Environment Canada
Proficiency Testing Program

Study 0100
September 2012

Major Ions and Nutrients in Water

Environment Canada Proficiency Testing Program

Glossary of Terms and Definitions

A. Statistics listed in Data Summary (Appendix A)

Assigned Value: The Robust Mean of test results for a parameter and sample [1]
R-Std Dev: Robust Standard Deviation [1]
Acceptable Limits: See 'Limits & Flags' and Table 1
Warning Limits: See 'Limits & Flags' and Table 1
Action Limits: See 'Limits & Flags' and Table 1
N: The number of usable test results for calculating the assigned value

B. Calculation of Performance Statistics (Appendix A)

Laboratory Bias: Laboratory Bias [2] D = x-X, where D is the deviation, x is the test result and X is the assigned value. This deviation is normalized with the robust standard deviation (R-Std Dev) and evaluated by the z-score [3].

Limits & Flags: Acceptable Limits/No Flags: When a test result is within 2 R-Std Dev of the assigned value, flags are not assigned (see Table 1 below).

Warning Limits/Warning Flags: When a test result is between 2 and 3 R-Std Dev, the flags 'WH' or 'WL' indicate a WARNING flag, for a high or low result respectively (see Table 1 below).

Action Limits/Action Flags: When a test result deviates by more than 3 R-Std Dev from the assigned value, the flags 'AH' or 'AL' indicate an ACTION flag, high or low respectively (see Table 1 below).

Table 1 Evaluating test results, determining limits and assigning flags [2]

Criteria	Limits	Flags
Assigned value ± 2 $\hat{\sigma}$*	Acceptable Limits	No Flag
2 $\hat{\sigma}$ - 3 $\hat{\sigma}$ from assigned value	Warning Limits	Warning Flag (W)
> 3 $\hat{\sigma}$ from assigned value	Action Limits	Action Flag (A)

* $\hat{\sigma}$ is the R-Std Dev

Systemic Bias: Systemic bias is indicated when a laboratory's test results (ranked by the Youden non-parametric analysis [4] for an individual parameter) are consistently higher or lower than the assigned value. Ranks are assigned to each test result for each sample, from 1 for the lowest, to N for the highest, where N is the number of usable test results. These ranks are totalled for each laboratory (Total Rank), and divided by the number of samples ranked (No. Samples Ranked). **Total Rank** and **Average Rank** for each laboratory are displayed on page 2 of the Data Summary. The **Overall Average Rank** for each parameter is shown at the bottom of the same page. Systemic bias is identified when a laboratory's **Average Rank** falls outside of the 95% confidence interval for the **Overall Average Rank**. Systemic bias may be indicated by the Youden rankings even when the test results have not been flagged (W or A) for deviation from the assigned value.

No.SamplesRanked: This is the number of test results used to determine systemic bias. A laboratory must report results for more than half of the samples in the set to allow for evaluation of bias (not including '<'). There must be ten or more laboratories participating, with sufficient test results reported, to determine systemic bias.

The two measured components of 'systemic' bias are 1) Bias Blank and 2) Bias % Slope. These components are illustrated in Figure 1: Parameter Performance. All 'systemic' biases are correctable with the investigation of the following two analytical components.

1) Bias Blank: The first component is the y-intercept of the linear regression plot (-0.0329 in Figure 1). These bias blanks are stated in the Data Summary and Evaluations for each parameter.

2) Bias % Slope: The second measured component is the % deviation of the laboratory test results versus the assigned values for a parameter. This is calculated as [(**m-1**) x 100], where **m** is the slope of the linear regression plot (laboratory test results) and **1** is the slope of the "ideal" line (assigned values). The Bias % Slope in Figure 1 below is minus 1.55 per cent (-1.55%). For most parameters, a Bias % Slope greater than the absolute value of 5 is considered unacceptable and <u>requires action</u>.

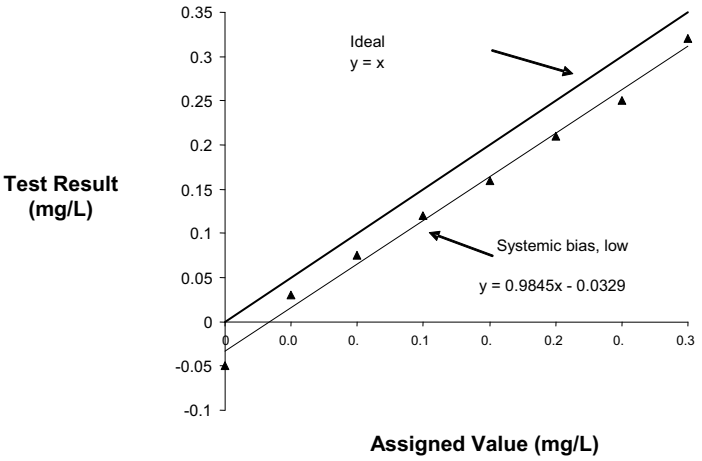

Figure 1: Parameter Performance

Bias Statement: Systemic bias is noted with the 'BIASED HIGH' or 'BIASED LOW' notations. An asterisk with the statement indicates that the bias is considered minor, yet worthy of evaluation. The minor biases are not recorded in the database and are not noted in the laboratory proficiency appraisal (see enclosed Laboratory Proficiency Appraisal). In Table 2 of the Final Report (Laboratory Performance Scores), systemic biases are calculated as the equivalent of *five* flagged values.

Method Coding: Method codes are an important part of quality assurance. These definitions are provided on the Data Reporting Forms to assist with uniform descriptions.

C. Determination of the 'Laboratory Performance Scores' in Table 2

The 'Laboratory Performance Scores' are a combination of 50% **Systemic Bias (parameters biased)** and 50% **Flagged Results**.

- Systemic bias (50%) is calculated as,

  [(No. of Parameters Biased / No. of Parameters Analyzed) x100] / 2

- Flagged results (50%) is calculated as,

  [(No. of Flags Assigned / No. of Results Reported) x100] / 2

These percentages are summed to obtain the % Score (Sum of Parameters Biased & Flagged Results)

The Laboratory Performance Rating is assigned according to the % Score.

- Very Good: 0 to 5%;
- Good: >5 to 12.5%;
- Fair: >12.5 to 30%
- Poor: >30%.

D. Uncertainty of Assigned Values

The standard uncertainty (u_X)of the assigned value may be estimated from the statistics presented in the data summary (Appendix A),

$$u_X = 1.25 \times \text{R-Std Dev} / \sqrt{N} \qquad [5]$$

This uncertainty is not used in the performance evaluations, but may be of interest to some participants. Reporting details of the measurement uncertainty of any assigned value is a requirement of *ISO/IEC 17043:2010, Conformity assessment – General requirements for proficiency testing.*

E. Associated Laboratory Evaluations with the Final Report

1. Laboratory Proficiency Appraisal (see Table 2 in the Final Report for definitions)
2. Z-Score Summary [3]

References:
[1] ISO 13528:2005(E), Statistical Methods for the use in Proficiency Testing by Interlaboratory Comparisons, Annex C, Robust Analysis, Section C.1: Algorithm A, p64.
[2] ISO 13528:2005(E), Statistical Methods for the use in Proficiency Testing by Interlaboratory Comparisons, Calculation of Performance Statistics, Section 7.1.1 and 7.1.2, p18-19.
[3] ISO 13528:2005(E), Statistical Methods for the use in Proficiency Testing by Interlaboratory Comparisons, *z*-scores, Section 7.4.1 and 7.4.2, p25-26.
[4] 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.
[5] ISO 13528:2005(E), Statistical Methods for the use in Proficiency Testing by Interlaboratory Comparisons, Standard uncertainty u_X of the assigned value , Section 5.6.2, p 9-10.

Section 2 – Major Ions and Nutrients in Natural Waters (MI)

Table 1	Participating Laboratories
Table 2	Laboratory Performance Scores
Table 3	Five-Year Historical Laboratory Performance
Table 4	Sample Design
Table 5	Summary of Interlaboratory Robust Means
Appendix A	Data Summary

2012-09-07

Program Name: FPMI

Study Code: 0100 Range of Samples: 1 to 10

Table 1 Participating Laboratories in FP PT for Major Ions & Nutrients

AGAT Laboratories, Burnaby, BC, CA
ALS Environmental, Edmonton, AB, CA
ALS Environmental, Winnipeg, MB, CA
Bay of Plenty Regional Council, Whakatane, NZ
Capital District Health Authority, QEII Lab, Halifax, NS, CA
Columbia Analytical Services, Jacksonville, FL, US
CSIRO Land and Water, Lucas Heights, NSW, AU
Environment Canada, ALET, Moncton, NB, CA
Environment Canada, NLET, Burlington, ON, CA
Environment Canada, NLET, Saskatoon, SK, CA
Environment New Brunswick, Fredericton, NB, CA
Environnement Québec, CEAEQ, Laval, QC, CA
Geoscience Laboratories, Sudbury, ON, CA
Kinectrics Inc., Toronto, ON, CA
Minera Alumbrera, Tucuman, AR
Ministry of Agriculture, Strovolos, Nicosia, CY
Nam Theun 2 Power Company, Vientiane, LA
NIWA, Hamilton, NZ
NRC, CDN Forestry Service, ON Region, Sault Ste. Marie, ON, CA
Ontario Ministry of Environment, Dorset, ON, CA
Santé Canada - DSPA, Longueuil, QC, CA
Saskatchewan Disease Control Laboratory, Regina, SK, CA
South Florida Water Management Dist., West Palm Beach, FL, US
TAIGA Environmental Laboratory, Yellowknife, NT, CA
U.S. Environmental Protection Agency, FOH, Chicago, IL, US
U.S. Geological Survey, NWQL, Denver, CO, US
US EPA ORD Western Ecology Division, Corvallis, OR, US
Ville de Montréal, Montréal, QC, CA

28 Laboratories (3 laboratory names unpublished).

2012-09-06

Program Name: FPMI **Number of Labs:** 36

Study Code: 0100 **Range of Samples:** 1 to 10

Table 2 Laboratory Performance Scores – FP PT for Major Ions & Nutrients

	Systemic Bias			Flagged Results			
Lab Code	No. of Parameters Analyzed	No. of Parameters Biased	Parameters Biased (50%)	No. of Results Reported	No. of Flags Assigned	Results Flagged (50%)	% Score (Sum of Parameters Biased & Results Flagged)
F004	5	0	0.00	50	0	0.00	0.00
F006	1	0	0.00	10	0	0.00	0.00
F090	2	0	0.00	20	0	0.00	0.00
F158a	2	0	0.00	20	0	0.00	0.00
F223b	6	0	0.00	49	0	0.00	0.00
F249	5	0	0.00	50	0	0.00	0.00
F304	2	0	0.00	20	0	0.00	0.00
F207	15	0	0.00	150	1	0.33	0.33
F248	11	0	0.00	110	1	0.45	0.45
F003	19	0	0.00	190	2	0.53	0.53
F026	16	0	0.00	160	2	0.63	0.63
F221	6	0	0.00	60	1	0.83	0.83
F223	5	0	0.00	47	2	2.13	2.13
F094	2	0	0.00	20	1	2.50	2.50
F014	12	0	0.00	120	6	2.50	2.50
F158	18	1	2.78	180	3	0.83	3.61
F021	15	1	3.33	150	1	0.33	3.67
F183	18	1	2.78	180	6	1.67	4.44
F015	19	1	2.63	190	7	1.84	4.47
F290	20	1	2.50	200	8	2.00	4.50
F015b	2	0	0.00	20	2	5.00	5.00
F193	11	1	4.55	110	3	1.36	5.91
F239	11	0	0.00	110	16	7.27	7.27
F113	14	1	3.57	140	11	3.93	7.50
F292	19	1	2.63	190	25	6.58	9.21
F139	10	1	5.00	100	9	4.50	9.50
F069	17	4	11.76	162	10	3.09	14.85
F026b	5	1	10.00	50	5	5.00	15.00
F036	16	3	9.38	160	20	6.25	15.63
F009	11	3	13.64	110	5	2.27	15.91
F022	17	5	14.71	170	14	4.12	18.82
F099	11	3	13.64	110	23	10.45	24.09
F154	19	7	18.42	190	49	12.89	31.32
F326	19	6	15.79	190	63	16.58	32.37
F011	17	9	26.47	170	51	15.00	41.47
F326a	4	3	37.50	40	27	33.75	71.25

Laboratory Performance Rating

Rating	% Score*
Very Good	0 - 5
Good	> 5 - 12.5
Fair	> 12.5 - 30
Poor	> 30

*Sum of Parameters Biased & Results Flagged

2012-09-06

Program Name: FPMI

Study Code: 0100

Table 3 Five-Year Historical Laboratory Performance - FP PT for Major Ions & Nutrients

LAB CODE	% Score Per Study (Sum of Parameters Biased & Results Flagged)										MEDIAN	RATING
	0091 Winter 2007	0092 Summer 2008	0093 Winter 2008	0094 Summer 2009	0095 Winter 2009	0096 Summer 2010	0097 Winter 2010	0098 Summer 2011	0099 Winter 2011	0100		
F003	0.8	0.8	2.5	2.5	0.0	0.8	0.0	0.0	0.0	0.5	0.6	Very Good
F004	0.8	0.8	0.8	0.0	0.0	1.0	0.0	2.0	0.0	0.0	0.4	Very Good
F006	0.0	0.0	0.0	15.0	0.0	10.0	50.0	5.0	55.0	0.0	2.5	Very Good
F009	18.6	0.9	6.4	0.9	0.9	1.8	0.9	9.6	0.9	15.9	1.4	Very Good
F011	22.5	15.6	35.6	16.5	15.8	22.2	1.4	6.5	6.8	41.5	16.2	Fair
F014	10.0	8.8	0.0	7.2	0.0	0.0	4.2	5.8	2.5	2.5	3.3	Very Good
F015	20.5	2.4	12.4	5.5	11.6	10.3	4.0	13.1	6.6	4.5	8.4	Good
F015b	0.0	100.0	27.5	2.5	0.0	40.0	15.0	2.6	0.0	5.0	3.8	Very Good
F021	8.3	5.3	1.3	11.3	5.4	2.3	6.3	10.0	5.7	3.7	5.5	Good
F022	1.9	1.4	1.4	5.6	17.2	10.3	11.7	14.7	5.9	18.8	8.1	Good
F026	5.3	0.3	8.8	0.3	4.0	0.3	4.1	11.6	3.8	0.6	3.9	Very Good
F026b	0.0	27.5	17.5	0.0	15.1	15.0	26.3	23.0	22.0	15.0	16.3	Fair
F036	4.4	15.9	16.6	1.9	0.0	4.1	8.4		3.8	15.6	4.4	Very Good
F069		19.4		7.4		12.4		9.2		14.9	12.4	Good
F090		25.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Very Good
F094	15.5	14.3	11.0	0.0	26.7	0.0	6.7	0.0	25.0	2.5	8.8	Good
F099		6.9		0.6		2.5		21.4		24.1	6.9	Good
F113	13.8	11.7	5.0	10.9	17.2	6.9	17.7	17.0	9.6	7.5	11.3	Good
F139		11.0	38.8			37.2	2.2		24.4	9.5	17.7	Fair
F154				33.1	27.3	17.8	12.0	7.9	17.4	31.3	17.8	Fair
F158	3.8	7.9	8.7	8.2	6.3	10.5	2.9	7.5	17.2	3.6	7.7	Good
F158a										0.0	0.0	Very Good
F183	9.1	13.2	2.2	4.7	6.9	9.2	2.9	6.7	13.8	4.4	6.8	Good
F193	1.4	27.1	3.6	5.0	28.9	14.3	4.6	12.7	1.8	5.9	5.5	Good
F207		2.1	5.6	0.7	0.9	9.7	0.0	1.0	4.0	0.3	1.0	Very Good
F221	1.0	0.0	1.0	0.0	10.0	1.0	0.0	0.8	0.7	0.8	0.8	Very Good
F223		23.4		1.4		0.0		7.3		2.1	2.1	Very Good

Laboratory Performance Rating

Rating	% Score
Very Good	0 - 5
Good	> 5 - 12.5
Fair	> 12.5 - 30
Poor	> 30

2012-09-06

Program Name: FPMI

Study Code: 0100

Table 3 Five-Year Historical Laboratory Performance - FP PT for Major Ions & Nutrients

LAB CODE	% Score Per Study (Sum of Parameters Biased & Results Flagged)										MEDIAN	RATING
	0091 Winter 2007	0092 Summer 2008	0093 Winter 2008	0094 Summer 2009	0095 Winter 2009	0096 Summer 2010	0097 Winter 2010	0098 Summer 2011	0099 Winter 2011	0100		
F223b				0.0				0.0		0.0	0.0	Very Good
F239								6.8		7.3	7.0	Good
F248		17.7	7.8	8.8	1.5	0.0	5.0	0.5	0.0	0.5	1.5	Very Good
F249										0.0	0.0	Very Good
F290									13.5	4.5	9.0	Good
F292							17.0		8.7	9.2	9.2	Good
F304					0.0	0.0	0.0	0.0	12.5	0.0	0.0	Very Good
F326										32.4	32.4	Poor
F326a										71.3	71.3	Poor
Interlab Median	4.4	9.9	5.6	4.7	4.7	5.5	4.1	6.7	5.9	4.5		

Laboratory Performance Rating

Rating	% Score
Very Good	0 - 5
Good	> 5 - 12.5
Fair	> 12.5 - 30
Poor	> 30

Program Name: FPMI 2012-09-07

Study Code: 0100

Table 4 Sample Design - FP PT for Major Ions & Nutrients

Sample Number	Sample Name	Source
1	BELLE-09A	Ontario
2	SWIFT-01D	Saskatchewan
3	SANGAMON-03	Illinois
4	CPMX-2	Alberta
5	RAISIN-99	Ontario
6	ION-91	Ontario
7	Raven Mix	Ontario
8	Cramich	Michigan
9	ION-96.4	Ontario
10	HAMIL-20.2	Ontario

Program Name: FPMI **Range of Samples:** 1 to 10 2012-09-06

Study Code: 0100

Table 5 Summary of Interlaboratory Robust Means - FP PT for Major Ions & Nutrients

Parameters	BELLE-09A Sample 1	SWIFT-01D Sample 2	SANGAMON-03 Sample 3	CPMX-2 Sample 4	RAISIN-99 Sample 5	ION-91 Sample 6	Raven Mix Sample 7	Cramich Sample 8	ION-96.4 Sample 9	HAMIL-20.2 Sample 10
Ammonia (mg/L N)	0.011	0.016	0.025	0.013	0.010	0.025	0.015	0.029	0.012	0.009
Boron (mg/L)	0.0077	0.058	0.035	0.116	0.0187	0.0060	0.071	0.021	0.045	0.055
Calcium (mg/L)	11.51	47.4	40.4	32.4	76.1	13.27	46.1	29.6	95.3	46.1
Chloride (mg/L)	5.64	8.45	16.7	20.2	15.3	1.31	16.5	13.2	74.3	72.4
Colour (Units)	39.3	3.04	24.6	26.0	94.3	4.99	22.9	3.49	14.2	5.18
Conductivity @ 25C (uS/cm)	105	627	369	744	451	95.7	580	264	827	551
Diss Inorg Carbon (mg/L C)	7.32	33.2	22.2	39.4	46.1	9.66	35.0	21.4	56.6	25.5
Diss Organic Carbon (mg/L C)	5.85	3.27	4.47	9.07	17.3	1.62	7.88	2.39	4.94	3.25
Fluoride (mg/L)	0.042	0.631	0.195	0.109	0.105	0.035	0.116	0.124	0.122	0.284
Magnesium (mg/L)	2.74	26.6	16.3	30.4	10.41	2.81	25.4	10.20	25.6	12.7
Nitrate + Nitrite (mg/L N)	0.318	0.358	11.80	0.670	0.398	0.274	0.261	0.259	2.86	2.00
pH (pH Units)	7.66	8.27	8.11	8.33	8.39	7.85	8.26	8.13	8.42	8.19
Potassium (mg/L)	0.820	8.64	3.83	9.25	1.44	0.507	7.25	1.18	3.57	4.05
Silicates (mg/L SiO2)	4.93	9.02	8.42	10.27	3.05	2.47	10.71	1.35	0.602	1.88
Sodium (mg/L)	4.97	42.3	5.01	80.5	9.66	1.29	36.1	7.87	43.6	42.8
Sulfate (mg/L)	7.76	167	18.2	182	19.7	3.13	125.5	21.1	76.5	44.0
Total Alkalinity (mg/L CaCO3)	33.1	145	96.2	170	202	42.5	150	91.8	247	111
Total Hardness (mg/L)	40.8	230	170	207	236	45.4	223	118	345	168
Total Kjeldahl N (mg/L N)	0.216	0.208	0.545	0.679	0.663	0.077	0.477	0.171	0.448	0.312
Total N (mg/L N)	0.523	0.558	12.2	1.34	1.059	0.341	0.719	0.436	3.20	2.26

Appendix A

PARAMETER: 07192 Ammonia mg/L N

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	0.022	0.021	0.014	0.02	0.02	0.018	0.03 WH	0.035	0.027	0.018
F004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.011	0.030	0.013	<0.005
F011	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.02	0.01	<0.01
F015	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.006	0.024	0.003	<0.002
F021	<0.002	<0.002	<0.002	<0.002	0.008	<0.002	0.006	0.022	0.003	<0.002
F022	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.025	<0.01	<0.01
F026	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.029	<0.01	<0.01
F036	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	0.015	0.035	0.014	0.006
F069	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.030	<0.010	<0.010
F113	0.005	0.004	<0.004	0.005	0.007	<0.004	0.013	0.032	0.014	0.004
F154	<0.010	<0.010	<0.010	0.014	0.012	<0.010	0.016	0.031	0.013	0.010
F158	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01
F158a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
F183	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.032	<0.020	<0.020
F207	0.005	<0.005	0.005	0.008	0.011	<0.005	0.017	0.031	0.014	0.008
F221	0.003	<0.001	<0.001	0.001	0.002	<0.001	0.010	0.031	0.007	0.002
F290	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.018	<0.010	<0.010
F292	0.031	0.029	0.031	0.032	0.032 WH	0.026	0.040 AH	0.056 AH	0.034 WH	0.031 WH
F304	0.003	<0.002	<0.002	<0.002	0.002	<0.002	0.011	0.033	0.006	0.003
F326	0.01	0.01	0.05	<0.01	<0.01	0.03	<0.01	0.04	<0.01	<0.01
ASSIGNED VALUE *	0.011	0.016	0.025	0.013	0.010	0.025	0.015	0.029	0.012	0.009
R-STD DEV *	0.0111	0.0127	0.0225	0.0129	0.0085	0.0069	0.0069	0.0072	0.0077	0.0079
ACCEPTABLE LIMITS(+-) *	0.0222	-	-	0.0258	0.0170	-	0.0138	0.0144	0.0154	0.0158
WARNING LIMITS(+-) *	.0222- .0333	-	-	.0258- .0387	.0170- .0255	-	.0138- .0207	.0144- .0216	.0154- .0231	.0158- .0237
ACTION LIMITS(<>) *	0.0333	-	-	0.0387	0.0255	-	0.0207	0.0216	0.0231	0.0237
N *	7	4	4	6	9	3	13	19	12	8

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	71.5	7.1	WH		10			Phenate
F004	19.5	6.5			3			Salicylate/nitroprus
F011	18.5	6.1			3			
F015	8.0	2.6			3			Colorimetry
F021	12.0	3.0			4			Flow injection
F022	6.0	6.0			1			
F026	7.0	7.0			1			Phenate
F036	40.5	8.1			5			Colorimetry
F069	15.5	7.7			2			
F113	42.0	5.2			8			
F154	43.5	7.2			6			Colorimetry
F158	2.5	2.5			1			Colorimetry
F158a	0.0	0.0			0			Colorimetry
F183	13.5	13.5			1			Colorimetry
F207	48.5	6.0			8			
F221	23.0	3.2			7			
F290	1.0	1.0			1			Flow injection
F292	83.0	8.3	WHAHAHWHWH		10			Phenate
F304	27.5	4.5			6			
F326	32.0	6.4			5			Metrohm,861CompactIC

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

OVERALL AVERAGE RANK IS 6.0

PARAMETER: 05091 Boron mg/L

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F014	0.010	0.060	0.037	0.117	0.019	<0.010	0.071	0.022	0.044	0.056
F015	<0.01	0.06	0.04	0.12	0.02	<0.01	0.08	0.02	0.05	0.06
F021	<0.01	0.06	0.03	0.12	0.02	<0.01	0.07	0.02	0.04	0.05
F022	0.0071	0.054	0.034	0.109	<0.025	0.007	0.065	<0.025	0.042	0.052
F026	<0.02	0.055	0.034	0.110	<0.02	<0.02	0.066	0.020	0.042	0.052
F069	0.008	0.059	0.036	0.117	0.019	0.006	0.070	0.021	0.045	0.056
F139	0.006	0.054	0.032	0.108	0.018	0.005	0.065	0.018	0.042	0.05
F154	0.045 AH	0.141 AH	0.087 AH	0.205 AH	0.049 AH	<0.030	0.112 AH	0.040 AH	0.070 AH	0.086 AH
F158	0.006	0.058	0.034	0.120	0.017	0.005	0.072	0.020	0.045	0.056
F183	0.008	0.057	0.034	0.111	0.0185	0.0069	0.069	0.022	0.045	0.056
F249	0.007	0.056	0.033	0.116	0.018	0.006	0.066	0.021	0.043	0.054
F290	0.007	0.052	0.032	0.103	0.017	0.006	0.063	0.019	0.040	0.051
F292	<0.05	0.08 AH	0.058 AH	0.144 AH	<0.05	<0.05	0.094 AH	<0.05	0.068 AH	0.076 AH
F326	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
ASSIGNED VALUE *	0.0077	0.058	0.035	0.116	0.0187	0.0060	0.071	0.021	0.045	0.055
R-STD DEV *	0.00179	0.0044	0.0043	0.0092	0.00149	0.00090	0.0074	0.0016	0.0045	0.0050
ACCEPTABLE LIMITS(+-) *	0.00358	0.0088	0.0086	0.0184	0.00298	0.00180	0.0148	0.0032	0.0090	0.0100
WARNING LIMITS(+-) *	.00358- .005	.0088- .0132	.0086- .0129	.0184- .0276	.00298- .004	.00180- .002	.0148- .0222	.0032- .0048	.0090- .0135	.0100- .0150
ACTION LIMITS(<>) *	0.00537	0.0132	0.0129	0.0276	0.00447	0.00270	0.0222	0.0048	0.0135	0.0150
N *	9	13	13	13	10	7	13	11	13	13

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F014	76.0	8.4			9			ICP-AES
F015	77.0	9.6			8			ICP-AES
F021	44.5	5.5			8			ICP-AES
F022	35.0	4.3			8			
F026	32.0	4.5			7			ICP-AES
F069	74.0	7.4			10			ICP-AES
F139	22.5	2.2		BIASED LOW*	10	-6.5	-0.0007	ICP-AES
F154	108.0	12.0	AHAHAHAHAH AHAHAHAH	BIASED HIGH	9	52.9	0.0202	ICP-MS
F158	60.0	6.0			10			ICP-MS
F183	68.0	6.8			10			ICP-MS
F249	50.0	5.0			10			
F290	21.0	2.1		BIASED LOW	10	-11.4	0.0006	ICP-MS
F292	72.0	12.0	AHAHAH AH AHAH	BIASED HIGH*	6	7.0	0.0189	ICP-AES
F326	0.0	0.0		INSUFFICIENT DATA	0			AcidDig&4100 MP-AES

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 10

OVERALL AVERAGE RANK IS 6.4

PARAMETER: 20091 Calcium mg/L

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	11.6	48.6	40.4	32.6	76.6	13.1	46.8	29.9	96.6	46.2
F009	11.3	46.0	38.6	30.7	71.6	12.9	43.8	27.7	94.3	42.8
F011	11.5	55.0 AH	46.3 AH	38.9 AH	82.2	14.5	55.3 AH	33.1 WH	105.	50.4
F014	12.0	49.2	42.3	32.9	77.4	13.9	48.6	31.3	95.5	47.7
F015	12.5	44.2	37.9	32.3	74.7	14.3	44.2	27.8	90.9	42.5
F021	11.8	49.6	42.2	33.4	76.0	13.6	47.4	30.3	93.5	47.1
F022	10.6	43.9	37.3	29.9	69.4	12.2	41.5	27.6	83.4 WL	41.7
F026	11.8	47.3	41.2	32.1	75.6	13.5	46.3	30.2	98.6	45.1
F036	10.9	46.6	39.3	30.0	75.1	12.5	45.8	28.3	92.9	46.5
F069	11.6	48.6	42.	33.	78.8	13.5	47.7	30.6	98.	46.9
F099	12.6	45.4	41.7	34.1	70.2	14.6	42.4	31.8	275. AH	47.9
F113	11.3	47.8	40.7	32.4	77.2	13.2	46.9	29.8	95.6	46.7
F139	10.5	43.7	37.6	29.6	69.7	12.2	42.8	27.3	83.7 WL	41.8
F154	11.7	47.8	41.8	33.8	77.9	13.4	47.1	30.4	95.3	47.1
F158	11.5	48.8	41.3	33.1	78.2	13.5	47.0	30.4	99.5	48.0
F183	11.5	46.3	40.2	32.2	75.0	13.2	45.7	30.0	92.7	47.1
F193	12.7	46.6	39.8	32.2	77.9	13.4	46.3	28.9	104.	48.2
F207	11.2	47.0	39.1	31.3	76.2	12.6	44.8	28.4	90.8	44.4
F223	11.7	49.1	40.4	33.5	76.9				96.8	47.6
F223b	11.5	47.7	40.5	32.0	77.2	13.3	46.4	29.4	95.4	45.9
F239	10. WL	50.	40.	35.	80.	10. AL	48.	30.	100.	50.
F248	11.6	48.1	40.8	32.6	77.1	13.4	46.7	29.7	95.8	46.4
F249	11.3	46.2	38.9	31.9	73.2	12.9	44.6	28.5	90.1	44.3
F290	11.5	47.2	42.0	33.2	78.3	13.3	46.6	30.3	95.1	45.5
F292	11.4	48.3	41.3	32.1	76.8	13.6	47.0	30.0	95.8	45.9
F326	13.3 WH	51.7	42.7	38.0 AH	82.1	16.3 AH	51.9 WH	31.8	99.1	49.4
F326a	7.66 AL	30.6 AL	23.5 AL	23.6 AL	40.1 AL	8.06 AL	26.6 AL	15.4 AL	53.0 AL	28.3 AL
ASSIGNED VALUE *	11.51	47.4	40.4	32.4	76.1	13.27	46.1	29.6	95.3	46.1
R-STD DEV *	0.606	2.23	1.85	1.68	3.37	0.820	2.28	1.59	4.87	2.62
ACCEPTABLE LIMITS(+-) *	1.212	4.46	3.70	3.36	6.74	1.640	4.56	3.18	9.74	5.24
WARNING LIMITS(+-) *	1.212- 1.818	4.46- 6.69	3.70- 5.55	3.36- 5.04	6.74- 10.11	1.640- 2.460	4.56- 6.84	3.18- 4.77	9.74- 14.61	5.24- 7.86
ACTION LIMITS(<>) *	1.818	6.69	5.55	5.04	10.11	2.460	6.84	4.77	14.61	7.86
N *	27	27	27	27	27	26	26	26	27	27

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	145.5	14.5			10			AAS absorption
F009	60.5	6.0		BIASED LOW*	10	-2.4	-0.8037	ICP-MS
F011	250.0	25.0	AHAHAH AHWH	BIASED HIGH	10	9.5	1.2435	
F014	211.0	21.1			10			ICP-AES
F015	96.0	9.6			10			ICP-AES
F021	188.5	18.8			10			ICP-AES
F022	26.5	2.6	WL	BIASED LOW	10	-12.1	1.2475	
F026	146.5	14.6			10			ICP-AES
F036	78.5	7.8			10			AAS absorption
F069	199.0	19.9			10			ICP-AES
F099	179.5	17.9	AH		10			
F113	139.5	13.9			10			
F139	28.5	2.8	WL	BIASED LOW	10	-11.5	1.1153	ICP-AES
F154	185.0	18.5			10			ICP-MS
F158	196.5	19.6			10			ICP-MS
F183	111.0	11.1			10			ICP-MS
F193	161.0	16.1			10			ICP-MS
F207	75.0	7.5			10			
F223	130.0	18.5			7			
F223b	125.5	12.5			10			
F239	177.0	17.7	WL AL		10			Titration
F248	152.0	15.2			10			ICP-MS
F249	66.5	6.6			10			
F290	155.5	15.5			10			ICP-AES
F292	151.0	15.1			10			ICP-AES
F326	253.5	25.3	WH AH AHWH	BIASED HIGH*	10	2.8	2.5634	Metrohm,861CompactIC
F326a	10.0	1.0	ALALALALALALALALAL	BIASED LOW	10	-47.1	2.4881	AcidDig&4100 MP-AES

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 5

OVERALL AVERAGE RANK IS 13.8

PARAMETER: 17092 Chloride mg/L

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	5.61	8.39	16.4	19.9	14.7	1.31	16.	12.9	73.2	70.6
F009	5.71	8.58	16.7	20.0	15.3	1.31	16.5	13.4	75.8	76.5
F011	6.2 WH	9.4 WH	18.8 WH	22.5 WH	17.1	1.4	18.5 WH	14.9 AH	85.7 AH	83.0 AH
F014	5.11 WL	8.93	16.9	21.0	16.9	1.12 WL	17.0	13.2	68.1	71.6
F015	5.9	8.6	17.4	21.	15.8	1.3	17.1	13.6	77.	72.
F021	5.7	8.6	16.5	19.9	15.4	1.4	16.4	13.3	77.5	74.1
F022	5.9	8.86	17.4	21.2	15.9	1.33	17.2	13.9	80.7 WH	77.3
F026	5.61	8.18	15.9	19.6	14.5	1.27	15.8	12.7	72.0	69.7
F036	4.80 AL	7.29 AL	15.2	18.8	14.5	1.21	10.7 AL	11.8 WL	73.3	72.5
F069	5.77	8.51	16.8	19.7	15.6	1.41	16.5	13.4	71.2	68.5
F099	5.74	8.60	17.5	21.0	16.5	1.22	17.3	13.8	76.4	74.0
F113	5.71	8.55	16.8	20.5	15.3	1.32	16.6	13.4	75.1	72.8
F139	5.94	8.52	15.8	19.6	14.7	0.94 AL	15.9	13.0	73.9	72.2
F154	5.72	8.50	16.8	20.4	15.3	1.33	16.5	13.3	74.7	72.5
F158	5.3	8.0	15.5	18.9	14.0	1.3	15.8	12.7	72.8	70.7
F183	5.58	8.32	16.5	20.1	15.0	1.36	16.3	13.1	74.9	72.8
F193	5.48	8.38	16.2	20.4	14.9	1.23	16.2	13.0	72.0	71.0
F207	5.7	8.1	16.8	19.6	14.9	1.3	15.7	13.1	72.5	70.6
F223b	<10.		16.4	19.8	14.8	<10.	16.1	13.0	72.4	70.3
F239	5.6	8.1	17.	20.	16.	1.4	18.	13.	71.	69.
F248	5.48	8.23	16.6	20.4	15.1	1.34	16.4	13.2	74.4	72.2
F290	5.71	8.66	17.3	21.1	15.7	1.34	17.1	13.7	76.8	74.3
F292	4.81 AL	7.36 WL	15.2	18.5	13.7	1.13	14.9	11.9 WL	70.6	68.8
F326	5.81	9.28 WH	20.2 AH	24.5 AH	17.3 WH	1.76 AH	19.4 AH	15.0 AH	102. AH	96.5 AH
ASSIGNED VALUE *	5.64	8.45	16.7	20.2	15.3	1.31	16.5	13.2	74.3	72.4
R-STD DEV *	0.242	0.375	0.79	0.91	0.91	0.091	0.84	0.49	3.16	2.82
ACCEPTABLE LIMITS(+-) *	0.484	0.750	1.58	1.82	1.82	0.182	1.68	0.98	6.32	5.64
WARNING LIMITS(+-) *	.484- .726	.750- 1.125	1.58- 2.37	1.82- 2.73	1.82- 2.73	.182- .273	1.68- 2.52	.98- 1.47	6.32- 9.48	5.64- 8.46
ACTION LIMITS(<>) *	0.726	1.125	2.37	2.73	2.73	0.273	2.52	1.47	9.48	8.46
N *	23	23	24	24	24	23	24	24	24	24

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	82.0	8.2			10			IC Dionex
F009	146.0	14.6			10			IC Dionex
F011	227.0	22.7	WHWHWHWH WHAHAHAH	BIASED HIGH	10	15.5	-0.4293	
F014	124.5	12.4	WL WL		10			IC Dionex
F015	172.5	17.2			10			IC
F021	148.5	14.8			10			IC Dionex
F022	202.5	20.2	WH	BIASED HIGH	10	8.2	-0.4287	
F026	53.5	5.3		BIASED LOW*	10	-3.4	-0.0524	IC Dionex
F036	40.5	4.0	ALAL ALWL	BIASED LOW*	10	1.2	-1.6918	IC Dionex
F069	125.5	12.5			10			IC
F099	179.0	17.9			10			
F113	151.0	15.1			10			
F139	88.5	8.8	AL		10			IC
F154	141.0	14.1			10			IC
F158	49.0	4.9		BIASED LOW*	10	-1.7	-0.4921	IC Dionex
F183	117.5	11.7			10			IC
F193	81.0	8.1			10			IC Dionex
F207	81.0	8.1			10			
F223b	50.0	7.1			7			
F239	117.5	11.7			10			IC
F248	115.5	11.5			10			IC Dionex
F290	184.0	18.4			10			IC Dionex
F292	18.5	1.8	ALWL WL	BIASED LOW*	10	-4.1	-0.7005	IC
F326	232.0	23.2	WHAHAHWHAHAHAHAHAH	BIASED HIGH	10	38.3	-2.5713	Metrohm,861CompactIC

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 5

OVERALL AVERAGE RANK IS 12.3

PARAMETER: 00292 Colour Units

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	32.4	2.8	20.2	23.1	82.7	3.7 WL	19.7	2.4	12.4	4.1
F011	45.	<5.	26.	27.	103.	5.	24.	<5.	15.	<5.
F015	42.	<2.5	30.	30.	95.	5.	29.	<2.5	15.	5.
F021	41.	<5.	26.	28.	96.	<5.	20.	<5.	14.	<5.
F036	40.4	3.8	26.0	29.0	107.	5.0	25.4	4.0	16.4	6.0
F094	41.8	3.0	23.9	24.5	102.	4.8	21.3	3.9	13.5	5.6
F154	37.2	<5.0	22.8	22.6	83.0	5.1	19.7	<5.0	13.2	<5.0
F158	30.6	<5.0	20.1	22.6	83.0	<5.0	19.9	<5.0	12.8	<5.0
F183	38.8	<4.96	24.8	28.1	101.	<4.96	24.5	<4.96	16.5	6.14
F193	44.3	3.2	26.9	27.4	99.5	6.4 WH	23.5	3.7	15.2	5.1
F207	39.0	3.0	24.0	24.0	88.0	5.0	21.0	3.0	13.0	5.0
F248	27.9	2.6	18.0	20.7	76.9	3.2 AL	18.0	2.4	11.6	3.8
F290	36.	<5.	23.	26.	99.	<5.	23.	<5.	14.	<5.
F292	50.	<5.0	30.0	30.	125. WH	5.0	30.	5.0	20.0 AH	5.0
F326	42.	<5.	27.	26.	87.	7. AH	26.	<5.	14.	6.
ASSIGNED VALUE *	39.3	3.04	24.6	26.0	94.3	4.99	22.9	3.49	14.2	5.18
R-STD DEV *	5.89	0.413	3.74	3.24	11.69	0.476	3.69	1.073	1.79	0.884
ACCEPTABLE LIMITS(+-) *	11.78	0.826	7.48	6.48	23.38	0.952	7.38	2.146	3.58	1.768
WARNING LIMITS(+-) *	11.78- 17.67	.826- 1.239	7.48- 11.22	6.48- 9.72	23.38- 35.07	.952- 1.428	7.38- 11.07	2.146- 3.219	3.58- 5.37	1.768- 2.652
ACTION LIMITS(<>) *	17.67	1.239	11.22	9.72	35.07	1.428	11.07	3.219	5.37	2.652
N *	15	6	15	15	15	11	15	7	15	10

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	24.0	2.4	WL	BIASED LOW*	10	-12.3	-0.5223	Auto Analyser
F011	72.5	10.3			7			
F015	82.0	10.2			8			Apparent
F021	51.0	8.5			6			Apparent
F036	96.5	9.6			10			True
F094	65.5	6.5			10			True
F154	31.5	4.5			7			Spectrophotometry
F158	17.0	2.8		BIASED LOW*	6	-11.8	-1.0433	Spectrophotometry
F183	72.0	10.2			7			Spectrophotometry
F193	91.0	9.1	WH		10			Spectrophotometry
F207	51.5	5.1			10			
F248	10.5	1.0	AL	BIASED LOW*	10	-19.0	-0.7740	Spectrophotometry
F290	41.5	6.9			6			Apparent
F292	106.0	11.7	WH AH	BIASED HIGH	9	33.0	-1.3897	True
F326	77.5	9.6	AH		8			Hach, DR/2010

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 25

OVERALL AVERAGE RANK IS 7.1

PARAMETER: 00392 Conductivity @ 25C uS/cm

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	104.	629.	377.	745.	449.	94.7	578.	261.	829.	549.
F004	104.	625.	369.	740.	450.	94.6	577.	263.	825.	547.
F009	103.	629.	371.	746.	454.	94.	584.	265.	831.	553.
F011	105.	628.	371.	742.	455.	96.2	588.	269.	841.	557.
F014	106.	631.	368.	747.	457.	95.9	586.	264.	837.	558.
F015	99. WL	611.	365.	733.	439.	89. AL	567.	258.	802.	536. WL
F015b	110. WH	630.	380.	760.	460.	100. WH	580.	270.	820.	550.
F021	100. WL	615.	362.	723.	438.	93.7	566.	261.	811.	544.
F022	106.	636.	373.	754.	457.	96.	593.	267.	840.	557.
F026	104.	623.	365.	745.	452.	96.3	583.	266.	826.	549.
F036	107.	642.	379.	765.	464.	97.0	595.	268.	852.	565. WH
F069	<100. WL	575. AL	341. AL	678. AL	413. AL	<100.	532. AL	240. AL	753. AL	503. AL
F090	106.	637.	374.	749.	455.	97.	586.	267.	837.	556.
F099	109.	642.	391. WH	789. AH	476. WH	106. AH	607. WH	273.	860.	618. AH
F113	103.	615.	363.	736.	442.	93.1	574.	259.	824.	548.
F154	106.	611.	345. WL	721.	441.	96.	568.	254.	787. WL	543.
F158	107.	627.	370.	743.	452.	97.1	589.	268.	832.	551.
F183	105.	634.	372.	748.	455.	96.5	584.	265.	830.	551.
F193	104.	631.	371.	748.	453.	93.5	583.	268.	832.	552.
F207	106.	629.	372.	747.	453.	96.	582.	269.	833.	553.
F221	105.	629.	374.	744.	457.	96.5	580.	266.	830.	554.
F239	106.	635.	362.	751.	441.	99.	566.	268.	805.	553.
F248	106.	628.	367.	746.	457.	96.6	582.	266.	831.	551.
F290	97. AL	607.	357.	727.	432.	92.	566.	252. WL	806.	532. WL
F292	111. WH	624.	358.	732.	427. WL	94.0	572.	258.	825.	551.
F326	106.	640.	376.	759.	464.	96.	591.	265.	848.	559.
ASSIGNED VALUE *	105	627	369	744	451	95.7	580	264	827	551
R-STD DEV *	2.3	11.0	8.3	12.8	10.9	2.07	11.0	5.2	16.9	6.7
ACCEPTABLE LIMITS(+-) *	4.6	22.0	16.6	25.6	21.8	4.14	22.0	10.4	33.8	13.4
WARNING LIMITS(+-) *	4.6- 6.9	22.0- 33.0	16.6- 24.9	25.6- 38.4	21.8- 32.7	4.14- 6.21	22.0- 33.0	10.4- 15.6	33.8- 50.7	13.4- 20.1
ACTION LIMITS(<>) *	6.9	33.0	24.9	38.4	32.7	6.21	33.0	15.6	50.7	20.1
N *	25	26	26	26	26	25	26	26	26	26

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	113.5	11.3			10			PC Titrate
F004	88.0	8.8			10			Radiometer
F009	132.0	13.2			10			Cond. meter
F011	167.5	16.7			10			
F014	166.0	16.6			10			PC Titrate
F015	41.5	4.1	WL AL WL	BIASED LOW*	10	-2.0	-2.1685	Cond. meter
F015b	190.5	19.0	WH WH		10			Cond. meter
F021	47.5	4.7	WL	BIASED LOW*	10	-2.1	-0.1702	Cond. meter
F022	197.5	19.7			10			
F026	113.0	11.3			10			PC Titrate
F036	236.5	23.6	WH	BIASED HIGH	10	3.1	-2.1471	Auto electrode
F069	8.0	1.0	WLALALALAL ALALALAL	BIASED LOW	8	-9.2	3.2677	Cond. meter
F090	195.0	19.5			10			Cond. meter
F099	255.5	25.5	WHAHWHAHWH AH	BIASED HIGH	10	4.8	3.7543	
F113	64.0	6.4		BIASED LOW*	10	-0.5	-3.2149	automated probe
F154	58.0	5.8	WL WL	BIASED LOW	10	-3.9	3.6644	Radiometer
F158	160.5	16.0			10			PC Titrate
F183	157.0	15.7			10			Cond. meter
F193	145.5	14.5			10			Cond. meter
F207	164.0	16.4			10			
F221	154.0	15.4			10			
F239	138.0	13.8			10			Cond. meter
F248	148.5	14.8			10			Radiometer
F290	27.0	2.7	AL WL WL	BIASED LOW*	10	-2.0	-5.4611	PC Titrate
F292	84.0	8.4	WH WL		10			PC Titrate
F326	205.5	20.5		BIASED HIGH	10	2.6	-2.7971	Cond. meter

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 2.5

OVERALL AVERAGE RANK IS 13.4

PARAMETER: 06592 Diss Inorg Carbon mg/L C

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	7.3	33.1	22.2	39.1	45.9	9.7	34.9	20.9	56.5	25.4
F015	7.5	34.	23.	40.1	46.7	10.1	35.1	22.	56.8	26.2
F022	6.9	31.4	21.3	39.1	42.3 AL	9.22	32. AL	20.7	56.1	23.9
F026	7.50	34.8	22.9	40.4	47.2	10.5	35.8	22.3	59.6 AH	26.7
F036	7.52	33.1	22.3	38.5	46.1	9.70	35.0	21.5	55.6	25.7
F094	6.96	32.5	21.0	37.9	44.7	9.06	33.3 WL	20.3	55.3	24.2
F154	7.6	33.9	22.3	39.6	46.4	9.9	35.0	21.2	57.1	25.8
F183	7.28	33.9	22.5	39.4	46.0	9.59	35.0	21.6	56.7	26.1
F290	7.4	28.5 AL	22.1	39.6	46.2	9.7	34.9	21.4	57.3	25.9
F326	7.2	34.1	22.2	39.8	47.1	9.3	37.5 AH	21.6	56.9	25.1
ASSIGNED VALUE *	7.32	33.2	22.2	39.4	46.1	9.66	35.0	21.4	56.6	25.5
R-STD DEV *	0.267	1.36	0.66	0.76	1.00	0.446	0.65	0.67	0.91	0.96
ACCEPTABLE LIMITS(+-) *	0.534	2.72	1.32	1.52	2.00	0.892	1.30	1.34	1.82	1.92
WARNING LIMITS(+-) *	.534- .801	2.72- 4.08	1.32- 1.98	1.52- 2.28	2.00- 3.00	.892- 1.338	1.30- 1.95	1.34- 2.01	1.82- 2.73	1.92- 2.88
ACTION LIMITS(<>) *	0.801	4.08	1.98	2.28	3.00	1.338	1.95	2.01	2.73	2.88
N *	10	10	10	10	10	10	10	10	10	10

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	41.0	4.1			10			Carbon analyser
F015	83.5	8.3		BIASED HIGH*	10	-0.1	0.5271	Carbon analyser
F022	18.5	1.8	AL AL	BIASED LOW*	10	-3.0	-0.4698	
F026	95.5	9.5	AH	BIASED HIGH*	10	3.7	0.0356	Colorimetry
F036	52.0	5.2			10			Shimadzu
F094	16.0	1.6	WL	BIASED LOW*	10	-1.9	-0.5571	IR detection
F154	68.5	6.8			10			Carbon analyser
F183	58.0	5.8			10			Shimadzu
F290	53.0	5.3	AL		10			Shimadzu
F326	64.0	6.4	AH		10			ShimTOCAnaly-TOC-Vcs

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 7.5

OVERALL AVERAGE RANK IS 5.5

PARAMETER: 06002 Diss Organic Carbon mg/L C

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	5.8	3.	4.2	9.	17.4	1.4	7.8	2.1	4.7	2.9
F004	5.80	3.01	3.95	8.72	17.4	1.61	7.61	1.97	4.51	2.94
F011	6.6	3.9	6.5 AH	12.4 AH	20.8 AH	2.8 AH	10.4 AH	4.2 AH	9.7 AH	5.3 AH
F015	6.	2.6	3.6	7.7	16.2	1.2	7.5	1.6	4.3	2.8
F021	6.0	3.4	4.9	9.4	18.1	1.5	8.3	2.3	5.3	3.6
F022	5.3	3.44	4.18	8.95	16.5	1.68	8.16	2.46	4.57	3.03
F026	5.65	3.19	4.04	8.66	16.7	1.46	7.50	2.12	4.66	3.03
F036	6.0	4.9 AH	5.4	11.4 AH	20.4 AH	2.0	9.8 AH	3.3	8.2 AH	4.5 WH
F069	6.07	3.21	4.35	8.99	17.7	1.44	7.75	2.18	4.65	3.02
F113	5.50	2.94	4.13	8.71	17.4	1.42	7.52	2.08	4.62	2.93
F154	6.6	2.7	4.8	9.6	18.0	2.0	8.2	2.6	5.4	3.2
F158	5.7	3.0	4.1	8.8	17.3	1.3	7.7	2.1	4.7	3.0
F183	5.87	3.50	4.75	9.96	18.2	1.25	8.58	2.60	5.71	3.54
F207	5.9	3.0	4.1	9.0	16.9	1.4	7.3	2.0	4.6	3.1
F290	6.3	3.7	4.7	9.1	16.9	2.3	7.9	2.9	5.5	3.5
F292	5.2	2.9	3.8	8.1	16.1	1.5	7.0	2.2	4.3	2.9
F326	5.3	4.7 WH	5.7	9.0	16.4	2.0	7.7	3.1	4.8	4.4 WH
ASSIGNED VALUE *	5.85	3.27	4.47	9.07	17.3	1.62	7.88	2.39	4.94	3.25
R-STD DEV *	0.439	0.500	0.663	0.680	0.95	0.367	0.556	0.531	0.605	0.439
ACCEPTABLE LIMITS(+-) *	0.878	1.000	1.326	1.360	1.90	0.734	1.112	1.062	1.210	0.878
WARNING LIMITS(+-) *	.878- 1.317	1.000- 1.500	1.326- 1.989	1.360- 2.040	1.90- 2.85	.734- 1.101	1.112- 1.668	1.062- 1.593	1.210- 1.815	.878- 1.317
ACTION LIMITS(<>) *	1.317	1.500	1.989	2.040	2.85	1.101	1.668	1.593	1.815	1.317
N *	17	17	17	17	17	17	17	17	17	17

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	74.5	7.4			10			UV IR
F004	60.5	6.0			10			TOC analyser
F011	167.5	16.7	AHAHAHAHAHAHAHAH	BIASED HIGH	10	14.2	1.4059	
F015	25.0	2.5		BIASED LOW*	10	-4.0	-0.4162	Carbon analyser
F021	123.5	12.3			10			Carbon analyser
F022	81.0	8.1			10			
F026	61.0	6.1			10			UV digestion, colori
F036	154.0	15.4	AH AHAH AH AHWH	BIASED HIGH	10	14.6	0.7078	automated
F069	92.0	9.2			10			IR detection
F113	54.0	5.4			10			
F154	122.0	12.2			10			Carbon analyser
F158	63.0	6.3			10			TOC analyser
F183	121.5	12.1			10			Shimadzu
F207	62.5	6.2			10			
F290	125.5	12.5			10			Shimadzu
F292	32.5	3.2		BIASED LOW*	10	-6.9	-0.1904	TOC analyser
F326	110.0	11.0	WH WH		10			ShimTOCAnaly-TOC-Vcs

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 7.5

OVERALL AVERAGE RANK IS 9.0

PARAMETER: 09092 Fluoride mg/L

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE	1=	2=	3=	4=	5=	6=	7=	8=	9=	10=
	BELLE-09A	SWIFT-01D	SANGAMON-03	CPMX-2	RAISIN-99	ION-91	Raven Mix	Cramich	ION-96.4	HAMIL-20.2
LAB NO	LAB RESULT	LAB RESULT	LAB RESULT	LAB RESULT	LAB RESULT	LAB RESULT	LAB RESULT	LAB RESULT	LAB RESULT	LAB RESULT
F003	0.04	0.64	0.19	0.11	0.1	0.03	0.11	0.12	0.12	0.29
F009	0.03	0.62	0.17	0.10	0.09	0.03	0.10	0.11	0.10	0.26
F011	<0.1	0.7	0.2	0.1	<0.1	<0.1	0.1	0.1	0.1	0.3
F014	<0.100	0.671	0.220	0.139 WH	0.130 WH	<0.100	0.147	0.153	0.159	0.320
F015	0.05	0.69	0.2	0.12	0.12	0.04	0.13	0.13	0.15	0.31
F022	0.044	0.65	0.2	0.11	0.11	0.034	0.11	0.12	0.12	0.28
F069	0.048					0.035				
F139	0.03	0.62	0.19	0.08	0.1	0.03	0.11	0.13	0.12	0.29
F154	<0.10	0.64	0.19	0.11	0.10	<0.10	0.11	0.13	0.13	0.30
F158	<0.20	0.61	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.26
F183	<0.06	0.62	0.19	0.12	0.11	<0.06	0.12	0.13	0.13	0.29
F193	0.04	0.62	0.18	0.10	0.10	<0.04	0.11	0.12	0.12	0.27
F223b	<0.1	0.6	0.19	0.12	0.11	<0.1	0.13	0.13	0.14	0.28
F248	0.05	0.69	0.19	0.12	0.10	0.04	0.13	0.10	0.12	0.29
F290	0.05	0.59	0.18	0.11	0.11	0.04	0.13	0.13	0.12	0.27
F292	<0.20	0.53 WL	0.22	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.28
F326	0.04	0.57	0.26 AH	0.08	0.07 WL	0.04	0.08 WL	0.14	0.09	0.21 AL
ASSIGNED VALUE *	0.042	0.631	0.195	0.109	0.105	0.035	0.116	0.124	0.122	0.284
R-STD DEV *	0.0087	0.0474	0.0172	0.0148	0.0118	0.0053	0.0163	0.0144	0.0199	0.0202
ACCEPTABLE LIMITS(+-) *	0.0174	0.0948	0.0344	0.0296	0.0236	0.0106	0.0326	0.0288	0.0398	0.0404
WARNING LIMITS(+-) *	.0174- .0261	.0948- .1422	.0344- .0516	.0296- .0444	.0236- .0354	.0106- .0159	.0326- .0489	.0288- .0432	.0398- .0597	.0404- .0606
ACTION LIMITS(<>) *	0.0261	0.1422	0.0516	0.0444	0.0354	0.0159	0.0489	0.0432	0.0597	0.0606
N *	10	16	15	14	13	9	14	14	14	16

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	63.5	6.3			10			IC Dionex
F009	28.5	2.8		BIASED LOW*	10	-0.4	-0.0146	Alizarin
F011	51.0	7.2			7			
F014	111.5	13.9	WHWH	BIASED HIGH*	8	2.0	0.0274	PC-Titrate
F015	114.5	11.4		BIASED HIGH	10	8.5	0.0027	IC
F022	74.5	7.4			10			
F069	12.0	6.0		INSUFFICIENT DATA	2			IC
F139	56.5	5.6			10			IC
F154	69.0	8.6			8			IC
F158	7.5	3.7		INSUFFICIENT DATA	2			IC Dionex
F183	74.5	9.3			8			IC
F193	45.0	5.0			9			IC Dionex
F223b	71.5	8.9			8			
F248	84.0	8.4			10			IC Dionex
F290	71.0	7.1			10			IC Dionex
F292	21.5	7.1	WL	INSUFFICIENT DATA	3			IC
F326	47.0	4.7	AH WL WL AL		10			Metrohm,861CompactIC

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 5

OVERALL AVERAGE RANK IS 7.4

PARAMETER: 12091 Magnesium mg/L

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	2.7	27.2	16.2	31.7	10.4	2.73	25.3	10.2	26.7	12.9
F009	2.50	24.6	14.8	27.7	9.52	2.58	23.2	9.17 WL	23.3	11.5
F011	3.0	28.8	17.8	33.2	11.7 WH	3.1	27.8	11.4 WH	28.0	14.0
F014	2.82	26.9	16.4	30.6	10.3	2.89	26.0	10.5	26.7	13.0
F015	3.	25.6	16.4	30.	11.	3.	25.3	10.1	24.5	13.2
F021	2.76	27.5	16.5	31.1	10.5	2.81	25.8	10.3	26.1	12.9
F022	2.52	25.1	15.1	28.2	9.81	2.56	23.9	9.69	23.9	12.
F026	2.65	26.5	16.0	29.9	10.2	2.68	25.4	9.98	25.3	12.2
F036	2.72	26.2	16.0	28.9	10.1	2.74	24.9	9.82	25.2	12.1
F069	2.88	28.	16.9	32.	11.1	2.95	26.7	10.6	26.8	13.3
F099	2.44	24.3	16.4	29.6	10.2	2.52	22.6	10.3	24.0	12.7
F113	2.58	25.8	15.6	29.8	10.0	2.68	24.9	9.89	24.8	12.3
F139	2.68	25.8	15.5	30.2	10.1	2.79	24.8	9.86	25.0	12.3
F154	3.74 AH	38.4 AH	22.6 AH	43.0 AH	15.0 AH	3.72 AH	34.0 AH	13.8 AH	34.8 AH	17.3 AH
F158	2.8	27.1	16.3	30.8	10.6	2.9	25.5	10.5	26.3	13.2
F183	2.64	26.0	16.2	29.8	10.2	2.72	24.6	10.1	25.3	13.1
F193	3.13	26.3	16.8	30.5	10.9	3.08	26.5	10.3	26.7	12.8
F207	2.6	26.5	15.8	29.9	10.4	2.7	24.5	9.8	25.1	12.4
F223	2.35	28.3	16.9	33.1	10.5	2.45	27.9	10.3	26.6	13.4
F239	6.0 AH	27.	18.	30.	9.0 WL	6.0 AH	26.	15. AH	24.	12.
F248	2.74	26.0	16.0	30.2	10.5	2.84	24.7	10.2	25.4	12.6
F249	2.68	26.5	15.2	30.6	9.97	2.75	25.0	9.79	25.6	12.3
F290	2.72	26.4	16.1	29.9	10.6	2.76	25.4	10.3	25.2	12.8
F292	2.76	26.5	16.0	30.1	10.4	2.80	25.4	9.92	25.7	12.6
F326	2.91	30.7 AH	19.6 AH	34.3 WH	12.5 AH	3.33 WH	28.8 WH	11.1	28.4	14.8 AH
F326a	2.16 WL	25.3	13.7 WL	29.0	9.93	2.59	22.5	9.12 WL	24.1	11.5
ASSIGNED VALUE *	2.74	26.6	16.3	30.4	10.41	2.81	25.4	10.20	25.6	12.7
R-STD DEV *	0.237	1.29	0.93	1.40	0.546	0.229	1.50	0.496	1.39	0.69
ACCEPTABLE LIMITS(+-) *	0.474	2.58	1.86	2.80	1.092	0.458	3.00	0.992	2.78	1.38
WARNING LIMITS(+-) *	.474- .711	2.58- 3.87	1.86- 2.79	2.80- 4.20	1.092- 1.638	.458- .687	3.00- 4.50	.992- 1.488	2.78- 4.17	1.38- 2.07
ACTION LIMITS(<>) *	0.711	3.87	2.79	4.20	1.638	0.687	4.50	1.488	4.17	2.07
N *	26	26	26	26	26	26	26	26	26	26

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	154.0	15.4			10			AAS absorption
F009	22.5	2.2	WL	BIASED LOW	10	-8.4	-0.0592	ICP-MS
F011	235.5	23.5	WH WH	BIASED HIGH	10	8.5	0.1701	
F014	179.5	17.9			10			ICP-AES
F015	149.5	14.9			10			ICP-AES
F021	178.0	17.8			10			ICP-AES
F022	31.5	3.1		BIASED LOW	10	-6.5	0.0247	
F026	102.0	10.2			10			ICP-AES
F036	85.5	8.5			10			AAS absorption
F069	217.5	21.7		BIASED HIGH	10	5.1	-0.0290	ICP-AES
F099	73.5	7.3			10			
F113	70.0	7.0			10			
F139	89.0	8.9			10			ICP-AES
F154	257.0	25.7	AHAHAHAHAHAHAHAHAHAH	BIASED HIGH	10	40.1	-0.2179	ICP-MS
F158	185.5	18.5			10			ICP-MS
F183	104.5	10.4			10			ICP-MS
F193	187.5	18.7			10			ICP-MS
F207	88.5	8.8			10			
F223	170.5	17.0			10			
F239	159.0	15.9	AH WLAH AH		10			Titration
F248	127.5	12.7			10			ICP-MS
F249	101.5	10.1			10			
F290	136.0	13.6			10			ICP-AES
F292	134.0	13.4			10			ICP-AES
F326	243.0	24.3	AHAHWHAHWHWH AH	BIASED HIGH	10	12.9	0.2262	Metrohm,861CompactIC
F326a	27.5	2.7	WL WL WL	BIASED LOW	10	-5.3	-0.4671	AcidDig&4100 MP-AES

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 5

OVERALL AVERAGE RANK IS 13.5

PARAMETER: 07092 Nitrate + Nitrite mg/L N

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE	1=	2=	3=	4=	5=	6=	7=	8=	9=	10=
	BELLE-09A	SWIFT-01D	SANGAMON-03	CPMX-2	RAISIN-99	ION-91	Raven Mix	Cramich	ION-96.4	HAMIL-20.2
LAB NO	LAB RESULT	LAB RESULT	LAB RESULT	LAB RESULT	LAB RESULT	LAB RESULT	LAB RESULT	LAB RESULT	LAB RESULT	LAB RESULT
F003	0.326	0.365	11.8	0.712	0.423	0.28	0.276	0.267	2.88	2.03
F004	0.324	0.353	11.6	0.640	0.403	0.272	0.258	0.258	2.99	2.00
F009	0.31	0.35	11.5	0.67	0.39	0.27	0.25	0.25	2.80	1.97
F011	0.28	0.43 WH	12.9 WH	0.62	0.50 AH	0.25	0.32 WH	0.25	2.95	2.15
F015	0.34	0.398	12.	0.761 WH	0.454	0.295	0.293	0.287 WH	3.07	2.12
F021	0.31	0.36	11.4	0.67	0.41	0.27	0.26	0.26	2.67	1.86
F022	0.28	0.33	12.4	0.62	0.36	0.24 WL	0.23	0.24	2.92	2.
F026	0.293	0.346	12.0	0.668	0.366	0.26	0.251	0.250	2.88	2.0
F026b	0.313	0.329	11.6	0.634	0.381	0.257	0.236	0.249	2.80	1.92
F036	0.330	0.351	11.7	0.667	0.397	0.284	0.256	0.263	2.80	2.01
F069	0.334	0.368	11.9	0.697	0.417	0.293	0.279	0.275	2.82	2.01
F099	0.34	0.38	12.2	0.71	0.42	0.29	0.28	0.27	2.97	2.08
F113	0.310	0.339	11.5	0.662	0.382	0.263	0.247	0.245	2.86	2.01
F139	0.358	0.348	13.1 WH	0.72	0.458 WH	0.291	0.258	0.254	3.04	2.22 WH
F154	0.272 WL	0.305	11.0	0.635	0.368	0.255	0.240	0.236	2.66	1.82 WL
F158	0.32	0.29 WL	11.5	0.48 AL	0.37	0.28	0.20 WL	0.27	2.82	1.91
F158a	0.31	0.35	11.8	0.64	0.39	0.26	0.26	0.26	2.81	1.90
F183	0.329	0.372	11.6	0.696	0.405	0.283	0.283	0.255	2.95	2.03
F193	0.29	0.33	<0.05 AL	0.62	0.34	0.26	0.24	0.25	2.61	1.90
F207	0.323	0.362	11.4	0.682	0.398	0.279	0.266	0.264	2.77	1.99
F221	0.319	0.364	11.2	0.689	0.389	0.280	0.269	0.267	2.84	2.03
F239	0.34	0.43 WH	11.	0.81 AH	0.47 WH	0.29	0.50 AH	0.29 WH	2.7	2.0
F290	0.32	0.37	12.0	0.68	0.40	0.27	0.26	0.25	2.87	2.00
F292	0.306	0.344	12.6	0.679	0.381	0.265	0.255	0.253	2.92	2.03
F304	0.324	0.365	11.7	0.690	0.397	0.276	0.267	0.262	2.81	1.99
F326	0.35	0.41	12.4	0.65	0.38	0.33 AH	0.26	0.30 AH	3.48 AH	2.58 AH
ASSIGNED VALUE *	0.318	0.358	11.80	0.670	0.398	0.274	0.261	0.259	2.86	2.00
R-STD DEV *	0.0219	0.0271	0.531	0.0403	0.0297	0.0163	0.0207	0.0132	0.129	0.086
ACCEPTABLE LIMITS(+-) *	0.0438	0.0542	1.062	0.0806	0.0594	0.0326	0.0414	0.0264	0.258	0.172
WARNING LIMITS(+-) *	.0438- .0657	.0542- .0813	1.062- 1.593	.0806- .1209	.0594- .0891	.0326- .0489	.0414- .0621	.0264- .0396	.258- .387	.172- .258
ACTION LIMITS(<>) *	0.0657	0.0813	1.593	0.1209	0.0891	0.0489	0.0621	0.0396	0.387	0.258
N *	26	26	25	26	26	26	26	26	26	26

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	187.5	18.7			10			AA Cadmium redn
F004	136.5	13.6			10			AA Cadmium redn
F009	90.0	9.0			10			IC Dionex
F011	159.5	15.9	WHWH AH WH		10			
F015	233.0	23.3	WH WH	BIASED HIGH*	10	1.5	0.0529	AA Cadmium redn
F021	104.5	10.4			10			IC Dionex
F022	69.0	6.9	WL		10			
F026	95.5	9.5			10			AA Cadmium redn
F026b	60.5	6.0		BIASED LOW*	10	-1.6	-0.0175	IC Dionex
F036	139.0	13.9			10			AA Hydrazine redn
F069	192.5	19.2			10			
F099	217.0	21.7		BIASED HIGH*	10	3.3	0.0106	
F113	87.5	8.7			10			
F139	202.5	20.2	WH WH WH		10			IC
F154	26.0	2.6	WL WL	BIASED LOW	10	-6.7	-0.0119	Flow injection Cd
F158	83.5	8.3	WL AL WL		10			AA Hydrazine redn
F158a	100.5	10.0			10			AA Hydrazine redn
F183	182.0	18.2			10			Colorimetry
F193	34.5	3.8	AL	BIASED LOW	9	-7.6	0.0005	IC Dionex
F207	130.0	13.0			10			
F221	147.0	14.7			10			
F239	189.5	18.9	WH AHWH AHWH		10			IC
F290	143.0	14.3			10			IC Dionex
F292	124.5	12.4			10			Flow injection Cd
F304	145.0	14.5			10			
F326	204.0	20.4	AH AHAHAH		10			Metrohm,861CompactIC

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 5

OVERALL AVERAGE RANK IS 13.4

PARAMETER: 01092 pH pH Units

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	7.46	8.22	8.04	8.28	8.4	7.7	8.22	8.04	8.41	8.12
F009	7.67	8.24	8.07	8.29	8.38	7.72	8.23	8.06	8.38	8.14
F011	7.55	8.15	8.00	8.23	8.29	7.75	8.17	8.04	8.31	8.09
F014	7.74	8.29	8.14	8.36	8.41	7.92	8.31	8.18	8.45	8.22
F015	7.8	8.33	8.19	8.37	8.43	7.94	8.32	8.21	8.45	8.26
F015b	7.8	8.29	8.16	8.35	8.39	7.91	8.28	8.14	8.4	8.19
F021	7.82	8.38	8.23	8.41	8.47	7.96	8.41	8.30	8.51	8.31
F022	7.46	8.05 WL	7.93 WL	8.15 WL	8.26	7.71	8.16	8.01	8.39	8.08
F026	7.42	8.12	8.02	8.28	8.36	7.78	8.24	8.1	8.39	8.16
F026b	7.55	8.38	8.19	8.47	8.57 WH	7.93	8.38	8.18	8.54	8.32
F036	7.67	8.20	8.07	8.25	8.31	7.79	8.19	8.07	8.32	8.12
F069	7.6	8.2	8.1	8.3	8.3	7.9	8.2	8.1	8.4	8.2
F090	7.65	8.25	8.08	8.30	8.32	7.82	8.23	8.10	8.35	8.15
F099	7.92	8.44	8.20	8.14 WL	8.55	7.82	8.04 WL	7.95	8.25 WL	8.05
F113	7.77	8.32	8.18	8.4	8.45	7.92	8.34	8.22	8.45	8.25
F139	7.80	8.38	8.14	8.46	8.52	7.93	8.34	8.22	8.55	8.30
F154	7.59	8.28	8.13	8.35	8.42	7.80	8.29	8.12	8.45	8.19
F158	7.90	8.37	8.25	8.42	8.47	8.00	8.38	8.28	8.49	8.33
F183	7.06 AL	8.10	7.75 AL	8.07 AL	8.27	7.73	8.02 WL	7.81 AL	8.33	7.95 WL
F193	7.57	8.29	8.11	8.35	8.42	7.83	8.27	8.12	8.48	8.16
F221	7.60	8.19	8.04	8.29	8.34	7.83	8.19	8.03	8.36	8.06
F239	7.6	8.4	8.1	8.4	8.3	8.2 AH	8.3	8.2	8.4	8.3
F248	7.70	8.32	8.15	8.38	8.47	7.80	8.33	8.19	8.52	8.28
F290	7.78	8.26	8.18	8.35	8.43	7.97	8.31	8.21	8.44	8.25
F292	7.73	8.31	8.16	8.32	8.40	7.91	8.30	8.17	8.43	8.20
F326	7.7	8.3	8.0	8.3	8.4	7.8	8.2	8.1	8.4	8.1
ASSIGNED VALUE *	7.66	8.27	8.11	8.33	8.39	7.85	8.26	8.13	8.42	8.19
R-STD DEV *	0.156	0.101	0.089	0.085	0.089	0.106	0.088	0.096	0.076	0.102
ACCEPTABLE LIMITS(+-) *	0.312	0.202	0.178	0.170	0.178	0.212	0.176	0.192	0.152	0.204
WARNING LIMITS(+-) *	.312- .468	.202- .303	.178- .267	.170- .255	.178- .267	.212- .318	.176- .264	.192- .288	.152- .228	.204- .306
ACTION LIMITS(<>) *	0.468	0.303	0.267	0.255	0.267	0.318	0.264	0.288	0.228	0.306
N *	26	26	26	26	26	26	26	26	26	26

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	74.5	7.4			10			pH Stirred
F009	86.0	8.6			10			pH Stirred
F011	41.5	4.1		BIASED LOW*	10	0.3	-0.1254	
F014	170.5	17.0			10			PC-Titrate
F015	204.0	20.4			10			pH Stirred
F015b	151.5	15.1			10			pH Stirred
F021	239.0	23.9		BIASED HIGH	10	-7.7	0.7490	pH Stirred
F022	31.0	3.1	WLWLWL	BIASED LOW	10	9.9	-0.9480	
F026	74.0	7.4			10			pH Stirred
F026b	215.5	21.5	WH	BIASED HIGH	10	28.4	-2.2275	pH Stirred
F036	70.5	7.0			10			pH Stirred
F069	103.5	10.3			10			
F090	97.5	9.7			10			pH Stirred
F099	121.5	12.1	WL WL WL		10			
F113	201.0	20.1			10			
F139	224.5	22.4		BIASED HIGH*	10	1.8	-0.0404	
F154	135.5	13.5			10			pH Stirred
F158	240.5	24.0		BIASED HIGH	10	-19.2	1.6946	pH Stirred
F183	18.0	1.8	AL ALAL WLAL WL	BIASED LOW	10	42.6	-3.7269	pH unstirred
F193	138.5	13.8			10			pH unstirred
F221	70.0	7.0			10			
F239	169.0	16.9	AH		10			pH unstirred
F248	187.0	18.7			10			pH Stirred
F290	184.0	18.4			10			PC Titrate
F292	158.0	15.8			10			pH Stirred
F326	103.5	10.3			10			pH unstirred

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 5

OVERALL AVERAGE RANK IS 13.5

PARAMETER: 19091 Potassium mg/L

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	0.82	8.73	3.82	9.31	1.39	0.5	7.53	1.18	3.46	3.95
F009	0.75	7.91	3.50 WL	8.42	1.32	0.48	6.57	1.10	3.17 WL	3.86
F011	0.8	9.4	4.1	9.9	1.5	0.5	8.0 WH	1.2	3.9 WH	4.3
F014	0.89	8.9	4.0	9.0	1.5	0.55	7.2	1.3	3.7	4.3
F015	0.9	8.3	3.8	9.	1.4	0.5	7.2	1.1	3.4	3.8
F021	0.78	8.99	3.92	9.53	1.37	0.49	7.36	1.15	3.52	4.06
F022	0.837	8.54	3.77	9.06	1.44	0.493	7.19	1.21	3.5	3.99
F026	0.822	8.44	3.78	9.09	1.40	0.502	7.13	1.15	3.50	3.88
F036	0.820	8.61	3.82	8.69	1.42	0.500	7.02	1.18	3.46	4.04
F069	0.856	9.23	3.94	9.76	1.51	0.552	7.81	1.17	3.72	4.21
F099	0.865	9.26	3.93	10.4 WH	1.51	0.59 WH	7.78	1.25	3.81	4.38
F113	0.796	8.39	3.65	9.12	1.35	0.487	7.15	1.13	3.43	3.90
F139	0.974 WH	7.75	3.71	8.67	2.18 AH	0.573	6.65	1.58 AH	3.53	3.86
F154	0.57 AL	8.13	3.64	9.17	1.34	0.46	6.90	1.21	3.52	4.01
F158	0.8	8.6	3.8	9.2	1.4	0.5	7.1	1.2	3.6	4.1
F183	0.854	8.44	3.98	8.85	1.37	0.518	7.13	1.19	3.56	4.01
F207	0.8	8.5	3.8	9.1	1.4	0.5	7.0	1.1	3.4	4.0
F223	0.93	8.45	3.76	9.01	1.50	0.67 AH	7.11	1.3	3.59	4.02
F223b		8.79	3.76	9.43						3.94
F239	<1.0	8.3	3.6	9.5	1.5	<1.0	7.1	1.2	3.6	4.1
F248	0.838	8.65	3.85	9.27	1.45	0.528	7.22	1.19	3.57	4.01
F249	0.80	8.32	3.79	9.35	1.45	0.51	7.19	1.18	3.68	4.11
F290	0.8	8.4	3.8	9.0	1.4	0.5	7.1	1.1	3.4	3.8
F292	<2.0	8.7	4.0	9.1	<2.0	<2.0	7.3	<2.0	3.6	4.0
F326	0.74	9.47	4.22 WH	10.3 WH	1.48	0.40 WL	8.17 WH	1.14	3.75	4.37
F326a	0.73	11.3 AH	3.87	13.2 AH	1.49	0.11 AL	8.92 AH	0.96 AL	5.35 AH	5.42 AH
ASSIGNED VALUE *	0.820	8.64	3.83	9.25	1.44	0.507	7.25	1.18	3.57	4.05
R-STD DEV *	0.0620	0.470	0.144	0.442	0.071	0.0378	0.346	0.065	0.155	0.186
ACCEPTABLE LIMITS(+-) *	0.1240	0.940	0.288	0.884	0.142	0.0756	0.692	0.130	0.310	0.372
WARNING LIMITS(+-) *	.1240- .1860	.940- 1.410	.288- .432	.884- 1.326	.142- .213	.0756- .1134	.692- 1.038	.130- .195	.310- .465	.372- .558
ACTION LIMITS(<>) *	0.1860	1.410	0.432	1.326	0.213	0.1134	1.038	0.195	0.465	0.558
N *	23	26	26	26	24	23	25	24	25	26

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	126.5	12.6			10			AAS absorption
F009	22.0	2.2	WL WL	BIASED LOW	10	-9.0	0.0192	ICP-MS
F011	198.0	19.8	WH WH	BIASED HIGH	10	9.2	-0.0676	
F014	188.5	18.8			10			ICP-MS
F015	87.5	8.7			10			ICP-AES
F021	131.5	13.1			10			ICP-AES
F022	115.5	11.5			10			
F026	99.0	9.9			10			ICP-AES
F036	108.5	10.8			10			AAS absorption
F069	199.5	19.9		BIASED HIGH	10	6.8	-0.0554	ICP-AES
F099	221.5	22.1	WH WH	BIASED HIGH	10	9.9	-0.0767	
F113	67.0	6.7			10			
F139	117.5	11.7	WH AH AH		10			ICP-AES
F154	72.0	7.2	AL		10			ICP-MS
F158	130.0	13.0			10			ICP-MS
F183	125.0	12.5			10			ICP-MS
F207	86.0	8.6			10			
F223	151.5	15.1	AH		10			
F223b	51.5	12.8		INSUFFICIENT DATA	4			
F239	105.5	13.1			8			Flame photometer
F248	156.0	15.6			10			ICP-MS
F249	138.0	13.8			10			
F290	70.5	7.0			10			ICP-AES
F292	97.5	16.2			6			ICP-AES
F326	173.0	17.3	WHWH WLWH		10			Metrohm,861CompactIC
F326a	167.0	16.7	AH AH ALAHALAHAH		10			AcidDig&4100 MP-AES

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 5

OVERALL AVERAGE RANK IS 12.9

PARAMETER: 14091 Silicates mg/L SiO2

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	4.87	9.21	8.51	10.4	3.08	2.49	10.9	1.38	0.61	1.91
F011	5.19	9.36	9.09	11.0	3.11	2.50	11.7	1.37	0.600	1.91
F015	5.41 WH	9.33	8.90	10.5	3.25	2.69	11.2	1.36	0.663	1.92
F022	4.95	9.09	8.5	10.3	3.05	2.49	10.8	1.35	0.583	1.91
F026	4.65	8.78	8.16	10.0	2.92	2.34	10.3	1.29	0.57	1.82
F026b	4.90	8.75	8.22	9.87	2.82	2.37	10.3	1.26	0.538	1.73
F036	4.88	8.94	8.43	10.2	3.17	2.57	10.6	1.46	0.620	1.97
F069	5.	9.13	8.5	9.86	3.04	2.55	10.7	1.35	0.58	1.86
F099	4.84	9.27	8.60	10.6	3.10	2.52	11.0	1.41	0.64	1.28 AL
F113	6.14 AH	12.3 AH	11.3 AH	14.0 AH	4.01 AH	3.27 AH	14.8 AH	1.83 AH	0.819 AH	2.55 AH
F154	4.92	6.98 AL	7.36 WL	8.87 WL	2.08 AL	2.10 WL	9.29 WL	1.07 AL	0.599	1.92
F158	4.8	8.8	8.2	10.0	2.9	2.3	10.5	1.2	<1.0	1.8
F183	4.65	8.94	7.89	9.95	2.96	2.38	10.2	1.27	0.609	1.77
F207	4.78	8.84	8.19	10.1	2.96	2.38	10.4	1.31	0.57	1.83
F221	4.99	9.05	8.47	11.0	3.02	2.44	11.3	1.34	0.59	1.88
F290	5.06	9.07	8.52	10.4	3.08	2.55	10.9	1.37	0.58	1.98
F292	4.98	9.02	8.56	10.4	3.06	2.46	10.7	1.34	0.55	1.90
F326	4.77	8.73	8.11	9.75	3.20	2.48	10.1	1.45	0.88 AH	2.05
ASSIGNED VALUE *	4.93	9.02	8.42	10.27	3.05	2.47	10.71	1.35	0.602	1.88
R-STD DEV *	0.194	0.271	0.374	0.498	0.149	0.124	0.539	0.086	0.0449	0.106
ACCEPTABLE LIMITS(+-) *	0.388	0.542	0.748	0.996	0.298	0.248	1.078	0.172	0.0898	0.212
WARNING LIMITS(+-) *	.388- .582	.542- .813	.748- 1.122	.996- 1.494	.298- .447	.248- .372	1.078- 1.617	.172- .258	.0898- .1347	.212- .318
ACTION LIMITS(<>) *	0.582	0.813	1.122	1.494	0.447	0.372	1.617	0.258	0.1347	0.318
N *	18	18	18	18	18	18	18	18	17	18

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	116.5	11.6			10			Molybdosilicate
F011	143.0	14.3		BIASED HIGH	10	8.5	-0.1365	
F015	151.5	15.1	WH	BIASED HIGH*	10	3.4	0.0713	ICP-AES
F022	101.5	10.1			10			
F026	41.0	4.1		BIASED LOW*	10	-2.8	-0.0381	Molybdosilicate
F026b	39.5	3.9		BIASED LOW*	10	-2.8	-0.0473	
F036	116.5	11.6			10			Molybdosilicate
F069	94.5	9.4			10			ICP-AES
F099	121.0	12.1	AL		10			
F113	178.0	17.8	AHAHAHAHAHAHAHAHAHAH	BIASED HIGH	10	37.3	-0.1363	
F154	39.5	3.9	ALWLWLALWLWLAL	BIASED LOW	10	-15.4	0.0590	Heteropolyblue
F158	40.5	4.5		BIASED LOW*	9	-1.3	-0.1045	Molybdosilicate
F183	48.0	4.8			10			ICP-MS
F207	55.5	5.5			10			
F221	102.0	10.2			10			
F290	123.5	12.3			10			Auto Molybdate
F292	93.0	9.3			10			Flow injection
F326	87.0	8.7	AH		10			Spectroquant (1.1479

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 5

OVERALL AVERAGE RANK IS 9.4

PARAMETER: 11091 Sodium mg/L

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	4.9	42.7	4.96	82.	9.5	1.3	36.5	7.86	44.2	43.1
F009	4.49	39.1	4.45	73.3 WL	8.76 WL	1.20	32.6	7.12	39.3	38.4
F011	5.5	47.3 WH	5.5	87.8 WH	10.7 WH	1.4	40.6 WH	8.7	48.9 WH	47.9 WH
F014	4.94	42.2	5.01	78.7	9.51	1.32	36.2	8.08	44.6	42.2
F015	5.1	40.1	4.8	81.4	9.6	1.3	34.6	7.5	40.6	39.7
F021	5.22	45.3	5.25	82.5	10.0	1.36	37.7	8.42	45.4	45.2
F022	4.7	40.8	5.12	77.	9.95	1.22	34.8	7.9	41.4	41.4
F026	4.94	41.3	4.77	78.0	9.04	1.21	34.4	7.42	41.9	41.1
F036	4.76	41.8	4.87	80.6	9.57	1.29	35.5	7.71	42.5	42.4
F069	5.06	43.1	4.95	82.4	9.96	1.31	37.8	7.69	43.9	44.3
F099	6.63 AH	53.0 AH	6.30 AH	108. AH	11.9 AH	2.03 AH	56.4 AH	9.91 AH	65.6 AH	67.5 AH
F113	4.68	42.0	4.71	80.9	9.3	1.24	36.1	7.69	42.8	42.7
F139	4.80	40.7	4.85	78.0	9.37	1.49 WH	34.4	7.54	42.1	40.4
F154	7.26 AH	59.8 AH	7.11 AH	116. AH	13.5 AH	1.65 AH	48.5 AH	10.8 AH	58.8 AH	57.0 AH
F158	4.8	42.5	4.8	79.8	9.5	1.3	35.4	7.9	43.4	42.7
F183	5.04	43.0	5.18	84.4	9.60	1.29	36.4	8.05	44.4	44.6
F193	5.18	40.7	5.03	80.3	9.68	1.31	36.9	7.85	44.2	41.1
F207	4.8	42.	4.7	78.8	9.6	1.1 WL	34.4	7.6	42.2	42.1
F223	<10.	43.4	<10.	82.0	10.8 WH	<10.	37.2	<10.	44.4	43.5
F223b		41.8		80.3	9.18	<5.			42.5	42.1
F239	5.1	40.	5.3	78.	9.6	1.3	36.	8.1	46.	44.
F248	4.86	39.8	4.89	77.5	9.29	1.28	34.3	7.68	41.7	40.8
F249	4.90	42.8	4.89	79.1	9.35	1.29	35.9	7.61	43.6	43.1
F290	5.0	41.7	4.9	78.9	9.6	1.3	35.5	7.9	42.7	42.0
F292	4.95	43.0	5.03	80.6	9.72	1.30	36.3	7.96	44.2	42.9
F326	5.30	47.8 WH	5.53	88.0 WH	10.1	1.27	39.2	8.35	47.2	46.5
F326a	3.70 AL	36.8 WL	4.87	61.1 AL	9.67	1.00 AL	22.9 AL	7.26	27.8 AL	27.2 AL
ASSIGNED VALUE *	4.97	42.3	5.01	80.5	9.66	1.29	36.1	7.87	43.6	42.8
R-STD DEV *	0.279	2.30	0.289	3.45	0.430	0.074	2.05	0.428	2.45	2.51
ACCEPTABLE LIMITS(+-) *	0.558	4.60	0.578	6.90	0.860	0.148	4.10	0.856	4.90	5.02
WARNING LIMITS(+-) *	.558- .837	4.60- 6.90	.578- .867	6.90- 10.35	.860- 1.290	.148- .222	4.10- 6.15	.856- 1.284	4.90- 7.35	5.02- 7.53
ACTION LIMITS(<>) *	0.837	6.90	0.867	10.35	1.290	0.222	6.15	1.284	7.35	7.53
N *	25	27	25	27	27	25	26	25	27	27

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	149.5	14.9			10			AAS absorption
F009	18.0	1.8	WLWL	BIASED LOW	10	-9.0	-0.0646	ICP-MS
F011	236.0	23.6	WH WHWH WH WHWH	BIASED HIGH	10	10.1	0.2558	
F014	147.5	14.7			10			ICP-AES
F015	92.5	9.2			10			ICP-AES
F021	217.0	21.7		BIASED HIGH*	10	3.4	0.3056	ICP-AES
F022	93.0	9.3			10			
F026	58.0	5.8		BIASED LOW*	10	-3.1	-0.1424	ICP-AES
F036	105.5	10.5			10			AAS absorption
F069	179.0	17.9			10			ICP-AES
F099	255.0	25.5	AHAHAHAHAHAHAHAHAHAH	BIASED HIGH	10	39.5	0.5026	
F113	97.5	9.7			10			
F139	77.5	7.7	WH		10			ICP-AES
F154	257.0	25.7	AHAHAHAHAHAHAHAHAHAH	BIASED HIGH	10	41.4	-0.7191	ICP-MS
F158	115.0	11.5			10			ICP-MS
F183	178.0	17.8			10			ICP-MS
F193	147.5	14.7			10			ICP-MS
F207	77.0	7.7	WL		10			
F223	125.0	20.8	WH		6			
F223b	48.0	9.6			5			
F239	154.0	15.4			10			Flame photometer
F248	59.5	5.9		BIASED LOW*	10	-4.3	-0.0213	ICP-MS
F249	116.5	11.6			10			
F290	121.0	12.1			10			ICP-AES
F292	165.0	16.5			10			ICP-AES
F326	217.0	21.7	WH WH	BIASED HIGH	10	9.8	-0.1648	Metrohm,861CompactIC
F326a	34.5	3.4	ALWL AL ALAL ALAL	BIASED LOW	10	-27.9	0.4569	AcidDig&4100 MP-AES

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 5

OVERALL AVERAGE RANK IS 13.5

PARAMETER: 16092 Sulfate mg/L

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	7.85	166.	18.2	178.	19.	3.07	119.	21.	74.8	42.7
F009	7.67	160.	17.8	174.	19.2	3.04	122.	20.8	74.9	42.5
F011	9. WH	187. AH	21. AH	200. WH	25. AH	4. AH	143. AH	25. AH	89. AH	49. WH
F014	7.14	162.	18.1	168.	21.2	2.62	119.	21.0	69.4 AL	49.8 WH
F015	7.3	169.	18.	186.	19.5	2.9	126.	21.3	77.	47.
F021	7.8	162.	17.9	192.	19.2	3.1	133.	20.4	78.5	44.8
F022	8.	174.	19.	189.	20.3	3.	131.	22.1	78.6	44.9
F026	7.67	164.	17.8	181.	18.7	3.13	123.	20.8	75.1	42.3
F036	7.50	168.	18.6	183.	19.8	3.20	88.7 AL	21.3	76.7	43.1
F069	7.93	170.	17.9	184.	19.1	3.43	127.	20.5	75.6	41.2
F113	8.33	168.	19.4	183.	21.0	3.43	128.	22.4 WH	79.3	45.4
F139	8.31	165.	17.5	181.	19.2	3.65	124.	21.1	77.0	44.9
F154	7.89	170.	18.4	184.	19.4	3.00	128.	21.4	77.6	44.0
F158	7.6	162.	17.7	176.	18.4	3.0	126.	20.6	76.3	42.2
F183	7.52	166.	17.7	181.	19.1	3.31	126.	20.8	77.9	43.6
F193	7.70	169.	18.1	182.	19.8	3.17	128.	21.3	74.7	43.6
F207	7.5	162.	19.1	176.	21.4	3.0	120.	21.0	73.8	42.3
F223b	7.31	167.	17.0	182.	18.4	2.84	126.	20.2	75.7	42.3
F239	8.1	166.	18.	191.	21.	3.1	124.	21.	74.	44.
F248	7.70	166.	18.0	179.	19.4	3.05	124.	20.9	75.2	43.2
F290	7.8	169.	18.5	180.	19.8	3.1	126.	21.3	78.4	44.6
F292	6.47 WL	159.	16.7	173.	18.0	2.33 WL	122.	19.6 WL	74.5	41.9
F326	8.96 WH	197. AH	22.2 AH	210. AH	24.4 AH	4.41 AH	147. AH	26.3 AH	85.5 AH	49.8 WH
ASSIGNED VALUE *	7.76	167	18.2	182	19.7	3.13	125.5	21.1	76.5	44.0
R-STD DEV *	0.428	4.8	0.75	7.0	1.22	0.272	5.01	0.63	2.30	2.04
ACCEPTABLE LIMITS(+-) *	0.856	9.6	1.50	14.0	2.44	0.544	10.02	1.26	4.60	4.08
WARNING LIMITS(+-) *	.856- 1.284	9.6- 14.4	1.50- 2.25	14.0- 21.0	2.44- 3.66	.544- .816	10.02- 15.03	1.26- 1.89	4.60- 6.90	4.08- 6.12
ACTION LIMITS(<>) *	1.284	14.4	2.25	21.0	3.66	0.816	15.03	1.89	6.90	6.12
N *	23	23	23	23	23	23	23	23	23	23

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	90.5	9.0			10			IC Dionex
F009	65.5	6.5			10			IC Dionex
F011	222.0	22.2	WHAHAHWHAHAHAHAHAHWH	BIASED HIGH	10	10.7	1.6002	
F014	80.5	8.0	ALWH		10			IC Dionex
F015	130.0	13.0			10			IC
F021	128.5	12.8			10			IC Dionex
F022	178.0	17.8			10			
F026	79.0	7.9			10			IC Dionex
F036	124.0	12.4	AL		10			IC Dionex
F069	118.5	11.8			10			IC
F113	188.0	18.8	WH	BIASED HIGH*	10	0.3	1.1294	
F139	126.0	12.6			10			IC
F154	152.5	15.2			10			IC
F158	63.5	6.3			10			IC Dionex
F183	105.0	10.5			10			IC
F193	136.5	13.6			10			IC Dionex
F207	84.5	8.4			10			
F223b	68.0	6.8			10			
F239	129.0	12.9			10			IC
F248	98.5	9.8			10			IC Dionex
F290	146.0	14.6			10			IC Dionex
F292	19.5	1.9	WL WL WL	BIASED LOW*	10	-4.0	-0.4580	IC
F326	226.5	22.6	WHAHAHAHAHAHAHAHAHWH	BIASED HIGH	10	16.1	0.3900	Metrohm,861CompactIC

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 5

OVERALL AVERAGE RANK IS 12.0

PARAMETER: 06192 Total Alkalinity mg/L CaCO3

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	31.8	143.	95.5	170.	201.	42.	150.	91.	245.	109.
F009	33.	144.	95.	170.	202.	42.	150.	92.	247.	110.
F011	32.4	143.	94.9	168.	200.	41.6	148.	90.7	244.	109.
F014	33.4	147.	97.4	173.	205.	42.9	152.	92.9	250.	112.
F015	33.5	146.	97.3	172.	205.	42.8	152.	93.	249.	112.
F021	33.	145.	96.	170.	202.	42.	150.	92.	245.	110.
F022	33.4	145.	99.8	176.	208.	42.9	151.	92.6	247.	112.
F026	29.9 AL	142.	94.3	168.	200.	41.5	147.	90.3	245.	109.
F036	31.8	141.	91.8 WL	162. WL	192. WL	41.5	141. WL	86.9 WL	232. WL	104. WL
F069	34.3	147.	97.6	174.	205.	43.4	153.	93.2	249.	112.
F099	33.6	147.	98.4	174.	209.	43.5	153.	94.1	253.	113.
F113	34.1	144.	96.0	168.	201.	42.9	149.	91.8	242.	109.
F154	33.	145.	96.	170.	203.	42.	151.	92.	246.	110.
F158	32.8	141.	93.7	166.	197.	41.8	146.	89.6	240.	108.
F183	34.1	146.	96.1	173.	208.	42.0	155.	89.3	252.	111.
F193	33.1	149.	92.8	172.	204.	42.1	149.	92.6	259. WH	110.
F207	34.0	140.	96.0	168.	199.	42.0	148.	91.0	242.	109.
F223	32.3	144.	97.1	170.	202.	41.4	150.	91.4	246.	111.
F239	34.	149.	99.	175.	204.	45. WH	157.	95.	244.	120. AH
F248	32.	143.	95.	167.	197.	42.	147.	90.	241.	109.
F290	34.	144.	96.	193. AH	193.	44.	144.	80. AL	258.	122. AH
F292	43.4 AH	149.	96.4	171.	201.	43.6	156.	96.7 WH	251.	115.
F326	32.4	173. AH	108. AH	132. AL	222. AH	46.5 AH	166. AH	97.3 WH	314. AH	119. WH
ASSIGNED VALUE *	33.1	145	96.2	170	202	42.5	150	91.8	247	111
R-STD DEV *	1.01	3.1	2.02	3.8	4.6	0.99	4.0	2.24	5.7	2.7
ACCEPTABLE LIMITS(+-) *	2.02	6.2	4.04	7.6	9.2	1.98	8.0	4.48	11.4	5.4
WARNING LIMITS(+-) *	2.02- 3.03	6.2- 9.3	4.04- 6.06	7.6- 11.4	9.2- 13.8	1.98- 2.97	8.0- 12.0	4.48- 6.72	11.4- 17.1	5.4- 8.1
ACTION LIMITS(<>) *	3.03	9.3	6.06	11.4	13.8	2.97	12.0	6.72	17.1	8.1
N *	23	23	23	23	23	23	23	23	23	23

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	80.0	8.0			10			PC Titrate
F009	106.5	10.6			10			Mettler
F011	60.0	6.0			10			
F014	168.0	16.8			10			PC-Titrate
F015	161.5	16.1			10			Titration
F021	110.0	11.0			10			PC Titrate
F022	167.0	16.7			10			
F026	49.5	4.9	AL	BIASED LOW*	10	-0.1	-2.0643	PC Titrate
F036	16.5	1.6	WLWLWL WLWLWLWL	BIASED LOW	10	-5.9	1.1482	Titroprocessor
F069	184.0	18.4		BIASED HIGH*	10	1.0	0.7111	
F099	192.0	19.2		BIASED HIGH*	10	2.8	-0.6188	
F113	102.0	10.2			10			
F154	117.5	11.7			10			Radiometer
F158	36.0	3.6		BIASED LOW*	10	-2.9	0.4942	PC Titrate
F183	152.5	15.2			10			Colorimetry
F193	135.5	13.5	WH		10			Titration
F207	75.5	7.5			10			
F223	101.0	10.1			10			
F239	190.0	19.0	WH AH	BIASED HIGH*	10	-1.1	4.7911	Titration
F248	51.0	5.1		BIASED LOW*	10	-2.4	0.5868	Titration
F290	131.5	13.1	AH AL AH		10			PC Titrate
F292	183.0	18.3	AH WH	BIASED HIGH*	10	-1.7	5.6730	PC Titrate
F326	189.5	18.9	AHAHALAHAHAHWHAHWH	BIASED HIGH	10	18.5	-11.6547	Titration

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 3

OVERALL AVERAGE RANK IS 12.0

PARAMETER: 10692 Total Hardness mg/L

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	40.	234.	168.	212.	234.	43.8	221.	117.	351.	168.
F011	40.9	256. WH	189. WH	234. AH	253. AH	48.8	253. AH	130.	378. WH	183.
F014	41.4	234.	173.	208.	235.	46.6	229.	121.	348.	172.
F015	43.9	216.	162.	205.	233.	48.	215.	111.	329.	161.
F022	36.9 WL	213.	155. WL	191. WL	214. AL	41.2	202. WL	109.	307. WL	154.
F026b	40.4	227.	169.	203.	231.	44.7	220.	117.	350.	163.
F099	40.4	228.	167.	206.	235.	45.0	221.	115.	333.	167.
F154	44.7 WH	277. AH	197. AH	261. AH	256. AH	48.7	257. AH	133.	381. WH	189. WH
F158	40.2	233.	170.	209.	239.	45.6	222.	119.	356.	174.
F207	39.0	226.	162.	201.	233.	42.	213.	111.	330.	162.
F239	50. AH	236.	174.	211.	237.	50.	227.	137. WH	349.	174.
F290	40.	227.	171.	206.	239.	45.	221.	118.	341.	166.
F292	39.9	230.	169.	204.	234.	45.4	222.	116.	345.	166.
F326	40.9	227.	170.	200.	235.	37.5 WL	232.	107.	340.	168.
ASSIGNED VALUE *	40.8	230	170	207	236	45.4	223	118	345	168
R-STD DEV *	1.89	9.5	6.8	6.8	4.4	3.28	9.9	9.3	16.1	8.0
ACCEPTABLE LIMITS(+-) *	3.78	19.0	13.6	13.6	8.8	6.56	19.8	18.6	32.2	16.0
WARNING LIMITS(+-) *	3.78- 5.67	19.0- 28.5	13.6- 20.4	13.6- 20.4	8.8- 13.2	6.56- 9.84	19.8- 29.7	18.6- 27.9	32.2- 48.3	16.0- 24.0
ACTION LIMITS(<>) *	5.67	28.5	20.4	20.4	13.2	9.84	29.7	27.9	48.3	24.0
N *	14	14	14	14	14	14	14	14	14	14

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	74.5	7.4			10			calculated AAS
F011	125.5	12.5	WHWHAHAH AH WH	BIASED HIGH	10	11.0	-1.2908	
F014	99.5	9.9			10			calculated ICP
F015	47.5	4.7			10			calculated ICP
F022	12.0	1.2	WL WLWLAL WL WL	BIASED LOW	10	-10.4	2.4532	
F026b	55.5	5.5			10			calculated ICP
F099	62.5	6.2			10			
F154	136.0	13.6	WHAHAHAHAH AH WHWH	BIASED HIGH	10	13.4	2.1956	calculated ICP
F158	96.0	9.6			10			calculated ICP
F207	28.5	2.8		BIASED LOW*	10	-2.9	-1.2120	
F239	117.5	11.7	AH WH	BIASED HIGH*	10	-2.3	10.3257	Calculated Titration
F290	71.5	7.1			10			calculated ICP
F292	63.0	6.3			10			calculated ICP
F326	60.5	6.0	WL		10			Titration (EDTA)

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 5

OVERALL AVERAGE RANK IS 7.5

PARAMETER: 07392 Total Kjeldahl N mg/L N

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	0.229	0.204	0.652	0.686	0.69	0.071	0.455	0.176	0.429	0.307
F026b	0.196	0.160	<0.01 AL	0.50 AL	0.557	0.05	0.376	0.139	0.078 AL	0.063 AL
F036	0.209	0.209	0.493	0.654	0.687	0.069	0.472	0.174	0.472	0.350 WH
F069	0.237	0.221	0.581	0.71	0.711	0.079	0.527	0.198	0.46	0.309
F154	0.24	0.22	0.57	0.65	0.70	<0.20	0.50	0.22	0.41	0.31
F207	0.18	0.16	0.51	0.67	0.67	0.05	0.46	0.14	0.42	0.31
F290	0.19	0.26	0.39	0.74	0.55	0.12	0.46	0.10	0.50	0.31
F292	0.25	0.23	0.60	0.72	0.74	0.10	0.54	0.22	0.58	0.38 AH
ASSIGNED VALUE *	0.216	0.208	0.545	0.679	0.663	0.077	0.477	0.171	0.448	0.312
R-STD DEV *	0.0296	0.0386	0.0918	0.0498	0.0801	0.0291	0.0503	0.0481	0.0757	0.0129
ACCEPTABLE LIMITS(+-) *	0.0592	0.0772	0.1836	0.0996	0.1602	0.0582	0.1006	0.0962	0.1514	0.0258
WARNING LIMITS(+-) *	.0592- .0888	.0772- .1158	.1836- .2754	.0996- .1494	.1602- .2403	.0582- .0873	.1006- .1509	.0962- .1443	.1514- .2271	.0258- .0387
ACTION LIMITS(<>) *	0.0888	0.1158	0.2754	0.1494	0.2403	0.0873	0.1509	0.1443	0.2271	0.0387
N *	8	8	7	8	8	7	8	8	8	8

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	42.0	4.2			10			block digestion
F026b	14.0	1.5	ALAL	ALAL	9			calculated
F036	42.0	4.2		WH	10			Kjeldahl digestion
F069	56.0	5.6			10			Kjeldahl digestion
F154	44.5	4.9			9			block digestion
F207	28.5	2.8			10			
F290	43.5	4.3			10			digested Salicylate
F292	73.5	7.3		AH	10			Kjeldahl digestion

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

OVERALL AVERAGE RANK IS 4.4

PARAMETER: 07293 Total N mg/L N

WATER SCIENCE & TECHNOLOGY
ENVIRONMENT CANADA

FP PT for Major Ions & Nutrients

SAMPLE LAB NO	1= BELLE-09A LAB RESULT	2= SWIFT-01D LAB RESULT	3= SANGAMON-03 LAB RESULT	4= CPMX-2 LAB RESULT	5= RAISIN-99 LAB RESULT	6= ION-91 LAB RESULT	7= Raven Mix LAB RESULT	8= Cramich LAB RESULT	9= ION-96.4 LAB RESULT	10= HAMIL-20.2 LAB RESULT
F003	0.554	0.567	12.	1.35	1.08	0.358	0.763	0.445	3.19	2.29
F004	0.573	0.599	12.2	1.35	1.06	0.374	0.753	0.447	3.29	2.30
F006	0.5	0.6	12.2	1.3	1.1	0.3	0.7	0.4	3.1	2.2
F011	0.51	0.53	11.6	1.21	1.03	0.33	0.71	0.43	3.02	2.14
F015	0.54	0.59	14.8 AH	1.39	1.21	0.34	0.8	0.46	3.27	2.3
F021	0.61	0.59	12.1	1.46	1.13	0.36	0.77	0.47	3.27	2.34
F026	0.488	0.506	11.3	1.17	0.923	0.310	0.627	0.389	2.96	2.06
F069	0.559	0.591	17.8 AH	1.42	1.17	0.359	0.785	0.474	3.34	2.42
F113	0.488	0.54	12.0	1.33	1.07	0.311	0.716	0.4	3.17	2.20
F158	0.48	0.50	11.1	1.23	0.85	0.34	0.61	0.41	3.05	2.15
F183	0.52	0.46	12.2	1.33	1.06	0.34	0.60	0.44	3.34	2.25
F221	0.531	0.565	11.7	1.37	0.621 AL	0.342	0.732	0.437	3.25	2.27
F290	0.44	0.50	11.7	1.23	0.96	0.30	0.63	0.34 WL	2.86	2.00
F292	0.56	0.58	13.1	1.40	1.12	0.37	0.79	0.47	3.50	2.41
F326	0.5	0.8 AH	12.9	1.5	1.6 AH	0.5 AH	0.8	0.7 AH	3.3	2.5
ASSIGNED VALUE *	0.523	0.558	12.2	1.34	1.059	0.341	0.719	0.436	3.20	2.26
R-STD DEV *	0.0434	0.0527	0.82	0.105	0.1342	0.0310	0.0809	0.0397	0.174	0.144
ACCEPTABLE LIMITS(+-) *	0.0868	0.1054	1.64	0.210	0.2684	0.0620	0.1618	0.0794	0.348	0.288
WARNING LIMITS(+-) *	.0868- .1302	.1054- .1581	1.64- 2.46	.210- .315	.2684- .4026	.0620- .0930	.1618- .2427	.0794- .1191	.348- .522	.288- .432
ACTION LIMITS(<>) *	0.1302	0.1581	2.46	0.315	0.4026	0.0930	0.2427	0.1191	0.522	0.432
N *	15	15	15	15	15	15	15	15	15	15

* NOTE: SEE GLOSSARY FOR DEFINITIONS

LAB NO.	TOTAL RANK	AVERAGE RANK	SUMMARY OF FLAGGING	BIAS STATEMENT	NO.SAMPLES RANKED	BIAS % SLOPE	BIAS BLANK	METHOD CODING
F003	88.0	8.8			10			autoclaved
F004	106.5	10.6			10			Persulfate dig.
F006	65.0	6.5			10			combustion chemilum.
F011	45.0	4.5			10			
F015	112.0	11.2	AH		10			autoclaved
F021	116.5	11.6			10			Hydrazine
F026	25.5	2.5		BIASED LOW*	10	-7.2	-0.0280	autoclaved
F069	129.5	12.9	AH	BIASED HIGH	10	47.1	-0.4381	Persulfate dig.
F113	56.5	5.6			10			FIA
F158	33.0	3.3		BIASED LOW*	10	-8.8	0.0077	Persulfate dig.
F183	68.5	6.8			10			Flow injection
F221	71.5	7.1	AL		10			
F290	24.0	2.4	WL	BIASED LOW*	10	-3.8	-0.0821	Combustion - IR
F292	124.5	12.4		BIASED HIGH*	10	7.5	-0.0028	calculated
F326	134.0	13.4	AH AHAH AH	BIASED HIGH*	10	4.2	0.1506	SpCractSet20&1.09713

* NOTE: INDICATED BIAS STATEMENT IS FOR CAUTION ONLY AND NOT COUNTED IN STUDY STATISTICS
PERCENT SLOPE USED FOR CAUTION COMPARISON = 10

OVERALL AVERAGE RANK IS 8.0