10	H VHH H H	BIASED HIGH	7.00	1.8402	ICP-MS
F037	145.50	14.550	10	VLVH				ICP-MS
F038	99.50	16.583	6					ICP-MS
F046	119.00	13.222	9	H				ICP-MS
F048	66.50	13.300	5	VL EL				ICP
F060	134.50	13.450	10					
F094	250.00	25.000	10	EHVHEHEHEH EHEHH	BIASED HIGH*	-2.85	43.0559	ICP-MS
F096	149.00	14.900	10	H				ICP-AES
F133	230.00	23.000	10	EHEHVHEHVHEHVHVH	BIASED HIGH	-9.75	35.4292	ICP-MS
F135	30.50	6.100	5					AAS FL
F138	137.50	13.750	10					COLORMETRIC
F145	78.50	7.850	10	L L				ICP-AES
F147	178.00	17.800	10	VHVH H				ICP
F153	58.50	6.500	9	VLVLVLVLL L	BIASED LOW*	1.99	-9.5445	ICP-OES
F154	262.00	26.200	10	VHEHVHVHVHEHEHEHEHEH	BIASED HIGH	16.05	16.3866	ICP-MS
F155	201.00	20.100	10	H VH H				ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 14.290

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F025	6.00	1.000	6	VLELELELELELELEL	BIASED LOW*	1.46	-80.3966	ICP-AES
F026	33.00	3.667	9	VLVLVLVLL	BIASED LOW	-9.01	-1.8105	ICP
F031	45.00	4.500	10	L	BIASED LOW*	-4.89	-3.1747	ICP
F135	30.50	6.100	5					AAS FL
F153	58.50	6.500	9	VLVLVLVLLL	BIASED LOW*	1.99	-9.5445	ICP-OES
F014	43.50	7.250	6					ICP-MS
F010	74.00	7.400	10					ICP-OES
F145	78.50	7.850	10	LL				ICP-AES
F003	110.50	11.050	10					ICP-OES
F002	127.00	12.700	10					AAS
F015	127.50	12.750	10					ICP
F046	119.00	13.222	9	H				ICP-MS
F048	66.50	13.300	5	VLEL				ICP
F060	134.50	13.450	10					
F138	137.50	13.750	10					COLORMETRIC
F012	138.50	13.850	10	VLVLVLHH				ICP-MS
F037	145.50	14.550	10	VLVH				ICP-MS
F096	149.00	14.900	10	H				ICP-AES
F024	150.00	15.000	10					ICP-AES
F022	151.50	15.150	10	VLH				ICP-AES
F038	99.50	16.583	6					ICP-MS
F011	118.00	16.857	7	L				AAS
F147	178.00	17.800	10	VHVHH				ICP
F019	198.50	19.850	10	VHVHH				ICP
F032	201.00	20.100	10					ICP-AES
F155	201.00	20.100	10	HVHH				ICP
F032b	223.00	22.300	10	HVHHHH	BIASED HIGH	7.00	1.8402	ICP-MS
F133	230.00	23.000	10	EHEHVHEHVHEHVHVH	BIASED HIGH	-9.75	35.4292	ICP-MS
F094	250.00	25.000	10	EHVHEHEHEHEHEHH	BIASED HIGH*	-2.85	43.0559	ICP-MS
F154	262.00	26.200	10	VHEHVHVHVHEHEHEHEHEH	BIASED HIGH	16.05	16.3866	ICP-MS

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 14.290

PARAMETER: 82095 Lead ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.5000 BASIC ACCEPTABLE ERROR= 1.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	14.8	3.00	4.0	19.50	26.9	14.00	<2.0	0.00	25.0	13.00	64.0	8.50
F003	14.0	1.50	3.7	6.50	25.8	6.00	<0.2	0.00	22.7	1.00	60.	2.50
F009	16.	17.50	3.9	15.50	26.	9.00	<0.5	0.00	26.	20.50	70.	28.50
F010	16.3	21.00	4.2	23.50	27.8	19.50	<0.3	0.00	27.	27.50	60.	2.50
F011	15.	6.50	3.8	11.00	25.3	5.00	0.2	6.50	23.6	3.50	64.5	11.00
F012	15.	6.50	4.	19.50	26.	9.00	2. H	8.00	24.	7.00	63.	5.50
F014	15.8	14.00	3.9	15.50	26.5	11.00	<1.0	0.00	24.9	12.00	68.1	25.00
F015	16.5	23.00	4.2	23.50	28.8	24.00	<0.5	0.00	28.2	31.00	66.9	22.00
F019	<30.	0.00	<30.	0.00	33. EH	32.00	<30.	0.00	<30.	0.00	72. H	31.00
F022	14.	1.50	6. EH	26.00	29.	26.50	5. EH	9.00	24.	7.00	65.	14.00
F024	15.	6.50	3.	1.00	24. L	1.50	<2.	0.00	24.	7.00	66.	19.00
F025	17.9	28.00	3.9	15.50	27.9	21.00	<0.3	0.00	26.5	25.50	71.4 H	30.00
F026	<20.	0.00	<20.	0.00	27.8	19.50	<20.	0.00	24.0	7.00	66.1	20.00
F031	17.	25.50	4.	19.50	29.	26.50	<1.	0.00	26.	20.50	70.	28.50
F032	16.94	24.00	<11.	0.00	29.09	29.00	<11.	0.00	27.07	29.00	68.61	26.00
F032b	15.446	10.00	3.7739	9.00	27.4441	17.00	0.129	4.00	26.3752	24.00	63.17	7.00
F037	14.93	4.00	4.084	22.00	25.86	7.00	<1.0	0.00	22.72	2.00	62.46	4.00
F038	15.3	9.00	3.66	4.00	26.8	13.00	0.17	5.00	24.6	10.00	65.5	17.00
F042	17.4	27.00	3.67	5.00	25.0	4.00	2.00W	0.00	26.5	25.50	65.0	14.00
F046	15.7	11.00	3.76	8.00	27.2	16.00	<0.2	0.00	24.7	11.00	65.1	16.00
F048	15.80	14.00	3.79	10.00	27.50	18.00	<1.0	0.00	25.54	16.00	65.96	18.00
F060	17.	25.50	5. EH	25.00	29.	26.50	<2.0	0.00	27.	27.50	69.	27.00
F094	16.	17.50	3.1	2.50	24.6	3.00	0.1	2.00	23.6	3.50	56.8 EL	1.00
F096	15.75	12.00	3.82	12.00	27.1	15.00	<1.	0.00	25.2	15.00	65.	14.00
F133	16.	17.50	4.	19.50	24. L	1.50	<2.	0.00	26.	20.50	64.	8.50
F135	21. EH	29.00	<10.	0.00	29.	26.50	<10.	0.00	26.	20.50		0.00
F138	15.8	14.00	3.70	6.50	26.6	12.00	0.004	1.00	25.6	17.00	64.4	10.00
F139	16.07	20.00	3.88	13.00	28.05	23.00	0.110	3.00	25.14	14.00	64.60	12.00
F145	16.4	22.00	3.1	2.50	30.1	31.00	<2.0	0.00	32.3 EH	32.00	66.3	21.00
F147	<25.	0.00	<25.	0.00	30.	30.00	<25.	0.00	26.	20.50	73. H	32.00
F153	15.	6.50	<12.	0.00	26.	9.00	<12.	0.00	24.	7.00	63.	5.50
F154	16.0	17.50	3.9	15.50	28.0	22.00	0.2	6.50	26.0	20.50	67.6	23.00
F155	<20.	0.00	<20.	0.00	38. EH	33.00	<20.	0.00	28.	30.00	68.	24.00
MEDIAN	15.8000		3.8900		27.4441		0.1700		25.5700		65.3000	
1CRIT	2.3580		1.6434		3.0566		1.5000		2.9442		5.3280	
N	26		24		30		7		30		30	
MEAN	15.9552		3.8682		27.5715		0.4156		25.4415		65.8233	
3STDEV	2.3943		1.0561		5.2525		1.9438		3.9934		8.7167	

PARAMETER: 82095 Lead ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F002	102.	22.00	209.	16.00	309.	25.00	439.	25.00
F003	89. EL	1.00	187. VL	1.00	269. VL	1.00	382. VL	2.00
F009	101.	19.00	212.	19.50	302.	19.50	434.	21.00
F010	95.	3.50	202.	8.00	291.	8.50	420.	11.50
F011	98.6	11.00	205.	11.50	291.	8.50	416.	10.00
F012	95.	3.50	196.	5.00	272. L	3.00	401.	5.00
F014	104.	27.00	214.	21.50	306.	23.00	453. H	28.00
F015	100.	15.00	210.	17.50	300.	14.00	430.	18.00
F019	98.	9.50	216.	27.00	304.	21.00	424.	15.00
F022	99.	12.00	206.	13.00	295.	11.00	420.	11.50
F024	100.	15.00	215.	24.50	305.	22.00	440.	26.50
F025	95.5	5.00	192. L	2.00	331. VH	32.00	391. L	4.00
F026	96.8	6.00	198.8	6.00	285.9	5.00	369.1 VL	1.00
F031	104.	27.00	215.	24.50	310.	26.50	440.	26.50
F032	108.6 H	32.00	224.89 H	32.00	325.16 H	31.00	457.21 H	30.00
F032b	104.17	29.00	194.166 L	4.00	271.94 L	2.00	382.68 VL	3.00
F037	97.49	8.00	201.	7.00	290.6	7.00	423.2	14.00
F038	103.	24.50	214.	21.50	316.	28.00	438.	24.00
F042	92.6 L	2.00	193. L	3.00	275. L	4.00	406.	6.00
F046	100.	15.00	208.	15.00	301.	17.50	436.	22.00
F048	101.01	21.00	212.0	19.50	300.2	16.00	437.0	23.00
F060	106.	30.50	223.	31.00	324. H	30.00	468. VH	31.00
F094	101.	19.00	215.	24.50	299.	12.00	410.	8.50
F096	100.3	17.00	203.	9.00	286.5	6.00	407.8	7.00
F133	98.	9.50	204.	10.00	300.	14.00	410.	8.50
F135		0.00		0.00		0.00		0.00
F138	99.9	13.00	210.	17.50	301.	17.50	431.	19.00
F139	97.434	7.00	207.09	14.00	293.5	10.00		0.00
F145	102.3	23.00	222.7	30.00	308.	24.00	453.1 H	29.00
F147	103.	24.50	222.	29.00	317.	29.00	426.	16.50
F153	101.	19.00	205.	11.50	302.	19.50	421.	13.00
F154	104.	27.00	217.	28.00	310.	26.50	433.	20.00
F155	106.	30.50	215.	24.50	300.	14.00	426.	16.50
MEDIAN	100.1500		209.5000		300.6000		426.0000	
1CRIT	7.4190		13.9800		19.4460		26.9700	
N	30		30		30		29	
MEAN	100.2035		208.5585		299.7267		423.7238	
3STDEV	9.8985		25.2861		39.0360		57.0370	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	146.00	16.222	9					AAS
F003	22.50	2.500	9	ELVLVLVL	BIASED LOW	-10.52	0.2726	ICP-OES
F009	170.00	18.889	9					ICP-MS
F010	125.50	13.944	9					GFAAS,ICP-OES
F011	84.50	8.450	10					ICP-MS
F012	72.00	7.200	10	H L	BIASED LOW	-7.15	0.7568	ICP-MS
F014	177.00	19.667	9	H				ICP-MS
F015	188.00	20.889	9					GFAAS, ICP
F019	135.50	22.583	6	EH H				ICP
F022	131.50	13.150	10	EH EH				ICP-AES
F024	123.00	13.667	9	L				ICP-AES
F025	163.00	18.111	9	H L VHL				ICP-MS
F026	64.50	9.214	7	VL				ICP
F031	225.00	25.000	9		BIASED HIGH*	3.02	0.5863	GFAAS
F032	233.00	29.125	8	H H H H	BIASED HIGH	7.67	-0.3214	ICP-AES
F032b	109.00	10.900	10	L L VL				ICP-MS
F037	75.00	8.333	9					ICP-MS
F038	156.00	15.600	10					ICP-MS
F042	90.50	10.056	9	L L L				GFAAS
F046	131.50	14.611	9					ICP-MS
F048	155.50	17.278	9					ICP
F060	254.00	28.222	9	EH H VH	BIASED HIGH	9.22	-1.6110	
F094	93.50	9.350	10	EL				ICP-MS
F096	107.00	11.889	9					ICP-MS
F133	109.50	12.167	9	L				ICP-MS
F135	76.00	25.333	3	EH	INSUFFICIENT DATA			GFAAS
F138	127.50	12.750	10					ICP-MS
F139	116.00	12.889	9					ICP-MS
F145	214.50	23.833	9	EH H				ICP-AES
F147	181.50	25.929	7	H	BIASED HIGH*	1.01	4.4027	ICP
F153	91.00	11.375	8					ICP-OES
F154	206.50	20.650	10					ICP-MS
F155	172.50	24.643	7	EH				ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 15.722

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	22.50	2.500	9	ELVLVLVL	BIASED LOW	-10.52	0.2726	ICP-OES
F012	72.00	7.200	10	HL	BIASED LOW	-7.15	0.7568	ICP-MS
F037	75.00	8.333	9					ICP-MS
F011	84.50	8.450	10					ICP-MS
F026	64.50	9.214	7	VL				ICP
F094	93.50	9.350	10	EL				ICP-MS
F042	90.50	10.056	9	LLL				GFAAS
F032b	109.00	10.900	10	LLVL				ICP-MS
F153	91.00	11.375	8					ICP-OES
F096	107.00	11.889	9					ICP-MS
F133	109.50	12.167	9	L				ICP-MS
F138	127.50	12.750	10					ICP-MS
F139	116.00	12.889	9					ICP-MS
F022	131.50	13.150	10	EHEH				ICP-AES
F024	123.00	13.667	9	L				ICP-AES
F010	125.50	13.944	9					GFAAS,ICP-OES
F046	131.50	14.611	9					ICP-MS
F038	156.00	15.600	10					ICP-MS
F002	146.00	16.222	9					AAS
F048	155.50	17.278	9					ICP
F025	163.00	18.111	9	HLVHL				ICP-MS
F009	170.00	18.889	9					ICP-MS
F014	177.00	19.667	9	H				ICP-MS
F154	206.50	20.650	10					ICP-MS
F015	188.00	20.889	9					GFAAS, ICP
F019	135.50	22.583	6	EHH				ICP
F145	214.50	23.833	9	EHH				ICP-AES
F155	172.50	24.643	7	EH				ICP
F031	225.00	25.000	9		BIASED HIGH*	3.02	0.5863	GFAAS
F135	76.00	25.333	3	EH	INSUFFICIENT DATA			GFAAS
F147	181.50	25.929	7	H	BIASED HIGH*	1.01	4.4027	ICP
F060	254.00	28.222	9	EHHVH	BIASED HIGH	9.22	-1.6110	
F032	233.00	29.125	8	HHHH	BIASED HIGH	7.67	-0.3214	ICP-AES

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 15.722

PARAMETER: 93095 Lithium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.5000 BASIC ACCEPTABLE ERROR= 0.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F011	4.	5.00	3.5	3.00	1.5	3.00	0.3	1.00	1.5	2.00	34.9	6.00
F012	3. L	1.50	5. VH	7.50	2.	4.50	3. EH	3.00	5. EH	5.50	30. VL	2.00
F022	5. H	7.00	5. VH	7.50	5. EH	6.00	5. EH	4.00	5. EH	5.50	35.	7.50
F025	<1. EL	0.00	3. L	1.50	<1. L	0.00	<1.	0.00	<1. L	0.00	31. L	3.00
F038	4.	5.00	3. L	1.50	1. L	1.00	<1.	0.00	1. L	1.00	35.	7.50
F048	3.86	3.00	3.61	4.00	1.36	2.00	<1.0	0.00	1.54	3.00	34.44	5.00
F060	4.	5.00	4.	5.50	2.	4.50	1.	2.00	2.	4.00	33.	4.00
F094	3. L	1.50	4.	5.50	<3.	0.00	<3.	0.00	<3.	0.00	36.	9.50
F139	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	29.01 VL	1.00
F153	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	36.	9.50
MEDIAN OR *TARGET												
CONC.	4.0000		3.8050		1.7500		*0.5000		1.7700		34.6700	
1CRIT	0.7100		0.6983		0.5750		0.5900		0.5762		2.5502	
N	4		4		4		2		3		7	
MEAN	3.9650		3.7775		1.7150		2.0000		1.6800		33.3343	
3STDEV	-		-		-		-		-		5.7708	

SAMPLE	7 = TMDA-62		8 = TMDA-63		9 = TMDA-64		10 = TMDA-65	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F011	59.1	10.00	101.	8.00	149.	6.00	177.	6.00
F012	53.	3.00	85. VL	1.00	114. EL	1.00	192. H	10.00
F022	57.	6.00	100.	6.50	150.	7.00	170.	3.00
F025	53.	3.00	94.	4.00	146.	4.00	175.	5.00
F038	58.	7.00	100.	6.50	170. VH	10.00	190. H	9.00
F048	58.56	8.00	101.4	9.00	154.2	8.00	184.9	7.00
F060	54.	5.00	96.	5.00	147.	5.00	171.	4.00
F094	59.	9.00	103.	10.00	162. H	9.00	186.	8.00
F139	49.68 VL	1.00	88.5 L	2.00	134.5 L	2.00	156.1 VL	1.00
F153	53.	3.00	92.	3.00	145.	3.00	165.	2.00
MEDIAN OR *TARGET								
CONC.	55.5000		98.0000		148.0000		176.0000	
1CRIT	3.8000		6.3500		9.3500		11.0300	
N	8		8		8		8	
MEAN	55.6950		96.6125		148.4625		177.3625	
3STDEV	7.5604		13.3915		22.0964		24.7464	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F011	50.00	5.000	10					ICP-MS
F012	39.00	3.900	10	L VH EHEHVL VLELH				ICP-MS
F022	60.00	6.000	10	H VHEHEHEH				ICP-AES
F025	20.50	3.417	6	ELL L L L				ICP-AES
F038	48.50	5.389	9	L L L VHH				ICP-MS
F048	49.00	5.444	9					ICP
F060	44.00	4.400	10					
F094	52.50	7.500	7	L H	BIASED HIGH	7.48	-0.8350	ICP-MS
F139	7.00	1.400	5	VLVLL L VL	BIASED LOW	-9.65	-0.9906	ICP-OES
F153	20.50	4.100	5					FAAS

OVERALL AVERAGE RANK IS 4.827

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F139	7.00	1.400	5	VLVLLLVL	BIASED LOW	-9.65	-0.9906	ICP-OES
F025	20.50	3.417	6	ELLLLL				ICP-AES
F012	39.00	3.900	10	LVHEHEHVLVLELH				ICP-MS
F153	20.50	4.100	5					FAAS
F060	44.00	4.400	10					
F011	50.00	5.000	10					ICP-MS
F038	48.50	5.389	9	LLLVHH				ICP-MS
F048	49.00	5.444	9					ICP
F022	60.00	6.000	10	HVHEHEHEH				ICP-AES
F094	52.50	7.500	7	LH	BIASED HIGH	7.48	-0.8350	ICP-MS

OVERALL AVERAGE RANK IS 4.827

PARAMETER: 25095 Manganese ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.5000 BASIC ACCEPTABLE ERROR= 1.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	15.5	27.00	<10.0	0.00	13.5	6.50	<10.0	0.00	26.5	28.00	77.0	21.00
F003	14.2	8.00	7.9	8.50	13.6	8.50	0.6	8.50	23.1	8.00	73.1	9.00
F009	13.	2.50	7.4	5.00	12.2	3.00	0.5	2.00	22. L	2.50	66. VL	3.00
F010	14.	6.00	7.8	7.00	13.	4.50	<0.2	0.00	23.2	9.50	72.	7.50
F011	14.4	9.00	8.1	14.50	13.7	10.00	0.6	8.50	23.2	9.50	75.9	16.00
F012	13.	2.50	6. EL	2.00	11. EL	2.00	<2.	0.00	22. L	2.50	65. VL	2.00
F014	16.	29.50	9.	26.50	14.	17.00	<5.	0.00	25.	15.00	76.	18.00
F015	16.	29.50	9.	26.50	15.	29.50	1.	14.00	25.	15.00	79.	26.00
F019	14.	6.00	8.	11.50	14.	17.00	<1.	0.00	23.	7.00	76.	18.00
F022	15.	19.50	9.	26.50	14.	17.00	5. EH	15.00	27.	29.00	81.	29.00
F024	15.	19.50	7.	3.50	14.	17.00	<1.	0.00	25.	15.00	78.	25.00
F025	8. EL	1.00	1. EL	1.00	6. EL	1.00	<1.	0.00	17. EL	1.00	70.	5.00
F026	14.6	12.00	8.3	18.50	14.3	23.50	<2.0	0.00	22.4	5.00	74.6	11.00
F031	14.5	10.50	8.	11.50	13.6	8.50	0.5	2.00	24.	11.00	72.	7.50
F032	16.44	31.00	9.467	30.00	16.52 H	31.00	<0.1 EL	0.00	27.41	30.00	82.23 H	30.00
F032b	15.1275	23.00	8.742	23.00	14.799	27.00	0.5968	6.00	25.8495	24.00	77.444	24.00
F037	13.81	4.00	7.646	6.00	13.	4.50	<1.0	0.00	22.27	4.00	71.03	6.00
F038	14.5	10.50	8.33	20.00	14.0	17.00	0.56	4.00	24.5	12.00	77.2	22.00
F046	14.8	13.50	8.25	17.00	13.8	11.50	0.57	5.00	22.8	6.00	69.5 L	4.00
F048	15.36	25.00	9.01	29.00	14.67	25.00	<1.0	0.00	25.60	22.50	77.25	23.00
F060	14.8	13.50	8.1	14.50	13.8	11.50	0.5	2.00	26.	25.50	80.5	28.00
F094	15.4	26.00	7.9	8.50	14.	17.00	0.6	8.50	25.3	18.50	64.4 VL	1.00
F096	15.	19.50	8.7	22.00	14.3	23.50	<2.	0.00	25.4	20.50	76.1	20.00
F133	14.85	15.00	8.30	18.50	14.20	22.00	0.60	8.50	25.4	20.50	73.4	10.00
F135	15.	19.50	9.	26.50	15.	29.50	<2.	0.00	28. H	31.00	83. H	31.00
F138	14.9	16.00	8.55	21.00	13.5	6.50	0.601	11.00	25.3	18.50	75.3	14.00
F139	22.96 EH	32.00	13.95 EH	31.00	21.35 EH	32.00	0.959	13.00	37.89 EH	32.00	113.5 EH	32.00
F145	15.3	24.00	8.2	16.00	14.7	26.00	<1.0	0.00	25.6	22.50	75.4	15.00
F147	15.	19.50	8.	11.50	14.	17.00	<1.	0.00	26.	25.50	76.	18.00
F153	14.	6.00	7.	3.50	14.	17.00	<1.	0.00	25.	15.00	75.	12.50
F154	15.9	28.00	8.9	24.00	14.8	28.00	0.7	12.00	26.2	27.00	80.4	27.00
F155	15.	19.50	8.	11.50	14.	17.00	<1.	0.00	25.	15.00	75.	12.50
MEDIAN	14.9500		8.2000		14.0000		0.6000		25.0000		75.9500	
1CRIT	2.3070		1.9020		2.2500		1.5000		2.9100		5.9670	
N	30		29		30		14		30		30	
MEAN	14.8129		8.1929		13.9663		0.6348		24.7676		75.3451	
3STDEV	2.3665		2.1721		2.7919		0.4496		4.8131		12.6644	

PARAMETER: 25095 Manganese ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F002	105.	21.00	205.	20.00	302.	16.00	413.	17.00
F003	98.2	5.50	194.	7.00	287.	7.00	388.	5.50
F009	90. VL	1.00	175. VL	1.00	266. VL	1.00	366. VL	3.00
F010	99.	7.00	195.	9.00	289.	8.00	391.	8.00
F011	103.	13.50	200.	12.50	294.	9.00	388.	5.50
F012	93. L	2.50	180. VL	2.00	272. VL	2.00	364. VL	1.00
F014	104.	17.00	195.	9.00	315.	27.00	421.	23.00
F015	108.	25.00	212.	26.00	315.	27.00	426.	25.00
F019	104.	17.00	200.	12.50	298.	11.00	408.	12.50
F022	115. H	31.00	209.	24.00	308.	22.00	420.	22.00
F024	110.	27.00	215.	27.00	315.	27.00	435.	27.00
F025	93. L	2.50	186. L	3.00	284.	4.00	399.	9.00
F026	100.5	9.00	192.4	6.00	285.0	5.50	364.9 VL	2.00
F031	96. L	4.00	190.	5.00	285.	5.50	389.	7.00
F032	114.5 H	30.00	221. H	31.00	331.2 H	31.00	448.2 H	30.00
F032b	109.9287	26.00	215.4444	28.00	310.3125	25.00	444.5 H	29.00
F037	99.1	8.00	189. L	4.00	281. L	3.00	401.	10.00
F038	104.	17.00	206.	21.50	310.	24.00	423.	24.00
F046	101.	10.00	201.	14.00	301.	15.00	413.	17.00
F048	106.7	23.00	204.8	19.00	302.1	17.00	416.3	21.00
F060	111.	28.00	220. H	29.50	328. H	30.00	452. H	31.00
F094	107.	24.00	207.	23.00	309.	23.00	374. L	4.00
F096	104.3	20.00	206.	21.50	305.3	20.00	414.2	20.00
F133	98.2	5.50	203.	16.50	307.	21.00	414.	19.00
F135	106.	22.00	203.	16.50	300.	12.50	409.	14.00
F138	104.	17.00	199.	11.00	296.	10.00	404.	11.00
F139	158.8 EH	32.00	318.1 EH	32.00	438.1 EH	32.00	601.7 EH	32.00
F145	101.8	11.00	210.4	25.00	300.5	14.00	427.1	26.00
F147	103.	13.50	204.	18.00	300.	12.50	412.	15.00
F153	102.	12.00	195.	9.00	305.	19.00	408.	12.50
F154	112. H	29.00	220. H	29.50	323. H	29.00	442. H	28.00
F155	104.	17.00	202.	15.00	304.	18.00	413.	17.00
MEDIAN	104.0000		203.0000		302.0500		413.0000	
1CRIT	7.6500		13.5900		19.5330		26.1900	
N	30		30		30		30	
MEAN	103.9076		202.6682		302.0804		410.8067	
3STDEV	16.4947		30.0942		40.6464		65.6539	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	156.50	19.562	8					AAS
F003	75.50	7.550	10		BIASED LOW	-5.64	0.4472	ICP-OES
F009	24.00	2.400	10	L VLVLVLVLVL	BIASED LOW	-11.71	-0.6752	ICP-MS
F010	66.50	7.389	9					ICP-OES
F011	108.00	10.800	10					ICP-MS
F012	18.50	2.056	9	ELEL L VLL VLVLVL	BIASED LOW	-11.00	-0.7242	ICP-MS
F014	182.00	20.222	9					ICP-MS
F015	243.50	24.350	10					ICP
F019	112.50	12.500	9					ICP
F022	235.00	23.500	10	EH H				ICP-AES
F024	188.00	20.889	9					ICP-AES
F025	27.50	3.056	9	ELELEL EL L L	BIASED LOW*	-2.55	-7.3985	ICP-AES
F026	92.50	10.278	9	VL				ICP
F031	72.50	7.250	10	L	BIASED LOW	-5.89	0.0265	ICP
F032	274.00	30.444	9	H EL H H H H H	BIASED HIGH	8.72	0.6286	ICP-AES
F032b	235.00	23.500	10	H				ICP-MS
F037	49.50	5.500	9	L L	BIASED LOW*	-4.16	-1.5643	ICP-MS
F038	172.00	17.200	10					ICP-MS
F046	113.00	11.300	10	L				ICP-MS
F048	204.50	22.722	9					ICP
F060	213.50	21.350	10	H H H				
F094	153.50	15.350	10	VL L				ICP-MS
F096	187.00	20.778	9					ICP-AES
F133	156.50	15.650	10					ICP-MS
F135	202.50	22.500	9	H H				GFAAS AAS-FL
F138	136.00	13.600	10					ICP-MS
F139	300.00	30.000	10	EHEHEH EHEHEHEHEHEH	BIASED HIGH	46.12	3.1216	ICP-MS
F145	179.50	19.944	9					ICP-AES
F147	150.50	16.722	9					ICP
F153	106.50	11.833	9					ICP-OES
F154	261.50	26.150	10	H H H H	BIASED HIGH	7.17	-0.0083	ICP-MS
F155	142.50	15.833	9					ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 16.026

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F012	18.50	2.056	9	ELELLVLLVLVLVL	BIASED LOW	-11.00	-0.7242	ICP-MS
F009	24.00	2.400	10	LVLVLVLVLVL	BIASED LOW	-11.71	-0.6752	ICP-MS
F025	27.50	3.056	9	ELELELELLL	BIASED LOW*	-2.55	-7.3985	ICP-AES
F037	49.50	5.500	9	LL	BIASED LOW*	-4.16	-1.5643	ICP-MS
F031	72.50	7.250	10	L	BIASED LOW	-5.89	0.0265	ICP
F010	66.50	7.389	9					ICP-OES
F003	75.50	7.550	10		BIASED LOW	-5.64	0.4472	ICP-OES
F026	92.50	10.278	9	VL				ICP
F011	108.00	10.800	10					ICP-MS
F046	113.00	11.300	10	L				ICP-MS
F153	106.50	11.833	9					ICP-OES
F019	112.50	12.500	9					ICP
F138	136.00	13.600	10					ICP-MS
F094	153.50	15.350	10	VLL				ICP-MS
F133	156.50	15.650	10					ICP-MS
F155	142.50	15.833	9					ICP
F147	150.50	16.722	9					ICP
F038	172.00	17.200	10					ICP-MS
F002	156.50	19.562	8					AAS
F145	179.50	19.944	9					ICP-AES
F014	182.00	20.222	9					ICP-MS
F096	187.00	20.778	9					ICP-AES
F024	188.00	20.889	9					ICP-AES
F060	213.50	21.350	10	HHH				
F135	202.50	22.500	9	HH				GFAAS AAS-FL
F048	204.50	22.722	9					ICP
F022	235.00	23.500	10	EHH				ICP-AES
F032b	235.00	23.500	10	H				ICP-MS
F015	243.50	24.350	10					ICP
F154	261.50	26.150	10	HHHH	BIASED HIGH	7.17	-0.0083	ICP-MS
F139	300.00	30.000	10	EHEHEHEHEHEHEHEHEH	BIASED HIGH	46.12	3.1216	ICP-MS
F032	274.00	30.444	9	HELHHHHH	BIASED HIGH	8.72	0.6286	ICP-AES

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 16.026

PARAMETER: 42095 Molybdenum ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.5000 BASIC ACCEPTABLE ERROR= 1.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	6.9	3.50	4.8	5.00	15.3	17.50	0.2	6.00	9.8	5.00	70.	5.00
F009	7.1	8.00	5.	7.50	15.	13.50	<0.5	0.00	10.	9.50	71.	8.50
F010	10. H	20.50	5.7	18.00	14.4	9.00	<1.	0.00	8.8	3.00	71.	8.50
F011	7.7	15.00	5.3	14.00	15.1	16.00	0.2	6.00	11.1	17.00	74.9	18.00
F012	8.	18.50	8. EH	22.00	15.	13.50	3. VH	10.00	16. VH	22.00	70.	5.00
F015	<10.	0.00	<10.	0.00	10. EL	1.00	<10.	0.00	<10.	0.00	70.	5.00
F019	8.	18.50	6.	19.50	18. H	24.00	<5.	0.00	12.	20.00	76.	20.50
F022	10. H	20.50	10. EH	23.00	14.	6.00	10. EH	12.00	10.	9.50	70.	5.00
F024	7.	6.50	5.	7.50	15.	13.50	<1.	0.00	10.	9.50	76.	20.50
F025	14. EH	23.00	4.	2.50	13.	5.00	<3.	0.00	10.	9.50	64. VL	2.00
F032	7.379	12.00	5.084	10.00	17.1	23.00	<0.8	0.00	9.997	6.00	76.76	22.00
F032b	7.8971	16.00	5.6169	17.00	15.9045	21.00	0.4556	8.00	11.9416	19.00	75.6985	19.00
F038	7.13	9.00	5.05	9.00	14.9	10.00	0.2	6.00	10.4	13.00	73.9	15.00
F046	6.97	5.00	4.83	6.00	14.2	7.50	<0.2	0.00	10.0	9.50	71.9	11.00
F048	7.69	14.00	5.61	16.00	15.75	20.00	<1.0	0.00	11.16	18.00	73.53	14.00
F060	7.	6.50	6.	19.50	15.	13.50	<1.0	0.00	10.	9.50	73.	13.00
F094	6.9	3.50	5.1	11.00	14.2	7.50	0.1	2.00	9.7	4.00	82. VH	25.00
F096	7.3	11.00	5.19	12.00	15.7	19.00	0.15	4.00	10.9	15.50	74.	16.00
F133	6.8	2.00	4.4	4.00	12.4 L	3.00	0.6	9.00	8.4	2.00	60.2 EL	1.00
F138	7.61	13.00	5.37	15.00	15.3	17.50	0.123	3.00	10.9	15.50	74.1	17.00
F139	7.211	10.00	5.261	13.00	14.912	11.00	0.0934	1.00	10.62	14.00	71.03	10.00
F145	7.9	17.00	6.7	21.00	12.9	4.00	<5.	0.00	19.1 EH	23.00	72.3	12.00
F147	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	78.	23.00
F153	4. EL	1.00	4.	2.50	12. L	2.00	<4.	0.00	6. VL	1.00	70.	5.00
F155	11. VH	22.00	1. EL	1.00	17.	22.00	7. VH	11.00	15. VH	21.00	80. H	24.00
MEDIAN	7.3790		5.1900		15.0000		0.2000		10.0000		73.0000	
1CRIT	1.8527		1.7214		2.3100		1.5000		2.0100		5.7900	
N	21		21		22		10		21		23	
MEAN	7.7851		5.3339		14.7303		1.2029		10.7961		72.9182	
3STDEV	3.3621		2.5833		3.8214		6.3119		5.2499		10.0819	

PARAMETER: 42095 Molybdenum ug/L

SAMPLE	7 = TMDA-62		8 = TMDA-63		9 = TMDA-64		10 = TMDA-65	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	92.	4.00	147.	4.50	265.	4.00	357. L	2.00
F009	94.	5.50	150.	6.50	270.	5.50	373.	4.00
F010	95.	7.00	152.	8.00	274.	7.00	381.	6.00
F011	100.	18.50	158.	16.00	277.	9.50	393.	19.00
F012	94.	5.50	147.	4.50	270.	5.50	377.	5.00
F015	100.	18.50	160.	20.50	280.	15.00	390.	13.00
F019	99.	16.00	156.	13.00	278.	12.00	384.	8.00
F022	98.	12.00	155.	11.00	292.	21.00	390.	13.00
F024	110. VH	25.00	150.	6.50	285.	18.50	405.	21.00
F025	85. VL	2.00	139. VL	1.00	258. L	3.00	366.	3.00
F032	105.5 H	23.00	166.4	23.00	299.7 H	24.00	414.84 H	24.00
F032b	103.664	22.00	167.114 H	24.00	303.2165 H	25.00	411.864	23.00
F038	101.	20.50	156.	13.00	285.	18.50	390.	13.00
F046	96.0	8.00	153.	9.00	277.	9.50	385.	10.00
F048	98.65	15.00	157.9	15.00	279.2	14.00	390.1	15.00
F060	98.	12.00	159.	19.00	295.	22.00	409.	22.00
F094	87.3 L	3.00	142. L	2.00	254. L	2.00	439. EH	25.00
F096	99.5	17.00	158.3	17.00	281.2	16.00	391.6	17.00
F133	82.2 EL	1.00	144.4 L	3.00	247. VL	1.00	337. EL	1.00
F138	96.9	10.00	156.	13.00	279.	13.00	384.	8.00
F139	98.34	14.00	162.61	22.00	276.1	8.00	389.98	11.00
F145	96.3	9.00	158.8	18.00	277.1	11.00	393.5	20.00
F147	107. H	24.00	169. H	25.00	298. H	23.00	392.	18.00
F153	98.	12.00	154.	10.00	290.	20.00	391.	16.00
F155	101.	20.50	160.	20.50	282.	17.00	384.	8.00
MEDIAN	98.0000		156.0000		279.0000		390.0000	
1CRIT	7.2900		10.7700		18.1500		24.8100	
N	23		23		23		23	
MEAN	97.5719		155.2402		279.2304		388.8210	
3STDEV	14.8489		18.9556		33.6352		39.6366	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	56.50	5.650	10	L	BIASED LOW	-7.49	1.1668	ICP-OES
F009	68.50	7.611	9					ICP-MS
F010	87.00	9.667	9	H				ICP-OES
F011	149.00	14.900	10					ICP-MS
F012	111.50	11.150	10	EH VHVH				ICP-MS
F015	73.00	12.167	6	EL				ICP
F019	151.50	16.833	9	H				ICP
F022	133.00	13.300	10	H EH EH				ICP-AES
F024	128.50	14.278	9	VH				ICP-AES
F025	51.00	5.667	9	EH VLVLVLL	BIASED LOW	-6.98	-0.9343	ICP-AES
F032	167.00	18.556	9	H H H				ICP-AES
F032b	194.00	19.400	10	H H	BIASED HIGH	6.52	0.2191	ICP-MS
F038	127.00	12.700	10					ICP-MS
F046	75.50	8.389	9					ICP-MS
F048	141.00	15.667	9					ICP
F060	137.00	15.222	9					
F094	85.00	8.500	10	VHL L L EH				ICP-MS
F096	144.50	14.450	10					ICP-MS
F133	27.00	2.700	10	L ELELL VLEL	BIASED LOW	-12.58	-0.0303	ICP-MS
F138	125.00	12.500	10					ICP-MS
F139	114.00	11.400	10					ICP-MS
F145	135.00	15.000	9	EH				ICP-AES
F147	113.00	22.600	5	H H H	BIASED HIGH*	-0.29	10.1784	ICP
F153	69.50	7.722	9	EL L VL				ICP-OES
F155	167.00	16.700	10	VHEL VHVHH				ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 12.309

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F133	27.00	2.700	10	LELELLVLEL	BIASED LOW	-12.58	-0.0303	ICP-MS
F003	56.50	5.650	10	L	BIASED LOW	-7.49	1.1668	ICP-OES
F025	51.00	5.667	9	EHVLVLVLL	BIASED LOW	-6.98	-0.9343	ICP-AES
F009	68.50	7.611	9					ICP-MS
F153	69.50	7.722	9	ELLVL				ICP-OES
F046	75.50	8.389	9					ICP-MS
F094	85.00	8.500	10	VHLLLEH				ICP-MS
F010	87.00	9.667	9	H				ICP-OES
F012	111.50	11.150	10	EHVHVH				ICP-MS
F139	114.00	11.400	10					ICP-MS
F015	73.00	12.167	6	EL				ICP
F138	125.00	12.500	10					ICP-MS
F038	127.00	12.700	10					ICP-MS
F022	133.00	13.300	10	HEHEH				ICP-AES
F024	128.50	14.278	9	VH				ICP-AES
F096	144.50	14.450	10					ICP-MS
F011	149.00	14.900	10					ICP-MS
F145	135.00	15.000	9	EH				ICP-AES
F060	137.00	15.222	9					
F048	141.00	15.667	9					ICP
F155	167.00	16.700	10	VHELVHVHH				ICP
F019	151.50	16.833	9	H				ICP
F032	167.00	18.556	9	HHH				ICP-AES
F032b	194.00	19.400	10	HH	BIASED HIGH	6.52	0.2191	ICP-MS
F147	113.00	22.600	5	HHH	BIASED HIGH*	-0.29	10.1784	ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 12.309

PARAMETER: 28095 Nickel ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.5000 BASIC ACCEPTABLE ERROR= 1.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	10.0	13.50	5.4	13.00	15.9	4.00	<2.0	0.00	126.	26.00	62.0	24.50
F003	9.1	5.00	5.4	13.00	18.1	15.50	0.3	3.50	106. VL	4.00	61.	21.00
F009	8.7	2.00	5.6	17.00	16.	5.50	<2.	0.00	98. VL	2.00	50. EL	1.00
F010	10.3	19.00	5.6	17.00	17.5	9.00	<1.	0.00	112.	8.00	57.	7.00
F011	9.9	8.50	5.3	8.50	17.6	10.00	0.6	7.00	121.	20.50	59.6	11.00
F014	10.	13.50	5.	4.50	18.	13.00	<5.	0.00	111.	7.00	60.	14.00
F015	<20.	0.00	<20.	0.00	<20.	0.00	<20.	0.00	120.	17.00	60.	14.00
F019	10.	13.50	<10.	0.00	16.	5.50	<10.	0.00	120.	17.00	60.	14.00
F022	10.	13.50	6.	22.50	19.	21.00	5. EH	14.00	117.	12.50	61.	21.00
F024	10.	13.50	4. EL	1.00	17.	8.00	<1.	0.00	120.	17.00	60.	14.00
F025	11.1	25.00	5.5	15.00	18.4	19.00	1.1	12.00	119.	14.50	62.5	26.00
F026	10.2	18.00	6.1	24.00	18.2	17.00	5.7 EH	15.00	97.6 VL	1.00	56.9	6.00
F032	11.88	27.00	5.202	6.00	20.48	27.00	<1.5	0.00	127.35	28.00	63.61	28.00
F032b	10.4652	20.00	5.7395	19.00	19.2255	25.00	0.6367	8.00	123.7371	25.00	62.5685	27.00
F038	10.0	13.50	5.3	8.50	18.6	20.00	0.3	3.50	115.	9.50	60.5	19.00
F042	10.6	21.00	5.6	17.00	19.7	26.00	0.	1.00	117.	12.50	55.5	5.00
F046	9.84	7.00	5.30	8.50	18.1	15.50	0.38	5.00	110. L	6.00	57.3	8.00
F048	10.83	24.00	6.17	25.00	19.08	22.00	1.30	13.00	115.6	11.00	60.47	18.00
F060	10.	13.50	6.	22.50	18.	13.00	<1.0	0.00	121.	20.50	60.	14.00
F094	10.	13.50	4.9	3.00	19.2	23.50	0.4	6.00	127.	27.00	53.3 L	4.00
F096	11.4	26.00	5.4	13.00	16.4	7.00	<8.	0.00	122.6	24.00	57.9	9.00
F133	8.4	1.00	4.8	2.00	15.6 L	3.00	0.2	2.00	105.0 VL	3.00	52.6 L	3.00
F135	14. EH	28.00	<10.	0.00	39. EH	29.00	<10.	0.00		0.00	79. EH	29.50
F138	9.41	6.00	5.34	11.00	17.9	11.00	0.843	10.00	119.	14.50	60.1	17.00
F139	10.61	22.00	5.794	20.00	18.33	18.00	1.029	11.00	122.5	23.00	61.36	23.00
F145	9.9	8.50	5.3	8.50	14.4 L	1.00	<0.7	0.00	109.1 L	5.00	52.3 VL	2.00
F147	<20.	0.00	<20.	0.00	32. EH	28.00	<20.	0.00	132. VH	29.00	79. EH	29.50
F153	9.	3.50	5.	4.50	18.	13.00	<3.	0.00	115.	9.50	59.	10.00
F154	10.7	23.00	5.8	21.00	19.2	23.50	0.8	9.00	121.	20.50	62.	24.50
F155	9.	3.50	<4. EL	0.00	15. L	2.00	<4.	0.00	121.	20.50	61.	21.00
MEDIAN	10.0000		5.4000		18.1000		0.6367		119.0000		60.0000	
1CRIT	2.0100		1.7340		2.4960		1.5000		8.5500		5.0100	
N	26		23		27		13		27		27	
MEAN	10.1129		5.4511		18.3895		0.9914		117.1069		59.2411	
3STDEV	2.1636		1.0323		8.9318		3.6097		20.8340		8.8380	

PARAMETER: 28095 Nickel ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F002	102.	21.00	200.	17.00	270.	18.00	402.	16.00
F003	93.	5.00	187.	4.00	255.	6.00	371. L	5.00
F009	83. EL	1.00	165. EL	1.00	228. EL	1.00	338. VL	2.00
F010	95.	6.00	190.	6.00	253.	5.00	379.	6.50
F011	101.	18.00	199.	15.00	260.	7.00	389.	10.00
F014	100.	13.50	197.	11.50	269.	16.00	388.	9.00
F015	100.	13.50	210.	24.00	280.	26.00	420.	27.00
F019	96.	7.50	200.	17.00	270.	18.00	404.	19.00
F022	103.	23.00	203.	19.50	270.	18.00	412.	24.00
F024	100.	13.50	200.	17.00	275.	22.00	410.	23.00
F025	107.	27.50	198.	14.00	261.	8.00	384.	8.00
F026	91.7 L	4.00	176.3 VL	3.00	232.7 VL	2.00	327.0 VL	1.00
F032	109.67 H	29.00	214.7 H	28.00	288.3 H	29.00	431.7 H	29.00
F032b	104.4237	25.00	209.8005	23.00	266.439	13.00	398.264	14.00
F038	100.	13.50	197.	11.50	276.	23.50	408.	22.00
F042	102.	21.00	188.	5.00	265.	10.00	379.	6.50
F046	96.0	7.50	194.	9.00	268.	14.50	406.	21.00
F048	100.8	16.00	197.1	13.00	266.0	11.50	402.6	17.00
F060	101.	18.00	203.	19.50	276.	23.50	416.	25.00
F094	107.	27.50	209.	22.00	286. H	28.00	346. VL	4.00
F096	96.1	9.00	204.4	21.00	274.1	21.00	401.8	15.00
F133	88.2 VL	2.00	169.5 VL	2.00	239. VL	3.00	341. VL	3.00
F135		0.00		0.00		0.00		0.00
F138	101.	18.00	211.	26.50	271.	20.00	405.	20.00
F139	104.1	24.00	210.2	25.00	263.4	9.00	402.8	18.00
F145	89.4 L	3.00	192.8	8.00	249.4 L	4.00	392.7	11.00
F147	99.	10.50	217. H	29.00	277.	25.00	418.	26.00
F153	99.	10.50	191.	7.00	268.	14.50	393.	12.00
F154	105.	26.00	211.	26.50	282.	27.00	426.	28.00
F155	102.	21.00	195.	10.00	266.	11.50	395.	13.00
MEDIAN	100.0000		199.0000		268.0000		401.8000	
1CRIT	7.4100		13.3500		17.4900		25.5180	
N	27		27		27		27	
MEAN	99.3972		198.4371		266.2607		393.6357	
3STDEV	14.3517		31.3080		35.9629		67.2903	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	153.00	17.000	9					AAS
F003	82.00	8.200	10	VL L				ICP-OES
F009	32.50	3.611	9	VLELELELELVL	BIASED LOW	-15.86	-0.1815	ICP-MS
F010	83.50	9.278	9					ICP-OES
F011	115.50	11.550	10					ICP-MS
F014	102.00	11.333	9					ICP-MS
F015	121.50	20.250	6					ICP
F019	111.50	13.938	8					ICP
F022	189.00	18.900	10	EH				ICP-AES
F024	129.00	14.333	9	EL				ICP-AES
F025	169.00	16.900	10					ICP-MS
F026	91.00	9.100	10	EHVL L VLVLVL				ICP
F032	231.00	25.667	9	H H H H	BIASED HIGH	7.39	0.4747	ICP-AES
F032b	199.00	19.900	10					ICP-MS
F038	144.50	14.450	10					ICP-MS
F042	125.00	12.500	10					GFAAS
F046	102.00	10.200	10	L				ICP-MS
F048	170.50	17.050	10					ICP
F060	169.50	18.833	9					
F094	158.50	15.850	10	L H VL				ICP-MS
F096	145.00	16.111	9					ICP-AES
F133	24.00	2.400	10	L VLL VLVLVLVL	BIASED LOW	-14.12	0.9303	ICP-MS
F135	86.50	28.833	3	EH EH EH	INSUFFICIENT DATA			GFAAS
F138	154.00	15.400	10					ICP-MS
F139	193.00	19.300	10					ICP-MS
F145	51.00	5.667	9	L L VLL L	BIASED LOW*	-2.73	-3.7555	ICP-AES
F147	177.00	25.286	7	EH VHEH H	BIASED HIGH*	0.63	11.5435	ICP
F153	84.50	9.389	9					ICP-OES
F154	229.00	22.900	10		BIASED HIGH	5.87	-0.7822	ICP-MS
F155	102.50	12.812	8	ELL				ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 14.434

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F133	24.00	2.400	10	LVLLVLVLVLVL	BIASED LOW	-14.12	0.9303	ICP-MS
F009	32.50	3.611	9	VLELELELELVL	BIASED LOW	-15.86	-0.1815	ICP-MS
F145	51.00	5.667	9	LLVLLL	BIASED LOW*	-2.73	-3.7555	ICP-AES
F003	82.00	8.200	10	VLL				ICP-OES
F026	91.00	9.100	10	EHVLLVLVLVL				ICP
F010	83.50	9.278	9					ICP-OES
F153	84.50	9.389	9					ICP-OES
F046	102.00	10.200	10	L				ICP-MS
F014	102.00	11.333	9					ICP-MS
F011	115.50	11.550	10					ICP-MS
F042	125.00	12.500	10					GFAAS
F155	102.50	12.812	8	ELL				ICP
F019	111.50	13.938	8					ICP
F024	129.00	14.333	9	EL				ICP-AES
F038	144.50	14.450	10					ICP-MS
F138	154.00	15.400	10					ICP-MS
F094	158.50	15.850	10	LHVL				ICP-MS
F096	145.00	16.111	9					ICP-AES
F025	169.00	16.900	10					ICP-MS
F002	153.00	17.000	9					AAS
F048	170.50	17.050	10					ICP
F060	169.50	18.833	9					
F022	189.00	18.900	10	EH				ICP-AES
F139	193.00	19.300	10					ICP-MS
F032b	199.00	19.900	10					ICP-MS
F015	121.50	20.250	6					ICP
F154	229.00	22.900	10		BIASED HIGH	5.87	-0.7822	ICP-MS
F147	177.00	25.286	7	EHVHEHH	BIASED HIGH*	0.63	11.5435	ICP
F032	231.00	25.667	9	HHHH	BIASED HIGH	7.39	0.4747	ICP-AES
F135	86.50	28.833	3	EHEHEH	INSUFFICIENT DATA			GFAAS

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 14.434

PARAMETER: 34095 Selenium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.5000 BASIC ACCEPTABLE ERROR= 0.5000 CONCENTRATION ERROR INCREMENT= 0.0800

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	5.2	15.50	4.6	14.00	1.7	12.00	<0.1	0.00	1.7	12.00	37.5	14.00
F009	4.9	10.50	4.2	10.00	1.5	7.50	<0.5	0.00	1.6	9.50	35.	7.00
F010	6. H	18.50	5.	17.00	2.	15.00	1. H	5.00	2.	14.50	37.	13.00
F011	4.8	8.00	3.9	6.00	1.6	11.00	<10.	0.00	1.8	13.00	36.	11.50
F014	4.9	10.50	4.3	11.50	1.9	13.00	<1.0	0.00	1.6	9.50	38.6	15.00
F015	5.2	15.50	4.5	13.00	1.3	3.00	<1.0	0.00	1.0 L	1.50	40.2 H	17.00
F022	10. EH	22.00	10. EH	22.00	10. EH	19.00	10. EH	6.00	10. EH	18.00	36.	11.50
F025	5.3	17.00	5.0	17.00	2.0	15.00	<0.2	0.00	1.5	8.00	50.0 EH	23.00
F031	5.	13.00	4.	8.00	<3.	0.00	<3.	0.00	<3.	0.00	33.	2.00
F032	4.8	8.00	4.1	9.00	1.5	7.50	0.1	2.00	1.2	4.50	35.1	8.00
F037	6.153 H	20.00	5.241 H	20.00	2.036	17.00	0.5674	4.00	2.357 H	16.00	43.87 VH	21.00
F038	5.	13.00	5.	17.00	2.	15.00	<1.	0.00	2.	14.50	40. H	16.00
F042	4.00 L	2.00	3.27 L	2.00	1.11	2.00	1.00W	0.00	1.00W	0.00	32.7	1.00
F046	4.62	6.00	3.96	7.00	1.55	10.00	<0.4	0.00	1.67	11.00	34.5	6.00
F048	6.51 VH	21.00	6.52 VH	21.00	2.69 VH	18.00	<1.0	0.00	4.25 EH	17.00	45.66 VH	22.00
F060	4.8	8.00	4.3	11.50	1.4	4.00	<0.2	0.00	1.05	3.00	35.4	9.00
F094	2.7 EL	1.00	1.4 EL	1.00	<0.4 EL	0.00	<0.4	0.00	<0.4 VL	0.00	34.	3.50
F096	4.51	5.00	3.81	5.00	1.45	5.00	<1.	0.00	1.46	7.00	34.1	5.00
F133	6. H	18.50	5.	17.00	1.	1.00	<1.	0.00	1. L	1.50	43. VH	20.00
F138	4.10	4.00	3.37 L	3.00	1.52	9.00	0.096	1.00	1.41	6.00	35.8	10.00
F145	4.08 L	3.00	3.45 L	4.00	1.48	6.00	0.25	3.00	1.2	4.50	41.3 VH	19.00
F153	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	<10.	0.00	34.	3.50
F154	5.	13.00	5.	17.00	<2.	0.00	<2.	0.00	<2.	0.00	41. H	18.00
F155	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00	<100.	0.00
MEDIAN	4.9500		4.3000		1.5500		0.4087		1.6000		36.0000	
1CRIT	0.8560		0.8040		0.5840		0.5000		0.5880		3.3400	
N	20		20		17		4		15		21	
MEAN	5.0437		4.4260		1.6904		0.4794		1.7865		37.6681	
3STDEV	2.0038		2.2630		1.0927		-		2.2096		10.7097	

PARAMETER: 34095 Selenium ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F003	52.7	15.00	104.	13.50	153.	13.50	191.	11.00
F009	47.	5.00	98.	6.00	146.	7.00	189.	8.50
F010	50.	12.00	100.	9.50	149.	9.50	190.	10.00
F011	54.6 H	18.00	99.4	8.00	154.	15.00	198.	15.00
F014	51.0	14.00	102.	12.00	153.	13.50	196.	14.00
F015	48.7	8.00	111. H	19.00	164.	19.00	210. H	18.00
F022	49.	9.00	104.	13.50	156.	16.00	193.	12.00
F025	67.0 EH	23.00	117. VH	20.00	235. EH	24.00	290. EH	24.00
F031	46.	2.00	91. L	2.00	132. VL	1.00	169. VL	1.00
F032	49.1	10.00	95.2	3.00	141.8	6.00	180.8	3.00
F037	61.16 VH	21.00	120.9 VH	21.00	180. VH	22.00	231.2 VH	23.00
F038	53.	16.00	100.	9.50	150.	11.00	200.	17.00
F042	45.2 L	1.00	90.9 L	1.00	136. L	2.50	182.	4.00
F046	46.9	3.50	95.9	4.50	141.	4.00	186.	7.00
F048	62.03 VH	22.00	127.3 VH	23.00	174.9 VH	21.00	220.3 VH	21.00
F060	49.6	11.00	106.	15.50	149.	9.50	194.	13.00
F094	48.6	7.00	98.3	7.00	147.	8.00	173. L	2.00
F096	46.9	3.50	95.9	4.50	141.5	5.00	184.5	5.00
F133	57. VH	20.00	121. VH	22.00	186. VH	23.00	231. VH	22.00
F138	50.3	13.00	106.	15.50	152.	12.00	189.	8.50
F145	53.38	17.00	106.88	17.00	170. H	20.00	214.75 H	20.00
F153	48.	6.00	101.	11.00	160.	17.00	199.	16.00
F154	55. H	19.00	110.	18.00	163.	18.00	211. H	19.00
F155	<100.	0.00	<100.	0.00	136. L	2.50	185.	6.00
MEDIAN	50.0000		102.0000		152.5000		193.5000	
1CRIT	4.4600		8.6200		12.6600		15.9400	
N	21		21		22		22	
MEAN	51.4271		103.9752		154.6909		197.6614	
3STDEV	13.1634		24.1176		39.9967		46.4603	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	120.50	13.389	9					ICP-OES
F009	71.00	7.889	9					ICP-MS
F010	124.00	12.400	10	H H				Hydride AAS
F011	105.50	11.722	9	H				ICP-MS
F014	113.00	12.556	9					ICP-MS
F015	114.00	12.667	9	L H H H				GFAAS, ICP
F022	149.00	14.900	10	EHEHEHEHEH				ICP-AES
F025	171.00	19.000	9	EHEHVHEHEH	BIASED HIGH	48.83	-4.4898	HAA
F031	29.00	4.143	7	L VLVL	BIASED LOW	-13.39	1.3558	ICP
F032	61.00	6.100	10					Hydride gen.
F037	185.00	18.500	10	H H H VHVHVHVHVH	BIASED HIGH	18.73	0.4265	ICP-MS
F038	129.00	14.333	9	H				ICP-MS
F042	15.50	1.938	8	L L L L L	BIASED LOW	-7.57	-1.0501	GFAAS
F046	59.00	6.556	9					ICP-MS
F048	186.00	20.667	9	VHVHVH EHVHVHVHVHVH	BIASED HIGH	14.02	3.0189	ICP
F060	84.50	9.389	9					
F094	29.50	4.214	7	ELELEL VL L	BIASED LOW	-7.26	0.1702	ICP-MS
F096	45.00	5.000	9		BIASED LOW	-5.53	-0.2282	ICP-MS
F133	145.00	16.111	9	H L VHVHVHVHVH				ICP-MS
F138	82.00	8.200	10	L				8-10 ICP 1-7 HGAFS
F145	113.50	11.350	10	L L VH H H				HG AAS
F153	53.50	10.700	5					ICP-OES
F154	122.00	17.429	7	H H H				ICP-MS
F155	8.50	4.250	2	L	INSUFFICIENT DATA			ICP

OVERALL AVERAGE
RANK IS 11.353

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F042	15.50	1.938	8	LLLLL	BIASED LOW	-7.57	-1.0501	GFAAS
F031	29.00	4.143	7	LVLVL	BIASED LOW	-13.39	1.3558	ICP
F094	29.50	4.214	7	ELELELVLL	BIASED LOW	-7.26	0.1702	ICP-MS
F155	8.50	4.250	2	L	INSUFFICIENT DATA			ICP
F096	45.00	5.000	9		BIASED LOW	-5.53	-0.2282	ICP-MS
F032	61.00	6.100	10					Hydride gen.
F046	59.00	6.556	9					ICP-MS
F009	71.00	7.889	9					ICP-MS
F138	82.00	8.200	10	L				8-10 ICP 1-7 HGAFS
F060	84.50	9.389	9					
F153	53.50	10.700	5					ICP-OES
F145	113.50	11.350	10	LLVHHH				HG AAS
F011	105.50	11.722	9	H				ICP-MS
F010	124.00	12.400	10	HH				Hydride AAS
F014	113.00	12.556	9					ICP-MS
F015	114.00	12.667	9	LHHH				GFAAS, ICP
F003	120.50	13.389	9					ICP-OES
F038	129.00	14.333	9	H				ICP-MS
F022	149.00	14.900	10	EHEHEHEHEH				ICP-AES
F133	145.00	16.111	9	HLVHVHVHVHVH				ICP-MS
F154	122.00	17.429	7	HHH				ICP-MS
F037	185.00	18.500	10	HHHVHVHVHVHVH	BIASED HIGH	18.73	0.4265	ICP-MS
F025	171.00	19.000	9	EHEHVHEHEH	BIASED HIGH	48.83	-4.4898	HAA
F048	186.00	20.667	9	VHVHVHEHVHVHVHVHVH	BIASED HIGH	14.02	3.0189	ICP

OVERALL AVERAGE
RANK IS 11.353

PARAMETER: 47095 Silver ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.5000 BASIC ACCEPTABLE ERROR= 0.5000 CONCENTRATION ERROR INCREMENT= 0.0800

SAMPLE LAB NO	1 = TM-25.2 REPORTED VALUE	RANK	2 = TM-23.2 REPORTED VALUE	RANK	3 = TM-54.3D REPORTED VALUE	RANK	4 = TM-FSWAWA REPORTED VALUE	RANK	5 = TM-54A REPORTED VALUE	RANK	6 = TMDA-61 REPORTED VALUE	RANK
F003	4.6	11.00	3.9	9.50	0.7	6.50	<0.1	0.00	0.4	3.50	23.	12.00
F010	4.2	3.50	3.6	2.50	0.4	1.00	<0.2	0.00	0.3	2.00	14.6 VL	2.00
F011	4.5	8.00	3.7	4.50	0.7	6.50	<0.1	0.00	0.5	7.50	23.	12.00
F012	8. EH	21.00	9. EH	21.00	<2.	0.00	3. EH	4.00	4. EH	13.00	43. EH	21.00
F015	4.2	3.50	3.6	2.50	0.6	2.00	<0.5	0.00	<0.5	0.00	21.	7.00
F022	5.	16.50	5. H	20.00	5. EH	16.00	5. EH	5.00	5. EH	14.00	23.	12.00
F025	5.0	16.50	4.3	17.00	0.7	6.50	<0.1	0.00	0.4	3.50	25.8 H	20.00
F037	5.378	19.00	4.658	18.00	1.861 EH	15.00	<1.0	0.00	1.041 H	12.00	18.02 VL	4.00
F038	4.68	12.00	3.95	12.00	0.73	10.00	0.01	1.00	0.50	7.50	23.2	15.00
F042	4.31	5.00	3.76	7.00	2.50W	0.00	2.50W	0.00	2.50W	0.00	20.6 L	6.00
F046	4.54	9.00	3.89	8.00	0.67	3.00	<0.02	0.00	0.46	5.00	24.3	17.00
F048	3.25 EL	1.00	2.44 EL	1.00	<1.0	0.00	<1.0	0.00	<1.0	0.00	25.63 H	19.00
F060	5.	16.50	4.	14.00	<1.0	0.00	<1.0	0.00	<1.0	0.00	22.	9.50
F094	4.9	13.00	3.7	4.50	0.9	12.50	<0.2	0.00	<0.2	0.00	18.7 VL	5.00
F096	4.98	14.00	4.25	16.00	0.75	11.00	<0.1	0.00	0.5	7.50	24.4	18.00
F133	4.45	7.00	3.90	9.50	0.70	6.50	<0.05	0.00	0.50	7.50	9.00 EL	1.00
F138	4.55	10.00	3.91	11.00	0.719	9.00	0.017	2.00	0.279	1.00	24.1	16.00
F139	4.347	6.00	3.748	6.00	0.675	4.00	<0.5	0.00	0.558	10.00	23.043	14.00
F145	5.8 H	20.00	4.8 H	19.00	0.9	12.50	1.3 VH	3.00	1.	11.00	21.7	8.00
F153	4.	2.00	4.	14.00	1.	14.00	<1.	0.00	<1.	0.00	17. VL	3.00
F155	5.	16.50	4.	14.00	<2.	0.00	<2.	0.00	<2.	0.00	22.	9.50
MEDIAN OR *TARGET												
CONC.	4.6000		3.9100		0.7095		*0.2000		0.5000		23.0000	
1CRIT	0.8280		0.7728		0.5168		0.5640		0.5000		2.3000	
N	19		19		14		3		12		19	
MEAN	4.7071		4.0351		0.8289		1.4390		0.8466		21.8470	
3STDEV	1.3013		1.1651		0.9143		-		2.9261		8.6429	

PARAMETER: 47095 Silver ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F003	17.	8.50	30.6	10.00	33.	13.50	29.	11.00
F010	16.1	5.50	15.3	2.00	18.5	2.00	15.	2.00
F011	18.2	14.50	27.6	7.00	29.8	9.00	29.3	12.50
F012	29. EH	21.00	34.	16.50	44.	20.00	45.	21.00
F015	17.	8.50	30.	9.00	34.	16.00	30.	14.50
F022	15. VL	3.00	17.	3.00	21.	4.00	14.	1.00
F025	19.9 H	20.00	33.6	15.00	37.5	17.00	34.9	19.00
F037	16.76	7.00	18.56	4.00	19.07	3.00	17.51	3.00
F038	18.7	19.00	32.9	12.50	32.7	12.00	29.3	12.50
F042	16.1	5.50	31.3	11.00	25.6	8.00	24.0	7.00
F046	18.3	16.00	34.2	18.00	33.9	15.00	30.3	16.00
F048	18.60	18.00	33.02	14.00	38.0	18.00	33.43	18.00
F060	18.	12.50	21.	6.00	33.	13.50	30.	14.50
F094	14.5 VL	2.00	19.7	5.00	30.	10.00	35.2	20.00
F096	17.9	11.00	37.2	20.00	38.8	19.00	32.6	17.00
F133	9.55 EL	1.00	13.15	1.00	15.45	1.00	18.30	4.00
F138	18.2	14.50	32.9	12.50	30.8	11.00	28.6	10.00
F139	17.72	10.00	303.0	21.00	24.59	6.00	23.714	6.00
F145	18.4	17.00	36.5	19.00	25.3	7.00	25.2	8.00
F153	16. L	4.00	29.	8.00	24.	5.00	20.	5.00
F155	18.	12.50	34.	16.50	45.	21.00	28.	9.00
MEDIAN OR *TARGET CONC.	17.9000		31.3000		30.8000		29.0000	
1CRIT	1.8920		2.9640		2.9240		2.7800	
N	19		19		19		19	
MEAN	17.3884		28.8621		30.1874		27.0713	
3STDEV	4.0000		20.2991		20.5282		17.2896	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	85.50	9.500	9					ICP-OES
F010	22.50	2.500	9	VL	BIASED LOW	-46.94	1.4220	ICP-OES
F011	81.50	9.056	9	L				ICP-MS
F012	158.50	17.611	9	EHEH EHEHEHEH	BIASED HIGH	31.32	3.5689	ICP-MS
F015	63.00	7.875	8					ICP
F022	94.50	9.450	10	H EHEHEH VL				ICP-AES
F025	134.50	14.944	9	H H				ICP-MS
F037	85.00	9.444	9	EH H VL				ICP-MS
F038	113.50	11.350	10					ICP-MS
F042	49.50	7.071	7	L				GFAAS
F046	107.00	11.889	9					ICP-MS
F048	89.00	12.714	7	ELEL H				ICP
F060	86.50	12.357	7					
F094	72.00	9.000	8	VLVL				ICP-MS
F096	133.50	14.833	9					ICP-MS
F133	38.50	4.278	9	ELEL	BIASED LOW	-54.25	1.1300	ICP-MS
F138	97.00	9.700	10					ICP-MS
F139	83.00	9.222	9					ICP-MS
F145	124.50	12.450	10	H H VH				ICP-AES
F153	55.00	6.875	8	VLL				GFAAS
F155	99.00	14.143	7					ICP

OVERALL AVERAGE RANK IS 10.291

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F010	22.50	2.500	9	VL	BIASED LOW	-46.94	1.4220	ICP-OES
F133	38.50	4.278	9	ELEL	BIASED LOW	-54.25	1.1300	ICP-MS
F153	55.00	6.875	8	VLL				GFAAS
F042	49.50	7.071	7	L				GFAAS
F015	63.00	7.875	8					ICP
F094	72.00	9.000	8	VLVL				ICP-MS
F011	81.50	9.056	9	L				ICP-MS
F139	83.00	9.222	9					ICP-MS
F037	85.00	9.444	9	EHHVL				ICP-MS
F022	94.50	9.450	10	HEHEHEHVL				ICP-AES
F003	85.50	9.500	9					ICP-OES
F138	97.00	9.700	10					ICP-MS
F038	113.50	11.350	10					ICP-MS
F046	107.00	11.889	9					ICP-MS
F060	86.50	12.357	7					
F145	124.50	12.450	10	HHVH				ICP-AES
F048	89.00	12.714	7	ELEL				ICP
F155	99.00	14.143	7					ICP
F096	133.50	14.833	9	VHVHH				ICP-MS
F025	134.50	14.944	9	HH				ICP-MS
F012	158.50	17.611	9	EHEHEHEHEH	BIASED HIGH	31.32	3.5689	ICP-MS

OVERALL AVERAGE RANK IS 10.291

PARAMETER: 38095 Strontium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 2.5000 BASIC ACCEPTABLE ERROR= 2.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE LAB NO	1 = TM-25.2 REPORTED VALUE	RANK	2 = TM-23.2 REPORTED VALUE	RANK	3 = TM-54.3D REPORTED VALUE	RANK	4 = TM-FSWAWA REPORTED VALUE	RANK	5 = TM-54A REPORTED VALUE	RANK	6 = TMDA-61 REPORTED VALUE	RANK
F003	136.	4.50	56.6	5.50	30.0	8.50	55.3	6.00	74.2	3.00	65.3	4.00
F009	134.	1.50	56.	3.50	29.	5.00	54.	2.00	74.	2.00	65.	3.00
F011	136.	4.50	56.6	5.50	28.1	4.00	55.8	7.00	75.1	6.50	65.7	5.00
F015	148.	16.00	62.	15.50	32.	17.00	60.	16.00	82.	15.50	71.	16.00
F022	150.	17.50	62.	15.50	22. EL	1.00	58.	12.00	80.	12.00	69.	11.00
F024	150.	17.50	61.	12.00	31.	12.50	59.	15.00	82.	15.50	71.	16.00
F025	140.	10.50	55.	2.00	27.	3.00	55.	4.00	75.	4.50	66.	7.00
F032	154.5 H	19.00	64.91	19.00	35.41 H	19.00	62.2	17.00	83.59	18.00	73.55	19.00
F032b	147.4787	15.00	61.1058	13.00	31.8918	16.00	62.2655	18.00	85.215	19.00	70.012	14.00
F038	139.	9.00	59.2	8.50	30.9	11.00	57.7	11.00	78.4	9.00	69.4	12.00
F046	137.	7.50	59.4	10.00	30.7	10.00	57.2	8.00	77.9	8.00	68.2	9.00
F048	143.4	13.00	60.65	11.00	31.69	15.00	58.78	13.00	80.47	13.00	69.96	13.00
F060	147.	14.00	61.3	14.00	31.3	14.00	63.	19.00	83.3	17.00	72.1	18.00
F094	134.	1.50	62.1	17.00	32.8	18.00	57.6	10.00	81.	14.00	68.5	10.00
F096	137.	7.50	57.2	7.00	29.8	7.00	55.	4.00	75.1	6.50	65.8	6.00
F133	140.0	10.50	59.2	8.50	29.6	6.00	58.8	14.00	79.4	10.00	67.0	8.00
F138	141.	12.00	62.6	18.00	31.0	12.50	57.5	9.00	79.8	11.00	71.0	16.00
F139	136.	4.50	54.2	1.00	26.02 L	2.00	52.	1.00	73.1	1.00	63.1	1.00
F153	172. EH	20.00	115. EH	20.00	105. EH	20.00	97. EH	20.00	114. EH	20.00	96. EH	20.00
F155	136.	4.50	56.	3.50	30.	8.50	55.	4.00	75.	4.50	64.	2.00
MEDIAN	140.0000		60.0250		30.8000		57.6500		79.6000		68.7500	
1CRIT	10.7500		5.9515		4.1980		5.8090		7.1260		6.4750	
N	17		18		18		18		18		18	
MEAN	142.2576		59.6037		30.4562		57.8970		78.9708		68.4734	
3STDEV	17.6454		8.1971		6.2626		7.8475		10.3955		8.0352	

PARAMETER: 38095 Strontium ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F003	112.	1.50	191.	4.50	256.	4.50	370.	3.00
F009	112.	1.50	188.	1.50	253.	2.00	374.	5.50
F011	115.	8.50	194.	6.00	252.	1.00	374.	5.50
F015	124.	15.00	210.	16.50	284.	16.00	416.	17.00
F022	123.	14.00	209.	14.50	275.	13.00	395.	11.00
F024	130. H	19.00	210.	16.50	280.	14.00	420. H	18.00
F025	114.	5.50	191.	4.50	261.	8.00	388.	10.00
F032	129. H	18.00	216.	19.00	290.7 H	20.00	421.7 H	20.00
F032b	125.2741	17.00	215.667	18.00	285.738	17.00	421.4525 H	19.00
F038	121.	12.00	205.	13.00	281.	15.00	402.	15.00
F046	118.	10.00	202.	11.00	272.	12.00	401.	14.00
F048	120.96	11.00	201.9	10.00	270.9	11.00	397.0	12.00
F060	125.	16.00	209.	14.50	286.	18.50	407.	16.00
F094	114.	5.50	188.	1.50	256.	4.50	347. VL	2.00
F096	114.3	7.00	194.7	7.00	260.4	6.00	378.2	8.00
F133	115.0	8.50	196.5	9.00	270.	10.00	377.	7.00
F138	122.	13.00	204.	12.00	266.	9.00	400.	13.00
F139	113.5	4.00	194.9	8.00	260.5	7.00	385.6	9.00
F153	140. EH	20.00	232. EH	20.00	286.	18.50	332. EL	1.00
F155	113.	3.00	189.	3.00	255.	3.00	371.	4.00
MEDIAN	119.4800		201.9500		270.4500		391.5000	
1CRIT	9.5188		14.4670		18.5770		25.8400	
N	17		17		18		18	
MEAN	119.8255		201.9804		269.9188		390.2362	
3STDEV	16.4955		25.5255		34.5835		58.0766	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	45.00	4.500	10		BIASED LOW	-5.53	0.4713	ICP-OES
F009	27.50	2.750	10		BIASED LOW*	-4.90	-1.1587	ICP-MS
F011	53.50	5.350	10					ICP-MS
F015	160.50	16.050	10		BIASED HIGH	6.26	-2.0135	ICP
F022	121.50	12.150	10	EL				ICP-AES
F024	156.00	15.600	10	H H				ICP-AES
F025	59.00	5.900	10					ICP-AES
F032	188.00	18.800	10	H H H H H	BIASED HIGH	7.47	0.5301	ICP-AES
F032b	166.00	16.600	10	H	BIASED HIGH	7.67	-2.2977	ICP-MS
F038	115.50	11.550	10					ICP-MS
F046	99.50	9.950	10					ICP-MS
F048	122.00	12.200	10					ICP
F060	161.00	16.100	10		BIASED HIGH*	4.28	0.4057	
F094	84.00	8.400	10	VL				ICP-MS
F096	66.00	6.600	10					ICP-AES
F133	91.50	9.150	10					ICP-MS
F138	125.50	12.550	10					ICP-MS
F139	38.50	3.850	10	L	BIASED LOW*	-0.61	-5.2597	ICP-OES
F153	179.50	17.950	10	EHEHEHEHEHEHEHEH EL	BIASED HIGH	-26.88	65.0480	GFAAS
F155	40.00	4.000	10		BIASED LOW	-5.45	0.1131	ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 10.500

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F009	27.50	2.750	10		BIASED LOW*	-4.90	-1.1587	ICP-MS
F139	38.50	3.850	10	L	BIASED LOW*	-0.61	-5.2597	ICP-OES
F155	40.00	4.000	10		BIASED LOW	-5.45	0.1131	ICP
F003	45.00	4.500	10		BIASED LOW	-5.53	0.4713	ICP-OES
F011	53.50	5.350	10					ICP-MS
F025	59.00	5.900	10					ICP-AES
F096	66.00	6.600	10					ICP-AES
F094	84.00	8.400	10	VL				ICP-MS
F133	91.50	9.150	10					ICP-MS
F046	99.50	9.950	10					ICP-MS
F038	115.50	11.550	10					ICP-MS
F022	121.50	12.150	10	EL				ICP-AES
F048	122.00	12.200	10					ICP
F138	125.50	12.550	10					ICP-MS
F024	156.00	15.600	10	HH				ICP-AES
F015	160.50	16.050	10		BIASED HIGH	6.26	-2.0135	ICP
F060	161.00	16.100	10		BIASED HIGH*	4.28	0.4057	
F032b	166.00	16.600	10	H	BIASED HIGH	7.67	-2.2977	ICP-MS
F153	179.50	17.950	10	EHEHEHEHEHEHEHEHEL	BIASED HIGH	-26.88	65.0480	GFAAS
F032	188.00	18.800	10	HHHHH	BIASED HIGH	7.47	0.5301	ICP-AES

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 10.500

PARAMETER: 81095 Thallium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.7500 BASIC ACCEPTABLE ERROR= 0.7500 CONCENTRATION ERROR INCREMENT= 0.0800

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	6.58	6.50	3.85	8.50	1.41	10.00	0.040	3.00	1.08	9.00	38.1	13.00
F011	6.2	3.00	3.6	4.00	1.4	8.00	<0.1	0.00	0.9	2.50	34.6	3.00
F012	7.	11.50	5. EH	13.50	2. EH	12.00	<2.	0.00	2. EH	10.00	38.	11.00
F014	6.8	10.00	3.9	10.00	1.4	8.00	<1.0	0.00	<1.0	0.00	39.	14.00
F025	7.	11.50	4.	11.00	1. EL	1.00	<1.	0.00	<1.	0.00	40.	15.00
F038	6.47	5.00	3.72	6.00	1.38	6.00	<0.05	0.00	0.90	2.50	37.1	5.00
F046	5.71 EL	1.00	3.25	1.00	1.26	2.00	<0.02	0.00	0.90	2.50	22.1 EL	1.00
F048	6.19	2.00	3.40	2.00	<1.0 EL	0.00	<1.0	0.00	<1.0	0.00	37.11	6.00
F060	9. EH	14.00	5. EH	13.50	<4.0	0.00	<4.0	0.00	<4.0	0.00	38.	11.00
F094	7.14	13.00	3.59	3.00	1.35	4.00	<0.5	0.00	0.93	6.00	37.6	8.00
F096	6.73	9.00	3.84	7.00	1.4	8.00	<0.1	0.00	0.94	7.00	38.	11.00
F133	6.35	4.00	3.70	5.00	1.30	3.00	<0.05	0.00	0.90	2.50	35.7	4.00
F138	6.58	6.50	3.85	8.50	1.37	5.00	0.004	1.00	0.952	8.00	37.3	7.00
F139	6.63	8.00	4.015	12.00	1.484	11.00	0.0055	2.00	0.907	5.00	37.72	9.00
F153	<8.	0.00	<8.	0.00	<8.	0.00	<8.	0.00	<8.	0.00	34.	2.00
F155	<110.	0.00	<110.	0.00	<110.	0.00	<110.	0.00	<110.	0.00	<110.	0.00
MEDIAN OR *TARGET												
CONC.	6.6050		3.8450		1.3900		*0.0050		0.9185		37.6000	
1CRIT	1.2184		0.9976		0.8012		0.7500		0.7635		3.6980	
N	12		11		10		1		9		13	
MEAN	6.6392		3.7695		1.3754		0.0055		0.9343		37.0946	
3STDEV	0.8914		0.5375		0.1762		-		0.1644		4.2044	

SAMPLE	7 = TMDA-62		8 = TMDA-63		9 = TMDA-64		10 = TMDA-65	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	53.1	12.00	103.	9.00	152.	9.50	212.	14.50
F011	50.9	5.00	98.8	3.00	144.	4.00	197.	5.00
F012	51.	6.00	100.	6.00	147.	5.00	196.	3.50
F014	53.	11.00	105.	12.50	155.	12.00	203.	8.00
F025	56.	15.00	110.	15.00	132. L	2.00	179. L	2.00
F038	52.7	9.50	104.	11.00	157.	14.00	208.	12.00
F046	23.1 EL	1.00	31.8 EL	1.00	36.6 EL	1.00	41.1 EL	1.00
F048	51.27	7.00	102.7	8.00	149.0	7.00	205.7	10.00
F060	54.	13.00	105.	12.50	156.	13.00	212.	14.50
F094	55.	14.00	109.	14.00	159.	15.00	218.	16.00
F096	52.7	9.50	99.6	5.00	142.6	3.00	196.	3.50
F133	49.3	3.00	98.9	4.00	150.0	8.00	199.5	6.00
F138	51.7	8.00	101.	7.00	148.	6.00	204.	9.00
F139	50.85	4.00	103.13	10.00	152.99	11.00	207.86	11.00
F153	49.	2.00	98.	2.00	152.	9.50	201.	7.00
F155	<110.	0.00	<110.	0.00	160.	16.00	209.	13.00
MEDIAN OR *TARGET								
CONC.	51.7000		102.7000		151.0000		203.5000	
1CRIT	4.8260		8.9060		12.7700		16.9700	
N	13		13		14		14	
MEAN	51.8862		102.1639		149.7564		202.1471	
3STDEV	5.0244		9.1155		20.2183		24.9840	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	95.00	9.500	10					ICP-MS
F011	37.50	4.167	9		BIASED LOW*	-3.58	-0.2055	ICP-MS
F012	78.50	8.722	9	EHEH EH				ICP-MS
F014	85.50	10.688	8					ICP-MS
F025	72.50	9.062	8	EL L L				ICP-MS
F038	71.00	7.889	9					ICP-MS
F046	11.50	1.278	9	EL ELELELELEL	BIASED LOW	-79.78	5.8571	ICP-MS
F048	42.00	6.000	7	EL				ICP
F060	91.50	13.071	7	EHEH	BIASED HIGH*	3.24	0.5722	
F094	93.00	10.333	9					ICP-MS
F096	63.00	7.000	9					ICP-MS
F133	39.50	4.389	9					ICP-MS
F138	66.00	6.600	10					ICP-MS
F139	83.00	8.300	10					ICP-MS
F153	22.50	4.500	5					ICP-OES
F155	29.00	14.500	2		INSUFFICIENT DATA			ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 10.00

OVERALL AVERAGE
RANK IS 7.546

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F046	11.50	1.278	9	ELELELELELEL	BIASED LOW	-79.78	5.8571	ICP-MS
F011	37.50	4.167	9		BIASED LOW*	-3.58	-0.2055	ICP-MS
F133	39.50	4.389	9					ICP-MS
F153	22.50	4.500	5					ICP-OES
F048	42.00	6.000	7	EL				ICP
F138	66.00	6.600	10					ICP-MS
F096	63.00	7.000	9					ICP-MS
F038	71.00	7.889	9					ICP-MS
F139	83.00	8.300	10					ICP-MS
F012	78.50	8.722	9	EHEHEH				ICP-MS
F025	72.50	9.062	8	ELLL				ICP-MS
F003	95.00	9.500	10					ICP-MS
F094	93.00	10.333	9					ICP-MS
F014	85.50	10.688	8					ICP-MS
F060	91.50	13.071	7	EHEH	BIASED HIGH*	3.24	0.5722	
F155	29.00	14.500	2		INSUFFICIENT DATA			ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 10.00

OVERALL AVERAGE
RANK IS 7.546

PARAMETER: 92095 Uranium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.5000 BASIC ACCEPTABLE ERROR= 0.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	6.36	8.00	5.64	8.00	3.22	10.00	0.039	1.50	2.28	7.50	36.4	6.00
F009	6.3	6.50	5.6	6.50	3.1	7.00	<0.5	0.00	2.3	9.50	37.	9.00
F010	8. VH	16.00	9. EH	16.00	<5.	0.00	<5.	0.00	<5.	0.00	38.	12.00
F011	5.9	3.00	5.3	4.00	3.	4.50	<0.1	0.00	2.2	4.00	<0.1 EL	0.00
F012	6.	4.00	6.	13.50	3.	4.50	<2.	0.00	3. EH	15.00	35.	5.00
F014	6.6	13.00	5.8	9.50	3.3	11.00	<0.5	0.00	2.3	9.50	39.4	14.00
F022	50. EH	17.00	50. EH	17.00	50. EH	16.00	50. EH	6.00	50. EH	16.00	50. EH	16.00
F024	5.6 L	2.00	5.2	3.00	2.7	1.00	<0.5	0.00	2.1	2.00	33. L	3.00
F025	7.5 H	15.00	6.0	13.50	3.2	9.00	<0.4	0.00	2.2	4.00	41.1 VH	15.00
F038	6.51	10.50	5.82	11.00	4.09 H	15.00	0.05	4.50	2.22	6.00	37.3	11.00
F046	5.46 L	1.00	4.87 L	2.00	2.99	2.00	<0.1	0.00	2.28	7.50	23.6 EL	1.00
F048	6.14	5.00	5.44	5.00	3.00	4.50	<1.0	0.00	2.09	1.00	37.07	10.00
F060	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00	<50.	0.00
F094	6.5	9.00	4.7 L	1.00	3.	4.50	<0.1	0.00	2.2	4.00	29.1 VL	2.00
F096	6.51	10.50	5.92	12.00	3.37	12.00	<0.1	0.00	2.43	12.00	36.9	8.00
F133	6.55	12.00	5.80	9.50	3.45	13.00	0.05	4.50	2.45	13.00	33.7 L	4.00
F138	6.30	6.50	5.60	6.50	3.17	8.00	0.039	1.50	2.32	11.00	36.7	7.00
F139	6.937	14.00	6.143	15.00	3.56	14.00	0.0416	3.00	2.465	14.00	39.08	13.00
MEDIAN	6.5000		5.8000		3.1850		0.0458		2.2900		36.9500	
1CRIT	0.8600		0.8180		0.6611		0.5000		0.6074		2.6870	
N	15		15		14		3		14		14	
MEAN	6.5138		5.8755		3.2464		0.0472		2.3389		36.4107	
3STDEV	1.7493		2.6919		0.8813		-		0.6278		8.6685	

PARAMETER: 92095 Uranium ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F003	53.6	10.00	95.6	8.00	139.	7.00	212.	11.00
F009	54.	12.00	97.	11.00	142.	11.00	214.	13.00
F010	53.	9.00	92.	7.00	138.	6.00	208.	9.00
F011	50.9	6.50	89.4 L	5.00	133.	5.00	198.	7.00
F012	50.	4.50	85. VL	4.00	114. VL	3.00	192. L	6.00
F014	56.2	16.00	98.7	14.00	157. VH	16.00	238. VH	16.00
F022	50.	4.50	110. VH	18.00	96. VL	2.00	180. VL	2.00
F024	49. L	2.00	83. VL	3.00	121. VL	4.00	189. L	5.00
F025	60.2 EH	17.00	108. VH	16.00	161. VH	17.00	187. VL	4.00
F038	54.9	15.00	98.4	13.00	146.	14.00	218.	14.00
F046	26.1 EL	1.00	33.3 EL	1.00	38.5 EL	1.00	49.9 EL	1.00
F048	53.76	11.00	96.6	10.00	140.3	9.00	213.5	12.00
F060	<50.	0.00	80. VL	2.00	140.	8.00	200.	8.00
F094	54.3	13.00	97.4	12.00	143.	12.00	182. VL	3.00
F096	50.9	6.50	108.5 VH	17.00	166.5 VH	18.00	262.6 EH	17.00
F133	49.6	3.00	91.2	6.00	145.	13.00	219.	15.00
F138	52.6	8.00	95.7	9.00	141.	10.00	211.	10.00
F139	54.74	14.00	100.78	15.00	147.93	15.00		0.00
MEDIAN	53.0000		96.1500		140.6500		208.0000	
1CRIT	3.6500		6.2390		8.9090		12.9500	
N	15		16		16		15	
MEAN	52.5000		94.8300		137.7644		204.1000	
3STDEV	6.5405		23.0730		46.3243		46.9001	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	77.00	7.700	10					ICP-MS
F009	85.50	9.500	9					ICP-MS
F010	75.00	10.714	7	VHEH				ICP-AES
F011	39.00	4.875	8	EL L				ICP-MS
F012	59.50	6.611	9	EH VLVLL				ICP-MS
F014	119.00	13.222	9	VHVH				ICP-MS
F022	114.50	11.450	10	EHEHEHEHEHEH VHVLVL				ICP-AES
F024	25.00	2.778	9	L L L VLVLL	BIASED LOW	-10.67	-0.3323	Phosphorimetry
F025	110.50	12.278	9	H VHEHVHVHVL				ICP-MS
F038	114.00	11.400	10	H				ICP-MS
F046	17.50	1.944	9	L L ELELELELEL	BIASED LOW	-76.90	6.5955	ICP-MS
F048	67.50	7.500	9					ICP
F060	18.00	6.000	3	VL	INSUFFICIENT DATA			
F094	60.50	6.722	9	L VL VL				ICP-MS
F096	113.00	12.556	9	VHVHEH				ICP-MS
F133	93.00	9.300	10	L				ICP-MS
F138	77.50	7.750	10					ICP-MS
F139	117.00	13.000	9					ICP-MS

OVERALL AVERAGE
RANK IS 8.753

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F046	17.50	1.944	9	LLELELELELEL	BIASED LOW	-76.90	6.5955	ICP-MS
F024	25.00	2.778	9	LLLVLVLL	BIASED LOW	-10.67	-0.3323	Phosphorimetry
F011	39.00	4.875	8	ELL				ICP-MS
F060	18.00	6.000	3	VL	INSUFFICIENT DATA			
F012	59.50	6.611	9	EHVLVLL				ICP-MS
F094	60.50	6.722	9	LVLVL				ICP-MS
F048	67.50	7.500	9					ICP
F003	77.00	7.700	10					ICP-MS
F138	77.50	7.750	10					ICP-MS
F133	93.00	9.300	10	L				ICP-MS
F009	85.50	9.500	9					ICP-MS
F010	75.00	10.714	7	VHEH				ICP-AES
F038	114.00	11.400	10	H				ICP-MS
F022	114.50	11.450	10	EHEHEHEHEHEHVHVLVL				ICP-AES
F025	110.50	12.278	9	HVHEHVHVHVL				ICP-MS
F096	113.00	12.556	9	VHVHEH				ICP-MS
F139	117.00	13.000	9					ICP-MS
F014	119.00	13.222	9	VHVH				ICP-MS

OVERALL AVERAGE RANK IS 8.753

PARAMETER: 23095 Vanadium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.5000 BASIC ACCEPTABLE ERROR= 1.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	10.6	15.00	2.1	12.50	18.5	20.00	0.1	2.50	11.7	7.50	69.	9.50
F009	10.	7.50	2.	7.50	17.	9.50	<2.	0.00	11.	4.00	66.	2.50
F010	10.5	13.00	2.1	12.50	17.	9.50	0.6	5.00	12.4	16.00	69.	9.50
F011	10.6	15.00	2.	7.50	17.5	12.50	<0.1	0.00	11.7	7.50	70.2	11.00
F012	10.	7.50	2.	7.50	13. EL	2.00	<2.	0.00	11.	4.00	65. L	1.00
F014	11.2	22.00	2.6	18.00	18.3	18.50	1.0	6.00	12.1	15.00	72.5	20.00
F015	10.	7.50	<10.	0.00	20.	25.00	<10.	0.00	10.	2.00	80. EH	26.00
F019	12.	25.00	<5.	0.00	16.	5.00	<5.	0.00	13.	20.50	68.	6.00
F022	10.	7.50	5. EH	19.00	16.	5.00	5. EH	7.00	11.	4.00	71.	14.50
F024	8. EL	1.50	<1. EL	0.00	16.	5.00	<1.	0.00	12.	11.50	71.	14.50
F025	8. EL	1.50	<2.	0.00	8. EL	1.00	<2.	0.00	2. EL	1.00	68.	6.00
F032	11.73	24.00	2.09	11.00	21.71 VH	26.00	<0.9	0.00	13.05	22.00	76.85 H	25.00
F032b	11.3264	23.00	2.2319	15.00	19.5955	24.00	0.0488	1.00	13.4683	24.00	75.443	24.00
F038	10.	7.50	2.	7.50	18.	16.00	<1.	0.00	12.	11.50	71.	14.50
F046	10.3	12.00	1.97	4.00	17.2	11.00	<0.2	0.00	11.3	6.00	67.1	4.00
F048	11.06	20.00	2.27	16.00	18.69	21.00	<1.0	0.00	12.71	17.00	72.02	18.00
F060	9.	3.00	1. EL	1.50	16.	5.00	<1.0	0.00	12.	11.50	73.	21.00
F094	10.6	15.00	2.5	17.00	19.4	23.00	<0.1	0.00	13.2	23.00	75.	23.00
F096	10.9	18.00	<3.	0.00	17.5	12.50	<3.	0.00	12.9	19.00	71.7	17.00
F133	10.	7.50	1. EL	1.50	16.	5.00	<1.	0.00	12.	11.50	66.	2.50
F138	11.1	21.00	2.14	14.00	18.3	18.50	0.311	4.00	12.8	18.00	72.1	19.00
F139	<10.	0.00	<10.	0.00	16.93	8.00	<10.	0.00	<10.	0.00	68.8	8.00
F145	10.8	17.00	1.1 EL	3.00	17.8	14.00	0.1	2.50	14.	25.00	70.8	12.00
F153	10.	7.50	2.	7.50	18.	16.00	<1.	0.00	12.	11.50	68.	6.00
F154	11.	19.00	2.	7.50	19.	22.00	<1.	0.00	12.	11.50	74.	22.00
F155	10.	7.50	<5.	0.00	18.	16.00	<50.	0.00	13.	20.50	71.	14.50
MEDIAN	10.5000		2.0000		17.6500		0.3110		12.0000		71.0000	
1CRIT	2.0400		1.5300		2.4690		1.5000		2.1300		5.6700	
N	22		16		24		5		23		24	
MEAN	10.4871		2.0689		17.4881		0.4222		12.1012		70.7297	
3STDEV	1.8288		0.9245		4.4771		-		2.5221		8.4840	

PARAMETER: 23095 Vanadium ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F003	104.	6.50	180.	7.50	265.	6.50	354.	5.00
F009	101.	2.00	172. L	1.00	261.	3.00	358.	6.50
F010	105.	8.50	180.	7.50	265.	6.50	359.	8.50
F011	108.	14.00	187.	16.00	267.	8.00	353.	4.00
F012	98. L	1.00	173.	2.00	262.	4.00	347. L	2.00
F014	105.	8.50	182.	10.50	274.	12.50	384.	19.00
F015	110.	19.00	190.	19.00	290.	23.00	390.	22.00
F019	102.	3.50	178.	5.00	263.	5.00	358.	6.50
F022	110.	19.00	185.	13.00	290.	23.00	387.	21.00
F024	110.	19.00	190.	19.00	285.	19.00	375.	15.00
F025	104.	6.50	175.	3.00	254. L	1.00	350. L	3.00
F032	118.9 H	26.00	203.7 H	25.00	301.9 VH	25.00	405.5 H	25.00
F032b	118.8456 H	25.00	206.7757 VH	26.00	285.3863	20.00	391.459	23.00
F038	108.	14.00	190.	19.00	290.	23.00	380.	18.00
F046	102.	3.50	180.	7.50	273.	11.00	370.	12.00
F048	110.18	22.00	186.84	15.00	277.0	15.00	374.6	13.00
F060	112.	23.00	201. H	24.00	302. VH	26.00	410. H	26.00
F094	108.	14.00	182.	10.50	274.	12.50	365.	10.00
F096	107.9	12.00	187.2	17.00	280.6	17.00	374.8	14.00
F133	103.	5.00	176.	4.00	256. L	2.00	339. L	1.00
F138	110.	19.00	191.	21.00	280.	16.00	377.	16.00
F139	106.4	11.00	182.3	12.00	268.5	9.00	369.	11.00
F145	105.5	10.00	193.9	22.00	275.2	14.00	386.3	20.00
F153	110.	19.00	180.	7.50	271.	10.00	359.	8.50
F154	117. H	24.00	197.	23.00	289.	21.00	393.	24.00
F155	109.	16.00	186.	14.00	284.	18.00	379.	17.00
MEDIAN	108.0000		185.5000		274.6000		374.7000	
1CRIT	7.8900		12.5400		17.8860		23.8920	
N	24		24		24		24	
MEAN	107.7844		185.7059		276.1494		372.4857	
3STDEV	12.9045		23.2402		34.1538		45.7531	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	92.50	9.250	10					ICP-OES
F009	43.50	4.833	9	L	BIASED LOW*	-4.76	-0.8528	ICP-MS
F010	96.50	9.650	10					ICP-OES
F011	95.50	10.611	9					ICP-MS
F012	31.00	3.444	9	EL L L L	BIASED LOW	-6.25	-0.9992	ICP-MS
F014	150.00	15.000	10					ICP-MS
F015	143.50	17.938	8	EH				ICP
F019	76.50	9.562	8					ICP
F022	133.00	13.300	10	EH EH				ICP-AES
F024	104.50	13.062	8	ELEL				ICP-AES
F025	23.00	2.875	8	EL EL EL L L	BIASED LOW	-5.15	-3.8290	ICP-AES
F032	209.00	23.222	9	VH H H H VHH	BIASED HIGH	8.66	0.8960	ICP-AES
F032b	205.00	20.500	10	H VH	BIASED HIGH*	4.82	1.7379	ICP-MS
F038	131.00	14.556	9					ICP-MS
F046	71.00	7.889	9					ICP-MS
F048	157.00	17.444	9					ICP
F060	141.00	15.667	9	EL H VHH				
F094	148.00	16.444	9					ICP-MS
F096	126.50	15.812	8					ICP-AES
F133	40.00	4.444	9	EL L L	BIASED LOW	-8.46	1.3769	ICP-MS
F138	166.50	16.650	10					ICP-MS
F139	59.00	9.833	6					ICP-OES
F145	139.50	13.950	10	EL				ICP-AES
F153	93.50	10.389	9					ICP-OES
F154	174.00	19.333	9	H				ICP-MS
F155	123.50	15.438	8					ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 12.819

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F025	23.00	2.875	8	ELELELLL	BIASED LOW	-5.15	-3.8290	ICP-AES
F012	31.00	3.444	9	ELLLL	BIASED LOW	-6.25	-0.9992	ICP-MS
F133	40.00	4.444	9	ELLL	BIASED LOW	-8.46	1.3769	ICP-MS
F009	43.50	4.833	9	L	BIASED LOW*	-4.76	-0.8528	ICP-MS
F046	71.00	7.889	9					ICP-MS
F003	92.50	9.250	10					ICP-OES
F019	76.50	9.562	8					ICP
F010	96.50	9.650	10					ICP-OES
F139	59.00	9.833	6					ICP-OES
F153	93.50	10.389	9					ICP-OES
F011	95.50	10.611	9					ICP-MS
F024	104.50	13.062	8	ELEL				ICP-AES
F022	133.00	13.300	10	EHEH				ICP-AES
F145	139.50	13.950	10	EL				ICP-AES
F038	131.00	14.556	9					ICP-MS
F014	150.00	15.000	10					ICP-MS
F155	123.50	15.438	8					ICP
F060	141.00	15.667	9	ELHVHH				
F096	126.50	15.812	8					ICP-AES
F094	148.00	16.444	9					ICP-MS
F138	166.50	16.650	10					ICP-MS
F048	157.00	17.444	9					ICP
F015	143.50	17.938	8	EH				ICP
F154	174.00	19.333	9	H				ICP-MS
F032b	205.00	20.500	10	HVH	BIASED HIGH*	4.82	1.7379	ICP-MS
F032	209.00	23.222	9	VHHHHVHH	BIASED HIGH	8.66	0.8960	ICP-AES

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 12.819

PARAMETER: 30095 Zinc ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA
BURLINGTON ONTARIO

NWRI Interlab QA for Trace Elements

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 2.0000 BASIC ACCEPTABLE ERROR= 2.0000 CONCENTRATION ERROR INCREMENT= 0.0800

SAMPLE	1 = TM-25.2		2 = TM-23.2		3 = TM-54.3D		4 = TM-FSWAWA		5 = TM-54A		6 = TMDA-61	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	26.	27.00	15.0	19.00	27.0	9.50	<10.0	0.00	32.0	16.50	70.0	16.00
F003	22.9	7.00	11.0	7.50	27.6	13.00	3.2	11.00	28.6	9.00	69.0	12.50
F009	20. L	3.00	19. VH	24.00	25.	4.50	2.7	4.00	26. L	2.00	58. EL	1.00
F010	23.5	15.00	11.1	11.00	28.9	18.50	<1. L	0.00	30.	11.00	69.	12.50
F011	23.	10.00	32.6 EH	30.00	28.6	16.00	<10.	0.00	28.3	8.00	72.9	23.00
F012	24.	17.00	11.	7.50	24. L	2.50	9. EH	21.00	31.	13.00	68.	10.50
F014	23.	10.00	11.	7.50	29.	20.00	<5.	0.00	30.	11.00	73.	25.00
F015	25.	23.50	11.	7.50	28.	14.50	3.	8.50	32.	16.50	72.	22.00
F019	26.	27.00	22. VH	27.50	31.	26.00	5.	17.50	34.	27.00	73.	25.00
F022	22.	5.00	12.	13.50	27.	9.50	5.	17.50	30.	11.00	66.	5.00
F024	24.	17.00	9. L	3.00	28.	14.50	<5.	0.00	32.	16.50	71.	19.00
F025	20. L	3.00	8. VL	1.50	22. VL	1.00	<1. L	0.00	27. L	3.50	67.	8.50
F026	23.2	13.50	22.0 VH	27.50	29.7	21.00	<5.0	0.00	27.4 L	5.00	66.5	7.00
F031	20. L	3.00	8. VL	1.50	24. L	2.50	<5.	0.00	25. VL	1.00	61. L	2.00
F032	24.71	21.00	18.94 VH	23.00	30.27	23.00	2.808	6.00	32.61	22.00	71.05	21.00
F032b	26.958	30.00	20.8433 VH	26.00	31.9601	29.00	3.6739	13.00	33.6698	25.00	76.3002	30.00
F037	27.09	31.00	13.04	17.00	32.3	30.00	3.407	12.00	32.13	19.00	75.69	28.00
F038	25.	23.50	15.	19.00	31.	26.00	3.	8.50	34.	27.00	73.	25.00
F042	100.W	0.00	100.W	0.00	100.W	0.00	100.W	0.00	100.W	0.00	100.W	0.00
F046	24.6	20.00	12.4	15.00	28.7	17.00	2.89	7.00	28.0	6.50	66.4	6.00
F048	29.24 H	32.00	25.05 VH	29.00	34.69 H	32.00	5.05	20.00	36.24	29.00	84.02 EH	32.00
F060	25.8	25.00	17.1 VH	22.00	30.5	24.00	3.1	10.00	34.	27.00	75.9	29.00
F094	23.	10.00	13.	16.00	30.	22.00	2.	1.50	33.	23.50	71.	19.00
F096	23.2	13.50	15.7 H	21.00	33.5 H	31.00	2.8	5.00		0.00	70.4	17.00
F133	24.5	19.00	11.5	12.00	27.5	12.00	2.0	1.50	32.5	21.00	69.5	14.00
F135	23.	10.00	<20.	0.00	26.	6.00	<20.	0.00	28.	6.50	65.	4.00
F138	22.2	6.00	10.9	4.00	26.4	7.00	3.99	15.00	32.4	20.00	64.6	3.00
F139	26.413	29.00	20.16 VH	25.00	31.18	28.00	3.857	14.00	36.66 H	30.00	80.67 H	31.00
F145	24.9	22.00	15.	19.00	28.9	18.50	2.3	3.00	31.8	14.00	69.8	15.00
F147	19. L	1.00	<10.	0.00	25.	4.50	<10.	0.00	27. L	3.50	67.	8.50
F153	24.	17.00	11.	7.50	27.	9.50	5.	17.50	33.	23.50	71.	19.00
F154	26.	27.00	12.	13.50	31.	26.00	<5.	0.00	37. H	31.00	75.	27.00
F155	23.	10.00	11.	7.50	27.	9.50	5.	17.50	32.	16.50	68.	10.50
MEDIAN	24.0000		12.7000		28.6500		3.2000		32.0000		70.2000	
1CRIT	3.7600		2.8560		4.1320		2.0960		4.4000		7.4560	
N	30		27		30		18		29		30	
MEAN	23.8990		14.6938		28.5337		3.6542		31.2176		70.2903	
3STDEV	5.6379		12.9427		7.2607		2.7885		8.2061		12.1432	

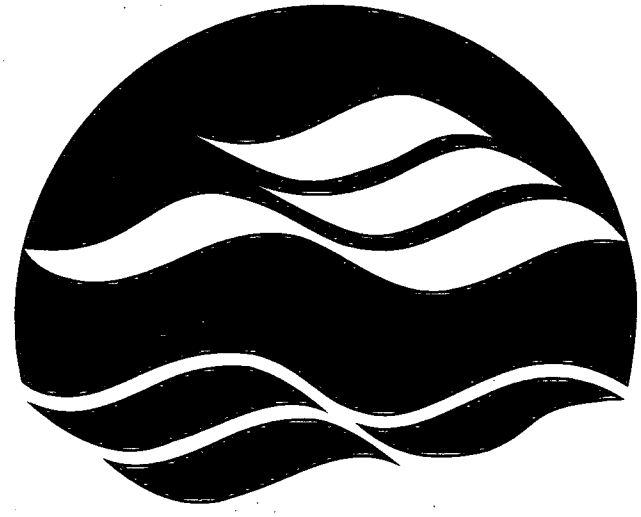
PARAMETER: 30095 Zinc ug/L

SAMPLE LAB NO	7 = TMDA-62 REPORTED VALUE	RANK	8 = TMDA-63 REPORTED VALUE	RANK	9 = TMDA-64 REPORTED VALUE	RANK	10 = TMDA-65 REPORTED VALUE	RANK
F002	109.	14.00	202.	13.50	305.	14.50	385.	12.00
F003	105.	9.00	185. L	5.00	276. L	5.00	401.	26.00
F009	92. VL	2.00	168. VL	1.00	263. VL	2.00	329. VL	1.00
F010	112.	18.50	207.	18.00	310.	18.00	389.	14.00
F011	82.4 EL	1.00	194.	9.50	303.	13.00	398.	22.00
F012	105.	9.00	177. L	3.00	271. L	3.00	351. L	5.00
F014	111.	17.00	203.	15.00	318.	24.00	396.	20.50
F015	114.	23.00	212.	25.00	324.	30.00	409.	29.00
F019	116.	27.00	214.	26.50	320.	26.50	403.	27.50
F022	109.	14.00	198.	12.00	302.	12.00	380.	9.50
F024	115.	25.50	210.	22.00	320.	26.50	400.	24.50
F025	106.	11.50	192.	7.50	291.	9.00	377.	8.00
F026	103.2	6.00	188.2	6.00	279.0 L	7.00	348.9 L	4.00
F031	95. L	3.00	175. VL	2.00	259. VL	1.00	344. L	2.00
F032	113.39	21.00	208.25	20.00	310.83	19.00	389.03	16.00
F032b	114.454	24.00	207.899	19.00	309.711	17.00	384.087	11.00
F037	124. H	31.00	210.	22.00	311.	20.50	390.	17.00
F038	115.	25.50	210.	22.00	320.	26.50	400.	24.50
F042	103.	5.00	218.	29.00	277. L	6.00	389.	14.00
F046	109.	14.00	195.	11.00	301.	11.00	396.	20.50
F048	131.06 VH	33.00	245.1 VH	33.00	347.7 H	33.00	437.0 H	33.00
F060	120.	28.50	229. H	31.00	342. H	32.00	432. H	31.00
F094	112.	18.50	204.	16.50	311.	20.50	380.	9.50
F096	113.7	22.00	210.3	24.00	312.9	22.00	392.3	18.00
F133	122.0 H	30.00	225. H	30.00	321.	29.00	399.	23.00
F135	99. L	4.00	182. L	4.00	274. L	4.00	348. L	3.00
F138	104.	7.00	192.	7.50	287.	8.00	356. L	6.00
F139	129.02 VH	32.00	238.82 VH	32.00	341.35 H	31.00	436.6 H	32.00
F145	109.1	16.00	215.5	28.00	308.1	16.00	403.	27.50
F147	105.	9.00	202.	13.50	305.	14.50	389.	14.00
F153	113.	20.00	204.	16.50	315.	23.00	395.	19.00
F154	120.	28.50	214.	26.50	320.	26.50	411.	30.00
F155	106.	11.50	194.	9.50	294.	10.00	369.	7.00
MEDIAN	111.0000		204.0000		309.7110		390.0000	
1CRIT	10.7200		18.1600		26.6169		33.0400	
N	31		31		31		31	
MEAN	110.4472		203.7732		304.6094		388.4167	
3STDEV	23.9311		42.8965		57.9038		65.2996	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	142.00	15.778	9					AAS
F003	105.00	10.500	10	L L				ICP-OES
F009	44.50	4.450	10	L VH L ELVLVLVLVL	BIASED LOW	-16.11	0.8200	ICP-MS
F010	136.50	15.167	9	L				ICP-OES
F011	132.50	14.722	9	EH EL				ICP-MS
F012	91.50	9.150	10	L EH L L L				ICP-MS
F014	150.00	16.667	9					ICP-MS
F015	199.50	19.950	10					ICP
F019	257.50	25.750	10	VH	BIASED HIGH*	2.61	2.7582	ICP
F022	109.00	10.900	10					ICP-AES
F024	168.50	18.722	9	L				ICP-AES
F025	53.50	5.944	9	L VLVLL L	BIASED LOW*	-3.31	-3.6778	ICP-AES
F026	97.00	10.778	9	VH L L L				ICP
F031	18.00	2.000	9	L VLL VLL L VLVLL	BIASED LOW	-12.97	-1.9877	ICP
F032	192.00	19.200	10	VH				ICP-AES
F032b	224.00	22.400	10	VH				ICP-MS
F037	227.50	22.750	10	H				ICP-MS
F038	227.50	22.750	10					ICP-MS
F042	54.00	13.500	4	L	INSUFFICIENT DATA			AAS
F046	128.00	12.800	10					ICP-MS
F048	306.00	30.600	10	H VHH EHVHVHH H	BIASED HIGH	11.71	5.0847	ICP
F060	259.50	25.950	10	VH H H H	BIASED HIGH	10.89	-0.5188	
F094	157.00	15.700	10					ICP-MS
F096	173.50	19.278	9	H H				ICP-AES
F133	191.50	19.150	10	H H				ICP-MS
F135	41.50	5.188	8	L L L L	BIASED LOW	-11.31	0.9630	AAS-FL
F138	83.50	8.350	10	L				ICP-MS
F139	284.00	28.400	10	VH H H VHVHH H	BIASED HIGH	11.43	2.3796	ICP-MS
F145	179.00	17.900	10					ICP-AES
F147	68.50	8.562	8	L L				ICP
F153	172.50	17.250	10					ICP-OES
F154	236.00	26.222	9	H	BIASED HIGH*	4.31	1.4190	ICP-MS
F155	109.50	10.950	10					ICP

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 5.00

OVERALL AVERAGE
RANK IS 16.194



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