NWRI CONTRIBUTION NO. 89-86

Summary Report for the Interlab Prairie Provinces Quality Assurance Pgm, Studies 61-72 (Sept 87 - Aug 88) for Inorganic Constituents in Surface Waters.

H. Alkema

Management Perspective PP61 - PP72

Under the auspices of the Prairie Provinces Water Board, a quality assurance program was initiated for assessing and improving the comparability of water quality data generated by the Federal Water Quality Branch Saskatoon Laboratory (ECS) and the Alberta, Saskatchewan and Manitoba provincial laboratories.

In the first phase of this program, interlab studies are conducted bi-monthly on some 40 parameters involving about 200 analytical procedures.

Twelve studies were sent out in the period from September 1987 to August 1988. These studies dealt with analyses of trace metals, major ions, nutrients, and physical parameters in natural and spiked water samples. The reference water samples are typical of the surface waters found in the various regions.

A number of key analyses were identified to be out of control and promptly brought to the attention of laboratory managers to help improve the quality of their data, and to help them to re-evaluate their internal quality control procedures.

Dr. J. Lawrence
Director
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ABSTRACT

This compiled report of twelve quality assurance studies evaluates the chemical analysis of surface waters for laboratories in the Prairie Provinces Quality Assurance (PPQA) program. This report, which covers the period from September 1987 to August 1988 (QA studies PP 61 to PP 72), describes the following: study design, treatment of data, performance indicators, and comments on individual laboratory performance.

A single bimonthly study consists of 4 or 5 standard reference samples of known values. Half of these samples are for trace metal analysis at two levels. The other half of the samples are analysed for 25 major ion, nutrient and physical parameters. Altogether, 200 analysis methodologies with their analysis results are tabulated in the data summary. Since other laboratories in other QA programs analyse the same samples, all results are reported in the data summary so that statistical analyses are more acurately made.

Each monthly report, in conclusion, summarizes laboratory performance. Good performance (and compatibility) is indicated by the lack of flagged results. More than several flagged results indicates poorer performance. Results are flagged by two criteria: those that exceed the 10% or 1 Standard Deviation Test, and those that are statistical outliers according to the Grubbs' outlier test.

Generally, analyses were performed well, nevertheless, a number of key analyses were identified to be out of control and promptly brought to the attention of laboratory managers. The laboratories in the PPQC program have usually shown prompt correction of problems when notified of them.

PERSPECTIVE DE GESTION PP61 - PP72

Sur les auspices du Conseil des Eaux des Provinces de Prairie, un programme d'assurance de la qualité a été initié pour évaluer et améliorer la comparabilité des résultats d'analyse des eaux de surface fournis par le Division de Qualité des Eaux à Saskatoon et le Laboratoire National de Qualité des Eaux, ainsi que les laboratoires provincials de l'Alberta, Saskatchewan, et Manitoba.

Suivant les réglementations de projet de l'assurance de qualité de l'INRE, six études d'assurance de la qualité ont été menées entre Septembre 1987 et Août 1988 (soit une tous les deux mois). Ces études ont été porté sur l'analyse des composés métalliques à l'état de trace, des principaux ions, des substances nutratives et des paramètres physiques à partir d'un éventail d'échantillons typiques.

Dans le rapport annuel, on présente et on évalue les données que nous ont fournies treize laboratoires (pour la période précitée) ayant eu à déterminer 40 paramètres en faisant appel à deux centaines environs de méthodes analytiques différentes.

Règle générale, les laboratoires ont éffectué de bonnes analyses. Cependant, on a constaté que les résultats de certaines analyses clés s'écartaient trop des marges d'erreur permises. Les directeurs de laboratoires visés en ont été informés ce qui leur a permis de se rendre compte qu'ils doivent réevaluer les méthodes de contrôle interne de la qualité et produire des données plus exactes.

Dr. J. Lawrence
Directeur
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RESUME

Ce rapport regroupant douze études sur le contrôle de la qualité (CQ) présente une évaluation de l'analyse chimique des eaux de surface pour les laboratoires des Provinces de Prairie. Dans ce rapport couvrant la période de Septembre 1987 à Août 1988 (études CQ FP21 à FP32), on décrit les aspects suivant du contrôle de la qualité: conception des études, traitment des données, indicateurs d'exactitude et commentaires sur la performance individuelle des laboratoires.

Une étude bimestrielle indivduelle porte sur quatre ou cinq échantillons de référence de valeurs connues. On utilise la moitié de ces échantillons pour analyser la tenuer en métaux à l'état de trace à deux niveaux. Les laboratoires utilisent l'autre moitié des échantillons pour faire rapport sur 25 ions principaux, nutriants et paramètres physiques. Environs 200 méthodologies d'analyse et résultats individuels sont ensuite rassemblés dans un résumé des données. Puisque les autres laboratoires des programmes de contrôle de la qualité analysent les mêmes échantillons, on peut, grâce aux résultats présentés, faire les analyses statistiques les plus précises possibles.

A la conclusion de chaque rapport bimestriel, on trouve un résumé de la performance des laboratoires. L'absence de résultats pointés indique une bonne performance (et la comparabilité des données). S'il y a plusiers résultats pointés, c'est que la performance a été plus faible. On pointe aux résultats en fonction de deux critères: s'ils divergent de plus de test de 10% ou le deviation standard et, si, selon de Grubbs, ils sont des valeurs statistiques rejetées.

En général, les résultats des analyses ont été satisfaisant; on a cependant, constaté que les résultats d'un certain nombre d'analyse clés étaient aberrants. On en a rapidement informé le chefs de laboratoires, et avec l'exception d'un laboratoire les laboratoires faisant partie du programme fédéral-provincial de contrôle de la qualité ont immédiatement apporté les corrections nécessaires.

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DATE	January 8, 1988

TO / À: Distribution

FROM / DE:
H. Alkema
Quality Assurance Section
National Water Research Institute
Burlington, Ontario

SUBJECT / OBJET: Prairie Provinces Quality Assurance Program (PPQC)

I have enclosed the final report for PP 61-62.

If you have any comments on this report, or any legitimate corrections to the data base, please do not hesitate to communicate them.

Harry A.

H. Alkema

RESEARCH & APPLICATIONS BRANCH

FINAL REPORT

REPORT NO. RAB 87-07d

PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAM

STUDIES 61 AND 62

for September and October, 1987

TRACE METALS, MAJOR IONS, NUTRIENTS AND PHYSICAL PARAMETERS IN SURFACE WATERS

by

H. Alkema

Quality Assurance Section
National Water Research Institute
Burlington, Ontario

January 1988

Introduction

As part of an on-going study, the Quality Assurance Section, NWRI in Burlington, Ontario, has been sending reference water samples bi-monthly to chemical laboratories participating in the PPWB program. This report summarizes the most recent PPWB interlaboratory quality control studies: PP 61 and 62, for the months September and October, 1987. These two studies dealt with trace metals, major ions, nutrients and physical parameters. The levels were at various levels.

Study Design

Five water samples were submitted to each laboratory for chemical analyses. Three samples were submitted for trace metals analysis, while the remaining two were submitted for major ions, nutrients and some physical measurements. The following is a breakdown of the five samples:

PP 61 - Sample 1 - 125 ml, DA* for trace metals (3% HNO_3)
Sample 2 - up to 1L, major ions etc., stored at 4^oC

PP 62 - Sample 3 - 1L, SE* for trace metals (0.2% HNO_3)
Sample 4 - up to 1L, major ions, etc., stored at 4^oC
Sample 5 - 1L, SE for trace metals (0.2% HNO_3)

* for definitions see Appendix 1

Treatment of Data

Each laboratory was asked to perform only those analyses which were routine to their particular laboratory, using the general methodology guidelines listed above. Results for these analyses were recorded on report sheets provided with the PP samples. Upon receipt of the Reporting Sheets, the results were tabulated for each parameter, first for each method reported, and then for all methods combined. These data, and the resulting statistics are presented in the Data Summary. (attached)

Preliminary data summaries, including problematic results, were sent 3 or 18 November and 4 December. Each laboratory was given three weeks to notify us of any errors in data transcription or compilation.

Performance Indicators

In previous reports the mean has always been used as comparator for accuracy assessment. We now have "design values" for several reference waters (RMs) and certified referenc waters (CRMs). These design values are used to test each reported result (whether few or many) for accuracy. Consequently, for stable parameters, the design values will be used as comparator for the ten percent warning circles, and the mean will be used for unstable parameters (perhaps due to biological acti vity).

Percentage deviations from the comparator are used as an indicator for the laboratory head to determine the extent of the descrepencies between the laboratory result and comparator as it applies to his procedures. However, please keep in mind that at low levels, high % deviations are often seen, and may be misleading if interpreted too strictly.

A result which deviates more than 10% from the comparator is circled in the data tables and its value noted in the comments which follow. Results reported with an "L" (less than) or flagged with an "R" (rejectable) are not used in the statistical calculations. Performance indicators are fully explained in Appendix II.

Comments on Laboratory Performance

Results accompanied with a 'less than' are difficult to appraise. If a design value or mean is significantly lower than the detection limit given by a particular laboratory, then that detection limit is too high. Such a result is assigned 'HDL' and is labelled in the Data Summary.

If, on the other hand, the detection limit reported is far lower than the mean or design value, then the use of 'less than' is clearly inadequate and the result is flagged low. The magnitude of the deviation from the mean in such a case is taken from the detection limit given.

General Comments: A high coefficient of variation (incomparability) was observed for Aluminum at the 0.018 ppm level.

Individual laboratory deviations are listed below:

Lab 1
- a low result for DIC: -28%; Mg: -21% & -14%
- results for Pb at low level: -70% (R)* & +50%
- a high result for SiO_2: +15%
- an HDL at low level for Al & Mn

Lab 3
- a high result for Fe by SE: +67%
- a low result for DIC: -21%; and DOC: -12%
- high results for NO_3+NO_2: +11%; and F: +17%

Lab 4
- a high result for B at low level (R)
- a low result for DIC: -11%

Lab 6
- low results for Sr: -57% (R); -65% (R); & -55% (R)
- a high result by SE for Al: +83% (R) & +44%; V: +87% (R) Mo: +63% (R); Zn: +47% (R); Ni: +27%; Fe: +81% (R) & +22%
- high results for Mg: +12%; Ca: +15%; Hard: +11% Ammonia: (R) & (R) and TP (R) & (R) at low level; NO_3+NO_2: +65% & +11%; and TKN: (R) at low level & +100%
- an HDL for Fluoride and Pb at low level

Lab 8
- a low result for by DA for Pb: -12%
- a low result for by SE for Cu: -24%; and Zn: -30%
- a low result for NO_3+NO_2: -50%; and F: -18%
- an HDL for TKN and low level Mn, Fe, Zn, & Al

PPWB laboratories average number of deviations per sample was 2.2.

* (R) rejectable by Grubbs' statistical procedure (noncomparable data)

APPENDIX I

Definitions of Types of Metals Analysis

1. DA - Direct Aspiration

Without sample pretreatment, samples are aspirated by Atomic Absorption Spectrophotometry (AAS) ar Inuctively Coupled (Argon) Plasma (ICAP or ICP). Standards should contain the acid equivalent of the sample.

2. SE - Code for low level analysis

Analysis is carried out by one of the following methods:

1. Solvent extraction sample concentration followed by AAS.
2. Digestion and concentration of aqueous phase followed by ICAP.
3. Digestion of aqueous phase and ICAP analysis.
4. Graphite tube (flameless) AAS.

APPENDIX II

Performance Indicators

1. Circled Results

Results are circled in the data tables when a minor deviation from the comparator has ocurred. (The comparator is the design value of the reference sample, or the mean in the case of a biologically active sample.) Circled results are in general greater than or less than 10% from the comparator. At very low levels of analytes or with parameters that are difficult to analyse, a greater deviation than 10% is allowed. Under these conditions, a result is circled when it is outside one standard deviation of the comparator. These circled results, though acceptable values, are a warning to laboratory managers that the parameter analysis should be investigated.

2. Rejectable Results

Each laboratory result is statistically tested to see if it is outlying. Outlying results were caused by non random causes such as a faulty calibration or a transcription error. These outlying results, calculated by the Grubbs' procedure,* and indicated in the data tables with an 'R', are noncomparable with the other data for the parameter.

3. A High Co-efficient of Variation (HCV)

Occasionally data for a parameter yields a very high relative standard deviation (RSD). When this HCV is not due to outlying values, it indicates a high variability within the data set. The data in this set is then noncomparable. In such a case, the RSD for the parameter is circled in the data tables and the parameter's noncomparability is noted in the comments.

4. High Detection Limits (HDL)

Each laboratory determines its own detection limits according to its own requirements. When major differences of detection limits occur, the result is flagged with 'HDL' in the data tables. An HDL indicates that low level analysis may not be comparable with the analyses of other laboratories.

* reference : Frank E. Grubbs, Technometrics, 1969, p. 1.

DATA SUMMARY

FEDERAL-PROVINCIAL & PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAMS

STUDY NO. FP 21 PP 61 IR156 DATE: 01/09/87 DUE DATE: 31/10/87 PAGE 1

SAMPLE 1 SPIKED SAMPLE. TRACE METALS D/A. (IN 3% HNO3)

LAB	13009 AL TOT 5X ICP	13111 AL DIS ICP DA	13302 AL EXT AAS GF	13305 AL EXT AAS SE	13999 ALUMINUM COMMON	23003 V EXT AAS GF	23009 V TOT 5X ICP	23011 V TOT 5X ICP	23111 V DIS ICP DA	23999 VANADIUM COMMON	24009 CR TOT 5X ICP	24011 CR TOT 5X ICP	24111 CR DIS ICP DA
1	-	-	-	-	-	-	2.350	-	-	2.350	0.303	-	-
2	-	-	3.1	-	3.1	-	-	-	-	-	-	-	-
3	2.75	-	2.68	-	2.68	-	2.34	-	-	2.34	0.288	-	-
6	2.5	-	-	-	2.5	-	-	2.2	-	2.2	-	0.28	-
8	-	-	2.6	-	2.6	-	-	-	-	-	-	-	-
9	-	2.7	-	-	2.7	-	-	-	2.35	2.35	-	-	0.30
10	-	2.58	-	-	2.58	-	-	-	2.25	2.25	-	-	0.279
12	-	-	-	-	-	-	-	-	2.25	2.25	-	-	0.29
14	-	-	-	2.94	2.94	2.39	-	-	-	2.39	-	-	-
MEAN	2.6250	2.6400	2.7933	2.9400	2.7286	2.3900	2.3450	2.2000	2.2833	2.3043	.2955	.2800	.2897
STD DEV	.1768	.0849	.2686	-	.2147	-	.0071	-	.0577	.0702	.0106	-	.0105
REL STD	6.7	3.2	9.6	-	7.9	-	.3	-	2.5	3.0	3.6	-	3.6
DES VAL	-	-	-	-	2.684	-	-	-	-	2.328	-	-	-

LAB	24302 CR EXT AAS DA	24999 CHROMIUM COMMON	25003 MN TOT AAS DA	25004 MN TOT 5X AAS	25010 MN TOT 5X ICP	25011 MN TOT 5X ICP	25111 MN DIS ICP DA	25304 MN EXT AAS DA	25306 MN EXT AAS GF	25311 MN EXT ICP DA	25999 MANGNESE COMMON	26004 FE TOT AAS DA	26009 FE TOT 5X ICP
1	-	0.303	0.268	-	-	-	-	-	-	-	0.268	-	-
2	-	-	-	-	-	-	-	0.26	-	-	0.26	-	-
3	-	0.288	-	0.263	0.262	-	-	-	-	-	0.263	1.11	1.12
6	-	0.28	-	-	-	0.25	-	-	-	-	0.25	-	-
8	0.30	0.30	-	-	-	-	-	-	-	0.24	0.24	-	-
9	-	0.30	-	-	-	-	0.26	-	-	-	0.26	-	-
10	-	0.279	-	-	-	-	0.254	-	-	-	0.254	-	-
11	0.30	0.30	-	-	-	-	-	0.31	-	-	0.31	-	-
12	-	0.29	-	-	-	-	0.26	-	-	-	0.26	-	-
14	0.234R	0.234R	-	-	-	-	-	-	0.256	-	0.256	-	-
MEAN	.3000	.2925	.2680	.2630	.2620	.2500	.2580	.2850	.2560	.2400	.2621	1.1100	1.1200
STD DEV	.0000	.0096	-	-	-	-	.0035	.0354	-	-	.0185	-	-
REL STD	-1.0	3.3	-	-	-	-	1.3	12.4	-	-	7.1	-	-
DES VAL	-	.302	-	-	-	-	-	-	-	-	.263	-	-

LAB	26011 FE TOT 5X ICP	26111 FE DIS ICP DA	26304 FE EXT AAS DA	26306 FE EXT AAS GF	26311 FE EXT ICP DA	26999 IRON COMMON	27009 CO TOT 5X ICP	27011 CO TOT 5X ICP	27111 CO DIS ICP DA	27301 CO EXT AAS DA	27999 COBALT COMMON	28009 NI TOT 5X ICP	28011 NI TOT 5X ICP
1	-	-	-	-	-	-	1.110	-	-	-	1.110	1.300	-
2	-	-	1.1	-	-	1.1	-	-	-	-	-	-	-
3	-	-	-	-	-	1.11	1.07	-	-	-	1.07	1.24	-
6	1.0	-	-	-	-	1.0	-	1.0	-	-	1.0	-	1.2
8	-	-	-	-	1.03	1.03	-	-	-	1.11	1.11	-	-
9	-	1.10	-	-	-	1.10	-	-	1.10	-	1.10	-	-
10	-	1.07	-	-	-	1.07	-	-	1.02	-	1.02	-	-
11	-	-	1.1	-	-	1.1	-	-	-	1.0	1.0	-	-
12	-	1.07	-	-	-	1.07	-	-	1.01	-	1.01	-	-
14	-	-	-	0.923	-	0.923	-	-	-	1.32 R	1.32 R	-	-
MEAN	1.0000	1.0800	1.1000	.9230	1.0300	1.0559	1.0900	1.0000	1.0433	1.0550	1.0525	1.2700	1.2000
STD DEV	-	.0173	.0000	-	-	.0619	.0283	-	.0493	.0778	.0501	.0424	-
REL STD	-	1.6	-1.0	-	-	5.9	2.6	-	4.7	7.4	4.8	3.3	-
DES VAL	-	-	-	-	-	1.094	-	-	-	-	1.072	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 21 PP 61 IR156 SAMPLE 1

LAB	28111 NI DIS ICP DA	28301 NI EXT AAS DA	28309 NI EXT AAS GF	28311 NI EXT ICP DA	28999 NICKEL COMMON	29009 CU TOT 5X ICP	29011 CU TOT 5X ICP	29111 CU DIS ICP DA	29306 CU EXT AAS DA	29308 CU EXT AAS GF	29311 CU EXT ICP DA	29999 COPPER COMMON	30009 ZN TOT 5X ICP
1	-	-	-	-	1.300	0.290	-	-	-	-	-	0.290	0.323
2	-	-	-	-	-	-	-	-	0.28	-	-	0.28	-
3	-	-	-	-	1.24	0.286	-	-	-	-	-	0.286	0.320
6	-	-	-	-	1.2	-	0.27	-	-	-	-	0.27	-
8	-	-	-	1.16	1.16	-	-	-	-	-	0.26	0.26	-
9	1.25	-	-	-	1.25	-	-	0.28	-	-	-	0.28	-
10	1.22	-	-	-	1.22	-	-	0.283	-	-	-	0.283	-
11	-	1.2	-	-	1.2	-	-	-	0.29	-	-	0.29	-
12	1.24	-	-	-	1.24	-	-	0.28	-	-	-	0.28	-
14	-	-	1.77 R	-	1.77 R	-	-	-	-	0.258	-	0.258	-
MEAN	1.2367	1.2000	-	1.1600	1.2263	.2880	.2700	.2810	.2850	.2580	.2600	.2777	.3215
STD DEV	.0153	-	-	-	.0417	.0028	-	.0017	.0071	-	-	.0114	.0021
REL STD	1.2	-	-	-	3.4	1.0	-	.6	2.5	-	-	4.1	.7
DES VAL	-	-	-	-	1.237	-	-	-	-	-	-	.290	-

LAB	30011 ZN TOT 5X ICP	30111 ZN DIS ICP DA	30304 ZN EXT AAS DA	30306 ZN EXT AAS GF	30311 ZN EXT ICP DA	30999 ZINC COMMON	38001 SR TOT AAS DA	38009 SR TOT ICP DA	38011 SR TOT ICP DA	38111 SR DIS ICP DA	38301 SR EXT AAS DA	38999 STRNTIUM COMMON	42009 MO TOT 5X ICP
1	-	-	-	-	-	0.323	-	-	-	-	-	-	4.660
2	-	-	0.31	-	-	0.31	-	-	-	-	-	-	-
3	-	-	-	-	-	0.320	0.478	0.486	-	-	-	0.478	4.50
6	0.32	-	-	-	-	0.32	-	-	0.21 R	-	-	0.21 R	-
8	-	-	-	-	0.29	0.29	-	-	-	-	-	-	-
9	-	0.32	-	-	-	0.32	-	-	-	0.50	-	0.50	-
10	-	0.307	-	-	-	0.307	-	-	-	-	0.50	0.50	-
11	-	-	0.35	-	-	0.35	-	-	-	-	-	-	-
12	-	0.33	-	-	-	0.33	-	-	-	-	-	-	-
14	-	-	-	0.303	-	0.303	-	-	-	-	-	-	-
MEAN	.3200	.3190	.3300	.3030	.2900	.3173	.4780	.4860	-	.5000	.5000	.4927	4.5800
STD DEV	-	.0115	.0283	-	-	.0163	-	-	-	-	-	.0127	.1131
REL STD	-	3.6	8.6	-	-	5.1	-	-	-	-	-	2.6	2.5
DES VAL	-	-	-	-	-	.314	-	-	-	-	-	.488	-

LAB	42011 MO TOT 5X ICP	42111 MO DIS ICP DA	42301 MO EXT AAS DA	42999 MOLYBNUM COMMON	48009 CD TOT 5X ICP	48011 CD TOT 5X ICP	48111 CD DIS ICP DA	48301 CD EXT AAS DA	48303 CD EXT AAS GF	48999 CADMIUM COMMON	56001 BA TOT AAS DA	56009 BA TOT 5X ICP	56011 BA TOT 5X ICP
1	-	-	-	4.660	0.237	-	-	-	-	0.237	-	-	-
2	-	-	-	-	-	-	-	0.24	-	0.24	-	-	-
3	-	-	-	4.50	0.228	-	-	-	-	0.228	2.48	2.49	-
6	4.2	-	-	4.2	-	0.23	-	-	-	0.23	-	-	2.3
8	-	-	-	-	-	-	-	0.24	-	0.24	-	-	-
9	-	4.6	-	4.6	-	-	0.24	-	-	0.24	-	-	-
10	-	4.53	-	4.53	-	-	0.220	-	-	0.220	-	-	-
11	-	-	-	-	-	-	-	0.25	-	0.25	-	-	-
12	-	4.61	-	4.61	-	-	0.23	-	-	0.23	-	-	-
14	-	-	0.91 R	0.91 R	-	-	-	-	0.282	0.282	-	-	-
MEAN	4.2000	4.5800	-	4.5167	.2325	.2300	.2300	.2433	.2820	.2397	2.4800	2.4900	2.3000
STD DEV	-	.0436	-	.1655	.0064	-	.0100	.0058	-	.0170	-	-	-
REL STD	-	1.0	-	3.7	2.7	-	4.3	2.4	-	7.1	-	-	-
DES VAL	-	-	-	4.663	-	-	-	-	-	.238	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 21 PP 61 IR156 SAMPLE 1

LAB	56111 BA DIS ICP DA	56999 BARIUM COMMON	82009 PB TOT 5X ICP	82011 PB TOT 5X ICP	82111 PB DIS ICP DA	82301 PB EXT AAS DA	82302 PB EXT AAS SE	82305 PB EXT AAS GF	82311 PB EXT ICP DA	82999 LEAD COMMON
1	-	-	-	-	-	-	1.309	-	-	1.309
2	-	-	-	-	-	1.3	-	-	-	1.3
3	-	2.48	1.32	-	-	-	-	-	-	1.32
6	-	2.3	-	1.3	-	-	-	-	-	1.3
8	-	-	-	-	-	-	-	-	1.18	1.18
9	2.6	2.6	-	-	1.35	-	-	-	-	1.35
10	2.47	2.47	-	-	1.29	-	-	-	-	1.29
11	-	-	-	-	-	1.3	-	-	-	1.3
12	2.46	2.46	-	-	1.34	-	-	-	-	1.34
14	-	-	-	-	-	-	-	1.29	-	1.29
MEAN	2.5100	2.4620	1.3200	1.3000	1.3267	1.3000	1.3090	1.2900	1.1800	1.2979
STD DEV	.0781	.1069	-	-	.0321	.0000	-	-	-	.0461
REL STD	3.1	4.3	-	-	2.4	-1.0	-	-	-	3.6
DES VAL	-	2.541	-	-	-	-	-	-	-	1.337

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 21 PP 61 IR156 SAMPLE 2

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS	00125 SUM OF ANIONS	02011 COLOUR APPARE	02021 COLOUR VIS COM	02023 COLOUR SPECT	02040 COLOUR COMMON	02041 CONDUCT SPEC 25	02060 CONDUCT COMMON	02072 TURB HELLIG	02073 TURB HACH	02074 TURB NPLMTRI	02077 TURB HACH FZ
1	-1.15	1.508	1.543	-	2. L	-	2. L	177.	177.	-	-	-	-
2	+0.68	1.545	1.524	5. L	-	-	5. L	173.	173.	-	0.2	-	-
3	-2.1	1.522	1.587	10.	-	-	10.	176.	176.	-	0.07	-	-
4	-	-	-	-	5. L	-	5. L	174.	174.	-	-	-	-
6	+8.5	1.9	1.6	-	-	-	-	167.	167.	-	-	0.34	-
7	-0.5	1.51	1.52	2.	-	-	2.	207. R	207. R	-	0.45	-	-
8	+0.21	1.58	1.57	5. L	-	-	5. L	171.	171.	-	-	0.09	-
9	+0.93	1.62	1.59	-	-	-	-	170.	170.	-	-	-	-
10	+2.12	1.602	1.535	-	-	1. L	1. L	172.	172.	-	-	0.2	-
11	-	-	-	5. L	-	-	5. L	180.	180.	-	-	-	0.1
12	-	-	-	-	5. L	-	5. L	174.	174.	-	0.3	-	-
14	-	-	-	0.	-	-	0.	159.0	159.0	0.3	-	-	-
MEAN	1.0875	1.5984	1.5586	4.0000	-	-	4.0000	172.0909	172.0909	.3000	.2550	.2100	.1000
STD DEV	3.2660	.1290	.0319	5.2915	-	-	5.2915	5.5938	5.5938	-	.1605	.1253	-
REL STD	300.3	8.1	2.0	132.3	-	-	132.3	3.3	3.3	-	62.9	59.7	-
DES VAL	-	-	-	-	-	-	5.000	-	171.825	-	-	-	-

LAB	02081 TURB RATIO	02090 TURBIDTY COMMON	05105 BORON AA CARM	05106 BORON F AZOMETH	05107 BORON ICP DA	05111 BORON F ICP DA	05190 BORON COMMON	06008 TOC CO2 FLM	06052 TIC CO2 ?	06101 DOC IR /DIF	06104 DOC UV CO2 IR	06107 DOC UV CO2 PHE	06109 DOC UV CO2 OH
1	-	-	-	-	0.002L	-	0.002L	-	-	-	-	0.4 L	-
2	-	0.2	-	-	-	-	-	-	-	-	-	0.5 L	-
3	-	0.07	-	-	-	-	-	-	-	-	0.1 L	-	-
4	0.04	0.04	0.02 L	-	-	-	0.02 L	-	-	-	0.5	-	-
6	-	0.34	-	-	-	-	-	-	-	-	0.3	-	-
7	-	0.45	-	-	-	-	-	-	-	-	-	-	-
8	-	0.09	-	0.05 L	-	-	0.05 L	-	-	-	-	-	-
10	-	0.2	-	-	-	0.01	0.01	-	-	-	-	-	0.2
11	-	0.1	-	-	-	-	-	2.1 R	4.9	-	-	-	-
12	-	0.3	-	-	-	-	-	-	-	0.5 L	-	-	-
14	-	0.3	-	-	-	-	-	-	-	-	-	-	-
MEAN	.0400	.2090	-	-	-	.0100	.0100	-	4.9000	-	.4000	-	.2000
STD DEV	-	.1358	-	-	-	-	-	-	-	-	.1414	-	-
REL STD	-	65.0	-	-	-	-	-	-	-	-	35.4	-	-
DES VAL	-	.126	-	-	-	-	-	-	-	-	-	-	-

LAB	06150 D O C COMMON	06151 DIC IR COMBUST	06152 DIC UV CO2 IR	06154 DIC AA CO2 PHE	06159 DIC AA CO2 OH	06490 D I C COMMON	07004 TKN AA NITPRUS	07010 TKN AA SAL	07015 TKN DIG BERTHEL	07016 TKN BLK AMM-SAL	07018 TKN BLK INDOPHE	07021 TKN BLK DIG BER	07090 TKN COMMON
1	0.4 L	-	-	4.3	-	4.3	-	-	-	-	-	0.050L	0.050L
2	0.5 L	-	-	-	-	-	-	-	-	-	-	-	-
3	0.1 L	-	4.68	-	-	4.68	-	0.035	-	-	-	-	0.035
4	0.5	-	5.3	-	-	5.3	-	-	-	-	-	-	-
6	0.3	-	-	-	-	-	-	-	-	0.3 R	-	-	0.3 R
8	-	-	-	-	-	-	-	-	0.2 L	-	-	-	0.2 L HDL
10	0.2	-	-	-	5.5	5.5	-	-	-	-	-	-	-
11	2.1 R	-	-	-	-	4.9	-	-	-	-	-	-	-
12	0.5 L	5.7	-	-	-	5.7	-	-	-	-	0.06	-	0.06
14	-	-	-	-	-	-	0.08	-	-	-	-	-	0.08
MEAN	.3333	5.7000	4.9900	4.3000	5.5000	5.0633	.0800	.0350	-	-	.0600	-	.0583
STD DEV	.1528	-	.4384	-	-	.5307	-	-	-	-	-	-	.0225
REL STD	45.8	-	8.8	-	-	10.5	-	-	-	-	-	-	38.7
DES VAL	.950	-	-	-	-	5.943	-	-	-	-	-	-	.082

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 21 PP 61 IR156 SAMPLE 2

LAB	07109 NO3+NO2 AA HYD	07110 NO3+NO2 AA2 CD	07111 NO3+NO2 DIS SPEC	07112 NO3+NO2 UF AA CD	07390 NITRATE COMMON	07505 NH3 TOT AA BERT	07506 NH3 TOT SPEC EL	07540 NH3 TOT AA SAL	07555 NH3 DIS AA PHEN	07557 NH3 DIS AA INDO	07562 NH3 DIS AA EDTA	07563 NH3 DIS AA INDO	07590 AMMONIA COMMON
1	-	-	0.036	-	0.036	-	-	-	-	-	0.002L	-	0.002L
2	-	0.04	-	-	0.04	-	-	-	-	-	-	-	-
3	-	-	-	0.036	0.036	0.002	-	-	-	-	-	-	0.002
4	-	0.05	-	-	0.05	-	-	0.005L	-	-	-	-	0.005L
6	0.07	-	-	-	0.07	-	-	-	-	0.04 R	-	-	0.04 R
7	-	-	-	0.04	0.04	-	-	-	-	-	-	-	-
8	-	0.02	-	-	0.02	-	-	-	0.002L	-	-	-	0.002L
9	0.05	-	-	-	0.05	-	-	-	-	-	-	-	-
10	0.035	-	-	-	0.035	-	-	-	0.010L	-	-	-	0.010L
11	-	0.04	-	-	0.04	-	0.03 L	-	-	-	-	-	0.03 L HDL
12	-	0.05	-	-	0.05	-	-	-	-	-	-	0.005L	0.005L
14	-	-	0.01 L	-	0.01 L	0.10 L	-	-	-	-	-	-	0.10 L HDL
MEAN	.0517	.0400	.0360	.0380	.0425	.0020	-	-	-	-	-	-	.0020
STD DEV	.0176	.0122	-	.0028	.0126	-	-	-	-	-	-	-	-
REL STD	34.0	30.6	-	7.4	29.7	-	-	-	-	-	-	-	-
DES VAL	-	-	-	-	.042	-	-	-	-	-	-	-	.010

LAB	07601 T N UV AA SUL	07602 T N CALC'D	07605 T N UV HY SUL	07651 T N DIS UV AA	07690 TOT N COMMON	07790 T N DIS COMMON	09103 F DIS COL SP	09105 F DIS SP EL	09106 F DIS EL POT	09107 F DIS AUT POT	09108 F DIS SP EL	09115 F DIS AA ALIZ	09190 FLUORIDE COMMON
1	-	-	-	-	-	-	-	-	-	0.05 L	-	-	0.05 L
2	0.1 L	-	-	-	-	0.1 L	-	-	0.05 L	-	-	-	0.05 L
3	-	-	-	-	-	-	-	-	-	-	0.04	-	0.04
4	-	-	-	0.07	-	0.07	-	-	-	-	-	-	-
6	-	-	-	-	-	-	0.1 L	-	-	-	-	-	0.1 L HDL
8	-	0.22 L	-	-	0.22 L	-	-	0.04	-	-	-	-	0.04
9	-	-	-	-	-	-	-	-	-	-	-	0.06	0.06
10	-	-	0.08	-	-	0.08	-	-	-	-	-	0.04	0.04
11	-	-	-	-	-	-	-	0.05 L	-	-	-	-	0.05 L
12	-	0.11	-	-	0.11	-	-	0.10 L	-	-	-	-	0.10 L HDL
14	-	-	-	-	-	-	-	0.010L	-	-	-	-	0.010L
MEAN	-	.1100	.0800	.0700	.1100	.0750	-	.0400	-	-	.0400	.0500	.0450
STD DEV	-	-	-	-	-	.0071	-	-	-	-	-	.0141	.0100
REL STD	-	-	-	-	-	9.4	-	-	-	-	-	28.3	22.2
DES VAL	-	-	-	-	.120	.069	-	-	-	-	-	-	.060

LAB	10101 ALKLNTY TITR'N	10108 ALKLNTY POT TIT	10109 ALKLNTY POT TIT	10111 ALKLNTY TIT PRO	10112 ALKLNTY TIT CON	10190 ALKLINTY COMMON	10301 PH	10390 PH COMMON	10602 HARDNSS CALC'D	10603 HARDNSS TITR'N	10606 HARDNSS CALC'D	10690 HARDNESS COMMON	11005 NA TOT ICP
1	24.	-	-	-	-	24.	7.4	7.4	43.	-	-	43.	-
2	-	-	-	-	-	-	-	-	46.9	-	-	46.9	-
3	-	-	-	24.0	-	24.0	6.78	6.78	-	-	45.9	45.9	-
4	21.9	-	-	-	-	21.9	7.63	7.63	-	-	-	-	-
6	-	-	23.	-	-	23.	7.5	7.5	-	52.	-	52.	-
7	22.0	-	-	-	-	22.0	7.4	7.4	-	48.2	-	48.2	-
8	-	-	22.0	-	-	22.0	7.5	7.5	48.5	-	-	48.5	-
9	-	22.5	-	-	-	22.5	7.51	7.51	47.	-	-	47.	15.
10	-	-	-	-	23.	23.	7.51	7.51	-	-	-	-	14.08
11	22.	-	-	-	-	22.	6.7	6.7	48.	-	-	48.	-
12	22.3	-	-	-	-	22.3	7.1	7.1	-	-	-	-	-
14	26.7 R	-	-	-	-	26.7 R	7.55	7.55	49.8	-	-	49.8	-
MEAN	22.4400	22.5000	22.5000	24.0000	23.0000	22.6700	7.3255	7.3255	47.2000	50.1000	45.9000	47.7000	14.5400
STD DEV	.8849	-	.7071	-	-	.8070	.3198	.3198	2.3178	2.6870	-	2.5085	.6505
REL STD	3.9	-	3.1	-	-	3.6	4.4	4.4	4.9	5.4	-	5.3	4.5
DES VAL	-	-	-	-	-	23.008	-	7.472	-	-	-	46.882	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 21 PP 61 IR156 SAMPLE 2

LAB	11102 NA F AAS	11103 NA DIS FL PH	11105 NA DIS AAS DA	11107 NA UF FL PH	11311 NA EXT ICP	11990 SODIUM COMMON	12005 MG TOT ICP	12101 MG DIS CALC'D	12102 MG DIS AAS DA	12106 MG UF AAS DA	12107 MG DIS AAS AUT	12303 MG UF AAS AUT	12311 MG EXT ICP
1	-	12.8	-	-	-	12.8	-	-	-	-	-	2.3	-
2	-	13.3	-	-	-	13.3	-	-	-	-	2.9	-	-
3	-	-	-	13.2	-	13.2	-	-	-	2.9	-	-	-
6	14.	-	-	-	-	14.	-	2.9	-	-	-	-	-
7	-	-	12.6	-	-	12.6	-	-	2.90	-	-	-	-
8	-	-	-	-	13.4	13.4	-	-	-	-	-	-	3.17
9	-	-	-	-	-	15.	3.0	-	-	-	-	-	-
10	-	-	-	-	-	14.08	2.99	-	-	-	-	-	-
11	13.	-	-	-	-	13.	-	-	3.0	-	-	-	-
12	-	13.6	-	-	-	13.6	-	-	-	-	-	-	-
14	13.2	-	-	-	-	13.2	-	-	-	-	-	-	-
MEAN	13.4000	13.2333	12.6000	13.2000	13.4000	13.4709	2.9950	2.9000	2.9500	2.9000	2.9000	2.3000	3.1700
STD DEV	.5292	.4041	-	-	-	.6795	.0071	-	.0707	-	-	-	-
REL STD	3.9	3.1	-	-	-	5.0	.2	-	2.4	-	-	-	-
DES VAL	-	-	-	-	-	13.236	-	-	-	-	-	-	-

LAB	12990 MGNESIUM COMMON	14102 SILICA ANSA AA	14105 SILICA MOLY AA	14106 SILICA MOLY	14111 SILICA ICP DA	14190 SILICA COMMON	15401 T P UV AA ASC	15406 T P UF AA ASC	15409 T P BLK AA ASC	15413 T P ACL AA SNCL	15421 T P BLK DIG ASC	15490 TOT P COMMON	16304 SO4 DIS AUTO BA
1	2.3	1.6	-	-	-	1.6	-	-	-	-	0.006L	0.006L	-
2	2.9	1.38	-	-	-	1.38	-	-	-	-	-	-	30.0
3	2.9	-	-	1.38	-	1.38	-	-	-	0.002	-	0.002	-
4	-	-	-	-	-	-	-	0.003L	-	-	-	0.003L	-
6	2.9	-	-	-	-	-	-	-	0.02 R	-	-	0.02 R	30.
7	2.90	-	-	-	-	-	-	0.005	-	-	-	0.005	-
8	3.17	-	1.3	-	-	1.3	-	-	-	0.001L	-	0.001L	-
9	3.0	-	-	-	1.35	1.35	-	-	-	-	-	-	-
10	2.99	-	1.39	-	-	1.39	0.010L	-	-	-	-	0.010L HDL	-
11	3.0	-	-	-	-	-	-	0.022R	-	-	-	0.022R	-
12	-	-	1.4	-	-	1.4	-	0.004	-	-	-	0.004	-
14	-	-	-	-	-	-	-	0.008L	-	-	-	0.008L HDL	-
MEAN	2.8956	1.4900	1.3633	1.3800	1.3500	1.4000	-	.0045	-	.0020	-	.0037	30.0000
STD DEV	.2400	.1556	.0551	-	-	.0943	-	.0007	-	-	-	.0015	.0000
REL STD	8.3	10.4	4.0	-	-	6.7	-	15.7	-	-	-	41.7	-1.0
DES VAL	2.898	-	-	-	-	1.390	-	-	-	-	-	.004	-

LAB	16306 SO4 DIS AA MTB	16307 SO4 UF AA MTB	16309 SO4 DIS I C	16310 SO4 DIS AA CALM	16990 SULFATE COMMON	17203 CL DIS AA FE	17204 CL DIS AG TIT	17206 CL DIS AA AG	17208 CL DIS AA AG	17209 CL DIS I C	17210 CL DIS TIT CON	17990 CHLORIDE COMMON	19005 K TOT ICP
1	28.	-	-	-	28.	17.	-	-	-	-	-	17.	-
2	-	-	29.7	-	29.7	-	-	-	-	16.3	-	16.3	-
3	-	29.8	-	-	29.8	-	-	-	17.1	-	-	17.1	-
6	-	-	-	-	30.	-	16.	-	-	-	-	16.	-
7	29.9	-	-	-	29.9	16.3	-	-	-	-	-	16.3	-
8	30.0	-	-	-	30.0	-	-	18.	-	-	-	18.	-
9	-	-	30.6	-	30.6	-	-	-	-	17.9	-	17.9	1.2
10	-	-	-	28.5	28.5	-	-	-	-	-	17.	17.	1.32
11	28.	-	-	-	28.	-	-	17.	-	-	-	17.	-
12	29.5	-	-	-	29.5	-	-	16.3	-	-	-	16.3	-
14	26.6	-	-	-	26.6	-	-	16.5	-	-	-	16.5	-
MEAN	28.6667	29.8000	30.1500	28.5000	29.1455	16.6500	16.0000	16.9500	17.1000	17.1000	17.0000	16.8545	1.2600
STD DEV	1.3530	-	.6364	-	1.2053	.4950	-	.7594	-	1.1314	-	.6563	.0849
REL STD	4.7	-	2.1	-	4.1	3.0	-	4.5	-	6.6	-	3.9	6.7
DES VAL	-	-	-	-	29.809	-	-	-	-	-	-	17.010	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 21 PP 61 IR156 SAMPLE 2

LAB	19102 K DIS AAS	19103 K DIS FLM PH	19106 K DIS AAS LI	19107 K DIS FLM PH	19301 K EXT HNO3 AA	19990 PTASSIUM COMMON	20005 CA TOT ICP	20100 CA DIS CALC'D	20103 CA DIS AAS	20108 CA DIS AAS UF	20110 CA DIS AAS AUT	20311 CA EXT ICP	20990 CALCIUM COMMON
1	-	1.1	-	-	-	1.1	-	-	-	-	14.7	-	14.7
2	-	1.12	-	-	-	1.12	-	-	-	-	14.	-	14.
3	-	-	-	1.20	-	1.20	-	-	-	13.6	-	-	13.6
6	1.1	-	-	-	-	1.1	-	16.	-	-	-	-	16.
7	1.13	-	-	-	-	1.13	-	-	13.9	-	-	-	13.9
8	-	-	-	-	1.1	1.1	-	-	-	-	-	14.2	14.2
9	-	-	-	-	-	1.2	13.9	-	-	-	-	-	13.9
10	-	-	-	-	-	1.32	14.16	-	-	-	-	-	14.16
11	-	-	1.2	-	-	1.2	-	-	14.	-	-	-	14.
12	-	1.2	-	-	-	1.2	-	-	-	-	-	-	-
14	1.20	-	-	-	-	1.20	-	-	15.2	-	-	-	15.2
MEAN	1.1433	1.1400	1.2000	1.2000	1.1000	1.1700	14.0300	16.0000	14.3667	13.6000	14.3500	14.2000	14.3660
STD DEV	.0513	.0529	-	-	-	.0677	.1838	-	.7234	-	.4950	-	.7330
REL STD	4.5	4.6	-	-	-	5.8	1.3	-	5.0	-	3.4	-	5.1
DES VAL	-	-	-	-	-	1.245	-	-	-	-	-	-	13.973

DATA SUMMARY

FEDERAL-PROVINCIAL & PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAMS

STUDY NO. FP 22 PP 62 IR157 DATE: 01/10/87 DUE DATE: 31/10/87

SAMPLE 3 SPIKED SAMPLE. TRACE METALS S/E. (IN 0.2% HNO3)

LAB	13009 AL TOT 5X ICP	13105 AL DIS AAS GF	13111 AL DIS ICP DA	13302 AL EXT AAS GF	13305 AL EXT AAS SE	13306 AL UF AAS OX	13999 ALUMINUM COMMON	23002 V TOT AAS SE	23003 V EXT AAS GF	23009 V TOT 5X ICP	23011 V TOT 5X ICP	23102 V DIS AAS SE	23111 V DIS ICP DA
1	-	-	-	-	-	0.059	0.059	-	-	0.011	-	-	-
2	-	-	-	-	0.060	-	0.060	-	-	-	-	-	-
3	0.066	-	-	-	0.059	-	0.059	0.012	-	0.010	-	-	-
6	0.087	-	-	-	-	-	0.087	-	-	-	0.02 R	-	-
8	-	-	-	0.2 L	-	-	0.2 L HDL	-	-	-	-	-	-
9	-	-	0.03	-	-	-	0.03	-	-	-	-	-	0.01
10	-	-	0.06	-	-	-	0.06	-	-	-	-	-	0.010
12	-	0.055	-	-	-	-	0.055	-	-	-	-	0.011	-
14	-	0.073	-	-	-	-	0.073	-	0.010	-	-	-	-
MEAN	.0765	.0640	.0450	-	.0595	.0590	.0604	.0120	.0100	.0105	-	.0110	.0100
STD DEV	.0148	.0127	.0212	-	.0007	-	.0161	-	-	.0007	-	-	.0000
REL STD	19.4	19.9	47.1	-	1.2	-	26.7	-	-	6.7	-	-	-1.0
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

LAB	23999 VANADIUM COMMON	24003 CR TOT AAS SE	24004 CR TOT AAS GF	24009 CR TOT 5X ICP	24011 CR TOT 5X ICP	24056 CR DIS AAS GF	24111 CR DIS ICP DA	24302 CR EXT AAS DA	24303 CR EXT AAS SE	24999 CHROMIUM COMMON	25003 MN TOT AAS DA	25004 MN TOT 5X AAS	25010 MN TOT 5X ICP
1	0.011	-	-	0.011	-	-	-	-	-	0.011	0.012	-	-
3	0.012	0.013	-	0.014	-	-	-	-	-	0.013	-	0.011	0.011
6	0.02 R	-	-	-	0.016	-	-	-	-	0.016	-	-	-
8	-	-	0.016	-	-	-	-	-	-	0.016	-	-	-
9	0.01	-	-	-	-	-	0.011	-	-	0.011	-	-	-
10	0.010	-	-	-	-	-	0.013	-	-	0.013	-	-	-
11	-	-	-	-	-	-	-	-	0.012	0.012	-	-	-
12	0.011	-	-	-	-	0.013	-	-	-	0.013	-	-	-
14	0.010	-	-	-	-	-	-	0.01 L	-	0.01 L HDL	-	-	-
MEAN	.0107	.0130	.0160	.0125	.0160	.0130	.0120	-	.0120	.0131	.0120	.0110	.0110
STD DEV	.0008	-	-	.0021	-	-	.0014	-	-	.0020	-	-	-
REL STD	7.7	-	-	17.0	-	-	11.8	-	-	14.9	-	-	-
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

LAB	25011 MN TOT 5X ICP	25107 MN DIS AAS GF	25111 MN DIS ICP DA	25304 MN EXT AAS DA	25306 MN EXT AAS GF	25311 MN EXT ICP DA	25999 MANGNESE COMMON	26005 FE TOT AAS SE	26009 FE TOT 5X ICP	26011 FE TOT 5X ICP	26107 FE DIS AAS GF	26111 FE DIS ICP DA	26305 FE EXT AAS SE
1	-	-	-	-	-	-	0.012	-	-	-	-	-	-
2	-	-	-	0.01	-	-	0.01	-	-	-	-	-	0.033
3	-	-	-	-	-	-	0.011	0.029	0.033	-	-	-	-
6	0.013	-	-	-	-	-	0.013	-	-	0.035	-	-	-
8	-	-	-	-	-	0.02 L	0.02 L HDL	-	-	-	-	-	-
9	-	-	0.012	-	-	-	0.012	-	-	-	-	0.03	-
10	-	-	0.012	-	-	-	0.012	-	-	-	-	0.027	-
11	-	-	-	0.01	-	-	0.01	-	-	-	-	-	0.027
12	-	0.012	-	-	-	-	0.012	-	-	-	0.025	-	-
14	-	-	-	-	0.013	-	0.013	-	-	-	-	-	-
MEAN	.0130	.0120	.0120	.0100	.0130	-	.0117	.0290	.0330	.0350	.0250	.0285	.0300
STD DEV	-	-	.0000	.0000	-	-	.0011	-	-	-	-	.0021	.0042
REL STD	-	-	-1.0	-1.0	-	-	9.6	-	-	-	-	7.4	14.1
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 22 PP 62 IR157 SAMPLE 3

LAB	26306 FE EXT AAS GF	26311 FE EXT ICP DA	26999 IRON COMMON	27002 CO TOT AAS SE	27003 CO TOT AAS GF	27009 CO TOT 5X ICP	27011 CO TOT 5X ICP	27107 CO DIS AAS GF	27111 CO DIS ICP DA	27301 CO EXT AAS DA	27302 CO EXT AAS SE	27999 COBALT COMMON	28002 NI TOT AAS SE
1	-	-	-	-	-	0.011	-	-	-	-	-	0.011	-
2	-	-	0.033	-	-	-	-	-	-	-	-	-	-
3	-	-	0.029	0.011	-	0.011	-	-	-	-	-	0.011	0.013
6	-	-	0.035	-	-	-	0.012	-	-	-	-	0.012	-
8	-	0.03	0.03	-	0.013	-	-	-	-	-	-	0.013	-
9	-	-	0.03	-	-	-	-	-	0.01	-	-	0.01	-
10	-	-	0.027	-	-	-	-	-	0.010	-	-	0.010	-
11	-	-	0.027	-	-	-	-	-	-	-	0.010	0.010	-
12	-	-	0.025	-	-	-	-	0.011	-	-	-	0.011	-
14	0.021	-	0.021	-	-	-	-	-	-	0.01 L	-	0.01 L	-
MEAN	.0210	.0300	.0286	.0110	.0130	.0110	.0120	.0110	.0100	-	.0100	.0110	.0130
STD DEV	-	-	.0042	-	-	.0000	-	-	.0000	-	-	.0011	-
REL STD	-	-	14.7	-	-	-1.0	-	-	-1.0	-	-	9.7	-
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

HDL

LAB	28009 NI TOT 5X ICP	28011 NI TOT 5X ICP	28107 NI DIS AAS GF	28111 NI DIS ICP DA	28302 NI EXT AAS SE	28309 NI EXT AAS GF	28999 NICKEL COMMON	29005 CU TOT AAS SE	29009 CU TOT 5X ICP	29011 CU TOT 5X ICP	29107 CU DIS AAS GF	29111 CU DIS ICP DA	29305 CU EXT AAS SE
1	0.012	-	-	-	-	-	0.012	-	0.014	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	0.014
3	0.013	-	-	-	-	-	0.013	0.013	0.013	-	-	-	-
6	-	0.016	-	-	-	-	0.016	-	-	0.016	-	-	-
8	-	-	-	-	-	0.014	0.014	-	-	-	-	-	-
9	-	-	-	0.013	-	-	0.013	-	-	-	-	0.012	-
10	-	-	-	0.011	-	-	0.011	-	-	-	-	0.013	-
11	-	-	-	-	0.012	-	0.012	-	-	-	-	-	0.013
12	-	-	0.010	-	-	-	0.010	-	-	-	0.014	-	-
14	-	-	-	-	-	0.037R	0.037R	-	-	-	-	-	-
MEAN	.0125	.0160	.0100	.0120	.0120	.0140	.0126	.0130	.0135	.0160	.0140	.0125	.0135
STD DEV	.0007	-	-	.0014	-	-	.0018	-	.0007	-	-	.0007	.0007
REL STD	5.7	-	-	11.8	-	-	14.6	-	5.2	-	-	5.7	5.2
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

LAB	29308 CU EXT AAS GF	29311 CU EXT ICP DA	29999 COPPER COMMON	30005 ZN TOT AAS SE	30009 ZN TOT 5X ICP	30011 ZN TOT 5X ICP	30107 ZN DIS AAS GF	30111 ZN DIS ICP DA	30304 ZN EXT AAS DA	30305 ZN EXT AAS SE	30306 ZN EXT AAS GF	30311 ZN EXT ICP DA	30999 ZINC COMMON
1	-	-	0.014	-	0.017	-	-	-	-	-	-	-	0.017
2	-	-	0.014	-	-	-	-	-	0.01	-	-	-	0.01
3	-	-	0.013	0.016	0.015	-	-	-	-	-	-	-	0.016
6	-	-	0.016	-	-	0.021R	-	-	-	-	-	-	0.021R
8	-	0.01	0.01	-	-	-	-	-	-	-	-	0.01	0.01
9	-	-	0.012	-	-	-	-	0.015	-	-	-	-	0.015
10	-	-	0.013	-	-	-	-	0.016	-	-	-	-	0.016
11	-	-	0.013	-	-	-	-	-	-	0.016	-	-	0.016
12	-	-	0.014	-	-	-	0.017	-	-	-	-	-	0.017
14	0.013	-	0.013	-	-	-	-	-	-	-	0.012	-	0.012
MEAN	.0130	.0100	.0132	.0160	.0160	-	.0170	.0155	.0100	.0160	.0120	.0100	.0143
STD DEV	-	-	.0015	-	.0014	-	-	.0007	-	-	-	-	.0029
REL STD	-	-	11.7	-	8.8	-	-	4.6	-	-	-	-	20.0
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 22 PP 62 IR157 SAMPLE 3

LAB	38001 SR TOT AAS DA	38009 SR TOT ICP DA	38011 SR TOT ICP DA	38111 SR DIS ICP DA	38301 SR EXT AAS DA	38999 STRNTIUM COMMON	42009 MO TOT 5X ICP	42011 MO TOT 5X ICP	42111 MO DIS ICP DA	42301 MO EXT AAS DA	42999 MOLYBNUM COMMON	48002 CD TOT AAS SE	48003 CD TOT AAS GF
1	-	-	-	-	-	-	0.013	-	-	-	0.013	-	-
3	0.351	0.342	-	-	-	0.351	0.012	-	-	-	0.012	0.011	-
6	-	-	0.13 R	-	-	0.13 R	-	0.02 R	-	-	0.02 R	-	-
9	-	-	-	0.38	-	0.38	-	-	0.01	-	0.01	-	0.011
10	-	-	-	-	0.37	0.37	-	-	0.014	-	0.014	-	-
14	-	-	-	-	-	-	-	-	-	0.010L	0.010L HDL	-	-
MEAN	.3510	.3420	-	.3800	.3700	.3670	.0125	-	.0120	-	.0123	.0110	.0110
STD DEV	-	-	-	-	-	.0147	.0007	-	.0028	-	.0017	-	-
REL STD	-	-	-	-	-	4.0	5.7	-	23.6	-	13.9	-	-
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

LAB	48009 CD TOT 5X ICP	48011 CD TOT 5X ICP	48103 CD DIS AAS GF	48111 CD DIS ICP DA	48302 CD EXT AAS SE	48303 CD EXT AAS GF	48309 CD EXT AAS GF	48999 CADMIUM COMMON	56009 BA TOT 5X ICP	56011 BA TOT 5X ICP	56111 BA DIS ICP DA	56999 BARIUM COMMON	82002 PB TOT AAS SE
1	0.011	-	-	-	-	-	-	0.011	-	-	-	-	-
2	-	-	-	-	0.011	-	-	0.011	-	-	-	-	-
3	0.011	-	-	-	-	-	-	0.011	0.055	-	-	0.055	0.010
6	-	0.012	-	-	-	-	-	0.012	-	0.059	-	0.059	-
8	-	-	-	-	-	-	0.011	0.011	-	-	-	-	-
9	-	-	-	-	-	-	-	0.011	-	-	0.05	0.05	-
10	-	-	-	0.009	-	-	-	0.009	-	-	0.05	0.05	-
11	-	-	-	-	0.010	-	-	0.010	-	-	-	-	-
12	-	-	0.011	-	-	-	-	0.011	-	-	-	-	-
14	-	-	-	-	-	0.012	-	0.012	-	-	-	-	-
MEAN	.0110	.0120	.0110	.0090	.0105	.0120	.0110	.0109	.0550	.0590	.0500	.0535	.0100
STD DEV	.0000	-	-	-	.0007	-	-	.0009	-	-	.0000	.0044	-
REL STD	-1.0	-	-	-	6.7	-	-	8.0	-	-	-1.0	8.1	-
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

LAB	82004 PB TOT AAS GF	82009 PB TOT 5X ICP	82011 PB TOT 5X ICP	82104 PB DIS AAS GF	82302 PB EXT AAS SE	82305 PB EXT AAS GF	82309 PB EXT AAS GF	82999 LEAD COMMON
1	-	-	-	-	0.003R	-	-	0.003R
2	-	-	-	-	0.011	-	-	0.011
3	-	0.010	-	-	-	-	-	0.010
6	-	-	0.01	-	-	-	-	0.01
8	-	-	-	-	-	-	0.012	0.012
9	0.011	-	-	-	-	-	-	0.011
10	-	-	-	-	-	-	0.007	0.007
11	-	-	-	-	0.009	-	-	0.009
12	-	-	-	0.010	-	-	-	0.010
14	-	-	-	-	-	0.011	-	0.011
MEAN	.0110	.0100	.0100	.0100	.0100	.0110	.0095	.0101
STD DEV	-	-	-	-	.0014	-	.0035	.0015
REL STD	-	-	-	-	14.1	-	37.2	14.4
DES VAL	-	-	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 22 PP 62 IR157 SAMPLE 4

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS	00125 SUM OF ANIONS	02011 COLOUR APPARE	02021 COLOUR VIS COM	02023 COLOUR SPECT	02040 COLOUR COMMON	02041 CONDUCT SPEC 25	02060 CONDUCT COMMON	02072 TURB HELLIG	02073 TURB HACH	02074 TURB NPLMTRI	02077 TURB HACH FZ
1	-1.23	1.560	1.599	-	55.	-	55.	178.	178.	-	-	-	-
2	-	1.629	1.398	40.	-	-	40.	175.	175.	-	0.3	-	-
3	+0.65	1.598	1.577	50.	-	-	50.	177.	177.	-	0.15	-	-
4	-	-	-	-	40.	-	40.	176.	176.	-	-	-	-
6	+6.1	1.7	1.5	-	-	-	-	168.	168.	-	-	0.30	-
7	+1.4	1.60	1.55	53.	-	-	53.	206. R	206. R	-	0.84 R	-	-
8	+2.19	1.62	1.55	50.	-	-	50.	171.	171.	-	-	0.20	-
9	+0.31	1.63	1.62	-	-	-	-	173.	173.	-	-	-	-
10	+4.34	1.651	1.514	-	-	33.	33.	174.	174.	-	-	0.4	-
11	-	-	-	35.	-	-	35.	170.	170.	-	-	-	0.20
12	-	-	-	-	40.	-	40.	175.	175.	-	0.4	-	-
14	-	-	-	-	-	-	-	162.	162.	0.5	-	-	-
MEAN	1.9667	1.6235	1.5385	45.6000	45.0000	33.0000	44.0000	172.6364	172.6364	.5000	.2833	.3000	.2000
STD DEV	2.5106	.0413	.0696	7.7006	8.6603	-	8.0932	4.6534	4.6534	-	.1258	.1000	-
REL STD	127.7	2.5	4.5	16.9	19.2	-	18.4	2.7	2.7	-	44.4	33.3	-
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

LAB	02081 TURB RATIO	02090 TURBIDTY COMMON	05105 BORON AA CARM	05106 BORON F AZOMETH	05107 BORON ICP DA	05111 BORON F ICP DA	05190 BORON COMMON	06008 TOC CO2 FLM	06052 TIC CO2 ?	06101 DOC IR /DIF	06104 DOC UV CO2 IR	06107 DOC UV CO2 PHE	06109 DOC UV CO2 OH
1	-	-	-	-	0.002L	-	0.002L	-	-	-	-	7.2	-
2	-	0.3	-	-	-	-	-	-	-	-	-	8.0	-
3	-	0.15	-	-	-	-	-	-	-	-	6.53	-	-
4	0.12	0.12	0.07	-	-	-	0.07 R?	-	-	-	7.1	-	-
6	-	0.30	-	-	-	-	-	-	-	-	6.7	-	-
7	-	0.84 R	-	-	-	-	-	-	-	-	-	-	-
8	-	0.20	-	0.05 L	-	-	0.05 L	-	-	-	-	-	-
10	-	0.4	-	-	-	0.01 L	0.01 L	-	-	-	-	-	6.9
11	-	0.20	-	-	-	-	-	8.6	5.4	-	-	-	-
12	-	0.4	-	-	-	-	-	-	-	8.1	-	-	-
14	-	0.5	-	-	-	-	-	-	-	-	-	-	-
MEAN	.1200	.2856	.0700	-	-	-	.0700	8.6000	5.4000	8.1000	6.7767	7.6000	6.9000
STD DEV	-	.1289	-	-	-	-	-	-	-	-	.2926	.5657	-
REL STD	-	45.2	-	-	-	-	-	-	-	-	4.3	7.4	-
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

LAB	06150 D O C COMMON	06151 DIC IR COMBUST	06152 DIC UV CO2 IR	06159 DIC AA CO2 OH	06490 D I C COMMON	07004 TKN AA NITPRUS	07010 TKN AA SAL	07015 TKN DIG BERTHEL	07016 TKN BLK AMM-SAL	07018 TKN BLK INDOPHE	07021 TKN BLK DIG BER	07090 TKN COMMON	07109 NO3+NO2 AA HYD
1	7.2	-	-	-	-	-	-	-	-	-	0.209	0.209	-
2	8.0	-	-	-	-	-	-	-	-	-	-	-	-
3	6.53	-	5.81	-	5.81	-	0.242	-	-	-	-	0.242	-
4	7.1	-	6.8	-	6.8	-	-	-	-	-	-	-	-
6	6.7	-	-	-	-	-	-	-	0.5	-	-	0.5	0.24
8	-	-	-	-	-	-	-	0.25	-	-	-	0.25	-
9	-	-	-	-	-	-	-	-	-	-	-	-	0.21
10	6.9	-	-	7.0	7.0	-	-	-	-	-	-	-	0.225
11	8.6	-	-	-	5.4	-	-	-	-	-	-	-	-
12	8.1	7.2	-	-	7.2	-	-	-	-	0.04	-	0.04	-
14	-	-	-	-	-	0.26	-	-	-	-	-	0.26	-
MEAN	7.3913	7.2000	6.3050	7.0000	6.4420	.2600	.2420	.2500	.5000	.0400	.2090	.2502	.2250
STD DEV	.7480	-	.7000	-	.7905	-	-	-	-	-	-	.1473	.0150
REL STD	10.1	-	11.1	-	12.3	-	-	-	-	-	-	58.9	6.7
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 22 PP 62 IR157 SAMPLE 4

LAB	07110 NO3+NO2 AA2 CD	07111 NO3+NO2 DIS SPEC	07112 NO3+NO2 UF AA CD	07390 NITRATE COMMON	07505 NH3 TOT AA BERT	07506 NH3 TOT SPEC EL	07540 NH3 TOT AA SAL	07555 NH3 DIS AA PHEN	07557 NH3 DIS AA INDO	07562 NH3 DIS AA EDTA	07563 NH3 DIS AA INDO	07590 AMMONIA COMMON	07601 T N UV AA SUL
1	-	0.206	-	0.206	-	-	-	-	-	0.002L	-	0.002L	-
2	0.23	-	-	0.23	-	-	-	-	-	-	-	-	0.30
3	-	-	0.240	0.240	0.001	-	-	-	-	-	-	0.001	-
4	0.21	-	-	0.21	-	-	0.005L	-	-	-	-	0.005L	-
6	-	-	-	0.24	-	-	-	-	0.04 R	-	-	0.04 R	-
7	-	-	0.23	0.23	-	-	-	-	-	-	-	-	-
8	0.23	-	-	0.23	-	-	-	0.004	-	-	-	0.004	-
9	-	-	-	0.21	-	-	-	-	-	-	-	-	-
10	-	-	-	0.225	-	-	-	0.010L	-	-	-	0.010L?	-
11	0.17	-	-	0.17	-	0.03 L	-	-	-	-	-	0.03 L HDL	-
12	0.22	-	-	0.22	-	-	-	-	-	-	0.005L	0.005L	-
14	-	0.19	-	0.19	0.10 L	-	-	-	-	-	-	0.10 L HDL	-
MEAN	.2120	.1980	.2350	.2168	.0010	-	-	.0040	-	-	-	.0025	.3000
STD DEV	.0249	.0113	.0071	.0209	-	-	-	-	-	-	-	.0021	-
REL STD	11.7	5.7	3.0	9.6	-	-	-	-	-	-	-	84.9	-
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

LAB	07602 T N CALC'D	07605 T N UV HY SUL	07651 T N DIS UV AA	07690 TOT N COMMON	07790 T N DIS COMMON	09103 F DIS COL SP	09105 F DIS SP EL	09106 F DIS EL POT	09107 F DIS AUT POT	09108 F DIS SP EL	09115 F DIS AA ALIZ	09190 FLUORIDE COMMON	10101 ALKLNTY TITR'N
1	-	-	-	-	-	-	-	-	0.34	-	-	0.34	31.
2	-	-	-	-	0.30	-	-	0.33	-	-	-	0.33	-
3	-	-	-	-	-	-	-	-	-	0.37	-	0.37	-
4	-	-	0.39	-	0.39	-	-	-	-	-	-	-	27.9
6	-	-	-	-	-	0.3	-	-	-	-	-	0.3	-
7	-	-	-	-	-	-	-	-	-	-	-	-	28.3
8	0.48	-	-	0.48	-	-	0.26	-	-	-	-	0.26	-
9	-	-	-	-	-	-	-	-	-	-	0.36	0.36	-
10	-	0.32	-	-	0.32	-	-	-	-	-	0.57 R	0.57 R	-
11	-	-	-	-	-	-	0.30	-	-	-	-	0.30	29.
12	0.26	-	-	0.26	-	-	0.31	-	-	-	-	0.31	28.6
14	-	-	-	-	-	-	0.27	-	-	-	-	0.27	31.78
MEAN	.3700	.3200	.3900	.3700	.3367	.3000	.2850	.3300	.3400	.3700	.3600	.3156	29.4300
STD DEV	.1556	-	-	.1556	.0473	-	.0238	-	-	-	-	.0378	1.5798
REL STD	42.0	-	-	42.0	14.0	-	8.4	-	-	-	-	12.0	5.4
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

LAB	10108 ALKLNTY POT TIT	10109 ALKLNTY POT TIT	10111 ALKLNTY TIT PRO	10112 ALKLNTY TIT CON	10190 ALKLINTY COMMON	10301 PH	10390 PH COMMON	10602 HARDNSS CALC'D	10603 HARDNSS TITR'N	10606 HARDNSS CALC'D	10690 HARDNESS COMMON	11005 NA TOT ICP	11102 NA F AAS
1	-	-	-	-	31.	8.0	8.0	55.	-	-	55.	-	-
2	-	-	-	-	-	-	-	56.4	-	-	56.4	-	-
3	-	-	29.3	-	29.3	6.98	6.98	-	-	55.4	55.4	-	-
4	-	-	-	-	27.9	7.52	7.52	-	-	-	-	-	-
6	-	31.	-	-	31.	7.4	7.4	-	60.	-	60.	-	9.
7	-	-	-	-	28.3	7.5	7.5	-	57.9	-	57.9	-	-
8	-	29.0	-	-	29.0	7.60	7.60	57.1	-	-	57.1	-	-
9	30.	-	-	-	30.	7.62	7.62	55.	-	-	55.	10.	-
10	-	-	-	29.	29.	7.58	7.58	-	-	-	-	9.96	-
11	-	-	-	-	29.	6.8	6.8	57.	-	-	57.	-	9.6
12	-	-	-	-	28.6	7.4	7.4	-	-	-	-	-	-
14	-	-	-	-	31.78	7.18	7.18	59.65	-	-	59.65	-	9.50
MEAN	30.0000	30.0000	29.3000	29.0000	29.5345	7.4164	7.4164	56.6917	58.9500	55.4000	57.0500	9.9800	9.3667
STD DEV	-	1.4142	-	-	1.2464	.3297	.3297	1.7217	1.4849	-	1.8621	.0283	.3215
REL STD	-	4.7	-	-	4.2	4.4	4.4	3.0	2.5	-	3.3	.3	3.4
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

LAB	11103 NA DIS FL PH	11105 NA DIS AAS DA	11107 NA UF FL PH	11311 NA EXT ICP	11990 SODIUM COMMON	12005 MG TOT ICP	12101 MG DIS CALC'D	12102 MG DIS AAS DA	12106 MG UF AAS DA	12107 MG DIS AAS AUT	12303 MG UF AAS AUT	12311 MG EXT ICP	12990 MGNESIUM COMMON
1	9.1	-	-	-	9.1	-	-	-	-	-	3.	-	3.
2	9.7	-	-	-	9.7	-	-	-	-	3.4	-	-	3.4
3	-	-	9.55	-	9.55	-	-	-	3.4	-	-	-	3.4
6	-	-	-	-	9.	-	3.9	-	-	-	-	-	3.9
7	-	9.2	-	-	9.2	-	-	3.46	-	-	-	-	3.46
8	-	-	-	9.45	9.45	-	-	-	-	-	-	3.72	3.72
9	-	-	-	-	10.	3.4	-	-	-	-	-	-	3.4
10	-	-	-	-	9.96	3.52	-	-	-	-	-	-	3.52
11	-	-	-	-	9.6	-	-	3.5	-	-	-	-	3.5
12	9.8	-	-	-	9.8	-	-	-	-	-	-	-	-
14	-	-	-	-	9.50	-	-	3.51	-	-	-	-	3.51
MEAN	9.5333	9.2000	9.5500	9.4500	9.5327	3.4600	3.9000	3.4900	3.4000	3.4000	3.0000	3.7200	3.4810
STD DEV	.3786	-	-	-	.3309	.0849	-	.0265	-	-	-	-	.2326
REL STD	4.0	-	-	-	3.5	2.5	-	.8	-	-	-	-	6.7
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

LAB	14102 SILICA ANSA AA	14105 SILICA MOLY AA	14106 SILICA MOLY	14111 SILICA ICP DA	14190 SILICA COMMON	15401 T P UV AA ASC	15406 T P UF AA ASC	15409 T P BLK AA ASC	15413 T P ACL AA SNCL	15421 T P BLK DIG ASC	15490 TOT P COMMON	16304 SO4 DIS AUTO BA	16306 SO4 DIS AA MTB
1	3.8	-	-	-	3.8	-	-	-	-	0.006L	0.006L	-	13.
2	3.45	-	-	-	3.45	-	-	-	0.009	-	0.009	14.0	-
3	-	-	3.38	-	3.38	-	-	-	0.009	-	0.009	-	-
4	-	-	-	-	-	-	0.004	-	-	-	0.004	-	-
6	-	-	-	-	-	-	-	0.03 R	-	-	0.03 R	12.	-
7	-	-	-	-	-	-	0.021R	-	-	-	0.021R	-	15.2
8	-	3.1	-	-	3.1	-	-	-	0.008	-	0.008	-	12.9
9	-	-	-	3.42	3.42	-	-	-	-	-	-	-	-
10	-	3.5	-	-	3.5	0.010L	-	-	-	-	0.010L	-	-
11	-	-	-	-	-	-	0.012	-	-	-	0.012	-	13.
12	-	3.5	-	-	3.5	-	0.007	-	-	-	0.007	-	14.1
14	-	-	-	-	-	-	0.008L	-	-	-	0.008L	-	14.2
MEAN	3.6250	3.3667	3.3800	3.4200	3.4500	-	.0077	-	.0087	-	.0082	13.0000	13.7333
STD DEV	.2475	.2309	-	-	.2065	-	.0040	-	.0006	-	.0026	1.4142	.9245
REL STD	6.8	6.9	-	-	6.0	-	52.7	-	6.7	-	32.3	10.9	6.7
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

LAB	16307 SO4 UF AA MTB	16309 SO4 DIS I C	16310 SO4 DIS AA CALM	16990 SULFATE COMMON	17203 CL DIS AA FE	17204 CL DIS AG TIT	17206 CL DIS AA AG	17208 CL DIS AA AG	17209 CL DIS I C	17210 CL DIS TIT CON	17990 CHLORIDE COMMON	19005 K TOT ICP	19102 K DIS AAS
1	-	-	-	13.	24.	-	-	-	-	-	24.	-	-
2	-	12.8	-	14.0	-	-	-	-	22.8	-	22.8	-	-
3	13.5	-	-	13.5	-	-	-	23.9	-	-	23.9	-	-
6	-	-	-	12.	-	22.	-	-	-	-	22.	-	2.8
7	-	-	-	15.2	23.1	-	-	-	-	-	23.1	-	2.81
8	-	-	-	12.9	-	-	25.	-	-	-	25.	-	-
9	-	12.7	-	12.7	-	-	-	-	26.5 R	-	26.5 R	2.9	-
10	-	-	11.6	11.6	-	-	-	-	-	24.0	24.0	3.08	-
11	-	-	-	13.	-	-	23.	-	-	-	23.	-	-
12	-	-	-	14.1	-	-	23.1	-	-	-	23.1	-	-
14	-	-	-	14.2	-	-	24.1	-	-	-	24.1	-	2.93
MEAN	13.5000	12.7500	11.6000	13.2909	23.5500	22.0000	23.8000	23.9000	22.8000	24.0000	23.5000	2.9900	2.8467
STD DEV	-	.0707	-	1.0425	.6364	-	.9416	-	-	-	.8551	.1273	.0723
REL STD	-	.6	-	7.8	2.7	-	4.0	-	-	-	3.6	4.3	2.5
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 22 PP 62 IR157 SAMPLE 4

LAB	19103 K DIS FLM PH	19106 K DIS AAS LI	19107 K DIS FLM PH	19301 K EXT HNO3 AA	19990 PTASSIUM COMMON	20005 CA TOT ICP	20100 CA DIS CALC'D	20103 CA DIS AAS	20108 CA DIS AAS UF	20110 CA DIS AAS AUT	20311 CA EXT ICP	20990 CALCIUM COMMON
1	2.7	-	-	-	2.7	-	-	-	-	17.	-	17.
2	3.1	-	-	-	3.1	-	-	-	-	17.	-	17.
3	-	-	2.91	-	2.91	-	-	-	16.6	-	-	16.6
6	-	-	-	-	2.8	-	18.	-	-	-	-	18.
7	-	-	-	-	2.81	-	-	16.8	-	-	-	16.8
8	-	-	-	2.9	2.9	-	-	-	-	-	16.7	16.7
9	-	-	-	-	2.9	16.5	-	-	-	-	-	16.5
10	-	-	-	-	3.08	17.0	-	-	-	-	-	17.0
11	-	2.8	-	-	2.8	-	-	17.	-	-	-	17.
12	2.8	-	-	-	2.8	-	-	-	-	-	-	-
14	-	-	-	-	2.93	-	-	18.1	-	-	-	18.1
MEAN	2.8667	2.8000	2.9100	2.9000	2.8845	16.7500	18.0000	17.3000	16.6000	17.0000	16.7000	17.0700
STD DEV	.2082	-	-	-	.1220	.3536	-	.7000	-	.0000	-	.5478
REL STD	7.3	-	-	-	4.2	2.1	-	4.0	-	-1.0	-	3.2
DES VAL	-	-	-	-	-	-	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 22 PP 62 IR157 SAMPLE 5

LAB	13009 AL TOT 5X ICP	13105 AL DIS AAS GF	13111 AL DIS ICP DA	13302 AL EXT AAS GF	13305 AL EXT AAS SE	13306 AL UF AAS OX	13999 ALUMINUM COMMON	23002 V TOT AAS SE	23003 V EXT AAS GF	23009 V TOT 5X ICP	23011 V TOT 5X ICP	23102 V DIS AAS SE	23111 V DIS ICP DA
1	-	-	-	-	-	0.020L	0.020L HDL	-	-	0.005	-	-	-
2	-	-	-	-	0.014	-	0.014	-	-	-	-	-	-
3	0.017	-	-	-	0.014	-	0.014	0.005	-	0.005	-	-	-
6	0.033R	-	-	-	-	-	0.033R	-	-	-	0.01 L	-	-
8	-	-	-	0.2 L	-	-	0.2 L HDL	-	-	-	-	-	-
9	-	-	0.02	-	-	-	0.02	-	-	-	-	-	0.01 L
10	-	-	0.02	-	-	-	0.02	-	-	-	-	-	0.005L
12	-	0.015	-	-	-	-	0.015	-	-	-	-	0.005	-
14	-	0.058R	-	-	-	-	0.058R	-	0.005	-	-	-	-
MEAN	.0170	.0150	.0200	-	.0140	-	.0166	.0050	.0050	.0050	-	.0050	-
STD DEV	-	-	.0000	-	.0000	-	.0031	-	-	.0000	-	-	-
REL STD	-	-	-1.0	-	-1.0	-	18.9	-	-	-1.0	-	-	-
DES VAL	-	-	-	-	-	-	.018	-	-	-	-	-	-

HCU

LAB	23999 VANADIUM COMMON	24003 CR TOT AAS SE	24004 CR TOT AAS GF	24009 CR TOT 5X ICP	24011 CR TOT 5X ICP	24056 CR DIS AAS GF	24111 CR DIS ICP DA	24302 CR EXT AAS DA	24303 CR EXT AAS SE	24999 CHROMIUM COMMON	25003 MN TOT AAS DA	25004 MN TOT 5X AAS	25010 MN TOT 5X ICP
1	0.005	-	-	0.008	-	-	-	-	-	0.008	0.008L	-	-
3	0.005	0.006	-	0.006	-	-	-	-	-	0.006	-	0.007	0.006
6	0.01 L	-	-	-	0.006	-	-	-	-	0.006	-	-	-
8	-	-	0.008	-	-	-	-	-	-	0.008	-	-	-
9	0.01 L	-	0.006	-	-	-	-	-	-	0.006	-	-	-
10	0.005L	-	-	-	-	-	0.006	-	-	0.006	-	-	-
11	-	-	-	-	-	-	-	-	0.005	0.005	-	-	-
12	0.005	-	-	-	-	0.007	-	-	-	0.007	-	-	-
14	0.005	-	-	-	-	-	-	0.01 L	-	0.01 L HDL	-	-	-
MEAN	.0050	.0060	.0070	.0070	.0060	.0070	.0060	-	.0050	.0065	-	.0070	.0060
STD DEV	.0000	-	.0014	.0014	-	-	-	-	-	.0011	-	-	-
REL STD	-1.0	-	20.2	20.2	-	-	-	-	-	16.4	-	-	-
DES VAL	.005	-	-	-	-	-	-	-	-	.007	-	-	-

LAB	25011 MN TOT 5X ICP	25107 MN DIS AAS GF	25111 MN DIS ICP DA	25304 MN EXT AAS DA	25306 MN EXT AAS GF	25311 MN EXT ICP DA	25999 MANGNESE COMMON	26005 FE TOT AAS SE	26009 FE TOT 5X ICP	26011 FE TOT 5X ICP	26111 FE DIS ICP DA	26305 FE EXT AAS SE	26306 FE EXT AAS GF
1	-	-	-	-	-	-	0.008L HDL	-	-	-	-	-	-
2	-	-	-	0.005	-	-	0.005	-	-	-	-	0.008	-
3	-	-	-	-	-	-	0.007	0.010	0.009	-	-	-	-
6	0.006	-	-	-	-	-	0.006	-	-	0.013R	-	-	-
8	-	-	-	-	-	0.02 L	0.02 L HDL	-	-	-	-	-	-
9	-	-	0.006	-	-	-	0.006	-	-	-	0.01 L	-	-
10	-	-	0.006	-	-	-	0.006	-	-	-	0.006	-	-
11	-	-	-	0.02 R	-	-	0.02 R	-	-	-	-	0.006	-
12	-	0.006	-	-	-	-	0.006	-	-	-	-	-	-
14	-	-	-	-	0.006	-	0.006	-	-	-	-	-	0.006
MEAN	.0060	.0060	.0060	.0050	.0060	-	.0060	.0100	.0090	-	.0060	.0070	.0060
STD DEV	-	-	.0000	-	-	-	.0006	-	-	-	-	.0014	-
REL STD	-	-	-1.0	-	-	-	9.6	-	-	-	-	20.2	-
DES VAL	-	-	-	-	-	-	.006	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 22 PP 62 IR157 SAMPLE 5

LAB	26311 FE EXT ICP DA	26999 IRON COMMON	27002 CO TOT AAS SE	27003 CO TOT AAS GF	27009 CO TOT 5X ICP	27011 CO TOT 5X ICP	27107 CO DIS AAS GF	27111 CO DIS ICP DA	27301 CO EXT AAS DA	27302 CO EXT AAS SE	27999 COBALT COMMON	28002 NI TOT AAS SE	28009 NI TOT 5X ICP
1	-	-	-	-	0.004	-	-	-	-	-	0.004	-	0.005
2	-	0.008	-	-	-	-	-	-	-	-	-	-	-
3	-	0.010	0.005	-	0.005	-	-	-	-	-	0.005	0.007	0.007
6	-	0.013R	-	-	-	0.005	-	-	-	-	0.005	-	-
8	0.02 L	0.02 L } HDL	-	0.006	-	-	-	-	-	-	0.006	-	-
9	-	0.01 L	-	-	-	-	-	0.01 L	-	-	0.01 L } HDL	-	-
10	-	0.006	-	-	-	-	-	0.005L	-	-	0.005L	-	-
11	-	0.006	-	-	-	-	-	-	-	0.004	0.004	-	-
12	-	-	-	-	-	-	0.005	-	-	-	0.005	-	-
14	-	0.006	-	-	-	-	-	-	0.01 L	-	0.01 L HDL	-	-
MEAN	-	.0072	.0050	.0060	.0045	.0050	.0050	-	-	.0040	.0048	.0070	.0060
STD DEV	-	.0018	-	-	.0007	-	-	-	-	-	.0008	-	.0014
REL STD	-	24.8	-	-	15.7	-	-	-	-	-	15.6	-	23.6
DES VAL	-	.006	-	-	-	-	-	-	-	-	.005	-	-

LAB	28011 NI TOT 5X ICP	28107 NI DIS AAS GF	28111 NI DIS ICP DA	28302 NI EXT AAS SE	28309 NI EXT AAS GF	28999 NICKEL COMMON	29005 CU TOT AAS SE	29009 CU TOT 5X ICP	29011 CU TOT 5X ICP	29107 CU DIS AAS GF	29111 CU DIS ICP DA	29305 CU EXT AAS SE	29308 CU EXT AAS GF
1	-	-	-	-	-	0.005	-	0.006	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	0.007	-
3	-	-	-	-	-	0.007	0.006	0.006	-	-	-	-	-
6	0.009	-	-	-	-	0.009	-	-	0.008	-	-	-	-
8	-	-	-	-	0.007	0.007	-	-	-	-	-	-	-
9	-	-	0.01 L	-	-	0.01 L } HDL	-	-	-	-	0.01 L	-	-
10	-	-	0.010L	-	-	0.010L	-	-	-	-	0.007	-	-
11	-	-	-	0.006	-	0.006	-	-	-	-	-	0.006	-
12	-	0.006	-	-	-	0.006	-	-	-	0.006	-	-	-
14	-	-	-	-	0.060R	0.060R	-	-	-	-	-	-	0.006
MEAN	.0090	.0060	-	.0060	.0070	.0067	.0060	.0060	.0080	.0060	.0070	.0065	.0060
STD DEV	-	-	-	-	-	.0014	-	.0000	-	-	-	.0007	-
REL STD	-	-	-	-	-	20.5	-	-1.0	-	-	-	10.9	-
DES VAL	-	-	-	-	-	.007	-	-	-	-	-	-	-

LAB	29309 CU EXT AAS GF	29999 COPPER COMMON	30005 ZN TOT AAS SE	30009 ZN TOT 5X ICP	30011 ZN TOT 5X ICP	30107 ZN DIS AAS GF	30111 ZN DIS ICP DA	30304 ZN EXT AAS DA	30305 ZN EXT AAS SE	30306 ZN EXT AAS GF	30311 ZN EXT ICP DA	30999 ZINC COMMON	38001 SR TOT AAS DA
1	-	0.006	-	0.008	-	-	-	-	-	-	-	0.008	-
2	-	0.007	-	-	-	-	-	0.005	-	-	-	0.005	-
3	-	0.006	0.007	0.007	-	-	-	-	-	-	-	0.007	0.170
6	-	0.008	-	-	0.006	-	-	-	-	-	-	0.006	-
8	0.007	0.007	-	-	-	-	-	-	-	-	0.01 L	0.01 L } HDL	-
9	-	0.01 L HDL	-	-	-	-	0.01 L	-	-	-	-	0.01 L	-
10	-	0.007	-	-	-	-	0.007	-	-	-	-	0.007	-
11	-	0.006	-	-	-	-	-	-	0.007	-	-	0.007	-
12	-	0.006	-	-	-	0.006	-	-	-	-	-	0.006	-
14	-	0.006	-	-	-	-	-	-	-	0.005	-	0.005	-
MEAN	.0070	.0066	.0070	.0075	.0060	.0060	.0070	.0050	.0070	.0050	-	.0064	.1700
STD DEV	-	.0007	-	.0007	-	-	-	-	-	-	-	.0011	-
REL STD	-	11.1	-	9.4	-	-	-	-	-	-	-	16.6	-
DES VAL	-	.007	-	-	-	-	-	-	-	-	-	.007	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 22 PP 62 IR157 SAMPLE 5

LAB	38009 SR TOT ICP DA	38011 SR TOT ICP DA	38111 SR DIS ICP DA	38301 SR EXT AAS DA	38999 STRNTIUM COMMON	42009 MO TOT 5X ICP	42011 MO TOT 5X ICP	42102 MO DIS AAS SE	42111 MO DIS ICP DA	42301 MO EXT AAS DA	42999 MOLYBNUM COMMON	48002 CD TOT AAS SE	48003 CD TOT AAS GF
1	-	-	-	-	-	0.007	-	-	-	-	0.007	-	-
3	0.171	-	-	-	0.170	0.006	-	-	-	-	0.006	0.005	-
6	-	0.08 R	-	-	0.08 R	-	0.008	-	-	-	0.008	-	-
9	-	-	0.18	-	0.18	-	-	-	0.01 L	-	0.01 L HOL	-	0.006
10	-	-	-	0.18	0.18	-	-	-	0.006	-	0.006	-	-
12	-	-	-	-	-	-	-	0.006	-	-	0.006	-	-
14	-	-	-	-	-	-	-	-	-	0.10 L	0.10 L HOL	-	-
MEAN	.1710	-	.1800	.1800	.1767	.0065	.0080	.0060	.0060	-	.0066	.0050	.0060
STD DEV	-	-	-	-	.0058	.0007	-	-	-	-	.0009	-	-
REL STD	-	-	-	-	3.3	10.9	-	-	-	-	13.6	-	-
DES VAL	-	-	-	-	.174	-	-	-	-	-	.007	-	-

LAB	48009 CD TOT 5X ICP	48011 CD TOT 5X ICP	48103 CD DIS AAS GF	48111 CD DIS ICP DA	48302 CD EXT AAS SE	48303 CD EXT AAS GF	48309 CD EXT AAS GF	48999 CADMIUM COMMON	56009 BA TOT 5X ICP	56011 BA TOT 5X ICP	56111 BA DIS ICP DA	56999 BARIUM COMMON	82002 PB TOT AAS SE
1	0.005	-	-	-	-	-	-	0.005	-	-	-	-	-
2	-	-	-	-	0.005	-	-	0.005	-	-	-	-	-
3	0.005	-	-	-	-	-	-	0.005	0.021	-	-	0.021	0.006
6	-	0.006	-	-	-	-	-	0.006	-	0.022	-	0.022	-
8	-	-	-	-	-	-	0.005	0.005	-	-	-	-	-
9	-	-	-	-	-	-	-	0.006	-	-	0.02	0.02	-
10	-	-	-	0.004	-	-	-	0.004	-	-	0.02	0.02	-
11	-	-	-	-	0.005	-	-	0.005	-	-	-	-	-
12	-	-	0.006	-	-	-	-	0.006	-	-	-	-	-
14	-	-	-	-	-	0.006	-	0.006	-	-	-	-	-
MEAN	.0050	.0060	.0060	.0040	.0050	.0060	.0050	.0053	.0210	.0220	.0200	.0208	.0060
STD DEV	.0000	-	-	-	.0000	-	-	.0007	-	-	.0000	.0010	-
REL STD	-1.0	-	-	-	-1.0	-	-	12.7	-	-	-1.0	4.6	-
DES VAL	-	-	-	-	-	-	-	.005	-	-	-	.023	-

LAB	82004 PB TOT AAS GF	82009 PB TOT 5X ICP	82011 PB TOT 5X ICP	82104 PB DIS AAS GF	82302 PB EXT AAS SE	82305 PB EXT AAS GF	82309 PB EXT AAS GF	82999 LEAD COMMON
1	-	-	-	-	0.009	-	-	0.009
2	-	-	-	-	0.006	-	-	0.006
3	-	0.006	-	-	-	-	-	0.006
6	-	-	0.005L	-	-	-	-	0.005L HOL
8	-	-	-	-	-	-	0.006	0.006
9	0.007	-	-	-	-	-	-	0.007
10	-	-	-	-	-	-	0.003	0.003
11	-	-	-	-	0.005	-	-	0.005
12	-	-	-	0.006	-	-	-	0.006
14	-	-	-	-	-	0.004	-	0.004
MEAN	.0070	.0060	-	.0060	.0067	.0040	.0045	.0058
STD DEV	-	-	-	-	.0021	-	.0021	.0017
REL STD	-	-	-	-	31.2	-	47.1	29.7
DES VAL	-	-	-	-	-	-	-	.006

DATES RECEIVED 1 87/09/30 2 87/11/06 3 87/10/02 3 87/11/30 4 87/11/02
5 87/ / 6 87/09/29 7 87/11/27 8 87/10/14 9 87/11/17
10 87/11/02 11 87/11/05 12 87/11/12 14 87/12/03

NOTE: ALL CONCENTRATION UNITS ARE EXPRESSED IN MG/L OF EACH ELEMENT, THE EXCEPTIONS BEING: COLOUR IN RELATIVE UNITS, CONDUCTIVITY IN USIE/CM, TURBIDITY IN JTU OR NTU, NITROGEN ANALYSES IN "N", ALKALINITY & HARDNESS IN CACO3, SILICA IN SIO2, AND SULFATE IN SO4.

DISTRIBUTION - PPWB

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MEMORANDUM **NOTE DE SERVICE**

H.Alkema\NWRI\336-4929\ha

SECURITY - CLASSIFICATION - DE SÉCURITÉ	
OUR FILE/NOTRE RÉFÉRENCE	
YOUR FILE/VOTRE RÉFÉRENCE	
DATE	March 4, 1988

TO / À: Distribution

FROM / DE:
H. Alkema
Quality Assurance Section
National Water Research Institute
Burlington, Ontario

SUBJECT / OBJET: Prairie Provinces Quality Assurance Program (PPQA)

I have enclosed the final report for PP 63-64.

If you have any comments on this report, or any legitimate corrections to the data base, please do not hesitate to communicate them.

Harry A.

H. Alkema

RESEARCH & APPLICATIONS BRANCH

FINAL REPORT

REPORT NO. RAB 87-09e

PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAM

STUDIES 63 AND 64

for November and December, 1987

TRACE METALS, MAJOR IONS, NUTRIENTS AND PHYSICAL PARAMETERS IN SURFACE WATERS

by

H. Alkema

Quality Assurance Section
National Water Research Institute
Burlington, Ontario

March 1988

Introduction

As part of an on-going study, the Quality Assurance Section, NWRI in Burlington, Ontario, has been sending reference water samples bi-monthly to chemical laboratories participating in the PPWB program. This report summarizes the most recent PPWB interlaboratory quality control studies: PP 63 and 63, for the months November and December, 1987. These two studies dealt with trace metals, major ions, nutrients and physical parameters. The levels were mostly at high levels with one soft coloured water.

Study Design

Five water samples were submitted to each laboratory for chemical analyses. Two samples were submitted for trace metals analysis, while the remaining three were submitted for major ions, nutrients and some physical measurements. The following is a breakdown of the five samples:

PP 63 - Sample 1 - 125 ml, DA* for trace metals (3% HNO_3)
Sample 2 - up to 1L, major ions etc., stored at 4^oC

PP 64 - Sample 3 - 1L, SE* for trace metals (0.2% HNO_3)
Sample 4 - up to 1L, major ions, etc., stored at 4^oC
Sample 5 - up to 1L, major ions, etc., stored at 4^oC

* for definitions see Appendix 1

Treatment of Data

Each laboratory was asked to perform only those analyses which were routine to their particular laboratory, using the general methodology guidelines listed above. Results for these analyses were recorded on report sheets provided with the PP samples. Upon receipt of the Reporting Sheets, the results were tabulated for each parameter, first for each method reported, and then for all methods combined. These data, and the resulting statistics are presented in the Data Summary. (attached)

Preliminary data summaries, including problematic results, were sent December 16, or January 8, or 22, and February 5. Each laboratory was given three weeks to notify us of any errors in data transcription, compilation, or flags.

Performance Indicators

In previous reports the mean has always been used as comparator for accuracy assessment. We now have "design values" for several reference waters (RMs) and certified referenc waters (CRMs). These design values are used to test each reported result (whether few or many) for accuracy. Consequently, for stable parameters, the design values will be used as comparator for the ten percent warning circles, and the mean will be used for unstable parameters (perhaps due to biological activity).

Percentage deviations from the comparator are used as an indicator for the laboratory head to determine the extent of the discrepencies between the laboratory result and comparator as it applies to his procedures. However, please keep in mind that at low levels, high % deviations are often seen, and may be misleading if interpreted too strictly.

A result which deviates more than 10% from the comparator is circled in the data tables and its value noted in the comments which follow. Results reported with an "L" (less than) or flagged with an "R" (rejectable) are not used in the statistical calculations. Performance indicators are fully explained in Appendix II.

Comments on Laboratory Performance

Results accompanied with a 'less than' are difficult to appraise. If a design value or mean is significantly lower than the detection limit given by a particular laboratory, then that detection limit is too high. Such a result is assigned 'HDL' and is labelled in the Data Summary.

If, on the other hand, the detection limit reported is far lower than the mean or design value, then the use of 'less than' is clearly inadequate and the result is flagged low. The magnitude of the deviation from the mean in such a case is taken from the detection limit given.

General Comments: A high coefficient of variation (incomparability) was observed for DOC at 1.4 ppm, and at 10.6 ppm, for Colour at 130 units and for Iron at low level.

Individual laboratory deviations are listed below:

Lab 1
- a low result for Cl: -12%; Mg: -24% (R)*; & Ca at DL
- results for Zn at high level: +14%
- high results for SiO_2: +20%, & +11%
- an HDL for SiO_2, Mg, & SO_4

Lab 3
- rejectable results for Turbidity at low level: 3 x (R)
- a low rejectable for Ammonia: -95% (R)
- high results for SO_4: +144% (R); & Al: +12%

Lab 4
- no anomalies

Lab 6
- low results for Sr: -26%, & -16%;
- a result at low level for Al: +26%; & Co: -13%
- results for Ba: -90%, & +110% (R)
- high results for Mg: +42%; & K at low level (2 x)
  Ammonia: 3 x (R), TP 3 x (R) at low level; & TKN: 2 x (R)
- a low result for F: -12%; and SiO_2: -15%
- an HDL for Fluoride and Pb at low level

* (R) rejectable by Grubbs' statistical procedure (noncomparable data)

Lab 8 - a result at high level for Cr: +30% (R); Co: -16%; Cd: -18%; & Pb: -13%
- a result at low level for Cr: +41% (R); Cu: +18%; Zn: +11%; & Cd: -12%
- a result for TKN: +60% (R); SiO_2: -13%; Amm.: +27%; Turb.: high at low level; & SO_4: +120% (R) at low level
- an HDL for low level Al

PPWB laboratories average number of deviations per sample was 2.5.

APPENDIX I

Definitions of Types of Metals Analysis

1. DA - Direct Aspiration

Without sample pretreatment, samples are aspirated by Atomic Absorption Spectrophotometry (AAS) ar Inuctively Coupled (Argon) Plasma (ICAP or ICP). Standards should contain the acid equivalent of the sample.

2. SE - Code for low level analysis

Analysis is carried out by one of the following methods:

1. Solvent extraction sample concentration followed by AAS.
2. Digestion and concentration of aqueous phase followed by ICAP.
3. Digestion of aqueous phase and ICAP analysis.
4. Graphite tube (flameless) AAS.

APPENDIX II

Performance Indicators

1. **Circled Results**

Results are circled in the data tables when a minor deviation from the comparator has ocurred. (The comparator is the design value of the reference sample, or the mean in the case of a biologically active sample.) Circled results are in general greater than or less than 10% from the comparator. At very low levels of analytes or with parameters that are difficult to analyse, a greater deviation than 10% is allowed. Under these conditions, a result is circled when it is outside one standard deviation of the comparator. These circled results, though acceptable values, are a warning to laboratory managers that the parameter analysis should be investigated.

2. **Rejectable Results**

Each laboratory result is statistically tested to see if it is outlying. Outlying results were caused by non random causes such as a faulty calibration or a transcription error. These outlying results, calculated by the Grubbs' procedure,* and indicated in the data tables with an 'R', are noncomparable with the other data for the parameter.

3. **A High Co-efficient of Variation (HCV)**

Occasionally data for a parameter yields a very high relative standard deviation (RSD). When this HCV is not due to outlying values, it indicates a high variability within the data set. The data in this set is then noncomparable. In such a case, the RSD for the parameter is circled in the data tables and the parameter's noncomparability is noted in the comments.

4. **High Detection Limits (HDL)**

Each laboratory determines its own detection limits according to its own requirements. When major differences of detection limits occur, the result is flagged with 'HDL' in the data tables. An HDL indicates that low level analysis may not be comparable with the analyses of other laboratories.

* reference : Frank E. Grubbs, Technometrics, 1969, p. 1.

DATA SUMMARY

FEDERAL-PROVINCIAL & PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAMS

STUDY NO. FP 23 PP 63 DATE: 01/11/87 DUE DATE: 31/12/87

SAMPLE 1 SPIKED SAMPLE. TRACE METALS D/A. (IN 3% HNO3)

LAB	13009 AL TOT 5X ICP	13111 AL DIS ICP DA	13302 AL EXT AAS DA	13305 AL EXT AAS SE	13999 ALUMINUM COMMON	23003 V EXT AAS GF	23009 V TOT 5X ICP	23011 V TOT 5X ICP	23111 V DIS ICP DA	23999 VANADIUM COMMON	24004 CR TOT AAS GF	24009 CR TOT 5X ICP	24011 CR TOT 5X ICP
1	-	-	-	-	-	-	0.913	-	-	0.913	-	0.098	-
2	-	-	1.1	-	1.1	-	-	-	-	-	-	-	-
3	1.15	-	1.15	-	1.15	-	0.993	-	-	0.993	-	0.102	-
6	1.0	-	-	-	1.0	-	-	0.94	-	0.94	-	-	0.098
8	-	-	1.0	-	1.0	-	-	-	-	-	0.129R	-	-
9	-	1.1	-	-	1.1	-	-	-	0.97	0.97	-	-	-
10	-	0.99	-	-	0.99	-	-	-	0.95	0.95	-	-	-
14	-	-	-	0.77 R	0.77 R	1.05	-	-	-	1.05	-	-	-
MEAN	1.0750	1.0450	1.0833	-	1.0567	1.0500	.9530	.9400	.9600	.9693	-	.1000	.0980
STD DEV	.1061	.0778	.0764	-	.0683	-	.0566	-	.0141	.0479	-	.0028	-
REL STD	9.9	7.4	7.1	-	6.5	-	5.9	-	1.5	4.9	-	2.8	-
DES VAL	-	-	-	-	1.025	-	-	-	-	.954	-	-	-

LAB	24111 CR DIS ICP DA	24302 CR EXT AAS DA	24999 CHROMIUM COMMON	25003 MN TOT AAS DA	25004 MN TOT 5X AAS	25010 MN TOT 5X ICP	25011 MN TOT 5X ICP	25111 MN DIS ICP DA	25304 MN EXT AAS DA	25306 MN EXT AAS GF	25311 MN EXT ICP DA	25999 MANGNESE COMMON	26004 FE TOT AAS DA
1	-	-	0.098	0.100	-	-	-	-	-	-	-	0.100	-
2	-	-	-	-	-	-	-	-	0.11	-	-	0.11	-
3	-	-	0.102	-	0.101	0.100	-	-	-	-	-	0.101	0.492
6	-	-	0.098	-	-	-	0.096	-	-	-	-	0.096	-
8	-	-	0.129R	-	-	-	-	-	-	-	0.09	0.09	-
9	0.10	-	0.10	-	-	-	-	0.10	-	-	-	0.10	-
10	0.093	-	0.093	-	-	-	-	0.096	-	-	-	0.096	-
11	-	0.10	0.10	-	-	-	-	-	0.11	-	-	0.11	-
14	-	-	-	-	-	-	-	-	-	0.031R	-	0.031R	-
MEAN	.0965	.1000	.0985	.1000	.1010	.1000	.0960	.0980	.1100	-	.0900	.1004	.4920
STD DEV	.0049	-	.0031	-	-	-	-	.0028	.0000	-	-	.0069	-
REL STD	5.1	-	3.1	-	-	-	-	2.9	-1.0	-	-	6.9	-
DES VAL	-	-	.099	-	-	-	-	-	-	-	-	.099	-

LAB	26009 FE TOT 5X ICP	26011 FE TOT 5X ICP	26111 FE DIS ICP DA	26304 FE EXT AAS DA	26306 FE EXT AAS GF	26311 FE EXT ICP DA	26999 IRON COMMON	27009 CO TOT 5X ICP	27011 CO TOT 5X ICP	27111 CO DIS ICP DA	27301 CO EXT AAS DA	27999 COBALT COMMON	28009 NI TOT 5X ICP
1	-	-	-	-	-	-	-	0.286	-	-	-	0.286	0.482
2	-	-	-	0.52	-	-	0.52	-	-	-	-	-	-
3	0.506	-	-	-	-	-	0.492	0.297	-	-	-	0.297	0.510
6	-	0.50	-	-	-	-	0.50	-	0.28	-	-	0.28	-
8	-	-	-	-	-	0.46	0.46	-	-	-	0.25	0.25	-
9	-	-	0.50	-	-	-	0.50	-	-	0.27	-	0.27	-
10	-	-	0.472	-	-	-	0.472	-	-	0.270	-	0.270	-
11	-	-	-	0.50	-	-	0.50	-	-	-	0.29	0.29	-
14	-	-	-	-	0.556	-	0.556	-	-	-	-	-	-
MEAN	.5060	.5000	.4860	.5100	.5560	.4600	.5000	.2915	.2800	.2700	.2700	.2776	.4960
STD DEV	-	-	.0198	.0141	-	-	.0292	.0078	-	.0000	.0283	.0157	.0198
REL STD	-	-	4.1	2.8	-	-	5.8	2.7	-	-1.0	10.5	5.7	4.0
DES VAL	-	-	-	-	-	-	.499	-	-	-	-	.297	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 23 PP 63 SAMPLE 1

LAB	28011 NI TOT 5X ICP	28111 NI DIS ICP DA	28301 NI EXT AAS DA	28311 NI EXT ICP DA	28999 NICKEL COMMON	29009 CU TOT 5X ICP	29011 CU TOT 5X ICP	29111 CU DIS ICP DA	29306 CU EXT AAS DA	29308 CU EXT AAS GF	29311 CU EXT ICP DA	29999 COPPER COMMON	30009 ZN TOT 5X ICP
1	-	-	-	-	0.482	0.098	-	-	-	-	-	0.098	0.122
2	-	-	-	-	-	-	-	-	0.1	-	-	0.1	-
3	-	-	-	-	0.510	0.103	-	-	-	-	-	0.103	0.107
6	0.48	-	-	-	0.48	-	0.10	-	-	-	-	0.10	-
8	-	-	-	0.45	0.45	-	-	-	-	-	0.11	0.11	-
9	-	0.48	-	-	0.48	-	-	0.10	-	-	-	0.10	-
10	-	0.47	-	-	0.47	-	-	0.103	-	-	-	0.103	-
11	-	-	0.51	-	0.51	-	-	-	0.11	-	-	0.11	-
14	-	-	-	-	-	-	-	-	-	0.101	-	0.101	-
MEAN	.4800	.4750	.5100	.4500	.4831	.1005	.1000	.1015	.1050	.1010	.1100	.1028	.1145
STD DEV	-	.0071	-	-	.0213	.0035	-	.0021	.0071	-	-	.0044	.0106
REL STD	-	1.5	-	-	4.4	3.5	-	2.1	6.7	-	-	4.3	9.3
DES VAL	-	-	-	-	.482	-	-	-	-	-	-	.103	-

LAB	30011 ZN TOT 5X ICP	30111 ZN DIS ICP DA	30304 ZN EXT AAS DA	30306 ZN EXT AAS GF	30311 ZN EXT ICP DA	30999 ZINC COMMON	38009 SR TOT ICP DA	38011 SR TOT ICP DA	38111 SR DIS ICP DA	38301 SR EXT AAS DA	38999 STRNTIUM COMMON	42009 MO TOT 5X ICP	42011 MO TOT 5X ICP
1	-	-	-	-	-	0.122	-	-	-	-	-	0.926	-
2	-	-	0.11	-	-	0.11	-	-	-	-	-	-	-
3	-	-	-	-	-	0.107	0.375	-	-	-	0.375	0.990	-
6	0.10	-	-	-	-	0.10	-	0.28	-	-	0.28	-	0.92
8	-	-	-	-	0.10	0.10	-	-	-	-	-	-	-
9	-	0.10	-	-	-	0.10	-	-	0.37	-	0.37	-	-
10	-	0.103	-	-	-	0.103	-	-	-	0.35	0.35	-	-
11	-	-	0.11	-	-	0.11	-	-	-	-	-	-	-
14	-	-	-	0.096	-	0.096	-	-	-	-	-	-	-
MEAN	.1000	.1015	.1100	.0960	.1000	.1053	.3750	.2800	.3700	.3500	.3438	.9580	.9200
STD DEV	-	.0021	.0000	-	-	.0079	-	-	-	-	.0439	.0453	-
REL STD	-	2.1	-1.0	-	-	7.5	-	-	-	-	12.8	4.7	-
DES VAL	-	-	-	-	-	.107	-	-	-	-	.379	-	-

LAB	42111 MO DIS ICP DA	42999 MOLYBNUM COMMON	48009 CD TOT 5X ICP	48011 CD TOT 5X ICP	48111 CD DIS ICP DA	48301 CD EXT AAS DA	48999 CADMIUM COMMON	56001 BA TOT AAS DA	56009 BA TOT 5X ICP	56011 BA TOT 5X ICP	56111 BA DIS ICP DA	56999 BARIUM COMMON	82009 PB TOT 5X ICP
1	-	0.926	0.098	-	-	-	0.098	-	0.988	-	-	0.988	-
2	-	-	-	-	-	0.1	0.1	-	-	-	-	-	-
3	-	0.990	0.096	-	-	-	0.096	0.990	1.03	-	-	0.990	0.493
6	-	0.92	-	0.097	-	-	0.097	-	-	0.096R	-	0.096R	-
8	-	-	-	-	-	0.08	0.08	-	-	-	-	-	-
9	0.95	0.95	-	-	0.10	-	0.10	-	-	-	1.0	1.0	-
10	0.98	0.98	-	-	0.089	-	0.089	-	-	-	0.97	0.97	-
11	-	-	-	-	-	0.10	0.10	-	-	-	-	-	-
MEAN	.9650	.9532	.0970	.0970	.0945	.0933	.0950	.9900	1.0090	-	.9850	.9870	.4930
STD DEV	.0212	.0313	.0014	-	.0078	.0115	.0071	-	.0297	-	.0212	.0125	-
REL STD	2.2	3.3	1.5	-	8.2	12.4	7.4	-	2.9	-	2.2	1.3	-
DES VAL	-	.970	-	-	-	-	.098	-	-	-	-	.992	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 23 PP 63 SAMPLE 1

LAB	82011 PB TOT 5X ICP	82111 PB DIS ICP DA	82301 PB EXT AAS DA	82302 PB EXT AAS SE	82305 PB EXT AAS GF	82311 PB EXT ICP DA	82999 LEAD COMMON
1	-	-	-	0.476	-	-	0.476
2	-	-	0.49	-	-	-	0.49
3	-	-	-	-	-	-	0.493
6	0.47	-	-	-	-	-	0.47
8	-	-	-	-	-	0.42	0.42
9	-	0.48	-	-	-	-	0.48
10	-	0.44	-	-	-	-	0.44
11	-	-	0.50	-	-	-	0.50
14	-	-	-	-	0.45	-	0.45
MEAN	.4700	.4600	.4950	.4760	.4500	.4200	.4688
STD DEV	-	.0283	.0071	-	-	-	.0268
REL STD	-	6.1	1.4	-	-	-	5.7
DES VAL	-	-	-	-	-	-	.485

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 23 PP 63 SAMPLE 2

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS	00125 SUM OF ANIONS	02011 COLOUR APPARE	02021 COLOUR VIS COM	02023 COLOUR SPECT	02024 COL TRU SPECT	02040 COLOUR COMMON	02041 CONDUCT SPEC 25	02060 CONDUCT COMMON	02072 TURB HELLIG	02073 TURB HACH	02074 TURB NPLMTRI
1	-0.18	2.79	2.80	-	-	-	3.	3.	299.	299.	-	0.2	-
2	+0.67	2.803	2.765	5. L	-	-	-	5. L	290.	290.	-	0.2	-
3	-0.64	2.812	2.848	5.	-	-	-	5.	294.	294.	-	0.84 R	-
4	-	-	-	-	5. L	-	-	5. L	295.	295.	-	-	-
6	+2.9	3.01	2.84	-	-	-	-	-	295.	295.	-	-	0.27
7	-0.2	2.81	2.83	1.	-	-	-	1.	293.	293.	-	0.28	-
8	+1.35	2.86	2.78	-	5. L	-	-	5. L	296.	296.	-	-	0.17
9	-0.86	2.89	2.94	-	-	-	-	-	288.	288.	-	-	-
10	+1.47	2.814	2.732	-	-	1.	-	1.	283.	283.	-	-	0.3
11	-	-	-	5. L	-	-	-	5. L	280.	280.	-	-	-
12	-	-	-	-	5. L	-	-	5. L	295.	295.	-	0.5	-
14	-	-	-	0.	-	-	-	0.	298.	298.	0.2	-	-
MEAN	.5638	2.8486	2.8169	2.0000	-	1.0000	3.0000	2.0000	292.1667	292.1667	.2000	.2950	.2467
STD DEV	1.2829	.0731	.0637	2.6458	-	-	-	2.0000	5.8595	5.8595	-	.1418	.0681
REL STD	227.6	2.6	2.3	132.3	-	-	-	100.0	2.0	2.0	-	48.1	27.6
DES VAL	-	-	-	-	-	-	-	2.339	-	292.285	-	-	-

LAB	02077 TURB HACH FZ	02081 TURB RATIO	02090 TURBIDTY COMMON	05105 BORON AA CARM	05106 BORON F AZOMETH	05111 BORON F ICP DA	05190 BORON COMMON	06101 DOC IR /DIF	06104 DOC UV CO2 IR	06107 DOC UV CO2 PHE	06109 DOC UV CO2 OH	06150 D O C COMMON	06151 DIC IR COMBUST
1	-	-	0.2	-	-	-	-	-	-	1.3	-	1.3	-
2	-	-	0.2	-	-	-	-	-	-	1.2	-	1.2	-
3	-	-	0.84 R	-	-	-	-	-	1.1	-	-	1.1	-
4	-	0.20	0.20	0.06	-	-	0.06	-	1.8	-	-	1.8	-
6	-	-	0.27	-	-	-	-	-	1.7	-	-	1.7	-
7	-	-	0.28	-	-	-	-	-	-	-	-	-	-
8	-	-	0.17	-	0.05 L	-	0.05 L	-	-	-	-	-	-
10	-	-	0.3	-	-	0.03	0.03	-	-	-	1.1	1.1	-
11	0.2	-	0.2	-	-	-	-	11. R	-	-	-	11. R	-
12	-	-	0.5	-	-	-	-	0.5 L	-	-	-	0.5 L	20.
14	-	-	0.2	-	-	-	-	-	-	-	-	-	-
MEAN	.2000	.2000	.2520	.0600	-	.0300	.0450	-	1.5333	1.2500	1.1000	1.3667	20.0000
STD DEV	-	-	.0973	-	-	-	.0212	-	.3786	.0707	-	.3077	-
REL STD	-	-	38.6	-	-	-	47.1	-	24.7	5.7	-	22.5	-
DES VAL	-	-	.198	-	-	-	.042	-	-	-	-	1.468	-

LAB	06152 DIC UV CO2 IR	06154 DIC AA CO2 PHE	06159 DIC AA CO2 OH	06180 DIC CALC'D	06490 D I C COMMON	07010 TKN AA SAL	07015 TKN DIG BERTHEL	07016 TKN BLK AMM-SAL	07018 TKN BLK INDOPHE	07021 TKN BLK DIG BER	07090 TKN COMMON	07105 NO3+NO2 DIS AA	07109 NO3+NO2 AA HYD
1	-	18.2	-	-	18.2	-	-	-	-	0.123	0.123	0.35	-
3	18.7	-	-	-	18.7	0.127	-	-	-	-	0.127	-	-
4	17.	-	-	-	17.	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	0.4 R	-	-	0.4 R	-	0.30
8	-	-	-	-	-	-	0.20 R	-	-	-	0.20 R	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	0.30
10	-	-	17.8	-	17.8	-	-	-	-	-	-	-	0.290
11	-	-	-	16.	16.	-	-	-	-	-	-	-	-
12	-	-	-	-	20.	-	-	-	0.11	-	0.11	-	-
MEAN	17.8500	18.2000	17.8000	16.0000	17.9500	.1270	-	-	.1100	.1230	.1200	.3500	.2967
STD DEV	1.2021	-	-	-	1.3824	-	-	-	-	-	.0089	-	.0058
REL STD	6.7	-	-	-	7.7	-	-	-	-	-	7.4	-	1.9
DES VAL	-	-	-	-	18.067	-	-	-	-	-	.128	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 23 PP 63 SAMPLE 2

LAB	07110 NO3+NO2 AA2 CD	07111 NO3+NO2 DIS SPEC	07112 NO3+NO2 UF AA CD	07390 NITRATE COMMON	07505 NH3 TOT AA BERT	07540 NH3 TOT AA SAL	07555 NH3 DIS AA PHEN	07557 NH3 DIS AA INDO	07562 NH3 DIS AA EDTA	07563 NH3 DIS AA INDO	07590 AMMONIA COMMON	07601 T N UV AA SUL	07602 T N CALC'D
1	-	-	-	0.35	-	-	-	-	0.010	-	0.010	-	-
2	0.30	-	-	0.30	-	-	-	-	-	-	-	0.37	-
3	-	-	0.358	0.358	0.001L	-	-	-	-	-	0.001L	-	-
4	0.34	-	-	0.34	-	0.005L	-	-	-	-	0.005L	-	-
6	-	-	-	0.30	-	-	-	0.03 R	-	-	0.03 R	-	-
7	-	-	0.37	0.37	-	-	-	-	-	-	-	-	-
8	0.36	-	-	0.36	-	-	0.004	-	-	-	0.004	-	0.56
9	-	-	-	0.30	-	-	-	-	-	-	-	-	-
10	-	-	-	0.290	-	-	0.010L	-	-	-	0.010L	-	-
11	0.34	-	-	0.34	-	0.007L	-	-	-	-	0.007L	-	-
12	0.36	-	-	0.36	-	-	-	-	-	0.005L	0.005L	-	0.47
14	-	0.305	-	0.305	-	-	-	-	-	-	-	-	-
MEAN	.3400	.3050	.3640	.3311	-	-	.0040	-	.0100	-	.0070	.3700	.5150
STD DEV	.0245	-	.0085	.0297	-	-	-	-	-	-	.0042	-	.0636
REL STD	7.2	-	2.3	9.0	-	-	-	-	-	-	60.6	-	12.4
DES VAL	-	-	-	.336	-	-	-	-	-	-	.014	-	-

LAB	07605 T N UV HY SUL	07651 T N DIS UV AA	07690 TOT N COMMON	07790 T N DIS COMMON	09103 F DIS COL SP	09105 F DIS SP EL	09106 F DIS EL POT	09107 F DIS AUT POT	09108 F DIS SP EL	09115 F DIS AA ALIZ	09190 FLUORIDE COMMON	10101 ALKLNTY TITR'N	10108 ALKLNTY POT TIT
1	-	-	-	-	-	-	-	0.56	-	-	0.56	76.	-
2	-	-	-	0.37	-	-	0.56	-	-	-	0.56	72.7	-
3	-	-	-	-	-	-	-	-	0.62	-	0.62	-	-
4	-	0.43	-	0.43	-	-	-	-	-	-	-	74.6	-
6	-	-	-	-	0.5	-	-	-	-	-	0.5	-	-
7	-	-	-	-	-	-	-	-	-	-	-	74.6	-
8	-	-	0.56	-	-	0.56	-	-	-	-	0.56	-	-
9	-	-	-	-	-	-	-	-	-	0.60	0.60	-	77.
10	0.41	-	-	0.41	-	-	-	-	-	0.55	0.55	-	-
11	-	-	-	-	-	0.48	-	-	-	-	0.48	80.	-
12	-	-	0.47	-	-	0.55	-	-	-	-	0.55	75.2	-
14	-	-	-	-	-	-	-	-	-	-	-	80.7	-
MEAN	.4100	.4300	.5150	.4033	.5000	.5300	.5600	.5600	.6200	.5750	.5533	76.2571	77.0000
STD DEV	-	-	.0636	.0306	-	.0436	-	-	-	.0354	.0433	2.9743	-
REL STD	-	-	12.4	7.6	-	8.2	-	-	-	6.1	7.8	3.9	-
DES VAL	-	-	.507	.435	-	-	-	-	-	-	.565	-	-

LAB	10109 ALKLNTY POT TIT	10111 ALKLNTY TIT PRO	10112 ALKLNTY TIT CON	10116 ALKLNTY CO2 IR	10190 ALKLINTY COMMON	10301 PH	10390 PH COMMON	10602 HARDNSS CALC'D	10603 HARDNSS TITR'N	10606 HARDNSS CALC'D	10690 HARDNESS COMMON	11005 NA TOT ICP	11102 NA F AAS
1	-	-	-	-	76.	7.6	7.6	101.	-	-	101.	-	-
2	-	-	-	-	72.7	8.1	8.1	103.8	-	-	103.8	-	-
3	-	76.3	-	75.5	76.3	7.63	7.63	-	-	104.	104.	-	-
4	-	-	-	-	74.6	8.15	8.15	-	-	-	-	-	-
6	80.	-	-	-	80.	7.8	7.8	-	110.	-	110.	-	16.
7	-	-	-	-	74.6	8.1	8.1	105.7	109.0	-	109.0	-	-
8	76.7	-	-	-	76.7	7.90	7.90	107.	-	-	107.	-	-
9	-	-	-	-	77.	7.96	7.96	107.	-	-	107.	15.	-
10	-	-	73.	-	73.	8.07	8.07	-	-	-	-	14.05	-
11	-	-	-	-	80.	8.0	8.0	110.	-	-	110.	-	80. R
12	-	-	-	-	75.2	7.8	7.8	-	-	-	-	-	-
14	-	-	-	-	80.7	7.902	7.902	-	-	-	-	-	15.95
MEAN	78.3500	76.3000	73.0000	75.5000	76.4000	7.9177	7.9177	105.7500	109.5000	104.0000	106.4750	14.5250	15.9750
STD DEV	2.3335	-	-	-	2.6663	.1819	.1819	3.0840	.7071	-	3.2740	.6718	.0354
REL STD	3.0	-	-	-	3.5	2.3	2.3	2.9	.6	-	3.1	4.6	.2
DES VAL	-	-	-	-	75.768	-	7.919	-	-	-	107.479	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 23 PP 63 SAMPLE 2

LAB	11103 NA DIS FL PH	11105 NA DIS AAS DA	11107 NA UF FL PH	11311 NA EXT ICP	11990 SODIUM COMMON	12005 MG TOT ICP	12101 MG DIS CALC'D	12102 MG DIS AAS DA	12106 MG UF AAS DA	12107 MG DIS AAS AUT	12303 MG UF AAS AUT	12311 MG EXT ICP	12990 MGNESIUM COMMON
1	16.	-	-	-	16.	-	-	-	-	-	5. R	-	5. R
2	15.2	-	-	-	15.2	-	-	-	-	6.4	-	-	6.4
3	-	-	15.1	-	15.1	-	-	-	6.4	-	-	-	6.4
6	-	-	-	-	16.	-	6.8	-	-	-	-	-	6.8
7	-	14.2	-	-	14.2	-	-	6.4	-	-	-	-	6.4
8	-	-	-	14.7	14.7	-	-	-	-	-	-	6.94	6.94
9	-	-	-	-	15.	6.8	-	-	-	-	-	-	6.8
10	-	-	-	-	14.05	6.63	-	-	-	-	-	-	6.63
11	-	-	-	-	80. R	-	-	6.8	-	-	-	-	6.8
12	15.1	-	-	-	15.1	-	-	-	-	-	-	-	-
14	-	-	-	-	15.95	-	-	6.23	-	-	-	-	6.23
MEAN	15.4333	14.2000	15.1000	14.7000	15.1300	6.7150	6.8000	6.4767	6.4000	6.4000	-	6.9400	6.6000
STD DEV	.4933	-	-	-	.7013	.1202	-	.2926	-	-	-	-	.2483
REL STD	3.2	-	-	-	4.6	1.8	-	4.5	-	-	-	-	3.8
DES VAL	-	-	-	-	14.762	-	-	-	-	-	-	-	6.563

LAB	14102 SILICA ANSA AA	14105 SILICA MOLY AA	14106 SILICA MOLY	14111 SILICA ICP DA	14190 SILICA COMMON	15106 T P FIL UV ASC	15406 T P UF AA ASC	15409 T P BLK AA ASC	15413 T P ACL AA SNCL	15421 T P BLK DIG ASC	15490 TOT P COMMON	16304 SO4 DIS AUTO BA	16306 SO4 DIS AA MTB
1	2.6	-	-	-	2.6	-	-	-	-	0.006L	0.006L	-	28.
2	2.16	-	-	-	2.16	-	-	-	-	-	-	29.3	-
3	-	-	2.11	-	2.11	-	-	-	0.005	-	0.005	-	-
4	-	-	-	-	-	-	0.006	-	-	-	0.006	-	-
6	-	-	-	-	-	-	-	0.02 R	-	-	0.02 R	30.	-
7	-	-	-	-	-	-	-	-	-	-	-	-	30.9
8	-	1.9	-	-	1.9	-	-	-	0.007	-	0.007	-	28.9
9	-	-	-	2.14	2.14	-	-	-	-	-	-	-	-
10	-	1.84	-	-	1.84	0.010L	-	-	-	-	0.010L	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	29.
12	-	2.2	-	-	2.2	-	0.005	-	-	-	0.005	-	29.4
14	-	-	-	-	-	-	-	-	-	-	-	-	30.85
MEAN	2.3800	1.9800	2.1100	2.1400	2.1357	-	.0055	-	.0060	-	.0058	29.6500	29.5083
STD DEV	.3111	.1929	-	-	.2463	-	.0007	-	.0014	-	.0010	.4950	1.1534
REL STD	13.1	9.7	-	-	11.5	-	12.9	-	23.6	-	16.7	1.7	3.9
DES VAL	-	-	-	-	2.175	-	-	-	-	-	.007	-	-

LAB	16307 SO4 UF AA MTB	16309 SO4 DIS I C	16310 SO4 DIS AA CALM	16990 SULFATE COMMON	17203 CL DIS AA FE	17204 CL DIS AG TIT	17206 CL DIS AA AG	17208 CL DIS AA AG	17209 CL DIS I C	17210 CL DIS TIT CON	17990 CHLORIDE COMMON	19005 K TOT ICP	19102 K DIS AAS
1	-	-	-	28.	23.	-	-	-	-	-	23.	-	-
2	-	30.	-	29.3	-	-	-	-	24.	-	24.	-	-
3	28.9	-	-	28.9	-	-	-	23.7	-	-	23.7	-	-
6	-	-	-	30.	-	22.	-	-	-	-	22.	-	3.4
7	-	-	-	30.9	23.6	-	-	-	-	-	23.6	-	3.18
8	-	-	-	28.9	-	-	22.	-	-	-	22.	-	-
9	-	31.	-	31.	-	-	-	-	25.8	-	25.8	3.0	-
10	-	-	29.	29.	-	-	-	-	-	22.	22.	2.96	-
11	-	-	-	29.	-	-	24.	-	-	-	24.	-	-
12	-	-	-	29.4	-	-	22.9	-	-	-	22.9	-	-
14	-	-	-	30.85	-	-	25.35	-	-	-	25.35	-	3.21
MEAN	28.9000	30.5000	29.0000	29.5682	23.3000	22.0000	23.5625	23.7000	24.9000	22.0000	23.4864	2.9800	3.2633
STD DEV	-	.7071	-	.9875	.4243	-	1.4453	-	1.2728	-	1.2892	.0283	.1193
REL STD	-	2.3	-	3.3	1.8	-	6.1	-	5.1	-	5.5	.9	3.7
DES VAL	-	-	-	29.706	-	-	-	-	-	-	23.735	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 23 PP 63 SAMPLE 2

LAB	19103 K DIS FLM PH	19106 K DIS AAS LI	19107 K DIS FLM PH	19301 K EXT HNO3 AA	19990 PTASSIUM COMMON	20005 CA TOT ICP	20100 CA DIS CALC'D	20103 CA DIS AAS	20108 CA DIS AAS UF	20110 CA DIS AAS AUT	20311 CA EXT ICP	20990 CALCIUM COMMON
1	3.3	-	-	-	3.3	-	-	-	-	32.	-	32.
2	3.1	-	-	-	3.1	-	-	-	-	31.	-	31.
3	-	-	3.20	-	3.20	-	-	-	31.0	-	-	31.0
6	-	-	-	-	3.4	-	33.	-	-	-	-	33.
7	-	-	-	-	3.18	-	-	31.8	-	-	-	31.8
8	-	-	-	3.2	3.2	-	-	-	-	-	31.4	31.4
9	-	-	-	-	3.0	32.	-	-	-	-	-	32.
10	-	-	-	-	2.96	31.7	-	-	-	-	-	31.7
11	-	3.4	-	-	3.4	-	-	31.	-	-	-	31.
12	3.1	-	-	-	3.1	-	-	-	-	-	-	-
14	-	-	-	-	3.21	-	-	32.0	-	-	-	32.0
MEAN	3.1667	3.4000	3.2000	3.2000	3.1864	31.8500	33.0000	31.6000	31.0000	31.5000	31.4000	31.6900
STD DEV	.1155	-	-	-	.1435	.2121	-	.5292	-	.7071	-	.6262
REL STD	3.6	-	-	-	4.5	.7	-	1.7	-	2.2	-	2.0
DES VAL	-	-	-	-	3.186	-	-	-	-	-	-	31.636

DATA SUMMARY

FEDERAL-PROVINCIAL & PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAMS

STUDY NO. FP 24 PP 64 DATE: 01/12/87 DUE DATE: 31/12/87

SAMPLE 3 SPIKED SAMPLE. TRACE METALS S/E. (IN 0.2% HNO3)

LAB	13009 AL TOT 5X ICP	13111 AL DIS ICP DA	13302 AL EXT AAS DA	13305 AL EXT AAS SE	13306 AL UF AAS OX	13999 ALUMINUM COMMON	23002 V TOT AAS SE	23003 V EXT AAS GF	23009 V TOT 5X ICP	23011 V TOT 5X ICP	23111 V DIS ICP DA	23999 VANADIUM COMMON	24003 CR TOT AAS SE
1	-	-	-	-	0.094	0.094	-	-	0.045	-	-	0.045	-
2	-	-	-	0.082	-	0.082	-	-	-	-	-	-	-
3	0.088	-	-	0.082	-	0.082	0.048	-	0.048	-	-	0.048	0.064
6	0.11	-	-	-	-	0.11	-	-	-	0.051	-	0.051	-
8	-	-	0.2 L	-	-	0.2 L	-	-	-	-	-	-	-
9	-	0.09	-	-	-	0.09	-	-	-	-	0.050	0.050	-
10	-	0.09	-	-	-	0.09	-	-	-	-	0.050	0.050	-
12	-	-	-	0.08	-	0.08	-	-	-	-	-	-	-
14	-	-	-	0.155R	-	0.155R	-	0.034R	-	-	-	0.034R	-
MEAN	.0990	.0900	-	.0813	.0940	.0897	.0480	-	.0465	.0510	.0500	.0488	.0640
STD DEV	.0156	.0000	-	.0012	-	.0104	-	-	.0021	-	.0000	.0024	-
REL STD	15.7	-1.0	-	1.4	-	11.5	-	-	4.6	-	-1.0	4.9	-
DES VAL	-	-	-	-	-	.087	-	-	-	-	-	.051	-

LAB	24004 CR TOT AAS GF	24009 CR TOT 5X ICP	24011 CR TOT 5X ICP	24056 CR DIS AAS GF	24111 CR DIS ICP DA	24303 CR EXT AAS SE	24999 CHROMIUM COMMON	25003 MN TOT AAS DA	25004 MN TOT 5X AAS	25010 MN TOT 5X ICP	25011 MN TOT 5X ICP	25107 MN DIS AAS GF	25111 MN DIS ICP DA
1	-	0.063	-	-	-	-	0.063	0.051	-	-	-	-	-
3	-	0.065	-	-	-	-	0.064	-	0.049	0.050	-	-	-
6	-	-	0.063	-	-	-	0.063	-	-	-	0.049	-	-
8	0.093R	-	-	-	-	-	0.093R	-	-	-	-	-	-
9	-	-	-	-	0.066	-	0.066	-	-	-	-	-	0.050
10	-	-	-	-	0.064	-	0.064	-	-	-	-	-	0.051
11	-	-	-	-	-	0.060	0.060	-	-	-	-	-	-
12	-	-	-	0.070	-	-	0.070	-	-	-	-	0.046	-
MEAN	-	.0640	.0630	.0700	.0650	.0600	.0643	.0510	.0490	.0500	.0490	.0460	.0505
STD DEV	-	.0014	-	-	.0014	-	.0031	-	-	-	-	-	.0007
REL STD	-	2.2	-	-	2.2	-	4.8	-	-	-	-	-	1.4
DES VAL	-	-	-	-	-	-	.066	-	-	-	-	-	-

LAB	25304 MN EXT AAS DA	25306 MN EXT AAS GF	25311 MN EXT ICP DA	25999 MANGNESE COMMON	26005 FE TOT AAS SE	26009 FE TOT 5X ICP	26011 FE TOT 5X ICP	26111 FE DIS ICP DA	26305 FE EXT AAS SE	26306 FE EXT AAS GF	26311 FE EXT ICP DA	26999 IRON COMMON	27002 CO TOT AAS SE
1	-	-	-	0.051	-	-	-	-	-	-	-	-	-
2	0.05	-	-	0.05	-	-	-	-	0.084	-	-	0.084	-
3	-	-	-	0.049	0.076	0.077	-	-	-	-	-	0.076	0.063
6	-	-	-	0.049	-	-	0.092	-	-	-	-	0.092	-
8	-	-	0.05	0.05	-	-	-	-	-	-	0.08	0.08	-
9	-	-	-	0.050	-	-	-	0.08	-	-	-	0.08	-
10	-	-	-	0.051	-	-	-	0.076	-	-	-	0.076	-
11	0.05	-	-	0.05	-	-	-	-	0.066	-	-	0.066	-
12	-	-	-	0.046	-	-	-	-	-	-	-	-	-
14	-	0.054	-	0.054	-	-	-	-	-	0.039R	-	0.039R	-
MEAN	.0500	.0540	.0500	.0500	.0760	.0770	.0920	.0780	.0750	-	.0800	.0791	.0630
STD DEV	.0000	-	-	.0020	-	-	-	.0028	.0127	-	-	.0080	-
REL STD	-1.0	-	-	4.0	-	-	-	3.6	17.0	-	-	10.1	-
DES VAL	-	-	-	.050	-	-	-	-	-	-	-	.077	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 24 PP 64 SAMPLE 3

LAB	27003 CO TOT AAS GF	27009 CO TOT 5X ICP	27011 CO TOT 5X ICP	27107 CO DIS AAS GF	27111 CO DIS ICP DA	27302 CO EXT AAS SE	27999 COBALT COMMON	28002 NI TOT AAS SE	28009 NI TOT 5X ICP	28011 NI TOT 5X ICP	28107 NI DIS AAS GF	28111 NI DIS ICP DA	28302 NI EXT AAS SE
1	-	0.063	-	-	-	-	0.063	-	0.065	-	-	-	-
3	-	0.064	-	-	-	-	0.063	0.065	0.067	-	-	-	-
6	-	-	0.058	-	-	-	0.058	-	-	0.064	-	-	-
8	0.074	-	-	-	-	-	0.074	-	-	-	-	-	-
9	-	-	-	-	0.06	-	0.06	-	-	-	-	0.06	-
10	-	-	-	-	0.060	-	0.060	-	-	-	-	0.064	-
11	-	-	-	-	-	0.061	0.061	-	-	-	-	-	0.063
12	-	-	-	0.070	-	-	0.070	-	-	-	0.070	-	-
MEAN	.0740	.0635	.0580	.0700	.0600	.0610	.0636	.0650	.0660	.0640	.0700	.0620	.0630
STD DEV	-	.0007	-	-	.0000	-	.0055	-	.0014	-	-	.0028	-
REL STD	-	1.1	-	-	-1.0	-	8.7	-	2.1	-	-	4.6	-
DES VAL	-	-	-	-	-	-	.067	-	-	-	-	-	-

LAB	28309 NI EXT AAS GF	28999 NICKEL COMMON	29005 CU TOT AAS SE	29009 CU TOT 5X ICP	29011 CU TOT 5X ICP	29107 CU DIS AAS GF	29111 CU DIS ICP DA	29305 CU EXT AAS SE	29311 CU EXT ICP DA	29999 COPPER COMMON	30005 ZN TOT AAS SE	30009 ZN TOT 5X ICP	30011 ZN TOT 5X ICP
1	-	0.065	-	0.048	-	-	-	-	-	0.048	-	0.055	-
2	-	-	-	-	-	-	-	0.051	-	0.051	-	-	-
3	-	0.065	0.050	0.050	-	-	-	-	-	0.050	0.055	0.057	-
6	-	0.064	-	-	0.052	-	-	-	-	0.052	-	-	0.057
8	0.068	0.068	-	-	-	-	-	-	0.06	0.06	-	-	-
9	-	0.06	-	-	-	-	0.05	-	-	0.05	-	-	-
10	-	0.064	-	-	-	-	0.055	-	-	0.055	-	-	-
11	-	0.063	-	-	-	-	-	0.050	-	0.050	-	-	-
12	-	0.070	-	-	-	0.055	-	-	-	0.055	-	-	-
MEAN	.0680	.0649	.0500	.0490	.0520	.0550	.0525	.0505	.0600	.0523	.0550	.0560	.0570
STD DEV	-	.0030	-	.0014	-	-	.0035	.0007	-	.0037	-	.0014	-
REL STD	-	4.7	-	2.9	-	-	6.7	1.4	-	7.1	-	2.5	-
DES VAL	-	.066	-	-	-	-	-	-	-	.051	-	-	-

LAB	30107 ZN DIS AAS GF	30111 ZN DIS ICP DA	30304 ZN EXT AAS DA	30305 ZN EXT AAS SE	30306 ZN EXT AAS GF	30311 ZN EXT ICP DA	30999 ZINC COMMON	38009 SR TOT ICP DA	38011 SR TOT ICP DA	38111 SR DIS ICP DA	38301 SR EXT AAS DA	38999 STRNTIUM COMMON	42009 MO TOT 5X ICP
1	-	-	-	-	-	-	0.055	-	-	-	-	-	0.071
2	-	-	0.058	-	-	-	0.058	-	-	-	-	-	-
3	-	-	-	-	-	-	0.055	0.170	-	-	-	0.170	0.070
6	-	-	-	-	-	-	0.057	-	0.14	-	-	0.14	-
8	-	-	-	-	-	0.06	0.06	-	-	-	-	-	-
9	-	0.06	-	-	-	-	0.06	-	-	0.18	-	0.18	-
10	-	0.064	-	-	-	-	0.064	-	-	-	0.15	0.15	-
11	-	-	-	0.055	-	-	0.055	-	-	-	-	-	-
12	0.055	-	-	-	-	-	0.055	-	-	-	-	-	-
14	-	-	-	-	0.047	-	0.047	-	-	-	-	-	-
MEAN	.0550	.0620	.0580	.0550	.0470	.0600	.0566	.1700	.1400	.1800	.1500	.1600	.0705
STD DEV	-	.0028	-	-	-	-	.0045	-	-	-	-	.0183	.0007
REL STD	-	4.6	-	-	-	-	8.0	-	-	-	-	11.4	1.0
DES VAL	-	-	-	-	-	-	.054	-	-	-	-	.167	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 24 PP 64 SAMPLE 3

LAB	42011 MO TOT 5X ICP	42111 MO DIS ICP DA	42999 MOLYBNUM COMMON	48002 CD TOT AAS SE	48003 CD TOT AAS GF	48009 CD TOT 5X ICP	48011 CD TOT 5X ICP	48103 CD DIS AAS GF	48111 CD DIS ICP DA	48302 CD EXT AAS SE	48309 CD EXT AAS GF	48999 CADMIUM COMMON	56009 BA TOT 5X ICP
1	-	-	0.071	-	-	0.050	-	-	-	-	-	0.050	0.023
2	-	-	-	-	-	-	-	-	-	0.051	-	0.051	-
3	-	-	0.070	0.050	-	0.050	-	-	-	-	-	0.050	0.021
6	0.071	-	0.071	-	-	-	0.051	-	-	-	-	0.051	-
8	-	-	-	-	-	-	-	-	-	-	0.045	0.045	-
9	-	0.07	0.07	-	0.052	-	-	-	-	-	-	0.052	-
10	-	0.077	0.077	-	-	-	-	-	0.047	-	-	0.047	-
11	-	-	-	-	-	-	-	-	-	0.050	-	0.050	-
12	-	-	-	-	-	-	-	0.048	-	-	-	0.048	-
MEAN	.0710	.0735	.0718	.0500	.0520	.0500	.0510	.0480	.0470	.0505	.0450	.0493	.0220
STD DEV	-	.0049	.0029	-	-	.0000	-	-	-	.0007	-	.0022	.0014
REL STD	-	6.7	4.1	-	-	-1.0	-	-	-	1.4	-	4.5	6.4
DES VAL	-	-	.072	-	-	-	-	-	-	-	-	.051	-

LAB	56011 BA TOT 5X ICP	56111 BA DIS ICP DA	56999 BARIUM COMMON	82002 PB TOT AAS SE	82004 PB TOT AAS GF	82009 PB TOT 5X ICP	82011 PB TOT 5X ICP	82104 PB DIS AAS GF	82111 PB DIS ICP DA	82302 PB EXT AAS SE	82305 PB EXT AAS GF	82309 PB EXT AAS GF	82999 LEAD COMMON
1	-	-	0.023	-	-	-	-	-	-	0.069	-	-	0.069
2	-	-	-	-	-	-	-	-	-	0.068	-	-	0.068
3	-	-	0.021	0.067	-	0.070	-	-	-	-	-	-	0.067
6	0.048R	-	0.048R	-	-	-	0.066	-	-	-	-	-	0.066
8	-	-	-	-	-	-	-	-	-	-	-	0.067	0.067
9	-	0.02	0.02	-	0.065	-	-	-	-	-	-	-	0.065
10	-	0.02	0.02	-	-	-	-	-	0.055	-	-	-	0.055
11	-	-	-	-	-	-	-	-	-	0.066	-	-	0.066
12	-	-	-	-	-	-	-	0.068	-	-	-	-	0.068
14	-	-	-	-	-	-	-	-	-	-	0.057	-	0.057
MEAN	-	.0200	.0210	.0670	.0650	.0700	.0660	.0680	.0550	.0677	.0570	.0670	.0648
STD DEV	-	.0000	.0014	-	-	-	-	-	-	.0015	-	-	.0048
REL STD	-	-1.0	6.7	-	-	-	-	-	-	2.3	-	-	7.4
DES VAL	-	-	.023	-	-	-	-	-	-	-	-	-	.065

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS	00125 SUM OF ANIONS	02011 COLOUR APPARE	02021 COLOUR VIS COM	02023 COLOUR SPECT	02024 COL TRU SPECT	02040 COLOUR COMMON	02041 CONDUCT SPEC 25	02060 CONDUCT COMMON	02072 TURB HELLIG	02073 TURB HACH	02074 TURB NPLMTRI
1	-3.57	3.78	4.06	-	-	-	2. L	2. L	453.	453.	-	0.1 L	-
2	-0.58	3.752	3.795	5. L	-	-	-	5. L	440.	440.	-	0.1	-
3	+0.06	3.713	3.709	5.	-	-	-	5.	446.	446.	-	0.93 R	-
4	-	-	-	-	5. L	-	-	5. L	449.	449.	-	-	-
6	+0.6	3.86	3.81	-	-	-	-	-	446.	446.	-	-	0.10
7	+0.2	3.73	3.71	1.	-	-	-	1.	442.	442.	-	0.25	-
8	+0.80	3.69	3.36	-	5. L	-	-	5. L	446.	446.	-	-	0.56
9	+1.72	3.84	3.71	-	-	-	-	-	435.	435.	-	-	-
10	-0.03	3.787	3.789	-	-	1. L	-	1. L	433.	433.	-	-	0.3
11	-	-	-	5. L	-	-	-	5. L	450.	450.	-	-	-
12	-	-	-	-	5. L	-	-	5. L	475.	475.	-	0.5	-
14	-	-	-	0.	-	-	-	0.	453.	453.	0.05	-	-
MEAN	-.0997	3.7690	3.7429	2.0000	-	-	-	2.0000	447.3333	447.3333	.0500	.2833	.3200
STD DEV	1.5587	.0597	.1927	2.6458	-	-	-	2.6458	10.8068	10.8068	-	.2021	.2307
REL STD	-1.0	1.6	5.1	132.3	-	-	-	132.3	2.4	2.4	-	71.3	72.1
DES VAL	-	-	-	-	-	-	-	2.522	-	444.562	-	-	-

LAB	02077 TURB HACH FZ	02081 TURB RATIO	02090 TURBIDTY COMMON	05105 BORON AA CARM	05106 BORON F AZOMETH	05111 BORON F ICP DA	05190 BORON COMMON	06101 DOC IR /DIF	06104 DOC UV CO2 IR	06107 DOC UV CO2 PHE	06109 DOC UV CO2 OH	06150 D O C COMMON	06151 DIC IR COMBUST
1	-	-	0.1 L	-	-	-	-	-	-	0.4 L	-	0.4 L	-
2	-	-	0.1	-	-	-	-	-	-	0.5 L	-	0.5 L	-
3	-	-	0.93 R	-	-	-	-	-	0.1 L	-	-	0.1 L	-
4	-	0.08	0.08	0.02 L	-	-	0.02 L	-	0.2	-	-	0.2	-
6	-	-	0.10	-	-	-	-	-	0.1	-	-	0.1	-
7	-	-	0.25	-	-	-	-	-	-	-	-	-	-
8	-	-	0.56	-	0.05 L	-	0.05 L	-	-	-	-	-	-
10	-	-	0.3	-	-	0.01	0.01	-	-	-	0.2 L	0.2 L	-
11	0.2	-	0.2	-	-	-	-	6.1 R	-	-	-	6.1 R	-
12	-	-	0.5	-	-	-	-	0.5 L	-	-	-	0.5 L	0.5
14	-	-	0.05	-	-	-	-	-	-	-	-	-	-
MEAN	.2000	.0800	.2378	-	-	.0100	.0100	-	.1500	-	-	.1500	.5000
STD DEV	-	-	.1858	-	-	-	-	-	.0707	-	-	.0707	-
REL STD	-	-	78.1	-	-	-	-	-	47.1	-	-	47.1	-
DES VAL	-	-	.184	-	-	-	.011	-	-	-	-	.525	-

LAB	06152 DIC UV CO2 IR	06154 DIC AA CO2 PHE	06159 DIC AA CO2 OH	06180 DIC CALC'D	06490 D I C COMMON	07010 TKN AA SAL	07015 TKN DIG BERTHEL	07016 TKN BLK AMM-SAL	07018 TKN BLK INDOPHE	07021 TKN BLK DIG BER	07090 TKN COMMON	07105 NO3+NO2 DIS AA	07109 NO3+NO2 AA HYD
1	-	1.0 L	-	-	1.0 L	-	-	-	-	0.050L	0.050L	0.02 L	-
3	0.5 L	-	-	-	0.5 L	0.012	-	-	-	-	0.012	-	-
4	1. L	-	-	-	1. L	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	0.5 R	-	-	0.5 R	-	0.03
8	-	-	-	-	-	-	0.20 L	-	-	-	0.20 L	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	0.02
10	-	-	0.2 L	-	0.2 L	-	-	-	-	-	-	-	0.020
11	-	-	-	1. L	1. L	-	-	-	-	-	-	-	-
12	-	-	-	-	0.5	-	-	-	0.01	-	0.01	-	-
MEAN	-	-	-	-	.5000	.0120	-	-	.0100	-	.0110	-	.0233
STD DEV	-	-	-	-	-	-	-	-	-	-	.0014	-	.0058
REL STD	-	-	-	-	-	-	-	-	-	-	12.9	-	24.7
DES VAL	-	-	-	-	.661	-	-	-	-	-	.035	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 24 PP 64 SAMPLE 4

LAB	07110 NO3+NO2 AA2 CD	07111 NO3+NO2 DIS SPEC	07112 NO3+NO2 UF AA CD	07390 NITRATE COMMON	07505 NH3 TOT AA BERT	07540 NH3 TOT AA SAL	07555 NH3 DIS AA PHEN	07557 NH3 DIS AA INDO	07562 NH3 DIS AA EDTA	07563 NH3 DIS AA INDO	07590 AMMONIA COMMON	07601 T N UV AA SUL	07602 T N CALC'D
1	-	-	-	0.02 L	-	-	-	-	0.003	-	0.003	-	-
2	0.01 L	-	-	0.01 L	-	-	-	-	-	-	-	0.1 L	-
3	-	-	0.020	0.020	0.001L	-	-	-	-	-	0.001L	-	-
4	0.02	-	-	0.02	-	0.005L	-	-	-	-	0.005L	-	-
6	-	-	-	0.03	-	-	-	0.02 R	-	-	0.02 R	-	-
7	-	-	0.03	0.03	-	-	-	-	-	-	-	-	-
8	0.03	-	-	0.03	-	-	0.002	-	-	-	0.002	-	0.23
9	-	-	-	0.02	-	-	-	-	-	-	-	-	-
10	-	-	-	0.020	-	-	0.010L	-	-	-	0.010L	-	-
11	0.05	-	-	0.05	-	0.008	-	-	-	-	0.008	-	-
12	0.04	-	-	0.04	-	-	-	-	-	0.005L	0.005L	-	0.05
14	-	0.01 L	-	0.01 L	-	-	-	-	-	-	-	-	-
MEAN	.0350	-	.0250	.0289	-	.0080	.0020	-	.0030	-	.0043	-	.1400
STD DEV	.0129	-	.0071	.0105	-	-	-	-	-	-	.0032	-	.1273
REL STD	36.9	-	28.3	36.5	-	-	-	-	-	-	74.2	-	90.9
DES VAL	-	-	-	.026	-	-	-	-	-	-	.004	-	-

LAB	07605 T N UV HY SUL	07651 T N DIS UV AA	07690 TOT N COMMON	07790 T N DIS COMMON	09103 F DIS COL SP	09105 F DIS SP EL	09106 F DIS EL POT	09107 F DIS AUT POT	09108 F DIS SP EL	09115 F DIS AA ALIZ	09190 FLUORIDE COMMON	10101 ALKLNTY TITR'N	10108 ALKLNTY POT TIT
1	-	-	-	-	-	-	-	0.05 L	-	-	0.05 L	5. L	-
2	-	-	-	0.1 L	-	-	0.05 L	-	-	-	0.05 L	-0.1	-
3	-	-	-	-	-	-	-	-	0.01	-	0.01	-	-
4	-	0.03	-	0.03	-	-	-	-	-	-	-	-	-
6	-	-	-	-	0.1 L	-	-	-	-	-	0.1 L	-	-
7	-	-	-	-	-	-	-	-	-	-	-	0.1 L	-
8	-	-	0.23 L	-	-	0.018	-	-	-	-	0.018	-	-
9	-	-	-	-	-	0.05	-	-	-	-	0.05	-	4.
10	0.02	-	-	0.02	-	-	-	-	-	0.04 L	0.04 L	-	-
11	-	-	-	-	-	0.05 L	-	-	-	-	0.05 L	0.5 L	-
12	-	-	0.05	-	-	0.10 L	-	-	-	-	0.10 L	0.5 L	-
14	-	-	-	-	-	-	-	-	-	-	-	2.076	-
MEAN	.0200	.0300	0.05	.0250	-	.0340	-	-	.0100	-	.0260	.9880	4.0000
STD DEV	-	-	-	.0071	-	.0226	-	-	-	-	.0212	1.5387	-
REL STD	-	-	-	28.3	-	66.6	-	-	-	-	81.4	155.7	-
DES VAL	-	-	.055	.053	-	-	-	-	-	-	.025	-	-

LAB	10109 ALKLNTY POT TIT	10111 ALKLNTY TIT PRO	10112 ALKLNTY TIT CON	10116 ALKLNTY CO2 IR	10190 ALKLINTY COMMON	10301 PH	10390 PH COMMON	10602 HARDNSS CALC'D	10603 HARDNSS TITR'N	10606 HARDNSS CALC'D	10690 HARDNESS COMMON	11005 NA TOT ICP	11102 NA F AAS
1	-	-	-	-	5. L	5.1	5.1	144.	-	-	144.	-	-
2	-	-	-	-	-0.1	5.5	5.5	144.0	-	-	144.0	-	-
3	-	-1.9	-	0.5 L	-1.9	5.49	5.49	-	-	141.	141.	-	-
4	-	-	-	-	-	5.70	5.70	-	-	-	-	-	-
6	20. L	-	-	-	20. L	5.8	5.8	-	150.	-	150.	-	19.
7	-	-	-	-	0.1 L	5.6	5.6	146.6	149.5	-	149.5	-	-
8	1.00 L	-	-	-	1.00 L	5.55	5.55	143.	-	-	143.	-	-
9	-	-	-	-	4.	5.56	5.56	147.	-	-	147.	20.	-
10	-	-	0.1 L	-	0.1 L	5.49	5.49	-	-	-	-	18.67	-
11	-	-	-	-	0.5 L	5.4	5.4	140.	-	-	140.	-	19.
12	-	-	-	-	0.5 L	5.7	5.7	-	-	-	-	-	-
14	-	-	-	-	2.076	5.491	5.491	-	-	-	-	-	20.25
MEAN	-	-1.9000	-	-	1.0190	5.5318	5.5318	144.1000	149.7500	141.0000	144.8125	19.3350	19.4167
STD DEV	-	-	-	-	2.5675	.1769	.1769	2.5573	.3536	-	3.7027	.9405	.7217
REL STD	-	-	-	-	252.0	3.2	3.2	1.8	.2	-	2.6	4.9	3.7
DES VAL	-	-	-	-	.750	-	5.481	-	-	-	148.540	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

LAB	11103 NA DIS FL PH	11105 NA DIS AAS DA	11107 NA UF FL PH	11311 NA EXT ICP	11990 SODIUM COMMON	12005 MG TOT ICP	12101 MG DIS CALC'D	12102 MG DIS AAS DA	12106 MG UF AAS DA	12107 MG DIS AAS AUT	12303 MG UF AAS AUT	12311 MG EXT ICP	12990 MGNESIUM COMMON
1	20.	-	-	-	20.	-	-	-	-	-	9.	-	9.
2	19.5	-	-	-	19.5	-	-	-	-	9.5	-	-	9.5
3	-	-	19.3	-	19.3	-	-	-	9.3	-	-	-	9.3
6	-	-	-	-	19.	-	9.7	-	-	-	-	-	9.7
7	-	17.8	-	-	17.8	-	-	9.4	-	-	-	-	9.4
8	-	-	-	18.7	18.7	-	-	-	-	-	-	9.71	9.71
9	-	-	-	-	20.	9.8	-	-	-	-	-	-	9.8
10	-	-	-	-	18.67	9.65	-	-	-	-	-	-	9.65
11	-	-	-	-	19.	-	-	9.5	-	-	-	-	9.5
12	19.3	-	-	-	19.3	-	-	-	-	-	-	-	-
14	-	-	-	-	20.25	-	-	9.02	-	-	-	-	9.02
MEAN	19.6000	17.8000	19.3000	18.7000	19.2291	9.7250	9.7000	9.3067	9.3000	9.5000	9.0000	9.7100	9.4580
STD DEV	.3606	-	-	-	.7109	.1061	-	.2532	-	-	-	-	.2807
REL STD	1.8	-	-	-	3.7	1.1	-	2.7	-	-	-	-	3.0
DES VAL	-	-	-	-	19.142	-	-	-	-	-	-	-	9.446

LAB	14102 SILICA ANSA AA	14105 SILICA MOLY AA	14106 SILICA MOLY	14111 SILICA ICP DA	14190 SILICA COMMON	15106 T P FIL UV ASC	15406 T P UF AA ASC	15409 T P BLK AA ASC	15413 T P ACL AA SNCL	15421 T P BLK DIG ASC	15490 TOT P COMMON	16304 SO4 DIS AUTO BA	16306 SO4 DIS AA MTB
1	0.5 L	-	-	-	0.5 L	-	-	-	-	0.006L	0.006L	-	35.
2	0.1 L	-	-	-	0.1 L	-	-	-	-	-	-	35.8	-
3	-	-	0.02	-	0.02	-	-	-	0.002	-	0.002	-	-
4	-	-	-	-	-	-	0.003L	-	-	-	0.003L	-	-
6	-	-	-	-	-	-	-	0.02 R	-	-	0.02 R	38.	-
7	-	-	-	-	-	-	-	-	-	-	-	-	39.3
8	-	0.2 L	-	-	0.2 L	-	-	-	0.001L	-	0.001L	-	38.4
9	-	-	-	0.02 L	0.02 L	-	-	-	-	-	-	-	-
10	-	0.01 L	-	-	0.01 L	0.010L	-	-	-	-	0.010L	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	37.
12	-	0.5 L	-	-	0.5 L	-	0.003L	-	-	-	0.003L	-	35.9
14	-	-	-	-	-	-	-	-	-	-	-	-	38.65
MEAN	-	-	.0200	-	.0200	-	-	-	.0020	-	.0020	36.9000	37.3750
STD DEV	-	-	-	-	-	-	-	-	-	-	-	1.5556	1.6934
REL STD	-	-	-	-	-	-	-	-	-	-	-	4.2	4.5
DES VAL	-	-	-	-	.010	-	-	-	-	-	.004	-	-

LAB	16307 SO4 UF AA MTB	16309 SO4 DIS I C	16310 SO4 DIS AA CALM	16990 SULFATE COMMON	17203 CL DIS AA FE	17204 CL DIS AG TIT	17206 CL DIS AA AG	17208 CL DIS AA AG	17209 CL DIS I C	17210 CL DIS TIT CON	17990 CHLORIDE COMMON	19005 K TOT ICP	19102 K DIS AAS
1	-	-	-	35.	115.	-	-	-	-	-	115.	-	-
2	-	37.	-	37.	-	-	-	-	108.	-	108.	-	-
3	36.1	-	-	36.1	-	-	-	104.4	-	-	104.4	-	-
6	-	-	-	38.	-	104.	-	-	-	-	104.	-	0.8
7	-	-	-	39.3	102.3	-	-	-	-	-	102.3	-	0.90
8	-	-	-	38.4	-	-	100.	-	-	-	100.	-	-
9	-	39.	-	39.	-	-	-	-	100.	-	100.	0.9	-
10	-	-	37.	37.	-	-	-	-	-	107.	107.	0.86	-
11	-	-	-	37.	-	-	110.	-	-	-	110.	-	-
12	-	-	-	35.9	-	-	103.	-	-	-	103.	-	-
14	-	-	-	38.65	-	-	101.6	-	-	-	101.6	-	0.895
MEAN	36.1000	38.0000	37.0000	37.3955	108.6500	104.0000	103.6500	104.4000	104.0000	107.0000	105.0273	.8800	.8650
STD DEV	-	1.4142	-	1.3882	8.9803	-	4.4072	-	5.6569	-	4.6065	.0283	.0563
REL STD	-	3.7	-	3.7	8.3	-	4.3	-	5.4	-	4.4	3.2	6.5
DES VAL	-	-	-	37.109	-	-	-	-	-	-	105.402	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 24 PP 64 SAMPLE 4

LAB	19103 K DIS FLM PH	19106 K DIS AAS LI	19107 K DIS FLM PH	19301 K EXT HNO3 AA	19990 PTASSIUM COMMON	20005 CA TOT ICP	20100 CA DIS CALC'D	20103 CA DIS AAS	20108 CA DIS AAS UF	20110 CA DIS AAS AUT	20311 CA EXT ICP	20990 CALCIUM COMMON
1	1.0	-	-	-	1.0	-	-	-	-	43.	-	43.
2	1.3 R	-	-	-	1.3 R	-	-	-	-	42.	-	42.
3	-	-	0.95	-	0.95	-	-	-	41.0	-	-	41.0
6	-	-	-	-	0.8	-	44.	-	-	-	-	44.
7	-	-	-	-	0.90	-	-	43.2	-	-	-	43.2
8	-	-	-	0.88	0.88	-	-	-	-	-	41.2	41.2
9	-	-	-	-	0.9	43.	-	-	-	-	-	43.
10	-	-	-	-	0.86	43.2	-	-	-	-	-	43.2
11	-	1.0	-	-	1.0	-	-	42.	-	-	-	42.
12	0.9	-	-	-	0.9	-	-	-	-	-	-	-
14	-	-	-	-	0.895	-	-	41.9	-	-	-	41.9
MEAN	.9500	1.0000	.9500	.8800	.9085	43.1000	44.0000	42.3667	41.0000	42.5000	41.2000	42.4500
STD DEV	.0707	-	-	-	.0613	.1414	-	.7234	-	.7071	-	.9721
REL STD	7.4	-	-	-	6.7	.3	-	1.7	-	1.7	-	2.3
DES VAL	-	-	-	-	.884	-	-	-	-	-	-	42.537

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 24 PP 64 SAMPLE 5

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS	00125 SUM OF ANIONS	02011 COLOUR APPARE	02021 COLOUR VIS COM	02023 COLOUR SPECT	02024 COL TRU SPECT	02040 COLOUR COMMON	02041 CONDUCT SPEC 25	02060 CONDUCT COMMON	02072 TURB HELLIG	02073 TURB HACH	02074 TURB NPLMTRI
1	-6.06	0.31	0.35	-	-	-	166.	166.	38.	38.	-	0.2	-
2	+2.95	0.321	0.303	140.	-	-	-	140.	35.	35.	-	0.3	-
3	-7.6	0.336	0.393	120.	-	-	-	120.	36.6	36.6	-	0.95 R	-
4	-	-	-	-	130.	-	-	130.	36.6	36.6	-	-	-
6	-1.4	0.34	0.35	-	-	-	-	-	36.	36.	-	-	0.21
7	-9.0	0.32	0.38	172.	-	-	-	172.	36.7	36.7	-	0.40	-
8	+2.43	0.342	0.326	-	100.	-	-	100.	37.4	37.4	-	-	0.28
9	-4.2	0.34	0.37	-	-	-	-	-	38.	38.	-	-	-
10	+9.03	0.329	0.274	-	-	95.	-	95.	35.5	35.5	-	-	0.3
11	-	-	-	140.	-	-	-	140.	36.	36.	-	-	-
12	10.8	0.348	0.280	-	120.	-	-	120.	39.	39.	-	0.5	-
14	-	-	-	-	-	-	-	-	37.15	37.15	0.2	-	-
MEAN	-.3389	.3318	.3362	143.0000	116.6667	95.0000	166.0000	131.4444	36.8292	36.8292	.2000	.3500	.2633
STD DEV	7.1313	.0125	.0432	21.5097	15.2753	-	-	26.3776	1.1478	1.1478	-	.1291	.0473
REL STD	-1.0	3.8	12.8	15.0	13.1	-	-	20.1	3.1	3.1	-	36.9	17.9
DES VAL	-	-	-	-	-	-	-	131.800	-	36.550	-	-	-

LAB	02077 TURB HACH FZ	02081 TURB RATIO	02090 TURBIDTY COMMON	05105 BORON AA CARM	05106 BORON F AZOMETH	05111 BORON F ICP DA	05190 BORON COMMON	06101 DOC IR /DIF	06104 DOC UV CO2 IR	06107 DOC UV CO2 PHE	06109 DOC UV CO2 OH	06150 D O C COMMON	06151 DIC IR COMBUST
1	-	-	0.2	-	-	-	-	-	-	10.5	-	10.5	-
2	-	-	0.3	-	-	-	-	-	-	10.7	-	10.7	-
3	-	-	0.95 R	-	-	-	-	-	9.4	-	-	9.4	-
4	-	0.24	0.24	0.13	-	-	0.13	-	11.	-	-	11.	-
6	-	-	0.21	-	-	-	-	-	11.8	-	-	11.8	-
7	-	-	0.40	-	-	-	-	-	-	-	-	-	-
8	-	-	0.28	-	0.27	-	0.27	-	-	-	-	-	-
10	-	-	0.3	-	-	0.01 R	0.01 R	-	-	-	9.4	9.4	-
11	0.2	-	0.2	-	-	-	-	20. R	-	-	-	20. R	-
12	-	-	0.5	-	-	-	-	12.0	-	-	-	12.0	0.8
14	-	-	0.2	-	-	-	-	-	-	-	-	-	-
MEAN	.2000	.2400	.2830	.1300	.2700	-	.2000	12.0000	10.7333	10.6000	9.4000	10.6857	.8000
STD DEV	-	-	.0996	-	-	-	.0990	-	1.2220	.1414	-	1.0335	-
REL STD	-	-	35.2	-	-	-	49.5	-	11.4	1.3	-	9.7	-
DES VAL	-	-	.424	-	-	-	.205	-	-	-	-	12.400	-

LAB	06152 DIC UV CO2 IR	06154 DIC AA CO2 PHE	06159 DIC AA CO2 OH	06180 DIC CALC'D	06490 D I C COMMON	07010 TKN AA SAL	07015 TKN DIG BERTHEL	07016 TKN BLK AMM-SAL	07018 TKN BLK INDOPHE	07021 TKN BLK DIG BER	07090 TKN COMMON	07105 NO3+NO2 DIS AA	07109 NO3+NO2 AA HYD
1	-	1.0 L	-	-	1.0 L	-	-	-	-	0.299	0.299	0.03	-
3	0.5	-	-	-	0.5	0.276	-	-	-	-	0.276	-	-
4	1. L	-	-	-	1. L	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	0.7 R	-	-	0.7 R	-	0.03
8	-	-	-	-	-	-	0.30	-	-	-	0.30	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	0.02
10	-	-	0.4	-	0.4	-	-	-	-	-	-	-	0.025
11	-	-	-	1. L	1. L	-	-	-	-	-	-	-	-
12	-	-	-	-	0.8	-	-	-	0.31	-	0.31	-	-
MEAN	.5000	-	.4000	-	.5667	.2760	.3000	-	.3100	.2990	.2963	.0300	.0250
STD DEV	-	-	-	-	.2082	-	-	-	-	-	.0144	-	.0050
REL STD	-	-	-	-	36.7	-	-	-	-	-	4.9	-	20.0
DES VAL	-	-	-	-	.273	-	-	-	-	-	.364	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

LAB	07110 NO3+NO2 AA2 CD	07111 NO3+NO2 DIS SPEC	07112 NO3+NO2 UF AA CD	07390 NITRATE COMMON	07505 NH3 TOT AA BERT	07540 NH3 TOT AA SAL	07555 NH3 DIS AA PHEN	07557 NH3 DIS AA INDO	07562 NH3 DIS AA EDTA	07563 NH3 DIS AA INDO	07590 AMMONIA COMMON	07601 T N UV AA SUL	07602 T N CALC'D
1	-	-	-	0.03	-	-	-	-	0.039	-	0.039	-	-
2	0.01	-	-	0.01	-	-	-	-	-	-	-	0.10	-
3	-	-	0.019	0.019	0.002R	-	-	-	-	-	0.002R	-	-
4	0.03	-	-	0.03	-	0.036	-	-	-	-	0.036	-	-
6	-	-	-	0.03	-	-	-	0.03	-	-	0.03	-	-
7	-	-	0.03	0.03	-	-	-	-	-	-	-	-	-
8	0.04	-	-	0.04	-	-	0.047	-	-	-	0.047	-	0.34
9	-	-	-	0.02	-	-	-	-	-	-	-	-	-
10	-	-	-	0.025	-	-	0.03	-	-	-	0.03	-	-
11	0.05	-	-	0.05	-	0.030	-	-	-	-	0.030	-	-
12	0.04	-	-	0.04	-	-	-	-	-	0.046	0.046	-	0.35
14	-	0.02	-	0.02	-	-	-	-	-	-	-	-	-
MEAN	.0340	.0200	.0245	.0287	-	.0330	.0385	.0300	.0390	.0460	.0369	.1000	.3450
STD DEV	.0152	-	.0078	.0110	-	.0042	.0120	-	-	-	.0074	-	.0071
REL STD	44.6	-	31.7	38.3	-	12.9	31.2	-	-	-	20.2	-	2.0
DES VAL	-	-	-	.020	-	-	-	-	-	-	.016	-	-

LAB	07605 T N UV HY SUL	07651 T N DIS UV AA	07690 TOT N COMMON	07790 T N DIS COMMON	09103 F DIS COL SP	09105 F DIS SP EL	09106 F DIS EL POT	09107 F DIS AUT POT	09108 F DIS SP EL	09115 F DIS AA ALIZ	09190 FLUORIDE COMMON	10101 ALKLNTY TITR'N	10108 ALKLNTY POT TIT
1	-	-	-	-	-	-	-	0.05 L	-	-	0.05 L	5. L	-
2	-	-	-	0.10	-	-	0.05 L	-	-	-	0.05 L	2.6	-
3	-	-	-	-	-	-	-	-	0.03	-	0.03	-	-
4	-	0.25	-	0.25	-	-	-	-	-	-	-	2.5	-
6	-	-	-	-	0.1 L	-	-	-	-	-	0.1 L	-	-
7	-	-	-	-	-	-	-	-	-	-	-	2.9	-
8	-	-	0.34	-	-	0.031	-	-	-	-	0.031	-	-
9	-	-	-	-	-	0.05 L	-	-	-	-	0.05 L	-	8.5 R
10	0.19	-	-	0.19	-	-	-	-	-	0.04 L	0.04 L	-	-
11	-	-	-	-	-	0.05 L	-	-	-	-	0.05 L	2.9	-
12	-	-	0.35	-	-	0.10 L	-	-	-	-	0.10 L	2.9	-
14	-	-	-	-	-	-	-	-	-	-	-	5.387	-
MEAN	.1900	.2500	.3450	.1800	-	.0310	-	-	.0300	-	.0305	3.1978	-
STD DEV	-	-	.0071	.0755	-	-	-	-	-	-	.0007	1.0865	-
REL STD	-	-	2.0	41.9	-	-	-	-	-	-	2.3	34.0	-
DES VAL	-	-	.320	.175	-	-	-	-	-	-	.040	-	-

LAB	10109 ALKLNTY POT TIT	10111 ALKLNTY TIT PRO	10112 ALKLNTY TIT CON	10116 ALKLNTY CO2 IR	10190 ALKLINTY COMMON	10301 PH	10390 PH COMMON	10602 HARDNSS CALC'D	10603 HARDNSS TITR'N	10606 HARDNSS CALC'D	10690 HARDNESS COMMON	11005 NA TOT ICP	11102 NA F AAS
1	-	-	-	-	5. L	6.2	6.2	5. L	-	-	5. L	-	-
2	-	-	-	-	2.6	6.3	6.3	7.2	-	-	7.2	-	-
3	-	3.5	-	2.3	3.5	6.04	6.04	-	-	7.5	7.5	-	-
4	-	-	-	-	2.5	6.51	6.51	-	-	-	-	-	-
6	20. L	-	-	-	20. L	6.2	6.2	-	8.	-	8.	-	4.
7	-	-	-	-	2.9	6.4	6.4	7.1	7.5	-	7.5	-	-
8	2.30	-	-	-	2.30	6.19	6.19	8.08	-	-	8.08	-	-
9	-	-	-	-	8.5 R	6.38	6.38	7.	-	-	7.	4.3	-
10	-	-	3.1	-	3.1	6.37	6.37	-	-	-	-	3.98	-
11	-	-	-	-	2.9	6.1	6.1	7.4	-	-	7.4	-	4.2
12	-	-	-	-	2.9	6.2	6.2	7.7	-	-	7.7	-	-
14	-	-	-	-	5.387	6.361	6.361	-	-	-	-	-	4.33
MEAN	2.3000	3.5000	3.1000	2.3000	3.1208	6.2709	6.2709	7.4133	7.7500	7.5000	7.5475	4.1400	4.1767
STD DEV	-	-	-	-	.9190	.1377	.1377	.4102	.3536	-	.3700	.2263	.1662
REL STD	-	-	-	-	29.4	2.2	2.2	5.5	4.6	-	4.9	5.5	4.0
DES VAL	-	-	-	-	3.563	-	6.194	-	-	-	7.798	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

LAB	11103 NA DIS FL PH	11105 NA DIS AAS DA	11107 NA UF FL PH	11311 NA EXT ICP	11990 SODIUM COMMON	12005 MG TOT ICP	12101 MG DIS CALC'D	12102 MG DIS AAS DA	12106 MG UF AAS DA	12107 MG DIS AAS AUT	12111 MG DIS ICP	12303 MG UF AAS AUT	12311 MG EXT ICP
1	4.	-	-	-	4.	-	-	-	-	-	-	1. L	-
2	4.0	-	-	-	4.0	-	-	-	-	0.66	-	-	-
3	-	-	4.1	-	4.1	-	-	-	0.67	-	-	-	-
6	-	-	-	-	4.	-	1.	-	-	-	-	-	-
7	-	3.9	-	-	3.9	-	-	0.7	-	-	-	-	-
8	-	-	-	3.98	3.98	-	-	-	-	-	-	-	0.79
9	-	-	-	-	4.3	0.7	-	-	-	-	-	-	-
10	-	-	-	-	3.98	0.68	-	-	-	-	-	-	-
11	-	-	-	-	4.2	-	-	0.7	-	-	-	-	-
12	4.2	-	-	-	4.2	-	-	-	-	-	0.70	-	-
14	-	-	-	-	4.33	-	-	0.64	-	-	-	-	-
MEAN	4.0667	3.9000	4.1000	3.9800	4.0900	.6900	1.0000	.6800	.6700	.6600	.7000	-	.7900
STD DEV	.1155	-	-	-	.1451	.0141	-	.0346	-	-	-	-	-
REL STD	2.8	-	-	-	3.5	2.0	-	5.1	-	-	-	-	-
DES VAL	-	-	-	-	4.245	-	-	-	-	-	-	-	-

LAB	12990 MGNESIUM COMMON	14102 SILICA ANSA AA	14105 SILICA MOLY AA	14106 SILICA MOLY	14111 SILICA ICP DA	14190 SILICA COMMON	15106 T P FIL UV ASC	15406 T P UF AA ASC	15409 T P BLK AA ASC	15413 T P ACL AA SNCL	15421 T P BLK DIG ASC	15490 TOT P COMMON	16304 SO4 DIS AUTO BA
1	1. L	2.6	-	-	-	2.6	-	-	-	-	0.006L	0.006L	-
2	0.66	2.40	-	-	-	2.40	-	-	-	-	-	-	4.7
3	0.67	-	-	2.34	-	2.34	-	-	-	0.008	-	0.008	-
4	-	-	-	-	-	-	-	0.006	-	-	-	0.006	-
6	1.	-	-	-	-	-	-	-	0.02 R	-	-	0.02 R	10. L
7	0.7	-	-	-	-	-	-	-	-	-	-	-	-
8	0.79	-	2.2	-	-	2.2	-	-	-	0.009	-	0.009	-
9	0.7	-	-	-	2.35	2.35	-	-	-	-	-	-	-
10	0.68	-	1.93	-	-	1.93	0.010L	-	-	-	-	0.010L	-
11	0.7	-	-	-	-	-	-	-	-	-	-	-	-
12	0.70	-	2.4	-	-	2.4	-	0.010	-	-	-	0.010	-
14	0.64	-	-	-	-	-	-	-	-	-	-	-	-
MEAN	.7240	2.5000	2.1767	2.3400	2.3500	2.3171	-	.0080	-	.0085	-	.0083	4.7000
STD DEV	.1048	.1414	.2359	-	-	.2077	-	.0028	-	.0007	-	.0017	-
REL STD	14.5	5.7	10.8	-	-	9.0	-	35.4	-	8.3	-	20.7	-
DES VAL	.704	-	-	-	-	2.338	-	-	-	-	-	.011	-

LAB	16306 SO4 DIS AA MTB	16307 SO4 UF AA MTB	16309 SO4 DIS I C	16310 SO4 DIS AA CALM	16990 SULFATE COMMON	17203 CL DIS AA FE	17204 CL DIS AG TIT	17206 CL DIS AA AG	17208 CL DIS AA AG	17209 CL DIS I C	17210 CL DIS TIT CON	17990 CHLORIDE COMMON	19005 K TOT ICP
1	5. L	-	-	-	5. L	5.	-	-	-	-	-	5.	-
2	-	-	2.8	-	4.7	-	-	-	-	5.4	-	5.4	-
3	-	6.8 R	-	-	6.8 R	-	-	-	5.5	-	-	5.5	-
6	-	-	-	-	10. L	-	6.	-	-	-	-	6.	-
7	7.6 R	-	-	-	7.6 R	5.8	-	-	-	-	-	5.8	-
8	6.10 R	-	-	-	6.10 R	-	-	5.30	-	-	-	5.30	-
9	-	-	2.6	-	2.6	-	-	-	-	5.	-	5.	0.3
10	-	-	-	2.8	2.8	-	-	-	-	-	5.4	5.4	0.27
11	8.0 R	-	-	-	8.0 R	-	-	6.0	-	-	-	6.0	-
12	-	-	2.8	-	2.8	-	-	5.7	-	-	-	5.7	-
14	2.883	-	-	-	2.883	-	-	5.203	-	-	-	5.203	-
MEAN	2.8830	-	2.7333	2.8000	3.1566	5.4000	6.0000	5.5508	5.5000	5.2000	5.4000	5.4821	.2850
STD DEV	-	-	.1155	-	.8691	.5657	-	.3687	-	.2828	-	.3570	.0212
REL STD	-	-	4.2	-	27.5	10.5	-	6.6	-	5.4	-	6.5	7.4
DES VAL	-	-	-	-	2.781	-	-	-	-	-	-	5.708	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 24 PP 64 SAMPLE 5

LAB	19102 K DIS AAS	19103 K DIS FLM PH	19106 K DIS AAS LI	19107 K DIS FLM PH	19301 K EXT HNO3 AA	19990 PTASSIUM COMMON	20005 CA TOT ICP	20100 CA DIS CALC'D	20103 CA DIS AAS	20108 CA DIS AAS UF	20110 CA DIS AAS AUT	20111 CA DIS ICP	20311 CA EXT ICP
1	-	0.3	-	-	-	0.3	-	-	-	-	1. L	-	-
2	-	0.27	-	-	-	0.27	-	-	-	-	1.8	-	-
3	-	-	-	0.30	-	0.30	-	-	-	1.90	-	-	-
6	0.2	-	-	-	-	0.2	-	1.6	-	-	-	-	-
7	0.24	-	-	-	-	0.24	-	-	1.7	-	-	-	-
8	-	-	-	-	0.29	0.29	-	-	-	-	-	-	1.93
9	-	-	-	-	-	0.3	1.8	-	-	-	-	-	-
10	-	-	-	-	-	0.27	1.81	-	-	-	-	-	-
11	-	-	0.4	-	-	0.4	-	-	1.7	-	-	-	-
12	-	0.3	-	-	-	0.3	-	-	-	-	-	1.93	-
14	0.285	-	-	-	-	0.285	-	-	1.79	-	-	-	-
MEAN	.2417	.2900	.4000	.3000	.2900	.2868	1.8050	1.6000	1.7300	1.9000	1.8000	1.9300	1.9300
STD DEV	.0425	.0173	-	-	-	.0488	.0071	-	.0520	-	-	-	-
REL STD	17.6	6.0	-	-	-	17.0	.4	-	3.0	-	-	-	-
DES VAL	-	-	-	-	-	.286	-	-	-	-	-	-	-

LAB	20990 CALCIUM COMMON
1	1. L
2	1.8
3	1.90
6	1.6
7	1.7
8	1.93
9	1.8
10	1.81
11	1.7
12	1.93
14	1.79
MEAN	1.7960
STD DEV	.1074
REL STD	6.0
DES VAL	1.843

DATES RECEIVED 1 87/12/03 2 88/01/11 3 87/12/16 3 88/01/20 4 87/12/29
5 87/ / 6 87/12/03 7 88/02/02 8 87/12/10 9 88/01/19
10 87/12/29 11 87/12/21 12 88/01/11 14 88/01/28

NOTE: ALL CONCENTRATION UNITS ARE EXPRESSED IN MG/L OF EACH ELEMENT, THE EXCEPTIONS BEING: COLOUR IN RELATIVE UNITS, CONDUCTIVITY IN USIE/CM, TURBIDITY IN JTU OR NTU, NITROGEN ANALYSES IN "N", ALKALINITY & HARDNESS IN CACO3, SILICA IN SIO2, AND SULFATE IN SO4.

DISTRIBUTION - PPWB

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MEMORANDUM **NOTE DE SERVICE**

H.Alkema\NWRI\336-4929\ha

SECURITY - CLASSIFICATION - DE SÉCURITÉ	
OUR FILE/NOTRE RÉFÉRENCE	
YOUR FILE/VOTRE RÉFÉRENCE	
DATE	May 31, 1988

TO / À: Distribution

FROM / DE:
H. Alkema
Quality Assurance Section
National Water Research Institute
Burlington, Ontario

SUBJECT / OBJET: Prairie Provinces Quality Assurance Program (PPQA)

I have enclosed the final report for PP 65-66.

If you have any comments on this report, or any legitimate corrections to the data base, please do not hesitate to communicate them.

H. Alkema

RESEARCH & APPLICATIONS BRANCH

FINAL REPORT

REPORT NO. RAB 88-05

PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAM

STUDIES 65 AND 66

for January and February 1988

TRACE METALS, MAJOR IONS, NUTRIENTS AND PHYSICAL PARAMETERS IN SURFACE WATERS

by

H. Alkema

Quality Assurance Section
National Water Research Institute
Burlington, Ontario

May 1988

Introduction

As part of an on-going study, the Quality Assurance Section, NWRI in Burlington, Ontario, has been sending reference water samples bi-monthly to chemical laboratories participating in the PPWB program. This report summarizes the most recent PPWB interlaboratory quality control studies: PP 65 and 66, for the months January and February, 1988. These two studies dealt with trace metals, major ions, nutrients and physical parameters. The levels were from low to medium levels.

Study Design

Five water samples were submitted to each laboratory for chemical analyses. Three samples were submitted for trace metals analysis, while the remaining two were submitted for major ions, nutrients and some physical measurements. The following is a breakdown of the five samples:

PP 65 - Sample 1 - 125 ml, DA* for trace metals (3% HNO_3)
Sample 2 - up to 1L, major ions etc., stored at 4^oC

PP 66 - Sample 3 - 1L, SE* for trace metals (0.2% HNO_3)
Sample 4 - up to 1L, major ions, etc., stored at 4^oC
Sample 5 - 1L, SE for trace metals (0.2% HNO_3)

* for definitions see Appendix 1

Treatment of Data

Each laboratory was asked to perform only those analyses which were routine to their particular laboratory, using the general methodology guidelines listed above. Results for these analyses were recorded on report sheets provided with the PP samples. Upon receipt of the Reporting Sheets, the results were tabulated for each parameter, first for each method reported, and then for all methods combined. These data, and the resulting statistics are presented in the Data Summary. (attached)

Preliminary data summaries, including problematic results, were sent March 1 or 21 and April 11. Each laboratory was given three weeks to notify us of any errors in data transcription, compilation, or flags.

Performance Indicators

In previous reports the mean has always been used as comparator for accuracy assessment. We now have "design values" for several reference waters (RMs) and certified referenc waters (CRMs). These design values are used to test each reported result (whether few or many) for accuracy. Consequently, for stable parameters, the design values will be used as comparator for the ten percent warning circles, and the mean will be used for unstable parameters (perhaps due to biological activity).

Percentage deviations from the comparator are used as an indicator for the laboratory head to determine the extent of the discrepencies between the laboratory result and comparator as it applies to his procedures. However, please keep in mind that at low levels, high % deviations are often seen, and may be misleading if interpreted too strictly.

A result which deviates more than 10% from the comparator is circled in the data tables and its value noted in the comments which follow. Results reported with an "L" (less than) or flagged with an "R" (rejectable) are not used in the statistical calculations. Performance indicators are fully explained in Appendix II.

Comments on Laboratory Performance

Results accompanied with a 'less than' are difficult to appraise. If a design value or mean is significantly lower than the detection limit given by a particular laboratory, then that detection limit is too high. Such a result is assigned 'HDL' and is labelled in the Data Summary.

If, on the other hand, the detection limit reported is far lower than the mean or design value, then the use of 'less than' is clearly inadequate and the result is flagged low. The magnitude of the deviation from the mean in such a case is taken from the detection limit given.

Attached are two tables listing flagged data by laboratory (Table 1), and listing parameters for which there was a high coefficient of variation (Table 2). The latter was generated with a new set of criteria to provide a more accurate and more consistent description of difficult to analyse parameters or levels. Your comments will be appreciated.

PPWB laboratories average number of deviations per sample was 2.8

TABLE 1

PRAIRIE PROVINCES LABORATORIES FLAG TABLE

LAB	1	FLAGS :	TKN	32%	HARDNESS	14%	SODIUM	-22%	L
			CHLORIDE	-21%	CALCIUM	26%			
			MGNESIUM	-14%					
		HDL :	SODIUM		SULFATE		MANGNESE		
LAB	3	FLAGS :	PH	-13%	SULFATE	-14%	FLUORIDE	17%	
			PH	-13%					
		HDL :	NONE						
LAB	4	FLAGS :	T N DIS	30%					
		HDL :	NONE						
LAB	6	FLAGS :	COBALT	-13%	NICKEL	-18%	STRNTIUM	-64%	R*
			BARIUM	15%	TKN	164%	R SODIUM	-22%	
			MGNESIUM	24%	R TOT P	400%	R ALUMINUM	-76%	R
			CHROMIUM	57%	IRON	333%	R NICKEL	-50%	
			COPPER	43%	ZINC	-38%	STRNTIUM	-70%	R
			BARIUM	118%	R LEAD	60%	TKN	21%	
			MGNESIUM	12%	TOT P	150%	R ALUMINUM	-50%	R
			CHROMIUM	-31%	IRON	-45%	NICKEL	-69%	R
			STRNTIUM	-66%	R MOLYBNUM	-23%			
		HDL :	AMMONIA		SULFATE		CHLORIDE		
			VANADIUM		AMMONIA		VANADIUM		
LAB	8	FLAGS :	NICKEL	-18%	LEAD	-16%	SILICA	-16%	
			IRON	2900%	R COPPER	43%	SILICA	-16%	
			IRON	38%	COPPER	-23%	ZINC	25%	
		HDL :	TKN		TOT N		ALUMINUM		
			MANGNESE		COBALT		ZINC		
			ALUMINUM		MANGNESE				

* 'R' a Grubbs' rejectable flag, ie. non-comparable data
'L' a 'less than' result lower than the comparator

TABLE 2

HIGH COEFFICIENT OF VARIATION

AN HCV FOR	BORON	AT	.033 PPM
AN HCV FOR	NICKEL	AT	.006 PPM
AN HCV FOR	COLOUR	AT	39.100 PPM
AN HCV FOR	BORON	AT	.063 PPM
AN HCV FOR	T N DIS	AT	.309 PPM
AN HCV FOR	IRON	AT	.029 PPM

APPENDIX I

Definitions of Types of Metals Analysis

1. DA - Direct Aspiration

Without sample pretreatment, samples are aspirated by Atomic Absorption Spectrophotometry (AAS) ar Inuctively Coupled (Argon) Plasma (ICAP or ICP). Standards should contain the acid equivalent of the sample.

2. SE - Code for low level analysis

Analysis is carried out by one of the following methods:

1. Solvent extraction sample concentration followed by AAS.
2. Digestion and concentration of aqueous phase followed by ICAP.
3. Digestion of aqueous phase and ICAP analysis.
4. Graphite tube (flameless) AAS.

APPENDIX II

Performance Indicators

1. **Circled Results**

Results are circled in the data tables when a minor deviation from the comparator has ocurred. (The comparator is the design value of the reference sample, or the mean in the case of a biologically active sample.) Circled results are in general greater than or less than 10% from the comparator. At very low levels of analytes or with parameters that are difficult to analyse, a greater deviation than 10% is allowed. Under these conditions, a result is circled when it is outside one standard deviation of the comparator. These circled results, though acceptable values, are a warning to laboratory managers that the parameter analysis should be investigated.

2. **Rejectable Results**

Each laboratory result is statistically tested to see if it is outlying. Outlying results were caused by non random causes such as a faulty calibration or a transcription error. These outlying results, calculated by the Grubbs' procedure,* and indicated in the data tables with an 'R', are noncomparable with the other data for the parameter.

3. **A High Co-efficient of Variation (HCV)**

Occasionally data for a parameter yields a very high relative standard deviation (RSD). When this HCV is not due to outlying values, it indicates a high variability within the data set. The data in this set is then noncomparable. In such a case, the RSD for the parameter is circled in the data tables and the parameter's noncomparability is noted in the comments.

4. **High Detection Limits (HDL)**

Each laboratory determines its own detection limits according to its own requirements. When major differences of detection limits occur, the result is flagged with 'HDL' in the data tables. An HDL indicates that low level analysis may not be comparable with the analyses of other laboratories.

* reference : Frank E. Grubbs, Technometrics, 1969, p. 1.

DATA SUMMARY

FEDERAL-PROVINCIAL & PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAMS

STUDY NO. FP 25 PP 65 DATE: 01/01/88 DUE DATE: 29/02/88 PAGE 1

SAMPLE 1 SPIKED SAMPLE. TRACE METALS D/A. (IN 3% HNO3)

LAB	13009 AL TOT 5X ICP	13102 AL DIS AAS DA	13111 AL DIS ICP DA	13302 AL EXT AAS DA	13321 AL EXT ICP DA	13999 ALUMINUM COMMON	23009 V TOT 5X ICP	23011 V TOT 5X ICP	23101 V DIS ICP DA	23111 V DIS ICP DA	23321 V EXT ICP DA	23999 VANADIUM COMMON	24004 CR TOT AAS GF
1	-	-	-	-	-	-	0.460	-	-	-	-	0.460	-
2	-	-	-	0.5	-	0.5	-	-	-	-	-	-	-
3	-	-	-	0.533	0.550	0.533	-	-	-	-	0.505	0.505	-
6	0.49	-	-	-	-	0.49	-	0.50	-	-	-	0.50	-
8	-	-	-	0.5	-	0.5	-	-	-	-	-	-	0.052
9	-	-	0.50	-	-	0.50	-	-	-	0.49	-	0.49	-
10	-	-	0.43 R	-	-	0.43 R	-	-	-	0.445	-	0.445	-
14	-	0.525	-	-	-	0.525	-	-	0.530	-	-	0.530	-
MEAN	.4900	.5250	.5000	.5110	.5500	.5080	.4600	.5000	.5300	.4675	.5050	.4883	.0520
STD DEV	-	-	-	.0191	-	.0169	-	-	-	.0318	-	.0311	-
REL STD	-	-	-	3.7	-	3.3	-	-	-	6.8	-	6.4	-
DES VAL	-	-	-	-	-	.518	-	-	-	-	-	.492	-

LAB	24009 CR TOT 5X ICP	24011 CR TOT 5X ICP	24111 CR DIS ICP DA	24302 CR EXT AAS DA	24321 CR EXT ICP DA	24999 CHROMIUM COMMON	25003 MN TOT AAS DA	25011 MN TOT 5X ICP	25104 MN DIS AAS DA	25111 MN DIS ICP DA	25304 MN EXT AAS DA	25309 MN EXT AAS DA	25311 MN EXT ICP DA
1	0.048	-	-	-	-	0.048	0.045	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	0.05	-	-
3	-	-	-	-	0.056	0.056	-	-	-	-	0.049	-	-
6	-	0.051	-	-	-	0.051	-	0.044	-	-	-	-	-
8	-	-	-	-	-	0.052	-	-	-	-	-	-	0.04
9	-	-	0.050	-	-	0.050	-	-	-	0.047	-	-	-
10	-	-	0.041	-	-	0.041	-	-	-	0.042	-	-	-
11	-	-	-	0.05	-	0.05	-	-	-	-	0.05	-	-
13	-	-	-	0.05	-	0.05	-	-	-	-	-	0.05	-
14	-	-	-	-	-	-	-	-	0.032	-	-	-	-
MEAN	.0480	.0510	.0455	.0500	.0560	.0498	.0450	.0440	.0320	.0445	.0497	.0500	.0400
STD DEV	-	-	.0064	.0000	-	.0042	-	-	-	.0035	.0006	-	-
REL STD	-	-	14.0	-1.0	-	8.5	-	-	-	7.9	1.2	-	-
DES VAL	-	-	-	-	-	.054	-	-	-	-	-	-	-

LAB	25321 MN EXT ICP DA	25999 MANGNESE COMMON	26011 FE TOT 5X ICP	26104 FE DIS AAS DA	26111 FE DIS ICP DA	26304 FE EXT AAS DA	26311 FE EXT ICP DA	26321 FE EXT ICP DA	26999 IRON COMMON	27009 CO TOT 5X ICP	27011 CO TOT 5X ICP	27111 CO DIS ICP DA	27301 CO EXT AAS DA
1	-	0.045	-	-	-	-	-	-	-	0.215	-	-	-
2	-	0.05	-	-	-	0.27	-	-	0.27	-	-	-	-
3	0.048	0.049	-	-	-	0.255	-	0.256	0.255	-	-	-	-
6	-	0.044	0.26	-	-	-	-	-	0.26	-	0.20	-	-
8	-	0.04	-	-	-	-	0.22	-	0.22	-	-	-	0.23
9	-	0.047	-	-	0.25	-	-	-	0.25	-	-	0.22	-
10	-	0.042	-	-	0.224	-	-	-	0.224	-	-	0.196	-
11	-	0.05	-	-	-	0.24	-	-	0.24	-	-	-	0.21
13	-	0.05	-	-	-	0.40 R	-	-	0.40 R	-	-	-	-
14	-	0.032	-	0.199	-	-	-	-	0.199	-	-	-	-
MEAN	.0480	.0449	.2600	.1990	.2370	.2550	.2200	.2560	.2398	.2150	.2000	.2080	.2200
STD DEV	-	.0058	-	-	.0184	.0150	-	-	.0238	-	-	.0170	.0141
REL STD	-	12.8	-	-	7.8	5.9	-	-	9.9	-	-	8.2	6.4
DES VAL	-	.046	-	-	-	-	-	-	.251	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 25 PP 65 SAMPLE 1

LAB	27321 CO EXT ICP DA	27999 COBALT COMMON	28009 NI TOT 5X ICP	28011 NI TOT 5X ICP	28111 NI DIS ICP DA	28301 NI EXT AAS DA	28311 NI EXT ICP DA	28321 NI EXT ICP DA	28999 NICKEL COMMON	29009 CU TOT 5X ICP	29011 CU TOT 5X ICP	29106 CU DIS AAS DA	29111 CU DIS ICP DA
1	-	0.215	0.255	-	-	-	-	-	0.255	0.040	-	-	-
3	0.226	0.226	-	-	-	-	-	0.272	0.272	-	-	-	-
6	-	0.20	-	0.22	-	-	-	-	0.22	-	0.049	-	-
8	-	0.23	-	-	-	-	0.22	-	0.22	-	-	-	-
9	-	0.22	-	-	0.26	-	-	-	0.26	-	-	-	0.048
10	-	0.196	-	-	0.232	-	-	-	0.232	-	-	-	0.045
11	-	0.21	-	-	-	0.27	-	-	0.27	-	-	-	-
13	-	-	-	-	-	0.25	-	-	0.25	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	0.082R	-
MEAN	.2260	.2139	.2550	.2200	.2460	.2600	.2200	.2720	.2474	.0400	.0490	-	.0465
STD DEV	-	.0127	-	-	.0198	.0141	-	-	.0210	-	-	-	.0021
REL STD	-	6.0	-	-	8.0	5.4	-	-	8.5	-	-	-	4.6
DES VAL	-	.231	-	-	-	-	-	-	.267	-	-	-	-

LAB	29306 CU EXT AAS DA	29311 CU EXT ICP DA	29321 CU EXT ICP DA	29999 COPPER COMMON	30009 ZN TOT 5X ICP	30011 ZN TOT 5X ICP	30104 ZN DIS AAS DA	30111 ZN DIS ICP DA	30304 ZN EXT AAS DA	30311 ZN EXT ICP DA	30321 ZN EXT ICP DA	30999 ZINC COMMON	38011 SR TOT ICP DA
1	-	-	-	0.040	0.054	-	-	-	-	-	-	0.054	-
2	0.04	-	-	0.04	-	-	-	-	0.05	-	-	0.05	-
3	-	-	0.047	0.047	-	-	-	-	-	-	0.058	0.058	-
6	-	-	-	0.049	-	0.050	-	-	-	-	-	0.050	0.06 R
8	-	0.04	-	0.04	-	-	-	-	-	0.05	-	0.05	-
9	-	-	-	0.048	-	-	-	0.055	-	-	-	0.055	-
10	-	-	-	0.045	-	-	-	0.051	-	-	-	0.051	-
11	0.04	-	-	0.04	-	-	-	-	0.05	-	-	0.05	-
13	0.06	-	-	0.06	-	-	-	-	0.05	-	-	0.05	-
14	-	-	-	0.082R	-	-	0.066R	-	-	-	-	0.066R	-
MEAN	.0467	.0400	.0470	.0454	.0540	.0500	-	.0530	.0500	.0500	.0580	.0520	-
STD DEV	.0115	-	-	.0066	-	-	-	.0028	.0000	-	-	.0030	-
REL STD	24.7	-	-	14.6	-	-	-	5.3	.0	-	-	5.7	-
DES VAL	-	-	-	.047	-	-	-	-	-	-	-	.056	-

LAB	38111 SR DIS ICP DA	38321 SR EXT ICP DA	38999 STRNTIUM COMMON	42009 MO TOT 5X ICP	42011 MO TOT 5X ICP	42111 MO DIS ICP DA	42121 MO EXT ICP DA	42999 MOLYBNUM COMMON	48009 CD TOT 5X ICP	48011 CD TOT 5X ICP	48111 CD DIS ICP DA	48301 CD EXT AAS DA	48321 CD EXT ICP DA
1	-	-	-	0.815	-	-	-	0.815	0.038	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	0.04	-
3	-	0.173	0.173	-	-	-	0.93	0.93	-	-	-	-	0.040
6	-	-	0.06 R	-	0.83	-	-	0.83	-	0.042	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	0.04	-
9	0.17	-	0.17	-	-	0.86	-	0.86	-	-	0.040	-	-
10	-	-	-	-	-	0.82	-	0.82	-	-	0.036	-	-
11	-	-	-	-	-	-	-	-	-	-	-	0.04	-
13	-	-	-	-	-	-	-	-	-	-	-	0.05	-
MEAN	.1700	.1730	.1715	.8150	.8300	.8400	.9300	.8510	.0380	.0420	.0380	.0425	.0400
STD DEV	-	-	.0021	-	-	.0283	-	.0475	-	-	.0028	.0050	-
REL STD	-	-	1.2	-	-	3.4	-	5.6	-	-	7.4	11.8	-
DES VAL	-	-	.166	-	-	-	-	.896	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 25 PP 65 SAMPLE 1

LAB	48999 CADMIUM COMMON	56009 BA TOT 5X ICP	56011 BA TOT 5X ICP	56111 BA DIS ICP DA	56301 BA EXT AAS DA	56321 BA EXT ICP DA	56999 BARIUM COMMON	82011 PB TOT 5X ICP	82101 PB DIS AAS DA	82111 PB DIS ICP DA	82301 PB EXT AAS DA	82302 PB EXT AAS SE	82311 PB EXT ICP DA
1	0.038	0.445	-	-	-	-	0.445	-	-	-	-	0.252	-
2	0.04	-	-	-	-	-	-	-	-	-	0.28	-	-
3	0.040	-	-	-	0.456	0.459	0.456	-	-	-	-	-	-
6	0.042	-	0.52	-	-	-	0.52	0.26	-	-	-	-	-
8	0.04	-	-	-	-	-	-	-	-	-	-	-	0.23
9	0.040	-	-	0.45	-	-	0.45	-	-	0.28	-	-	-
10	0.036	-	-	0.42	-	-	0.42	-	-	0.211	-	-	-
11	0.04	-	-	-	-	-	-	-	-	-	0.26	-	-
13	0.05	-	-	-	-	-	-	-	-	-	0.3	-	-
14	-	-	-	-	-	-	-	-	0.446R	-	-	-	-
MEAN	.0407	.4450	.5200	.4350	.4560	.4590	.4582	.2600	-	.2455	.2800	.2520	.2300
STD DEV	.0039	-	-	.0212	-	-	.0372	-	-	.0488	.0200	-	-
REL STD	9.5	-	-	4.9	-	-	8.1	-	-	19.9	7.1	-	-
DES VAL	.042	-	-	-	-	-	.454	-	-	-	-	-	-

LAB	82321 PB EXT ICP DA	82999 LEAD COMMON
1	-	0.252
2	-	0.28
3	0.282	0.282
6	-	0.26
8	-	0.23
9	-	0.28
10	-	0.211
11	-	0.26
13	-	0.3
14	-	0.446R
MEAN	.2820	.2617
STD DEV	-	.0279
REL STD	-	10.7
DES VAL	-	.275

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 25 PP 65 SAMPLE 2

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS	00125 SUM OF ANIONS	02011 COLOUR APPARE	02021 COLOUR VIS COM	02023 COLOUR SPECT	02024 COL TRU SPECT	02040 COLOUR COMMON	02041 CONDUCT SPEC 25	02060 CONDUCT COMMON	02073 TURB HACH	02074 TURB NPLMTRI	02077 TURB HACH FZ
1	+1.42	1.07	1.04	-	-	-	4.	4.	96.	96.	0.1 L	-	-
2	+2.40	0.940	0.896	5. L	-	-	-	5. L	94.	94.	0.2	-	-
3	-0.29	0.939	0.944	5. L	-	-	-	5. L	96.0	96.0	0.1	-	-
4	-	-	-	-	5. L	-	-	5. L	94.8	94.8	-	-	-
5	+1.06	0.958	0.938	10.	-	-	-	10.	96.7	96.7	0.12	-	-
6	+4.86	0.97	0.88	-	-	-	-	-	96.	96.	-	0.11	-
7	+0.2	0.93	0.93	6.	-	-	-	6.	94.0	94.0	0.16	-	-
8	+1.23	0.948	0.925	5. L	-	-	-	5. L	94.0	94.0	-	0.13	-
9	-1.0	0.98	1.00	-	-	-	-	-	99.	99.	-	-	-
10	-1.97	0.901	0.938	-	-	2.0	-	2.0	92.	92.	-	0.2	-
11	-	-	-	5. L	-	-	-	5. L	94.	94.	-	-	0.2
12	+2.2	0.977	0.935	-	5. L	-	-	5. L	100.	100.	0.3	-	-
13	-	-	-	-	-	-	-	-	112. R	112. R	-	-	-
14	-	-	-	-	-	-	-	-	96.4	96.4	-	-	-
MEAN	1.2344	.9613	.9426	8.0000	-	2.0000	4.0000	5.5000	95.6077	95.6077	.1760	.1467	.2000
STD DEV	1.9093	.0450	.0465	2.8284	-	-	-	3.4157	2.1812	2.1812	.0792	.0473	-
REL STD	154.7	4.7	4.9	35.4	-	-	-	62.1	2.3	2.3	45.0	32.2	-
DES VAL	-	-	-	-	-	-	-	3.793	-	94.106	-	-	-

LAB	02081 TURB RATIO	02090 TURBIDTY COMMON	05105 BORON AA CARM	05106 BORON F AZOMETH	05111 BORON F ICP DA	05190 BORON COMMON	06101 DOC IR /DIF	06104 DOC UV CO2 IR	06107 DOC UV CO2 PHE	06109 DOC UV CO2 OH	06150 D O C COMMON	06151 DIC IR COMBUST	06152 DIC UV CO2 IR
1	-	0.1 L	-	-	-	-	-	-	1.0	-	1.0	-	-
2	-	0.2	-	-	-	-	-	-	1.6	-	1.6	-	-
3	-	0.1	-	-	-	-	-	1.4	-	-	1.4	-	9.8
4	0.21	0.21	0.04	-	-	0.04	-	1.5	-	-	1.5	-	10.
5	-	0.12	-	-	-	-	-	-	-	-	-	-	-
6	-	0.11	-	-	-	-	-	1.5	-	-	1.5	-	-
7	-	0.16	-	-	-	-	-	-	-	-	-	-	-
8	-	0.13	-	0.05 L	-	0.05 L	HDL -	-	-	-	-	-	-
10	-	0.2	-	-	0.01	0.01	-	-	-	1.0	1.0	-	-
11	-	0.2	-	-	-	-	5.1 R	-	-	-	5.1 R	-	-
12	-	0.3	-	-	-	-	0.5 L	-	-	-	0.5 L	11.2	-
MEAN	.2100	.1730	.0400	-	.0100	.0250	-	1.4667	1.3000	1.0000	1.3333	11.2000	9.9000
STD DEV	-	.0613	-	-	-	.0212	-	.0577	.4243	-	.2658	-	.1414
REL STD	-	35.4	-	-	-	84.9	-	3.9	32.6	-	19.9	-	1.4
DES VAL	-	.187	-	-	-	.033	-	-	-	-	1.274	-	-

LAB	06154 DIC AA CO2 PHE	06159 DIC AA CO2 OH	06180 DIC CALC'D	06490 D I C COMMON	07010 TKN AA SAL	07015 TKN DIG BERTHEL	07016 TKN BLK AMM-SAL	07018 TKN BLK INDOPHE	07021 TKN BLK DIG BER	07090 TKN COMMON	07105 NO3+NO2 DIS AA	07109 NO3+NO2 AA HYD	07110 NO3+NO2 AA2 CD
1	9.3	-	-	9.3	-	-	-	-	0.100	0.100	0.29	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	0.28
3	-	-	-	9.8	0.057	-	-	-	-	0.057	-	-	-
4	-	-	-	10.	-	-	-	-	-	-	-	-	0.28
5	-	-	-	-	-	-	-	-	-	-	-	-	0.300
6	-	-	-	-	-	-	0.2 R	-	-	0.2 R	-	0.30	-
8	-	-	-	-	-	0.20 L	-	-	-	0.20 L	-	-	0.27
9	-	-	-	-	-	-	-	-	-	-	-	0.26	-
10	-	9.9	-	9.9	-	-	-	-	-	-	-	0.270	-
11	-	-	9.7	9.7	-	-	-	-	-	-	-	-	0.22
12	-	-	-	11.2	-	-	-	0.07	-	0.07	-	-	0.29
13	-	-	-	-	-	-	-	-	-	-	-	-	0.35 R
14	-	-	-	-	-	-	-	-	-	-	-	-	0.25
MEAN	9.3000	9.9000	9.7000	9.9833	.0570	-	-	.0700	.1000	.0757	.2900	.2767	.2700
STD DEV	-	-	-	.6432	-	-	-	-	-	.0221	-	.0208	.0271
REL STD	-	-	-	6.4	-	-	-	-	-	29.1	-	7.5	10.0
DES VAL	-	-	-	9.909	-	-	-	-	-	.075	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 25 PP 65 SAMPLE 2

LAB	07112 NO3+NO2 UF AA CD	07390 NITRATE COMMON	07505 NH3 TOT AA BERT	07540 NH3 TOT AA SAL	07555 NH3 DIS AA PHEN	07557 NH3 DIS AA INDO	07562 NH3 DIS AA EDTA	07563 NH3 DIS AA INDO	07590 AMMONIA COMMON	07601 T N UV AA SUL	07602 T N CALC'D	07605 T N UV HY SUL	07651 T N DIS UV AA
1	-	0.29	-	-	-	-	0.006	-	0.006	-	-	-	-
2	-	0.28	-	-	-	-	-	-	-	0.31	-	-	-
3	0.298	0.298	0.004	-	-	-	-	-	0.004	-	-	-	-
4	-	0.28	-	0.005L	-	-	-	-	0.005L	-	-	-	0.37
5	-	0.300	-	-	-	0.002L	-	-	0.002L	-	-	-	-
6	-	0.30	-	-	-	0.01 L	-	-	0.01 L	-	-	-	-
7	0.27	0.27	-	-	-	-	-	-	-	-	-	-	-
8	-	0.27	-	-	0.003	-	-	-	0.003	-	0.47 L	-	-
9	-	0.26	-	-	-	-	-	-	-	-	-	-	-
10	-	0.270	-	-	0.010L	-	-	-	0.010L	-	-	0.35	-
11	-	0.22	-	0.007L	-	-	-	-	0.007L	-	-	-	-
12	-	0.29	-	-	-	-	-	0.005L	0.005L	-	0.36	-	-
13	-	0.35 R	-	0.1 L	-	-	-	-	0.1 L	-	-	-	-
14	-	0.25	-	-	-	-	-	-	-	-	-	-	-
MEAN	.2840	.2752	.0040	-	.0030	-	.0060	-	.0043	.3100	.3600	.3500	.3700
STD DEV	.0198	.0228	-	-	-	-	-	-	.0015	-	-	-	-
REL STD	7.0	8.3	-	-	-	-	-	-	35.3	-	-	-	-
DES VAL	-	.302	-	-	-	-	-	-	.003	-	-	-	-

LAB	07655 T N DIS UV EDTA	07690 TOT N COMMON	07790 T N DIS COMMON	09103 F DIS COL SP	09105 F DIS SP EL	09106 F DIS EL POT	09107 F DIS AUT POT	09108 F DIS SP EL	09115 F DIS AA ALIZ	09190 FLUORIDE COMMON	10101 ALKLNTY TITR'N	10108 ALKLNTY POT TIT	10109 ALKLNTY POT TIT
1	-	-	-	-	-	-	0.05 L	-	-	0.05 L	44.	-	-
2	-	-	0.31	-	-	0.05 L	-	-	-	0.05 L	38.4	-	-
3	-	-	-	-	-	-	-	0.04	-	0.04	-	-	-
4	-	-	0.37	-	-	-	-	-	-	-	39.9	-	-
5	0.310	-	0.310	-	-	0.05 L	-	-	-	0.05 L	40.6	-	-
6	-	-	-	0.1 L	-	-	-	-	-	0.1 L	-	-	44.
7	-	-	-	-	-	-	-	-	-	-	39.4	-	-
8	-	0.47 L	-	-	0.05 L	-	-	-	-	0.05 L	-	-	40.0
9	-	-	-	-	-	-	-	-	0.10 L	0.10 L	-	44.	-
10	-	-	0.35	-	-	-	-	-	0.04 L	0.04 L	-	-	-
11	-	-	-	-	0.05 L	-	-	-	-	0.05 L	43.	-	-
12	-	0.36	-	-	0.10 L	-	-	-	-	0.10 L	40.3	-	-
13	-	-	-	-	-	-	-	-	-	-	45.	-	-
14	-	-	-	-	-	-	-	-	-	-	44.1	-	-
MEAN	.3100	.3600	.3350	-	-	-	-	.0400	-	.0400	41.6333	44.0000	42.0000
STD DEV	-	-	.0300	-	-	-	-	-	-	-	2.4026	-	2.8284
REL STD	-	-	9.0	-	-	-	-	-	-	-	5.8	-	6.7
DES VAL	-	.368	.330	-	-	-	-	-	-	.051	-	-	-

LAB	10111 ALKLNTY TIT PRO	10112 ALKLNTY TIT CON	10190 ALKLINTY COMMON	10301 PH	10390 PH COMMON	10602 HARDNSS CALC'D	10603 HARDNSS TITR'N	10606 HARDNSS CALC'D	10690 HARDNESS COMMON	11005 NA TOT ICP	11102 NA F AAS	11103 NA DIS FL PH	11105 NA DIS AAS DA
1	-	-	44.	7.7	7.7	51.	-	-	51.	-	-	1. L	-
2	-	-	38.4	7.7	7.7	43.6	-	-	43.6	-	-	1.3	-
3	39.0	-	39.0	6.69	6.69	-	-	43.6	43.6	-	-	-	-
4	-	-	39.9	7.91	7.91	-	-	-	-	-	-	-	-
5	-	-	40.6	6.74	6.74	44.8	-	-	44.8	-	-	1.2	-
6	-	-	44.	7.2	7.2	-	46.	-	46.	-	1.	-	-
7	-	-	39.4	7.9	7.9	-	45.7	-	45.7	-	-	-	1.15
8	-	-	40.0	7.80	7.80	44.2	-	-	44.2	-	-	-	-
9	-	-	44.	7.53	7.53	45.	-	-	45.	1.2	-	-	-
10	-	41.	41.	7.94	7.94	-	-	-	-	1.31	-	-	-
11	-	-	43.	6.8	6.8	37.	-	-	37.	-	1.2	-	-
12	-	-	40.3	7.8	7.8	45.2	-	-	45.2	-	-	1.3	-
13	-	-	45.	7.3	7.3	41.3	-	-	41.3	-	1.8	-	-
14	-	-	44.1	7.68	7.68	-	-	-	-	2.1 R	-	-	-
MEAN	39.0000	41.0000	41.6214	7.4779	7.4779	44.0125	45.8500	43.6000	44.3091	1.2550	1.3333	1.2667	1.1500
STD DEV	-	-	2.2767	.4525	.4525	3.9383	.2121	-	3.3848	.0778	.4163	.0577	-
REL STD	-	-	5.5	6.1	6.1	8.9	.5	-	7.6	6.2	31.2	4.6	-
DES VAL	-	-	41.154	-	7.678	-	-	-	44.748	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 25 PP 65 SAMPLE 2

LAB	11107 NA UF FL PH	11311 NA EXT ICP	11990 SODIUM COMMON	12005 MG TOT ICP	12101 MG DIS CALC'D	12102 MG DIS AAS DA	12106 MG UF AAS DA	12107 MG DIS AAS AUT	12111 MG DIS ICP	12303 MG UF AAS AUT	12311 MG EXT ICP	12990 MGNESIUM COMMON	14102 SILICA ANSA AA
1	-	-	1. L	-	-	-	-	-	-	2.7	-	2.7	-
2	-	-	1.3	-	-	-	-	2.7	-	-	-	2.7	2.36
3	1.27	-	1.27	-	-	-	2.7	-	-	-	-	2.7	-
5	-	-	1.2	-	-	2.76	-	-	-	-	-	2.76	-
6	-	-	1.	-	3.4 R	-	-	-	-	-	-	3.4 R	-
7	-	-	1.15	-	-	2.58	-	-	-	-	-	2.58	-
8	-	1.19	1.19	-	-	-	-	-	-	-	2.91	2.91	-
9	-	-	1.2	3.0	-	-	-	-	-	-	-	3.0	-
10	-	-	1.31	2.68	-	-	-	-	-	-	-	2.68	-
11	-	-	1.2	-	-	2.8	-	-	-	-	-	2.8	-
12	-	-	1.3	-	-	-	-	-	2.85	-	-	2.85	-
13	-	-	1.8	-	-	-	2.81	-	-	-	-	2.81	-
14	-	-	2.1 R	-	-	2.8	-	-	-	-	-	2.8	-
MEAN	1.2700	1.1900	1.2655	2.8400	-	2.7350	2.7550	2.7000	2.8500	2.7000	2.9100	2.7742	2.3600
STD DEV	-	-	.1981	.2263	-	.1050	.0778	-	-	-	-	.1133	-
REL STD	-	-	15.7	8.0	-	3.8	2.8	-	-	-	-	4.1	-
DES VAL	-	-	1.278	-	-	-	-	-	-	-	-	2.753	-

LAB	14105 SILICA MOLY AA	14106 SILICA MOLY	14107 SILICA MOLY AA	14111 SILICA ICP DA	14190 SILICA COMMON	15313 T P ACL AA SNCL	15401 T P UV AA ASC	15406 T P UF AA ASC	15409 T P BLK AA ASC	15413 T P ACL AA SNCL	15421 T P BLK DIG ASC	15490 TOT P COMMON	16304 SO4 DIS AUTO BA
1	-	-	2.6	-	2.6	-	-	-	-	-	0.006L	0.006L	-
2	-	-	-	-	2.36	-	-	-	-	0.001L	-	0.001L	3.3
3	-	2.38	-	-	2.38	-	-	-	-	0.002	-	0.002	-
4	-	-	-	-	-	-	-	0.003L	-	-	-	0.003L	-
5	1.9	-	-	-	1.9	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	0.02 R	-	-	0.02 R	10. L
7	-	-	-	-	-	-	-	0.012R	-	-	-	0.012R	-
8	2.0	-	-	-	2.0	-	-	-	-	0.001L	-	0.001L	-
9	-	-	-	2.35	2.35	-	-	-	-	-	-	-	-
10	2.2	-	-	-	2.2	-	0.010L	-	-	-	-	0.010L	-
11	-	-	-	-	-	0.007	-	-	-	-	-	0.007	-
12	2.4	-	-	-	2.4	-	-	0.003L	-	-	-	0.003L	-
MEAN	2.1250	2.3800	2.6000	2.3500	2.2738	.0070	-	-	-	.0020	-	.0045	3.3000
STD DEV	.2217	-	-	-	.2290	-	-	-	-	-	-	.0035	-
REL STD	10.4	-	-	-	10.1	-	-	-	-	-	-	78.6	-
DES VAL	-	-	-	-	2.385	-	-	-	-	-	-	.004	-

LAB	16306 SO4 DIS AA MTB	16307 SO4 UF AA MTB	16309 SO4 DIS I C	16310 SO4 DIS AA CALM	16990 SULFATE COMMON	17203 CL DIS AA FE	17204 CL DIS AG TIT	17206 CL DIS AA AG	17208 CL DIS AA AG	17209 CL DIS I C	17210 CL DIS TIT CON	17990 CHLORIDE COMMON	19005 K TOT ICP
1	5. L	-	-	-	5. L HDL	1.	-	-	-	-	-	1.	-
2	-	-	3.1	-	3.1	-	-	-	-	1.2	-	1.2	-
3	-	2.8	-	-	2.8	-	-	-	1.2	-	-	1.2	-
5	3.3	-	-	-	3.3	-	-	1.3	-	-	-	1.3	-
6	-	-	-	-	1.0 L HDL	-	2. L	-	-	-	-	2. L HDL	-
7	4.1	-	-	-	4.1	1.27	-	-	-	-	-	1.27	-
8	3.18	-	-	-	3.18	-	-	1.40	-	-	-	1.40	-
9	-	-	3.3	-	3.3	-	-	-	-	1.1	-	1.1	0.5
10	-	-	-	3.0	3.0	-	-	-	-	-	1.3	1.3	0.46
11	-	4.0	-	-	4.0	-	-	1.0	-	-	-	1.0	-
12	3.6	-	-	-	3.6	-	-	1.2	-	-	-	1.2	-
13	3.0	-	-	-	3.0	-	-	1.	-	-	-	1.	-
14	-	-	3.1	-	3.1	-	-	-	-	1.04	-	1.04	0.45
MEAN	3.4360	3.4000	3.1667	3.0000	3.3164	1.1350	-	1.1800	1.2000	1.1133	1.3000	1.1675	.4700
STD DEV	.4307	.8485	.1155	-	.4173	.1909	-	.1789	-	.0808	-	.1375	.0265
REL STD	12.5	25.0	3.6	-	12.6	16.8	-	15.2	-	7.3	-	11.8	5.6
DES VAL	-	-	-	-	3.270	-	-	-	-	-	-	1.273	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 25 PP 65 SAMPLE 2

LAB	19102 K DIS AAS	19103 K DIS FLM PH	19106 K DIS AAS LI	19107 K DIS FLM PH	19301 K EXT HNO3 AA	19990 PTASSIUM COMMON	20005 CA TOT ICP	20100 CA DIS CALC'D	20103 CA DIS AAS	20108 CA DIS AAS UF	20110 CA DIS AAS AUT	20111 CA DIS ICP	20311 CA EXT ICP
1	-	0.4	-	-	-	0.4	-	-	-	-	15.9	-	-
2	-	0.49	-	-	-	0.49	-	-	-	-	13.0	-	-
3	-	-	-	0.47	-	0.47	-	-	-	13.0	-	-	-
5	-	0.4	-	-	-	0.4	-	-	13.4	-	-	-	-
6	0.4	-	-	-	-	0.4	-	12.8	-	-	-	-	-
7	0.39	-	-	-	-	0.39	-	-	13.2	-	-	-	-
8	-	-	-	-	0.51	0.51	-	-	-	-	-	-	12.9
9	-	-	-	-	-	0.5	13.4	-	-	-	-	-	-
10	-	-	-	-	-	0.46	12.27	-	-	-	-	-	-
11	-	-	0.4	-	-	0.4	-	-	10.	-	-	-	-
12	-	0.5	-	-	-	0.5	-	-	-	-	-	13.5	-
13	0.52	-	-	-	-	0.52	-	-	-	11.9	-	-	-
14	-	-	-	-	-	0.45	14.5	-	-	-	-	-	-
MEAN	.4367	.4475	.4000	.4700	.5100	.4531	13.3900	12.8000	12.2000	12.4500	14.4500	13.5000	12.9000
STD DEV	.0723	.0550	-	-	-	.0492	1.1150	-	1.9079	.7778	2.0506	-	-
REL STD	16.6	12.3	-	-	-	10.9	8.3	-	15.6	6.2	14.2	-	-
DES VAL	-	-	-	-	-	.486	-	-	-	-	-	-	-

LAB	20990 CALCIUM COMMON
1	15.9
2	13.0
3	13.0
5	13.4
6	12.8
7	13.2
8	12.9
9	13.4
10	12.27
11	10.
12	13.5
13	11.9
14	14.5
MEAN	13.0592
STD DEV	1.3545
REL STD	10.4
DES VAL	12.664

DATA SUMMARY

FEDERAL-PROVINCIAL & PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAMS

STUDY NO. FP 26 PP 66 DATE: 01/02/88 DUE DATE: 29/01/88

SAMPLE 3 SPIKED SAMPLE. TRACE METALS S/E. (IN 0.2% HNO3)

LAB	13009 AL TOT 5X ICP	13105 AL DIS AAS GF	13111 AL DIS ICP DA	13302 AL EXT AAS DA	13305 AL EXT AAS SE	13306 AL UF AAS OX	13999 ALUMINUM COMMON	23002 V TOT AAS SE	23003 V EXT AAS GF	23009 V TOT 5X ICP	23011 V TOT 5X ICP	23111 V DIS ICP DA	23999 VANADIUM COMMON
1	-	-	-	-	-	0.044	0.044	-	-	0.004	-	-	0.004
2	-	-	-	-	0.031	-	0.031	-	-	-	-	-	-
3	0.037	-	-	-	0.033	-	0.033	0.005	-	0.005	-	-	0.005
6	0.010R	-	-	-	-	-	0.010R	-	-	-	0.010L	-	0.010L HDL
8	-	-	-	0.2 L	-	-	0.2 L HDL	-	-	-	-	-	-
9	-	-	0.02 R	-	-	-	0.02 R	-	-	-	-	0.005	0.005
10	-	-	0.04	-	-	-	0.04	-	-	-	-	0.005L	0.005L
12	-	0.035	-	-	-	-	0.035	-	-	-	-	-	-
14	-	0.057	-	-	-	-	0.057	-	0.004	-	-	-	0.004
MEAN	.0370	.0460	.0400	-	.0320	.0440	.0400	.0050	.0040	.0045	-	.0050	.0045
STD DEV	-	.0156	-	-	.0014	-	.0096	-	-	.0007	-	-	.0006
REL STD	-	33.8	-	-	4.4	-	24.0	-	-	15.7	-	-	12.8
DES VAL	-	-	-	-	-	-	.041	-	-	-	-	-	.005

LAB	24003 CR TOT AAS SE	24004 CR TOT AAS GF	24009 CR TOT 5X ICP	24011 CR TOT 5X ICP	24056 CR DIS AAS GF	24111 CR DIS ICP DA	24303 CR EXT AAS SE	24999 CHROMIUM COMMON	25003 MN TOT AAS DA	25004 MN TOT 5X AAS	25010 MN TOT 5X ICP	25011 MN TOT 5X ICP	25107 MN DIS AAS GF
1	-	-	0.006	-	-	-	-	0.006	0.008L	-	-	-	-
3	0.006	-	0.006	-	-	-	-	0.006	-	0.005	0.006	-	-
6	-	-	-	0.011	-	-	-	0.011	-	-	-	0.005	-
8	-	0.006	-	-	-	-	-	0.006	-	-	-	-	-
9	-	-	-	-	-	0.007	-	0.007	-	-	-	-	-
10	-	-	-	-	-	0.006	-	0.006	-	-	-	-	-
11	-	-	-	-	-	-	0.005	0.005	-	-	-	-	-
12	-	-	-	-	0.007	-	-	0.007	-	-	-	-	0.005
14	-	-	-	-	-	-	-	-	-	-	-	-	0.005
MEAN	.0060	.0060	.0060	.0110	.0070	.0065	.0050	.0068	-	.0050	.0060	.0050	.0050
STD DEV	-	-	.0000	-	-	.0007	-	.0018	-	-	-	-	.0000
REL STD	-	-	-1.0	-	-	10.9	-	27.1	-	-	-	-	-1.0
DES VAL	-	-	-	-	-	-	-	.007	-	-	-	-	-

LAB	25111 MN DIS ICP DA	25304 MN EXT AAS DA	25311 MN EXT ICP DA	25999 MANGNESE COMMON	26005 FE TOT AAS SE	26009 FE TOT 5X ICP	26011 FE TOT 5X ICP	26107 FE DIS AAS GF	26111 FE DIS ICP DA	26305 FE EXT AAS SE	26311 FE EXT ICP DA	26999 IRON COMMON	27003 CO TOT AAS GF
1	-	-	-	0.008L	-	-	-	-	-	-	-	-	-
2	-	0.01 L	-	0.01 L	-	-	-	-	-	0.007	-	0.007	-
3	-	-	-	0.005	0.005	0.005	-	-	-	-	-	0.005	-
6	-	-	-	0.005	-	-	0.026R	-	-	-	-	0.026R	-
8	-	-	0.02 L	0.02 L HDL	-	-	-	-	-	-	0.18 R	0.18 R	0.005L
9	0.006	-	-	0.006	-	-	-	-	0.01 L	-	-	0.01 L	-
10	0.006	-	-	0.006	-	-	-	-	0.004	-	-	0.004 HDL	-
11	-	0.01 L	-	0.01 L	-	-	-	-	-	0.006	-	0.006	-
12	-	-	-	0.005	-	-	-	0.005	-	-	-	0.005	-
14	-	-	-	0.005	-	-	-	0.004	-	-	-	0.004	-
MEAN	.0060	-	-	.0053	.0050	.0050	-	.0045	.0040	.0065	-	.0052	-
STD DEV	.0000	-	-	.0005	-	-	-	.0007	-	.0007	-	.0012	-
REL STD	-1.0	-	-	9.7	-	-	-	15.7	-	10.9	-	22.6	-
DES VAL	-	-	-	.007	-	-	-	-	-	-	-	.006	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 26 PP 66 SAMPLE 3

LAB	27009 CO TOT 5X ICP	27011 CO TOT 5X ICP	27107 CO DIS AAS GF	27111 CO DIS ICP DA	27302 CO EXT AAS SE	27999 COBALT COMMON	28002 NI TOT AAS SE	28009 NI TOT 5X ICP	28011 NI TOT 5X ICP	28107 NI DIS AAS GF	28111 NI DIS ICP DA	28302 NI EXT AAS SE	28309 NI EXT AAS GF
1	0.005	-	-	-	-	0.005	-	0.006	-	-	-	-	-
3	0.005	-	-	-	-	0.005	0.006	0.006	-	-	-	-	-
6	-	0.005	-	-	-	0.005	-	-	0.003	-	-	-	-
8	-	-	-	-	-	0.005 L?	-	-	-	-	-	-	0.006
9	-	-	-	0.01 L	-	0.01 L } HDL	-	-	-	-	0.01 L	-	-
10	-	-	-	0.007	-	0.007	-	-	-	-	0.010	-	-
11	-	-	-	-	0.005	0.005	-	-	-	-	-	0.006	-
12	-	-	0.005	-	-	0.005	-	-	-	0.006	-	-	-
MEAN	.0050	.0050	.0050	.0070	.0050	.0053	.0060	.0060	.0030	.0060	.0100	.0060	.0060
STD DEV	.0000	-	-	-	-	.0008	-	.0000	-	-	-	-	-
REL STD	-1.0	-	-	-	-	15.3	-	-1.0	-	-	-	-	-
DES VAL	-	-	-	-	-	.005	-	-	-	-	-	-	-

LAB	28999 NICKEL COMMON	29005 CU TOT AAS SE	29009 CU TOT 5X ICP	29011 CU TOT 5X ICP	29107 CU DIS AAS GF	29111 CU DIS ICP DA	29305 CU EXT AAS SE	29311 CU EXT ICP DA	29999 COPPER COMMON	30005 ZN TOT AAS SE	30009 ZN TOT 5X ICP	30011 ZN TOT 5X ICP	30107 ZN DIS AAS GF
1	0.006	-	0.007	-	-	-	-	-	0.007	-	0.007	-	-
2	-	-	-	-	-	-	0.007	-	0.007	-	-	-	-
3	0.006	0.007	0.005	-	-	-	-	-	0.007	0.007	0.005	-	-
6	0.003	-	-	0.010	-	-	-	-	0.010	-	-	0.005	-
8	0.006	-	-	-	-	-	-	0.01	0.01	-	-	-	-
9	0.01 L HDL	-	-	-	-	0.01 L	-	-	0.01 L HDL	-	-	-	-
10	0.010	-	-	-	-	0.008	-	-	0.008	-	-	-	-
11	0.006	-	-	-	-	-	0.007	-	0.007	-	-	-	-
12	0.006	-	-	-	0.007	-	-	-	0.007	-	-	-	0.006
14	-	-	-	-	0.006	-	-	-	0.006	-	-	-	0.004
MEAN	.0061	.0070	.0060	.0100	.0065	.0080	.0070	.0100	.0077	.0070	.0060	.0050	.0050
STD DEV	.0020	-	.0014	-	.0007	-	.0000	-	.0014	-	.0014	-	.0014
REL STD	33.1	-	23.6	-	10.9	-	-1.0	-	18.4	-	23.6	-	28.3
DES VAL	.006	-	-	-	-	-	-	-	.007	-	-	-	-

LAB	30111 ZN DIS ICP DA	30304 ZN EXT AAS DA	30305 ZN EXT AAS SE	30311 ZN EXT ICP DA	30999 ZINC COMMON	38009 SR TOT ICP DA	38011 SR TOT ICP DA	38111 SR DIS ICP DA	38999 STRNTIUM COMMON	42009 MO TOT 5X ICP	42011 MO TOT 5X ICP	42111 MO DIS ICP DA	42999 MOLYBNUM COMMON
1	-	-	-	-	0.007	-	-	-	-	0.006	-	-	0.006
2	-	0.01	-	-	0.01	-	-	-	-	-	-	-	-
3	-	-	-	-	0.007	0.166	-	-	0.166	0.007	-	-	0.007
6	-	-	-	-	0.005	-	0.05 R	-	0.05 R	-	0.009	-	0.009
8	-	-	-	0.01 L	0.01 L?	-	-	-	-	-	-	-	-
9	0.01 L	-	-	-	0.01 L } HDL	-	-	0.17	0.17	-	-	0.01 L	0.01 L HDL
10	0.007	-	-	-	0.007	-	-	-	-	-	-	0.005L	0.005L
11	-	-	0.007	-	0.007	-	-	-	-	-	-	-	-
12	-	-	-	-	0.006	-	-	-	-	-	-	-	-
14	-	-	-	-	0.004	-	-	-	-	-	-	-	-
MEAN	.0070	.0100	.0070	-	.0066	.1660	-	.1700	.1680	.0065	.0090	-	.0073
STD DEV	-	-	-	-	.0018	-	-	-	.0028	.0007	-	-	.0015
REL STD	-	-	-	-	26.7	-	-	-	1.7	10.9	-	-	20.8
DES VAL	-	-	-	-	.008	-	-	-	.164	-	-	-	.007

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 26 PP 66 SAMPLE 3

LAB	48002 CD TOT AAS SE	48004	48009 CD TOT 5X ICP	48011 CD TOT 5X ICP	48103 CD DIS AAS GF	48111 CD DIS ICP DA	48302 CD EXT AAS SE	48309 CD EXT AAS GF	48999 CADMIUM COMMON	56009 BA TOT 5X ICP	56011 BA TOT 5X ICP	56111 BA DIS ICP DA	56999 BARIUM COMMON
1	-	-	0.005	-	-	-	-	-	0.005	0.022	-	-	0.022
2	-	-	-	-	-	-	0.005	-	0.005	-	-	-	-
3	0.005	-	0.005	-	-	-	-	-	0.005	0.021	-	-	0.021
6	-	-	-	0.005	-	-	-	-	0.005	-	0.048R	-	0.048R
8	-	-	-	-	-	-	-	0.006	0.006	-	-	-	-
9	-	0.005	-	-	-	-	-	-	0.005	-	-	0.023	0.023
10	-	-	-	-	-	0.003	-	-	0.003	-	-	0.02	0.02
11	-	-	-	-	-	-	0.005	-	0.005	-	-	-	-
12	-	-	-	-	0.005	-	-	-	0.005	-	-	-	-
14	-	-	-	-	0.003	-	-	-	0.003	-	-	-	-
MEAN	.0050	.0050	.0050	.0050	.0040	.0030	.0050	.0060	.0047	.0215	-	.0215	.0215
STD DEV	-	-	.0000	-	.0014	-	.0000	-	.0009	.0007	-	.0021	.0013
REL STD	-	-	-1.0	-	35.4	-	-1.0	-	20.2	3.3	-	9.9	6.0
DES VAL	-	-	-	-	-	-	-	-	.005	-	-	-	.022

LAB	82002 PB TOT AAS SE	82004 PB TOT AAS GF	82009 PB TOT 5X ICP	82011 PB TOT 5X ICP	82104 PB DIS AAS GF	82302 PB EXT AAS SE	82309 PB EXT AAS GF	82999 LEAD COMMON
1	-	-	-	-	-	0.007	-	0.007
2	-	-	-	-	-	0.005	-	0.005
3	0.005	-	0.005	-	-	-	-	0.005
6	-	-	-	0.008	-	-	-	0.008
8	-	-	-	-	-	-	0.006	0.006
9	-	0.005	-	-	-	-	-	0.005
10	-	-	-	-	-	-	0.003	0.003
11	-	-	-	-	-	0.005	-	0.005
12	-	-	-	-	0.005	-	-	0.005
14	-	-	-	-	0.006	-	-	0.006
MEAN	.0050	.0050	.0050	.0080	.0055	.0057	.0045	.0055
STD DEV	-	-	-	-	.0007	.0012	.0021	.0014
REL STD	-	-	-	-	12.9	20.4	47.1	24.6
DES VAL	-	-	-	-	-	-	-	.005

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 26 PP 66 SAMPLE 4

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS	00125 SUM OF ANIONS	02011 COLOUR APPARE	02021 COLOUR VIS COM	02023 COLOUR SPECT	02024 COL TRU SPECT	02040 COLOUR COMMON	02041 CONDUCT SPEC 25	02060 CONDUCT COMMON	02073 TURB HACH	02074 TURB NPLMTRI	02077 TURB HACH FZ
1	-0.32	1.56	1.57	-	-	-	53.	53.	178.	178.	0.4	-	-
2	+1.47	1.603	1.557	40.	-	-	-	40.	175.	175.	0.3	-	-
3	-1.24	1.587	1.627	40.	-	-	-	40.	178.	178.	0.1	-	-
4	-	-	-	-	35.	-	-	35.	176.	176.	-	-	-
5	+1.03	1.60	1.57	40.	-	-	-	40.	173.	173.	0.19	-	-
6	+5.69	1.71	1.53	-	-	-	-	-	170.	170.	-	0.14	-
7	-1.3	1.54	1.58	52.	-	-	-	52.	176.5	176.5	0.25	-	-
8	+1.98	1.60	1.54	-	35.	-	-	35.	176.	176.	-	0.19	-
9	+2.4	1.71	1.63	-	-	-	-	-	174.	174.	-	-	-
10	+0.82	1.549	1.524	-	-	31.	-	31.	172.	172.	-	0.2	-
11	-	-	-	35.	-	-	-	35.	175.	175.	-	-	0.2
12	+3.1	1.653	1.553	-	30.	-	-	30.	180.	180.	0.4	-	-
13	-	-	-	-	-	-	-	-	188.	188.	-	-	-
14	-	-	-	-	-	-	-	-	178.	178.	-	-	-
MEAN	1.3630	1.6112	1.5681	41.4000	33.3333	31.0000	53.0000	39.1000	176.3929	176.3929	.2733	.1767	.2000
STD DEV	2.1164	.0612	.0365	6.3087	2.8868	-	-	7.8944	4.2706	4.2706	.1186	.0321	-
REL STD	155.3	3.8	2.3	15.2	8.7	-	-	20.2	2.4	2.4	43.4	18.2	-
DES VAL	-	-	-	-	-	-	-	44.000	-	161.583	-	-	-

LAB	02081 TURB RATIO	02090 TURBIDTY COMMON	05105 BORON AA CARM	05106 BORON F AZOMETH	05111 BORON F ICP DA	05190 BORON COMMON	06101 DOC IR /DIF	06104 DOC UV CO2 IR	06107 DOC UV CO2 PHE	06109 DOC UV CO2 OH	06150 D O C COMMON	06151 DIC IR COMBUST	06152 DIC UV CO2 IR
1	-	0.4	-	-	-	-	-	-	7.0	-	7.0	-	-
2	-	0.3	-	-	-	-	-	-	7.5	-	7.5	-	-
3	-	0.1	-	-	-	-	-	6.5	-	-	6.5	-	6.7
4	0.18	0.18	0.08	-	-	0.08	-	7.2	-	-	7.2	-	6.9
5	-	0.19	-	-	-	-	-	-	-	-	-	-	-
6	-	0.14	-	-	-	-	-	7.8	-	-	7.8	-	-
7	-	0.25	-	-	-	-	-	-	-	-	-	-	-
8	-	0.19	-	0.10	-	0.10	-	-	-	-	-	-	-
10	-	0.2	-	-	0.01	0.01	-	-	-	6.6	6.6	-	-
11	-	0.2	-	-	-	-	10.6 R	-	-	-	10.6 R	-	-
12	-	0.4	-	-	-	-	8.0	-	-	-	8.0	7.8	-
MEAN	.1800	.2318	.0800	.1000	.0100	.0633	8.0000	7.1667	7.2500	6.6000	7.2286	7.8000	6.8000
STD DEV	-	.0978	-	-	-	.0473	-	.6506	.3536	-	.5736	-	.1414
REL STD	-	42.2	-	-	-	74.6	-	9.1	4.9	-	7.9	-	2.1
DES VAL	-	.286	-	-	-	-	-	-	-	-	7.391	-	-

HCV

LAB	06154 DIC AA CO2 PHE	06159 DIC AA CO2 OH	06180 DIC CALC'D	06490 D I C COMMON	07010 TKN AA SAL	07015 TKN DIG BERTHEL	07016 TKN BLK AMM-SAL	07018 TKN BLK INDOPHE	07021 TKN BLK DIG BER	07090 TKN COMMON	07105 NO3+NO2 DIS AA	07109 NO3+NO2 AA HYD	07110 NO3+NO2 AA2 CD
1	5.8	-	-	5.8	-	-	-	-	0.246	0.246	0.23	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	0.12
3	-	-	-	6.7	0.233	-	-	-	-	0.233	-	-	-
4	-	-	-	6.9	-	-	-	-	-	-	-	-	0.21
5	-	-	-	-	-	-	-	-	-	-	-	-	0.230
6	-	-	-	-	-	-	0.3	-	-	0.3	-	0.24	-
8	-	-	-	-	-	0.25	-	-	-	0.25	-	-	0.20
9	-	-	-	-	-	-	-	-	-	-	-	0.18	-
10	-	7.0	-	7.0	-	-	-	-	-	-	-	0.225	-
11	-	-	9.5	9.5	-	-	-	-	-	-	-	-	0.18
12	-	-	-	7.8	-	-	-	0.21	-	0.21	-	-	0.22
13	-	-	-	-	-	-	-	-	-	-	-	-	0.30
MEAN	5.8000	7.0000	9.5000	7.2833	.2330	.2500	.3000	.2100	.2460	.2478	.2300	.2150	.2086
STD DEV	-	-	-	1.2608	-	-	-	-	-	.0331	-	.0312	.0543
REL STD	-	-	-	17.3	-	-	-	-	-	13.4	-	14.5	26.0
DES VAL	-	-	-	6.442	-	-	-	-	-	.250	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 26 PP 66

SAMPLE 4

LAB	07111 NO3+NO2 DIS SPEC	07112 NO3+NO2 UF AA CD	07390 NITRATE COMMON	07505 NH3 TOT AA BERT	07540 NH3 TOT AA SAL	07555 NH3 DIS AA PHEN	07557 NH3 DIS AA INDO	07562 NH3 DIS AA EDTA	07563 NH3 DIS AA INDO	07590 AMMONIA COMMON	07601 T N UV AA SUL	07602 T N CALC'D	07605 T N UV HY SUL
1	-	-	0.23	-	-	-	-	0.005	-	0.005	-	-	-
2	-	-	0.12	-	-	-	-	-	-	-	0.22	-	-
3	-	0.221	0.221	0.004	-	-	-	-	-	0.004	-	-	-
4	-	-	0.21	-	0.005L	-	-	-	-	0.005L	-	-	-
5	-	-	0.230	-	-	-	0.002L	-	-	0.002L	-	-	-
6	-	-	0.24	-	-	-	0.01 L	-	-	0.01 L	-	-	-
7	-	0.21	0.21	-	-	-	-	-	-	-	-	-	-
8	-	-	0.20	-	-	0.005	-	-	-	0.005	-	0.45	-
9	-	-	0.18	-	-	-	-	-	-	-	-	-	-
10	-	-	0.225	-	-	0.010L	-	-	-	0.010L	-	-	0.30
11	-	-	0.18	-	0.007L	-	-	-	-	0.007L	-	-	-
12	-	-	0.22	-	-	-	-	-	0.005L	0.005L	-	0.43	-
13	-	-	0.30	-	0.1 L	-	-	-	-	0.1 L	-	-	-
14	0.20	-	0.20	-	-	-	-	-	-	-	-	-	-
MEAN	.2000	.2155	.2119	.0040	-	.0050	-	.0050	-	.0047	.2200	.4400	.3000
STD DEV	-	.0078	.0395	-	-	-	-	-	-	.0006	-	.0141	-
REL STD	-	3.6	18.7	-	-	-	-	-	-	12.4	-	3.2	-
DES VAL	-	-	.217	-	-	-	-	-	-	.003	-	-	-

HDL

LAB	07651 T N DIS UV AA	07655 T N DIS UV EDTA	07690 TOT N COMMON	07790 T N DIS COMMON	09103 F DIS COL SP	09105 F DIS SP EL	09106 F DIS EL POT	09107 F DIS AUT POT	09108 F DIS SP EL	09115 F DIS AA ALIZ	09190 FLUORIDE COMMON	10101 ALKLNTY TITR'N	10108 ALKLNTY POT TIT
1	-	-	-	-	-	-	-	0.33	-	-	0.33	31.	-
2	-	-	-	0.22	-	-	0.33	-	-	-	0.33	27.5	-
3	-	-	-	-	-	-	-	-	0.37	-	0.37	-	-
4	0.40	-	-	0.40	-	-	-	-	-	-	-	28.3	-
5	-	0.314	-	0.314	-	-	0.284	-	-	-	0.284	28.8	-
6	-	-	-	-	0.3	-	-	-	-	-	0.3	-	-
7	-	-	-	-	-	-	-	-	-	-	-	28.5	-
8	-	-	0.45	-	-	0.32	-	-	-	-	0.32	-	-
9	-	-	-	-	-	-	-	-	-	0.30	0.30	-	32.
10	-	-	-	0.30	-	-	-	-	-	0.28	0.28	-	-
11	-	-	-	-	-	-	-	-	-	-	-	30.	-
12	-	-	0.43	-	-	0.34	-	-	-	-	0.34	28.5	-
13	-	-	-	-	-	-	-	-	-	-	-	30.	-
14	-	-	-	-	-	-	-	-	-	-	-	31.6	-
MEAN	.4000	.3140	.4400	.3085	.3000	.3300	.3070	.3300	.3700	.2900	.3171	29.3556	32.0000
STD DEV	-	-	.0141	.0737	-	.0141	.0325	-	-	.0141	.0290	1.3648	-
REL STD	-	-	3.2	23.9	-	4.3	10.6	-	-	4.9	9.1	4.6	-
DES VAL	-	-	.370	.337	-	-	-	-	-	-	.316	-	-

LAB	10109 ALKLNTY POT TIT	10111 ALKLNTY TIT PRO	10112 ALKLNTY TIT CON	10190 ALKLINTY COMMON	10301 PH	10390 PH COMMON	10602 HARDNSS CALC'D	10603 HARDNSS TITR'N	10606 HARDNSS CALC'D	10690 HARDNESS COMMON	11005 NA TOT ICP	11102 NA F AAS	11103 NA DIS FL PH
1	-	-	-	31.	7.4	7.4	55.	-	-	55.	-	-	9.
2	-	-	-	27.5	7.4	7.4	55.9	-	-	55.9	-	-	9.7
3	-	28.5	-	28.5	6.42	6.42	-	-	55.2	55.2	-	-	-
4	-	-	-	28.3	7.45	7.45	-	-	-	-	-	-	-
5	-	-	-	28.8	6.67	6.67	56.7	-	-	56.7	-	-	9.2
6	32.	-	-	32.	7.0	7.0	-	60.	-	60.	-	10.	-
7	-	-	-	28.5	7.7	7.7	-	57.5	-	57.5	-	-	-
8	28.0	-	-	28.0	7.30	7.30	56.1	-	-	56.1	-	-	-
9	-	-	-	32.	7.23	7.23	58.	-	-	58.	10.7	-	-
10	-	-	28.	28.	7.78	7.78	-	-	-	-	9.44	-	-
11	-	-	-	30.	6.6	6.6	45. R	-	-	45. R	-	9.4	-
12	-	-	-	28.5	7.6	7.6	57.9	-	-	57.9	-	-	9.6
13	-	-	-	30.	6.8	6.8	52.6	-	-	52.6	-	9.9	-
14	-	-	-	31.6	7.39	7.39	-	-	-	-	10.2	-	-
MEAN	30.0000	28.5000	28.0000	29.4786	7.1957	7.1957	56.0286	58.7500	55.2000	56.4900	10.1133	9.7667	9.3750
STD DEV	2.8284	-	-	1.5953	.4283	.4283	1.8563	1.7678	-	2.0322	.6345	.3215	.3304
REL STD	9.4	-	-	5.4	6.0	6.0	3.3	3.0	-	3.6	6.3	3.3	3.5
DES VAL	-	-	-	29.535	-	7.416	-	-	-	57.050	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 26 PP 66

SAMPLE 4

LAB	11105 NA DIS AAS DA	11107 NA UF FL PH	11311 NA EXT ICP	11990 SODIUM COMMON	12005 MG TOT ICP	12101 MG DIS CALC'D	12102 MG DIS AAS DA	12106 MG UF AAS DA	12107 MG DIS AAS AUT	12111 MG DIS ICP	12303 MG UF AAS AUT	12311 MG EXT ICP	12990 MGNESIUM COMMON
1	-	-	-	9.	-	-	-	-	-	-	3.	-	3.
2	-	-	-	9.7	-	-	-	-	3.4	-	-	-	3.4
3	-	9.46	-	9.46	-	-	-	3.4	-	-	-	-	3.4
5	-	-	-	9.2	-	-	3.39	-	-	-	-	-	3.39
6	-	-	-	10.	-	3.9	-	-	-	-	-	-	3.9
7	8.60	-	-	8.60	-	-	3.21	-	-	-	-	-	3.21
8	-	-	9.38	9.38	-	-	-	-	-	-	-	3.61	3.61
9	-	-	-	10.7	3.6	-	-	-	-	-	-	-	3.6
10	-	-	-	9.44	3.32	-	-	-	-	-	-	-	3.32
11	-	-	-	9.4	-	-	3.4	-	-	-	-	-	3.4
12	-	-	-	9.6	-	-	-	-	-	3.53	-	-	3.53
13	-	-	-	9.9	-	-	-	3.40	-	-	-	-	3.40
14	-	-	-	10.2	-	-	3.40	-	-	-	-	-	3.40
MEAN	8.6000	9.4600	9.3800	9.5831	3.4600	3.9000	3.3500	3.4000	3.4000	3.5300	3.0000	3.6100	3.4277
STD DEV	-	-	-	.5385	.1980	-	.0935	.0000	-	-	-	-	.2128
REL STD	-	-	-	5.6	5.7	-	2.8	-1.0	-	-	-	-	6.2
DES VAL	-	-	-	9.533	-	-	-	-	-	-	-	-	3.481

LAB	14102 SILICA ANSA AA	14105 SILICA MOLY AA	14106 SILICA MOLY	14107 SILICA MOLY AA	14111 SILICA ICP DA	14190 SILICA COMMON	15401 T P UV AA ASC	15406 T P UF AA ASC	15409 T P BLK AA ASC	15413 T P ACL AA SNCL	15421 T P BLK DIG ASC	15490 TOT P COMMON	16304 SO4 DIS AUTO BA
1	-	-	-	3.6	-	3.6	-	-	-	-	0.006L	0.006L	-
2	3.42	-	-	-	-	3.42	-	-	-	0.003	-	0.003	14.3
3	-	-	3.37	-	-	3.37	-	-	-	0.007	-	0.007	-
4	-	-	-	-	-	-	-	0.006	-	-	-	0.006	-
5	-	2.8	-	-	-	2.8	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	0.02 R	-	-	0.02 R	13.
7	-	-	-	-	-	-	-	0.019R	-	-	-	0.019R	-
8	-	2.9	-	-	-	2.9	-	-	-	0.007	-	0.007	-
9	-	-	-	-	3.42	3.42	-	-	-	-	-	-	-
10	-	3.3	-	-	-	3.3	0.010L	-	-	-	-	0.010L HDL	-
11	-	-	-	-	-	-	-	-	-	0.008	-	0.008	-
12	-	3.5	-	-	-	3.5	-	0.009	-	-	-	0.009	-
MEAN	3.4200	3.1250	3.3700	3.6000	3.4200	3.2888	-	.0075	-	.0063	-	.0067	13.6500
STD DEV	-	.3304	-	-	-	.2860	-	.0021	-	.0022	-	.0021	.9192
REL STD	-	10.6	-	-	-	8.7	-	28.3	-	35.5	-	31.0	6.7
DES VAL	-	-	-	-	-	3.450	-	-	-	-	-	.008	-

LAB	16306 SO4 DIS AA MTB	16307 SO4 UF AA MTB	16309 SO4 DIS I C	16310 SO4 DIS AA CALM	16990 SULFATE COMMON	17203 CL DIS AA FE	17204 CL DIS AG TIT	17206 CL DIS AA AG	17208 CL DIS AA AG	17209 CL DIS I C	17210 CL DIS TIT CON	17990 CHLORIDE COMMON	19005 K TOT ICP
1	13.	-	-	-	13.	23.	-	-	-	-	-	23.	-
2	-	-	13.1	-	14.3	-	-	-	-	23.8	-	23.8	-
3	-	13.5	-	-	13.5	-	-	-	23.8	-	-	23.8	-
5	13.8	-	-	-	13.8	-	-	24.0	-	-	-	24.0	-
6	-	-	-	-	13.	-	22.	-	-	-	-	22.	-
7	16.1	-	-	-	16.1	23.3	-	-	-	-	-	23.3	-
8	12.6	-	-	-	12.6	-	-	25.	-	-	-	25.	-
9	-	-	15.	-	15.	-	-	-	-	24.	-	24.	3.2
10	-	-	-	13.0	13.0	-	-	-	-	-	23.5	23.5	2.86
11	14.	-	-	-	14.	-	-	24.	-	-	-	24.	-
12	14.6	-	-	-	14.6	-	-	22.9	-	-	-	22.9	-
13	14.	-	-	-	14.	-	-	-	-	-	-	-	-
14	-	-	13.3	-	13.3	-	-	-	-	22.8	-	22.8	2.95
MEAN	14.0143	13.5000	13.8000	13.0000	13.8615	23.1500	22.0000	23.9750	23.8000	23.5333	23.5000	23.5083	3.0033
STD DEV	1.1379	-	1.0440	-	.9726	.2121	-	.8578	-	.6429	-	.7728	.1762
REL STD	8.1	-	7.6	-	7.0	.9	-	3.6	-	2.7	-	3.3	5.9
DES VAL	-	-	-	-	13.250	-	-	-	-	-	-	23.500	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 26 PP 66

SAMPLE 4

LAB	19102 K DIS AAS	19103 K DIS FLM PH	19106 K DIS AAS LI	19107 K DIS FLM PH	19301 K EXT HNO3 AA	19990 PTASSIUM COMMON	20005 CA TOT ICP	20100 CA DIS CALC'D	20103 CA DIS AAS	20108 CA DIS AAS UF	20110 CA DIS AAS AUT	20111 CA DIS ICP	20311 CA EXT ICP
1	-	2.7	-	-	-	2.7	-	-	-	-	17.	-	-
2	-	2.80	-	-	-	2.80	-	-	-	-	16.8	-	-
3	-	-	-	2.81	-	2.81	-	-	-	16.5	-	-	-
5	-	2.8	-	-	-	2.8	-	-	17.1	-	-	-	-
6	3.0	-	-	-	-	3.0	-	17.6	-	-	-	-	-
7	2.68	-	-	-	3.0	2.68	-	-	16.7	-	-	-	-
8	-	-	-	-	-	3.0	-	-	-	-	-	-	-
9	-	-	-	-	-	3.2	17.3	-	-	-	-	-	16.5
10	-	-	2.8	-	-	2.86	15.87	-	-	-	-	-	-
11	-	-	-	-	-	2.8	-	-	12. R	-	-	-	-
12	2.8	-	-	-	-	2.8	-	-	-	-	-	17.5	-
13	3.20	-	-	-	-	3.20	-	-	-	15.4	-	-	-
14	-	-	-	-	-	2.95	17.1	-	-	-	-	-	-
MEAN	2.9200	2.7667	2.8000	2.8100	3.0000	2.8923	16.7567	17.6000	16.9000	15.9500	16.9000	17.5000	16.5000
STD DEV	.2286	.0577	-	-	-	.1683	.7744	-	.2828	.7778	.1414	-	-
REL STD	7.8	2.1	-	-	-	5.8	4.6	-	1.7	4.9	.8	-	-
DES VAL	-	-	-	-	-	2.885	-	-	-	-	-	-	-

LAB	20990 CALCIUM COMMON
1	17.
2	16.8
3	16.5
5	17.1
6	17.6
7	16.7
8	16.5
9	17.3
10	15.87
11	12. R
12	17.5
13	15.4
14	17.1
MEAN	16.7808
STD DEV	.6474
REL STD	3.9
DES VAL	17.070

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 26 PP 66 SAMPLE 5

LAB	13009 AL TOT 5X ICP	13105 AL DIS AAS GF	13111 AL DIS ICP DA	13302 AL EXT AAS DA	13305 AL EXT AAS SE	13306 AL UF AAS OX	13999 ALUMINUM COMMON	23002 V TOT AAS SE	23003 V EXT AAS GF	23009 V TOT 5X ICP	23011 V TOT 5X ICP	23111 V DIS ICP DA	23999 VANADIUM COMMON
1	-	-	-	-	-	0.044	0.044	-	-	0.012	-	-	0.012
2	-	-	-	-	0.039	-	0.039	-	-	-	-	-	-
3	0.042	-	-	-	0.041	-	0.041	0.011	-	0.011	-	-	0.011
6	0.020R	-	-	-	-	-	0.020R	-	-	-	0.01 L	-	0.01 L HDL
8	-	-	-	0.2 L	-	-	0.2 L HDL	-	-	-	-	-	-
9	-	-	0.05	-	-	-	0.05	-	-	-	-	0.010	0.010
10	-	-	0.05	-	-	-	0.05	-	-	-	-	0.011	0.011
12	-	0.052	-	-	-	-	0.052	-	-	-	-	-	-
14	-	0.106R	-	-	-	-	0.106R	-	0.008	-	-	-	0.008
MEAN	.0420	.0520	.0500	-	.0400	.0440	.0460	.0110	.0080	.0115	-	.0105	.0104
STD DEV	-	-	.0000	-	.0014	-	.0054	-	-	.0007	-	.0007	.0015
REL STD	-	-	-1.0	-	3.5	-	11.7	-	-	6.1	-	6.7	14.6
DES VAL	-	-	-	-	-	-	.040	-	-	-	-	-	.011

LAB	24003 CR TOT AAS SE	24004 CR TOT AAS GF	24009 CR TOT 5X ICP	24011 CR TOT 5X ICP	24056 CR DIS AAS GF	24111 CR DIS ICP DA	24302 CR EXT AAS DA	24999 CHROMIUM COMMON	25003 MN TOT AAS DA	25004 MN TOT 5X AAS	25010 MN TOT 5X ICP	25011 MN TOT 5X ICP	25107 MN DIS AAS GF
1	-	-	0.013	-	-	-	-	0.013	0.012	-	-	-	-
3	0.012	-	0.012	-	-	-	-	0.012	-	0.011	0.013	-	-
6	-	-	-	0.009	-	-	-	0.009	-	-	-	0.011	-
8	-	0.015	-	-	-	-	-	0.015	-	-	-	-	-
9	-	-	-	-	-	0.012	-	0.012	-	-	-	-	-
10	-	-	-	-	-	0.009	-	0.009	-	-	-	-	-
11	-	-	-	-	-	-	0.010	0.010	-	-	-	-	-
12	-	-	-	-	0.013	-	-	0.013	-	-	-	-	0.012
14	-	-	-	-	-	-	-	-	-	-	-	-	0.012
MEAN	.0120	.0150	.0125	.0090	.0130	.0105	.0100	.0116	.0120	.0110	.0130	.0110	.0120
STD DEV	-	-	.0007	-	-	.0021	-	.0021	-	-	-	-	.0000
REL STD	-	-	5.7	-	-	20.2	-	18.4	-	-	-	-	-1.0
DES VAL	-	-	-	-	-	-	-	.013	-	-	-	-	-

LAB	25111 MN DIS ICP DA	25304 MN EXT AAS DA	25311 MN EXT ICP DA	25999 MANGNESE COMMON	26005 FE TOT AAS SE	26009 FE TOT 5X ICP	26011 FE TOT 5X ICP	26107 FE DIS AAS GF	26111 FE DIS ICP DA	26305 FE EXT AAS SE	26311 FE EXT ICP DA	26999 IRON COMMON	27003 CO TOT AAS GF
1	-	-	-	0.012	-	-	-	-	-	-	-	-	-
2	-	0.01	-	0.01	-	-	-	-	-	0.029	-	0.029	-
3	-	-	-	0.011	0.028	0.030	-	-	-	-	-	0.028	-
6	-	-	-	0.011	-	-	0.016	-	-	-	-	0.016	-
8	-	-	0.02 L	0.02 L	-	-	-	-	-	-	0.04	0.04	0.011
9	0.013	-	-	0.013 HDL	-	-	-	-	0.03	-	-	0.03	-
10	0.012	-	-	0.012	-	-	-	-	0.023	-	-	0.023	-
11	-	0.02 R	-	0.02 R	-	-	-	-	-	0.021	-	0.021	-
12	-	-	-	0.012	-	-	-	0.028	-	-	-	0.028	-
14	-	-	-	0.012	-	-	-	0.018	-	-	-	0.018	-
MEAN	.0125	.0100	-	.0116	.0280	.0300	.0160	.0230	.0265	.0250	.0400	.0259	.0110
STD DEV	.0007	-	-	.0009	-	-	-	.0071	.0049	.0057	-	.0073	-
REL STD	5.7	-	-	7.9	-	-	-	30.7	18.7	22.6	-	28.2	-
DES VAL	-	-	-	.012	-	-	-	-	-	-	-	.029	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 26 PP 66

SAMPLE 5

LAB	27009 CO TOT 5X ICP	27011 CO TOT 5X ICP	27107 CO DIS AAS GF	27111 CO DIS ICP DA	27302 CO EXT AAS SE	27999 COBALT COMMON	28002 NI TOT AAS SE	28009 NI TOT 5X ICP	28011 NI TOT 5X ICP	28107 NI DIS AAS GF	28111 NI DIS ICP DA	28302 NI EXT AAS SE	28309 NI EXT AAS GF
1	0.010	-	-	-	-	0.010	-	0.014	-	-	-	-	-
3	0.011	-	-	-	-	0.011	0.012	0.013	-	-	-	-	-
6	-	0.010	-	-	-	0.010	-	-	0.004R	-	-	-	-
8	-	-	-	-	-	0.011	-	-	-	-	-	-	-
9	-	-	-	0.010	-	0.010	-	-	-	-	0.014	-	0.013
10	-	-	-	0.009	-	0.009	-	-	-	-	0.008	-	-
11	-	-	-	-	0.010	0.010	-	-	-	-	-	0.012	-
12	-	-	0.011	-	-	0.011	-	-	-	0.012	-	-	-
MEAN	.0105	.0100	.0110	.0095	.0100	.0103	.0120	.0135	-	.0120	.0110	.0120	.0130
STD DEV	.0007	-	-	.0007	-	.0007	-	.0007	-	-	.0042	-	-
REL STD	6.7	-	-	7.4	-	6.9	-	5.2	-	-	38.6	-	-
DES VAL	-	-	-	-	-	.011	-	-	-	-	-	-	-

LAB	28999 NICKEL COMMON	29005 CU TOT AAS SE	29009 CU TOT 5X ICP	29011 CU TOT 5X ICP	29107 CU DIS AAS GF	29111 CU DIS ICP DA	29305 CU EXT AAS SE	29311 CU EXT ICP DA	29999 COPPER COMMON	30005 ZN TOT AAS SE	30009 ZN TOT 5X ICP	30011 ZN TOT 5X ICP	30107 ZN DIS AAS GF
1	0.014	-	0.012	-	-	-	-	-	0.012	-	0.016	-	-
2	-	-	-	-	-	-	0.012	-	0.012	-	-	-	-
3	0.012	0.012	0.011	-	-	-	-	-	0.012	0.016	0.016	-	-
6	0.004R	-	-	0.011	-	-	-	-	0.011	-	-	0.013	-
8	0.013	-	-	-	-	-	-	0.01	0.01	-	-	-	-
9	0.014	-	-	-	-	0.012	-	-	0.012	-	-	-	-
10	0.008	-	-	-	-	0.010	-	-	0.010	-	-	-	-
11	0.012	-	-	-	-	-	0.011	-	0.011	-	-	-	-
12	0.012	-	-	-	0.012	-	-	-	0.012	-	-	-	0.017
14	-	-	-	-	0.011	-	-	-	0.011	-	-	-	0.009
MEAN	.0121	.0120	.0115	.0110	.0115	.0110	.0115	.0100	.0113	.0160	.0160	.0130	.0130
STD DEV	.0020	-	.0007	-	.0007	.0014	.0007	-	.0008	-	.0000	-	.0057
REL STD	16.8	-	6.1	-	6.1	12.9	6.1	-	7.3	-	-1.0	-	43.5
DES VAL	.013	-	-	-	-	-	-	-	.013	-	-	-	-

LAB	30111 ZN DIS ICP DA	30304 ZN EXT AAS DA	30305 ZN EXT AAS SE	30311 ZN EXT ICP DA	30999 ZINC COMMON	38009 SR TOT ICP DA	38011 SR TOT ICP DA	38111 SR DIS ICP DA	38999 STRNTIUM COMMON	42009 MO TOT 5X ICP	42011 MO TOT 5X ICP	42111 MO DIS ICP DA	42999 MOLYBNUM COMMON
1	-	-	-	-	0.016	-	-	-	-	0.012	-	-	0.012
2	-	0.02	-	-	0.02	-	-	-	-	-	-	-	-
3	-	-	-	-	0.016	0.176	-	-	0.176	0.012	-	-	0.012
6	-	-	-	-	0.013	-	0.06 R	-	0.06 R	-	0.010	-	0.010
8	-	-	-	0.02	0.02	-	-	-	-	-	-	-	-
9	0.015	-	-	-	0.015	-	-	0.18	0.18	-	-	0.011	0.011
10	0.016	-	-	-	0.016	-	-	-	-	-	-	0.012	0.012
11	-	-	0.016	-	0.016	-	-	-	-	-	-	-	-
12	-	-	-	-	0.017	-	-	-	-	-	-	-	-
14	-	-	-	-	0.009	-	-	-	-	-	-	-	-
MEAN	.0155	.0200	.0160	.0200	.0158	.1760	-	.1800	.1780	.0120	.0100	.0115	.0114
STD DEV	.0007	-	-	-	.0032	-	-	-	.0028	.0000	-	.0007	.0009
REL STD	4.6	-	-	-	20.2	-	-	-	1.6	-1.0	-	6.1	7.8
DES VAL	-	-	-	-	.016	-	-	-	.175	-	-	-	.013

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 26 PP 66 SAMPLE 5

LAB	48002 CD TOT AAS SE	48003 CD TOT AAS GF	48009 CD TOT 5X ICP	48011 CD TOT 5X ICP	48103 CD DIS AAS GF	48111 CD DIS ICP DA	48302 CD EXT AAS SE	48309 CD EXT AAS GF	48999 CADMIUM COMMON	56009 BA TOT 5X ICP	56011 BA TOT 5X ICP	56111 BA DIS ICP DA	56999 BARIUM COMMON
1	-	-	0.011	-	-	-	-	-	0.011	0.024	-	-	0.024
2	-	-	-	-	-	-	0.011	-	0.011	-	-	-	-
3	0.011	-	0.011	-	-	-	-	-	0.011	0.022	-	-	0.022
6	-	-	-	0.010	-	-	-	-	0.010	-	0.015	-	0.015
8	-	-	-	-	-	-	-	0.012	0.012	-	-	-	-
9	-	0.011	-	-	-	-	-	-	0.011	-	-	0.024	0.024
10	-	-	-	-	-	0.009	-	-	0.009	-	-	0.02	0.02
11	-	-	-	-	-	-	0.011	-	0.011	-	-	-	-
12	-	-	-	-	0.011	-	-	-	0.011	-	-	-	-
14	-	-	-	-	0.005R	-	-	-	0.005R	-	-	-	-
MEAN	.0110	.0110	.0110	.0100	.0110	.0090	.0110	.0120	.0108	.0230	.0150	.0220	.0210
STD DEV	-	-	.0000	-	-	-	.0000	-	.0008	.0014	-	.0028	.0037
REL STD	-	-	-1.0	-	-	-	-1.0	-	7.7	6.1	-	12.9	17.8
DES VAL	-	-	-	-	-	-	-	-	.011	-	-	-	.024

LAB	82002 PB TOT AAS SE	82004 PB TOT AAS GF	82009 PB TOT 5X ICP	82011 PB TOT 5X ICP	82104 PB DIS AAS GF	82302 PB EXT AAS SE	82309 PB EXT AAS GF	82999 LEAD COMMON
1	-	-	-	-	-	0.012	-	0.012
2	-	-	-	-	-	0.011	-	0.011
3	0.010	-	0.010	-	-	-	-	0.010
6	-	-	-	0.01	-	-	-	0.01
8	-	-	-	-	-	-	0.011	0.011
9	-	0.010	-	-	-	-	-	0.010
10	-	-	-	-	-	-	0.007	0.007
11	-	-	-	-	-	0.010	-	0.010
12	-	-	-	-	0.011	-	-	0.011
14	-	-	-	-	0.009	-	-	0.009
MEAN	.0100	.0100	.0100	.0100	.0100	.0110	.0090	.0101
STD DEV	-	-	-	-	.0014	.0010	.0028	.0014
REL STD	-	-	-	-	14.1	9.1	31.4	13.6
DES VAL	-	-	-	-	-	-	-	.010

DATES RECEIVED 1 88/02/18 2 88/03/11 3 88/02/09 3 88/03/22 4 88/02/25
5 88/04/13 6 88/02/26 6 88/03/01 7 88/03/21 8 88/03/03
9 88/03/07 10 88/02/29 11 88/02/22 12 88/03/03 13 88/03/02
14 88/04/08

NOTE: ALL CONCENTRATION UNITS ARE EXPRESSED IN MG/L OF EACH ELEMENT, THE EXCEPTIONS BEING: COLOUR IN RELATIVE UNITS, CONDUCTIVITY IN USIE/CM, TURBIDITY IN JTU OR NTU, NITROGEN ANALYSES IN "N", ALKALINITY & HARDNESS IN CACO3, SILICA IN SIO2, AND SULFATE IN SO4.

DISTRIBUTION - PPWB

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MEMORANDUM **NOTE DE SERVICE**

H.Alkema\NWRI\336-4929\ha

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DATE	August 8, 1988

TO / À: Distribution

FROM / DE:
H. Alkema
Quality Assurance Section
National Water Research Institute
Burlington, Ontario

SUBJECT / OBJET: Prairie Provinces Quality Assurance Program (PPQA)

I have enclosed the final report for PP 67-68.

If you have any comments on this report, or any legitimate corrections to the data base, please do not hesitate to communicate them.

Harry A.

H. Alkema

RESEARCH & APPLICATIONS BRANCH

FINAL REPORT

REPORT NO. RAB 88-10

PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAM

STUDIES 67 AND 68

for March and April 1988

TRACE METALS, MAJOR IONS, NUTRIENTS AND PHYSICAL PARAMETERS IN SURFACE WATERS

by

H. Alkema

Quality Assurance Section
National Water Research Institute
Burlington, Ontario

August 1988

Introduction

As part of an on-going study, the Quality Assurance Section, NWRI in Burlington, Ontario, has been sending reference water samples bi-monthly to chemical laboratories participating in the PPWB program. This report summarizes the most recent PPWB interlaboratory quality control studies: PP 67 and 68, for the months March and April, 1988. These two studies dealt with trace metals, major ions, nutrients and physical parameters. The levels were from medium to high levels.

Study Design

Five water samples were submitted to each laboratory for chemical analyses. Two samples were submitted for trace metals analysis, while the remaining three were submitted for major ions, nutrients and some physical measurements. The following is a breakdown of the four samples:

PP 67 - Sample 1 - 125 ml, DA* for trace metals (3% HNO_3)
Sample 2 - up to 1L, major ions etc., stored at 4^oC

PP 68 - Sample 3 - 1L, SE* for trace metals (0.2% HNO_3)
Sample 4 - up to 1L, major ions, etc., stored at 4^oC
Sample 5 - up to 1L, major ions, etc., stored at 4^oC

* for definitions see Appendix 1

Treatment of Data

Each laboratory was asked to perform only those analyses which were routine to their particular laboratory, using the general methodology guidelines listed above. Results for these analyses were recorded on report sheets provided with the QA samples. Upon receipt of the Reporting Sheets, the results were tabulated for each parameter, first for each method reported, and then for all methods combined. These data, and the resulting statistics are presented in the Data Summary. (attached)

Preliminary data summaries, including problematic results, were sent May 13 and July 6. Each laboratory was given three weeks to notify us of any errors in data transcription, compilation, or flags.

Performance Indicators

In the PPWB QA program, two types of reference samples are used for the accuracy assessment. Reference waters (RMs) and certified reference waters (CRMs) have Design Values for the stable parameters. Also, regional samples are used occassionally as reference samples. The means for the regional samples, and the Design Values (together called the comparator) are used to test each reported result for accuracy.

Percentage deviations from the comparator are used as an indicator for the laboratory head to determine the extent of the discrepencies between the laboratory result and comparator as it applies to his procedures. However, please keep in mind that at low levels, high % deviations are often seen, and may be misleading if interpreted too strictly.

A result which deviates more than 10% from the comparator is marked with an asterik in the data tables and its value tabulated in the flags table (Table 1). Results reported with an "L" (less than) or flagged with an "R" (rejectable) are not used in the statistical calculations. Performance indicators are fully explained in Appendix II.

Comments on Laboratory Performance

Results accompanied with a 'less than' are difficult to appraise. If a design value or mean is significantly lower than the detection limit given by a particular laboratory, then that detection limit is too high. Such a result is assigned an 'HDL' and is tabulated for each laboratory in Table 1.

If, on the other hand, the detection limit reported is far lower than the mean or design value, then the use of 'less than' is clearly inadequate and the result is flagged low. The magnitude of the deviation from the mean in such a case is taken from the detection limit given.

Attached are two tables listing flagged data by laboratory (Table 1), and listing parameters for which there was a high coefficient of variation (Table 2). The latter was generated with a new set of criteria to provide a more accurate and more consistent description of difficult to analyse parameters or levels. Your comments will be appreciated.

PPWB laboratories average number of deviations per sample was 2.8

TABLE 1

PRAIRIE PROV LABS FLAG TABLE - STUDIES PP 67 PP 68

LAB	1	FLAGS :	MOLYBNUM	-11%	D O C	-61%	AMMONIA	43%	R%
			SILICA	16%	D O C	406% R	ALKLINTY	44%	R
			HARDNESS	21%	SODIUM	-18% R	PTASSIUM	-17%	
		HDL :	NONE						
LAB	3	FLAGS :	T N DIS	19% R	T N DIS	29% R			
		HDL :	NONE						
LAB	4	FLAGS :	BORON	233%	BORON	200%			
		HDL :	NONE						
LAB	6	FLAGS :	STRNTIUM	-50% R	TKN	44%	ALKLINTY	16%	
			TOT P	233% R	COPPER	-23%	STRNTIUM	-58%	R
			TOT P	567% R	TKN	51%	AMMONIA	122%	R
			ALKLINTY	14%	TOT P	400% R			
		HDL :	NONE						
LAB	8	FLAGS :	ALUMINUM	17%	COPPER	17%	TURBIDTY	214%	
			SILICA	-13%	CHROMIUM	-23%	IRON	38%	
			COPPER	131% R	ZINC	36%	TKN	35%	
			D O C	137%	D I C	-46%	SILICA	-14%	
			SULFATE	19% R	CHLORIDE	-11%			
		HDL :	TKN		TOT N		ALUMINUM		
			MANGNESE		TOT N				

NOTE: A VERY HIGH FREQUENCY OF FLAGGED RESULTS (OR A HIGH %) IS INDICATIVE OF POOR PERFORMANCE. ON THE OTHER HAND, LABS WITH FEW IF ANY FLAGS ARE JUDGED TO HAVE VERY GOOD PERFORMANCE.

ALSO, AN "R" FLAG INDICATES A NON COMPARABLE RESULT, THAT IS, ONE PRODUCED WITH NON RANDOM FACTORS. AN "L" FLAG INDICATES A 'LESS THAN' RESULT LOWER THAN THE COMPARATOR.

TABLE 2

HIGH COEFFICIENT OF VARIATION

AN HCV FOR	D O C	AT	1.790 PPM
AN HCV FOR	BORON	AT	.045 PPM
AN HCV FOR	TOT P	AT	.006 PPM
AN HCV FOR	IRON	AT	.029 PPM
AN HCV FOR	BORON	AT	.040 PPM
AN HCV FOR	PTASSIUM	AT	16.042 PPM
AN HCV FOR	D O C	AT	.760 PPM
AN HCV FOR	BORON	AT	.010 PPM

APPENDIX I

Definitions of Types of Metals Analysis

1. DA - Direct Aspiration

Without sample pretreatment, samples are aspirated by Atomic Absorption Spectrophotometry (AAS) ar Inuctively Coupled (Argon) Plasma (ICAP or ICP). Standards should contain the acid equivalent of the sample.

2. SE - Code for low level analysis

Analysis is carried out by one of the following methods:

1. Solvent extraction sample concentration followed by AAS.
2. Digestion and concentration of aqueous phase followed by ICAP.
3. Digestion of aqueous phase and ICAP analysis.
4. Graphite tube (flameless) AAS.

APPENDIX II

Performance Indicators

1. Circled Results

Results are circled in the data tables when a minor deviation from the comparator has ocurred. (The comparator is the design value of the reference sample, or the mean in the case of a biologically active sample.) Circled results are in general greater than or less than 10% from the comparator. At very low levels of analytes or with parameters that are difficult to analyse, a greater deviation than 10% is allowed. Under these conditions, a result is circled when it is outside one standard deviation of the comparator. These circled results, though acceptable values, are a warning to laboratory managers that the parameter analysis should be investigated.

2. Rejectable Results

Each laboratory result is statistically tested to see if it is outlying. Outlying results were caused by non random causes such as a faulty calibration or a transcription error. These outlying results, calculated by the Grubbs' procedure,* and indicated in the data tables with an 'R', are noncomparable with the other data for the parameter.

3. A High Co-efficient of Variation (HCV)

Occasionally data for a parameter yields a very high relative standard deviation (RSD). When this HCV is not due to outlying values, it indicates a high variability within the data set. The data in this set is then noncomparable. In such a case, the RSD for the parameter is circled in the data tables and the parameter's noncomparability is noted in the comments.

4. High Detection Limits (HDL)

Each laboratory determines its own detection limits according to its own requirements. When major differences of detection limits occur, the result is flagged with 'HDL' in the data tables. An HDL indicates that low level analysis may not be comparable with the analyses of other laboratories.

* reference : Frank E. Grubbs, Technometrics, 1969, p. 1.

DATA SUMMARY

FEDERAL-PROVINCIAL & PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAMS

STUDY NO. FP 27 PP 67 DATE: 01/03/88 DUE DATE: 30/04/88

SAMPLE 1 SPIKED SAMPLE.

TRACE METALS D/A. (IN 3% HNO3)

LAB	13009 AL TOT 5X ICP	13102 AL DIS AAS DA	13111 AL DIS ICP DA	13302 AL EXT AAS DA	13321 AL EXT ICP DA	13999 ALUMINUM COMMON	23009 V TOT 5X ICP	23011 V TOT 5X ICP	23101 V DIS ICP DA	23111 V DIS ICP DA	23321 V EXT ICP DA	23999 VANADIUM COMMON	24004 CR TOT AAS GF
1	-	-	-	-	-	-	0.860	-	-	-	-	0.860	-
2	-	-	-	1.1	-	1.1	-	-	-	-	-	-	-
3	-	-	-	1.02	1.05	1.02	-	-	-	-	0.958	0.958	-
6	1.0	-	-	-	-	1.0	-	1.0	-	-	-	1.0	-
8	-	-	-	1.2	-	1.2 *	-	-	-	-	-	-	0.091
9	-	-	1.1	-	-	1.1	-	-	-	1.0	-	1.0	-
10	-	-	1.01	-	-	1.01	-	-	-	0.93	-	0.93	-
12	-	-	0.98	-	-	0.98	-	-	-	0.96	-	0.96	-
14	-	1.06	-	-	-	1.06	-	-	1.10	-	-	1.10 *	-
MEAN	1.0000	1.0600	1.0300	1.1067	1.0500	1.0588	.8600	1.0000	1.1000	.9633	.9580	.9726	.0910
STD DEV	-	-	.0624	.0902	-	.0726	-	-	-	.0351	-	.0737	-
REL STD	-	-	6.1	8.1	-	6.9	-	-	-	3.6	-	7.6	-
DES VAL	-	-	-	-	-	1.025	-	-	-	-	-	.954	-

LAB	24009 CR TOT 5X ICP	24011 CR TOT 5X ICP	24111 CR DIS ICP DA	24302 CR EXT AAS DA	24311 CR EXT ICP DA	24321 CR EXT ICP DA	24999 CHROMIUM COMMON	25003 MN TOT AAS DA	25011 MN TOT 5X ICP	25104 MN DIS AAS DA	25111 MN DIS ICP DA	25304 MN EXT AAS DA	25311 MN EXT ICP DA
1	0.099	-	-	-	-	-	0.099	0.095	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	0.11	-
3	-	-	-	-	-	0.104	0.104	-	-	-	-	0.100	-
6	-	0.098	-	-	-	-	0.098	-	0.10	-	-	-	-
8	-	-	-	-	-	-	0.091	-	-	-	-	-	0.09
9	-	-	0.100	-	-	-	0.100	-	-	-	0.100	-	-
10	-	-	0.095	-	-	-	0.095	-	-	-	0.099	-	-
11	-	-	-	0.10	-	-	0.10	-	-	-	-	-	-
12	-	-	0.092	-	-	-	0.092	-	-	-	0.10	-	-
13	-	-	-	-	0.116R	-	0.116R	-	-	-	-	-	0.099
14	-	-	-	-	-	-	-	-	-	0.093	-	-	-
MEAN	.0990	.0980	.0957	.1000	-	.1040	.0974	.0950	.1000	.0930	.0997	.1050	.0945
STD DEV	-	-	.0040	-	-	-	.0044	-	-	-	.0006	.0071	.0064
REL STD	-	-	4.2	-	-	-	4.5	-	-	-	.6	6.7	6.7
DES VAL	-	-	-	-	-	-	.099	-	-	-	-	-	-

LAB	25321 MN EXT ICP DA	25999 MANGNESE COMMON	26011 FE TOT 5X ICP	26104 FE DIS AAS DA	26111 FE DIS ICP DA	26304 FE EXT AAS DA	26311 FE EXT ICP DA	26321 FE EXT ICP DA	26999 IRON COMMON	27009 CO TOT 5X ICP	27011 CO TOT 5X ICP	27111 CO DIS ICP DA	27301 CO EXT AAS DA
1	-	0.095	-	-	-	-	-	-	-	0.270	-	-	-
2	-	0.11 *	-	-	-	0.49	-	-	0.49	-	-	-	-
3	0.102	0.100	-	-	-	0.504	-	0.501	0.504	-	-	-	-
6	-	0.10	0.51	-	-	-	-	-	0.51	-	0.30	-	-
8	-	0.09	-	-	-	-	0.49	-	0.49	-	-	-	0.30
9	-	0.100	-	-	0.50	-	-	-	0.50	-	-	0.29	-
10	-	0.099	-	-	0.48	-	-	-	0.48	-	-	0.265	-
11	-	-	-	-	-	0.48	-	-	0.48	-	-	-	0.30
12	-	0.10	-	-	0.48	-	-	-	0.48	-	-	0.28	-
13	-	0.099	-	-	-	-	0.749R	-	0.749R	-	-	-	-
14	-	0.093	-	0.540	-	-	-	-	0.540	-	-	-	-
MEAN	.1020	.0986	.5100	.5400	.4867	.4913	.4900	.5010	.4971	.2700	.3000	.2783	.3000
STD DEV	-	.0053	-	-	.0115	.0121	-	-	.0195	-	-	.0126	.0000
REL STD	-	5.4	-	-	2.4	2.5	-	-	3.9	-	-	4.5	-1.0
DES VAL	-	.099	-	-	-	-	-	-	.499	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 27 PP 67 SAMPLE 1

LAB	27321 CO EXT ICP DA	27999 COBALT COMMON	28009 NI TOT 5X ICP	28011 NI TOT 5X ICP	28111 NI DIS ICP DA	28301 NI EXT AAS DA	28311 NI EXT ICP DA	28321 NI EXT ICP DA	28999 NICKEL COMMON	29009 CU TOT 5X ICP	29011 CU TOT 5X ICP	29106 CU DIS AAS DA	29111 CU DIS ICP DA
1	-	0.270	0.450	-	-	-	-	-	0.450	0.095	-	-	-
3	0.284	0.284	-	-	-	-	-	0.499	0.499	-	-	-	-
6	-	0.30	-	0.50	-	-	-	-	0.50	-	0.097	-	-
8	-	0.30	-	-	-	-	0.47	-	0.47	-	-	-	-
9	-	0.29	-	-	0.48	-	-	-	0.48	-	-	-	0.11
10	-	0.265	-	-	0.47	-	-	-	0.47	-	-	-	0.107
11	-	0.30	-	-	-	0.48	-	-	0.48	-	-	-	-
12	-	0.28	-	-	0.48	-	-	-	0.48	-	-	-	0.10
13	-	-	-	-	-	-	0.497	-	0.497	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	0.114	-
MEAN	.2840	.2861	.4500	.5000	.4767	.4800	.4835	.4990	.4807	.0950	.0970	.1140	.1057
STD DEV	-	.0138	-	-	.0058	-	.0191	-	.0164	-	-	-	.0051
REL STD	-	4.8	-	-	1.2	-	3.9	-	3.4	-	-	-	4.9
DES VAL	-	.297	-	-	-	-	-	-	.482	-	-	-	-

LAB	29306 CU EXT AAS DA	29311 CU EXT ICP DA	29321 CU EXT ICP DA	29999 COPPER COMMON	30009 ZN TOT 5X ICP	30011 ZN TOT 5X ICP	30104 ZN DIS AAS DA	30111 ZN DIS ICP DA	30304 ZN EXT AAS DA	30311 ZN EXT ICP DA	30321 ZN EXT ICP DA	30999 ZINC COMMON	38011 SR TOT ICP DA
1	-	-	-	0.095	0.104	-	-	-	-	-	-	0.104	-
2	0.10	-	-	0.10	-	-	-	-	0.10	-	-	0.10	-
3	0.099	-	0.099	0.099	-	-	-	-	-	-	0.109	0.109	-
6	-	-	-	0.097	-	0.10	-	-	-	-	-	0.10	0.19 R
8	-	0.12	-	0.12 *	-	-	-	-	-	0.10	-	0.10	-
9	-	-	-	0.11	-	-	-	0.10	-	-	-	0.10	-
10	-	-	-	0.107	-	-	-	0.106	-	-	-	0.106	-
11	0.10	-	-	0.10	-	-	-	-	0.09	-	-	0.09 *	-
12	-	-	-	0.10	-	-	-	0.103	-	-	-	0.103	-
13	-	0.098	-	0.098	-	-	-	-	-	0.11	-	0.11	-
14	-	-	-	0.114	-	-	0.132R	-	-	-	-	0.132R	-
MEAN	.0997	.1090	.0990	.1036	.1040	.1000	-	.1030	.0950	.1050	.1090	.1022	-
STD DEV	.0006	.0156	-	.0080	-	-	-	.0030	.0071	.0071	-	.0057	-
REL STD	.6	14.3	-	7.7	-	-	-	2.9	7.4	6.7	-	5.6	-
DES VAL	-	-	-	.103	-	-	-	-	-	-	-	.107	-

LAB	38111 SR DIS ICP DA	38301 SR EXT AAS DA	38321 SR EXT ICP DA	38999 STRNTIUM COMMON	42009 MO TOT 5X ICP	42011 MO TOT 5X ICP	42111 MO DIS ICP DA	42121 MO EXT ICP DA	42301 MO EXT AAS DA	42999 MOLYBNUM COMMON	48009 CD TOT 5X ICP	48011 CD TOT 5X ICP	48103 CD DIS AAS GF
1	-	-	-	-	0.860	-	-	-	-	0.860*	0.093	-	-
3	-	-	0.364	0.364	-	-	-	0.951	1.00	1.00	-	-	-
6	-	-	-	0.19 R	-	0.99	-	-	-	0.99	-	0.096	-
9	0.37	-	-	0.37	-	-	0.95	-	-	0.95	-	-	-
10	-	0.36	-	0.36	-	-	0.93	-	-	0.93	-	-	-
12	-	-	-	-	-	-	0.94	-	-	0.94	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	0.10
MEAN	.3700	.3600	.3640	.3647	.8600	.9900	.9400	.9510	1.0000	.9450	.0930	.0960	.1000
STD DEV	-	-	-	.0050	-	-	.0100	-	-	.0501	-	-	-
REL STD	-	-	-	1.4	-	-	1.1	-	-	5.3	-	-	-
DES VAL	-	-	-	.379	-	-	-	-	-	.970	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 27 PP 67 SAMPLE 1

LAB	48111 CD DIS ICP DA	48301 CD EXT AAS DA	48311 CD EXT ICP DA	48321 CD EXT ICP DA	48999 CADMIUM COMMON	56009 BA TOT 5X ICP	56011 BA TOT 5X ICP	56111 BA DIS ICP DA	56301 BA EXT AAS DA	56321 BA EXT ICP DA	56999 BARIUM COMMON	82011 PB TOT 5X ICP	82101 PB DIS AAS DA
1	-	-	-	-	0.093	0.945	-	-	-	-	0.945	-	-
2	-	0.10	-	-	0.10	-	-	-	-	-	-	-	-
3	-	0.100	-	0.096	0.100	-	-	-	1.00	0.994	1.00	-	-
6	-	-	-	-	0.096	-	0.98	-	-	-	0.98	0.48	-
8	-	0.10	-	-	0.10	-	-	-	-	-	-	-	-
9	0.100	-	-	-	0.100	-	-	1.0	-	-	1.0	-	-
10	0.088	-	-	-	0.088	-	-	0.98	-	-	0.98	-	-
11	-	0.10	-	-	0.10	-	-	-	-	-	-	-	-
12	0.094	-	-	-	0.094	-	-	0.96	-	-	0.96	-	-
13	-	-	0.099	-	0.099	-	-	-	-	-	-	-	-
14	-	-	-	-	0.10	-	-	-	-	-	-	-	0.48
MEAN	.0940	.1000	.0990	.0960	.0973	.9450	.9800	.9800	1.0000	.9940	.9775	.4800	.4800
STD DEV	.0060	.0000	-	-	.0041	-	-	.0200	-	-	.0219	-	-
REL STD	6.4	-1.0	-	-	4.2	-	-	2.0	-	-	2.2	-	-
DES VAL	-	-	-	-	.098	-	-	-	-	-	.992	-	-

LAB	82111 PB DIS ICP DA	82301 PB EXT AAS DA	82302 PB EXT AAS SE	82309 PB EXT AAS GF	82311 PB EXT ICP DA	82321 PB EXT ICP DA	82999 LEAD COMMON
1	-	-	0.500	-	-	-	0.500
2	-	0.51	-	-	-	-	0.51
3	-	-	-	-	-	0.480	0.480
6	-	-	-	-	-	-	0.48
8	-	-	-	-	0.49	-	0.49
9	0.49	-	-	-	-	-	0.49
10	-	-	-	0.42 R	-	-	0.42 R
11	-	0.50	-	-	-	-	0.50
12	0.47	-	-	-	-	-	0.47
13	-	-	-	-	0.444	-	0.444
14	-	-	-	-	-	-	0.48
MEAN	.4800	.5050	.5000	-	.4670	.4800	.4844
STD DEV	.0141	.0071	-	-	.0325	-	.0186
REL STD	2.9	1.4	-	-	7.0	-	3.8
DES VAL	-	-	-	-	-	-	.485

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 27 PP 67 SAMPLE 2

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS	00125 SUM OF ANIONS	02011 COLOUR APPARE	02021 COLOUR VIS COM	02023 COLOUR SPECT	02024 COL TRU SPECT	02040 COLOUR COMMON	02041 CONDUCT SPEC 25	02060 CONDUCT COMMON	02073 TURB HACH	02074 TURB NPLMTRI	02077 TURB HACH FZ
1	1.12	8.54	8.35	-	-	-	7.	7.	916.	916.	0.2	-	-
2	0.73	8.252	8.375	5.	-	-	-	5.	933.	933.	0.3	-	-
3	-0.65	8.246	8.354	5.	-	-	-	5.	917.	917.	0.09	-	-
4	-	-	-	-	5. L	-	-	5. L	910.	910.	-	-	-
5	0.38	8.38	8.32	5.	-	-	-	5.	846.4	846.4	0.15	-	-
6	0.6	8.5	8.6	-	-	-	-	-	882.	882.	-	0.36	-
7	0.62	8.40	8.29	7.	-	-	-	7.	905.	905.	0.28	-	-
8	0.23	8.20	8.16	5. L	-	-	-	5. L	915.	915.	-	0.50	-
9	2.33	8.35	7.97	-	-	-	-	-	898.	898.	-	-	-
10	0.77	8.416	8.286	-	-	4.	-	4.	880.	880.	-	0.2	-
11	-	-	-	5.	-	-	-	5.	900.	900.	-	-	0.24
12	-	-	-	-	5.	-	-	5.	940.	940.	0.4	-	-
13	-	-	-	-	-	-	-	-	860.	860.	-	-	-
14	-	-	-	-	-	-	-	-	929.	929.	-	-	-
MEAN	.6821	8.3649	8.3006	5.4000	5.0000	4.0000	7.0000	5.3750	902.2429	902.2429	.2367	.3533	.2400
STD DEV	.7905	.1158	.1696	.8944	-	-	-	1.0607	27.1116	27.1116	.1122	.1501	-
REL STD	115.9	1.4	2.0	16.6	-	-	-	19.7	3.0	3.0	47.4	42.5	-
DES VAL	-	-	-	-	-	-	-	4.420	-	898.418	-	-	-

LAB	02081 TURB RATIO	02090 TURBIDTY COMMON	05105 BORON AA CARM	05106 BORON F AZOMETH	05111 BORON F ICP DA	05190 BORON COMMON	06001 TOC COMB IR	06051 TIC COMB IR	06101 DOC IR /DIF	06104 DOC UV CO2 IR	06107 DOC UV CO2 PHE	06109 DOC UV CO2 OH	06150 D O C COMMON
1	-	0.2	-	-	-	-	-	-	-	-	0.7	-	0.7 *
2	-	0.3	-	-	-	-	-	-	-	-	1.8	-	1.8
3	-	0.09	-	-	-	-	-	-	-	1.1	-	-	1.1
4	0.32	0.32	0.15	-	-	0.15 *	-	-	-	1.7	-	-	1.7
5	-	0.15	-	-	-	-	2.6	19.	-	-	-	-	2.6 *
6	-	0.36 *	-	-	-	-	-	-	-	1.6	-	-	1.6
7	-	0.28	-	-	-	-	-	-	-	-	-	-	-
8	-	0.50 *	-	0.05 L	-	0.05 L	-	-	-	-	-	-	2.4
10	-	0.2	-	-	0.05	0.05	-	-	-	-	-	1.0	1.0 *
11	-	0.24	-	-	-	-	-	-	3.	-	-	-	3. *
12	-	0.4 *	-	-	-	-	-	-	2.	-	-	-	2.
MEAN	.3200	.2764	.1500	-	.0500	.1000	2.6000	19.0000	2.5000	1.4667	1.2500	1.0000	1.7900
STD DEV	-	.1177	-	-	-	.0707	-	-	.7071	.3215	.7778	-	.7355
REL STD	-	42.6	-	-	-	70.7	-	-	28.3	21.9	62.2	-	41.1
DES VAL	-	.159	-	-	-	.045	-	-	-	-	-	-	1.403

LAB	06151 DIC IR COMBUST	06152 DIC UV CO2 IR	06154 DIC AA CO2 PHE	06159 DIC AA CO2 OH	06180 DIC CALC'D	06490 D I C COMMON	07010 TKN AA SAL	07015 TKN DIG BERTHEL	07016 TKN BLK AMM-SAL	07018 TKN BLK INDOPHE	07021 TKN BLK DIG BER	07090 TKN COMMON	07105 NO3+NO2 DIS AA
1	-	-	16.9	-	-	16.9	-	-	-	-	0.139	0.139	0.56
3	-	15.3	-	-	-	15.3	0.126	-	-	-	-	0.126	-
4	-	-	17.4	-	-	17.4	-	-	-	-	-	-	-
5	-	-	-	-	-	19. *	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	0.2	-	-	0.2 *	-
8	-	-	-	-	-	13.8	-	0.20 L	-	-	-	0.20 L	-
10	-	-	-	16.1	-	16.1	-	-	-	-	-	-	-
11	-	-	-	-	13.	13. *	-	-	-	-	-	-	-
12	16.8	-	-	-	-	16.8	-	-	-	0.09	-	0.09 *	-
MEAN	16.8000	15.3000	17.1500	16.1000	13.0000	16.0375	.1260	-	.2000	.0900	.1390	.1388	.5600
STD DEV	-	-	.3536	-	-	1.9544	-	-	-	-	-	.0458	-
REL STD	-	-	2.1	-	-	12.2	-	-	-	-	-	33.0	-
DES VAL	-	-	-	-	-	15.551	-	-	-	-	-	.170	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 27 PP 67 SAMPLE 2

LAB	07109 NO3+NO2 AA HYD	07110 NO3+NO2 AA2 CD	07111 NO3+NO2 DIS SPEC	07112 NO3+NO2 UF AA CD	07390 NITRATE COMMON	07505 NH3 TOT AA BERT	07540 NH3 TOT AA SAL	07555 NH3 DIS AA PHEN	07557 NH3 DIS AA INDO	07562 NH3 DIS AA EDTA	07563 NH3 DIS AA INDO	07590 AMMONIA COMMON	07601 T N UV AA SUL
1	-	-	-	-	0.56	-	-	-	-	0.012	-	0.012*	-
2	-	0.55	-	-	0.55	-	-	-	-	-	-	-	0.62
3	-	-	-	0.608	0.608	0.009	-	-	-	-	-	0.009	0.756R
4	-	0.58	-	-	0.58	-	0.008	-	-	-	-	0.008	-
5	-	0.575	-	-	0.575	-	-	-	0.006	-	-	0.006	-
6	0.56	-	-	-	0.56	-	-	-	0.01	-	-	0.01	-
7	-	-	-	0.52	0.52	-	-	-	-	-	-	-	-
8	-	0.61	-	-	0.61	-	-	0.010	-	-	-	0.010	-
9	0.52	-	-	-	0.52	-	-	-	-	-	-	-	-
10	0.57	-	-	-	0.57	-	-	0.01 L	-	-	-	0.01 L	-
11	-	0.48	-	-	0.48 *	-	0.047R	-	-	-	-	0.047R	-
12	-	0.60	-	-	0.60	-	-	-	-	-	0.005	0.005*	-
13	-	0.60	-	-	0.60	-	0.10 L	-	-	-	-	0.10 L	-
14	-	-	0.57	-	0.57	-	-	-	-	-	-	-	-
MEAN	.5500	.5707	.5700	.5640	.5645	.0090	.0080	.0100	.0080	.0120	.0050	.0086	.6200
STD DEV	.0265	.0448	-	.0622	.0375	-	-	-	.0028	-	-	.0024	-
REL STD	4.8	7.8	-	11.0	6.6	-	-	-	35.4	-	-	28.5	-
DES VAL	-	-	-	-	.577	-	-	-	-	-	-	.013	-

LAB	07602 T N CALC'D	07651 T N DIS UV AA	07655 T N DIS UV EDTA	07690 TOT N COMMON	07790 T N DIS COMMON	09103 F DIS COL SP	09105 F DIS SP EL	09106 F DIS EL POT	09107 F DIS AUT POT	09108 F DIS SP EL	09190 FLUORIDE COMMON	10101 ALKLNTY TITR'N	10108 ALKLNTY POT TIT
1	-	-	-	-	-	-	-	-	0.08	-	0.08	72.	-
2	-	-	-	-	0.62	-	-	0.07	-	-	0.07	65.9	-
3	-	-	-	-	0.756R	-	-	-	-	0.08	0.08	-	-
4	-	0.65	-	-	0.65	-	-	-	-	-	-	67.7	-
5	-	-	0.640	-	0.640	-	-	0.05 L	-	-	0.05 *	68.2	-
6	-	-	-	-	-	0.1	-	-	-	-	0.1	-	-
7	-	-	-	-	-	-	-	-	-	-	-	66.8	-
8	0.81 L	-	-	0.81 L	-	-	0.07	-	-	-	0.07	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	68.
10	-	-	-	-	-	-	0.04	-	-	-	0.04 *	-	-
11	-	-	-	-	-	-	0.11	-	-	-	0.11 *	69.	-
12	0.69	-	-	0.69	-	-	0.10 L	-	-	-	0.10 L	68.0	-
13	-	-	-	-	-	-	-	-	-	-	-	78.	-
14	-	-	-	-	-	-	-	-	-	-	-	70.5	-
MEAN	.6900	.6500	.6400	.6900	.6367	.1000	.0733	.0700	.0800	.0800	.0786	69.5667	68.0000
STD DEV	-	-	-	-	.0153	-	.0351	-	-	-	.0227	3.6596	-
REL STD	-	-	-	-	2.4	-	47.9	-	-	-	28.9	5.3	-
DES VAL	-	-	-	.698	.660	-	-	-	-	-	.084	-	-

LAB	10109 ALKLNTY POT TIT	10111 ALKLNTY TIT PRO	10112 ALKLNTY TIT CON	10190 ALKLINTY COMMON	10301 PH	10390 PH COMMON	10602 HARDNSS CALC'D	10603 HARDNSS TITR'N	10606 HARDNSS CALC'D	10645 HARDNSS ?	10690 HARDNESS COMMON	11001 NA TOT AAS	11005 NA TOT ICP
1	-	-	-	72.	8.1	8.1	269.	-	-	-	269.	-	-
2	-	-	-	65.9	7.9	7.9	262.0	-	-	-	262.0	-	-
3	-	71.6	-	71.6	7.93	7.93	-	-	256.	-	256.	-	-
4	-	-	-	67.7	7.93	7.93	-	-	-	-	-	-	-
5	-	-	-	68.2	7.0 R	7.0 R	266.7	-	-	-	266.7	-	-
6	76.	-	-	76. *	8.2	8.2	-	262.	-	-	262.	-	-
7	-	-	-	66.8	8.0	8.0	-	272.8	-	-	272.8	-	-
8	67.0	-	-	67.0	7.90	7.90	260.	-	-	-	260.	-	-
9	-	-	-	68.	7.90	7.90	-	-	-	260.	260.	-	60.
10	-	-	63.	63.	8.09	8.09	-	-	-	-	-	-	61.
11	-	-	-	69.	8.0	8.0	260.	-	-	-	260.	-	-
12	-	-	-	68.0	7.8	7.8	-	-	-	-	-	-	-
13	-	-	-	78. *	7.5	7.5	278.4	-	-	-	278.4	-	-
14	-	-	-	70.5	8.14	8.14	262.6	-	-	-	262.6	59.95	-
MEAN	71.5000	71.6000	63.0000	69.4071	7.9531	7.9531	265.5286	267.4000	256.0000	260.0000	264.5000	59.9500	60.5000
STD DEV	6.3640	-	-	3.9659	.1777	.1777	6.5987	7.6368	-	-	6.6053	-	.7071
REL STD	8.9	-	-	5.7	2.2	2.2	2.5	2.9	-	-	2.5	-	1.2
DES VAL	-	-	-	65.597	-	7.882	-	-	-	-	261.132	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 27 PP 67 SAMPLE 2

LAB	11102 NA F AAS	11103 NA DIS FL PH	11105 NA DIS AAS DA	11107 NA UF FL PH	11111 NA DIS ICP	11311 NA EXT ICP	11990 SODIUM COMMON	12005 MG TOT ICP	12101 MG DIS CALC'D	12102 MG DIS AAS DA	12106 MG UF AAS DA	12107 MG DIS AAS AUT	12111 MG DIS ICP
1	-	62.	-	-	-	-	62.	-	-	-	-	-	-
2	-	58.9	-	-	-	-	58.9	-	-	-	-	21.6	-
3	-	-	-	60.9	-	-	60.9	-	-	-	20.3	-	-
5	-	59.5	-	-	-	-	59.5	-	-	21.4	-	-	-
6	61.	-	-	-	-	-	61.	-	21.	-	-	-	-
7	-	-	59.0	-	-	-	59.0	-	-	22.4	-	-	-
8	-	-	-	-	-	59.1	59.1	-	-	-	-	-	-
9	-	-	-	-	-	-	60.	22.	-	-	-	-	-
10	-	-	-	-	-	-	61.	22.	-	-	-	-	-
11	54.	-	-	-	-	-	54.	-	-	21.	-	-	-
12	-	60.0	-	-	-	-	60.0	-	-	-	-	-	-
13	-	-	-	-	59.57	-	59.57	-	-	-	-	-	22.20
14	-	-	-	-	-	-	59.95	-	-	20.1	-	-	-
MEAN	57.5000	60.1000	59.0000	60.9000	59.5700	59.1000	59.6092	22.0000	21.0000	21.2250	20.3000	21.6000	22.2000
STD DEV	4.9497	1.3441	-	-	-	-	1.9210	.0000	-	.9535	-	-	-
REL STD	8.6	2.2	-	-	-	-	3.2	-1.0	-	4.5	-	-	-
DES VAL	-	-	-	-	-	-	59.367	-	-	-	-	-	-

LAB	12303 MG UF AAS AUT	12311 MG EXT ICP	12990 MGNESIUM COMMON	14105 SILICA MOLY AA	14106 SILICA MOLY	14107 SILICA MOLY AA	14111 SILICA ICP DA	14190 SILICA COMMON	15313 T P ACL AA SNCL	15401 T P UV AA ASC	15406 T P UF AA ASC	15409 T P BLK AA ASC	15413 T P ACL AA SNCL
1	23.	-	23.	-	-	15.0	-	15.0	-	-	-	-	-
2	-	-	21.6	-	-	-	-	-	-	-	-	-	0.003
3	-	-	20.3	-	13.7	-	-	13.7	-	-	-	-	0.008
4	-	-	-	-	-	-	-	-	-	-	0.003L	-	-
5	-	-	21.4	12.0	-	-	-	12.0 *	-	-	-	-	-
6	-	-	21.	-	-	-	-	-	-	-	-	0.02 R	-
7	-	-	22.4	-	-	-	-	-	-	-	0.064R	-	-
8	-	21.5	21.5	12.7	-	-	-	12.7 *	-	-	-	-	0.008
9	-	-	22.	-	-	-	14.5	14.5	-	-	-	-	-
10	-	-	22.	13.6	-	-	-	13.6	-	0.01 L	-	-	-
11	-	-	21.	-	-	-	-	-	0.005L	-	-	-	-
12	-	-	-	14.8	-	-	-	14.8	-	-	0.003L	-	-
13	-	-	22.20	-	-	-	-	-	-	-	0.026	-	-
14	-	-	20.1	-	-	-	-	-	-	-	-	-	-
MEAN	23.0000	21.5000	21.5417	13.2750	13.7000	15.0000	14.5000	13.7571	-	-	.0260	-	.0063
STD DEV	-	-	.8501	1.2093	-	-	-	1.1118	-	-	-	-	.0029
REL STD	-	-	3.9	9.1	-	-	-	8.1	-	-	-	-	45.6
DES VAL	-	-	21.447	-	-	-	-	14.645	-	-	-	-	-

LAB	15421 T P BLK DIG ASC	15490 TOT P COMMON	16304 SO4 DIS AUTO BA	16306 SO4 DIS AA MTB	16307 SO4 UF AA MTB	16309 SO4 DIS I C	16310 SO4 DIS AA CALM	16990 SULFATE COMMON	17203 CL DIS AA FE	17204 CL DIS AG TIT	17206 CL DIS AA HG	17208 CL DIS AA HG	17209 CL DIS I C
1	0.006L	0.006L	-	73.	-	-	-	73.	190.	-	-	-	-
2	-	0.003	74.1	-	-	74.	-	74.1	-	-	-	-	194.
3	-	0.008	-	-	70.8	-	-	70.8	-	-	-	181.2	-
4	-	0.003L	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	74.8	-	-	-	74.8	-	-	190.	-	-
6	-	0.02 R	71.	-	-	-	-	71.	-	196.	-	-	-
7	-	0.064R	-	76.4	-	-	-	76.4	189.0	-	-	-	-
8	-	0.008	-	75.	-	-	-	75.	-	-	185.	-	-
9	-	-	-	-	-	68.	-	68.	-	-	-	-	183.
10	-	0.01 L	-	-	-	-	70.	70.	-	-	-	-	-
11	-	0.005L	-	75.	-	-	-	75.	-	-	190.	-	-
12	-	0.003L	-	73.9	-	-	-	73.9	-	-	190.	-	-
13	-	0.026*	-	79.30	-	-	-	79.30*	-	-	195.0	-	-
14	-	-	-	-	-	69.0	-	69.0	-	-	-	-	176.0
MEAN	-	.0113	72.5500	75.3429	70.8000	70.3333	70.0000	73.1000	189.5000	196.0000	190.0000	181.2000	184.3333
STD DEV	-	.0101	2.1920	2.0362	-	3.2146	-	3.2044	.7071	-	3.5355	-	9.0738
REL STD	-	89.9	3.0	2.7	-	4.6	-	4.4	.4	-	1.9	-	4.9
DES VAL	-	.006	-	-	-	-	-	71.209	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 27 PP 67 SAMPLE 2

LAB	17210 CL DIS TIT CON	17990 CHLORIDE COMMON	19001 K TOT AAS	19005 K TOT ICP	19102 K DIS AAS	19103 K DIS FLM PH	19106 K DIS AAS LI	19107 K DIS FLM PH	19111 K DIS ICP	19301 K EXT HNO3 AA	19990 PTASSIUM COMMON	20005 CA TOT ICP	20050
1	-	190.	-	-	-	18.0	-	-	-	-	18.0	-	-
2	-	194.	-	-	-	17.8	-	-	-	-	17.8	-	-
3	-	181.2	-	-	-	-	-	18.5	-	-	18.5	-	-
5	-	190.	-	-	-	18.3	-	-	-	-	18.3	-	-
6	-	196.	-	-	18.	-	-	-	-	-	18.	-	-
7	-	189.0	-	-	17.8	-	-	-	-	-	17.8	-	-
8	-	185.	-	-	-	-	-	-	-	17.0	17.0	-	-
9	-	183.	-	19.	-	-	-	-	-	-	19.	69.	-
10	196.	196.	-	18.	-	-	-	-	-	-	18.	70.	-
11	-	190.	-	-	-	-	19.	-	-	-	19.	-	-
12	-	190.	-	-	-	18.6	-	-	-	-	18.6	-	-
13	-	195.0	-	-	-	-	-	-	21.60R	-	21.60R	-	-
14	-	176.0	16.5	-	-	-	-	-	-	-	16.5	-	72.1
MEAN	196.0000	188.8615	16.5000	18.5000	17.9000	18.1750	19.0000	18.5000	-	17.0000	18.0417	69.5000	72.1000
STD DEV	-	6.0868	-	.7071	.1414	.3500	-	-	-	-	.7391	.7071	-
REL STD	-	3.2	-	3.8	.8	1.9	-	-	-	-	4.1	1.0	-
DES VAL	-	192.162	-	-	-	-	-	-	-	-	18.083	-	-

LAB	20100 CA DIS CALC'D	20103 CA DIS AAS	20108 CA DIS AAS UF	20110 CA DIS AAS AUT	20111 CA DIS ICP	20311 CA EXT ICP	20990 CALCIUM COMMON
1	-	-	-	70.	-	-	70.
2	-	-	-	69.3	-	-	69.3
3	-	-	69.3	-	-	-	69.3
5	-	71.5	-	-	-	-	71.5
6	70.	-	-	-	-	-	70.
7	-	70.8	-	-	-	-	70.8
8	-	-	-	-	-	68.7	68.7
9	-	-	-	-	-	-	69.
10	-	-	-	-	-	-	70.
11	-	70.	-	-	-	-	70.
13	-	-	-	-	74.62	-	74.62
14	-	-	-	-	-	-	72.1
MEAN	70.0000	70.7667	69.3000	69.6500	74.6200	68.7000	70.4433
STD DEV	-	.7506	-	.4950	-	-	1.6502
REL STD	-	1.1	-	.7	-	-	2.3
DES VAL	-	-	-	-	-	-	68.387

DATA SUMMARY

FEDERAL-PROVINCIAL & PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAMS

STUDY NO. FP 28 PP 68 DATE: 01/04/88 DUE DATE: 30/04/88

SAMPLE 3 SPIKED SAMPLE. TRACE METALS S/E. (IN 0.2% HNO3)

LAB	13009 AL TOT 5X ICP	13105 AL DIS AAS GF	13111 AL DIS ICP DA	13302 AL EXT AAS DA	13305 AL EXT AAS SE	13306 AL UF AAS OX	13999 ALUMINUM COMMON	23002 V TOT AAS SE	23003 V EXT AAS GF	23009 V TOT 5X ICP	23011 V TOT 5X ICP	23111 V DIS ICP DA	23999 VANADIUM COMMON
1	-	-	-	-	-	0.057	0.057	-	-	0.011	-	-	0.011
2	-	-	-	-	0.056	-	0.056	-	-	-	-	-	-
3	0.059	-	-	-	-	-	0.059	0.011	-	0.010	-	-	0.011
6	0.060	-	-	-	-	-	0.060	-	-	-	0.01	-	0.01
8	-	-	-	0.2 L	-	-	0.2 L	-	-	-	-	-	-
9	-	-	0.04	-	-	-	0.04 *	-	-	-	-	0.010	0.010
10	-	-	0.08	-	-	-	0.08 *	-	-	-	-	0.014	0.014*
14	-	0.063	-	-	-	-	0.063	-	0.008	-	-	-	0.008
MEAN	.0595	.0630	.0600	-	.0560	.0570	.0593	.0110	.0080	.0105	.0100	.0120	.0107
STD DEV	.0007	-	.0283	-	-	-	.0118	-	-	.0007	-	.0028	.0020
REL STD	1.2	-	47.1	-	-	-	19.9	-	-	6.7	-	23.6	18.4
DES VAL	-	-	-	-	-	-	.061	-	-	-	-	-	.010

LAB	24003 CR TOT AAS SE	24004 CR TOT AAS GF	24009 CR TOT 5X ICP	24011 CR TOT 5X ICP	24111 CR DIS ICP DA	24303 CR EXT AAS SE	24999 CHROMIUM COMMON	25003 MN TOT AAS DA	25004 MN TOT 5X AAS	25010 MN TOT 5X ICP	25011 MN TOT 5X ICP	25107 MN DIS AAS GF	25111 MN DIS ICP DA
1	-	-	0.014	-	-	-	0.014	0.012	-	-	-	-	-
3	0.014	-	0.012	-	-	-	0.014	-	0.011	0.011	-	-	-
6	-	-	-	0.011	-	-	0.011	-	-	-	0.010	-	-
8	-	0.010	-	-	-	-	0.010*	-	-	-	-	-	-
9	-	0.013	-	-	-	-	0.013	-	-	-	-	-	0.012
10	-	-	-	-	0.013	-	0.013	-	-	-	-	-	0.011
11	-	-	-	-	-	0.013	0.013	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	0.012	-
MEAN	.0140	.0115	.0130	.0110	.0130	.0130	.0126	.0120	.0110	.0110	.0100	.0120	.0115
STD DEV	-	.0021	.0014	-	-	-	.0015	-	-	-	-	-	.0007
REL STD	-	18.4	10.9	-	-	-	12.0	-	-	-	-	-	6.1
DES VAL	-	-	-	-	-	-	.013	-	-	-	-	-	-

LAB	25304 MN EXT AAS DA	25311 MN EXT ICP DA	25999 MANGNESE COMMON	26005 FE TOT AAS SE	26009 FE TOT 5X ICP	26011 FE TOT 5X ICP	26107 FE DIS AAS GF	26111 FE DIS ICP DA	26305 FE EXT AAS SE	26311 FE EXT ICP DA	26999 IRON COMMON	27003 CO TOT AAS GF	27009 CO TOT 5X ICP
1	-	-	0.012	-	-	-	-	-	-	-	-	-	0.012
2	0.01	-	0.01	-	-	-	-	-	0.029	-	0.029	-	-
3	-	-	0.011	0.029	0.028	-	-	-	-	-	0.029	-	0.011
6	-	-	0.010	-	-	0.034	-	-	-	-	0.034	-	-
8	-	0.02 L	0.02 L	-	-	-	-	-	-	0.04	0.04 *	0.011	-
9	-	-	0.012	-	-	-	-	0.03	-	-	0.03	-	-
10	-	-	0.011	-	-	-	-	0.022	-	-	0.022	-	-
11	-	-	-	-	-	-	-	-	0.029	-	0.029	-	-
14	-	-	0.012	-	-	-	0.015	-	-	-	0.015*	-	-
MEAN	.0100	-	.0111	.0290	.0280	.0340	.0150	.0260	.0290	.0400	.0285	.0110	.0115
STD DEV	-	-	.0009	-	-	-	-	.0057	.0000	-	.0075	-	.0007
REL STD	-	-	8.1	-	-	-	-	21.8	-1.0	-	26.2	-	6.1
DES VAL	-	-	.012	-	-	-	-	-	-	-	.029	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

LAB	27011 CO TOT 5X ICP	27111 CO DIS ICP DA	27302 CO EXT AAS SE	27999 COBALT COMMON	28002 NI TOT AAS SE	28009 NI TOT 5X ICP	28011 NI TOT 5X ICP	28111 NI DIS ICP DA	28302 NI EXT AAS SE	28309 NI EXT AAS GF	28999 NICKEL COMMON	29005 CU TOT AAS SE	29009 CU TOT 5X ICP
1	-	-	-	0.012	-	0.013	-	-	-	-	0.013	-	0.014
3	-	-	-	0.011	0.014	0.013	-	-	-	-	0.014	0.013	0.014
6	0.010	-	-	0.010	-	-	0.011	-	-	-	0.011	-	-
8	-	-	-	0.011	-	-	-	-	-	0.012	0.012	-	-
9	-	0.01	-	0.01	-	-	-	0.01	-	-	0.01	-	-
10	-	0.010	-	0.010	-	-	-	0.012	-	-	0.012	-	-
11	-	-	0.012	0.012	-	-	-	-	0.013	-	0.013	-	-
MEAN	.0100	.0100	.0120	.0109	.0140	.0130	.0110	.0110	.0130	.0120	.0121	.0130	.0140
STD DEV	-	.0000	-	.0009	-	.0000	-	.0014	-	-	.0013	-	.0000
REL STD	-	-1.0	-	8.3	-	-1.0	-	12.9	-	-	11.1	-	-1.0
DES VAL	-	-	-	.011	-	-	-	-	-	-	.013	-	-

LAB	29011 CU TOT 5X ICP	29107 CU DIS AAS GF	29111 CU DIS ICP DA	29305 CU EXT AAS SE	29311 CU EXT ICP DA	29999 COPPER COMMON	30005 ZN TOT AAS SE	30009 ZN TOT 5X ICP	30011 ZN TOT 5X ICP	30107 ZN DIS AAS GF	30111 ZN DIS ICP DA	30304 ZN EXT AAS DA	30305 ZN EXT AAS SE
1	-	-	-	-	-	0.014	-	0.016	-	-	-	-	-
2	-	-	-	0.014	-	0.014	-	-	-	-	-	0.015	-
3	-	-	-	-	-	0.013	0.015	0.015	-	-	-	-	-
6	0.010	-	-	-	-	0.010*	-	-	0.013	-	-	-	-
8	-	-	-	-	0.03 R	0.03 R	-	-	-	-	-	-	-
9	-	-	0.01	-	-	0.01 *	-	-	-	-	0.015	-	-
10	-	-	0.013	-	-	0.013	-	-	-	-	0.014	-	-
11	-	-	-	0.014	-	0.014	-	-	-	-	-	-	0.013R
14	-	0.012	-	-	-	0.012	-	-	-	0.011	-	-	-
MEAN	.0100	.0120	.0115	.0140	-	.0125	.0150	.0155	.0130	.0110	.0145	.0150	-
STD DEV	-	-	.0021	.0000	-	.0017	-	.0007	-	-	.0007	-	-
REL STD	-	-	18.4	-1.0	-	13.5	-	4.6	-	-	4.9	-	-
DES VAL	-	-	-	-	-	.013	-	-	-	-	-	-	-

LAB	30311 ZN EXT ICP DA	30999 ZINC COMMON	38009 SR TOT ICP DA	38011 SR TOT ICP DA	38111 SR DIS ICP DA	38301 SR EXT AAS DA	38999 STRNTIUM COMMON	42009 MO TOT 5X ICP	42011 MO TOT 5X ICP	42111 MO DIS ICP DA	42999 MOLYBNUM COMMON	45009	45999
1	-	0.016	-	-	-	-	-	0.014	-	-	0.014*	0.052	0.052
2	-	0.015	-	-	-	-	-	-	-	-	-	-	-
3	-	0.015	0.36	-	-	-	0.36	0.012	-	-	0.012	-	-
6	-	0.013	-	0.15 R	-	-	0.15 R	-	0.011	-	0.011	-	-
8	0.02	0.02 G	-	-	-	-	-	-	-	-	-	-	-
9	-	0.015	-	-	0.37	-	0.37	-	-	0.01	0.01	-	-
10	-	0.014	-	-	-	0.35	0.35	-	-	0.010	0.010	-	-
11	-	0.013	-	-	-	-	-	-	-	-	-	-	-
14	-	0.011*	-	-	-	-	-	-	-	-	-	-	-
MEAN	.0200	.0147	.3600	-	.3700	.3500	.3600	.0130	.0110	.0100	.0114	.0520	.0520
STD DEV	-	.0025	-	-	-	-	.0100	.0014	-	.0000	.0017	-	-
REL STD	-	17.0	-	-	-	-	2.8	10.9	-	-1.0	14.7	-	-
DES VAL	-	.015	-	-	-	-	.350	-	-	-	.012	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 28 PP 68 SAMPLE 3

LAB	48002 CD TOT AAS SE	48004	48009 CD TOT 5X ICP	48011 CD TOT 5X ICP	48103 CD DIS AAS GF	48111 CD DIS ICP DA	48302 CD EXT AAS SE	48309 CD EXT AAS GF	48999 CADMIUM COMMON	56009 BA TOT 5X ICP	56011 BA TOT 5X ICP	56111 BA DIS ICP DA	56999 BARIUM COMMON
1	-	-	0.010	-	-	-	-	-	0.010	-	-	-	-
2	-	-	-	-	-	-	0.011	-	0.011	-	-	-	-
3	0.010	-	0.010	-	-	-	-	-	0.010	0.053	-	-	0.053
6	-	-	-	0.010	-	-	-	-	0.010	-	0.050	-	0.050
8	-	-	-	-	-	-	-	0.011	0.011	-	-	-	-
9	-	0.011	-	-	-	-	-	-	0.011	-	-	0.05	0.05
10	-	-	-	-	-	0.010	-	-	0.010	-	-	0.06	0.06
11	-	-	-	-	-	-	0.011	-	0.011	-	-	-	-
14	-	-	-	-	0.010	-	-	-	0.010	-	-	-	-
MEAN	.0100	.0110	.0100	.0100	.0100	.0100	.0110	.0110	.0104	.0530	.0500	.0550	.0533
STD DEV	-	-	.0000	-	-	-	.0000	-	.0005	-	-	.0071	.0047
REL STD	-	-	-1.0	-	-	-	-1.0	-	5.0	-	-	12.9	8.9
DES VAL	-	-	-	-	-	-	-	-	.011	-	-	-	.052

LAB	82002 PB TOT AAS SE	82004 PB TOT AAS GF	82009 PB TOT 5X ICP	82011 PB TOT 5X ICP	82104 PB DIS AAS GF	82302 PB EXT AAS SE	82309 PB EXT AAS GF	82999 LEAD COMMON
1	-	-	-	-	-	0.012	-	0.012
2	-	-	-	-	-	0.011	-	0.011
3	0.010	-	0.010	-	-	-	-	0.010
6	-	-	-	0.009	-	-	-	0.009
8	-	-	-	-	-	-	0.012	0.012
9	-	0.011	-	-	-	-	-	0.011
10	-	-	-	-	-	-	0.008	0.008
11	-	-	-	-	-	0.010	-	0.010
14	-	-	-	-	0.010	-	-	0.010
MEAN	.0100	.0110	.0100	.0090	.0100	.0110	.0100	.0103
STD DEV	-	-	-	-	-	.0010	.0028	.0013
REL STD	-	-	-	-	-	9.1	28.3	12.8
DES VAL	-	-	-	-	-	-	-	.010

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 28 PP 68 SAMPLE 4

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS	00125 SUM OF ANIONS	02011 COLOUR APPARE	02021 COLOUR VIS COM	02023 COLOUR SPECT	02024 COL TRU SPECT	02040 COLOUR COMMON	02041 CONDUCT SPEC 25	02060 CONDUCT COMMON	02073 TURB HACH	02074 TURB NPLMTRI	02077 TURB HACH FZ
1	2.03	6.02	5.78	-	-	-	2. L	2. L	616.	616.	0.1 L	-	-
2	0.83	5.855	5.759	5. L	-	-	-	5. L	623.	623.	0.1	-	-
3	3.6	6.076	5.653	5. L	-	-	-	5. L	623.	623.	0.04	-	-
4	-	-	-	-	5. L	-	-	5. L	610.	610.	-	-	-
5	4.36	6.10	5.59	5.	-	-	-	5.	581.9	581.9	0.06	-	-
6	3.3	6.2	5.8	-	-	-	-	-	594.	594.	-	0.11	-
7	2.28	5.97	5.70	0.	-	-	-	0.	602.	602.	0.21	-	-
8	1.63	5.96	5.77	5. L	-	-	-	5. L	612.	612.	-	0.08	-
9	3.96	6.04	5.58	-	-	-	-	-	590.	590.	-	-	-
10	1.3	5.943	5.796	-	-	1. L	-	1. L	590.	590.	-	0.2	-
11	-	-	-	5. L	-	-	-	5. L	490. R	490. R	-	-	0.18
12	-	-	-	-	5. L	-	-	5. L	630.	630.	0.4	-	-
13	-	-	-	-	-	-	-	-	625.	625.	-	-	-
14	-	-	-	-	-	-	-	-	623.	623.	-	-	-
MEAN	2.5878	6.0182	5.7142	2.5000	-	-	-	2.5000	609.2231	609.2231	.1620	.1300	.1800
STD DEV	1.2563	.1010	.0872	3.5355	-	-	-	3.5355	16.0046	16.0046	.1484	.0624	-
REL STD	48.5	1.7	1.5	141.4	-	-	-	141.4	2.6	2.6	91.6	48.0	-
DES VAL	-	-	-	-	-	-	-	2.833	-	606.020	-	-	-

LAB	02081 TURB RATIO	02090 TURBIDTY COMMON	05105 BORON AA CARM	05106 BORON F AZOMETH	05111 BORON F ICP DA	05190 BORON COMMON	06001 TOC COMB IR	06051 TIC COMB IR	06101 DOC IR /DIF	06104 DOC UV CO2 IR	06107 DOC UV CO2 PHE	06109 DOC UV CO2 OH	06150 D O C COMMON
1	-	0.1 L	-	-	-	-	-	-	-	-	18.7	-	18.7
2	-	0.1	-	-	-	-	-	-	-	-	26.0 R	-	26.0 R
3	-	0.04	-	-	-	-	-	-	-	16.3	-	-	16.3
4	0.07	0.07	0.12	-	-	0.12 *	-	-	-	19.0	-	-	19.0
5	-	0.06	-	-	-	-	20.	20.	-	-	-	-	20.
6	-	0.11	-	-	-	-	-	-	-	20.1	-	-	20.1
7	-	0.21	-	-	-	-	-	-	-	-	-	-	-
8	-	0.08	-	0.05 L	-	0.05 L	-	-	-	-	-	-	18.5
10	-	0.2	-	-	0.07	0.07	-	-	-	-	-	18.3	18.3
11	-	0.18	-	-	-	-	-	-	15.	-	-	-	15. *
12	-	0.4	-	-	-	-	-	-	17.5	-	-	-	17.5
MEAN	.0700	.1450	.1200	-	.0700	.0950	20.0000	20.0000	16.2500	18.4667	18.7000	18.3000	18.1556
STD DEV	-	.1079	-	-	-	.0354	-	-	1.7678	1.9553	-	-	1.6644
REL STD	-	74.4	-	-	-	37.2	-	-	10.9	10.6	-	-	9.2
DES VAL	-	.205	-	-	-	.040	-	-	-	-	-	-	20.427

LAB	06151 DIC IR COMBUST	06152 DIC UV CO2 IR	06154 DIC AA CO2 PHE	06159 DIC AA CO2 OH	06180 DIC CALC'D	06490 D I C COMMON	07010 TKN AA SAL	07015 TKN DIG BERTHEL	07016 TKN BLK AMM-SAL	07018 TKN BLK INDOPHE	07021 TKN BLK DIG BER	07090 TKN COMMON	07105 NO3+NO2 DIS AA
1	-	-	18.5	-	-	18.5	-	-	-	-	0.713	0.713	2.00
3	-	16.4	-	-	-	16.4	0.716	-	-	-	-	0.716	-
4	-	19.1	-	-	-	19.1	-	-	-	-	-	-	-
5	-	-	-	-	-	20. *	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	0.9	-	-	0.9	-
8	-	-	-	-	-	15.7	-	1.10	-	-	-	1.10 *	-
10	-	-	-	17.3	-	17.3	-	-	-	-	-	-	-
11	-	-	-	-	17.	17.	-	-	-	-	-	-	-
12	18.9	-	-	-	-	18.9	-	-	-	0.66	-	0.66	-
MEAN	18.9000	17.7500	18.5000	17.3000	17.0000	17.8625	.7160	1.1000	.9000	.6600	.7130	.8178	2.0000
STD DEV	-	1.9092	-	-	-	1.4861	-	-	-	-	-	.1821	-
REL STD	-	10.8	-	-	-	8.3	-	-	-	-	-	22.3	-
DES VAL	-	-	-	-	-	17.616	-	-	-	-	-	.839	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 28 PP 68 SAMPLE 4

LAB	07109 NO3+NO2 AA HYD	07110 NO3+NO2 AA2 CD	07111 NO3+NO2 DIS SPEC	07112 NO3+NO2 UF AA CD	07390 NITRATE COMMON	07505 NH3 TOT AA BERT	07540 NH3 TOT AA SAL	07555 NH3 DIS AA PHEN	07557 NH3 DIS AA INDO	07562 NH3 DIS AA EDTA	07563 NH3 DIS AA INDO	07590 AMMONIA COMMON	07601 T N UV AA SUL
1	-	-	-	-	2.00	-	-	-	-	0.209R	-	0.209R	-
2	-	2.0	-	-	2.0	-	-	-	-	-	-	-	2.3
3	-	-	-	2.122	2.122	0.144	-	-	-	-	-	0.144	3.04 R
4	-	2.05	-	-	2.05	-	0.14	-	-	-	-	0.14	-
5	-	1.975	-	-	1.975	-	-	-	0.148	-	-	0.148	-
6	2.03	-	-	-	2.03	-	-	-	0.15	-	-	0.15	-
7	-	-	-	1.94	1.94	-	-	-	-	-	-	-	-
8	-	2.20	-	-	2.20	-	-	0.150	-	-	-	0.150	-
9	1.9	-	-	-	1.9	-	-	-	-	-	-	-	-
10	2.02	-	-	-	2.02	-	-	0.135	-	-	-	0.135	-
11	-	1.9	-	-	1.9	-	0.15	-	-	-	-	0.15	-
12	-	2.06	-	-	2.06	-	-	-	-	-	0.145	0.145	-
13	-	1.75	-	-	1.75 *	-	0.15	-	-	-	-	0.15	-
14	-	-	1.5 R	-	1.5 R	-	-	-	-	-	-	-	-
MEAN	1.9833	1.9907	-	2.0310	1.9959	.1440	.1467	.1425	.1490	-	.1450	.1458	2.3000
STD DEV	.0723	.1406	-	.1287	.1114	-	.0058	.0106	.0014	-	-	.0054	-
REL STD	3.6	7.1	-	6.3	5.6	-	3.9	7.4	.9	-	-	3.7	-
DES VAL	-	-	-	-	2.042	-	-	-	-	-	-	.077	-

LAB	07602 T N CALC'D	07651 T N DIS UV AA	07655 T N DIS UV EDTA	07690 TOT N COMMON	07790 T N DIS COMMON	09103 F DIS COL SP	09105 F DIS SP EL	09106 F DIS EL POT	09107 F DIS AUT POT	09108 F DIS SP EL	09115 F DIS AA ALIZ	09190 FLUORIDE COMMON	10101 ALKLNTY TITR'N
1	-	-	-	-	-	-	-	-	1.14	-	-	1.14	84.
2	-	-	-	-	2.3	-	-	1.1	-	-	-	1.1	77.2
3	-	-	-	-	3.04 R	-	-	-	-	1.13	-	1.13	82.5
4	-	2.4	-	-	2.4	-	-	-	-	-	-	-	79.9
5	-	-	2.36	-	2.36	-	-	0.980	-	-	-	0.980*	80.
6	-	-	-	-	-	1.1	-	-	-	-	-	1.1	-
7	-	-	-	-	-	-	-	-	-	-	-	-	78.9
8	3.30	-	-	3.30	-	-	1.00	-	-	-	-	1.00	-
10	-	-	-	-	-	-	-	-	-	-	1.13	1.13	-
11	-	-	-	-	-	-	1.1	-	-	-	-	1.1	80.
12	2.72	-	-	2.72	-	-	1.13	-	-	-	-	1.13	78.9
13	-	-	-	-	-	-	-	-	-	-	-	-	90. R
14	-	-	-	-	-	-	-	-	-	-	-	-	83.6
MEAN	3.0100	2.4000	2.3600	3.0100	2.3533	1.1000	1.0650	1.0400	1.1400	1.1300	1.1300	1.0900	80.5556
STD DEV	.4101	-	-	.4101	.0503	-	.0919	.0849	-	-	-	.0589	2.3104
REL STD	13.6	-	-	13.6	2.1	-	8.6	8.2	-	-	-	5.4	2.9
DES VAL	-	-	-	2.971	2.425	-	-	-	-	-	-	1.111	-

LAB	10108 ALKLNTY POT TIT	10109 ALKLNTY POT TIT	10112 ALKLNTY TIT CON	10190 ALKLINTY COMMON	10301 PH	10390 PH COMMON	10602 HARDNSS CALC'D	10603 HARDNSS TITR'N	10606 HARDNSS CALC'D	10645 HARDNSS ?	10690 HARDNESS COMMON	11001 NA TOT AAS	11005 NA TOT ICP
1	-	-	-	84.	8.1	8.1	198.	-	-	-	198.	-	-
2	-	-	-	77.2	7.9	7.9	194.9	-	-	-	194.9	-	-
3	-	-	-	82.5	7.82	7.82	-	-	196.	-	196.	-	-
4	-	-	-	79.9	7.91	7.91	-	-	-	-	-	-	-
5	-	-	-	80.	7.26	7.26	202.6	-	-	-	202.6	-	-
6	-	83.	-	83.	7.8	7.8	-	200.	-	-	200.	-	-
7	-	-	-	78.9	8.1	8.1	-	201.	-	-	201.	-	-
8	-	79.0	-	79.0	8.05	8.05	198.	-	-	-	198.	-	-
9	80.	-	-	80.	7.94	7.94	-	-	-	190.	190.	-	39.
10	-	-	81.	81.	8.05	8.05	-	-	-	-	-	-	38.
11	-	-	-	80.	8.0	8.0	201.	-	-	-	201.	-	-
12	-	-	-	78.9	8.0	8.0	-	-	-	-	-	-	-
13	-	-	-	90. R	7.7	7.7	203.1	-	-	-	203.1	-	-
14	-	-	-	83.6	8.08	8.08	211.3	-	-	-	211.3	37.7	-
MEAN	80.0000	81.0000	81.0000	80.6154	7.9079	7.9079	201.2714	200.5000	196.0000	190.0000	199.6273	37.7000	38.5000
STD DEV	-	2.8284	-	2.0728	.2226	.2226	5.2876	.7071	-	-	5.4272	-	.7071
REL STD	-	3.5	-	2.6	2.8	2.8	2.6	.4	-	-	2.7	-	1.8
DES VAL	-	-	-	78.912	-	7.775	-	-	-	-	199.691	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 28 PP 68 SAMPLE 4

LAB	11102 NA F AAS	11103 NA DIS FL PH	11105 NA DIS AAS DA	11107 NA UF FL PH	11111 NA DIS ICP	11311 NA EXT ICP	11990 SODIUM COMMON	12005 MG TOT ICP	12101 MG DIS CALC'D	12102 MG DIS AAS DA	12106 MG UF AAS DA	12107 MG DIS AAS AUT	12111 MG DIS ICP
1	-	38.	-	-	-	-	38.	-	-	-	-	-	-
2	-	36.0	-	-	-	-	36.0	-	-	-	-	31.4	-
3	-	-	-	39.6	-	-	39.6	-	-	-	31.1	-	-
5	-	36.5	-	-	-	-	36.5	-	-	33.7	-	-	-
6	39.	-	-	-	-	-	39.	-	32.	-	-	-	-
7	-	-	37.2	-	-	-	37.2	-	-	32.0	-	-	-
8	-	-	-	-	-	37.1	37.1	-	-	-	-	-	-
9	-	-	-	-	-	-	39.	31.5	-	-	-	-	-
10	-	-	-	-	-	-	38.	31.	-	-	-	-	-
11	33. R	-	-	-	-	-	33. R	-	-	31.	-	-	-
12	-	38.0	-	-	-	-	38.0	-	-	-	-	-	-
13	-	-	-	-	37.93	-	37.93	-	-	-	-	-	31.56
14	-	-	-	-	-	-	37.7	-	-	30.4	-	-	-
MEAN	39.0000	37.1250	37.2000	39.6000	37.9300	37.1000	37.8358	31.2500	32.0000	31.7750	31.1000	31.4000	31.5600
STD DEV	-	1.0308	-	-	-	-	1.0458	.3536	-	1.4431	-	-	-
REL STD	-	2.8	-	-	-	-	2.8	1.1	-	4.5	-	-	-
DES VAL	-	-	-	-	-	-	37.802	-	-	-	-	-	-

LAB	12303 MG UF AAS AUT	12311 MG EXT ICP	12990 MGNESIUM COMMON	14105 SILICA MOLY AA	14106 SILICA MOLY	14107 SILICA MOLY AA	14111 SILICA ICP DA	14190 SILICA COMMON	15313 T P ACL AA SNCL	15401 T P UV AA ASC	15406 T P UF AA ASC	15409 T P BLK AA ASC	15413 T P ACL AA SNCL
1	33.	-	33.	-	-	1.3	-	1.3 *	-	-	-	-	-
2	-	-	31.4	-	-	-	-	-	-	-	-	-	0.001L
3	-	-	31.1	-	1.08	-	-	1.08	-	-	-	-	0.002
4	-	-	-	-	-	-	-	-	-	-	0.003L	-	-
5	-	-	33.7	0.9	-	-	-	0.9 *	-	-	-	-	-
6	-	-	32.	-	-	-	-	-	-	-	-	0.02 R	-
7	-	-	32.0	-	-	-	-	-	-	-	0.003	-	-
8	-	32.3	32.3	1.0	-	-	-	1.0	-	-	-	-	0.001L
9	-	-	31.5	-	-	-	1.15	1.15	-	-	-	-	-
10	-	-	31.	1.13	-	-	-	1.13	-	0.01 L	-	-	-
11	-	-	31.	-	-	-	-	-	0.005L	-	-	-	-
12	-	-	-	1.2	-	-	-	1.2	-	-	0.003L	-	-
13	-	-	31.56	-	-	-	-	-	-	-	0.03 R	-	-
14	-	-	30.4	-	-	-	-	-	-	-	-	-	-
MEAN	33.0000	32.3000	31.7467	1.0575	1.0800	1.3000	1.1500	1.1086	-	-	.0030	-	.002
STD DEV	-	-	.9236	.1338	-	-	-	.1312	-	-	-	-	-
REL STD	-	-	2.9	12.6	-	-	-	11.8	-	-	-	-	-
DES VAL	-	-	31.617	-	-	-	-	1.119	-	-	-	-	-

LAB	15421 T P BLK DIG ASC	15490 TOT P COMMON	16304 SO4 DIS AUTO BA	16306 SO4 DIS AA MTB	16307 SO4 UF AA MTB	16309 SO4 DIS I C	16310 SO4 DIS AA CALM	16990 SULFATE COMMON	17203 CL DIS AA FE	17204 CL DIS AG TIT	17206 CL DIS AA HG	17208 CL DIS AA HG	17209 CL DIS I C
1	0.006L	0.006L	-	117.	-	-	-	117.	52.	-	-	-	-
2	-	0.001L	114.3	-	-	115.	-	114.3	-	-	-	-	58.
3	-	0.002	-	-	105.0	-	-	105.0	-	-	-	56.2	-
4	-	0.003L	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	103.5	-	-	-	103.5	-	-	57.0	-	-
6	-	0.02 R	111.	-	-	-	-	111.	-	56.	-	-	-
7	-	0.003	-	115.6	-	-	-	115.6	56.0	-	-	-	-
8	-	0.001L	-	115.	-	-	-	115.	-	-	58.	-	-
9	-	-	-	-	-	110.	-	110.	-	-	-	-	55.
10	-	0.01 L	-	-	-	-	115.	115.	-	-	-	-	-
11	-	0.005L	-	120.	-	-	-	120.	-	-	54.	-	-
12	-	0.003L	-	116.	-	-	-	116.	-	-	56.5	-	-
13	-	0.03 R	-	122.1	-	-	-	122.1	-	-	55.0	-	-
14	-	-	-	-	-	134.0R	-	134.0R	-	-	-	-	70.4 R
MEAN	-	.0025	112.6500	115.6000	105.0000	112.5000	115.0000	113.7083	54.0000	56.0000	56.1000	56.2000	56.5000
STD DEV	-	.0007	2.3335	5.9231	-	3.5355	-	5.5144	2.8284	-	1.5969	-	2.1213
REL STD	-	35.4	2.1	5.1	-	3.1	-	4.8	5.2	-	2.8	-	3.8
DES VAL	-	.003	-	-	-	-	-	111.613	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 28 PP 68 SAMPLE 4

LAB	17210 CL DIS TIT CON	17990 CHLORIDE COMMON	19001 K TOT AAS	19005 K TOT ICP	19102 K DIS AAS	19103 K DIS FLM PH	19105 K DIS AAS DA	19106 K DIS AAS LI	19107 K DIS FLM PH	19111 K DIS ICP	19301 K EXT HNO3 AA	19990 PTASSIUM COMMON	20005 CA TOT ICP
1	-	52.	-	-	-	16.0	-	-	-	-	-	16.0	-
2	-	58.	-	-	-	15.4	-	-	-	-	-	15.4	-
3	-	56.2	-	-	-	-	-	-	16.7	-	-	16.7	-
5	-	57.0	-	-	-	16.3	-	-	-	-	-	16.3	-
6	-	56.	-	-	16.	-	-	-	-	-	-	16.	-
7	-	56.0	-	-	16.0	-	-	-	-	-	-	16.0	-
8	-	58.	-	-	-	-	-	-	-	-	15.0	15.0	-
9	-	55.	-	17.	-	-	-	-	-	-	-	17.	26.5
10	56.	56.	-	16.2	-	-	-	-	-	-	-	16.2	26.4
11	-	54.	-	-	-	-	-	16.	-	-	-	16.	-
12	-	56.5	-	-	-	16.5	-	-	-	-	-	16.5	-
13	-	55.0	-	-	-	-	-	-	-	18.70	-	18.70	-
14	-	70.4 R	15.0	-	-	-	-	-	-	-	-	15.0	-
MEAN	56.0000	55.8083	15.0000	16.6000	16.0000	16.0500	1.1000	16.0000	16.7000	18.7000	15.0000	16.2154	26.4500
STD DEV	-	1.6747	-	.5657	.0000	.4796	-	-	-	-	-	0.9538	.0707
REL STD	-	3.0	-	3.4	-1.0	3.0	-	-	-	-	-	5.8	.3
DES VAL	-	57.019	-	-	-	-	-	-	-	-	-	16.042	-

LAB	20100 CA DIS CALC'D	20103 CA DIS AAS	20108 CA DIS AAS UF	20110 CA DIS AAS AUT	20111 CA DIS ICP	20311 CA EXT ICP	20990 CALCIUM COMMON
1	-	-	-	25.	-	-	25.
2	-	-	-	26.3	-	-	26.3
3	-	-	27.2	-	-	-	27.2
5	-	25.6	-	-	-	-	25.6
6	27.	-	-	-	-	-	27.
7	-	26.2	-	-	-	-	26.2
8	-	-	-	-	-	26.2	26.2
9	-	-	-	-	-	-	26.5
10	-	-	-	-	-	-	26.4
11	-	30.	-	-	-	-	30. *
13	-	-	-	-	29.04	-	29.04
MEAN	27.0000	27.2667	27.2000	25.6500	29.0400	26.2000	26.8582
STD DEV	-	2.3861	-	.9192	-	-	1.4601
REL STD	-	8.8	-	3.6	-	-	5.4
DES VAL	-	-	-	-	-	-	26.531

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS	00125 SUM OF ANIONS	02011 COLOUR APPARE	02021 COLOUR VIS COM	02023 COLOUR SPECT	02024 COL TRU SPECT	02040 COLOUR COMMON	02041 CONDUCT SPEC 25	02060 CONDUCT COMMON	02073 TURB HACH	02074 TURB NPLMTRI	02077 TURB HACH FZ
1	4.62	1.65	1.81	-	-	-	2. L	2. L	175.	175.	0.1 L	-	-
2	0.16	1.522	1.526	5. L	-	-	-	5. L	175.	175.	0.1	-	-
3	-1.8	1.542	1.599	5. L	-	-	-	5. L	175.	175.	0.03	-	-
4	-	-	-	-	5. L	-	-	5. L	172.	172.	-	-	-
5	-0.6	1.49	1.50	5.	-	-	-	5.	169.2	169.2	0.12	-	-
6	3.2	1.5	1.6	-	-	-	-	-	166.	166.	-	0.12	-
7	-1.56	1.50	1.54	0.	-	-	-	0.	170.	170.	0.35	-	-
8	2.30	1.52	1.59	5. L	-	-	-	5. L	173.	173.	-	0.09	-
9	1.24	1.63	1.59	-	-	-	-	-	165.	165.	-	-	-
10	3.4	1.569	1.466	-	-	1. L	-	1. L	167.	167.	-	0.2	-
11	-	-	-	5. L	-	-	-	5. L	160.	160.	-	-	0.13
12	-	-	-	-	5. L	-	-	5. L	173.	173.	0.3	-	-
13	-	-	-	-	-	-	-	-	205. R	205. R	-	-	-
14	-	-	-	-	-	-	-	-	173.5	173.5	-	-	-
MEAN	1.2178	1.5470	1.5801	2.5000	-	-	-	2.5000	170.2846	170.2846	.1800	.1367	.1300
STD DEV	2.3099	.0581	.0986	3.5355	-	-	-	3.5355	4.6443	4.6443	.1377	.0569	-
REL STD	189.7	3.8	6.2	141.4	-	-	-	141.4	2.7	2.7	76.5	41.6	-
DES VAL	-	-	-	-	-	-	-	4.500	-	171.952	-	-	-

LAB	02081 TURB RATIO	02090 TURBIDTY COMMON	05105 BORON AA CARM	05106 BORON F AZOMETH	05111 BORON F ICP DA	05190 BORON COMMON	06001 TOC COMB IR	06051 TIC COMB IR	06101 DOC IR /DIF	06104 DOC UV CO2 IR	06107 DOC UV CO2 PHE	06109 DOC UV CO2 OH	06150 D O C COMMON
1	-	0.1 L	-	-	-	-	-	-	-	-	20.4 R	-	20.4 R
2	-	0.1	-	-	-	-	-	-	-	-	0.5 L	-	0.5 L
3	-	0.03	-	-	-	-	-	-	-	0.4	-	-	0.4
4	0.09	0.09	0.02	-	-	0.02	-	-	-	0.45	-	-	0.45
5	-	0.12	-	-	-	-	0.95	2.0	-	-	-	-	0.95
6	-	0.12	-	-	-	-	-	-	-	0.2	-	-	0.2
7	-	0.35	-	-	-	-	-	-	-	-	-	-	-
8	-	0.09	-	0.05 L	-	0.05 L	-	-	-	-	-	-	1.8 *
10	-	0.2	-	-	0.01	0.01	-	-	-	-	-	0.2 L	0.2 L
11	-	0.13	-	-	-	-	-	-	1. L	-	-	-	1. L
12	-	0.3	-	-	-	-	-	-	1.0 L	-	-	-	1.0 L
MEAN	.0900	.1530	.0200	-	.0100	.0150	.9500	2.0000	-	.3500	-	-	.7600
STD DEV	-	.1007	-	-	-	.0071	-	-	-	.1323	-	-	.6436
REL STD	-	65.8	-	-	-	47.1	-	-	-	37.8	-	-	84.7
DES VAL	-	.169	-	-	-	.010	-	-	-	-	-	-	.580

LAB	06151 DIC IR COMBUST	06152 DIC UV CO2 IR	06154 DIC AA CO2 PHE	06159 DIC AA CO2 OH	06180 DIC CALC'D	06490 D I C COMMON	07010 TKN AA SAL	07015 TKN DIG BERTHEL	07016 TKN BLK AMM-SAL	07018 TKN BLK INDOPHE	07021 TKN BLK DIG BER	07090 TKN COMMON	07109 NO3+NO2 AA HYD
1	-	-	5.2	-	-	5.2	-	-	-	-	0.050L	0.050L	-
3	-	4.6	-	-	-	4.6	0.039	-	-	-	-	0.039	-
4	-	5.5	-	-	-	5.5	-	-	-	-	-	-	-
5	-	-	-	-	-	2.0 *	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	0.1	-	-	0.1 *	0.06
8	-	-	-	-	-	3.0 *	-	0.20 L	-	-	-	0.20 L	-
9	-	-	-	-	-	-	-	-	-	-	-	-	0.03
10	-	-	-	5.6	-	5.6	-	-	-	-	-	-	0.040
11	-	-	-	-	5.	5.	-	-	-	-	-	-	-
12	6.0	-	-	-	-	6.0	-	-	-	0.06	-	0.06	-
MEAN	6.0000	5.0500	7.8000	5.6000	5.0000	4.6125	.0390	-	.1000	.0600	-	.0495	.0433
STD DEV	-	.6364	-	-	-	1.3943	-	-	-	-	-	.0148	.0153
REL STD	-	12.6	-	-	-	30.2	-	-	-	-	-	30.0	35.3
DES VAL	-	-	-	-	-	5.537	-	-	-	-	-	.070	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 28 PP 68 SAMPLE 5

LAB	07110 NO3+NO2 AA2 CD	07111 NO3+NO2 DIS SPEC	07112 NO3+NO2 UF AA CD	07390 NITRATE COMMON	07505 NH3 TOT AA BERT	07510 NH3 TOT ?	07540 NH3 TOT AA SAL	07555 NH3 DIS AA PHEN	07557 NH3 DIS AA INDO	07562 NH3 DIS AA EDTA	07563 NH3 DIS AA INDO	07590 AMMONIA COMMON	07601 T N UV AA SUL
1	-	0.042	-	0.042	-	-	-	-	-	0.011	-	0.011	-
2	0.05	-	-	0.05	-	-	-	-	-	-	-	-	0.1 L
3	-	-	0.046	0.046	0.005L	-	-	-	-	-	-	0.005L	0.065
4	0.045	-	-	0.045	-	-	0.005L	-	-	-	-	0.005L	-
5	0.039	-	-	0.039*	-	-	-	-	0.002L	-	-	0.002*	-
6	-	-	-	0.06 *	-	-	-	-	0.02 R	-	-	0.02 R	-
7	-	-	0.05	0.05	-	-	-	-	-	-	-	-	-
8	0.05	-	-	0.05	-	-	-	0.004	-	-	-	0.004*	-
9	-	-	-	0.03 *	-	-	-	-	-	-	-	-	-
10	-	-	-	0.040	-	-	-	0.01 L	-	-	-	0.01 L	-
11	0.06	-	-	0.06 *	-	-	0.012	-	-	-	-	0.012	-
12	0.05	-	-	0.05	-	-	-	-	-	-	0.005L	0.005L	-
13	0.2 L	-	-	0.2 L	-	0.1 L	-	-	-	-	-	0.1 L	-
14	-	0.055	-	0.055	-	-	-	-	-	-	-	-	-
MEAN	.0490	.0485	.0480	.0475	-	-	.0120	.0040	-	.0110	-	.0090	.0650
STD DEV	.0069	.0092	.0028	.0085	-	-	-	-	-	-	-	.0044	-
REL STD	14.1	19.0	5.9	17.9	-	-	-	-	-	-	-	48.4	-
DES VAL	-	-	-	.042	-	-	-	-	-	-	-	.007	-

LAB	07602 T N CALC'D	07651 T N DIS UV AA	07655 T N DIS UV EDTA	07690 TOT N COMMON	07790 T N DIS COMMON	09103 F DIS COL SP	09105 F DIS SP EL	09106 F DIS EL POT	09107 F DIS AUT POT	09108 F DIS SP EL	09115 F DIS AA ALIZ	09190 FLUORIDE COMMON	10101 ALKLNTY TITR'N
1	-	-	-	-	-	-	-	-	0.05 L	-	-	0.05 L	33. R
2	-	-	-	-	0.1 L	-	-	0.05 L	-	-	-	0.05 L	21.1
3	-	-	-	-	0.065	-	-	-	-	0.05	-	0.05	-
4	-	0.075	-	-	0.075	-	-	-	-	-	-	-	21.7
5	-	-	0.065	-	0.065	-	0.05 L	-	-	-	-	0.05 L	21.5
6	-	-	-	-	-	0.1 L	-	-	-	-	-	0.1 L	-
7	-	-	-	-	-	-	-	-	-	-	-	-	21.4
8	0.25 L	-	-	0.25 L	-	-	0.046	-	-	-	-	0.046	-
10	-	-	-	-	-	-	-	-	-	-	0.04 L	0.04 L	-
11	-	-	-	-	-	-	0.02 L	-	-	-	-	0.02 *	22.
12	0.11	-	-	0.11	-	-	0.10 L	-	-	-	-	0.10 L	21.9
13	-	-	-	-	-	-	-	-	-	-	-	-	26.
14	-	-	-	-	-	-	-	-	-	-	-	-	23.9
MEAN	.1100	.0750	.0650	.1100	.0683	-	.0460	-	-	.0500	-	.0480	22.4375
STD DEV	-	-	-	-	.0058	-	-	-	-	-	-	.0028	1.6733
REL STD	-	-	-	-	8.4	-	-	-	-	-	-	5.9	7.5
DES VAL	-	-	-	.115	.072	-	-	-	-	-	-	.044	-

LAB	10108 ALKLNTY POT TIT	10109 ALKLNTY POT TIT	10111 ALKLNTY TIT PRO	10112 ALKLNTY TIT CON	10190 ALKLINTY COMMON	10301 PH	10390 PH COMMON	10602 HARDNSS CALC'D	10603 HARDNSS TITR'N	10606 HARDNSS CALC'D	10645 HARDNSS ?	10690 HARDNESS COMMON	11001 NA TOT AAS
1	-	-	-	-	33. R	7.5	7.5	57.	-	-	-	57. *	-
2	-	-	-	-	21.1	7.3	7.3	45.6	-	-	-	45.6	-
3	-	-	22.9	-	22.9	7.76	7.76	-	-	47.0	-	47.0	-
4	-	-	-	-	21.7	7.78	7.78	-	-	-	-	-	-
5	-	-	-	-	21.5	6.26 R	6.26 R	44.1	-	-	-	44.1	-
6	-	26.	-	-	26. *	7.2	7.2	-	46.	-	-	46.	-
7	-	-	-	-	21.4	7.7	7.7	-	47.0	-	-	47.0	-
8	-	22.0	-	-	22.0	7.50	7.50	46.9	-	-	-	46.9	-
9	24.	-	-	-	24.	7.54	7.54	-	-	-	47.	47.	-
10	-	-	-	20.	20. *	7.60	7.60	-	-	-	-	-	-
11	-	-	-	-	22.	7.8	7.8	55.	-	-	-	55. *	-
12	-	-	-	-	21.9	7.5	7.5	-	-	-	-	-	-
13	-	-	-	-	26. *	6.9	6.9	51.1	-	-	-	51.1	-
14	-	-	-	-	23.9	7.60	7.60	50.5	-	-	-	50.5	13.1
MEAN	24.0000	24.0000	22.9000	20.0000	22.6462	7.5138	7.5138	50.0286	46.5000	47.0000	47.0000	48.8364	13.1000
STD DEV	-	2.8284	-	-	1.8374	.2558	.2558	4.8172	.7071	-	-	4.0908	-
REL STD	-	11.8	-	-	8.1	3.4	3.4	9.6	1.5	-	-	8.4	-
DES VAL	-	-	-	-	22.855	-	7.402	-	-	-	-	47.250	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 28 PP 68 SAMPLE 5

LAB	11005 NA TOT ICP	11102 NA F AAS	11103 NA DIS FL PH	11105 NA DIS AAS DA	11107 NA UF FL PH	11111 NA DIS ICP	11311 NA EXT ICP	11990 SODIUM COMMON	12005 MG TOT ICP	12101 MG DIS CALC'D	12102 MG DIS AAS DA	12106 MG UF AAS DA	12107 MG DIS AAS AUT
1	-	-	11. R	-	-	-	-	11. R	-	-	-	-	-
2	-	-	13.3	-	-	-	-	13.3	-	-	-	-	2.9
3	-	-	-	-	13.1	-	-	13.1	-	-	-	2.8	-
4	-	-	13.3	-	-	-	-	13.3	-	-	2.89	-	-
5	-	14.	-	-	-	-	-	14.	-	2.9	-	-	-
6	-	-	-	12.7	-	-	-	12.7	-	-	2.9	-	-
7	-	-	-	-	-	-	12.8	12.8	-	-	-	-	-
8	15.	-	-	-	-	-	-	15. *	3.0	-	-	-	-
9	13.7	-	-	-	-	-	-	13.7	2.94	-	-	-	-
10	-	13.	-	-	-	-	-	13.	-	-	3.4	-	-
11	-	-	13.3	-	-	-	-	13.3	-	-	-	-	-
12	-	-	-	-	-	13.64	-	13.64	-	-	-	-	-
13	-	-	-	-	-	-	-	13.1	-	-	2.74	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-
MEAN	14.3500	13.5000	13.3000	12.7000	13.1000	13.6400	12.8000	13.4117	2.9700	2.9000	2.9825	2.8000	2.9000
STD DEV	.9192	.7071	.0000	-	-	-	-	.6242	.0424	-	.2878	-	-
REL STD	6.4	5.2	-1.0	-	-	-	-	4.7	1.4	-	9.6	-	-
DES VAL	-	-	-	-	-	-	-	13.354	-	-	-	-	-

LAB	12111 MG DIS ICP	12303 MG UF AAS AUT	12311 MG EXT ICP	12990 MGNESIUM COMMON	14105 SILICA MOLY AA	14106 SILICA MOLY	14107 SILICA MOLY AA	14111 SILICA ICP DA	14190 SILICA COMMON	15313 T P ACL AA SNCL	15401 T P UV AA ASC	15406 T P UF AA ASC	15409 T P BLK AA ASC
1	-	2.86	-	2.86	-	-	1.4	-	1.4	-	-	-	-
2	-	-	-	2.9	-	-	-	-	-	-	-	-	-
3	-	-	-	2.8	-	1.35	-	-	1.35	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	0.003L	-
5	-	-	-	2.89	1.1	-	-	-	1.1 *	-	-	-	-
6	-	-	-	2.9	-	-	-	-	-	-	-	-	0.02 R
7	-	-	-	2.9	-	-	-	-	-	-	-	0.004	-
8	-	-	3.07	3.07	1.2	-	-	-	1.2 *	-	-	-	-
9	-	-	-	3.0	-	-	-	1.39	1.39	-	-	-	-
10	-	-	-	2.94	1.34	-	-	-	1.34	-	0.01 L	-	-
11	-	-	-	3.4 R	-	-	-	-	-	0.005L	-	-	-
12	-	-	-	-	1.3	-	-	-	1.3	-	-	0.003L	-
13	2.96	-	-	2.96	-	-	-	-	-	-	-	0.007	-
14	-	-	-	2.74	-	-	-	-	-	-	-	-	-
MEAN	2.9600	2.8600	3.0700	2.9055	1.2350	1.3500	1.4000	1.3900	1.2971	-	-	.0055	-
STD DEV	-	-	-	.0900	.1075	-	-	-	.1097	-	-	.0021	-
REL STD	-	-	-	3.1	8.7	-	-	-	8.5	-	-	38.6	-
DES VAL	-	-	-	2.897	-	-	-	-	1.395	-	-	-	-

LAB	15413 T P ACL AA SNCL	15421 T P BLK DIG ASC	15490 TOT P COMMON	16304 SO4 DIS AUTO BA	16306 SO4 DIS AA MTB	16307 SO4 UF AA MTB	16309 SO4 DIS I C	16310 SO4 DIS AA CALM	16990 SULFATE COMMON	17203 CL DIS AA FE	17204 CL DIS AG TIT	17206 CL DIS AA HG	17208 CL DIS AA HG
1	-	0.006L	0.006L	-	32.	-	-	-	32.	17.	-	-	-
2	0.001L	-	0.001L	30.0	-	-	30.	-	30.	-	-	-	-
3	0.001	-	0.001	-	-	30.3	-	-	30.3	-	-	-	16.9
4	-	-	0.003L	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	28.8	-	-	-	28.8	-	-	16.9	-
6	-	-	0.02 R	28.	-	-	-	-	28.	-	18.	-	-
7	-	-	0.004	-	31.2	-	-	-	31.2	16.4	-	-	-
8	0.001	-	0.001	-	35. R	-	-	-	35. R	-	-	15. R	-
9	-	-	-	-	-	-	30.	-	30.	-	-	-	-
10	-	-	0.01 L	-	-	-	-	28.	28.	-	-	-	-
11	-	-	0.005L	-	29.	-	-	-	29.	-	-	17.	-
12	-	-	0.003L	-	29.3	-	-	-	29.3	-	-	16.5	-
13	-	-	0.007	-	32.70	-	-	-	32.70	-	-	16.0	-
14	-	-	-	-	-	-	30.4	-	30.4	-	-	-	-
MEAN	.0010	-	.0033	29.0000	30.5000	30.3000	30.1333	28.0000	29.9750	16.7000	18.0000	16.6000	16.9000
STD DEV	.0000	-	.0029	1.4142	1.6829	-	.2309	-	1.4741	.4243	-	.4546	-
REL STD	-1.0	-	88.4	4.9	5.5	-	.8	-	4.9	2.5	-	2.7	-
DES VAL	-	-	.004	-	-	-	-	-	29.500	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 28 PP 68 SAMPLE 5

LAB	17209 CL DIS I C	17210 CL DIS TIT CON	17990 CHLORIDE COMMON	19001 K TOT AAS	19005 K TOT ICP	19102 K DIS AAS	19103 K DIS FLM PH	19106 K DIS AAS LI	19107 K DIS FLM PH	19111 K DIS ICP	19301 K EXT HNO3 AA	19990 PTASSIUM COMMON	20005 CA TOT ICP
1	-	-	17.	-	-	-	1.0	-	-	-	-	1.0 *	-
2	18.0	-	18.0	-	-	-	1.2	-	-	-	-	1.2	-
3	-	-	16.9	-	-	-	-	-	1.27	-	-	1.27	-
5	-	-	16.9	-	-	-	1.2	-	-	-	-	1.2	-
6	-	-	18. R	-	-	1.1	-	-	-	-	-	1.1	-
7	-	-	16.4	-	-	1.22	-	-	-	-	-	1.22	-
8	-	-	15. *	-	-	-	-	-	-	-	1.2	1.2	-
9	17.	-	17.	-	1.3	-	-	-	-	-	-	1.3	14.
10	-	17.	17.	-	1.37	-	-	-	-	-	-	1.37 *	13.9
11	-	-	17.	-	-	-	-	1.3	-	-	-	1.3	-
12	-	-	16.5	-	-	-	1.2	-	-	-	-	1.2	-
13	-	-	16.0	-	-	-	-	-	-	1.00	-	1.00 *	-
14	16.8	-	16.8	1.27	-	-	-	-	-	-	-	1.27	-
MEAN	17.2667	17.0000	16.7083	1.2700	1.3350	1.1600	1.1500	1.3000	1.2700	1.0000	1.2000	1.2023	13.9500
STD DEV	.6429	-	.7166	-	.0495	.0849	.1000	-	-	-	-	.1114	.0707
REL STD	3.7	-	4.3	-	3.7	7.3	8.7	-	-	-	-	9.3	.5
DES VAL	-	-	16.929	-	-	-	-	-	-	-	-	1.206	-

LAB	20050	20100 CA DIS CALC'D	20103 CA DIS AAS	20108 CA DIS AAS UF	20110 CA DIS AAS AUT	20111 CA DIS ICP	20311 CA EXT ICP	20990 CALCIUM COMMON
1	-	-	-	-	13.	-	-	13.
2	-	-	-	-	13.5	-	-	13.5
3	-	-	-	14.2	-	-	-	14.2
5	-	-	12.9	-	-	-	-	12.9
6	-	14.	-	-	-	-	-	14.
7	-	-	13.5	-	-	-	-	13.5
8	-	-	-	-	-	-	13.7	13.7
9	-	-	-	-	-	-	-	14.
10	-	-	-	-	-	-	-	13.9
11	-	-	16.	-	-	-	-	16. *
13	-	-	-	-	-	15.30	-	15.30
14	15.7	-	-	-	-	-	-	15.7
MEAN	15.7000	14.0000	14.1333	14.2000	13.2500	15.3000	13.7000	14.1417
STD DEV	-	-	1.6442	-	.3536	-	-	1.0086
REL STD	-	-	11.6	-	2.7	-	-	7.1
DES VAL	-	-	-	-	-	-	-	14.160

DATES RECEIVED 1 88/04/15 2 88/05/02 3 88/04/03 3 88/06/06 4 88/04/28
5 88/06/28 6 88/03/24 6 88/04/18 7 88/06/17 8 88/04/15
9 88/04/26 10 88/06/23 11 88/05/04 12 88/05/10 13 88/04/13
14 88/06/23

NOTE: ALL CONCENTRATION UNITS ARE EXPRESSED IN MG/L OF EACH ELEMENT, THE EXCEPTIONS BEING: COLOUR IN RELATIVE UNITS, CONDUCTIVITY IN USIE/CM, TURBIDITY IN JTU OR NTU, NITROGEN ANALYSES IN "N", ALKALINITY & HARDNESS IN CACO3, SILICA IN SIO2, AND SULFATE IN SO4.

DISTRIBUTION - PPWB

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H.Alkema\NWRI\336-4929\ha

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TO / À: Distribution

FROM / DE:
H. Alkema
Quality Assurance Section
National Water Research Institute
Burlington, Ontario

SUBJECT / OBJET: Prairie Provinces Quality Assurance Program (PPQA)

I have enclosed the final report for PP 69-70.

If you have any comments on this report, or any legitimate corrections to the data base, please do not hesitate to communicate them.

Harry A

H. Alkema

RESEARCH & APPLICATIONS BRANCH

FINAL REPORT

REPORT NO. RAB 88-12

PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAM

STUDIES 69 AND 70

for May and June 1988

TRACE METALS, MAJOR IONS, NUTRIENTS AND PHYSICAL PARAMETERS IN SURFACE WATERS

by

H. Alkema

Quality Assurance Section
National Water Research Institute
Burlington, Ontario

September 1988

Introduction

As part of an on-going study, the Quality Assurance Section, NWRI in Burlington, Ontario, has been sending reference water samples bi-monthly to chemical laboratories participating in the PPWB program. This report summarizes the most recent PPWB interlaboratory quality control studies: PP 69 and 70, for the months of May and June, 1988. These two studies dealt with trace metals, major ions, nutrients and physical parameters. The levels involved softer coloured waters for the major ion samples.

Study Design

Four water samples were submitted to each laboratory for chemical analyses. Two samples were submitted for trace metals analysis, while the remaining two were submitted for major ions, nutrients and some physical measurements. The following is a breakdown of the four samples:

PP 69 - Sample 1 - 125 ml, DA* for trace metals (3% HNO_3)
Sample 2 - up to 1L, major ions etc., stored at 4^oC

PP 70 - Sample 3 - 1L, SE* for trace metals (0.2% HNO_3)
Sample 4 - up to 1L, major ions, etc., stored at 4^oC

* for definitions see Appendix 1

Treatment of Data

Each laboratory was asked to perform only those analyses which were routine to their particular laboratory, using the general methodology guidelines listed above. Results for these analyses were recorded on report sheets provided with the QA samples. Upon receipt of the Reporting Sheets, the results were tabulated for each parameter, first for each method reported, and then for all methods combined. These data, and the resulting statistics are presented in the Data Summary. (attached)

Preliminary data summaries, including problematic results, were sent June 29 or July 8, and August 18. Each laboratory was given three weeks to notify us of any errors in data transcription, compilation, or flags.

Performance Indicators

In the PPWB QA program, two types of reference samples are used for the accuracy assessment. Reference waters (RMs) and certified reference waters (CRMs) have Design Values for the stable parameters. Also, regional samples are used occassionally as reference samples. The means for the regional samples, and the Design Values (together called the comparator) are used to test each reported result for accuracy.

Percentage deviations from the comparator are used as an indicator for the laboratory head to determine the extent of the discrepencies between the laboratory result and comparator as it applies to his procedures. However, please keep in mind that at low levels, high % deviations are often seen, and may be misleading if interpreted too strictly.

A result which deviates more than 10% from the comparator is marked with an asterik in the data tables and its value tabulated in the flags table (Table 1). Results reported with an "L" (less than) or flagged with an "R" (rejectable) are not used in the statistical calculations. Performance indicators are fully explained in Appendix II.

Comments on Laboratory Performance

Results accompanied with a 'less than' are difficult to appraise. If a design value or mean is significantly lower than the detection limit given by a particular laboratory, then that detection limit is too high. Such a result is assigned an 'HDL' and is tabulated for each laboratory in Table 1.

If, on the other hand, the detection limit reported is far lower than the mean or design value, then the use of 'less than' is clearly inadequate and the result is flagged low. The magnitude of the deviation from the mean in such a case is taken from the detection limit given.

Attached are two tables listing flagged data by laboratory (Table 1), and listing parameters for which there was a high standard deviation (Table 2). The latter (formerly called a high coefficient of variation) was generated with a new set of criteria to provide a more accurate and more consistent description of difficult to analyse parameters or levels. Your comments will be appreciated.

PPWB laboratories average number of deviations per sample was 3.6

TABLE 1: PRAIRIE PROV LABS FLAG TABLE - STUDIES PP 69 PP 70

LAB	1	FLAGS :	TURBIDTY	98%	SILICA	27%	R	SULFATE	222% R
			CHLORIDE	-21%	CALCIUM	-72%	R	MANGNESE	-83% R
			MGNESIUM	16%	SILICA	20%		SULFATE	18%
			PTASSIUM	-24% R					
		HDL :	NONE						
LAB	3	FLAGS :	PH	14% R					
		HDL :	NONE						
LAB	4	FLAGS :	TOT P	-60%					
		HDL :	NONE						
LAB	6	FLAGS :	CHROMIUM	-14%	NICKEL	-11%	G	ZINC	-14%
			STRNTIUM	-28% R	CADMIUM	-12%	G	CONDUCT	-13%
			TKN	45%	HARDNESS	-21%	R	SODIUM	21% R
			TOT P	200% R	CHLORIDE	-30%		PTASSIUM	109% R
			ALUMINUM	-20%	CHROMIUM	43%		IRON	67%
			NICKEL	67%	COPPER	43%		STRNTIUM	-42% R
			MOLYBNUM	243% R	LEAD	80%	R	TKN	115% R
			ALKLINTY	26% R	TOT P	186%	R	SULFATE	-12%
		HDL :	AMMONIA		ALKLINTY			MGNESIUM	
			SULFATE		CALCIUM			VANADIUM	
			AMMONIA						
LAB	8	FLAGS :	CHROMIUM	246% R	COBALT	-76%	R	BORON	171%
			AMMONIA	57%	SULFATE	108%	R	CHROMIUM	43%
			BORON	162%	D I C	-23%		NITRATE	18%
			HARDNESS	12%	MGNESIUM	22%			
		HDL :	D I C		ALUMINUM			MANGNESE	
			IRON		COPPER			ZINC	
			TKN		TOT N				

-NOTE: A VERY HIGH FREQUENCY OF FLAGGED RESULTS (OR A HIGH %) IS INDICATIVE OF POOR PERFORMANCE. ON THE OTHER HAND, LABS WITH FEW IF ANY FLAGS ARE JUDGED TO HAVE VERY GOOD PERFORMANCE.

ALSO, AN "R" FLAG INDICATES A NON COMPARABLE RESULT, THAT IS, ONE PRODUCED WITH NON RANDOM FACTORS. AN "L" FLAG INDICATES A 'LESS THAN' RESULT LOWER THAN THE COMPARATOR.

TABLE 2: HIGH STANDARD DEVIATION

PARAMETER		LEVEL
COLOUR	AT	131.444 PPM
BORON	AT	.203 PPM
ALKALINITY	AT	3.220 PPM
POTASSIUM	AT	.287 PPM
BORON	AT	.065 PPM

APPENDIX I

Definitions of Types of Metals Analysis

1. DA - Direct Aspiration

Without sample pretreatment, samples are aspirated by Atomic Absorption Spectrophotometry (AAS) ar Inuctively Coupled (Argon) Plasma (ICAP or ICP). Standards should contain the acid equivalent of the sample.

2. SE - Code for low level analysis

Analysis is carried out by one of the following methods:

1. Solvent extraction sample concentration followed by AAS.
2. Digestion and concentration of aqueous phase followed by ICAP.
3. Digestion of aqueous phase and ICAP analysis.
4. Graphite tube (flameless) AAS.

APPENDIX II

Performance Indicators

1. **Circled Results**

Results are circled in the data tables when a minor deviation from the comparator has ocurred. (The comparator is the design value of the reference sample, or the mean in the case of a biologically active sample.) Circled results are in general greater than or less than 10% from the comparator. At very low levels of analytes or with parameters that are difficult to analyse, a greater deviation than 10% is allowed. Under these conditions, a result is circled when it is outside one standard deviation of the comparator. These circled results, though acceptable values, are a warning to laboratory managers that the parameter analysis should be investigated.

2. **Rejectable Results**

Each laboratory result is statistically tested to see if it is outlying. Outlying results were caused by non random causes such as a faulty calibration or a transcription error. These outlying results, calculated by the Grubbs' procedure,* and indicated in the data tables with an 'R', are noncomparable with the other data for the parameter.

3. **A High Co-efficient of Variation (HCV)**

Occasionally data for a parameter yields a very high relative standard deviation (RSD). When this HCV is not due to outlying values, it indicates a high variability within the data set. The data in this set is then noncomparable. In such a case, the RSD for the parameter is circled in the data tables and the parameter's noncomparability is noted in the comments.

4. **High Detection Limits (HDL)**

Each laboratory determines its own detection limits according to its own requirements. When major differences of detection limits occur, the result is flagged with 'HDL' in the data tables. An HDL indicates that low level analysis may not be comparable with the analyses of other laboratories.

* reference : Frank E. Grubbs, Technometrics, 1969, p. 1.

DATA SUMMARY

FEDERAL-PROVINCIAL & PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAMS

STUDY NO. FP 29 PP 69 DATE: 01/05/88 DUE DATE: 30/06/88

SAMPLE 1 SPIKED SAMPLE. TRACE METALS D/A. (IN 3% HNO3)

LAB	13009 AL TOT 5X ICP	13102 AL DIS AAS DA	13111 AL DIS ICP DA	13302 AL EXT AAS DA	13306 AL UF AAS OX	13321 AL EXT ICP DA	13999 ALUMINUM COMMON	23009 V TOT 5X ICP	23011 V TOT 5X ICP	23101 V DIS ICP DA	23111 V DIS ICP DA	23321 V EXT ICP DA	23999 VANADIUM COMMON
1	-	-	-	-	2.60	-	2.60	2.18	-	-	-	-	2.18
3	-	-	-	2.80	-	0.507	2.80	-	-	-	-	2.32	2.32
6	2.6	-	-	-	-	-	2.6	-	2.2	-	-	-	2.2
8	-	-	-	2.8	-	-	2.8	-	-	-	-	-	-
9	-	-	2.7	-	-	-	2.7	-	-	-	2.35	-	2.35
10	-	-	2.63	-	-	-	2.63	-	-	-	2.28	-	2.28
14	-	2.68	-	-	-	-	2.68	-	-	2.50	-	-	2.50
MEAN	2.6000	2.6800	2.6650	2.8000	2.6000	.5070	2.6871	2.1800	2.2000	2.5000	2.3150	2.3200	2.3050
STD DEV	-	-	.0495	.0000	-	-	.0858	-	-	-	.0495	-	.1162
REL STD	-	-	1.9	-1.0	-	-	3.2	-	-	-	2.1	-	5.0
DES VAL	-	-	-	-	-	-	2.690	-	-	-	-	-	2.324

LAB	24009 CR TOT 5X ICP	24011 CR TOT 5X ICP	24111 CR DIS ICP DA	24302 CR EXT AAS DA	24311 CR EXT ICP DA	24321 CR EXT ICP DA	24999 CHROMIUM COMMON	25003 MN TOT 5X ICP	25011 MN TOT 5X ICP	25104 MN DIS AAS DA	25111 MN DIS ICP DA	25304 MN EXT AAS DA	25311 MN EXT ICP DA
1	0.293	-	-	-	-	-	0.293	0.258	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	0.28	-
3	-	-	-	-	-	0.290	0.290	-	-	-	-	0.271	-
6	-	0.26	-	-	-	-	0.26 *	-	0.24	-	-	-	-
8	-	-	-	1.04 R	-	-	1.04 R	-	-	-	-	-	0.25
9	-	-	0.29	-	-	-	0.29	-	-	-	0.26	-	-
10	-	-	0.292	-	-	-	0.292	-	-	-	0.256	-	-
11	-	-	-	0.32	-	-	0.32	-	-	-	-	1.1 R	-
13	-	-	-	-	0.30	-	0.30	-	-	-	-	-	0.26
14	-	-	-	-	-	-	-	-	-	0.264	-	-	-
MEAN	.2930	.2600	.2910	.3200	.3000	.2900	.2921	.2580	.2400	.2640	.2580	.2755	.2550
STD DEV	-	-	.0014	-	-	-	.0177	-	-	-	.0028	.0064	.0071
REL STD	-	-	.5	-	-	-	6.1	-	-	-	1.1	2.3	2.8
DES VAL	-	-	-	-	-	-	.301	-	-	-	-	-	-

LAB	25321 MN EXT ICP DA	25999 MANGNESE COMMON	26011 FE TOT 5X ICP	26104 FE DIS AAS DA	26111 FE DIS ICP DA	26304 FE EXT AAS DA	26311 FE EXT ICP DA	26321 FE EXT ICP DA	26999 IRON COMMON	27009 CO TOT 5X ICP	27011 CO TOT 5X ICP	27111 CO DIS ICP DA	27301 CO EXT AAS DA
1	-	0.258	-	-	-	-	-	-	-	1.03	-	-	-
2	-	0.28	-	-	-	1.1	-	-	1.1	-	-	-	-
3	0.047	0.271	-	-	-	1.10	-	0.256	1.10	-	-	-	-
6	-	0.24	1.0	-	-	-	-	-	1.0	-	1.0	-	-
8	-	0.25	-	-	-	-	1.10	-	1.10	-	-	-	0.26 R
9	-	0.26	-	-	1.10	-	-	-	1.10	-	-	1.05	-
10	-	0.256	-	-	1.08	-	-	-	1.08	-	-	1.04	-
11	-	1.1 R	-	-	-	1.1	-	-	1.1	-	-	-	1.1
13	-	0.26	-	-	-	-	1.1	-	1.1	-	-	-	-
14	-	0.264	-	1.04	-	-	-	-	1.04	-	-	-	-
MEAN	.0470	.2599	1.0000	1.0400	1.0900	1.1000	1.1000	.2560	1.0800	1.0300	1.0000	1.0450	1.1000
STD DEV	-	.0115	-	-	.0141	.0000	.0000	-	.0361	-	-	.0071	-
REL STD	-	4.4	-	-	1.3	-1.0	-1.0	-	3.3	-	-	.7	-
DES VAL	-	.263	-	-	-	-	-	-	1.088	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 29 PP 69 SAMPLE 1

LAB	27321 CO EXT ICP DA	27999 COBALT COMMON	28009 NI TOT 5X ICP	28011 NI TOT 5X ICP	28111 NI DIS ICP DA	28301 NI EXT AAS DA	28311 NI EXT ICP DA	28321 NI EXT ICP DA	28999 NICKEL COMMON	29009 CU TOT 5X ICP	29011 CU TOT 5X ICP	29106 CU DIS AAS DA	29111 CU DIS ICP DA
1	-	1.03	1.18	-	-	-	-	-	1.18	0.263	-	-	-
3	1.06	1.06	-	-	-	-	-	1.26	1.26	-	-	-	-
6	-	1.0	-	1.1	-	-	-	-	1.1 *	-	0.26	-	-
8	-	0.26 R	-	-	-	-	1.24	-	1.24	-	-	-	-
9	-	1.05	-	-	1.20	-	-	-	1.20	-	-	-	0.30
10	-	1.04	-	-	1.24	-	-	-	1.24	-	-	-	0.283
11	-	1.1	-	-	-	1.2	-	-	1.2	-	-	-	-
13	-	-	-	-	-	-	1.26	-	1.26	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	0.304	-
MEAN	1.0600	1.0467	1.1800	1.1000	1.2200	1.2000	1.2500	1.2600	1.2100	.2630	.2600	.3040	.2915
STD DEV	-	.0333	-	-	.0283	-	.0141	-	.0535	-	-	-	.0120
REL STD	-	3.2	-	-	2.3	-	1.1	-	4.4	-	-	-	4.1
DES VAL	-	1.070	-	-	-	-	-	-	1.236	-	-	-	-

LAB	29306 CU EXT AAS DA	29311 CU EXT ICP DA	29321 CU EXT ICP DA	29999 COPPER COMMON	30009 ZN TOT 5X ICP	30011 ZN TOT 5X ICP	30104 ZN DIS AAS DA	30111 ZN DIS ICP DA	30304 ZN EXT AAS DA	30311 ZN EXT ICP DA	30321 ZN EXT ICP DA	30999 ZINC COMMON	38011 SR TOT ICP DA
1	-	-	-	0.263	0.312	-	-	-	-	-	-	0.312	-
2	0.28	-	-	0.28	-	-	-	-	0.31	-	-	0.31	-
3	-	-	0.279	0.279	-	-	-	-	-	-	0.330	0.330	-
6	-	-	-	0.26	-	0.27	-	-	-	-	-	0.27 *	0.35 R
8	-	0.28	-	0.28	-	-	-	-	-	0.30	-	0.30	-
9	-	-	-	0.30	-	-	-	0.31	-	-	-	0.31	-
10	-	-	-	0.283	-	-	-	0.301	-	-	-	0.301	-
11	0.29	-	-	0.29	-	-	-	-	0.33	-	-	0.33	-
13	-	0.27	-	0.27	-	-	-	-	-	0.29	-	0.29	-
14	-	-	-	0.304	-	-	0.346	-	-	-	-	0.346	-
MEAN	.2850	.2750	.2790	.2809	.3120	.2700	.3460	.3055	.3200	.2950	.3300	.3099	-
STD DEV	.0071	.0071	-	.0144	-	-	-	.0064	.0141	.0071	-	.0218	-
REL STD	2.5	2.6	-	5.1	-	-	-	2.1	4.4	2.4	-	7.0	-
DES VAL	-	-	-	.288	-	-	-	-	-	-	-	.315	-

LAB	38111 SR DIS ICP DA	38301 SR EXT AAS DA	38321 SR EXT ICP DA	38999 STRNTIUM COMMON	42009 MO TOT 5X ICP	42011 MO TOT 5X ICP	42111 MO DIS ICP DA	42121 MO EXT ICP DA	42999 MOLYBNUM COMMON	48009 CD TOT 5X ICP	48011 CD TOT 5X ICP	48103 CD DIS AAS GF	48111 CD DIS ICP DA
1	-	-	-	-	4.34	-	-	-	4.34	0.226	-	-	-
3	-	-	0.495	0.495	-	-	-	4.54	4.54	-	-	-	-
6	-	-	-	0.35 R	-	4.3	-	-	4.3	-	0.21	-	-
9	0.49	-	-	0.49	-	-	4.5	-	4.5	-	-	-	0.24
10	-	0.49	-	0.49	-	-	4.49	-	4.49	-	-	-	0.225
14	-	-	-	-	-	-	-	-	-	-	-	0.24	-
MEAN	.4900	.4900	.4950	.4917	4.3400	4.3000	4.4950	4.5400	4.4340	.2260	.2100	.2400	.2325
STD DEV	-	-	-	.0029	-	-	.0071	-	.1067	-	-	-	.0106
REL STD	-	-	-	.6	-	-	.2	-	2.4	-	-	-	4.6
DES VAL	-	-	-	.488	-	-	-	-	4.646	-	-	-	-

LAB	48301 CD EXT AAS DA	48302 CD EXT AAS SE	48311 CD EXT ICP DA	48321 CD EXT ICP DA	48999 CADMIUM COMMON	56009 BA TOT 5X ICP	56011 BA TOT 5X ICP	56111 BA DIS ICP DA	56301 BA EXT AAS DA	56321 BA EXT ICP DA	56999 BARIUM COMMON	82011 PB TOT 5X ICP	82101 PB DIS AAS DA
1	-	-	-	-	0.226	2.52	-	-	-	-	2.52	-	-
2	-	0.24	-	-	0.24	-	-	-	-	-	-	-	-
3	-	-	-	0.236	0.236	-	-	-	2.43	0.434	2.43	-	-
6	-	-	-	-	0.21 *	-	2.4	-	-	-	2.4	1.2	-
8	0.23	-	-	-	0.23	-	-	-	-	-	-	-	-
9	-	-	-	-	0.24	-	-	2.55	-	-	2.55	-	-
10	-	-	-	-	0.225	-	-	2.44	-	-	2.44	-	-
11	0.24	-	-	-	0.24	-	-	-	-	-	-	-	-
13	-	-	0.24	-	0.24	-	-	-	-	-	-	-	-
14	-	-	-	-	0.24	-	-	-	-	-	-	-	1.29
MEAN	.2350	.2400	.2400	.2360	.2327	2.5200	2.4000	2.4950	2.4300	.4340	2.4680	1.2000	1.2900
STD DEV	.0071	-	-	-	.0100	-	-	.0778	-	-	.0638	-	-
REL STD	3.0	-	-	-	4.3	-	-	3.1	-	-	2.6	-	-
DES VAL	-	-	-	-	.238	-	-	-	-	-	2.530	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 29 PP 69 SAMPLE 1

LAB	82111 PB DIS ICP DA	82301 PB EXT AAS DA	82302 PB EXT AAS SE	82311 PB EXT ICP DA	82321 PB EXT ICP DA	82999 LEAD COMMON
2	-	-	1.2	-	-	1.2
3	-	-	-	-	1.34	1.34
6	-	-	-	-	-	1.2
8	-	-	-	1.26	-	1.26
9	1.35	-	-	-	-	1.35
10	1.17	-	-	-	-	1.17 *
11	-	1.4	-	-	-	1.4
13	-	-	-	1.5	-	1.5 *
14	-	-	-	-	-	1.29
MEAN	1.2600	1.4000	1.2000	1.3800	1.3400	1.3011
STD DEV	.1273	-	-	.1697	-	.1076
REL STD	10.1	-	-	12.3	-	8.3
DES VAL	-	-	-	-	-	1.331

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 29 PP 69 SAMPLE 2

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS	00125 SUM OF ANIONS	02011 COLOUR APPARE	02021 COLOUR VIS COM	02023 COLOUR SPECT	02024 COL TRU SPECT	02040 COLOUR COMMON	02041 CONDUCT SPEC 25	02060 CONDUCT COMMON	02073 TURB HACH	02074 TURB NPLMTRI	02077 TURB HACH FZ
1	-17.	0.31	0.44	-	-	-	145.	145.	36.	36.	0.5	-	-
2	2.6	0.327	0.311	160.	-	-	-	160.	37.	37.	0.2	-	-
3	4.8	0.336	0.305	120.	-	-	-	120.	36.6	36.6	0.16	-	-
4	-	-	-	-	120.	-	-	120.	37.0	37.0	-	-	-
5	1.59	0.334	0.324	130.	-	-	-	130.	36.5	36.5	0.20	-	-
6	-	-	-	-	-	-	-	-	32.	32. *	-	0.24	-
7	-5.57	0.32	0.35	195.	-	-	-	195. *	35.6	35.6	0.7 R	-	-
8	-3.47	0.35	0.37	-	-	-	-	-	37.6	37.6	-	0.29	-
9	4.76	0.33	0.30	-	-	-	-	-	37.	37.	-	-	-
10	9.38	0.325	0.270	-	-	93.	-	93. *	35.2	35.2	-	0.2	-
11	-	-	-	100.	-	-	-	100. *	35.	35.	-	-	0.2
12	-	-	-	-	120.	-	-	120.	36.	36.	0.3	-	-
13	-	-	-	-	-	-	-	-	40.	40.	-	-	-
14	-	-	-	-	-	-	-	-	37.2	37.2	-	-	-
MEAN	-.3638	.3290	.3338	141.0000	120.0000	93.0000	145.0000	131.4444	36.3357	36.3357	.2720	.2433	.2000
STD DEV	8.2287	.0118	.0528	37.1484	.0000	-	-	31.4250	1.7504	1.7504	.1375	.0451	-
REL STD	-1.0	3.6	15.8	26.3	-1.0	-	-	23.9	4.8	4.8	50.6	18.5	-
DES VAL	-	-	-	-	-	-	-	130.800	-	36.726	-	-	-

LAB	02081 TURB RATIO	02090 TURBIDTY COMMON	05105 BORON AA CARM	05106 BORON F AZOMETH	05111 BORON F ICP DA	05190 BORON COMMON	06004 TOC AC IR	06053 TIC CALC'D	06101 DOC IR /DIF	06104 DOC UV CO2 IR	06107 DOC UV CO2 PHE	06109 DOC UV CO2 OH	06150 D O C COMMON
1	-	0.5 *	-	-	-	-	-	-	-	-	10.1	-	10.1
2	-	0.2	-	-	-	-	-	-	-	-	11.	-	11.
3	-	0.16	-	-	-	-	-	-	-	9.4	-	-	9.4
4	0.23	0.23	0.140	-	-	0.140	-	-	-	9.70	-	-	9.70
5	-	0.20	-	-	-	-	-	-	14.0	-	-	-	14.0 *
6	-	0.24	-	-	-	-	-	-	-	11.6	-	-	11.6
7	-	0.7 R	-	-	-	-	-	-	-	-	-	-	-
8	-	0.29	-	0.55	-	0.55 *	10.4	1.0 L	-	-	-	-	10.4
10	-	0.2	-	-	0.01	0.01	-	-	-	-	-	9.1	9.1 *
11	-	0.2	-	-	-	-	-	-	-	-	-	-	-
12	-	0.3	-	-	-	-	-	-	11.8	-	-	-	11.8
MEAN	.2300	.2520	.1400	.5500	.0100	.2333	10.4000	-	12.9000	10.2333	10.5500	9.1000	10.7889
STD DEV	-	.0973	-	-	-	.2818	-	-	1.5556	1.1930	.6364	-	1.5260
REL STD	-	38.6	-	-	-	120.8	-	-	12.1	11.7	6.0	-	14.1
DES VAL	-	.324	-	-	-	.203	-	-	-	-	-	-	11.400

LAB	06151 DIC IR COMBUST	06152 DIC UV CO2 IR	06154 DIC AA CO2 PHE	06159 DIC AA CO2 OH	06490 D I C COMMON	07010 TKN AA SAL	07015 TKN DIG BERTHEL	07016 TKN BLK AMM-SAL	07018 TKN BLK INDOPHE	07021 TKN BLK DIG BER	07090 TKN COMMON	07109 NO3+NO2 AA HYD	07110 NO3+NO2 AA2 CD
1	-	-	0.5	-	0.5	-	-	-	-	0.268	0.268	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	0.03
3	-	0.5 L	-	-	0.5 L	0.316	-	-	-	-	0.316	-	-
4	-	0.664	-	-	0.664	-	-	-	-	-	-	-	0.043
5	1.26	-	-	-	1.26 *	-	-	-	-	-	-	-	0.032
6	-	-	-	-	-	-	-	0.5	-	-	0.5 *	-	-
8	-	-	-	-	1.0 L	-	0.40	-	-	-	0.40	-	0.04
9	-	-	-	-	-	-	-	-	-	-	-	0.05	-
10	-	-	-	0.3	0.3	-	-	-	-	-	-	0.030	-
11	-	-	-	-	-	-	-	-	-	-	-	-	0.04
12	1.0 L	-	-	-	1.0 L	-	-	-	0.24	-	0.24	-	0.03
13	-	-	-	-	-	-	-	-	-	-	-	-	0.2 L
MEAN	1.2600	.6640	.5000	.3000	.6810	.3160	.4000	.5000	.2400	.2680	.3448	.0400	.0358
STD DEV	-	-	-	-	.4137	-	-	-	-	-	.1059	.0141	.0058
REL STD	-	-	-	-	60.7	-	-	-	-	-	30.7	35.4	16.2
DES VAL	-	-	-	-	.420	-	-	-	-	-	.330	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 29 PP 69 SAMPLE 2

LAB	07111 NO3+NO2 DIS SPEC	07112 NO3+NO2 UF AA CD	07390 NITRATE COMMON	07505 NH3 TOT AA BERT	07540 NH3 TOT AA SAL	07555 NH3 DIS AA PHEN	07557 NH3 DIS AA INDO	07562 NH3 DIS AA EDTA	07563 NH3 DIS AA INDO	07590 AMMONIA COMMON	07602 T N CALC'D	07605 T N UV HY SUL	07651 T N DIS UV AA
1	0.025	-	0.025	-	-	-	-	0.008	-	0.008	-	-	-
2	-	-	0.03	-	-	-	-	-	-	-	-	-	-
3	-	0.034	0.034	0.005	-	-	-	-	-	0.005	-	-	-
4	-	-	0.043	-	0.007	-	-	-	-	0.007	-	-	0.273
5	-	-	0.032	-	-	-	0.004	-	-	0.004*	-	-	-
6	-	-	-	-	-	-	0.01 L	-	-	0.01 L	-	-	-
7	-	0.03	0.03	-	-	-	-	-	-	-	-	-	-
8	-	-	0.04	-	-	0.014	-	-	-	0.014*	0.44	-	-
9	-	-	0.05	-	-	-	-	-	-	-	-	-	-
10	-	-	0.030	-	-	0.015	-	-	-	0.015*	-	0.20	-
11	-	-	0.04	-	0.052R	-	-	-	-	0.052R	-	-	-
12	-	-	0.03	-	-	-	-	-	0.009	0.009	0.27	-	-
13	-	-	0.2 L	-	0.1 L	-	-	-	-	0.1 L	-	-	-
14	0.05	-	0.05	-	-	-	-	-	-	-	-	-	-
MEAN	.0375	.0320	.0362	.0050	.0070	.0145	.0040	.0080	.0090	.0089	.3550	.2000	.2730
STD DEV	.0177	.0028	.0083	-	-	.0007	-	-	-	.0042	.1202	-	-
REL STD	47.1	8.8	22.9	-	-	4.9	-	-	-	47.6	33.9	-	-
DES VAL	-	-	.028	-	-	-	-	-	-	.029	-	-	-

LAB	07655 T N DIS UV EDTA	07690 TOT N COMMON	07790 T N DIS COMMON	09103 F DIS COL SP	09105 F DIS SP EL	09106 F DIS EL POT	09107 F DIS AUT POT	09108 F DIS SP EL	09115 F DIS AA ALIZ	09190 FLUORIDE COMMON	10101 ALKLNTY TITR'N	10108 ALKLNTY POT TIT	10109 ALKLNTY POT TIT
1	-	-	-	-	-	-	0.01	-	-	0.01 *	5.	-	-
2	-	-	-	-	-	-	-	-	-	-	3.3	-	-
3	-	-	-	-	-	-	-	0.02	-	0.02	1.9	-	-
4	-	-	0.273	-	-	-	-	-	-	-	2.5	-	-
5	0.245	-	0.245	-	-	0.05 L	-	-	-	0.05 L	2.92	-	-
6	-	-	-	0.1 L	-	-	-	-	-	0.1 L	-	-	20. L
7	-	-	-	-	-	-	-	-	-	-	2.6	-	-
8	-	0.44	-	-	0.05 L	-	-	-	-	0.05 L	-	-	4.00
9	-	-	-	-	-	-	-	-	-	-	-	4.8	-
10	-	-	0.20 *	-	-	-	-	-	0.04 L	0.04 L	-	-	-
11	-	-	-	-	0.05 L	-	-	-	-	0.05 L	2.8	-	-
12	-	0.27	-	-	0.10 L	-	-	-	-	0.10 L	2.9	-	-
13	-	-	-	-	-	-	-	-	-	-	6. R	-	-
14	-	-	-	-	-	-	-	-	-	-	4.9	-	-
MEAN	.2450	.3550	.2393	-	-	-	.0100	.0200	-	.0150	3.2022	4.8000	4.0000
STD DEV	-	.1202	.0368	-	-	-	-	-	-	.0071	1.0612	-	-
REL STD	-	33.9	15.4	-	-	-	-	-	-	47.1	33.1	-	-
DES VAL	-	.337	.188	-	-	-	-	-	-	.035	-	-	-

LAB	10111 ALKLNTY TIT PRO	10112 ALKLNTY TIT CON	10190 ALKLINTY COMMON	10301 PH	10390 PH COMMON	10602 HARDNSS CALC'D	10603 HARDNSS TITR'N	10606 HARDNSS CALC'D	10690 HARDNESS COMMON	11001 NA TOT AAS	11005 NA TOT ICP	11102 NA F AAS	11103 NA DIS FL PH
1	-	-	5.	6.37	6.37	7.	-	-	7.	-	-	-	4.
2	-	-	3.3	6.3	6.3	7.3	-	-	7.3	-	-	-	4.0
3	1.8	-	1.8	7.13 R	7.13 R	-	-	7.6	7.6	-	-	-	-
4	-	-	2.5	6.38	6.38	-	-	-	-	-	-	-	-
5	-	-	2.92	6.04	6.04	-	-	-	-	-	-	-	4.0
6	-	-	20. L	6.0	6.0	-	6. R	-	6. R	-	-	5. R	-
7	-	-	2.6	6.4	6.4	-	7.5	-	7.5	-	-	-	-
8	-	-	4.00	6.40	6.40	7.98	-	-	7.98	-	-	-	-
9	-	-	4.8	6.40	6.40	-	-	-	-	-	4.2	-	-
10	-	2.9	2.9	6.48	6.48	-	-	-	-	-	4.04	-	-
11	-	-	2.8	6.1	6.1	6.9	-	-	6.9	-	-	4.1	-
12	-	-	2.9	6.5	6.5	7.1	-	-	7.1	-	-	-	4.1
13	-	-	6. R	6.4	6.4	7.2	-	-	7.2	-	-	-	-
14	-	-	4.9	6.44	6.44	12.4 R	-	-	12.4 R	4.07	-	-	-
MEAN	1.8000	2.9000	3.3683	6.3238	6.3238	7.2467	7.5000	7.6000	7.3225	4.0700	4.1200	4.1000	4.0250
STD DEV	-	-	1.0544	.1667	.1667	.3861	-	-	.3562	-	.1131	-	.0500
REL STD	-	-	31.3	2.6	2.6	5.3	-	-	4.9	-	2.7	-	1.2
DES VAL	-	-	3.220	-	6.229	-	-	-	7.590	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 29 PP 69 SAMPLE 2

LAB	11105 NA DIS AAS DA	11107 NA UF FL PH	11111 NA DIS ICP	11311 NA EXT ICP	11990 SODIUM COMMON	12005 MG TOT ICP	12101 MG DIS CALC'D	12102 MG DIS AAS DA	12106 MG UF AAS DA	12107 MG DIS AAS AUT	12108 MG HARDN CALC'D	12111 MG DIS ICP	12303 MG UF AAS AUT
1	-	-	-	-	4.	-	-	-	-	-	-	-	0.5
2	-	-	-	-	4.0	-	-	-	-	0.68	-	-	-
3	-	4.04	-	-	4.04	-	-	-	0.71	-	-	-	-
5	-	-	-	-	4.0	-	-	-	-	-	0.69	-	-
6	-	-	-	-	5. R	-	1.5 L	-	-	-	-	-	-
7	3.72	-	-	-	3.72	-	-	0.69	-	-	-	-	-
8	-	-	-	4.17	4.17	-	-	-	-	-	-	-	-
9	-	-	-	-	4.2	0.7	-	-	-	-	-	-	-
10	-	-	-	-	4.04	0.67	-	-	-	-	-	-	-
11	-	-	-	-	4.1	-	-	0.7	-	-	-	-	-
12	-	-	-	-	4.1	-	-	-	-	-	-	0.7	-
13	-	-	4.1	-	4.1	-	-	-	-	-	-	0.66	-
14	-	-	-	-	4.07	-	-	0.62	-	-	-	-	-
MEAN	3.7200	4.0400	4.1000	4.1700	4.0450	.6850	-	.6700	.7100	.6800	.6900	.6800	.5000
STD DEV	-	-	-	-	.1210	.0212	-	.0436	-	-	-	.0283	-
REL STD	-	-	-	-	3.0	3.1	-	6.5	-	-	-	4.2	-
DES VAL	-	-	-	-	4.142	-	-	-	-	-	-	-	-

LAB	12311 MG EXT ICP	12990 MGNESIUM COMMON	14105 SILICA MOLY AA	14106 SILICA MOLY	14107 SILICA MOLY AA	14111 SILICA ICP DA	14190 SILICA COMMON	15313 T P ACL AA SNCL	15401 T P UV AA ASC	15406 T P UF AA ASC	15409 T P BLK AA ASC	15413 T P ACL AA SNCL	15421 T P BLK DIG ASC
1	-	0.5	-	-	2.9 R	-	2.9 R	-	-	-	-	-	0.007
2	-	0.68	-	-	-	-	-	-	-	-	-	0.006	-
3	-	0.71	-	2.37	-	-	2.37	-	-	-	-	0.008	-
4	-	-	-	-	-	-	-	-	-	0.004	-	-	-
5	-	0.69	1.9	-	-	-	1.9 *	-	-	-	-	-	-
6	-	1.5 L	-	-	-	-	-	-	-	-	0.03 R	-	-
7	-	0.69	-	-	-	-	-	-	-	0.017R	-	-	-
8	0.81	0.81	2.3	-	-	-	2.3	-	-	-	-	0.009	-
9	-	0.7	-	-	-	2.35	2.35	-	-	-	-	-	-
10	-	0.67	2.30	-	-	-	2.30	-	0.010L	-	-	-	-
11	-	0.7	-	-	-	-	-	0.009	-	-	-	-	-
12	-	0.7	2.5	-	-	-	2.5	-	-	0.008	-	-	-
13	-	0.66	-	-	-	-	-	-	-	0.01	-	-	-
14	-	0.62	-	-	-	-	-	-	-	-	-	-	-
MEAN	.8100	.6775	2.2500	2.3700	-	2.3500	2.2867	.0090	-	.0073	-	.0077	.0070
STD DEV	-	.0711	.2517	-	-	-	.2031	-	-	.0031	-	.0015	-
REL STD	-	10.5	11.2	-	-	-	8.9	-	-	41.7	-	19.9	-
DES VAL	-	.717	-	-	-	-	2.289	-	-	-	-	-	-

LAB	15490 TOT P COMMON	16304 SO4 DIS AUTO BA	16306 SO4 DIS AA MTB	16307 SO4 UF AA MTB	16309 SO4 DIS I C	16310 SO4 DIS AA CALM	16990 SULFATE COMMON	17203 CL DIS AA FE	17204 CL DIS AG TIT	17206 CL DIS AA HG	17208 CL DIS AA HG	17209 CL DIS I C	17210 CL DIS TIT CON
1	0.007	-	9. R	-	-	-	9. R	4.5	-	-	-	-	-
2	0.006*	4.6	-	-	2.7	-	2.7	-	-	-	-	5.2	-
3	0.008	-	-	2.7	-	-	2.7	-	-	-	5.6	-	-
4	0.004*	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	4.8 R	-	-	-	4.8 R	-	-	5.7	-	-	-
6	0.03 R	10. L	-	-	-	-	10. L	-	4.	-	-	-	-
7	0.017R	-	6.6 R	-	-	-	6.6 R	5.7	-	-	-	-	-
8	0.009	-	5.80 R	-	-	-	5.80 R	-	-	6.00	-	-	-
9	-	-	-	-	2.54	-	2.54	-	-	-	-	5.4	-
10	0.010L	-	-	-	-	2.9	2.9	-	-	-	-	-	5.3
11	0.009	-	7.6 R	-	-	-	7.6 R	-	-	5.8	-	-	-
12	0.008	-	-	-	-	-	-	-	-	5.9	-	-	-
13	0.01	-	3.39	-	-	-	3.39 *	-	-	6.	-	-	-
14	-	-	-	-	6.4 R	-	6.4 R	-	-	-	-	5.3	-
MEAN	.0076	4.6000	3.3900	2.7000	2.6200	2.9000	2.8460	5.1000	4.0000	5.8800	5.6000	5.3000	5.3000
STD DEV	.0019	-	-	-	.1131	-	.3298	.8485	-	.1304	-	.1000	-
REL STD	25.2	-	-	-	4.3	-	11.6	16.6	-	2.2	-	1.9	-
DES VAL	.010	-	-	-	-	-	2.793	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 29 PP 69 SAMPLE 2

LAB	17990 CHLORIDE COMMON	19001 K TOT AAS	19005 K TOT ICP	19102 K DIS AAS	19103 K DIS FLM PH	19106 K DIS AAS LI	19107 K DIS FLM PH	19111 K DIS ICP	19301 K EXT HNO3 AA	19990 PTASSIUM COMMON	20005 CA TOT ICP	20100 CA DIS CALC'D	20101 CA DIS EDTA
1	4.5 *	-	-	-	0.1	-	-	-	-	0.1 *	-	-	-
2	5.2	-	-	-	0.27	-	-	-	-	0.27	-	-	-
3	5.6	-	-	-	-	-	0.29	-	-	0.29	-	-	-
5	5.7	-	-	-	0.3	-	-	-	-	0.3	-	-	1.85
6	4. *	-	-	0.6 R	-	-	-	-	-	0.6 R	-	2. L	-
7	5.7	-	-	0.27	-	-	-	-	-	0.27	-	-	-
8	6.00	-	-	-	-	-	-	-	0.28	0.28	-	-	-
9	5.4	-	0.3	-	-	-	-	-	-	0.3	1.8	-	-
10	5.3	-	0.29	-	-	-	-	-	-	0.29	1.72	-	-
11	5.8	-	-	-	-	9.6 R	-	-	-	9.6 R	-	-	-
12	5.9	-	-	-	0.2	-	-	-	-	0.2	-	-	-
13	6.	-	-	-	-	-	-	0.16	-	0.16 *	-	-	-
14	5.3	0.30	-	-	-	-	-	-	-	0.30	-	-	-
MEAN	5.4154	.3000	.2950	.2700	.2175	-	.2900	.1600	.2800	.2509	1.7600	-	1.8500
STD DEV	.5900	-	.0071	-	.0888	-	-	-	-	.0674	.0566	-	-
REL STD	10.9	-	2.4	-	40.8	-	-	-	-	26.9	3.2	-	-
DES VAL	5.713	-	-	-	-	-	-	-	-	.287	-	-	-

LAB	20103 CA DIS AAS	20108 CA DIS AAS UF	20110 CA DIS AAS AUT	20111 CA DIS ICP	20311 CA EXT ICP	20990 CALCIUM COMMON
1	-	-	0.5 R	-	-	0.5 R
2	-	-	1.8	-	-	1.8
3	-	1.88	-	-	-	1.88
5	-	-	-	-	-	1.85
6	-	-	-	-	-	2. L
7	1.79	-	-	-	-	1.79
8	-	-	-	-	1.86	1.86
9	-	-	-	-	-	1.8
10	-	-	-	-	-	1.72
11	1.6	-	-	-	-	1.6 *
12	-	-	-	1.7	-	1.7
13	-	-	-	1.72	-	1.72
14	3.9 R	-	-	-	-	3.9 R
MEAN	1.6950	1.8800	1.8000	1.7100	1.8600	1.7720
STD DEV	.1344	-	-	.0141	-	.0866
REL STD	7.9	-	-	.8	-	4.9
DES VAL	-	-	-	-	-	1.815

DATA SUMMARY

FEDERAL-PROVINCIAL & PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAMS

STUDY NO. FP 30 PP 70 DATE: 01/06/88 DUE DATE: 30/06/88

SAMPLE 3 SPIKED SAMPLE. TRACE METALS S/E. (IN 0.2% HNO3)

LAB	13009 AL TOT 5X ICP	13105 AL DIS AAS GF	13111 AL DIS ICP DA	13302 AL EXT AAS DA	13305 AL EXT AAS SE	13306 AL UF AAS OX	13999 ALUMINUM COMMON	23002 V TOT AAS SE	23003 V EXT AAS GF	23009 V TOT 5X ICP	23011 V TOT 5X ICP	23111 V DIS ICP DA	23999 VANADIUM COMMON
1	-	-	-	-	-	0.034	0.034	-	-	0.004	-	-	0.004
2	-	-	-	-	0.033	-	0.033*	-	-	-	-	-	-
3	0.046	-	-	-	0.041	-	0.041	0.005	-	0.011	-	-	0.005
6	0.033	-	-	-	-	-	0.033*	-	-	-	0.01 L	-	0.01 L
8	-	-	-	0.2 L	-	-	0.2 L	-	-	-	-	-	-
9	-	-	0.02 R	-	-	-	0.02 R	-	-	-	-	0.01 L	0.01 L
10	-	-	0.04	-	-	-	0.04	-	-	-	-	0.004	0.004
14	-	0.051	-	-	-	-	0.051*	-	0.003	-	-	-	0.003
MEAN	.0395	.0510	.0400	-	.0370	.0340	.0387	.0050	.0030	.0075	-	.0040	.0040
STD DEV	.0092	-	-	-	.0057	-	.0070	-	-	.0049	-	-	.0008
REL STD	23.3	-	-	-	15.3	-	18.1	-	-	66.0	-	-	20.4
DES VAL	-	-	-	-	-	-	.041	-	-	-	-	-	.005

LAB	24003 CR TOT AAS SE	24004 CR TOT AAS GF	24009 CR TOT 5X ICP	24011 CR TOT 5X ICP	24111 CR DIS ICP DA	24303 CR EXT AAS SE	24999 CHROMIUM COMMON	25003 MN TOT 5X ICP	25004 MN TOT 5X AAS	25010 MN TOT 5X ICP	25011 MN TOT 5X ICP	25107 MN DIS AAS GF	25111 MN DIS ICP DA
1	-	-	0.007	-	-	-	0.007	0.001R	-	-	-	-	-
3	0.006	-	0.012	-	-	-	0.006	-	0.006	0.012	-	-	-
6	-	-	-	0.010	-	-	0.010*	-	-	-	0.008	-	-
8	-	0.010	-	-	-	-	0.010*	-	-	-	-	-	-
9	-	0.007	-	-	-	-	0.007	-	-	-	-	-	0.006
10	-	-	-	-	0.005	-	0.005	-	-	-	-	-	0.005
11	-	-	-	-	-	0.008	0.008	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	0.006	-
MEAN	.0060	.0085	.0095	.0100	.0050	.0080	.0076	-	.0060	.0120	.0080	.0060	.0055
STD DEV	-	.0021	.0035	-	-	-	.0019	-	-	-	-	-	.0007
REL STD	-	25.0	37.2	-	-	-	25.1	-	-	-	-	-	12.9
DES VAL	-	-	-	-	-	-	.007	-	-	-	-	-	-

LAB	25304 MN EXT AAS DA	25305 MN EXT AAS SE	25311 MN EXT ICP DA	25999 MANGNESE COMMON	26005 FE TOT AAS SE	26009 FE TOT 5X ICP	26011 FE TOT 5X ICP	26107 FE DIS AAS GF	26111 FE DIS ICP DA	26305 FE EXT AAS SE	26311 FE EXT ICP DA	26999 IRON COMMON	27003 CO TOT AAS GF
1	-	-	-	0.001R	-	-	-	-	-	-	-	-	-
2	0.01 L	-	-	0.01 L	-	-	-	-	-	0.007	-	0.007	-
3	-	-	-	0.006	0.007	0.030	-	-	-	-	-	0.007	-
6	-	-	-	0.008	-	-	0.010	-	-	-	-	0.010*	-
8	-	-	0.02 L	0.02 L	-	-	-	-	-	-	0.02 L	0.02 L	0.006
9	-	-	-	0.006	-	-	-	-	0.01 L	-	-	0.01 L	-
10	-	-	-	0.005	-	-	-	-	0.001R	-	-	0.001R	-
11	-	0.006	-	0.006	-	-	-	-	-	0.007	-	0.007	-
14	-	-	-	0.006	-	-	-	0.005	-	-	-	0.005	-
MEAN	-	.0060	-	.0062	.0070	.0300	.0100	.0050	-	.0070	-	.0072	.0060
STD DEV	-	-	-	.0010	-	-	-	-	-	.0000	-	.0018	-
REL STD	-	-	-	15.9	-	-	-	-	-	-1.0	-	24.8	-
DES VAL	-	-	-	.006	-	-	-	-	-	-	-	.006	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 30 PP 70 SAMPLE 3

LAB	27009 CO TOT 5X ICP	27011 CO TOT 5X ICP	27111 CO DIS ICP DA	27302 CO EXT AAS SE	27999 COBALT COMMON	28002 NI TOT AAS SE	28009 NI TOT 5X ICP	28011 NI TOT 5X ICP	28111 NI DIS ICP DA	28302 NI EXT AAS SE	28309 NI EXT AAS GF	28999 NICKEL COMMON	29005 CU TOT AAS SE
1	0.004	-	-	-	0.004	-	0.006	-	-	-	-	0.006	-
3	0.005	-	-	-	0.005	0.006	0.011	-	-	-	-	0.006	0.008
6	-	0.006	-	-	0.006	-	-	0.010	-	-	-	0.010*	-
8	-	-	-	-	0.006	-	-	-	-	-	0.007	0.007	-
9	-	-	0.01 L	-	0.01 L	-	-	-	0.01 L	-	-	0.01 L	-
10	-	-	0.004	-	0.004	-	-	-	0.006	-	-	0.006	-
11	-	-	-	0.006	0.006	-	-	-	-	0.007	-	0.007	-
MEAN	.0045	.0060	.0040	.0060	.0052	.0060	.0085	.0100	.0060	.0070	.0070	.0070	.0080
STD DEV	.0007	-	-	-	.0010	-	.0035	-	-	-	-	.0015	-
REL STD	15.7	-	-	-	19.0	-	41.6	-	-	-	-	22.1	-
DES VAL	-	-	-	-	.005	-	-	-	-	-	-	.006	-

LAB	29009 CU TOT 5X ICP	29011 CU TOT 5X ICP	29107 CU DIS AAS GF	29111 CU DIS ICP DA	29305 CU EXT AAS SE	29311 CU EXT ICP DA	29999 COPPER COMMON	30005 ZN TOT AAS SE	30009 ZN TOT 5X ICP	30011 ZN TOT 5X ICP	30107 ZN DIS AAS GF	30111 ZN DIS ICP DA	30304 ZN EXT AAS DA
1	0.007	-	-	-	-	-	0.007	-	0.011	-	-	-	-
2	-	-	-	-	0.008	-	0.008	-	-	-	-	-	0.01 L
3	0.012	-	-	-	-	-	0.008	0.007	0.016	-	-	-	-
6	-	0.010	-	-	-	-	0.010*	-	-	0.007	-	-	-
8	-	-	-	-	-	0.01 L	0.01 L	-	-	-	-	-	-
9	-	-	-	0.023R	-	-	0.023R	-	-	-	-	0.01 L	-
10	-	-	-	0.009	-	-	0.009	-	-	-	-	0.007	-
11	-	-	-	-	0.008	-	0.008	-	-	-	-	-	-
14	-	-	0.007	-	-	-	0.007	-	-	-	0.005	-	-
MEAN	.0095	.0100	.0070	.0090	.0080	-	.0081	.0070	.0135	.0070	.0050	.0070	-
STD DEV	.0035	-	-	-	.0000	-	.0011	-	.0035	-	-	-	-
REL STD	37.2	-	-	-	-1.0	-	13.1	-	26.2	-	-	-	-
DES VAL	-	-	-	-	-	-	.007	-	-	-	-	-	-

LAB	30305 ZN EXT AAS SE	30311 ZN EXT ICP DA	30999 ZINC COMMON	38009 SR TOT ICP DA	38011 SR TOT ICP DA	38111 SR DIS ICP DA	38301 SR EXT AAS DA	38999 STRNTIUM COMMON	42009 MO TOT 5X ICP	42011 MO TOT 5X ICP	42111 MO DIS ICP DA	42999 MOLYBNUM COMMON	48002 CD TOT AAS SE
1	-	-	0.011*	-	-	-	-	-	0.006	-	-	0.006	-
2	-	-	0.01 L	-	-	-	-	-	-	-	-	-	-
3	-	-	0.007	0.172	-	-	-	0.172	0.007	-	-	0.007	0.005
6	-	-	0.007	-	0.096R	-	-	0.096R	-	0.024R	-	0.024R	-
8	-	0.01 L	0.01 L	-	-	-	-	-	-	-	-	-	-
9	-	-	0.01 L	-	-	0.18	-	0.18	-	-	0.01 L	0.01 L	-
10	-	-	0.007	-	-	-	0.18	0.18	-	-	0.008	0.008	-
11	0.008	-	0.008	-	-	-	-	-	-	-	-	-	-
14	-	-	0.005	-	-	-	-	-	-	-	-	-	-
MEAN	.0080	-	.0075	.1720	-	.1800	.1800	.1773	.0065	-	.0080	.0070	.0050
STD DEV	-	-	.0020	-	-	-	-	.0046	.0007	-	-	.0010	-
REL STD	-	-	26.3	-	-	-	-	2.6	10.9	-	-	14.3	-
DES VAL	-	-	.007	-	-	-	-	.165	-	-	-	.007	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 30 PP 70 SAMPLE 3

LAB	48004	48009 CD TOT 5X ICP	48011 CD TOT 5X ICP	48103 CD DIS AAS GF	48111 CD DIS ICP DA	48302 CD EXT AAS SE	48309 CD EXT AAS GF	48999 CADMIUM COMMON	56009 BA TOT 5X ICP	56011 BA TOT 5X ICP	56111 BA DIS ICP DA	56999 BARIUM COMMON	82002 PB TOT AAS SE
1	-	0.004	-	-	-	-	-	0.004	0.024	-	-	0.024	-
2	-	-	-	-	-	0.005	-	0.005	-	-	-	-	-
3	-	0.010	-	-	-	-	-	0.005	0.024	-	-	0.024	0.004
6	-	-	0.005	-	-	-	-	0.005	-	0.032	-	0.032	-
8	-	-	-	-	-	-	0.005	0.005	-	-	-	-	-
9	0.005	-	-	-	-	-	-	0.005	-	-	0.02	0.02	-
10	-	-	-	-	0.005	-	-	0.005	-	-	0.02	0.02	-
11	-	-	-	-	-	0.005	-	0.005	-	-	-	-	-
14	-	-	-	0.005	-	-	-	0.005	-	-	-	-	-
MEAN	.0050	.0070	.0050	.0050	.0050	.0050	.0050	.0049	.0240	.0320	.0200	.0240	.0040
STD DEV	-	.0042	-	-	-	.0000	-	.0003	.0000	-	.0000	.0049	-
REL STD	-	60.6	-	-	-	-1.0	-	6.8	-1.0	-	-1.0	20.4	-
DES VAL	-	-	-	-	-	-	-	.005	-	-	-	.022	-

LAB	82004 PB TOT AAS GF	82009 PB TOT 5X ICP	82011 PB TOT 5X ICP	82104 PB DIS AAS GF	82302 PB EXT AAS SE	82309 PB EXT AAS GF	82999 LEAD COMMON
1	-	-	-	-	0.006	-	0.006
2	-	-	-	-	0.006	-	0.006
3	-	0.010	-	-	-	-	0.004
6	-	-	0.009R	-	-	-	0.009R
8	-	-	-	-	-	0.006	0.006
9	0.005	-	-	-	-	-	0.005
11	-	-	-	-	0.005	-	0.005
14	-	-	-	0.005	-	-	0.005
MEAN	.0050	.0100	-	.0050	.0057	.0060	.0053
STD DEV	-	-	-	-	.0006	-	.0008
REL STD	-	-	-	-	10.2	-	14.3
DES VAL	-	-	-	-	-	-	.005

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 30 PP 70 SAMPLE 4

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS	00125 SUM OF ANIONS	02011 COLOUR APPARE	02021 COLOUR VIS COM	02023 COLOUR SPECT	02024 COL TRU SPECT	02040 COLOUR COMMON	02041 CONDUCT SPEC 25	02060 CONDUCT COMMON	02073 TURB HACH	02074 TURB NPLMTRI	02077 TURB HACH FZ
1	-3.07	1.58	1.68	-	-	-	48.	48.	176.	176.	0.2	-	-
2	0.40	1.591	1.578	45.	-	-	-	45.	175.	175.	0.2	-	-
3	0.29	1.626	1.617	40.	-	-	-	40.	177.	177.	0.12	-	-
4	-	-	-	-	40.	-	-	40.	177.	177.	-	-	-
5	0.86	1.62	1.59	45.	-	-	-	45.	167.	167.	0.21	-	-
6	-1.2	1.62	1.67	-	-	-	-	-	167.	167.	-	0.24	-
7	0.52	1.56	1.57	54.	-	-	-	54. *	174.	174.	0.5 R	-	-
8	-	-	-	-	-	-	-	-	171.	171.	-	-	-
9	2.55	1.61	1.53	-	-	-	-	-	170.	170.	-	-	-
10	3.47	1.625	1.516	-	-	33.	-	33.	172.	172.	-	0.2	-
11	-	-	-	40.	-	-	-	40.	170.	170.	-	-	0.3
12	0.36	1.551	1.562	-	40.	-	-	40.	175.	175.	0.3	-	-
13	-	-	-	-	-	-	-	-	160.	160.	-	-	-
14	-	-	-	-	-	-	-	-	178.0	178.0	-	-	-
MEAN	.4644	1.5981	1.5903	44.8000	40.0000	33.0000	48.0000	42.7778	172.0714	172.0714	.2060	.2200	.3000
STD DEV	1.8990	.0288	.0566	5.7184	.0000	-	-	6.0162	5.0148	5.0148	.0639	.0283	-
REL STD	408.9	1.8	3.6	12.8	-1.0	-	-	14.1	2.9	2.9	31.0	12.9	-
DES VAL	-	-	-	-	-	-	-	41.350	-	169.611	-	-	-

LAB	02081 TURB RATIO	02090 TURBIDTY COMMON	05105 BORON AA CARM	05106 BORON F AZOMETH	05111 BORON F ICP DA	05190 BORON COMMON	06004 TOC AC IR	06053 TIC CALC'D	06101 DOC IR /DIF	06104 DOC UV CO2 IR	06107 DOC UV CO2 PHE	06109 DOC UV CO2 OH	06150 D O C COMMON
1	-	0.2	-	-	-	-	-	-	-	-	7.3	-	7.3
2	-	0.2	-	-	-	-	-	-	-	-	7.0	-	7.0
3	-	0.12	-	-	-	-	-	-	-	7.1	-	-	7.1
4	0.18	0.18	0.094	-	-	0.094	-	-	-	6.56	-	-	6.56
5	-	0.21	-	-	-	-	-	-	9.0	-	-	-	9.0 *
6	-	0.24	-	-	-	-	-	-	-	8.0	-	-	8.0
7	-	0.5 R	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	0.17	-	0.17 *	7.4	5.3	-	-	-	-	7.4
10	-	0.2	-	-	0.01	0.01	-	-	-	-	-	6.4	6.4 *
11	-	0.3	-	-	-	-	-	-	-	-	-	-	-
12	-	0.3	-	-	-	-	-	-	7.3	-	-	-	7.3
MEAN	.1800	.2167	.0940	.1700	.0100	.0913	7.4000	5.3000	8.1500	7.2200	7.1500	6.4000	7.3400
STD DEV	-	.0570	-	-	-	.0800	-	-	1.2021	.7275	.2121	-	.7797
REL STD	-	26.3	-	-	-	87.6	-	-	14.7	10.1	3.0	-	10.6
DES VAL	-	.263	-	-	-	.065	-	-	-	-	-	-	7.315

LAB	06151 DIC IR COMBUST	06152 DIC UV CO2 IR	06154 DIC AA CO2 PHE	06159 DIC AA CO2 OH	06490 D I C COMMON	07010 TKN AA SAL	07015 TKN DIG BERTHEL	07016 TKN BLK AMM-SAL	07018 TKN BLK INDOPHE	07021 TKN BLK DIG BER	07090 TKN COMMON	07109 NO3+NO2 AA HYD	07110 NO3+NO2 AA2 CD
1	-	-	6.2	-	6.2	-	-	-	-	0.234	0.234	-	-
3	-	6.2	-	-	6.2	0.253	-	-	-	-	0.253	-	-
4	-	7.35	-	-	7.35	-	-	-	-	-	-	-	0.217
5	8.54	-	-	-	8.54 *	-	-	-	-	-	-	-	0.225
6	-	-	-	-	-	-	-	0.5 R	-	-	0.5 R	-	-
8	-	-	-	-	5.3 *	-	0.20 L	-	-	-	0.20 L	-	0.25
9	-	-	-	-	-	-	-	-	-	-	-	0.21	-
10	-	-	-	6.7	6.7	-	-	-	-	-	-	0.18	-
11	-	-	-	-	-	-	-	-	-	-	-	-	0.18
12	7.2	-	-	-	7.2	-	-	-	0.21	-	0.21	-	0.22
13	-	-	-	-	-	-	-	-	-	-	-	-	0.25
MEAN	7.8700	6.7750	6.2000	6.7000	6.7843	.2530	-	-	.2100	.2340	.2323	.1950	.2237
STD DEV	.9475	.8132	-	-	1.0383	-	-	-	-	-	.0215	.0212	.0259
REL STD	12.0	12.0	-	-	15.3	-	-	-	-	-	9.3	10.9	11.6
DES VAL	-	-	-	-	6.901	-	-	-	-	-	.249	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 30 PP 70 SAMPLE 4

LAB	07111 NO3+NO2 DIS SPEC	07112 NO3+NO2 UF AA CD	07390 NITRATE COMMON	07505 NH3 TOT AA BERT	07540 NH3 TOT AA SAL	07555 NH3 DIS AA PHEN	07557 NH3 DIS AA INDO	07562 NH3 DIS AA EDTA	07563 NH3 DIS AA INDO	07590 AMMONIA COMMON	07602 T N CALC'D	07605 T N UV HY SUL	07651 T N DIS UV AA
1	0.235	-	0.235	-	-	-	-	0.008	-	0.008	-	-	-
3	-	0.222	0.222	0.005	-	-	-	-	-	0.005	-	-	-
4	-	-	0.217	-	0.005L	-	-	-	-	0.005L	-	-	0.42
5	-	-	0.225	-	-	-	0.002L	-	-	0.002*	-	-	-
6	-	-	-	-	-	-	0.01 L	-	-	0.01 L	-	-	-
7	-	0.21	0.21	-	-	-	-	-	-	-	-	-	-
8	-	-	0.25 *	-	-	0.006	-	-	-	0.006	0.45 L	-	-
9	-	-	0.21	-	-	-	-	-	-	-	-	-	-
10	-	-	0.18	-	-	0.010L	-	-	-	0.010L	-	0.33	-
11	-	-	0.18	-	0.013R	-	-	-	-	0.013R	-	-	-
12	-	-	0.22	-	-	-	-	-	0.005	0.005	0.43	-	-
13	-	-	0.25 *	-	0.1 L	-	-	-	-	0.1 L	-	-	-
14	0.14	-	0.14 *	-	-	-	-	-	-	-	-	-	-
MEAN	.1875	.2160	.2116	.0050	-	.0060	-	.0080	.0050	.0060	.4300	.3300	0.4200
STD DEV	.0672	.0085	.0316	-	-	-	-	-	-	.0014	-	-	-
REL STD	35.8	3.9	15.0	-	-	-	-	-	-	23.6	-	-	-
DES VAL	-	-	.214	-	-	-	-	-	-	.004	-	-	-

LAB	07655 T N DIS UV EDTA	07690 TOT N COMMON	07790 T N DIS COMMON	09103 F DIS COL SP	09105 F DIS SP EL	09106 F DIS EL POT	09107 F DIS AUT POT	09108 F DIS SP EL	09115 F DIS AA ALIZ	09190 FLUORIDE COMMON	10101 ALKLNTY TITR'N	10108 ALKLNTY POT TIT	10109 ALKLNTY POT TIT
1	-	-	-	-	-	-	0.32	-	-	0.32	32.	-	-
2	-	-	-	-	-	-	-	-	-	-	33.0	-	-
3	-	-	-	-	-	-	-	0.32	-	0.32	28.3	-	-
4	-	-	0.42	-	-	-	-	-	-	-	28.5	-	-
5	0.394	-	0.394	-	-	0.292	-	-	-	0.292	29.5	-	-
6	-	-	-	0.3	-	-	-	-	-	0.3	-	-	37. R
7	-	-	-	-	-	-	-	-	-	-	28.4	-	-
8	-	0.45 L	-	-	0.31	-	-	-	-	0.31	-	-	29.0
9	-	-	-	-	-	-	-	-	-	-	-	31.	-
10	-	-	0.33	-	-	-	-	-	0.29	0.29	-	-	-
11	-	-	-	-	0.28	-	-	-	-	0.28	29.	-	-
12	-	0.43	-	-	0.32	-	-	-	-	0.32	28.8	-	-
13	-	-	-	-	-	-	-	-	-	-	30.	-	-
14	-	-	-	-	-	-	-	-	-	-	32.7	-	-
MEAN	.3940	.4300	.3813	.3000	.3033	.2920	.3200	.3200	.2900	.3040	30.0200	31.0000	29.0000
STD DEV	-	-	.0463	-	.0208	-	-	-	-	.0157	1.8462	-	-
REL STD	-	-	12.1	-	6.9	-	-	-	-	5.2	6.1	-	-
DES VAL	-	.405	.328	-	-	-	-	-	-	.314	-	-	-

LAB	10111 ALKLNTY TIT PRO	10112 ALKLNTY TIT CON	10190 ALKLINTY COMMON	10301 PH	10390 PH COMMON	10602 HARDNSS CALC'D	10603 HARDNSS TITR'N	10606 HARDNSS CALC'D	10690 HARDNESS COMMON	11001 NA TOT AAS	11005 NA TOT ICP	11102 NA F AAS	11103 NA DIS FL PH
1	-	-	32.	7.45	7.45	56.	-	-	56.	-	-	-	9.
2	-	-	33.0 *	7.2	7.2	55.2	-	-	55.2	-	-	-	9.5
3	28.0	-	28.0	6.93	6.93	-	-	56.9	56.9	-	-	-	-
4	-	-	28.5	7.70	7.70	-	-	-	-	-	-	-	-
5	-	-	29.5	6.80	6.80	-	-	-	-	-	-	-	9.5
6	-	-	37. R	7.4	7.4	-	56.	-	56.	-	-	10.	-
7	-	-	28.4	7.6	7.6	-	57.8	-	57.8	-	-	-	-
8	-	-	29.0	7.60	7.60	63.3	-	-	63.3 *	-	-	-	-
9	-	-	31.	7.50	7.50	-	-	-	-	-	10.	-	-
10	-	28.	28.	7.72	7.72	-	-	-	-	-	9.69	-	-
11	-	-	29.	6.6	6.6	53.	-	-	53.	-	-	0.3 R	-
12	-	-	28.8	7.6	7.6	53.1	-	-	53.1	-	-	-	9.6
13	-	-	30.	7.3	7.3	60.6	-	-	60.6	-	-	-	-
14	-	-	32.7	7.81	7.81	59.8	-	-	59.8	9.44	-	-	-
MEAN	28.0000	28.0000	29.8385	7.3721	7.3721	57.2857	56.9000	56.9000	57.1700	9.4400	9.8450	10.0000	9.4000
STD DEV	-	-	1.7666	.3672	.3672	3.9868	1.2728	-	3.2880	-	.2192	-	.2708
REL STD	-	-	5.9	5.0	5.0	7.0	2.2	-	5.8	-	2.2	-	2.9
DES VAL	-	-	29.476	-	7.272	-	-	-	56.728	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 30 PP 70 SAMPLE 4

LAB	11105 NA DIS AAS DA	11107 NA UF FL PH	11111 NA DIS ICP	11311 NA EXT ICP	11990 SODIUM COMMON	12005 MG TOT ICP	12101 MG DIS CALC'D	12102 MG DIS AAS DA	12106 MG UF AAS DA	12107 MG DIS AAS AUT	12108 MG HARDN CALC'D	12111 MG DIS ICP	12303 MG UF AAS AUT
1	-	-	-	-	9.	-	-	-	-	-	-	-	4.
2	-	-	-	-	9.5	-	-	-	-	3.4	-	-	-
3	-	9.53	-	-	9.53	-	-	-	3.4	-	-	-	-
5	-	-	-	-	9.5	-	-	-	-	-	3.44	-	-
6	-	-	-	-	10.	-	3.6	-	-	-	-	-	-
7	8.8	-	-	-	8.8	-	-	3.4	-	-	-	-	-
8	-	-	-	10.3	10.3	-	-	-	-	-	-	-	-
9	-	-	-	-	10.	3.7	-	-	-	-	-	-	-
10	-	-	-	-	9.69	3.47	-	-	-	-	-	-	-
11	-	-	-	-	0.3 R	-	-	3.4	-	-	-	-	-
12	-	-	-	-	9.6	-	-	-	-	-	-	3.2	-
13	-	-	8.96	-	8.96	-	-	-	-	-	-	3.49	-
14	-	-	-	-	9.44	-	-	3.28	-	-	-	-	-
MEAN	8.8000	9.5300	8.9600	10.3000	9.5267	3.5850	3.6000	3.3600	3.4000	3.4000	3.4400	3.3450	4.0000
STD DEV	-	-	-	-	.4486	.1626	-	.0693	-	-	-	.2051	-
REL STD	-	-	-	-	4.7	4.5	-	2.1	-	-	-	6.1	-
DES VAL	-	-	-	-	9.554	-	-	-	-	-	-	-	-

LAB	12311 MG EXT ICP	12990 MGNESIUM COMMON	14105 SILICA MOLY AA	14106 SILICA MOLY	14107 SILICA MOLY AA	14111 SILICA ICP DA	14190 SILICA COMMON	15313 T P ACL AA SNCL	15401 T P UV AA ASC	15406 T P UF AA ASC	15409 T P BLK AA ASC	15413 T P ACL AA SNCL	15421 T P BLK DIG ASC
1	-	4. *	-	-	4.0	-	4.0 *	-	-	-	-	-	0.001
2	-	3.4	-	-	-	-	-	-	-	-	-	0.004	-
3	-	3.4	-	3.32	-	-	3.32	-	-	-	-	0.008	-
4	-	-	-	-	-	-	-	-	-	0.003	-	-	-
5	-	3.44	2.8	-	-	-	2.8 *	-	-	-	-	-	-
6	-	3.6	-	-	-	-	-	-	-	-	0.02 R	-	-
7	-	3.4	-	-	-	-	-	-	-	0.020R	-	-	-
8	4.21	4.21 *	-	-	-	-	-	-	-	-	-	0.010	-
9	-	3.7	-	-	-	3.6	3.6	-	-	-	-	-	-
10	-	3.47	3.45	-	-	-	3.45	-	0.010L	-	-	-	-
11	-	3.4	-	-	-	-	-	0.007	-	-	-	-	-
12	-	3.2	3.5	-	-	-	3.5	-	-	0.006	-	-	-
13	-	3.49	-	-	-	-	-	-	-	0.006	-	-	-
14	-	3.28	-	-	-	-	-	-	-	-	-	-	-
MEAN	4.2100	3.5377	3.2500	3.3200	4.0000	3.6000	3.4450	.0070	-	.0050	-	.0073	.0010
STD DEV	-	.2841	.3905	-	-	-	.3916	-	-	.0017	-	.0031	-
REL STD	-	8.0	12.0	-	-	-	11.4	-	-	34.6	-	41.7	-
DES VAL	-	3.449	-	-	-	-	3.329	-	-	-	-	-	-

LAB	15490 TOT P COMMON	16304 SO4 DIS AUTO BA	16306 SO4 DIS AA MTB	16307 SO4 UF AA MTB	16309 SO4 DIS I C	16310 SO4 DIS AA CALM	16990 SULFATE COMMON	17203 CL DIS AA FE	17204 CL DIS AG TIT	17206 CL DIS AA HG	17208 CL DIS AA HG	17209 CL DIS I C	17210 CL DIS TIT CON
1	0.001*	-	16.	-	-	-	16. *	23.7	-	-	-	-	-
2	0.004	13.5	-	-	12.6	-	13.5	-	-	-	-	22.6	-
3	0.008	-	-	13.5	-	-	13.5	-	-	-	23.7	-	-
4	0.003*	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	14.2	-	-	-	14.2	-	-	24.0	-	-	-
6	0.02 R	12.	-	-	-	-	12. *	-	24.	-	-	-	-
7	0.020R	-	14.9	-	-	-	14.9	23.6	-	-	-	-	-
8	0.010	-	-	-	-	-	-	-	-	23.	-	-	-
9	-	-	-	-	13.3	-	13.3	-	-	-	-	22.3	-
10	0.010L	-	-	-	-	12.1	12.1	-	-	-	-	-	24.
11	0.007	-	12.	-	-	-	12. *	-	-	24.	-	-	-
12	0.006	-	14.0	-	-	-	14.0	-	-	23.5	-	-	-
13	0.006	-	14.75	-	-	-	14.75	-	-	24.5	-	-	-
14	-	-	-	-	12.9	-	12.9	-	-	-	-	24.1	-
MEAN	.0056	12.7500	14.3083	13.5000	12.9333	12.1000	13.5958	23.6500	24.0000	23.8000	23.7000	23.0000	24.0000
STD DEV	.0029	1.0607	1.3298	-	.3512	-	1.2527	.0707	-	.5701	-	.9644	-
REL STD	51.1	8.3	9.3	-	2.7	-	9.2	.3	-	2.4	-	4.2	-
DES VAL	.007	-	-	-	-	-	13.589	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 30 PP 70 SAMPLE 4

LAB	17990 CHLORIDE COMMON	19001 K TOT AAS	19005 K TOT ICP	19102 K DIS AAS	19103 K DIS FLM PH	19106 K DIS AAS LI	19107 K DIS FLM PH	19111 K DIS ICP	19301 K EXT HNO3 AA	19990 PTASSIUM COMMON	20005 CA TOT ICP	20100 CA DIS CALC'D	20101 CA DIS EDTA
1	23.7	-	-	-	2.2 R	-	-	-	-	2.2 R	-	-	-
2	22.6	-	-	-	2.9	-	-	-	-	2.9	-	-	-
3	23.7	-	-	-	-	-	2.85	-	-	2.85	-	-	-
5	24.0	-	-	-	2.8	-	-	-	-	2.8	-	-	17.1
6	24.	-	-	3.	-	-	-	-	-	3.	-	16.3	-
7	23.6	-	-	2.69	-	-	-	-	-	2.69	-	-	-
8	23.	-	-	-	-	-	-	-	2.8	2.8	-	-	-
9	22.3	-	3.4	-	-	-	-	-	-	3.4 *	17.5	-	-
10	24.	-	2.93	-	-	-	-	-	-	2.93	16.90	-	-
11	24.	-	-	-	-	3.0	-	-	-	3.0	-	-	-
12	23.5	-	-	-	2.8	-	-	-	-	2.8	-	-	-
13	24.5	-	-	-	-	-	-	3.25	-	3.25 *	-	-	-
14	24.1	2.87	-	-	-	-	-	-	-	2.87	-	-	-
MEAN	23.6154	2.8700	3.1650	2.8450	2.8333	3.0000	2.8500	3.2500	2.8000	2.9408	17.2000	16.3000	17.1000
STD DEV	.6309	-	.3323	.2192	.0577	-	-	-	-	.2025	.4243	-	-
REL STD	2.7	-	10.5	7.7	2.0	-	-	-	-	6.9	2.5	-	-
DES VAL	23.526	-	-	-	-	-	-	-	-	2.893	-	-	-

LAB	20103 CA DIS AAS	20108 CA DIS AAS UF	20110 CA DIS AAS AUT	20111 CA DIS ICP	20311 CA EXT ICP	20990 CALCIUM COMMON
1	-	-	16.	-	-	16.
2	-	-	16.5	-	-	16.5
3	-	17.2	-	-	-	17.2
5	-	-	-	-	-	17.1
6	-	-	-	-	-	16.3
7	16.9	-	-	-	-	16.9
8	-	-	-	-	18.4	18.4
9	-	-	-	-	-	17.5
10	-	-	-	-	-	16.90
11	16.	-	-	-	-	16.
12	-	-	-	16.0	-	16.0
13	-	-	-	18.40	-	18.40
14	18.6	-	-	-	-	18.6
MEAN	17.1667	17.2000	16.2500	17.2000	18.4000	17.0615
STD DEV	1.3204	-	.3536	1.6971	-	.9350
REL STD	7.7	-	2.2	9.9	-	5.5
DES VAL	-	-	-	-	-	16.912

DATES RECEIVED 1 88/06/20 2 88/06/29 3 88/06/06 3 88/07/04 4 88/08/04
5 88/08/26 6 88/06/01 6 88/06/29 7 88/07/25 8 88/06/24
9 88/07/14 10 88/06/29 11 88/06/17 12 88/07/08 13 88/08/16
14 88/06/23

NOTE: ALL CONCENTRATION UNITS ARE EXPRESSED IN MG/L OF EACH ELEMENT, THE EXCEPTIONS BEING: COLOUR IN RELATIVE UNITS, CONDUCTIVITY IN USIE/CM, TURBIDITY IN JTU OR NTU, NITROGEN ANALYSES IN "N", ALKALINITY & HARDNESS IN CACO3, SILICA IN SIO2, AND SULFATE IN SO4.

DISTRIBUTION - PPWB

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MEMORANDUM **NOTE DE SERVICE**

H.Alkema\NWRI\336-4929\ha

SECURITY - CLASSIFICATION - DE SÉCURITÉ	
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DATE	November 30, 1988

TO / À: Distribution

FROM / DE:
H. Alkema
Quality Assurance Section
National Water Research Institute
Burlington, Ontario

SUBJECT / OBJET: Prairie Provinces Quality Assurance Program (PPQA)

I have enclosed the final report for PP 71-72.

If you have any comments on this report, or any legitimate corrections to the data base, please do not hesitate to communicate them.

Harry A

H. Alkema

RESEARCH & APPLICATIONS BRANCH

FINAL REPORT

REPORT NO. RAB 88-16

PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAM

STUDIES 71 AND 72

for July and August 1988

TRACE METALS, MAJOR IONS, NUTRIENTS AND PHYSICAL PARAMETERS IN SURFACE WATERS

by

H. Alkema

Quality Assurance Section
National Water Research Institute
Burlington, Ontario

November 1988

Introduction

As part of an on-going study, the Quality Assurance Section, NWRI in Burlington, Ontario, has been sending reference water samples bi-monthly to chemical laboratories participating in the PPWB program. This report summarizes the most recent PPWB interlaboratory quality control studies: PP 71 and 72, for the months July and August 1988. These two studies dealt with trace metals, major ions, nutrients and physical parameters. The levels were mainly medium levels.

Study Design

Four water samples were submitted to each laboratory for chemical analyses. Two samples were submitted for trace metals analysis, while the remaining two were submitted for major ions, nutrients and some physical measurements. The following is a breakdown of the four samples:

PP 71 - Sample 1 - 125 ml, DA* for trace metals (3% HNO_3)
Sample 2 - up to 1L, major ions etc., stored at 4^oC

PP 72 - Sample 3 - 1L, SE* for trace metals (0.2% HNO_3)
Sample 4 - up to 1L, major ions, etc., stored at 4^oC

* for definitions see Appendix 1

Treatment of Data

Each laboratory was asked to perform only those analyses which were routine to their particular laboratory, using the general methodology guidelines listed above. Results for these analyses were recorded on report sheets provided with the QA samples. Upon receipt of the Reporting Sheets, the results were tabulated for each parameter, first for each method reported, and then for all methods combined. These data, and the resulting statistics are presented in the Data Summary. (attached)

Preliminary data summaries, including problematic results, were sent August 19 or September 7, and November 4. Each laboratory was given three weeks to notify us of any errors in data transcription, compilation, or flags.

Performance Indicators

In the PPWB QA program, two types of reference samples are used for the accuracy assessment. Reference waters (RMs) and certified reference waters (CRMs) have Design Values for the stable parameters. Also, regional samples are used occassionally as reference samples. The means for the regional samples, and the Design Values (together called the comparator) are used to test each reported result for accuracy.

Percentage deviations from the comparator are used as an indicator for the laboratory head to determine the extent of the discrepencies between the laboratory result and comparator as it applies to his procedures. However, please keep in mind that at low levels, high % deviations are often seen, and may be misleading if interpreted too strictly.

A result which deviates more than 10% from the comparator is marked with an asterik in the data tables and its value tabulated in the flags table (Table 1). Results reported with an "L" (less than) or flagged with an "R" (rejectable) are not used in the statistical calculations. Performance indicators are fully explained in Appendix II.

Comments on Laboratory Performance

Results accompanied with a 'less than' are difficult to appraise. If a design value or mean is significantly lower than the detection limit given by a particular laboratory, then that detection limit is too high. Such a result is assigned an 'HDL' and is tabulated for each laboratory in Table 1.

If, on the other hand, the detection limit reported is far lower than the mean or design value, then the use of 'less than' is clearly inadequate and the result is flagged low. The magnitude of the deviation from the mean in such a case is taken from the detection limit given.

Attached are two tables listing flagged data by laboratory (Table 1), and listing parameters for which there was a high standard deviation (Table 2). The latter (formerly called a high coefficient of variation) was generated with a new set of criteria to provide a more accurate and more consistent description of difficult to analyse parameters or levels. Your comments will be appreciated.

PPWB laboratories average number of deviations per sample was 2.5

TABLE 1: PRAIRIE PROV LABORATORIES FLAGGED DATA - STUDIES PP 71-72

LAB	1	FLAGS :	AMMONIA	63%		IRON	-31%	LEAD	50%
			TOT P	174%					
		HDL :	NONE						
LAB	3	FLAGS :	NITRATE	-81%	L	T N DIS	-89% L		
		HDL :	NONE						
LAB	4	FLAGS :	NONE						
		HDL :	NONE						
LAB	6	FLAGS :	MANGNESE	-22%		D O C	-42%	TKN	143% R
			AMMONIA	150%	R	TOT P	217% R	PTASSIUM	13% R
			MANGNESE	-42%		NICKEL	69% R	MOLYBNUM	-38%
			LEAD	-50%	L	PH	19% R	MGNESIUM	23% R
			PTASSIUM	13%					
		HDL :	LEAD			AMMONIA		ALKLINTY	
LAB	8	FLAGS :	COBALT	-13%		NICKEL	-13%	CONDUCT	-13%
			TKN	143%	R	AMMONIA	-63%	TOT N	23%
			SILICA	-12%		PTASSIUM	-12%	CHROMIUM	23%
			COPPER	54%		ZINC	25%	LEAD	30%
			CONDUCT	-15%					
		HDL :	ALUMINUM			MANGNESE		TKN	
			TOT N			SILICA			

NOTE: A VERY HIGH FREQUENCY OF FLAGGED RESULTS (OR A HIGH %) IS INDICATIVE OF POOR PERFORMANCE. ON THE OTHER HAND, LABS WITH FEW IF ANY FLAGS ARE JUDGED TO HAVE VERY GOOD PERFORMANCE.

ALSO, AN "R" FLAG INDICATES A NON COMPARABLE RESULT, THAT IS, ONE PRODUCED WITH NON RANDOM FACTORS. AN "L" FLAG INDICATES A 'LESS THAN' RESULT LOWER THAN THE COMPARATOR.

TABLE 2: HIGH STANDARD DEVIATION

PARAMETER		LEVEL
D O C	AT	1.390 PPM
MANGNESE	AT	.012 PPM
IRON	AT	.029 PPM
COBALT	AT	.011 PPM
COPPER	AT	.013 PPM
D O C	AT	.389 PPM
T N DIS	AT	.045 PPM

APPENDIX I

Definitions of Types of Metals Analysis

1. DA - Direct Aspiration

Without sample pretreatment, samples are aspirated by Atomic Absorption Spectrophotometry (AAS) ar Inuctively Coupled (Argon) Plasma (ICAP or ICP). Standards should contain the acid equivalent of the sample.

2. SE - Code for low level analysis

Analysis is carried out by one of the following methods:

1. Solvent extraction sample concentration followed by AAS.
2. Digestion and concentration of aqueous phase followed by ICAP.
3. Digestion of aqueous phase and ICAP analysis.
4. Graphite tube (flameless) AAS.

APPENDIX II

Performance Indicators

1. **Circled Results**

Results are circled in the data tables when a minor deviation from the comparator has ocurred. (The comparator is the design value of the reference sample, or the mean in the case of a biologically active sample.) Circled results are in general greater than or less than 10% from the comparator. At very low levels of analytes or with parameters that are difficult to analyse, a greater deviation than 10% is allowed. Under these conditions, a result is circled when it is outside one standard deviation of the comparator. These circled results, though acceptable values, are a warning to laboratory managers that the parameter analysis should be investigated.

2. **Rejectable Results**

Each laboratory result is statistically tested to see if it is outlying. Outlying results were caused by non random causes such as a faulty calibration or a transcription error. These outlying results, calculated by the Grubbs' procedure,* and indicated in the data tables with an 'R', are noncomparable with the other data for the parameter.

3. **A High Co-efficient of Variation (HCV)**

Occasionally data for a parameter yields a very high relative standard deviation (RSD). When this HCV is not due to outlying values, it indicates a high variability within the data set. The data in this set is then noncomparable. In such a case, the RSD for the parameter is circled in the data tables and the parameter's noncomparability is noted in the comments.

4. **High Detection Limits (HDL)**

Each laboratory determines its own detection limits according to its own requirements. When major differences of detection limits occur, the result is flagged with 'HDL' in the data tables. An HDL indicates that low level analysis may not be comparable with the analyses of other laboratories.

* reference : Frank E. Grubbs, Technometrics, 1969, p. 1.

DATA SUMMARY

FEDERAL-PROVINCIAL & PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAMS

STUDY NO. FP 31 PP 71 DATE: 01/07/88 DUE DATE: 31/08/88 PAGE 1

SAMPLE 1 SPIKED SAMPLE. TRACE METALS D/A. (IN 3% HNO3)

LAB	13009 AL TOT 5X ICP	13111 AL DIS ICP DA	13302 AL EXT AAS DA	13306 AL UF AAS OX	13311 AL EXT ICP DA	13321 AL EXT ICP DA	13322 AL EXT DCP DA	13999 ALUMINUM COMMON	23009 V TOT 5X ICP	23011 V TOT 5X ICP	23012 V TOT 5X DCP	23111 V DIS ICP DA	23311 V EXT ICP DA
1	-	-	-	0.475	-	-	-	0.475	0.483	-	-	-	-
2	-	-	0.5	-	-	-	-	0.5	-	-	-	-	-
3	-	-	0.499	-	-	0.507	-	0.499	-	-	-	-	-
6	0.49	-	-	-	-	-	-	0.49	-	0.52	-	-	-
8	-	-	0.5	-	-	-	-	0.5	-	-	-	-	-
9	-	0.50	-	-	-	-	-	0.50	-	-	-	0.49	-
10	-	0.47	-	-	-	-	-	0.47	-	-	-	0.472	-
12	-	-	-	-	-	-	-	-	-	-	-	0.5	-
15	-	-	-	-	0.44	-	-	0.44	-	-	-	-	0.47
16	-	-	-	-	-	-	0.50	0.50	-	-	0.50	-	-
MEAN	.4900	.4850	.4997	.4750	.4400	.5070	.5000	.4860	.4830	.5200	.5000	.4873	.4700
STD DEV	-	.0212	.0006	-	-	-	-	.0208	-	-	-	.0142	-
REL STD	-	4.4	.1	-	-	-	-	4.3	-	-	-	2.9	-
DES VAL	-	-	-	-	-	-	-	.517	-	-	-	-	-

LAB	23321 V EXT ICP DA	23999 VANADIUM COMMON	24004 CR TOT AAS GF	24009 CR TOT 5X ICP	24011 CR TOT 5X ICP	24012 CR TOT 5X DCP	24111 CR DIS ICP DA	24302 CR EXT AAS DA	24311 CR EXT ICP DA	24321 CR EXT ICP DA	24999 CHROMIUM COMMON	25003 MN TOT 5X ICP	25011 MN TOT 5X ICP
1	-	0.483	-	0.051	-	-	-	-	-	-	0.051	0.048	-
3	0.485	0.485	-	-	-	-	-	-	-	0.052	0.052	-	-
6	-	0.52	-	-	0.049	-	-	-	-	-	0.049	-	0.036
8	-	-	0.056	-	-	-	-	-	-	-	0.056	-	-
9	-	0.49	-	-	-	-	0.049	-	-	-	0.049	-	-
10	-	0.472	-	-	-	-	0.049	-	-	-	0.049	-	-
11	-	-	-	-	-	-	-	0.051	-	-	0.051	-	-
12	-	0.5	-	-	-	-	0.060	-	-	-	0.060	-	-
13	-	-	-	-	-	-	-	-	0.05 L	-	0.05 L	-	-
15	-	0.47	-	-	-	-	-	-	0.047	-	0.047	-	-
16	-	0.50	-	-	-	0.05	-	-	-	-	0.05	-	-
MEAN	.4850	.4900	.0560	.0510	.0490	.0500	.0527	.0510	.0470	.0520	.0514	.0480	.0360
STD DEV	-	.0165	-	-	-	-	.0064	-	-	-	.0039	-	-
REL STD	-	3.4	-	-	-	-	12.1	-	-	-	7.5	-	-
DES VAL	-	.492	-	-	-	-	-	-	-	-	.053	-	-

LAB	25012 MN TOT 5X DCP	25104 MN DIS AAS DA	25111 MN DIS ICP DA	25304 MN EXT AAS DA	25311 MN EXT ICP DA	25321 MN EXT ICP DA	25999 MANGNESE COMMON	26009 FE TOT 5X ICP	26011 FE TOT 5X ICP	26012 FE TOT 5X DCP	26104 FE DIS AAS DA	26111 FE DIS ICP DA	26304 FE EXT AAS DA
1	-	-	-	-	-	-	0.048	0.248	-	-	-	-	-
2	-	-	-	0.04	-	-	0.04	-	-	-	-	-	0.28
3	-	-	-	0.048	-	0.047	0.048	-	-	-	-	-	0.27
6	-	-	-	-	-	-	0.036*	-	0.25	-	-	-	-
8	-	-	-	-	0.04	-	0.04	-	-	-	-	-	-
9	-	-	0.047	-	-	-	0.047	-	-	-	-	0.25	-
10	-	-	0.044	-	-	-	0.044	-	-	-	-	0.237	-
11	-	-	-	-	-	-	-	-	-	-	-	-	0.275
12	-	-	0.045	-	-	-	0.045	-	-	-	-	0.24	-
13	-	-	-	-	0.04	-	0.04	-	-	-	-	-	-
14	-	0.071R	-	-	-	-	0.071R	-	-	-	0.263	-	-
15	-	-	-	-	0.039	-	0.039*	-	-	-	-	-	-
16	0.06	-	-	-	-	-	0.06 *	-	-	0.298	-	-	-
MEAN	.0600	-	.0453	.0440	.0397	.0470	.0443	.2480	.2500	.2980	.2630	.2423	.2750
STD DEV	-	-	.0015	.0057	.0006	-	.0066	-	-	-	-	.0068	.0050
REL STD	-	-	3.4	12.9	1.5	-	14.9	-	-	-	-	2.8	1.8
DES VAL	-	-	-	-	-	-	.046	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 31 PP 71 SAMPLE 1

LAB	26311 FE EXT ICP DA	26321 FE EXT ICP DA	26999 IRON COMMON	27009 CO TOT 5X ICP	27011 CO TOT 5X ICP	27012 CO TOT 5X DCP	27111 CO DIS ICP DA	27301 CO EXT AAS DA	27311 CO EXT ICP DA	27321 CO EXT ICP DA	27999 COBALT COMMON	28009 NI TOT 5X ICP	28011 NI TOT 5X ICP
1	-	-	0.248	0.227	-	-	-	-	-	-	0.227	0.266	-
2	-	-	0.28	-	-	-	-	-	-	-	-	-	-
3	-	0.256	0.27	-	-	-	-	-	-	0.225	0.225	-	-
6	-	-	0.25	-	0.23	-	-	-	-	-	0.23	-	0.27
8	0.23	-	0.23	-	-	-	-	0.20	-	-	0.20 *	-	-
9	-	-	0.25	-	-	-	0.21	-	-	-	0.21	-	-
10	-	-	0.237	-	-	-	0.210	-	-	-	0.210	-	-
11	-	-	0.275	-	-	-	-	-	-	-	-	-	-
12	-	-	0.24	-	-	-	0.22	-	-	-	0.22	-	-
13	0.2	-	0.2 *	-	-	-	-	-	-	-	-	-	-
14	-	-	0.263	-	-	-	-	-	-	-	-	-	-
15	0.22	-	0.22	-	-	-	-	-	0.21	-	0.21	-	-
16	-	-	0.298*	-	-	0.223	-	-	-	-	0.223	-	-
MEAN	.2167	.2560	.2508	.2270	.2300	.2230	.2133	.2000	.2100	.2250	.2172	.2660	.2700
STD DEV	.0153	-	.0266	-	-	-	.0058	-	-	-	.0101	-	-
REL STD	7.1	-	10.6	-	-	-	2.7	-	-	-	4.6	-	-
DES VAL	-	-	.250	-	-	-	-	-	-	-	.229	-	-

LAB	28012 NI TOT 5X DCP	28111 NI DIS ICP DA	28301 NI EXT AAS DA	28311 NI EXT ICP DA	28321 NI EXT ICP DA	28999 NICKEL COMMON	29009 CU TOT 5X ICP	29011 CU TOT 5X ICP	29012 CU TOT 5X DCP	29106 CU DIS AAS DA	29111 CU DIS ICP DA	29306 CU EXT AAS DA	29311 CU EXT ICP DA
1	-	-	-	-	-	0.266	0.045	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	0.05	-
3	-	-	-	-	0.270	0.270	-	-	-	-	-	0.046	-
6	-	-	-	-	-	0.27	-	0.043	-	-	-	-	-
8	-	-	-	0.23	-	0.23 *	-	-	-	-	-	-	0.04
9	-	0.26	-	-	-	0.26	-	-	-	-	0.048	-	-
10	-	0.255	-	-	-	0.255	-	-	-	-	0.064	-	-
11	-	-	0.305	-	-	0.305*	-	-	-	-	-	0.047	-
12	-	0.27	-	-	-	0.27	-	-	-	-	0.043	-	-
13	-	-	-	0.251	-	0.251	-	-	-	-	-	-	0.041
14	-	-	-	-	-	-	-	-	-	0.129R	-	-	-
15	-	-	-	0.25	-	0.25	-	-	-	-	-	-	0.041
16	0.278	-	-	-	-	0.278	-	-	0.050	-	-	-	-
MEAN	.2780	.2617	.3050	.2437	.2700	.2641	.0450	.0430	.0500	-	.0517	.0477	.0407
STD DEV	-	.0076	-	.0118	-	.0190	-	-	-	-	.0110	.0021	.0006
REL STD	-	2.9	-	4.9	-	7.2	-	-	-	-	21.2	4.4	1.4
DES VAL	-	-	-	-	-	.264	-	-	-	-	-	-	-

LAB	29321 CU EXT ICP DA	29999 COPPER COMMON	30009 ZN TOT 5X ICP	30011 ZN TOT 5X ICP	30012 ZN TOT 5X DCP	30104 ZN DIS AAS DA	30111 ZN DIS ICP DA	30304 ZN EXT AAS DA	30311 ZN EXT ICP DA	30321 ZN EXT ICP DA	30999 ZINC COMMON	38012 SR TOT DCP DA	38111 SR DIS ICP DA
1	-	0.045	0.057	-	-	-	-	-	-	-	0.057	-	-
2	-	0.05	-	-	-	-	-	0.06	-	-	0.06	-	-
3	0.045	0.046	-	-	-	-	-	-	-	0.058	0.058	-	-
6	-	0.043	-	0.053	-	-	-	-	-	-	0.053	-	-
8	-	0.04	-	-	-	-	-	-	0.05	-	0.05	-	-
9	-	0.048	-	-	-	-	0.050	-	-	-	0.050	-	0.17
10	-	0.064*	-	-	-	-	0.057	-	-	-	0.057	-	-
11	-	0.047	-	-	-	-	-	0.055	-	-	0.055	-	-
12	-	0.043	-	-	-	-	0.055	-	-	-	0.055	-	-
13	-	0.041	-	-	-	-	-	-	0.057	-	0.057	-	-
14	-	0.129R	-	-	-	0.059	-	-	-	-	0.059	-	-
15	-	0.041	-	-	-	-	-	-	0.046	-	0.046*	-	-
16	-	0.050	-	-	0.058	-	-	-	-	-	0.058	0.225R	-
MEAN	.0450	.0465	.0570	.0530	.0580	.0590	.0540	.0575	.0510	.0580	.0550	-	.1700
STD DEV	-	.0065	-	-	-	-	.0036	.0035	.0056	-	.0041	-	-
REL STD	-	14.0	-	-	-	-	6.7	6.1	10.9	-	7.5	-	-
DES VAL	-	.046	-	-	-	-	-	-	-	-	.055	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 31 PP 71 SAMPLE 1

LAB	38301 SR EXT AAS DA	38311 SR EXT ICP DA	38321 SR EXT ICP DA	38999 STRNTIUM COMMON	42009 MO TOT 5X ICP	42011 MO TOT 5X ICP	42012 MO TOT 5X DCP	42111 MO DIS ICP DA	42121 MO EXT ICP DA	42311 MO EXT ICP DA	42999 MOLYBNUM COMMON	48009 CD TOT 5X ICP	48011 CD TOT 5X ICP
1	-	-	-	-	0.889	-	-	-	-	-	0.889	0.040	-
3	-	-	0.170	0.170	-	-	-	-	0.862	-	0.862	-	-
6	-	-	-	-	-	0.91	-	-	-	-	0.91	-	0.039
9	-	-	-	0.17	-	-	-	0.84	-	-	0.84	-	-
10	0.16	-	-	0.16	-	-	-	0.90	-	-	0.90	-	-
12	-	-	-	-	-	-	-	0.89	-	-	0.89	-	-
15	-	0.156	-	0.156	-	-	-	-	-	0.84	0.84	-	-
16	-	-	-	0.225R	-	-	0.95	-	-	-	0.95	-	-
MEAN	.1600	.1560	.1700	.1640	.8890	.9100	.9500	.8767	.8620	.8400	.8851	.0400	.0390
STD DEV	-	-	-	.0071	-	-	-	.0321	-	-	.0372	-	-
REL STD	-	-	-	4.3	-	-	-	3.7	-	-	4.2	-	-
DES VAL	-	-	-	.167	-	-	-	-	-	-	.892	-	-

LAB	48012 CD TOT 5X DCP	48103 CD DIS AAS GF	48111 CD DIS ICP DA	48301 CD EXT AAS DA	48311 CD EXT ICP DA	48321 CD EXT ICP DA	48999 CADMIUM COMMON	56009 BA TOT 5X ICP	56011 BA TOT 5X ICP	56012 BA TOT 5X DCP	56111 BA DIS ICP DA	56301 BA EXT AAS DA	56311 BA EXT ICP DA
1	-	-	-	-	-	-	0.040	0.447	-	-	-	-	-
2	-	-	-	0.04	-	-	0.04	-	-	-	-	-	-
3	-	-	-	-	-	0.041	0.041	-	-	-	-	0.435	-
6	-	-	-	-	-	-	0.039	-	0.43	-	-	-	-
8	-	-	-	0.04	-	-	0.04	-	-	-	-	-	-
9	-	-	0.041	-	-	-	0.041	-	-	-	0.44	-	-
10	-	-	0.038	-	-	-	0.038	-	-	-	0.43	-	-
11	-	-	-	0.042	-	-	0.042	-	-	-	-	-	-
12	-	-	0.038	-	-	-	0.038	-	-	-	0.43	-	-
13	-	-	-	-	0.036	-	0.036	-	-	-	-	-	-
14	-	0.100R	-	-	-	-	0.100R	-	-	-	-	-	-
15	-	-	-	-	0.038	-	0.038	-	-	-	-	-	0.412
16	0.050L	-	-	-	-	-	0.050L	-	-	0.499	-	-	-
MEAN	-	-	.0390	.0407	.0370	.0410	.0394	.4470	.4300	.4990	.4333	.4350	.4120
STD DEV	-	-	.0017	.0012	.0014	-	.0017	-	-	-	.0058	-	-
REL STD	-	-	4.4	2.8	3.8	-	4.4	-	-	-	1.3	-	-
DES VAL	-	-	-	-	-	-	.041	-	-	-	-	-	-

LAB	56321 BA EXT ICP DA	56999 BARIUM COMMON	82009 PB TOT 5X ICP	82011 PB TOT 5X ICP	82012 PB TOT 5X DCP	82101 PB DIS AAS DA	82111 PB DIS ICP DA	82301 PB EXT AAS DA	82311 PB EXT ICP DA	82321 PB EXT ICP DA	82999 LEAD COMMON
1	-	0.447	0.279	-	-	-	-	-	-	-	0.279
2	-	-	-	-	-	-	-	0.28	-	-	0.28
3	0.434	0.435	-	-	-	-	-	-	-	0.290	0.290
6	-	0.43	-	0.26	-	-	-	-	-	-	0.26
8	-	-	-	-	-	-	-	-	0.30	-	0.30
9	-	0.44	-	-	-	-	0.29	-	-	-	0.29
10	-	0.43	-	-	-	-	0.267	-	-	-	0.267
11	-	-	-	-	-	-	-	0.290	-	-	0.290
12	-	0.43	-	-	-	-	0.26	-	-	-	0.26
13	-	-	-	-	-	-	-	-	0.296	-	0.296
14	-	-	-	-	-	0.405R	-	-	-	-	0.405R
15	-	0.412	-	-	-	-	-	-	0.28	-	0.28
16	-	0.499	-	-	0.319	-	-	-	-	-	0.319*
MEAN	.4340	.4404	.2790	.2600	.3190	-	.2723	.2850	.2920	.2900	.2843
STD DEV	-	.0257	-	-	-	-	.0157	.0071	.0106	-	.0171
REL STD	-	5.8	-	-	-	-	5.8	2.5	3.6	-	6.0
DES VAL	-	.454	-	-	-	-	-	-	-	-	.273

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 31 PP 71 SAMPLE 2

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS	00125 SUM OF ANIONS	02011 COLOUR APPARE	02021 COLOUR VIS COM	02023 COLOUR SPECT	02024 COL TRU SPECT	02040 COLOUR COMMON	02041 CONDUCT SPEC 25	02060 CONDUCT COMMON	02073 TURB HACH	02074 TURB NPLMTRI	02077 TURB HACH FZ
1	0.53	2.87	2.84	-	-	-	2.7	2.7	297.	297.	0.21	-	-
2	-0.17	2.771	2.781	5. L	-	-	-	5. L	295.	295.	0.3	-	-
3	0.11	2.836	2.830	5. L	-	-	-	5. L	296.	296.	0.13	-	-
4	-	-	-	-	5. L	-	-	5. L	295.	295.	-	-	-
5	-0.53	2.855	2.884	5.	-	-	-	5.	292.	292.	0.18	-	-
6	2.90	2.94	2.78	-	-	-	-	-	285.	285.	-	0.14	-
7	1.1	2.82	2.76	6.	-	-	-	6.	301.	301.	0.28	-	-
8	1.58	2.733	2.821	5. L	-	-	-	5. L	255.	255. *	-	0.20	-
9	1.37	2.95	2.87	-	-	-	-	-	286.	286.	-	-	-
10	2.02	2.877	2.763	-	-	1. L	-	1. L	285.	285.	-	0.2	-
11	-	-	-	5. L	-	-	-	5. L	290.	290.	-	-	0.2
12	0.71	2.867	2.826	-	-	-	-	-	310.	310.	0.2	-	-
13	-	-	-	-	-	-	-	-	250.	250. *	-	-	-
14	-	-	-	-	-	-	-	-	294.0	294.0	-	-	-
15	-	-	-	5. L	-	-	-	5. L	290.	290.	-	0.2	-
16	-	-	-	-	-	-	-	-	315.	315.	0.6 R	-	-
MEAN	.9620	2.8519	2.8155	5.5000	-	-	2.7000	4.5667	289.7500	289.7500	.2167	.1850	.2000
STD DEV	1.0502	.0671	.0433	.7071	-	-	-	1.6921	16.7153	16.7153	.0635	.0300	-
REL STD	109.2	2.4	1.5	12.9	-	-	-	37.1	5.8	5.8	29.3	16.2	-
DES VAL	-	-	-	-	-	-	-	2.368	-	292.164	-	-	-

LAB	02081 TURB RATIO	02090 TURBIDTY COMMON	05100 BORON ?	05106 BORON F AZOMETH	05107 BORON ICP DA	05111 BORON F ICP DA	05190 BORON COMMON	06000 DOC ?	06009 TOC CO2 IR	06051 TIC COMB IR	06101 DOC IR /DIF	06104 DOC UV CO2 IR	06107 DOC UV CO2 PHE
1	-	0.21	-	-	-	-	-	-	-	-	-	-	1.1
2	-	0.3	-	-	-	-	-	-	-	-	-	-	1.5
3	-	0.13	-	-	-	-	-	-	-	-	-	1.6	-
4	0.14	0.14	-	-	-	-	-	-	-	-	-	1.71	-
5	-	0.18	-	-	-	-	-	-	-	-	2.4	-	-
6	-	0.14	-	-	-	-	-	-	-	-	-	0.8	-
7	-	0.28	-	-	-	-	-	-	-	-	-	-	-
8	-	0.20	-	0.05 L	-	-	0.05 L	-	-	-	-	-	-
10	-	0.2	-	-	-	0.03	0.03	-	-	-	-	-	-
11	-	0.2	-	-	-	-	-	6.5 R	-	-	-	-	-
12	-	0.2	-	-	-	-	-	-	-	-	1.0 L	-	-
15	-	0.2	-	-	0.01 L	-	0.01 L	-	1.	16.	-	-	-
16	-	0.6 R	0.05 L	-	-	-	0.05 L	-	-	-	-	-	-
MEAN	.1400	.1983	-	-	-	.0300	.0300	-	1.0000	16.0000	2.4000	1.3700	1.3000
STD DEV	-	.0513	-	-	-	-	-	-	-	-	-	.4967	.2828
REL STD	-	25.9	-	-	-	-	-	-	-	-	-	36.3	21.8
DES VAL	-	.209	-	-	-	-	.043	-	-	-	-	-	-

LAB	06109 DOC UV CO2 OH	06112 DOC PER IR	06150 D O C COMMON	06151 DIC IR COMBUST	06152 DIC UV CO2 IR	06154 DIC AA CO2 PHE	06159 DIC AA CO2 OH	06180 DIC CALC'D	06490 D I C COMMON	07010 TKN AA SAL	07015 TKN DIG BERTHEL	07016 TKN BLK AMM-SAL	07018 TKN BLK INDOPHE
1	-	-	1.1	-	-	18.0	-	-	18.0	-	-	-	-
2	-	-	1.5	-	-	-	-	-	-	-	-	-	-
3	-	-	1.6	-	17.6	-	-	-	17.6	0.105	-	-	-
4	-	-	1.71	-	19.2	-	-	-	19.2	-	-	-	-
5	-	-	2.4 *	21.	-	-	-	-	21. *	-	-	-	-
6	-	-	0.8 *	-	-	-	-	-	-	-	-	0.3 R	-
8	-	-	-	-	-	-	-	-	-	-	0.30 R	-	-
10	1.1	-	1.1	-	-	-	18.2	-	18.2	-	-	-	-
11	-	-	6.5 R	14.	-	-	-	-	14. *	-	-	-	-
12	-	-	1.0 L	20.0	-	-	-	-	20.0	-	-	-	0.15
15	-	-	1.	-	-	-	-	-	16.	-	-	-	-
16	-	1.3	1.3	-	-	-	-	22.5	22.5 *	-	-	-	-
MEAN	1.1000	1.3000	1.3900	18.3333	18.4000	18.0000	18.2000	22.5000	18.5000	.1050	-	-	.1500
STD DEV	-	-	.4816	3.7859	1.1314	-	-	-	2.5652	-	-	-	-
REL STD	-	-	34.6	20.7	6.1	-	-	-	13.9	-	-	-	-
DES VAL	-	-	1.444	-	-	-	-	-	18.038	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 31 PP 71 SAMPLE 2

LAB	07021 TKN BLK DIG BER	07023 TKN DIG INDO	07090 TKN COMMON	07109 NO3+NO2 AA HYD	07110 NO3+NO2 AA2 CD	07111 NO3+NO2 DIS SPEC	07112 NO3+NO2 UF AA CD	07121 NO3+NO2 AA AZ	07390 NITRATE COMMON	07505 NH3 TOT AA BERT	07540 NH3 TOT AA SAL	07555 NH3 DIS AA PHEN	07557 NH3 DIS AA INDO
1	0.115	-	0.115	-	-	0.286	-	-	0.286	-	-	-	-
2	-	-	-	-	0.27	-	-	-	0.27 *	-	-	-	-
3	-	-	0.105	-	-	-	0.363	-	0.363	0.005	-	-	-
4	-	-	-	-	0.294	-	-	-	0.294	-	0.005L	-	-
5	-	-	-	-	0.290	-	-	-	0.290	-	-	-	0.002L
6	-	-	0.3 R	0.34	-	-	-	-	0.34	-	-	-	0.02 R
7	-	-	-	-	-	-	0.24	-	0.24 *	-	-	-	-
8	-	-	0.30 R	-	0.35	-	-	-	0.35	-	-	0.003	-
9	-	-	-	0.31	-	-	-	-	0.31	-	-	-	-
10	-	-	-	0.33	-	-	-	-	0.33	-	-	0.010L	-
11	-	-	-	-	0.36	-	-	-	0.36	-	0.009	-	-
12	-	-	0.15 *	-	0.32	-	-	-	0.32	-	-	-	-
13	-	-	-	-	0.35	-	-	-	0.35	-	0.1 L	-	-
14	-	-	-	-	-	0.32	-	-	0.32	-	-	-	-
15	-	-	-	-	0.456	-	-	-	0.456*	-	-	0.010	-
16	-	0.3 R	0.3 R	-	-	-	-	0.29	0.29	-	-	-	-
MEAN	.1150	-	.1233	.3267	.3363	.3030	.3015	.2900	.3231	.0050	.0090	.0065	-
STD DEV	-	-	.0236	.0153	.0584	.0240	.0870	-	.0495	-	-	.0049	-
REL STD	-	-	19.2	4.7	17.4	7.9	28.8	-	15.3	-	-	76.1	-
DES VAL	-	-	.127	-	-	-	-	-	.336	-	-	-	-

LAB	07562 NH3 DIS AA EDTA	07563 NH3 DIS AA INDO	07565	07590 AMMONIA COMMON	07600 T N PER AUTO	07601 T N UV AA SUL	07602 T N CALC'D	07605 T N UV HY SUL	07651 T N DIS UV AA	07655 T N DIS UV EDTA	07690 TOT N COMMON	07790 T N DIS COMMON	09103 F DIS COL SP
1	0.013	-	-	0.013*	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	0.37	-	-	-	-	-	0.37	-
3	-	-	-	0.005	-	0.392	-	-	-	-	-	0.392	-
4	-	-	-	0.005L	-	-	-	-	0.396	-	-	0.396	-
5	-	-	-	0.002*	-	-	-	-	-	0.362	-	0.362	-
6	-	-	-	0.02 R	-	-	-	-	-	-	-	-	0.6
8	-	-	-	0.003*	-	-	0.65	-	-	-	0.65 *	-	-
10	-	-	-	0.010L	-	-	-	0.38	-	-	-	0.38	-
11	-	-	-	0.009	-	-	-	-	-	-	-	-	-
12	-	0.005L	-	0.005L	-	-	0.47	-	-	-	0.47	-	-
13	-	-	-	0.1 L	-	-	-	-	-	-	-	-	-
15	-	-	-	0.010	0.47	-	-	-	-	-	0.47	-	-
16	-	-	0.05 L	0.05 L	-	-	-	-	-	-	-	-	-
MEAN	.0130	-	-	.0080	.4700	.3810	.5600	.3800	.3960	.3620	.5300	.3800	.6000
STD DEV	-	-	-	.0040	-	.0156	.1273	-	-	-	.1039	.0144	-
REL STD	-	-	-	50.0	-	4.1	22.7	-	-	-	19.6	3.8	-
DES VAL	-	-	-	.013	-	-	-	-	-	-	.510	.429	-

LAB	09105 F DIS SP EL	09106 F DIS EL POT	09107 F DIS AUT POT	09108 F DIS SP EL	09115 F DIS AA ALIZ	09116 F DIS IC	09190 FLUORIDE COMMON	10101 ALKLNTY TITR'N	10108 ALKLNTY POT TIT	10109 ALKLNTY POT TIT	10111 ALKLNTY TIT PRO	10112 ALKLNTY TIT CON	10190 ALKLINTY COMMON
1	-	-	0.6	-	-	-	0.6	77.1	-	-	-	-	77.1
2	-	-	-	-	-	-	-	71.7	-	-	-	-	71.7
3	-	-	-	0.58	-	-	0.58	-	-	-	73.0	-	73.0
4	-	-	-	-	-	-	-	74.2	-	-	-	-	74.2
5	-	0.521	-	-	-	-	0.521	74.9	-	-	-	-	74.9
6	-	-	-	-	-	-	0.6	-	-	76.	-	-	76.
7	-	-	-	-	-	-	-	74.7	-	-	-	-	74.7
8	0.56	-	-	-	-	-	0.56	-	-	74.0	-	-	74.0
9	-	-	-	-	-	-	-	-	77.	-	-	-	77.
10	-	-	-	-	0.55	-	0.55	-	-	-	-	73.	73.
11	-	-	-	-	-	-	-	72.	-	-	-	-	72.
12	0.58	-	-	-	-	-	0.58	74.4	-	-	-	-	74.4
13	-	-	-	-	-	-	-	90. R	-	-	-	-	90. R
14	-	-	-	-	-	-	-	77.2	-	-	-	-	77.2
15	0.70 R	-	-	-	-	-	0.70 R	74.3	-	-	-	-	74.3
16	-	-	-	-	-	1. L	1. L	78.	-	-	-	-	78.
MEAN	.5700	.5210	.6000	.5800	.5500	-	.5701	74.8500	77.0000	75.0000	73.0000	73.0000	74.7667
STD DEV	.0141	-	-	-	-	-	.0286	2.0951	-	1.4142	-	-	1.9441
REL STD	2.5	-	-	-	-	-	5.0	2.8	-	1.9	-	-	2.6
DES VAL	-	-	-	-	-	-	.561	-	-	-	-	-	75.864

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 31 PP 71 SAMPLE 2

LAB	10301 PH	10390 PH COMMON	10602 HARDNSS CALC'D	10603 HARDNSS TITR'N	10606 HARDNSS CALC'D	10645 HARDNSS ?	10690 HARDNESS COMMON	11001 NA TOT AAS	11005 NA TOT ICP	11007 NA DIS DCP	11102 NA F AAS	11103 NA DIS FL PH	11105 NA DIS AAS DA
1	7.9	7.9	107.2	-	-	-	107.2	-	-	-	-	15.	-
2	7.5	7.5	105.0	-	-	-	105.0	-	-	-	-	15.3	-
3	8.13	8.13	-	-	106.	-	106.	-	-	-	-	-	-
4	7.91	7.91	-	-	-	-	-	-	-	-	-	-	-
5	6.82	6.82 *	-	-	-	-	-	-	-	-	-	14.9	-
6	7.80	7.80	-	108.	-	-	108.	-	-	-	16.	-	-
7	7.9	7.9	-	111.0	-	-	111.0	-	-	-	-	-	14.3
8	8.05	8.05	102.	-	-	-	102.	-	-	-	-	-	-
9	7.97	7.97	-	-	-	110.	110.	-	15.5	-	-	-	-
10	7.84	7.84	-	-	-	-	-	-	15.89	-	-	-	-
11	7.5	7.5	100.	-	-	-	100.	-	-	-	15.	-	-
12	8.0	8.0	106.	-	-	-	106.	-	-	-	-	15.0	-
13	7.7	7.7	111.9	-	-	-	111.9	-	-	-	-	-	-
14	7.96	7.96	100.2	-	-	-	100.2	9.68 R	-	-	-	-	-
15	7.9	7.9	110.	-	-	-	110.	-	-	-	-	-	-
16	7.26	7.26	100.	-	-	-	100.	-	-	11.4	-	-	-
MEAN	7.7588	7.7588	104.7000	109.5000	106.0000	110.0000	105.9462	-	15.6950	11.4000	15.5000	15.0500	14.3000
STD DEV	.3391	.3391	4.4677	2.1213	-	-	4.2803	-	.2758	-	.7071	.1732	-
REL STD	4.4	4.4	4.3	1.9	-	-	4.0	-	1.8	-	4.6	1.2	-
DES VAL	-	7.907	-	-	-	-	107.390	-	-	-	-	-	-

LAB	11107 NA UF FL PH	11111 NA DIS ICP	11311 NA EXT ICP	11990 SODIUM COMMON	12005 MG TOT ICP	12012 MG TOT DCP	12101 MG DIS CALC'D	12102 MG DIS AAS DA	12106 MG UF AAS DA	12107 MG DIS AAS AUT	12108 MG HARDN CALC'D	12111 MG DIS ICP	12303 MG UF AAS AUT
1	-	-	-	15.	-	-	-	-	-	-	-	-	6.5
2	-	-	-	15.3	-	-	-	-	-	6.4	-	-	-
3	14.8	-	-	14.8	-	-	-	-	6.4	-	-	-	-
5	-	-	-	14.9	-	-	-	-	-	-	6.51	-	-
6	-	-	-	16.	-	-	6.8	-	-	-	-	-	-
7	-	-	-	14.3	-	-	-	6.6	-	-	-	-	-
8	-	-	14.3	14.3	-	-	-	-	-	-	-	-	-
9	-	-	-	15.5	6.9	-	-	-	-	-	-	-	-
10	-	-	-	15.89	6.52	-	-	-	-	-	-	-	-
11	-	-	-	15.	-	-	-	6.6	-	-	-	-	-
12	-	-	-	15.0	-	-	-	-	-	-	-	6.6	-
13	-	15.3	-	15.3	-	-	-	-	-	-	-	6.57	-
14	-	-	-	9.68 R	-	-	-	5.60 R	-	-	-	-	-
15	-	15.2	-	15.2	-	-	-	-	-	-	-	6.6	-
16	-	-	-	11.4 *	-	5.98	-	-	-	-	-	-	-
MEAN	14.8000	15.2500	14.3000	14.8493	6.7100	5.9800	6.8000	6.6000	6.4000	6.4000	6.5100	6.5900	6.5000
STD DEV	-	.0707	-	1.1071	.2687	-	-	.0000	-	-	-	.0173	-
REL STD	-	.5	-	7.5	4.0	-	-	-1.0	-	-	-	.3	-
DES VAL	-	-	-	14.811	-	-	-	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 31 PP 71 SAMPLE 2

LAB	12311 MG EXT ICP	12990 MGNESIUM COMMON	14102 SILICA ANSA AA	14105 SILICA MOLY AA	14106 SILICA MOLY	14107 SILICA MOLY AA	14111 SILICA ICP DA	14112 SILICA DCP DA	14190 SILICA COMMON	15313 T P ACL AA SNCL	15315 T P AA SNCL	15401 T P UV AA ASC	15406 T P UF AA ASC
1	-	6.5	-	-	-	2.2	-	-	2.2	-	-	-	-
2	-	6.4	2.39	-	-	-	-	-	2.39	-	-	-	-
3	-	6.4	-	-	2.13	-	-	-	2.13	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	0.003
5	-	6.51	-	2.2	-	-	-	-	2.2	-	-	-	-
6	-	6.8	-	-	-	-	-	-	-	-	-	-	-
7	-	6.6	-	-	-	-	-	-	-	-	-	-	0.013
8	6.6	6.6	-	1.9	-	-	-	-	1.9 *	-	-	-	-
9	-	6.9	-	-	-	-	2.23	-	2.23	-	-	-	-
10	-	6.52	-	1.9	-	-	-	-	1.9 *	-	-	0.010L	-
11	-	6.6	-	-	-	-	-	-	-	0.013	-	-	-
12	-	6.6	-	2.2	-	-	-	-	2.2	-	-	-	0.004
13	-	6.57	-	-	-	-	-	-	-	-	-	-	0.006
14	-	5.60 R	-	-	-	-	-	-	-	-	-	-	-
15	-	6.6	-	-	-	-	1.95	-	1.95	-	-	-	0.004
16	-	5.98	-	-	-	-	-	2.02	2.02	-	0.2 R	-	-
MEAN	6.6000	6.5414	2.3900	2.0500	2.1300	2.2000	2.0900	2.0200	2.1120	.0130	-	-	.0060
STD DEV	-	.2097	-	.1732	-	-	.1980	-	.1631	-	-	-	.0041
REL STD	-	3.2	-	8.4	-	-	9.5	-	7.7	-	-	-	67.7
DES VAL	-	6.568	-	-	-	-	-	-	2.160	-	-	-	-

LAB	15409 T P BLK AA ASC	15413 T P ACL AA SNCL	15421 T P BLK DIG ASC	15490 TOT P COMMON	16304 SO4 DIS AUTO BA	16306 SO4 DIS AA MTB	16309 SO4 DIS I C	16310 SO4 DIS AA CALM	16311 SO4 DIS IC	16990 SULFATE COMMON	17203 CL DIS AA FE	17204 CL DIS AG TIT	17206 CL DIS AA HG
1	-	-	0.003	0.003	-	30.0	-	-	-	30.0	23.0	-	-
2	-	-	-	-	31.3	-	30.	-	-	30.	-	-	-
3	-	0.004	-	0.004	-	29.2	-	-	-	29.2	-	-	-
4	-	-	-	0.003	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	32.5	-	-	-	32.5	-	-	23.5
6	0.02 R	-	-	0.02 R	28.	-	-	-	-	28.	-	24.	-
7	-	-	-	0.013*	-	28.4	-	-	-	28.4	23.3	-	-
8	-	0.007	-	0.007	-	30.	-	-	-	30.	-	-	24.5
9	-	-	-	-	-	-	30.8	-	-	30.8	-	-	-
10	-	-	-	0.010L	-	-	-	29.	-	29.	-	-	-
11	-	-	-	0.013*	-	27.	-	-	-	27.	-	-	24.
12	-	-	-	0.004	-	29.5	-	-	-	29.5	-	-	23.8
13	-	-	-	0.006	-	32.8	-	-	-	32.8	-	-	24.
14	-	-	-	-	-	-	29.5	-	-	29.5	-	-	-
15	-	-	-	0.004	-	27.	-	-	-	27.	-	-	23.4
16	-	-	-	0.2 R	-	-	-	-	46. R	46. R	-	-	-
MEAN	-	.0055	.0030	.0063	29.6500	29.6000	30.1000	29.0000	-	29.5500	23.1500	24.0000	23.8667
STD DEV	-	.0021	-	.0040	2.3335	2.0646	.6557	-	-	1.7230	.2121	-	.3983
REL STD	-	38.6	-	63.2	7.9	7.0	2.2	-	-	5.8	.9	-	1.7
DES VAL	-	-	-	.007	-	-	-	-	-	29.692	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 31 PP 71 SAMPLE 2

LAB	17208 CL DIS AA HG	17209 CL DIS I C	17210 CL DIS TIT CON	17211 CL DIS IC	17990 CHLORIDE COMMON	19001 K TOT AAS	19005 K TOT ICP	19008 K TOT DCP	19102 K DIS AAS	19103 K DIS FLM PH	19105 K DIS AAS DA	19106 K DIS AAS LI	19107 K DIS FLM PH
1	-	-	-	-	23.0	-	-	-	-	3.0	-	-	-
2	-	24.0	-	-	24.0	-	-	-	-	0.29 R	-	-	-
3	23.5	-	-	-	23.5	-	-	-	-	-	-	-	3.07
5	-	-	-	-	23.5	-	-	-	-	3.1	-	-	-
6	-	-	-	-	24.	-	-	-	3.6 R	-	-	-	-
7	-	-	-	-	23.3	-	-	-	3.05	-	-	-	-
8	-	-	-	-	24.5	-	-	-	-	-	-	-	-
9	-	23.8	-	-	23.8	-	3.2	-	-	-	-	-	-
10	-	-	23.	-	23.	-	3.25	-	-	-	-	-	-
11	-	-	-	-	24.	-	-	-	-	-	-	3.3	-
12	-	-	-	-	23.8	-	-	-	-	3.1	-	-	-
13	-	-	-	-	24.	-	-	-	-	-	-	-	-
14	-	24.7	-	-	24.7	3.10	-	-	-	-	-	-	-
15	-	-	-	-	23.4	-	-	-	-	-	2.95	-	-
16	-	-	-	28. R	28. R	-	-	3.08	-	-	-	-	-
MEAN	23.5000	24.1667	23.0000	-	23.7500	3.1000	3.2250	3.0800	3.0500	3.0667	2.9500	3.3000	3.0700
STD DEV	-	.4726	-	-	.5034	-	.0354	-	-	.0577	-	-	-
REL STD	-	2.0	-	-	2.1	-	1.1	-	-	1.9	-	-	-
DES VAL	-	-	-	-	23.710	-	-	-	-	-	-	-	-

LAB	19111 K DIS ICP	19301 K EXT HNO3 AA	19990 PTASSIUM COMMON	20005 CA TOT ICP	20007 CA TOT DCP	20050 CA DIS AAS NO	20100 CA DIS CALC'D	20101 CA DIS EDTA	20103 CA DIS AAS	20108 CA DIS AAS UF	20110 CA DIS AAS AUT	20111 CA DIS ICP	20311 CA EXT ICP
1	-	-	3.0	-	-	-	-	-	-	-	32.2	-	-
2	-	-	0.29 R	-	-	-	-	-	-	-	31.5	-	-
3	-	-	3.07	-	-	-	-	-	-	31.8	-	-	-
5	-	-	3.1	-	-	-	-	31.9	-	-	-	-	-
6	-	-	3.6 R	-	-	-	32.	-	-	-	-	-	-
7	-	-	3.05	-	-	-	-	-	31.1	-	-	-	-
8	-	2.8	2.8 *	-	-	-	-	-	-	-	-	-	30.0
9	-	-	3.2	32.5	-	-	-	-	-	-	-	-	-
10	-	-	3.25	31.4	-	-	-	-	-	-	-	-	-
11	-	-	3.3	-	-	-	-	-	30.	-	-	-	-
12	-	-	3.1	-	-	-	-	-	-	-	-	31.9	-
13	3.11	-	3.11	-	-	-	-	-	-	-	-	33.9	-
14	-	-	3.10	-	-	30.9	-	-	-	-	-	-	-
15	-	-	2.95	-	-	-	-	-	-	-	-	33.1	-
16	-	-	3.08	-	27.9 R	-	-	-	-	-	-	-	-
MEAN	3.1100	2.8000	3.0854	31.9500	-	30.9000	32.0000	31.9000	30.5500	31.8000	31.8500	32.9667	30.0000
STD DEV	-	-	.1278	.7778	-	-	-	-	.7778	-	.4950	1.0066	-
REL STD	-	-	4.1	2.4	-	-	-	-	2.5	-	1.6	3.1	-
DES VAL	-	-	3.185	-	-	-	-	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

LAB	20990 CALCIUM COMMON
1	32.2
2	31.5
3	31.8
5	31.9
6	32.
7	31.1
8	30.0
9	32.5
10	31.4
11	30.
12	31.9
13	33.9
14	30.9
15	33.1
16	27.9 R
MEAN	31.7286
STD DEV	1.0659
REL STD	3.4
DES VAL	31.652

DATA SUMMARY

FEDERAL-PROVINCIAL & PRAIRIE PROVINCES QUALITY ASSURANCE PROGRAMS

STUDY NO. FP 32 PP 72 DATE: 01/08/88 DUE DATE: 31/08/88

SAMPLE 3 SPIKED SAMPLE. TRACE METALS S/E. (IN 0.2% HNO3)

LAB	13009 AL TOT 5X ICP	13105 AL DIS AAS GF	13111 AL DIS ICP DA	13302 AL EXT AAS DA	13305 AL EXT AAS SE	13306 AL UF AAS OX	13311 AL EXT ICP DA	13322 AL EXT DCP DA	13999 ALUMINUM COMMON	23002 V TOT AAS SE	23009 V TOT 5X ICP	23011 V TOT 5X ICP	23012 V TOT 5X DCP
1	-	-	-	-	-	0.042	-	-	0.042	-	0.012	-	-
2	-	-	-	-	0.036	-	-	-	0.036	-	-	-	-
3	0.046	-	-	-	0.041	-	-	-	0.041	0.011	0.011	-	-
6	0.042	-	-	-	-	-	-	-	0.042	-	-	0.01	-
8	-	-	-	0.2 L	-	-	-	-	0.2 L	-	-	-	-
9	-	-	0.04	-	-	-	-	-	0.04	-	-	-	-
10	-	-	0.06	-	-	-	-	-	0.06 *	-	-	-	-
12	-	0.050	-	-	-	-	-	-	0.050*	-	-	-	-
14	-	0.049	-	-	-	-	-	-	0.049*	-	-	-	-
15	-	-	-	-	-	-	0.183R	-	0.183R	-	-	-	-
16	-	-	-	-	-	-	-	0.074R	0.074R	-	-	-	0.024R
MEAN	.0440	.0495	.0500	-	.0385	.0420	-	-	.0450	.0110	.0115	.0100	-
STD DEV	.0028	.0007	.0141	-	.0035	-	-	-	.0076	-	.0007	-	-
REL STD	6.4	1.4	28.3	-	9.2	-	-	-	16.9	-	6.1	-	-
DES VAL	-	-	-	-	-	-	-	-	.040	-	-	-	-

LAB	23102 V DIS AAS SE	23111 V DIS ICP DA	23311 V EXT ICP DA	23999 VANADIUM COMMON	24003 CR TOT AAS SE	24004 CR TOT AAS GF	24009 CR TOT 5X ICP	24011 CR TOT 5X ICP	24012 CR TOT 5X DCP	24056 CR DIS AAS GF	24111 CR DIS ICP DA	24303 CR EXT AAS SE	24311 CR EXT ICP DA
1	-	-	-	0.012	-	-	0.014	-	-	-	-	-	-
3	-	-	-	0.011	0.012	-	0.012	-	-	-	-	-	-
6	-	-	-	0.01	-	-	-	0.013	-	-	-	-	-
8	-	-	-	-	-	0.016	-	-	-	-	-	-	-
9	-	0.01	-	0.01	-	0.012	-	-	-	-	-	-	-
10	-	0.013	-	0.013	-	-	-	-	-	-	0.014	-	-
11	-	-	-	-	-	-	-	-	-	-	-	0.011	-
12	0.013	-	-	0.013	-	-	-	-	-	0.014	-	-	-
15	-	-	0.02 R	0.02 R	-	-	-	-	-	-	-	-	0.011
16	-	-	-	0.024R	-	-	-	-	0.015	-	-	-	-
MEAN	.0130	.0115	-	.0115	.0120	.0140	.0130	.0130	.0150	.0140	.0140	.0110	.0110
STD DEV	-	.0021	-	.0014	-	.0028	.0014	-	-	-	-	-	-
REL STD	-	18.4	-	12.0	-	20.2	10.9	-	-	-	-	-	-
DES VAL	-	-	-	.011	-	-	-	-	-	-	-	-	-

LAB	24999 CHROMIUM COMMON	25004 MN TOT AAS DA	25009 MN TOT COL BIS	25010 MN TOT 5X ICP	25011 MN TOT 5X ICP	25012 MN TOT 5X DCP	25107 MN DIS AAS GF	25111 MN DIS ICP DA	25304 MN EXT AAS DA	25311 MN EXT ICP DA	25999 MANGNESE COMMON	26005 FE TOT AAS SE	26009 FE TOT 5X ICP
1	0.014	-	.0125	-	-	-	-	-	-	-	.0125	-	0.020
2	-	-	-	-	-	-	-	-	0.01	-	0.01	-	-
3	0.012	0.012	-	0.012	-	-	-	-	-	-	0.012	0.027	0.030
6	0.013	-	-	-	0.007	-	-	-	-	-	0.007*	-	-
8	0.016*	-	-	-	-	-	-	-	-	0.02 L	0.02 L	-	-
9	0.012	-	-	-	-	-	-	0.013	-	-	0.013	-	-
10	0.014	-	-	-	-	-	-	0.010	-	-	0.010	-	-
11	0.011	-	-	-	-	-	-	-	-	-	-	-	-
12	0.014	-	-	-	-	-	0.011	-	-	-	0.011	-	-
14	-	-	-	-	-	-	0.014	-	-	-	0.014	-	-
15	0.011	-	-	-	-	-	-	-	-	0.006	0.006*	-	-
16	0.015	-	-	-	-	0.020	-	-	-	-	0.020*	-	-
MEAN	.0132	.0120	.0125	.0120	.0070	.0200	.0125	.0115	.0100	.0060	.0116	.0270	.0250
STD DEV	.0017	-	-	-	-	-	.0021	.0021	-	-	.0039	-	.0071
REL STD	12.8	-	-	-	-	-	17.0	18.4	-	-	33.8	-	28.3
DES VAL	.013	-	-	-	-	-	-	-	-	-	.012	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 32 PP 72 SAMPLE 3

LAB	26011 FE TOT 5X ICP	26012 FE TOT 5X DCP	26107 FE DIS AAS GF	26111 FE DIS ICP DA	26305 FE EXT AAS SE	26311 FE EXT ICP DA	26999 IRON COMMON	27003 CO TOT AAS GF	27009 CO TOT 5X ICP	27011 CO TOT 5X ICP	27012 CO TOT 5X DCP	27107 CO DIS AAS GF	27111 CO DIS ICP DA
1	-	-	-	-	-	-	0.020*	-	0.011	-	-	-	-
2	-	-	-	-	0.027	-	0.027	-	-	-	-	-	-
3	-	-	-	-	-	-	0.027	-	0.010	-	-	-	-
6	0.024	-	-	-	-	-	0.024	-	-	0.011	-	-	-
8	-	-	-	-	-	0.03	0.03	0.013	-	-	-	-	-
9	-	-	-	0.03	-	-	0.03	-	-	-	-	-	0.01
10	-	-	-	0.026	-	-	0.026	-	-	-	-	-	0.007
11	-	-	-	-	0.040	-	0.040*	-	-	-	-	-	-
12	-	-	0.025	-	-	-	0.025	-	-	-	-	0.010	-
14	-	-	0.020	-	-	-	0.020*	-	-	-	-	-	-
15	-	-	-	-	-	0.005R	0.005R	-	-	-	-	-	-
16	-	0.036	-	-	-	-	0.036*	-	-	-	0.012	-	-
MEAN	.0240	.0360	.0225	.0280	.0335	.0300	.0277	.0130	.0105	.0110	.0120	.0100	.0085
STD DEV	-	-	.0035	.0028	.0092	-	.0061	-	.0007	-	-	-	.0021
REL STD	-	-	15.7	10.1	27.4	-	22.1	-	6.7	-	-	-	25.0
DES VAL	-	-	-	-	-	-	.029	-	-	-	-	-	-

LAB	27311 CO EXT ICP DA	27999 COBALT COMMON	28002 NI TOT AAS SE	28009 NI TOT 5X ICP	28011 NI TOT 5X ICP	28012 NI TOT 5X DCP	28107 NI DIS AAS GF	28111 NI DIS ICP DA	28302 NI EXT AAS SE	28309 NI EXT AAS GF	28311 NI EXT ICP DA	28999 NICKEL COMMON	29005 CU TOT AAS SE
1	-	0.011	-	0.013	-	-	-	-	-	-	-	0.013	-
3	-	0.010	0.013	0.011	-	-	-	-	-	-	-	0.013	0.012
6	-	0.011	-	-	0.022R	-	-	-	-	-	-	0.022R	-
8	-	0.013	-	-	-	-	-	-	-	0.013	-	0.013	-
9	-	0.01	-	-	-	-	-	0.01	-	-	-	0.01	-
10	-	0.007*	-	-	-	-	-	0.012	-	-	-	0.012	-
11	-	-	-	-	-	-	-	-	0.012	-	-	0.012	-
12	-	0.010	-	-	-	-	0.011	-	-	-	-	0.011	-
15	0.017	0.017*	-	-	-	-	-	-	-	-	0.02 L	0.02 L	-
16	-	0.012	-	-	-	0.014	-	-	-	-	-	0.014	-
MEAN	.0170	.0112	.0130	.0120	-	.0140	.0110	.0110	.0120	.0130	-	.0123	.0120
STD DEV	-	.0027	-	.0014	-	-	-	.0014	-	-	-	.0013	-
REL STD	-	24.3	-	11.8	-	-	-	12.9	-	-	-	10.5	-
DES VAL	-	.011	-	-	-	-	-	-	-	-	-	.013	-

LAB	29009 CU TOT 5X ICP	29011 CU TOT 5X ICP	29012 CU TOT 5X DCP	29107 CU DIS AAS GF	29111 CU DIS ICP DA	29305 CU EXT AAS SE	29308 CU EXT AAS GF	29311 CU EXT ICP DA	29999 COPPER COMMON	30005 ZN TOT AAS SE	30009 ZN TOT 5X ICP	30011 ZN TOT 5X ICP	30012 ZN TOT 5X DCP
1	0.013	-	-	-	-	-	-	-	0.013	-	0.014	-	-
2	-	-	-	-	-	0.013	-	-	0.013	-	-	-	-
3	0.012	-	-	-	-	-	-	-	0.012	0.017	0.016	-	-
6	-	0.012	-	-	-	-	-	-	0.012	-	-	0.017	-
8	-	-	-	-	-	-	-	0.02	0.02 *	-	-	-	-
9	-	-	-	-	0.01	-	-	-	0.01 *	-	-	-	-
10	-	-	-	-	0.014	-	-	-	0.014	-	-	-	-
11	-	-	-	-	-	0.012	-	-	0.012	-	-	-	-
12	-	-	-	0.012	-	-	-	-	0.012	-	-	-	-
14	-	-	-	0.011	-	-	-	-	0.011	-	-	-	-
15	-	-	-	-	-	-	0.012	-	0.012	-	-	-	-
16	-	-	0.018	-	-	-	-	-	0.018*	-	-	-	0.018
MEAN	.0125	.0120	.0180	.0115	.0120	.0125	.0120	.0200	.0133	.0170	.0150	.0170	.0180
STD DEV	.0007	-	-	.0007	.0028	.0007	-	-	.0029	-	.0014	-	-
REL STD	5.7	-	-	6.1	23.6	5.7	-	-	21.9	-	9.4	-	-
DES VAL	-	-	-	-	-	-	-	-	.013	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 32 PP 72 SAMPLE 3

LAB	30107 ZN DIS AAS GF	30111 ZN DIS ICP DA	30304 ZN EXT AAS DA	30305 ZN EXT AAS SE	30311 ZN EXT ICP DA	30999 ZINC COMMON	38009 SR TOT ICP DA	38012 SR TOT DCP DA	38111 SR DIS ICP DA	38301 SR EXT AAS DA	38311 SR EXT ICP DA	38999 STRNTIUM COMMON	42009 MO TOT 5X ICP
1	-	-	-	-	-	0.014	-	-	-	-	-	-	0.012
2	-	-	0.02	-	-	0.02 *	-	-	-	-	-	-	-
3	-	-	-	-	-	0.017	0.177	-	-	-	-	0.177	0.012
6	-	-	-	-	-	0.017	-	-	-	-	-	-	-
8	-	-	-	-	0.02	0.02 *	-	-	-	-	-	-	-
9	-	0.015	-	-	-	0.015	-	-	0.18	-	-	0.18	-
10	-	0.017	-	-	-	0.017	-	-	-	0.16	-	0.16	-
11	-	-	-	0.017	-	0.017	-	-	-	-	-	-	-
14	0.010	-	-	-	-	0.010*	-	-	-	-	-	-	-
15	-	-	-	-	0.006R	0.006R	-	-	-	-	0.171	0.171	-
16	-	-	-	-	-	0.018	-	0.304R	-	-	-	0.304R	-
MEAN	.0100	.0160	.0200	.0170	.0200	.0165	.1770	-	.1800	.1600	.1710	.1720	.0120
STD DEV	-	.0014	-	-	-	.0030	-	-	-	-	-	.0088	.0000
REL STD	-	8.8	-	-	-	17.9	-	-	-	-	-	5.1	-1.0
DES VAL	-	-	-	-	-	.016	-	-	-	-	-	.175	-

LAB	42011 MO TOT 5X ICP	42012 MO TOT 5X DCP	42111 MO DIS ICP DA	42311 MO EXT ICP DA	42999 MOLYBNUM COMMON	48002 CD TOT AAS SE	48004	48009 CD TOT 5X ICP	48011 CD TOT 5X ICP	48012 CD TOT 5X DCP	48103 CD DIS AAS GF	48111 CD DIS ICP DA	48302 CD EXT AAS SE
1	-	-	-	-	0.012	-	-	0.012	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	0.011
3	-	-	-	-	0.012	0.011	-	0.010	-	-	-	-	-
6	0.008	-	-	-	0.008*	-	-	-	0.012	-	-	-	-
9	-	-	0.01	-	0.01 *	-	0.012	-	-	-	-	-	-
10	-	-	0.013	-	0.013	-	-	-	-	-	-	0.010	-
11	-	-	-	-	-	-	-	-	-	-	-	-	0.011
12	-	-	-	-	-	-	-	-	-	-	0.011	-	-
14	-	-	-	-	-	-	-	-	-	-	0.013	-	-
15	-	-	-	0.01 L	0.01 *	-	-	-	-	-	-	-	-
16	-	0.005L	-	-	0.005*	-	-	-	-	0.011	-	-	-
MEAN	.0080	-	.0115	-	.0110	.0110	.0120	.0110	.0120	.0110	.0120	.0100	.0110
STD DEV	-	-	.0021	-	.0020	-	-	.0014	-	-	.0014	-	.0000
REL STD	-	-	18.4	-	18.2	-	-	12.9	-	-	11.8	-	-1.0
DES VAL	-	-	-	-	.013	-	-	-	-	-	-	-	-

LAB	48309 CD EXT AAS GF	48999 CADMIUM COMMON	56009 BA TOT 5X ICP	56011 BA TOT 5X ICP	56012 BA TOT 5X DCP	56111 BA DIS ICP DA	56311 BA EXT ICP DA	56999 BARIUM COMMON	82002 PB TOT AAS SE	82004 PB TOT AAS GF	82009 PB TOT 5X ICP	82011 PB TOT 5X ICP	82012 PB TOT 5X DCP
1	-	0.012	0.023	-	-	-	-	0.023	-	-	0.015	-	-
2	-	0.011	-	-	-	-	-	-	-	-	-	-	-
3	-	0.011	0.023	-	-	-	-	0.023	0.011	-	0.010	-	-
6	-	0.012	-	0.025	-	-	-	0.025	-	-	-	0.005L	-
8	0.011	0.011	-	-	-	-	-	-	-	-	-	-	-
9	-	0.012	-	-	-	0.02	-	0.02	-	0.010	-	-	-
10	-	0.010	-	-	-	0.02	-	0.02	-	-	-	-	-
11	-	0.011	-	-	-	-	-	-	-	-	-	-	-
12	-	0.011	-	-	-	-	-	-	-	-	-	-	-
14	-	0.013	-	-	-	-	-	-	-	-	-	-	-
15	0.005R	0.005R	-	-	-	-	0.024	0.024	-	-	-	-	-
16	-	0.011	-	-	0.033	-	-	0.033	-	-	-	-	0.015
MEAN	.0110	.0114	.0230	.0250	.0330	.0200	.0240	.0240	.0110	.0100	.0125	-	.0150
STD DEV	-	.0008	.0000	-	-	.0000	-	.0044	-	-	.0035	-	-
REL STD	-	7.1	-1.0	-	-	-1.0	-	18.3	-	-	28.3	-	-
DES VAL	-	.011	-	-	-	-	-	.024	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 32 PP 72 SAMPLE 3

LAB	82104 PB DIS AAS GF	82302 PB EXT AAS SE	82309 PB EXT AAS GF	82999 LEAD COMMON
1	-	-	-	0.015*
2	-	0.011	-	0.011
3	-	-	-	0.011
6	-	-	-	0.005*
8	-	-	0.013	0.013*
9	-	-	-	0.010
10	-	-	0.014	0.014*
11	-	0.010	-	0.010
12	0.011	-	-	0.011
14	0.011	-	-	0.011
15	-	-	.0005L	.0005*
16	-	-	-	0.015*
MEAN	.0110	.0105	.0135	.0121
STD DEV	.0000	.0007	.0007	.0020
REL STD	-1.0	6.7	5.2	16.3
DES VAL	-	-	-	.010

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS	00125 SUM OF ANIONS	02011 COLOUR APPARE	02021 COLOUR VIS COM	02023 COLOUR SPECT	02024 COL TRU SPECT	02040 COLOUR COMMON	02041 CONDUCT SPEC 25	02060 CONDUCT COMMON	02073 TURB HACH	02074 TURB NPLMTRI	02077 TURB HACH FZ
1	-0.65	3.80	3.85	-	-	-	1.4	1.4	451.	451.	0.07	-	-
2	-1.05	3.777	3.857	5. L	-	-	-	5. L	449.	449.	0.2	-	-
3	-0.14	3.729	3.739	5. L	-	-	-	5. L	450.	450.	0.07	-	-
4	-	-	-	-	5. L	-	-	5. L	448.	448.	-	-	-
5	-0.41	3.767	3.798	5. L	-	-	-	5. L	446.	446.	0.03	-	-
6	-	-	-	-	-	-	-	-	436.	436.	-	0.14	-
7	1.1	3.78	3.69	0.	-	-	-	0.	460.	460.	0.14	-	-
8	0.94	3.705	3.775	5. L	-	-	-	5. L	380.	380. *	-	0.27	-
9	-0.77	3.86	3.92	-	-	-	-	-	437.	437.	-	-	-
10	0.41	3.792	3.761	-	-	1. L	-	1. L	443.	443.	-	0.1	-
11	-	-	-	5. L	-	-	-	5. L	440.	440.	-	-	0.2
12	1.03	3.799	3.721	-	-	-	-	-	465.	465.	0.1 L	-	-
13	-	-	-	-	-	-	-	-	390.	390. *	-	-	-
14	-	-	-	-	-	-	-	-	449.5	449.5	-	-	-
15	-	-	-	5. L	-	-	-	5. L	440.	440.	-	0.1 L	-
16	-	-	-	-	-	-	-	-	480.	480.	0.3	-	-
MEAN	.0511	3.7788	3.7901	.0000	-	-	1.4000	.7000	441.5313	441.5313	.1350	.1700	.2000
STD DEV	.8370	.0443	.0737	-	-	-	-	.9899	24.7840	24.7840	.1009	.0889	-
REL STD	1637.6	1.2	1.9	-	-	-	-	141.4	5.6	5.6	74.8	52.3	-
DES VAL	-	-	-	-	-	-	-	2.535	-	444.638	-	-	-

LAB	02081 TURB RATIO	02090 TURBIDTY COMMON	05100 BORON ?	05106 BORON F AZOMETH	05107 BORON ICP DA	05111 BORON F ICP DA	05190 BORON COMMON	06000 DOC ?	06009 TOC CO2 IR	06051 TIC COMB IR	06100 DOC ?	06101 DOC IR /DIF	06104 DOC UV CO2 IR
1	-	0.07	-	-	-	-	-	-	-	-	-	-	-
2	-	0.2	-	-	-	-	-	-	-	-	-	-	-
3	-	0.07	-	-	-	-	-	-	-	-	-	-	0.4
4	0.06	0.06	-	-	-	-	-	-	-	-	-	-	0.155
5	-	0.03	-	-	-	-	-	-	-	-	-	1.7 R	-
6	-	0.14	-	-	-	-	-	-	-	-	-	-	0.1 L
7	-	0.14	-	-	-	-	-	-	-	-	-	-	-
8	-	0.27	-	0.05 L	-	-	0.05 L	-	-	-	-	-	-
10	-	0.1	-	-	-	0.02	0.02	-	-	-	-	-	-
11	-	0.2	-	-	-	-	-	2.	-	-	1. L	-	-
12	-	0.1 L	-	-	-	0.01 L	0.01 L	-	-	-	-	1.0 L	-
15	-	0.1 L	-	-	0.01 L	-	0.01 L	-	0.5	0.5	-	-	-
16	-	0.3	0.05 L	-	-	-	0.05 L	-	-	-	-	-	-
MEAN	.0600	.1436	-	-	-	.0200	.0200	2.0000	.5000	.5000	-	-	.2775
STD DEV	-	.0891	-	-	-	-	-	-	-	-	-	-	.1732
REL STD	-	62.1	-	-	-	-	-	-	-	-	-	-	62.4
DES VAL	-	.189	-	-	-	-	.011	-	-	-	-	-	-

LAB	06107 DOC UV CO2 PHE	06109 DOC UV CO2 OH	06112 DOC PER IR	06150 D O C COMMON	06151 DIC IR COMBUST	06152 DIC UV CO2 IR	06154 DIC AA CO2 PHE	06159 DIC AA CO2 OH	06180 DIC CALC'D	06490 D I C COMMON	07010 TKN AA SAL	07015 TKN DIG BERTHEL	07016 TKN BLK AMM-SAL
1	0.2 L	-	-	0.2 L	-	-	0.5 L	-	-	0.5 L	-	-	-
2	0.5 L	-	-	0.5 L	-	-	-	-	-	-	-	-	-
3	-	-	-	0.4	-	0.5 L	-	-	-	0.5 L	0.014L	-	-
4	-	-	-	0.155	-	-	-	-	-	-	-	-	-
5	-	-	-	1.7 R	0.5	-	-	-	-	0.5	-	-	-
6	-	-	-	0.1 L	-	-	-	-	-	-	-	-	0.2 R
8	-	-	-	-	-	-	-	-	-	-	-	0.20 L	-
10	-	0.2 L	-	0.2 L	-	-	-	0.2 L	-	0.2 L	-	-	-
11	-	-	-	1. L	-	-	-	-	-	-	-	-	-
12	-	-	-	1.0 L	1.0 L	-	-	-	-	1.0 L	-	-	-
15	-	-	-	0.5	-	-	-	-	-	0.5	-	-	-
16	-	-	0.5	0.5	-	-	-	-	0.2	0.2	-	-	-
MEAN	-	-	.5000	.3888	.5000	-	-	-	.2000	.4000	-	-	-
STD DEV	-	-	-	.1628	-	-	-	-	-	.1732	-	-	-
REL STD	-	-	-	41.9	-	-	-	-	-	43.3	-	-	-
DES VAL	-	-	-	.507	-	-	-	-	-	.654	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

LAB	07018 TKN BLK INDOPHE	07021 TKN BLK DIG BER	07023 TKN DIG INDO	07090 TKN COMMON	07109 NO3+NO2 AA HYD	07110 NO3+NO2 AA2 CD	07111 NO3+NO2 DIS SPEC	07112 NO3+NO2 UF AA CD	07121 NO3+NO2 AA AZ	07390 NITRATE COMMON	07505 NH3 TOT AA BERT	07540 NH3 TOT AA SAL	07555 NH3 DIS AA PHEN
1	-	0.140R	-	0.140R	-	-	0.020	-	-	0.020	-	-	-
2	-	-	-	-	-	0.01 L	-	-	-	0.01 *	-	-	-
3	-	-	-	0.014L	-	-	-	0.005L	-	0.005*	0.003	-	-
4	-	-	-	-	-	0.027	-	-	-	0.027	-	0.005L	-
5	-	-	-	-	-	0.026	-	-	-	0.026	-	-	-
6	-	-	-	0.2 R	0.03	-	-	-	-	0.03	-	-	-
7	-	-	-	-	-	-	-	0.02	-	0.02	-	-	-
8	-	-	-	0.20 L	-	0.02	-	-	-	0.02	-	-	0.002
9	-	-	-	-	0.03	-	-	-	-	0.03	-	-	-
10	-	-	-	-	0.02	-	-	-	-	0.02	-	-	0.010L
11	-	-	-	-	-	0.04 L	-	-	-	0.04 L	-	0.021	-
12	0.02	-	-	0.02	-	0.04	-	-	-	0.04	-	-	-
13	-	-	-	-	-	0.03	-	-	-	0.03	-	0.1 L	-
14	-	-	-	-	-	-	0.03	-	-	0.03	-	-	-
15	-	-	-	-	-	0.026	-	-	-	0.026	-	-	0.005L
16	-	-	0.4 R	0.4 R	-	-	-	-	0.05 L	0.05 L	-	-	-
MEAN	.0200	-	-	.0200	.0267	.0282	.0250	.0200	-	.0266	.0030	.0210	.0020
STD DEV	-	-	-	-	.0058	.0066	.0071	-	-	.0060	-	-	-
REL STD	-	-	-	-	21.7	23.6	28.3	-	-	22.7	-	-	-
DES VAL	-	-	-	.032	-	-	-	-	-	.026	-	-	-

LAB	07557 NH3 DIS AA INDO	07562 NH3 DIS AA EDTA	07563 NH3 DIS AA INDO	07565	07590 AMMONIA COMMON	07600 T N PER AUTO	07601 T N UV AA SUL	07602 T N CALC'D	07605 T N UV HY SUL	07651 T N DIS UV AA	07655 T N DIS UV EDTA	07690 TOT N COMMON	07790 T N DIS COMMON
1	-	0.011	-	-	0.011	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	0.05 L	-	-	-	-	-	0.05 L
3	-	-	-	-	0.003	-	0.005L	-	-	-	-	-	0.005*
4	-	-	-	-	0.005L	-	-	-	-	0.035	-	-	0.035
5	0.002L	-	-	-	0.002L	-	-	-	-	-	0.031	-	0.031
6	0.01 L	-	-	-	0.01 L	-	-	-	-	-	-	-	-
8	-	-	-	-	0.002	-	-	0.22 L	-	-	-	0.22 L	-
10	-	-	-	-	0.010L	-	-	-	0.07	-	-	-	0.07 *
11	-	-	-	-	0.021*	-	-	-	-	-	-	-	-
12	-	-	0.005L	-	0.005L	-	-	0.06	-	-	-	0.06	-
13	-	-	-	-	0.1 L	-	-	-	-	-	-	-	-
15	-	-	-	-	0.005L	0.06	-	-	-	-	-	0.06	-
16	-	-	-	0.05 L	0.05 L	-	-	-	-	-	-	-	-
MEAN	-	.0110	-	-	.0093	.0600	-	.0600	.0700	.0350	.0310	.0600	.0453
STD DEV	-	-	-	-	.0088	-	-	-	-	-	-	.0000	.0215
REL STD	-	-	-	-	95.2	-	-	-	-	-	-	-1.0	47.3
DES VAL	-	-	-	-	.004	-	-	-	-	-	-	.083	.051

LAB	09103 F DIS COL SP	09105 F DIS SP EL	09106 F DIS EL POT	09107 F DIS AUT POT	09108 F DIS SP EL	09115 F DIS AA ALIZ	09116 F DIS IC	09190 FLUORIDE COMMON	10101 ALKLNTY TITR'N	10108 ALKLNTY POT TIT	10109 ALKLNTY POT TIT	10110 ALKLNTY GRN TIT	10111 ALKLNTY TIT PRO
1	-	-	-	0.04 L	-	-	-	0.04 L	1.9	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	0.2	-
3	-	-	-	-	0.01 L	-	-	0.01 L	-	-	-	-	1.6
4	-	-	-	-	-	-	-	-	0.0	-	-	-	-
5	-	-	0.05 L	-	-	-	-	0.05 L	0.626	-	-	-	-
6	0.1 L	-	-	-	-	-	-	0.1 L	-	-	20. L	-	-
7	-	-	-	-	-	-	-	-	0.1 L	-	-	-	-
8	-	0.05 L	-	-	-	-	-	0.05 L	-	-	1.00	-	-
9	-	-	-	-	-	-	-	-	-	1. L	-	-	-
10	-	-	-	-	-	0.04 L	-	0.04 L	-	-	-	-	-
11	-	0.05 L	-	-	-	-	-	0.05 L	0.5 L	-	-	-	-
12	-	0.10 L	-	-	-	-	-	0.10 L	0.5 L	-	-	-	-
13	-	-	-	-	-	-	-	-	1.	-	-	-	-
14	-	-	-	-	-	-	-	-	1.48	-	-	-	-
15	-	0.05 L	-	-	-	-	-	0.05 L	2.0	-	-	-	-
16	-	-	-	-	-	-	1. L	1. L	5. R	-	-	-	-
MEAN	-	-	-	-	-	-	-	-	1.1677	-	1.0000	.2000	1.6000
STD DEV	-	-	-	-	-	-	-	-	.7761	-	-	-	-
REL STD	-	-	-	-	-	-	-	-	66.5	-	-	-	-
DES VAL	-	-	-	-	-	-	-	.025	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

LAB	10112 ALKLNTY TIT CON	10190 ALKLINTY COMMON	10301 PH	10390 PH COMMON	10602 HARDNSS CALC'D	10603 HARDNSS TITR'N	10606 HARDNSS CALC'D	10645 HARDNSS ?	10690 HARDNESS COMMON	11001 NA TOT AAS	11005 NA TOT ICP	11007 NA DIS DCP	11102 NA F AAS
1	-	1.9	5.4	5.4	148.	-	-	-	148.	-	-	-	-
2	-	0.2	5.5	5.5	145.5	-	-	-	145.5	-	-	-	-
3	-	1.6	5.59	5.59	-	-	144.	-	144.	-	-	-	-
4	-	0.0	5.66	5.66	-	-	-	-	-	-	-	-	-
5	-	0.626	4.91	4.91	-	-	-	-	-	-	-	-	-
6	-	20. L	6.5 R	6.5 R	-	152.	-	-	152.	-	-	-	20.
7	-	0.1 L	5.5	5.5	-	150.9	-	-	150.9	-	-	-	-
8	-	1.00	5.45	5.45	144.	-	-	-	144.	-	-	-	-
9	-	1. L	5.52	5.52	-	-	-	150.	150.	-	20.	-	-
10	0.1 L	0.1 L	5.83	5.83	-	-	-	-	-	-	19.9	-	-
11	-	0.5 L	5.5	5.5	120. R	-	-	-	120. R	-	-	-	19.
12	-	0.5 L	5.7	5.7	146.	-	-	-	146.	-	-	-	-
13	-	1.	5.7	5.7	157.1	-	-	-	157.1	-	-	-	-
14	-	1.48	5.41	5.41	139.4	-	-	-	139.4	11.8 R	-	-	-
15	-	2.0	5.6	5.6	150.	-	-	-	150.	-	-	-	-
16	-	5. R	5.42	5.42	140.	-	-	-	140.	-	-	15.1 R	-
MEAN	-	1.0896	5.5127	5.5127	146.2500	151.4500	144.0000	150.0000	147.2417	-	19.9500	-	19.5000
STD DEV	-	.7166	.2080	.2080	5.6886	.7778	-	-	5.1215	-	.0707	-	.7071
REL STD	-	65.8	3.8	3.8	3.9	.5	-	-	3.5	-	.4	-	3.6
DES VAL	-	.767	-	5.483	-	-	-	-	148.186	-	-	-	-

LAB	11103 NA DIS FL PH	11105 NA DIS AAS DA	11107 NA UF FL PH	11111 NA DIS ICP	11163	11311 NA EXT ICP	11990 SODIUM COMMON	12005 MG TOT ICP	12012 MG TOT DCP	12101 MG DIS CALC'D	12102 MG DIS AAS DA	12106 MG UF AAS DA	12107 MG DIS AAS AUT
1	19.	-	-	-	-	-	19.	-	-	-	-	-	-
2	19.4	-	-	-	-	-	19.4	-	-	-	-	-	9.5
3	-	-	19.0	-	-	-	19.0	-	-	-	-	9.2	-
5	18.9	-	-	-	-	-	18.9	-	-	-	-	-	-
6	-	-	-	-	-	-	20.	-	-	11.6 R	-	-	-
7	-	18.7	-	-	-	-	18.7	-	-	-	9.6	-	-
8	-	-	-	-	-	18.5	18.5	-	-	-	-	-	-
9	-	-	-	-	-	-	20.	9.8	-	-	-	-	-
10	-	-	-	-	-	-	19.9	9.50	-	-	-	-	-
11	-	-	-	-	-	-	19.	-	-	-	9.8	-	-
12	-	-	-	-	19.2	-	19.2	-	-	-	-	-	-
13	-	-	-	19.7	-	-	19.7	-	-	-	-	-	-
14	-	-	-	-	-	-	11.8 R	-	-	-	8.74	-	-
15	-	-	-	19.4	-	-	19.4	-	-	-	-	-	-
16	-	-	-	-	-	-	15.1 R	-	8.87	-	-	-	-
MEAN	19.1000	18.7000	19.0000	19.5500	19.2000	18.5000	19.2846	9.6500	8.8700	-	9.3800	9.2000	9.5000
STD DEV	.2646	-	-	.2121	-	-	.4964	.2121	-	-	.5632	-	-
REL STD	1.4	-	-	1.1	-	-	2.6	2.2	-	-	6.0	-	-
DES VAL	-	-	-	-	-	-	19.144	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 32 PP 72 SAMPLE 4

LAB	12108 MG HARDN CALC'D	12111 MG DIS ICP	12303 MG UF AAS AUT	12311 MG EXT ICP	12990 MGNESIUM COMMON	14102 SILICA ANSA AA	14105 SILICA MOLY AA	14106 SILICA MOLY	14107 SILICA MOLY AA	14111 SILICA ICP DA	14112 SILICA DCP DA	14190 SILICA COMMON	15313 T P ACL AA SNCL
1	-	-	10.0	-	10.0	-	-	-	0.28	-	-	0.28	-
2	-	-	-	-	9.5	0.1 L	-	-	-	-	-	0.1 L	-
3	-	-	-	-	9.2	-	-	0.02 L	-	-	-	0.02 L	-
5	9.47	-	-	-	9.47	-	0.2 L	-	-	-	-	0.2 L	-
6	-	-	-	-	11.6 R	-	-	-	-	-	-	-	-
7	-	-	-	-	9.6	-	-	-	-	-	-	-	-
8	-	-	-	9.7	9.7	-	0.2 L	-	-	-	-	0.2 L	-
9	-	-	-	-	9.8	-	-	-	-	0.01 L	-	0.01 L	-
10	-	-	-	-	9.50	-	0.01 L	-	-	-	-	0.01 L	-
11	-	-	-	-	9.8	-	-	-	-	-	-	-	0.005L
12	-	9.6	-	-	9.6	-	0.5 L	-	-	-	-	0.5 L	-
13	-	10.09	-	-	10.09	-	-	-	-	-	-	-	-
14	-	-	-	-	8.74	-	-	-	-	-	-	-	-
15	-	9.5	-	-	9.5	-	-	-	-	0.1 L	-	0.1 L	-
16	-	-	-	-	8.87	-	-	-	-	-	0.05 L	0.05 L	-
MEAN	9.4700	9.7300	10.0000	9.7000	9.5264	-	-	-	.2800	-	-	.2800	-
STD DEV	-	.3158	-	-	.3817	-	-	-	-	-	-	-	-
REL STD	-	3.2	-	-	4.0	-	-	-	-	-	-	-	-
DES VAL	-	-	-	-	9.448	-	-	-	-	-	-	.010	-

LAB	15315 T P AA SNCL	15401 T P UV AA ASC	15406 T P UF AA ASC	15409 T P BLK AA ASC	15413 T P ACL AA SNCL	15421 T P BLK DIG ASC	15490 TOT P COMMON	16304 SO4 DIS AUTO BA	16306 SO4 DIS AA MTB	16307 SO4 UF AA MTB	16309 SO4 DIS I C	16310 SO4 DIS AA CALM	16311 SO4 DIS IC
1	-	-	-	-	-	0.023	0.023*	-	37.5	-	-	-	-
2	-	-	-	-	-	-	-	38.7	-	-	38.	-	-
3	-	-	-	-	0.001L	-	0.001L	-	-	37.1	-	-	-
4	-	-	0.004	-	-	-	0.004	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	38.0	-	-	-	-
6	-	-	-	0.01	-	-	0.01	36.	-	-	-	-	-
7	-	-	0.001L	-	-	-	0.001L	-	35.4	-	-	-	-
8	-	-	-	-	0.001	-	0.001	-	38.	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	37.8	-	-
10	-	0.010L	-	-	-	-	0.010L	-	-	-	-	37.	-
11	-	-	-	-	-	-	0.005L	-	37.	-	-	-	-
12	-	-	0.003L	-	-	-	0.003L	-	36.4	-	-	-	-
13	-	-	0.004	-	-	-	0.004	-	42.1	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	34.8	-	-
15	-	-	0.002L	-	-	-	0.002L	-	33.	-	-	-	-
16	0.2 R	-	-	-	-	-	0.2 R	-	-	-	-	-	62. R
MEAN	-	-	.0040	.0100	.0010	.0230	.0084	37.3500	37.1750	37.1000	36.8667	37.0000	-
STD DEV	-	-	.0000	-	-	-	.0088	1.9092	2.5894	-	1.7926	-	-
REL STD	-	-	-1.0	-	-	-	104.7	5.1	7.0	-	4.9	-	-
DES VAL	-	-	-	-	-	-	.004	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 32 PP 72 SAMPLE 4

LAB	16990 SULFATE COMMON	17203 CL DIS AA FE	17204 CL DIS AG TIT	17206 CL DIS AA HG	17208 CL DIS AA HG	17209 CL DIS I C	17210 CL DIS TIT CON	17211 CL DIS IC	17990 CHLORIDE COMMON	19001 K TOT AAS	19005 K TOT ICP	19008 K TOT DCP	19102 K DIS AAS
1	37.5	106.	-	-	-	-	-	-	106.	-	-	-	-
2	38.	-	-	-	108.	-	-	-	108.	-	-	-	-
3	37.1	-	-	-	104.	-	-	-	104.	-	-	-	-
5	38.0	-	-	106.	-	-	-	-	106.	-	-	-	-
6	36.	-	108.	-	-	-	-	-	108.	-	-	-	1.0
7	35.4	104.8	-	-	-	-	-	-	104.8	-	-	-	0.85
8	38.	-	-	105.	-	-	-	-	105.	-	-	-	-
9	37.8	-	-	-	-	109.	-	-	109.	-	0.7	-	-
10	37.	-	-	-	-	-	106.	-	106.	-	0.91	-	-
11	37.	-	-	108.	-	-	-	-	108.	-	-	-	-
12	36.4	-	-	105.	-	-	-	-	105.	-	-	-	-
13	42.1 *	-	-	100.	-	-	-	-	100.	-	-	-	-
14	34.8	-	-	-	-	107.	-	-	107.	0.85	-	-	-
15	33. *	-	-	106.	-	-	-	-	106.	-	-	-	-
16	62. R	-	-	-	-	-	-	104.	104.	-	-	0.80	-
MEAN	37.0071	105.4000	108.0000	105.0000	106.0000	108.0000	106.0000	104.0000	105.7867	.8500	.8050	.8000	.9250
STD DEV	2.0507	.8485	-	2.6833	2.8284	1.4142	-	-	2.2161	-	.1485	-	.1061
REL STD	5.5	.8	-	2.6	2.7	1.3	-	-	2.1	-	18.4	-	11.5
DES VAL	37.115	-	-	-	-	-	-	-	105.394	-	-	-	-

LAB	19103 K DIS FLM PH	19105 K DIS AAS DA	19106 K DIS AAS LI	19107 K DIS FLM PH	19111 K DIS ICP	19301 K EXT HNO3 AA	19990 PTASSIUM COMMON	20005 CA TOT ICP	20007 CA TOT DCP	20050 CA DIS AAS NO	20100 CA DIS CALC'D	20101 CA DIS EDTA	20103 CA DIS AAS
1	0.85	-	-	-	-	-	0.85	-	-	-	-	-	-
2	0.90	-	-	-	-	-	0.90	-	-	-	-	-	-
3	-	-	-	0.97	-	-	0.97	-	-	-	-	-	-
5	0.8	-	-	-	-	-	0.8	-	-	-	-	43.0	-
6	-	-	-	-	-	-	1.0 *	-	-	-	41.6	-	-
7	-	-	-	-	-	-	0.85	-	-	-	-	-	43.1
8	-	-	-	-	-	0.85	0.85	-	-	-	-	-	-
9	-	-	-	-	-	-	0.7 *	43.5	-	-	-	-	-
10	-	-	-	-	-	-	0.91	42.5	-	-	-	-	-
11	-	-	1.0	-	-	-	1.0 *	-	-	-	-	-	32. R
12	0.9	-	-	-	-	-	0.9	-	-	-	-	-	-
13	-	-	-	-	1.16	-	1.16 *	-	-	-	-	-	-
14	-	-	-	-	-	-	0.85	-	-	41.4	-	-	-
15	-	0.78	-	-	-	-	0.78	-	-	-	-	-	-
16	-	-	-	-	-	-	0.80	-	37.7	-	-	-	-
MEAN	.8625	.7800	1.0000	.9700	1.1600	.8500	.8880	43.0000	37.7000	41.4000	41.6000	43.0000	43.1000
STD DEV	.0479	-	-	-	-	-	.1118	.7071	-	-	-	-	-
REL STD	5.6	-	-	-	-	-	12.6	1.6	-	-	-	-	-
DES VAL	-	-	-	-	-	-	.884	-	-	-	-	-	-

DATA SUMMARY - FED-PROV & PPWB QA PROGRAMS

STUDY NO. FP 32 PP 72 SAMPLE 4

LAB	20108 CA DIS AAS UP	20110 CA DIS AAS AUT	20111 CA DIS ICP	20311 CA EXT ICP	20990 CALCIUM COMMON
1	-	42.8	-	-	42.8
2	-	42.6	-	-	42.6
3	42.5	-	-	-	42.5
5	-	-	-	-	43.0
6	-	-	-	-	41.6
7	-	-	-	-	43.1
8	-	-	-	41.7	41.7
9	-	-	-	-	43.5
10	-	-	-	-	42.5
11	-	-	-	-	32. R
12	-	-	43.1	-	43.1
13	-	-	46.2	-	46.2
14	-	-	-	-	41.4
15	-	-	44.4	-	44.4
16	-	-	-	-	37.7 *
MEAN	42.5000	42.7000	44.5667	41.7000	42.5786
STD DEV	-	.1414	1.5567	-	1.8602
REL STD	-	.3	3.5	-	4.4
DES VAL	-	-	-	-	42.534

DATES RECEIVED

1 88/07/29	2 88/08/23	3 88/08/04	3 88/08/24	4 88/08/05
5 88/10/12	6 88/07/29	6 88/11/04	7 88/10/11	8 88/08/05
9 88/09/13	10 88/08/30	11 88/08/09	12 88/09/29	13 88/08/16
14 88/08/25	15 88/07/29	15 88/08/26	16 88/08/02	

NOTE: ALL CONCENTRATION UNITS ARE EXPRESSED IN MG/L OF EACH ELEMENT, THE EXCEPTIONS BEING: COLOUR IN RELATIVE UNITS, CONDUCTIVITY IN USIE/CM, TURBIDITY IN JTU OR NTU, NITROGEN ANALYSES IN "N", ALKALINITY & HARDNESS IN CACO3, SILICA IN SIO2, AND SULFATE IN SO4.

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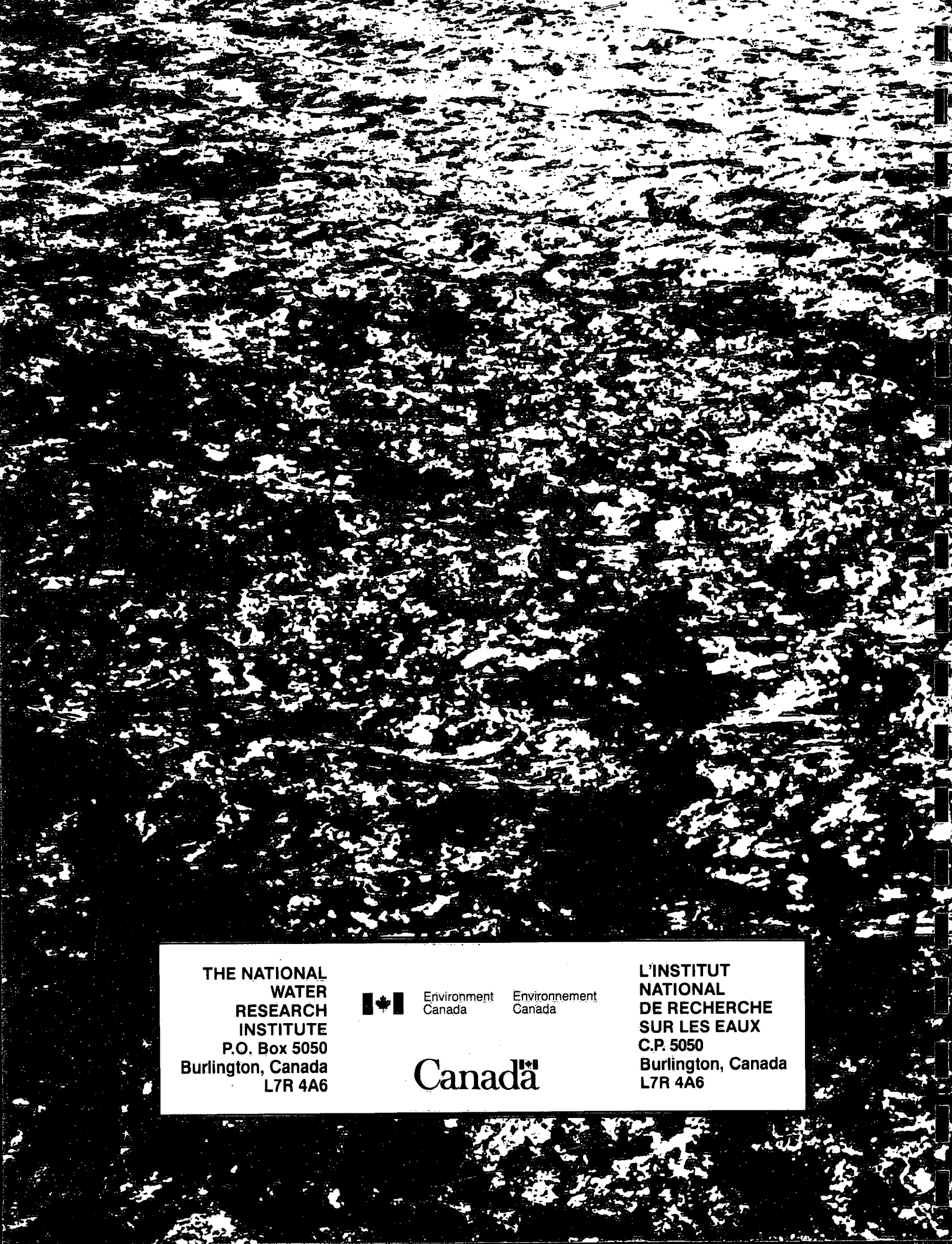

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