Environment Canada Environnement Canada

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ECOSYSTEM PERFORMANCE EVALUATION QA PROGRAM

STUDY FP77 - TRACE ELEMENTS FALL 2000

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NLET-TN00-013

NATIONAL WATER RESEARCH INSTITUTE
INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

National Water Research Institute

National Laboratory for Environmental Testing

NLET-TN00-013

Ecosystem Performance Evaluation Quality Assurance Program Trace Elements and Mercury in Surface Waters*

Study FP 77 - Final Report

Fall 2000

by

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Project Information & Quality Management
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Burlington, Ontario

December 2000

*companion studies: Rain & Soft Waters NLET-TN00-014 and Major Ions & Nutrients/TotalP NLET-TN00-012

Management Perspective

Quality assured analytical results are critical when transforming environmental analytical data into useful scientific advice. In the area of water analysis, the NLET branch of NWRI provides a variety of QA products and services geared to assisting EC labs provide quality assured analytical results. One of the most valuable QA services provided is the performance evaluation (PE) studies. The PE studies conducted by NLET fill a parameter and concentration gap not covered by any other PE or proficiency testing (PT) program. Participant labs find the NLET PE studies very useful to improve the quality of their analytical processes, while project leaders use the results of these studies to enable them to better compare data generated from different laboratories, in both the private and public sector. These studies are provided to EC laboratories, affiliate institutions in Canada and the US, and other public and private laboratories for a cost recovery fee.

The PE studies are created using many water types of natural waters and their associated parameter groups as the raw material. The availability of so many different water types in Canada is ideally suited to the preparation of test samples spanning the complete range of available water matrices. Waters range from very soft natural rainwaters, to soft waters found in Ontario, Quebec and British Columbia and to hard surface waters found in the Prairies and Canadian groundwaters. The chemical composition of the natural waters are diverse, and include 50 different parameters for nutrients, minerals and trace elements. Special studies are provided for Total Phosphorus and ambient Mercury.

Evaluations of laboratory performance are timely and complete. Laboratories receive a preliminary report which discloses systematic bias and precision. The final reports, which are also scheduled, provide a complete listing of current and historical performance. Individual performance appraisals indicate areas and parameters where remedial action is required to improve performance. In this way, the PE studies are effective for improved performance of laboratories.

Methodologies and approaches in analytical laboratories change as research and monitoring programs evolve. The PE studies, while large in terms of the number of laboratories being assessed, are flexible enough to respond to these changing requirements. Feedback from laboratories is solicited and assessed on a regular basis, and changes to the studies are implemented to meet these new needs. One recent example of this change is the development of a customised PE study to assess trace elements in natural sediments for the Metals in the Environment (MITE) Program being conducted by Canadian universities. This study is being added to the PE program in the 2000-01 fiscal year.

Perspective de gestion

Il est crucial de disposer de résultats d'analyse ayant subi une assurance de la qualité (AQ) lorsqu'on transforme des données analytiques environnementales en conseils scientifiques utiles. Dans le domaine de l'analyse de l'eau, le LNEE de l'INRE offre une gamme de produits et de services AQ visant à aider les laboratoires d'EC à produire des données d'analyse dont la qualité est assurée. Parmi les services AQ les plus valables figurent les études d'évaluation de la performance (EP) interlaboratoires. Les études EP réalisées par le LNEE comblent une lacune. Aucun autre programme EP ou de vérification de la compétence (VC) n'avait permis de recueillir des données sur les paramètres et les concentrations. Les laboratoires participants estiment que les études EP du LNEE sont très utiles pour améliorer la qualité de leurs processus d'analyse. Les chefs de projet utilisent les résultats de ces études pour les aider à comparer des données provenant de laboratoires différents, privés ou publics. Ces études sont en effet réalisées pour des laboratoires d'EC, des institutions affiliées du Canada et des États-Unis et d'autres laboratoires publics et privés selon la formule de recouvrement des coûts.

Pour les études EP, on utilise comme échantillons bruts de nombreux types d'eau naturelle et leurs paramètres associés. Le grand nombre de types d'eau qui existent au Canada permet de préparer suffisamment d'échantillons d'essai pour couvrir l'éventail complet des matrices d'eau disponibles, allant des eaux de pluie naturelles très douces que l'on trouve en Ontario, au Québec et en Colombie-Britannique aux eaux superficielles dures des Prairies et aux eaux souterraines. La composition chimique des eaux naturelles varie et comporte 50 paramètres différents sur les nutriments, les minéraux et les éléments traces. Des études spéciales portent sur le phosphore total et le mercure ambiant.

Les évaluations de la performance des laboratoires sont exécutées au moment opportun et de façon exhaustive. Les laboratoires reçoivent un rapport provisoire indiquant le biais systématique et le niveau de précision. Les rapports finaux, dont la date de livraison est également fixée, contiennent toutes les données sur la performance tant actuelle qu'antérieure. Les évaluations individuelles de la performance indiquent les secteurs et les paramètres envers lesquels il faut prendre des mesures correctives pour améliorer la performance. Les études EP s'avèrent ainsi efficaces pour améliorer la performance des laboratoires.

À mesure que les programmes de recherche et de suivi évoluent, les méthodologies et les approches utilisées par les laboratoires d'analyse se transforment. Les études EP, bien que vastes, compte tenu du nombre de laboratoires évalués, sont suffisamment souples pour tenir compte des changements. Pour ce faire, on invite régulièrement les laboratoires à communiquer leurs commentaires et on s'en sert pour modifier les études. À titre d'exemple de changement, mentionnons la conception sur mesure d'une étude EP pour évaluer les éléments traces dans les sédiments naturels aux fins du programme Métaux dans l'environnement mis en oeuvre par des universités canadiennes. Cette étude s'ajoute au programme EP au cours de l'année financière 2000-2001.

Abstract

Performance evaluation studies are an important part of assuring the accuracy and integrity of analytic results. NLET provides these PE studies as part of its mandate. The branch provides this service to all EC laboratories and to many affiliated institutions in Canada and the US. Such a wide range of institutions and laboratories, in turn, provides a diversity of data which gives greater credibility to data analysis and laboratory performance statements.

Evaluation of the analytic results is the most visible aspect of PE studies. All results are evaluated for the two important aspects of data - systematic bias and precision. The former is extremely important for comparability of data sets from different origins and the latter, precision, is a measure of the reliability of the data. For the NLET PE studies, systematic bias is tested with the non-parametric method of Youden, and precision is tested against precision functions developed by the quality assurance staff. Both evaluations are totalled to give a performance rating for each laboratory.

Performance ratings for laboratories are given in relative terms. Laboratories are ranked from the best performance to the lowest (the least flagged results to the most flagged). In real terms, good laboratories have few flagged results and the laboratories with poor performance may have half their results flagged. These results are summarised in individual laboratory appraisals which are sent to the lab managers in a timely, expedient manner. This objective, third party performance rating is valued by the laboratory managers and data users alike.

Evaluations include historical listings of performance. With these historical listings laboratories may track their previous performance and see the effectiveness of their remedial action. This unique and highly developed tool helps many laboratories generate more reliable and accurate data.

Résumé

Les études d'évaluation de la performance (EP) constituent un volet important de l'assurance de l'exactitude et de l'intégrité des résultats d'analyse. Dans le cadre de son mandat, le LNEE offre ce service à tous les laboratoires d'EC et à ses nombreuses institutions affiliées du Canada et des États-Unis. En raison de leur grand nombre, ces institutions et laboratoires fournissent en contrepartie des données diversifiées qui ajoutent à la crédibilité des analyses et des énoncés sur la performance des laboratoires.

L'évaluation des données d'analyse est l'aspect le plus visible des études EP. Elle porte sur deux aspects importants – le biais systématique et la précision. Le premier aspect est essentiel à la comparaison d'ensembles de données de sources différentes; le second aspect permet de mesurer le degré de fiabilité des données. Aux fins des études EP du LNEE, on teste le biais systématique par la méthode non paramétrique de Youden, et la précision, au moyen de fonctions sur la précision mises au point par le personnel chargé de l'assurance de la qualité. Les deux évaluations sont combinées pour coter la performance de chaque laboratoire.

La performance des laboratoires est cotée en termes relatifs. Les laboratoires sont classés du plus performant au moins performant. En termes réels, les laboratoires performants ont un faible nombre de résultats marqués tandis que les laboratoires peu performants peuvent avoir la moitié de leurs résultats marqués. Les évaluations remises dans un délai raisonnable aux gestionnaires de laboratoire contiennent un résumé des données. Cette évaluation objective par une tierce partie est utile tant pour les gestionnaires que pour les utilisateurs des données.

Comme les évaluations contiennent des données sur les performances antérieures, les laboratoires peuvent comparer leur performance avant et après la prise de mesures correctives. Cet outil exceptionnel et perfectionné aide nombre de laboratoires à produire des données plus fiables et plus exactes.

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NWRI Performance Evaluation Quality Assurance Studies

NWRI's performance evaluation quality assurance (QA) studies support a core group of government labs and various environmental programs. The QA program also addresses health issues such as toxic metal (lead, manganese and mercury) contamination of drinking water. US government agencies as well as the Canadian Metals in the Environment (MITE) program participate in the semi-annual studies along with many global participants. More than 200 labs are invited to participate, with approximately 60 labs completing analyses of the various study matrices.

The primary feature of these studies is the quality of data produced by the participating labs. Lab 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 problem areas within labs, as well participation quantifies lab performance and data quality.

These NWRI studies are an independent client driven QA service with consulting on all aspects of the program. The format of this report has been revised by eliminating the duplication of Appendix A, which is available in any previous report. We expect this information to be on our website in the near future at www.cciw.ca/nwri/nlet/nlet.html.

NWRI studies run on a voluntary and cost recovery basis, which leads to ongoing interest in study design and sample requirements by lab and program managers. Proposals for specialised studies are welcomed.

Table 1 List of participating† laboratories in trace elements in surface waters and mercury study FP 77.

ALS Chemex
Analytical Service Laboratories
City of Calgary
Durham Regional Environmental Laboratory
Environment Canada - ECS, Atlantic
Environment Canada - EPL, Prairie and Northern
Environment Canada - NWRI, NLET
Environment Canada - PESC
Enviro-Test Laboratories
EPCOR Water Services
Frontier Geosciences Inc.
Intemin Segemar
Laboratoire de Santé Publique du Québec
Lakehead University - Centre for Analytical Services
Laurentian University - Elliot Lake Research Field Station
Maxxam Analytics Inc.
McGill University - Natural Resource Sciences
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, Ontario
New Brunswick Department of the Environment
Ontario Ministry of the Environment - Etobicoke
Ontario Ministry of Northern Development and Mines - Geosciences Lab
Ontario Power Technologies
Petroleo Brasileiro SA/ CENPES/DIQUIM/SEQUIN
Philip Analytical Services
Region of Ottawa-Carleton
Saint Mary's University - Department of Chemistry
Saskatchewan Research Council
TAIGA Environmental Lab
Université du Québec - INRS - Eau
University of Maine - WRI
University of Waterloo - Department of Biology

† Lab select their routine parameters for this study.

Table 2a Laboratory Performance Scores Study 77 Trace Elements in Water

	SYSTEMATIC BIAS			FLAGGED RESULTS			
LAB CODE	# ANALYZED PARAMETERS	# BIASES	% BIASED PARAMETERS	# RESULTS RANKED	# FLAGS ASSIGNED	% RESULTS FLAGGED	AVE. BIAS & FLAGS (%)
F163	8	0	0.00	66	2	3.03	1.52
F038	24	0	0.00	195	6	3.08	1.54
F032b	15	0	0.00	110	6	5.45	2.73
F002	18	0	0.00	153	12	7.84	3.92
F003	22	1	4.55	210	7	3.33	3.94
F064	20	0	0.00	172	15	8.72	4.36
F015	24	1	4.17	215	21	9.77	6.97
F143	17	1	5.88	123	11	8.94	7.41
F042	13	2	15.38	95	2	2.11	8.74
F153	19	0	0.00	133	24	18.05	9.02
F025	24	1	4.17	168	24	14.29	9.23
F147	13	1	7.69	83	9	10.84	9.27
F010	20	1	5.00	166	25	15.06	10.03
F169	5	0	0.00	37	8	21.62	10.81
F154	14	1	7.14	121	21	17.36	12.25
F019	14	0	0.00	91	23	25.27	12.64
F138	20	3	15.00	200	22	11.00	13.00
F037	13	1	7.69	108	23	21.30	14.49
F026	8	1	12.50	65	11	16.92	14.71
F096	24	4	16.67	175	23	13.14	14.90
F095	24	1	4.17	205	62	30.24	17.21
F094	24	4	16.67	190	34	17.89	17.28
F014	16	3	18.75	117	19	16.24	17.49
F009	19	5	26.32	163	22	13.50	19.91
F024	19	4	21.05	133	30	22.56	21.80
F031	12	3	25.00	91	17	18.68	21.84
F048	23	7	30.43	158	22	13.92	22.18
F139	19	2	10.53	131	52	39.69	25.11
F011	23	7	30.43	181	38	20.99	25.71
F133	24	7	29.17	192	50	26.04	27.60
F159	20	8	40.00	145	25	17.24	28.62
F022	24	8	33.33	186	48	25.81	29.57
F032	19	9	47.37	149	21	14.09	30.73
F062	23	8	34.78	177	51	28.81	31.80
F168	2	1	50.00	17	8	47.06	48.53
F173	3	1	33.33	30	23	76.67	55.00

Laboratory parameters are selected from:

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

Table 2b Laboratory Performance Scores Study 77 Total Mercury

	SYSTEMATIC BIAS			FLAGGED RESULTS			
LAB CODE	# ANALYZED PARAMETERS	# BIASES	% BIASED PARAMETERS	# RESULTS RANKED	# FLAGS ASSIGNED	% RESULTS FLAGGED	AVE. BIAS & FLAGS (%)
F002	1	0	0.00	9	0	0.00	0.00
F003	1	0	0.00	9	0	0.00	0.00
F032	1	0	0.00	10	0	0.00	0.00
F038	1	0	0.00	9	0	0.00	0.00
F069	1	0	0.00	3	0	0.00	0.00
F095	1	0	0.00	9	0	0.00	0.00
F163	1	0	0.00	10	0	0.00	0.00
F009	1	0	0.00	9	1	11.11	5.56
F010	1	0	0.00	8	1	12.50	6.25
F025	1	0	0.00	10	2	20.00	10.00
F138	1	0	0.00	10	2	20.00	10.00
F015	1	0	0.00	9	2	22.22	11.11
F172	1	0	0.00	8	2	25.00	12.50
F036	1	0	0.00	10	4	40.00	20.00
F062	1	0	0.00	5	3	60.00	30.00
F159	1	0	0.00	5	5	100.00	50.00
F042	1	1	100.00	10	1	10.00	55.00
F006	1	1	100.00	9	2	22.22	61.11
F019	1	1	100.00	8	2	25.00	62.50
F024	1	1	100.00	9	5	55.56	77.78

Table 3a

Summary of Study-to-Study Performance
Trace Elements

% BIASED PARAMETERS & FLAGGED RESULTS ON STUDIES

LAB	0068	0069	0070	0071	0072	0073	0074	0075	0076	0077	MEDIAN	RATING
F002	0.0	1.4	0.6	0.0	0.6	0.0	1.2	16.4	7.8	3.9	0.9	GOOD
F003	7.8	0.7	1.2	3.1	5.6	3.1	19.5	1.9	0.2	3.9	3.1	GOOD
F009	30.9	10.8	22.2	26.4	16.6	49.4	31.9	6.6	12.3	19.9	21.1	MODERATE
F010	12.5	-	20.2	9.6	20.5	10.3	12.1	9.0	3.8	10.0	10.3	SATISFACTORY
F011	3.7	22.7	14.0	10.0	15.8	5.0	4.5	33.2	5.5	25.7	12.0	SATISFACTORY
F014	26.9	30.9	9.6	19.0	15.1	14.0	2.1	1.4	9.7	17.5	14.6	MODERATE
F015	1.9	5.9	7.0	11.0	6.4	11.7	7.4	13.5	14.9	6.8	7.2	SATISFACTORY
F019	26.6	13.3	14.2	6.8	7.7	10.6	10.4	24.1	19.7	12.6	13.0	MODERATE
F022	28.2	-	-	34.3	12.6	-	21.7	10.2	24.6	28.9	24.6	MODERATE
F024	10.5	14.4	8.1	16.2	18.1	9.7	9.5	26.5	17.1	21.8	15.3	MODERATE
F025	-	-	59.0	24.0	51.9	27.1	30.9	80.9	10.3	8.9	29.0	MODERATE
F026	14.7	28.5	22.2	13.6	8.1	27.2	23.4	52.6	19.8	14.7	21.0	MODERATE
F031	28.3	32.3	32.8	48.6	32.5	40.2	29.8	18.5	11.9	21.8	31.1	POOR
F032	9.4	13.0	3.1	21.8	5.5	1.7	52.9	22.1	14.5	30.7	13.7	MODERATE
F032b	5.7	-	-	10.6	7.2	5.2	16.7	23.0	2.3	2.7	6.4	SATISFACTORY
F037	17.0	41.7	25.9	18.7	26.2	36.4	22.9	13.9	17.8	14.5	20.8	MODERATE
F038	4.0	5.4	5.3	4.2	4.2	1.9	3.2	3.7	0.5	1.5	3.9	GOOD
F042	-	-	-	-	-	-	18.1	6.9	21.5	8.7	13.4	MODERATE
F048	5.2	31.2	11.0	1.9	13.0	22.8	21.8	22.1	7.6	21.8	17.4	MODERATE
F062	-	24.6	-	-	-	-	-	-	-	31.0	27.8	MODERATE
F064	21.5	-	-	-	42.6	-	-	-	55.1	4.4	32.1	POOR
F094	37.3	4.8	6.5	9.8	14.0	11.6	16.6	9.9	19.5	16.9	12.8	MODERATE
F095	-	-	-	-	68.9	9.5	-	6.3	-	16.5	13.0	MODERATE
F096	32.2	-	7.4	10.5	17.6	4.6	9.7	13.0	14.7	14.5	13.0	MODERATE
F133	-	-	54.2	17.0	10.1	15.4	35.2	23.8	11.4	27.0	20.4	MODERATE
F138	-	-	20.0	3.6	-	20.5	5.0	30.2	31.9	13.0	20.0	MODERATE
F139	-	-	-	-	43.1	40.2	29.0	22.3	11.8	23.7	26.4	MODERATE
F143	-	-	-	-	-	17.2	17.6	9.0	-	7.4	13.1	MODERATE
F147	-	-	-	-	-	-	18.7	2.2	-	9.3	9.3	SATISFACTORY
F153	-	-	-	-	-	-	15.4	21.2	14.5	9.0	15.0	MODERATE
F154	-	-	-	-	-	-	36.4	-	-	12.2	24.3	MODERATE
F159	-	-	-	-	-	-	-	30.6	32.9	28.1	30.6	POOR
F163	-	-	-	-	-	-	-	23.4	0.0	1.5	1.5	GOOD
F168	-	-	-	-	-	-	-	53.9	18.4	48.5	48.5	POOR
F169	-	-	-	-	-	-	-	6.9	6.7	10.8	6.9	SATISFACTORY
F173	-	-	-	-	-	-	-	-	-	55.0	-	-

INTERLAB MEDIAN	0068	0069	0070	0071	0072	0073	0074	0075	0076	0077
	14.7	14.4	14.0	11.0	15.1	11.7	18.1	18.5	14.5	14.5

STUDY DATES: 0068(Spring '96), 0069(Fall '96), 0070(Spring '97), 0071(Fall '97), 0072(02-MAR-1998), 0073(Fall '98), 0074(Spring '99), 0075(Fall '99), 0076(Spring '00), 0077(Fall '00).

DEFINITION OF RATING:

Good = 0 to 4.99%
Satisfactory = 5 to 12.49%
Moderate = 12.5 to 29.99%
Poor = >30%

Table 3b

Summary of Study-to-Study Performance
Total Mercury

% BIASED PARAMETERS & FLAGGED RESULTS ON STUDIES

LAB	0069	0071	0073	0075	0077	MEDIAN	RATING
F002	0.0	0.0	0.0	5.0	0.0	0.0	GOOD
F003	0.0	0.0	0.0	0.0	0.0	0.0	GOOD
F006	-	11.1	-	5.6	61.1	11.1	SATISFACTORY
F009	-	-	-	35.0	5.6	20.3	MODERATE
F010	-	11.1	5.6	0.0	6.2	5.9	SATISFACTORY
F015	0.0	0.0	75.0	72.2	11.1	11.1	SATISFACTORY
F019	-	-	-	80.0	62.5	71.2	POOR
F024	-	-	61.1	0.0	77.8	61.1	POOR
F025	-	0.0	5.6	100	10.0	7.8	SATISFACTORY
F032	0.0	0.0	-	0.0	0.0	0.0	GOOD
F036	80.0	0.0	0.0	85.0	20.0	20.0	MODERATE
F038	0.0	50.0	-	12.5	0.0	6.2	SATISFACTORY
F042	-	-	50.0	-	55.0	52.5	POOR
F062	-	-	-	-	30.0	-	-
F069	-	-	-	50.0	0.0	25.0	MODERATE
F095	-	-	-	-	0.0	-	-
F138	-	-	0.0	0.0	10.0	0.0	GOOD
F159	-	-	-	0.0	50.0	25.0	MODERATE
F163	-	-	-	0.0	0.0	0.0	GOOD
F172	-	-	-	-	12.5	-	-

INTERLAB MEDIAN	0069	0071	0073	0075	0077
	0.0	0.0	5.6	5.6	10.0

STUDY DATES: 0069(Fall '96), 0071(Fall '97), 0073(Fall '98), 0075(01-SEP-1999), 0077(Fall '00).

DEFINITION OF RATING:

Good = 0 to 4.99%
Satisfactory = 5 to 12.49%
Moderate = 12.5 to 29.99%
Poor = >30%

Table 4a Sample design for trace elements in water FP 77

Sample Number	Sample Name	Expected Copper concentration (μg/L)
FP77 TM-1	TM-Humb-95	1.53
FP77 TM-2	TM-FSKen	8.00
FP77 TM-3	TM-24.2	7.20
FP77 TM-4	TM-26.2	14.0
FP77 TM-5	TM-40	40.0
FP77 TM-6	TM-FSWawa	30.9
FP77 TM-7	TM-Lnglke A	47.8
FP77 TM-8	TMDA-61	67.7
FP77 TM-9	TMDA-63	196
FP77 TM-10	TMDA-54.3	454

Table 4b Sample design for Mercury FP 77

Sample Number	Sample Name	Design Value (µg/L)
FP77 HG-1	HG771	0.003
FP77 HG-2	HG772	0.050
FP77 HG-3	HG773	0.110
FP77 HG-4	HG774	0.167
FP77 HG-5	HG775	0.112
FP77 HG-6	HG776	0.190
FP77 HG-7	HG777	0.277
FP77 HG-8	HG778	0.323
FP77 HG-9	HG779	0.351
FP77 HG-10	HG7710	0.470

ALL SAMPLES PRESERVED WITH 1% SULPHURIC ACID AND 0.05% POTASSIUM DICHROMATE

Table 5a Summary of Median Values for Trace Elements - Study 77

PARAMETER		TM-Humb-95 Sample 1	TM-FS-Ken Sample 2	TM-24.2 Sample 3	TM-26.2 Sample 4	TM-40 Sample 5
Aluminum	µg/L	4.5950	61.000	30.000	65.850	38.300
Antimony	µg/L	0.2035	0.2090	2.6000	2.0300	43.000
Arsenic	µg/L	0.9000	0.3000	5.0000	7.4150	39.100
Barium	µg/L	21.600	11.200	8.7600	24.870	43.100
Beryllium	µg/L	0.0020	0.0020	2.0000	3.3000	46.800
Bismuth	µg/L	-	-	2.1800	4.4000	31.985
Cadmium	µg/L	0.0400	0.0100	4.1860	6.8000	43.206
Chromium	µg/L	0.5000	0.2000	4.7000	11.000	39.945
Cobalt	µg/L	0.0800	0.0200	6.0000	8.0000	41.000
Copper	µg/L	1.5250	8.0000	7.2000	14.000	40.000
Iron	µg/L	8.0000	10.150	10.800	21.150	41.050
Lead	µg/L	0.3300	0.1800	6.0370	9.7100	36.700
Lithium	µg/L	2.0000	1.4850	5.2000	6.8000	36.400
Manganese	µg/L	1.2000	1.1000	8.2740	16.440	41.600
Molybdenum	µg/L	1.3000	0.2000	5.5000	8.4700	43.100
Nickel	µg/L	1.2000	0.9000	4.9900	9.7900	43.000
Selenium	µg/L	0.2000	0.1500	3.1895	5.0000	45.690
Silver	µg/L	0.1500	0.2000	3.3300	6.3000	30.000
Strontium	µg/L	173.00	28.500	67.950	99.200	69.350
Thallium	µg/L	0.0100	0.0050	3.6600	5.0000	44.100
Uranium	µg/L	0.3700	0.0110	4.2100	7.4050	39.000
Vanadium	µg/L	0.3085	0.2100	6.9000	12.000	42.000
Zinc	µg/L	2.2000	4.0000	19.700	33.000	51.000

		TM-FSWawa Sample 6	TM-LngIkeA Sample 7	TMDA-61 Sample 8	TMDA-63 Sample 9	TMDA-54.3 Sample 10
Aluminum	µg/L	12.800	18.000	59.300	164.50	408.20
Antimony	µg/L	0.2150	0.1705	32.000	104.00	26.000
Arsenic	µg/L	1.2200	0.9000	33.000	94.300	44.700
Barium	µg/L	11.000	21.200	62.600	192.00	326.00
Beryllium	µg/L	0.0020	-	36.000	98.000	19.800
Bismuth	µg/L	0.5900	0.0200	25.720	96.750	21.968
Cadmium	µg/L	0.0100	0.1500	59.250	169.00	160.00
Chromium	µg/L	0.2000	0.3000	68.150	180.00	454.00
Cobalt	µg/L	0.0400	0.1000	62.100	190.00	318.00
Copper	µg/L	30.900	47.800	67.650	194.85	455.60
Iron	µg/L	10.000	124.70	79.950	202.20	400.98
Lead	µg/L	0.1430	7.6000	63.500	204.50	529.50
Lithium	µg/L	0.3370	0.6815	33.400	99.680	26.000
Manganese	µg/L	0.6000	16.080	74.000	200.00	275.00
Molybdenum	µg/L	0.2000	0.2000	72.450	153.76	310.20
Nickel	µg/L	0.5000	104.00	58.000	193.10	357.00
Selenium	µg/L	0.3000	0.7000	36.800	100.00	29.500
Silver	µg/L	0.2000	0.1200	13.700	11.910	14.100
Strontium	µg/L	55.250	57.900	67.000	199.00	613.50
Thallium	µg/L	0.0050	0.0080	36.625	100.40	27.250
Uranium	µg/L	0.0400	0.1235	34.700	91.600	60.000
Vanadium	µg/L	0.1215	0.4500	70.850	186.00	356.01
Zinc	µg/L	3.7930	13.000	69.550	205.00	554.50

Table 5b Summary of Median Values for Mercury - Study 77

PARAMETERS		HG77-1 Sample 1	HG77-2 Sample 2	HG77-3 Sample 3	HG77-4 Sample 4	HG77-5 Sample 5
Mercury	µg/L	0.0030	0.0502	0.1100	0.1670	0.1100

		HG77-6 Sample 6	HG77-7 Sample 7	HG77-8 Sample 8	HG77-9 Sample 9	HG77-10 Sample 10
Mercury	µg/L	0.1900	0.2770	0.3260	0.3510	0.4700

Appendix

Data & Evaluation Summary

FPTM STUDY 0077 DATA SUMMARY 2000-11-27 PAGE 1

PARAMETER: 13095 Aluminum ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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= TMHUMB-95	2= TMFS-KEN	3= TM-24.2	4= TM-26.2	5= TM-40	6= TMFS-WAWA	7= TM-LNGLKEA	8= TMDA-61	9= TMDA-63	10= TMDA-54.3
LAB NO	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE
F002	3.5	58.9	28.8	63.7	35.9	11.6	15.3	53.5	149.	396.
F003	4.25	63.3	31.4	69.1	42.2	13.0	18.7	60.5	177.	440.
F009	4.6	70.	34.	77. H	43.	15.	20.	67.	189. H	454. H
F010	<7.	59.	30.	62.	32.	9.	16.	51.	157.	390.
F011	<30.	53.	<30.	58.	31.	<30.	<30.	48. L	129. VL	369.
F014	3.9	53.7	25.7	5.6 EL	32.6	10.2	14.4	46.6 L	145.	326. EL
F015	4.0	63.5	30.5	68.2	40.1	12.6	17.9	59.7	167.7	430.1
F019	<30.	110. EH	30.	40. EL	<30.	<30.	<30.	40. VL	130. VL	400.
F022	1.387	50.462	21.466 L	53.033 L	18.978 VL	8.163	16.776	25.152 EL	144.7	355.393 L
F024	<5.	46. L	19. L	58.	22. VL	<5. EL	<5. EL	45. L	150.	400.
F025	<0.2	61.	29.	65.	37.	12.	17.	56.	200. VH	400.
F026	9.0	64.9	33.7	70.7	43.9	13.5	19.6	61.9	169.3	426.0
F031	<20.	60.	30.	70.	40.	<20.	20.	60.	170.	420.
F032	6.6	61.9	29.4	65.2	38.8	13.	18.9	59.6	165.	394.
F032b	<10.	65.2	30.1	68.4	38.3	13.0	18.7	60.7	168.	414.
F037	4.24	60.05	29.79	63.46	36.72	12.44	17.21	55.1	155.	392.
F038	5.	64.	31.	68.	40.	13.	19.	60.	162.	385.
F042	10.W	64.8	31.6	66.5	41.3	15.1	21.4	60.3	168.	410.
F048	3.09	60.82	29.29	66.66	37.7	11.73	17.19	58.85	199.41 VH	427.11
F062	<3.	58.	27.	63.	34.	11.	14.	55.	158.	408.
F064	7.5	67.4	34.6	68.8	42.6	18.3	21.3	60.4	165.9	408.4
F094	<10.	60.	30.	70.	50. H	10.	20.	60.	170.	410.
F095	<10.	41.4 EL	14.8 EL	50.5 L	17.1 EL	<10.	<10. EL	37.7 VL	193. H	418.
F096	4.59	53.2	26.1	58.4	32.3	10.8	15.1	50.5	144.	348. L
F133	26. EH	68.	45. EH	69.	48. H	30. EH	37. EH	68.	158.	391.
F143	<10.	61.	31.	64.	41.	13.	18.	61.	164.	427.
F147		63.2		78.4 H	50.9 VH			80.5 EH	187.7 H	432.1
F153	8.	77. VH	34.	86. VH	37.	13.	10. EL	59.	154.	432.
F154	10. H	70.	40. H	70.	40.	20. H	20.	60.	190. H	420.
F159	<5.	57.	27.	63.	35.	11.	15.	52.	150.	380.
MEDIAN	4.5950	61.0000	30.0000	65.8500	38.3000	12.8000	18.0000	59.3000	164.5000	408.2000
1CRIT	5.0000	10.6000	7.5000	11.0850	8.3300	5.7800	6.3000	10.4300	20.9500	45.3200
N	14	28	26	28	27	22	23	28	28	28
MEAN	5.5907	61.2619	29.7864	64.5733	37.4592	12.8305	17.8903	55.9768	164.3111	404.3965
3STDEV	6.3892	19.0585	12.0765	23.0375	19.7431	7.4547	6.4090	21.6357	49.0559	68.0126

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	83.00	8.300	10					ICP-MS
F003	200.00	20.000	10					ICP-MS
F009	238.50	23.850	10	H H	BIASED HIGH	11.40	1.2695	ICP-MS
F010	72.50	8.056	9					ICP-OES
F011	24.50	4.083	6	L VL	BIASED LOW	-9.22	-5.9438	ICP-MS
F014	40.00	4.000	10	EL L EL	BIASED LOW	-18.86	-3.6157	ICP-MS
F015	167.00	16.700	10					ICP-MS GFAA
F019	64.50	10.750	6	EH EL VLVL				ICP-OES
F022	30.00	3.000	10	L L VL EL L	BIASED LOW	-11.22	-7.0232	ICP-MS
F024	37.00	5.286	7	L L VLELELL	BIASED LOW*	1.21	-13.8816	ICP-AES
F025	126.00	14.000	9	VH				ICP
F026	221.00	22.100	10					I.C.P
F031	153.00	19.125	8					ICP
F032	143.50	14.350	10					ICP-AES
F032b	169.50	18.833	9					ICP-MS
F037	106.00	10.600	10					ICP-MS
F038	158.50	15.850	10					ICP-MS
F042	186.00	20.667	9					ICP-OES
F048	144.00	14.400	10	VH				ICP
F062	79.00	8.778	9					ICP-MS
F064	209.00	20.900	10					ICP-AES (USN)
F094	162.00	18.000	9	H				ICP-MS
F095	56.00	8.000	7	ELELL EL ELVLH				ICP
F096	53.00	5.300	10	L	BIASED LOW	-14.62	0.6510	ICP-MS
F133	217.50	21.750	10	EH EH H EHEH				ICP-MS
F143	162.50	18.056	9					ICP-SW2
F147	159.00	26.500	6	H VH EHH	BIASED HIGH*	3.54	11.2440	ICP
F153	176.50	17.650	10	VH VH EL				ICP-AES
F154	224.00	22.400	10	H H H H	BIASED HIGH*	2.78	5.3511	ICP-MS
F159	64.00	7.111	9					ASTM D 5673

* 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 14.438

PARAMETER: 51095 Antimony ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	0.1	<0.1	2.8	2.1	41.3	<0.1	0.2	32.8	106.	24.6
F003	0.2	<0.2	2.5	2.2	43.2	0.3	0.2	34.7	104.	25.9
F009	<0.1	<0.1	2.5	1.9	45.	<0.1	<0.1	32.	101.	29. H
F011	0.5	0.3	3.0	2.1	51.4 VH	0.9 H	0.6	31.7	204. EH	33.7 VH
F014	<1.0	2.2 EH	2.7	3.4 VH	56.6 EH	3.6 EH	4.9 EH	42.4 EH	127. VH	44.8 EH
F015	0.321	0.118	2.857	2.259	46.77	0.130	0.141	36.04 H	112.1	28.05
F022	<1.	<1.	2.306	1.834	38.894 L	<1.	<1.	30.48	98.459	23.996
F025	<0.2	<0.2	3.2	2.3	40.	<0.2	<0.2	32.	9.9 EL	14.0 EL
F031	<3.	<3.	4. EH	3. VH	42.	<3.	<3.	34.	103.	26.
F032	<0.5	<0.5	2.3	1.8	37.3 L	0.1	<0.5	29.6	89.8 VL	25.6
F038	0.18	<0.05	2.47	1.93	45.4	0.08	0.10	31.2	99.4	28.3
F048	<1.	<1.	2.91	2.31	45.14	<1.	<1.	35.75 H	110.84	26.73
F062	<0.3	<0.3	2.2	1.6	40.	<0.3	<0.3	29.0	94.5 L	24.5
F094	<0.8	<0.8	2.4	1.8	38.5 L	<0.8	<0.8	29.1	94. L	24.3
F095	<5.	<5.	<5.	5.3 EH	46.6	<5.	<5.	31.7	107.	32.5 VH
F096	<1.	<1.	2.35	1.82	39.6	<1.	<1.	29.7	94.9 L	27.9
F133	0.20	0.05	2.65	2.00	44.9	0.10	0.10	34.0	106.0	26.8
F138	0.207	0.049	2.63	2.06	40.6	0.79 H	0.107	32.6	106.	24.6
F139	1.70 EH	0.6	2.6	1.5	42.6			27.1 VL	106.1	21.5 VL
F153	<10.	<10.	<10.	<10.	51. VH	<10.	<10.	37. VH	105.	42. EH
F159	<1.	<1.	2.6	2.	43.	<1.	<1.	32.	100.	26.
MEDIAN	0.2035	0.2090	2.6000	2.0300	43.0000	0.2150	0.1705	32.0000	104.0000	26.0000
1CRIT	0.5000	0.5000	0.6680	0.6224	3.9000	0.5000	0.5000	3.0200	8.7800	2.5400
N	6	4	17	18	19	6	5	19	19	19
MEAN	0.2680	0.2670	2.6337	2.1341	43.4686	0.3867	0.2496	32.3879	103.4263	27.4724
3STDEV	0.3406	-	0.7392	1.2783	10.9261	0.9979	-	6.8965	23.9815	13.2944

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	75.50	9.438	8					ICP-MS
F003	84.50	9.389	9					Hydride, ICP-OES
F009	65.50	10.917	6	H				ICP-MS
F011	123.00	12.300	10	VHH EHVH				ICP-MS
F014	137.00	15.222	9	EH VHEHEHEHEHVHEH	BIASED HIGH	21.09	3.6716	ICP-MS
F015	118.00	11.800	10	H				ICP-MS GFAA
F022	27.00	4.500	6	L	BIASED LOW	-5.35	-0.4068	ICP-MS
F025	52.50	8.750	6	ELEL				ICP
F031	82.00	13.667	6	EHVH				ICP
F032	23.00	3.286	7	L VL	BIASED LOW	-13.74	0.7826	Hydride AAS
F038	64.50	7.167	9					ICP-MS
F048	96.00	16.000	6	H	BIASED HIGH	6.42	0.0980	ICP
F062	19.50	3.250	6	L	BIASED LOW	-8.95	0.1545	ICP-MS
F094	20.50	3.417	6	L L	BIASED LOW	-9.77	0.1594	ICP-MS
F095	80.50	16.100	5	EH VH	BIASED HIGH*	-0.56	3.4466	ICP
F096	37.00	6.167	6	L				ICP-MS
F133	86.50	8.650	10					ICP-MS
F138	77.50	7.750	10	H				ICP-MS 1638
F139	52.50	6.562	8	EH VL VL				ICP-MS
F153	71.00	17.750	4	VH VH EH	INSUFFICIENT DATA			ICP-AES
F159	59.50	9.917	6					ASTM D 5673

* 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 9.497

PARAMETER: 33095 Arsenic ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	0.9	<0.5	4.7	7.4	39.1	1.3	1.	33.6	94.8	43.4
F003	0.5	<0.1	4.7	7.4	38.2	0.8	0.4	33.1	96.6	46.1
F009	0.9	0.3	5.0	7.8	42.	1.3	0.9	33.	96.	45.
F010	0.4	<0.2	4.2	7.2	35. L	0.6 L	0.4	30.	85. L	41.
F011	<1.	<1.	5.1	7.8	42.3	1.1	<1.	33.8	95.1	44.8
F014	<1.5	<1.5	5.2	7.7	41.5	<1.5	<1.5	35.5	98.7	45.2
F015	0.9	0.3	4.7	7.2	39.2	1.1	0.8	33.4	94.3	44.2
F022	0.659	0.242	4.544	7.174	41.183	1.172	0.191 L	33.206	96.844	45.955
F024	<2.	<2.	5.	7.	38.	<2.	<2.	33.	91.	45.
F025	0.6	<0.2	4.3	6.7	25. EL	2.8 EH	0.6	24.0 VL	76.0 VL	36.0 VL
F031	<2.	<2.	4. L	7.	34. L	<2.	<2.	28. VL	81. VL	40. L
F032	0.4	<0.1	5.0	8.0	19.1 EL	0.4 L	0.3 L	16.0 EL	55.1 EL	20.0 EL
F037	1.256	0.7804	5.163	7.764	40.47	1.556	1.424	32.86	93.67	44.23
F038	0.9	0.3	5.0	7.9	41.3	1.2	0.8	33.8	97.8	46.3
F042	2.0W	2.0W	3.51 VL	6.10 L	41.0	2.0W	2.0W	33.6	97.1	42.7
F048	<1.	<1.	5.73	8.38	46.05 VH	1.59	1.07	36.65 H	103.98 H	52.65 VH
F062	1.1	0.4	6.0 H	9.1 VH	48.5 VH	1.5	1.1	41.0 EH	116. EH	54.4 EH
F064	<1.	<1.	5.5	7.7	38.1	<1.	<1.	33.2	98.2	45.8
F094	0.9	<0.4	4.7	7.3	38.	1.3	1.	31.7	91.	44.3
F095	<5.	<5.	<5.	<5. VL	35.6	<5.	<5.	26.8 VL	90.6	41.1
F096	1.09	<1.	4.85	7.43	39.8	1.24	<1.	32.6	92.6	44.3
F133	<1.	<1.	5.	8.	43. H	1.	<1.	37. H	100.	51. VH
F138	0.61	0.23	4.84	7.20	39.5	0.72	0.60	32.3	88.9	45.3
F139	1.537 H	0.498	3.801 L	4.563 EL	35.056 L	1.037	0.932	28.274 VL	105. H	41.844
F143	<4.	<4.	<4. L	5. VL	38.	<4.	<4.	30.	85. L	45.
F153	<4.	<4.	7. EH	5. VL	38.	<4.	<4.	34.	90.	43.
F154	1.4	0.9 H	5.2	8.0	41.9	1.5	1.2	34.2	95.3	44.7
F159	1.	<1.	5.2	7.6	39.	1.3	1.2	33.	93.	45.
F163	<3.0	<3.0	3.8 L	7.7	39.	<3.0	<3.0	32.9	92.	44.5
MEDIAN	0.9000	0.3000	5.0000	7.4150	39.1000	1.2200	0.9000	33.0000	94.3000	44.7000
1CRIT	0.5320	0.5000	0.8600	1.0532	3.5880	0.5576	0.5320	3.1000	8.0040	4.0360
N	14	7	25	26	27	18	15	27	27	27
MEAN	0.9082	0.4029	4.8491	7.2865	38.8614	1.1842	0.8201	32.3515	93.3146	44.3844
3STDEV	0.7410	0.5186	1.5868	2.4201	11.3497	0.8166	0.8606	8.4863	18.8307	9.1377

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	117.50	13.056	9					ICP-MS
F003	106.50	11.833	9					Hydride, ICP-OES
F009	149.50	14.950	10					ICP-MS
F010	41.00	4.556	9	L L L	BIASED LOW	-9.34	-0.1758	Hydride-AA
F011	129.50	18.500	7					GFAAS
F014	135.00	22.500	6		BIASED HIGH*	4.44	0.0605	ICP-MS
F015	107.50	10.750	10					ICP-MS GFAA
F022	117.00	11.700	10	L				ICP-MS
F024	73.00	12.167	6					ICP-AES
F025	48.50	5.389	9	ELEH VLVLVL	BIASED LOW	-21.53	-0.1967	ICP
F031	23.50	3.917	6	L L VLVLL	BIASED LOW	-14.01	0.3004	ICP
F032	49.50	5.500	9	ELL L ELELEL	BIASED LOW	-45.22	0.0239	Hydride AAS
F037	153.00	15.300	10					ICP-MS
F038	163.00	16.300	10					ICP-MS
F042	74.50	12.417	6	VLL				ICP-OES
F048	194.00	24.250	8	VH H H VH	BIASED HIGH	11.24	0.6369	ICP
F062	220.50	22.050	10	H VHVH EHEHEH	BIASED HIGH	23.02	0.0053	ICP-MS
F064	117.00	19.500	6					hydride - AAS
F094	94.00	10.444	9					ICP-MS
F095	22.00	5.500	4	VL VL	INSUFFICIENT DATA			ICP
F096	104.50	13.062	8					ICP-MS
F133	154.00	22.000	7	H H VH	BIASED HIGH	7.17	0.5931	ICP-MS
F138	90.50	9.050	10					HG-AFS
F139	88.00	8.800	10	H L ELL VLH				ICP-MS
F143	40.50	8.100	5	L VL L				ICP-SW2
F153	77.00	12.833	6	EHVL				ICP-AES
F154	186.00	18.600	10	H				ICP-MS
F159	138.00	15.333	9					ASTM D 5673
F163	70.50	11.750	6	L				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 13.184

PARAMETER: 56095 Barium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	21.6	11.2	8.8	24.8	42.9	10.8	21.3	62.5	201.	338.
F003	23.0	11.7	9.07	25.9	43.5	11.6	22.5	66.6	203.	342.
F009	22.	12.	8.8	25.	44.	11.	22.	63.	193.	330.
F010	21.	11.	8.6	24.3	41.9	10.7	20.4	61.2	187.	321.
F011	21.7	11.3	8.7	25.3	43.2	11.1	21.6	64.6	216. EH	342.
F014	22.	11.	<10.	26.	44.	11.	23.	66.	203.	341.
F015	21.69	11.39	8.75	24.87	43.61	11.07	21.74	63.02	192.	323.7
F019	21.	15. EH	9.	25.	40.	9. EL	21.	63.	187.	330.
F022	19.469	10.972	8.125	22.545 EL	37.747 EL	9.645	19.642	58.375	178.261 L	301.69 L
F024	22.	12.	9.	26.	45.	11.	22.	66.	205. H	350. H
F025	21.1	10.8	8.3	23.3	40.9	10.5	20.0	60.1	192.	325.
F031	24.	12.	10.	26.	46.	12.	22.	64.	198.	345.
F032	20.4	11.	8.67	24.3	41.8	10.6	20.	61.	188.	311.
F032b	22.8	11.4	9.29	25.5	46.4	11.2	21.6	62.4	196.	326.
F037	21.01	11.04	8.5	23.69	41.67	10.53	20.74	60.19	184.	316.
F038	23.1	11.5	8.76	25.5	46.0	11.6	21.8	67.3	195.	329.
F042	20.9	10.5	10.W	24.6	43.6	10.3	20.8	63.9	199.	337.
F048	23.48	12.23	9.21	25.45	44.78	11.17	23.06	65.51	196.55	328.62
F062	21.0	10.9	8.4	24.6	42.4	10.7	21.2	62.6	194.	321.
F064	21.2	11.3	8.7	25.5	43.4	11.2	20.8	63.3	191.9	325.5
F094	21.3	11.4	8.8	25.1	42.5	12.	21.2	62.1	188.	315.
F095	20.6	11.0	8.5	24.2	41.9	10.7	20.8	63.4	192.	327.
F096	21.4	10.8	8.30	23.9	42.3	10.8	20.9	62.5	192.	332.
F133	22.2	11.10	8.55	24.7	43.9	10.65	22.6	64.4	195.0	329.
F138	20.5	11.0	8.20	24.4	38.9 L	10.3	20.4	59.7	183.	290. EL
F139	22.	12.4	10.	24.9	42.	12.2	21.9	61.8	183.8	310.2
F143	20.	10.	8.	24.	44.	10.	18. EL	58.	181.	315.
F147	21.9	11.5	8.8	24.7	43.2	11.2	21.6	63.2	193.2	327.8
F153	19.	11.	12. EH	25.	43.	11.	20.	61.	185.	321.
F154	22.7	11.3	8.8	24.5	43.1	11.0	22.	62.3	191.	319.
F159	22.	11.	8.8	25.	43.	11.	21.	60.	190.	320.
MEDIAN	21.6000	11.2000	8.7600	24.8700	43.1000	11.0000	21.2000	62.6000	192.0000	326.0000
1CRIT	2.7060	2.0820	1.9356	2.9022	3.9960	2.0700	2.6820	5.1660	12.9300	20.9700
N	29	29	27	30	29	29	29	29	29	29
MEAN	21.5534	11.3011	8.7935	24.8670	42.9814	10.9091	21.2594	62.6791	192.3948	325.8452
3STDEV	2.7748	1.3609	1.3215	2.0451	4.5997	1.5321	2.4832	5.9352	18.5018	30.6859

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	176.50	17.650	10					ICP-MS
F003	267.50	26.750	10		BIASED HIGH	5.13	-0.0490	ICP-MS
F009	213.00	21.300	10					ICP-MS
F010	89.00	8.900	10					ICP-OES
F011	215.50	21.550	10	EH				ICP-MS
F014	218.50	24.278	9					ICP-MS
F015	178.50	17.850	10					ICP-MS GFAA
F019	147.00	14.700	10	EH EL				ICP-OES
F022	21.00	2.100	10	ELEL L L	BIASED LOW	-7.29	-0.3235	ICP-MS
F024	262.00	26.200	10	H H	BIASED HIGH	7.49	-0.8400	ICP-AES
F025	70.50	7.050	10		BIASED LOW*	0.08	-1.0913	ICP
F031	279.00	27.900	10		BIASED HIGH	5.11	-0.0235	ICP
F032	71.50	7.150	10		BIASED LOW*	-4.10	0.4044	ICP-AES
F032b	227.50	22.750	10					ICP-MS
F037	73.50	7.350	10		BIASED LOW*	-3.31	-0.1028	ICP-MS
F038	245.50	24.550	10		BIASED HIGH*	0.81	1.1374	ICP-MS
F042	130.00	14.444	9					ICP-OES
F048	259.00	25.900	10		BIASED HIGH*	0.82	1.1771	ICP
F062	116.00	11.600	10					ICP-MS
F064	172.50	17.250	10					ICP-AES (USN)
F094	159.00	15.900	10					ICP-MS
F095	112.50	11.250	10					ICP
F096	116.50	11.650	10					ICP-AES
F133	190.50	19.050	10					ICP-MS
F138	47.00	4.700	10	L EL	BIASED LOW	-9.99	1.6259	ICP-MS 1638
F139	176.50	17.650	10					ICP-OES
F143	47.50	4.750	10	EL	BIASED LOW*	-3.67	-0.7791	ICP-SW2
F147	193.00	19.300	10					ICP
F153	120.00	12.000	10	EH				ICP-AES
F154	163.50	16.350	10					ICP-MS
F159	139.50	13.950	10					ASTM D 5673

* 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 15.906

PARAMETER: 94095 Beryllium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	<0.1	<0.1	2.0	3.2	45.6	<0.1	<0.1	36.8	100.	20.2
F003	<0.002	<0.002	2.14	3.46	47.9	<0.002	<0.002	36.8	103.	20.5
F009	<0.1	<0.1	2.1	3.4	49.	<0.1	<0.1	38.	100.	21.
F010	<0.2	<0.2	2.	3.2	46.	<0.2	<0.2	34.7	96.	18.2
F011	<0.2	<0.2	1.9	3.4	43.5 L	<0.2	<0.2	33.5	91.8	18.1 L
F015	0.007	0.003	2.211	3.643	50.02	<0.002	<0.002	38.04	106.7 H	20.68
F019	<1.	<1.	2.	4. EH	45.	<1.	<1.	34.	93.	20.
F022	<1.	<1.	1.809	3.173	44.124	<1.	<1.	33.497	93.319	18.091 L
F024	<1.	<1.	2.	3.	51. H	<1.	<1.	39. H	105. H	21.
F025	<0.2	<0.2	2.0	3.4	45.1	<0.2	<0.2	34.	98.1	19.
F032	<0.03	<0.03	1.98	3.15	44.4	<0.03	<0.03	33.2 L	91.2 L	17.8 L
F032b	<1.	<1.	2.25	3.3563	49.4	<1.	<1.	38.9 H	96.6	20.
F038	<0.5	<0.5	2.1	3.5	46.5	<0.5	<0.5	37.4	96.9	18.7
F042	0.02W	0.02W	2.03	3.27	46.8	0.02W	0.02W	35.5	98.0	19.5
F048	<1.	<1.	2.16	3.68	53.73 VH	<1.	<1.	41.00 VH	111.60 VH	22.81 EH
F062	<0.3	<0.3	2.2	3.6	50.2 H	<0.3	<0.3	37.9	103.	20.5
F064	<0.4	<0.4	2.1	3.4	49.3	<0.4	<0.4	36.5	99.0	19.8
F094	<0.5	<0.5	1.9	2.9	46.	<0.5	<0.5	35.4	97.8	19.5
F095	0.2	0.1	1.9	3.2	45.3	0.1	0.2	34.4	96.4	18.0 L
F096	<1.	<1.	1.98	3.07	44.1	<1.	<1.	33.6	92.1	18.6
F133	<0.5	<0.5	2.0	3.5	52. VH	<0.5	<0.5	39.5 H	105.5 H	20.5
F138	0.002	0.005	2.16	3.30	46.7	0.008	0.002	37.9	99.4	19.1
F139	0.426	0.055	2.713 EH	2.917	61.457 EH	0.019		34.64	121.963 EH	19.361
F143	<1.	<1.	2.	3.3	49.	<1.	<1.	36.	97.	20.
F147					48.1			36.3	99.8	20.
F153	<1.	<1.	2.	3.	47.	<1.	<1.	35.	97.	20.
F159	<1.	<1.	2.	3.	44.	<1.	<1.	32. VL	86. VL	17. VL
MEDIAN OR CONC.	*TARGET *0.0020	*0.0020	2.0000	3.3000	46.8000	*0.0020	*0.0020	36.0000	98.0000	19.8000
1CRIT	0.5000	0.5000	0.5900	0.6680	3.2780	0.5000	0.5000	2.6300	6.3500	1.6580
N	2	2	24	24	25	1	2	25	25	25
MEAN	0.1035	0.0300	2.0463	3.2966	47.4510	0.0190	0.1010	36.0191	98.7288	19.5253
3STDEV	-	-	0.2925	0.6244	7.7982	-	-	5.7060	14.6355	2.9000

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING			BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	87.00	14.500	6							ICP-MS
F003	117.00	19.500	6							ICP-MS
F009	121.00	20.167	6							ICP-MS
F010	54.50	9.083	6							ICP-OES
F011	33.50	5.583	6	L		L	BIASED LOW	-6.46	-0.0667	ICP-MS
F015	145.00	18.125	8		H					ICP-MS GFAA
F019	71.50	11.917	6	EH						ICP-OES
F022	26.00	4.333	6			L	BIASED LOW*	-4.68	-0.3762	ICP-MS
F024	112.50	18.750	6	H	H H					ICP-AES
F025	66.00	11.000	6							ICP
F032	23.50	3.917	6		L L L		BIASED LOW	-6.74	-0.0492	ICP-AES
F032b	111.00	18.500	6		H					ICP-MS
F038	88.50	14.750	6							ICP-MS
F042	81.50	13.583	6							ICP-OES
F048	152.50	25.417	6	VH	VHVHEH		BIASED HIGH	14.00	0.0425	ICP
F062	133.00	22.167	6	H			BIASED HIGH	5.26	0.1125	ICP-MS
F064	101.50	16.917	6							ICP-AES (USN)
F094	52.00	8.667	6							ICP-MS
F095	52.00	5.200	10			L	BIASED LOW	-96.97	22.3890	ICP
F096	30.50	5.083	6				BIASED LOW	-6.04	-0.0032	ICP-AES
F133	129.50	21.583	6	VH	H H		BIASED HIGH	8.27	0.0110	ICP-MS
F138	100.50	10.050	10							ICP-MS 1638
F139	111.00	12.333	9	EH	EH	EH				ICP-MS
F143	85.50	14.250	6							ICP-SW2
F147	67.00	16.750	4				INSUFFICIENT DATA			ICP
F153	69.50	11.583	6							ICP-AES
F159	20.00	3.333	6		VLVLVL		BIASED LOW	-11.75	0.3835	ASTM D 5673

* 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 12.965

PARAMETER: 83095 Bismuth ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F011	<5.	<5.	<5.	<5.	<5. EL	<5.	<5.	<5. EL	<5. EL	<5. VL
F015	<0.02	<0.02	2.18	3.59	30.77	0.11	<0.02	26.24	100.8	18.82 L
F022	<1.	<1.	1.887	3.569 L	29.161	3.498 EH	<1.	24.943	89.529	22.436
F025	<1.	<1.	<1. VL	<1. EL	2. EL	<1.	<1.	2. EL	7. EL	1. EL
F038	<0.5	<0.5	2.7	4.4	35.7 H	<0.5	<0.5	30.0 VH	101.	21.5
F094	0.08	0.05	2.96 H	4.77	37.8 VH	0.77	0.15	30.7 VH	101.	23.4
F095	0.5	0.4	0.5 EL	9.8 EH	33.2	3.4 EH	9.1 EH	25.2	95.7	25.4 VH
F096	<0.1	<0.1	2.83 H	4.61	36.6 VH	0.41	<0.1	31.2 VH	97.8	22.6
F133	<0.05	<0.05	1.00 VL	1.50 EL	14.05 VL	0.10	0.05	12.45 VL	49.3 EL	8.20 VL
MEDIAN OR CONC.	*TARGET *0.0200	*0.0200	2.1800	4.4000	31.9850	0.5900	*0.0200	25.7200	96.7500	21.9680
1CRIT	0.5000	0.5000	0.6344	0.8120	3.0188	0.5072	0.5000	2.5176	8.2000	2.2174
N	2	2	5	5	6	4	1	6	5	6
MEAN	0.2900	0.2250	2.1194	4.1878	29.9135	1.1725	0.1500	24.9222	86.6258	19.4927
3STDEV	-	-	-	-	22.6477	-	-	18.0224	-	15.7603

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F011	0.00	-	0	EL ELELVL				ICP-MS
F015	27.00	3.857	7	L				ICP-MS GFAA
F022	25.00	3.571	7	L EH				ICP-MS
F025	4.00	1.000	4	VLELEL ELELEL				ICP
F038	32.50	5.417	6	H VH				ICP-MS
F094	50.50	5.050	10	H VH VH				ICP-MS
F095	41.00	4.100	10	ELEH EHEH VH				ICP
F096	40.00	5.714	7	H VH VH				ICP-MS
F133	13.00	1.625	8	VLELVL VLELVL				ICP-MS

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

OVERALL AVERAGE
RANK IS 3.949

PARAMETER: 48095 Cadmium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	<0.1	<0.1	4.2	6.8	44.	<0.1	0.2	60.8	172.	159.
F003	0.024	0.006	4.10	6.76	42.0	0.011	0.147	57.9	170.	160.
F009	<0.1	<0.1	4.3	6.9	44.	<0.1	0.2	60.	171.	162.
F010	0.04	0.01	4.2	6.7	42.	0.02	0.16	58.	163.	156.
F011	<0.1	<0.1	4.1	6.9	43.7	<0.1	0.2	59.5	181. H	163.
F014	<0.5	<0.5	4.1	7.1	45.0	<0.5	<0.5	61.6	168.	163.
F015	0.04	<0.01	4.36	7.08	45.45	0.02	0.19	61.61	173.7	164.3
F019	<4.	<4.	<4.	4. EL	44.	<4.	<4.	61.	168.	163.
F022	<0.1	<0.1	3.955	6.809	43.112	<0.1	0.135	59.774	171.799	156.418
F024	<1.	<1.	4.	6.	45.	<1.	<1.	62.	175.	165.
F025	<0.2	<0.2	3.9	6.5	40.8	<0.2	<0.2	56.7	170.	160.
F026	<2.	<2.	4.5	7.3	44.0	<2.	<2.	59.0	166.3	161.9
F031	<1.	<1.	5. EH	8.	46.	<1.	<1.	60.	169.	164.
F032	<0.6	<0.6	4.05	6.55	41.2	<0.6	<0.6	55.7	159.	147. L
F032b	<0.5	<0.5	4.27	7.35	47.1 H	<0.5	<0.5	60.4	174.	164.
F037	<0.1	<0.1	4.085	6.789	43.72	<0.1	0.1463	58.49	166.	156.
F038	<0.05	<0.05	3.89	6.70	42.9	<0.05	0.15	60.1	170.	154.
F042	0.5W	0.5W	3.90	6.54	40.9	0.5W	0.5W	56.0	159.	152.
F048	<1.	<1.	4.85	7.74	46.45	<1.	<1.	65.41 H	182.66 H	174.66 H
F062	<0.03	<0.03	4.51	7.58	47. H	<0.03	0.12	65.4 H	187. VH	173. H
F064	<0.03	<0.03	4.1	6.7	42.9	0.04	0.15	57.6	164.1	153.8
F094	<0.1	<0.1	3.9	6.3	41.1	0.2	0.2	55.4	158.	150.
F095	0.4	1.6 VH	3.8	6.2	42.0	0.7 EH	0.7 EH	58.0	164.	156.
F096	<0.1	<0.1	4.03	6.69	41.37	<0.1	0.14	56.3	163.1	158.6
F133	<0.1	<0.1	4.6	7.6	49.2 EH	<0.1	0.1	67.0 EH	185.0 H	177.5 EH
F138	0.034	0.006	4.23	6.92	44.6	0.013	0.138	61.9	177.	162.
F139	0.833	0.237	4.186	5.522	42.024	0.078	0.356 EH	48.089 EL	171.94	133.246 EL
F143	<1.	<1.	4.6	7.7	46.	<1.	<1.	60.	166.	160.
F147			4.2	6.4	41.8			57.5	163.2	152.4
F153	<1.	<1.	4.3	7.2	40.	<1.	<1.	54. L	158.	156.
F154	<0.2	<0.2	4.2	6.8	43.3	<0.2	<0.2	59.5	166.	155.
F159	<1.	<1.	4.1	6.8	43.	<1.	<1.	59.	170.	160.
F163	0.02	<0.02	3.91	6.59	41.4	<0.02	0.09	57.	161.	154.
F169	<0.010	<0.10	4.305	7.101	39. L	<0.10	0.136	57.	169.	160.
MEDIAN OR *TARGET CONC.	0.0400	0.0100	4.1860	6.8000	43.2060	*0.0100	0.1500	59.2500	169.0000	160.0000
1CRIT	1.0000	1.0000	1.1912	1.3480	3.5324	1.0000	1.0000	4.4950	11.0800	10.5400
N	5	2	31	32	32	6	17	32	31	32
MEAN	0.1076	0.1235	4.1913	6.8319	43.3696	0.0618	0.1687	59.1433	169.3484	159.2524
3STDEV	-	-	0.6929	1.4296	5.7060	0.1964	0.1663	7.7393	18.7978	17.4778

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	143.50	20.500	7					ICP-MS
F003	105.00	10.500	10					ICP-MS
F009	152.50	21.786	7					ICP-MS
F010	97.50	9.750	10					TM-1-2-4-6-7 GFAAS
F011	145.50	20.786	7	H				ICP-MS
F014	135.00	22.500	6					ICP-MS
F015	186.00	20.667	9					ICP-MS GFAA
F019	92.00	18.400	5	EL				ICP-OES
F022	106.00	15.143	7					ICP-MS
F024	128.50	21.417	6					ICP-AES
F025	60.50	10.083	6					ICP
F026	131.00	21.833	6					I.C.P.
F031	164.50	27.417	6	EH	BIASED HIGH*	0.41	1.2871	ICP
F032	34.50	5.750	6	L	BIASED LOW	-7.17	0.4659	ICP-AES
F032b	166.50	27.750	6	H	BIASED HIGH*	2.38	0.6884	ICP-MS
F037	93.50	13.357	7					ICP-MS
F038	92.00	13.143	7					ICP-MS
F042	28.50	4.750	6		BIASED LOW	-5.52	0.0501	ICP-OES
F048	194.00	32.333	6	H H H	BIASED HIGH	8.41	0.3539	ICP
F062	192.00	27.429	7	H H VHH	BIASED HIGH	9.49	0.0029	ICP-MS
F064	84.00	10.500	8					ICP-AES (USN) CONC
F094	44.00	5.500	8		BIASED LOW	-6.44	0.1208	ICP-MS
F095	88.00	8.800	10	VH EHEH				ICP
F096	62.00	8.857	7					ICP-MS
F133	198.50	28.357	7	EH EHH EH	BIASED HIGH	10.02	0.5791	ICP-MS
F138	166.00	16.600	10					ICP-MS 1638
F139	94.00	9.400	10	EHEL EL				ICP-MS
F143	145.00	24.167	6					ICP-SW2
F147	57.50	9.583	6					ICP
F153	68.50	11.417	6	L				ICP-AES
F154	95.00	15.833	6					ICP-MS
F159	104.00	17.333	6					ASTM D 5673
F163	47.00	5.875	8		BIASED LOW*	-4.26	0.0290	GFAAS, ICP-AES
F169	103.00	14.714	7	L				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 15.723

PARAMETER: 24095 Chromium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	<0.1	<0.1	4.2	10.5	38.3	<0.1	0.3	67.9	194. H	467.
F003	0.549	0.142	5.04	11.5	40.8	0.254	0.264	70.1	187.	452.
F009	0.5	0.2	4.9	12.	41.	0.1	0.3	71.	186.	495. H
F010	1.5	0.6	4.9	11.1	40.	0.7	0.9	68.	177.	452.
F011	<0.3	<0.3	4.9	11.8	41.7	<0.3	<0.3	75.3 H	215. EH	522. EH
F014	0.7	<0.5	4.6	10.8	40.0	<0.5	<0.5	67.8	176.	414. L
F015	0.5	<0.2	4.7	11.3	39.5	0.2	0.2	67.5	178.6	447.7
F019	<6.	<6.	<6.	8. EL	38.	<6.	<6.	68.	180.	466.
F022	<1.	<1.	4.063	10.512	37.177	<1.	<1.	60.794 L	176.056	429.839
F024	<1.	<1.	4.	11.	41.	<1.	<1.	71.	190.	480.
F025	<1.	<1.	5.	11.	39.	<1.	<1.	66.	170.	450.
F031	<1.	1.	6.	12.	42.	1.	<1.	70.	186.	455.
F032	<1.0	<1.0	4.54	10.7	37.1	<1.0	<1.0	63.3	168.	414. L
F032b	<5.	<5.	<5.	10.8	40.6	<5.	<5.	70.2	177.	451.
F037	<1.0	<1.0	4.773	11.2	39.59	<1.0	<1.0	68.46	181.	452.
F038	0.5	<0.5	4.9	11.5	41.5	<0.5	<0.5	68.3	180.	425. L
F042	2.0W	2.0W	4.55	11.1	39.9	2.0W	2.0W	68.9	182.	460.
F048	<1.	<1.	4.15	10.68	39.99	<1.	<1.	69.50	176.97	464.20
F062	<0.2	<0.2	4.4	10.8	38.6	<0.2	<0.2	67.5	178.	460.
F064	0.38	0.2	4.3	10.8	38.5	0.25	<0.2	67.1	176.1	438.6
F094	<0.4	<0.4	<0.4 EL	<0.4 EL	21.3 EL	<0.4	<0.4	54.6 EL	183.	493. H
F095	0.4	0.6	2.35 EL	8.8 EL	34.8 L	0.6	0.5	66.0	176.	454.
F096	<2.	<2.	7.9 EH	12.8	42.3	<2.	3.0 EH	73.9 H	190.	478.
F133	1.5	1.5	5.0	12.0	50.5 EH	2.5 EH	1.5	79.5 EH	205. EH	437.
F138	0.45	0.10	4.55	10.4	40.2	0.09	0.14	69.5	174.	458.
F139									190.5	461.6
F143	<1.	<1.	4.6	11.	38.	<1.	<1.	65.	173.	475.
F147			5.5	11.3	40.2			69.5	184.2	464.2
F153	<1.	<1.	5.	11.	38.	<1.	<1.	66.	169.	445.
F154	2. EH	2. EH	6.	12.	42.	1.	<1.	70.	183.	444.
F159	<1.	<1.	4.7	11.	39.	<1.	<1.	65.	180.	420. L
MEDIAN OR *TARGET										
CONC.	0.5000	*0.2000	4.7000	11.0000	39.9450	*0.2000	0.3000	68.1500	180.0000	454.0000
1CRIT	1.5000	1.5000	1.6920	2.0700	3.8067	1.5000	1.5000	5.4990	12.2100	28.6500
N	9	7	25	27	28	8	7	28	29	28
MEAN	0.7332	0.6060	4.7706	11.0590	39.5985	0.5130	0.5663	68.2698	181.3595	456.2549
3STDEV	1.2511	1.3885	1.4982	1.9430	5.1318	1.0183	1.3199	8.6831	22.5686	53.1403

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	88.50	12.643	7	H				ICP-MS
F003	147.50	14.750	10					ICP-MS
F009	162.50	16.250	10	H				ICP-MS
F010	121.50	12.150	10					ICP-OES
F011	158.50	26.417	6	H EHEH	BIASED HIGH	15.74	-1.0592	ICP-MS
F014	66.50	9.500	7	L				ICP-MS
F015	91.50	10.167	9					ICP-MS GFAA
F019	61.50	12.300	5	EL				ICP-OES
F022	27.00	4.500	6	L	BIASED LOW*	-4.91	-0.3546	ICP-MS
F024	120.50	20.083	6					ICP-AES
F025	67.50	11.250	6					ICP
F031	158.00	19.750	8					ICP
F032	23.50	3.917	6	L	BIASED LOW	-8.83	1.1240	ICP-AES
F032b	79.00	15.800	5					ICP-MS
F037	97.00	16.167	6					ICP-MS
F038	106.00	15.143	7	L				ICP-MS
F042	98.50	16.417	6					ICP-OES
F048	78.50	13.083	6					ICP
F062	69.50	11.583	6					ICP-MS
F064	58.00	6.444	9		BIASED LOW*	-3.25	0.1771	ICP-AES (USN)
F094	51.50	12.875	4	ELELEL EL H	INSUFFICIENT DATA			ICP-MS
F095	54.00	5.400	10	ELELL	BIASED LOW*	0.04	-1.5879	ICP
F096	175.50	25.071	7	EH EHH	BIASED HIGH*	4.81	1.9104	ICP-AES
F133	179.00	17.900	10	EHEH EHEH				ICP-MS
F138	81.00	8.100	10					ICP-MS 1638
F139	49.00	24.500	2		INSUFFICIENT DATA			ICP-OES
F143	66.00	11.000	6					ICP-SW2
F147	128.50	21.417	6					ICP
F153	59.00	9.833	6					ICP-AES
F154	159.00	17.667	9	EHEH				ICP-MS
F159	62.50	10.417	6	L				ASTM D 5673

* 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 13.576

PARAMETER: 27095 Cobalt ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	<0.1	<0.1	5.9	7.9	39.8	<0.1	<0.1	64.4	205. H	339. H
F003	0.014	0.016	6.35	8.38	42.3	0.006	0.064	64.7	203. H	319.
F009	<0.1	<0.1	6.3	8.5	42.	<0.1	<0.1	65.	195.	341. H
F010	1.4	0.9	6.1	9.	41.	<0.8	1.8 EH	62.	188.	315.
F011	<0.1	<0.1	6.3	8.6	42.8	0.1	0.1	68.5 H	230. EH	359. VH
F015	0.064	0.040	6.031	8.381	42.40	0.040	0.099	63.83	193.8	350.9 VH
F019	<5.	<5.	<5.	6. EL	40.	<5.	<5.	61.	190.	326.
F022	<1.	<1.	5.63	7.664	38.485	<1.	<1.	55.285 L	186.975	301.594
F024	<1.	<1.	6.	7.	42.	<1.	<1.	65.	200.	330.
F025	<0.3	<0.3	5.8	7.8	39.3	<0.3	<0.3	60.1	196.	317.
F032	<1.5	<1.5	6.	7.66	39.1	<1.5	<1.5	59.6	183.	295. L
F032b	<1.	<1.	6.24	8.41	45.8 EH	<1.	<1.	62.1	183.	296. L
F038	<0.1	<0.1	6.1	8.3	42.9	<0.1	<0.1	64.4	195.	300.
F048	<1.	<1.	5.35	7.48	40.68	<1.	<1.	62.82	184.23	319.36
F062	<0.3	<0.3	5.9	8.0	40.2	<0.3	<0.3	62.1	190.	319.
F064	<0.4	<0.4	5.6	7.8	40.2	<0.4	<0.4	61.9	185.9	314.3
F094	<0.1	<0.1	5.9	8.	39.9	0.2	<0.1	61.7	189.	307.
F095	0.7	0.4	2.4 EL	4.5 EL	37.6	0.3 EH	0.8	59.7	187.	317.
F096	<3.	<3.	7.5 EH	8.6	42.6	<3.	<3.	67.4 H	198.	335.
F133	0.08	0.02	6.06	8.24	41.6	0.06	0.10	64.0	185.0	313.
F138	0.091	0.049	6.11	8.29	41.0	0.15	0.14	64.6	193.	327.
F139	1.075	0.318	6.736	6.859	43.887	0.028	0.02	52.58 EL		
F143	<1.	<1.	5.2	8.2	41.	<1.	<1.	62.	185.	310.
F147				8.7	40.5			62.7	195.2	323.
F153	<1.	<1.	6.	8.	40.	<1.	<1.	61.	188.	325.
F154	<0.2	<0.2	6.2	8.2	42.2	<0.2	<0.2	63.9	191.	315.
F159	<1.	<1.	5.6	7.9	40.	<1.	<1.	59.	180.	300.
MEDIAN OR CONC.	*TARGET *0.0800	*0.0200	6.0000	8.0000	41.0000	*0.0400	0.1000	62.1000	190.0000	318.0000
1CRIT	1.5000	1.5000	1.7700	1.8900	3.8700	1.5000	1.5000	5.1360	12.8100	20.4900
N	5	5	23	25	25	6	6	25	24	24
MEAN	0.4020	0.1654	5.9742	7.9546	41.0341	0.0963	0.2172	62.4094	191.2544	319.1731
3STDEV	-	-	0.9994	1.8078	4.0374	0.1849	0.7847	7.3856	18.1962	40.2510

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	93.00	15.500	6	H H				ICP-MS
F003	130.50	13.050	10	H				ICP-MS
F009	130.00	21.667	6	H	BIASED HIGH	6.54	-1.3638	ICP-MS
F010	113.00	12.556	9	EH				ICP-OES
F011	158.50	19.812	8	H EHVH	BIASED HIGH	14.97	-0.4371	ICP-MS
F015	127.00	12.700	10	VH				ICP-MS GFAA
F019	50.00	10.000	5	EL				ICP-OES
F022	30.00	5.000	6	L	BIASED LOW*	-4.18	-0.5513	ICP-MS
F024	103.00	17.167	6					ICP-AES
F025	59.00	9.833	6					ICP
F032	28.50	4.750	6	L	BIASED LOW	-6.77	1.2603	ICP-AES
F032b	87.00	14.500	6	EH L				ICP-MS
F038	103.00	17.167	6					ICP-MS
F048	57.00	9.500	6					ICP
F062	74.00	12.333	6					ICP-MS
F064	49.50	8.250	6					ICP-AES (USN)
F094	62.00	8.857	7					ICP-MS
F095	55.50	5.550	10	ELEL EH	BIASED LOW*	-0.28	-1.3293	ICP
F096	142.50	23.750	6	EH H	BIASED HIGH*	4.88	0.5842	ICP-AES
F133	95.00	9.500	10					ICP-MS
F138	129.00	12.900	10					ICP-MS 1638
F139	68.00	8.500	8	EL				ICP-MS
F143	56.50	9.417	6					ICP-SW2
F147	90.00	18.000	5					ICP
F153	69.00	11.500	6					ICP-AES
F154	98.00	16.333	6					ICP-MS
F159	30.50	5.083	6		BIASED LOW	-5.74	0.5498	ASTM D 5673

* 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 12.176

PARAMETER: 29095 Copper ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	1.6	8.4	7.8	14.7	41.3	31.7	49.	70.1	217. VH	481.
F003	1.47	7.90	7.78	14.8	41.0	33.0	49.2	72.2	208. H	464.
F009	1.6	8.7	8.4	16.	44. H	35. H	50.	75. H	210. H	507. VH
F010	<0.9	7.1	6.6	13.9	39.	30.	49.	67.	191.	440.
F011	1.4	8.3	8.0	15.6	41.9	33.0	49.9	76.5 VH	242. EH	527. EH
F014	1.5	8.1	7.4	14.1	40.6	31.0	45.7	67.6	194.	413. L
F015	1.35	7.72	7.23	13.94	39.09	30.43	45.05	66.43	188.5	431.1
F019	<5.	<5. EL	<5. EL	6. EL	35. L	25. EL	39. VL	65.	194.	461.
F022	1.1	7.621	7.061	13.826	38.406	29.316	43.56	62.823	195.768	443.214
F024	<1.	8.	8.	14.	40.	31.	49.	71.	200.	460.
F025	1.6	7.9	7.4	13.6	38.8	29.8	43.3 L	65.9	202.	462.
F026	6.8 EH	10.7 H	8.2	14.8	41.8	33.0	47.5	68.2	189.9	443.5
F031	<3.	8.	5. EL	12.	40.	28.	52.	66.	196.	486. H
F032	<1.1	7.82	5.97	12.6	38.9	30.9	47.6	63.1	178. L	442.
F032b	<5.	7.76	7.44	14.7	43.3	30.6	46.0	66.6	186.	452.
F037	2.432	10.14 H	6.831	12.7	36.21	27.39 L	46.26	60.57 L	172. VL	386. EL
F038	1.5	8.2	7.6	14.8	41.1	31.8	48.1	68.7	198.	427.
F042	10.W	10.W	10.W	13.1	38.8	30.9	48.8	68.4	194.	428.
F048	<1.	7.41	6.88	13.94	39.73	30.69	48.98	70.19	190.99	462.40
F062	1.0	7.8	6.8	14.0	40.5	31.5	49.0	71.0	203.	468.
F064	2.5	9.6	7.4	13.7	44.7 H	33.1	54.3 VH	69.0	191.2	457.2
F094	1.7	7.4	6.8	14.	38.6	29.7	45.5	66.3	192.	431.
F095	0.4	6.25	5.7	12.7	38.2	29.6	44.6	65.8	192.	452.
F096	<5.	9.6	11.0 EH	15.5	42.3	32.0	50.3	74.6 H	209. H	482.
F133	0.9	7.6	7.0	14.2	41.0	37.0 EH	49.0	71.0	197.0	444.
F138	1.55	8.07	7.71	14.2	38.7	28.6	46.0	69.9	206.	460.
F139								28.6 EL	171.2 VL	477.7
F143	3.	9.	7.	13.	44. H	31.	52.	64.	190.	464.
F147		8.1	7.1	14.8	40.5	31.6	47.8	69.6	195.7	448.6
F153	<2.	8.	7.	14.	39.	30.	46.	67.	184.	467.
F154	1.9	8.7	8.4	14.7	42.4	32.6	49.0	72.4	204.	454.
F159	1.4	7.5	7.1	14.	38.	29.	43. L	64.	180. L	430.
F163	<2.0	7.5	7.2	14.	39.3	29.8	45.3	67.7	191.	445.
F168	1.0	5.8 L	5.8	13.7	44.2 H	29.3	41.7 L	70.6	202.	472.
F169	<2.	7.5	7.5	13.8	35. L	32.	49.	61. L	199.	416. L
F173	19.2 EH	12.9 EH	5.0 EL	11.4 L	31.4 EL	26.1 L	36.3 EL	56.4 VL	371.5 EH	483.2
MEDIAN	1.5250	8.0000	7.2000	14.0000	40.0000	30.9000	47.8000	67.6500	194.8500	455.6000
1CRIT	1.5015	1.8900	1.8420	2.2500	3.8100	3.2640	4.2780	5.4690	13.1010	28.7460
N	20	31	30	33	33	33	33	34	34	34
MEAN	1.8651	8.1416	7.2367	13.9032	40.0193	30.7099	47.1561	67.5033	196.5605	454.5563
3STDEV	3.7252	2.6684	1.9979	2.7114	6.7982	5.3919	8.6370	11.7931	36.5332	62.6923

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	260.00	26.000	10	VH				ICP-MS
F003	253.00	25.300	10	H				ICP-MS
F009	307.50	30.750	10	H H H H VH	BIASED HIGH	10.92	-0.6534	ICP-MS
F010	112.00	12.444	9					ICP-OES
F011	290.00	29.000	10	VHEHEH	BIASED HIGH	17.10	-1.2277	ICP-MS
F014	166.00	16.600	10	L				ICP-MS
F015	117.50	11.750	10					ICP-MS GFAA
F019	54.50	7.786	7	ELELELL ELVL				ICP-OES
F022	99.00	9.900	10					ICP-MS
F024	206.00	22.889	9					ICP-AES
F025	146.00	14.600	10	L				ICP
F026	227.50	22.750	10	EHH				I.C.P.
F031	145.50	16.167	9	EL H				ICP
F032	89.50	9.944	9	L				ICP-AES
F032b	158.50	17.611	9					ICP-MS
F037	91.50	9.150	10	H L L VLEL				ICP-MS
F038	207.00	20.700	10					ICP-MS
F042	100.00	14.286	7					ICP-OES
F048	146.50	16.278	9					ICP
F062	198.00	19.800	10					ICP-MS
F064	237.00	23.700	10	H VH				ICP-AES (USN) CONC
F094	109.50	10.950	10					ICP-MS
F095	74.50	7.450	10		BIASED LOW*	-0.48	-1.6075	ICP
F096	282.00	31.333	9	EH H H	BIASED HIGH	5.68	1.2382	ICP-AES
F133	196.00	19.600	10	EH				ICP-MS
F138	184.00	18.400	10					ICP-MS 1638
F139	32.00	10.667	3	ELVL	INSUFFICIENT DATA			ICP-OES
F143	196.00	19.600	10	H				ICP-SW2
F147	188.00	20.889	9					ICP
F153	138.00	15.333	9					ICP-AES
F154	266.00	26.600	10					ICP-MS
F159	82.00	8.200	10	L L	BIASED LOW	-5.85	-0.2761	ASTM D 5673
F163	124.50	13.833	9					ICP-AES
F168	146.50	14.650	10	L H L				GFAAS, deut. BG
F169	128.00	14.222	9	L L L				GFAAS
F173	133.50	13.350	10	EHEHELL ELL ELVLEH				Zeeman 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 17.539

PARAMETER: 26095 Iron ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	<50.	<50.	<50.	<50.	<50.	<50.	100. VL	70. L	230. VH	410.
F003	8.	10.	11.	22.	42.	9.	129.	82.	207.	407.
F010	3. VL	7. L	7. L	18.	37.	5. VL	119.	74.	194.	389.
F011	<30.	<30.	<30.	<30.	50. VH	<30.	140. H	90. H	230. VH	430.
F014	<10.	11.	<10.	21.	41.	<10.	131.	82.	211.	418.
F015	14. VH	16. VH	14. H	20.	32. VL	10.	125.	80.	204.	412.
F019	9.	12.	12.	25. H	44.	11.	131.	84.	206.	417.
F022	147.131 EH	67.884 EH	32.434 EH	38.003 EH	99.288 EH	104.35 EH	216.985 EH	125.22 EH	260.668 EH	406.93
F024	7.	11.	11.	22.	46.	10.	125.	83.	210.	415.
F025	<10.	<10.	<10.	<10. VL	20. VL	<10.	110. L	60. VL	190.	390.
F026	7.6	9.9	9.8	20.5	38.0	8.5	107.8 L	74.3	187.0	382.2
F031	8.	11.	11.	23.	44.	10.	124.	79.	200.	396.
F032	5.86	9.16	9.79	21.	39.8	8.41	117.	76.4	196.	377.
F032b	<50.	<50.	<50.	<50.	<50.	<50.	126.	79.9	205.	395.
F037	75.09 VH	<50.0	<50.0	<50.0	67.99 VH	51.58 VH	167. VH	106. VH	237. VH	439. H
F038	<30.	<30.	<30.	<30.	40.	<30.	120.	80.	190.	380.
F042	6.59	9.62	9.96	22.1	42.3	8.57	127.	81.8	209.	412.
F048	<100.	<100.	<100.	<100.	<100.	<100.	113.63	<100.	193.39	400.98
F062	125. VH	41. VH	15. VH	21.	73. VH	74.7 EH	179. VH	106. VH	229. H	407.
F064	7.0	10.3	10.8	24.1	43.1	10.4	124.7	81.8	202.2	401.0
F094	<5. L	<5. VL	<5. VL	<5. EL	18. VL	<5. VL	97. VL	52. VL	183. L	354. L
F095	5.9	7.6	6.1 VL	17.7	[illegible]	7.3 L	123.	76.5	198.	395.
F096	<3. VL	5.5 VL	7.1 L	19.0	[illegible]	4.9 VL	121.	75.6	199.	404.
F133	10.	<10.	<10.	<10. VL	[illegible] VL	<10.	130.	90. H	170. VH	320. EL
F138	6.31	9.62	10.4	17.5 L	[illegible]	10.9	127.	78.7	220.	432.
F139	19.559 VH	22.054 VH	12.412	17.192 L	[illegible]	14.418 VH	[illegible]	65.994 VL	198.238	297.932 EL
F143	6.	9.	10.	21.	[illegible]	8.	[illegible] L	74.	190.	377.
F147	16.6 VH	16.1 VH	12.5	24.1	[illegible]	12.8 H	134.	84.8	209.7	406.
F153	8.	9.	10.	23.	[illegible]	8.	119.	78.	195.	395.
F154	160. EH	60. EH	50. EH	50. EH	[illegible] VH	50. VH	180. VH	120. EH	230. VH	400.
F163	6.2	9.5	9.9	21.3	[illegible]	8.	126.	79.	202.	393.
MEDIAN	8.0000	10.1500	10.8000	21.1500	[illegible]	10.0000	124.7000	79.9500	202.2000	400.9800
1CRIT	2.4800	2.6520	2.7040	3.5320	[illegible]	2.6400	11.8160	8.2360	18.0160	33.9184
N	20	20	19	20	[illegible]	20	29	28	29	29
MEAN	24.9420	15.0427	11.8998	22.0652	[illegible]	16.8289	127.3353	81.8855	205.3630	397.3141
3STDEV	120.1474	37.9238	15.5897	12.5556	[illegible]	54.7603	54.5080	35.7127	42.7677	65.4254

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	57.00	14.250	4	VLL VH	INSUFFICIENT DATA			ICP-MS
F003	159.50	15.950	10					ICP-OES
F010	46.50	4.650	10	VLL L VL	BIASED LOW*	-2.06	-3.7258	ICP-OES
F011	133.50	26.700	5	VH H H VH	BIASED HIGH	5.99	8.0463	AAS
F014	135.50	19.357	7					ICP-MS
F015	148.50	14.850	10	VHVHH VL				ICP
F019	195.00	19.500	10	H				ICP-OES
F022	246.00	24.600	10	EHEHEHEHEHEHEHEHEH	BIASED HIGH	-13.01	70.8130	ICP-MS
F024	171.50	17.150	10					ICP-AES
F025	22.50	4.500	5	VLVL L VL	BIASED LOW*	2.75	-20.4401	ICP
F026	67.50	6.750	10	L	BIASED LOW	-5.28	-1.5415	I.C.P.
F031	143.50	14.350	10					ICP
F032	70.00	7.000	10		BIASED LOW	-5.44	0.0895	ICP-AES
F032b	64.00	16.000	4		INSUFFICIENT DATA			ICP-MS
F037	180.50	25.786	7	VH VHVHVHVHVHH	BIASED HIGH*	-2.18	42.2439	ICP-MS
F038	51.50	10.300	5					ICP-OES
F042	148.00	14.800	10					ICP-OES
F048	29.00	9.667	3		INSUFFICIENT DATA			ICP
F062	219.50	21.950	10	VHVHVH VHEHVHVHH	BIASED HIGH	-9.04	44.2918	ICP-MS
F064	149.50	14.950	10					ICP-AES (USN)
F094	8.00	1.600	5	L VLVLELVLVLVLVLL L	BIASED LOW	-5.86	-19.0248	ICP-OES
F095	67.50	6.750	10	VL L	BIASED LOW*	-0.70	-2.8497	ICP
F096	68.00	7.556	9	VLVLL VL				ICP-AES
F133	69.00	11.500	6	VLVL H VLEL				ICP-MS
F138	144.00	14.400	10	L				Colorimetry
F139	121.00	12.100	10	VHVH L VH VL EL				ICP-MS
F143	60.50	6.050	10	L	BIASED LOW	-5.99	-0.9541	ICP-SW2
F147	197.50	19.750	10	VHVH H				ICP
F153	98.00	9.800	10					ICP-AES
F154	234.00	23.400	10	EHEHEHEHVHVHVHEHVH	BIASED HIGH	-15.84	61.5023	ICP-MS
F163	96.00	9.600	10					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 13.854

PARAMETER: 82095 Lead ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	0.3	0.2	6.2	9.9	36.7	0.2	7.6	63.4	220. H	559.
F003	0.331	0.155	6.00	9.72	38.1	0.132	7.48	63.5	207.	533.
F009	<0.1	<0.1	6.5	9.7	37.	<0.1	7.5	67.	213.	539.
F010	<0.3	<0.3	6.5	10.3	33. L	<0.3	9.6 H	63.	204.	529.
F011	0.4	0.2	5.7	9.1	35.2	0.2	7.3	61.4	205.	504.
F014	<1.0	<1.0	6.2	10.1	37.3	<1.0	7.9	66.4	198.	560.
F015	0.33	0.14	6.03	9.70	35.92	0.13	7.71	63.89	214.7	594. VH
F019	<30.	<30.	<30.	<30.	40.	<30.	<30.	60.	200.	550.
F022	0.327	0.129	6.164	9.475	33.705	<0.1	7.689	62.342	208.134	513.713
F024	<2.	<2.	6.	9.	37.	<2.	7.	66.	210.	550.
F025	<0.3	<0.3	6.0	9.5	35.6	<0.3	7.3	63.4	200.	530.
F026	<20.	<20.	<20.	<20.	37.3	<20.	<20.	69.4 H	223.5 H	573.6 H
F031	<0.5	<5.	6.6	9.3	38.5	<0.5	9.4	70.0 H	238. VH	580. VH
F032	<11.	<11.	<11.	12.1 H	38.6	<11.	<11.	64.7	204.	510.
F032b	<0.5	<0.5	6.24	9.80	30.9 VL	<0.5	8.01	53.2 EL	202.	507.
F037	<0.4	<0.4	6.044	9.595	34.77	<0.4	7.22	63.1	204.	517.
F038	0.33	0.18	5.80	9.48	35.7	0.15	7.32	61.9	204.	511.
F042	2.0W	2.0W	5.98	9.74	37.2	2.0W	7.39	66.0	212.	540.
F048	<1.	<1.	6.26	9.79	38.08	<1.	7.82	66.71	212.03	546.40
F062	0.3	<0.2	6.6	10.6	30.3 VL	<0.2	8.2	54.4 VL	86.2 EL	511.
F064	0.6	0.8 EH	5.7	9.0	35.1	0.6 EH	7.1	63.3	201.2	511.8
F094	0.3	0.2	6.4	10.3	37.5	0.3	8.	64.9	209.	528.
F095	<4.	<4.	<4. EL	8.2	38.9	<4.	8.25	64.6	203.	527.
F096	<0.5	<0.5	5.77	9.64	35.0	<0.5	7.50	63.3	234. VH	567. H
F133	<2.	<2.	4. EL	8.	34.	<2.	6.	62.	200.	498.
F138	0.331	0.0171	6.67	10.8	39.8	0.141	8.11	70.0 H	236. VH	579. H
F139	1.108 EH		4.764	6.882 EL	29.044 EL	0.143	6.304	42.431 EL		
F143	<2.	<2.	5.6	7.5 L	36.	<2.	6.5	63.	202.	524.
F147					37.6			66.5	210.5	533.3
F153	<4.	<4.	8. EH	11.	40.	<4.	9.	66.	201.	536.
F154	0.5	0.2	6.0	9.7	36.1	0.1	7.7	64.0	207.	521.
F159	<1.	<1.	6.	9.8	36.	<1.	7.4	63.	200.	510.
F163	<2.0	<2.0	5.4	10.	35.4	<2.0	5.5 L	62.8	199.	520.
F169	<2.	<2.	6.1	10.2	37.1	<2.	7.9	63.8	204.	516.
F173	0.2	0.0	14.9 EH	24.0 EH	89.0 EH	0.0	15.5 EH	149.0 EH	844.7 EH	1527.4 EH
MEDIAN	0.3300	0.1800	6.0370	9.7100	36.7000	0.1430	7.6000	63.5000	204.5000	529.5000
1CRIT	1.5000	1.5000	1.7722	1.9926	3.6120	1.5000	1.8660	5.2200	13.6800	33.1800
N	11	9	28	30	33	9	29	33	32	32
MEAN	0.3681	0.1579	6.1151	9.7013	36.3447	0.1662	7.6622	63.8467	208.9395	535.3379
3STDEV	0.2765	0.1690	1.6060	2.5919	6.7561	0.1688	2.3170	10.3446	31.5964	71.7848

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	168.00	16.800	10	H				ICP-MS
F003	144.00	14.400	10					ICP-MS
F009	153.50	21.929	7					ICP-MS
F010	128.00	18.286	7	L H				TM-1-2-3-6-7 GFAAS
F011	83.00	8.300	10					ICP-MS
F014	146.50	20.929	7					ICP-MS
F015	157.50	15.750	10	VH				ICP-MS GFAA
F019	68.50	17.125	4		INSUFFICIENT DATA			ICP-OES
F022	95.00	10.556	9					ICP-MS
F024	116.50	16.643	7					ICP-AES
F025	83.50	11.929	7					ICP
F026	115.50	28.875	4	H H H	INSUFFICIENT DATA			I.C.P.
F031	191.00	27.286	7	H VHVH	BIASED HIGH	10.12	1.0680	GFAAS
F032	103.50	20.700	5	H				ICP-AES
F032b	84.00	12.000	7	VL EL				ICP-MS
F037	81.00	11.571	7					ICP-MS
F038	88.00	8.800	10					ICP-MS
F042	134.00	19.143	7					ICP-OES
F048	168.00	24.000	7					ICP
F062	96.00	12.000	8	VL VLEL				ICP-MS
F064	91.50	9.150	10	EH EH				ICP-AES (USN) CONC
F094	181.00	18.100	10					ICP-MS
F095	111.00	18.500	6	EL				ICP
F096	117.00	16.714	7	VHH				ICP-MS
F133	25.50	3.643	7	EL	BIASED LOW	-5.50	0.2347	ICP-MS
F138	226.00	22.600	10	H VHH				ICP-MS 1638
F139	27.00	3.857	7	EH ELEL EL	BIASED LOW	-31.83	0.8760	ICP-MS
F143	61.00	8.714	7	L				ICP-SW2
F147	99.00	24.750	4		INSUFFICIENT DATA			ICP
F153	175.50	25.071	7	EH	BIASED HIGH*	0.63	1.1557	ICP-AES
F154	137.00	13.700	10					ICP-MS
F159	81.00	11.571	7					ASTM D 5673
F163	62.00	8.857	7	L				GFAAS, ICP-AES
F169	128.50	18.357	7					GFAAS
F173	234.00	23.400	10	EHEHEH EHEHEHEH				Zeeman 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 15.647

PARAMETER: 93095 Lithium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F003	2.20	1.61	5.53	7.03	37.8	0.337	0.670	35.0	104.	27.9
F010	2.3	2.	5.3	6.9	36.3	<1.	<1.	33.	94.	25.8
F011	1.9	1.4	5.1	6.5	34.2	0.3	0.6	31.9	104.	25.4
F015	1.91	1.47	5.20	6.54	35.97	0.31	0.59	32.38	94.77	25.95
F022	1.777	1.327	4.506	5.923	31.531 EL	<1.	<1.	28.344 EL	86.641 VL	23.583 EL
F025	<4.	<4.	5.	7.	38.	<4.	<4.	35.	100.	27.
F038	2.	2.	6. H	7.	41. VH	<1.	<1.	38. EH	100.	26.
F048	1.91	1.32	5.10	6.47	36.77	<1.	<1.	34.61	99.68	27.58
F062	2.0	1.4	5.2	6.7	35.9	0.3	0.6	33.4	97.6	26.4
F094	2.3	1.9	5.3	6.8	38.	0.7	1.	34.9	104.	28.3 H
F095	3.6 EH	1.5	5.5	7.4	36.4	1.6 EH	1.8 EH	33.2	94.6	26.6
F096	1.8	1.3	4.8	6.2	34.8	<1.	<1.	32.5	107. H	25.9
F133	2.	1.	5.	6.	37.	<1.	1.	34.	96.	26.
F139	3.179 VH	2.713 EH	8.019 EH	7.531	57.652 EH	0.415	0.693	35.67	124.781 EH	29.651 EH
F159	1.9	1.8	5.	6.9	35.	<1.	<1.	31.	89. VL	25.
MEDIAN	2.0000	1.4850	5.2000	6.8000	36.4000	0.3370	0.6815	33.4000	99.6800	26.0000
1CRIT	0.5900	0.5591	0.7820	0.8780	2.6540	0.5000	0.5109	2.4740	6.4508	2.0300
N	12	12	13	13	13	4	6	13	13	13
MEAN	2.1166	1.5856	5.2331	6.7262	36.7031	0.4405	0.7605	33.5815	98.8192	26.4485
3STDEV	1.0688	0.7734	0.8902	1.0907	5.0851	-	0.5182	4.0745	14.7504	2.8480

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING			BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	101.50	10.150	10							ICP-MS
F010	64.00	8.000	8							ICP-OES
F011	44.50	4.450	10							ICP-MS
F015	52.00	5.200	10							ICP-MS GFAA
F022	11.00	1.375	8		EL	ELVLEL	BIASED LOW	-13.19	0.0610	ICP-MS
F025	61.00	10.167	6							ICP
F038	92.00	11.500	8	H	VH	EH	BIASED HIGH*	0.90	1.1415	ICP-MS
F048	58.00	7.250	8							ICP
F062	62.00	6.200	10							ICP-MS
F094	103.00	10.300	10			H				ICP-MS
F095	92.00	9.200	10	EH	EHEH					ICP
F096	36.00	4.500	8			H				ICP-MS
F133	54.00	6.000	9							ICP-MS
F139	126.00	12.600	10	VHEHEH	EH	EHEH	BIASED HIGH	25.86	0.3504	ICP-MS
F159	37.00	4.625	8			VL				ASTM D 5673

* 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 7.474

PARAMETER: 25095 Manganese ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	1.2	1.1	8.3	16.2	40.8	0.6	15.3	71.8	202.	276.
F003	1.29	1.15	8.82	17.1	43.1	0.636	17.3	76.5	205.	279.
F009	1.3	1.2	8.9	17.	43.	0.5	17.	77.	204.	296. H
F010	0.4 EL	0.4	7.7	15.9	41.	<0.3 EL	15.	73.	197.	273.
F011	1.2	1.0	8.2	16.1	39.0	0.6	14.8	70.2	201.	263.
F014	<5.	<5.	8.	17.	44.	<5.	17.	71.	198.	253. L
F015	1.167	1.105	8.274	16.47	41.97	0.575	16.16	73.21	215.0 H	295.8 H
F019	<1.	<1.	5. EL	12. EL	38.	<1.	11. EL	69.	189.	269.
F022	0.965	0.97	7.687	15.716	39.717	<1.	14.902	66.169 EL	195.354	263.254
F024	<1.	<1.	9.	17.	44.	<1.	17.	79.	215. H	295. H
F025	1.	1.	8.	16.	41.	<1.	16.	73.	195.	271.
F026	2.4 EH	<2.	8.4	16.4	40.2	<2.	15.5	71.1	189.0	268.6
F031	1.4	1.4	9.	18.	45.	0.9 EH	17.	78.	208.	286.
F032	1.11	1.07	8.56	16.5	41.3	0.549	15.5	73.	196.	263.
F032b	1.17	1.12	8.24	16.2	43.5	<1.	16.6	72.5	201.	260.
F037	1.249	1.148	8.671	17.1	42.98	0.6539	16.33	76.56	207.	284.
F038	1.30	1.16	8.66	16.0	41.4	0.63	16.0	75.1	200.	262.
F042	10.W	10.W	10.W	16.8	42.6	10.W	16.6	76.4	204.	284.
F048	<1.	<1.	7.88	16.41	41.64	<1.	16.78	75.73	193.35	276.80
F062	<0.3 EL	<0.3 EL	4.8 EL	13.1 EL	38.1	<0.3 EL	12.7 L	71.8	197.	276.
F064	1.2	1.1	8.2	16.7	42.1	0.6	15.5	74.5	200.6	276.8
F094	1.2	1.1	8.5	16.6	42.1	0.7	16.5	75.8	202.	276.
F095	0.7	0.4	6.2 L	14.1	38.9	0.5	13.4 L	71.7	195.	275.
F096	1.4	1.2	8.5	16.7	42.7	<1.	16.5	77.2	207.	288.
F133	0.40 EL	0.30 EL	7.50	15.80	41.4	0.10 EL	16.30	75.0	213.	293. H
F138	1.12	1.14	8.44	17.1	41.6	0.60	16.2	78.3	208.	272.
F139					42.1			74.8	203.2	279.1
F143	1.2	1.2	9.1	18.	43.	0.6	15.	74.	199.	269.
F147			8.2	16.3	41.3		16.3	74.	197.8	271.5
F153	1.2	1.0	9.	17.	40.	<1.	15.	73.	194.	280.
F154	1.4	1.2	8.7	17.	43.2	0.6	16.9	76.0	196.	271.
F159	<1.	1.	7.9	16.	40.	<1.	15.	68. L	190.	250. L
F163	1.	1.	8.1	16.4	40.8	<1.0	15.1	73.3	195.	272.
MEDIAN	1.2000	1.1000	8.2740	16.4400	41.6000	0.6000	16.0800	74.0000	200.0000	275.0000
1CRIT	1.5000	1.5000	1.9064	2.3964	3.9060	1.5000	2.3748	5.8500	13.4100	17.9100
N	21	22	29	29	31	14	30	31	29	31
MEAN	1.1796	1.0347	8.1563	16.2999	41.5647	0.5960	15.7957	73.8871	200.1484	274.8985
3STDEV	0.4826	0.6410	2.4520	2.5705	4.4442	0.1565	3.1026	7.6275	15.8413	30.2846

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	132.00	13.200	10					ICP-MS
F003	240.00	24.000	10					ICP-MS
F009	238.00	23.800	10	H				ICP-MS
F010	76.00	8.444	9	EL EL				ICP-OES
F011	89.00	8.900	10					ICP-MS
F014	117.50	16.786	7	L				ICP-MS
F015	176.50	17.650	10	H H				ICP-MS GFAA
F019	19.00	2.714	7	ELEL EL	BIASED LOW*	-1.64	-4.0080	ICP-OES
F022	44.00	4.889	9	EL	BIASED LOW*	-3.57	-0.7036	ICP-MS
F024	211.50	30.214	7	H H	BIASED HIGH	7.49	-0.3799	ICP-AES
F025	88.00	9.778	9					ICP
F026	93.00	11.625	8	EH				I.C.P.
F031	273.50	27.350	10	EH	BIASED HIGH*	3.82	0.6155	ICP
F032	116.00	11.600	10					ICP-AES
F032b	138.50	15.389	9					ICP-MS
F037	229.00	22.900	10					ICP-MS
F038	155.50	15.550	10					ICP-MS
F042	146.50	24.417	6					ICP-OES
F048	115.50	16.500	7					ICP
F062	47.00	6.714	7	ELELELEL ELL	BIASED LOW*	1.27	-3.6996	ICP-MS
F064	160.00	16.000	10					ICP-AES (USN)
F094	188.00	18.800	10					ICP-MS
F095	51.00	5.100	10	L L	BIASED LOW*	-0.26	-1.6748	ICP
F096	217.50	24.167	9					ICP-AES
F133	129.50	12.950	10	ELEL EL H				ICP-MS
F138	191.50	19.150	10					ICP-MS 1638
F139	88.00	22.000	4		INSUFFICIENT DATA			ICP-OES
F143	183.00	18.300	10					ICP-SW2
F147	103.50	14.786	7					ICP
F153	131.00	14.556	9					ICP-AES
F154	205.00	20.500	10					ICP-MS
F159	43.00	5.375	8	L L	BIASED LOW	-8.02	0.7655	ASTM D 5673
F163	95.00	10.556	9					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 15.574

PARAMETER: 42095 Molybdenum ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	1.1	0.1	5.8	8.5	42.5	0.3	<0.1	73.6	172. VH	320.
F003	1.15	0.17	5.49	8.72	48.3 H	0.016	0.068	79.8 H	156.	318.
F009	1.3	0.2	5.5	8.7	45.	0.5	0.2	75.	161.	321.
F010	5.7 EH	2.6 EH	6.2	9.3	44.	3. EH	2.7 EH	74.	159.	319.
F011	1.3	0.2	5.9	8.9	44.6	0.1	0.2	75.3	173. VH	313.
F015	1.25	0.23	5.44	8.33	42.15	0.19	0.19	70.70	152.8	302.
F019	<5.	<5.	6.	7.	40.	<5.	<5.	69.	150.	312.
F022	0.959	<1.	4.755	7.68	39.025 L	<1.	<1.	66.61 L	142.038 L	288.393 L
F024	1.	<1.	6.	8.	44.	<1.	<1.	75.	160.	320.
F025	0.8	<0.2	4.5	7.6	41.1	<2.	<0.2	68.3	146.	297.
F032	1.18	<0.8	5.52	8.72	41.5	<0.8	<0.8	69.2	149.	294.
F032b	<5.	<5.	5.75	8.47	44.5	<5.	<5.	73.4	151.	298.
F038	1.30	0.20	5.73	8.72	44.7	0.11	0.22	72.7	158.	312.
F048	1.09	<1.	5.34	8.68	43.63	<1.	<1.	73.95	154.52	312.36
F062	<3.5	<3.5	5.0	8.0	40.	<3.5	<3.5	69.	150.	291.
F064	1.4	<0.8	5.5	8.6	43.1	<0.8	<0.8	72.2	151.8	309.0
F094	1.3	0.2	5.4	8.2	41.6	0.4	0.2	68.2	146.	295.
F095	0.8	0.4	5.3	8.7	43.4	0.4	0.5	73.6	156.	313.
F096	1.56	<0.5	5.98	9.20	43.9	<0.5	<0.5	74.1	159.	324.
F133	1.4	0.2	5.2	8.3	42.9	0.2	0.2	71.6	146.0	292.
F138	1.32	0.23	5.84	8.81	43.4	0.11	0.19	75.6	159.	306.
F139	8.354 EH	2.244 H	6.135	6.944	54.336 EH			66.754	182.686 EH	284.212 L
F143	<1.	<1.	5.6	8.2	43.	<1.	<1.	67.	149.	312.
F147								75.4	159.6	311.4
F153	4. VH	<3.	4. EL	8.	41.	<3.	<3.	70.	153.	308.
F159	1.4	<1.	5.3	8.3	41.	<1.	<1.	69.	150.	290. L
MEDIAN	1.3000	0.2000	5.5000	8.4700	43.1000	0.2000	0.2000	72.4500	153.7600	310.2000
1CRIT	1.5000	1.5000	1.7400	1.9182	3.9960	1.5000	1.5000	5.7570	10.6356	20.0220
N	18	10	23	23	23	9	8	24	24	24
MEAN	1.6505	0.4274	5.5209	8.3622	43.0122	0.2567	0.2375	71.7752	155.0717	306.4230
3STDEV	3.5261	1.8257	1.1917	1.4468	5.5290	0.4212	0.2988	8.5150	21.0293	31.3893

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	120.00	13.333	9	VH				ICP-MS
F003	128.50	12.850	10	H H				ICP-MS
F009	154.50	15.450	10					ICP-MS
F010	181.50	18.150	10	EHEH EHEH	BIASED HIGH*	2.09	1.7700	ICP-OES
F011	155.50	15.550	10	VH				ICP-MS
F015	89.00	8.900	10					ICP-MS GFAA
F019	58.00	9.667	6					ICP-OES
F022	15.00	2.143	7	L L L L	BIASED LOW	-6.96	-0.5616	ICP-MS
F024	118.00	16.857	7					ICP-AES
F025	28.50	4.071	7		BIASED LOW*	-4.16	-0.6775	ICP
F032	69.50	9.929	7					ICP-AES
F032b	84.00	14.000	6					ICP-MS
F038	133.00	13.300	10					ICP-MS
F048	95.00	13.571	7					ICP
F062	31.50	5.250	6		BIASED LOW	-5.72	0.5757	ICP-MS
F064	93.50	13.357	7					ICP-AES (USN)
F094	70.00	7.000	10					ICP-MS
F095	119.00	11.900	10					ICP
F096	145.00	20.714	7		BIASED HIGH*	4.31	-0.3821	ICP-MS
F133	79.00	7.900	10					ICP-MS
F138	139.00	13.900	10					ICP-MS 1638
F139	111.00	13.875	8	EHH EH EHL				ICP-MS
F143	60.00	10.000	6					ICP-SW2
F147	59.00	19.667	3		INSUFFICIENT DATA			ICP
F153	65.50	9.357	7	VH EL				ICP-AES
F159	55.50	7.929	7	L				ASTM D 5673

* 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 11.874

PARAMETER: 28095 Nickel ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	1.	0.8	5.1	9.6	42.1	0.5	104.	58.7	207. H	374.
F003	1.13	0.721	5.38	10.4	47.7 H	0.396	116. VH	61.2	208. H	361.
F009	0.8	0.9	5.4	10.	45.	0.3	108.	60.	198.	387. H
F010	1.9	1.1	5.4	10.2	43.	<0.8	105.	58.	190.	352.
F011	1.2	0.9	5.5	10.8	45.8	0.6	150. EH	66.0 VH	238. EH	402. VH
F014	<5.	<5.	5.	10.	44.	<5.	109.	54.	196.	325. L
F015	2.39	1.35	5.62	10.95	48.68 H	1.22	116.8 VH	63.74 H	215.8 VH	388.3 H
F019	<10.	<10.	<10.	20. EH	40.	<10.	120. VH	60.	200.	380. H
F022	1.714	0.957	4.824	9.313	42.651	<1.	99.52	53.01 L	190.985	347.24
F024	<1.	<1.	5.	10.	46.	<1.	110.	61.	200.	375.
F025	1.3	1.0	5.0	9.4	41.7	<0.5	100.	56.	190.	360.
F026	10.1 EH	6.1 EH	6.7 H	11.7	46.5	8.2 EH	102.1	60.0	190.4	356.3
F032	<1.5	<1.5	4.9	10.2	42.7	<1.5	101.	56.4	188.	337.
F032b	<1.	<1.	4.81	10.5	45.9	<1.	106.	55.7	203.	347.
F037	1.459	0.901	5.645	9.142	40.15	0.5891	102.	52.61 L	175. L	317. VL
F038	1.0	0.8	5.1	10.1	42.9	0.2	107.	58.4	195.	341.
F042	2.0W	2.0W	4.62	9.51	42.9	2.0W	105.	57.2	192.	355.
F048	1.52	<1.	4.98	9.78	43.43	<1.	109.86	58.86	189.89	362.00
F062	1.1	0.8	4.9	9.8	42.8	0.5	104.	57.4	191.	361.
F064	0.8	1.0	4.7	9.3	43.0	<0.6	103.5	56.9	193.1	352.0
F094	<0.1	<0.1 EL	2.8 L	7.5 L	40.6	<0.1	104.	55.8	192.	348.
F095	0.4	0.7	1.9 EL	7.0 L	39.9	0.7	103.	54.8	188.	355.
F096	3.5 EH	<3.	6.3	8.7	43.3	<3.	109.	61.7	206.	388. H
F133	0.8	0.4	4.6	9.2	44.0	<0.2	111.0	59.4	197.0	359.
F138	0.09	0.69	4.94	9.76	41.4	0.25	103.	59.7	197.	360.
F139					45.3		103.9	64.3 H	19.3 EL	350.8
F143	<1.	<1.	5.	10.	44.	<1.	99.	57.	186.	362.
F147				14. EH	44.7		107.7	64.2 H	204.5	378.
F153	<2.	<2.	5.	10.	42.	<2.	100.	58.	190.	357.
F154	1.6	1.1	5.2	10.1	44.1	0.7	111.	60.5	195.	352.
F159	1.6	1.	4.9	9.6	44.	<1.	100.	55.	190.	330. L
F163	<2.0	<2.0	4.9	9.6	42.6	<2.0	102.	57.	195.	361.
F168	<4.	<4.	4.8	9.4	38. L	<4.	81. EL	49. VL	162. VL	275. EL
F169	<2.	<2.	4.72	8.5	40.	<2.	101.	64. H	187.	353.
F173	0.3	0.0 EL	0.0 EL	3.7 EL	33.5 EL	0.0	89.1 VL	45.8 EL	258.0 EH	375.5
MEDIAN	1.2000	0.9000	4.9900	9.7900	43.0000	0.5000	104.0000	58.0000	193.1000	357.0000
1CRIT	1.5000	1.5000	1.7094	1.9974	3.9900	1.5000	7.6500	4.8900	12.9960	22.8300
N	19	17	30	32	33	11	33	33	33	33
MEAN	1.3428	0.8894	4.8980	9.8142	43.0949	0.5414	105.2267	58.1673	195.1720	357.7921
3STDEV	2.1322	0.6131	2.3255	3.4757	6.3944	0.8095	17.5092	10.3751	36.4440	50.3311

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	164.50	16.450	10	H				ICP-MS
F003	223.00	22.300	10	H VH H				ICP-MS
F009	201.00	20.100	10	H				ICP-MS
F010	166.50	18.500	9					ICP-OES
F011	256.50	25.650	10	EHVHEHVH	BIASED HIGH	15.39	2.9413	ICP-MS
F014	120.00	17.143	7	L				ICP-MS
F015	275.00	27.500	10	H VHH VHH	BIASED HIGH	9.17	1.1508	ICP-MS GFAA
F019	155.00	25.833	6	EH VH H				ICP-OES
F022	91.00	10.111	9	L				ICP-MS
F024	183.50	26.214	7		BIASED HIGH*	4.79	0.0389	ICP-AES
F025	111.50	12.389	9					ICP
F026	217.00	21.700	10	EHEHH EH				I.C.P.
F032	84.00	12.000	7					ICP-AES
F032b	134.00	19.143	7					ICP-MS
F037	92.50	9.250	10	L L VL				ICP-MS
F038	148.00	14.800	10					ICP-MS
F042	101.00	14.429	7					ICP-OES
F048	150.50	18.812	8					ICP
F062	140.00	14.000	10					ICP-MS
F064	108.50	12.056	9					ICP-AES (USN)
F094	65.50	9.357	7	ELL L				ICP-MS
F095	66.00	6.600	10	ELL	BIASED LOW*	-0.44	-1.7657	ICP
F096	195.50	24.438	8	EH H				ICP-AES
F133	136.50	15.167	9					ICP-MS
F138	126.50	12.650	10					ICP-MS 1638
F139	90.00	18.000	5	H EL				ICP-OES
F143	109.50	15.643	7					ICP-SW2
F147	176.00	29.333	6	EH H	BIASED HIGH	5.29	1.2884	ICP
F153	102.00	14.571	7					ICP-AES
F154	206.50	20.650	10					ICP-MS
F159	107.00	11.889	9	L				ASTM D 5673
F163	105.50	15.071	7					ICP-AES
F168	26.50	3.786	7	L ELVLVLEL	BIASED LOW	-22.70	3.4411	GFAAS, deut. BG
F169	75.00	10.714	7	H				GFAAS
F173	74.00	7.400	10	ELELELEL VLELEH	BIASED LOW	11.39	-5.4541	Zeeman 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 16.276

PARAMETER: 34095 Selenium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F003	0.2	0.1	3.2	5.1	46.4	0.1	0.5	36.7	98.7	29.4
F009	0.5	0.2	3.2	5.0	46.	0.5	0.8	37.	101.	30.
F010	<0.2	<0.2	3.	5.	45.	<0.2	0.2	35.	110. H	29.
F011	<1.	<1.	4. H	5.	47.	<1.	1.	38.	99.	30.
F014	<1.5	<1.5	3.3	5.1	47.3	<1.5	<1.5	36.8	108.	29.7
F015	0.5	<0.2	3.3	5.0	45.5	<0.2	0.7	37.5	104.2	30.2
F022	<1.	<1.	3.719	4.754	52.548 VH	<1.	<1.	39.876	112.239 H	36.003 VH
F024	<5.	<5.	<5.	<5.	45.	<5.	<5.	36.	100.	27.
F025	0.2	<0.2	3.7	5.8	53.0 VH	0.5	0.3	41.0 H	81.0 VL	33.0 H
F031	<3.	<3.	<3.	<3. EL	42.	<3.	<3.	32. L	94.	26. L
F032	0.1	<0.05	2.6	4.5	40.2 L	0.1	0.1 L	31.0 VL	94.9	25.8 L
F037	<3.0	<3.0	3.179	5.018	45.69	<3.0	<3.0	35.58	99.82	29.45
F038	<0.5	<0.5	3.1	4.7	47.0	<0.5	0.8	38.0	107.	29.5
F048	<1.	<1.	4.78 EH	5.05	52.50 VH	<1.	1.49 EH	39.60	110.31 H	33.85 VH
F062	<0.4	<0.4	4.4 VH	7.1 EH	66.8 EH	<0.4	0.8	54.3 EH	151. EH	45.3 EH
F064	0.8 H	0.6	2.6	5.2	44.6	<0.4	<0.4	36.3	99.7	29.4
F094	<0.4	<0.4	2.7	4.2	42.5	<0.4	0.7	34.1	96.2	28.9
F095	<5.	<5.	<5.	<5.	40.5 L	<5.	<5.	33.3 L	48.5 EL	27.4
F096	<1.	<1.	2.9	4.5	43.3	<1.	<1.	33.8	97.8	28.3
F133	<1.	<1.	4. H	6. H	60. EH	<1.	<1.	50. EH	135. EH	38. VH
F138	0.15	0.07	2.85	4.52	44.0	0.09	0.52	34.4	91.3 L	25.6 L
F143	<4.	<4.	<4.	<4. L	50. H	5.6 EH	<4.	40.	101.	34. VH
F153	<10.	<10.	<10.	<10.	37. VL	<10.	<10.	45. VH	103.	36. VH
F154	<2.	<2.	3.	6. H	47.	<2.	<2.	37.	103.	30.
F159	<1.	<1.	2.5	4.7	43.	<1.	<1.	33. L	93.	27.
MEDIAN	0.2000	0.1500	3.1895	5.0000	45.6900	0.3000	0.7000	36.8000	100.0000	29.5000
1CRIT	0.5000	0.5000	0.7152	0.8600	4.1152	0.5000	0.5160	3.4040	8.4600	2.8200
N	5	2	18	18	23	4	10	23	23	23
MEAN	0.3100	0.1500	3.2638	5.0523	46.5234	0.3000	0.6320	37.3894	101.7465	30.3436
3STDEV	-	-	1.4932	1.3462	13.4371	-	0.7075	11.8612	29.5491	9.6513

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	84.50	8.450	10					Hydride, ICP-OES
F009	102.00	10.200	10					ICP-MS
F010	67.50	9.643	7	H				Hydride-AA
F011	98.50	14.071	7	H				ICP-MS
F014	94.00	15.667	6					ICP-MS
F015	99.00	12.375	8					ICP-MS GFAA
F022	111.00	18.500	6	VH H VH	BIASED HIGH	12.45	0.2594	ICP-MS
F024	38.00	9.500	4		INSUFFICIENT DATA			ICP-AES
F025	109.00	12.111	9	VH H VLH				ICP
F031	14.00	3.500	4	EL L L	INSUFFICIENT DATA			ICP
F032	20.50	2.278	9	L L VL L	BIASED LOW	-6.12	-0.9469	Hydride AAS
F037	68.00	11.333	6					ICP-MS
F038	90.00	12.857	7					HVAAS
F048	127.00	18.143	7	EH VH EH H VH	BIASED HIGH	9.99	0.6629	ICP
F062	148.00	21.143	7	VHEHEH EHEHEH	BIASED HIGH	50.90	-0.5148	ICP-MS
F064	71.00	8.875	8	H				hydride - AAS
F094	37.50	5.357	7		BIASED LOW*	-3.84	-0.4439	ICP-MS
F095	14.00	3.500	4	L L EL	INSUFFICIENT DATA			ICP
F096	35.50	5.917	6					ICP-MS
F133	132.00	22.000	6	H H EH EHEHVH	BIASED HIGH	35.51	-0.8948	ICP-MS
F138	37.00	3.700	10	L L	BIASED LOW	-8.00	-0.0315	HG-AFS
F143	82.50	16.500	5	L H EH VH				ICP-SW2
F153	62.50	15.625	4	VL VH VH	INSUFFICIENT DATA			ICP-AES
F154	90.00	15.000	6	H				ICP-MS
F159	24.00	4.000	6	L	BIASED LOW	-6.66	-0.3877	ASTM D 5673

* 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 10.988

PARAMETER: 47095 Silver ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	<0.1	<0.1	3.5	6.	28.1	0.2	<0.1	13.9	11.	14.1
F003	<0.005	<0.005	3.33	6.38	33.1	<0.005	<0.005	13.9	13.6	14.0
F009	<0.1	<0.1	3.4	6.8	35.	<0.1	<0.1	14.	14.	15.
F010	0.2	<0.2	3.4	6.3	21.	<0.2	<0.2	13.1	8.4	11. VL
F011	0.1	<0.1	3.1	6.1	33.4	0.2	0.1	13.6	13.3	14.2
F015	<0.02	<0.02	3.07	5.65	30.10	<0.02	<0.02	12.31	11.91	12.97
F022	<0.1	<0.1	5.61 EH	10.021 EH	36.821	<0.1	<0.1	22.779 EH	19.449	23.215 EH
F024	<1.	<1.	2. VL	4. EL	11.	<1.	<1.	10. VL	10.	11. VL
F025	<0.1	<0.1	3.0	6.3	30.9	<0.1	<0.1	13.2	12.3	13.5
F032	<0.6	<0.6	3.42	6.57	33.4	<0.6	<0.6	13.7	12.7	13.6
F037	<0.2	<0.2	3.46	6.911	19.67	<0.2	<0.2	14.38	13.95	14.57
F038	0.02	<0.01	3.44	6.50	27.2	<0.01	0.04	14.0	8.54	14.1
F048	<1.	<1.	3.25	6.15	29.92	<1.	<1.	14.38	11.40	14.96
F062	<0.02	<0.02	1.92 VL	5.04 L	28.5	0.43	0.30	12.5	12.6	12.5 L
F064	<0.06	<0.06	1.86 VL	1.9 EL	34.1	0.18	0.14	13.7	12.2	14.5
F094	0.2	0.2	2.7	5.6	10.4	1. VH	<0.2	4.5 EL	6.5	13.1
F095	0.5	0.6	2.9	6.25	33.4	0.6	0.7 H	12.7	11.0	8.6 EL
F096	<0.1	<0.1	3.25	6.26	24.4	<0.1	<0.1	13.2	9.45	14.1
F133	<0.05	<0.05	3.40	6.60	25.8	<0.05	<0.05	14.40	9.00	15.20
F138	0.002	0.001	3.60	7.09	35.8	0.037	0.010	15.2	14.8	15.8 H
F153	<5.	<5.	8. EH	7.0	30.	<5.	<5.	11.0 VL	9.	16.0 H
MEDIAN	0.1500	0.2000	3.3300	6.3000	30.0000	0.2000	0.1200	13.7000	11.9100	14.1000
1CRIT	0.5000	0.5000	0.7264	0.9640	2.8600	0.5000	0.5000	1.5560	1.4128	1.5880
N	4	1	19	19	19	5	4	19	19	19
MEAN	0.1300	0.2000	3.2500	6.1843	28.6732	0.3220	0.1450	13.3247	11.5342	13.9053
3STDEV	-	-	2.1558	2.1368	18.1902	-	-	3.6074	5.8623	3.9898

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING			BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	68.50	9.786	7							ICP-MS
F003	77.50	12.917	6							ICP-MS
F009	100.50	16.750	6				BIASED HIGH	18.12	-0.9195	ICP-MS
F010	44.50	6.357	7			VL				ICP-OES
F011	79.50	8.833	9							ICP-MS
F015	44.00	7.333	6							ICP-MS GFAA
F022	125.00	20.833	6	EHEH	EH	EH	BIASED HIGH	15.94	4.3183	ICP-MS
F024	18.50	3.083	6	VLEL	VL	VL	BIASED LOW	-67.83	3.7457	ICP-AES
F025	59.00	9.833	6							ICP
F032	80.50	13.417	6							ICP-AES
F037	88.50	14.750	6							ICP-MS
F038	70.50	8.812	8							ICP-MS
F048	71.00	11.833	6							ICP
F062	47.00	5.875	8	VLL		L				ICP-MS
F064	63.50	7.938	8	VLEL						ICP-AES (USN) CONC
F094	30.50	3.389	9		VH EL		BIASED LOW	-62.61	1.5917	ICP-MS
F095	66.50	6.650	10		H	EL				ICP
F096	50.00	8.333	6							ICP-MS
F133	76.50	12.750	6							ICP-MS
F138	122.00	12.200	10			H				ICP-MS 1638
F153	78.50	13.083	6	EH	VL	H				ICP-AES

OVERALL AVERAGE RANK IS 9.878

PARAMETER: 38095 Strontium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	177.	28.4	67.1	95.5	68.6	55.4	59.	66.6	204.	622.
F003	185.	29.5	71.3	103.	70.6	60.2	62.9	68.7	205.	636.
F009	177.	30.	71.	101.	72.	58.	60.	69.	200.	608.
F010	172.	29.1	69.	99.	70.	57.	59.	69.	198.	610.
F011	165.	29.7	65.8	85.2 EL	65.9	54.7	57.0	62.8	200.	594.
F015	173.	26.9	64.5	100.3	64.7	52.1	54.0	63.0	206.7	632.
F022	159. L	27.	65.	93.	67.	51.	56.	62.	187.	629.
F024	200. EH	32.	79. EH	110. EH	79. EH	64. VH	66. H	77. VH	220. EH	690. EH
F025	176.	28.	67.	98.	69.	55.	57.	66.	200.	617.
F032	162.	27.5	67.5	95.7	66.9	53.1	53.8	63.8	187.	560. L
F032b	174.	27.8	68.4	101.	72.4	58.1	58.1	68.6	196.	598.
F038	176.	28.5	68.4	99.1	70.8	55.6	56.5	69.3	201.	610.
F048	176.	29.6	71.3	101.	71.6	58.0	64.0 H	69.9	198.	645.
F062	173.	28.8	69.2	100.	70.4	57.1	59.3	67.9	201.	628.
F064	167.2	28.5	68.5	99.3	69.4	53.9	57.7	67.4	194.2	600.4
F094	166.	28.7	66.5	94.5	68.9	55.1	57.7	65.6	190.	565. L
F095	185.	35.1 EH	71.9	102.	76.2 H	66.7 EH	67.9 VH	73.7 H	205.	621.
F096	168.	27.6	65.2	94.0	67.7	54.0	55.9	65.7	193.	609.
F133	169.8	27.2	64.0	93.1	67.2	54.6	58.6	64.6	187.7	566. L
F138	184.	28.6	69.0	100.	69.3	56.2	62.4	74.1 H	218. H	622.
F139	171.4	18.4 EL	61.1 L	93.2	62. L	47.1 L	50.4 L	59.7 L	196.2	628.
F159	160. L	26.	63.	100.	70.	51.	53.	61.	190.	560. L
MEDIAN	173.0000	28.5000	67.9500	99.2000	69.3500	55.2500	57.9000	67.0000	199.0000	613.5000
1CRIT	12.7300	4.0600	6.4270	8.3020	6.5110	5.6650	5.8240	6.3700	14.2900	39.1600
N	20	20	20	20	20	20	20	20	19	19
MEAN	172.8700	28.4700	67.6800	98.1350	69.4300	55.7050	58.3950	66.9350	199.1474	612.6526
3STDEV	20.6126	3.9080	7.5645	9.5026	7.5619	9.0641	9.9451	10.3661	20.5943	62.2319

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	121.50	12.150	10					ICP-MS
F003	186.50	18.650	10		BIASED HIGH*	3.55	1.0755	ICP-MS
F009	164.50	16.450	10					ICP-MS
F010	132.00	13.200	10					ICP-OES
F011	73.50	7.350	10	EL				ICP-MS
F015	88.50	8.850	10					ICP-MS
F022	48.00	4.800	10	L	BIASED LOW*	2.92	-7.6461	ICP-MS
F024	217.00	21.700	10	EH EHEHEHVHH VHEHEH	BIASED HIGH	12.25	1.1145	ICP-AES
F025	105.50	10.550	10					ICP
F032	49.00	4.900	10	L	BIASED LOW	-9.15	3.7543	ICP-AES
F032b	130.50	13.050	10					ICP-MS
F038	131.00	13.100	10					ICP-MS
F048	176.50	17.650	10	H	BIASED HIGH*	4.87	-1.5880	ICP
F062	149.50	14.950	10					ICP-MS
F064	98.00	9.800	10					ICP-AES (USN)
F094	79.00	7.900	10	L				ICP-MS
F095	200.00	20.000	10	EH H EHVHH	BIASED HIGH*	0.06	7.2927	ICP
F096	68.00	6.800	10					ICP-AES
F133	60.00	6.000	10	L				ICP-MS
F138	161.00	16.100	10	H H				ICP-MS 1638
F139	44.50	4.450	10	ELL L L L L	BIASED LOW*	4.04	-10.0979	ICP-OES
F159	46.00	4.600	10	L L	BIASED LOW	-8.90	3.0741	

* 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 11.500

PARAMETER: 81095 Thallium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F003	0.006	0.004	3.78	5.00	43.3	0.005	0.005	36.1	102.	27.4
F011	<0.1	<0.1	3.6	4.8	42.6	<0.1	<0.1	35.6	101.	25.5
F014	<1.0	<1.0	3.0	4.6	40.6	<1.0	<1.0	33.2	89.9 L	25.2
F015	0.011	<0.002	4.00	5.40	45.89	0.009	0.017	39.21	101.9	28.57
F022	<0.1	<0.1	3.512	4.568	38.483 L	<0.1	<0.1	32.781 L	96.246	25.116
F025	<0.2	<0.2	3.6	4.8	42.9	<0.2	<0.2	35.7	97.2	26.6
F038	0.12	0.10	3.81	5.10	44.6	0.11	0.09	37.0	101.	27.2
F048	<1.	<1.	3.26	4.53	45.53	<1.	<1.	37.69	101.83	27.50
F062	<0.2	<0.2	4.3	5.5	37.6 VL	<0.2	<0.2	31.5 L	42.8 EL	26.0
F064	0.15	0.4	3.2	5.4	45.8	0.8 H	2.7 EH	48.1 EH	106.5	28.5
F094	<0.05	<0.05	4.03	5.36	47.2	0.13	<0.05	39.1	106.	28.9
F095	0.4	0.6	0.8 EL	0.5 EL	44.7	0.1	0.2	38.7	97.9	21.5 VL
F096	<0.1	<0.1	3.66	5.04	42.4	<0.1	<0.1	36.25	96.9	27.5
F133	<0.05	<0.05	3.70	4.95	44.2	<0.05	<0.05	37.1	99.8	27.3
F138	0.011	0.005	4.12	5.40	47.0	0.005	0.008	39.0	106.	30.4 H
F153	<7.	<7.	<7.	<7.	44.	<7.	<7.	35.	91. L	22. VL
MEDIAN OR CONC.	*TARGET *0.0100	*0.0050	3.6600	5.0000	44.1000	*0.0050	*0.0080	36.6250	100.4000	27.2500
1CRIT	0.7500	0.7500	0.9828	1.0900	4.2180	0.7500	0.7500	3.6200	8.7220	2.8700
N	4	3	13	13	14	4	4	14	14	14
MEAN	0.0730	0.1683	3.6363	4.9960	43.7145	0.0872	0.0787	36.6022	99.1911	26.6633
3STDEV	-	-	0.9601	0.9380	6.5194	-	-	5.9849	13.7659	5.2410

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	59.50	5.950	10					ICP-MS
F011	36.50	6.083	6					ICP-MS
F014	18.00	3.000	6	L	BIASED LOW	-10.35	0.3200	ICP-MS
F015	88.50	9.833	9					ICP-MS GFAA
F022	19.00	3.167	6	L L	BIASED LOW*	-4.38	-1.1374	ICP-MS
F025	37.00	6.167	6					ICP
F038	73.50	7.350	10					ICP-MS
F048	51.50	8.583	6					ICP
F062	39.00	6.500	6	VL L EL				ICP-MS
F064	96.00	9.600	10	H EHEH				ICP-AES (USN) CONC
F094	89.50	12.786	7		BIASED HIGH*	5.62	0.1984	ICP-MS
F095	53.00	5.300	10	ELEL VL				ICP
F096	45.50	7.583	6					ICP-MS
F133	52.00	8.667	6					ICP-MS
F138	93.50	9.350	10	H				ICP-MS 1638
F153	17.00	4.250	4	L VL	INSUFFICIENT DATA			ICP-AES

* 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 7.364

PARAMETER: 92095 Uranium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F003	0.358	0.010	4.35	7.60	39.0	0.038	0.134	34.7	94.5	60.8
F009	0.4	<0.1	4.2	7.3	39.	0.1	0.1	37.	96.	65. H
F010	<5.	<5.	<5.	9. VH	38.	<5.	<5.	34.	87.	59.
F011	0.3	<0.1	4.3	7.3	39.0	<0.1	0.1	34.8	94.6	61.1
F014	0.5	<0.5	4.1	7.1	37.6	<0.5	<0.5	33.3	85.6 L	59.0
F015	0.310	0.010	3.921	6.758	35.25 L	0.037	0.126	31.31 L	97.84 H	55.39 L
F022	0.33	<0.1	4.176	7.113	37.231	<0.1	0.121	32.94	87.485	58.527
F024	<0.5	<0.5	4.2	7.2	40.	<0.5	<0.5	32. L	83. L	49. EL
F025	<0.4	<0.4	4.2	7.5	39.8	<0.4	<0.4	35.6	92.2	62.9
F038	0.37	0.01	4.33	7.57	41.7	0.04	0.15	36.9	94.6	63.6
F048	<1.	<1.	4.42	7.69	43.11 H	<1.	<1.	37.42 H	95.77	64.93 H
F062	0.37	<0.02	4.74	8.16	33.0 VL	0.08	0.15	29.7 VL	39.2 EL	56.2
F064	0.6	0.5	4.6	7.4	35.8 L	<0.5	0.5 EH	26.8 VL	85.5 L	58.1
F094	0.4	<0.1	4.7	8.2	42.1 H	0.2	0.1	37.	96.	65.7 H
F095	<5.	23.3 EH	22.9 EH	13.6 EH	54.2 EH	35.7 EH	15.5 EH	60.1 EH	121. EH	67.8 VH
F096	0.36	<0.1	4.21	7.41	37.9	<0.1	0.14	35.0	88.1	60.0
F133	0.35	<0.05	3.85	6.90	37.3	0.05	0.10	33.5	84.0 L	57.4
F138	0.400	0.011	4.78	8.22	42.5 H	0.043	0.0151	39.9 VH	100. H	68.4 VH
F139	1.014 EH	0.204	3.977	5.969 VL	57.719 EH	0.094	0.054	29.126 VL		93.747 EH
F143	<10.	<10.	<10.	<10.	39.	<10.	<10.	35.	91.	58.
F159	<1.	<1.	3.9	7.	36. L	<1.	<1.	31. L	82. VL	57.
MEDIAN OR *TARGET CONC.	0.3700	0.0110	4.2100	7.4050	39.0000	*0.0400	0.1235	34.7000	91.6000	60.0000
1CRIT	0.5000	0.5000	0.7226	0.9143	2.8100	0.5000	0.5000	2.5520	5.9660	4.0700
N	12	6	17	18	19	8	12	19	18	19
MEAN	0.3957	0.1242	4.3002	7.5234	39.7101	0.0806	0.1479	34.2208	90.8442	60.9920
3STDEV	0.2298	0.5471	0.7948	1.6422	12.1692	0.1523	0.3280	8.2021	16.2772	11.5362

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	91.50	9.150	10					ICP-MS
F009	101.50	11.278	9	H				ICP-MS
F010	54.50	10.900	5	VH				ICP-OES
F011	75.00	9.375	8					ICP-MS
F014	52.50	7.500	7	L				ICP-MS
F015	45.00	4.500	10	L L H L	BIASED LOW*	1.97	-1.1210	ICP-MS GFAA
F022	50.00	6.250	8					ICP-MS
F024	40.00	6.667	6	L L EL				Phosphorimetry
F025	74.00	12.333	6					ICP
F038	109.50	10.950	10					ICP-MS
F048	98.00	16.333	6	H H H	BIASED HIGH	5.28	0.6526	ICP
F062	66.00	7.333	9	VL VLEL				ICP-MS
F064	73.00	8.111	9	L EHVLL				FLUOROMETRY CONC
F094	125.50	13.944	9	H H				ICP-MS
F095	150.00	16.667	9	EHEHEHEHEHEHEHVH	BIASED HIGH*	1.19	19.3523	ICP
F096	78.50	9.812	8					ICP-MS
F133	41.50	4.611	9	L	BIASED LOW	-6.99	0.2851	ICP-MS
F138	132.00	13.200	10	H VHH VH				ICP-MS 1638
F139	77.00	8.556	9	EH VLEH VL EH				ICP-MS
F143	41.00	10.250	4		INSUFFICIENT DATA			ICP-SW2
F159	20.00	3.333	6	L L VL	BIASED LOW	-9.55	0.4340	ASTM D 5673

* 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 9.557

PARAMETER: 23095 Vanadium ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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 LAB NO	1= TMHUMB-95 REPORTED VALUE	2= TMFS-KEN REPORTED VALUE	3= TM-24.2 REPORTED VALUE	4= TM-26.2 REPORTED VALUE	5= TM-40 REPORTED VALUE	6= TMFS-WAWA REPORTED VALUE	7= TM-LNGLKEA REPORTED VALUE	8= TMDA-61 REPORTED VALUE	9= TMDA-63 REPORTED VALUE	10= TMDA-54.3 REPORTED VALUE
F002	0.4	0.2	7.	12.3	41.1	0.2	0.5	70.9	195.	380. H
F003	0.317	0.220	7.20	12.6	43.2	0.130	0.202	72.8	196.	359.
F009	<1.	<1.	9. EH	17. EH	57. EH	<1.	<1.	95. EH	249. EH	488. EH
F010	<0.3	<0.3	6.5	11.7	40.2	<0.3	<0.3	68.	178.	349.
F011	0.2	0.2	6.9	12.6	43.3	0.1	<0.1	76.5	213. EH	381. H
F014	<1.0	<1.0	7.7	12.9	43.8	<1.0	<1.0	72.7	180.	330. L
F015	0.23	0.24	6.90	12.53	44.68	0.08	<0.05	73.19	188.7	392.4 VH
F019	<5.	<5.	7.	12.	44.	<5.	<5.	67.	176.	354.
F022	0.286	0.171	6.541	12.037	41.169	0.113	0.274	64.415 L	187.028	353.701
F024	<1.	<1.	6.	10. EL	42.	<1.	<1.	71.	190.	370.
F025	<1.0	<1.0	6.	11.	41.	<1.0	<1.0	68.	187.	361.
F032	<0.9	<0.9	7.03	12.2	42.	<0.9	<0.9	70.2	186.	353.
F032b	<1.	<1.	7.19	12.0	44.4	<1.	<1.	73.2	187.	351.
F038	<1.	<1.	7.	12.	44.	<1.	<1.	70.	191.	345.
F042	5.0W	5.0W	6.50	11.8	42.8	5.0W	5.0W	71.5	189.	365.
F048	<1.	<1.	6.49	11.88	43.38	<1.	<1.	72.21	184.85	356.02
F062	<0.3	<0.3	6.6	12.0	42.1	<0.3	<0.3	71.2	186.	362.
F064	<0.5	<0.5	6.6	12.0	42.0	<0.5	<0.5	69.9	183.3	358.1
F094	0.3	0.2	6.8	12.2	41.6	0.3	0.4	70.2	187.	356.
F095	0.4	0.6 EH	6.2	12.2	41.8	0.7 EH	0.8	70.8	186.	365.
F096	<3.	<3.	9.6 EH	13.5	42.7	<3.	<3.	72.8	191.	376.
F133	<1.	<1.	6.	11.	41.	<1.	<1.	70.	177.	340.
F138	0.35	0.22	6.46	11.2	38.3 EL	0.10	0.56	71.5	166. VL	328. L
F139				13.5	41.			69.4	181.	348.7
F143	<1.	<1.	6.2	12.	42.	<1.	<1.	66.	182.	356.
F153	<1.	<1.	7.	12.	41.	<1.	<1.	67.	178.	357.
F154	<1.	<1.	7.	12.	43.	<1.	<1.	71.	186.	339.
F159	<1.	<1.	7.1	13.	41.	<1.	<1.	6.6 EL	180.	340.
MEDIAN	0.3085	0.2100	6.9000	12.0000	42.0000	0.1215	0.4500	70.8500	186.0000	356.0100
1CRIT	1.5000	1.5000	1.8240	2.1300	3.9300	1.5000	1.5000	5.6610	12.5700	22.7706
N	5	6	26	26	26	6	4	26	26	26
MEAN	0.2966	0.2133	6.8043	12.1595	42.3165	0.1572	0.4335	70.4390	186.3799	357.6124
3STDEV	-	0.0447	1.8137	1.8273	3.6596	0.2172	-	7.6379	22.1964	41.7481

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING		BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	131.50	13.150	10		H				ICP-MS
F003	150.50	15.050	10						ICP-MS
F009	166.00	27.667	6	EHEHEH	EHEHEH	BIASED HIGH	36.73	-1.0402	ICP-MS
F010	34.50	5.750	6			BIASED LOW*	-2.14	-0.9922	ICP-OES
F011	144.50	16.056	9		EHH				ICP-MS
F014	102.50	17.083	6		L				ICP-MS
F015	144.50	16.056	9		VH				ICP-MS GFAA
F019	72.50	12.083	6						ICP-OES
F022	77.00	7.700	10		L				ICP-MS
F024	78.00	13.000	6	EL					ICP-AES
F025	52.00	8.667	6						ICP
F032	88.50	14.750	6						ICP-AES
F032b	112.50	18.750	6						ICP-MS
F038	94.00	15.667	6						ICP-MS
F042	94.50	15.750	6						ICP-OES
F048	83.00	13.833	6						ICP
F062	90.50	15.083	6						ICP-MS
F064	72.50	12.083	6						ICP-AES (USN)
F094	101.00	10.100	10						ICP-MS
F095	112.00	11.200	10	EH EH					ICP
F096	141.50	23.583	6	EH		BIASED HIGH	5.05	-0.3597	ICP-AES
F133	27.50	4.583	6			BIASED LOW*	-4.60	0.3751	ICP-MS
F138	51.50	5.150	10	EL	VLL	BIASED LOW	-8.38	0.4422	ICP-MS 1638
F139	54.50	10.900	5						ICP-OES
F143	55.00	9.167	6						ICP-SW2
F153	59.50	9.917	6						ICP-AES
F154	81.50	13.583	6						
F159	64.00	10.667	6		EL				ASTM D 5673

* 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 12.878

PARAMETER: 30095 Zinc ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

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= TMHUMB-95	2= TMFS-KEN	3= TM-24.2	4= TM-26.2	5= TM-40	6= TMFS-WAWA	7= TM-LNGLKEA	8= TMDA-61	9= TMDA-63	10= TMDA-54.3
LAB NO	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE	REPORTED VALUE
F002	2.2	3.6	21.3	35.2	54.7	3.9	13.4	72.2	229. H	598.
F003	2.40	4.07	20.1	33.3	52.3	3.47	13.5	71.4	209.	555.
F009	2.5	4.4	26. VH	35.	53.	4.	13.	73.	212.	610. H
F010	<5.	<5.	5. EL	9. EL	26. EL	<5.	<5. EL	47. EL	183. L	542.
F011	<10.	<10.	20.	34.	53.	<10.	12.	74.	225. H	602. H
F014	<5.	<5.	19.	31.	51.	<5.	13.	71.	209.	508. L
F015	2.0	3.1	17.9	30.6	49.2	3.1	11.9	69.3	205.2	554.
F019	<5.	5.	20.	33.	49.	<5.	13.	70.	207.	575.
F022	1.871	3.929	21.142	36.16	56.259	3.686	14.519	73.867	237.351 VH	635.874 VH
F024	<5.	<5.	20.	34.	53.	<5.	13.	73.	215.	585.
F025	2.2	7.2 EH	20.7	33.	50.5	3.5	13.2	68.8	205.	557.
F026	<5.	<5.	17.9	30.5	48.0	<5.	12.4	64.1	189.8	535.1
F031	<5.	<5.	19.	32.	50.	<5.	12.	65.	194.	547.
F032	1.39	2.84	19.1	31.8	50.1	2.72	12.1	67.5	201.	536.
F032b	2.76	4.44	20.6	33.8	53.5	4.37	13.8	68.9	202.	548.
F037	<0.8	3.25	15.69 L	27.1 L	44.64 L	0.8209L	9.626 L	59.53 L	182. L	498. L
F038	2.	4.	19.	33.	51.	3.	14.	72.	205.	544.
F042	1.63	4.17	17.9	30.2	48.8	2.68	12.5	65.3	193.	519.
F048	2.62	4.72	21.95	35.3	55.25	4.47	15.38	72.45	217.17	592.90
F062	2.9	4.6	26.2 VH	44.9 EH	67.2 EH	5.1	15.9 H	92.0 EH	272. EH	773. EH
F064	2.6	3.2	19.3	32.9	49.7	7.8 EH	12.3	68.7	199.1	552.4
F094	<2.	<2.	13. VL	26. VL	51.	<2.	7. EL	61. L	194.	528.
F095	4.5 EH	5.9	21.1	34.2	52.6	5.7	16.8 H	70.7	205.	558.
F096	<2.	4.0	19.3	33.4	53.1	4.1	13.5	72.6	212.	583.
F133	2.0	2.5	22.5	38.5 H	61.0 VH	7.5 VH	15.5	84.0 VH	254. EH	673. VH
F138	2.44	4.71	22.5	36.7	58.9 H	3.96	12.8	70.0	221.	624. VH
F139								69.8	188.5	566.
F143	1.8	3.0	20.	34.	50.	2.5	12.	67.	203.	548.
F147			19.7	31.	50.9		13.5	68.3	201.7	548.7
F153	11. EH	3.	18.	33.	52.	6. H	17. H	69.	201.	566.
F154	<5.	7. H	21.	38. H	51.	<5.	17. H	77. H	205.	538.
F159	1.8	3.2	16. L	28. L	43. L	3.4	10. L	56. VL	170. VL	490. L
F163	1.9	3.5	19.1	31.8	49.9	3.1	12.9	67.9	205.	565.
F169	<10.	<10.	18.	22. EL	45. L	<10.	12.	60. L	210.	543.
MEDIAN	2.2000	4.0000	19.7000	33.0000	51.0000	3.7930	13.0000	69.5500	205.0000	554.5000
1CRIT	2.0160	2.1600	3.4160	4.4800	5.9200	2.1434	2.8800	7.4040	18.2400	46.2000
N	18	22	31	31	31	20	29	32	32	32
MEAN	2.3401	4.0740	19.5736	32.5310	51.3338	4.0128	13.0871	69.1671	206.8694	563.5930
3STDEV	1.9010	2.9776	6.8839	10.1251	10.9603	3.6722	4.5598	15.8546	44.2687	109.9601

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	219.50	21.950	10	H				ICP-MS
F003	182.50	18.250	10					ICP-MS
F009	226.50	22.650	10	VH H				ICP-MS
F010	16.00	2.667	6	ELELEL ELELL	BIASED LOW*	1.60	-22.6057	ICP-OES
F011	163.00	23.286	7	H H				ICP-MS
F014	102.00	14.571	7	L				ICP-MS
F015	99.50	9.950	10					ICP-MS GFAA
F019	145.00	18.125	8					ICP-OES
F022	233.00	23.300	10	VHVH				ICP-MS
F024	164.50	23.500	7					ICP-AES
F025	168.00	16.800	10	EH				ICP
F026	46.00	6.571	7		BIASED LOW*	-3.49	-2.1361	I.C.P.
F031	68.50	9.786	7					ICP
F032	81.50	8.150	10					ICP-AES
F032b	186.50	18.650	10					ICP-MS
F037	28.00	3.111	9	L L L L L L L	BIASED LOW	-9.88	-2.0801	ICP-MS
F038	147.50	14.750	10					ICP-MS
F042	68.00	6.800	10		BIASED LOW	-6.32	-0.0117	ICP-OES
F048	247.00	24.700	10		BIASED HIGH	6.74	0.2060	ICP
F062	284.00	28.400	10	VHEHEH H EHEHEH	BIASED HIGH	39.13	-2.5925	ICP-MS
F064	130.00	13.000	10	EH				ICP-AES (USN)
F094	41.00	5.857	7	VLVL ELL	BIASED LOW*	-3.94	-4.0650	ICP-MS
F095	221.00	22.100	10	EH H				ICP
F096	188.50	20.944	9					ICP-AES
F133	251.50	25.150	10	H VHVH VHEHVH	BIASED HIGH	21.69	-0.2560	ICP-MS
F138	229.00	22.900	10	H VH				ICP-MS 1638
F139	44.50	14.833	3		INSUFFICIENT DATA			ICP-OES
F143	106.00	10.600	10					ICP-SW2
F147	102.50	14.643	7					ICP
F153	169.00	16.900	10	EH H H				ICP-AES
F154	185.00	23.125	8	H H H H				
F159	36.00	3.600	10	L L L L VLVLL	BIASED LOW	-11.87	-2.0866	ASTM D 5673
F163	119.50	11.950	10					ICP-AES
F169	59.00	8.429	7	ELL L				AAS

* 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 15.916

FPHG STUDY 0077 DATA SUMMARY 2000-11-27 PAGE 1

PARAMETER: 80095 Mercury ug/L

NATIONAL WATER RESEARCH INSTITUTE
ENVIRONMENT CANADA

NWRI Ecosystem Interlab QA for Mercury

LOWER LIMIT OF BASIC ACCEPTABLE ERROR= 0.0200 BASIC ACCEPTABLE ERROR= 0.0200 CONCENTRATION ERROR INCREMENT= 0.1250

SAMPLE LAB NO	1= HG77-1 REPORTED VALUE	2= HG77-2 REPORTED VALUE	3= HG77-3 REPORTED VALUE	4= HG77-4 REPORTED VALUE	5= HG77-5 REPORTED VALUE	6= HG77-6 REPORTED VALUE	7= HG77-7 REPORTED VALUE	8= HG77-8 REPORTED VALUE	9= HG77-9 REPORTED VALUE	10= HG77-10 REPORTED VALUE
F002	<0.02	0.06	0.110	0.170	0.120	0.190	0.270	0.340	0.360	0.470
F003	<0.005	0.053	0.112	0.164	0.120	0.195	0.277	0.343	0.376	0.488
F006	<0.02	0.04	0.09	0.13	0.09	0.16	0.22 L	0.28	0.28 L	0.41
F009	<0.02	0.04	0.10	0.17	0.09	0.19	0.29	0.36	0.42 H	0.54
F010	0.2 EH	<0.1	0.1	0.2	0.1	0.2	0.3	0.3	0.3	
F015	<0.05	0.08 EH	0.15 H	0.18	0.14	0.23	0.29	0.36	0.37	0.51
F019	<0.03	<0.03 EL	0.06 VL	0.14	0.08	0.16	0.23	0.30	0.34	0.48
F024	<0.05	0.07	0.15 H	0.18	0.14	0.24 H	0.34 H	0.39 H	0.29	0.72 EH
F025	0.05 EH	0.05	0.11	0.12 L	0.13	0.17	0.29	0.35	0.4	0.46
F032	0.002	0.049	0.105	0.156	0.114	0.188	0.262	0.326	0.358	0.468
F036	0.0014	0.065	0.126	0.175	0.135	0.094 EL	0.370 VH	0.389 H	0.404	0.587 VH
F038	<0.01	0.05	0.10	0.15	0.11	0.18	0.24	0.32	0.35	0.46
F042	0.0003	0.0504	0.1053	0.1508	0.1036	0.1774	0.2379	0.306	0.2429VL	0.4507
F062	<0.1	<0.1	<0.1	<0.1 VL	<0.1	0.2	0.2 L	0.2 EL	0.3	0.4
F069	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.302	0.351	0.450
F095	<0.02	0.06	0.11	0.18	0.13	0.22	0.31	0.36	0.38	0.49
F138	0.0005	0.046	0.144 H	0.103 VL	0.107	0.193	0.243	0.304	0.351	0.492
F159	<0.20	<0.20	0.24 EH	0.48 EH	<0.20	<0.20	0.51 EH	<0.20 EL	0.31	0.34 EL
F163	0.0009	0.049	0.107	0.159	0.11	0.189	0.252	0.316	0.318	0.423
F172	<0.1	<0.1	0.2 VH	0.2	0.1	0.2	0.3	0.4 H	0.4	0.5
MEDIAN OR *TARGET CONC.	*0.0030	0.0502	0.1100	0.1670	0.1100	0.1900	0.2770	0.3260	0.3510	0.4700
1CRIT	0.0200	0.0238	0.0312	0.0384	0.0312	0.0412	0.0521	0.0582	0.0614	0.0763
N	5	11	16	16	14	16	17	17	18	17
MEAN	0.0110	0.0548	0.1200	0.1641	0.1114	0.1902	0.2778	0.3321	0.3466	0.4752
3STDEV	-	0.0222	0.0818	0.0657	0.0414	0.0546	0.1166	0.0949	0.1142	0.1334

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	95.00	10.556	9					CVAA
F003	102.50	11.389	9					Acid Dig'n, CVAAS
F006	20.50	2.278	9	L L	BIASED LOW	-13.74	-0.0077	AA - SnCl2
F009	92.00	10.222	9	H				ICP-MS
F010	68.50	8.562	8	EH				Cold vapor AA
F015	134.00	14.889	9	EHH	BIASED HIGH*	0.09	0.0285	CVAF
F019	34.00	4.250	8	ELVL	BIASED LOW	11.42	-0.0549	Cold Vapour
F024	134.00	14.889	9	H H H H EH	BIASED HIGH	31.88	-0.0206	CVAA
F025	92.00	9.200	10	EH L				CVAA
F032	78.50	7.850	10					CVAAS
F036	129.00	12.900	10	ELVHH VH				AFS
F038	60.50	6.722	9					CVAAS
F042	51.00	5.100	10	VL	BIASED LOW	-12.22	0.0024	AFS
F062	22.50	4.500	5	VL L EL				Cold Vapour AAS
F069	20.50	6.833	3		INSUFFICIENT DATA			CVAA
F095	124.00	13.778	9					Cold Vapour Fluor
F138	74.50	7.450	10	H VL				1631
F159	62.00	12.400	5	EHEH EHEL EL				ASTM D 3223
F163	66.00	6.600	10					
F172	118.00	14.750	8	VH H	BIASED HIGH*	2.80	0.0304	CVAA

* 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 9.343

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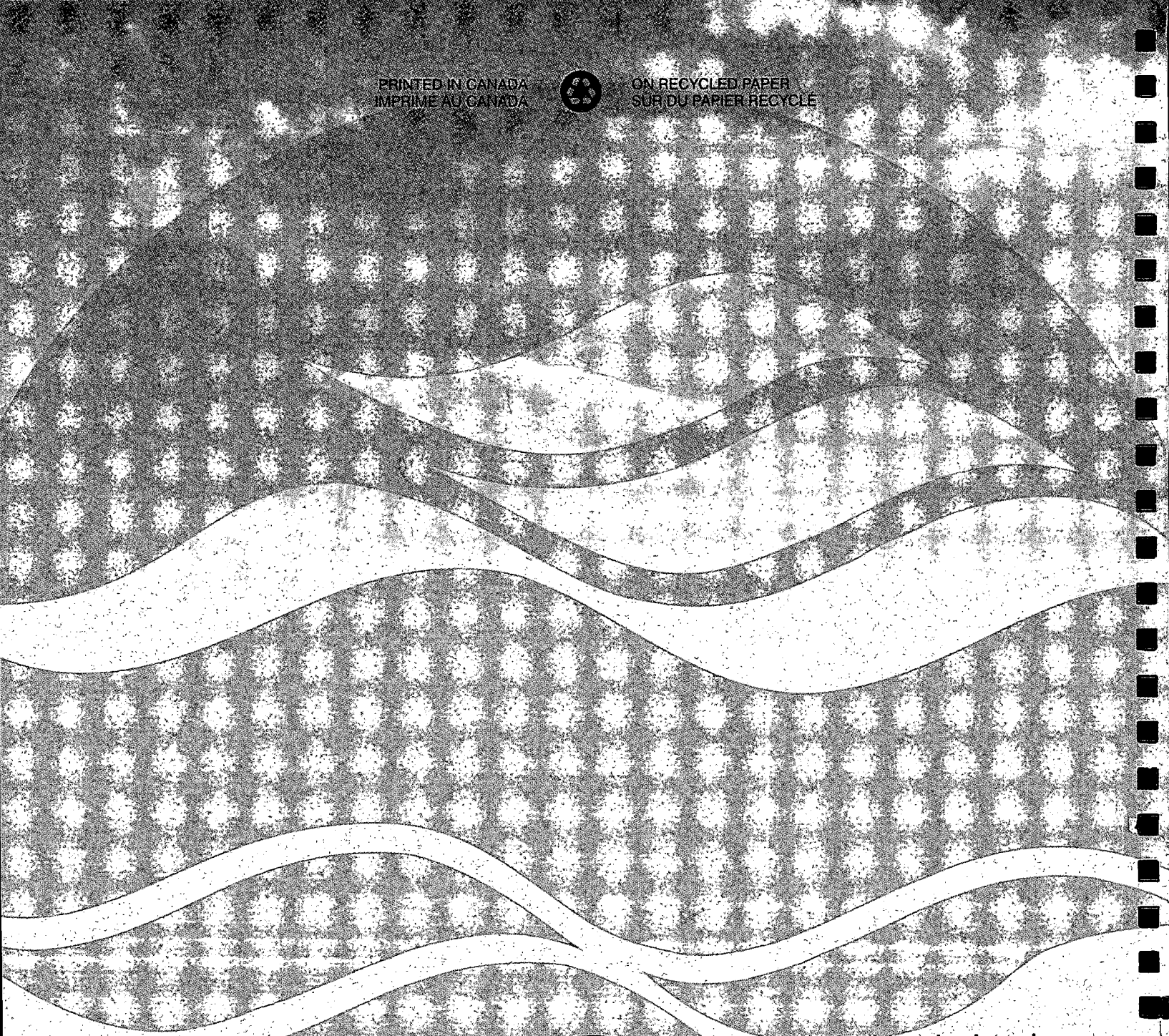

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