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NATIONAL WATER RESEARCH INSTITUTE

INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Ecosystem Interlaboratory QA Program
Study FP 72 - Major Ions & Nutrients and Total Phosphorus in Surface Waters
(March & April 1998)

H. Alkema and L. Hjelm

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National Water Research Institute
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June 19, 1998

To: Participants of the NWRI Ecosystem Interlaboratory QA Program

Re: Final Report for NWRI Study FP 72 - Major Ions & Nutrients and Total Phosphorus Portions

Dear Participant:

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

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

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

The laboratories listed in this report submitted their data with a confidential laboratory code. This confidentiality is fully respected by our staff. Access to these codes is possible through the relevant laboratories or program authorities.

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

Yours truly,

Harry A.

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Attachment: Individual Laboratory Appraisal

Canada

National Water Research Institute
National Laboratory for Environmental Testing

Report no. NWRI-QA-98-02

Ecosystem Interlaboratory Quality Assurance Program
Study FP 72 - Final Report

March and April 1998

An Interlaboratory Quality Assurance Study for Major Ions & Nutrients and Total Phosphorus in Surface Waters*

by

H. Alkema and L. Hjelm

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

June 1998

* companion studies: Rain and Soft Waters; Report NWRI-QA-97-01 and Trace Metals; Report NWRI-QA-97-03

NWRI Interlaboratory Quality Assurance Studies for Acid Rain and Surface Waters

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

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

The QA studies are executed twice a year and accommodate environmental programs in both Canada and the United States of America. The US Environmental Protection Agency, US Geological Survey, and numerous university acid rain programs show a continued interest in this program. More than 200 laboratories are invited to participate on a voluntary basis in each study. Currently, 40 of these labs participate in the various study matrixes. One study consists of five (5) series of ten (10) samples each and includes numerous parameters for analysis. The primary feature of these studies is to report the quality of data produced by the participating laboratories. Laboratory performance is ranked in terms of the number of biased parameters (systematic bias) and flagged results (precision measurement). The reports produced from the client data provide a powerful tool for the diagnosis of problematic analysis. Environmental programs and data users are therefore encouraged to have their labs participate as a means of quantifying laboratory performance and data quality.

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

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Table of Contents

Table 1	List of Participating Laboratories
Table 2	Laboratory Performance Scores - Study FP 72
	a) Major Ions and Nutrients b) Total Phosphorus
Table 3	Summary of Study-to-Study Performance
	a) Major Ions and Nutrients b) Total Phosphorus
Table 4	Sample Design
	a) Major Ions and Nutrients b) Total Phosphorus
Table 5	Summary of Interlaboratory Median Values - Study FP 72
	a) Major Ions and Nutrients b) Total Phosphorus
Appendix A	Glossary of Terms Quantifying Bias in NWRI QA Studies
Appendix B	Data & Evaluation Summary
	a) Major Ions and Nutrients b) Total Phosphorus

Table 1 List of participating[†] laboratories in the major ions & nutrients and total phosphorus portions of interlaboratory study FP 72 (March & April 1998).

Accutest Laboratories Ltd.
AECL Research - ASB, Whiteshell
Aqualta
ASL - Analytical Service Lab Ltd.
Can Test Ltd.
Chemex Environmental Services
City of Calgary - Waterworks
CRD Water Department Laboratory
Environment Canada - EPL, Prairie & Northern Region
Environment Canada - EQL, Atlantic Region
Environment Canada - ETC, AMD
Environment Canada - NHRI, WQL
Environment Canada - NWRI, NLET
Environment Canada - Pacific Environmental Science Centre
Environnement Canada - CSL, Laboratoire régional - Québec
Enviro-Test Laboratories
Enviro-Test Manitoba Technology Centre
Falconbridge Ltd. - Kidd Creek Division
Falconbridge Ltd. - Sudbury Operations
Fisheries and Oceans Canada - Freshwater Institute
FOOD CONTROL S.A.
Laboratoire de Santé Publique du Québec
Laurentian University - Elliot Lake Field Research Station
Maxxam Analytics
Ministère de l'Environnement et de la Faune du Québec - Laval
Ministère de l'Environnement et de la Faune du Québec - Sainte-Foy
Monroe County Environmental Health Laboratory
Natural Resources Canada - CFS, Atlantic Region
Natural Resources Canada - CFS, Ontario Region
New Brunswick Department of the Environment - ASL
Norwest Labs
Ontario Hydro Technologies
Ontario Ministry of Environment and Energy - Dorset
Ontario Ministry of Environment and Energy - Etobicoke
Ontario Ministry of Northern Development and Mines - Geosciences Laboratory
Saskatchewan Health - LDCSB
TAIGA Environmental Laboratory
University of Alberta - Department of Biological Sciences
University of Maine - Water Research Institute
US Environmental Protection Agency - Western Ecology Division
US Geological Survey - National Water Quality Laboratory
York-Durham Regional Environmental Laboratory

[†] Laboratories select their routine parameters from the series of samples in this study.

Table 2a

Laboratory Performance Scores (Study 0072)

Major Ions & Nutrients

	SYSTEMATIC BIAS			FLAGGED RESULTS			
LAB CODE	NO. OF PARAMETERS ANALYZED	NO. OF PARAMETERS BIASED	PERCENTAGE OF PARAMETERS BIASED (%)	NO. OF RESULTS RANKED	NO. OF FLAGS ASSIGNED	PERCENTAGE OF RESULTS FLAGGED (%)	SUM OF BIAS & FLAGGED DATA % SCORE
F122	1	0	0.00	10	0	0.00	0.00
F036	13	0	0.00	124	1	0.81	0.40
F004	8	0	0.00	73	3	4.11	2.05
F069	16	0	0.00	143	8	5.59	2.80
F003	19	0	0.00	188	14	7.45	3.72
F002	15	0	0.00	146	11	7.53	3.77
F048	16	0	0.00	148	16	10.81	5.41
F008	20	0	0.00	191	22	11.52	5.76
F080	15	1	6.67	143	10	6.99	6.83
F019	14	0	0.00	124	20	16.13	8.06
F032	18	2	11.11	160	9	5.62	8.37
F094	21	1	4.76	197	25	12.69	8.73
F026	15	2	13.33	150	9	6.00	9.67
F095	21	2	9.52	197	21	10.66	10.09
F133	11	1	9.09	110	14	12.73	10.91
F009	12	0	0.00	116	26	22.41	11.21
F092	18	3	16.67	168	16	9.52	13.10
F014	18	2	11.11	148	23	15.54	13.33
F038	17	2	11.76	153	24	15.69	13.73
F113	13	2	15.38	130	16	12.31	13.85
F007	11	2	18.18	104	10	9.62	13.90
F022	19	3	15.79	179	24	13.41	14.60
F093	13	1	7.69	118	28	23.73	15.71
F031	14	2	14.29	140	31	22.14	18.21
F135	13	2	15.38	114	24	21.05	18.22
F015	19	4	21.05	179	28	15.64	18.35
F063	17	4	23.53	167	22	13.17	18.35
F068	7	2	28.57	69	6	8.70	18.63
F064	14	2	14.29	139	36	25.90	20.09
F010	19	4	21.05	176	37	21.02	21.04
F046	21	5	23.81	201	42	20.90	22.35
F006	16	5	31.25	148	35	23.65	27.45
F025	20	4	20.00	189	67	35.45	27.72
F011	16	5	31.25	149	39	26.17	28.71
F042	16	6	37.50	151	32	21.19	29.35
F074	16	6	37.50	160	35	21.88	29.69
F074m	6	2	33.33	60	29	48.33	40.83
F103	13	5	38.46	120	53	44.17	41.31
F139	8	4	50.00	76	37	48.68	49.34
F037	13	8	61.54	128	69	53.91	57.72
F074u	3	2	66.67	30	19	63.33	65.00
F012	8	6	75.00	77	57	74.03	74.51

The parameters were selected from:

Cond	Colour	B	DOC	pH	DIC
TKN	Ammon	NO3	F	Na	Mg
SO4	Cl	K	Ca	Turb	TN
Hard	SiO2				

Table 2b

Laboratory Performance Scores (Study 0072)

Total Phosphorus

	SYSTEMATIC BIAS			FLAGGED RESULTS			
LAB CODE	NO. OF PARAMETERS ANALYZED	NO. OF PARAMETERS BIASED	PERCENTAGE OF PARAMETERS BIASED (%)	NO. OF RESULTS RANKED	NO. OF FLAGS ASSIGNED	PERCENTAGE OF RESULTS FLAGGED (%)	SUM OF BIAS & FLAGGED DATA % SCORE
F002	1	0	0.00	9	0	0.00	0.00
F003	1	0	0.00	10	0	0.00	0.00
F004	1	0	0.00	9	0	0.00	0.00
F007	1	0	0.00	9	0	0.00	0.00
F008	1	0	0.00	9	0	0.00	0.00
F009	1	0	0.00	9	0	0.00	0.00
F010	1	0	0.00	9	0	0.00	0.00
F014	1	0	0.00	9	0	0.00	0.00
F015	1	0	0.00	10	0	0.00	0.00
F025	1	0	0.00	9	0	0.00	0.00
F026	1	0	0.00	10	0	0.00	0.00
F038	1	0	0.00	10	0	0.00	0.00
F042	1	0	0.00	10	0	0.00	0.00
F048	1	0	0.00	9	0	0.00	0.00
F060	1	0	0.00	9	0	0.00	0.00
F069	1	0	0.00	9	0	0.00	0.00
F072	1	0	0.00	9	0	0.00	0.00
F074	1	0	0.00	10	0	0.00	0.00
F080	1	0	0.00	10	0	0.00	0.00
F092	1	0	0.00	10	0	0.00	0.00
F094	1	0	0.00	9	0	0.00	0.00
F113	1	0	0.00	10	0	0.00	0.00
F095	1	0	0.00	10	1	10.00	5.00
F032	1	0	0.00	9	1	11.11	5.56
F022	1	0	0.00	10	3	30.00	15.00
F133	1	0	0.00	10	3	30.00	15.00
F036	1	0	0.00	9	3	33.33	16.67
F046	1	0	0.00	9	3	33.33	16.67
F139	1	0	0.00	7	6	85.71	42.86
F122	1	0	0.00	10	9	90.00	45.00
F006	1	1	100.00	9	5	55.56	77.78
F064	1	1	100.00	9	7	77.78	88.89

Table 3a SUMMARY of STUDY-TO-STUDY PERFORMANCE

Major Ions & Nutrients

LAB CODE	% BIASED PARAMETERS & FLAGGED RESULTS ON STUDIES 0063	0064	0065	0066	0067	0068	0069	0070	0071	0072	MEDIAN SCORE	COMMENTS
F002	15.4	12.5	6.5	4.8	1.7	4.0	4.9	10.9	13.3	3.8	5.7	SATISFACTORY
F003	2.8	3.3	2.1	6.1	9.3	9.7	14.8	0.5	3.1	3.7	3.5	GOOD
F004	8.5	0.0	3.8	1.5	1.4	16.8	0.8	1.4	1.4	2.1	1.5	GOOD
F006	17.6	15.8	18.6	23.4	23.8	21.1	30.3	19.7	24.9	27.4	22.2	MODERATE
F007	11.0	0.9	-	11.0	9.6	13.7	4.1	11.9	3.2	13.9	11.0	SATISFACTORY
F008	11.4	12.1	9.9	6.4	6.6	9.3	6.6	9.3	10.3	5.8	9.3	SATISFACTORY
F009	11.5	20.6	27.2	12.5	10.0	1.2	1.3	22.5	2.8	11.2	11.4	SATISFACTORY
F010	13.0	6.6	10.1	20.6	12.7	7.9	-	14.4	23.1	21.0	13.0	MODERATE
F011	41.9	27.9	6.2	25.5	25.7	8.4	12.6	26.5	22.5	28.7	25.6	MODERATE
F012	-	-	-	-	-	-	45.1	-	-	74.5	59.8	POOR
F014	14.8	15.4	30.9	23.6	12.6	5.4	12.8	4.5	15.3	13.3	14.1	MODERATE
F015	15.7	7.6	8.5	11.5	20.0	15.6	18.7	19.1	4.7	18.3	15.6	MODERATE
F019	-	-	-	38.2	15.3	3.1	9.2	5.2	2.4	8.1	8.1	SATISFACTORY
F022	-	-	-	-	-	15.8	-	14.4	28.9	14.6	15.2	MODERATE
F025	16.0	8.7	7.0	20.4	-	-	-	13.6	44.3	27.7	16.0	MODERATE
F026	16.3	3.8	5.7	9.0	25.3	10.7	15.7	25.0	11.3	9.7	11.0	SATISFACTORY
F031	6.9	3.6	23.6	16.8	15.9	14.3	17.1	13.3	11.1	18.2	15.1	MODERATE
F032	1.4	0.8	7.1	10.4	5.0	4.2	9.1	5.0	9.6	8.4	6.1	SATISFACTORY
F036	1.2	7.2	-	8.3	15.9	20.1	6.4	2.0	1.7	0.4	6.4	SATISFACTORY
F037	23.6	38.1	23.3	-	17.5	34.3	22.4	34.2	25.8	57.7	25.8	MODERATE
F038	9.5	6.1	6.8	9.3	12.5	14.4	19.5	27.8	14.1	13.7	13.1	MODERATE
F042	10.5	7.7	13.7	16.5	14.4	9.4	-	12.6	23.8	29.3	13.7	MODERATE
F046	11.1	3.9	13.3	12.1	10.9	14.0	12.9	15.1	15.9	22.4	13.1	MODERATE
F048	10.4	9.8	17.7	32.0	19.3	17.8	19.3	8.6	22.8	5.4	17.8	MODERATE
F063	-	13.5	-	-	-	7.3	11.3	9.6	8.9	18.4	10.5	SATISFACTORY
F064	-	57.6	-	-	-	14.3	-	-	-	20.1	20.1	MODERATE
F068	-	1.8	10.6	28.6	3.4	11.8	0.7	9.3	0.0	18.6	9.3	SATISFACTORY
F069	-	13.5	6.5	16.4	18.0	16.4	7.6	4.5	-	2.8	10.6	SATISFACTORY
F074	-	-	21.1	19.3	21.7	19.0	-	-	16.6	29.7	20.2	MODERATE
F074m	-	-	-	-	-	-	-	-	-	40.8	-	-
F074u	-	-	-	-	-	-	-	-	-	65.0	-	-
F080	-	-	11.2	6.2	8.8	0.0	10.4	-	23.8	6.8	8.8	SATISFACTORY
F092	-	-	-	-	31.9	34.7	-	25.0	-	13.1	28.5	MODERATE
F093	-	-	-	-	50.3	61.5	36.3	46.7	30.6	15.7	41.5	POOR
F094	-	-	-	-	13.5	35.4	18.4	23.1	5.0	8.7	16.0	MODERATE
F095	-	-	-	-	6.8	-	-	6.4	-	10.1	6.8	SATISFACTORY
F103	-	-	-	-	-	34.3	-	-	-	41.3	37.8	POOR
F113	-	-	-	-	-	-	37.5	28.9	10.6	13.8	21.4	MODERATE
F122	-	-	-	-	-	-	-	-	-	0.0	-	-
F133	-	-	-	-	-	-	-	7.3	11.3	10.9	10.9	SATISFACTORY
F135	-	-	-	-	-	-	-	-	-	18.2	-	-
F139	-	-	-	-	-	-	-	-	-	49.3	-	-
INTERLAB MEDIAN	11.4	7.7	10.1	12.5	13.5	14.3	12.8	13.3	11.3	14.6		

STUDY DATES: 0063(05-JUL-93), 0064(05-JAN-94), 0065(05-JUL-94), 0066(04-JAN-95), 0067(05-JUL-95), 0068(01-MAR-96), 0069(01-SEP-96), 0070(03-MAR-97), 0071(02-SEP-97), 0072(02-MAR-98)

Table 3b SUMMARY of STUDY-TO-STUDY PERFORMANCE

Total Phosphorus

LAB CODE	% BIASED PARAMETERS & FLAGGED RESULTS ON STUDIES 0063	0064	0065	0066	0067	0068	0069	0070	0071	0072	MEDIAN SCORE	COMMENTS
F002	15.0	5.6	11.1	15.0	27.8	5.0	81.3	5.0	50.0	0.0	13.1	MODERATE
F003	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	GOOD
F004	0.0	0.0	15.0	0.0	5.0	0.0	0.0	5.0	0.0	0.0	0.0	GOOD
F006	37.5	87.5	57.1	92.9	90.0	14.3	100.0	78.6	22.2	77.8	78.2	POOR
F007	5.0	5.6	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	GOOD
F008	0.0	15.0	0.0	10.0	0.0	10.0	5.6	5.0	0.0	0.0	2.5	GOOD
F009	-	90.0	93.8	-	-	-	-	75.0	11.1	0.0	75.0	POOR
F010	0.0	0.0	10.0	0.0	20.0	0.0	-	50.0	0.0	0.0	0.0	GOOD
F014	0.0	0.0	10.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	GOOD
F015	0.0	50.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	GOOD
F022	-	-	-	-	-	0.0	-	5.6	0.0	15.0	2.8	GOOD
F025	-	0.0	6.2	0.0	-	-	-	6.2	0.0	0.0	0.0	GOOD
F026	5.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	50.0	0.0	0.0	GOOD
F032	85.7	0.0	6.2	5.0	0.0	5.0	6.2	12.5	0.0	5.6	5.3	SATISFACTORY
F036	0.0	70.0	0.0	-	0.0	70.0	0.0	5.6	10.0	16.7	5.6	SATISFACTORY
F038	20.0	0.0	0.0	50.0	15.0	15.0	0.0	10.0	50.0	0.0	12.5	MODERATE
F042	10.0	5.0	0.0	0.0	0.0	0.0	-	20.0	0.0	0.0	0.0	GOOD
F046	45.0	25.0	27.8	15.0	90.0	41.7	6.2	0.0	5.6	16.7	20.8	MODERATE
F048	-	0.0	0.0	15.0	10.0	0.0	10.0	75.0	0.0	0.0	0.0	GOOD
F060	-	-	-	-	-	-	-	-	-	0.0	-	-
F064	-	100.0	-	-	-	95.0	-	-	-	88.9	95.0	POOR
F069	-	5.0	-	-	-	-	87.5	78.6	0.0	0.0	5.0	SATISFACTORY
F072	-	-	0.0	-	-	-	-	-	0.0	0.0	0.0	GOOD
F074	-	-	-	15.0	-	-	-	-	0.0	0.0	0.0	GOOD
F080	-	-	0.0	10.0	15.0	10.0	18.8	-	100.0	0.0	10.0	SATISFACTORY
F092	-	-	-	-	0.0	0.0	-	0.0	-	0.0	0.0	GOOD
F094	-	-	-	-	5.6	-	-	-	0.0	0.0	0.0	GOOD
F095	-	-	-	-	0.0	-	-	-	-	5.0	2.5	GOOD
F113	-	-	-	-	-	-	25.0	100.0	-	0.0	25.0	MODERATE
F122	-	-	-	-	-	-	-	-	5.6	45.0	25.3	MODERATE
F133	-	-	-	-	-	-	-	10.0	5.0	15.0	10.0	SATISFACTORY
F139	-	-	-	-	-	-	-	-	-	42.9	-	-
INTERLAB MEDIAN	5.0	5.0	0.0	10.0	5.0	0.0	5.6	5.6	0.0	0.0		

STUDY DATES: 0063(05-JUL-93), 0064(05-JAN-94), 0065(05-JUL-94), 0066(04-JAN-95), 0067(05-JUL-95), 0068(01-MAR-96), 0069(01-SEP-96), 0070(03-MAR-97), 0071(02-SEP-97), 0072(02-MAR-98)

Table 4a Sample design for the major ions & nutrients portion of interlaboratory study FP 72 (March & April 1998).

Sample Number	Sample Name	Source (Province/State)	Expected Conductance (µS/cm 25°C)
FP 72 MI-1	Ion-915	Lake Superior, Ontario	97.2
FP 72 MI-2	Ont-96	Lake Superior, Ontario	311.0
FP 72 MI-3	Cran-01	Cranberry Lake, New Jersey	165.0
FP 72 MI-4	HH-94	Hamilton Harbor RYC, Ontario	504.0
FP 72 MI-5	Wattap-03	Waterloo Ground Water, Ontario	454.0
FP 72 MI-6	Spen-94	Spencer Creek, Ontario	568.0
FP 72 MI-7	Assin-01	Assiniboine River - Wayside, Manitoba	893.0
FP 72 MI-8	Batt-97	Battle River, Saskatchewan	588.0
FP 72 MI-9	Assin-97	Assiniboine River - Miniota, Manitoba	783.0
FP 72 MI-10	Fort-97	Qu'appelle River, Saskatchewan	846.0

Table 4b Sample design‡ for the total phosphorus portion of interlaboratory study FP 72 (March & April 1998).

Sample Number	Sample Name	Expected Value - Median (ppm)
FP 72 TP-1	Phos721	0.0040
FP 72 TP-2	Phos722	0.0730
FP 72 TP-3	Phos723	0.0950
FP 72 TP-4	Phos724	0.1240
FP 72 TP-5	Phos725	0.2045
FP 72 TP-6	Phos726	0.1545
FP 72 TP-7	Phos727	0.2600
FP 72 TP-8	Phos728	0.2845
FP 72 TP-9	Phos729	0.3114
FP 72 TP-10	Phos7210	0.4400

‡ All samples are preserved with 0.2% H_2SO_4.

Table 5a

Summary of Interlaboratory Median Values for Major Ions & Nutrients - Study 0072

PARAMETER		SAMPLE NUMBER						
		ION-915 SAMPLE 1	ONT-96 SAMPLE 2	CRAN-01 SAMPLE 3	HH-94 SAMPLE 4	WATTAP-03 SAMPLE 5	SPEN-94 SAMPLE 6	ASSIN-01 SAMPLE 7
Turbidity	JTU/NTU	0.0900	0.1300	0.1000	0.1100	0.0800	0.1600	0.2000
Colour	Hazen Unit	1.1400	2.1000	10.000	4.1000	1.2000	21.300	14.000
Specific Conductance	uS/cm	97.200	311.000	165.000	504.000	454.000	568.000	893.000
pH	pH Units	7.7400	7.9250	7.6500	8.1150	8.2350	8.2500	8.4650
Boron	mg/L	0.0100	0.0260	0.0135	0.0510	0.0120	0.0100	0.1075
Diss Organic Carbon	mg/L C	1.2400	1.8100	3.8100	2.0100	0.8750	6.2200	7.0300
Total Alkalinity	mg/L CaCO3	41.820	89.050	34.300	100.250	131.060	222.000	262.000
Diss Inorg Carbon	mg/L C	10.000	21.455	8.1500	23.900	31.050	51.640	60.050
Nitrate + Nitrite	mg/L N	0.3400	0.4585	0.0180	2.2795	3.6280	0.5792	0.0100
Ammonia	mg/L N	0.0030	0.0280	0.0600	0.0046	0.0050	0.0040	0.0110
Total N	mg/L N	0.4237	0.6755	0.3237	2.4700	3.7150	0.8648	0.4350
Total Kjeldahl N	mg/L N	0.0800	0.2100	0.3040	0.2700	0.1100	0.3500	0.4580
Fluoride	mg/L	0.0400	0.6000	0.1945	0.3600	0.2000	0.1640	0.1670
Total Hardness	mg/L	44.750	122.000	51.300	162.950	210.000	280.000	367.500
Sodium	mg/L	1.3300	13.400	11.200	35.000	10.320	13.250	60.000
Magnesium	mg/L	2.7600	8.4300	5.0500	10.800	26.500	29.200	39.300
Silicates	mg/L SiO2	2.4800	1.1800	0.4000	1.6000	13.100	6.4110	11.000
Sulfate	mg/L	3.4000	25.850	15.200	46.350	54.100	39.300	197.000
Chloride	mg/L	1.4000	23.750	17.945	60.000	23.361	29.810	24.400
Potassium	mg/L	0.5000	1.4800	0.5800	3.5100	1.6350	1.6000	8.4000
Calcium	mg/L	13.200	35.000	12.000	46.750	40.450	64.300	81.750

		BATT-97 SAMPLE 8	ASSIN-97 SAMPLE 9	FORT-97 SAMPLE 10
Turbidity	JTU/NTU	0.6800	0.1900	0.2000
Colour	Hazen Unit	36.300	17.100	22.800
Specific Conductance	uS/cm	588.000	783.000	846.000
pH	pH Units	8.1000	8.0650	7.9700
Boron	mg/L	0.0800	0.1000	0.1200
Diss Organic Carbon	mg/L C	10.900	7.5000	7.4200
Total Alkalinity	mg/L CaCO3	204.950	167.000	147.750
Diss Inorg Carbon	mg/L C	48.302	39.950	35.548
Nitrate + Nitrite	mg/L N	0.0795	0.1720	0.5185
Ammonia	mg/L N	0.0050	0.0035	0.0040
Total N	mg/L N	0.7275	0.6924	1.0900
Total Kjeldahl N	mg/L N	0.7000	0.5705	0.6405
Fluoride	mg/L	0.1620	0.1325	0.1400
Total Hardness	mg/L	168.000	258.500	225.000
Sodium	mg/L	62.885	65.800	89.200
Magnesium	mg/L	18.000	32.900	30.940
Silicates	mg/L SiO2	6.0300	5.0500	4.6600
Sulfate	mg/L	88.950	193.000	214.600
Chloride	mg/L	9.5900	31.000	40.500
Potassium	mg/L	8.9000	10.200	12.000
Calcium	mg/L	38.000	49.450	39.400

Table 5b

Summary of Interlaboratory Median Values for Total Phosphorus - Study 0072

PARAMETER		SAMPLE NUMBER						
		PHOS-721 SAMPLE 1	PHOS-722 SAMPLE 2	PHOS-723 SAMPLE 3	PHOS-724 SAMPLE 4	PHOS-725 SAMPLE 5	PHOS-726 SAMPLE 6	PHOS-727 SAMPLE 7
Total Phosphorus	mg/L P	0.0040	0.0730	0.0950	0.1240	0.2045	0.1545	0.2600

		PHOS-728 SAMPLE 8	PHOS-729 SAMPLE 9	PHOS-7210 SAMPLE 10
		0.2845	0.3114	0.4400

Appendix A

Glossary of Terms
Quantifying Bias in NWRI QA Studies

GLOSSARY OF TERMS

Used for the Evaluation of Interlaboratory Results

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

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

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

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

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

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

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

Satisfactory: Fully acceptable, 'good results'.

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

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

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

In general, for the NWRI QA studies, the values chosen for the **basic acceptable error** and the **concentration error increment** are selected so that good precision may be inferred. Historically, for the Federal-Provincial QA Program, for moderate ranges, this has been achieved with the 10% Deviation Rule.

For a sample whose **target value** is at or below the **lower limit for use of basic acceptable error**, the **basic acceptable error** is used to determine the range of acceptable deviations.

> For example: Suppose that the **lower limit for use of the basic acceptable error** has been set as 10 μg/L and the **basic acceptable error** is 1.0 μg/L, if a **target** (median) **value** for a sample is 5 μg/L, then any **reported result** within the range 5 ± 1.0 or 4.0 to 6.0 μg/L would be considered acceptable. The **BAE** would define the acceptable result within the 0-10 μg/L range.

For results above the **lower limit for use of basic acceptable error**, an allowance is made for the increased variability due to concentration. For almost all substances it appears that the variability of results increases with concentration. The allowance is added to the **basic acceptable error**. It is calculated by multiplying the **concentration error increment** (as a percentage) by the difference between the **target value** and the **lower limit for use of basic acceptable error**.

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

The calculated acceptable difference is termed **1 criteria** or **crit**. This value and the value of three standard deviations (**3SD**) are both action criteria in the determination of flags. When the

reported value is subtracted from the **target value**, the difference is then divided by the **1 criteria** value. This produces the number of **1 crit** deviations. The assigned flag depends upon what range this number falls into.

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

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

References:

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

June 1996

Quantifying Bias in NWRI QA Studies

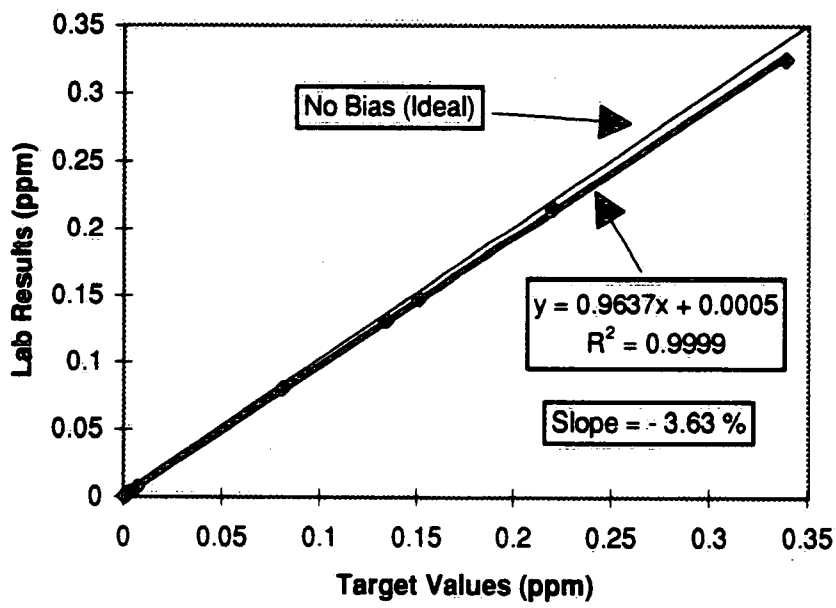
Introduction

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

Degree of Bias

In the NWRI QA studies with 10 sample series, systematic bias[1] is assessed non-parametrically by the procedure of Youden. Up until now, the degree of bias has not been calculated for the QA reports. The degree of bias may be parametrically quantified by two parameters taken from the parameter performance chart, as in figure 1. When bias is indicated by the procedure of Youden, the slope and intercept, give the degree of bias. A complication arises from the high precision of methodologies and instrumentation like ICPMS. A very high precision of analysis may lead to an assessment of very low bias, e.g. 2 or 3%.

Figure 1 **Parameter Performance**



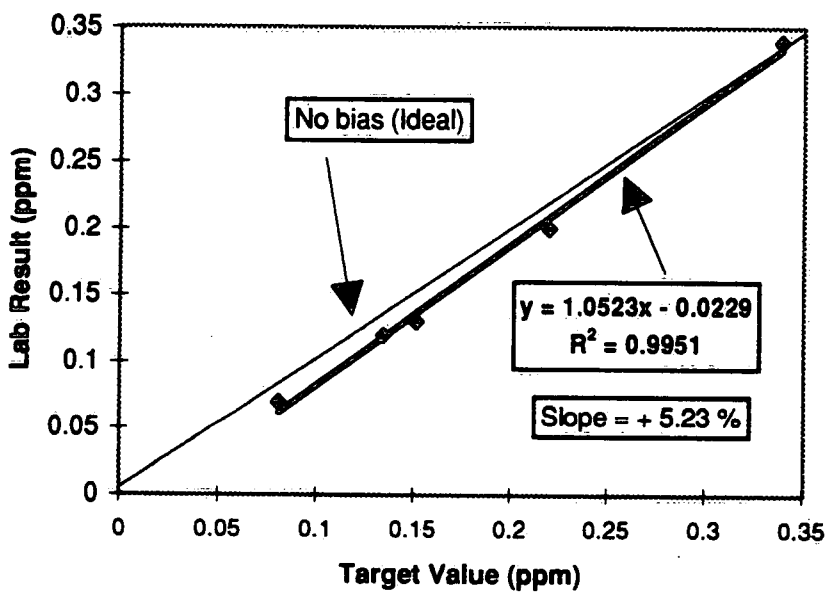
[1] Systematic bias is often identified with the comparison of data to a certified standard.

Parameter Performance Graph and Bias

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

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

Figure 2 **Parameter Performance**



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

Conclusion

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

NWRI Ecosystem Interlaboratory QA Program

Bias Critical Values
Major Ions & Nutrients and Total Phosphorus

Parameter	%
Conductance	2.5
Colour	25
Turbidity	50
Boron	10
pH	10
DOC	7.5
DIC	7.5
Total Alkalinity	3
Nitrate + Nitrite	5
Ammonia	7.5
Total Nitrogen	10
TKN	10
Fluoride	5
Total Hardness	5
Sodium	5
Magnesium	5
Silicates	5
Sulfate	5
Chloride	5
Potassium	5
Calcium	5
Total Phosphorus	5

June 1996

Appendix B

Data & Evaluation Summary

a) Major Ions and Nutrients
b) Total Phosphorus

PARAMETER: 00392 Specific Conductance uS/cm

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= 2.0000 CONCENTRATION ERROR INCREMENT= 0.0400

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	95.90	10.00	310.0	14.50	163.0	9.50	502.0	17.00	453.0	16.00	566.0	17.00
F003	97.2	18.00	311.	19.00	165.	16.00	500.	13.50	452.	15.00	570.	23.00
F004	97.3	19.50	311.	19.00	165.	16.00	505.	20.50	454.	18.50	568.	18.50
F006	101.	31.50	317.	32.00	171.	33.00	505.	20.50	454.	18.50	568.	18.50
F007	97.5	23.00	311.3	22.00	162.6	8.00	507.4	28.00	458.4	27.00	548.7	6.00
F008	98.5	28.00	314.	26.50	168.	31.00	504.	18.00	454.	18.50	565.	16.00
F009	98.	25.50	314.	26.50	166.	23.00	510.	31.00	460.	30.50	576.	32.00
F010	97.	16.00	315.	28.50	165.	16.00	500.	13.50	460.	30.50	560.	13.50
F011	93.3	3.00	303.	6.00	162.	7.00	489.	7.00	440.	6.00	550.	8.00
F014	103.	34.50	325.	33.00	174. H	34.00	536. H	34.00	480. H	34.00	605. H	34.00
F015	92.	2.00	295. L	3.00	158.	2.00	492.	8.00	446.	8.00	551.	9.00
F019	97.3	19.50	311.	19.00	165.	16.00	506.	23.50	457.	24.50	571.	25.50
F022	96.5	13.00	308.	12.50	165.	16.00	498.	10.50	448.	10.50	570.	23.00
F025	97.5	23.00	312.	23.00	166.	23.00	506.	23.50	456.	22.50	570.	23.00
F026	99.25	29.00	316.5	31.00	169.5	32.00	513.5	32.00	463.	32.00	574.5	31.00
F031	98.	25.50	313.	25.00	165.	16.00	506.	23.50	457.	24.50	571.	25.50
F032	97.0	16.00	308.	12.50	167.	27.50	501.	15.50	449.	12.00	556.	10.00
F036	96.4	12.00	310.	14.50	166.	23.00	499.	12.00	450.	13.00	560.	13.50
F037	95.5	8.50	297.0	4.00	160.6	5.00	471.0 L	2.00	427.0 L	2.00	523.0 VL	2.00
F038	97.	16.00	307.	10.50	167.	27.50	495.	9.00	447.	9.00	559.	11.50
F042	93.6	4.00	302.	5.00	160.	4.00	486.	6.00	435.	4.00	542. L	4.00
F046	94.4	7.00	334. EH	35.00	163.	9.50	540. EH	35.00	486. EH	35.00	607. EH	35.00
F048	97.4	21.00	311.	19.00	166.	23.00	507.	27.00	456.	22.50	572.	28.00
F063	94.	5.50	290. L	2.00	159.	3.00	473. L	3.00	428. L	3.00	537. L	3.00
F064	102.	33.00	304.	8.00	166.	23.00	485.	5.00	438.	5.00	543. L	5.00
F069	99.8	30.00	315.	28.50	167.	27.50	508.	29.00	459.	28.50	572.	28.00
F074	94.	5.50	304.	8.00	161.	6.00	483.	4.00	442.	7.00	549.	7.00
F074m	79. EL	1.00	255. EL	1.00	135. EL	1.00	416. EL	1.00	375. EL	1.00	468. EL	1.00
F080	97.5	23.00	311.	19.00	165.	16.00	506.	23.50	458.	26.00	574.	30.00
F092	98.33	27.00	312.12	24.00	167.56	30.00	506.88	26.00	455.81	21.00	569.16	20.00
F094	103.	34.50	327. H	34.00	176. EH	35.00	520.	33.00	468.	33.00	579.	33.00
F095	96.6	14.00	304.	8.00	164.	12.00	501.	15.50	451.	14.00	559.	11.50
F113	95.5	8.50	307.	10.50	163.2	11.00	498.	10.50	448.	10.50	562.	15.00
F133	96.1	11.00	310.5	16.00	165.2	20.00	504.5	19.00	454.0	18.50	569.5	21.00
F135	101.	31.50	316.	30.00	167.	27.50	509.	30.00	459.	28.50	572.	28.00
MEDIAN	97.2000		311.0000		165.0000		504.0000		454.0000		568.0000	
1CRIT	5.8480		14.4000		8.5600		22.1200		20.1200		24.6800	
N	32		33		33		33		33		33	
MEAN	96.9494		309.7703		164.9897		501.0085		452.0367		563.0867	
3STDEV	6.6931		22.0773		9.7193		36.8322		31.3994		43.7964	

PARAMETER: 00392 Specific Conductance uS/cm

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	893.0	18.50	587.0	16.00	783.0	18.00	842.0	16.00
F003	898.	24.50	590.	24.50	789.	24.50	848.	23.00
F004	895.	21.00	588.	18.50	785.	19.00	847.	20.00
F006	893.	18.50	588.	18.50	793.	30.00	854.	31.00
F007	894.9	20.00	576.3	10.00	770.0	11.00	844.7	17.00
F008	884.	11.00	586.	15.00	778.	13.50	836.	11.50
F009	907.	32.00	595.	31.00	790.	27.00	850.	27.50
F010	900.	29.50	590.	24.50	790.	27.00	850.	27.50
F011	862.	8.00	569.	7.00	757.	7.00	809. L	4.50
F014	945. H	34.00	627. VH	34.00	839. VH	34.00	908. EH	35.00
F015	860.	7.00	574.	8.00	763.	9.00	815.	7.50
F019	900.	29.50	590.	24.50	790.	27.00	847.	20.00
F022	892.	17.00	590.	24.50	780.	15.50	837.	13.00
F025	899.	27.00	589.	21.00	788.	22.50	848.	23.00
F026	907.5	33.00	597.5	32.00	796.5	33.00	857.5	33.00
F031	899.	27.00	589.	21.00	789.	24.50	851.	29.00
F032	859.	6.00	578.	11.00	762.	8.00	820.	9.00
F036	890.	13.50	580.	12.00	780.	15.50	840.	15.00
F037	806.0 EL	2.00	549.0 VL	3.00	715.0 VL	3.00	765.0 EL	2.00
F038	885.	12.00	582.	13.00	777.	12.00	836.	11.50
F042	858.	5.00	566.	6.00	709. VL	2.00	809. L	4.50
F046	959. EH	35.00	630. EH	35.00	841. VH	35.00	905. VH	34.00
F048	901.	31.00	593.	30.00	791.	29.00	852.	30.00
F063	854. L	4.00	564.	5.00	745. L	5.00	815.	7.50
F064	839. L	3.00	560. L	4.00	743. L	4.00	801. L	3.00
F069	899.	27.00	591.	27.50	788.	22.50	848.	23.00
F074	872.	9.00	546. VL	2.00	767.	10.00	823.	10.00
F074m	727. EL	1.00	477. EL	1.00	635. EL	1.00	700. EL	1.00
F080	898.	24.50	592.	29.00	794.	31.00	849.	26.00
F092	895.27	22.00	587.65	17.00	785.92	20.00	848.26	25.00
F094	891.	15.50	603.	33.00	796.	32.00	855.	32.00
F095	880.	10.00	576.	9.00	755.	6.00	814.	6.00
F113	891.	15.50	583.	14.00	781.	17.00	839.	14.00
F133	897.5	23.00	589.0	21.00	786.5	21.00	847.0	20.00
F135	890.	13.50	591.	27.50	778.	13.50	846.	18.00
MEDIAN	893.0000		588.0000		783.0000		846.0000	
1CRIT	37.6800		25.4800		33.2800		35.8000	
N	33		33		33		33	
MEAN	885.9142		583.5287		776.7855		837.8321	
3STDEV	72.0195		45.2307		71.5454		69.1588	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	152.50	15.250	10					02041
F003	201.00	20.100	10					Conductivity Probe
F004	190.50	19.050	10					02041
F006	252.00	25.200	10					Electrode
F007	172.00	17.200	10					CPQ002E2
F008	189.00	18.900	10					Autoelectrode
F009	286.00	28.600	10		BIASED HIGH*	1.09	-0.0055	Electrode
F010	226.50	22.650	10					Conductivimeter
F011	63.50	6.350	10	L	BIASED LOW	-3.99	3.2891	
F014	340.50	34.050	10	H H H H H VHVHEH	BIASED HIGH	7.06	-3.5215	
F015	63.50	6.350	10	L	BIASED LOW	-3.05	-0.4545	cond. meter, V2.2
F019	229.00	22.900	10					
F022	155.50	15.550	10					Conductivity Meter
F025	231.50	23.150	10					Cond. Meter
F026	318.00	31.800	10		BIASED HIGH*	1.37	1.4797	WATER ANALYSES SYS
F031	241.50	24.150	10					Cond meter
F032	127.50	12.750	10					Electrode
F036	144.00	14.400	10					Electrode
F037	33.50	3.350	10	L L VLELVLVLEL	BIASED LOW	-10.92	16.8785	V.W.R.
F038	132.00	13.200	10					CONDUCTIVITY METER
F042	44.50	4.450	10	L VLL	BIASED LOW	-5.99	6.3179	Cond. Meter
F046	295.50	29.550	10	EH EHEHEHEHEHVHVH	BIASED HIGH	8.58	-9.7000	Meter
F048	260.50	26.050	10					Electrode
F063	41.00	4.100	10	L L L L L L	BIASED LOW	-4.07	-3.8202	conductance meter
F064	93.00	9.300	10	L L L L L				Conductivity meter
F069	271.50	27.150	10					TWRI I 2781-85
F074	68.50	6.850	10	VL	BIASED LOW	-2.64	-3.0834	Electrode
F074m	10.00	1.000	10	ELELELELELELELELELEL	BIASED LOW	-18.27	0.9553	Electrode
F080	248.00	24.800	10					Electrode cell
F092	232.00	23.200	10					Conductivity meter
F094	315.00	31.500	10	H EH	BIASED HIGH*	-0.57	13.8348	Conductivity Meter
F095	106.00	10.600	10					Titralyzer
F113	126.50	12.650	10					YSI conduct meter
F133	190.50	19.050	10					COND. METER
F135	248.00	24.800	10					APHA 2510-B

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 2.50

OVERALL AVERAGE
RANK IS 18.000

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F074m	10.00	1.000	10	ELELELELELELELELELEL	BIASED LOW	-18.27	0.9553	Electrode
F037	33.50	3.350	10	LLVLELVLVLEL	BIASED LOW	-10.92	16.8785	V.W.R.
F063	41.00	4.100	10	LLLLLL	BIASED LOW	-4.07	-3.8202	conductance meter
F042	44.50	4.450	10	LVLL	BIASED LOW	-5.99	6.3179	Cond. Meter
F011	63.50	6.350	10	L	BIASED LOW	-3.99	3.2891	
F015	63.50	6.350	10	L	BIASED LOW	-3.05	-0.4545	cond. meter, V2.2
F074	68.50	6.850	10	VL	BIASED LOW	-2.64	-3.0834	Electrode
F064	93.00	9.300	10	LLLLL				Conductivity meter
F095	106.00	10.600	10					Titralyzer
F113	126.50	12.650	10					YSI conduct meter
F032	127.50	12.750	10					Electrode
F038	132.00	13.200	10					CONDUCTIVITY METER
F036	144.00	14.400	10					Electrode
F002	152.50	15.250	10					02041
F022	155.50	15.550	10					Conductivity Meter
F007	172.00	17.200	10					CPQ002E2
F008	189.00	18.900	10					Autoelectrode
F004	190.50	19.050	10					02041
F133	190.50	19.050	10					COND. METER
F003	201.00	20.100	10					Conductivity Probe
F010	226.50	22.650	10					Conductivimeter
F019	229.00	22.900	10					
F025	231.50	23.150	10					Cond. Meter
F092	232.00	23.200	10					Conductivity meter
F031	241.50	24.150	10					Cond meter
F080	248.00	24.800	10					Electrode cell
F135	248.00	24.800	10					APHA 2510-B
F006	252.00	25.200	10					Electrode
F048	260.50	26.050	10					Electrode
F069	271.50	27.150	10					TWRI I 2781-85
F009	286.00	28.600	10		BIASED HIGH*	1.09	-0.0055	Electrode
F046	295.50	29.550	10	EHEHEHEHEHEHVHVH	BIASED HIGH	8.58	-9.7000	Meter
F094	315.00	31.500	10	HEH	BIASED HIGH*	-0.57	13.8348	Conductivity Meter
F026	318.00	31.800	10		BIASED HIGH*	1.37	1.4797	WATER ANALYSES SYS
F014	340.50	34.050	10	HHHHHVHVHEH	BIASED HIGH	7.06	-3.5215	

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 2.50

OVERALL AVERAGE
RANK IS 18.000

PARAMETER: 00292 Colour Hazen Unit

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 5.0000 BASIC ACCEPTABLE ERROR= 5.0000 CONCENTRATION ERROR INCREMENT= 0.1500

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	<5.0	0.00	<5.0	0.00	5.0	3.00	<5.0	0.00	<5.0	0.00	20.0	6.50
F003	1.3	8.00	2.1	6.00	10.	11.00	3.6	6.00	0.9	3.50	21.	9.50
F004	<5.	0.00	<5.	0.00	7.5	8.00	<5.	0.00	<5.	0.00	20.	6.50
F007	<5.	0.00	<5.	0.00	13.	19.00	5.	12.50	<5.	0.00	22.	12.00
F008	<5.	0.00	<5.	0.00	5.	3.00	<5.	0.00	<5.	0.00	15.	3.00
F010	<1.	0.00	<1.	0.00	7.	7.00	2.	2.50	<1.	0.00	16.	4.00
F011	<5.	0.00	<5.	0.00	5.	3.00	<5.	0.00	<5.	0.00	10. VL	1.00
F014	0.	1.00	0. EL	1.00	5.	3.00	0. EL	1.00	0.	1.00	20.	6.50
F025	<5.	0.00	<5.	0.00	5.	3.00	5.	12.50	5. EH	10.00	30. H	20.00
F031	1.0	4.00	1.8	3.50	11.7	16.00	3.9	7.00	0.9	3.50	25.6	18.00
F032	1.2	7.00	1.8	3.50	10.0	11.00	4.2	9.00	1.4	6.00	24.4	17.00
F036	1.0	4.00	2.2	7.00	10.8	14.00	3.4	4.00	<0.8	0.00	23.2	16.00
F038	<5.	0.00	<5.	0.00	9.	9.00	<5.	0.00	<5.	0.00	21.	9.50
F042	1.14	6.00	4.11	11.00	12.3	18.00	5.60	15.00	1.89	7.00	22.7	13.00
F046	<5.	0.00	<5.	0.00	10.	11.00	5.	12.50	<5.	0.00	27.	19.00
F048	<2.	0.00	3.3	9.00	11.2	15.00	4.4	10.00	<2.	0.00	23.1	15.00
F063	2.	9.00	<2.	0.00	6.	6.00	2.	2.50	<2.	0.00	12. L	2.00
F092	2.7	11.00	4.0	10.00	17.0 H	20.00	6.1	16.00	1.0	5.00	35.4 EH	21.00
F094	2.5	10.00	2.5	8.00	<2.5 L	0.00	5.	12.50	2.5	9.00	20.	6.50
F095	1.	4.00	2.	5.00	12.	17.00	4.	8.00	2.	8.00	23.	14.00
F103	0.6	2.00	1.5	2.00	10.3	13.00	3.5	5.00	0.7	2.00	21.3	11.00
MEDIAN	1.1400		2.1000		10.0000		4.1000		1.2000		21.3000	
1CRIT	5.0000		5.0000		5.7500		5.0000		5.0000		7.4450	
N	9		9		19		14		8		19	
MEAN	1.3044		2.3556		8.7263		4.0429		1.4112		21.4368	
3STDEV	1.6509		2.2765		8.4230		3.1581		1.8245		12.1046	

PARAMETER: 00292 Colour Hazen Unit

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	10.0	5.00	35.0	8.50	15.0	7.00	20.0	7.50
F003	14.	11.00	35.	8.50	16.	10.00	22.	10.00
F004	10.	5.00	35.	8.50	15.	7.00	20.	7.50
F007	13.	8.50	40.	14.00	20.	19.00	25.	14.00
F008	10.	5.00	30.	4.00	15.	7.00	15. L	4.00
F010	10.	5.00	26. L	2.00	13.	4.00	17.	5.00
F011	10.	5.00	30.	4.00	10. L	2.50	10. VL	1.50
F014	5. L	1.00	30.	4.00	10. L	2.50	10. VL	1.50
F025	20.	20.00	40.	14.00	20.	19.00	30.	20.00
F031	17.5	19.00	41.2	17.00	18.8	15.00	26.9	19.00
F032	16.4	17.00	40.0	14.00	18.4	14.00	26.2	17.00
F036	14.4	12.00	38.2	12.00	17.2	12.00	22.8	11.00
F038	13.	8.50	31.	6.00	15.	7.00	20.	7.50
F042	15.2	16.00	42.0	18.50	19.7	17.00	26.4	18.00
F046	17.	18.00	45.	20.00	20.	19.00	25.	14.00
F048	14.5	13.00	42.0	18.50	19.1	16.00	25.4	16.00
F063	7. L	2.00	20. EL	1.00	9. L	1.00	12. L	3.00
F092	21.6 H	21.00	57.3 EH	21.00	27.1 EH	21.00	38.4 EH	21.00
F094	15.	14.50	35.	8.50	15.	7.00	20.	7.50
F095	15.	14.50	41.	16.00	18.	13.00	25.	14.00
F103	13.7	10.00	36.3	11.00	17.1	11.00	23.6	12.00
MEDIAN	14.0000		36.3000		17.1000		22.8000	
1CRIT	6.3500		9.6950		6.8150		7.6700	
N	19		19		19		18	
MEAN	13.4579		36.4579		16.4368		22.3500	
3STDEV	9.5457		15.2503		9.0766		13.3147	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	37.50	6.250	6					02011
F003	83.50	8.350	10					Spectrophotometric
F004	42.50	7.083	6					02021
F007	99.00	14.143	7					CPQ006E0
F008	26.00	4.333	6	L	BIASED LOW*	-10.67	-3.0883	Autospec
F010	29.50	4.214	7	L	BIASED LOW	-25.34	-0.3954	Colorimetry
F011	17.00	2.833	6	VL L VL	BIASED LOW*	-11.21	-5.4797	
F014	22.50	2.250	10	EL EL L L VL	BIASED LOW*	-18.05	-2.6567	
F025	118.50	14.813	8	EHH				Visual Comparison
F031	122.00	12.200	10					Spectrophotometry
F032	115.50	11.550	10					TCU
F036	92.00	10.222	9					TCU
F038	47.50	7.917	6					Spectrophotometry
F042	139.50	13.950	10					Colorimetric
F046	113.50	16.214	7		BIASED HIGH	25.33	-1.2013	Meter
F048	112.50	14.063	8					Colorimetric
F063	26.50	3.312	8	L L ELL L	BIASED LOW	-47.34	0.4073	auto colour
F092	167.00	16.700	10	H EHH EHEHEH	BIASED HIGH	60.36	0.2074	Spectrophotometry
F094	83.50	9.278	9	L				Apparent
F095	113.50	11.350	10					Hach 4000 V
F103	79.00	7.900	10					MinoltaChromometer

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 25.00

OVERALL AVERAGE
RANK IS 9.757

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F014	22.50	2.250	10	ELELLLVL	BIASED LOW*	-18.05	-2.6567	
F011	17.00	2.833	6	VLLVL	BIASED LOW*	-11.21	-5.4797	
F063	26.50	3.312	8	LLELLL	BIASED LOW	-47.34	0.4073	auto colour
F010	29.50	4.214	7	L	BIASED LOW	-25.34	-0.3954	Colorimetry
F008	26.00	4.333	6	L	BIASED LOW*	-10.67	-3.0883	Autospec
F002	37.50	6.250	6					02011
F004	42.50	7.083	6					02021
F103	79.00	7.900	10					MinoltaChromometer
F038	47.50	7.917	6					Spectrophotometry
F003	83.50	8.350	10					Spectrophotometric
F094	83.50	9.278	9	L				Apparent
F036	92.00	10.222	9					TCU
F095	113.50	11.350	10					Hach 4000 V
F032	115.50	11.550	10					TCU
F031	122.00	12.200	10					Spectrophotometry
F042	139.50	13.950	10					Colorimetric
F048	112.50	14.063	8					Colorimetric
F007	99.00	14.143	7					CPQ006E0
F025	118.50	14.813	8	EHH				Visual Comparison
F046	113.50	16.214	7		BIASED HIGH	25.33	-1.2013	Meter
F092	167.00	16.700	10	HEHHEHEHEH	BIASED HIGH	60.36	0.2074	Spectrophotometry

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 25.00

OVERALL AVERAGE
RANK IS 9.757

PARAMETER: 00192 Turbidity JTU/NTU

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.2000 BASIC ACCEPTABLE ERROR= 0.2500 CONCENTRATION ERROR INCREMENT= 0.1000

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	0.07	7.50	0.15	13.00	0.15	14.00	0.14	12.50	0.07	9.50	0.16	11.00
F004	0.24	19.00	0.11	7.00	0.35 EH	21.00	0.30	20.00	0.06	7.50	0.18	13.50
F006	0.04	2.50	0.10	3.00	0.09	4.00	0.26	19.00	0.03	3.50	0.46 EH	20.00
F008	0.05	4.50	0.11	7.00	0.08	2.50	0.06	5.50	0.03	3.50	0.07	1.50
F010	0.1	13.00	0.3 EH	21.00	0.1	9.00	0.2	16.50	0.1	13.50	0.2	17.00
F011	<0.1	0.00	0.1	3.00	0.1	9.00	<0.1	0.00	<0.1	0.00	0.1	5.50
F014	<0.1	0.00	<0.1	0.00	<0.1	0.00	<0.1	0.00	<0.1	0.00	<0.1	0.00
F015	0.05	4.50	0.11	7.00	0.10	9.00	0.06	5.50	0.05	5.00	0.10	5.50
F022	<0.03	0.00	<0.03 EL	0.00	<0.03	0.00	<0.03	0.00	<0.03	0.00	<0.03	0.00
F025	0.1	13.00	0.2	19.00	0.2	18.00	0.2	16.50	0.2	20.00	0.2	17.00
F031	0.07	7.50	0.15	13.00	0.08	2.50	0.04	2.00	0.01	2.00	0.07	1.50
F032	<0.05	0.00	<0.06	0.00	<0.07	0.00	<0.05	0.00	<0.05	0.00	<0.08	0.00
F038	0.1	13.00	0.2	19.00	0.3	19.50	0.2	16.50	0.1	13.50	0.5 EH	21.00
F042	0.25 EH	20.00	0.20	19.00	0.30	19.50	0.20	16.50	0.18	19.00	0.30	19.00
F046	0.14	16.50	0.16	15.50	0.16	15.00	0.12	11.00	0.12	16.00	0.19	15.00
F048	0.08	10.00	0.12	10.00	0.10	9.00	0.08	7.50	0.06	7.50	0.10	5.50
F063	0.1	13.00	0.1	3.00	0.1	9.00	0.1	9.50	0.1	13.50	0.1	5.50
F064	0.14	16.50	0.16	15.50	0.17	16.00	0.14	12.50	0.17	18.00	0.18	13.50
F092	0.16	18.00	0.18	17.00	0.18	17.00	0.17	14.00	0.15	17.00	0.20	17.00
F093	0.06	6.00	0.15	13.00	0.10	9.00	0.08	7.50	0.09	11.00	0.17	12.00
F094	<0.1	0.00	<0.1	0.00	<0.1	0.00	<0.1	0.00	<0.1	0.00	<0.1	0.00
F095	0.071	9.00	0.114	9.00	0.096	5.00	0.058	4.00	0.054	6.00	0.109	9.00
F113	0.0	1.00	0.1	3.00	0.	1.00	0.	1.00	0.	1.00	0.1	5.50
F122	0.04T	2.50	0.13	11.00	0.12	13.00	0.054T	3.00	0.07T	9.50	0.13	10.00
F135	0.1	13.00	0.1	3.00	0.1	9.00	0.1	9.50	0.1	13.50	0.1	5.50
MEDIAN	0.0900		0.1300		0.1000		0.1100		0.0800		0.1600	
1CRIT	0.2500		0.2500		0.2500		0.2500		0.2500		0.2500	
N	18		20		19		18		18		18	
MEAN	0.0951		0.1372		0.1382		0.1257		0.0858		0.1711	
3STDEV	0.1463		0.1065		0.1958		0.1920		0.1382		0.2637	

PARAMETER: 00192 Turbidity JTU/NTU

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	0.21	15.00	0.57	2.00	0.18	11.00	0.19	6.50
F004	0.34	23.00	0.95	24.50	0.25	19.00	0.20	10.00
F006	0.26	19.00	0.95	24.50	0.65 EH	22.00	0.46 H	22.00
F008	0.12	6.00	0.65	9.50	0.14	8.50	0.2	10.00
F010	0.2	12.50	0.8	20.50	0.2	13.00	0.3	18.50
F011	0.1	3.00	0.7	16.50	0.1	2.50	0.2	10.00
F014	<0.1	0.00	0.6	4.50	<0.1	0.00	<0.1	0.00
F015	0.15	7.50	0.67	11.00	0.14	8.50	0.19	6.50
F022	0.04	1.00	0.58	3.00	<0.03	0.00	0.09	1.00
F025	0.3	21.00	0.9	22.50	0.4	21.00	0.4	21.00
F031	0.11	5.00	0.69	14.00	0.14	8.50	0.21	13.00
F032	<0.11	0.00	0.74	19.00	<0.16	0.00	<0.15	0.00
F038	0.3	21.00	0.7	16.50	0.1	2.50	0.7 EH	23.00
F042	0.30	21.00	0.90	22.50	0.30	20.00	0.35	20.00
F046	0.22	16.00	0.68	12.50	0.23	16.50	0.24	15.00
F048	0.17	10.00	0.68	12.50	0.14	8.50	0.17	4.00
F063	0.2	12.50	0.7	16.50	0.2	13.00	0.3	18.50
F064	0.23	17.00	0.63	7.00	0.24	18.00	0.24	15.00
F092	0.25	18.00	0.64	8.00	0.23	16.50	0.26	17.00
F093	0.20	12.50	0.70	16.50	0.21	15.00	0.24	15.00
F094	0.1	3.00	0.8	20.50	0.1	2.50	0.1	2.50
F095	0.161	9.00	0.650	9.50	0.138	6.00	0.173	5.00
F113	0.1	3.00	0.5	1.00	0.1	2.50	0.1	2.50
F122	0.15	7.50	0.61	6.00	0.12	5.00	0.20	10.00
F135	0.2	12.50	0.6	4.50	0.2	13.00	0.2	10.00
MEDIAN	0.2000		0.6800		0.1900		0.2000	
1CRIT	0.2500		0.2980		0.2500		0.2500	
N	21		22		21		21	
MEAN	0.1920		0.6905		0.1837		0.2344	
3STDEV	0.1943		0.2670		0.2225		0.2582	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	102.00	10.200	10					02073
F004	164.50	16.450	10	EH				02081
F006	139.50	13.950	10	EH EHH				NTU
F008	58.50	5.850	10		BIASED LOW*	1.93	-0.0467	Turbidimeter
F010	154.50	15.450	10	EH				Nephelometry
F011	49.50	7.071	7					
F014	4.50	4.500	1		INSUFFICIENT DATA			
F015	70.00	7.000	10					Nephel sgle beam
F022	5.00	1.667	3	EL	INSUFFICIENT DATA			Tubidity Meter
F025	189.00	18.900	10		BIASED HIGH*	25.02	0.0675	Turbidity Meter
F031	69.00	6.900	10					Turbidity meter
F032	19.00	19.000	1		INSUFFICIENT DATA			FTU
F038	165.50	16.550	10	EH EH				TURBIDIMETER
F042	196.50	19.650	10	EH	BIASED HIGH*	15.77	0.1034	Nephelometric
F046	149.00	14.900	10					Turbidimeter
F048	84.50	8.450	10					Nephelometric
F063	114.00	11.400	10					turbidimeter
F064	149.00	14.900	10					Turbidimetric
F092	159.50	15.950	10					Turbidity meter
F093	117.50	11.750	10					Ratio Turbidimeter
F094	28.50	7.125	4		INSUFFICIENT DATA			Nephelometric
F095	71.50	7.150	10					Hach 2100 AN
F113	21.50	2.150	10		BIASED LOW*	-16.80	-0.0614	ASTM
F122	77.50	7.750	10					HACH 18900,NTU
F135	93.50	9.350	10					APHA 2130-B

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 50.00

OVERALL AVERAGE
RANK IS 11.356

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F022	5.00	1.667	3	EL	INSUFFICIENT DATA			Tubidity Meter
F113	21.50	2.150	10		BIASED LOW*	-16.80	-0.0614	ASTM
F014	4.50	4.500	1		INSUFFICIENT DATA			
F008	58.50	5.850	10		BIASED LOW*	1.93	-0.0467	Turbidimeter
F031	69.00	6.900	10					Turbidity meter
F015	70.00	7.000	10					Nephel sgle beam
F011	49.50	7.071	7					
F094	28.50	7.125	4		INSUFFICIENT DATA			Nephelometric
F095	71.50	7.150	10					Hach 2100 AN
F122	77.50	7.750	10					HACH 18900,NTU
F048	84.50	8.450	10					Nephelometric
F135	93.50	9.350	10					APHA 2130-B
F002	102.00	10.200	10					02073
F063	114.00	11.400	10					turbidimeter
F093	117.50	11.750	10					Ratio Turbidimeter
F006	139.50	13.950	10	EHEHH				NTU
F064	149.00	14.900	10					Turbidimetric
F046	149.00	14.900	10					Turbidimeter
F010	154.50	15.450	10	EH				Nephelometry
F092	159.50	15.950	10					Turbidity meter
F004	164.50	16.450	10	EH				02081
F038	165.50	16.550	10	EHEH				TURBIDIMETER
F025	189.00	18.900	10		BIASED HIGH*	25.02	0.0675	Turbidity Meter
F032	19.00	19.000	1		INSUFFICIENT DATA			FTU
F042	196.50	19.650	10	EH	BIASED HIGH*	15.77	0.1034	Nephelometric

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 50.00

OVERALL AVERAGE
RANK IS 11.356

PARAMETER: 01092 pH pH Units

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 5.5000 BASIC ACCEPTABLE ERROR= 0.2500 CONCENTRATION ERROR INCREMENT= 0.0000

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	7.77	21.00	8.08	32.00	7.65	20.00	8.17	30.00	8.29	29.50	8.35	32.00
F003	7.78	24.00	7.92	19.00	7.67	23.50	8.13	23.50	8.25	22.50	8.24	18.00
F004	7.63	10.50	7.94	21.00	7.58	10.00	8.07	14.50	8.22	17.50	8.27	23.00
F006	7.8	27.50	8.2 H	37.00	7.7	26.00	8.5 EH	37.00	8.7 EH	38.00	8.8 EH	38.00
F007	7.80	27.50	8.04	30.50	7.71	27.00	8.10	16.50	8.23	19.00	8.29	24.50
F008	7.72	19.00	7.85	14.50	7.61	15.00	8.1	16.50	8.2	16.00	8.21	15.00
F009	7.86	32.50	7.87	17.00	7.78	34.50	8.13	23.50	8.22	17.50	8.22	16.00
F010	7.84	31.00	8.01	27.00	7.65	20.00	8.13	23.50	8.19	14.50	8.26	22.00
F011	7.86	32.50	8.04	30.50	7.74	30.00	8.21	32.50	8.33	31.00	8.38	33.00
F014	7.76	20.00	8.18 H	35.00	7.65	20.00	8.24	34.00	8.38	33.50	8.49	36.00
F015	7.71	17.50	7.86	16.00	7.63	17.00	8.05	13.00	8.19	14.50	8.20	13.00
F019	7.7	16.00	7.8	10.50	7.6	12.50	8.	12.00	8.1	9.00	8.2	13.00
F022	7.64	12.00	7.93	20.00	7.64	18.00	7.97	10.00	8.13	10.50	8.29	24.50
F025	6.95 EL	1.00	7.52 VL	1.00	6.78 EL	1.00	7.74 L	1.00	8.04	6.00	8.10	4.50
F026	7.775	22.00	8.152	34.00	7.756	33.00	8.160	29.00	8.269	28.00	8.390	34.50
F031	7.78	24.00	7.96	23.00	7.78	34.50	8.12	20.50	8.26	25.50	8.23	17.00
F032	7.82	30.00	8.02	28.50	7.74	30.00	8.14	26.50	8.24	20.50	8.32	28.50
F036	7.67	14.50	7.84	13.00	7.60	12.50	8.15	28.00	8.26	25.50	8.31	26.50
F037	7.80	27.50	7.83	12.00	7.69	25.00	8.12	20.50	8.25	22.50	8.25	20.00
F038	7.52	5.50	7.85	14.50	7.59	11.00	7.9	4.50	8.02	4.50	8.08	3.00
F042	7.54	7.00	7.66 L	3.00	7.56	8.00	7.96	8.00	7.99	1.00	8.11	6.50
F046	7.58	9.00	7.79	9.00	7.56	8.00	7.99	11.00	8.09	8.00	8.14	9.00
F048	7.95	35.00	7.95	22.00	7.90	37.00	8.30	36.00	8.40	35.00	8.33	30.00
F063	7.50	3.50	7.71	5.00	7.48	4.00	7.82 L	2.00	8.00	2.50	8.10	4.50
F064	7.63	10.50	7.76	7.00	7.56	8.00	8.07	14.50	8.15	12.50	8.16	10.00
F068	7.545	8.00	7.695	4.00	7.505	5.00	7.939	6.00	8.077	7.00	8.055	2.00
F069	7.52	5.50	7.77	8.00	7.61	15.00	7.96	8.00	8.13	10.50	8.18	11.00
F074	8.23 EH	37.00	8.55 EH	38.00	8.16 EH	38.00	8.59 EH	38.00	8.68 EH	37.00	8.79 EH	37.00
F074m	7.67	14.50	7.73	6.00	7.53	6.00	7.96	8.00	8.15	12.50	8.11	6.50
F080	7.78	24.00	8.12	33.00	7.67	23.50	8.11	18.50	8.24	20.50	8.25	20.00
F092	7.71	17.50	7.98	24.50	7.61	15.00	8.21	32.50	8.36	32.00	8.39	34.50
F093	7.66	13.00	7.90	18.00	7.66	22.00	8.13	23.50	8.26	25.50	8.25	20.00
F094	7.29 VL	2.00	7.64 L	2.00	7.25 EL	2.00	7.86 L	3.00	8.02	4.50	8.12	8.00
F095	7.80	27.50	8.02	28.50	7.72	28.00	8.14	26.50	8.29	29.50	8.31	26.50
F103	8.01 H	36.00	8.19 H	36.00	7.74	30.00	8.11	18.50	8.26	25.50	8.03	1.00
F113	7.9	34.00	7.98	24.50	7.82	36.00	8.26	35.00	8.38	33.50	8.32	28.50
F133	8.32 EH	38.00	8.00	26.00	7.75	32.00	8.18	31.00	8.41	36.00	8.34	31.00
F135	7.5	3.50	7.8	10.50	7.4	3.00	7.9	4.50	8.0	2.50	8.2	13.00
MEDIAN	7.7400		7.9250		7.6500		8.1150		8.2350		8.2500	
1CRIT	0.2500		0.2500		0.2500		0.2500		0.2500		0.2500	
N	36		36		36		36		36		36	
MEAN	7.7236		7.9185		7.6414		8.0914		8.2213		8.2565	
3STDEV	0.5030		0.4509		0.3575		0.3987		0.4102		0.4040	

PARAMETER: 01092 pH pH Units

SAMPLE LAB NO	7 = ASSIN-01 REPORTED VALUE	RANK	8 = BATT-97 REPORTED VALUE	RANK	9 = ASSIN-97 REPORTED VALUE	RANK	10 = FORT-97 REPORTED VALUE	RANK
F002	8.52	30.00	8.25	30.50	8.06	19.00	8.15	33.50
F003	8.50	26.50	8.08	16.00	7.93	4.50	7.85	8.00
F004	8.46	18.50	8.16	23.00	8.11	22.50	7.88	11.50
F006	9.1 EH	38.00	8.6 EH	37.00	8.3	36.00	8.1	29.00
F007	8.47	20.50	8.28	32.50	8.16	28.50	8.10	29.00
F008	8.46	18.50	8.04	11.00	8.04	17.00	7.82	6.50
F009	8.49	23.50	8.08	16.00	8.05	18.00	7.89	13.00
F010	8.41	14.50	8.22	27.00	8.18	31.00	8.09	27.00
F011	8.55	32.50	8.28	32.50	8.24	33.00	8.15	33.50
F014	8.62	36.00	8.47 H	36.00	8.42 H	37.00	8.38 VH	37.00
F015	8.40	12.00	8.07	14.00	8.07	20.00	7.93	16.00
F019	8.4	12.00	7.9	3.00	8.	10.50	8.	21.50
F022	8.43	16.00	8.21	26.00	8.13	24.50	8.1	29.00
F025	8.35	6.50	7.92	4.00	7.87	2.00	7.73	3.00
F026	8.493	25.00	8.347	35.00	8.253	34.00	8.237 H	36.00
F031	8.47	20.50	8.10	19.50	8.09	21.00	7.94	18.00
F032	8.49	23.50	8.24	28.50	8.16	28.50	8.11	31.00
F036	8.55	32.50	8.17	24.50	8.17	30.00	7.93	16.00
F037	8.48	22.00	8.01	10.00	7.95	7.00	8.07	24.00
F038	8.27	1.00	8.	7.50	7.97	9.00	7.86	9.00
F042	8.40	12.00	8.05	12.50	8.01	12.50	7.88	11.50
F046	8.35	6.50	8.00	7.50	7.93	4.50	7.82	6.50
F048	8.54	31.00	8.15	22.00	8.14	26.50	7.99	20.00
F063	8.34	4.00	8.05	12.50	8.02	14.50	7.87	10.00
F064	8.41	14.50	8.00	7.50	7.95	7.00	7.79	4.00
F068	8.343	5.00	7.882	2.00	7.877	3.00	7.687 L	2.00
F069	8.39	10.00	8.08	16.00	8.03	16.00	7.95	19.00
F074	8.82 EH	37.00	8.81 EH	38.00	8.73 EH	38.00	8.71 EH	38.00
F074m	8.30	2.50	7.85 L	1.00	7.64 EL	1.00	7.66 L	1.00
F080	8.45	17.00	8.09	18.00	8.01	12.50	8.08	25.50
F092	8.59	35.00	8.33	34.00	8.27	35.00	8.21	35.00
F093	8.50	26.50	8.24	28.50	8.13	24.50	8.08	25.50
F094	8.37	8.00	7.95	5.00	7.95	7.00	7.8	5.00
F095	8.51	28.50	8.25	30.50	8.22	32.00	8.14	32.00
F103	8.38	9.00	8.00	7.50	8.02	14.50	7.93	16.00
F113	8.57	34.00	8.11	21.00	8.11	22.50	7.91	14.00
F133	8.51	28.50	8.17	24.50	8.14	26.50	8.01	23.00
F135	8.3	2.50	8.1	19.50	8.0	10.50	8.0	21.50
MEDIAN	8.4650		8.1000		8.0650		7.9700	
1CRIT	0.2500		0.2500		0.2500		0.2500	
N	36		36		36		36	
MEAN	8.4616		8.1355		8.0822		7.9851	
3STDEV	0.3008		0.4603		0.3704		0.4523	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	277.50	27.750	10					10301
F003	185.50	18.550	10					pH Probe
F004	172.00	17.200	10					10301
F006	343.50	34.350	10	H EHEHEHEHEH	BIASED HIGH	79.96	-6.1093	Stirred
F007	255.50	25.550	10					CPQ004D0
F008	149.00	14.900	10					Autoelectrode
F009	211.50	21.150	10					pH meter
F010	237.50	23.750	10					Stirred-electrode
F011	321.00	32.100	10		BIASED HIGH*	-1.33	0.2345	
F014	324.50	32.450	10	H H H VH	BIASED HIGH	18.30	-1.2658	
F015	153.00	15.300	10					auto pH meter
F019	120.00	12.000	10					Stirred
F022	190.50	19.050	10					pH Meter
F025	30.00	3.000	10	ELVLELL	BIASED LOW	97.46	-8.1992	pH Meter
F026	310.50	31.050	10	H	BIASED HIGH	-7.70	0.7520	RADIOMETER
F031	223.50	22.350	10					Stirred, pH meter
F032	275.50	27.550	10					Unstirred
F036	223.00	22.300	10					Unstirred
F037	190.50	19.050	10					Accumet
F038	69.50	6.950	10		BIASED LOW	-11.74	0.8005	pH METER
F042	82.00	8.200	10	L	BIASED LOW	5.02	-0.5396	Unstirred
F046	79.00	7.900	10		BIASED LOW*	0.87	-0.1970	Meter
F048	294.50	29.450	10					Electrode
F063	62.50	6.250	10	L	BIASED LOW	6.02	-0.6476	pH meter
F064	95.50	9.550	10					pH meter
F068	44.00	4.400	10	L	BIASED LOW	5.41	-0.6270	unstirred
F069	119.00	11.900	10					TWRI I-2587-85
F074	376.00	37.600	10	EHEHEHEHEHEHEHEHEHEH	BIASED HIGH	-16.47	1.8811	Stirred
F074m	59.00	5.900	10	L ELL	BIASED LOW*	-3.66	0.1029	Stirred
F080	212.50	21.250	10					Stir, Comb. Elect.
F092	295.00	29.500	10					Titrator stirred
F093	227.00	22.700	10					Meter (stirred)
F094	46.50	4.650	10	VLL ELL	BIASED LOW	41.62	-3.5784	pH Meter
F095	289.50	28.950	10					Titralyzer
F103	194.00	19.400	10	H H				Accumet 925
F113	283.00	28.300	10					Elect unstirred
F133	296.50	29.650	10	EH				ELECTRODE
F135	91.00	9.100	10					APHA4500-H stirred

* 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 19.500

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F025	30.00	3.000	10	ELVLELL	BIASED LOW	97.46	-8.1992	pH Meter
F068	44.00	4.400	10	L	BIASED LOW	5.41	-0.6270	unstirred
F094	46.50	4.650	10	VLLELL	BIASED LOW	41.62	-3.5784	pH Meter
F074m	59.00	5.900	10	LELL	BIASED LOW*	-3.66	0.1029	Stirred
F063	62.50	6.250	10	L	BIASED LOW	6.02	-0.6476	pH meter
F038	69.50	6.950	10		BIASED LOW	-11.74	0.8005	pH METER
F046	79.00	7.900	10		BIASED LOW*	0.87	-0.1970	Meter
F042	82.00	8.200	10	L	BIASED LOW	5.02	-0.5396	Unstirred
F135	91.00	9.100	10					APHA4500-H stirred
F064	95.50	9.550	10					pH meter
F069	119.00	11.900	10					TWRI I-2587-85
F019	120.00	12.000	10					Stirred
F008	149.00	14.900	10					Autoelectrode
F015	153.00	15.300	10					auto pH meter
F004	172.00	17.200	10					10301
F003	185.50	18.550	10					pH Probe
F037	190.50	19.050	10					Accumet
F022	190.50	19.050	10					pH Meter
F103	194.00	19.400	10	HH				Accumet 925
F009	211.50	21.150	10					pH meter
F080	212.50	21.250	10					Stir, Comb. Elect.
F036	223.00	22.300	10					Unstirred
F031	223.50	22.350	10					Stirred, pH meter
F093	227.00	22.700	10					Meter (stirred)
F010	237.50	23.750	10					Stirred-electrode
F007	255.50	25.550	10					CPQ004D0
F032	275.50	27.550	10					Unstirred
F002	277.50	27.750	10					10301
F113	283.00	28.300	10					Elect unstirred
F095	289.50	28.950	10					Titralyzer
F048	294.50	29.450	10					Electrode
F092	295.00	29.500	10					Titrator stirred
F133	296.50	29.650	10	EH				ELECTRODE
F026	310.50	31.050	10	H	BIASED HIGH	-7.70	0.7520	RADIOMETER
F011	321.00	32.100	10		BIASED HIGH*	-1.33	0.2345	
F014	324.50	32.450	10	HHHVH	BIASED HIGH	18.30	-1.2658	
F006	343.50	34.350	10	HEHEHEHEHEH	BIASED HIGH	79.96	-6.1093	Stirred
F074	376.00	37.600	10	EHEHEHEHEHEHEHEHEHEH	BIASED HIGH	-16.47	1.8811	Stirred

* 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 19.500

pH

PARAMETER: 06192 Total Alkalinity mg/L CaCO3

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= 1.5000 CONCENTRATION ERROR INCREMENT= 0.0400

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	40.4	4.50	86.9	4.00	33.0	3.50	97.9	7.00	128.2	7.50	218.8	9.00
F003	42.3	23.00	91.5	28.00	34.2	13.50	103.	28.00	132.	21.50	222.	17.50
F006	46. EH	34.00	94.	32.00	36.	28.50	104.	29.50	134.	26.50	226.	26.00
F007	39.8	2.00	86.2	2.00	32.2	2.00	95.8	1.00	126.2	1.00	217.6	7.00
F008	41.	9.00	88.	9.50	34.	10.00	98.	8.50	129.	10.50	217.	5.50
F009	41.	9.00	88.	9.50	34.	10.00	99.	13.00	128.	4.50	220.	13.00
F010	43.	27.50	93.	30.00	35.	23.50	105.	32.00	138. H	32.00	237. H	33.00
F011	42.1	21.50	90.7	25.00	34.2	13.50	102.	24.00	134.	26.50	228.	28.50
F014	42.6	25.50	90.3	24.00	34.8	22.00	102.	24.00	132.	21.50	224.	23.50
F015	45.4 H	33.00	93.2	31.00	37.5 H	32.00	104.	29.50	135.	29.50	227.	27.00
F019	42.	19.50	89.	15.50	34.	10.00	98.	8.50	130.	15.00	220.	13.00
F022	41.84	18.00	89.7	19.00	34.25	16.00	95.94	2.00	131.12	18.00	207.98 L	1.00
F025	42.6	25.50	90.0	21.00	35.3	26.00	100.	16.50	131.	17.00	220.	13.00
F026	41.615	15.00	90.225	23.00	33.815	8.00	102.68	27.00	133.96	25.00	228.455	30.00
F031	44.	30.00	89.	15.50	38. H	33.50	105.	32.00	140. H	33.00	228.	28.50
F032	44.4	31.00	94.4 H	33.00	36.4	30.00	105.	32.00	137.	31.00	232.	32.00
F036	41.8	17.00	88.1	11.00	34.2	13.50	98.9	11.50	129.	10.50	219.	10.00
F038	45. H	32.00	96. EH	34.00	37.	31.00	107. H	34.00	141. H	34.00	239. EH	34.00
F042	40.9	7.00	87.5	5.00	33.0	3.50	98.9	11.50	129.	10.50	222.	17.50
F046	40.7	6.00	88.5	13.00	31.1 EL	1.00	100.	16.50	130.	15.00	222.	17.50
F048	42.53	24.00	90.07	22.00	35.10	25.00	100.5	18.00	131.2	19.00	223.8	22.00
F063	41.	9.00	89.	15.50	36.	28.50	97.	5.00	127.	3.00	212.	2.00
F064	43.	27.50	89.	15.50	35.	23.50	101.	21.00	130.	15.00	222.	17.50
F069	43.4	29.00	91.3	27.00	35.7	27.00	102.	24.00	133.	24.00	225.	25.00
F074	40.3	3.00	85.3	1.00	34.6	20.50	96.5	4.00	126.7	2.00	218.1	8.00
F080	41.6	14.00	91.2	26.00	34.3	17.50	102.4	26.00	134.5	28.00	228.6	31.00
F092	41.29	12.00	86.58	3.00	33.76	6.00	97.34	6.00	128.10	6.00	215.68	3.00
F093	42.	19.50	92.	29.00	38. H	33.50	96.	3.00	132.	21.50	224.	23.50
F094	42.1	21.50	89.9	20.00	34.6	20.50	101.	21.00	132.	21.50	223.	21.00
F095	41.7	16.00	87.8	7.50	34.4	19.00	98.5	10.00	129.	10.50	217.	5.50
F103	20.9 EL	1.00	88.2	12.00	34.2	13.50	101.	21.00	135.	29.50	221.	15.00
F113	41.2	11.00	89.1	18.00	33.2	5.00	99.1	14.00	128.2	7.50	222.6	20.00
F133	41.4	13.00	87.8	7.50	34.3	17.50	99.3	15.00	129.2	13.00	219.1	11.00
F135	40.4	4.50	87.7	6.00	33.8	7.00	100.9	19.00	128.0	4.50	216.9	4.00
MEDIAN	41.8200		89.0500		34.3000		100.2500		131.0600		222.0000	
1CRIT	3.1328		5.0220		2.8320		5.4700		6.7024		10.3400	
N	32		32		31		32		32		32	
MEAN	42.0117		89.6211		34.5750		100.3706		131.4119		222.4261	
3STDEV	3.9725		6.2536		3.4286		7.8806		9.7572		15.2821	

PARAMETER: 06192 Total Alkalinity mg/L CaCO3

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	259.4	12.50	205.4	19.00	163.9	6.00	144.2	5.00
F003	262.	18.00	217. H	32.00	165.	10.00	156. H	30.50
F006	268.	25.00	208.	23.00	172.	26.50	152.	27.00
F007	254.6	3.00	197.5	2.00	163.0	2.50	143.3	2.00
F008	258.	6.00	201.	5.00	163.	2.50	145.	7.50
F009	260.	14.00	203.	10.50	164.	7.50	146.	12.50
F010	278. H	32.00	219. H	33.00	177. H	31.00	159. VH	32.00
F011	269.	27.50	211.	26.50	172.	26.50	151.	26.00
F014	265.	22.50	211.	26.50	171.	25.00	150.	23.50
F015	269.	27.50	212.	28.00	173.	28.00	154.	29.00
F019	261.	15.50	203.	10.50	165.	10.00	145.	7.50
F022	262.55	20.00	193.68 L	1.00	166.53	15.00	148.33	19.00
F025	261.	15.50	202.	7.50	167.	18.00	148.	18.00
F026	271.42	29.00	212.68	29.00	173.37	29.00	152.08	28.00
F031	272.	30.00	216. H	31.00	195. EH	34.00	161. VH	34.00
F032	273.	31.00	215. H	30.00	176. H	30.00	156. H	30.50
F036	259.	10.50	203.	10.50	165.	10.00	146.	12.50
F038	283. VH	34.00	222. VH	34.00	181. VH	33.00	160. VH	33.00
F042	258.	6.00	205.	18.00	166.	14.00	144.	3.50
F046	263.	21.00	206.	20.00	169.	21.50	147.	15.00
F048	262.0	18.00	206.8	21.00	166.9	16.00	148.4	20.00
F063	254.	1.00	199.	4.00	161.	1.00	146.	12.50
F064	259.	10.50	204.	15.50	167.	18.00	149.	21.50
F069	266.	24.00	209.	24.00	170.	23.00	150.	23.50
F074	258.5	8.00	204.9	17.00	165.8	12.00	147.3	16.00
F080	268.7	26.00	210.1	25.00	170.7	24.00	150.7	25.00
F092	254.25	2.00	198.30	3.00	163.50	4.00	144.55	6.00
F093	282. VH	33.00	204.	15.50	180. VH	32.00	130. EL	1.00
F094	265.	22.50	207.	22.00	169.	21.50	149.	21.50
F095	258.	6.00	202.	7.50	164.	7.50	144.	3.50
F103	262.	18.00	203.	10.50	167.	18.00	146.	12.50
F113	259.4	12.50	203.9	14.00	167.4	20.00	147.5	17.00
F133	258.8	9.00	203.4	13.00	165.9	13.00	145.8	10.00
F135	256.0	4.00	201.7	6.00	163.7	5.00	145.1	9.00
MEDIAN	262.0000		204.9500		167.0000		147.7500	
1CRIT	11.9400		9.6580		8.1400		7.3700	
N	32		32		32		32	
MEAN	263.5506		206.3962		168.5531		148.7581	
3STDEV	19.5756		16.2769		14.4332		12.9823	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	78.00	7.800	10		BIASED LOW*	-0.30	-1.7858	10110
F003	222.00	22.200	10	H H				Pot'metricTitrat'n
F006	278.00	27.800	10	EH	BIASED HIGH*	0.79	2.8776	0.2N H2SO4
F007	24.50	2.450	10		BIASED LOW*	-2.13	-1.4088	CPQ005E0
F008	74.00	7.400	10		BIASED LOW*	-1.95	0.1178	Autoelectrode
F009	103.50	10.350	10					Titration
F010	306.00	30.600	10	H H H H H VH	BIASED HIGH	7.37	-1.9352	Titration
F011	245.50	24.550	10					
F014	238.00	23.800	10					
F015	294.50	29.450	10	H H	BIASED HIGH*	1.64	2.7001	poten tit SA V2.2
F019	125.00	12.500	10					Titrimetric
F022	129.00	12.900	10	L L				Titration
F025	178.00	17.800	10					Titration
F026	243.00	24.300	10					TITROPROCESSOR
F031	301.50	30.150	10	H H H EHVH	BIASED HIGH	4.67	2.2381	Titration
F032	310.50	31.050	10	H H H H	BIASED HIGH	4.12	1.1296	Titration
F036	117.00	11.700	10					Titration
F038	333.00	33.300	10	H EH H H EHVHVHVHVH	BIASED HIGH	8.18	-0.3654	Titration
F042	96.50	9.650	10					ANC Gran Plot
F046	146.50	14.650	10	EL				Titration
F048	205.00	20.500	10					Titration
F063	81.50	8.150	10					titr. pH 4.5
F064	185.50	18.550	10					Titrimetric
F069	250.50	25.050	10					Fixed endpt titrn
F074	91.50	9.150	10					AutoTitration
F080	242.50	24.250	10					pH Titration
F092	51.00	5.100	10		BIASED LOW	-3.17	0.7525	Mettler Titrator
F093	211.50	21.150	10	H VH VHEL				Titration
F094	213.00	21.300	10					Autotitrator
F095	93.00	9.300	10					Titralyzer
F103	151.00	15.100	10	EL				Titration
F113	139.00	13.900	10					Gran titration
F133	122.00	12.200	10					TITRIMETRIC
F135	69.00	6.900	10		BIASED LOW*	-2.34	0.6744	APHA 2320-B

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 3.00

OVERALL AVERAGE
RANK IS 17.500

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F007	24.50	2.450	10		BIASED LOW*	-2.13	-1.4088	CPQ005E0
F092	51.00	5.100	10		BIASED LOW	-3.17	0.7525	Mettler Titrator
F135	69.00	6.900	10		BIASED LOW*	-2.34	0.6744	APHA 2320-B
F008	74.00	7.400	10		BIASED LOW*	-1.95	0.1178	Autoelectrode
F002	78.00	7.800	10		BIASED LOW*	-0.30	-1.7858	10110
F063	81.50	8.150	10					titr. pH 4.5
F074	91.50	9.150	10					AutoTitration
F095	93.00	9.300	10					Titralyzer
F042	96.50	9.650	10					ANC Gran Plot
F009	103.50	10.350	10					Titration
F036	117.00	11.700	10					Titration
F133	122.00	12.200	10					TITRIMETRIC
F019	125.00	12.500	10					Titrimetric
F022	129.00	12.900	10	LL				Titration
F113	139.00	13.900	10					Gran titration
F046	146.50	14.650	10	EL				Titration
F103	151.00	15.100	10	EL				Titration
F025	178.00	17.800	10					Titration
F064	185.50	18.550	10					Titrimetric
F048	205.00	20.500	10					Titration
F093	211.50	21.150	10	HVHVHEL				Titration
F094	213.00	21.300	10					Autotitrator
F003	222.00	22.200	10	HH				Pot'metricTitrat'n
F014	238.00	23.800	10					
F080	242.50	24.250	10					pH Titration
F026	243.00	24.300	10					TITROPROCESSOR
F011	245.50	24.550	10					
F069	250.50	25.050	10					Fixed endpt titrn
F006	278.00	27.800	10	EH	BIASED HIGH*	0.79	2.8776	0.2N H2SO4
F015	294.50	29.450	10	HH	BIASED HIGH*	1.64	2.7001	poten tit SA V2.2
F031	301.50	30.150	10	HHHEHVH	BIASED HIGH	4.67	2.2381	Titration
F010	306.00	30.600	10	HHHHHVH	BIASED HIGH	7.37	-1.9352	Titration
F032	310.50	31.050	10	HHHH	BIASED HIGH	4.12	1.1296	Titration
F038	333.00	33.300	10	HEHHHEHVHVHVHVH	BIASED HIGH	8.18	-0.3654	Titration

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 3.00

OVERALL AVERAGE
RANK IS 17.500

PARAMETER: 05091 Boron mg/L

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.0050 BASIC ACCEPTABLE ERROR= 0.0050 CONCENTRATION ERROR INCREMENT= 0.1000

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F008	<0.05	0.00	0.048 VH	10.00	<0.05	0.00	0.063 H	12.00	<0.05	0.00	<0.05	0.00
F009	<0.01	0.00	0.02	1.50	0.01	1.50	0.04 L	2.00	0.01	1.50	<0.01	0.00
F010	0.018 H	4.00	0.030	8.50	0.017	6.00	0.052	8.00	0.013	5.00	0.010	3.50
F012	0.07 EH	5.00	0.14 EH	11.00	0.06 EH	8.00	0.18 EH	13.00	0.18 EH	8.00	0.30 EH	7.00
F014	<0.200	0.00	<0.200	0.00	<0.200	0.00	<0.200	0.00	<0.200	0.00	<0.200	0.00
F015	<0.01	0.00	0.02	1.50	0.01	1.50	0.05	6.00	0.01	1.50	0.01	3.50
F022	<0.025	0.00	0.03	8.50	<0.025	0.00	0.06	10.50	<0.025	0.00	<0.025	0.00
F038	<0.1	0.00	<0.1	0.00	<0.1	0.00	<0.1	0.00	<0.1	0.00	<0.1	0.00
F046	0.012	3.00	0.027	7.00	0.015	5.00	0.049	4.50	0.014	6.00	0.012	5.00
F069	<0.016	0.00	0.025	5.00	<0.016	0.00	0.045	3.00	<0.016	0.00	<0.016	0.00
F080	<0.04	0.00	<0.04	0.00	<0.04	0.00	0.051	7.00	<0.04	0.00	<0.04	0.00
F093	0.006	1.00	0.026	6.00	0.012	4.00	0.053	9.00	0.011	3.50	0.008	2.00
F094	<0.05	0.00	<0.05	0.00	<0.05	0.00	0.06	10.50	<0.05	0.00	<0.05	0.00
F095	0.007	2.00	0.022	3.00	0.011	3.00	0.049	4.50	0.011	3.50	0.007	1.00
F103	<0.01	0.00	0.023	4.00	0.032 EH	7.00	0.020 EL	1.00	0.017	7.00	0.014	6.00
MEDIAN OR *TARGET CONC.	*0.0100		0.0260		0.0135		0.0510		0.0120		0.0100	
1CRIT	0.0057		0.0071		0.0058		0.0096		0.0057		0.0055	
N	3		8		5		11		5		5	
MEAN	0.0123		0.0289		0.0174		0.0520		0.0132		0.0108	
3STDEV	-		0.0232		-		0.0195		-		-	

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F008	0.115	11.50	0.087	10.00	0.112	11.00	0.134	13.00
F009	0.1	3.50	0.08	6.00	0.09	1.00	0.11	3.00
F010	0.106	7.00	0.08	6.00	0.099	5.00	0.122	11.00
F012	0.48 EH	14.00	0.36 EH	13.00	0.34 EH	14.00	0.33 EH	14.00
F014	<0.200	0.00	<0.200	0.00	<0.200	0.00	<0.200	0.00
F015	0.11	9.50	0.08	6.00	0.1	7.50	0.12	7.50
F022	0.1	3.50	0.08	6.00	0.1	7.50	0.12	7.50
F038	0.1	3.50	<0.1	0.00	0.1	7.50	0.1 L	2.00
F046	0.11	9.50	0.080	6.00	0.10	7.50	0.12	7.50
F069	0.100	3.50	0.076	2.00	0.091	2.00	0.115	4.00
F080	0.109	8.00	0.074	1.00	0.096	4.00	0.119	5.00
F093	0.115	11.50	0.086	9.00	0.108	10.00	0.133	12.00
F094	0.12	13.00	0.1 VH	11.00	0.13 VH	12.00	0.12	7.50
F095	0.104	6.00	0.078	3.00	0.095	3.00	0.121	10.00
F103	0.056 EL	1.00	0.116 VH	12.00	0.28 EH	13.00	0.073 EL	1.00
MEDIAN OR *TARGET CONC.	0.1075		0.0800		0.1000		0.1200	
1CRIT	0.0153		0.0125		0.0145		0.0165	
N	12		11		12		12	
MEAN	0.1074		0.0857		0.1176		0.1195	
3STDEV	0.0198		0.0343		0.1498		0.0259	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F008	67.50	11.250	6	VH H	BIASED HIGH*	-9.00	0.0197	ICP
F009	20.00	2.500	8	L	BIASED LOW*	-4.51	-0.0034	ICP-MS
F010	64.00	6.400	10	H				ICP-OES
F012	107.00	10.700	10	EHEHEHEHEHEHEHEHEH	BIASED HIGH	144.80	0.1138	ICP-MS
F014	0.00	*******	0		INSUFFICIENT DATA			ICP-OES
F015	44.50	4.944	9					ICP
F022	43.50	7.250	6					ICP-AES
F038	13.00	4.333	3	L	INSUFFICIENT DATA			ICPOES
F046	61.00	6.100	10					ICP-MS
F069	19.50	3.250	6		BIASED LOW*	-5.13	-0.0013	ICP
F080	25.00	5.000	5					ICP no digestion
F093	68.00	6.800	10					ICP
F094	54.00	10.800	5	VHVH	BIASED HIGH*	-5.28	0.0191	ICP
F095	39.00	3.900	10		BIASED LOW*	1.00	-0.0032	ICP
F103	52.00	5.778	9	EHEL ELVHEHEL				ICP-OES

* 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 6.336

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F014	0.00	*******	0		INSUFFICIENT DATA			ICP-OES
F009	20.00	2.500	8	L	BIASED LOW*	-4.51	-0.0034	ICP-MS
F069	19.50	3.250	6		BIASED LOW*	-5.13	-0.0013	ICP
F095	39.00	3.900	10		BIASED LOW*	1.00	-0.0032	ICP
F038	13.00	4.333	3	L	INSUFFICIENT DATA			ICPOES
F015	44.50	4.944	9					ICP
F080	25.00	5.000	5					ICP no digestion
F103	52.00	5.778	9	EHELELVHEHEL				ICP-OES
F046	61.00	6.100	10					ICP-MS
F010	64.00	6.400	10	H				ICP-OES
F093	68.00	6.800	10					ICP
F022	43.50	7.250	6					ICP-AES
F012	107.00	10.700	10	EHEHEHEHEHEHEHEHEH	BIASED HIGH	144.80	0.1138	ICP-MS
F094	54.00	10.800	5	VHVH	BIASED HIGH*	-5.28	0.0191	ICP
F008	67.50	11.250	6	VHH	BIASED HIGH*	-9.00	0.0197	ICP

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

OVERALL AVERAGE
RANK IS 6.336

PARAMETER: 06002 Diss Organic Carbon mg/L C

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 2.0000 BASIC ACCEPTABLE ERROR= 0.7500 CONCENTRATION ERROR INCREMENT= 0.1000

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	1.4	18.50	2.1	16.50	4.0	16.00	2.5	21.00	1.2	15.50	6.9	19.00
F003	1.4	18.50	2.2	20.00	3.8	10.00	2.4	18.50	1.4	19.00	6.7	14.00
F004	1.37	17.00	2.12	18.00	3.81	12.00	2.36	17.00	1.20	15.50	6.71	15.00
F006	1.5	21.00	2.0	15.00	4.5	21.00	2.0	9.50	1.5	20.50	7.5 H	22.00
F008	1.	3.50	3. EH	22.00	4.	16.00	2.	9.50	1.	13.50	7.	20.00
F010	1.2	10.00	1.8	10.00	3.7	7.00	2.0	9.50	0.8	8.00	6.2	9.00
F014	1.7	22.00	2.3	21.00	4.6	22.00	2.4	18.50	1.5	20.50	7.1	21.00
F015	0.8	1.00	1.4	1.00	3.8	10.00	1.5	1.00	<0.5	0.00	5.4	2.00
F022	2.15 EH	23.00	3.86 EH	23.00	5.27 EH	23.00	4.54 EH	23.00	3.55 EH	22.00	10.7 EH	23.00
F025	1.2	10.00	1.8	10.00	3.6	5.00	1.9	5.50	0.7	3.00	6.0	6.00
F026	1.0675	6.00	1.737	7.00	3.519	4.00	1.9515	7.00	0.7305	5.00	6.147	7.00
F032	1.1	7.00	1.6	4.00	3.3	2.00	1.8	4.00	0.7	3.00	5.7	4.00
F037	1.3051	15.00	1.9673	14.00	3.8335	13.00	2.2482	15.00	1.2393	17.00	6.8875	18.00
F042	1.19	8.00	1.73	6.00	4.00	16.00	2.01	12.00	0.83	10.00	6.22	12.00
F046	1.31	16.00	1.81	12.00	4.26	19.00	1.66	2.00	0.30	1.00	4.06 EL	1.00
F063	0.97	2.00	1.79	8.00	4.11	18.00	2.41	20.00	0.85	11.00	5.61	3.00
F069	1.20	10.00	1.80	10.00	3.61	6.00	2.13	13.00	0.90	12.00	6.21	11.00
F074	1.44	20.00	2.16	19.00	4.44	20.00	2.52	22.00	1.32	18.00	6.72	16.00
F080	1.0	3.50	1.7	5.00	3.8	10.00	2.0	9.50	0.7	3.00	6.8	17.00
F092	1.3	13.50	1.5	2.00	3.5	3.00	1.9	5.50	0.8	8.00	6.2	9.00
F094	1.3	13.50	2.1	16.50	3.9	14.00	2.3	16.00	0.8	8.00	6.3	13.00
F095	1.04	5.00	1.54	3.00	3.19	1.00	1.79	3.00	0.77	6.00	5.81	5.00
F113	1.24	12.00	1.85	13.00	3.76	8.00	2.18	14.00	1.	13.50	6.2	9.00
MEDIAN	1.2400		1.8100		3.8100		2.0100		0.8750		6.2200	
1CRIT	0.7500		0.7500		0.9310		0.7510		0.7500		1.1720	
N	21		21		21		21		20		21	
MEAN	1.2492		1.9335		3.8973		2.1171		0.9970		6.3959	
3STDEV	0.5425		0.9654		0.9899		0.7386		0.8151		1.5875	

PARAMETER: 06002 Diss Organic Carbon mg/L C

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	7.6	18.50	11.4	16.00	8.3	20.50	8.0	19.50
F003	7.7	20.00	11.2	15.00	7.8	15.00	7.5	14.50
F004	7.56	16.00	10.7	11.00	7.64	13.00	7.35	10.00
F006	8.0	21.00	11.5	18.00	8.5	22.00	8.5	22.00
F008	7.	10.50	13. H	22.00	8.	17.00	8.	19.50
F010	7.0	10.50	10.4	7.00	7.1	4.50	7.0	5.50
F014	8.2	22.00	11.7	19.00	8.1	19.00	7.9	17.00
F015	5.9	2.00	10.9	12.50	7.3	8.50	7.5	14.50
F022	12.5 EH	23.00	15.8 EH	23.00	11.6 EH	23.00	11.6 EH	23.00
F025	6.8	6.00	9.9	4.50	7.1	4.50	6.8	3.00
F026	6.7895	5.00	10.4095	8.00	7.368	10.00	7.113	7.00
F032	6.6	3.50	9.8	3.00	6.8	3.00	7.0	5.50
F037	7.5803	17.00	11.4870	17.00	7.7451	14.00	7.4678	13.00
F042	7.22	14.00	10.9	12.50	7.40	11.00	7.42	12.00
F046	4.59 EL	1.00	8.39 EL	1.00	4.79 EL	1.00	4.41 EL	1.00
F063	6.89	9.00	12.03	20.00	8.09	18.00	7.92	18.00
F069	7.03	12.00	10.3	6.00	7.14	6.00	6.98	4.00
F074	7.44	15.00	10.92	14.00	7.92	16.00	7.80	16.00
F080	7.6	18.50	12.2	21.00	8.3	20.50	8.1	21.00
F092	6.6	3.50	9.9	4.50	7.3	8.50	7.3	9.00
F094	7.2	13.00	10.5	9.00	7.5	12.00	7.4	11.00
F095	6.87	8.00	9.70	2.00	6.61	2.00	6.77	2.00
F113	6.83	7.00	10.6	10.00	7.29	7.00	7.2	8.00
MEDIAN	7.0300		10.9000		7.5000		7.4200	
1CRIT	1.2530		1.6400		1.3000		1.2920	
N	21		21		21		21	
MEAN	7.1624		10.9260		7.5859		7.4772	
3STDEV	1.5632		2.5217		1.5089		1.3714	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	181.00	18.100	10					Shimadzu
F003	164.50	16.450	10					UV dig IR detect
F004	144.50	14.450	10					06104
F006	192.00	19.200	10	H	BIASED HIGH	7.71	0.2922	UV Per
F008	153.50	15.350	10	EH H				Calculation
F010	81.00	8.100	10					Conductimetry
F014	202.00	20.200	10		BIASED HIGH*	3.50	0.4975	
F015	52.50	5.833	9					AutoC analyzer
F022	229.00	22.900	10	EHEHEHEHEHEHEHEHEH	BIASED HIGH	37.89	1.4260	UV-Oxidation
F025	57.50	5.750	10					Persulfate IR
F026	66.00	6.600	10					AUTOANALYSER
F032	39.00	3.900	10		BIASED LOW	-7.82	-0.0600	Colourimetry
F037	153.00	15.300	10					Persulfate IR
F042	113.50	11.350	10					IR
F046	55.00	5.500	10	ELELELELEL	BIASED LOW	-34.02	0.3372	Combustion IR
F063	127.00	12.700	10					UV-persulfate
F069	90.00	9.000	10					Infrared Spectr.
F074	176.00	17.600	10					PerSO4 IR Det
F080	129.00	12.900	10					Persulfate, IR
F092	66.50	6.650	10					Combustion
F094	126.00	12.600	10					Infrared
F095	37.00	3.700	10		BIASED LOW	-8.48	-0.0588	Skalar
F113	101.50	10.150	10					UV-Presulfate-IR

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 7.50

OVERALL AVERAGE
RANK IS 11.952

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F095	37.00	3.700	10		BIASED LOW	-8.48	-0.0588	Skalar
F032	39.00	3.900	10		BIASED LOW	-7.82	-0.0600	Colourimetry
F046	55.00	5.500	10	ELELELELEL	BIASED LOW	-34.02	0.3372	Combustion IR
F025	57.50	5.750	10					Persulfate IR
F015	52.50	5.833	9					AutoC analyzer
F026	66.00	6.600	10					AUTOANALYSER
F092	66.50	6.650	10					Combustion
F010	81.00	8.100	10					Conductimetry
F069	90.00	9.000	10					Infrared Spectr.
F113	101.50	10.150	10					UV-Presulfate-IR
F042	113.50	11.350	10					IR
F094	126.00	12.600	10					Infrared
F063	127.00	12.700	10					UV-persulfate
F080	129.00	12.900	10					Persulfate, IR
F004	144.50	14.450	10					06104
F037	153.00	15.300	10					Persulfate IR
F008	153.50	15.350	10	EHH				Calculation
F003	164.50	16.450	10					UV dig IR detect
F074	176.00	17.600	10					PerSO4 IR Det
F002	181.00	18.100	10					Shimadzu
F006	192.00	19.200	10	H	BIASED HIGH	7.71	0.2922	UV Per
F014	202.00	20.200	10		BIASED HIGH*	3.50	0.4975	
F022	229.00	22.900	10	EHEHEHEHEHEHEHEHEHEH	BIASED HIGH	37.89	1.4260	UV-Oxidation

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 7.50

OVERALL AVERAGE
RANK IS 11.952

PARAMETER: 06592 Diss Inorg Carbon mg/L C

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.5000 BASIC ACCEPTABLE ERROR= 0.5000 CONCENTRATION ERROR INCREMENT= 0.1000

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	9.1	2.00	19.8	3.00	7.6	2.00	23.0	4.00	29.7	4.00	47.9	5.00
F003	9.9	7.50	21.4	8.50	8.2	10.50	23.4	6.50	30.9	8.00	51.2	6.00
F008	10.	9.50	21.	6.00	8.	6.50	24.	10.00	31.	9.00	52.	11.00
F010	10.1	11.50	22.	16.00	8.2	10.50	25.	15.00	32.	13.00	54.	14.50
F015	10.1	11.50	20.9	4.50	8.1	8.50	23.4	6.50	30.2	5.00	51.3	7.00
F022	9.79	4.00	21.2	7.00	7.95	5.00	23.8	9.00	30.7	6.50	52.3	12.00
F025	10.2	14.50	21.7	14.00	8.1	8.50	25.2	16.00	34.0	17.00	55.9	17.00
F026	10.16	13.00	21.64	13.00	8.2425	12.00	23.675	8.00	31.655	12.00	51.48	9.00
F032	10.0	9.50	21.6	11.50	8.0	6.50	24.2	13.00	31.6	11.00	53.2	13.00
F036	9.8	5.50	21.8	15.00	8.34	14.00	24.7	14.00	32.2	14.00	54.4	16.00
F042	11.1 EH	18.00	24.1 H	18.00	8.99 EH	18.00	26.7	18.00	35.0 H	18.00	58.8 H	18.00
F046	10.2	14.50	21.6	11.50	8.25	13.00	24.1	11.00	31.1	10.00	51.8	10.00
F074	10.44	16.00	23.28	17.00	8.76	17.00	26.16	17.00	32.64	15.00	54.00	14.50
F080	9.8	5.50	18.2 L	2.00	7.8	4.00	20.7 L	3.00	27.0 L	2.00	47.2	4.00
F092	10.6	17.00	21.4	8.50	8.4	15.00	20.5 L	2.00	27.4 L	3.00	42.2 EL	1.00
F094	9.9	7.50	20.9	4.50	8.5	16.00	23.3	5.00	30.7	6.50	51.4	8.00
F095	7.45 EL	1.00	16.6 EL	1.00	5.88 EL	1.00	18.2 EL	1.00	23.6 EL	1.00	44.5 L	2.00
F113	9.63	3.00	21.51	10.00	7.75	3.00	24.17	12.00	32.67	16.00	47.06	3.00
MEDIAN	10.0000		21.4550		8.1500		23.9000		31.0500		51.6400	
1CRIT	1.4500		2.5955		1.2650		2.8400		3.5550		5.6140	
N	16		16		16		16		16		16	
MEAN	9.9825		21.2456		8.1370		23.7066		30.9666		51.2275	
3STDEV	0.9965		3.1297		0.8515		4.2287		5.2597		8.9764	

PARAMETER: 06592 Diss Inorg Carbon mg/L C

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	55.7	4.00	45.0	3.00	38.4	4.00	33.7	4.00
F003	59.6	7.00	49.4	12.00	40.3	11.00	35.8	11.50
F008	62.	13.00	48.	7.00	39.	5.50	35.	7.00
F010	63.	14.50	50.	14.00	41.	14.00	36.	13.50
F015	59.9	9.00	47.9	6.00	39.0	5.50	34.7	5.50
F022	60.2	10.00	48.6	11.00	39.4	8.00	35.4	9.00
F025	66.0	17.00	52.2	17.00	43.1	17.00	39.1	17.00
F026	58.67	6.00	48.305	10.00	40.38	12.00	35.695	10.00
F032	61.6	12.00	49.6	13.00	40.2	10.00	35.8	11.50
F036	63.0	14.50	50.2	15.00	41.2	15.00	36.0	13.50
F042	67.9 H	18.00	55.2 EH	18.00	44.8 H	18.00	39.9 H	18.00
F046	60.5	11.00	48.3	9.00	39.7	9.00	35.3	8.00
F074	63.72	16.00	51.72	16.00	42.36	16.00	37.44	16.00
F080	56.4	5.00	44.4	2.00	35.6	3.00	31.3 L	2.00
F092	46.2 EL	1.00	47.6	5.00	35.4 L	2.00	33.6	3.00
F094	59.7	8.00	48.2	8.00	39.1	7.00	34.7	5.50
F095	52.8 L	3.00	39.9 EL	1.00	31.5 EL	1.00	26.9 EL	1.00
F113	50.37 L	2.00	45.51	4.00	40.94	13.00	37.41	15.00
MEDIAN	60.0500		48.3025		39.9500		35.5475	
1CRIT	6.4550		5.2803		4.4450		4.0048	
N	16		16		16		16	
MEAN	59.5725		48.4334		39.6925		35.4341	
3STDEV	11.8541		6.3081		5.9815		5.1469	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	35.00	3.500	10		BIASED LOW*	-6.91	0.2668	Shimadzu
F003	88.50	8.850	10					IR detection
F008	84.50	8.450	10					Auto DNR
F010	136.50	13.650	10					Conductimetry
F015	69.00	6.900	10					AutoC analyzer
F022	81.50	8.150	10					UV-Oxidation
F025	155.00	15.500	10		BIASED HIGH	11.23	-1.1605	Infrared
F026	105.00	10.500	10					AUTOANALYSER
F032	111.00	11.100	10					Colourimetry
F036	136.50	13.650	10					Colourimetry
F042	180.00	18.000	10	EHH EH H H H EHH H	BIASED HIGH	14.12	-0.4151	IR
F046	107.00	10.700	10					Combustion IR
F074	160.50	16.050	10		BIASED HIGH*	5.38	0.2730	IR Detection
F080	32.50	3.250	10	L L L L	BIASED LOW*	-7.10	-0.8202	H3PO4, IR
F092	57.50	5.750	10	L L ELEL L				Combustion
F094	76.00	7.600	10					Infrared
F095	13.00	1.300	10	ELELELELELL L ELELEL	BIASED LOW	-11.00	-2.6416	Skalar
F113	81.00	8.100	10	L				Phosphoric acid-IR

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 7.50

OVERALL AVERAGE
RANK IS 9.500

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F095	13.00	1.300	10	ELELELELELLLELELEL	BIASED LOW	-11.00	-2.6416	Skalar
F080	32.50	3.250	10	LLLL	BIASED LOW*	-7.10	-0.8202	H3PO4, IR
F002	35.00	3.500	10		BIASED LOW*	-6.91	0.2668	Shimadzu
F092	57.50	5.750	10	LLELELL				Combustion
F015	69.00	6.900	10					AutoC analyzer
F094	76.00	7.600	10					Infrared
F113	81.00	8.100	10	L				Phosphoric acid-IR
F022	81.50	8.150	10					UV-Oxidation
F008	84.50	8.450	10					Auto DNR
F003	88.50	8.850	10					IR detection
F026	105.00	10.500	10					AUTOANALYSER
F046	107.00	10.700	10					Combustion IR
F032	111.00	11.100	10					Colourimetry
F036	136.50	13.650	10					Colourimetry
F010	136.50	13.650	10					Conductimetry
F025	155.00	15.500	10		BIASED HIGH	11.23	-1.1605	Infrared
F074	160.50	16.050	10		BIASED HIGH*	5.38	0.2730	IR Detection
F042	180.00	18.000	10	EHHEHHHHEHHH	BIASED HIGH	14.12	-0.4151	IR

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 7.50

OVERALL AVERAGE
RANK IS 9.500

PARAMETER: 07092 Nitrate + Nitrite mg/L N

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.0200 BASIC ACCEPTABLE ERROR= 0.0200 CONCENTRATION ERROR INCREMENT= 0.0800

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	0.356	27.00	0.464	24.50	0.010	2.00	2.22	9.00	3.72	29.50	0.540	9.50
F004	0.347	21.50	0.456	17.00	0.015	10.00	2.35	28.00	3.68	24.50	0.566	14.00
F006	0.45 VH	32.00	0.63 VH	34.00	0.04 H	21.00	2.82 VH	36.00	4.34 VH	36.00	0.72 VH	33.00
F007	0.32	5.00	0.41	4.00	<0.04	0.00	2.27	15.50	3.51	12.00	0.43 VL	2.50
F008	0.33	9.50	0.44	10.00	0.01	2.00	2.27	15.50	1.46 EL	3.00	0.57	17.00
F009	0.34	17.50	0.44	10.00	0.05 VH	23.50	2.24	10.00	3.71	28.00	0.5 L	5.00
F010	0.33	9.50	0.44	10.00	<0.02	0.00	1.89 VL	3.00	3.8	31.00	0.43 VL	2.50
F011	0.332	11.00	0.446	12.00	<0.008	0.00	2.54 H	33.00	3.7	26.50	0.598	25.00
F014	0.35	24.50	0.46	20.50	<0.05	0.00	2.3	22.50	3.7	26.50	0.60	26.50
F015	0.321	6.50	0.392 L	2.00	0.013	7.50	2.03 L	4.00	3.18 L	4.00	0.533	8.00
F019	0.35	24.50	0.46	20.50	<0.03	0.00	2.32	24.50	3.66	23.00	0.54	9.50
F022	0.34	17.50	0.461	23.00	0.02	15.00	2.285	20.00	3.459	10.00	0.568	15.50
F025	0.338	13.50	0.465	26.50	0.013	7.50	2.28	19.00	3.68	24.50	0.584	20.00
F026	0.3375	12.00	0.4475	13.00	0.0205	17.00	2.296	21.00	3.6345	20.00	0.5805	19.00
F031	0.36	28.00	0.46	20.50	0.05 VH	23.50	2.3	22.50	3.53	14.50	0.59	24.00
F032	0.355	26.00	0.465	26.50	<0.015	0.00	2.33	26.50	3.64	21.50	0.585	21.50
F036	0.348	23.00	0.464	24.50	0.018	12.50	2.27	15.50	3.39	8.00	0.568	15.50
F037	0.3187	4.00	0.4280	6.00	0.0170	11.00	2.2060	8.00	3.3615	7.00	0.5541	12.00
F038	0.338	13.50	0.451	16.00	0.01	2.00	2.33	26.50	3.57	16.50	0.586	23.00
F046	0.416 VH	31.00	0.531 H	32.00	0.029	19.00	2.65 VH	34.00	3.82	32.00	0.635	31.00
F048	0.34	17.50	0.48	30.00	0.013	7.50	2.4	30.00	4.3 VH	35.00	0.74 VH	34.00
F063	0.31	3.00	0.43	7.00	0.02	15.00	2.11	5.00	3.42	9.00	0.51 L	6.00
F064	0.48 VH	34.00	0.47	28.00	0.08 EH	25.00	2.19	7.00	3.64	21.50	0.61	28.00
F068	0.34	17.50	0.448	14.00	0.012	4.00	2.279	18.00	3.626	18.00	0.578	18.00
F069	0.325	8.00	0.435	8.00	<0.05	0.00	2.32	24.50	3.72	29.50	0.498 L	4.00
F074	0.369	29.00	0.489	31.00	0.013	7.50	2.479	31.00	3.929	33.00	0.639	32.00
F074m	0.453 VH	33.00	0.555 VH	33.00	0.022	18.00	2.778 VH	35.00	3.519	13.00	0.633	29.50
F074u	0.392 H	30.00	0.475	29.00	0.044 H	22.00	0.901 EL	1.00	0.885 EL	1.00	0.633	29.50
F080	0.34	17.50	0.46	20.50	<0.05	0.00	2.26	13.00	3.48	11.00	0.56	13.00
F092	0.3062	2.00	0.4064	3.00	0.0128	5.00	2.1252	6.00	3.2223 L	5.00	0.5290	7.00
F094	0.321	6.50	0.421	5.00	0.02	15.00	2.27	15.50	3.57	16.50	0.554	11.00
F095	0.34	17.50	0.45	15.00	<0.05	0.00	2.25	11.50	3.53	14.50	0.60	26.50
F103	0.79 EH	36.00	0.86 EH	36.00	<0.5	0.00	2.25	11.50	3.30 L	6.00	0.92 EH	35.00
F113	0.347	21.50	0.457	18.00	0.018	12.50	2.368	29.00	3.63	19.00	0.585	21.50
F135	0.68 EH	35.00	0.68 EH	35.00	<0.01	0.00	2.48	32.00	4.07 H	34.00	1.13 EH	36.00
F139	0.21 VL	1.00	0.28 EL	1.00	0.03	20.00	1.59 EL	2.00	1.26 EL	2.00	0.35 VL	1.00
MEDIAN	0.3400		0.4585		0.0180		2.2795		3.6280		0.5792	
1CRIT	0.0456		0.0551		0.0200		0.2008		0.3086		0.0647	
N	34		34		24		34		34		34	
MEAN	0.3624		0.4667		0.0217		2.2802		3.4830		0.5843	
3STDEV	0.2043		0.1687		0.0365		0.5941		1.7206		0.2562	

PARAMETER: 07092 Nitrate + Nitrite mg/L N

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	0.006	4.00	0.084	20.00	0.187	26.00	0.538	28.00
F004	<0.010	0.00	0.073	10.00	0.161	16.00	0.511	16.00
F006	0.02	12.00	0.16 VH	29.00	0.31 VH	34.00	0.71 VH	34.00
F007	<0.04	0.00	<0.04 VL	0.00	0.12 VL	7.00	0.39 VL	4.00
F008	<0.01	0.00	0.08	17.50	0.18	22.00	0.5	13.50
F009	<0.05	0.00	<0.05 L	0.00	0.1 VL	5.00	0.48	10.00
F010	<0.02	0.00	0.02 VL	1.00	0.09 VL	4.00	0.33 VL	1.00
F011	<0.008	0.00	0.079	14.50	0.168	18.00	0.524	22.00
F014	<0.05	0.00	0.09	23.50	0.20	30.00	0.53	25.50
F015	0.015	11.00	0.072	9.00	0.160	14.00	0.457 L	6.00
F019	<0.02	0.00	<0.02 VL	0.00	0.08 VL	3.00	0.5	13.50
F022	0.011	9.00	0.09	23.50	0.185	25.00	0.524	22.00
F025	0.007	5.50	0.071	8.00	0.157	11.50	0.545	30.00
F026	0.012	10.00	0.064	6.00	0.1765	20.00	0.516	17.00
F031	0.01	7.50	0.10	26.50	0.19	27.50	0.52	19.50
F032	<0.005	0.00	0.080	17.50	0.160	14.00	0.530	25.50
F036	<0.008	0.00	0.088	22.00	0.184	24.00	0.520	19.50
F037	<0.05	0.00	<0.05 L	0.00	0.0344 VL	1.00	0.3801 VL	3.00
F038	<0.005	0.00	0.079	14.50	0.179	21.00	0.53	25.50
F046	<0.02	0.00	0.086	21.00	0.201	31.00	0.589 H	32.00
F048	<0.005	0.00	0.067	7.00	0.15	8.50	0.50	13.50
F063	0.01	7.50	0.08	17.50	0.15	8.50	0.46	7.00
F064	<0.05	0.00	0.15 VH	28.00	0.23 VH	33.00	0.54	29.00
F068		0.00	0.074	11.00	0.157	11.50	0.517	18.00
F069	<0.05	0.00	<0.05 L	0.00	0.117 VL	6.00	0.463	8.00
F074	0.003	1.50	0.095	25.00	0.195	29.00	0.570	31.00
F074m	0.003	1.50	0.034 VL	3.00	0.154	10.00	0.596 H	33.00
F074u	0.070 EH	13.00	0.023 VL	2.00	0.073 VL	2.00	0.430 L	5.00
F080	<0.05	0.00	0.10	26.50	0.19	27.50	0.50	13.50
F092	0.0045	3.00	0.0749	12.00	0.1666	17.00	0.4771	9.00
F094	<0.02	0.00	0.08	17.50	0.176	19.00	0.491	11.00
F095	<0.05	0.00	0.06	5.00	0.21 H	32.00	0.53	25.50
F103	<0.5	0.00	<0.5	0.00	0.63 EH	36.00	0.89 EH	35.00
F113	0.007	5.50	0.075	13.00	0.183	23.00	0.524	22.00
F135	0.45 EH	14.00	1.13 EH	30.00	0.45 EH	35.00	1.35 EH	36.00
F139	<0.03	0.00	0.05 L	4.00	0.16	14.00	0.38 VL	2.00
MEDIAN	0.0100		0.0795		0.1720		0.5185	
1CRIT	0.0200		0.0248		0.0322		0.0599	
N	11		28		34		34	
MEAN	0.0157		0.0807		0.1750		0.5195	
3STDEV	0.0530		0.0802		0.1943		0.2667	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	179.50	17.950	10					Cd reduction
F004	157.00	17.444	9					07110
F006	301.00	30.100	10	VHVHH VHVHVH VHVHVH	BIASED HIGH	19.01	0.0580	Auto Anal
F007	50.00	7.143	7	VL VLVLVL	BIASED LOW*	-0.41	-0.0705	CPQ103E2
F008	110.00	12.222	9	EL				Auto FIA Color
F009	109.00	13.625	8	VH L L VL				TRAACS
F010	62.00	7.750	8	VL VL VLVLVL	BIASED LOW*	2.24	-0.1132	Hydrazine SO4
F011	162.00	20.250	8	H				
F014	199.50	24.938	8					
F015	72.00	7.200	10	L L L L	BIASED LOW	-12.17	0.0073	ICA, V1.2
F019	118.50	16.929	7	VLVL				Ion Chromatograph
F022	180.50	18.050	10					Colorimetry
F025	166.00	16.600	10					Cadmium Reduction
F026	155.00	15.500	10					AUTOANALYSER
F031	214.00	21.400	10	VH				IC
F032	179.00	22.375	8					Colourimetry
F036	164.50	18.278	9					Ion Chromatography
F037	52.00	6.500	8	L VLVL	BIASED LOW	-5.05	-0.0363	I.C. Waters
F038	158.50	17.611	9					ION CHROMATOGRAPHY
F046	263.00	29.222	9	VHH VH H	BIASED HIGH	7.30	0.0327	Colorimetry
F048	183.00	20.333	9	VHVH				IC
F063	85.50	8.550	10	L				auto Cd red.
F064	233.50	25.944	9	VH EH VHVH				Ion Chromatography
F068	130.00	14.444	9					IC, Dionex
F069	88.00	12.571	7	L L VL				Colorimetric
F074	250.00	25.000	10					Autoanal Azo Dye
F074m	209.00	20.900	10	VHVH VH VL H				Autoanal Azo Dye
F074u	134.50	13.450	10	H H ELEL EHVLVLL				CD Red Col Azo Dye
F080	142.50	17.813	8					Ion Chrom Colour
F092	69.00	6.900	10	L	BIASED LOW	-10.15	0.0062	Technicon
F094	117.00	13.000	9					IC and Colorimetry
F095	147.50	18.438	8	H				Skalar
F103	195.50	27.929	7	EHEH L EH EHEH	BIASED HIGH	-22.95	0.4992	Ion Chromatography
F113	185.00	18.500	10					FIA, Lachat 8000
F135	287.00	31.889	9	EHEH H EHEHEHEHEH	BIASED HIGH	-6.11	0.5386	Kit Hach 8039 8507
F139	47.00	5.222	9	VLEL ELELVL L VL	BIASED LOW	-58.94	0.1106	IC

* 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 17.312

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F139	47.00	5.222	9	VLELELELVLLVL	BIASED LOW	-58.94	0.1106	IC
F037	52.00	6.500	8	LVLVL	BIASED LOW	-5.05	-0.0363	I.C. Waters
F092	69.00	6.900	10	L	BIASED LOW	-10.15	0.0062	Technicon
F007	50.00	7.143	7	VLVLVLVL	BIASED LOW*	-0.41	-0.0705	CPQ103E2
F015	72.00	7.200	10	LLLL	BIASED LOW	-12.17	0.0073	ICA, V1.2
F010	62.00	7.750	8	VLVLVLVLVL	BIASED LOW*	2.24	-0.1132	Hydrazine SO4
F063	85.50	8.550	10	L				auto Cd red.
F008	110.00	12.222	9	EL				Auto FIA Color
F069	88.00	12.571	7	LLVL				Colorimetric
F094	117.00	13.000	9					IC and Colorimetry
F074u	134.50	13.450	10	HHELELEHVLVLL				CD Red Col Azo Dye
F009	109.00	13.625	8	VHLLVL				TRAACS
F068	130.00	14.444	9					IC, Dionex
F026	155.00	15.500	10					AUTOANALYSER
F025	166.00	16.600	10					Cadmium Reduction
F019	118.50	16.929	7	VLVL				Ion Chromatograph
F004	157.00	17.444	9					07110
F038	158.50	17.611	9					ION CHROMATOGRAPHY
F080	142.50	17.813	8					Ion Chrom Colour
F003	179.50	17.950	10					Cd reduction
F022	180.50	18.050	10					Colorimetry
F036	164.50	18.278	9					Ion Chromatography
F095	147.50	18.438	8	H				Skalar
F113	185.00	18.500	10					FIA, Lachat 8000
F011	162.00	20.250	8	H				
F048	183.00	20.333	9	VHVH				IC
F074m	209.00	20.900	10	VHVHVHVLH				Autoanal Azo Dye
F031	214.00	21.400	10	VH				IC
F032	179.00	22.375	8					Colourimetry
F014	199.50	24.938	8					
F074	250.00	25.000	10					Autoanal Azo Dye
F064	233.50	25.944	9	VHEHVHVH				Ion Chromatography
F103	195.50	27.929	7	EHEHLEHEHEH	BIASED HIGH	-22.95	0.4992	Ion Chromatography
F046	263.00	29.222	9	VHHVHH	BIASED HIGH	7.30	0.0327	Colorimetry
F006	301.00	30.100	10	VHVHHVHVHVHVHVHVH	BIASED HIGH	19.01	0.0580	Auto Anal
F135	287.00	31.889	9	EHEHHEHEHEHEHEH	BIASED HIGH	-6.11	0.5386	Kit Hach 8039 8507

* 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 17.312

Nitrate + Nitrite

PARAMETER: 07192 Ammonia mg/L N

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.0050 BASIC ACCEPTABLE ERROR= 0.0050 CONCENTRATION ERROR INCREMENT= 0.1250

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	<0.005	0.00	0.030	16.00	0.058	10.50	0.007	13.00	0.006	9.00	0.006	10.00
F004	<0.005	0.00	0.026	12.50	0.050	6.00	0.006	11.00	<0.005	0.00	0.009	11.00
F006	<0.02	0.00	0.03	16.00	0.07	24.50	<0.02	0.00	<0.02	0.00	<0.02	0.00
F008	0.003	7.50	0.032	19.00	0.064	19.00	0.003	7.00	0.003	6.50	0.004	8.00
F010	<0.02	0.00	<0.02 L	0.00	0.05	6.00	<0.02	0.00	<0.02	0.00	<0.02	0.00
F011	0.002	6.00	0.022	5.00	0.047 L	4.00	0.002	6.00	<0.002	0.00	<0.002	0.00
F012	<0.001	0.00	0.001 EL	1.00	0.004 EL	1.00	<0.001	0.00	<0.001	0.00	0.001	4.50
F014	<0.010	0.00	0.024	10.00	0.060	14.00	<0.010	0.00	<0.010	0.00	<0.010	0.00
F015	<0.005	0.00	0.034	20.50	0.073 H	27.00	<0.005	0.00	<0.005	0.00	<0.005	0.00
F019	<0.02	0.00	0.02 L	4.00	0.05	6.00	<0.02	0.00	<0.02	0.00	<0.02	0.00
F022	0.009 H	10.50	0.04 VH	24.00	0.083 VH	28.00	0.006	11.00	0.003	6.50	0.002	7.00
F025	<0.1	0.00	0.03	16.00	0.06	14.00	<0.1	0.00	<0.1	0.00	<0.1	0.00
F026	0.001	5.00	0.0234	8.00	0.0564	9.00	0.0012	5.00	0.0012	5.00	0.0017	6.00
F032	<0.002	0.00	0.024	10.00	0.058	10.50	<0.002	0.00	<0.002	0.00	<0.002	0.00
F036	0.005	9.00	0.037 H	22.00	0.067	21.00	0.005	9.00	0.010	11.50	<0.002	0.00
F038	<0.005	0.00	0.026	12.50	0.065	20.00	<0.005	0.00	0.008	10.00	<0.005	0.00
F042	0.00W	0.00	0.03W	0.00	0.06	14.00	0.01W	0.00	0.00W	0.00	0.00W	0.00
F046	0.023 VH	13.00	0.063 EH	26.00	0.109 EH	29.00	0.034 EH	16.00	0.041 EH	14.00	0.034 EH	15.00
F048	<0.020	0.00	<0.020 L	0.00	0.035 VL	2.00	<0.020	0.00	<0.020	0.00	<0.020	0.00
F063	0.012 VH	12.00	0.034	20.50	0.069	22.00	0.006	11.00	0.012 H	13.00	0.012 VH	13.00
F064	0.0030	7.50	0.013 VL	2.00	0.063	18.00	0.0042	8.00	0.0035	8.00	0.0044	9.00
F069	<0.02	0.00	0.024	10.00	0.059	12.00	<0.02	0.00	<0.02	0.00	<0.02	0.00
F074	0.00	2.50	0.03	16.00	0.07	24.50	0.00	2.50	0.00	2.00	0.00	2.00
F074m	0.00	2.50	0.023	6.00	0.061	16.00	0.00	2.50	0.001	4.00	0.001	4.50
F074u	0.00	2.50	0.016 VL	3.00	0.044 L	3.00	0.00	2.50	0.00	2.00	0.00	2.00
F092	<0.001	0.00	0.0233	7.00	0.0543	8.00	0.0103 H	15.00	<0.001	0.00	0.0095 H	12.00
F093	0.05 EH	14.00	0.05 VH	25.00	0.07	24.50	<0.01	0.00	<0.01	0.00	<0.01	0.00
F094	0.009 H	10.50	0.038 H	23.00	0.07	24.50	0.009	14.00	0.01	11.50	0.021 VH	14.00
F095	<0.05	0.00	<0.05	0.00	<0.05	0.00	<0.05	0.00	<0.05	0.00	<0.05	0.00
F113	0.000	2.50	0.030	16.00	0.062	17.00	0.000	2.50	0.000	2.00	0.000	2.00
F135	<0.01	0.00	<0.01 VL	0.00	<0.01 EL	0.00	<0.01	0.00	<0.01	0.00	<0.01	0.00
MEDIAN OR *TARGET												
CONC.	0.0030		0.0280		0.0600		0.0046		*0.0050		0.0040	
1CRIT	0.0050		0.0079		0.0119		0.0050		0.0050		0.0050	
N	13		24		27		15		13		14	
MEAN	0.0052		0.0283		0.0603		0.0040		0.0044		0.0051	
3STDEV	0.0193		0.0238		0.0299		0.0099		0.0124		0.0174	

PARAMETER: 07192 Ammonia mg/L N

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	0.019 H	14.50	0.007	11.00	0.003	7.50	<0.005	0.00
F004	0.017 H	12.50	0.010	14.00	0.008	10.00	0.016 VH	14.00
F006	<0.02	0.00	<0.02	0.00	<0.02	0.00	<0.02	0.00
F008	0.012	10.50	0.004	7.00	0.004	9.00	0.005	9.00
F010	<0.02	0.00	<0.02	0.00	<0.02	0.00	<0.02	0.00
F011	0.01	6.50	0.005	8.50	0.003	7.50	0.009	13.00
F012	0.001 VL	1.50	0.002	3.00	0.001	2.50	0.003	8.00
F014	<0.010	0.00	<0.010	0.00	<0.010	0.00	<0.010	0.00
F015	0.011	9.00	<0.005	0.00	<0.005	0.00	<0.005	0.00
F019	<0.02	0.00	<0.02	0.00	<0.02	0.00	<0.02	0.00
F022	0.017 H	12.50	0.005	8.50	0.002	5.00	0.002	4.50
F025	<0.1	0.00	<0.1	0.00	<0.1	0.00	<0.1	0.00
F026	0.0057	4.00	0.0026	4.00	0.0015	4.00	0.0027	7.00
F032	<0.002 VL	0.00	<0.002	0.00	<0.002	0.00	<0.002	0.00
F036	0.012	10.50	<0.003	0.00	<0.003	0.00	<0.004	0.00
F038	0.01	6.50	0.006	10.00	<0.005	0.00	0.007	12.00
F042	0.02W	0.00	0.02W	0.00	0.01W	0.00	0.01W	0.00
F046	<0.02	0.00	<0.02	0.00	0.020 VH	15.00	<0.02	0.00
F048	<0.020	0.00	<0.020	0.00	<0.020	0.00	<0.020	0.00
F063	0.020 VH	16.00	0.009	13.00	0.012 VH	12.00	0.006	10.00
F064	0.0039 L	3.00	0.0035	6.00	0.0028	6.00	0.0026	6.00
F069	<0.02	0.00	<0.02	0.00	0.032 EH	16.00	<0.02	0.00
F074	0.01	6.50	0.00	1.00	0.00	1.00	0.00	1.50
F074m	0.001 VL	1.50	0.003	5.00	0.011 H	11.00	0.001	3.00
F074u	0.019 H	14.50	0.008	12.00	0.018 VH	13.00	0.002	4.50
F092	<0.001 VL	0.00	<0.001	0.00	<0.001	0.00	0.0062	11.00
F093	<0.01	0.00	<0.01	0.00	<0.01	0.00	0.03 VH	15.00
F094	0.025 VH	17.00	0.017 EH	15.00	0.019 VH	14.00	0.032 EH	16.00
F095	<0.05	0.00	<0.05	0.00	<0.05	0.00	<0.05	0.00
F113	0.01	6.50	0.001	2.00	0.001	2.50	0.000	1.50
F135	<0.01	0.00	<0.01	0.00	<0.01	0.00	<0.01	0.00
MEDIAN OR *TARGET CONC.	0.0110		0.0050		0.0035		0.0040	
1CRIT	0.0058		0.0050		0.0050		0.0050	
N	14		13		14		13	
MEAN	0.0126		0.0051		0.0076		0.0071	
3STDEV	0.0145		0.0080		0.0206		0.0229	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	91.50	11.438	8	H				Alkaline phenol
F004	91.00	11.375	8	H VH				07540
F006	40.50	20.250	2		INSUFFICIENT DATA			Auto Anal
F008	102.50	10.250	10					Auto Color
F010	6.00	6.000	1	L	INSUFFICIENT DATA			Auto. color.
F011	56.50	7.062	8	L				
F012	21.50	3.071	7	ELEL VL	BIASED LOW	-96.48	0.0013	Technicon
F014	24.00	12.000	2		INSUFFICIENT DATA			
F015	56.50	18.833	3	H	INSUFFICIENT DATA			auto. Berthelot
F019	10.00	5.000	2	L	INSUFFICIENT DATA			Colormetric
F022	117.50	11.750	10	H VHVH H				Colorimetry
F025	30.00	15.000	2		INSUFFICIENT DATA			Phenate
F026	57.00	5.700	10		BIASED LOW*	-3.28	-0.0025	AUTOANALYSER
F032	20.50	10.250	2	VL	INSUFFICIENT DATA			Colourimetry
F036	83.00	13.833	6	H				Colourimetry
F038	71.00	11.833	6					COLOR - AUTOMATED
F042	14.00	14.000	1		INSUFFICIENT DATA			Colorimetric
F046	128.00	18.286	7	VHEHEHEHEHEH VH	BIASED HIGH	39.09	0.0252	Colorimetry
F048	2.00	2.000	1	L VL	INSUFFICIENT DATA			IC
F063	142.50	14.250	10	VH H VHVH VH				auto phenate
F064	73.50	7.350	10	VL L	BIASED LOW*	-1.64	-0.0020	SIE
F069	38.00	12.667	3	EH	INSUFFICIENT DATA			Colorimetric
F074	59.50	5.950	10		BIASED LOW	24.57	-0.0047	Autoanal Phen Blue
F074m	56.00	5.600	10	VL H	BIASED LOW*	2.40	-0.0027	Autoanal Phen Blue
F074u	59.00	5.900	10	VLL H VH	BIASED LOW	-31.89	0.0021	Colour Phen Blue
F092	53.00	10.600	5	H H VL				Technicon
F093	78.50	19.625	4	EHVH VH	INSUFFICIENT DATA			Distilled-Nessler
F094	159.50	15.950	10	H H VHVHEHVHEH	BIASED HIGH*	-5.76	0.0131	Colorimetry
F095	0.00	*******	0		INSUFFICIENT DATA			Skalar
F113	54.50	5.450	10		BIASED LOW	11.46	-0.0037	FIA, Lachat 8000
F135	0.00	*******	0	VLEL	INSUFFICIENT DATA			Kit Hach 8155

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 7.50

OVERALL AVERAGE
RANK IS 10.096

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F095	0.00	*******	0		INSUFFICIENT DATA			Skalar
F135	0.00	*******	0	VLEL	INSUFFICIENT DATA			Kit Hach 8155
F048	2.00	2.000	1	LVL	INSUFFICIENT DATA			IC
F012	21.50	3.071	7	ELELVL	BIASED LOW	-96.48	0.0013	Technicon
F019	10.00	5.000	2	L	INSUFFICIENT DATA			Colormetric
F113	54.50	5.450	10		BIASED LOW	11.46	-0.0037	FIA, Lachat 8000
F074m	56.00	5.600	10	VLH	BIASED LOW*	2.40	-0.0027	Autoanal Phen Blue
F026	57.00	5.700	10		BIASED LOW*	-3.28	-0.0025	AUTOANALYSER
F074u	59.00	5.900	10	VLLHVH	BIASED LOW	-31.89	0.0021	Colour Phen Blue
F074	59.50	5.950	10		BIASED LOW	24.57	-0.0047	Autoanal Phen Blue
F010	6.00	6.000	1	L	INSUFFICIENT DATA			Auto. color.
F011	56.50	7.062	8	L				
F064	73.50	7.350	10	VLL	BIASED LOW*	-1.64	-0.0020	SIE
F032	20.50	10.250	2	VL	INSUFFICIENT DATA			Colourimetry
F008	102.50	10.250	10					Auto Color
F092	53.00	10.600	5	HHVL				Technicon
F004	91.00	11.375	8	HVH				07540
F003	91.50	11.438	8	H				Alkaline phenol
F022	117.50	11.750	10	HVHVHH				Colorimetry
F038	71.00	11.833	6					COLOR - AUTOMATED
F014	24.00	12.000	2		INSUFFICIENT DATA			
F069	38.00	12.667	3	EH	INSUFFICIENT DATA			Colorimetric
F036	83.00	13.833	6	H				Colourimetry
F042	14.00	14.000	1		INSUFFICIENT DATA			Colorimetric
F063	142.50	14.250	10	VHHVHVHVH				auto phenate
F025	30.00	15.000	2		INSUFFICIENT DATA			Phenate
F094	159.50	15.950	10	HHVHVHEHVHEH	BIASED HIGH*	-5.76	0.0131	Colorimetry
F046	128.00	18.286	7	VHEHEHEHEHEHVH	BIASED HIGH	39.09	0.0252	Colorimetry
F015	56.50	18.833	3	H	INSUFFICIENT DATA			auto. Berthelot
F093	78.50	19.625	4	EHVHVH	INSUFFICIENT DATA			Distilled-Nessler
F006	40.50	20.250	2		INSUFFICIENT DATA			Auto Anal

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON= 7.50

OVERALL AVERAGE
RANK IS 10.096

PARAMETER: 07392 Total Kjeldahl N mg/L N

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.0400 BASIC ACCEPTABLE ERROR= 0.0400 CONCENTRATION ERROR INCREMENT= 0.1500

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	0.067	4.00	0.210	8.50	0.304	8.00	0.216	5.00	0.068	4.00	0.355	9.00
F006	<0.1	0.00	0.3 H	12.00	0.4 H	13.50	0.5 EH	14.00	0.3 EH	12.00	0.6 EH	15.00
F008	0.18 VH	11.00	0.34 VH	14.00	0.4 H	13.50	0.4 VH	13.00	0.14	9.00	0.45 H	13.00
F014	<0.20	0.00	0.20	7.00	0.26	3.00	0.28	8.50	<0.20	0.00	0.32	5.00
F019	0.08	5.50	0.15	2.00	0.28	4.00	<0.02 EL	0.00	<0.02 VL	0.00	0.28	2.00
F022	0.05	2.00	0.17	3.50	0.23	2.00	0.21	4.00	0.04 L	2.00	0.29	3.00
F025	0.13 H	8.00	0.28 H	11.00	1.35 EH	15.00	0.36 H	12.00	0.13	8.00	0.43	11.50
F032	0.14 H	9.00	0.24	10.00	0.30	6.00	0.30	10.00	0.10	6.00	0.38	10.00
F046	<0.1	0.00	0.198	6.00	0.353	10.00	0.219	6.00	0.120	7.00	0.339	7.00
F063	0.08	5.50	0.21	8.50	0.31	9.00	0.26	7.00	0.09	5.00	0.35	8.00
F064	0.056	3.00	0.17	3.50	0.21 L	1.00	0.17 L	2.00	0.046 L	3.00	0.33	6.00
F069	<0.1	0.00	0.189	5.00	0.303	7.00	0.176 L	3.00	<0.1	0.00	0.306	4.00
F074	0.00 VL	1.00	0.10 VL	1.00	0.29	5.00	0.00 EL	1.00	0.00 VL	1.00	0.18 VL	1.00
F092	<0.5	0.00	<0.5	0.00	<0.5	0.00	<0.5	0.00	<0.5	0.00	<0.5	0.00
F094	0.12	7.00	0.32 VH	13.00	0.36	11.00	0.28	8.50	0.17 H	11.00	0.53 VH	14.00
F095	0.16 VH	10.00	0.35 VH	15.00	0.39 H	12.00	0.31	11.00	0.16	10.00	0.43	11.50
MEDIAN	0.0800		0.2100		0.3040		0.2700		0.1100		0.3500	
1CRIT	0.0460		0.0655		0.0796		0.0745		0.0505		0.0865	
N	9		13		13		12		10		13	
MEAN	0.0981		0.2290		0.3215		0.2651		0.1064		0.3685	
3STDEV	0.1131		0.1779		0.1570		0.2040		0.1295		0.2098	

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	0.458	8.00	0.689	7.00	0.579	9.00	0.636	7.00
F006	0.8 EH	15.00	0.6	2.00	0.9 EH	16.00	0.8 H	15.00
F008	0.52	12.50	0.82	16.00	0.62	11.00	0.76	14.00
F014	0.41	4.00	0.66	5.00	0.51	4.00	0.60	4.50
F019	0.44	5.00	0.65	4.00	0.54	6.00	0.64	8.00
F022	0.4	3.00	0.69	8.00	0.23 EL	1.00	0.6	4.50
F025	0.57 H	14.00	0.80	15.00	0.64	12.50	0.75	13.00
F032	0.48	10.00	0.72	11.00	0.60	10.00	0.68	10.00
F046	0.441	6.00	0.780	14.00	0.649	14.00	0.833 H	16.00
F063	0.45	7.00	0.71	9.00	0.52	5.00	0.62	6.00
F064	0.36	1.00	0.61	3.00	0.48	3.00	0.53	2.00
F069	0.463	9.00	0.715	10.00	0.547	7.00	0.587	3.00
F074	0.39	2.00	0.56 L	1.00	0.42 L	2.00	0.225 EL	1.00
F092	<0.5	0.00	0.68	6.00	0.562	8.00	0.641	9.00
F094	0.51	11.00	0.76	12.50	0.65	15.00	0.73	12.00
F095	0.52	12.50	0.76	12.50	0.64	12.50	0.69	11.00
MEDIAN	0.4580		0.7000		0.5705		0.6405	
1CRIT	0.1027		0.1390		0.1196		0.1301	
N	13		14		14		14	
MEAN	0.4655		0.7017		0.5684		0.6617	
3STDEV	0.1527		0.1740		0.2030		0.2214	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	69.50	6.950	10					Block digestion
F006	114.50	12.722	9	H H EHEHEHEH EHH	BIASED HIGH	-12.68	0.2272	Block dig
F008	127.00	12.700	10	VHVHH VH H	BIASED HIGH*	2.14	0.0858	Auto FIA Color
F014	41.00	5.125	8					
F019	36.50	4.562	8	ELVL				Digest-Technicon
F022	33.00	3.300	10	L EL	BIASED LOW	-10.14	-0.0409	Colorimetry
F025	120.00	12.000	10	H H EHH H	BIASED HIGH*	-5.43	0.1947	Block Dig Phenate
F032	92.00	9.200	10	H				Colourimetry
F046	86.00	9.556	9	H				Dig-Dist-Color
F063	70.00	7.000	10					auto kjeldahl
F064	27.50	2.750	10	L L L	BIASED LOW*	-9.54	-0.0379	Kjedahl digest SIE
F069	48.00	6.000	8	L				Colorim, Blk Dig
F074	16.00	1.600	10	VLVL ELVLVL L L EL	BIASED LOW	-22.53	-0.0696	UV Total N
F092	23.00	7.667	3		INSUFFICIENT DATA			Digest - Technicon
F094	115.00	11.500	10	VH H VH				Colorimetry
F095	118.00	11.800	10	VHVHH	BIASED HIGH*	-3.98	0.0864	Skalar

* 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 7.841

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F074	16.00	1.600	10	VLVLELVLVLLLEL	BIASED LOW	-22.53	-0.0696	UV Total N
F064	27.50	2.750	10	LLL	BIASED LOW*	-9.54	-0.0379	Kjedahl digest SIE
F022	33.00	3.300	10	LEL	BIASED LOW	-10.14	-0.0409	Colorimetry
F019	36.50	4.562	8	ELVL				Digest-Technicon
F014	41.00	5.125	8					
F069	48.00	6.000	8	L				Colorim, Blk Dig
F003	69.50	6.950	10					Block digestion
F063	70.00	7.000	10					auto kjeldahl
F092	23.00	7.667	3		INSUFFICIENT DATA			Digest - Technicon
F032	92.00	9.200	10	H				Colourimetry
F046	86.00	9.556	9	H				Dig-Dist-Color
F094	115.00	11.500	10	VHHVH				Colorimetry
F095	118.00	11.800	10	VHVHH	BIASED HIGH*	-3.98	0.0864	Skalar
F025	120.00	12.000	10	HHEHHH	BIASED HIGH*	-5.43	0.1947	Block Dig Phenate
F008	127.00	12.700	10	VHVHHVHH	BIASED HIGH*	2.14	0.0858	Auto FIA Color
F006	114.50	12.722	9	HHEHEHEHEHEHH	BIASED HIGH	-12.68	0.2272	Block dig

* 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 7.841

PARAMETER: 07293 Total N mg/L N

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.0500 BASIC ACCEPTABLE ERROR= 0.0500 CONCENTRATION ERROR INCREMENT= 0.1500

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	0.44	11.00	0.66	6.00	0.17 EL	1.00	2.39	3.50	4.09	13.00	0.69 L	2.00
F003	0.420	6.50	0.686	9.00	0.313	5.00	2.39	3.50	3.60	4.50	0.878	9.00
F004	0.412	4.00	0.666	7.00	0.320	7.00	2.49	9.00	3.64	6.00	0.828	5.00
F010	0.40	3.00	0.61	3.00	0.25	3.00	2.6	12.00	3.8	10.00	0.79	3.00
F015	0.42	6.50	0.63	4.00	0.33	9.00	2.4	5.00	3.6	4.50	0.97	10.00
F025	0.468	13.00	0.745	13.00	1.36 EH	14.00	2.64	13.00	3.81	11.00	1.01	12.00
F026	0.4275	8.00	0.6533	5.00	0.3274	8.00	2.4700	7.50	3.5808	3.00	0.8616	7.00
F042	0.436	9.00	0.694	10.00	0.368	10.00	2.47	7.50	4.38 EH	14.00	0.868	8.00
F046	0.416	5.00	0.729	11.00	0.382	12.00	2.869 EH	14.00	3.940	12.00	0.974	11.00
F074	0.370	2.00	0.585	2.00	0.300	4.00	2.250	2.00	3.360	2.00	0.815	4.00
F074m	0.159 EL	1.00	0.514 EL	1.00	0.243	2.00	1.723 EL	1.00	2.090 EL	1.00	0.635 L	1.00
F094	0.44	11.00	0.74	12.00	0.38	11.00	2.55	10.00	3.74	8.00	1.08 H	14.00
F095	0.50 EH	14.00	0.80	14.00	0.39	13.00	2.56	11.00	3.69	7.00	1.03	13.00
F113	0.44	11.00	0.685	8.00	0.315	6.00	2.455	6.00	3.754	9.00	0.843	6.00
MEDIAN	0.4237		0.6755		0.3237		2.4700		3.7150		0.8648	
1CRIT	0.1061		0.1438		0.0911		0.4130		0.5998		0.1722	
N	12		12		12		12		12		12	
MEAN	0.4241		0.6736		0.3265		2.4721		3.7171		0.8798	
3STDEV	0.0703		0.1442		0.1385		0.3086		0.5383		0.2863	

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	0.16 EL	1.00	0.29 EL	1.00	0.30 EL	1.00	0.87 L	2.00
F003	0.429	7.00	0.712	6.00	0.700	10.00	1.07	6.00
F004	0.420	6.00	0.710	5.00	0.680	5.50	1.08	7.00
F010	0.23 VL	2.00	0.38 VL	2.00	0.50 L	3.00	0.88 L	3.00
F015	0.45	9.00	0.73	8.00	0.68	5.50	1.1	8.00
F025	0.577 H	14.00	0.871	14.00	0.797	11.00	1.30 H	13.00
F026	0.4542	10.00	0.7382	9.00	0.6948	8.00	1.1279	10.00
F042	0.467	11.00	0.744	10.00	0.698	9.00	1.05	4.00
F046	0.441	8.00	0.866	13.00	0.850 H	13.50	1.422 VH	14.00
F074	0.390	4.00	0.650	4.00	0.610	4.00	1.060	5.00
F074m	0.267 VL	3.00	0.539 L	3.00	0.455 VL	2.00	0.783 L	1.00
F094	0.51	12.00	0.84	12.00	0.83	12.00	1.22	11.50
F095	0.52	13.00	0.82	11.00	0.85 H	13.50	1.22	11.50
F113	0.418	5.00	0.725	7.00	0.690	7.00	1.119	9.00
MEDIAN	0.4350		0.7275		0.6924		1.0900	
1CRIT	0.1077		0.1516		0.1464		0.2060	
N	12		12		11		12	
MEAN	0.4164		0.7045		0.6668		1.0914	
3STDEV	0.2497		0.3847		0.3175		0.3631	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	41.50	4.150	10	EL L ELELELL				07601
F003	66.50	6.650	10					Autclave digestion
F004	61.50	6.150	10					07657
F010	44.00	4.400	10	VLVLL L				Hydrazine SO4
F015	69.50	6.950	10					perSO4 dig autocol
F025	128.00	12.800	10	EH H H	BIASED HIGH*	-6.51	0.2904	Calculation
F026	75.50	7.550	10					AUTOCLAVE-AUTOANAL
F042	92.50	9.250	10	EH				Persulfate Digest
F046	113.50	11.350	10	EH H VH	BIASED HIGH*	8.03	0.0555	Calculation
F074	33.00	3.300	10		BIASED LOW*	-9.21	0.0024	UV Autoanal NH4
F074m	16.00	1.600	10	ELEL ELELL VLL VLL	BIASED LOW	-41.52	0.0731	UV Dig Colour NH4
F094	113.50	11.350	10	H	BIASED HIGH*	-1.35	0.1066	Calculation
F095	121.00	12.100	10	EH H	BIASED HIGH*	-3.11	0.1317	Calculation
F113	74.00	7.400	10					Persulfate-FIA

* 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 7.500

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F074m	16.00	1.600	10	ELELELELLVLLVLL	BIASED LOW	-41.52	0.0731	UV Dig Colour NH4
F074	33.00	3.300	10		BIASED LOW*	-9.21	0.0024	UV Autoanal NH4
F002	41.50	4.150	10	ELLELELELL				07601
F010	44.00	4.400	10	VLVLLL				Hydrazine SO4
F004	61.50	6.150	10					07657
F003	66.50	6.650	10					Autclave digestion
F015	69.50	6.950	10					perSO4 dig autocol
F113	74.00	7.400	10					Persulfate-FIA
F026	75.50	7.550	10					AUTOCLAVE-AUTOANAL
F042	92.50	9.250	10	EH				Persulfate Digest
F046	113.50	11.350	10	EHHVH	BIASED HIGH*	8.03	0.0555	Calculation
F094	113.50	11.350	10	H	BIASED HIGH*	-1.35	0.1066	Calculation
F095	121.00	12.100	10	EHH	BIASED HIGH*	-3.11	0.1317	Calculation
F025	128.00	12.800	10	EHHH	BIASED HIGH*	-6.51	0.2904	Calculation

* 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 7.500

PARAMETER: 09092 Fluoride mg/L

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.0200 BASIC ACCEPTABLE ERROR= 0.0200 CONCENTRATION ERROR INCREMENT= 0.1000

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	0.04	10.00	0.61	19.50	0.20	18.50	0.37	19.00	0.19	10.00	0.17	15.00
F006	<0.1	0.00	0.6	15.50	0.2	18.50	0.4	25.50	0.2	16.50	0.2 H	20.50
F008	0.1 VH	19.00	0.62	23.00	0.18	7.00	0.38	21.00	0.21	20.50	0.2 H	20.50
F009	0.04	10.00	0.65	27.00	0.21	23.00	0.4	25.50	0.22	23.00	0.19	18.00
F010	0.09 VH	17.50	0.68 H	28.00	0.23	26.00	0.45 VH	29.00	0.25 H	27.00	0.21 H	24.00
F011	0.07 H	15.50	0.69 H	29.00	0.24 H	27.00	0.41	27.00	0.24 H	25.50	0.2 H	20.50
F014	<0.100	0.00	0.602	17.00	0.194	14.00	0.362	16.50	0.196	12.00	0.163	13.00
F015	0.03	4.50	0.53	3.50	0.19	12.00	0.18 EL	2.00	0.09 EL	2.00	0.1 VL	2.00
F019	<0.05	0.00	0.59	10.50	0.19	12.00	0.39	23.00	0.22	23.00	0.24 VH	26.00
F022	0.03	4.50	0.57	6.50	0.18	7.00	0.35	8.50	0.2	16.50	0.16	10.00
F025	0.20 EH	20.00	0.63	24.50	0.30 EH	28.00	0.44 H	28.00	0.29 VH	28.00	0.25 VH	27.00
F031	0.03	4.50	0.59	10.50	0.18	7.00	0.36	13.00	0.19	10.00	0.16	10.00
F032	<0.03	0.00	0.59	10.50	0.18	7.00	0.36	13.00	0.18	7.00	0.15	7.00
F037	0.0668 H	14.00	0.5780	8.00	0.206	22.00	0.344	6.00	0.363 EH	29.00	0.164	14.00
F038	0.06	13.00	0.61	19.50	0.2	18.50	0.39	23.00	0.22	23.00	0.2 H	20.50
F046	<0.05	0.00	0.569	5.00	0.127 EL	2.00	0.322	5.00	0.185	8.00	0.188	17.00
F048	0.030	4.50	0.59	10.50	0.18	7.00	0.36	13.00	0.20	16.50	0.15	7.00
F063	<0.10	0.00	0.38 EL	1.00	0.16	3.00	0.32	4.00	0.17	4.50	0.14	4.00
F064	0.09 VH	17.50	0.64	26.00	0.22	24.50	0.37	19.00	0.24 H	25.50	0.21 H	24.00
F068	0.030	4.50	0.619	22.00	0.187	10.00	0.352	10.00	0.166	3.00	0.129 L	3.00
F069	<0.1	0.00	0.595	14.00	0.195	15.00	0.362	16.50	0.199	13.00	0.161	12.00
F080	0.04	10.00	0.61	19.50	0.20	18.50	0.37	19.00	0.20	16.50	0.16	10.00
F094	0.07 H	15.50	0.63	24.50	0.22	24.50	0.36	13.00	0.2	16.50	0.21 H	24.00
F095	0.04	10.00	0.61	19.50	0.19	12.00	0.36	13.00	0.19	10.00	0.15	7.00
F103	<0.2	0.00	0.53	3.50	<0.2	0.00	0.39	23.00	0.21	20.50	<0.2	0.00
F113	0. VL	1.00	0.388 EL	2.00	0.032 EL	1.00	0. EL	1.00	0.032 EL	1.00	0. EL	1.00
F133	0.030	4.50	0.594	13.00	0.170	4.00	0.346	7.00	0.179	6.00	0.143	5.00
F135	<0.2	0.00	0.6	15.50	0.2	18.50	0.3 L	3.00	0.2	16.50	<0.2	0.00
F139	0.04	10.00	0.57	6.50	0.20	18.50	0.35	8.50	0.17	4.50	0.18	16.00
MEDIAN	0.0400		0.6000		0.1945		0.3600		0.2000		0.1640	
1CRIT	0.0220		0.0780		0.0375		0.0540		0.0380		0.0344	
N	18		27		26		27		27		25	
MEAN	0.0515		0.5924		0.1934		0.3592		0.2002		0.1731	
3STDEV	0.0698		0.1531		0.0662		0.1357		0.1027		0.0925	

PARAMETER: 09092 Fluoride mg/L

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	0.17	16.00	0.17	18.00	0.14	16.50	0.15	18.00
F006	0.2	21.00	0.2 H	22.50	0.1 L	2.00	0.1 L	2.00
F008	0.22 VH	25.50	0.17	18.00	0.13	11.00	0.13	8.00
F009	0.18	18.50	0.13	3.00	0.15	20.00	0.17	21.00
F010	0.21 H	23.50	0.20 H	22.50	0.18 VH	22.00	0.19 VH	22.50
F011	0.2	21.00	0.17	18.00	0.16	21.00	0.16	20.00
F014	0.164	13.00	0.164	15.00	0.135	14.00	0.142	15.00
F015	0.1 VL	2.00	0.1 VL	2.00	<0.01 EL	0.00	<0.01 EL	0.00
F019	0.11 VL	3.00	0.25 VH	27.00	0.12	6.50	0.12	5.00
F022	0.16	10.00	0.16	11.00	0.12	6.50	0.13	8.00
F025	0.25 VH	27.00	0.23 VH	26.00	0.21 VH	24.50	0.21 VH	26.00
F031	0.16	10.00	0.17	18.00	0.13	11.00	0.14	12.50
F032	0.15	7.50	0.15	7.50	0.13	11.00	0.13	8.00
F037	0.164	13.00	0.184	21.00	0.146	19.00	0.148	16.00
F038	0.21 H	23.50	0.22 VH	24.50	0.21 VH	24.50	0.2 VH	24.50
F046	0.275 EH	28.00	0.146	6.00	0.222 VH	26.00	0.218 VH	27.00
F048	0.15	7.50	0.15	7.50	0.13	11.00	0.14	12.50
F063	0.13 L	4.00	0.16	11.00	0.11	4.00	0.11	4.00
F064	0.22 VH	25.50	0.22 VH	24.50	0.19 VH	23.00	0.19 VH	22.50
F068	0.135	5.00	0.145	5.00	0.104	3.00	0.109	3.00
F069	0.164	13.00	0.162	14.00	0.127	8.00	0.133	10.00
F080	0.16	10.00	0.16	11.00	0.13	11.00	0.14	12.50
F094	0.17	16.00	0.17	18.00	0.14	16.50	0.14	12.50
F095	0.18	18.50	0.16	11.00	0.14	16.50	0.15	18.00
F103	<0.2	0.00	<0.2	0.00	<0.2	0.00	0.20 VH	24.50
F113	0.036 EL	1.00	0.086 VL	1.00	0. EL	1.00	0. EL	1.00
F133	0.145	6.00	0.143	4.00	0.116	5.00	0.121	6.00
F135	0.2	21.00	<0.2	0.00	<0.2	0.00	<0.2	0.00
F139	0.17	16.00	0.16	11.00	0.14	16.50	0.15	18.00
MEDIAN	0.1670		0.1620		0.1325		0.1400	
1CRIT	0.0347		0.0342		0.0312		0.0320	
N	26		25		24		25	
MEAN	0.1720		0.1678		0.1412		0.1481	
3STDEV	0.1028		0.0855		0.0872		0.0884	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	160.50	16.050	10					Automated ISE
F006	144.00	16.000	9	H H L L				Electrode
F008	173.50	17.350	10	VH H VH				Auto FIA Color
F009	189.00	18.900	10					Technicon
F010	242.00	24.200	10	VHH VHH H H H VHVH	BIASED HIGH	8.61	0.0344	Alizarin
F011	224.50	22.450	10	H H H H H	BIASED HIGH	12.29	0.0114	
F014	129.50	14.389	9					
F015	30.00	3.750	8	ELELVLVLVLELEL	BIASED LOW	-13.63	-0.0388	ICA, V1.2
F019	136.00	15.111	9	VHVLVH				Ion Chromatograph
F022	88.50	8.850	10					IC
F025	259.00	25.900	10	EH EHH VHVHVHVHVHVH	BIASED HIGH	-14.88	0.1171	Ion Sel Elect Auto
F031	106.50	10.650	10					SIE
F032	78.50	8.722	9					Colourimetry
F037	162.00	16.200	10	H EH				Electrode
F038	214.50	21.450	10	H H VHVHVH				ION CHROMATOGRAPHY
F046	124.00	13.778	9	EL EH VHVH				Ion Chromatography
F048	97.00	9.700	10					Electrode
F063	39.50	4.389	9	EL L	BIASED LOW	-39.24	0.0436	ISE
F064	232.00	23.200	10	VH H H VHVHVHVH	BIASED HIGH*	-4.49	0.0527	IC
F068	68.50	6.850	10	L	BIASED LOW	8.00	-0.0357	IC, Dionex
F069	115.50	12.833	9					Ion Spec Electrode
F080	138.00	13.800	10					Ion Spec. Electr.
F094	181.00	18.100	10	H H				ISE
F095	135.50	13.550	10					IC
F103	71.50	17.875	4	VH	INSUFFICIENT DATA			Ion Chromatography
F113	11.00	1.100	10	VLELELELELELELVLELEL	BIASED LOW	-35.93	-0.0810	IC, Dionex
F133	60.50	6.050	10		BIASED LOW*	1.96	-0.0215	I.S.E.
F135	74.50	14.900	5	L				APHA 4500-F-C
F139	125.50	12.550	10					IC

* 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 14.119

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F113	11.00	1.100	10	VLELELELELELELVLELEL	BIASED LOW	-35.93	-0.0810	IC, Dionex
F015	30.00	3.750	8	ELELVLVLVLELEL	BIASED LOW	-13.63	-0.0388	ICA, V1.2
F063	39.50	4.389	9	ELL	BIASED LOW	-39.24	0.0436	ISE
F133	60.50	6.050	10		BIASED LOW*	1.96	-0.0215	I.S.E.
F068	68.50	6.850	10	L	BIASED LOW	8.00	-0.0357	IC, Dionex
F032	78.50	8.722	9					Colourimetry
F022	88.50	8.850	10					IC
F048	97.00	9.700	10					Electrode
F031	106.50	10.650	10					SIE
F139	125.50	12.550	10					IC
F069	115.50	12.833	9					Ion Spec Electrode
F095	135.50	13.550	10					IC
F046	124.00	13.778	9	ELEHVHVH				Ion Chromatography
F080	138.00	13.800	10					Ion Spec. Electr.
F014	129.50	14.389	9					
F135	74.50	14.900	5	L				APHA 4500-F-C
F019	136.00	15.111	9	VHVLVH				Ion Chromatograph
F006	144.00	16.000	9	HHLL				Electrode
F003	160.50	16.050	10					Automated ISE
F037	162.00	16.200	10	HEH				Electrode
F008	173.50	17.350	10	VHHVH				Auto FIA Color
F103	71.50	17.875	4	VH	INSUFFICIENT DATA			Ion Chromatography
F094	181.00	18.100	10	HH				ISE
F009	189.00	18.900	10					Technicon
F038	214.50	21.450	10	HHVHVHVH				ION CHROMATOGRAPHY
F011	224.50	22.450	10	HHHHH	BIASED HIGH	12.29	0.0114	
F064	232.00	23.200	10	VHHHVHVHVHVH	BIASED HIGH*	-4.49	0.0527	IC
F010	242.00	24.200	10	VHHVHHHHHVHVH	BIASED HIGH	8.61	0.0344	Alizarin
F025	259.00	25.900	10	EHEHHVHVHVHVHVHVH	BIASED HIGH	-14.88	0.1171	Ion Sel Elect Auto

* 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 14.119

Fluoride

PARAMETER: 11091 Sodium mg/L

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= 0.5000 CONCENTRATION ERROR INCREMENT= 0.0400

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	1.37	25.00	14.01	33.00	10.84	10.00	34.93	17.00	10.23	16.00	13.11	16.00
F003	1.34	21.50	13.4	20.00	11.1	17.00	35.5	21.00	10.5	24.00	13.5	23.50
F006	1.	2.50	14.	31.00	12.	34.00	36.	28.00	11.	34.00	14.	29.50
F007	1.40	30.00	13.7	28.50	11.5	29.00	34.7	15.50	10.6	27.00	13.6	26.00
F008	1.4	30.00	14.	31.00	12.	34.00	36.	28.00	11.	34.00	13.	13.50
F009	1.2	4.50	11.3 VL	1.00	9.8 VL	2.00	29.8 EL	1.00	9. VL	1.00	13.6	26.00
F010	1.23	7.00	13.54	24.00	10.91	13.00	34.6	13.50	10.81	31.00	14.16	32.00
F011	1.38	26.00	12.9	10.00	10.8	9.00	33.3	5.50	10.	11.00	12.3	6.00
F012	1.30	16.00	13.52	23.00	11.34	22.00	36.31	30.00	10.82	32.00	14.22	33.00
F014	1.35	23.00	13.4	20.00	11.4	24.50	35.9	25.50	10.3	17.50	13.3	20.50
F015	1.3	16.00	13.6	25.50	11.4	24.50	35.9	25.50	10.5	24.00	13.4	22.00
F019	1.4	30.00	13.6	25.50	11.5	29.00	36.	28.00	10.5	24.00	13.5	23.50
F022	1.4	30.00	12.6	8.00	10.6	7.50	33.7	8.00	10.1	13.50	12.8	11.00
F025	1.20	4.50	14.8 H	36.00	12.1	36.00	38.2 VH	36.00	11.2 H	36.00	14.0	29.50
F026	1.329	18.00	11.505 VL	2.00	10.595	6.00	34.255	12.00	9.953	9.00	11.705 VL	1.00
F031	1.6	35.50	15.5 EH	37.00	12.2 H	37.00	39.7 VH	37.00	12.4 EH	37.00	16.4 EH	37.00
F032	1.33	19.50	14.0	31.00	11.9	32.00	37.4 H	33.00	10.7	28.50	13.7	28.00
F036	1.34	21.50	13.4	20.00	11.3	20.50	35.7	23.00	10.2	15.00	13.0	13.50
F037	1.228	6.00	12.76	9.00	10.90	12.00	30.51 VL	2.00	9.799	8.00	12.05 L	4.00
F038	1.26	11.50	13.2	16.00	11.4	24.50	33.9	10.00	10.	11.00	12.6	10.00
F042	1.33	19.50	14.2	34.00	11.4	24.50	34.7	15.50	10.5	24.00	14.5 H	34.00
F046	1.43	34.00	13.5	22.00	11.5	29.00	35.8	24.00	10.5	24.00	13.3	20.50
F048	1.40	30.00	13.7	28.50	11.6	31.00	35.6	22.00	10.8	30.00	14.8 VH	35.00
F063	1.26	11.50	12.4 L	6.00	10.4	4.50	33.5	7.00	9.6	5.00	12.4	8.00
F064	1.27	13.00	12.2 L	5.00	10.4	4.50	36.5	31.00	9.39 L	2.00	11.9 L	2.00
F068	1.283	14.00	12.97	11.00	10.89	11.00	33.85	9.00	9.787	7.00	12.33	7.00
F069	1.36	24.00	13.3	17.50	11.1	17.00	34.2	11.00	10.1	13.50	13.0	13.50
F074	1.25	9.50	12.00 L	4.00	10.30	3.00	32.40 L	3.00	9.45	4.00	12.10 L	5.00
F080	1.24	8.00	12.5	7.00	10.6	7.50	33. L	4.00	9.7	6.00	12.5	9.00
F092	1.40	30.00	13.30	17.50	11.30	20.50	35.00	19.00	10.40	21.00	13.20	17.50
F093	1.82 EH	37.00	13.18	15.00	11.08	15.00	36.83	32.00	10.70	28.50	15.02 VH	36.00
F094	1.	2.50	13.	12.00	11.	14.00	35.	19.00	10.	11.00	13.	13.50
F095	1.3	16.00	13.1	14.00	11.2	19.00	35.0	19.00	10.3	17.50	13.2	17.50
F103	1.60	35.50	14.4 H	35.00	12.0	34.00	37.6 H	35.00	11.0	34.00	14.1	31.00
F133	1.25	9.50	13.05	13.00	11.10	17.00	34.60	13.50	10.38	20.00	13.60	26.00
F135	1.4	30.00	11.8 VL	3.00	9.3 EL	1.00	33.3	5.50	9.4 L	3.00	12.0 L	3.00
F139	0.76 EL	1.00	13.61	27.00	11.48	27.00	37.55 H	34.00	10.32	19.00	13.25	19.00
MEDIAN	1.3300		13.4000		11.2000		35.0000		10.3200		13.2500	
1CRIT	0.5132		0.9960		0.9080		1.8600		0.8728		0.9900	
N	35		35		35		35		35		35	
MEAN	1.3180		13.2613		11.1639		35.0639		10.3011		13.2583	
3STDEV	0.3592		2.1545		1.5762		4.7480		1.4250		2.3521	

PARAMETER: 11091 Sodium mg/L

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	59.65	17.00	62.67	17.00	65.80	18.50	89.58	21.00
F003	63.8 H	35.00	66.0 H	31.00	68.2	30.00	91.7	25.00
F006	61.	24.00	61.	8.50	67.	26.50	90.	22.00
F007	61.0	24.00	64.5	26.00	66.0	21.50	88.7	16.00
F008	60.	19.00	63.	20.00	67.	26.50	92.	26.50
F009	63. H	33.00	67. H	37.00	66.	21.50	92.	26.50
F010	60.0	19.00	62.2	14.00	65.5	16.00	90.6	23.00
F011	56.6 L	6.00	60.5	6.00	62.8	7.50	82.9 VL	7.00
F012	63.95 H	36.00	65.09	28.00	70.45 VH	37.00	92.43	28.00
F014	61.1	26.50	64.2	24.00	67.5	28.00	92.7	31.00
F015	61.1	26.50	64.3	25.00	65.8	18.50	92.5	30.00
F019	60.5	21.00	64.	23.00	66.1	23.00	91.3	24.00
F022	57.4	9.00	60.6	7.00	63.	9.50	87.	11.00
F025	61.7	29.00	66.2 H	32.00	52.4 EL	2.00	71.5 EL	2.00
F026	51.800 VL	2.00	62.885	19.00	65.215	15.00	86.630	8.00
F031	65.9 VH	37.00	66.7 H	35.00	70.0 H	35.00	99.3 VH	37.00
F032	58.6	12.00	61.2	10.00	64.8	13.00	87.4	12.00
F036	60.0	19.00	63.3	21.00	66.3	24.00	89.1	18.00
F037	47.90 EL	1.00	54.60 VL	2.00	58.54 VL	3.00	76.59 VL	3.00
F038	59.5	16.00	61.8	12.00	62.8	7.50	87.5	13.50
F042	55.8 L	5.00	62.7	18.00	65.6	17.00	86.9	10.00
F046	60.6	22.00	63.4	22.00	66.6	25.00	89.4	20.00
F048	61.6	28.00	65.8	29.50	68.5	31.00	93.1	33.00
F063	57.6	10.00	61.0	8.50	63.0	9.50	86.7	9.00
F064	59.3	15.00	33.8 EL	1.00	43.9 EL	1.00	62.4 EL	1.00
F068	56.98 L	7.00	61.39	11.00	64.5	12.00	88.87	17.00
F069	58.4	11.00	61.9	13.00	64.4	11.00	87.5	13.50
F074	55.30 VL	4.00	57.80 VL	4.00	59.80 VL	4.50	82.50 VL	6.00
F080	57. L	8.00	58. VL	5.00	60. VL	6.00	81. VL	4.00
F092	59.20	14.00	62.30	15.00	65.90	20.00	89.20	19.00
F093	62.10	31.00	66.44 H	34.00	68.65	32.00	92.47	29.00
F094	61.	24.00	65.	27.00	68.	29.00	93.	32.00
F095	59.0	13.00	62.4	16.00	65.0	14.00	87.7	15.00
F103	62.8	32.00	66.8 H	36.00	69.4 H	34.00	94.0 H	35.00
F133	61.9	30.00	65.8	29.50	69.1 H	33.00	93.3 H	34.00
F135	53.8 VL	3.00	57.7 VL	3.00	59.8 VL	4.50	82.3 VL	5.00
F139	63.77 H	34.00	66.42 H	33.00	70.23 H	36.00	95.77 VH	36.00
MEDIAN	60.0000		62.8850		65.8000		89.2000	
1CRIT	2.8600		2.9754		3.0920		4.0280	
N	35		35		35		35	
MEAN	59.6243		62.8456		65.1210		88.4526	
3STDEV	8.3369		8.5093		10.8185		14.9818	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	190.50	19.050	10					11103
F003	248.00	24.800	10	H H				ICP-OES
F006	240.00	24.000	10					ICP
F007	243.50	24.350	10					CPQ116E0
F008	262.50	26.250	10					ICP
F009	153.50	15.350	10	VLVLELVL H H				ICP-MS
F010	192.50	19.250	10					ICP-OES
F011	94.00	9.400	10	L VL				
F012	285.00	28.500	10	H VH				ICP-MS
F014	240.50	24.050	10					ICP-OES
F015	237.50	23.750	10					ICP
F019	251.00	25.100	10					ICAP
F022	114.50	11.450	10					ICP-AES
F025	243.00	24.300	10	H VHH H ELEL				ICP
F026	92.00	9.200	10	VL VLVL				FLAME AA
F031	364.50	36.450	10	EHH VHEHEHVHH H VH	BIASED HIGH	8.05	0.8130	ICP
F032	219.00	21.900	10	H				AAS
F036	195.50	19.550	10					AAS
F037	50.00	5.000	10	VL L ELVLVLVL	BIASED LOW	-15.47	0.8553	ICP-MS
F038	132.00	13.200	10					FAES
F042	201.50	20.150	10	H L				Flame AA, Air
F046	242.50	24.250	10					ICAP
F048	298.00	29.800	10	VH	BIASED HIGH*	3.92	0.0316	IC
F063	79.00	7.900	10	L	BIASED LOW*	-2.78	-0.4445	FAA
F064	75.50	7.550	10	L L L ELELEL	BIASED LOW	-32.33	3.5848	AA
F068	106.00	10.600	10	L				IC, Dionex
F069	145.00	14.500	10					ICP
F074	47.00	4.700	10	L L L VLVLVLVL	BIASED LOW	-7.86	-0.1000	AAS
F080	64.50	6.450	10	L L VLVLVL	BIASED LOW	-8.60	0.4310	FAA no digestion
F092	193.50	19.350	10					Atomic Emission
F093	289.50	28.950	10	EH VH H				ICP
F094	184.00	18.400	10					ICP
F095	161.00	16.100	10					IC
F103	341.50	34.150	10	H H H H H	BIASED HIGH	5.15	0.2656	ICP-OES
F133	225.50	22.550	10	H H				ICP-MS
F135	61.00	6.100	10	VLEL L L VLVLVLVL	BIASED LOW	-8.12	-0.2163	APHA 3500-Na B
F139	266.00	26.600	10	EL H H H H H VH				ICP-OES

* 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 19.000

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F074	47.00	4.700	10	LLLVLVLVLVL	BIASED LOW	-7.86	-0.1000	AAS
F037	50.00	5.000	10	VLLELVLVLVL	BIASED LOW	-15.47	0.8553	ICP-MS
F135	61.00	6.100	10	VLELLLVLVLVLVL	BIASED LOW	-8.12	-0.2163	APHA 3500-Na B
F080	64.50	6.450	10	LLVLVLVL	BIASED LOW	-8.60	0.4310	FAA no digestion
F064	75.50	7.550	10	LLLELELEL	BIASED LOW	-32.33	3.5848	AA
F063	79.00	7.900	10	L	BIASED LOW*	-2.78	-0.4445	FAA
F026	92.00	9.200	10	VLVLVL				FLAME AA
F011	94.00	9.400	10	LVL				
F068	106.00	10.600	10	L				IC, Dionex
F022	114.50	11.450	10					ICP-AES
F038	132.00	13.200	10					FAES
F069	145.00	14.500	10					ICP
F009	153.50	15.350	10	VLVLELVLHH				ICP-MS
F095	161.00	16.100	10					IC
F094	184.00	18.400	10					ICP
F002	190.50	19.050	10					11103
F010	192.50	19.250	10					ICP-OES
F092	193.50	19.350	10					Atomic Emission
F036	195.50	19.550	10					AAS
F042	201.50	20.150	10	HL				Flame AA, Air
F032	219.00	21.900	10	H				AAS
F133	225.50	22.550	10	HH				ICP-MS
F015	237.50	23.750	10					ICP
F006	240.00	24.000	10					ICP
F014	240.50	24.050	10					ICP-OES
F046	242.50	24.250	10					ICAP
F025	243.00	24.300	10	HVHHHELEL				ICP
F007	243.50	24.350	10					CPQ116E0
F003	248.00	24.800	10	HH				ICP-OES
F019	251.00	25.100	10					ICAP
F008	262.50	26.250	10					ICP
F139	266.00	26.600	10	ELHHHHVH				ICP-OES
F012	285.00	28.500	10	HVH				ICP-MS
F093	289.50	28.950	10	EHVHH				ICP
F048	298.00	29.800	10	VH	BIASED HIGH*	3.92	0.0316	IC
F103	341.50	34.150	10	HHHHH	BIASED HIGH	5.15	0.2656	ICP-OES
F031	364.50	36.450	10	EHHVHEHEHVHHHVH	BIASED HIGH	8.05	0.8130	ICP

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

OVERALL AVERAGE
RANK IS 19.000

PARAMETER: 19091 Potassium mg/L

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.5000 BASIC ACCEPTABLE ERROR= 0.1000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	0.46	6.00	1.75 VH	34.00	0.60	27.50	3.28	6.00	1.64	20.00	1.46	5.00
F003	0.51	26.50	1.45	16.00	0.59	23.00	3.69	28.00	1.64	20.00	1.59	16.00
F006	0.5	18.00	1.5	24.50	0.6	27.50	3.5	17.00	1.6	12.50	1.6	18.50
F007	0.502	24.00	1.60	31.50	0.618	31.00	3.75	31.00	1.76	31.00	1.73	31.00
F008	0.49	9.00	1.5	24.50	0.59	23.00	3.6	24.00	1.7	27.00	1.7	28.50
F009	0.44	4.00	1.29 L	4.00	0.51	7.50	3.05 VL	2.00	1.42 L	4.00	1.41 L	4.00
F010	0.44	4.00	1.54	30.00	0.57	14.50	4.14 VH	35.00	1.78	32.00	1.78 H	32.00
F011	0.486	7.00	1.39	6.00	0.566	12.50	3.31	8.00	1.56	8.00	1.54	9.50
F012	0.49	9.00	1.68 H	33.00	0.70 H	33.50	3.86 H	32.00	1.93 VH	34.00	1.93 VH	34.00
F014	0.533	31.00	1.44	14.50	0.478	5.00	3.59	22.00	1.89 VH	33.00	1.48	6.00
F015	0.5	18.00	1.6	31.50	0.6	27.50	3.7	29.50	1.7	27.00	1.7	28.50
F019	<1.	0.00	1. EL	1.00	<1.	0.00	36. EH	36.00	10. EH	36.00	13. EH	36.00
F022	0.52	28.50	1.44	14.50	0.58	18.50	3.49	14.50	1.59	10.50	1.58	14.50
F025	<0.2 EL	0.00	1.41	11.50	0.45 L	3.00	3.95 VH	34.00	2.22 EH	35.00	2.07 EH	35.00
F026	0.492	11.00	1.406	9.00	0.554	10.00	3.298	7.00	1.586	9.00	1.542	11.00
F031	0.6 EH	33.50	2.0 EH	35.00	0.7 H	33.50	3.9 H	33.00	1.7	27.00	1.8 H	33.00
F032	0.49	9.00	1.41	11.50	0.55	9.00	3.48	12.50	1.59	10.50	1.56	12.50
F036	0.505	25.00	1.47	18.00	0.56	11.00	3.49	14.50	1.64	20.00	1.60	18.50
F037	0.3978 EL	2.00	1.342	5.00	0.4723 L	4.00	3.254	4.00	1.418 L	3.00	1.374 L	3.00
F038	0.5	18.00	1.49	19.50	0.58	18.50	3.62	26.00	1.71	30.00	1.63	23.50
F042	0.50	18.00	1.50	24.50	0.58	18.50	3.60	24.00	1.63	17.00	1.63	23.50
F046	0.54	32.00	1.51	29.00	0.64	32.00	3.57	21.00	1.65	22.50	1.63	23.50
F048	0.521	30.00	2.19 EH	36.00	0.588	21.00	3.63	27.00	1.67	24.00	1.71	30.00
F063	0.51	26.50	1.46	17.00	0.57	14.50	3.45	11.00	1.61	14.50	1.56	12.50
F064	0.44	4.00	1.12 VL	3.00	0.51	7.50	2.88 VL	1.00	1.39 L	2.00	1.64	26.50
F068	0.494	12.00	1.395	7.00	0.566	12.50	3.277	5.00	1.549	7.00	1.518	8.00
F069	0.495	13.00	1.50	24.50	0.573	16.00	3.52	19.00	1.61	14.50	1.58	14.50
F074	0.50	18.00	1.50	24.50	0.60	27.50	3.50	17.00	1.63	17.00	1.64	26.50
F080	0.52	28.50	1.50	24.50	0.59	23.00	3.7	29.50	1.60	12.50	1.54	9.50
F092	0.50	18.00	1.49	19.50	1.38 EH	35.00	3.53	20.00	1.65	22.50	1.62	21.00
F093		0.00		0.00		0.00		0.00		0.00		0.00
F094	0.5	18.00	1.5	24.50	0.6	27.50	3.6	24.00	1.7	27.00	1.6	18.50
F095	0.6 EH	33.50	1.5	24.50	0.6	27.50	3.5	17.00	1.7	27.00	1.6	18.50
F103	0.3 EL	1.00	1.1 VL	2.00	0.4 VL	2.00	3.2 L	3.00	1.2 EL	1.00	1.0 EL	1.00
F133	0.50	18.00	1.43	13.00	0.58	18.50	3.48	12.50	1.63	17.00	1.63	23.50
F135	0.5	18.00	1.4	8.00	0.5	6.00	3.4	10.00	1.5	5.00	1.5	7.00
F139	0.501	23.00	1.407	10.00	0.299 EL	1.00	3.397	9.00	1.512	6.00	1.232 VL	2.00
MEDIAN	0.5000		1.4800		0.5800		3.5100		1.6350		1.6000	
1CRIT	0.1000		0.1588		0.1048		0.2806		0.1681		0.1660	
N	31		34		33		34		34		34	
MEAN	0.4928		1.4712		0.5686		3.5384		1.6501		1.6090	
3STDEV	0.0869		0.4590		0.1828		0.6625		0.4490		0.4437	

PARAMETER: 19091 Potassium mg/L

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	8.23	15.00	8.70	10.50	10.25	22.00	11.65	10.00
F003	9.32 VH	33.00	9.70 H	34.00	11.1 H	33.50	13.1 H	34.00
F006	8.2	10.50	8.6	6.50	9.9	8.00	11.9	14.00
F007	9.12 H	32.00	9.33	29.00	10.7	31.00	12.7	32.50
F008	8.5	24.00	9.	21.50	10.	12.50	12.	17.50
F009	7.2 VL	2.00	9.	21.50	10.3	23.00	12.3	25.00
F010	10.81 EH	36.00	11.18 EH	36.00	13.11 EH	37.00	16.02 EH	37.00
F011	8.07	7.00	8.5	5.00	9.83	6.00	10.5 VL	3.00
F012	8.42	22.00	9.61 H	33.00	11.41 VH	36.00	14.30 VH	36.00
F014	9.60 VH	34.00	9.58 H	32.00	11.1 H	33.50	12.7	32.50
F015	8.7	28.00	9.2	27.50	10.4	24.50	12.5	27.00
F019	60. EH	37.00	64. EH	37.00	10.	12.50	12.	17.50
F022	8.2	10.50	8.6	6.50	9.98	10.00	12.	17.50
F025	8.73	30.00	9.37	30.00	6.28 EL	1.00	6.94 EL	1.00
F026	8.105	8.00	8.696	9.00	9.901	9.00	11.365	7.00
F031	8.0	5.00	8.3	2.00	9.8	5.00	11.9	14.00
F032	8.34	17.00	8.70	10.50	10.1	16.00	11.8	11.50
F036	8.22	14.00	8.74	13.00	10.1	16.00	11.9	14.00
F037	7.506 VL	3.00	8.453	4.00	9.314 L	3.00	11.19 L	5.00
F038	8.41	21.00	8.9	18.50	10.2	19.50	12.6	29.00
F042	8.63	27.00	8.77	14.00	11.4 VH	35.00	12.6	29.00
F046	8.46	23.00	9.03	23.00	10.4	24.50	12.1	20.50
F048	10.6 EH	35.00	9.08	24.00	10.5	27.00	12.4	26.00
F063	8.20	10.50	8.80	15.50	10.0	12.50	11.5	8.00
F064	6.84 VL	1.00	7.32 EL	1.00	8.29 EL	2.00	9.43 EL	2.00
F068	7.948	4.00	8.448	3.00	9.874	7.00	11.338	6.00
F069	8.21	13.00	8.72	12.00	10.2	19.50	11.8	11.50
F074	8.05	6.00	8.65	8.00	10.00	12.50	12.20	22.50
F080	8.6	26.00	9.1	25.50	9.7	4.00	11.1 L	4.00
F092	8.51	25.00	8.95	20.00	10.20	19.50	12.10	20.50
F093	8.78	31.00	9.86 VH	35.00	10.82	32.00	13.37 VH	35.00
F094	8.4	19.00	9.1	25.50	10.6	28.50	12.2	22.50
F095	8.3	16.00	8.8	15.50	10.1	16.00	12.0	17.50
F103	8.4	19.00	9.2	27.50	10.6	28.50	12.6	29.00
F133	8.40	19.00	8.88	17.00	10.43	26.00	12.28	24.00
F135	8.2	10.50	8.9	18.50	10.2	19.50	11.6	9.00
F139	8.720	29.00	9.382	31.00	10.660	30.00	12.640	31.00
MEDIAN	8.4000		8.9000		10.2000		12.0000	
1CRIT	0.5740		0.6040		0.6820		0.7900	
N	35		35		35		35	
MEAN	8.5168		9.0237		10.2388		12.0475	
3STDEV	2.0743		1.5667		1.7103		2.4451	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	156.00	15.600	10	VH				19103
F003	264.00	26.400	10	VHH H H				ICP-OES
F006	157.00	15.700	10					ICP
F007	304.00	30.400	10	H	BIASED HIGH	5.65	0.0248	CPQ107E2
F008	211.50	21.150	10					ICP
F009	97.00	9.700	10	L VLL L VL				ICP-MS
F010	293.50	29.350	10	VH H EHEHEHEH	BIASED HIGH	33.30	-0.3687	ICP-OES
F011	72.00	7.200	10	VL	BIASED LOW	-7.93	0.0819	
F012	302.50	30.250	10	H H H VHVH H VHVH	BIASED HIGH	12.26	-0.0459	ICP-MS
F014	243.50	24.350	10	VH VHH H				ICP-MS
F015	269.00	26.900	10					ICP
F019	213.00	26.625	8	EL EHEHEHEHEH				ICAP
F022	145.50	14.550	10					ICP-AES
F025	180.50	20.056	9	EL L VHEHEH ELEL				ICP
F026	90.00	9.000	10					FLAME AA
F031	221.00	22.100	10	EHEHH H H				ICP
F032	120.00	12.000	10					AAS
F036	164.00	16.400	10					AAS
F037	36.00	3.600	10	EL L L L VL L L	BIASED LOW	-6.81	-0.0762	ICP-MS
F038	223.50	22.350	10					FAES
F042	230.50	23.050	10	VH				Flame AA, Air
F046	251.00	25.100	10					Flame Emission
F048	280.00	28.000	10	EH EH				IC
F063	142.50	14.250	10					FAA
F064	50.00	5.000	10	VL VLL VLELELEL	BIASED LOW	-20.55	0.1086	AA
F068	71.50	7.150	10		BIASED LOW*	-4.79	-0.0062	IC, Dionex
F069	157.50	15.750	10					Potassium Flame-AA
F074	179.50	17.950	10					AAS
F080	187.00	18.700	10	L				FAA no digestion
F092	221.00	22.100	10	EH				Atomic Emission
F093	133.00	33.250	4	VH VH	INSUFFICIENT DATA			ICP
F094	235.00	23.500	10					ICP
F095	213.00	21.300	10	EH				IC
F103	114.00	11.400	10	ELVLVLL ELEL				ICP-OES
F133	188.50	18.850	10					ICP-MS
F135	111.50	11.150	10					APHA 3500-K B
F139	172.00	17.200	10	EL VL				ICP-OES

* 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 18.562

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F037	36.00	3.600	10	ELLLLVLLL	BIASED LOW	-6.81	-0.0762	ICP-MS
F064	50.00	5.000	10	VLVLLVLELELEL	BIASED LOW	-20.55	0.1086	AA
F068	71.50	7.150	10		BIASED LOW*	-4.79	-0.0062	IC, Dionex
F011	72.00	7.200	10	VL	BIASED LOW	-7.93	0.0819	
F026	90.00	9.000	10					FLAME AA
F009	97.00	9.700	10	LVLLLVL				ICP-MS
F135	111.50	11.150	10					APHA 3500-K B
F103	114.00	11.400	10	ELVLVLLELEL				ICP-OES
F032	120.00	12.000	10					AAS
F063	142.50	14.250	10					FAA
F022	145.50	14.550	10					ICP-AES
F002	156.00	15.600	10	VH				19103
F006	157.00	15.700	10					ICP
F069	157.50	15.750	10					Potassium Flame-AA
F036	164.00	16.400	10					AAS
F139	172.00	17.200	10	ELVL				ICP-OES
F074	179.50	17.950	10					AAS
F080	187.00	18.700	10	L				FAA no digestion
F133	188.50	18.850	10					ICP-MS
F025	180.50	20.056	9	ELLVHEHEHELEL				ICP
F008	211.50	21.150	10					ICP
F095	213.00	21.300	10	EH				IC
F092	221.00	22.100	10	EH				Atomic Emission
F031	221.00	22.100	10	EHEHHHH				ICP
F038	223.50	22.350	10					FAES
F042	230.50	23.050	10	VH				Flame AA, Air
F094	235.00	23.500	10					ICP
F014	243.50	24.350	10	VHVHHH				ICP-MS
F046	251.00	25.100	10					Flame Emission
F003	264.00	26.400	10	VHHHH				ICP-OES
F019	213.00	26.625	8	ELEHEHEHEHEH				ICAP
F015	269.00	26.900	10					ICP
F048	280.00	28.000	10	EHEH				IC
F010	293.50	29.350	10	VHHEHEHEHEH	BIASED HIGH	33.30	-0.3687	ICP-OES
F012	302.50	30.250	10	HHHVHVHHVHVH	BIASED HIGH	12.26	-0.0459	ICP-MS
F007	304.00	30.400	10	H	BIASED HIGH	5.65	0.0248	CPQ107E2
F093	133.00	33.250	4	VHVH	INSUFFICIENT DATA			ICP

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

OVERALL AVERAGE
RANK IS 18.562

Potassium

PARAMETER: 14091 Silicates mg/L SiO2

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.1000 BASIC ACCEPTABLE ERROR= 0.0250 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	2.50	16.00	1.22	20.50	0.45 H	20.50	1.57	8.00	12.70	6.00	6.40	11.50
F003	2.39	4.00	1.19	16.00	0.40	11.00	1.53	7.00	12.9	9.50	6.30	8.00
F008	2.5	16.00	1.2	18.00	0.4	11.00	1.7	22.50	12.8	8.00	6.5	15.50
F010	2.55	19.50	1.18	13.00	0.35 L	4.00	1.60	12.50	13.1	13.00	6.4	11.50
F011	2.82 VH	24.00	1.22	20.50	0.429	18.00	1.68	19.00	14.5 VH	24.00	7.29 VH	25.00
F015	2.5	16.00	1.2	18.00	0.4	11.00	1.6	12.50	13.8	21.00	6.6	20.50
F022	2.48	13.00	1.248	22.00	0.403	15.00	1.725 H	24.00	13.44	20.00	6.323	9.00
F025	2.20 VL	3.00	1.05 L	4.50	0.45 H	20.50	1.45 L	4.00	12.0 L	4.00	5.60 VL	3.00
F026	2.491	14.00	1.18	13.00	0.4125	17.00	1.6385	15.00	13.391	19.00	6.411	13.00
F032	2.44	7.00	1.16	9.50	0.385	7.00	1.58	10.00	12.9	9.50	6.21	5.00
F037	2.026 EL	2.00	1.053 L	6.00	0.320 VL	2.00	1.410 VL	3.00	11.290 VL	2.00	5.418 EL	2.00
F038	2.4	5.00	0.8 EL	1.50	<0.1 EL	0.00	1.4 VL	2.00	14.9 VH	25.00	6.9 H	24.00
F042	2.47	12.00	1.18	13.00	0.38	6.00	1.65	18.00	13.2	14.00	6.57	18.50
F046	2.46	11.00	1.20	18.00	0.41	16.00	1.59	11.00	13.0	11.00	6.16	4.00
F048	1.89 EL	1.00	0.80 EL	1.50	0.72 EH	23.00	1.17 EL	1.00	11.7 VL	3.00	6.68	23.00
F063	2.634	23.00	1.102	7.00	0.233 EL	1.00	1.526	6.00	13.37	18.00	6.57	18.50
F069	2.41	6.00	1.05 L	4.50	0.335 VL	3.00	1.51	5.00	13.3	16.50	6.23	6.00
F074	2.503	18.00	1.187	15.00	0.402	14.00	1.645	17.00	12.494	5.00	6.418	14.00
F074m	2.458	9.00	1.112	8.00	0.374	5.00	1.575	9.00	12.742	7.00	6.390	10.00
F074u	2.447	8.00	1.025 VL	3.00	0.436	19.00	1.692	21.00	8.940 EL	1.00	4.916 EL	1.00
F092	2.56	21.00	1.16	9.50	0.40	11.00	1.64	16.00	13.29	15.00	6.66	22.00
F093	2.93 EH	25.00	1.46 EH	25.00	0.47 VH	22.00	1.69	20.00	14.17 H	23.00	6.50	15.50
F094	2.6	22.00	1.3 H	23.00	0.4	11.00	1.7	22.50	13.9	22.00	6.6	20.50
F095	2.55	19.50	1.38 VH	24.00		0.00	1.79 VH	25.00	13.3	16.50	6.55	17.00
F113	2.459	10.00	1.169	11.00	0.386	8.00	1.634	14.00	13.017	12.00	6.271	7.00
MEDIAN	2.4800		1.1800		0.4000		1.6000		13.1000		6.4110	
1CRIT	0.1678		0.0898		0.0430		0.1150		0.8050		0.4037	
N	23		22		21		23		23		23	
MEAN	2.4717		1.1712		0.3996		1.5972		13.0567		6.3766	
3STDEV	0.4326		0.2456		0.1074		0.2700		2.1560		0.9536	

PARAMETER: 14091 Silicates mg/L SiO2

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	10.90	9.50	6.03	13.00	5.05	13.00	4.56	10.00
F003	12.1 VH	23.00	5.85	5.00	4.94	8.00	4.49	6.50
F008	10.7	5.00	6.2	17.00	5.2	19.50	4.8	21.00
F010	11.0	12.50	6.0	11.00	5.0	10.00	4.8	21.00
F011	12.4 VH	24.50	6.92 VH	24.00	5.91 EH	25.00	5.53 EH	25.00
F015	11.7 H	22.00	6.2	17.00	5.1	15.00	4.7	15.50
F022	11.36	17.00	6.15	15.00	5.32	23.00	4.9	23.00
F025	9.06 VL	2.00	5.35 VL	2.00	4.50 VL	3.00	4.20 VL	3.00
F026	11.085	14.00	6.009	12.00	5.029	12.00	4.6545	12.00
F032	10.9	9.50	5.86	7.00	4.88	7.00	4.49	6.50
F037	9.418 VL	3.00	5.478 L	3.00	4.246 EL	2.00	3.938 VL	2.00
F038	12.4 VH	24.50	6.5 H	22.50	5.2	19.50	4.8	21.00
F042	11.2	15.00	6.13	14.00	5.08	14.00	4.74	17.00
F046	10.8	6.00	5.95	8.00	4.81	4.00	4.38	4.00
F048	10.6	4.00	7.88 EH	25.00	5.33	24.00	5.31 VH	24.00
F063	11.46	19.00	5.98	10.00	5.181	17.00	4.75	18.00
F069	11.0	12.50	5.82	4.00	4.82	5.00	4.48	5.00
F074	10.868	8.00	6.290	20.00	5.027	11.00	4.621	11.00
F074m	10.821	7.00	5.971	9.00	4.965	9.00	4.529	9.00
F074u	7.323 EL	1.00	3.074 EL	1.00	2.460 EL	1.00	2.274 EL	1.00
F092	11.58	21.00	6.25	19.00	5.19	18.00	4.66	13.00
F093	11.40	18.00	6.50 H	22.50	5.24	21.00	4.77	19.00
F094	11.5	20.00	6.2	17.00	5.3	22.00	4.7	15.50
F095	11.3	16.00	6.32	21.00	5.15	16.00	4.68	14.00
F113	10.932	11.00	5.858	6.00	4.868	6.00	4.491	8.00
MEDIAN	11.0000		6.0300		5.0500		4.6600	
1CRIT	0.6790		0.3808		0.3220		0.2986	
N	22		23		23		23	
MEAN	10.9856		6.0790		5.0185		4.6280	
3STDEV	1.9766		0.9703		0.7576		0.7672	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	128.00	12.800	10	H				14109
F003	98.00	9.800	10	VH				Col.HeteropolyBlue
F008	153.50	15.350	10					Autocolormetric
F010	128.00	12.800	10	L				Colorimetry
F011	229.00	22.900	10	VH VHVHVHVHEHEH	BIASED HIGH	11.98	0.0571	
F015	168.50	16.850	10	H				autoMo blue color
F022	181.00	18.100	10	H				Colorimetry
F025	49.00	4.900	10	VLL H L L VLVLVLVLVL	BIASED LOW	-12.42	0.0394	Colorimetric
F026	141.00	14.100	10					AUTOANALYSER
F032	78.00	7.800	10					Colourimetry
F037	27.00	2.700	10	ELL VLVLVLELVLL ELVL	BIASED LOW	-13.84	-0.0130	ICP-MS
F038	145.00	16.111	9	ELELVLVHH VHH				COLOR - AUTOMATED
F042	141.50	14.150	10					Colorimetric
F046	93.00	9.300	10					ICAP
F048	129.50	12.950	10	ELELEHELVL EH VH				Colorimetric
F063	137.50	13.750	10	EL				colour
F069	67.50	6.750	10	L VL				Colorimetric
F074	133.00	13.300	10					FIA Molyb Blue
F074m	82.00	8.200	10					AutoanalMolybBlue
F074u	57.00	5.700	10	VL ELELELELELEL	BIASED LOW	-35.88	0.1303	Colour Molyb Blue
F092	165.50	16.550	10					Colorimetric
F093	211.00	21.100	10	EHEHVH H H	BIASED HIGH	5.19	0.0526	ICP
F094	195.50	19.550	10	H				ICP
F095	169.00	18.778	9	VH VH				ICP
F113	93.00	9.300	10					FIA, Lachat 8000

OVERALL AVERAGE
RANK IS 12.907

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F037	27.00	2.700	10	ELLVLVLVLELVLLELVL	BIASED LOW	-13.84	-0.0130	ICP-MS
F025	49.00	4.900	10	VLLHLLVLVLVLVLVL	BIASED LOW	-12.42	0.0394	Colorimetric
F074u	57.00	5.700	10	VLELELELELELEL	BIASED LOW	-35.88	0.1303	Colour Molyb Blue
F069	67.50	6.750	10	LVL				Colorimetric
F032	78.00	7.800	10					Colourimetry
F074m	82.00	8.200	10					AutoanalMolybBlue
F046	93.00	9.300	10					ICAP
F113	93.00	9.300	10					FIA, Lachat 8000
F003	98.00	9.800	10	VH				Col.HeteropolyBlue
F002	128.00	12.800	10	H				14109
F010	128.00	12.800	10	L				Colorimetry
F048	129.50	12.950	10	ELELEHELVLEHVH				Colorimetric
F074	133.00	13.300	10					FIA Molyb Blue
F063	137.50	13.750	10	EL				colour
F026	141.00	14.100	10					AUTOANALYSER
F042	141.50	14.150	10					Colorimetric
F008	153.50	15.350	10					Autocolormetric
F038	145.00	16.111	9	ELELVLVHHVHH				COLOR - AUTOMATED
F092	165.50	16.550	10					Colorimetric
F015	168.50	16.850	10	H				autoMo blue color
F022	181.00	18.100	10	H				Colorimetry
F095	169.00	18.778	9	VHVH				ICP
F094	195.50	19.550	10	H				ICP
F093	211.00	21.100	10	EHEHVHHH	BIASED HIGH	5.19	0.0526	ICP
F011	229.00	22.900	10	VHVHVHVHVHEHEH	BIASED HIGH	11.98	0.0571	

OVERALL AVERAGE
RANK IS 12.907

PARAMETER: 16092 Sulfate mg/L

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= 0.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	3.13	6.00	24.70	8.00	14.90	12.50	43.80	4.00	51.20	6.00	37.70	6.00
F003	3.5	27.50	25.8	18.00	15.2	20.00	54.9 EH	38.00	53.1	10.00	39.5	23.00
F006	<10.	0.00	24.	4.50	14.	4.00	46.	17.00	54.	17.50	38.	9.50
F007	3.0	2.00	26.0	21.50	15.0	15.50	45.9	16.00	53.8	15.00	41.2	34.00
F008	3.4	17.50	21. EL	1.00	12. EL	2.00	42. L	2.00	51.	4.00	33. EL	1.00
F009	3.4	17.50	26.	21.50	15.	15.50	47.	27.00	54.	17.50	40.	25.50
F010	3.4	17.50	24.	4.50	14.7	8.50	44.	6.50	51.	4.00	38.	9.50
F011	5. EH	36.50	578. EH	38.00	17. H	35.00	53. VH	37.00	57.	34.00	39.	15.00
F012	2.38 VL	1.00	21.37 EL	2.00	11.89 EL	1.00	41.30 VL	1.00	49.49 L	1.00	34.30 EL	2.00
F014	3.26	10.50	26.1	23.00	15.5	25.00	48.9	33.00	57.7	36.00	40.9	31.00
F015	3.2	7.50	25.	10.00	15.	15.50	45.	10.50	53.	8.50	40.	25.50
F019	3.49	25.00	26.5	28.00	15.6	29.50	46.5	21.00	54.7	25.00	40.8	30.00
F022	3.1	5.00	26.6	29.50	15.2	20.00	48.3	31.50	56.2	32.00	39.8	24.00
F025	3.4	17.50	26.2	24.50	15.0	15.50	46.3	19.00	54.1	19.50	40.4	28.50
F026	3.4115	21.00	25.3540	12.00	14.8683	11.00	46.8545	25.00	53.6446	13.00	39.3019	21.00
F031	3.46	24.00	26.2	24.50	15.5	25.00	46.6	22.50	54.4	21.50	39.4	22.00
F032	4.33 H	33.00	24.9	9.00	14.9	12.50	43.9	5.00	51.0	4.00	38.0	9.50
F036	3.45	23.00	25.9	20.00	14.7	8.50	44.7	9.00	53.0	8.50	39.3	19.00
F037	3.3854	14.00	28.2014 H	37.00	19.8143 EH	38.00	46.0880	18.00	49.7132 L	2.00	36.4310 L	3.00
F038	3.2	7.50	25.5	14.00	14.3	5.00	46.9	26.00	53.9	16.00	39.2	17.00
F042	3.53	29.00	26.8	32.00	15.7	32.00	45.6	14.00	54.1	19.50	40.4	28.50
F046	3.06	4.00	25.8	18.00	15.3	22.00	46.6	22.50	54.4	21.50	39.3	19.00
F048	3.44	22.00	25.8	18.00	15.2	20.00	46.8	24.00	54.6	23.00	39.3	19.00
F063	3.5	27.50	27.1	35.00	15.8	33.00	48.3	31.50	55.7	30.00	41.0	32.00
F064	3.4	17.50	25.4	13.00	14.7	8.50	44.4	8.00	56.4	33.00	41.5	36.00
F068	3.495	26.00	26.96	34.00	15.51	27.00	49.98 H	34.00	57.24	35.00	42.17 H	37.00
F069	3.05	3.00	24.2	7.00	13.8 L	3.00	45.3	13.00	53.6	11.50	37.3	5.00
F074	4.62 VH	34.00	25.22	11.00	17.64 VH	36.00	47.06	28.00	56.18	31.00	38.61	13.00
F080	3.24	9.00	26.7	31.00	15.4	23.00	47.5	30.00	55.6	29.00	41.1	33.00
F092	3.54	30.00	26.48	27.00	15.68	31.00	45.20	12.00	54.62	24.00	38.22	12.00
F093	3.28	12.00	26.4	26.00	15.5	25.00	46.4	20.00	53.6	11.50	40.1	27.00
F094	3.7	31.00	26.9	33.00	16.3	34.00	50.4 H	35.00	58.1 H	37.00	41.4	35.00
F095	3.4	17.50	26.6	29.50	15.6	29.50	47.4	29.00	55.4	28.00	39.1	16.00
F103	4.95 EH	35.00	24.1	6.00	14.4	6.00	44.0	6.50	52.5	7.00	36.5 L	4.00
F113	3.26	10.50	25.75	16.00	14.7	8.50	43.74	3.00	55.0	26.50	37.75	7.00
F133	3.38	13.00	25.55	15.00	15.10	18.00	45.78	15.00	53.65	14.00	38.79	14.00
F135	5. EH	36.50	23. L	3.00	18. VH	37.00	45.	10.50	55.	26.50	38.	9.50
F139	3.77	32.00	27.72	36.00	15.59	28.00	50.90 H	36.00	59.45 H	38.00	42.66 H	38.00
MEDIAN	3.4000		25.8500		15.2000		46.3500		54.1000		39.3000	
1CRIT	0.6440		1.9910		1.3520		3.2210		3.6860		2.7980	
N	34		36		36		36		36		36	
MEAN	3.4745		25.6890		15.2302		46.4473		54.2263		39.2159	
3STDEV	1.2171		3.9074		3.0203		6.6271		5.7753		4.8723	

PARAMETER: 16092 Sulfate mg/L

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	193.50	12.00	86.40	10.00	186.30	9.00	214.70	20.00
F003	196.	16.50	90.0	26.50	194.	22.50	201. L	2.00
F006	198.	22.00	89.	20.50	193.	19.00	214.	17.50
F007	199.4	26.00	89.4	23.00	194.0	22.50	216.0	22.00
F008	199.	24.50	95. H	34.00	192.	17.00	212.	14.50
F009	192.	10.00	86.	7.00	185.	5.00	210.	9.50
F010	189.	6.00	86.	7.00	183.	2.50	204.	4.00
F011	492. EH	37.00	97. H	36.00	253. EH	37.00	250. EH	37.00
F012	212.35 H	35.00	86.07	9.00	204.88	34.00	233.69 H	36.00
F014	201.	29.50	98.5 VH	37.00	200.	32.00	217.	23.00
F015	210. H	34.00	91.	29.50	205.	35.00	231. H	35.00
F019	198.	22.00	88.	15.00	190.	13.50	215.	21.00
F022	197.	18.50	90.	26.50	196.	27.00	210.	9.50
F025	196.	16.50	87.5	13.00	193.	19.00	224.	30.00
F026	187.7635	4.00	88.6681	18.00	194.3975	24.00	207.0650	6.00
F031	197.0	18.50	88.2	16.00	191.3	16.00	217.3	24.00
F032	188.	5.00	86.0	7.00	186.	7.00	211.	12.00
F036	193.	11.00	87.1	11.50	188.	11.00	211.	12.00
F037	222.2335 EH	36.00	103.0668 EH	38.00	209.6525 H	36.00	209.0795	8.00
F038	191.	9.00	89.	20.50	186.	7.00	211.	12.00
F042	190.	8.00	91.5	31.00	196.	27.00	225.	32.00
F046	201.	29.50	88.4	17.00	195.	25.00	222.	28.50
F048	195.3	15.00	88.9	19.00	189.2	12.00	214.6	19.00
F063	200.	27.50	91.	29.50	198.	30.00	222.	28.50
F064	198.	22.00	89.1	22.00	190.	13.50	213.	16.00
F068	201.9	31.00	92.47	32.00	198.07	31.00	228.6 H	34.00
F069	194.	13.00	85.8	4.50	187.	10.00	212.	14.50
F074	186.84	3.00	84.93	3.00	181.64	1.00	206.30	5.00
F080	200.	27.50	90.0	26.50	196.	27.00	221.	27.00
F092	195.00	14.00	85.80	4.50	197.56	29.00	224.51	31.00
F093	197.3	20.00	87.7	14.00	193.2	21.00	217.6	25.00
F094	207.	33.00	93.8	33.00	203.	33.00	226.	33.00
F095	202.	32.00	89.7	24.00	193.	19.00	219.	26.00
F103	177. VL	2.00	82.4 L	2.00	184.	4.00	203.	3.00
F113	135.7 EL	1.00	66.43 EL	1.00	191.0	15.00	39.09 EL	1.00
F133	189.2	7.00	87.10	11.50	183.0	2.50	208.3	7.00
F135	199.	24.50	90.	26.50	186.	7.00	214.	17.50
F139		0.00	96.43 H	35.00		0.00		0.00
MEDIAN	197.0000		88.9500		193.0000		214.6000	
1CRIT	12.2600		5.7770		12.0200		13.3160	
N	35		36		35		35	
MEAN	196.9653		89.2741		192.9017		215.5927	
3STDEV	23.8273		10.4041		19.3489		23.4555	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	93.50	9.350	10					16309
F003	204.00	20.400	10	EH L				Colorimetric, MTB
F006	131.50	14.611	9					Auto Anal
F007	197.50	19.750	10					CPQ100E2
F008	117.50	11.750	10	ELELL EL H				AutocolorLR-TurbHR
F009	156.00	15.600	10					Dionex
F010	70.00	7.000	10		BIASED LOW*	-4.72	0.0812	Calmagite
F011	342.50	34.250	10	EHEHH VH EHH EHEH	BIASED HIGH	13.58	84.4042	
F012	122.00	12.200	10	VLELELVLL ELH H				IC
F014	280.00	28.000	10	VH				
F015	211.00	21.100	10	H H				ICA, V1.2
F019	230.00	23.000	10					Ion Chromatograph
F022	223.50	22.350	10					IC
F025	203.00	20.300	10					Ion Chromatoraphy
F026	155.00	15.500	10					DIONEX I.C.
F031	214.00	21.400	10					IC
F032	104.00	10.400	10	H				Ion Chromatography
F036	133.50	13.350	10					Ion Chromatography
F037	230.00	23.000	10	H EH L L EHEHH				I.C. Waters
F038	134.00	13.400	10					ION CHROMATOGRAPHY
F042	253.00	25.300	10					IC
F046	207.00	20.700	10					Ion Chromatography
F048	191.00	19.100	10					IC
F063	304.50	30.450	10		BIASED HIGH*	2.39	0.3642	IC
F064	189.50	18.950	10					IC
F068	321.00	32.100	10	H H H	BIASED HIGH*	3.89	0.4499	IC, Dionex
F069	84.50	8.450	10	L	BIASED LOW*	-1.49	-0.8617	IC
F074	165.00	16.500	10	VH VH				IC
F080	263.00	26.300	10					Ion Chrom.
F092	214.50	21.450	10					Ion Chromatography
F093	201.50	20.150	10					Dionex IC
F094	337.00	33.700	10	H H	BIASED HIGH*	4.99	0.5019	ICP
F095	250.50	25.050	10					IC
F103	75.50	7.550	10	EH L VLL	BIASED LOW	-7.09	0.7299	Ion Chromatography
F113	89.50	8.950	10	ELEL EL				IC, Dionex
F133	117.00	11.700	10					I.C.
F135	198.50	19.850	10	EHL VH				APHA 4500 SO4-C
F139	243.00	34.714	7	H H H H	BIASED HIGH	9.23	-0.2612	IC

* 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 19.303

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F010	70.00	7.000	10		BIASED LOW*	-4.72	0.0812	Calmagite
F103	75.50	7.550	10	EHLVLL	BIASED LOW	-7.09	0.7299	Ion Chromatography
F069	84.50	8.450	10	L	BIASED LOW*	-1.49	-0.8617	IC
F113	89.50	8.950	10	ELELEL				IC, Dionex
F002	93.50	9.350	10					16309
F032	104.00	10.400	10	H				Ion Chromatography
F133	117.00	11.700	10					I.C.
F008	117.50	11.750	10	ELELLELH				AutocolorLR-TurbHR
F012	122.00	12.200	10	VLELELVLLELHH				IC
F036	133.50	13.350	10					Ion Chromatography
F038	134.00	13.400	10					ION CHROMATOGRAPHY
F006	131.50	14.611	9					Auto Anal
F026	155.00	15.500	10					DIONEX I.C.
F009	156.00	15.600	10					Dionex
F074	165.00	16.500	10	VHVH				IC
F064	189.50	18.950	10					IC
F048	191.00	19.100	10					IC
F007	197.50	19.750	10					CPQ100E2
F135	198.50	19.850	10	EHLVH				APHA 4500 SO4-C
F093	201.50	20.150	10					Dionex IC
F025	203.00	20.300	10					Ion Chromatoraphy
F003	204.00	20.400	10	EHL				Colorimetric, MTB
F046	207.00	20.700	10					Ion Chromatography
F015	211.00	21.100	10	HH				ICA, V1.2
F031	214.00	21.400	10					IC
F092	214.50	21.450	10					Ion Chromatography
F022	223.50	22.350	10					IC
F019	230.00	23.000	10					Ion Chromatograph
F037	230.00	23.000	10	HEHLLEHEHH				I.C. Waters
F095	250.50	25.050	10					IC
F042	253.00	25.300	10					IC
F080	263.00	26.300	10					Ion Chrom.
F014	280.00	28.000	10	VH				
F063	304.50	30.450	10		BIASED HIGH*	2.39	0.3642	IC
F068	321.00	32.100	10	HHH	BIASED HIGH*	3.89	0.4499	IC, Dionex
F094	337.00	33.700	10	HH	BIASED HIGH*	4.99	0.5019	ICP
F011	342.50	34.250	10	EHEHHVHEHHEHEH	BIASED HIGH	13.58	84.4042	
F139	243.00	34.714	7	HHHH	BIASED HIGH	9.23	-0.2612	IC

* 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 19.303

Sulfate

PARAMETER: 17092 Chloride mg/L

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= 0.5000 CONCENTRATION ERROR INCREMENT= 0.0600

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	1.29	3.50	23.30	14.00	17.80	17.00	58.30	10.00	21.80	2.00	28.60	7.50
F003	1.29	3.50	23.0	6.50	17.4	9.00	55.2 L	2.00	22.6	8.50	29.4	15.00
F006	<2.	0.00	25.	31.00	17.	4.00	60.	21.50	25.	34.50	29.	12.50
F007	1.34	13.00	23.2	12.50	17.6	13.00	58.6	12.00	23.2	16.50	30.2	27.00
F008	1.3	8.00	25.	31.00	20. H	36.00	57.	4.50	25.	34.50	30.	24.00
F009	1.3	8.00	23.	6.50	18.	22.00	60.	21.50	23.	14.00	30.	24.00
F010	1.5	31.00	24.	22.50	18.	22.00	60.	21.50	24.	26.00	30.	24.00
F011	1.3	8.00	24.1	25.50	18.3	27.00	59.7	18.00	23.7	24.00	29.9	21.00
F012	1.23	2.00	26.85 EH	38.00	19.39	35.00	71.38 EH	38.00	26.54 EH	38.00	34.63 EH	38.00
F014	1.47	28.50	23.7	18.50	18.2	25.50	61.9	33.00	20.0 EL	1.00	30.4	29.00
F015	1.5	31.00	25.	31.00	18.	22.00	60.	21.50	23.	14.00	34. VH	36.00
F019	1.42	21.50	23.2	12.50	17.1	6.00	68.8 EH	37.00	22.6	8.50	29.	12.50
F022	1.33	12.00	23.6	17.00	18.	22.00	58.8	13.50	23.4	20.50	28.7	9.00
F025	1.40	18.00	23.1	8.50	17.3	8.00	58.8	13.50	23.0	14.00	29.1	14.00
F026	1.3429	14.00	23.4597	15.00	17.0133	5.00	58.9966	15.00	23.3230	19.00	28.8637	10.00
F031	1.40	18.00	23.1	8.50	18.7	31.00	57.8	7.00	22.8	11.50	28.6	7.50
F032	1.0 EL	1.00	24.0	22.50	18.0	22.00	59.2	17.00	23.4	20.50	29.8	18.00
F036	1.45	24.00	23.5	16.00	17.7	14.50	60.5	28.00	22.8	11.50	30.0	24.00
F037	1.7614 EH	36.00	25.9534 H	37.00	18.3838	28.00	61.2736	30.00	22.5765	7.00	30.3846	28.00
F038	1.3	8.00	23.8	20.50	17.5	11.50	58.2	8.50	23.3	18.00	29.8	18.00
F042	1.57	35.00	25.2	34.00	18.9	33.00	63.3	36.00	24.3	28.50	30.9	33.50
F046	1.38	16.00	23.8	20.50	17.8	17.00	61.7	31.50	23.6	22.50	29.8	18.00
F048	1.47	28.50	24.6	29.00	17.8	17.00	58.4	11.00	25.0	34.50	34.6 EH	37.00
F063	1.4	18.00	25.3	35.00	17.7	14.50	63.0	35.00	24.7	32.00	30.9	33.50
F064	1.56	34.00	22.8	4.00	16.8	2.50	59.1	16.00	23.2	16.50	30.6	31.50
F068	1.451	26.00	24.08	24.00	18.66	30.00	61.22	29.00	24.44	31.00	29.82	20.00
F069	1.42	21.50	22.9	5.00	16.8	2.50	60.3	26.00	22.5	4.50	27.7	2.00
F074	1.41	20.00	21.32 L	1.00	21.21 EH	37.00	54.68 L	1.00	25.55 H	37.00	27.80	3.00
F080	1.46	27.00	23.7	18.50	17.5	11.50	60.0	21.50	24.3	28.50	29.6	16.00
F092	1.37	15.00	23.14	10.00	16.60	1.00	57.52	6.00	22.24	3.00	28.06	4.00
F093	1.30	8.00	22.0	2.00	17.2	7.00	61.7	31.50	22.7	10.00	30.5	30.00
F094	1.5	31.00	24.2	27.00	18.4	29.00	60.4	27.00	24.1	27.00	30.6	31.50
F095	1.3	8.00	24.1	25.50	18.2	25.50	60.1	25.00	23.6	22.50	28.1	5.00
F103	1.45	24.00	22.5	3.00	22.8 EH	38.00	58.2	8.50	22.5	4.50	28.9	11.00
F113	1.30	8.00	24.4	28.00	17.89	19.00	56.06	3.00	23.74	25.00	27.58 L	1.00
F133	1.45	24.00	23.15	11.00	17.41	10.00	57.00	4.50	22.52	6.00	28.45	6.00
F135	2.8 EH	37.00	25.1	33.00	18.8	32.00	60.0	21.50	24.4	30.00	30.0	24.00
F139	1.55	33.00	25.47	36.00	19.03	34.00	62.39	34.00	25.00	34.50	31.20	35.00
MEDIAN	1.4000		23.7500		17.9450		60.0000		23.3615		29.8100	
1CRIT	0.5240		1.8650		1.5167		4.0400		1.8417		2.2286	
N	35		36		36		36		36		36	
MEAN	1.4076		23.8737		18.0413		59.8183		23.5247		29.8133	
3STDEV	0.3192		2.7407		2.6720		7.1014		2.7781		4.2366	

PARAMETER: 17092 Chloride mg/L

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	22.40 L	3.00	9.77	26.00	29.00	2.00	38.00	4.00
F003	23.8	13.50	9.37	9.00	30.4	13.00	40.5	19.50
F006	24.	15.00	8. VL	1.00	31.	19.00	40.	15.50
F007	24.4	19.50	9.64	23.00	31.3	24.50	40.4	18.00
F008	25.	28.50	12. VH	37.00	31.	19.00	39.	9.00
F009	23.	6.50	9.2	5.00	30.	9.00	40.	15.50
F010	26.	34.00	12. VH	37.00	33.	33.00	41.	24.00
F011	24.8	26.00	9.9	30.50	31.6	28.00	40.3	17.00
F012	28.16 VH	37.00	9.85	29.00	36.30 EH	38.00	47.85 VH	36.00
F014	24.9	27.00	10.3	33.00	32.1	30.00	41.9	31.00
F015	28. VH	36.00	12. VH	37.00	36. VH	36.00	47. VH	35.00
F019	23.8	13.50	9.25	6.00	29.5	5.50	39.2	10.00
F022	22.9	5.00	9.67	25.00	30.3	11.50	36.5 L	1.00
F025	23.5	11.00	9.50	13.50	29.5	5.50	39.9	14.00
F026	23.7473	12.00	9.4863	12.00	30.8032	16.00	41.3414	27.00
F031	23.1	8.00	9.66	24.00	27.5 VL	1.00	392. EH	38.00
F032	24.4	19.50	9.6	21.00	31.2	22.00	40.8	22.00
F036	24.5	22.50	9.58	18.50	31.4	26.50	39.7	12.00
F037	20.8706 VL	1.00	8.4517 L	2.00	29.2530	3.00	38.3280	6.00
F038	24.4	19.50	9.1	4.00	31.2	22.00	40.6	21.00
F042	24.4	19.50	10.5	34.00	33.9 H	35.00	43.8 H	33.00
F046	24.2	16.50	9.29	7.00	31.7	29.00	41.1	26.00
F048	25.9	33.00	9.58	18.50	31.0	19.00	39.8	13.00
F063	25.0	28.50	9.6	21.00	31.3	24.50	41.0	24.00
F064	24.2	16.50	9.90	30.50	30.1	10.00	38.5	7.00
F068	24.59	24.00	9.53	15.00	32.43	32.00	41.53	29.00
F069	22.7	4.00	8.76	3.00	30.7	14.00	39.4	11.00
F074	25.58	32.00	10.93 H	35.00	30.91	17.00	38.75	8.00
F080	24.7	25.00	9.6	21.00	31.2	22.00	41.0	24.00
F092	23.00	6.50	9.39	10.00	30.72	15.00	41.40	28.00
F093	30.3 EH	38.00	9.54	16.00	36.2 EH	37.00	44.1 H	34.00
F094	25.2	31.00	9.8	27.50	32.3	31.00	41.6	30.00
F095	22.3 L	2.00	9.5	13.50	29.6	7.00	37.1 L	2.00
F103	23.3	9.00	9.32	8.00	30.3	11.50	37.2 L	3.00
F113	24.5	22.50	9.568	17.00	29.72	8.00	212.1 EH	37.00
F133	23.42	10.00	9.40	11.00	29.47	4.00	38.05	5.00
F135	25.1	30.00	9.8	27.50	31.4	26.50	40.5	19.50
F139	26.06	35.00	10.14	32.00	33.26	34.00	42.87	32.00
MEDIAN	24.4000		9.5900		31.0000		40.5000	
1CRIT	1.9040		1.0154		2.3000		2.8700	
N	36		37		36		36	
MEAN	24.4155		9.7966		31.2435		45.4339	
3STDEV	3.9364		2.3385		4.8656		84.7888	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	89.00	8.900	10	L				17209
F003	99.50	9.950	10	L				Col.Hg Thiocyanate
F006	154.00	17.111	9	VL				AgNO3 titration
F007	179.00	17.900	10					CPQ101E2
F008	231.50	23.150	10	H VH				Auto EIA Color
F009	132.00	13.200	10					Dionex
F010	275.00	27.500	10	VH				Titration
F011	225.00	22.500	10					
F012	329.00	32.900	10	EH EHEHEHVH EHVH	BIASED HIGH	21.11	-1.4843	IC
F014	256.50	25.650	10	EL				
F015	299.50	29.950	10	VHVHVHVHVH				ICA, V1.2
F019	133.00	13.300	10	EH				Ion Chromatograph
F022	136.50	13.650	10	L				IC
F025	120.00	12.000	10					Ion Chromatoraphy
F026	145.00	14.500	10					DIONEX I.C.
F031	154.50	15.450	10	VLEH				IC
F032	185.50	18.550	10	EL				Colourimetry
F036	197.50	19.750	10					Ion Chromatography
F037	178.00	17.800	10	EHH VLL				I.C. Waters
F038	151.00	15.100	10					ION CHROMATOGRAPHY
F042	321.50	32.150	10	H H	BIASED HIGH	6.08	-0.0909	IC
F046	204.00	20.400	10					Ion Chromatography
F048	240.50	24.050	10	EH				IC
F063	266.00	26.600	10					IC
F064	168.50	16.850	10					IC
F068	260.00	26.000	10					IC, Dionex
F069	93.50	9.350	10					IC
F074	191.00	19.100	10	L EHL H H				IC
F080	215.00	21.500	10					Ion Chrom.
F092	98.50	9.850	10					Ion Chromatography
F093	213.50	21.350	10	EH EHH				Dionex IC
F094	292.00	29.200	10					Colorimetry
F095	136.00	13.600	10	L L				IC
F103	120.50	12.050	10	EH L				Ion Chromatography
F113	168.50	16.850	10	L EH				IC, Dionex
F133	91.50	9.150	10					I.C.
F135	281.00	28.100	10	EH				APHA 4500 Cl-B
F139	339.50	33.950	10		BIASED HIGH*	4.12	0.4425	IC

* 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 19.451

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	89.00	8.900	10	L				17209
F133	91.50	9.150	10					I.C.
F069	93.50	9.350	10					IC
F092	98.50	9.850	10					Ion Chromatography
F003	99.50	9.950	10	L				Col.Hg Thiocyanate
F025	120.00	12.000	10					Ion Chromatoraphy
F103	120.50	12.050	10	EHL				Ion Chromatography
F009	132.00	13.200	10					Dionex
F019	133.00	13.300	10	EH				Ion Chromatograph
F095	136.00	13.600	10	LL				IC
F022	136.50	13.650	10	L				IC
F026	145.00	14.500	10					DIONEX I.C.
F038	151.00	15.100	10					ION CHROMATOGRAPHY
F031	154.50	15.450	10	VLEH				IC
F064	168.50	16.850	10					IC
F113	168.50	16.850	10	LEH				IC, Dionex
F006	154.00	17.111	9	VL				AgNO3 titration
F037	178.00	17.800	10	EHHVLL				I.C. Waters
F007	179.00	17.900	10					CPQ101E2
F032	185.50	18.550	10	EL				Colourimetry
F074	191.00	19.100	10	LEHLHH				IC
F036	197.50	19.750	10					Ion Chromatography
F046	204.00	20.400	10					Ion Chromatography
F093	213.50	21.350	10	EHEHH				Dionex IC
F080	215.00	21.500	10					Ion Chrom.
F011	225.00	22.500	10					
F008	231.50	23.150	10	HVH				Auto FIA Color
F048	240.50	24.050	10	EH				IC
F014	256.50	25.650	10	EL				
F068	260.00	26.000	10					IC, Dionex
F063	266.00	26.600	10					IC
F010	275.00	27.500	10	VH				Titration
F135	281.00	28.100	10	EH				APHA 4500 Cl-B
F094	292.00	29.200	10					Colorimetry
F015	299.50	29.950	10	VHVHVHVHVH				ICA, V1.2
F042	321.50	32.150	10	HH	BIASED HIGH	6.08	-0.0909	IC
F012	329.00	32.900	10	EHEHEHEHVHEHVH	BIASED HIGH	21.11	-1.4843	IC
F139	339.50	33.950	10		BIASED HIGH*	4.12	0.4425	IC

* 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 19.451

PARAMETER: 20091 Calcium mg/L

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= 0.2000 CONCENTRATION ERROR INCREMENT= 0.0500

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	13.20	17.50	35.00	19.00	11.96	17.00	47.80	24.50	39.90	13.00	64.40	20.50
F003	13.5	26.50	35.4	25.00	12.2	23.00	48.4	31.00	41.8	31.00	65.8	26.00
F006	13.	12.50	35.	19.00	12.	18.50	46.	13.00	40.	15.50	64.	16.00
F007	14.2 H	32.00	35.8	28.00	12.6	30.00	48.0	27.50	50.0 EH	36.00	67.0	31.50
F008	13.	12.50	35.	19.00	13. H	33.50	48.	27.50	41.	24.00	63.	11.50
F009	10.9 EL	2.00	37. H	33.00	11.7	8.50	39. EL	2.00	34. VL	3.00	63.	11.50
F010	13.69	29.00	35.2	23.00	12.29	25.00	46.4	15.50	40.7	19.50	67.	31.50
F011	12.8	7.50	31.4 VL	3.00	11.8	12.00	49.7 H	33.00	48.5 VH	34.00	77.2 EH	36.00
F012	9.92 EL	1.00	28.39 EL	1.00	9.29 EL	1.00	37.75 EL	1.00	33.52 VL	2.00	52.51 EL	1.00
F014	13.2	17.50	34.5	12.50	11.9	15.00	46.7	17.50	39.9	13.00	63.5	15.00
F015	13.5	26.50	35.8	28.00	12.2	23.00	47.9	26.00	41.4	28.50	65.9	28.00
F019	14.1 H	31.00	36.6	31.00	12.6	30.00	48.2	29.50	10.8 EL	1.00	66.2	29.00
F022	12.9	9.00	33.2	7.00	11.7	8.50	44.9	7.00	39.9	13.00	61.2	6.50
F025	14.6 VH	35.00	39.9 VH	35.00	13.0 H	33.50	52.0 VH	35.00	41.1	26.00	62.9	10.00
F026	12.940	10.00	33.565	8.00	11.480	6.00	45.795	11.00	38.450	8.00	58.993 VL	4.00
F031	13.7	30.00	36.1	30.00	12.3	26.50	48.2	29.50	41.5	30.00	66.7	30.00
F032	13.0	12.50	34.8	16.00	11.9	15.00	45.6	9.50	40.9	22.00	64.5	22.50
F036	13.0	12.50	34.9	17.00	11.9	15.00	45.8	12.00	40.1	17.00	64.3	18.00
F037	11.34 VL	3.00	30.51 VL	2.00	10.39 VL	2.00	43.29 L	4.00	34.60 VL	4.00	54.52 VL	2.00
F038	13.4	23.00	35.8	28.00	12.4	28.00	47.8	24.50	40.9	22.00	64.4	20.50
F042	12.8	7.50	31.8 VL	4.00	10.9 L	3.50	42.0 VL	3.00	35.5 VL	5.00	56.0 VL	3.00
F046	14.3 H	33.00	36.9	32.00	12.8 H	32.00	49.2	32.00	43.1 H	32.00	67.1	33.00
F048	13.4	23.00	34.7	14.50	12.6	30.00	46.8	19.00	40.9	22.00	64.8	24.00
F063	13.5	26.50	35.2	23.00	12.0	18.50	47.0	20.50	40.7	19.50	64.3	18.00
F064	12.2 L	5.00	33.7	9.50	10.9 L	3.50	44.5	5.00	38.3	6.50	61.2	6.50
F069	13.4	23.00	35.7	26.00	12.3	26.50	47.7	23.00	41.1	26.00	64.3	18.00
F074	12.60	6.00	32.80 L	6.00	11.70	8.50	44.60	6.00	38.30	6.50	60.10 L	5.00
F080	13.3	20.50	34.7	14.50	12.1	20.50	46.4	15.50	40.2	18.00	62.3	9.00
F092	13.20	17.50	34.30	11.00	11.70	8.50	45.60	9.50	39.30	10.00	63.10	13.50
F093	12.17 L	4.00	32.06 VL	5.00	11.03 L	5.00	45.43	8.00	38.56	9.00	65.89	27.00
F094	13.2	17.50	33.7	9.50	11.8	12.00	46.7	17.50	40.	15.50	63.1	13.50
F095	13.5	26.50	35.1	21.00	12.2	23.00	47.1	22.00	41.1	26.00	64.5	22.50
F103	14.5 VH	34.00	38.5 VH	34.00	13.2 VH	35.00	51.4 VH	34.00	44.4 VH	33.00	70.0 VH	34.00
F133	13.05	15.00	34.5	12.50	12.10	20.50	47.0	20.50	41.4	28.50	65.5	25.00
F135	13.3	20.50	35.2	23.00	11.8	12.00	46.1	14.00	39.6	11.00	62.2	8.00
F139	15.84 EH	36.00	42.65 EH	36.00	14.81 EH	36.00	56.14 EH	36.00	49.78 VH	35.00	73.89 VH	35.00
MEDIAN	13.2000		35.0000		12.0000		46.7500		40.4500		64.3000	
1CRIT	0.8100		1.9000		0.7500		2.4875		2.1725		3.3650	
N	34		34		34		34		34		34	
MEAN	13.1879		34.8334		12.0132		46.6769		40.3062		63.9880	
3STDEV	2.2711		5.5443		1.8155		7.1585		9.6186		10.4047	

PARAMETER: 20091 Calcium mg/L

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	80.40	12.00	35.60 L	4.00	47.50	8.00	36.20 VL	4.00
F003	80.6	13.50	40.6 H	32.00	48.9	12.00	39.6	21.50
F006	81.	16.00	38.	19.00	50.	22.50	39.	15.50
F007	86.8 H	32.00	39.9	30.00	51.8	30.00	41.8 H	33.00
F008	82.	22.00	39.	27.00	49.	14.00	39.	15.50
F009	82.	22.00	40.	31.00	49.	14.00	42. H	34.00
F010	87.6 H	34.00	37.5	14.00	49.	14.00	38.7	12.50
F011	81.8	19.00	37.1	12.00	55.7 VH	35.00	37.5	7.50
F012	68.24 EL	1.00	31.44 EL	1.00	41.50 VL	2.00	33.00 EL	2.00
F014	82.4	24.00	38.0	19.00	50.3	25.00	40.1	27.00
F015	83.	27.00	38.7	25.50	50.4	26.50	39.4	18.50
F019	82.5	25.00	38.6	24.00	50.2	24.00	40.	26.00
F022	78.	7.00	36.	6.00	47.4	7.00	38.	10.00
F025	86.9 H	33.00	41.9 VH	35.00	32.0 EL	1.00	25.7 EL	1.00
F026	74.755 VL	4.00	36.600	9.50	44.845 VL	3.00	37.890	9.00
F031	84.8	29.00	40.8 H	33.00	52.4 H	31.50	41.6 H	32.00
F032	81.9	20.00	37.7	15.00	49.5	19.50	39.8	24.00
F036	80.6	13.50	38.0	19.00	49.5	19.50	39.4	18.50
F037	69.70 VL	3.00	34.79 VL	3.00	46.86	5.00	35.42 VL	3.00
F038	82.6	26.00	37.2	13.00	49.1	16.00	39.	15.50
F042	69.5 VL	2.00	33.5 VL	2.00	45.4 VL	4.00	39.8	24.00
F046	85.0	30.00	39.8	29.00	52.4 H	31.50	40.6	30.00
F048	82.0	22.00	38.5	23.00	51.1	29.00	40.4	28.00
F063	81.7	18.00	38.7	25.50	50.7	28.00	40.5	29.00
F064	77.7	5.00	36.2	7.00	47.3	6.00	37.3	5.00
F069	81.4	17.00	38.0	19.00	50.0	22.50	39.6	21.50
F074	77.80	6.00	36.60	9.50	47.80	10.00	38.40	11.00
F080	79.4	9.00	38.0	19.00	49.4	18.00	39.5	20.00
F092	80.20	11.00	36.70	11.00	49.20	17.00	38.70	12.50
F093	78.01	8.00	36.57	8.00	47.86	11.00	37.41	6.00
F094	80.9	15.00	37.8	16.00	49.8	21.00	39.	15.50
F095	83.2	28.00	38.4	22.00	50.4	26.50	39.8	24.00
F103	88.1 H	35.00	41.6 VH	34.00	54.6 VH	34.00	42.9 VH	35.00
F133	85.1	31.00	39.6	28.00	53.0 H	33.00	41.3	31.00
F135	79.9	10.00	35.9 L	5.00	47.7	9.00	37.5	7.50
F139	95.52 EH	36.00	45.52 EH	36.00	62.85 EH	36.00	47.26 EH	36.00
MEDIAN	81.7500		38.0000		49.4500		39.4000	
1CRIT	4.2375		2.0500		2.6225		2.1200	
N	34		34		34		34	
MEAN	81.1549		37.9959		49.3990		39.1212	
3STDEV	12.3122		5.5502		7.9489		5.7553	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	139.50	13.950	10	L VL				20110
F003	241.50	24.150	10	H				ICP-OES
F006	167.50	16.750	10					ICP
F007	310.00	31.000	10	H EH H H	BIASED HIGH	5.12	0.6100	CPQ106E3
F008	206.50	20.650	10	H				ICP
F009	161.00	16.100	10	ELH ELVL H				ICP-MS
F010	218.00	21.800	10	H				ICP-OES
F011	199.00	19.900	10	VL H VHEH VH				
F012	13.00	1.300	10	ELELELELVLELELELVLEL	BIASED LOW	-15.76	-0.8492	ICP-MS
F014	185.50	18.550	10					ICP-OES
F015	257.50	25.750	10					ICP
F019	250.50	25.050	10	H EL				ICAP
F022	81.00	8.100	10		BIASED LOW	-5.03	0.4027	ICP-AES
F025	244.50	24.450	10	VHVHH VH H VHELEL				ICP
F026	72.50	7.250	10	VLVL VL	BIASED LOW	-9.82	1.6282	FLAME AA
F031	301.50	30.150	10	H H H	BIASED HIGH*	3.88	0.1510	ICP
F032	176.00	17.600	10					AAS
F036	162.00	16.200	10					AAS
F037	31.00	3.100	10	VLVLVLL VLVLVLVL VL	BIASED LOW	-14.29	1.1186	ICP-MS
F038	216.50	21.650	10					ICPOES
F042	58.00	5.800	10	VLL VLVLVLVLVLVL	BIASED LOW	-15.96	2.3986	Flame AA, Nitrous
F046	314.50	31.450	10	H H H H	BIASED HIGH*	3.57	0.5909	ICAP
F048	234.50	23.450	10					IC
F063	226.50	22.650	10					FAA
F064	59.00	5.900	10	L L	BIASED LOW*	-4.28	-0.3027	AA
F069	222.50	22.250	10					ICP
F074	74.50	7.450	10	L L	BIASED LOW	-5.54	0.3689	AAS
F080	164.00	16.400	10					ICP no digestion
F092	121.50	12.150	10					Atomic Absorption
F093	91.00	9.100	10	L VLL				ICP
F094	153.00	15.300	10					ICP
F095	241.50	24.150	10					IC
F103	342.00	34.200	10	VHVHVHVHVHVHH VHVHVH	BIASED HIGH	7.86	0.5857	ICP-OES
F133	245.00	24.500	10	H				ICP-MS
F135	120.00	12.000	10	L				APHA 3500-Ca B
F139	358.00	35.800	10	EHEHEHEHVHVHEHEHEHEH	BIASED HIGH	15.77	1.7686	ICP-OES

* 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 18.500

PARAMETER: 12091 Magnesium mg/L

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.5000 BASIC ACCEPTABLE ERROR= 0.2000 CONCENTRATION ERROR INCREMENT= 0.0500

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	2.68	9.00	8.03	6.00	4.85	4.00	10.40	6.50	25.30	5.00	28.20	4.00
F003	2.66	6.50	8.43	18.50	5.00	13.00	10.9	22.50	27.2	28.00	30.4	30.00
F006	3.	31.50	9.	31.00	5.	13.00	11.	28.00	28.	32.00	31. H	31.00
F007	2.78	21.00	8.30	12.00	5.03	16.00	10.5	10.00	10.7 EL	1.00	29.3	20.00
F008	2.9	28.00	8.5	23.00	5.3	28.50	11.	28.00	26.	12.00	29.	12.50
F009	2.4 L	1.00	7.1 EL	2.00	4.4 EL	1.00	9. EL	1.00	22.7 VL	2.00	29.9	24.50
F010	2.85	25.00	8.46	20.50	5.17	24.00	10.8	17.50	26.7	23.00	29.2	17.50
F011	2.74	15.00	1.39 EL	1.00	4.99	10.00	10.7	15.00	27.	27.00	29.1	14.50
F012	2.79	23.00	9.26 H	33.00	5.59 H	34.00	11.95 EH	34.00	29.36 VH	33.00	32.72 VH	34.00
F014	2.73	13.50	8.46	20.50	5.11	21.00	10.9	22.50	26.5	18.50	29.4	21.50
F015	2.9	28.00	8.9	30.00	5.3	28.50	11.3	32.00	27.5	30.50	30.3	28.50
F019	3.15 H	34.00	8.8	28.50	5.28	27.00	10.9	22.50	26.2	15.00	28.8	9.50
F022	2.66	6.50	8.	5.00	4.86	5.00	10.3	3.50	26.	12.00	28.7	7.00
F025	2.99	30.00	9.38 VH	34.00	5.42	32.00	11.8 H	33.00	27.3	29.00	29.9	24.50
F026	2.593	3.00	7.974	4.00	4.845	3.00	10.230	2.00	25.345	6.00	27.220 L	3.00
F031	3.2 H	35.00	8.8	28.50	5.4	31.00	11.1	31.00	26.8	24.50	30.1	27.00
F032	2.78	21.00	8.4	15.00	5.04	17.00	10.6	12.50	25.4	7.00	28.6	6.00
F036	2.73	13.50	8.43	18.50	5.02	15.00	10.7	15.00	26.0	12.00	28.8	9.50
F037	2.585	2.00	8.136	8.00	4.928	8.00	10.30	3.50	24.70 L	4.00	26.42 VL	2.00
F038	2.76	17.00	8.64	27.00	5.36	30.00	11.	28.00	26.4	16.50	29.4	21.50
F042	2.61	5.00	7.74 L	3.00	4.66	2.00	10.4	6.50	23.7 VL	3.00	26.3 VL	1.00
F046	2.77	19.00	8.42	17.00	5.05	18.00	10.7	15.00	27.5	30.50	30.0	26.00
F048	2.78	21.00	8.51	24.00	5.23	26.00	10.9	22.50	26.8	24.50	30.3	28.50
F063	2.9	28.00	8.6	26.00	5.2	25.00	10.9	22.50	26.6	21.00	29.5	23.00
F064	2.67	8.00	8.32	14.00	5.12	22.00	10.9	22.50	25.5	8.50	28.8	9.50
F069	2.76	17.00	8.41	16.00	5.07	19.00	10.5	10.00	26.5	18.50	29.1	14.50
F074	2.60	4.00	8.10	7.00	4.90	6.50	10.50	10.00	25.50	8.50	28.30	5.00
F080	2.86	26.00	8.56	25.00	5.14	23.00	10.9	22.50	26.4	16.50	29.0	12.50
F092	2.76	17.00	8.48	22.00	4.99	10.00	10.90	22.50	26.60	21.00	29.20	17.50
F093	2.72	12.00	8.24	10.00	4.99	10.00	10.37	5.00	26.82	26.00	31.35 H	32.00
F094	2.7	11.00	8.3	12.00	5.	13.00	10.8	17.50	26.6	21.00	29.2	17.50
F095	2.8	24.00	8.3	12.00	5.1	20.00	10.6	12.50	26.1	14.00	28.8	9.50
F103	3.14 H	33.00	9.58 VH	35.00	5.74 EH	35.00	12.1 EH	35.00	29.4 VH	34.00	32.3 VH	33.00
F133	2.69	10.00	8.15	9.00	4.90	6.50	10.45	8.00	25.8	10.00	29.2	17.50
F139	3.00	31.50	9.03 H	32.00	5.52 H	33.00	11.01	30.00	35.60 EH	35.00	38.10 EH	35.00
MEDIAN	2.7600		8.4300		5.0500		10.8000		26.5000		29.2000	
1CRIT	0.3130		0.5965		0.4275		0.7150		1.5000		1.6350	
N	33		33		33		33		33		33	
MEAN	2.7890		8.4291		5.1019		10.7942		26.3705		29.4397	
3STDEV	0.4278		1.2843		0.6170		1.1369		3.8742		3.6643	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F012	13.00	1.300	10	ELELELELVLELELELVLEL	BIASED LOW	-15.76	-0.8492	ICP-MS
F037	31.00	3.100	10	VLVLVLLVLVLVLVLVL	BIASED LOW	-14.29	1.1186	ICP-MS
F042	58.00	5.800	10	VLLVLVLVLVLVLVL	BIASED LOW	-15.96	2.3986	Flame AA, Nitrous
F064	59.00	5.900	10	LL	BIASED LOW*	-4.28	-0.3027	AA
F026	72.50	7.250	10	VLVLVL	BIASED LOW	-9.82	1.6282	FLAME AA
F074	74.50	7.450	10	LL	BIASED LOW	-5.54	0.3689	AAS
F022	81.00	8.100	10		BIASED LOW	-5.03	0.4027	ICP-AES
F093	91.00	9.100	10	LVLL				ICP
F135	120.00	12.000	10	L				APHA 3500-Ca B
F092	121.50	12.150	10					Atomic Absorption
F002	139.50	13.950	10	LVL				20110
F094	153.00	15.300	10					ICP
F009	161.00	16.100	10	ELHELVLH				ICP-MS
F036	162.00	16.200	10					AAS
F080	164.00	16.400	10					ICP no digestion
F006	167.50	16.750	10					ICP
F032	176.00	17.600	10					AAS
F014	185.50	18.550	10					ICP-OES
F011	199.00	19.900	10	VLHVHEHVH				
F008	206.50	20.650	10	H				ICP
F038	216.50	21.650	10					ICPOES
F010	218.00	21.800	10	H				ICP-OES
F069	222.50	22.250	10					ICP
F063	226.50	22.650	10					FAA
F048	234.50	23.450	10					IC
F003	241.50	24.150	10	H				ICP-OES
F095	241.50	24.150	10					IC
F025	244.50	24.450	10	VHVHHVHHVHELEL				ICP
F133	245.00	24.500	10	H				ICP-MS
F019	250.50	25.050	10	HEL				ICAP
F015	257.50	25.750	10					ICP
F031	301.50	30.150	10	HHH	BIASED HIGH*	3.88	0.1510	ICP
F007	310.00	31.000	10	HEHHH	BIASED HIGH	5.12	0.6100	CPQ106E3
F046	314.50	31.450	10	HHHH	BIASED HIGH*	3.57	0.5909	ICAP
F103	342.00	34.200	10	VHVHVHVHVHVHHVHVHVH	BIASED HIGH	7.86	0.5857	ICP-OES
F139	358.00	35.800	10	EHEHEHEHVHVHEHEHEHEH	BIASED HIGH	15.77	1.7686	ICP-OES

* 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 18.500

PARAMETER: 12091 Magnesium mg/L

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	38.50	8.50	17.20	3.00	31.50	5.00	30.00	6.50
F003	39.1	13.00	17.6	10.50	32.3	10.50	31.1	20.50
F006	41.	32.00	19.	30.00	34.	27.50	33. H	32.00
F007	39.2	15.00	18.0	18.50	32.5	13.50	31.1	20.50
F008	40.	23.50	17.	2.00	33.	20.00	31.	19.00
F009	40.3	27.50	18.5	28.50	34.1	29.50	32.4	30.50
F010	39.3	17.50	17.9	16.00	32.6	15.00	30.7	14.00
F011	39.9	22.00	18.	18.50	32.8	16.50	30.6	12.00
F012	44.03 EH	34.00	19.84 VH	33.00	37.10 EH	34.00	34.47 VH	34.00
F014	40.0	23.50	18.1	21.00	33.5	26.00	31.8	27.50
F015	40.3	27.50	18.5	28.50	34.1	29.50	31.7	25.50
F019	37.5	3.00	17.5	7.50	31.3	3.50	29.8	4.00
F022	38.	6.00	17.6	10.50	32.	8.50	30.6	12.00
F025	40.6	29.50	19.1 H	31.00	19.7 EL	1.00	18.8 EL	1.00
F026	37.690	4.00	16.615 L	1.00	31.720	6.00	30.260	9.00
F031	40.6	29.50	19.2 H	32.00	34.0	27.50	32.4	30.50
F032	38.5	8.50	17.3	5.00	32.5	13.50	30.2	8.00
F036	38.7	11.00	17.8	14.50	32.4	12.00	30.0	6.50
F037	35.68 VL	1.00	17.52	9.00	31.26	2.00	28.69 L	2.00
F038	38.6	10.00	18.	18.50	33.	20.00	31.6	23.50
F042	36.7 L	2.00	17.3	5.00	32.0	8.50	29.9	5.00
F046	40.8	31.00	18.3	26.50	34.2	31.00	31.7	25.50
F048	40.2	26.00	18.2	23.50	34.3	32.00	32.1	29.00
F063	39.7	20.00	18.3	26.50	33.3	23.50	31.8	27.50
F064	38.1	7.00	17.3	5.00	31.3	3.50	29.3	3.00
F069	39.3	17.50	17.7	13.00	32.9	18.00	30.8	15.50
F074	37.80	5.00	18.00	18.50	31.80	7.00	30.30	10.00
F080	39.5	19.00	18.2	23.50	33.0	20.00	31.4	22.00
F092	39.10	13.00	17.80	14.50	32.80	16.50	30.80	15.50
F093	39.29	16.00	18.20	23.50	33.07	22.00	30.94	18.00
F094	40.1	25.00	18.2	23.50	33.4	25.00	31.6	23.50
F095	39.1	13.00	17.5	7.50	32.3	10.50	30.6	12.00
F103	42.8 VH	33.00	20.0 VH	34.00	36.1 VH	33.00	34.0 VH	33.00
F133	39.8	21.00	17.68	12.00	33.3	23.50	30.9	17.00
F139	49.80 EH	35.00	23.20 EH	35.00	44.10 EH	35.00	40.40 EH	35.00
MEDIAN	39.3000		18.0000		32.9000		30.9400	
1CRIT	2.1400		1.0750		1.8200		1.7220	
N	33		33		33		33	
MEAN	39.5185		18.0709		33.0136		31.1382	
3STDEV	4.2755		2.0993		3.7944		3.6153	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	57.50	5.750	10		BIASED LOW*	-2.86	-0.1385	12107
F003	173.00	17.300	10					ICP-OES
F006	288.00	28.800	10	H H	BIASED HIGH	5.11	-0.0306	ICP
F007	147.50	14.750	10	EL				CPQ106E3
F008	196.50	19.650	10					ICP
F009	147.50	14.750	10	L ELELELVL				ICP-MS
F010	190.00	19.000	10					ICP-OES
F011	151.50	15.150	10	EL				
F012	326.00	32.600	10	H H EHVHVHEHVHEHVH	BIASED HIGH	12.68	-0.2615	ICP-MS
F014	215.50	21.550	10					ICP-OES
F015	288.50	28.850	10		BIASED HIGH*	2.61	0.1601	ICP
F019	154.50	15.450	10	H				ICAP
F022	76.00	7.600	10		BIASED LOW*	-2.05	-0.0978	ICP-AES
F025	245.00	24.500	10	VH H H ELEL				ICP
F026	41.00	4.100	10	L L	BIASED LOW*	-3.70	-0.1834	FLAME AA
F031	296.50	29.650	10	H H	BIASED HIGH*	2.63	0.2349	ICP
F032	113.50	11.350	10					AAS
F036	127.50	12.750	10					AAS
F037	41.50	4.150	10	L VLVL L	BIASED LOW	-8.76	0.4203	ICP-MS
F038	212.00	21.200	10					ICPOES
F042	41.00	4.100	10	L VLVLL	BIASED LOW	-6.00	-0.0329	Flame AA, Nitrous
F046	239.50	23.950	10					ICAP
F048	257.00	25.700	10					IC
F063	243.00	24.300	10					FAA
F064	103.00	10.300	10					AA
F069	159.00	15.900	10					ICP
F074	81.50	8.150	10		BIASED LOW*	-3.34	0.0726	AAS
F080	210.00	21.000	10					ICP no digestion
F092	169.50	16.950	10					Atomic Absorption
F093	174.50	17.450	10	H				ICP
F094	189.00	18.900	10					ICP
F095	135.00	13.500	10					IC
F103	338.00	33.800	10	H VHEHEHVHVHVHVHVHVH	BIASED HIGH	8.86	0.3219	ICP-OES
F133	134.50	13.450	10					ICP-MS
F139	336.50	33.650	10	H H EHEHEHEHEHEH	BIASED HIGH	35.33	-1.6148	ICP-OES

* 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 18.000

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F026	41.00	4.100	10	LL	BIASED LOW*	-3.70	-0.1834	FLAME AA
F042	41.00	4.100	10	LVLVLL	BIASED LOW	-6.00	-0.0329	Flame AA, Nitrous
F037	41.50	4.150	10	LVLVLL	BIASED LOW	-8.76	0.4203	ICP-MS
F002	57.50	5.750	10		BIASED LOW*	-2.86	-0.1385	12107
F022	76.00	7.600	10		BIASED LOW*	-2.05	-0.0978	ICP-AES
F074	81.50	8.150	10		BIASED LOW*	-3.34	0.0726	AAS
F064	103.00	10.300	10					AA
F032	113.50	11.350	10					AAS
F036	127.50	12.750	10					AAS
F133	134.50	13.450	10					ICP-MS
F095	135.00	13.500	10					IC
F007	147.50	14.750	10	EL				CPQ106E3
F009	147.50	14.750	10	LELELELVL				ICP-MS
F011	151.50	15.150	10	EL				
F019	154.50	15.450	10	H				ICAP
F069	159.00	15.900	10					ICP
F092	169.50	16.950	10					Atomic Absorption
F003	173.00	17.300	10					ICP-OES
F093	174.50	17.450	10	H				ICP
F094	189.00	18.900	10					ICP
F010	190.00	19.000	10					ICP-OES
F008	196.50	19.650	10					ICP
F080	210.00	21.000	10					ICP no digestion
F038	212.00	21.200	10					ICPOES
F014	215.50	21.550	10					ICP-OES
F046	239.50	23.950	10					ICAP
F063	243.00	24.300	10					FAA
F025	245.00	24.500	10	VHHHELEL				ICP
F048	257.00	25.700	10					IC
F006	288.00	28.800	10	HH	BIASED HIGH	5.11	-0.0306	ICP
F015	288.50	28.850	10		BIASED HIGH*	2.61	0.1601	ICP
F031	296.50	29.650	10	HH	BIASED HIGH*	2.63	0.2349	ICP
F012	326.00	32.600	10	HHEHVHVHEHVHEHVH	BIASED HIGH	12.68	-0.2615	ICP-MS
F139	336.50	33.650	10	HHEHEHEHEHEHEH	BIASED HIGH	35.33	-1.6148	ICP-OES
F103	338.00	33.800	10	HVHEHEHVHVHVHVHVHVH	BIASED HIGH	8.86	0.3219	ICP-OES

* 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 18.000

PARAMETER: 10692 Total Hardness mg/L

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Interlab QA for Major Ions

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.0000 BASIC ACCEPTABLE ERROR= 1.0000 CONCENTRATION ERROR INCREMENT= 0.0400

SAMPLE	1 = ION-915		2 = ONT-96		3 = CRAN-01		4 = HH-94		5 = WATTAP-03		6 = SPEN-94	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	44.7	11.00	123.	13.00	51.1	11.00	166.	16.00	216.	18.00	289.	18.00
F006	45.	13.00	124.	14.00	51.	10.00	160.	7.00	215.	16.50	287.	16.00
F008	44.4	10.00	122.	11.50	54.3	19.00	165.	14.00	209.	9.50	277.	7.00
F011	43.2	6.00	112. VL	2.00	50.	7.50	168.	18.50	232. EH	22.00	313. EH	22.00
F014	44.2	8.00	121.	10.00	50.8	9.00	161.	10.00	208.	8.00	280.	11.00
F015	45.8	16.00	127.	18.00	52.7	13.00	170.	20.50	223. H	20.00	297. H	21.00
F019	48.1 H	20.00	128. H	20.50	53.3	17.00	165.	14.00	212.	14.00	284.	14.00
F022	43.	4.50	116. L	5.00	49.	5.00	154. L	3.00	206.	5.00	270.	3.00
F025	48.8 H	21.00	138. EH	22.00	54.8 H	21.00	178. VH	22.00	215.	16.50	280.	11.00
F031	49. VH	22.00	128. H	20.50	55. H	22.00	168.	18.50	217.	19.00	288.	17.00
F037	38.961 VL	2.00	109.688 VL	1.00	46.237 VL	2.00	150.511 VL	2.00	188.111 EL	1.00	244.934 EL	1.00
F038	44.8	12.00	125.	16.50	53.	14.50	165.	14.00	211.	13.00	282.	13.00
F046	47.4	18.00	127.6	19.00	53.2	16.00	167.9	17.00	223.3 H	21.00	293.8 H	20.00
F048	45.5	15.00	120.8	9.00	54.5 H	20.00	160.4	8.00	202.0	3.00	276.7	6.00
F080	43.0	4.50	119.	7.00	48.5	4.00	157.	5.00	204.	4.00	272.	4.00
F092	44.3	9.00	120.6	8.00	49.8	6.00	158.7	6.00	207.7	7.00	277.8	8.00
F093	41.59 L	3.00	114.0 L	4.00	48.09 L	3.00	156.1	4.00	206.7	6.00	293.6 H	19.00
F094	44.	7.00	118.	6.00	50.	7.50	161.	10.00	209.	9.50	278.	9.00
F095	45.2	14.00	122.	11.50	51.5	12.00	161.	10.00	210.	11.50	280.	11.00
F103	47.5	19.00	125.	16.50	53.	14.50	170.	20.50	210.	11.50	285.	15.00
F133	36.3 EL	1.00	113.7 L	3.00	41.2 EL	1.00	143.1 EL	1.00	198.0 L	2.00	251.8 VL	2.00
F135	46.9	17.00	124.5	15.00	53.9	18.00	164.9	12.00	213.4	15.00	275.4	5.00
MEDIAN	44.7500		122.0000		51.3000		162.9500		210.0000		280.0000	
1CRIT	2.7500		5.8400		3.0120		7.4780		9.3600		12.1600	
N	20		20		20		20		20		20	
MEAN	44.8176		121.5600		51.4364		162.4755		210.8050		280.9050	
3STDEV	6.7714		14.2623		6.9823		15.8457		18.5767		29.2103	

PARAMETER: 10692 Total Hardness mg/L

SAMPLE	7 = ASSIN-01		8 = BATT-97		9 = ASSIN-97		10 = FORT-97	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F003	362.	9.00	174.	19.00	255.	7.00	227.	14.00
F006	371.	18.00	173.	17.00	265.	18.00	233.	18.00
F008	369.	14.00	167.	9.00	258.	11.00	225.	11.50
F011	369.	14.00	167.	9.00	274. H	21.00	220.	4.50
F014	370.	17.00	169.	13.50	264.	17.00	231.	17.00
F015	383.	20.00	177. H	21.00	271. H	20.00	236. H	21.00
F019	360.	7.00	168.	11.50	254.	5.50	223.	8.00
F022	350. L	3.00	162.	3.00	249.	4.00	220.	4.50
F025	384. H	22.00	183. EH	22.00	161. EL	1.00	142. EL	1.00
F031	374.	19.00	172.	16.00	267.	19.00	243. VH	22.00
F037	320.971 EL	1.00	159.018 L	2.00	245.738 L	3.00	206.589 VL	3.00
F038	365.	10.00	167.	9.00	259.	12.50	228.	15.50
F046	383.9 H	21.00	176.4 H	20.00	274.6 H	22.00	234.6	20.00
F048	359.8	6.00	164.8	5.00	256.5	9.00	223.4	9.00
F080	357.	5.00	164.	4.00	254.	5.50	221.	7.00
F092	361.3	8.00	164.9	6.00	257.9	10.00	223.5	10.00
F093	356.6	4.00	166.3	7.00	255.7	8.00	220.8	6.00
F094	367.	11.00	169.	13.50	262.	15.00	228.	15.50
F095	369.	14.00	168.	11.50	259.	12.50	225.	11.50
F103	368.	12.00	170.	15.00	260.	14.00	226.	13.00
F133	340.1 VL	2.00	146.0 EL	1.00	240.1 VL	2.00	204.8 VL	2.00
F135	369.6	16.00	173.5	18.00	263.0	16.00	233.9	19.00
MEDIAN	367.5000		168.0000		258.5000		225.0000	
1CRIT	15.6600		7.6800		11.3000		9.9600	
N	20		20		20		20	
MEAN	365.2650		168.5959		258.4969		224.5294	
3STDEV	29.6866		13.6843		23.5609		23.7208	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	136.00	13.600	10					Calculated
F006	147.50	14.750	10					Calculation
F008	116.50	11.650	10					Calculation
F011	126.50	12.650	10	VL EHEH H				
F014	120.50	12.050	10					Calculation
F015	190.50	19.050	10	H H H H H	BIASED HIGH	5.21	-0.6006	ICP
F019	131.50	13.150	10	H H				By Calculation
F022	40.00	4.000	10	L L L	BIASED LOW*	-3.94	0.3454	AAS
F025	159.50	15.950	10	H EHH VH H EHELEL				Calculation
F031	195.00	19.500	10	VHH H VH	BIASED HIGH*	1.67	3.9519	Titration
F037	18.00	1.800	10	VLVLVLVLELELELL L VL	BIASED LOW	-11.55	3.9050	Calculation
F038	130.00	13.000	10					Calculation
F046	194.00	19.400	10	H H H H H	BIASED HIGH*	5.00	-0.1763	Calculation Ca+Mg
F048	90.00	9.000	10	H				Titration
F080	50.00	5.000	10		BIASED LOW*	-2.29	-0.7256	EDTA Titration
F092	78.00	7.800	10					Calculation
F093	64.00	6.400	10	L L L H				Calculation
F094	104.00	10.400	10					Calculation
F095	119.50	11.950	10					Calculation
F103	151.00	15.100	10					Titration
F133	17.00	1.700	10	ELL ELELL VLVLELVLVL	BIASED LOW	-6.05	-6.0578	TITRIMETRIC
F135	151.00	15.100	10					APHA 2340-C

* 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

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F133	17.00	1.700	10	ELLELELLVLVLELVLVL	BIASED LOW	-6.05	-6.0578	TITRIMETRIC
F037	18.00	1.800	10	VLVLVLVLELELELLLVL	BIASED LOW	-11.55	3.9050	Calculation
F022	40.00	4.000	10	LLL	BIASED LOW*	-3.94	0.3454	AAS
F080	50.00	5.000	10		BIASED LOW*	-2.29	-0.7256	EDTA Titration
F093	64.00	6.400	10	LLLH				Calculation
F092	78.00	7.800	10					Calculation
F048	90.00	9.000	10	H				Titration
F094	104.00	10.400	10					Calculation
F008	116.50	11.650	10					Calculation
F095	119.50	11.950	10					Calculation
F014	120.50	12.050	10					Calculation
F011	126.50	12.650	10	VLEHEHH				
F038	130.00	13.000	10					Calculation
F019	131.50	13.150	10	HH				By Calculation
F003	136.00	13.600	10					Calculated
F006	147.50	14.750	10					Calculation
F103	151.00	15.100	10					Titration
F135	151.00	15.100	10					APHA 2340-C
F025	159.50	15.950	10	HEHHVHHEHELEL				Calculation
F015	190.50	19.050	10	HHHHH	BIASED HIGH	5.21	-0.6006	ICP
F046	194.00	19.400	10	HHHHH	BIASED HIGH*	5.00	-0.1763	Calculation Ca+Mg
F031	195.00	19.500	10	VHHHVH	BIASED HIGH*	1.67	3.9519	Titration

* 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

FPTP STUDY 0072 DATA SUMMARY 1998-06-05 PAGE 1

PARAMETER: 15092 Total Phosphorus mg/L P

NATIONAL WATER RESEARCH INSTITUTE
NATIONAL LAB FOR ENVIRONMENTAL TESTING
BURLINGTON ONTARIO

NWRI Ecosystem Interlab QA for Total P

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.0040 BASIC ACCEPTABLE ERROR= 0.0040 CONCENTRATION ERROR INCREMENT= 0.1000

SAMPLE	1 = PHOS-721		2 = PHOS-722		3 = PHOS-723		4 = PHOS-724		5 = PHOS-725		6 = PHOS-726	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	<0.001	0.00	0.075	19.50	0.096	18.50	0.120	9.50	0.206	19.00	0.154	14.00
F003	0.0017	5.00	0.0716	11.00	0.0976	20.00	0.1217	12.00	0.2114	26.00	0.1551	18.00
F004	<0.002	0.00	0.077	24.00	0.101	25.00	0.128	23.50	0.220	28.00	0.163	24.00
F006	<0.02	0.00	0.08	26.00	0.11 H	29.50	0.13	28.00	0.24 EH	31.00	0.17	28.50
F007	<0.004	0.00	0.072	13.50	0.095	15.00	0.123	15.00	0.210	23.00	0.153	11.00
F008	<0.001	0.00	0.075	19.50	0.099	22.50	0.129	25.50	0.211	25.00	0.162	23.00
F009	<0.03	0.00	0.08	26.00	0.1	24.00	0.12	9.50	0.2	7.50	0.15	4.00
F010	<0.010	0.00	0.070	7.50	0.090	5.50	0.120	9.50	0.200	7.50	0.165	25.50
F014	<0.005	0.00	0.072	13.50	0.095	15.00	0.12	9.50	0.20	7.50	0.15	4.00
F015	0.008	9.00	0.072	13.50	0.095	15.00	0.122	13.50	0.204	15.50	0.154	14.00
F022	0.02 VH	12.00	0.069	5.50	0.105	27.00	0.133	30.00	0.208	21.00	0.179 H	31.00
F025	<0.003	0.00	0.072	13.50	0.095	15.00	0.126	20.00	0.197	3.50	0.154	14.00
F026	0.0005	2.00	0.0736	17.00	0.0927	11.00	0.1163	6.00	0.1970	3.50	0.1444	2.00
F032	<0.002	0.00	0.076	22.00	0.096	18.50	0.124	16.50	0.202	10.50	0.154	14.00
F036	<0.0002	0.00	0.0802	28.00	0.1090 H	28.00	0.1380	31.00	0.2100	23.00	0.1600	21.50
F038	0.001	4.00	0.069	5.50	0.091	7.00	0.124	16.50	0.203	13.50	0.151	8.50
F042	0.005	7.50	0.076	22.00	0.093	12.00	0.126	20.00	0.218	27.00	0.165	25.50
F046	<0.02	0.00	0.088 H	30.00	0.110 H	29.50	0.145 EH	32.00	0.224	30.00	0.169	27.00
F048	<0.002	0.00	0.0658	2.00	0.0885	3.00	0.1153	3.00	0.2024	12.00	0.1506	7.00
F060	<0.05	0.00	0.08	26.00	0.09	5.50	0.13	28.00	0.21	23.00	0.16	21.50
F064	0.10 EH	14.00	0.03 EL	1.00	<0.02 EL	0.00	0.11	2.00	0.18 L	2.00	0.09 EL	1.00
F069	<0.001	0.00	0.067	3.50	0.088	2.00	0.116	4.50	0.202	10.50	0.150	4.00
F072	<0.005	0.00	0.071	10.00	0.092	8.50	0.126	20.00	0.204	15.50	0.151	8.50
F074	0.003	6.00	0.073	16.00	0.095	15.00	0.122	13.50	0.205	17.50	0.155	17.00
F080	0.005	7.50	0.070	7.50	0.092	8.50	0.128	23.50	0.200	7.50	0.154	14.00
F092	0.0005	3.00	0.0708	9.00	0.0926	10.00	0.1174	7.00	0.1988	5.00	0.1505	6.00
F094	<0.002	0.00	0.074	18.00	0.099	22.50	0.127	22.00	0.207	20.00	0.159	20.00
F095	0.012 VH	10.00	0.076	22.00	0.098	21.00	0.125	18.00	0.205	17.50	0.158	19.00
F113	0.	1.00	0.067	3.50	0.089	4.00	0.116	4.50	0.203	13.50	0.152	10.00
F122	0.0211 VH	13.00	0.100 EH	31.00	0.0622 EL	1.00	0.0947 EL	1.00	0.154 EL	1.00	0.170	28.50
F133	0.017 VH	11.00	0.084 H	29.00	0.103	26.00	0.129	25.50	0.221	29.00	0.174 H	30.00
F139	<0.1	0.00	<0.1	0.00	<0.1	0.00	0.13	28.00	0.30 EH	32.00	0.19 EH	32.00
MEDIAN OR *TARGET												
CONC.	*0.0040		0.0730		0.0950		0.1240		0.2045		0.1545	
1CRIT	0.0041		0.0109		0.0131		0.0160		0.0241		0.0191	
N	12		29		27		30		30		30	
MEAN	0.0079		0.0740		0.0955		0.1238		0.2067		0.1579	
3STDEV	0.0222		0.0153		0.0152		0.0179		0.0312		0.0245	

PARAMETER: 15092 Total Phosphorus mg/L P

SAMPLE	7 = PHOS-727		8 = PHOS-728		9 = PHOS-729		10 = PHOS-7210	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
F002	0.260	17.00	0.282	11.50	0.306	9.00	0.436	13.00
F003	0.2720	26.00	0.3003	24.00	0.3376	29.00	0.4666	28.00
F004	0.276	29.00	0.314	27.00	0.333	28.00	0.443	20.00
F006	0.29 H	31.00	0.32 H	29.00	0.35 H	31.00	0.48	30.50
F007	0.261	19.00	0.285	17.00	0.318	19.50	0.450	23.00
F008	0.269	24.00	0.293	21.00	0.322	25.00	0.452	24.50
F009	0.26	17.00	0.27	3.50	0.31	14.50	0.44	16.50
F010	0.255	9.50	0.290	19.00	0.320	23.50	0.435	12.00
F014	0.25	6.50	0.27	3.50	0.30	6.00	0.43	8.50
F015	0.25	6.50	0.28	9.00	0.29	4.00	0.48	30.50
F022	0.273	27.50	0.315	28.00	0.319	21.50	0.5 H	32.00
F025	0.262	20.00	0.295	22.00	0.323	26.00	0.444	21.00
F026	0.2502	8.00	0.2651	2.00	0.2968	5.00	0.4194	6.00
F032	0.270	25.00	0.344 VH	31.00	0.320	23.50	0.440	16.50
F036	0.2060 VL	3.00	0.3220 H	30.00	0.3190	21.50	0.4420	19.00
F038	0.255	9.50	0.282	11.50	0.303	8.00	0.471	29.00
F042	0.259	14.50	0.279	7.00	0.329	27.00	0.449	22.00
F046	0.273	27.50	0.311	26.00	0.338	30.00	0.452	24.50
F048	0.2561	12.00	0.2865	18.00	0.3108	16.00	0.4332	10.00
F060	0.26	17.00	0.28	9.00	0.31	14.50	0.46	27.00
F064	0.17 EL	1.00	0.31	25.00	0.24 EL	1.00	0.43	8.50
F069	0.249	4.00	0.280	9.00	0.308	11.00	0.411	5.00
F072	0.266	22.00	0.277	6.00	0.308	11.00	0.459	26.00
F074	0.258	13.00	0.284	15.50	0.308	11.00	0.439	14.00
F080	0.263	21.00	0.283	13.50	0.313	18.00	0.409	4.00
F092	0.2496	5.00	0.2753	5.00	0.3028	7.00	0.4218	7.00
F094	0.259	14.50	0.292	20.00	0.278	3.00	0.394	3.00
F095	0.268	23.00	0.284	15.50	0.309	13.00	0.434	11.00
F113	0.256	11.00	0.283	13.50	0.312	17.00	0.440	16.50
F122	0.185 EL	2.00	0.217 EL	1.00	0.250 EL	2.00	0.380 L	2.00
F133	0.278	30.00	0.296	23.00	0.318	19.50	0.440	16.50
F139	0.46 EH	32.00	0.53 EH	32.00	0.55 EH	32.00	0.36 EL	1.00
MEDIAN OR *TARGET CONC.	0.2600		0.2845		0.3114		0.4400	
1CRIT	0.0296		0.0320		0.0347		0.0476	
N	30		30		30		30	
MEAN	0.2580		0.2916		0.3121		0.4394	
3STDEV	0.0582		0.0535		0.0552		0.0664	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F002	131.00	14.556	9					15413
F003	199.00	19.900	10					Autoclave dig
F004	228.50	25.389	9		BIASED HIGH*	2.70	0.0062	15423
F006	264.50	29.389	9	H EH H H H	BIASED HIGH	10.23	0.0027	Auto anal
F007	156.00	17.333	9					CPQ104E3
F008	210.00	23.333	9					Colourmetric
F009	122.50	13.611	9					Pers dig + TRAACS
F010	119.50	13.278	9					Colorimetry
F014	74.00	8.222	9					
F015	130.50	13.050	10					colorimetric, V1.3
F022	235.50	23.550	10	VH H H				Colorimetry
F025	155.00	17.222	9					Auto Ascorbic AR
F026	62.50	6.250	10		BIASED LOW*	-4.69	-0.0004	AUTOCLAVE-AUTOANAL
F032	177.50	19.722	9	VH				Colourimetry
F036	205.00	22.778	9	H VLH				Colourimetry
F038	113.00	11.300	10					COLOR - DIGESTION
F042	184.50	18.450	10					Persulfate Digest
F046	256.50	28.500	9	H H EH	BIASED HIGH*	0.49	0.0171	Dig-Color
F048	83.00	9.222	9					Colorimetric
F060	171.50	19.056	9					Colorimetric
F064	55.50	6.167	9	EHELEL L ELEL EL	BIASED LOW	-15.12	0.0093	Colorimetric
F069	53.50	5.944	9		BIASED LOW*	-4.27	0.0008	Color blk dig
F072	127.50	14.167	9					Ascorbic acid
F074	138.50	13.850	10					UV Dig Colour PO4
F080	125.00	12.500	10					Colorimetry
F092	64.00	6.400	10		BIASED LOW*	-3.26	-0.0008	Colorimetric
F094	143.00	15.889	9					Colorimetric
F095	170.00	17.000	10	VH				Skalar
F113	94.50	9.450	10					persulfate-FIA
F122	82.50	8.250	10	VHEHELELEL ELELELL				Colorimetric
F133	239.50	23.950	10	VHH H				COLORIMETRIC
F139	189.00	27.000	7	EHEHEHEHEHEL	BIASED HIGH*	-2.40	0.1120	ICP-OES

* 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 15.926

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.SAMPLES RANKED	SUMMARY OF FLAGGING	BIAS STATEMENT	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F069	53.50	5.944	9		BIASED LOW*	-4.27	0.0008	Color blk dig
F064	55.50	6.167	9	EHELELLELELEL	BIASED LOW	-15.12	0.0093	Colorimetric
F026	62.50	6.250	10		BIASED LOW*	-4.69	-0.0004	AUTOCLAVE-AUTOANAL
F092	64.00	6.400	10		BIASED LOW*	-3.26	-0.0008	Colorimetric
F014	74.00	8.222	9					
F122	82.50	8.250	10	VHEHELELELELELELL				Colorimetric
F048	83.00	9.222	9					Colorimetric
F113	94.50	9.450	10					persulfate-FIA
F038	113.00	11.300	10					COLOR - DIGESTION
F080	125.00	12.500	10					Colorimetry
F015	130.50	13.050	10					colorimetric, V1.3
F010	119.50	13.278	9					Colorimetry
F009	122.50	13.611	9					Pers dig + TRAACS
F074	138.50	13.850	10					UV Dig Colour PO4
F072	127.50	14.167	9					Ascorbic acid
F002	131.00	14.556	9					15413
F094	143.00	15.889	9					Colorimetric
F095	170.00	17.000	10	VH				Skalar
F025	155.00	17.222	9					Auto Ascorbic AR
F007	156.00	17.333	9					CPQ104E3
F042	184.50	18.450	10					Persulfate Digest
F060	171.50	19.056	9					Colorimetric
F032	177.50	19.722	9	VH				Colourimetry
F003	199.00	19.900	10					Autoclave dig
F036	205.00	22.778	9	HVLH				Colourimetry
F008	210.00	23.333	9					Colourmetric
F022	235.50	23.550	10	VHHH				Colorimetry
F133	239.50	23.950	10	VHHH				COLORIMETRIC
F004	228.50	25.389	9		BIASED HIGH*	2.70	0.0062	15423
F139	189.00	27.000	7	EHEHEHEHEHEL	BIASED HIGH*	-2.40	0.1120	ICP-OES
F046	256.50	28.500	9	HHEH	BIASED HIGH*	0.49	0.0171	Dig-Color
F006	264.50	29.389	9	HEHHHH	BIASED HIGH	10.23	0.0027	Auto anal

* 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 15.926

11345

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