NWRI CONTRIBUTION NO. 86-89

Summary Report PPQC Studies 25-36 (Sept. 84 - Aug. 85) Trace Metals, Major Ions, Nutrients and Physical Parameters in Spiked Samples.

H. Alkema

Executive Summary PPQC 25-36

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 WQB Calgary Lab (ECS) and the Alberta, Saskatchewan and Manitoba provincial laboratories.

In the first phase of this program, interlab studies are designed and conducted bi-monthly on some 40 parameters involving some 100 analytical procedures.

Twelve studies were sent out in the period of September 1984 to August 1985. These studies dealt with the analysis of trace metals, major ions, nutrients, and physical parameters in spiked water samples.

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

Sommaire, études de contrôle de la qualité des provinces des Prairies n°s 25 à 36 (sept. 1984 - août 1985) Métaux à l'état de trace, ions majeurs, substances nutritives et paramètres physiques dans les échantillons dopés. H. Alkema.

SOMMAIRE ADMINISTRATIF

Sous l'égide de la Prairie Provinces Board, on a lancé un programme d'assurance de la qualité pour évaluer et améliorer la compatibilité des données issues du laboratoire de la Direction de la qualité de l'eau du gouvernement fédéral à Calgary (SCE) et des laboratoires gouvernementaux des provinces de l'Alberta, de la Saskatchewan et du Manitoba.

Au cours de la première phase du programme, on a mené tous les deux mois des études interlaboratoires portant sur une quarantaine de paramètres et une centaine de méthodes analytiques.

On a procédé à douze études pendant la période allant de septembre 1984 à août 1985. Ces études ont eu pour objet l'analyse de la teneur en métaux à l'état de trace, des ions majeurs, des substances nutritives et des paramètres physiques dans les échantillons d'eau dopés.

On a constaté qu'un certain nombre d'analyses clés n'ont pas donné les résultats escomptés. On en a informé les chefs de laboratoires concernés pour les inciter à améliorer la qualité de leurs données et à reviser les méthodes de contrôle de la qualité internes.

DISTRIBUTION

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MEMORANDUM **NOTE DE SERVICE**

H. AIKEMA/IWD-NWRI/4645/yf

SECURITY - CLASSIFICATION - DE SÉCURITÉ	
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DATE	February 1, 1985

TO / À: Distribution

FROM / DE: H. Alkema
Quality Assurance and Methods Section
AMD/NWRI, Burlington

SUBJECT / OBJET: Final Summary Report on Prairie Province Water Board QC PPQC Studies 25 and 26 (PP25-26)

I have enclosed the final report for PP25-26.

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

Since there were no changes to the data for these studies, no computer printout is enclosed with this report.

Harry A.

H. Alkema

SUMMARY REPORT

PPQC STUDIES 25 and 26

for SEPTEMBER and OCTOBER 1984

TRACE METALS, MAJOR IONS, NUTRIENTS and PHYSICAL PARAMETERS IN SPIKED WATER SAMPLES

by

H. Alkema

January 1985

AMD
NWRI
CCIW
BURLINGTON, Ontario

This report summarizes the PPWB interlaboratory quality control studies 25 and 26, for the months of September and October, 1984. These two studies dealt mainly with low and medium levels for trace metals, major ions, nutrients and physical parameters.

SAMPLE PARTICULARS

Two samples were for trace metals and three were for the remaining parameters. The five samples contained the following parameters:

PP25 - Sample 1 - 125 ml, D/A * of trace metals (3% HNO_3)
Sample 2 - up to 1L, major ions etc., stored at 4°C

PP26 - Sample 3 - 1L, S/E * of trace metals (0.2% HNO_3)
Sample 4 - up to 1L, major ions, etc., stored at 4°C
Sample 5 - up to 1L, major ions, etc., stored at 4°C

DATA ANALYSIS

Routine analyses performed by each lab were reported on the report sheets submitted with the PPQC samples. All of the data, combined data and their resulting statistics are presented in Tables 1-5. This is the final summary report. Preliminary data summaries were sent to the reporting labs to provide immediate notification of anomalies. These summaries were sent on October 29 and December 27, 1984. Labs reporting data between

* for definitions see Appendix 1

these two dates were notified of major anomalies by telephone. To rectify any errors in compilation of data summaries the labs were given three weeks.

Data for each parameter were accumulated under a "combined" method code ending in 90 or 99. Under these codes, data for each parameter were combined for statistical comparison.

PERFORMANCE INDICATORS

Deviant results, those greater than 10%, are circles in the data tables and a % deviation from the mean is noted in the comments. Flagged results, those with an L or R, are not used in the statistical calculations. Performance indicators are fully explained in Appendix 2.

COMMENTS ON LAB PERFORMANCE

High coefficients of variation (incomparability) were observed for ammonia and for Cr by SE. For a new sample from Saskatchewan, there may have been nonhomogeneity for TKN, NO_3-NO_2 and ammonia.

Individual lab deviations are listed below:

Lab 1 - a high result for Cr by DA, 21%

- a low result for MO by SE, -30%; SO_4 -11% (R)*

Lab 2 - a low result for Cl, -19%; and high for Na, +11%

Lab 3 - a low result for Cr by DA, 17%; Al by SE, 70%

- a high result for Cd by DA, +14%; DOC, 41%

Lab 4 - a high detection limit (HDL) for ammonia

Lab 5 - erratic rejectable conductivity results 3(R)*,-55%, +32%, -96%

- a high result for F, +31%

Lab 6 - a high result for Al by SE, +110%; Fe by SE, +39%, Alkalinity, +14%; K, +23% (R); and SO_4, +24% (R)

- a low result for Mn by DA, -16%; pH, -9% and -17%
- a high bias for Mg +16% with 2 (R)
- an HDL for TKN and Alkalinity

Lab 7 - a rejectable result for SO_4, -83% (R)

Lab 8 - a low result for DIC, -15%; Al by DA, -30%

- a high result for Co by DA, 14%
- rejectable results for Turbidity 2(R); DOC, 600%(R), 240%(R) and K, +15%(R)
- an HDL for Cu by SE, Zn by SE and ammonia

PPWB labs average number of anomalies per sample is 7/5

R= rejectable by Grubb's procedure for statistical calculation

Appendix I

Definitions of Types of Metals Analysis

1. D/A - Direct Aspiration

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

2. S/E - Code for low level analysis.

Analysis is presently 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 followed by ICAP.
4. Graphite tube (flameless) AAS.

Appendix II

Performance Indicators

1. Unacceptable results are circled. A result is deemed unacceptable when it deviates more than 10 percent from the mean result. Near the detection limit a greater deviation is usually allowed. Presently, deviant results are mostly compared to the mean of the parameter in the study, but may also be compared to a mean value from a previous study if it is available. In the future, the design values will be known for certified reference samples and an absolute comparison will be made. When there is a high % CV or when only a few results are reported for a parameter and a previously analysed mean is used, a footnote will indicate the previous mean.

2. When a high detection limit occurs, compared to the other labs, this is marked with a "HDL" to indicate lack of comparability.

3. In the case of systemmatic anomoly, when two analyses of a parameter have the same % deviation from the mean, this is noted by the word "biased" high or low.

4. A percent deviation is written to show the severity of the anomoly. Generally the comments indicate differences from the mean above 10%.

5. The "R" flag beside a result in the tables or in the comments indicates that this result is an outlier according to Grubbs* and is rejected in statistical calculations.

* Reference: Frank E. Grubbs, Technometrics, 1969, P.1

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 1

STUDY NO. 025 DATE: 01/09/84 DISTRIBUTED: 04/09/84

SAMPLE = 1 SPIKED SAMPLE. TRACE METALS D/A.

LAB	13302 AL EXTBL AAS DA MG/L	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP D/A MG/L V	23011 V TOTAL 5X ICAP UG/L V	23301 V EXTRBL AAS DA MG/L	23999 VANADIUM COMBINED MG/L V	24002 CR TOTAL AAS DA MG/L CR	24009 CR TOTAL ICAP DA MG/L CR	24011 CR TOTAL 5X ICAP UG/L CR	24302 CR EXTBL AAS DA MG/L	24999 CHROMIUM COMBINED MG/L CR
1	--	--	0.916	--	--	0.916	--	0.116	--	--	0.116 *
3	1.0	1.0	--	--	1.0	1.0	--	--	--	0.08	0.08 *
6	--	1.1	--	0.96	--	0.96	--	--	0.088	--	0.088
8	0.7	0.7 *	--	--	--	--	0.10	--	--	--	0.10
MEAN	.8500	.9333	.9160	.9600	1.0000	.9587	.1000	.1160	.0880	.0800	.0960
STD. DEV.	.2121	.2082	--	--	--	.0420	--	--	--	--	.0157
REL. STD.	25.0	22.3	--	--	--	4.4	--	--	--	--	16.3
DES. VAL.	--	1.019	--	--	--	.953	--	--	--	--	.098

LAB	25003 MN TOTAL ICAP DA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25111 MN DISS ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25999 MANGNESE COMBINED MG/L MN	26011 FE TOTAL 5X ICAP UG/L FE	26111 FE DISS ICAP UG/L FE	26304 FE EXTBL AAS DA MG/L	26999 IRON COMBINED MG/L FE	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO
1	0.094	--	--	--	0.094	--	--	0.49	0.49	0.283	--
2	--	--	--	0.10	0.10	--	--	--	--	--	--
3	--	--	--	0.11	0.11	--	--	0.51	0.51	--	--
6	--	0.082	--	--	0.082 *	0.52	--	--	0.52	--	0.28
8	--	--	0.100	--	0.100	--	0.531	--	0.531	--	--
MEAN	.0940	.0820	.1000	.1050	.0972	.5200	.5310	.5000	.5128	.2830	.2800
STD. DEV.	--	--	--	.0071	.0103	--	--	.0141	.0174	--	--
REL. STD.	--	--	--	6.7	10.6	--	--	2.8	3.4	--	--
DES. VAL.	--	--	--	--	.098	--	--	--	.498	--	--

LAB	27301 CO EXTBL AAS DA MG/L	27999 COBALT COMBINED MG/L CO	28009 NI TOTAL ICAP DA MG/L NI	28011 NI TOTAL 5X ICAP UG/L NI	28101 NI DISS AAS DA MG/L	28301 NI EXTBL AAS DA MG/L	28999 NICKEL COMBINED MG/L NI	29009 CU TOTAL ICAP MG/L CU	29011 CU TOTAL 5X ICAP UG/L CU	29111 CU DISS ICAP UG/L CU	29306 CU EXTBL AAS DA MG/L
1	--	0.283	0.462	--	--	--	0.462	0.095	--	--	--
2	--	--	--	--	--	0.50	0.50	--	--	--	0.11
3	0.32	0.32	--	--	--	0.51	0.51	--	--	--	0.11
6	--	0.28	--	0.50	--	--	0.50	--	0.11	--	--
8	0.35	0.35 *	--	--	0.50	--	0.50	--	--	0.096	--
MEAN	.3350	.3083	.4620	.5000	.5000	.5050	.4944	.0950	.1100	.0960	.1100
STD. DEV.	.0212	.0333	--	--	--	.0071	.0186	--	--	--	0.0000
REL. STD.	6.3	10.8	--	--	--	1.4	3.8	--	--	--	0.0
DES. VAL.	--	.297	--	--	--	--	.479	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 1

STUDY NO. 025 DATE: 01/09/84 DISTRIBUTED: 04/09/84

SAMPLE = 1 SPIKED SAMPLE. TRACE METALS D/A.

LAB	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN	30011 ZN TOTAL 5X ICAP UG/L ZN	30111 ZN DISS ICAP UG/L ZN	30304 ZN EXTBL AAS DA MG/L	30999 ZINC COMBINED MG/L ZN	38301 SR EXTBL AAS DA MG/L	38999 STRNTIUM COMBINED MG/L SR	42009 MO TOTAL ICAP MG/L MO	42011 MO TOTAL 5X ICAP UG/L MO	42301 MO EXTBL AAS DA MG/L
1	0.095	0.143	--	--	--	0.143 *	--	--	0.890	--	--
2	0.11	--	--	--	0.11	0.11	--	--	--	--	--
3	0.11	--	--	--	0.12	0.12	0.40	0.40	--	--	0.78
6	0.11	--	0.10	--	--	0.10	--	--	--	0.85	--
8	0.096	--	--	0.10	--	0.10	--	--	--	--	--
MEAN	.1042	.1430	.1000	.1000	.1150	.1146	.4000	.4000	.8900	.8500	.7800
STD. DEV.	.0079	--	--	--	.0071	.0179	--	--	--	--	--
REL. STD.	7.6	--	--	--	6.1	15.6	--	--	--	--	--
DES. VAL.	.103	--	--	--	--	.107	--	.389	--	--	--

LAB	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD	48011 CD TOTAL 5X ICAP UG/L CD	48101 CD DISS AAS DA MG/L	48301 CD EXTBL AAS DA MG/L	48999 CADMIUM COMBINED MG/L CD	56011 BA TOTAL 5X ICAP UG/L BA	56301 BA EXTBL AAS DA MG/L	56999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB	82301 PB EXTBL AAS DA MG/L
1	0.890	0.101	--	--	--	0.101	--	--	--	--	--
3	0.78	--	--	--	0.12	0.12 *	--	1.0	1.0	--	0.51
6	0.85	--	0.090	--	--	0.090	1.1	--	1.1	0.50	--
8	--	--	--	0.11	--	0.11	--	--	--	--	0.50
MEAN	.8400	.1010	.0900	.1100	.1200	.1053	1.1000	1.0000	1.0500	.5000	.5050
STD. DEV.	.0557	--	--	--	--	.0128	--	--	.0707	--	.0071
REL. STD.	6.6	--	--	--	--	12.2	--	--	6.7	--	1.4
DES. VAL.	.914	--	--	--	--	.098	--	--	.992	--	--

LAB	82302 PB EXTBL AAS SE MG/L	82999 LEAD COMBINED MG/L PB
1	0.505	0.505
3	--	0.51
6	--	0.50
8	--	0.50
MEAN	.5050	.5038
STD. DEV.	--	.0048
REL. STD.	--	1.0
DES. VAL.	--	.481

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 2

STUDY NO. 025 DATE: 01/09/84 DISTRIBUTED: 04/09/84

SAMPLE = 2 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR A REL UNIT	02021 COLOUR V IS COMP REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLMTRIC NTU	02190 COLOUR COMBINED REL UNIT	02290 CONDUCT COMBINED USIE/CM	02390 TURBIDTY COMBINED JTU/NTU
1	0.65	2.33	2.30	--	--	232.	--	--	--	232.	--
2	1.62	2.213	2.142	5.0	--	230.	0.1	--	5.0	230.	0.1
3	-0.72	2.249	2.282	--	--	232.5	--	--	--	232.5	--
4	--	--	--	--	5.	224.	0.26	--	5.	224.	0.26
5	0.70	2.32	2.29	10.	--	95.0 R	0.11	--	10.	95.0 R	0.11
6	0.0	2.4	2.4	--	--	237.	--	0.15	--	237.	0.15
7	0.3	2.27	2.25	14.	--	226.	0.3	--	14.	226.	0.3
8	0.69	2.39	2.36	5. L	--	228.	--	0.80 R	5. L	228.	0.80 R
MEAN	.4629	2.3103	2.2891	9.6667	5.0000	229.9286	.1925	.1500	8.5000	229.9286	.1840
STD. DEV.	.7213	.0704	.0823	4.5092	--	4.3821	.1024	--	4.3569	4.3821	.0907
REL. STD.	155.8	3.0	3.6	46.6	--	1.9	53.2	--	51.3	1.9	49.3
DES. VAL.	--	--	--	--	--	--	--	--	4.786	227.111	.571

LAB	05105 BORON AA CARM MG/L	05106 BORON F AUTO AN MG/L B	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 DOC UV CO2 EV MG/L C	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06290 D O C COMBINED MG/L	06490 D I C COMBINED MG/L
1	--	--	--	--	--	1.1	--	--	19.3	1.1	19.3
3	--	--	--	--	1.9	--	--	19.8	--	1.9	19.8
4	0.05	--	0.05	--	1.2	--	--	--	--	1.2	--
5	--	--	--	1.12 L	--	--	21.2	--	--	1.12 L	21.2
6	--	--	--	--	1.3	--	--	--	--	1.3	--
8	--	0.05 L	0.05 L	10.0 R	--	--	16.5	--	--	10.0 R	16.5
MEAN	.0500	--	.0500	--	1.4667	1.1000	18.8500	19.8000	19.3000	1.3750	19.2000
STD. DEV.	--	--	--	--	.3786	--	3.3234	--	--	.3594	1.9715
REL. STD.	--	--	--	--	25.8	--	17.6	--	--	26.1	10.3
DES. VAL.	--	--	.060	--	--	--	--	--	--	1.886	19.640

LAB	07010 TKN AUTAN MG/L N	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG AA 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3+NO2 F AA HYD MG/L N	07110 NO3+NO2 AA2 CD MG/L N	07111 NO3+NO2 DIS SPEC MG/L N	07112 NO3+NO2 UF AA CD MG/L	07190 NITRATE COMBINED MG/L	07505 TOT HN3 AA BERT MG/L N
1	--	--	--	0.080	0.080	--	--	0.350	--	0.350	--
2	--	--	--	--	--	--	0.34	--	--	0.34	--
3	0.092	--	--	--	0.092	--	--	--	0.325	0.325	0.005L
4	--	--	--	--	--	--	0.34	--	--	0.34	--
5	--	--	--	--	--	--	0.335	--	--	0.335	--
6	--	--	0.2	--	0.2	0.34	--	--	--	0.34	--
7	--	--	--	--	--	--	--	--	0.36	0.36	--
8	--	0.20 L	--	--	0.20 L	--	0.33	--	--	0.33	--
MEAN	.0920	--	.2000	.0800	.1240	.3400	.3363	.3500	.3425	.3400	--
STD. DEV.	--	--	--	--	.0661	--	.0048	--	.0247	.0110	--
REL. STD.	--	--	--	--	53.3	--	1.4	--	7.2	3.2	--
DES. VAL.	--	--	--	--	.185	--	--	--	--	.328	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 2

STUDY NO. 025 DATE: 01/09/84 DISTRIBUTED: 04/09/84

SAMPLE = 2 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	07506 TOT NH3 SPEC EL MG/L N	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07602 TOTAL N CALC+D MG/L N	07651 TOT N F UV AA MG/L	07690 TOTAL N COMBINED MG/L	09103 FLUORIDE DIS COLR MG/L F	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L
1	--	--	--	0.008	0.008	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	0.06	--
3	--	--	--	--	0.005 L	--	--	--	--	--	--
4	0.1 L	--	--	--	0.1 L	--	0.40	--	--	--	--
5	--	--	0.004 *	--	0.004	--	0.409	--	--	--	0.068
6	--	--	0.02 *	--	0.02	--	--	--	0.1 L	--	--
8	--	0.02	--	--	0.02	0.53 L	--	0.53 L	--	0.10	--
MEAN	--	.0200	.0120	.0080	.0130	--	.4045	--	--	.0800	.0680
STD. DEV.	--	--	.0113	--	.0082	--	.0064	--	--	.0283	--
REL. STD.	--	--	94.3	--	63.4	--	1.6	--	--	35.4	--
DES. VAL.	--	--	--	--	.017	--	--	.454	--	--	--

LAB	09107 FLUOR F AUTO POT MG/L F	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR+M MG/L CAC	10106 ALKLINTY IR CO2 MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC	10301 PH UNITS	10390 PH COMBINED UNITS	10602 HARDNESS CALC+D MG/L	10603 HARDNESS TITR+N MG/L	10690 HARDNSS COMBINED MG/L
1	0.09	0.09	81.	--	--	81.	8.1	8.1	102.	--	102.
2	--	0.06	74.9	--	--	74.9	7.9	7.9	--	--	--
3	--	--	--	75.7	--	75.7	8.1	8.1	--	--	--
4	--	--	73.5	--	--	73.5	7.8	7.8	--	--	--
5	--	0.068	78.8	--	--	78.8	7.95	7.95	--	102.	102.
6	--	0.1 L	--	--	80.	80.	7.2	7.2	--	108.	108.
7	--	--	77.0	--	--	77.0	8.2	8.2	99.9	102.2	102.2
8	--	0.10	--	--	81.0	81.0	8.05	8.05	105.	--	105.
MEAN	.0900	.0795	77.0400	75.7000	80.5000	77.7375	7.9125	7.9125	102.3000	104.0667	103.8400
STD. DEV.	--	.0186	2.9955	--	.7071	2.8844	.3148	.3148	2.5632	3.4078	2.6510
REL. STD.	--	23.5	3.9	--	.9	3.7	4.0	4.0	2.5	3.3	2.6
DES. VAL.	--	.091	--	--	--	79.547	--	7.901	--	--	103.950

LAB	11102 SODIUM AAS F MG/L NA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS D/A MG/L	11107 SODIUM FL PH UF MG/L	11111 NA DISS ICAP MG/L NA	11190 SODIUM COMBINED MG/L	12101 MG DISS CALC+D MG/L	12102 MG FIL AAS DA MG/L	12106 MG DISS AA DA UF MG/L	12107 MG DISS AAS AUTO MG/L	12111 MG DISS ICAP MG/L MG
1	--	5.	--	--	--	5.	--	--	--	--	--
2	--	4.9	--	--	--	4.9	--	--	--	6.9	--
3	--	--	--	4.54	--	4.54	--	--	7.0	--	--
5	--	4.6	--	--	--	4.6	7.3	--	--	--	--
6	5.	--	--	--	--	5.	8.7	--	--	--	--
7	--	--	4.3	--	--	4.3	--	7.4	--	--	--
8	--	--	--	--	4.64	4.64	--	--	--	--	7.76
MEAN	5.0000	4.8333	4.3000	4.5400	4.6400	4.7114	8.0000	7.4000	7.0000	6.9000	7.7600
STD. DEV.	--	.2082	--	--	--	.2640	.9899	--	--	--	--
REL. STD.	--	4.3	--	--	--	5.6	12.4	--	--	--	--
DES. VAL.	--	--	--	--	--	4.568	--	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 2

STUDY NO. 025 DATE: 01/09/84 DISTRIBUTED: 04/09/84

SAMPLE = 2 SPIKED SAMPLE.

MAJOR IONS 4 C.

LAB	12190 MGNESIUM COMBINED MG/L MG	12303 MG UF AAS AUTO MG/L MG	14102 SILICA R ANSA AA MG/L	14105 SILICA R MOLY AA MG/L	14106 SILICA R MOLY UF MG/L	14190 SILICA COMBINED MG/L	15406 T P UF AA ASC MG/L P	15409 T P BLK AA ASC MG/L P	15413 TOTAL P AA SNCL2 MG/L P	15421 T P BLK DIG ASC MG/L P	15490 TOTAL P COMBINED MG/L
1	7.5	7.5	1.3	--	--	1.3	--	--	--	0.006L	0.006L
2	6.9	--	1.4	--	--	1.4	--	--	--	--	--
3	7.0	--	--	--	1.24	1.24	--	--	0.001 *	--	0.001
4	--	--	--	--	--	--	0.003L	--	--	--	0.003L
5	7.3	--	--	1.3	--	1.3	--	--	--	--	--
6	8.7 *	--	--	--	--	--	--	0.01 L	--	--	0.01 L
7	7.4	--	--	--	--	--	0.006	--	--	--	0.006
8	7.76	--	--	1.4	--	1.4	--	--	0.002 *	--	0.002
MEAN	7.5086	7.5000	1.3500	1.3500	1.2400	1.3280	.0060	--	.0015	--	.0030
STD. DEV.	.6010	--	.0707	.0707	--	.0701	--	--	.0007	--	.0026
REL. STD.	8.0	--	5.2	5.2	--	5.3	--	--	47.1	--	88.2
DES. VAL.	7.368	--	--	--	--	1.286	--	--	--	--	.004

LAB	16304 SO4 DISS AUTO BA MG/L	16306 SO4 DISS AA MTB MG/L	16307 SO4 DISS AAN MBUF MG/L	16309 SO4 DISS I C MG/L SO4	16390 SULFATE COMBINED MG/L SO4	17203 CL DISS AA UF FE MG/L	17204 CL DISS AG TITN MG/L	17205 CL DISS ION EL MG/L	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17250 CHLORIDE COMBINED MG/L
1	--	16.	--	--	16.	12.	--	--	--	--	12.
2	16.8	--	--	17.1	17.0	--	--	9.5	--	--	9.5 *
3	--	--	17.0	--	17.0	--	--	--	--	13.0	13.0
5	--	16.8	--	--	16.8	--	--	--	11.9	--	11.9
6	22. R	--	--	--	22. R	--	12.	--	--	--	12.
7	--	17.6	--	--	17.6	11.4	--	--	--	--	11.4
8	--	18.	--	--	18.	--	--	--	12.	--	12.
MEAN	16.8000	17.1000	17.0000	17.1000	17.0667	11.7000	12.0000	9.5000	11.9500	13.0000	11.6857
STD. DEV.	--	.8869	--	--	.6890	.4243	--	--	.0707	--	1.0746
REL. STD.	--	5.2	--	--	4.0	3.6	--	--	.6	--	9.2
DES. VAL.	--	--	--	--	16.100	--	--	--	--	--	11.978

LAB	19102 K DISS AAS MG/L K	19103 K DISS F LM PHOT MG/L	19105 K DISS AAS DA MG/L	19107 K DIS UF FLM PHOT MG/L	19190 PTASSIUM COMBINED MG/L	20100 CA DISS CALC+D MG/L CA	20101 CA DISS TIT EDTA MG/L	20103 CA DISS AAS MG/L	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20111 CA DISS ICAP MG/L CA
1	--	3.2	--	--	3.2	--	--	--	--	28.5	--
2	--	3.30 +	--	--	3.30	--	--	--	--	27.0	--
3	--	--	--	3.07	3.07	--	--	--	28.0	--	--
5	--	3.2	--	--	3.2	--	28.8	--	--	--	--
6	3.3	--	--	--	3.3	29.	--	--	--	--	--
7	3.3	--	--	--	3.3	--	--	27.8	--	--	--
8	--	--	3.80 R	--	3.80 R	--	--	--	--	--	29.1
MEAN	3.3000	3.2333	--	3.0700	3.2283	29.0000	28.8000	27.8000	28.0000	27.7500	29.1000
STD. DEV.	0.0000	.0577	--	--	.0917	--	--	--	--	1.0607	--
REL. STD.	0.0	1.8	--	--	2.8	--	--	--	--	3.8	--
DES. VAL.	--	--	--	--	3.136	--	--	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 2 (cont) STUDY NO. 025 DATE: 01/09/84 DISTRIBUTED: 04/09/84

SAMPLE = 2 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	20190 CALCIUM COMBINED MG/L CA
1	28.5
2	27.0
3	28.0
5	28.8
6	29.
7	27.8
8	29.1
MEAN	28.3143
STD. DEV.	.7581
REL. STD.	2.7
DES. VAL.	28.138

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 3 STUDY NO. 026 DATE: 01/10/84 DISTRIBUTED: 04/09/84

SAMPLE = 3 SPIKED SAMPLE. TRACE METALS 0.2% HNO3 S/E.

LAB	13302 AL EXTBL AAS DA MG/L	13305 AL EXTBL AAS SE MG/L AL	13306 AL UFAAS SE OX/EP MG/L AL	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP D/A MG/L V	23011 V TOTAL 5X ICAP UG/L V	23302 V EXTRBL SE PH1.6 MG/L	23999 VANADIUM COMBINED MG/L V	24004 CR TOTAL AAS G F MG/L	24009 CR TOTAL ICAP DA MG/L CR	24011 CR TOTAL 5X ICAP UG/L CR
1	--	--	0.020L	0.020L	0.005	--	--	0.005	--	0.009	--
2	--	0.011	--	0.011	--	--	--	--	--	--	--
3	--	0.006	--	0.006 *	--	--	0.005	0.005	--	--	--
6	--	--	--	0.04 *	--	0.01 L	--	0.01 L	--	--	0.006
8	0.2 L	--	--	0.2 L	--	--	--	--	0.012	--	--
MEAN	--	.0085	--	.0190	.0050	--	.0050	.0050	.0120	.0090	.0060
STD. DEV.	--	.0035	--	.0184	--	--	--	0.0000	--	--	--
REL. STD.	--	41.6	--	96.6	--	--	--	0.0	--	--	--
DES. VAL.	--	--	--	.019	--	--	--	.006	--	--	--

LAB	24303 CR EXTBL AAS SE MG/L	24999 CHROMIUM COMBINED MG/L CR	25003 MN TOTAL ICAP DA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25111 MN DISS ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25999 MANGNESE COMBINED MG/L MN	26011 FE TOTAL 5X ICAP UG/L FE	26111 FE DISS ICAP UG/L FE	26304 FE EXTBL AAS DA MG/L	26305 FE EXTBL AAS SE MG/L
1	--	0.009	0.008L	--	--	--	0.008L	--	--	0.02 L	--
2	--	--	--	--	--	0.011	0.011 *	--	--	--	--
3	0.006	0.006 *	--	--	--	0.01 L	0.01 L	--	--	--	0.007
6	--	0.006 *	--	0.004	--	--	0.004 *	0.016	--	--	--
8	--	0.012 *	--	--	0.02 L	--	0.02 L	--	0.02 L	--	--
MEAN	.0060	.0083	--	.0040	--	.0110	.0075	.0160	--	--	.0070
STD. DEV.	--	.0029	--	--	--	--	.0049	--	--	--	--
REL. STD.	--	34.8	--	--	--	--	66.0	--	--	--	--
DES. VAL.	--	.009	--	--	--	--	.007	--	--	--	--

LAB	26999 IRON COMBINED MG/L FE	27003 CO TOTAL AAS G F MG/L	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO	27302 CO EXTBL AAS SE MG/L	27999 COBALT COMBINED MG/L CO	28007 NI TOTAL AAS G F MG/L	28009 NI TOTAL ICAP DA MG/L NI	28011 NI TOTAL 5X ICAP UG/L NI	28302 NI EXTBL AAS SE MG/L	28999 NICKEL COMBINED MG/L NI
1	0.02 L	--	0.004	--	--	0.004	--	0.008	--	--	0.008
3	0.007	--	--	--	0.005	0.005	--	--	--	0.006	0.006
6	0.016 *	--	--	0.004	--	0.004	--	--	0.006	--	0.006
8	0.02 L	0.006	--	--	--	0.006	0.007	--	--	--	0.007
MEAN	.0115	.0060	.0040	.0040	.0050	.0048	.0070	.0080	.0060	.0060	.0068
STD. DEV.	.0064	--	--	--	--	.0010	--	--	--	--	.0010
REL. STD.	55.3	--	--	--	--	20.2	--	--	--	--	14.2
DES. VAL.	.005	--	--	--	--	.005	--	--	--	--	.007

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 3 (cont) STUDY NO. 026 DATE: 01/10/84 DISTRIBUTED: 04/09/84

SAMPLE = 3 SPIKED SAMPLE. TRACE METALS 0.2% HNO3 S/E.

LAB	29009 CU TOTAL ICAP MG/L CU	29011 CU TOTAL 5X ICAP UG/L CU	29111 CU DISS ICAP UG/L CU	29305 CU EXTBL AAS SE MG/L	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN	30011 ZN TOTAL 5X ICAP UG/L ZN	30111 ZN DISS ICAP UG/L ZN	30305 ZN EXTBL AAS SE MG/L	30999 ZINC COMBINED MG/L ZN	38301 SR EXTBL AAS DA MG/L
1	0.008	--	--	--	0.008	0.006	--	--	--	0.006	--
3	--	--	--	0.007	0.007	--	--	--	0.007	0.007	0.18
6	--	0.005	--	--	0.005	--	0.004	--	--	0.004	--
8	--	--	0.01 L	--	0.01 L (HDL)	--	--	0.01 L	--	0.01 L (HDL)	--
MEAN	.0080	.0050	--	.0070	.0067	.0060	.0040	--	.0070	.0057	.1800
STD. DEV.	--	--	--	--	.0015	--	--	--	--	.0015	--
REL. STD.	--	--	--	--	22.9	--	--	--	--	27.0	--
DES. VAL.	--	--	--	--	.007	--	--	--	--	.006	--

LAB	38999 STRNTIUM COMBINED MG/L SR	42009 MO TOTAL ICAP MG/L MO	42011 MO TOTAL 5X ICAP UG/L MO	42302 MO EXTBL AAS SE MG/L	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD	48011 CD TOTAL 5X ICAP UG/L CD	48103	48302 CD EXTBL AAS SE MG/L	48999 CADMIUM COMBINED MG/L CD	56011 BA TOTAL 5X ICAP UG/L BA
1	--	0.004	--	--	0.004 *	0.004	--	--	--	0.004	--
3	0.18	--	--	0.007	0.007	--	--	--	0.005	0.005	--
6	--	--	0.006	--	0.006	--	0.004	--	--	0.004	0.023
8	--	--	--	--	--	--	--	0.005	--	0.005	--
MEAN	.1800	.0040	.0060	.0070	.0057	.0040	.0040	.0050	.0050	.0045	.0230
STD. DEV.	--	--	--	--	.0015	--	--	--	--	.0006	--
REL. STD.	--	--	--	--	27.0	--	--	--	--	12.8	--
DES. VAL.	.183	--	--	--	.008	--	--	--	--	.005	--

LAB	56301 BA EXTBL AAS DA MG/L	56999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB	82302 PB EXTBL AAS SE MG/L	82305 PB EXTBL AAS G F MG/L	82999 LEAD COMBINED MG/L PB
1	--	--	--	0.006	--	0.006
3	0.1 L	0.1 L	--	0.006	--	0.006
6	--	0.023	0.005L	--	--	0.005L
8	--	--	--	--	0.005L	0.005L
MEAN	--	.0230	--	.0060	--	.0060
STD. DEV.	--	--	--	0.0000	--	0.0000
REL. STD.	--	--	--	0.0	--	0.0
DES. VAL.	--	.038	--	--	--	.006

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 4

STUDY NO. 026 DATE: 01/10/84 DISTRIBUTED: 04/09/84

SAMPLE = 4 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR A REL UNIT	02021 COLOUR V IS COMP REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLMTRIC NTU	02190 COLOUR COMBINED REL UNIT	02290 CONDUCT COMBINED USIE/CM	02390 TURBIDTY COMBINED JTU/NTU
1	0.0	3.80	3.80	--	--	447.	--	--	--	447.	--
2	1.63	3.82	3.94	5. L	--	450.	0.2	--	5. L	450.	0.2
3	-1.4	3.663	3.764	--	--	447.4	--	--	--	447.4	--
4	--	--	--	--	5. L	413.	0.18	--	5. L	413.	0.18
5	0.02	3.82	3.82	5.	--	588. R	0.06	--	5.	588. R	0.06
6	2.6	4.0	3.8	--	--	459.	--	0.10	--	459.	0.10
7	0.1 L	3.63	3.63	4.	--	438.	0.2	--	4.	438.	0.2
8	1.16	3.86	3.77	5. L	--	448.	--	0.65 R	5. L	448.	0.65 R
MEAN	.6683	3.7990	3.7891	4.5000	--	443.2000	.1600	.1000	4.5000	443.2000	.1480
STD. DEV.	1.4172	.1239	.0915	.7071	--	14.6633	.0673	--	.7071	14.6633	.0642
REL. STD.	212.1	3.3	2.4	15.7	--	3.3	42.1	--	15.7	3.3	43.4
DES. VAL.	--	--	--	--	--	--	--	--	2.343	441.371	.213

LAB	05105 BORON AA CARM MG/L	05106 BORON F AUTO AN MG/L B	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 DOC UV CO2 EV MG/L C	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06290 D O C COMBINED MG/L	06490 D I C COMBINED MG/L
1	--	--	--	--	--	0.4 L	--	--	1.0 L	0.4 L	1.0 L
3	--	--	--	--	0.2 *	--	--	0.1 L	--	0.2 *	0.1 L
4	0.02 L	--	0.02 L	--	0.3 *	--	--	--	--	0.3 *	--
5	--	--	--	0.52 L	--	--	0.52 L	--	--	0.52 L	0.52 L
6	--	--	--	--	0.9 *	--	--	--	--	0.9 *	--
8	--	0.05 L	0.05 L	1.0 L	--	--	1.0 L	--	--	1.0 L	1.0 L
MEAN	--	--	--	--	.4667	--	--	--	--	.4667	--
STD. DEV.	--	--	--	--	.3786	--	--	--	--	.3786	--
REL. STD.	--	--	--	--	81.1	--	--	--	--	81.1	--
DES. VAL.	--	--	--	--	--	--	--	--	--	.693	.606

LAB	07010 TKN AUTAN MG/L N	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG AA 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3+NO2 F AA HYD MG/L N	07110 NO3+NO2 AA2 CD MG/L N	07111 NO3+NO2 DIS SPEC MG/L N	07112 NO3+NO2 UF AA CD MG/L	07190 NITRATE COMBINED MG/L	07505 TOT HN3 AA BERT MG/L N
1	--	--	--	0.050L	0.050L	--	--	0.025	--	0.025	--
2	--	--	--	--	--	--	0.03	--	--	0.03	--
3	0.008	--	--	--	0.008	--	--	--	0.017	0.017	0.005L
4	--	--	--	--	--	--	0.04	--	--	0.04	--
5	--	--	--	--	--	--	0.023	--	--	0.023	--
6	--	--	0.2	--	0.2	*(HDL)0.03	--	--	--	0.03	--
7	--	--	--	--	--	--	--	--	0.03	0.03	--
8	--	0.20 L	--	--	0.20 L	--	0.02	--	--	0.02	--
MEAN	.0080	--	.2000	--	.1040	.0300	.0283	.0250	.0235	.0269	--
STD. DEV.	--	--	--	--	.1358	--	.0089	--	.0092	.0072	--
REL. STD.	--	--	--	--	130.5	--	31.4	--	39.1	26.9	--
DES. VAL.	--	--	--	--	.133	--	--	--	--	.032	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 4

STUDY NO. 026 DATE: 01/10/84 DISTRIBUTED: 04/09/84

SAMPLE = 4 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	07506 TOT NH3 SPEC EL MG/L N	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07602 TOTAL N CALC+D MG/L N	07651 TOT N F UV AA MG/L	07690 TOTAL N COMBINED MG/L	09103 FLUORIDE DIS COLR MG/L F	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L
1	--	--	--	0.016	0.016	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	0.05 L	--
3	--	--	--	--	0.005L	--	--	--	--	--	--
4	0.1 L	--	--	--	0.1 L (HDL)	--	0.07	--	--	--	--
5	--	--	0.002L	--	0.002L	--	0.049	--	--	--	0.05 L
6	--	--	0.02	--	0.02 *	--	--	--	0.1 L	--	--
8	--	0.02 L	--	--	0.02 L (HDL)	0.22 L	--	0.22 L	--	0.1 L	--
MEAN	--	--	.0200	.0160	.0180	--	.0595	--	--	--	--
STD. DEV.	--	--	--	--	.0028	--	.0148	--	--	--	--
REL. STD.	--	--	--	--	15.7	--	25.0	--	--	--	--
DES. VAL.	--	--	--	--	.012	--	--	.044	--	--	--

LAB	09107 FLUOR F AUTO POT MG/L F	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR+N MG/L CAC	10106 ALKLINTY IR CO2 MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC	10301 PH UNITS	10390 PH COMBINED UNITS	10602 HARDNESS CALC+D MG/L	10603 HARDNESS TITR+N MG/L	10690 HARDNSS COMBINED MG/L
1	0.05 L	0.05 L	5. L	--	--	5. L	6.1	6.1	146.	--	146.
2	--	0.05 L	1.2	--	--	1.2	6.1	6.1	--	--	--
3	--	--	--	1.8	--	1.8	5.5	5.5	--	--	--
4	--	--	1.7	--	--	1.7	5.3	5.3	--	--	--
5	--	0.05 L	0.5 L	--	--	0.5 L	5.3	5.3	--	148.	148.
6	--	0.1 L	--	--	20. L	20. L	4.6	4.6 *	--	156.	156.
7	--	--	0.7	--	--	0.7	6.1	6.1	141.6	149.7	149.7
8	--	0.1 L	--	--	2.00	2.00	5.45	5.45	151.	--	151.
MEAN	--	--	1.2000	1.8000	2.0000	1.4800	5.5563	5.5563	146.2000	151.2333	150.1400
STD. DEV.	--	--	.5000	--	--	.5263	.5274	.5274	4.7032	4.2147	3.7747
REL. STD.	--	--	41.7	--	--	35.6	9.5	9.5	3.2	2.8	2.5
DES. VAL.	--	--	--	--	--	1.459	--	5.505	--	--	147.587

LAB	11102 SODIUM AAS F MG/L NA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS D/A MG/L	11107 SODIUM FL PH UF MG/L	11111 NA DISS ICAP MG/L NA	11190 SODIUM COMBINED MG/L	12101 MG DISS CALC+D MG/L	12102 MG FIL AAS DA MG/L	12106 MG DISS AA DA UF MG/L	12107 MG DISS AAS AUTO MG/L	12111 MG DISS ICAP MG/L MG
1	--	20.	--	--	--	20.	--	--	--	--	--
2	--	21.5	--	--	--	21.5 *	--	--	--	9.3	--
3	--	--	--	18.70	--	18.70	--	--	9.0	--	--
5	--	19.3	--	--	--	19.3	9.56	--	--	--	--
6	19.	--	--	--	--	19.	11.6 R	--	--	--	--
7	--	--	17.8	--	--	17.8	--	9.4	--	--	--
8	--	--	--	--	19.0	19.0	--	--	--	--	9.98
MEAN	19.0000	20.2667	17.8000	18.7000	19.0000	19.3286	9.5600	9.4000	9.0000	9.3000	9.9800
STD. DEV.	--	1.1240	--	--	--	1.1629	--	--	--	--	--
REL. STD.	--	5.5	--	--	--	6.0	--	--	--	--	--
DES. VAL.	--	--	--	--	--	19.053	--	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 4 STUDY NO. 026 DATE: 01/10/84 DISTRIBUTED: 04/09/84

SAMPLE = 4 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	12190 MGNESIUM COMBINED MG/L MG	12303 MG UF AAS AUTO MG/L MG	14102 SILICA R ANSA AA MG/L	14105 SILICA R MOLY AA MG/L	14106 SILICA R MOLY UF MG/L	14190 SILICA COMBINED MG/L	15406 T P UF AA ASC MG/L P	15409 T P BLK AA ASC MG/L P	15413 TOTAL P AA SNCL2 MG/L P	15421 T P BLK DIG ASC MG/L P	15490 TOTAL P COMBINED MG/L
1	9.6	9.6	0.5 L	--	--	0.5 L	--	--	--	0.006L	0.006L
2	9.3	--	0.1 L	--	--	0.1 L	--	--	--	--	--
3	9.0	--	--	--	0.02 L	0.02 L	--	--	0.001L	--	0.001L
4	--	--	--	--	--	--	0.003L	--	--	--	0.003L
5	9.56	--	--	0.2 L	--	0.2 L	--	--	--	--	--
6	11.6 R	--	--	--	--	--	--	0.01	--	--	0.01
7	9.4	--	--	--	--	--	0.001L	--	--	--	0.001L
8	9.98	--	--	0.2 L	--	0.2 L	--	--	0.001	--	0.001
MEAN	9.4733	9.6000	--	--	--	--	--	.0100	.0010	--	.0055
STD. DEV.	.3286	--	--	--	--	--	--	--	--	--	.0064
REL. STD.	3.5	--	--	--	--	--	--	--	--	--	115.7
DES. VAL.	9.384	--	--	--	--	.009	--	--	--	--	.007

LAB	16304 SO4 DISS AUTO BA MG/L	16306 SO4 DISS AA MTB MG/L	16307 SO4 DISS AAN MBUF MG/L	16309 SO4 DISS I C MG/L SO4	16390 SULFATE COMBINED MG/L SO4	17203 CL DISS AA UF FE MG/L	17204 CL DISS AG TITN MG/L	17205 CL DISS ION EL MG/L	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17290 CHLORIDE COMBINED MG/L
1	--	32. R	--	--	32. R	108.	--	--	--	--	108.
2	36.5	--	--	37.0	36.8	--	--	112.	--	--	112.
3	--	--	37.0	--	37.0	--	--	--	--	104.8	104.8
5	--	35.5	--	--	35.5	--	--	--	109.	--	109.
6	35.	--	--	--	35.	--	110.	--	--	--	110.
7	--	37.9	--	--	37.9	100.	--	--	--	--	100.
8	--	37.	--	--	37.	--	--	--	105.	--	105.
MEAN	35.7500	36.8000	37.0000	37.0000	36.5333	104.0000	110.0000	112.0000	107.0000	104.8000	106.9714
STD. DEV.	1.0607	1.2124	--	--	1.0764	5.6569	--	--	2.8284	--	4.0173
REL. STD.	3.0	3.3	--	--	2.9	5.4	--	--	2.6	--	3.8
DES. VAL.	--	--	--	--	37.096	--	--	--	--	--	105.338

LAB	19102 K DISS AAS MG/L K	19103 K DISS F LM PHOT MG/L	19105 K DISS AAS DA MG/L	19107 K DIS UF FLM PHOT MG/L	19190 PTASSIUM COMBINED MG/L	20100 CA DISS CALC+D MG/L CA	20101 CA DISS TIT EDTA MG/L	20103 CA DISS AAS MG/L	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20111 CA DISS ICAP MG/L CA
1	--	0.9	--	--	0.9	--	--	--	--	42.4	--
2	--	0.95	--	--	0.95	--	--	--	--	42.	--
3	--	--	--	0.90	0.90	--	--	--	41.8	--	--
5	--	0.8	--	--	0.8	--	43.5	--	--	--	--
6	0.9	--	--	--	0.9	43.	--	--	--	--	--
7	1.0	--	--	--	1.0	--	--	41.3	--	--	--
8	--	--	0.80	--	0.80	--	--	--	--	--	44.0
MEAN	.9500	.8833	.8000	.9000	.8929	43.0000	43.5000	41.3000	41.8000	42.2000	44.0000
STD. DEV.	.0707	.0764	--	--	.0732	--	--	--	--	.2828	--
REL. STD.	7.4	8.6	--	--	8.2	--	--	--	--	.7	--
DES. VAL.	--	--	--	--	.872	--	--	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 4 (and) STUDY NO. 026 DATE: 01/10/84 DISTRIBUTED: 04/09/84

SAMPLE = 4 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	20190 CALCIUM COMBINED MG/L CA
1	42.4
2	42.
3	41.8
5	43.5
6	43.
7	41.3
8	44.0
MEAN	42.5714
STD. DEV.	.9708
REL. STD.	2.3
DES. VAL.	42.264

TABLE 5

SAMPLE = 5 MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR A REL UNIT	02021 COLOUR V IS COMP REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLMTRIC NTU	02190 COLOUR COMBINED REL UNIT	02290 CONDUCT COMBINED USIE/CM	02390 TURBIDTY COMBINED JTU/NTU
1	2.03	9.30	8.93	--	--	901.	--	--	--	901.	--
2	1.891	9.300	8.955	5.	--	908.	0.4	--	5.	908.	0.4
3	1.04	9.082	8.894	--	--	907.2	--	--	--	907.2	--
4	--	--	--	--	10.	913.	0.38	--	10.	913.	0.38
5	2.13	9.46	9.06	15.	--	37.4 R	0.38	--	15.	37.4 R	0.38
6	0.52	9.7	9.6	--	--	912.	--	0.35	--	912.	0.35
7	20.5	8.93	5.89	17.	--	892.	1.3	--	17.	892.	--
8	-.08	9.39	9.40	--	--	915.	--	--	--	915.	--
MEAN	4.0044	9.3089	8.6756	12.3333	10.0000	906.8857	.6150	.3500	11.7500	906.8857	.3773
STD. DEV.	7.3211	.2509	1.2568	6.4291	--	8.0307	.4568	--	5.3774	8.0307	.0206
REL. STD.	182.8	2.7	14.5	52.1	--	.9	74.3	--	45.8	.9	5.5
DES. VAL.	--	--	--	--	--	--	--	--	--	923.000	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 5

STUDY NO. 026 DATE: 01/10/84 DISTRIBUTED: 04/09/84

SAMPLE = 5 NATURAL SAMPLE. MAJOR IONS 4 C.

LAB	05105 BORON AA CARM MG/L	05106 BORON F AUTO AN MG/L B	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 DOC UV CO2 EV MG/L C	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06290 D O C COMBINED MG/L	06490 D I C COMBINED MG/L
1	--	--	--	--	--	7.6	--	--	40.3	7.6	40.3
3	--	--	--	--	11.4	--	--	42.7	--	11.4 *	42.7
4	0.14	--	0.14	--	5.8	--	--	--	--	6.8	--
5	--	--	--	5.93	--	--	44.0 *	--	--	5.93	44.0
6	--	--	--	--	8.8	--	--	--	--	8.8	--
8	--	0.17	0.17	27.5 R	--	--	34.5 *	--	--	27.5 R	34.5
MEAN	.1400	.1700	.1550	5.9300	9.0000	7.6000	39.2500	42.7000	40.3000	8.1060	40.3750
STD. DEV.	--	--	.0212	--	2.3065	--	6.7175	--	--	2.1230	4.2058
REL. STD.	--	--	13.7	--	25.6	--	17.1	--	--	26.2	10.4
DES. VAL.	--	--	--	--	--	--	--	--	--	6.700	40.800

LAB	07010 TKN AUTAN MG/L N	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG AA 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3+NO2 F AA HYD MG/L N	07110 NO3+NO2 AA2 CD MG/L N	07111 NO3+NO2 DIS SPEC MG/L N	07112 NO3+NO2 UF AA CD MG/L	07190 NITRATE COMBINED MG/L	07505 TOT HN3 AA BERT MG/L N
1	--	--	--	0.820	0.820	--	--	1.16	--	1.16	--
2	--	--	--	--	--	--	0.60	--	--	0.60	--
3	0.698	--	--	--	0.698	--	--	--	1.085	1.085	0.005L
4	--	--	--	--	--	--	0.50 *	--	--	0.50	--
5	--	--	--	--	--	--	0.881 *	--	--	0.881	--
6	--	--	1.5	--	1.5	0.54	--	--	--	0.54	--
7	--	--	--	--	--	--	--	--	0.58	0.58	--
8	--	1.3	--	--	1.3	--	0.59	--	--	0.59	--
MEAN	.6980	1.3000	1.5000	.8200	1.0795	.5400	.6428	1.1600	.8325	.7420	--
STD. DEV.	--	--	--	--	.3822	--	.1651	--	.3571	.2620	--
REL. STD.	--	--	--	--	35.4	--	25.7	--	42.9	35.3	--
DES. VAL.	--	--	--	--	.703	--	--	--	--	1.185	--

LAB	07506 TOT NH3 SPEC EL MG/L N	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07602 TOTAL N CALC+D MG/L N	07651 TOT N F UV AA MG/L	07690 TOTAL N COMBINED MG/L	09103 FLUORIDE DIS COLR MG/L F	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L
1	--	--	--	0.033	0.033	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	0.26	--
3	--	--	--	--	0.005L	--	--	--	--	--	--
4	0.1 L	--	--	--	0.1 L (HDL)	--	--	--	--	--	--
5	--	--	0.356 *	--	0.356	--	1.525	--	--	--	0.340
6	--	--	0.60 *	--	0.60	--	--	--	0.2	--	--
8	--	0.59	--	--	0.59	1.89	--	1.89	--	0.24	--
MEAN	--	.5900	.4780	.0330	.3948	1.8900	1.5250	1.8900	.2000	.2500	.3400
STD. DEV.	--	--	.1725	--	.2662	--	--	--	--	.0141	--
REL. STD.	--	--	36.1	--	67.4	--	--	--	--	5.7	--
DES. VAL.	--	--	--	--	.006	--	--	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 5 STUDY NO. 026 DATE: 01/10/84 DISTRIBUTED: 04/09/84

SAMPLE = 5 NATURAL SAMPLE. MAJOR IONS 4 C.

LAB	09107 FLUOR F AUTO POT MG/L F	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR+N MG/L CAC	10106 ALKLINTY IR CO2 MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC	10301 PH UNITS	10390 PH COMBINED UNITS	10602 HARDNESS CALC+D MG/L	10603 HARDNESS TITR+N MG/L	10690 HARDNSS COMBINED MG/L
1	0.26	0.26	154.	--	--	154.	7.9	7.9	240.	--	240.
2	--	0.26	164.	--	--	164.	8.0	8.0	--	--	--
3	--	--	--	154.6	--	154.6	8.1	8.1	--	--	--
4	--	--	173.5	--	--	173.5	8.0	8.0	--	--	--
5	--	0.340	168.	--	--	168.	7.7	7.7	--	243.	243.
6	--	0.2	--	--	191.	191.	7.5	7.5	--	256.	256.
7	--	--	167.4	--	--	167.4	8.2	8.2	232.5	247.2	247.2
8	--	0.24	--	--	173.	173.	8.15	8.15	245.	--	245.
MEAN	.2600	.2600	165.3800	154.6000	182.0000	168.1875	7.9438	7.9438	239.1667	248.7333	246.2400
STD. DEV.	--	.0510	7.2161	--	12.7279	11.8073	.2382	.2382	6.2915	6.6343	6.0653
REL. STD.	--	19.6	4.4	--	7.0	7.0	3.0	3.0	2.6	2.7	2.5
DES. VAL.	--	.220	--	--	--	180.400	--	8.300	--	--	--

LAB	11102 SODIUM AAS F MG/L NA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS D/A MG/L	11107 SODIUM FL PH UF MG/L	11111 NA DISS ICAP MG/L NA	11190 SODIUM COMBINED MG/L	12101 MG DISS CALC+D MG/L	12102 MG FIL AAS DA MG/L	12106 MG DISS AA DA UF MG/L	12107 MG DISS AAS AUTO MG/L	12111 MG DISS ICAP MG/L MG
1	--	99.	--	--	--	99.	--	--	--	--	--
2	--	102.	--	--	--	102.	--	--	--	30.	--
3	--	--	--	98.	--	98.	--	--	29.4	--	--
5	--	101.	--	--	--	101.	31.0	--	--	--	--
6	99.	--	--	--	--	99.	36. R	--	--	--	--
7	--	--	93.3	--	--	93.3	--	32.1	--	--	--
8	--	--	--	--	99.0	99.0	--	--	--	--	31.9
MEAN	99.0000	100.6667	93.3000	98.0000	99.0000	98.7571	31.0000	32.1000	29.4000	30.0000	31.9000
STD. DEV.	--	1.5275	--	--	--	2.7712	--	--	--	--	--
REL. STD.	--	1.5	--	--	--	2.8	--	--	--	--	--
DES. VAL.	--	--	--	--	--	96.100	--	--	--	--	--

LAB	12190 MGNESIUM COMBINED MG/L MG	12303 MG UF AAS AUTO MG/L MG	14102 SILICA R ANSA AA MG/L	14105 SILICA R MOLY AA MG/L	14106 SILICA R MOLY UF MG/L	14190 SILICA COMBINED MG/L	15406 T P UF AA ASC MG/L P	15409 T P BLK AA ASC MG/L P	15413 TOTAL P AA SNCL2 MG/L P	15421 T P BLK DIG ASC MG/L P	15490 TOTAL P COMBINED MG/L
1	31.	31.	0.5 L	--	--	0.5 L	--	--	--	0.044	0.044
2	30.	--	0.5	--	--	0.5	--	--	--	--	--
3	29.4	--	--	--	0.40	0.40	--	--	0.048	--	0.048
4	--	--	--	--	--	--	0.038	--	--	--	0.038
5	31.0	--	--	0.4	--	0.4	--	--	--	--	--
6	36. R	--	--	--	--	--	--	0.05	--	--	0.05
7	32.1	--	--	--	--	--	0.038	--	--	--	0.038
8	31.9	--	--	0.3	--	0.3	--	--	0.053	--	0.053
MEAN	30.9000	31.0000	.5000	.3500	.4000	.4000	.0380	.0500	.0505	.0440	.0452
STD. DEV.	1.0507	--	--	.0707	--	.0816	0.0000	--	.0035	--	.0063
REL. STD.	3.4	--	--	20.2	--	20.4	0.0	--	7.0	--	13.9
DES. VAL.	36.400	--	--	--	--	.195	--	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 5 STUDY NO. 026 DATE: 01/10/84 DISTRIBUTED: 04/09/84

SAMPLE = 5 NATURAL SAMPLE. MAJOR IONS 4 C.

LAB	16304 SO4 DISS AUTO BA MG/L	16306 SO4 DISS AA MTB MG/L	16307 SO4 DISS AAN MBUF MG/L	16309 SO4 DISS I C MG/L SO4	16390 SULFATE COMBINED MG/L SO4	17203 CL DISS AA UF FE MG/L	17204 CL DISS AG TITN MG/L	17205 CL DISS ION EL MG/L	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17290 CHLORIDE COMBINED MG/L
1	--	186.	--	--	186.	70.	--	--	--	--	70.
2	186.	--	--	188.	187.	--	--	62.	--	--	62.
3	--	--	181.5	--	181.5	--	--	--	--	68.8	68.8
5	--	177.5	--	--	177.5	--	--	--	68.5	--	68.5
6	178.	--	--	--	178.	--	74.	--	--	--	74.
7	--	29.6 R	--	--	29.6 R	67.	--	--	--	--	67.
8	--	190.	--	--	190.	--	--	--	69.	--	69.
MEAN	182.0000	184.5000	181.5000	188.0000	183.3333	68.5000	74.0000	62.0000	68.7500	68.8000	68.4714
STD. DEV.	5.6569	6.3836	--	--	5.1153	2.1213	--	--	.3536	--	3.5901
REL. STD.	3.1	3.5	--	--	2.8	3.1	--	--	.5	--	5.2
DES. VAL.	--	--	--	--	187.800	--	--	--	--	--	70.100

LAB	19102 K DISS AAS MG/L K	19103 K DISS F LM PHOT MG/L	19105 K DISS AAS DA MG/L	19107 K DIS UF FLM PHOT MG/L	19190 PTASSIUM COMBINED MG/L	20100 CA DISS CALC+D MG/L CA	20101 CA DISS TIT EDTA MG/L	20103 CA DISS AAS MG/L	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20111 CA DISS ICAP MG/L CA
1	--	7.7	--	--	7.7	--	--	--	--	45.	--
2	--	7.8	--	--	7.8	--	--	--	--	44.	--
3	--	--	--	7.59	7.59	--	--	--	44.2	--	--
5	--	8.2	--	--	8.2	--	46.2	--	--	--	--
6	10.2 R	--	--	--	10.2 R	42.	--	--	--	--	--
7	8.9	--	--	--	8.9	--	--	40.2	--	--	--
8	--	--	7.50	--	7.50	--	--	--	--	--	45.5
MEAN	8.9000	7.9000	7.5000	7.5900	7.9483	42.0000	46.2000	40.2000	44.2000	44.5000	45.5000
STD. DEV.	--	.2646	--	--	.5258	--	--	--	--	.7071	--
REL. STD.	--	3.3	--	--	6.6	--	--	--	--	1.6	--
DES. VAL.	--	--	--	--	7.870	--	--	--	--	--	--

LAB	20190 CALCIUM COMBINED MG/L CA
1	45.
2	44.
3	44.2
5	46.2
6	42.
7	40.2
8	45.5
MEAN	43.8714
STD. DEV.	2.0998
REL. STD.	4.8
DES. VAL.	43.900

DATES RECEIVED 1 84/10/22 2 84/10/04 3 84/10/17 3 84/11/14 4 84/10/30
5 84/12/24 6 84/10/10 6 84/10/19 7 84/11/05 8 84/11/09

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MEMORANDUM **NOTE DE SERVICE**

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SECURITY - CLASSIFICATION - DE SÉCURITÉ	
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YOUR FILE/VOTRE RÉFÉRENCE	
DATE	18 March, 1985

TO / À: Distribution

FROM / DE:
H. Alkema
Quality Assurance and Methods Section
AMD/NWRI, Burlington

SUBJECT / OBJET: Final Summary Report on Prairie Province Water Board QC PPQC Studies 27 and 28 (PP27-28)

I have enclosed the final report for PP27-28.

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

Since there were several changes to the data base for these studies, a computer data printout is enclosed with this report.

Also included with this final report is the complete 1984 data set. This data set conforms with Task Force requirements and is enclosed only for Gary Dunn and laboratory heads. The data format is the same as the final data summaries, and includes data from studies PP 17 - 28.

Harry A.
H. Alkema

enclosure: 1984 Data Set

SUMMARY REPORT

PPQC STUDIES 27 AND 28

for November and December, 1984

TRACE METALS, MAJOR IONS, NUTRIENTS AND PHYSICAL PARAMETERS IN SPIKED SAMPLES

by

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March 1985.

AMD
NWRI
CCIW
Burlington, Ontario

This report summarizes the PPWB interlaboratory quality control studies PP 27 and 28, for the months November and December, 1984. These two studies dealt with trace metals, major ions, nutrients and physical parameters. The levels were mainly low.

Sample Particulars

Two samples were analyzed for trace metals and three for the remaining parameters. The following is a breakdown of the five samples:

PPWB 27 - Sample 1 - 125 ml, D/A * for trace metals (3% HNO_3)
Sample 2 - up to 1L, major ions etc., stored at 4°C

PPWB 28 - Sample 3 - 1L, S/E * for trace metals (0.2% HNO_3)
Sample 4 - up to 1L, major ions, etc., stored at 4°C
Sample 5 - up to 1L, major ions, etc., stored at 4°C

* for definitions see Appendix 1

Data Analysis

Results for routine analyses were recorded by the laboratories on the report sheets provided with the PPWB samples. Submitted results were tabulated for each parameter, first for each method reported, and then for all methods combined. These data, and their resulting statistics are presented in Tables 1-5. Preliminary data summaries were sent (January 9 and February 6, 1985) to the reporting laboratories to provide immediate notification of anomalies. To rectify any errors in compilation of data summaries, the laboratories were given three weeks. The results from one laboratory were received after the due date, but were included as a courtesy.

Performance Indicators

A result which deviates more than 10% from the mean is circled in the data

tables and its value is noted in the comments. 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 2 of the previous report dated February 1, 1985.

Comments on Laboratory Performance

A high coefficient of variation (incomparability) was observed for Cd by DA.

Individual laboratory deviations are listed below:

Lab 1 - a low result for Fe by SE, -30%.

Lab 2 - a high result for Si, +12%; and +15% (R); DOC, +14%; and TP, (R) at Detection Limit (DL).
- a low result for Ni by SE, -30% (R).

Lab 3 - a low result for Mo by DA, -61% (R); and Pb by DA, -17%;
- a high result for Alk, +11%; Cu by SE, +18%.
- high results for SO_4, +12% (R); and +160% (coloured water)

Lab 4 - no anomalies

Lab 5 - a low result for DOC, -50%; and NO_3+NO_2, -13%;
- a high result for F, +35% (R)

Lab 6 - a low result for Mn by DA, -13%; Fe by SE, -30%; Cr by SE,-42%; and Pb by SE, -55%
- a high result for Al by SE, +32%, and Mn by SE, +74% (R)
- high results for TKN at the DL, +100% and +39%
- high results for Hardness, +21%, and +400% (R)
- a high result for DOC, -60% (R); NO_3+NO_2, +400% (R)
- erratic results for Na, +260% (R), +90% (R), and +40%
- erratic results for Mg, +210% (R), +19% (R), and 1000% (R)
- a high results for SO_4, +300% (R); Cl, +240% (R); and

(R) = rejectable by Grubb's procedure for statistical calculation

NH_3, +18%

- erratic results for Ca, -38% (R), +74% (R), and -17%
- a low result for pH, -11% (R)
- high results for TP at the DL, +200% (R), 80% (R)
- a high ionic balance indicating gross errors
- a high detection limit for Alkalinity, SO_4 and K.

Lab 7 - a high result for Turb, 200% (R); and SO_4, +120% (coloured water)

Lab 8 - a high result for Al by DA, +12 %; Cr by SE, +52%
- a low result for Zn by DA, -21%; Mo by SE, -30%; Cu by DA, -36%; and Pb by SE, -45%
- a high result for Turb., +100%; and DOC, +400% near the DL, and +30%
- a high detection limit for TKN, NH_3 and Al by SE.

PPWB laboratories average number of deviations per sample is 2.3

(R) = rejectable by Grubb's procedure for statistical calculation

Appendix I

Definitions of Types of Metals Analysis

1. D/A - Direct Aspiration

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

2. S/E - Code for low level analysis.

Analysis is presently 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 followed by ICAP.
4. Graphite tube (flameless) AAS.

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 1

STUDY NO. 027 DATE: 01/11/84 DISTRIBUTED: 29/10/84

SAMPLE = 1 SPIKED SAMPLE.

TRACE METALS D/A.

LAB	13302 AL EXTBL AAS DA MG/L	13311 AL EXTBL ICAP DA MG/L	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP D/A MG/L V	23011 V TOTAL 5X ICAP UG/L V	23301 V EXTRBL AAS DA MG/L	23311 V EXTBL ICAP DA MG/L	23999 VANADIUM COMBINED MG/L V	24004 CR TOTAL AAS G F MG/L	24009 CR TOTAL ICAP DA MG/L CR	24011 CR TOTAL 5X ICAP UG/L CR
1	--	--	--	0.457	--	--	--	0.457	--	0.058	--
2	0.55	--	0.55	--	--	--	--	--	--	--	--
3	0.50	0.54	0.50	--	--	0.50	0.53	0.50	--	--	--
6	--	--	0.49	--	0.47	--	--	0.47	--	--	0.051
8	0.6	--	0.6 *	--	--	--	--	--	0.062	--	--
MEAN	.5500	.5400	.5350	.4570	.4700	.5000	.5300	.4757	.0620	.0580	.0510
STD. DEV.	.0500	--	.0507	--	--	--	--	.0221	--	--	--
REL. STD.	9.1	--	9.5	--	--	--	--	4.6	--	--	--
DES. VAL.	--	--	.540	--	--	--	--	.522	--	--	--

LAB	24302 CR EXTBL AAS DA MG/L	24311 CR EXTBL ICAP DA MG/L	24999 CHROMIUM COMBINED MG/L CR	25003 MN TOTAL ICAP DA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25111 MN DISS ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25311 MN EXTBL ICAP DA MG/L	25999 MANGNESE COMBINED MG/L MN	26011 FE TOTAL 5X ICAP UG/L FE	26111 FE DISS ICAP UG/L FE
1	--	--	0.058	0.045	--	--	--	--	0.045	--	--
2	--	--	--	--	--	--	0.04	--	0.04	--	--
3	0.05	0.060	0.05	--	--	--	0.05	0.049	0.05	--	--
6	--	--	0.051	--	0.037	--	--	--	0.037 *	0.24	--
8	--	--	0.062	--	--	0.04	--	--	0.04	--	0.24
MEAN	.0500	.0600	.0553	.0450	.0370	.0400	.0450	.0490	.0424	.2400	.2400
STD. DEV.	--	--	.0057	--	--	--	.0071	--	.0051	--	--
REL. STD.	--	--	10.4	--	--	--	15.7	--	12.1	--	--
DES. VAL.	--	--	.057	--	--	--	--	--	.046	--	--

LAB	26304 FE EXTBL AAS DA MG/L	26311 FE EXTBL ICAP DA MG/L	26999 IRON COMBINED MG/L FE	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO	27301 CO EXTBL AAS DA MG/L	27311 CO EXTBL ICAP DA MG/L	27999 COBALT COMBINED MG/L CO	28009 NI TOTAL ICAP DA MG/L NI	28011 NI TOTAL 5X ICAP UG/L NI	28101 NI DISS AAS DA MG/L
1	0.24	--	0.24	0.218	--	--	--	0.218	0.249	--	--
2	0.27	--	0.27	--	--	--	--	--	--	--	--
3	0.25	0.26	0.25	--	--	0.25	0.24	0.25	--	--	--
6	--	--	0.24	--	0.21	--	--	0.21	--	0.27	--
8	--	--	0.24	--	--	0.26	--	0.26	--	--	0.28
MEAN	.2533	.2600	.2480	.2180	.2100	.2550	.2400	.2345	.2490	.2700	.2800
STD. DEV.	.0153	--	.0130	--	--	.0071	--	.0242	--	--	--
REL. STD.	6.0	--	5.3	--	--	2.8	--	10.3	--	--	--
DES. VAL.	--	--	.252	--	--	--	--	.238	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 1

STUDY NO. 027 DATE: 01/11/84 DISTRIBUTED: 29/10/84

SAMPLE = 1 SPIKED SAMPLE.

TRACE METALS D/A.

LAB	28301 NI EXTBL AAS DA MG/L	28311 NI EXTBL ICAP DA MG/L	28999 NICKEL COMBINED MG/L NI	29009 CU TOTAL ICAP MG/L CU	29011 CU TOTAL 5X ICAP UG/L CU	29111 CU DISS ICAP UG/L CU	29306 CU EXTBL AAS DA MG/L	29311 CU EXTBL ICAP DA MG/L	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN	30011 ZN TOTAL 5X ICAP UG/L ZN
1	--	--	0.249	0.040	--	--	--	--	0.040	0.055	--
2	0.29	--	0.29	--	--	--	0.06	--	0.06	--	--
3	0.29	0.29	0.29	--	--	--	0.06	0.055	0.06	--	--
6	--	--	0.27	--	0.044	--	--	--	0.044	--	0.049
8	--	--	0.28	--	--	0.03	--	--	0.03 *	--	--
MEAN	.2900	.2900	.2758	.0400	.0440	.0300	.0600	.0550	.0468	.0550	.0490
STD. DEV.	0.0000	--	.0171	--	--	--	0.0000	--	.0131	--	--
REL. STD.	0.0	--	6.2	--	--	--	0.0	--	28.0	--	--
DES. VAL.	--	--	.274	--	--	--	--	--	.048	--	--

LAB	30111 ZN DISS ICAP UG/L ZN	30304 ZN EXTBL AAS DA MG/L	30311 ZN EXTBL ICAP DA MG/L	30999 ZINC COMBINED MG/L ZN	38301 SR EXTBL AAS DA MG/L	38311 SR EXTBL ICAP DA MG/L	38999 STRNTIUM COMBINED MG/L SR	42009 MO TOTAL ICAP MG/L MO	42011 MO TOTAL 5X ICAP UG/L MO	42301 MO EXTBL AAS DA MG/L	42311 MO EXTBL ICAP DA MG/L
1	--	--	--	0.055	--	--	--	0.862	--	--	--
2	--	0.06	--	0.06	--	--	--	--	--	--	--
3	--	0.05	0.058	0.05	0.20	0.18	0.20	--	--	0.35 R	0.97
6	--	--	--	0.049	--	--	--	--	0.84	--	--
8	0.04	--	--	0.04 *	--	--	--	--	--	--	--
MEAN	.0400	.0550	.0580	.0508	.2000	.1800	.2000	.8620	.8400	--	.9700
STD. DEV.	--	.0071	--	.0075	--	--	--	--	--	--	--
REL. STD.	--	12.9	--	14.7	--	--	--	--	--	--	--
DES. VAL.	--	--	--	.059	--	--	.175	--	--	--	--

LAB	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD	48011 CD TOTAL 5X ICAP UG/L CD	48301 CD EXTBL AAS DA MG/L	48311 CD EXTBL ICAP DA MG/L	48999 CADMIUM COMBINED MG/L CD	56011 BA TOTAL 5X ICAP UG/L BA	56301 BA EXTBL AAS DA MG/L	56311 BA EXTBL ICAP DA MG/L	56999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB
1	0.862	0.041	--	--	--	0.041	--	--	--	--	--
2	--	--	--	0.04	--	0.04	--	--	--	--	--
3	0.35 R	--	--	0.05	0.043	0.05 *	--	0.50	0.48	0.50	--
6	0.84	--	0.036	--	--	0.036 *	0.44	--	--	0.44	0.28
8	--	--	--	0.05	--	0.05 *	--	--	--	--	--
MEAN	.8907	.0410	.0360	.0467	.0430	.0434	.4400	.5000	.4800	.4700	.2800
STD. DEV.	.0696	--	--	.0058	--	.0063	--	--	--	.0424	--
REL. STD.	7.8	--	--	12.4	--	14.5	--	--	--	9.0	--
DES. VAL.	1.045	--	--	--	--	.043	--	--	--	.504	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 1 STUDY NO. 027 DATE: 01/11/84 DISTRIBUTED: 29/10/84

SAMPLE = 1 SPIKED SAMPLE.

TRACE METALS D/A.

LAB	82301 PB EXTBL AAS DA MG/L	82302 PB EXTBL AAS SE MG/L	82311 PB EXTBL ICAP DA MG/L	82999 LEAD COMBINED MG/L PB
1	--	0.291	--	0.291
2	0.30	--	--	0.30
3	0.25	--	0.29	0.25 *
6	--	--	--	0.28
8	0.28	--	--	0.28
MEAN	.2767	.2910	.2900	.2802
STD. DEV.	.0252	--	--	.0188
REL. STD.	9.1	--	--	6.7
DES. VAL.	--	--	--	.295

TABLE 2
SAMPLE = 2 MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR A REL UNIT	02021 COLOUR V IS COMP REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLMTRIC NTU	02190 COLOUR COMBINED REL UNIT	02290 CONDUCT COMBINED USIE/CM	02390 TURBIDTY COMBINED JTU/NTU
1	-0.99	1.00	1.02	--	--	95.	--	--	--	95.	--
2	1.74	.932	.900	5. L	--	94.	0.1	--	5. L	94.	0.1
3	-0.85	0.969	0.986	--	--	96.3	--	--	--	96.3	--
4	--	--	--	--	5.	93.5	0.5	--	5.	93.5	0.5
5	1.91	0.967	0.931	5.	--	96.2	0.06	--	5.	96.2	0.06
6	4.0	1.3	1.2	--	--	90.	--	0.30	--	90.	0.30
7	-1.8	0.88	0.91	--	--	89.6	0.3	--	--	89.6	0.3
8	0.567	0.958	0.947	5. L	--	89.2	--	0.70	5. L	89.2	0.71 *
MEAN	.6539	1.0009	.9849	5.0000	5.0000	92.9750	.2400	.5000	5.0000	92.9750	.3267
STD. DEV.	2.0391	.1371	.1038	--	--	2.9611	.2026	.2828	0.0000	2.9611	.2422
REL. STD.	311.9	13.7	10.5	--	--	3.2	84.4	56.6	0.0	3.2	74.1
DES. VAL.	--	--	--	--	--	--	--	--	3.825	93.833	.234

LAB	05105 BORON AA CARM MG/L	05106 BORON F AUTO AN MG/L B	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 DOC UV CO2 EV MG/L C	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06290 D O C COMBINED MG/L	06490 D I C COMBINED MG/L
1	--	--	--	--	--	0.8	--	--	10.4	0.8	10.4
2	--	--	--	--	--	1.4	--	--	--	1.4	--
3	--	--	--	--	1.8	--	--	9.7	--	1.8	9.7
4	0.04	--	0.04	--	1.1	--	--	9.1	--	1.1	9.1
5	--	--	--	0.58 L	--	--	11.	--	--	0.58 L	11.
6	--	0.05 L	0.05 L	6.5 R	--	--	7.5	--	--	6.5 R	7.5
MEAN	.0400	--	.0400	--	1.4500	1.1000	9.2500	9.4000	10.4000	1.2750	9.5400
STD. DEV.	--	--	--	--	.4950	.4243	2.4749	.4243	--	.4272	1.3465
REL. STD.	--	--	--	--	34.1	38.6	26.8	4.5	--	33.5	14.1
DES. VAL.	--	--	.055	--	--	--	--	--	--	2.000	9.718

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 2

STUDY NO. 027 DATE: 01/11/84 DISTRIBUTED: 29/10/84

SAMPLE = 2 NATURAL SAMPLE.

MAJOR IONS 4 C.

LAB	07010 TKN AUTAN MG/L N	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG AA 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3+NO2 F AA HYD MG/L N	07110 NO3+NO2 AA2 CD MG/L N	07111 NO3+NO2 DIS SPEC MG/L N	07112 NO3+NO2 UF AA CD MG/L	07190 NITRATE COMBINED MG/L	07505 TOT NH3 AA BERT MG/L N
1	--	--	--	0.070	0.070	--	--	0.290	--	0.290	--
2	--	--	--	--	--	--	0.30	--	--	0.30	--
3	0.052	--	--	--	0.052	--	--	--	0.284	0.284	0.01 L
4	--	--	--	--	--	--	0.31	--	--	0.31	--
5	--	--	0.2	--	0.2 *	0.30	0.248	--	--	0.248 *	--
6	--	--	--	--	--	--	--	--	--	0.30	--
7	--	0.20 L	--	--	0.20 L (HDL)	--	0.28	--	0.26	0.26	--
8	--	--	--	--	--	--	--	--	--	0.28	--
MEAN	.0520	--	.2000	.0700	.1073	.3000	.2845	.2900	.2720	.2840	--
STD. DEV.	--	--	--	--	.0808	--	.0273	--	.0170	.0211	--
REL. STD.	--	--	--	--	75.2	--	9.6	--	6.2	7.4	--
DES. VAL.	--	--	--	--	.161	--	--	--	--	.308	--

LAB	07506 TOT NH3 SPEC EL MG/L N	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07601 TOTAL N AA UV MG/L	07602 TOTAL N CALC+D MG/L N	07651 TOT N F UV AA MG/L	07652 TOT N F UV H2O2 MG/L	07690 TOTAL N COMBINED MG/L	09103 FLUORIDE DIS COLR MG/L F
1	--	--	--	0.013	0.013	--	--	--	--	--	--
2	--	--	--	--	--	0.33	--	--	--	--	--
3	--	--	--	--	0.005 L	--	--	--	--	--	--
4	0.1 L	--	--	--	0.1 L (HDL)	--	--	--	--	--	--
5	--	--	0.004	--	0.004	--	--	--	0.32	--	--
6	--	--	0.01	--	0.01	--	--	0.325	--	--	--
8	--	0.20 L	--	--	0.20 L (HDL)	--	0.48 L	--	--	0.48 L	0.1 L
MEAN	--	--	.0070	.0130	.0090	.3300	--	.3250	.3200	--	--
STD. DEV.	--	--	.0042	--	.0046	--	--	--	--	--	--
REL. STD.	--	--	60.6	--	50.9	--	--	--	--	--	--
DES. VAL.	--	--	--	--	.019	--	--	--	--	.343	--

LAB	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L	09107 FLUOR F AUTO POT MG/L F	09108 F DISS SPEC EL MG/L	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR+N MG/L CAC	10106 ALKLINTY IR CO2 MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10111 ALKLINTY TITROPRO MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC	10301 PH UNITS
1	--	--	0.05 L	--	0.05 L	43.	--	--	--	43.	7.6
2	0.05 L	--	--	--	0.05 L	39.1	--	--	--	39.1	7.8
3	--	--	--	0.35	0.35	--	46.2	--	40.1	46.2 *	7.4
4	--	--	--	--	--	40.6	--	--	--	40.6	7.6
5	--	0.05 L	--	--	0.05 L	40.9	--	--	--	40.9	7.5
6	--	--	--	--	0.1 L	--	--	42.	--	42.	6.7
7	--	--	--	--	--	39.8	--	--	--	39.8	7.1
8	0.1 L	--	--	--	0.1 L	--	--	41.6	--	41.6	7.75
MEAN	--	--	--	.3500	.3500	40.6800	46.2000	41.8000	40.1000	41.6500	7.4313
STD. DEV.	--	--	--	--	--	1.4755	--	.2828	--	2.2117	.3674
REL. STD.	--	--	--	--	--	3.6	--	.7	--	5.3	4.9
DES. VAL.	--	--	--	--	.060	--	--	--	--	41.111	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 2

STUDY NO. 027 DATE: 01/11/84 DISTRIBUTED: 29/10/84

SAMPLE = 2 NATURAL SAMPLE.

MAJOR IONS 4 C.

LAB	10390 PH COMBINED UNITS	10602 HARDNESS CALC+D MG/L	10603 HARDNESS TITR+M MG/L	10690 HARDNESS COMBINED MG/L	11102 SODIUM AAS F MG/L NA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS D/A MG/L	11107 SODIUM FL PH UF MG/L	11111 NA DISS ICAP MG/L NA	11190 SODIUM COMBINED MG/L	12101 MG DISS CALC+D MG/L
1	7.6	45.	--	45.	--	2. *	--	--	--	2.	--
2	7.8	--	--	--	--	1.3 *	--	--	--	1.3	--
3	7.4	--	--	--	--	--	--	1.27	--	1.27	--
4	7.6	--	--	--	--	--	--	--	--	--	--
5	7.5	--	45.3	45.3	--	1.2 *	--	--	--	1.2	2.8
6	6.7	--	56.	56. *	5. R	--	--	--	--	5. R	8.7 R
7	7.1	40.9 -	45.3	40.9	--	--	1.21	--	--	1.21	--
8	7.75	44.6	--	44.6	--	--	--	--	1.25	1.25	--
MEAN	7.4313	43.5000	48.8667	46.3600	--	1.5000	1.2100	1.2700	1.2500	1.3717	2.8000
STD. DEV.	.3674	2.2605	6.1776	5.6748	--	.4359	--	--	--	.3101	--
REL. STD.	4.9	5.2	12.6	12.2	--	29.1	--	--	--	22.6	--
DES. VAL.	7.706	--	--	44.065	--	--	--	--	--	1.271	--

LAB	12102 MG FIL AAS DA MG/L	12106 MG DISS AA DA UF MG/L	12107 MG DISS AAS AUTO MG/L	12111 MG DISS ICAP MG/L MG	12190 MGNESIUM COMBINED MG/L MG	12303 MG UF AAS AUTO MG/L MG	14102 SILICA R ANSA AA MG/L	14105 SILICA R MOLY AA MG/L	14106 SILICA R MOLY UF MG/L	14190 SILICA COMBINED MG/L	15406 T P UF AA ASC MG/L P
1	--	--	--	--	3.	3.	2.4	--	--	2.4	--
2	--	--	2.6	--	2.6	--	2.8	--	--	2.8 *	--
3	--	3.0	--	--	3.0	--	--	--	2.33	2.33	--
4	--	--	--	--	--	--	--	--	--	--	0.003L
5	--	--	--	--	2.8	--	--	2.5	--	2.5	--
6	--	--	--	--	8.7 R	--	--	--	--	--	--
7	2.65	--	--	--	2.65	--	--	--	--	--	0.003
8	--	--	--	2.95	2.95	--	--	2.5	--	2.5	--
MEAN	2.6500	3.0000	2.6000	2.9500	2.8333	3.0000	2.6000	2.5000	2.3300	2.5060	.0030
STD. DEV.	--	--	--	--	.1700	--	.2828	0.0000	--	.1794	--
REL. STD.	--	--	--	--	6.3	--	10.9	0.0	--	7.2	--
DES. VAL.	--	--	--	--	2.745	--	--	--	--	1.374	--

LAB	15409 T P BLK AA ASC MG/L P	15413 TOTAL P AA SNCL2 MG/L P	15421 T P BLK DIG ASC MG/L P	15490 TOTAL P COMBINED MG/L	16302 SO4 DISS TURB EA MG/L SO4	16304 SO4 DISS AUTO BA MG/L	16306 SO4 DISS AA MTB MG/L	16307 SO4 DISS AAN MBUF MG/L	16309 SO4 DISS I C MG/L SO4	16390 SULFATE COMBINED MG/L SO4	17203 CL DISS AA UF FE MG/L
1	--	--	0.006L	0.006L	--	--	5. L	--	--	5. L	1. L
2	--	0.001	--	0.001	--	3.2	--	--	3.1	3.1	--
3	--	--	--	--	--	--	--	3.8	--	3.8	--
4	--	--	--	0.003L	--	--	--	--	--	--	--
5	--	--	--	--	--	--	3.0 -	--	--	3.0	--
6	0.01 L	--	--	0.01 L	13. R	--	--	--	--	13. R	--
7	--	--	--	0.003	--	--	3.2	--	--	3.2	1.2
8	--	0.002	--	0.002	--	--	3.2	--	--	3.2	--
MEAN	--	.0015	--	.0020	--	3.2000	3.1333	3.8000	3.1000	3.2600	1.2000
STD. DEV.	--	.0007	--	.0010	--	--	.1155	--	--	.3130	--
REL. STD.	--	47.1	--	50.0	--	--	3.7	--	--	9.6	--
DES. VAL.	--	--	--	.006	--	--	--	--	--	3.325	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 2

STUDY NO. 027 DATE: 01/11/84 DISTRIBUTED: 29/10/84

SAMPLE = 2 NATURAL SAMPLE.

MAJOR IONS 4 C.

LAB	17204 CL DISS AG TITN MG/L	17205 CL DISS ION EL MG/L	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17290 CHLORIDE COMBINED MG/L	19102 K DISS AAS MG/L K	19103 K DISS F LM PHOT MG/L	19107 K DIS UF FLM PHOT MG/L	19111 K DISS ICAP MG/L K	19190 PTASSIUM COMBINED MG/L	20100 CA DISS CALC+D MG/L CA
1	--	--	--	--	1. L	--	0.5	--	--	0.5	--
2	--	1.0	--	--	1.0	--	0.50	--	--	0.50	--
3	--	--	--	1.37	1.37	--	--	0.52	--	0.52	--
5	--	--	1.2	--	1.2	--	0.4	--	--	0.4	--
6	4. R	--	--	--	4. R	1. L	--	--	--	1. L	8.0 R
7	--	--	--	--	1.2	0.49	--	--	--	0.49	--
8	--	--	2.0 L	--	2.0 L	--	--	--	0.49	0.49	--
MEAN	--	1.0000	1.2000	1.3700	1.1925	.4900	.4667	.5200	.4900	.4833	--
STD. DEV.	--	--	--	--	.1513	--	.0577	--	--	.0423	--
REL. STD.	--	--	--	--	12.7	--	12.4	--	--	8.7	--
DES. VAL.	--	--	--	--	1.245	--	--	--	--	.432	--

LAB	20101 CA DISS TIT EDTA MG/L	20103 CA DISS AAS MG/L	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20111 CA DISS ICAP MG/L CA	20190 CALCIUM COMBINED MG/L CA
1	--	--	--	13.	--	13.
2	--	--	--	13.	--	13.
3	--	--	13.1	--	--	13.1
5	13.6	--	--	--	--	13.6
6	--	--	--	--	--	8.0 R
7	--	12.0	--	--	--	12.0
8	--	--	--	--	13.0	13.0
MEAN	13.6000	12.0000	13.1000	13.0000	13.0000	12.9500
STD. DEV.	--	--	--	0.0000	--	.5206
REL. STD.	--	--	--	0.0	--	4.0
DES. VAL.	--	--	--	--	--	12.387

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 3

STUDY NO. 028 DATE: 01/12/84 DISTRIBUTED: 29/10/84

SAMPLE = 3 SPIKED SAMPLE.

TRACE METALS S/E.

LAB	13302 AL EXTBL AAS DA MG/L	13305 AL EXTBL AAS SE MG/L AL	13306 AL UFAAS SE OX/EP MG/L AL	13311 AL EXTBL ICAP DA MG/L	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP D/A MG/L V	23011 V TOTAL 5X ICAP UG/L V	23302 V EXTRBL SE PH1.6 MG/L	23311 V EXTBL ICAP DA MG/L	23999 VANADIUM COMBINED MG/L V	24004 CR TOTAL AAS G F MG/L
1	--	--	0.030	--	0.030	0.011	--	--	--	0.011	--
2	--	0.03	--	--	0.03	--	--	--	--	--	--
3	--	0.014	--	0.042	0.042	--	--	0.011	0.012	0.012	--
6	--	--	--	--	0.05	--	0.01	--	--	0.01	--
8	0.2 L	--	--	--	0.2 L (HDL)	--	--	--	--	--	0.021
MEAN	--	.0220	.0300	.0420	.0380	.0110	.0100	.0110	.0120	.0110	.0210
STD. DEV.	--	.0113	--	--	.0098	--	--	--	--	.0010	--
REL. STD.	--	51.4	--	--	25.8	--	--	--	--	9.1	--
DES. VAL.	--	--	--	--	.038	--	--	--	--	.011	--

LAB	24009 CR TOTAL ICAP DA MG/L CR	24011 CR TOTAL 5X ICAP UG/L CR	24303 CR EXTBL AAS SE MG/L	24311 CR EXTBL ICAP DA MG/L	24999 CHROMIUM COMBINED MG/L CR	25003 MN TOTAL ICAP DA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25111 MN DISS ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25311 MN EXTBL ICAP DA MG/L	25999 MANGNESE COMBINED MG/L MN
1	0.013	--	--	--	0.013	0.012	--	--	--	--	0.012
2	--	--	--	--	--	--	--	--	0.01	--	0.01
3	--	--	0.010	0.013	0.013	--	--	--	0.02 L	0.013	0.013
6	--	0.008	--	--	0.008 *	--	0.011	--	--	--	0.011
8	--	--	--	--	0.021 *	--	--	0.02 R	--	--	0.02 R
MEAN	.0130	.0080	.0100	.0130	.0138	.0120	.0110	--	.0160	.0130	.0115
STD. DEV.	--	--	--	--	.0054	--	--	--	--	--	.0013
REL. STD.	--	--	--	--	39.1	--	--	--	--	--	11.2
DES. VAL.	--	--	--	--	.013	--	--	--	--	--	.012

LAB	26011 FE TOTAL 5X ICAP UG/L FE	26111 FE DISS ICAP UG/L FE	26304 FE EXTBL AAS DA MG/L	26305 FE EXTBL AAS SE MG/L	26311 FE EXTBL ICAP DA MG/L	26999 IRON COMBINED MG/L FE	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO	27301 CO EXTBL AAS DA MG/L	27302 CO EXTBL AAS SE MG/L	27311 CO EXTBL ICAP DA MG/L
1	--	--	0.02 L	--	--	0.02 L	0.010	--	--	--	--
2	--	--	--	0.025	--	0.025	--	--	--	--	--
3	--	--	--	0.021	0.029	0.029	--	--	--	0.011	0.011
6	0.033	--	--	--	--	0.033	--	0.009	--	--	--
8	--	0.02 L	--	--	--	0.02 L	--	--	0.013	--	--
MEAN	.0330	--	--	.0230	.0290	.0290	.0100	.0090	.0130	.0110	.0110
STD. DEV.	--	--	--	.0028	--	.0040	--	--	--	--	--
REL. STD.	--	--	--	12.3	--	13.8	--	--	--	--	--
DES. VAL.	--	--	--	--	--	.030	--	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 3

STUDY NO. 028 DATE: 01/12/84 DISTRIBUTED: 29/10/84

SAMPLE = 3 SPIKED SAMPLE.

TRACE METALS S/E.

LAB	27999 COBALT COMBINED MG/L CO	28009 NI TOTAL ICAP DA MG/L NI	28011 NI TOTAL 5X ICAP UG/L NI	28302 NI EXTBL AAS SE MG/L	28309 NI EXTR AAS G F MG/L NI	28311 NI EXTBL ICAP DA MG/L	28999 NICKEL COMBINED MG/L NI	29009 CU TOTAL ICAP MG/L CU	29011 CU TOTAL 5X ICAP UG/L CU	29305 CU EXTBL AAS SE MG/L	29308 CU EXTBL AAS G F MG/L
1	0.010	0.013	--	--	--	--	0.013	0.012	--	--	--
2	--	--	--	0.009R	--	--	0.009R	--	--	0.013	--
3	0.011	--	--	0.013	--	0.013	0.013	--	--	0.013	--
6	0.009	--	0.012	--	--	--	0.012	--	0.014	--	--
8	0.013	--	--	--	0.014	--	0.014	--	--	--	0.013
MEAN	.0108	.0130	.0120	.0130	.0140	.0130	.0130	.0120	.0140	.0130	.0130
STD. DEV.	.0017	--	--	--	--	--	.0008	--	--	0.0000	--
REL. STD.	15.9	--	--	--	--	--	6.3	--	--	0.0	--
DES. VAL.	.011	--	--	--	--	--	.013	--	--	--	--

LAB	29311 CU EXTBL ICAP DA MG/L	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN	30011 ZN TOTAL 5X ICAP UG/L ZN	30111 ZN DISS ICAP UG/L ZN	30304 ZN EXTBL AAS DA MG/L	30305 ZN EXTBL AAS SE MG/L	30311 ZN EXTBL ICAP DA MG/L	30999 ZINC COMBINED MG/L ZN	38301 SR EXTBL AAS DA MG/L	38311 SR EXTBL ICAP DA MG/L
1	--	0.012	0.014	--	--	--	--	--	0.014	--	--
2	--	0.013	--	--	--	0.013	--	--	0.013	--	--
3	0.016	0.016 *	--	--	--	--	0.015	0.013	0.013	0.20	0.18
6	--	0.014	--	0.014	--	--	--	--	0.014	--	--
8	--	0.013	--	--	0.01 L	--	--	--	0.01 L (MDL?)	--	--
MEAN	.0160	.0136	.0140	.0140	--	.0130	.0150	.0130	.0135	.2000	.1800
STD. DEV.	--	.0015	--	--	--	--	--	--	.0006	--	--
REL. STD.	--	11.2	--	--	--	--	--	--	4.3	--	--
DES. VAL.	--	.012	--	--	--	--	--	--	.014	--	--

LAB	38999 STRNTIUM COMBINED MG/L SR	42009 MO TOTAL ICAP MG/L MO	42011 MO TOTAL 5X ICAP UG/L MO	42302 MO EXTBL AAS SE MG/L	42311 MO EXTBL ICAP DA MG/L	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD	48011 CD TOTAL 5X ICAP UG/L CD	48302 CD EXTBL AAS SE MG/L	48309 CD EXTBL AAS G F MG/L CD	48311 CD EXTBL ICAP DA MG/L
1	--	0.012	--	--	--	0.012	0.012	--	--	--	--
2	--	--	--	--	--	--	--	--	0.011	--	--
3	0.18	--	--	0.012	0.014	0.014	--	--	0.011	--	0.011
6	--	--	0.011	--	--	0.011 *	--	0.010	--	--	--
8	--	--	--	--	--	--	--	--	--	0.010	--
MEAN	.1800	.0120	.0110	.0120	.0140	.0123	.0120	.0100	.0110	.0100	.0110
STD. DEV.	--	--	--	--	--	.0015	--	--	0.0000	--	--
REL. STD.	--	--	--	--	--	12.4	--	--	0.0	--	--
DES. VAL.	.189	--	--	--	--	.016	--	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 3

STUDY NO. 028 DATE: 01/12/84 DISTRIBUTED: 29/10/84

SAMPLE = 3 SPIKED SAMPLE.

TRACE METALS S/E.

LAB	48999 CADMIUM COMBINED MG/L CD	56011 BA TOTAL 5X ICAP UG/L BA	56301 BA EXTBL AAS DA MG/L	56311 BA EXTBL ICAP DA MG/L	56999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB	82302 PB EXTBL AAS SE MG/L	82305 PB EXTBL AAS G F MG/L	82311 PB EXTBL ICAP DA MG/L	82999 LEAD COMBINED MG/L PB
1	0.012	--	--	--	--	--	0.012	--	--	0.012
2	0.011	--	--	--	--	--	0.011	--	--	0.011
3	0.011	--	0.1 L	0.024	0.024	--	0.011	--	0.011	0.011
6	0.010	0.042	--	--	0.042 *	0.005	--	--	--	0.005 *
8	0.010	--	--	--	--	--	--	0.006	--	0.006 *
MEAN	.0108	.0420	--	.0240	.0330	.0050	.0113	.0060	.0110	.0090
STD. DEV.	.0008	--	--	--	.0127	--	.0006	--	--	.0032
REL. STD.	7.7	--	--	--	38.6	--	5.1	--	--	36.0
DES. VAL.	.011	--	--	--	.027	--	--	--	--	.011

TABLE 4.

SAMPLE = 4 MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR A REL UNIT	02021 COLOUR V IS COMP REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLNTRIC NTU	02190 COLOUR COMBINED REL UNIT	02290 CONDUCT COMBINED USIE/CM	02390 TURBIDTY COMBINED JTU/NTU
1	4.62	6.23	5.68	--	--	612.	--	--	--	612.	--
2	2.60	5.871	5.577	5. L	--	610.	0.5	--	5. L	610.	0.5
3	-1.31	5.877	6.033	--	--	618.	--	--	--	618.	--
4	--	--	--	--	5.	586.	0.25	--	5.	586.	0.25
5	2.65	6.07	5.76	5.	--	592.	0.08	--	5.	592.	0.08
6	5.0	6.3	5.7	--	--	566.	--	0.15	--	566.	0.15
7	0.5	5.75	5.69	4.	--	549.	0.2	--	4.	549.	0.2
8	3.38	5.98	5.59	5. L	--	613.	--	0.40	5. L	613.	0.40
MEAN	2.4914	6.0111	5.7186	4.5000	5.0000	593.2500	.2575	.2750	4.6667	593.2500	.2633
STD. DEV.	2.2386	.2007	.1526	.7071	--	25.0414	.1767	.1768	.5774	25.0414	.1583
REL. STD.	89.9	3.3	2.7	15.7	--	4.2	68.6	64.3	12.4	4.2	60.1
DES. VAL.	--	--	--	--	--	--	--	--	5.833	608.910	.225

LAB	05105 BORON AA CARM MG/L	05106 BORON F AUTO AN MG/L B	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 DOC UV CO2 EV MG/L C	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06290 D O C COMBINED MG/L	06490 D I C COMBINED MG/L
1	--	--	--	--	--	21.2 *	--	--	17.4	21.2	17.4
2	--	--	--	--	--	26. *	--	--	--	26. *	--
3	--	--	--	--	20.2	--	--	17.8	--	20.2	17.8
4	0.13	--	0.13	--	20.	--	--	16.	--	20.	16.
5	--	--	--	20. *	--	--	19.	--	--	20.	19.
6	--	0.05 L	0.05 L	30.0 *	--	--	16.0	--	--	30.0 *	16.0
MEAN	.1300	--	.1300	25.0000	20.1000	23.6000	17.5000	16.9000	17.4000	22.9000	17.2400
STD. DEV.	--	--	--	7.0711	.1414	3.3941	2.1213	1.2728	--	4.1718	1.2759
REL. STD.	--	--	--	28.3	.7	14.4	12.1	7.5	--	18.2	7.4
DES. VAL.	--	--	.093	--	--	--	--	--	--	20.838	20.144

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 4

STUDY NO. 028 DATE: 01/12/84 DISTRIBUTED: 29/10/84

SAMPLE = 4 SPIKED SAMPLE.

MAJOR IONS 4 C.

LAB	07010 TKN AUTAN MG/L N	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG AA 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3+NO2 F AA HYD MG/L N	07110 NO3+NO2 AA2 CD MG/L N	07111 NO3+NO2 DIS SPEC MG/L N	07112 NO3+NO2 UF AA CD MG/L	07190 NITRATE COMBINED MG/L	07505 TOT NH3 AA BERT MG/L N
1	--	--	--	0.800	0.800	--	--	1.98	--	1.98	--
2	--	--	--	--	--	--	2.1	--	--	2.1	--
3	0.668	--	--	--	0.668	--	--	--	2.061	2.061	0.042
4	--	--	--	--	--	--	2.1	--	--	2.1	--
5	--	--	--	--	--	--	2.00	--	--	2.00	--
6	--	--	0.9	--	0.9	1.83	--	--	--	1.83	--
7	--	--	--	--	--	--	--	--	1.85	1.85	--
8	--	0.85	--	--	0.85	--	2.15	--	--	2.15	--
MEAN	.6680	.8500	.9000	.8000	.8045	1.8300	2.0875	1.9800	1.9555	2.0089	.0420
STD. DEV.	--	--	--	--	.0997	--	.0629	--	.1492	.1180	--
REL. STD.	--	--	--	--	12.4	--	3.0	--	7.6	5.9	--
DES. VAL.	--	--	--	--	.912	--	--	--	--	2.043	--

LAB	07506 TOT NH3 SPEC EL MG/L N	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07601 TOTAL N AA UV MG/L	07602 TOTAL N CALC+D MG/L N	07651 TOT N F UV AA MG/L	07652 TOT N F UV H2O2 MG/L	07690 TOTAL N COMBINED MG/L	09103 FLUORIDE DIS COLR MG/L F
1	--	--	--	0.051	0.051	--	--	--	--	--	--
2	--	--	--	--	--	2.4	--	--	--	--	--
3	--	--	--	--	0.042	--	--	--	--	--	--
4	0.1 L	--	--	--	0.1 L (MDL)	--	--	--	--	--	--
5	--	--	0.048	--	0.048	--	--	--	2.2	--	--
6	--	--	0.06	--	0.06	--	--	2.40	--	--	--
7	--	0.05	--	--	0.05	--	--	--	--	--	1.1
8	--	--	--	--	--	--	3.00	--	--	3.00	--
MEAN	--	.0500	.0540	.0510	.0502	2.4000	3.0000	2.4000	2.2000	3.0000	1.1000
STD. DEV.	--	--	.0085	--	.0065	--	--	--	--	--	--
REL. STD.	--	--	15.7	--	12.9	--	--	--	--	--	--
DES. VAL.	--	--	--	--	.045	--	--	--	--	2.506	--

LAB	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L	09107 FLUCR F AUTO POT MG/L F	09108 F DISS SPEC EL MG/L	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR+N MG/L CAC	10106 ALKLINTY IR CO2 MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10111 ALKLINTY TITROPRO MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC	10301 PH UNITS
1	--	--	1.10	--	1.10	81.	--	--	--	81.	7.7
2	1.14	--	--	--	1.14	76.3	--	--	--	76.3	7.7
3	--	--	--	1.10	1.10	--	78.2	--	77.8	78.2	7.6
4	--	--	--	--	--	77.1	--	--	--	77.1	7.6
5	--	1.59 R	--	--	1.59 R	78.6	--	--	--	78.6	7.85
6	--	--	--	--	1.1	--	--	81.	--	81.	6.8 R
7	--	--	--	--	--	75.3	--	--	--	75.3	7.5
8	1.07	--	--	--	1.07	--	--	78.4	--	78.4	7.70
MEAN	1.1050	--	1.1000	1.1000	1.1020	77.6600	78.2000	79.7000	77.8000	78.2375	7.6643
STD. DEV.	.0495	--	--	--	.0249	2.2233	--	1.8385	--	2.0389	.1107
REL. STD.	4.5	--	--	--	2.3	2.9	--	2.3	--	2.6	1.4
DES. VAL.	--	--	--	--	1.132	--	--	--	--	78.013	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 4 STUDY NO. 028 DATE: 01/12/84 DISTRIBUTED: 29/10/84

SAMPLE = 4 SPIKED SAMPLE.

MAJOR IONS 4 C.

LAB	10390 PH COMBINED UNITS	10602 HARDNESS CALC+D MG/L	10603 HARDNESS TITR+N MG/L	10690 HARDNESS COMBINED MG/L	11102 SODIUM AAS F MG/L NA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS D/A MG/L	11107 SODIUM FL PH UF MG/L	11111 NA DISS ICAP MG/L NA	11190 SODIUM COMBINED MG/L	12101 MG DISS CALC+D MG/L
1	7.7	204.	--	204.	--	40.	--	--	--	40.	--
2	7.7	--	--	--	--	39.0	--	--	--	39.0	--
3	7.6	--	--	--	--	--	--	37.8	--	37.8	--
4	7.6	--	--	--	--	--	--	--	--	--	--
5	7.85	--	200.	200.	--	38.0	--	--	--	38.0	32.1
6	6.8 R	--	204.	204.	42.	--	--	--	--	42.	37. R
7	7.5	181.9	201.6	201.6	--	--	38.4	--	--	38.4	--
8	7.70	197.	--	197.	--	--	--	--	38.7	38.7	--
MEAN	7.6643	194.3000	201.8667	201.3200	42.0000	39.0000	38.4000	37.8000	38.7000	39.1286	32.1000
STD. DEV.	.1107	11.2947	2.0133	2.9516	--	1.0000	--	--	--	1.4591	--
REL. STD.	1.4	5.8	1.0	1.5	--	2.6	--	--	--	3.7	--
DES. VAL.	7.663	--	--	198.724	--	--	--	--	--	37.385	--

LAB	12102 MG FIL AAS DA MG/L	12106 MG DISS AA DA UF MG/L	12107 MG DISS AAS AUTO MG/L	12111 MG DISS ICAP MG/L MG	12190 MGNESIUM COMBINED MG/L MG	12303 MG UF AAS AUTO MG/L MG	14102 SILICA R ANSA AA MG/L	14105 SILICA R MOLY AA MG/L	14106 SILICA R MOLY UF MG/L	14190 SILICA COMBINED MG/L	15406 T P UF AA ASC MG/L P
1	--	--	--	--	32.	32.	1.1	--	--	1.1	--
2	--	--	30.	--	30.	--	1.2	--	--	1.2	--
3	--	30.7	--	--	30.7	--	--	--	1.08	1.08	--
4	--	--	--	--	--	--	--	--	--	--	0.003L
5	--	--	--	--	32.1	--	--	1.1	--	1.1	--
6	--	--	--	--	37. R	--	--	--	--	--	--
7	30.0	--	--	--	30.0	--	--	--	--	--	0.001L
8	--	--	--	32.0	32.0	--	--	1.2	--	1.2	--
MEAN	30.0000	30.7000	30.0000	32.0000	31.1333	32.0000	1.1500	1.1500	1.0800	1.1360	--
STD. DEV.	--	--	--	--	1.0191	--	.0707	.0707	--	.0590	--
REL. STD.	--	--	--	--	3.3	--	6.1	6.1	--	5.2	--
DES. VAL.	--	--	--	--	31.448	--	--	--	--	1.117	--

LAB	15409 T P BLK AA ASC MG/L P	15413 TOTAL P AA SNCL2 MG/L P	15421 T P BLK DIG ASC MG/L P	15490 TOTAL P COMBINED MG/L	16304 SO4 DISS AUTO BA MG/L	16306 SO4 DISS AA MTB MG/L	16307 SO4 DISS AAN MBUF MG/L	16309 SO4 DISS I C MG/L SO4	16390 SULFATE COMBINED MG/L SO4	17203 CL DISS AA UF FE MG/L	17204 CL DISS AG TITN MG/L
1	--	--	0.006L	0.006L	--	108.	--	--	108.	57.	--
2	--	0.020R	--	0.020R (HCL?)	110.	--	126.3R	115.	115.	--	--
3	--	--	--	--	--	--	--	--	126.3R	--	--
4	--	--	--	0.003L	--	113.	--	--	--	--	--
5	--	--	--	--	--	--	--	--	113.	--	58.
6	0.01 R	--	--	0.01 R (HCL?)	113.	115.0	--	--	113.	58.7	--
7	--	--	--	0.001L	--	110.	--	--	115.0	--	--
8	--	0.001	--	0.001	--	--	--	--	110.	--	--
MEAN	--	.0010	--	.0010	111.5000	111.5000	--	115.0000	112.3333	57.8500	58.0000
STD. DEV.	--	--	--	--	2.1213	3.1091	--	--	2.8048	1.2021	--
REL. STD.	--	--	--	--	1.9	2.8	--	--	2.5	2.1	--
DES. VAL.	--	--	--	.003	--	--	--	--	111.212	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 4 STUDY NO. 028 DATE: 01/12/84 DISTRIBUTED: 29/10/84

SAMPLE = 4 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	17205 CL DISS ION EL MG/L	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17290 CHLORIDE COMBINED MG/L	19102 K DISS AAS MG/L K	19103 K DISS F LM PHOT MG/L	19107 K DIS UF FLM PHOT MG/L	19111 K DISS ICAP MG/L K	19190 PTASSIUM COMBINED MG/L	20100 CA DISS CALC*D MG/L CA	20101 CA DISS TIT EDTA MG/L
1	--	--	--	57.	--	16.0	--	--	16.0	--	--
2	55.	--	--	55.	--	16.	--	--	16.	--	--
3	--	--	59.54	59.54	--	--	16.1	--	16.1	--	--
5	--	57.	--	57.	--	16.5	--	--	16.5	--	27.2
6	--	--	--	58.	16.	--	--	--	16.	21.	--
7	--	--	--	58.7	17.2	--	--	--	17.2	--	--
8	--	56.	--	56.	--	--	--	14.5	14.5	--	--
MEAN	55.0000	56.5000	59.5400	57.3200	16.6000	16.1667	16.1000	14.5000	16.0429	21.0000	27.2000
STD. DEV.	--	.7071	--	1.5612	.8485	.2887	--	--	.8101	--	--
REL. STD.	--	1.3	--	2.7	5.1	1.8	--	--	5.0	--	--
DES. VAL.	--	--	--	57.093	--	--	--	--	15.944	--	--

LAB	20103 CA DISS AAS MG/L	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20111 CA DISS ICAP MG/L CA	20190 CALCIUM COMBINED MG/L CA
1	--	--	29.	--	29.
2	--	--	26.	--	26.
3	--	25.9	--	--	25.9
5	--	--	--	--	27.2
6	--	--	--	--	21. *
7	23.4	--	--	--	23.4
8	--	--	--	26.0	26.0
MEAN	23.4000	25.9000	27.5000	26.0000	25.5000
STD. DEV.	--	--	2.1213	--	2.5968
REL. STD.	--	--	7.7	--	10.2
DES. VAL.	--	--	--	--	26.537

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 5.

STUDY NO. 028 DATE: 01/12/84 DISTRIBUTED: 29/10/84

SAMPLE = 5 NATURAL SAMPLE.

MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR A REL UNIT	02021 COLOUR V IS COMP REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLMTRIC NTU	02190 COLOUR COMBINED REL UNIT	02290 CONDUCT COMBINED USIE/CM	02390 TURBIDTY COMBINED JTU/NTU
1	2.5	0.41	0.39	--	--	37.	--	--	--	37.	--
2	0.80	0.326	0.321	140.	--	36.	0.5	--	140.	36.	0.5
3	-11.5	0.361	0.455	--	--	37.2	--	--	--	37.2	--
4	--	--	--	--	100. G	35.4	0.6	--	100. G	35.4	0.6
5	1.87	0.318	0.306	200.	--	37.3	0.23	--	200.	37.3	0.23
6	57.0	1.1	0.3	--	--	36.	--	0.29	--	36.	0.29
7	-2.6	0.32	0.34	169.	--	36.1	1.4 R	--	169.	36.1	1.4 R
8	9.39	0.399	0.330	50. G	--	37.4	--	0.50	50. G	37.4	0.50
MEAN	8.2086	.4620	.3489	169.6667	--	36.5500	.4433	.3950	169.6667	36.5500	.4240
STD. DEV.	22.4162	.2838	.0554	30.0056	--	.7597	.1914	.1485	30.0056	.7597	.1566
REL. STD.	273.1	61.4	15.9	17.7	--	2.1	43.2	37.6	17.7	2.1	36.9
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

LAB	05105 BORON AA CARM MG/L	05106 BORON F AUTO AN MG/L B	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 DOC UV CO2 EV MG/L C	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06290 D O C COMBINED MG/L	06490 D I C COMBINED MG/L
1	--	--	--	--	--	11.0	--	--	1.0 L	11.0	1.0 L
2	--	--	--	--	--	12.	--	--	--	12.	--
3	--	--	--	--	11.0	--	--	0.1 *	--	11.0	0.1
4	0.26	--	0.26	--	4.9 R	--	--	0.5 *	--	4.9 R	0.5
5	--	--	--	15.	--	--	0.22	--	--	15.	0.22
6	--	0.15	0.15	13.0	--	--	1.0 L	--	--	13.0	1.0 L
MEAN	.2600	.1500	.2050	14.0000	11.0000	11.5000	.2200	.3000	--	12.4000	.2733
STD. DEV.	--	--	.0778	1.4142	--	.7071	--	.2828	--	1.6733	.2053
REL. STD.	--	--	37.9	10.1	--	6.1	--	94.3	--	13.5	75.1
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

LAB	07010 TKN AUTAN MG/L N	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG AA 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3+NO2 F AA HYD MG/L N	07110 NO3+NO2 AA2 CD MG/L N	07111 NO3+NO2 DIS SPEC MG/L N	07112 NO3+NO2 UF AA CD MG/L	07190 NITRATE COMBINED MG/L	07505 TOT HN3 AA BERT MG/L N
1	--	--	--	0.370	0.370	--	--	0.025	--	0.025	--
2	--	--	--	--	--	--	0.01 L	--	--	0.01 L	--
3	0.284	--	--	--	0.284	--	--	--	0.01 L	0.01 L	0.01 L
4	--	--	--	--	--	--	0.02 *	--	--	0.02	--
5	--	--	--	--	--	--	0.014 *	--	--	0.014	--
6	--	--	0.5	--	0.5 *	0.10 R	--	--	--	0.10 R	--
7	--	--	--	--	--	--	--	--	0.01 L	0.01 L	--
8	--	0.30	--	--	0.30	--	0.02 *	--	--	0.02	--
MEAN	.2840	.3000	.5000	.3700	.3635	--	.0180	.0250	--	.0198	--
STD. DEV.	--	--	--	--	.0984	--	.0035	--	--	.0045	--
REL. STD.	--	--	--	--	27.1	--	19.2	--	--	22.8	--
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 5.

STUDY NO. 028 DATE: 01/12/84 DISTRIBUTED: 29/10/84

SAMPLE = 5 NATURAL SAMPLE.

MAJOR IONS 4 C.

LAB	07506 TOT NH3 SPEC EL MG/L N	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07601 TOTAL N AA UV MG/L	07602 TOTAL N CALC+D MG/L N	07651 TOT N F UV AA MG/L	07652 TOT N F UV H2O2 MG/L	07690 TOTAL N COMBINED MG/L	09103 FLUORIDE DIS COLR MG/L F
1	--	--	--	0.014	0.014	--	--	--	--	--	--
2	--	--	--	--	--	0.10	--	--	--	--	--
3	--	--	--	--	0.005 L	--	--	--	--	--	--
4	0.1 L	--	--	--	0.1 L (HDL)	--	--	--	--	--	--
5	--	--	0.009	--	0.009	--	--	--	0.21	--	--
6	--	--	0.02	--	0.02	--	--	0.215	--	--	--
8	--	0.02	--	--	0.02	--	0.32	--	--	--	0.1 L
MEAN	--	.0200	.0145	.0140	.0158	.1000	.3200	.2150	.2100	.3200	--
STD. DEV.	--	--	.0078	--	.0053	--	--	--	--	--	--
REL. STD.	--	--	53.6	--	33.7	--	--	--	--	--	--
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

LAB	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L	09107 FLUOR F AUTO POT MG/L F	09108 F DISS SPEC EL MG/L	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR+N MG/L CAC	10106 ALKLINTY IR CO2 MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10111 ALKLINTY TITROPRO MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC	10301 PH UNITS
1	--	--	0.05 L	--	0.05 L	5.	--	--	--	5.	6.2
2	0.05 L	--	--	--	0.05 L	3.5	--	--	--	3.5	6.4
3	--	--	--	0.029	0.029	--	3.8	--	3.40	3.40	6.0
4	--	--	--	--	--	2.9	--	--	--	2.9	6.2
5	--	0.05	--	--	0.05	2.94	--	--	--	2.94	6.15
6	--	--	--	--	0.1 L	--	--	20. L	--	20. L(HDL)	6.2
7	--	--	--	--	--	2.6	--	--	--	2.6	6.0
8	0.1 L	--	--	--	0.1 L	--	--	4.60	--	4.60	6.40
MEAN	--	.0500	--	.0290	.0395	3.3880	3.8000	4.6000	3.4000	3.5629	6.1938
STD. DEV.	--	--	--	--	.0148	.9580	--	--	--	.9061	.1522
REL. STD.	--	--	--	--	37.6	28.3	--	--	--	25.4	2.5
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

LAB	10390 PH COMBINED UNITS	10602 HARDNESS CALC+D MG/L	10603 HARDNESS TITR+N MG/L	10690 HARDNESS COMBINED MG/L	11102 SODIUM AAS F MG/L NA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS D/A MG/L	11107 SODIUM FL PH UF MG/L	11111 NA DISS ICAP MG/L NA	11190 SODIUM COMBINED MG/L	12101 MG DISS CALC+D MG/L
1	6.2	9.	--	9.	--	5.	--	--	--	5.	--
2	6.4	--	--	--	--	4.1	--	--	--	4.1	--
3	6.0	--	--	--	--	--	--	4.22	--	4.22	--
4	6.2	--	--	--	--	--	--	--	--	--	--
5	6.15	6.96	--	6.96	--	4.0	--	--	--	4.0	--
6	6.2	--	40. R	40. R	8. R	--	--	--	--	8. R	7.8 R
7	6.0	7.0	7.5	7.0	--	--	4.0	--	--	4.0	--
8	6.40	7.73	--	7.73	--	--	--	--	4.15	4.15	--
MEAN	6.1938	7.6725	7.5000	7.6725	--	4.3667	4.0000	4.2200	4.1500	4.2450	--
STD. DEV.	.1522	.9531	--	.9531	--	.5508	--	--	--	.3797	--
REL. STD.	2.5	12.4	--	12.4	--	12.6	--	--	--	8.9	--
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 5.

STUDY NO. 028 DATE: 01/12/84 DISTRIBUTED: 29/10/84

SAMPLE = 5 NATURAL SAMPLE.

MAJOR IONS 4 C.

LAB	12102 MG FIL AAS DA MG/L	12106 MG DISS AA DA UF MG/L	12107 MG DISS AAS AUTO MG/L	12111 MG DISS ICAP MG/L MG	12190 MGNESIUM COMBINED MG/L MG	12303 MG UF AAS AUTO MG/L MG	14102 SILICA R ANSA AA MG/L	14105 SILICA R MOLY AA MG/L	14106 SILICA R MOLY UF MG/L	14190 SILICA COMBINED MG/L	15406 T P UF AA ASC MG/L P
1	--	--	--	--	1. L	1. L	2.3	--	--	2.3	--
2	--	--	0.67	--	0.67	--	2.8 R	--	--	2.8 R	--
3	--	0.84	--	--	0.84	--	--	--	2.25	2.25	--
4	--	--	--	--	--	--	--	--	--	--	0.01
5	0.54	--	--	--	0.54	--	--	2.4	--	2.4	--
6	--	--	--	--	7.8 R	--	--	--	--	--	--
7	0.68	--	--	--	0.68	--	--	--	--	--	0.013
8	--	--	--	0.79	0.79	--	--	2.4	--	2.4	--
MEAN	.6100	.8400	.6700	.7900	.7040	--	2.3000	2.4000	2.2500	2.3375	.0115
STD. DEV.	.0990	--	--	--	.1167	--	--	0.0000	--	.0750	.0021
REL. STD.	16.2	--	--	--	16.6	--	--	0.0	--	3.2	18.4
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

LAB	15409 T P BLK AA ASC MG/L P	15413 TOTAL P AA SNCL2 MG/L P	15421 T P BLK DIG ASC MG/L P	15490 TOTAL P COMBINED MG/L	16304 SO4 DISS AUTO PA MG/L	16306 SO4 DISS AA MT8 MG/L	16307 SO4 DISS AAN MBUF MG/L	16309 SO4 DISS I C MG/L SO4	16390 SULFATE COMBINED MG/L SO4	17203 CL DISS AA UF FE MG/L	17204 CL DISS AG TITN MG/L
1	--	--	0.010	0.010	--	5. L	--	--	5. L	6.	--
2	--	0.010	--	0.010	5.0	--	--	3.4	3.4	--	--
3	--	--	--	--	--	--	7.3	--	7.3 *	--	--
4	--	--	--	0.01	--	--	--	--	--	--	--
5	--	--	--	--	--	3.7 *	--	--	3.7	--	--
6	0.02 R	--	--	0.02 R	20. L	--	--	--	20. L(HDL)	--	8.
7	--	--	--	0.013	--	6.2 *	--	--	6.2 *	5.6	--
8	--	0.012	--	0.012	--	4.6	--	--	4.6	--	--
MEAN	--	.0110	.0100	.0110	5.0000	4.8333	7.3000	3.4000	5.0400	5.8000	8.0000
STD. DEV.	--	.0014	--	.0014	--	1.2662	--	--	1.6682	.2828	--
REL. STD.	--	12.9	--	12.9	--	26.2	--	--	33.1	4.9	--
DES. VAL.	--	--	--	--	--	--	--	--	2.7	--	--

LAB	17205 CL DISS ION EL MG/L	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17290 CHLORIDE COMBINED MG/L	19102 K DISS AAS MG/L K	19103 K DISS F LM PHOT MG/L	19107 K DIS UF FLM PHOT MG/L	19111 K DISS ICAP MG/L K	19190 PTASSIUM COMBINED MG/L	20100 CA DISS CALC+D MG/L CA	20103 CA DISS AAS MG/L
1	--	--	--	6.	--	0.3	--	--	0.3	--	--
2	5.1	--	--	5.1	--	0.30	--	--	0.30	--	--
3	--	--	6.65	6.65	--	--	0.38	--	0.38	--	--
4	--	5.9	--	5.9	--	0.2	--	--	0.2	--	1.9
5	--	--	--	8.	1. L	--	--	--	1. L	3.2 R	--
6	--	--	--	5.6	0.25	--	--	--	0.25	--	1.7
7	--	5.0	--	5.0	--	--	--	5.00 L	5.00 L(HDL)	--	--
8	--										
MEAN	5.1000	5.4500	6.6500	6.0357	.2500	.2667	.3800	--	.2860	--	1.8000
STD. DEV.	--	.6364	--	1.0323	--	.0577	--	--	.0669	--	.1414
REL. STD.	--	11.7	--	17.1	--	21.7	--	--	23.4	--	7.9
DES. VAL.	--	--	--	5.1	--	--	--	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 5

STUDY NO. 028 DATE: 01/12/84 DISTRIBUTED: 29/10/84

SAMPLE = 5 NATURAL SAMPLE.

MAJOR IONS 4 C.

LAB	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20111 CA DISS ICAP MG/L CA	20190 CALCIUM COMBINED MG/L CA
1	--	2.	--	2.
2	--	1.7	--	1.7
3	1.97	--	--	1.97
5	--	--	--	1.9
6	--	--	--	3.2 R
7	--	--	--	1.7
8	--	--	1.79	1.79
MEAN	1.9700	1.8500	1.7900	1.8433
STD. DEV.	--	.2121	--	.1325
REL. STD.	--	11.5	--	7.2
DES. VAL.	--	--	--	--

DATES RECEIVED 1 84/11/28 2 84/12/13 3 84/11/29 3 85/02/01 4 84/12/27
5 85/02/25 6 84/12/20 6 85/01/28 7 85/01/29 8 85/01/22

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MEMORANDUM **NOTE DE SERVICE**

H. ALKEMA/IWD-NWRI/4645/ha

SECURITY - CLASSIFICATION - DE SÉCURITÉ	
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YOUR FILE/VOTRE RÉFÉRENCE	
DATE	17 April 1985

TO / À: Distribution

FROM / DE: H. Alkema
Quality Assurance and Methods Section
AMD/NWRI, Burlington

SUBJECT / OBJET: Final Summary Report on Prairie Provinces Water Board Quality Control (PPQC) PPQC Studies 29 and 30

I have enclosed the final report for PP 29-30.

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

Since there were several changes to the data base for these studies, a computer data printout is enclosed with this report.

Harry A.

H. Alkema

SUMMARY REPORT

PPQC STUDIES 29 AND 30

for January and February, 1985

TRACE METALS, MAJOR IONS, NUTRIENTS AND PHYSICAL PARAMETERS IN SPIKED SAMPLES

by

H. Alkema

April 1985

AMD
NWRI
CCIW
Burlington, Ontario

This report summarizes the PPWB interlaboratory quality control studies PP 29 and 30, for the months January and February, 1985. These two studies dealt with trace metals, major ions, nutrients and physical parameters. The levels were mainly high.

Sample Particulars

Two samples were analyzed for trace metals and three for the remaining parameters. The following is a breakdown of the five samples:

PPWB 29 - Sample 1 - 125 ml, D/A * for trace metals (3% HNO_3)
Sample 2 - up to 1L, major ions etc., stored at 4°C

PPWB 30 - Sample 3 - 1L, S/E * for trace metals (0.2% HNO_3)
Sample 4 - up to 1L, major ions, etc., stored at 4°C
Sample 5 - 125 ml, D/A for trace metals (0.2% HNO_3)

* for definitions see Appendix 1

Data Analysis

Results for routine analyses were recorded by the laboratories on the report sheets provided with the PPWB samples. Submitted results were tabulated for each parameter, first for each method reported, and then for all methods combined. These data, and their resulting statistics are presented in Tables 1-5. Preliminary data summaries were sent (March 15, and March 22, 1985) to the reporting laboratories to provide immediate notification of anomalies. To rectify any errors in compilation of data summaries, the laboratories were given three weeks. The results from one laboratory were received after the due date, but were included as a courtesy.

Performance Indicators

A result which deviates more than 10% from the mean is circled in the data

tables and its value is noted in the comments. 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 2 of a previous report dated February 1, 1985.

Comments on Laboratory Performance

A high coefficient of variation (incomparability) was observed for NH_3 and Turbidity. In general, there was a good improvement over the previous study.

Individual laboratory deviations are listed below:

Lab 1
- a low result for Mo by DA, -15%; and DOC, -33% and -70%
- a high result for Al, +53%

Lab 2
- a high result for Cr by DA, +17%
- and biased high for Si, +16% (one R)

Lab 3
- a low result for Si, -26%
- a high result for Al by SE, +25%

Lab 4
- low results for DOC, -27% and -41%
- biased results for DIC, +100% (two R's)
- a high detection limit (HDL) for NH_3.

Lab 5
- no anomalies

Lab 6
- a high result for Ni by SE, +22%; and Pb by DA, +13%
- high results for Total P, (two R's)
- biased results for K, +50%, (two R's)
- a high result for TKN, +75% , possible HDL

(R) = rejectable by Grubb's procedure for statistical calculation

- erratic results for Mg, -32%, (R), and +12%
- a low result for Na, -32%, (R)

Lab 7
- high results for Total P (two R's)
- a high result for NO_3-NO_2, +15%
- a high result for Ca, +16%; and Turb, +150%

Lab 8
- a high result for Pb by DA, +53%; and by SE, +32%, (R)
- a high result for Mn by SE, +10%; and Co by SE, 19%
- erratic results for K, +16%, -19%, (R)
- a high result for colour, +200%, (R)

- an HDL for TKN, F, and Al by SE.

PPWB laboratories average number of deviations per sample was 1.4

Appendix I

Definitions of Types of Metals Analysis

1. D/A - Direct Aspiration

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

2. S/E - Code for low level analysis.

Analysis is presently 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 followed by ICAP.
4. Graphite tube (flameless) AAS.

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 1

STUDY NO. 029 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 1 SPIKED SAMPLE. TRACE METALS D/A.

LAB	13302 AL EXTBL AAS DA MG/L	13306 AL UFAAS SE OX/EP MG/L AL	13311 AL EXTBL ICAP DA MG/L	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP CA MG/L V	23011 V TOTAL 5X ICAP UG/L V	23301 V EXTRBL AAS DA MG/L	23311 V EXTBL ICAP DA MG/L	23999 VANADIUM COMBINED MG/L V	24004 CR TOTAL AAS G F MG/L	24009 CR TOTAL ICAP DA MG/L CR
1	--	3.080	--	3.080	2.050	--	--	--	2.050	--	0.278
2	2.6	--	--	2.6	--	--	--	--	--	--	--
3	2.8	--	2.8	2.8	--	--	2.2	2.3	2.2	--	--
6	--	--	--	2.8	--	2.3	--	--	2.3	--	--
8	2.8	--	--	2.8	--	--	--	--	--	0.32	--
MEAN	2.7333	3.0800	2.8000	2.8160	2.0500	2.3000	2.2000	2.3000	2.1833	.3200	.2780
STD. DEV.	.1155	--	--	.1711	--	--	--	--	.1258	--	--
REL. STD.	4.2	--	--	6.1	--	--	--	--	5.8	--	--
DES. VAL.	--	--	--	2.658	--	--	--	--	2.382	--	--

LAB	24011 CR TOTAL 5X ICAP UG/L CR	24302 CR EXTBL AAS DA MG/L	24311 CR EXTBL ICAP DA MG/L	24999 CHROMIUM COMBINED MG/L CR	25003 MN TOTAL ICAP CA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25311 MN EXTBL ICAP DA MG/L	25999 MANGNESE COMBINED MG/L MN	26011 FE TOTAL 5X ICAP UG/L FE	26304 FE EXTBL AAS DA MG/L
1	--	--	--	0.278	0.233	--	--	--	0.233 *	--	1.15
2	--	0.35	--	0.35 *	--	--	0.27	--	0.27	--	1.1
3	--	0.30	0.33	0.30	--	--	0.28	0.28	0.28	--	1.1
6	0.29	--	--	0.29	--	0.30	--	--	0.30 *	1.1	--
8	--	--	--	0.32	--	--	--	0.26	0.26	--	--
MEAN	.2900	.3250	.3300	.3076	.2330	.3000	.2750	.2700	.2666	1.1000	1.1167
STD. DEV.	--	.0354	--	.0283	--	--	.0071	.0141	.0248	--	.0289
REL. STD.	--	10.9	--	9.2	--	--	2.6	5.2	9.2	--	2.6
DES. VAL.	--	--	--	.297	--	--	--	--	.261	--	--

LAB	26311 FE EXTBL ICAP DA MG/L	26999 IRON COMBINED MG/L FE	27003 CO TOTAL AAS G F MG/L	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO	27301 CO EXTBL AAS DA MG/L	27311 CO EXTBL ICAP DA MG/L	27999 COBALT COMBINED MG/L CO	28009 NI TOTAL ICAP DA MG/L NI	28011 NI TOTAL 5X ICAP UG/L NI	28301 NI EXTBL AAS DA MG/L
1	--	1.15	--	0.974	--	--	--	0.974	1.100	--	--
2	--	1.1	--	--	--	--	--	--	--	--	1.2
3	1.2	1.1	--	--	--	1.1	1.1	1.1	--	--	1.3
6	--	1.1	--	--	1.0	--	--	1.0	--	1.2	--
8	1.07	1.07	1.11	--	--	--	--	1.11	--	--	--
MEAN	1.1350	1.1040	1.1100	.9740	1.0000	1.1000	1.1000	1.0460	1.1000	1.2000	1.2500
STD. DEV.	.0919	.0288	--	--	--	--	--	.0691	--	--	.0707
REL. STD.	8.1	2.6	--	--	--	--	--	6.6	--	--	5.7
DES. VAL.	--	1.092	--	--	--	--	--	1.076	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 1 (cont'd) STUDY NO. 029 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 1 SPIKED SAMPLE. TRACE METALS D/A.

LAB	28307 NI EXTBL AAS G.F.	28311 NI EXTBL ICAP DA MG/L	28999 NICKEL COMBINED MG/L NI	29009 CU TOTAL ICAP MG/L CU	29011 CU TOTAL 5X ICAP UG/L CU	29306 CU EXTBL AAS DA MG/L	29311 CU EXTBL ICAP DA MG/L	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN	30011 ZN TOTAL 5X ICAP UG/L ZN	30304 ZN EXTBL AAS DA MG/L
1	--	--	1.100	0.260	--	--	--	0.260	0.300	--	--
2	--	--	1.2	--	--	0.30	--	0.30	--	--	0.32
3	--	1.4	1.3	--	--	0.30	0.21	0.30	--	--	0.32
6	--	--	1.2	--	0.30	--	--	0.30	--	0.31	--
8	1.22	--	1.22	--	--	--	0.28	0.28	--	--	--
MEAN	1.2200	1.4000	1.2040	.2600	.3000	.3000	.2450	.2880	.3000	.3100	.3200
STD. DEV.	--	--	.0713	--	--	0.0000	.0495	.0179	--	--	0.0000
REL. STD.	--	--	5.9	--	--	0.0	20.2	6.2	--	--	0.0
DES. VAL.	--	--	1.235	--	--	--	--	.290	--	--	--

LAB	30311 ZN EXTBL ICAP DA MG/L	30999 ZINC COMBINED MG/L ZN	38301 SR EXTBL AAS DA MG/L	38311 SR EXTBL ICAP DA MG/L	38999 STRNTIUM COMBINED MG/L SR	42009 MO TOTAL ICAP MG/L MO	42011 MO TOTAL 5X ICAP UG/L MO	42301 MO EXTBL AAS DA MG/L	42311 MO EXTBL ICAP DA MG/L	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD
1	--	0.300	--	--	--	3.960	--	--	--	3.960	0.230
2	--	0.32	--	--	--	--	--	--	--	--	--
3	0.35	0.32	0.50	0.54	0.50	--	--	1.3	4.7	4.7	--
6	--	0.31	--	--	--	--	4.5	--	--	4.5	--
8	0.31	0.31	--	--	--	--	--	--	--	--	--
MEAN	.3300	.3120	.5000	.5400	.5000	3.9600	4.5000	1.3000	4.7000	4.3867	.2300
STD. DEV.	.0283	.0084	--	--	--	--	--	--	--	.3828	--
REL. STD.	8.6	2.7	--	--	--	--	--	--	--	8.7	--
DES. VAL.	--	.313	--	--	.482	--	--	--	--	4.815	--

LAB	48011 CD TOTAL 5X ICAP UG/L CD	48301 CD EXTBL AAS DA MG/L	48311 CD EXTBL ICAP DA MG/L	48999 CADMIUM COMBINED MG/L CD	56011 BA TOTAL 5X ICAP UG/L BA	56301 BA EXTBL AAS DA MG/L	56311 BA EXTBL ICAP DA MG/L	56999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB	82301 PB EXTBL AAS DA MG/L	82302 PB EXTBL AAS SE MG/L
1	--	--	--	0.230	--	--	--	--	--	--	1.480
2	--	0.24	--	0.24	--	--	--	--	--	1.3	--
3	--	0.25	0.25	0.25	--	2.7	2.5	2.7	--	1.3	--
6	0.22	--	--	0.22	2.5	--	--	2.5	1.4	--	--
8	--	0.24	--	0.24	--	--	--	--	--	--	--
MEAN	.2200	.2433	.2500	.2360	2.5000	2.7000	2.5000	2.6000	1.4000	1.3000	1.4800
STD. DEV.	--	.0058	--	.0114	--	--	--	.1414	--	0.0000	--
REL. STD.	--	2.4	--	4.8	--	--	--	5.4	--	0.0	--
DES. VAL.	--	--	--	.239	--	--	--	2.550	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 1 (end) STUDY NO. 029 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 1 SPIKED SAMPLE. TRACE METALS D/A.

LAB	82311 PB EXTBL ICAP DA MG/L	82999 LEAD COMBINED MG/L PB
1	--	1.480
2	--	1.3
3	1.4	1.3
6	--	1.4
8	2.1 R	2.1 R
MEAN	1.4000	1.3700
STD. DEV.	--	.0872
REL. STD.	--	6.4
DES. VAL.	--	1.330

TABLE 2:

SAMPLE = 2 MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR A REL UNIT	02021 COLOUR V IS COMP REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLMTRIC NTU	02190 COLOUR COMBINED REL UNIT	02290 CONDUCT COMBINED USIE/CM	02390 TURBIDTY COMBINED JTU/NTU
1	6.17 *	2.13	2.41	--	--	234.	--	--	--	234.	--
2	1.128 *	2.251	2.200	5. L	--	231.	0.2	--	5. L	231.	0.2
3	0.93 *	2.247	2.289	--	--	234.	--	--	--	234.	--
4	--	--	--	--	5. L	228.	0.21	--	5. L	228.	0.21
5	1.75 *	2.27	2.19	5.	--	214.	0.15	--	5.	214.	0.15
6	6.7 *	2.1	2.4	--	--	232.	--	0.11	--	232.	0.11
7	6.9 *	2.55 *	2.22	7.	--	225.	0.36	--	7.	225.	0.36
8	1.83 *	2.40	2.32	5.	--	232.	--	0.95 R	5.	232.	0.95 R
MEAN	3.6297	2.2783	2.2899	5.6667	--	228.7500	.2300	.1100	5.6667	228.7500	.2060
STD. DEV.	2.7956	.1550	.0917	1.1547	--	6.6922	.0906	--	1.1547	6.6922	.0950
REL. STD.	77.0	6.8	4.0	20.4	--	2.9	39.4	--	20.4	2.9	46.1
DES. VAL.	--	--	--	--	--	--	--	--	5.353	227.570	.273

LAB	05105 BORON AA CARM MG/L	05106 BORON F AUTO AN MG/L B	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 COC UV CO2 EV MG/L C	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06290 D O C COMBINED MG/L	06490 D I C COMBINED MG/L
1	--	--	--	--	--	1.0	--	--	19.4	1.0 *	19.4
2	--	--	--	--	--	1.6	--	--	--	1.6	--
3	--	--	--	--	1.5	--	--	19.9	--	1.5	19.9
4	0.03	--	0.03	--	1.1	--	--	38. R	--	1.1 *	38. R
5	--	--	--	1.9	--	--	20.	--	--	1.9	20.
8	--	0.05 L	0.05 L	2.0	--	--	18.0	--	--	2.0	18.0
MEAN	.0300	--	.0300	1.9500	1.3000	1.3000	19.0000	19.9000	19.4000	1.5167	19.3250
STD. DEV.	--	--	--	.0707	.2828	.4243	1.4142	--	--	.4070	.9215
REL. STD.	--	--	--	3.6	21.8	32.6	7.4	--	--	26.8	4.8
DES. VAL.	--	--	.058	--	--	--	--	--	--	1.430	19.444

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 2 (cont'd) STUDY NO. 029 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 2 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	07010 TKN AUTAN MG/L N	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG AA 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3+NO2 F AA HYD MG/L N	07110 NO3+NO2 AA2 CD MG/L N	07111 NO3+NO2 CIS SPEC MG/L N	07112 NO3+NO2 UF AA CD MG/L	07190 NITRATE COMBINED MG/L	07505 TOT HN3 AA BERT MG/L N
1	--	--	--	0.160	0.160	--	--	0.308	--	0.308	--
2	--	--	--	--	--	--	0.32	--	--	0.32	--
3	0.153	--	--	--	0.153	--	--	--	0.339	0.339	0.008
4	--	--	--	--	--	--	0.35	--	--	0.35	--
5	--	--	--	--	--	--	0.310	--	--	0.310	--
6	--	--	0.3	--	0.3	0.30	--	--	--	0.30	--
7	--	--	--	--	--	--	--	--	0.38	0.38 *	--
8	--	0.20	--	--	0.20	--	0.33	--	--	0.33	--
MEAN	.1530	.2000	.3000	.1600	.2033	.3000	.3275	.3080	.3595	.3296	.0080
STD. DEV.	--	--	--	--	.0677	--	.0171	--	.0290	.0264	--
REL. STD.	--	--	--	--	33.3	--	5.2	--	8.1	8.0	--
DES. VAL.	--	--	--	--	.138	--	--	--	--	.328	--

LAB	07506 TOT NH3 SPEC EL MG/L N	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07601 TOTAL N AA UV MG/L	07602 TOTAL N CALC+D MG/L N	07651 TOT N F UV AA MG/L	07652 TOT N F UV H2O2 MG/L	07690 TOTAL N COMBINED MG/L N	07790 T N DISS COMBINED MG/L N
1	--	--	--	0.004	0.004	--	--	--	--	--	--
2	--	--	--	--	--	0.40	--	--	--	--	0.40
3	--	--	--	--	0.008	--	--	--	--	--	--
4	0.1 L	--	--	--	0.1 L (HDL)	--	--	--	0.39	--	0.39
5	--	--	0.002L	--	0.002L	--	--	0.455	--	--	0.455
6	--	--	0.01	--	0.01	--	--	--	--	--	--
8	--	0.017	--	--	0.017	--	0.53	--	--	0.53	--
MEAN	--	.0170	.0100	.0040	.0098	.4000	.5300	.4550	.3900	.5300	.4150
STD. DEV.	--	--	--	--	.0054	--	--	--	--	--	.0350
REL. STD.	--	--	--	--	55.8	--	--	--	--	--	8.4
DES. VAL.	--	--	--	--	.014	--	--	--	--	.398	.418

LAB	09103 FLUORIDE DIS COLR MG/L F	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L	09107 FLUOR F AUTO POT MG/L F	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR+N MG/L CAC	10106 ALKLINTY IR CO2 MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10111 ALKLINTY TITROPRO MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC	10301 PH UNITS
1	--	--	--	0.06	0.06	86.	--	--	--	86.	7.7
2	--	0.07	--	--	0.07	75.8	--	--	--	75.8	8.1
3	--	--	--	--	--	--	77.5	--	80.6	80.6	8.0
4	--	--	--	--	--	78.	--	--	--	78.	7.9
5	--	--	0.068	--	0.068	74.4	--	--	--	74.4	7.9
6	0.1	--	--	--	0.1	--	--	80.	--	80.	7.8
7	--	--	--	--	--	76.2	--	--	--	76.2	7.9
8	--	0.1 L	--	--	0.1 L (HDL)	--	--	80.0	--	80.0	8.10
MEAN	.1000	.0700	.0680	.0600	.0745	78.0800	77.5000	80.0000	80.6000	78.8750	7.9250
STD. DEV.	--	--	--	--	.0175	4.6100	--	0.0000	--	3.6582	.1383
REL. STD.	--	--	--	--	23.5	5.9	--	0.0	--	4.6	1.8
DES. VAL.	--	--	--	--	.089	--	--	--	--	79.218	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 2 (cont'd) STUDY NO. 029 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 2 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	10390 PH COMBINED UNITS	10602 HARDNESS CALC+D MG/L	10603 HARDNESS TITR+N MG/L	10690 HARDNESS COMBINED MG/L	11102 SODIUM AAS F MG/L AA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS DA MG/L	11107 SODIUM FL PH UF MG/L	11190 SODIUM COMBINED MG/L	11311 NA EXTBL HNO3 ICP MG/L	12101 MG DISS CALC+D MG/L
1	7.7	94.	--	94.	--	4.	--	--	4.	--	--
2	8.1	98.7	--	98.7	--	4.5	--	--	4.5	--	--
3	8.0	--	--	--	--	--	--	4.52	4.52	--	--
4	7.9	--	--	--	--	--	--	--	--	--	--
5	7.9	--	99.6	99.6	--	4.6	--	--	4.6	--	7.0
6	7.8	--	96.	96.	3. R	--	--	--	3. R	--	4.9 R
7	7.9	113.5	103.2	103.2	--	--	4.48	--	4.48	--	--
8	8.10	105.	--	105.	--	--	--	--	4.37	4.37	--
MEAN	7.9250	102.8000	99.6000	99.4167	--	4.3667	4.4800	4.5200	4.4117	4.3700	7.0000
STD. DEV.	.1389	8.4376	3.6000	4.1725	--	.3215	--	--	.2149	--	--
REL. STD.	1.8	8.2	3.6	4.2	--	7.4	--	--	4.9	--	--
DES. VAL.	7.895	--	--	103.930	--	--	--	--	4.585	--	--

LAB	12102 MG FIL AAS DA MG/L	12106 MG UF AAS DA MG/L	12107 MG DISS AAS AUTO MG/L	12190 MGNESIUM COMBINED MG/L MG	12303 MG UF AAS AUTO MG/L MG	12311 MG EXTBL HNO3 ICP MG/L	14102 SILICA R ANSA AA MG/L	14105 SILICA R MOLY AA MG/L	14106 SILICA R MOLY UF MG/L	14190 SILICA COMBINED MG/L	15406 T P UF AA ASC MG/L P
1	--	--	--	7.	7.	--	1.3	--	--	1.3 *	--
2	--	--	7.0	7.0	--	--	1.5	--	--	1.5 *	--
3	--	7.2	--	7.2	--	--	--	--	0.95	0.95 *	--
4	--	--	--	--	--	--	--	--	--	--	0.003L
5	--	--	--	7.0	--	--	--	1.3	--	1.3	--
6	--	--	--	4.9 R	--	--	--	--	--	--	--
7	7.25	--	--	7.25	--	--	--	--	--	--	0.035R
8	--	--	--	7.91	--	7.91	--	1.4	--	1.4	--
MEAN	7.2500	7.2000	7.0000	7.2267	7.0000	7.9100	1.4000	1.3500	.9500	1.2900	--
STD. DEV.	--	--	--	.3528	--	--	.1414	.0707	--	.2074	--
REL. STD.	--	--	--	4.9	--	--	10.1	5.2	--	16.1	--
DES. VAL.	--	--	--	7.372	--	--	--	--	--	1.293	--

LAB	15409 T P BLK AA ASC MG/L P	15413 TOTAL P AA SNCL2 MG/L P	15421 T P BLK DIG ASC MG/L P	15490 TOTAL P COMBINED MG/L	16302 SO4 DISS TURB BA MG/L SO4	16304 SO4 DISS AUTO BA MG/L	16306 SO4 DISS AA MTB MG/L	16307 SO4 DISS AAN MBUF MG/L	16390 SULFATE COMBINED MG/L SO4	17203 CL DISS AA UF FE MG/L	17204 CL DISS AG TITN MG/L
1	--	--	0.006L	0.006L	--	--	16.	--	16.	12.	--
2	--	0.001L	--	0.001L	--	16.9	--	--	16.9	--	--
3	--	--	--	--	--	--	--	16.4	16.4	--	--
4	--	--	--	0.003L	--	--	--	--	--	--	--
5	--	--	--	--	--	--	16.6	--	16.6	--	--
6	0.01 R	--	--	0.01 R	17.	--	--	--	17.	--	12.
7	--	--	--	0.035R	--	--	16.8	--	16.8	11.3	--
8	--	0.002	--	0.002	--	--	16.	--	16.	--	--
MEAN	--	.0020	--	.0020	17.0000	16.9000	16.3500	16.4000	16.5286	11.6500	12.0000
STD. DEV.	--	--	--	--	--	--	.4123	--	.4112	.4950	--
REL. STD.	--	--	--	--	--	--	2.5	--	2.5	4.2	--
DES. VAL.	--	--	--	.004	--	--	--	--	16.204	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 2 (end)

STUDY NO. 029 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 2 SPIKED SAMPLE.

MAJOR IONS 4 C.

LAB	17205 CL DISS ION EL MG/L	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17290 CHLORIDE COMBINED MG/L	19102 K DISS AAS MG/L	19103 K DISS F LM PHOT MG/L	19107 K DIS UF FLM PHOT MG/L	19190 PTASSIUM COMBINED MG/L	19311 K EXTBL HNO3 ICP MG/L	20100 CA DISS CALC+D MG/L CA	20101 CA DISS TIT EDTA MG/L
1	--	--	--	12.	--	3.2	--	3.2	--	--	--
2	10.9	--	--	10.9	--	3.2	--	3.2	--	--	--
3	--	--	11.26	11.26	--	--	3.16	3.16	--	--	--
4	--	11.9	--	11.9	--	3.2	--	3.2	--	--	--
5	--	--	--	12.	5.1 R	--	--	5.1 R	--	30.	28.3
6	--	--	--	11.3	3.21	--	--	3.21	--	--	--
7	--	13.	--	13.	--	--	--	3.70 *	3.70	--	--
8	--										
MEAN	10.9000	12.4500	11.2600	11.7657	3.2100	3.2000	3.1600	3.2783	3.7000	30.0000	28.3000
STD. DEV.	--	.7778	--	.6920	--	.0000	--	.2073	--	--	--
REL. STD.	--	6.2	--	5.9	--	.0	--	6.3	--	--	--
DES. VAL.	--	--	--	11.908	--	--	--	3.114	--	--	--

LAB	20103 CA DISS AAS MG/L	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20311 CA EXTBL HNO3 ICP MG/L	20190 CALCIUM COMBINED MG/L CA
1	--	--	26.	--	26.
2	--	--	28.	--	28.
3	--	27.6	--	--	27.6
4	--	--	--	--	28.3
5	--	--	--	--	30.
6	33.5	--	--	--	33.5 *
7	--	--	--	29.0	29.0
8					
MEAN	33.5000	27.6000	27.0000	29.0000	28.9143
STD. DEV.	--	--	1.4142	--	2.3681
REL. STD.	--	--	5.2	--	8.2
DES. VAL.	--	--	--	--	28.158

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 3 STUDY NO. 030 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 3 SPIKED SAMPLE.

TRACE METALS D/A. or S/E

LAB	13302 AL EXTBL AAS DA MG/L	13305 AL EXTBL AAS SE MG/L AL	13306 AL UFAAS SE OX/EP MG/L AL	13311 AL EXTBL ICAP DA MG/L	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP DA MG/L V	23011 V TOTAL 5X ICAP UG/L V	23302 V EXTRBL SE PH1.6 MG/L	23311 V EXTBL ICAP DA MG/L	23999 VANADIUM COMBINED MG/L V	24004 CR TOTAL AAS G F MG/L
1	--	--	0.135	--	0.135 *	0.046	--	--	--	0.046 -	--
2	--	0.073	--	--	0.073 *	--	--	--	--	--	0.070
3	--	--	--	0.11	0.11	--	--	0.050	0.047	0.050	--
6	--	--	--	--	0.10	--	0.05	--	--	0.05	--
8	0.2 L	--	--	--	0.2 L (HDL)	--	--	--	--	--	0.068
MEAN	--	.0730	.1350	.1100	.1045	.0460	.0500	.0500	.0470	.0487	.0690
STD. DEV.	--	--	--	--	.0256	--	--	--	--	.0023	.0014
REL. STD.	--	--	--	--	24.5	--	--	--	--	4.7	2.0
DES. VAL.	--	--	--	--	.088	--	--	--	--	.050	--

LAB	24009 CR TOTAL ICAP DA MG/L CR	24011 CR TOTAL 5X ICAP UG/L CR	24303 CR EXTBL AAS SE MG/L	24311 CR EXTBL ICAP DA MG/L	24999 CHROMIUM COMBINED MG/L CR	25003 MN TOTAL ICAP DA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25311 MN EXTBL ICAP DA MG/L	25999 MANGNESE COMBINED MG/L MN	26011 FE TOTAL 5X ICAP UG/L FE
1	0.062	--	--	--	0.062	0.048	--	--	--	0.048	--
2	--	--	--	--	0.070	--	--	0.05	--	0.05	--
3	--	--	0.067	0.060	0.067	--	--	0.05	0.058	0.05	--
6	--	0.073	--	--	0.073	--	0.046	--	--	0.046	0.084
8	--	--	--	--	0.068	--	--	--	0.055	0.055 *	--
MEAN	.0620	.0730	.0670	.0600	.0680	.0480	.0460	.0500	.0565	.0498	.0840
STD. DEV.	--	--	--	--	.0041	--	--	0.0000	.0021	.0033	--
REL. STD.	--	--	--	--	6.0	--	--	0.0	3.8	6.7	--
DES. VAL.	--	--	--	--	.066	--	--	--	--	.048	--

LAB	26304 FE EXTBL AAS DA MG/L	26305 FE EXTBL AAS SE MG/L	26311 FE EXTBL ICAP DA MG/L	26999 IRON COMBINED MG/L FE	27003 CO TOTAL AAS G F MG/L	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO	27302 CO EXTBL AAS SE MG/L	27311 CO EXTBL ICAP DA MG/L	27999 COBALT COMBINED MG/L CO	28009 NI TOTAL ICAP DA MG/L NI
1	0.07	--	--	0.07	--	0.061	--	--	--	0.061	0.063
2	--	0.070	--	0.070	--	--	--	--	--	--	--
3	--	0.075	0.10	0.075	--	--	--	0.066	0.059	0.066	--
6	--	--	--	0.084	--	--	0.061	--	--	0.061	--
8	--	--	0.080	0.080	0.08	--	--	--	--	0.08 *	--
MEAN	.0700	.0725	.0900	.0758	.0800	.0610	.0610	.0660	.0590	.0670	.0630
STD. DEV.	--	.0035	.0141	.0062	--	--	--	--	--	.0090	--
REL. STD.	--	4.9	15.7	8.2	--	--	--	--	--	13.4	--
DES. VAL.	--	--	--	.080	--	--	--	--	--	.065	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 3 (cont'd)

STUDY NO. 030 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 3 SPIKED SAMPLE. TRACE METALS D/A, or S/E

LAB	28011 NI TOTAL 5X ICAP UG/L NI	28302 NI EXTBL AAS SE MG/L	28309 NI EXTR AAS G F MG/L NI	28311 NI EXTBL ICAP DA MG/L	28999 NICKEL COMBINED MG/L NI	29009 CU TOTAL ICAP MG/L CU	29011 CU TOTAL 5X ICAP UG/L CU	29305 CU EXTBL AAS SE MG/L	29311 CU EXTBL ICAP DA MG/L	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN
1	--	--	--	--	0.063	0.046	--	--	--	0.046	0.055
2	--	0.063	--	--	0.063	--	--	0.052	--	0.052	--
3	--	0.065	--	0.066	0.065	--	--	0.051	0.054	0.051	--
6	0.083	--	--	--	0.083 *	--	0.056	--	--	0.056	--
8	--	--	0.067	--	0.067	--	--	--	0.057	0.057	--
MEAN	.0830	.0640	.0670	.0660	.0682	.0460	.0560	.0515	.0555	.0524	.0550
STD. DEV.	--	.0014	--	--	.0084	--	--	.0007	.0021	.0044	--
REL. STD.	--	2.2	--	--	12.4	--	--	1.4	3.8	8.4	--
DES. VAL.	--	--	--	--	.065	--	--	--	--	.049	--

LAB	30011 ZN TOTAL 5X ICAP UG/L ZN	30304 ZN EXTBL AAS DA MG/L	30305 ZN EXTBL AAS SE MG/L	30311 ZN EXTBL ICAP DA MG/L	30999 ZINC COMBINED MG/L ZN	38301 SR EXTBL AAS DA MG/L	38311 SR EXTBL ICAP DA MG/L	38999 STRNTIUM COMBINED MG/L SR	42009 MO TOTAL ICAP MG/L MO	42011 MO TOTAL 5X ICAP UG/L MO	42302 MO EXTBL AAS SE MG/L
1	--	--	--	--	0.055	--	--	--	0.068	--	--
2	--	0.05	--	--	0.05	--	--	--	--	--	--
3	--	--	0.050	0.060	0.050	0.18	0.17	0.18	--	--	0.070
6	0.058	--	--	--	0.058	--	--	--	--	0.08	--
8	--	--	--	0.058	0.058	--	--	--	--	--	--
MEAN	.0580	.0500	.0500	.0590	.0542	.1800	.1700	.1800	.0680	.0800	.0700
STD. DEV.	--	--	--	.0014	.0040	--	--	--	--	--	--
REL. STD.	--	--	--	2.4	7.4	--	--	--	--	--	--
DES. VAL.	--	--	--	--	.051	--	--	.167	--	--	--

LAB	42311 MO EXTBL ICAP DA MG/L	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD	48011 CD TOTAL 5X ICAP UG/L CD	48301 CD EXTBL AAS DA MG/L	48302 CD EXTBL AAS SE MG/L	48311 CD EXTBL ICAP DA MG/L	48999 CADMIUM COMBINED MG/L CD	56011 BA TOTAL 5X ICAP UG/L BA	56301 BA EXTBL AAS DA MG/L	56311 BA EXTBL ICAP DA MG/L
1	--	0.068	0.052	--	--	--	--	0.052	--	--	--
2	--	--	--	--	--	0.050	--	0.050	--	--	--
3	0.072	0.072	--	--	--	0.053	0.045	0.053	--	0.1 L	0.021
6	--	0.08	--	0.054	--	--	--	0.054	0.031	--	--
8	--	--	--	--	0.05	--	--	0.05	--	--	--
MEAN	.0720	.0733	.0520	.0540	.0500	.0515	.0450	.0518	.0310	--	.0210
STD. DEV.	--	.0061	--	--	--	.0021	--	.0018	--	--	--
REL. STD.	--	8.3	--	--	--	4.1	--	3.5	--	--	--
DES. VAL.	--	.069	--	--	--	--	--	.052	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 3 (and)

STUDY NO. 030 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 3 SPIKED SAMPLE.

TRACE METALS D/A, or S/E.

LAB	82999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB	82301 PB EXTBL AAS DA MG/L	82302 PB EXTBL AAS SE MG/L	82311 PB EXTBL ICAP DA MG/L	82999 LEAD COMBINED MG/L PB
1	--	--	--	0.071	--	0.071
2	--	--	--	0.069	--	0.069
3	0.021	--	--	0.069	0.064	0.069
6	0.031	0.07	--	--	--	0.07
8	--	--	0.09 R	--	--	0.09 R
MEAN	.0260	.0700	--	.0697	.0640	.0698
STD. DEV.	.0071	--	--	.0012	--	.0010
REL. STD.	27.2	--	--	1.7	--	1.4
DES. VAL.	.026	--	--	--	--	.067

TABLE 4

SAMPLE = 4 MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR A REL UNIT	02021 COLOUR V IS COMP REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLMTRIC NTU	02190 COLOUR COMBINED REL UNIT	02290 CONDUCT COMBINED USIE/CM	02390 TURBIDTY COMBINED JTU/NTU
1	0.12	8.24	8.26	--	--	910.	--	--	--	910.	--
2	0.465	8.066	8.141	0.5 L	--	907.	0.1	--	0.5 L	907.	0.1
3	0.35	8.095	8.152	--	--	919.	--	--	--	919.	--
4	--	--	--	--	5. L	907.	0.24	--	5. L	907.	0.24
5	1.46	8.35	8.11	5.	--	834.	0.10	--	5.	834.	0.10
6	3.6	8.7	8.1	--	--	913.	--	0.08	--	913.	0.08
7	3.3	8.58	8.03	0.	--	880.	0.65	--	0.	880.	0.65 *
8	5.55	7.90	8.83	5. L	--	895.	--	0.40	5. L	895.	0.40
MEAN	2.1207	8.2759	8.2319	2.5000	--	895.6250	.2725	.2400	2.5000	895.6250	.2617
STD. DEV.	2.0678	.2879	.2727	3.5355	--	27.6609	.2602	.2263	3.5355	27.6609	.2261
REL. STD.	97.5	3.5	3.3	141.4	--	3.1	95.5	94.3	141.4	3.1	86.4
DES. VAL.	--	--	--	--	--	--	--	--	.667	895.775	.273

LAB	05105 BORON AA CARM MG/L	05106 BORON F AUTO AN MG/L B	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 DOC UV CO2 EV MG/L C	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06290 D O C COMBINED MG/L	06490 D I C COMBINED MG/L
1	--	--	--	--	--	0.5	--	--	16.0	0.5 *	16.0
2	--	--	--	--	--	1.5	--	--	--	1.5	--
3	--	--	--	--	1.4	--	--	16.6	--	1.4	16.6
4	0.11	--	0.11	--	1.	--	--	31. R	--	1. *	31. R
5	--	--	--	1.3	--	--	17.	--	--	1.3	17.
6	--	0.05 L	0.05 L	2.0	--	--	15.0	--	--	2.0	15.0
MEAN	.1100	--	.1100	1.6500	1.2000	1.0000	16.0000	16.6000	16.0000	1.2833	16.1500
STD. DEV.	--	--	--	.4950	.2828	.7071	1.4142	--	--	.5037	.8699
REL. STD.	--	--	--	30.0	23.6	70.7	8.8	--	--	39.2	5.4
DES. VAL.	--	--	.090	--	--	--	--	--	--	1.764	14.925

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 4 (cont'd)

STUDY NO. 030 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 4 SPIKED SAMPLE.

MAJOR IONS 4 C.

LAB	07010 TKN AUTAN MG/L N	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG AA 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3+NO2 F AA HYD MG/L N	07110 NO3+NO2 AA2 CD MG/L N	07111 NO3+NO2 DIS SPEC MG/L N	07112 NO3+NO2 UF AA CD MG/L	07190 NITRATE COMBINED MG/L	07505 TOT NH3 AA BERT MG/L N
1	--	--	--	0.150	0.150	--	--	0.505	--	0.505	--
2	--	--	--	--	--	--	0.57	--	--	0.57	--
3	0.089	--	--	--	0.089	--	--	--	0.543	0.543	0.006
4	--	--	--	--	--	--	0.59	--	--	0.59	--
5	--	--	--	--	--	--	0.540	--	--	0.540	--
6	--	--	0.3	--	0.3 *	0.51	--	--	--	0.51	--
7	--	--	--	--	--	--	--	--	0.59	0.59	--
8	--	0.20 L	--	--	0.20 L(HDL)	--	0.59	--	--	0.59	--
MEAN	.0890	--	.3000	.1500	.1797	.5100	.5725	.5050	.5665	.5548	.0060
STD. DEV.	--	--	--	--	.1086	--	.0236	--	.0332	.0354	--
REL. STD.	--	--	--	--	60.4	--	4.1	--	5.9	6.4	--
DES. VAL.	--	--	--	--	.153	--	--	--	--	.576	--

LAB	07506 TOT NH3 SPEC EL MG/L N	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07601 TOTAL N AA UV MG/L	07602 TOTAL N CALC+D MG/L N	07651 TOT N F UV AA MG/L	07652 TOT N F UV H2O2 MG/L	07690 TOTAL N COMBINED MG/L N	07790 T N DISS COMBINED MG/L N
1	--	--	--	0.008	0.008 *	--	--	--	--	--	--
2	--	--	--	--	--	0.75	--	--	--	--	0.75
3	--	--	--	--	0.006 *	--	--	--	--	--	--
4	0.1 L	--	--	--	0.1 L	--	--	--	0.65	--	0.65
5	--	--	0.008	--	0.008 *	--	--	0.745	--	--	0.745
6	--	--	0.01	--	0.01	--	--	--	--	--	--
8	--	0.014	--	--	0.014 *	--	0.79 L	--	--	0.79 L	--
MEAN	--	.0140	.0090	.0080	.0092	.7500	--	.7450	.6500	--	.7150
STD. DEV.	--	--	.0014	--	.0030	--	--	--	--	--	.0563
REL. STD.	--	--	15.7	--	33.0	--	--	--	--	--	7.9
DES. VAL.	--	--	--	--	.025	--	--	--	--	.430	.657

LAB	09103 FLUORIDE DIS COLR MG/L F	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L	09107 FLUOR F AUTO POT MG/L F	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR+N MG/L CAC	10106 ALKLINTY IR CO2 MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10111 ALKLINTY TITROPRO MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC	10301 PH UNITS
1	--	--	--	0.05	0.05	68.	--	--	--	68.	7.8
2	--	0.07	--	--	0.07	63.0	--	--	--	63.0	8.0
3	--	--	--	--	--	--	64.9	--	69.1	64.9	7.8
4	--	--	--	--	--	65.	--	--	--	65.	7.8
5	--	--	0.063	--	0.063	65.2	--	--	--	65.2	7.8
6	0.1	--	--	--	0.1	--	--	69.	--	69.	7.7
7	--	--	--	--	--	62.7	--	--	--	62.7	7.9
8	--	0.1 L	--	--	0.1 L(HDL)	--	--	65.0	--	65.0	7.90
MEAN	.1000	.0700	.0630	.0500	.0708	64.7800	64.9000	67.0000	69.1000	65.3500	7.8375
STD. DEV.	--	--	--	--	.0212	2.1265	--	2.8284	--	2.1831	.0916
REL. STD.	--	--	--	--	29.9	3.3	--	4.2	--	3.3	1.2
DES. VAL.	--	--	--	--	.085	--	--	--	--	63.900	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 4 (cont'd)

STUDY NO. 030 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 4 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	10390 PH COMBINED UNITS	10602 HARDNESS CALC'D MG/L	10603 HARDNESS TITR'N MG/L	10690 HARDNESS COMBINED MG/L	11102 SODIUM AAS F MG/L NA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS DA MG/L	11107 SODIUM FL PH UF MG/L	11190 SODIUM COMBINED MG/L	11311 NA EXTBL HNO3 ICP MG/L	12101 MG DISS CALC'D MG/L
1	7.8	254.	--	254.	--	62.	--	--	62.	--	--
2	8.0	256.2	--	256.2	--	57.3	--	--	57.3	--	--
3	7.8	--	--	--	--	--	--	58.2	58.2	--	--
4	7.8	--	--	--	--	--	--	--	--	--	--
5	7.8	--	264.0	264.0	--	60.0	--	--	60.0	--	20.8
6	7.7	--	260.	260.	65.	--	--	--	65.	--	24.
7	7.9	273.7	266.1	266.1	--	--	61.0	--	61.0	--	--
8	7.90	256.	--	256.	--	--	--	--	54.0	54.0	--
MEAN	7.8375	259.9750	263.3667	259.3833	65.0000	59.7667	61.0000	58.2000	59.6429	54.0000	22.4000
STD. DEV.	.0916	9.2038	3.0989	4.8450	--	2.3587	--	--	3.5505	--	2.2627
REL. STD.	1.2	3.5	1.2	1.9	--	3.9	--	--	6.0	--	10.1
DES. VAL.	7.919	--	--	259.281	--	--	--	--	59.450	--	--

LAB	12102 MG FIL AAS DA MG/L	12106 MG UF AAS DA MG/L	12107 MG DISS AAS AUTO MG/L	12190 MGNESIUM COMBINED MG/L MG	12303 MG UF AAS AUTO MG/L MG	12311 MG EXTBL HNO3 ICP MG/L	14102 SILICA R ANSA AA MG/L	14105 SILICA R MOLY AA MG/L	14106 SILICA R MOLY UF MG/L	14190 SILICA COMBINED MG/L	15406 T P UF AA ASC MG/L P
1	--	--	--	21.	21.	--	14.9	--	--	14.9	--
2	--	--	21.	21.	--	--	17. R	--	--	17. R	--
3	--	21.0	--	21.0	--	--	--	--	14.18	14.18	--
4	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	20.8	--	--	--	14.4	--	14.4	0.013
6	--	--	--	24.	--	--	--	--	--	--	--
7	21.6	--	--	21.6	--	--	--	--	--	--	--
8	--	--	--	21.1	--	21.1	--	15.	--	15.	0.106R
MEAN	21.6000	21.0000	21.0000	21.5000	21.0000	21.1000	14.9000	14.7000	14.1600	14.6200	.0030
STD. DEV.	--	--	--	1.1299	--	--	--	.4243	--	.3936	--
REL. STD.	--	--	--	5.3	--	--	--	2.9	--	2.7	--
DES. VAL.	--	--	--	21.375	--	--	--	--	--	14.812	--

LAB	15409 T P BLK AA ASC MG/L P	15413 TOTAL P AA SNCL2 MG/L P	15421 T P BLK DIG ASC MG/L P	15490 TOTAL P COMBINED MG/L	16304 SO4 DISS AUTO EA MG/L	16306 SO4 DISS AA MTB MG/L	16307 SO4 DISS AAN MBUF MG/L	16390 SULFATE COMBINED MG/L SO4	17203 CL DISS AA UF FE MG/L	17204 CL DISS AG TITN MG/L	17205 CL DISS ION EL MG/L
1	--	--	0.006L	0.006L	--	72.	--	72.	190.	--	--
2	--	0.006	--	0.006	71.0	--	--	71.0	--	--	190.
3	--	--	--	--	--	--	71.3	71.3	--	--	--
4	--	--	--	0.003	--	--	--	--	--	--	--
5	--	--	--	--	--	67.5	--	67.5	--	--	--
6	0.02 R	--	--	0.02R (HOL?)	66.	--	--	66.	--	188.	--
7	--	--	--	0.106R	--	71.8	--	71.8	185.7	--	--
8	--	0.004	--	0.004	--	75.	--	75.	--	--	--
MEAN	--	.0050	--	.0043	68.5000	71.5750	71.3000	70.6571	187.8500	188.0000	190.0000
STD. DEV.	--	.0014	--	.0015	3.5355	3.0859	--	3.0044	3.0406	--	--
REL. STD.	--	28.3	--	35.3	5.2	4.3	--	4.3	1.6	--	--
DES. VAL.	--	--	--	.007	--	--	--	70.620	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 4 (cont'd)

STUDY NO. 030 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 4 SPIKED SAMPLE.

MAJOR IONS 4 C.

LAB	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17290 CHLORIDE COMBINED MG/L	19102 K DISS AAS MG/L K	19103 K DISS F LM PHOT MG/L	19107 K DIS UF FLM PHOT MG/L	19190 PTASSIUM COMBINED MG/L	19311 K EXTBL HNO3 ICP MG/L	20100 CA DISS CALC+D MG/L CA	20101 CA DISS TIT EDTA MG/L	20103 CA DISS AAS MG/L
1	--	--	190.	--	18.5	--	18.5	--	--	--	--
2	--	--	190.	--	17.7	--	17.7	--	--	--	--
3	--	176.9	176.9	--	--	18.1	18.1	--	--	--	--
5	190.	--	190.	--	18.2	--	18.2	--	--	71.5	--
6	--	--	188.	26.5 R	--	--	26.5 R	--	64.	--	--
7	--	--	185.7	18.0	--	--	18.0	--	--	--	74.0
8	210.	--	210.	--	--	--	14.6 R	14.6 R	--	--	--
MEAN	200.0000	176.9800	190.0971	18.0000	18.1333	18.1000	18.1000	--	64.0000	71.5000	74.0000
STD. DEV.	14.1421	--	9.9326	--	.4041	--	.2915	--	--	--	--
REL. STD.	7.1	--	5.2	--	2.2	--	1.6	--	--	--	--
DES. VAL.	--	--	194.563	--	--	--	18.152	--	--	--	--

LAB	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20311 CA EXTBL HNO3 ICP MG/L	20190 CALCIUM COMBINED MG/L CA
1	--	67.	--	67.
2	--	68.	--	68.
3	67.6	--	--	67.6
5	--	--	--	71.5
6	--	--	--	64.
7	--	--	--	74.0
8	--	--	67.5	67.5
MEAN	67.6000	67.5000	67.5000	68.5143
STD. DEV.	--	.7071	--	3.2611
REL. STD.	--	1.0	--	4.8
DES. VAL.	--	--	--	67.569

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 5.

STUDY NO. 030 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 5 SPIKED SAMPLE.

TRACE METALS D/A.

LAB	13302 AL EXTBL AAS DA MG/L	13311 AL EXTBL ICAP DA MG/L	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP DA MG/L V	23011 V TOTAL 5X ICAP UG/L V	23301 V EXTRBL AAS DA MG/L	23311 V EXTBL ICAP DA MG/L	23999 VANADIUM COMBINED MG/L V	24004 CR TOTAL AAS G F MG/L	24009 CR TOTAL ICAP DA MG/L CR	24011 CR TOTAL 5X ICAP UG/L CR
1	--	--	--	3.360	--	--	--	3.360	--	0.365	--
2	3.7	--	3.7	--	--	--	--	--	--	--	--
3	4.0	4.2	4.0	--	--	4.0	3.3	4.0	--	--	--
6	--	--	4.5	--	4.1	--	--	4.1	--	--	0.42
8	3.8	--	3.8	--	--	--	--	--	0.38	--	--
MEAN	3.8333	4.2000	4.0000	3.3600	4.1000	4.0000	3.3000	3.8200	.3800	.3650	.4200
STD. DEV.	.1528	--	.3559	--	--	--	--	.4015	--	--	--
REL. STD.	4.0	--	8.9	--	--	--	--	10.5	--	--	--
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

LAB	24302 CR EXTBL AAS DA MG/L	24311 CR EXTBL ICAP DA MG/L	24999 CHROMIUM COMBINED MG/L CR	25003 MN TOTAL ICAP DA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25311 MN EXTBL ICAP DA MG/L	25999 MANGNESE COMBINED MG/L MN	26011 FE TOTAL 5X ICAP UG/L FE	26304 FE EXTBL AAS DA MG/L	26311 FE EXTBL ICAP DA MG/L
1	--	--	0.365	0.437	--	--	--	0.437	--	1.96	--
2	0.42	--	0.42	--	--	0.49	--	0.49	--	1.8	--
3	0.35	0.44	0.35	--	--	0.49	0.59	0.49	--	1.9	2.1
6	--	--	0.42	--	0.48	--	--	0.48	2.1	--	--
8	--	--	0.38	--	--	--	0.54	0.54	--	--	2.05
MEAN	.3850	.4400	.3870	.4370	.4800	.4900	.5650	.4874	2.1000	1.8867	2.0750
STD. DEV.	.0495	--	.0319	--	--	0.0000	.0354	.0367	--	.0808	.0354
REL. STD.	12.9	--	8.3	--	--	0.0	6.3	7.5	--	4.3	1.7
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

LAB	26999 IRON COMBINED MG/L FE	27003 CO TOTAL AAS G F MG/L	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO	27301 CO EXTBL AAS DA MG/L	27311 CO EXTBL ICAP DA MG/L	27999 COBALT COMBINED MG/L CO	28009 NI TOTAL ICAP DA MG/L NI	28011 NI TOTAL 5X ICAP UG/L NI	28301 NI EXTBL AAS DA MG/L	28307
1	1.96	--	1.060	--	--	--	1.060	1.680	--	--	--
2	1.8	--	--	--	--	--	--	--	--	1.8	--
3	1.9	--	--	--	1.2	1.3	1.2	--	--	1.9	--
6	2.1	--	--	1.2	--	--	1.2	--	2.1	--	--
8	2.05	1.16	--	--	--	--	1.16	--	--	--	1.97
MEAN	1.9620	1.1600	1.0600	1.2000	1.2000	1.3000	1.1550	1.6800	2.1000	1.8500	1.9700
STD. DEV.	.1192	--	--	--	--	--	.0661	--	--	.0707	--
REL. STD.	6.1	--	--	--	--	--	5.7	--	--	3.8	--
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 5 (cont'd) STUDY NO. 030 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 5 SPIKED SAMPLE.

TRACE METALS D/A.

LAB	28311 NI EXTBL ICAP DA MG/L	28999 NICKEL COMBINED MG/L NI	29009 CU TOTAL ICAP MG/L CU	29011 CU TOTAL 5X ICAP UG/L CU	29306 CU EXTBL AAS DA MG/L	29311 CU EXTBL ICAP DA MG/L	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN	30011 ZN TOTAL 5X ICAP UG/L ZN	30304 ZN EXTBL AAS DA MG/L	30311 ZN EXTBL ICAP DA MG/L
1	--	1.680	0.431	--	--	--	0.431	0.478	--	--	--
2	--	1.8	--	--	0.49	--	0.49	--	--	0.49	--
3	1.7	1.9	--	--	0.49	0.58	0.49	--	--	0.49	0.41
6	--	2.1	--	0.53	--	--	0.53	--	0.55	--	--
8	--	1.97	--	--	--	0.52	0.52	--	--	--	0.56
MEAN	1.7000	1.8900	.4310	.5300	.4900	.5500	.4922	.4780	.5500	.4900	.4850
STD. DEV.	--	.1603	--	--	0.0000	.0424	.0386	--	--	0.0000	.1061
REL. STD.	--	8.5	--	--	0.0	7.7	7.8	--	--	0.0	21.9
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

LAB	30999 ZINC COMBINED MG/L ZN	38301 SR EXTBL AAS DA MG/L	38311 SR EXTBL ICAP DA MG/L	38999 STRNTIUM COMBINED MG/L SR	42009 MO TOTAL ICAP MG/L MO	42011 MO TOTAL 5X ICAP UG/L MO	42301 MO EXTBL AAS DA MG/L	42311 MO EXTBL ICAP DA MG/L	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD	48011 CD TOTAL 5X ICAP UG/L CD
1	0.478	--	--	--	3.380	--	--	--	3.380	0.472	--
2	0.49	--	--	--	--	--	--	--	--	--	--
3	0.49	0.86	1.0	0.86	--	--	1.8	3.3	3.3	--	--
6	0.55	--	--	--	--	4.1	--	--	4.1	--	0.52
8	0.56	--	--	--	--	--	--	--	--	--	--
MEAN	.5136	.8600	1.0000	.8600	3.3800	4.1000	1.8000	3.3000	3.5933	.4720	.5200
STD. DEV.	.0383	--	--	--	--	--	--	--	.4406	--	--
REL. STD.	7.5	--	--	--	--	--	--	--	12.3	--	--
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

LAB	48301 CD EXTBL AAS DA MG/L	48311 CD EXTBL ICAP DA MG/L	48999 CADMIUM COMBINED MG/L CD	56011 BA TOTAL 5X ICAP UG/L BA	56301 BA EXTBL AAS DA MG/L	56311 BA EXTBL ICAP DA MG/L	56999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB	82301 PB EXTBL AAS DA MG/L	82302 PB EXTBL AAS SE MG/L	82311 PB EXTBL ICAP DA MG/L
1	--	--	0.472	--	--	--	--	--	--	2.00	--
2	0.48	--	0.48	--	--	--	--	--	1.9	--	--
3	0.49	0.50	0.49	--	4.0	3.4	4.0	--	1.9	--	1.7
6	--	--	0.52	4.1	--	--	4.1	2.3	--	--	--
8	0.47	--	0.47	--	--	--	--	--	--	--	2.1
MEAN	.4800	.5000	.4864	4.1000	4.0000	3.4000	4.0500	2.3000	1.9000	2.0000	1.9000
STD. DEV.	.0100	--	.0204	--	--	--	.0707	--	0.0000	--	.2828
REL. STD.	2.1	--	4.2	--	--	--	1.7	--	0.0	--	14.9
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

TABLE 5 (end)

STUDY NO. 030 DATE: 01/01/85 DISTRIBUTED: 07/01/85

SAMPLE = 5 SPIKED SAMPLE.

TRACE METALS D/A.

LAB	82999 LEAD COMBINED MG/L PB
1	2.00
2	1.9
3	1.9
6	2.3 *
8	2.10
MEAN	2.0400
STD. DEV.	.1673
REL. STD.	8.2
DES. VAL.	--

DATES RECEIVED 1 85/03/18 2 85/03/06 3 85/02/20 3 85/03/22 4 85/02/11
5 85/03/11 6 85/02/12 7 85/04/01 8 85/03/12

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MEMORANDUM **NOTE DE SERVICE**

H. ALKEMA/IWD-NWRI/4645/ha

SECURITY - CLASSIFICATION - DE SÉCURITÉ	
OUR FILE/NOTRE RÉFÉRENCE	
YOUR FILE/VOTRE RÉFÉRENCE	
DATE	17 June 1985

TO / À: Distribution

FROM / DE: H. Alkema
Quality Assurance and Methods Section
AMD/NWRI, Burlington

SUBJECT / OBJET: Final Summary Report on Prairie Provinces Quality Control (PPQC)
PPQC Studies 31 and 32

I have enclosed the final report for PP 31-32.

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

Since there were several changes to the data base for these studies, a computer data printout is included for laboratory managers and Mr. Dunn.

Harry Alkema

H. Alkema

SUMMARY REPORT

PPQC STUDIES 31 AND 32

for March and April, 1985

TRACE METALS, MAJOR IONS, NUTRIENTS AND PHYSICAL PARAMETERS IN SPIKED SAMPLES

by

H. Alkema

June 1985

AMD
NWRI
CCIW
Burlington, Ontario

This report summarizes the PPWB interlaboratory quality control studies PP 31 and 32, for the months March and April, 1985. These two studies dealt with trace metals, major ions, nutrients and physical parameters. The levels were mainly low for metals and high for major ions.

Sample Particulars

Two samples were analyzed for trace metals and three for the remaining parameters. The following is a breakdown of the five samples:

PPWB 31 - Sample 1 - 125 ml, D/A * for trace metals (3% HNO_3)
Sample 2 - up to 1L, major ions etc., stored at 4°C

PPWB 32 - Sample 3 - 1L, S/E * for trace metals (0.2% HNO_3)
Sample 4 - up to 1L, major ions, etc., stored at 4°C
Sample 5 - 125 ml, D/A for trace metals (0.2% HNO_3)

* for definitions see Appendix 1

Data Analysis

Results for routine analyses were recorded by the laboratories on the report sheets provided with the PPWB samples. Submitted results were tabulated for each parameter, first for each method reported, and then for all methods combined. These data, and their resulting statistics are presented in Tables 1-5. Preliminary data summaries were sent (May 1, and May 22, 1985) to the reporting laboratories to provide immediate notification of anomalies. To rectify any errors in compilation of data summaries, the laboratories were given three weeks. The results from one laboratory were received after the due date, but were included as a courtesy.

Performance Indicators

A result which deviates more than 10% from the mean is circled in the data

tables and its value is noted in the comments. 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 2 of a previous report dated February 1, 1985.

Comments on Laboratory Performance

A high coefficient of variation (incomparability) was observed for NH_3 and Turbidity.

Individual laboratory deviations are listed below:

Lab 1
- erratic results for Pb by D/A, -12%; and Pb by S/E, +83% (R)
- biased high results for Al by D/A, +43%; and Al by S/E, +58%
- high results for Zn by S/E, +67%
- a high detection limit (HDL) for Fe by S/E
- a low result for Mo by S/E, -86%
- a low result for pH, -21%

Lab 2
- a high result for Zn by S/E, +83%
- low results for Al by D/A, -24%; and DOC, -89% (R)

Lab 3
- a low result for Mo by D/A, -53%
- high results for Mn by D/A, +26%; and Cd by D/A, +16%
- high results for NH_3, +389%; and NO_3+NO_2, +187%
- an HDL for Ba by S/E

Lab 4
- a low result for DOC, -16%
- biased results for DIC, +118% and +126% (two R's)
- biased high results for Turb, +64% and +143%

(R) = rejectable by Grubb's procedure for statistical calculation

- 2 HDL's for NH_3.

Lab 5
- erratic results for DOC, -47% (R), and +376%
- biased high results for Total N dissolved, +41% and +42%.
- a high result for F, +11%

Lab 6
- low results for Cd by D/A, -19%; Co by D/A, -16%; and Pb by D/A, -38% (R)
- high results for Al by S/E, +216%; Mn by S/E, +100%; Fe by S/E, 367% (R); and Zn by S/E, +217% (R)
- a low result for Cr by S/E, -38%
- high results for K, +59% (R); F, +21% (R)
- biased high results for Total P, +31%, +186%, and +1900% (R)
- high results for TKN, +72%; DOC, +376% and 658%, Alk, +51% NO_3+NO_2, +352%
- low results for Turb, -84%; and NH_3, -95%
- an HDL for F
- a low result for K, -89%

Lab 7
- low results for Na, -11%; pH, -21%; and Cond, -90% (R)
- a high result for NO_3+NO_2 +897% (R)

Lab 8
- biased high results for Cr by D/A, +56% (R); and Cr by S/E, +50% (R)
- high results for DOC, +867%; and Turb, +321% (R)
- a low result for pH, -26%
- a low result for Cu by D/A, -17%
- an HDL each for Al by S/E, Mn by S/E, Fe by S/E, and Zn by S/E
- an HDL each for F, TKN and K

PPWB laboratories average number of deviations per sample was 2.9

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 31 DATE: 01/03/85 DISTRIBUTED: 25/02/85

SAMPLE = 1 SPIKED SAMPLE. TRACE METALS D/A.

LAB	13302 AL EXTBL AAS DA MG/L	13306 AL UFAAS SE OX/EP MG/L AL	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP DA MG/L V	23011 V TOTAL 5X ICAP UG/L V	23301 V EXTRBL AAS DA MG/L	23999 VANADIUM COMBINED MG/L V	24004 CR TOTAL AAS G F MG/L	24009 CR TOTAL ICAP DA MG/L CR	24011 CR TOTAL 5X ICAP UG/L CR	24302 CR EXTBL AAS DA MG/L
1	--	0.770	0.770	0.461	--	--	0.461	--	0.051	--	--
2	0.41	--	0.41	--	--	--	--	--	--	--	--
3	0.5	--	0.5	--	--	0.5	0.5	--	--	--	--
6	--	--	0.48	--	0.46	--	0.46	--	--	--	0.05
8	0.6	--	0.6	--	--	--	--	0.089R	--	0.054	--
MEAN	.5033	.7700	.5520	.4610	.4600	.5000	.4737	--	.0510	.0540	.0500
STD. DEV.	.0950	--	.1395	--	--	--	.0228	--	--	--	--
REL. STD.	18.9	--	25.3	--	--	--	4.8	--	--	--	--
DES. VAL.	--	--	.537	--	--	--	.514	--	--	--	--

LAB	24999 CHROMIUM COMBINED MG/L CR	25003 MN TOTAL ICAP DA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25311 MN EXTBL ICAP DA MG/L	25999 MANGNESE COMBINED MG/L MN	26011 FE TOTAL 5X ICAP UG/L FE	26304 FE EXTBL AAS DA MG/L	26311 FE EXTBL ICAP DA MG/L	26999 IRON COMBINED MG/L FE	27003 CO TOTAL AAS G F MG/L
1	0.051	0.044	--	--	--	0.044	--	0.26	--	0.26	--
2	--	--	--	0.05	--	0.05	--	0.26	--	0.26	--
3	0.05	--	--	0.058	--	0.058	--	0.25	--	0.25	--
6	0.054	--	0.044	--	--	0.044	0.24	--	--	0.24	--
8	0.089R	--	--	--	0.04	0.04	--	--	0.24	0.24	0.24
MEAN	.0517	.0440	.0440	.0540	.0400	.0472	.2400	.2567	.2400	.2500	.2400
STD. DEV.	.0021	--	--	.0057	--	.0070	--	.0058	--	.0100	--
REL. STD.	4.0	--	--	10.5	--	14.9	--	2.2	--	4.0	--
DES. VAL.	.057	--	--	--	--	.046	--	--	--	.251	--

LAB	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO	27301 CO EXTBL AAS DA MG/L	27999 COBALT COMBINED MG/L CO	28009 NI TOTAL ICAP DA MG/L NI	28011 NI TOTAL 5X ICAP UG/L NI	28301 NI EXTBL AAS DA MG/L	28311 NI EXTBL ICAP DA MG/L	28999 NICKEL COMBINED MG/L NI	29009 CU TOTAL ICAP MG/L CU	29011 CU TOTAL 5X ICAP UG/L CU
1	0.215	--	--	0.215	0.244	--	--	--	0.244	0.043	--
3	--	--	0.26	0.26	--	--	0.30	--	0.30	--	--
6	--	0.20	--	0.20	--	0.25	--	--	0.25	--	0.043
8	--	--	--	0.24	--	--	--	0.26	0.26	--	--
MEAN	.2150	.2000	.2600	.2288	.2440	.2500	.3000	.2600	.2635	.0430	.0430
STD. DEV.	--	--	--	.0266	--	--	--	--	.0252	--	--
REL. STD.	--	--	--	11.6	--	--	--	--	9.6	--	--
DES. VAL.	--	--	--	.238	--	--	--	--	.275	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 31 DATE: 01/03/85 DISTRIBUTED: 25/02/85

SAMPLE = 1 SPIKED SAMPLE. TRACE METALS D/A.

LAB	29306 CU EXTBL AAS DA MG/L	29311 CU EXTBL ICAP DA MG/L	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN	30011 ZN TOTAL 5X ICAP UG/L ZN	30304 ZN EXTBL AAS DA MG/L	30311 ZN EXTBL ICAP DA MG/L	30999 ZINC COMBINED MG/L ZN	38301 SR EXTBL AAS DA MG/L	38999 STRNTIUM COMBINED MG/L SR	42009 MO TOTAL ICAP MG/L MO
1	--	--	0.043	0.061	--	--	--	0.061	--	--	0.805
2	0.05	--	0.05	--	--	0.058	--	0.058	--	--	--
3	0.05	--	0.05	--	--	0.05	--	0.05	0.18	0.18	--
6	--	--	0.043	--	0.053	--	--	0.053	--	--	--
8	--	0.04	0.04	--	--	--	0.05	0.05	--	--	--
MEAN	.0500	.0400	.0452	.0610	.0530	.0540	.0500	.0544	.1800	.1800	.8050
STD. DEV.	0.0000	--	.0045	--	--	.0057	--	.0049	--	--	--
REL. STD.	0.0	--	10.1	--	--	10.5	--	9.1	--	--	--
DES. VAL.	--	--	.048	--	--	--	--	.057	--	.180	--

LAB	42011 MO TOTAL 5X ICAP UG/L MO	42301 MO EXTBL AAS DA MG/L	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD	48011 CD TOTAL 5X ICAP UG/L CD	48301 CD EXTBL AAS DA MG/L	48999 CADMIUM COMBINED MG/L CD	56011 BA TOTAL 5X ICAP UG/L BA	56301 BA EXTBL AAS DA MG/L	56999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB
1	--	--	0.805	0.040	--	--	0.040	--	--	--	--
2	--	--	--	--	--	0.04	0.04	--	--	--	--
3	--	0.44 R	0.44 R	--	--	0.05	0.05	--	0.5	0.5	--
6	0.81	--	0.81	--	0.035	--	0.035	0.41	--	0.41	0.18 R
8	--	--	--	--	--	0.04	0.04	--	--	--	--
MEAN	.8100	--	.8075	.0400	.0350	.0433	.0410	.4100	.5000	.4550	--
STD. DEV.	--	--	.0035	--	--	.0058	.0055	--	--	.0636	--
REL. STD.	--	--	.4	--	--	13.3	13.4	--	--	14.0	--
DES. VAL.	--	--	.930	--	--	--	.043	--	--	.495	--

LAB	82301 PB EXTBL AAS DA MG/L	82302 PB EXTBL AAS SE MG/L	82311 PB EXTBL ICAP DA MG/L	82999 LEAD COMBINED MG/L PB
1	--	0.256	--	0.256
2	0.28	--	--	0.28
3	0.29	--	--	0.29
6	--	--	--	0.18 R
8	--	--	0.28	0.28
MEAN	.2850	.2560	.2800	.2765
STD. DEV.	.0071	--	--	.0145
REL. STD.	2.5	--	--	5.2
DES. VAL.	--	--	--	.291

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 31 DATE: 01/03/85 DISTRIBUTED: 25/02/85

SAMPLE = 2 NATURAL SAMPLE. MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR A REL UNIT	02021 COLOUR V IS COMP REL UNIT	02040 COLOUR COMBINED REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02060 CONDUCT COMBINED USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLMTRIC NTU	02090 TURBIDTY COMBINED JTU/NTU
1	1.12	9.52	9.31	--	--	--	917.	917.	--	--	--
2	1.284	9.042	9.277	5. L	--	5. L	910.	910.	0.4	--	0.4
3	1.21	9.233	9.012	--	--	--	938.7	938.7	--	--	--
4	--	--	--	--	10.	10.	926.	926.	0.62	--	0.62
5	2.07	9.61	9.22	20.	--	20.	903.	903.	0.25	--	0.25
6	2.6	10.0	9.5	--	--	--	919.	919.	--	0.06	0.06
7	-5.9	9.13	10.27	19.	--	19.	88.1 R	88.1 R	0.3	--	0.3
8	-1.12	8.94	9.15	10.	--	10.	920.	920.	--	0.45	0.45
MEAN	.1806	9.3536	9.3913	16.3333	10.0000	14.7500	919.1000	919.1000	.3925	.2550	.3467
STD. DEV.	2.9226	.3750	.4153	5.5076	--	5.5000	11.3946	11.3946	.1640	.2758	.1908
REL. STD.	*****	4.0	4.4	33.7	--	37.3	1.2	1.2	41.8	108.1	55.0
DES. VAL.	--	--	--	--	--	--	--	--	--	--	.378

LAB	05105 BORON AA CARM MG/L	05106 BORON F AUTO AN MG/L B	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 DOC UV CO2 EV MG/L C	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06290 D O C COMBINED MG/L	06490 D I C COMBINED MG/L
1	--	--	--	--	--	7.8	--	--	43.4	7.8	43.4
2	--	--	--	--	--	7.0	--	--	--	7.2	--
3	--	--	--	--	7.8	--	--	45.5	--	7.6	45.5
4	0.20	--	0.20	--	6.5	--	--	89. R	--	6.5	89. R
5	--	--	--	4.1 R	--	--	44.	--	--	4.1 R	44.
6	--	--	--	--	8.4	--	--	--	--	3.4	--
7	--	0.17	0.17	8.0	--	--	42.0	--	--	8.0	42.0
8											
MEAN	.2000	.1700	.1850	8.0000	7.5667	7.4000	43.0000	45.5000	43.4000	7.5833	43.7250
STD. DEV.	--	--	.0212	--	.9713	.5657	1.4142	--	--	.6998	1.4500
REL. STD.	--	--	11.5	--	12.8	7.6	3.3	--	--	9.2	3.3
DES. VAL.	--	--	.155	--	--	--	--	--	--	7.748	40.688

LAB	07010 TKN AUTAN MG/L N	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG AA 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3+NO2 F AA HYD MG/L N	07110 NO3+NO2 AA2 CD MG/L N	07111 NO3+NO2 DIS SPEC MG/L N	07112 NO3+NO2 UF AA CD MG/L	07390 NITRATE COMBINED MG/L	07505 TOT HN3 AA BERT MG/L N
1	--	--	--	0.670	0.670	--	--	1.320	--	1.320	--
2	--	--	--	--	--	--	1.32	--	--	1.32	--
3	0.615	--	--	--	0.615	--	--	--	1.355	1.355	0.049
4	--	--	--	--	--	--	1.3	--	--	1.3	--
5	--	--	--	--	--	--	1.29	--	--	1.29	--
6	--	--	0.8	--	0.8	1.28	--	--	--	1.28	--
7	--	--	--	--	--	--	--	--	13.13R	13.13R	--
8	--	0.70	--	--	0.70	--	1.35	--	--	1.35	--
MEAN	.6150	.7000	.8000	.6700	.6963	1.2800	1.3150	1.3200	1.3550	1.3164	.0490
STD. DEV.	--	--	--	--	.0776	--	.0255	--	--	.0287	--
REL. STD.	--	--	--	--	11.1	--	2.0	--	--	2.2	--
DES. VAL.	--	--	--	--	.875	--	--	--	--	.842	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 31 DATE: 01/03/85 DISTRIBUTED: 25/02/85

SAMPLE = 2 NATURAL SAMPLE.

MAJOR IONS 4 C.

LAB	07506 TOT NH3 SPEC EL MG/L N	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07601 TOTAL N AA UV MG/L	07602 TOTAL N CALC'D MG/L N	07651 TOT N F UV AA MG/L	07655 TOT N F UV EDTA MG/L	07690 TOTAL N COMBINED MG/L N	07790 T N DISS COMBINED MG/L N
1	--	--	--	0.017	0.017	--	--	--	--	--	--
2	--	--	--	--	--	1.4	--	--	--	--	1.4
3	--	--	--	--	0.049	--	--	--	--	--	--
4	0.1 L	--	--	--	0.1 L	--	--	1.6	--	--	1.6
5	--	--	0.066	--	0.066	--	--	--	2.15	--	2.15
6	--	--	0.01 L	--	0.01 L	--	--	--	--	--	--
8	--	0.02	--	--	0.02	--	2.05	--	--	2.05	--
MEAN	--	.0200	.0660	.0170	.0380	1.4000	2.0500	1.6000	2.1500	2.0500	1.7167
STD. DEV.	--	--	--	--	.0236	--	--	--	--	--	.3884
REL. STD.	--	--	--	--	62.1	--	--	--	--	--	22.6
DES. VAL.	--	--	--	--	.200	--	--	--	--	1.890	1.525

LAB	09103 FLUORIDE DIS COLR MG/L F	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L	09107 FLUOR F AUTO POT MG/L F	09108 F DISS SPEC EL MG/L	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR'N MG/L CAC	10106 ALKLINTY IR CO2 MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10111 ALKLINTY TITROPRO MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC
1	--	--	--	0.25	--	0.25	168.	--	--	--	168.
2	--	0.25	--	--	--	0.25	159.5	--	--	--	159.5
3	--	--	--	--	0.252	0.252	--	153.9	--	165.	165.
4	--	--	--	--	--	--	166.	--	--	--	166.
5	--	--	0.267	--	--	0.267	164.	--	--	--	164.
6	0.3 R	--	--	--	--	0.3 R	--	--	172.	--	172.
7	--	--	--	--	--	--	161.9	--	--	--	161.9
8	--	0.26	--	--	--	0.26	--	--	166.	--	166.
MEAN	--	.2550	.2670	.2500	.2520	.2558	163.8800	153.9000	169.0000	165.0000	165.3000
STD. DEV.	--	.0071	--	--	--	.0075	3.3387	--	4.2426	--	3.7823
REL. STD.	--	2.8	--	--	--	2.9	2.0	--	2.5	--	2.3
DES. VAL.	--	--	--	--	--	.248	--	--	--	--	170.458

LAB	10301 PH UNITS	10390 PH COMBINED UNITS	10602 HARDNESS CALC'D MG/L	10603 HARDNESS TITR'N MG/L	10690 HARDNESS COMBINED MG/L	11102 SODIUM AAS F MG/L NA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS DA MG/L	11107 SODIUM FL PH UF MG/L	11311 NA EXTBL HNO3 ICP MG/L	11990 SODIUM COMBINED MG/L
1	8.1	8.1	235.	--	235.	--	106.	--	--	--	106.
2	8.0	8.0	--	--	--	--	97.0	--	--	--	97.0
3	8.27	8.27	--	--	--	--	--	--	99.8	--	99.8
4	7.6	7.6	--	--	--	--	--	--	--	--	--
5	7.60	7.60	--	244.	244.	--	104.	--	--	--	104.
6	7.3	7.3	--	252.	252.	108.	--	--	--	--	108.
7	7.7	7.7	230.4	247.4	247.4	--	--	99.5	--	--	99.5
8	8.00	8.00	232.	--	232.	--	--	--	--	94.9	94.9
MEAN	7.8213	7.8213	232.4667	247.8000	242.0800	108.0000	102.3333	99.5000	99.8000	94.9000	101.3143
STD. DEV.	.3223	.3223	2.3352	4.0150	8.3983	--	4.7258	--	--	--	4.8168
REL. STD.	4.1	4.1	1.0	1.6	3.5	--	4.6	--	--	--	4.6
DES. VAL.	--	7.915	--	--	246.240	--	--	--	--	--	97.973

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 31 DATE: 01/03/85 DISTRIBUTED: 25/02/85

SAMPLE = 2 NATURAL SAMPLE. MAJOR IONS 4 C.

LAB	12101 MG DISS CALC+D MG/L	12102 MG FIL AAS DA MG/L	12106 MG UF AAS DA MG/L	12107 MG DISS AAS AUTO MG/L	12108 MG HARDN CALC+C MG/L	12303 MG UF AAS AUTO MG/L MG	12311 MG EXTBL HNO3 ICP MG/L	12990 MGNESIUM COMBINED MG/L MG	14102 SILICA R ANSA AA MG/L	14105 SILICA R MOLY AA MG/L	14106 SILICA R MOLY UF MG/L
1	--	--	--	--	--	31.	--	31.	0.5 L	--	--
2	--	--	--	30.	--	--	--	30.	0.4	--	--
3	--	--	30.4	--	--	--	--	30.4	--	--	0.41
5	--	--	--	--	30.8	--	--	30.8	--	0.4	--
6	34.	--	--	--	--	--	--	34.	--	--	--
7	--	31.4	--	--	--	--	--	31.4	--	--	--
8	--	--	--	--	--	--	30.6	30.6	--	0.4	--
MEAN	34.0000	31.4000	30.4000	30.0000	30.8000	31.0000	30.6000	31.1714	.4000	.4000	.4100
STD. DEV.	--	--	--	--	--	--	--	1.3238	--	0.0000	--
REL. STD.	--	--	--	--	--	--	--	4.2	--	0.0	--
DES. VAL.	--	--	--	--	--	--	--	30.900	--	--	--

LAB	14190 SILICA COMBINED MG/L	15406 T P UF AA ASC MG/L P	15409 T P BLK AA ASC MG/L P	15413 TOTAL P AA SNCL2 MG/L P	15421 T P BLK DIG ASC MG/L F	15490 TOTAL P COMBINED MG/L	16304 SO4 DISS AUTO BA MG/L	16306 SO4 DISS AA MTB MG/L	16307 SO4 DISS AAN MBUF MG/L	16309 SO4 DISS I C MG/L SO4	16990 SULFATE COMBINED MG/L SO4
1	0.5 L	--	--	--	0.028	0.028	--	190.	--	--	190.
2	0.4	--	--	0.027	--	0.027	189.	--	--	184.	189.
3	0.41	--	--	--	--	--	--	--	181.5	--	181.5
4	--	0.025	--	--	--	0.025	--	--	--	--	--
5	0.4	--	--	--	--	--	--	183.	--	--	183.
6	--	--	0.04	--	--	0.04	186.	--	--	--	186.
7	--	--	--	--	--	--	--	193.7	--	--	193.7
8	0.4	--	--	0.033	--	0.033	--	180.	--	--	180.
MEAN	.4025	.0250	.0400	.0300	.0280	.0306	187.5000	186.6750	181.5000	184.0000	186.1714
STD. DEV.	.0050	--	--	.0042	--	.0060	2.1213	6.2840	--	--	4.9889
REL. STD.	1.2	--	--	14.1	--	19.7	1.1	3.4	--	--	2.7
DES. VAL.	.410	--	--	--	--	.045	--	--	--	--	184.000

LAB	17203 CL DISS AA UF FE MG/L	17204 CL DISS AG TITR MG/L	17205 CL DISS ION EL MG/L	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17990 CHLORIDE COMBINED MG/L	19102 K DISS AAS MG/L K	19103 K DISS F FLM PHOT MG/L	19107 K DIS UF FLM PHOT MG/L	19301 K EXTBL HNO3 AA MG/L	19990 PTASSIUM COMBINED MG/L
1	70.	--	--	--	--	70.	--	8.3	--	--	8.3
2	--	--	73.	--	--	73.	--	8.2	--	--	8.2
3	--	--	--	--	64.92	64.92	--	--	8.3	--	8.3
5	--	--	--	72.0	--	72.0	--	8.4	--	--	8.4
6	--	76.	--	--	--	76.	12.6 R	--	--	--	12.6 R
7	73.3	--	--	--	--	73.3	7.8	--	--	--	7.8
8	--	--	--	70.	--	70.	--	--	--	7.50	7.50
MEAN	71.6500	76.0000	73.0000	71.0000	64.9200	71.3171	7.8000	8.3000	8.3000	7.5000	8.0833
STD. DEV.	2.3335	--	--	1.4142	--	3.5012	--	.1000	--	--	.3545
REL. STD.	3.3	--	--	2.0	--	4.9	--	1.2	--	--	4.4
DES. VAL.	--	--	--	--	--	68.955	--	--	--	--	7.889

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 31 DATE: 01/03/85 DISTRIBUTED: 25/02/85

SAMPLE = 2 NATURAL SAMPLE. MAJOR IONS 4 C.

LAB	20100 CA DISS CALC+D MG/L CA	20101 CA DISS TIT EDTA MG/L	20103 CA DISS AAS MG/L	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20311 CA EXTBL HNO3 ICP MG/L	20950 CALCIUM COMBINED MG/L CA
1	--	--	--	--	43.	--	43.
2	--	--	--	--	43.	--	43.
3	--	--	--	43.6	--	--	43.6
5	--	47.0	--	--	--	--	47.0
6	45.	--	--	--	--	--	45.
7	--	--	40.5	--	--	--	40.5
8	--	--	--	--	--	42.3	42.3
MEAN	45.0000	47.0000	40.5000	43.6000	43.0000	42.3000	43.4857
STD. DEV.	--	--	--	--	0.0000	--	2.0595
REL. STD.	--	--	--	--	0.0	--	4.7
DES. VAL.	--	--	--	--	--	--	43.664

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 32 DATE: 01/04/85 DISTRIBUTED: 25/02/85

SAMPLE = 3 SPIKED SAMPLE. TRACE METALS S/E.

LAB	13302 AL EXTBL AAS DA MG/L	13305 AL EXTBL AAS SE MG/L AL	13306 AL UFAAS SE OX/EP MG/L AL	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP CA MG/L V	23011 V TOTAL 5X ICAP UG/L V	23302 V EXTRBL SE PH1.6 MG/L	23999 VANADIUM COMBINED MG/L V	24004 CR TOTAL AAS G F MG/L	24009 CR TOTAL ICAP DA MG/L CR	24011 CR TOTAL 5X ICAP UG/L CR
1	--	--	0.030	0.030	0.003	--	--	0.003	--	0.006	--
2	--	0.013	--	0.013	--	--	--	--	--	--	--
3	--	0.015	--	0.015	--	--	0.005	0.005	--	--	--
6	--	--	--	0.06	--	0.01 L	--	0.01 L	--	--	0.005
8	0.2 L	--	--	0.2 L HDL	--	--	--	--	0.012R	--	--
MEAN	--	.0140	.0300	.0295	.0030	--	.0050	.0040	--	.0060	.0050
STD. DEV.	--	.0014	--	.0217	--	--	--	.0014	--	--	--
REL. STD.	--	10.1	--	73.6	--	--	--	35.4	--	--	--
DES. VAL.	--	--	--	.019	--	--	--	.006	--	--	--

LAB	24303 CR EXTBL AAS SE MG/L	24999 CHROMIUM COMBINED MG/L CR	25003 MN TOTAL ICAP DA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25311 MN EXTBL ICAP DA MG/L	25999 MANGNESE COMBINED MG/L MN	26011 FE TOTAL 5X ICAP UG/L FE	26304 FE EXTBL AAS DA MG/L	26305 FE EXTBL AAS SE MG/L	26311 FE EXTBL ICAP DA MG/L
1	--	0.006	0.008L	--	--	--	0.008L	--	0.02 L	--	--
2	--	--	--	--	0.01 L	--	0.01 L	--	--	0.006	--
3	0.006	0.006	--	--	0.005	--	0.005	--	--	0.004	--
6	--	0.005	--	0.012	--	--	0.012	0.028R	--	--	--
8	--	0.012R	--	--	--	0.02 L	0.02 L HDL	--	--	--	0.02 L
MEAN	.0060	.0057	--	.0120	.0050	--	.0085	--	--	.0050	--
STD. DEV.	--	.0006	--	--	--	--	.0049	--	--	.0014	--
REL. STD.	--	10.2	--	--	--	--	58.2	--	--	28.3	--
DES. VAL.	--	.008	--	--	--	--	.006	--	--	--	--

LAB	26999 IRON COMBINED MG/L FE	27003 CO TOTAL AAS G F MG/L	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO	27302 CO EXTBL AAS SE MG/L	27999 COBALT COMBINED MG/L CO	28009 NI TOTAL ICAP DA MG/L NI	28011 NI TOTAL 5X ICAP UG/L NI	28302 NI EXTBL AAS SE MG/L	28309 NI EXTR AAS G F MG/L NI	28999 NICKEL COMBINED MG/L NI
1	0.02 L HDL	--	0.003	--	--	0.003	0.006	--	--	--	0.006
2	0.006	--	--	--	--	--	--	--	0.007	--	0.007
3	0.004	--	--	--	0.005	0.005	--	--	0.006	--	0.006
6	0.028R	--	--	0.005	--	0.005	--	0.007	--	--	0.007
8	0.02 L HDL	0.006	--	--	--	0.006	--	--	--	0.007	0.007
MEAN	.0050	.0060	.0030	.0050	.0050	.0048	.0060	.0070	.0065	.0070	.0066
STD. DEV.	.0014	--	--	--	--	.0013	--	--	.0007	--	.0005
REL. STD.	28.3	--	--	--	--	26.5	--	--	10.9	--	8.3
DES. VAL.	.006	--	--	--	--	.005	--	--	--	--	.007

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 32 DATE: 01/04/85 DISTRIBUTED: 25/02/85

SAMPLE = 3 SPIKED SAMPLE. TRACE METALS S/E.

LAB	29009 CU TOTAL ICAP MG/L CU	29011 CU TOTAL 5X ICAP UG/L CU	29305 CU EXTBL AAS SE MG/L	29311 CU EXTBL ICAP DA MG/L	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN	30011 ZN TOTAL 5X ICAP UG/L ZN	30304 ZN EXTBL AAS DA MG/L	30305 ZN EXTBL AAS SE MG/L	30311 ZN EXTBL ICAP DA MG/L	30999 ZINC COMBINED MG/L ZN
1	0.005	--	--	--	0.005	0.010	--	--	--	--	0.010
2	--	--	0.007	--	0.007	--	--	0.011	--	--	0.011
3	--	--	0.007	--	0.007	--	--	--	0.007	--	0.007
6	--	0.008	--	--	0.008	--	0.019R	--	--	--	0.019R
8	--	--	--	0.01	0.01	--	--	--	--	0.01 L	0.01 L HDL
MEAN	.0050	.0080	.0070	.0100	.0074	.0100	--	.0110	.0070	--	.0093
STD. DEV.	--	--	0.0000	--	.0018	--	--	--	--	--	.0021
REL. STD.	--	--	0.0	--	24.5	--	--	--	--	--	22.3
DES. VAL.	--	--	--	--	.007	--	--	--	--	--	.006

LAB	38301 SR EXTBL AAS DA MG/L	38999 STRNTIUM COMBINED MG/L SR	42009 MO TOTAL ICAP MG/L MO	42011 MO TOTAL 5X ICAP UG/L MO	42302 MO EXTBL AAS SE MG/L	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD	48011 CD TOTAL 5X ICAP UG/L CD	48302 CD EXTBL AAS SE MG/L	48309 CD EXTBL AAS G F MG/L CD	48999 CADMIUM COMBINED MG/L CD
1	--	--	0.001L	--	--	0.001L	0.005	--	--	--	0.005
2	--	--	--	--	--	--	--	--	0.005	--	0.005
3	0.18	0.18	--	--	0.006	0.006	--	--	0.005	--	0.005
6	--	--	--	0.005L	--	0.005L	--	0.005	--	--	0.005
8	--	--	--	--	--	--	--	--	--	0.005	0.005
MEAN	.1800	.1800	--	--	.0060	.0060	.0050	.0050	.0050	.0050	.0050
STD. DEV.	--	--	--	--	--	--	--	--	0.0000	--	0.0000
REL. STD.	--	--	--	--	--	--	--	--	0.0	--	0.0
DES. VAL.	--	.183	--	--	--	.007	--	--	--	--	.005

LAB	56011 BA TOTAL 5X ICAP UG/L BA	56301 BA EXTBL AAS DA MG/L	56999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB	82302 PB EXTBL AAS SE MG/L	82309 PB EXTBL AAS G F MG/L PB	82999 LEAD COMBINED MG/L PB
1	--	--	--	--	0.011R	--	0.011R
2	--	--	--	--	0.006	--	0.006
3	--	0.1 L	0.1 L HDL	--	0.005	--	0.005
6	0.031	--	0.031	0.005L	--	--	0.005L
8	--	--	--	--	--	0.005L	0.005L
MEAN	.0310	--	.0310	--	.0055	--	.0055
STD. DEV.	--	--	--	--	.0007	--	.0007
REL. STD.	--	--	--	--	12.9	--	12.9
DES. VAL.	--	--	.026	--	--	--	.006

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 32 DATE: 01/04/85 DISTRIBUTED: 25/02/85

SAMPLE = 4 SYNTHETIC SAMPLE. MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR A REL UNIT	02021 COLOUR V IS COMP REL UNIT	02040 COLOUR COMBINED REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02060 CONDUCT COMBINED USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLMTRIC NTU	02090 TURBIDTY COMBINED JTU/NTU
1	0.26	3.87	3.85	--	--	--	470.	471.	--	--	--
2	1.602	3.789	3.913	5. L	--	5. L	452.	452.	0.2	--	0.2
3	2.27	3.782	3.615	--	--	--	471.5	471.5	--	--	--
4	--	--	--	--	5. L	5. L	452.	452.	0.44	--	0.44
5	1.39	3.82	3.71	5. L	--	5. L	462.	462.	0.11	--	0.11
6	1.3	3.8	3.9	--	--	--	468.	468.	--	0.24	0.24
7	-1.8	3.64	3.70	0.	--	0.	448.	448.	0.2	--	0.2
8	2.24	3.92	3.75	--	--	--	480.	480.	--	0.35	0.35
MEAN	1.0374	3.8030	3.7883	0.0000	--	0.0000	462.9375	462.9375	.2375	.2950	.2567
STD. DEV.	1.4220	.0873	.1077	--	--	--	11.3592	11.3592	.1415	.3778	.1188
REL. STD.	137.1	2.3	2.8	--	--	--	2.5	2.5	59.6	26.4	46.3
DES. VAL.	--	--	--	--	--	--	--	--	--	--	.181

LAB	05105 BORON AA CARM MG/L	05106 BORON F AUTO AN MG/L B	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 DOC UV CO2 EV MG/L C	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06290 D O C COMBINED MG/L	06490 D I C COMBINED MG/L
1	--	--	--	--	--	0.4 L	--	--	1.0 L	0.4 L	1.0 L
2	--	--	--	--	--	1.0 L	--	--	--	1.0 L	--
3	--	--	--	--	0.2	--	--	0.5	--	0.2	0.5
4	0.03	--	0.03	--	1.0	--	--	1.0 L	--	1.0	1.0 L
5	--	--	--	3.2	--	--	0.52 L	--	--	3.2	0.52 L
6	--	--	--	--	5.1	--	--	--	--	2.1	--
7	--	0.05 L	0.05 L	6.5	--	--	1.0 L	--	--	6.5	1.0 L
8	--										
MEAN	.0300	--	.0300	4.8500	2.1000	--	--	.5000	--	3.2000	.5000
STD. DEV.	--	--	--	2.3335	2.6287	--	--	--	--	2.6618	--
REL. STD.	--	--	--	48.1	125.2	--	--	--	--	83.2	--
DES. VAL.	--	--	--	--	--	--	--	--	--	.672	.606

LAB	07010 TKN AUTAN MG/L N	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG A/ 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3+NO2 F AA HYD MG/L N	07110 NO3+NO2 AA2 CD MG/L N	07111 NO3+NO2 DIS SPEC MG/L N	07112 NO3+NO2 UF AA CD MG/L	07390 NITRATE COMBINED MG/L	07505 TOT HN3 AA BERT MG/L N
1	--	--	--	0.050L	0.050L	--	--	0.022	--	0.022	--
3	0.055	--	--	--	0.055	--	--	--	0.089	0.089	0.044R
4	--	--	--	--	--	--	0.03	--	--	0.3	--
5	--	--	--	--	--	--	0.042	--	--	0.042	--
6	--	--	0.1	--	0.1	0.14	--	--	--	0.14	--
7	--	--	--	--	--	--	--	--	0.03	0.03	--
8	--	0.20 L	--	--	0.20 L HDL	--	0.05	--	--	0.05	--
MEAN	.0550	--	.1000	--	.0775	.1400	.0407	.0220	.0595	.0576	--
STD. DEV.	--	--	--	--	.0318	--	.0101	--	.0417	.0426	--
REL. STD.	--	--	--	--	41.1	--	24.8	--	70.1	73.9	--
DES. VAL.	--	--	--	--	.058	--	--	--	--	.031	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 32 DATE: 01/04/85 DISTRIBUTED: 25/02/85

SAMPLE = 4 SYNTHETIC SAMPLE. MAJOR IONS 4 C.

LAB	07506 TOT NH3 SPEC EL MG/L N	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07601 TOTAL N AA UV MG/L	07602 TOTAL N CALC+D MG/L N	07651 TOT N F UV AA MG/L	07655 TOT N F UV EDTA MG/L	07690 TOTAL N COMBINED MG/L N	07790 T N DISS COMBINED MG/L N
1	--	--	--	0.004	0.004	--	--	--	--	--	--
2	--	--	--	--	--	0.10 L	--	--	--	--	0.1 L
3	--	--	--	--	0.0446	--	--	--	--	--	--
4	0.1 L	--	--	--	0.1 L HDL	--	--	0.05	--	--	0.05
5	--	--	0.004	--	0.004	--	--	--	0.071	--	0.071
6	--	--	0.01 L	--	0.01 L	--	--	--	--	--	--
8	--	0.02 L	--	--	0.02 L	--	0.25 L	--	--	0.25 L	--
MEAN	--	--	.0040	.0040	.0040	--	--	.0500	.0710	--	.0605
STD. DEV.	--	--	--	--	0.0000	--	--	--	--	--	.0148
REL. STD.	--	--	--	--	0.0	--	--	--	--	--	24.5
DES. VAL.	--	--	--	--	.009	--	--	--	--	.030	.050

LAB	09103 FLUORIDE DIS COLR MG/L F	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L	09107 FLUOR F AUTO POT MG/L F	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR+N MG/L CAC	10106 ALKLINTY IR CO2 MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10110 ALKLINTY GRAN TIT MG/L CAC	10111 ALKLINTY TITROPRO MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC
1	--	--	--	0.05 L	0.05 L	--	--	--	--	--	--
2	--	0.05 L	--	--	0.05 L	--	--	--	0.2	--	0.2
3	--	--	--	--	--	--	2.0	--	--	0.5	0.6
4	--	--	--	--	--	0.75	--	--	--	--	0.75
5	--	--	0.013	--	0.013	0.5 L	--	--	--	--	0.5 L
6	0.1 L	--	--	--	0.1 L HDL	--	--	2.2	--	--	2.2
7	--	--	--	--	--	0.1 L	--	--	--	--	0.1 L
8	--	0.1 L	--	--	0.1 L HDL	--	--	0.0	--	--	0.0
MEAN	--	--	.0130	--	.0130	.7500	2.0000	1.1000	.2000	.6000	.7500
STD. DEV.	--	--	--	--	--	--	--	1.5556	--	--	.8646
REL. STD.	--	--	--	--	--	--	--	141.4	--	--	115.3
DES. VAL.	--	--	--	--	--	--	--	--	--	--	1.460

LAB	10251 ACIDITY PH=8.3 F MG/L	10290 ACIDITY COMBINED MG/L	10301 PH UNITS	10390 PH COMBINED UNITS	10602 HARDNESS CALC+D MG/L	10603 HARDNESS TITR+N MG/L	10690 HARDNESS COMBINED MG/L	11102 SODIUM AAS F MG/L NA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS DA MG/L	11107 SODIUM FL FH UF MG/L
1	5. L	5. L	4.3	4.3	144.	--	144.	--	22.	--	--
2	--	--	5.4	5.4	--	--	--	--	19.8	--	--
3	--	--	5.65	5.65	--	--	--	--	--	--	19.4
4	--	--	5.7	5.7	--	--	--	--	--	--	--
5	--	--	4.6	4.6	--	148.	148.	--	19.3	--	--
6	--	--	4.7	4.7	--	152.	152.	18.	--	--	--
7	--	--	4.3	4.3	141.6	150.2	150.2	--	--	17.0	--
8	--	--	4.05	4.05	151.	--	151.	--	--	--	--
MEAN	--	--	4.8375	4.8375	145.5333	150.0567	149.0400	18.0000	20.3667	17.0000	19.4000
STD. DEV.	--	--	.6540	.6540	4.8840	2.0033	3.1793	--	1.4364	--	--
REL. STD.	--	--	13.5	13.5	3.4	1.3	2.1	--	7.1	--	--
DES. VAL.	--	1.738	--	5.507	--	--	147.951	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 32 DATE: 01/04/85 DISTRIBUTED: 25/02/85

SAMPLE = 4 SYNTHETIC SAMPLE. MAJOR IONS 4 C.

LAB	11311 NA EXTBL HNO3 ICP MG/L	11990 SODIUM COMBINED MG/L	12101 MG DISS CALC+D MG/L	12102 MG FIL AAS DA MG/L	12106 MG UF AAS DA MG/L	12107 MG DISS AAS AUTO MG/L	12108 MG HARDN CALC+D MG/L	12303 MG UF AAS AUTO MG/L MG	12311 MG EXTBL HNO3 ICP MG/L	12990 MGNESIUM COMBINED MG/L MG	14102 SILICA R ANSA AA MG/L
1	--	22.	--	--	--	--	--	9.	--	9.	0.5 L
2	--	19.8	--	--	--	9.8	--	--	--	9.8	0.1 L
3	--	19.4	--	--	9.5	--	--	--	--	9.5	--
5	--	19.3	--	--	--	--	9.6	--	--	9.6	--
6	--	18.	9.	--	--	--	--	--	--	9.	--
7	--	17.0	--	9.4	--	--	--	--	--	9.4	--
8	19.1	19.1	--	--	--	--	--	--	10.2	10.2	--
MEAN	19.1000	19.2286	9.0000	9.4000	9.5000	9.8000	9.6000	9.0000	10.2000	9.5000	--
STD. DEV.	--	1.5564	--	--	--	--	--	--	--	.4282	--
REL. STD.	--	8.1	--	--	--	--	--	--	--	4.5	--
DES. VAL.	--	19.074	--	--	--	--	--	--	--	9.386	--

LAB	14105 SILICA R MOLY AA MG/L	14106 SILICA R MOLY UF MG/L	14190 SILICA COMBINED MG/L	15406 T P UF AA ASC MG/L P	15409 T P ELK AA ASC MG/L F	15413 TOTAL P AA SNCL2 MG/L P	15421 T P BLK DIG ASC MG/L P	15490 TOTAL P COMBINED MG/L	16304 SO4 DISS AUTO BA MG/L	16306 SO4 DISS AA MTB MG/L	16307 SO4 DISS AAN MBUF MG/L
1	--	--	0.5 L	--	--	--	0.006L	0.006L	--	36.	--
2	--	--	0.1 L	--	--	0.001L	--	0.001L	36.0	--	--
3	--	0.02 L	0.02 L	--	--	--	--	--	--	--	41.2
4	--	--	--	0.003L	--	--	--	0.003L	--	--	--
5	0.2 L	--	0.2 L	--	--	--	--	--	--	34.5	--
6	--	--	--	--	0.02	--	--	0.02	40.	--	--
7	--	--	--	--	--	--	--	--	--	35.0	--
8	0.2 L	--	0.2 L	--	--	0.001L	--	0.001L	--	37.5	--
MEAN	--	--	--	--	.0200	--	--	.0200	38.0000	35.7500	41.2000
STD. DEV.	--	--	--	--	--	--	--	--	2.8284	1.3229	--
REL. STD.	--	--	--	--	--	--	--	--	7.4	3.7	--
DES. VAL.	--	--	.009	--	--	--	--	.007	--	--	--

LAB	16309 SO4 DISS I C MG/L SO4	16990 SULFATE COMBINED MG/L SO4	17203 CL DISS AA UF FE MG/L	17204 CL DISS AG TITN MG/L	17205 CL DISS ION EL MG/L	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17990 CHLORIDE COMBINED MG/L	19102 K DISS AAS MG/L K	19103 K DISS F LM PHOT MG/L	19107 K DIS UF FLM PHOT MG/L
1	--	36.	110.	--	--	--	--	110.	--	1.0	--
2	35.0	35.0	--	--	112.	--	--	112.	--	0.88	--
3	--	41.2	--	--	--	--	97.06	97.06	--	--	0.90
5	--	34.5	--	--	--	106.	--	106.	--	0.8	--
6	--	40.	--	106.	--	--	--	106.	0.1 L	--	--
7	--	35.0	108.0	--	--	--	--	108.0	0.9	--	--
8	--	37.5	--	--	--	105.	--	105.	--	--	--
MEAN	35.0000	37.0286	109.0000	106.0000	112.0000	105.5000	97.0600	106.2943	.9000	.8933	.9000
STD. DEV.	--	2.6500	1.4142	--	--	.7071	--	4.7665	--	.1007	--
REL. STD.	--	7.2	1.3	--	--	.7	--	4.5	--	11.3	--
DES. VAL.	--	37.080	--	--	--	--	--	105.384	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 32 DATE: 01/04/85 DISTRIBUTED: 25/02/85

SAMPLE = 4 SYNTHETIC SAMPLE. MAJOR IONS 4 C.

LAB	19301 K EXTBL HNO3 AA MG/L	19990 PTASSIUM COMBINED MG/L	20100 CA DISS CALC'D MG/L CA	20101 CA DISS TIT EDTA MG/L	20103 CA DISS AAS MG/L	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20311 CA EXTBL HNO3 ICP MG/L	20990 CALCIUM COMBINED MG/L CA
1	--	1.0	--	--	--	--	43.	--	43.
2	--	0.88	--	--	--	--	42.	--	42.
3	--	0.90	--	--	--	42.7	--	--	42.7
5	--	0.8	--	43.4	--	--	--	--	43.4
6	--	0.1 L	46.	--	--	--	--	--	46.
7	--	0.9	--	--	41.2	--	--	--	41.2
8	5.00 L	5.00 L MDL	--	--	--	--	--	43.8	43.8
MEAN	--	.8960	46.0000	43.4000	41.2000	42.7000	42.5000	43.8000	43.1571
STD. DEV.	--	.0713	--	--	--	--	.7071	--	1.5252
REL. STD.	--	8.0	--	--	--	--	1.7	--	3.5
DES. VAL.	--	.882	--	--	--	--	--	--	42.274

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 32 DATE: 01/04/85 DISTRIBUTED: 25/02/85

SAMPLE = 5 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR A REL UNIT	02021 COLOUR V IS COMP REL UNIT	02040 COLOUR COMBINED REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02060 CONDUCT COMBINED USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLMTRIC NTU	02090 TURBIDTY COMBINED JTU/NTU
1	2.86	5.93	5.60	--	--	--	615.	615.	--	--	--
2	1.732	5.848	5.648	5. L	--	5. L	607.	607.	0.1	--	0.1
3	0.81	5.893	5.798	--	--	--	629.1	629.1	--	--	--
4	--	--	--	--	5. L	5. L	612.	612.	0.43	--	0.43
5	2.19	6.10	5.84	5. L	--	5. L	595.	595.	0.06	--	0.06
6	2.3	6.1	5.8	--	--	--	613.	613.	--	0.09	0.09
7	2.8	6.07	5.74	1.	--	1.	591.	591.	0.1	--	0.1
8	6.82	6.32	5.51	5. L	--	5. L	622.	622.	--	0.90 R	0.91 R
MEAN	2.7874	6.0373	5.7051	1.0000	--	1.0000	610.5125	610.5125	.1725	.0900	.1560
STD. DEV.	1.9099	.1618	.1221	--	--	--	12.7599	12.7599	.1727	--	.1540
REL. STD.	68.5	2.7	2.1	--	--	--	2.1	2.1	100.1	--	98.7
DES. VAL.	--	--	--	--	--	--	--	--	--	--	.214

LAB	05105 BORON AA CARM MG/L	05106 BORON F AUTO AN MG/L B	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 DOC UV CO2 EV MG/L C	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06290 D O C COMBINED MG/L	06490 D I C COMBINED MG/L
1	--	--	--	--	--	21.4	--	--	18.6	21.4	18.6
2	--	--	--	--	--	2.4 R	--	--	--	2.4 R	--
3	--	--	--	--	16.8	--	--	19.8	--	16.8	19.8
4	0.10	--	0.10	--	20.5	--	--	39. R	--	20.5	39. R
5	--	--	--	18.	--	--	20.	--	--	18.	20.
6	--	--	--	--	24.7	--	--	--	--	24.7	--
8	--	0.05 L	0.05 L	22.0	--	--	17.0	--	--	22.0	17.0
MEAN	.1000	--	.1000	20.0000	20.6667	21.4000	18.5000	19.8000	18.6000	20.5667	18.8500
STD. DEV.	--	--	--	2.8284	3.9526	--	2.1213	--	--	2.8500	1.3796
REL. STD.	--	--	--	14.1	19.1	--	11.5	--	--	13.9	7.3
DES. VAL.	--	--	.100	--	--	--	--	--	--	21.753	17.246

LAB	07010 TKN AUTAN MG/L N	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG AA 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3+NO2 F AA HYD MG/L N	07110 NO3+NO2 AA2 CD MG/L N	07111 NO3+NO2 DIS SPEC MG/L N	07112 NO3+NO2 UF AA CD MG/L	07390 NITRATE COMBINED MG/L	07505 TOT HN3 AA BERT MG/L N
1	--	--	--	0.750	0.750	--	--	2.070	--	2.070	--
2	--	--	--	--	--	--	2.0	--	--	2.0	--
3	0.738	--	--	--	0.738	--	--	--	2.03	2.03	0.076
4	--	--	--	--	--	--	2.0	--	--	2.0	--
5	--	--	--	--	--	--	1.98	--	--	1.98	--
6	--	--	0.8	--	0.8	2.03	--	--	--	2.03	--
7	--	--	--	--	--	--	--	--	2.07	2.07	--
8	--	0.95	--	--	0.95	--	2.10 +	--	--	2.10	--
MEAN	.7380	.9500	.8000	.7500	.8095	2.0300	2.0200	2.0700	2.0500	2.0350	.0760
STD. DEV.	--	--	--	--	.0974	--	.0542	--	.0283	.0417	--
REL. STD.	--	--	--	--	12.0	--	2.7	--	1.4	2.1	--
DES. VAL.	--	--	--	--	.887	--	--	--	--	2.036	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 32 DATE: 01/04/85 DISTRIBUTED: 25/02/85

SAMPLE = 5 SPIKED SAMPLE.

MAJOR IONS 4 C.

LAB	07506 TOT NH3 SPEC EL MG/L N	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07601 TOTAL N AA UV MG/L	07602 TOTAL N CALC+D MG/L N	07651 TOT N F UV AA MG/L	07655 TOT N F UV EDTA MG/L	07690 TOTAL N COMBINED MG/L N	07790 T N DISS COMBINED MG/L N
1	--	--	--	0.057	0.057	--	--	--	--	--	--
2	--	--	--	--	--	2.2	--	--	--	--	2.2
3	--	--	--	--	0.076	--	--	--	--	--	--
4	0.1 L	--	--	--	0.1 L MDL	--	--	2.24	--	--	2.24
5	--	--	0.048	--	0.048	--	--	--	2.58	--	2.58
6	--	--	0.04	--	0.04	--	--	--	--	--	--
8	--	0.05	--	--	0.05	--	3.05	--	--	3.05	--
MEAN	--	.0500	.0440	.0570	.0542	2.2000	3.0500	2.2400	2.5800	3.0500	2.3400
STD. DEV.	--	--	.0057	--	.0136	--	--	--	--	--	.2088
REL. STD.	--	--	12.9	--	25.1	--	--	--	--	--	8.9
DES. VAL.	--	--	--	--	.042	--	--	--	--	2.938	2.444

LAB	09103 FLUORIDE DIS COLR MG/L F	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L	09107 FLUOR F AUTO POT MG/L F	09108 F DISS SPEC EL MG/L	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR+N MG/L CAC	10106 ALKLINTY IR CO2 MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10111 ALKLINTY TITROPRO MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC
1	--	--	--	1.12	--	1.12	81.	--	--	--	81.
2	--	1.0	--	--	--	1.0	74.7	--	--	--	74.7
3	--	--	--	--	1.005	1.005	--	71.8	--	80.7	80.7
4	--	--	--	--	--	--	78.3	--	--	--	78.3
5	--	--	1.25	--	--	1.25	79.1	--	--	--	79.1
6	1.1	--	--	--	--	1.1	--	--	83.	--	83.
7	--	--	--	--	--	--	76.7	--	--	--	76.7
8	--	1.15	--	--	--	1.15	--	--	79.0	--	79.0
MEAN	1.1000	1.0750	1.2500	1.1200	1.0050	1.1042	77.9600	71.8000	81.0000	80.7000	79.0625
STD. DEV.	--	.1061	--	--	--	.0941	2.3912	--	2.8284	--	2.5950
REL. STD.	--	9.9	--	--	--	8.5	3.1	--	3.5	--	3.3
DES. VAL.	--	--	--	--	--	1.126	--	--	--	--	77.476

LAB	10301 PH UNITS	10390 PH COMBINED UNITS	10602 HARDNESS CALC+D MG/L	10603 HARDNESS TITR+N MG/L	10690 HARDNESS COMBINED MG/L	11102 SODIUM AAS F MG/L NA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS DA MG/L	11107 SODIUM FL PH UF MG/L	11311 NA EXTBL HNO3 ICP MG/L	11990 SODIUM COMBINED MG/L
1	7.9	7.9	192.	--	192.	--	39.	--	--	--	39.
2	7.9	7.9	--	--	--	--	38.3	--	--	--	38.3
3	8.00	8.00	--	--	--	--	--	--	37.6	--	37.6
4	7.7	7.7	--	--	--	--	--	--	--	--	--
5	7.45	7.45	--	199.	199.	--	39.0	--	--	--	39.0
6	7.2	7.2	--	200.	200.	40.	--	--	--	--	40.
7	7.7	7.7	197.8	204.4	204.4	--	--	40.3	--	--	40.3
8	7.95	7.95	213.	--	213.	--	--	--	--	38.4	38.4
MEAN	7.7250	7.7250	200.9333	201.1333	201.6800	40.0000	38.7667	40.3000	37.6000	38.4000	38.9429
STD. DEV.	.2777	.2777	10.8450	2.8729	7.7338	--	.4041	--	--	--	.9554
REL. STD.	3.6	3.6	5.4	1.4	3.8	--	1.0	--	--	--	2.5
DES. VAL.	--	7.663	--	--	198.581	--	--	--	--	--	37.690

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 32 DATE: 01/04/85 DISTRIBUTED: 25/02/85

SAMPLE = 5 SPIKED SAMPLE.

MAJOR IONS 4 C.

LAB	12101 MG DISS CALC+D MG/L	12102 MG FIL AAS DA MG/L	12106 MG UF AAS DA MG/L	12107 MG DISS AAS AUTO MG/L	12108 MG HARDN CALC+D MG/L	12303 MG UF AAS AUTO MG/L MG	12311 MG EXTBL HNO3 ICP MG/L	12990 MGNESIUM COMBINED MG/L MG	14102 SILICA R ANSA AA MG/L	14105 SILICA R MOLY AA MG/L	14106 SILICA R MOLY UF MG/L
1	--	--	--	--	--	31.	--	31.	1.1	--	--
2	--	--	--	30.	--	--	--	30.	1.1	--	--
3	--	--	30.7	--	--	--	--	30.7	--	--	1.11
5	--	--	--	--	31.4	--	--	31.4	--	1.1	--
6	31.	--	--	--	--	--	--	31.	--	--	--
7	--	31.8	--	--	--	--	--	31.8	--	--	--
8	--	--	--	--	--	--	34.7	34.7	--	1.5	--
MEAN	31.0000	31.8000	30.7000	30.0000	31.4000	31.0000	34.7000	31.5143	1.1000	1.0500	1.1100
STD. DEV.	--	--	--	--	--	--	--	1.5126	0.0000	.0707	--
REL. STD.	--	--	--	--	--	--	--	4.8	0.0	6.7	--
DES. VAL.	--	--	--	--	--	--	--	31.400	--	--	--

LAB	14190 SILICA COMBINED MG/L	15406 T P UF AA ASC MG/L P	15409 T P BLK AA ASC MG/L P	15413 TOTAL P AA SNCL2 MG/L P	15421 T P BLK DIG ASC MG/L F	15490 TOTAL P COMBINED MG/L	16304 SO4 DISS AUTO BA MG/L	16306 SO4 DISS AA MTB MG/L	16307 SO4 DISS AAN MBUF MG/L	16309 SO4 DISS I C MG/L SO4	16950 SULFATE COMBINED MG/L SO4
1	1.1	--	--	--	0.006L	0.006L	--	110.	--	--	110.
2	1.1	--	--	0.001	--	0.001	111.	--	--	110.	111.
3	1.11	--	--	--	--	--	--	--	115.5	--	115.5
4	--	0.003L	--	--	--	0.003L	--	--	--	--	--
5	1.1	--	--	--	--	--	--	118.	--	--	118.
6	--	--	0.04 R	--	--	0.04 R	102.	--	--	--	102.
7	--	--	--	--	--	--	--	116.0	--	--	116.0
8	1.0	--	--	0.002	--	0.002	--	107.	--	--	107.
MEAN	1.0820	--	--	.0015	--	.0015	106.5000	112.7500	115.5000	110.0000	111.3571
STD. DEV.	.0460	--	--	.0007	--	.0007	6.3640	5.1235	--	--	5.6474
REL. STD.	4.3	--	--	47.1	--	47.1	6.0	4.5	--	--	5.1
DES. VAL.	1.120	--	--	--	--	.002	--	--	--	--	111.350

LAB	17203 CL DISS AA UF FE MG/L	17204 CL DISS AG TITR MG/L	17205 CL DISS ION EL MG/L	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17930 CHLORIDE COMBINED MG/L	19102 K DISS AAS MG/L K	19103 K DISS F LM PHOT MG/L	19107 K DIS UF FLM PHOT MG/L	19301 K EXTGL HNO3 AA MG/L	19990 PTASSIUM COMBINED MG/L
1	58.	--	--	--	--	58.	--	15.0	--	--	15.0
2	--	--	60.	--	--	60.	--	16.3	--	--	16.3
3	--	--	--	--	57.2	57.2	--	--	16.0	--	16.0
5	--	--	--	56.5	--	56.5	--	16.7	--	--	16.7
6	--	60.	--	--	--	60.	16.0	--	--	--	16.0
7	58.3	--	--	--	--	58.3	14.4	--	--	--	14.4
8	--	--	--	55.	--	55.	--	--	--	15.5	15.5
MEAN	58.1500	60.0000	60.0000	55.7500	57.2000	57.8571	15.2000	16.0000	16.0000	15.5000	15.7000
STD. DEV.	.2121	--	--	1.0607	--	1.8183	1.1314	.8888	--	--	.7916
REL. STD.	.4	--	--	1.9	--	3.1	7.4	5.6	--	--	5.0
DES. VAL.	--	--	--	--	--	57.133	--	--	--	--	15.960

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 32 DATE: J1/04/85 DISTRIBUTED: 25/02/85

SAMPLE = 5 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	20100 CA DISS CALC+D MG/L CA	20101 CA DISS TIT EDTA MG/L	20103 CA DISS AAS MG/L	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20311 CA EXTBL HNO3 ICP MG/L	20990 CALCIUM COMBINED MG/L CA
1	--	--	--	--	26.	--	26.
2	--	--	--	--	26.	--	26.
3	--	--	--	26.4	--	--	26.4
5	--	28.0	--	--	--	--	28.0
6	29.	--	--	--	--	--	29.
7	--	--	26.8	--	--	--	26.8
8	--	--	--	--	--	28.0	28.0
MEAN	29.0000	28.0000	26.8000	26.4000	26.0000	28.0000	27.1714
STD. DEV.	--	--	--	--	0.0000	--	1.1686
REL. STD.	--	--	--	--	0.0	--	4.3
DES. VAL.	--	--	--	--	--	--	26.364

DATES RECEIVED 1 85/04/19 2 85/04/25 3 85/04/25 3 85/05/17 4 85/04/09
5 85/05/07 6 85/04/15 7 85/04/01 8 85/05/13

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OUR FILE/NOTRE RÉFÉRENCE	
YOUR FILE/VOTRE RÉFÉRENCE	
DATE	19 July 1985

TO / À: Distribution

FROM / DE: H. Alkema
Quality Assurance and Methods Section
AMD/NWRI, Burlington

SUBJECT / OBJET: Final Summary Report on Prairie Provinces Quality Control (PPQC)
PPQC Studies 33 and 34

I have enclosed the final report for PP 33-34.

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

Since there were several changes to the data base for these studies, a computer data printout is included for laboratory managers and Mr. Dunn.

H. Alkema/JFG

H. Alkema

SUMMARY REPORT

PPQC STUDIES 33 AND 34

for May and June, 1985

TRACE METALS, MAJOR IONS, NUTRIENTS AND PHYSICAL PARAMETERS IN SPIKED SAMPLES

by

H. Alkema

August 1985

AMD
NWRI
CCIW
Burlington, Ontario

Introduction

As part of an on-going study, the Quality Assurance and Methods Section, N.W.R.I. 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 inter-laboratory quality control studies: PP 33 and 34, for the months May and June, 1985. These two studies dealt with trace metals, major ions, nutrients and physical parameters. The levels were mainly high.

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:

PPWB 33 - Sample 1 - 125 ml, D/A * for trace metals (3% HNO_3)
Sample 2 - up to 1L, major ions etc., stored at 4°C

PPWB 34 - Sample 3 - 1L, S/E * for trace metals (0.2% HNO_3)
Sample 4 - up to 1L, major ions, etc., stored at 4°C
Sample 5 - 125 ml, D/A 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 PPWB 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 Tables 1-5.

Preliminary data summaries, including problematic results, were sent June 28, and July 19, 1985. Each laboratory was given three weeks to notify us of any errors in data transcription or compilation.

Performance Indicators

For an analysis where only 5 - 8 laboratories have reported results and two or more of these have their results greater than 10% from the mean, then it is not reasonable to use the mean as a comparator. Under these conditions, the design value is used instead.

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

A result which deviates more than 10% from the mean is circled in the data tables and its value is noted in the comments. 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 2 of a previous report dated February 1, 1985.

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 circled on the data summaries. 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.

Individual laboratory deviations are listed below:

Lab 1
- a high result for Al by D/A, +15%
- high results for F, +50%; Cl, +44%; and Na, +42%
- a low result for Mg, -20%

Lab 2
- a high result for Zn by D/A, +13%
- a high result for Turb, +303% (R)
- a low result for Al by D/A, -11%

Lab 3
- a low result for Al by S/E, -25%
- a high result for F, +160%

Lab 4
- two HDL's for NH_3.

Lab 5
- biased high results for DOC, +69% and +50%
- a high result for NH_3, +61%

Lab 6
- low results for Zn by D/A, -11%; and Pb by S/E, -16%
- a high result for Ni by S/E, +23%
- high results for Total P, +471% (R); and K, +31% (R)
- biased high results for TKN, +658% (R) and +265% (R)
- a low result for Mg, -24%
- HDL for each of Na, Total P, and SO_4

Lab 7
- high results for Colour, +60% (R); and Turb, +54% (R)

(R) = rejectable by Grubb's procedure for statistical calculation

Lab 8 - biased high results for DOC, +275% (R) and +76%
- biased low results for DIC, -54% (R) and -38%
- high results for Cr by S/E, +19%; and Cu by S/E, +10%
- a low result for Pb by S/E, -28%
- an HDL for K

PPWB laboratories average number of deviations per sample was 1.6

Appendix I

Definitions of Types of Metals Analysis

1. D/A - Direct Aspiration

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

2. S/E - Code for low level analysis.

Analysis is presently 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 followed by ICAP.
4. Graphite tube (flameless) AAS.

Appendix II

Performance Indicators

1. Unacceptable results are circled. A result is deemed unacceptable when it deviates more than 10 percent from the mean result. Near the detection limit a greater deviation is usually allowed. Presently, deviant results are mostly compared to the mean of the parameter in the study, but may also be compared to a mean value from a previous study if it is available. In the future, the design values will be known for certified reference samples and an absolute comparison will be made. When there is a high % CV or when only a few results are reported for a parameter and a previously analysed mean is used, a footnote will indicate the previous mean.

2. When a high detection limit occurs, compared to the other labs, this is marked with a "HDL" to indicate lack of comparability.

3. In the case of systemmatic anomoly, when two analyses of a parameter have the same % deviation from the mean, this is noted by the word "biased" high or low.

4. A percent deviation is written to show the severity of the anomoly. Generally the comments indicate differences from the mean above 10%.

5. The "R" flag beside a result in the tables or in the comments indicates that this result is an outlier according to Grubbs* and is rejected in statistical calculations.

* Reference: Frank E. Grubbs, Technometrics, 1969, P.1

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 033 DATE: 01/05/85 DISTRIBUTED: 29/04/85

SAMPLE = 1 SPIKED SAMPLE.

TRACE METALS D/A.

LAB	13009 AL TOT ICAP 5X MG/L	13302 AL EXTBL AAS DA MG/L	13306 AL UFAAS SE OX/EP MG/L AL	13311 AL EXTBL ICAP DA MG/L	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP DA MG/L V	23011 V TOTAL 5X ICAP UG/L V	23311 V EXTBL ICAP DA MG/L	23999 VANADIUM COMBINED MG/L V	24004 CR TOTAL AAS G F MG/L	24009 CR TOTAL ICAP DA MG/L CR
1	--	--	1.174	--	1.174	0.911	--	--	0.911	--	0.096
2	--	0.91	--	--	0.91	--	--	--	--	--	--
3	--	--	--	1.04	1.04	--	--	0.97	0.97	--	--
6	0.98	--	--	--	0.98	--	0.94	--	0.94	--	--
8	--	1.0	--	--	1.0	--	--	--	--	0.10	--
MEAN	.9800	.9550	1.1740	1.0400	1.0208	.9110	.9400	.9700	.9403	.1000	.0960
STD. DEV.	--	.0636	--	--	.0977	--	--	--	.0295	--	--
REL. STD.	--	6.7	--	--	9.6	--	--	--	3.1	--	--
DES. VAL.	--	--	--	--	1.016	--	--	--	.954	--	--

LAB	24011 CR TOTAL 5X ICAP UG/L CR	24311 CR EXTBL ICAP DA MG/L	24999 CHROMIUM COMBINED MG/L CR	25003 MN TOTAL ICAP DA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25311 MN EXTBL ICAP DA MG/L	25999 MANGNESE COMBINED MG/L MN	26011 FE TOTAL 5X ICAP UG/L FE	26304 FE EXTBL AAS DA MG/L	26311 FE EXTBL ICAP DA MG/L
1	--	--	0.096	0.097	--	--	--	0.097	--	0.51	--
2	--	--	--	--	--	0.10	--	0.10	--	0.48	--
3	--	0.10	0.10	--	--	0.11	0.10	0.10	--	0.54	0.51
6	0.10	--	0.10	--	0.099	--	--	0.099	0.48	--	--
8	--	--	0.10	--	--	--	0.10	0.10	--	--	0.49
MEAN	.1800	.1000	.0990	.0970	.0990	.1050	.1030	.0992	.4800	.5100	.5000
STD. DEV.	--	--	.0020	--	--	.0071	0.0000	.0013	--	.0300	.0141
REL. STD.	--	--	2.0	--	--	6.7	0.0	1.3	--	5.9	2.8
DES. VAL.	--	--	.098	--	--	--	--	.098	--	--	--

LAB	26999 IRON COMBINED MG/L FE	27003 CO TOTAL AAS G F MG/L	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO	27311 CO EXTBL ICAP DA MG/L	27999 COBALT COMBINED MG/L CO	28009 NI TOTAL ICAP DA MG/L NI	28011 NI TOTAL 5X ICAP UG/L NI	28311 NI EXTBL ICAP DA MG/L	28999 NICKEL COMBINED MG/L NI	29009 CU TOTAL ICAP MG/L CU
1	0.51	--	0.281	--	--	0.281	0.465	--	--	0.465	0.089
2	0.48	--	--	--	--	--	--	--	--	--	--
3	0.51	--	--	--	0.29	0.29	--	--	0.50	0.50	--
6	0.48	--	--	0.28	--	0.28	--	0.48	--	0.48	--
8	0.49	0.30	--	--	--	0.30	--	--	0.48	0.48	--
MEAN	.4940	.3000	.2810	.2800	.2900	.2878	.4650	.4800	.4940	.4813	.0890
STD. DEV.	.0152	--	--	--	--	.0093	--	--	.0141	.0144	--
REL. STD.	3.1	--	--	--	--	3.2	--	--	2.9	3.0	--
DES. VAL.	.499	--	--	--	--	.298	--	--	--	.480	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 033 DATE: 01/05/85 DISTRIBUTED: 29/04/85

SAMPLE = 1 SPIKED SAMPLE. TRACE METALS D/A.

LAB	29011 CU TOTAL 5X ICAP UG/L CU	29306 CU EXTBL AAS DA MG/L	29311 CU EXTBL ICAP DA MG/L	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN	30011 ZN TOTAL 5X ICAP UG/L ZN	30304 ZN EXTBL AAS DA MG/L	30311 ZN EXTBL ICAP DA MG/L	30999 ZINC COMBINED MG/L ZN	38311 SR EXTBL ICAP DA MG/L	38999 STRNTIUM COMBINED MG/L SR
1	--	--	--	0.089 -	0.107	--	--	--	0.107	--	--
2	--	0.10	--	0.10	--	--	0.12	--	0.12	--	--
3	--	--	0.10	0.10	--	--	--	0.11	0.11	0.38	0.38
6	0.10	--	--	0.10	--	0.095	--	--	0.095	--	--
8	--	--	0.10	0.10	--	--	--	0.10	0.10	--	--
MEAN	.1000	.1000	.1000	.0978	.1070	.0950	.1200	.1050	.1064	.3800	.3800
STD. DEV.	--	--	0.0000	.0049	--	--	--	.0071	.0096	--	--
REL. STD.	--	--	0.0	5.0	--	--	--	6.7	9.0	--	--
DES. VAL.	--	--	--	.103	--	--	--	--	.108	--	.389

LAB	42009 MO TOTAL ICAP MG/L MO	42011 MO TOTAL 5X ICAP UG/L MO	42311 MO EXTBL ICAP DA MG/L	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD	48011 CD TOTAL 5X ICAP UG/L CD	48301 CD EXTBL AAS DA MG/L	48311 CD EXTBL ICAP DA MG/L	48999 CADMIUM COMBINED MG/L CD	56011 BA TOTAL 5X ICAP UG/L BA	56301 BA EXTBL AAS DA MG/L
1	0.919	--	--	0.919	0.094	--	--	--	0.094	--	--
2	--	--	--	--	--	--	0.097	--	0.097	--	--
3	--	--	0.97	0.97	--	--	--	0.10	0.10	--	1.1
6	--	0.86	--	0.86	--	0.088	--	--	0.088	0.98	--
8	--	--	--	--	--	--	0.10	--	0.10	--	--
MEAN	.9190	.8600	.9700	.9163	.0940	.0880	.0985	.1000	.0958	.9800	1.1000
STD. DEV.	--	--	--	.0550	--	--	.0021	--	.0050	--	--
REL. STD.	--	--	--	6.0	--	--	2.2	--	5.2	--	--
DES. VAL.	--	--	--	.985	--	--	--	--	.099	--	--

LAB	56311 BA EXTBL ICAP DA MG/L	56999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB	82301 PB EXTBL AAS DA MG/L	82311 PB EXTBL ICAP DA MG/L	82999 LEAD COMBINED MG/L PB
2	--	--	--	0.45	--	0.45
3	1.01	1.01	--	--	0.48	0.48
6	--	0.98	0.48	--	--	0.48
8	--	--	--	--	0.50	0.50
MEAN	1.0100	.9950	.4800	.4500	.4900	.4775
STD. DEV.	--	.0212	--	--	.0141	.0206
REL. STD.	--	2.1	--	--	2.9	4.3
DES. VAL.	--	.995	--	--	--	.485

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 033 DATE: 01/05/85 DISTRIBUTED: 29/04/85

SAMPLE = 2 SPIKED SAMPLE.

MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR A REL UNIT	02021 COLOUR V IS COMP REL UNIT	02040 COLOUR COMBINED REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02060 CONDUCT COMBINED USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLMTRIC NTU	02090 TURBIDTY COMBINED JTU/NTU
1	-0.54	8.33	8.42	--	--	--	931.	931.	--	--	--
2	-3.2	7.95	8.50	5. L	--	5. L	906.	906.	0.5 R	--	0.5 R
3	1.6	7.751	8.001	5.	--	5.	815.9	815.9	0.16	--	0.16
4	--	--	--	--	5.	5.	909.	909.	0.14	--	0.14
5	0.92	8.39	8.23	5. L	--	5. L	892.	892.	0.14	--	0.14
6	1.8	8.5	8.2	--	--	--	890.	890.	--	0.08	0.08
7	--	--	--	8. R	--	8. R	880.	880.	0.1	--	0.1
8	-1.74	7.94	8.22	--	--	--	905.	905.	--	--	--
MEAN	-.1933	8.1435	8.2618	5.0000	5.0000	5.0000	891.1125	891.1125	.1350	.0800	.1240
STD. DEV.	1.9991	.3018	.1768	--	--	0.0000	34.0334	34.0334	.0252	--	.0329
REL. STD.	****	3.7	2.1	--	--	0.0	3.8	3.8	18.6	--	26.5
DES. VAL.	--	--	--	--	--	1.400	--	894.019	--	--	.278

LAB	05105 BORON AA CARM MG/L	05106 BORON F AUTO AN MG/L B	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 DOC UV CO2 EV MG/L C	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06290 D O C COMBINED MG/L	06490 D I C COMBINED MG/L
1	--	--	--	--	--	1.1	--	--	18.6	1.1	18.6
2	--	--	--	--	--	1.4	--	--	--	1.4	--
3	--	--	--	--	1.5	--	--	16.4	--	1.5	16.4
4	0.09	--	0.09	--	1.4	--	--	16.0	--	1.4	16.0
5	--	--	--	2.7	--	--	17.	--	--	2.7	17.
6	--	--	--	--	1.5	--	--	--	--	1.5	--
8	--	0.05 L	0.05 L	6. R	--	--	7. R	--	--	6. R	7. R
MEAN	.0900	--	.0900	2.7000	1.4667	1.2500	17.0000	16.2000	18.6000	1.6000	17.0000
STD. DEV.	--	--	--	--	.0577	.2121	--	.2828	--	.5586	1.1431
REL. STD.	--	--	--	--	3.9	17.0	--	1.7	--	34.9	6.7
DES. VAL.	--	--	.094	--	--	--	--	--	--	1.594	15.333

LAB	07010 TKN AUTAN MG/L N	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG AA 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3+NO2 F AA HYD MG/L N	07110 NO3+NO2 AA2 CD MG/L N	07111 NO3+NO2 DIS SPEC MG/L N	07112 NO3+NO2 UF AA CD MG/L	07390 NITRATE COMBINED MG/L	07505 TOT HN3 AA BERT MG/L N
1	--	--	--	0.120	0.120	--	--	0.594	--	0.594	--
2	--	--	--	--	--	--	0.58	--	--	0.58	--
3	0.091	--	--	--	0.091	--	--	--	0.579	0.579	0.009
4	--	--	--	--	--	--	0.60	--	--	0.60	--
5	--	--	--	--	--	--	0.592	--	--	0.592	--
6	--	--	0.5 R	--	0.5 R	0.64	--	--	--	0.64	--
7	--	--	--	--	--	--	--	--	0.54	0.54	--
8	--	0.20	--	--	0.20	--	0.60	--	--	0.60	--
MEAN	.0910	.2000	--	.1200	.1370	.6400	.5933	.5940	.5595	.5906	.0090
STD. DEV.	--	--	--	--	.0565	--	.0095	--	.0276	.0279	--
REL. STD.	--	--	--	--	41.2	--	1.6	--	4.9	4.7	--
DES. VAL.	--	--	--	--	.161	--	--	--	--	.566	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 033 DATE: 01/05/85 DISTRIBUTED: 29/04/85

SAMPLE = 2 SPIKED SAMPLE.

MAJOR IONS 4 C.

LAB	07506 TOT NH3 SPEC EL MG/L N	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07601 TOTAL N AA UV MG/L	07602 TOTAL N CALC+D MG/L N	07651 TOT N F UV AA MG/L	07655 TOT N F UV EDTA MG/L	07690 TOTAL N COMBINED MG/L N	07790 T N DISS COMBINED MG/L N
1	--	--	--	0.014	0.014	--	--	--	--	--	--
2	--	--	--	--	--	0.64	--	--	--	--	0.64
3	--	--	--	--	0.009	--	--	--	--	--	--
4	0.05 L	--	--	--	0.05 L MDL	--	--	0.63	--	--	0.63
5	--	--	0.025	--	0.025	--	--	--	0.632	--	0.632
6	--	--	0.01 L	--	0.01 L	--	--	--	--	--	--
8	--	0.014	--	--	0.014	--	0.80	--	--	0.80	--
MEAN	--	.0140	.0250	.0140	.0155	.6400	.8000	.6300	.6320	.8000	.6340
STD. DEV.	--	--	--	--	.0068	--	--	--	--	--	.0053
REL. STD.	--	--	--	--	43.6	--	--	--	--	--	.8
DES. VAL.	--	--	--	--	.021	--	--	--	--	.430	.667

LAB	09103 FLUORIDE DIS COLR MG/L F	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L	09107 FLUOR F AUTO POT MG/L F	09108 F DISS SPEC EL MG/L	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR+N MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10111 ALKLINTY TITROPRO MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC	10301 PH UNITS
1	--	--	--	0.12	--	0.12	66.	--	--	66.	8.1
2	--	0.06	--	--	--	0.06	61.2	--	--	61.2	7.9
3	--	--	--	--	0.066	0.066	--	--	66.7	66.7	7.83
4	--	--	--	--	--	--	64.4	--	--	64.4	7.9
5	--	--	0.056	--	--	0.056	64.7	--	--	64.7	7.90
6	0.1	--	--	--	--	0.1	--	66.	--	66.	7.9
7	--	--	--	--	--	--	63.7	--	--	63.7	8.0
8	--	--	--	--	--	--	--	65.0	--	65.0	8.05
MEAN	.1000	.0600	.0560	.1200	.0660	.0804	64.0000	65.5000	66.7000	64.7125	7.9475
STD. DEV.	--	--	--	--	--	.0282	1.7734	.7071	--	1.7241	.0921
REL. STD.	--	--	--	--	--	35.0	2.8	1.1	--	2.7	1.2
DES. VAL.	--	--	--	--	--	.082	--	--	--	64.650	--

LAB	10390 PH COMBINED UNITS	10602 HARDNESS CALC+D MG/L	10603 HARDNESS TITR+N MG/L	10690 HARDNESS COMBINED MG/L	11102 SODIUM AAS F MG/L NA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS DA MG/L	11107 SODIUM FL PH UF MG/L	11311 NA EXTBL HNO3 ICP MG/L	11990 SODIUM COMBINED MG/L	12101 MG DISS CALC+D MG/L
1	8.1	260.	--	260.	--	61.	--	--	--	61.	--
2	7.9	--	--	--	--	58.3	--	--	--	58.3	--
3	7.83	--	237.0	237.0	--	--	--	58.77	--	58.77	--
4	7.9	--	--	--	--	--	--	--	--	--	--
5	7.90	--	263.2	263.2	--	60.5	--	--	--	60.5	--
6	7.9	--	260.	260.	62.	--	--	--	--	62.	20.
7	8.0	--	265.7	265.7	--	--	60.6	--	--	60.6	--
8	8.05	250.	--	250.	--	--	--	--	57.3	57.3	--
MEAN	7.9475	255.0000	256.4775	255.9850	62.0000	59.9333	60.6000	58.7700	57.3000	59.7814	20.0000
STD. DEV.	.0921	7.0711	13.1930	10.7245	--	1.4364	--	--	--	1.6817	--
REL. STD.	1.2	2.8	5.1	4.2	--	2.4	--	--	--	2.8	--
DES. VAL.	7.902	--	--	259.818	--	--	--	--	--	59.483	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 033 DATE: 01/05/85 DISTRIBUTED: 29/04/85

SAMPLE = 2 SPIKED SAMPLE.

MAJOR IONS 4 C.

LAB	12102 MG FIL AAS DA MG/L	12106 MG UF AAS DA MG/L	12107 MG DISS AAS AUTO MG/L	12108 MG HARDN CALC'D MG/L	12303 MG UF AAS AUTO MG/L MG	12311 MG EXTBL HNO3 ICP MG/L	12990 MGNESIUM COMBINED MG/L MG	14102 SILICA R ANSA AA MG/L	14105 SILICA R MOLY AA MG/L	14106 SILICA R POLY UF MG/L	14190 SILICA COMBINED MG/L
1	--	--	--	--	22.	--	22.	14.7	--	--	14.7
2	--	--	21.0	--	--	--	21.0	16.	--	--	16.
3	--	19.0	--	--	--	--	19.0	--	--	13.55	13.55
5	--	--	--	21.0	--	--	21.0	--	14.2	--	14.2
6	--	--	--	--	--	--	20.	--	--	--	--
7	21.6	--	--	--	--	--	21.6	--	--	--	--
8	--	--	--	--	--	21.0	21.0	--	15.	--	15.
MEAN	21.6000	19.0000	21.0000	21.0000	22.0000	21.0000	20.8000	15.3500	14.6000	13.5500	14.6900
STD. DEV.	--	--	--	--	--	--	1.0066	.9192	.5657	--	.9154
REL. STD.	--	--	--	--	--	--	4.8	6.0	3.9	--	6.2
DES. VAL.	--	--	--	--	--	--	21.396	--	--	--	14.783

LAB	15406 T P UF AA ASC MG/L P	15409 T P BLK AA ASC MG/L P	15413 TOTAL P AA SNCL2 MG/L P	15490 TOTAL P COMBINED MG/L	16304 SO4 DISS AUTO BA MG/L	16306 SO4 DISS AA MTB MG/L	16307 SO4 DISS AAN MBUF MG/L	16990 SULFATE COMBINED MG/L SO4	17203 CL DISS AA UF FE MG/L	17204 CL DISS AG TITN MG/L	17205 CL DISS ION EL MG/L
1	--	--	--	--	--	70.	--	70.	200.	--	--
2	--	--	0.002	0.002	75.	--	--	75.	--	--	200.
3	--	--	--	--	--	--	68.5	68.5	--	--	--
4	0.003L	--	--	0.003L	--	--	--	--	--	--	--
5	--	--	--	--	--	68.0	--	68.0	--	--	--
6	--	0.02 R	--	0.02 R	68.	--	--	68.	--	192.	--
7	--	--	--	--	--	--	--	--	183.0	--	--
8	--	--	0.005	0.005	--	73.	--	73.	--	--	--
MEAN	--	--	.0035	.0035	71.5000	70.3333	68.5000	70.4167	191.5000	192.0000	200.0000
STD. DEV.	--	--	.0021	.0021	4.9497	2.5166	--	2.9397	12.0208	--	--
REL. STD.	--	--	60.6	60.6	6.9	3.6	--	4.2	6.3	--	--
DES. VAL.	--	--	--	.006	--	--	--	70.626	--	--	--

LAB	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17990 CHLORIDE COMBINED MG/L	19102 K DISS AAS MG/L K	19103 K DISS F LM PHOT MG/L	19107 K DIS UF FLM PHOT MG/L	19301 K EXTBL HNO3 AA MG/L	19990 PTASSIUM COMBINED MG/L	20100 CA DISS CALC'D MG/L CA	20101 CA DISS TIT EDTA MG/L	20103 CA DISS AAS MG/L
1	--	--	200.	--	18.5	--	--	18.5	--	--	--
2	--	--	200.	--	17.2	--	--	17.2	--	--	--
3	--	174.6	174.6	--	--	17.87	--	17.87	--	--	--
5	194.	--	194.	--	19.1	--	--	19.1	--	70.8	--
6	--	--	192.	24. R	--	--	--	24. R	70.	--	--
7	--	--	183.0	19.4	--	--	--	19.4	--	--	71.5
8	190.	--	190.	--	--	--	18.0	18.0	--	--	--
MEAN	192.0000	174.6400	190.5200	19.4000	18.2667	17.8700	18.0000	18.3450	70.0000	70.8000	71.5000
STD. DEV.	2.8284	--	9.1564	--	.9713	--	--	.8201	--	--	--
REL. STD.	1.5	--	4.8	--	5.3	--	--	4.5	--	--	--
DES. VAL.	--	--	193.817	--	--	--	--	18.145	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 033 DATE: 01/05/85 DISTRIBUTED: 29/04/85

SAMPLE = 2 SPIKED SAMPLE.

MAJOR IONS 4 C.

LAB	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20311 CA EXTBL HNO3 ICP MG/L	20990 CALCIUM COMBINED MG/L CA
1	--	68.	--	68.
2	--	65.	--	65.
3	63.6	--	--	63.6
5	--	--	--	70.8
6	--	--	--	70.
7	--	--	--	71.5
8	--	--	65.4	65.4
MEAN	63.6000	66.5000	65.4000	67.7571
STD. DEV.	--	2.1213	--	3.1304
REL. STD.	--	3.2	--	4.6
DES. VAL.	--	--	--	67.872

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 034 DATE: 01/06/85 DISTRIBUTED: 29/04/85

SAMPLE = 3 SPIKED SAMPLE. TRACE METALS S/E.

LAB	13009 AL TOT ICAP 5X MG/L	13302 AL EXTBL AAS DA MG/L	13305 AL EXTBL AAS SE MG/L AL	13306 AL UFAAS SE CX/EP MG/L AL	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP DA MG/L V	23011 V TOTAL 5X ICAP UG/L V	23302 V EXTRBL SE PH1.6 MG/L	23999 VANADIUM COMBINED MG/L V	24004 CR TOTAL AAS G F MG/L	24009 CR TOTAL ICAP DA MG/L CR
1	--	--	--	0.094	0.094	0.049	--	--	0.049	--	0.064
2	--	--	0.079	--	0.079	--	--	--	--	--	--
3	--	--	0.060	--	0.060	--	--	0.050	0.050	--	--
6	0.09	--	--	--	0.09	--	0.06	--	0.06	--	--
8	--	0.2 L	--	--	0.2 L	--	--	--	--	0.089	--
MEAN	.0900	--	.0695	.0940	.0808	.0490	.0600	.0500	.0530	.0890	.0640
STD. DEV.	--	--	.0134	--	.0152	--	--	--	.0061	--	--
REL. STD.	--	--	19.3	--	18.8	--	--	--	11.5	--	--
DES. VAL.	--	--	--	--	.092	--	--	--	.050	--	--

LAB	24011 CR TOTAL 5X ICAP UG/L CR	24303 CR EXTBL AAS SE MG/L	24999 CHROMIUM COMBINED MG/L CR	25003 MN TOTAL ICAP DA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25311 MN EXTBL ICAP DA MG/L	25999 MANGNESE COMBINED MG/L MN	26011 FE TOTAL 5X ICAP UG/L FE	26304 FE EXTBL AAS DA MG/L	26305 FE EXTBL AAS SE MG/L
1	--	--	0.064	0.050	--	--	--	0.050	--	0.08	--
2	--	--	--	--	--	0.04	--	0.04	--	--	0.068
3	--	0.067	0.067	--	--	0.044	--	0.044	--	--	0.077
6	0.078	--	0.078	--	0.057	--	--	0.057	0.088	--	--
8	--	--	0.089	--	--	--	0.06	0.06	--	--	--
MEAN	.0780	.0670	.0745	.0500	.0570	.0420	.0600	.0502	.0880	.0800	.0725
STD. DEV.	--	--	.0114	--	--	.0028	--	.0084	--	--	.0064
REL. STD.	--	--	15.3	--	--	6.7	--	16.8	--	--	8.8
DES. VAL.	--	--	.066	--	--	--	--	.049	--	--	--

LAB	26311 FE EXTBL ICAP DA MG/L	26999 IRON COMBINED MG/L FE	27003 CO TOTAL AAS G F MG/L	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO	27302 CO EXTBL AAS SE MG/L	27999 COBALT COMBINED MG/L CO	28009 NI TOTAL ICAP DA MG/L NI	28011 NI TOTAL 5X ICAP UG/L NI	28302 NI EXTBL AAS SE MG/L	28309 NI EXTR AAS G F MG/L NI
1	--	0.08	--	0.062	--	--	0.062	0.065	--	--	--
2	--	0.068	--	--	--	--	--	--	--	--	--
3	--	0.077	--	--	--	0.066	0.066	--	--	0.067	--
6	--	0.088	--	--	0.073	--	0.073	--	0.094	--	--
8	0.09	0.09	0.074	--	--	--	0.074	--	--	--	0.080
MEAN	.0900	.0806	.0740	.0620	.0730	.0660	.0688	.0650	.0940	.0670	.0800
STD. DEV.	--	.0089	--	--	--	--	.0057	--	--	--	--
REL. STD.	--	11.0	--	--	--	--	8.3	--	--	--	--
DES. VAL.	--	.079	--	--	--	--	.066	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 034 DATE: 01/06/85 DISTRIBUTED: 29/04/85

SAMPLE = 3 SPIKED SAMPLE. TRACE METALS S/E.

LAB	28999 NICKEL COMBINED MG/L NI	29009 CU TOTAL ICAP MG/L CU	29011 CU TOTAL 5X ICAP UG/L CU	29305 CU EXTBL AAS SE MG/L	29311 CU EXTBL ICAP CA MG/L	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN	30011 ZN TOTAL 5X ICAP UG/L ZN	30304 ZN EXTBL AAS DA MG/L	30305 ZN EXTBL AAS SE MG/L	30311 ZN EXTBL ICAP DA MG/L
1	0.065	0.052	--	--	--	0.052	0.052	--	--	--	--
2	--	--	--	0.053	--	0.053	--	--	0.05	--	--
3	0.067	--	--	0.053	--	0.053	--	--	--	0.054	--
6	0.094	--	0.054	--	--	0.054	--	0.046	--	--	--
8	0.080	--	--	--	0.06	0.06	--	--	--	--	0.06
MEAN	.0765	.0520	.0540	.0530	.0600	.0544	.0520	.0460	.0500	.0540	.0600
STD. DEV.	.0134	--	--	0.0000	--	.0032	--	--	--	--	--
REL. STD.	17.6	--	--	0.0	--	5.9	--	--	--	--	--
DES. VAL.	.065	--	--	--	--	.050	--	--	--	--	--

LAB	30999 ZINC COMBINED MG/L ZN	42009 MO TOTAL ICAP MG/L MO	42011 MO TOTAL 5X ICAP UG/L MO	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD	48011 CD TOTAL 5X ICAP UG/L CD	48302 CD EXTBL AAS SE MG/L	48309 CD EXTBL AAS G F MG/L CD	48999 CADMIUM COMBINED MG/L CD	56011 BA TOTAL 5X ICAP UG/L BA	56301 BA EXTBL AAS DA MG/L
1	0.052	0.074	--	0.074	0.048	--	--	--	0.048	--	--
2	0.05	--	--	--	--	--	0.050	--	0.050	--	--
3	0.054	--	--	--	--	--	0.052	--	0.052	--	0.1 L
6	0.046	--	0.07	0.07	--	0.050	--	--	0.050	0.24	--
8	0.06	--	--	--	--	--	--	0.053	0.053	--	--
MEAN	.0524	.0740	.0700	.0720	.0480	.0500	.0510	.0530	.0506	.2400	--
STD. DEV.	.0052	--	--	.0028	--	--	.0014	--	.0019	--	--
REL. STD.	9.9	--	--	3.9	--	--	2.8	--	3.9	--	--
DES. VAL.	.052	--	--	.070	--	--	--	--	.052	--	--

LAB	56999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB	82302 PB EXTBL AAS SE MG/L	82309 PB EXTBL AAS G F MG/L PB	82999 LEAD COMBINED MG/L PB
1	--	--	0.068	--	0.068
2	--	--	0.070	--	0.070
3	0.1 L	--	0.066	--	0.066
6	0.24	0.05	--	--	0.05
8	--	--	--	0.043	0.043
MEAN	.2400	.0500	.0680	.0430	.0594
STD. DEV.	--	--	.0020	--	.0121
REL. STD.	--	--	2.9	--	20.4
DES. VAL.	.026	--	--	--	.066

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 034 DATE: 01/06/85 DISTRIBUTED: 29/04/85

SAMPLE = 4 NATURAL SAMPLE. MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR A REL UNIT	02021 COLOUR V IS COMP REL UNIT	02040 COLOUR COMBINED REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02060 CONDUCT COMBINED USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLMTRIC NTU	02090 TURBIDTY COMBINED JTU/NTU
1	-5.21	0.91	1.01	--	--	--	97.	97.	--	--	--
2	1.52	0.94	0.91	5. L	--	5. L	95.	95.	0.2	--	0.2
3	3.13	.940	1.000	5.	--	5.	95.8	95.8	0.21	--	0.21
4	--	--	--	--	5.	5.	95.	95.	0.10	--	0.10
5	2.66	0.990	0.939	5. L	--	5. L	94.2	94.2	0.10	--	0.10
6	0.0	0.8	0.8	--	--	--	95.	95.	--	0.12	0.12
7	--	--	--	4.	--	4.	94.8	94.8	0.4 R	--	0.4 R
8	5.6	1.06	0.944	--	--	--	96.7	96.7	--	--	--
MEAN	1.2833	.9400	.9338	4.5000	5.0000	4.6667	95.4375	95.4375	.1525	.1200	.1460
STD. DEV.	3.6825	.0865	.0759	.7071	--	.5774	.9768	.9768	.0608	--	.0546
REL. STD.	287.0	9.2	8.1	15.7	--	12.4	1.0	1.0	39.8	--	37.4
DES. VAL.	--	--	--	--	--	3.864	--	93.785	--	--	.260

LAB	05105 BORON AA CARM MG/L	05106 BORON F AUTO AN MG/L B	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 DOC UV CO2 EV MG/L C	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06290 D O C COMBINED MG/L	06490 D I C COMBINED MG/L
1	--	--	--	--	--	1.1	--	--	11.5	1.1	11.5
2	--	--	--	--	--	1.5	--	--	--	1.5	--
3	--	--	--	--	1.4	--	--	--	--	1.4	--
4	0.05	--	0.05	--	1.2	--	--	10.0	--	1.2	10.0
5	--	--	--	2.6	--	--	11.	--	--	2.6	11.
6	--	--	--	--	1.3	--	--	--	--	1.3	--
8	--	0.05 L	0.05 L	3.	--	--	6.	--	--	3.	6.
MEAN	.0500	--	.0500	2.8000	1.3000	1.3000	8.5000	10.0000	11.5000	1.7286	9.6250
STD. DEV.	--	--	--	.2828	.1000	.2828	3.5355	--	--	.7521	2.4958
REL. STD.	--	--	--	10.1	7.7	21.8	41.6	--	--	43.5	25.9
DES. VAL.	--	--	.050	--	--	--	--	--	--	1.932	9.673

LAB	07010 TKN AUTAN MG/L N	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG AA 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3+NO2 F AA HYD MG/L N	07110 NO3+NO2 AA2 CD MG/L N	07111 NO3+NO2 DIS SPEC MG/L N	07112 NO3+NO2 UF AA CD MG/L	07390 NITRATE COMBINED MG/L	07505 TOT NH3 AA BERT MG/L N
1	--	--	--	0.080	0.080	--	--	0.298	--	0.298	--
2	--	--	--	--	--	--	0.29	--	--	0.29	--
3	0.052	--	--	--	0.052	--	--	--	0.306	0.306	0.001
4	--	--	--	--	--	--	0.30	--	--	0.30	--
5	--	--	--	--	--	--	0.297	--	--	0.297	--
6	--	--	0.5 R	--	0.5 R	0.27	--	--	--	0.27	--
7	--	--	--	--	--	--	--	--	0.27	0.27	--
8	--	0.20 L	--	--	0.20 L	--	0.32	--	--	0.32	--
MEAN	.0520	--	--	.0800	.0660	.2700	.3018	.2980	.2880	.2939	.0010
STD. DEV.	--	--	--	--	.0198	--	.0129	--	.0255	.0171	--
REL. STD.	--	--	--	--	30.0	--	4.3	--	8.8	5.8	--
DES. VAL.	--	--	--	--	.086	--	--	--	--	.307	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 034 DATE: 01/06/85 DISTRIBUTED: 29/04/85

SAMPLE = 4 NATURAL SAMPLE.

MAJOR IONS 4 C.

LAB	07506 TOT NH3 SPEC EL MG/L N	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07601 TOTAL N AA UV MG/L	07602 TOTAL N CALC+D MG/L N	07651 TOT N F UV AA MG/L	07655 TOT N F UV EDTA MG/L	07690 TOTAL N COMBINED MG/L N	07790 T N DISS COMBINED MG/L N
1	--	--	--	0.002L	0.002L	--	--	--	--	--	--
2	--	--	--	--	--	0.32	--	--	--	--	0.32
3	--	--	--	--	0.001	--	--	--	--	--	--
4	0.05 L	--	--	--	→ 0.05 L HDL	--	--	0.33	--	--	0.33
5	--	--	0.002L	--	0.002L	--	--	--	0.306	--	0.306
6	--	--	0.01 L	--	0.01 L	--	--	--	--	--	--
8	--	0.003	--	--	0.003	--	0.52 L	--	--	0.52 L	--
MEAN	--	.0030	--	--	.0020	.3200	--	.3300	.3060	--	.3187
STD. DEV.	--	--	--	--	.0014	--	--	--	--	--	.0121
REL. STD.	--	--	--	--	70.7	--	--	--	--	--	3.8
DES. VAL.	--	--	--	--	.008	--	--	--	--	.395	.331

LAB	09103 FLUORIDE DIS COLR MG/L F	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L	09107 FLUOR F AUTO POT MG/L F	09108 F DISS SPEC EL MG/L	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR+N MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10111 ALKLINTY TITROPRO MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC	10301 PH UNITS
1	--	--	--	0.05 L	--	0.05 L	42.	--	--	42.	7.8
2	--	0.05 L	--	--	--	0.05 L	39.1	--	--	39.1	7.7
3	--	--	--	--	0.41	0.41	--	--	41.5	41.5	7.82
4	--	--	--	--	--	--	40.9	--	--	40.9	7.9
5	--	--	0.05 L	--	--	0.05 L	40.5	--	--	40.5	7.70
6	0.1 L	--	--	--	--	0.1 L	--	42.	--	42.	7.4
7	--	--	--	--	--	--	40.0	--	--	40.0	7.9
8	--	--	--	--	--	--	--	42.5	--	42.5	7.95
MEAN	--	--	--	--	.4100	.4100	40.5000	42.2500	41.5000	41.0625	7.7713
STD. DEV.	--	--	--	--	--	--	1.0747	.3536	--	1.1550	.1758
REL. STD.	--	--	--	--	--	--	2.7	.8	--	2.8	2.3
DES. VAL.	--	--	--	--	--	.156	--	--	--	41.139	--

LAB	10390 PH COMBINED UNITS	10602 HARDNESS CALC+D MG/L	10603 HARDNESS TITR+N MG/L	10690 HARDNESS COMBINED MG/L	11102 SODIUM AAS F MG/L NA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS DA MG/L	11107 SODIUM FL PH UF MG/L	11311 NA EXTBL HNO3 ICP MG/L	11990 SODIUM COMBINED MG/L	12101 MG DISS CALC+D MG/L
1	7.8	41.	--	41.	--	2.	--	--	--	2.	--
2	7.7	--	--	--	--	1.3	--	--	--	1.3	--
3	7.82	--	43.4	43.4	--	--	--	1.34	--	1.34	--
4	7.9	--	--	--	--	--	--	--	--	--	--
5	7.70	--	46.2	46.2	--	1.3	--	--	--	1.3	--
6	7.4	--	40.	40.	1. L	--	--	--	--	→ 1. L HDL	1.9
7	7.9	--	46.1	46.1	--	--	1.3	--	--	1.3	--
8	7.95	46.8	--	46.8	--	--	--	--	1.22	1.22	--
MEAN	7.7713	43.9000	43.9250	43.9167	--	1.5333	1.3000	1.3400	1.2200	1.4100	1.9000
STD. DEV.	.1758	4.1012	2.9205	2.9123	--	.4041	--	--	--	.2917	--
REL. STD.	2.3	9.3	6.6	6.6	--	26.4	--	--	--	20.7	--
DES. VAL.	7.693	--	--	44.408	--	--	--	--	--	1.281	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 034 DATE: 01/06/85 DISTRIBUTED: 29/04/85

SAMPLE = 4 NATURAL SAMPLE. MAJOR IONS 4 C.

LAB	12102 MG FIL AAS DA MG/L	12106 MG UF AAS DA MG/L	12107 MG DISS AAS AUTO MG/L	12303 MG UF AAS AUTO MG/L MG	12311 MG EXTBL HNO3 ICP MG/L	12990 MGNESIUM COMBINED MG/L MG	14102 SILICA R ANSA AA MG/L	14105 SILICA R MOLY AA MG/L	14106 SILICA R MOLY UF MG/L	14190 SILICA COMBINED MG/L	15406 T P UF AA ASC MG/L P
1	--	--	--	2.	--	2.	2.3	--	--	2.3	--
2	--	--	2.7	--	--	2.7	2.5	--	--	2.5	--
3	--	2.6	--	--	--	2.6	--	--	2.31	2.31	--
4	--	--	--	--	--	--	--	--	--	--	0.003L
5	--	--	--	--	--	--	--	2.3	--	2.3	--
6	--	--	--	--	--	1.9	--	--	--	--	--
7	2.6	--	--	--	--	2.6	--	--	--	--	--
8	--	--	--	--	3.11	3.11	--	2.4	--	2.4	--
MEAN	2.6000	2.6000	2.7000	2.0000	3.1100	2.4850	2.4000	2.3500	2.3100	2.3620	--
STD. DEV.	--	--	--	--	--	.4562	.1414	.0707	--	.0879	--
REL. STD.	--	--	--	--	--	18.4	5.9	3.0	--	3.7	--
DES. VAL.	--	--	--	--	--	2.749	--	--	--	2.384	--

LAB	15409 T P BLK AA ASC MG/L P	15413 TOTAL P AA SNCL2 MG/L P	15421 T P BLK DIG ASC MG/L P	15490 TOTAL P COMBINED MG/L	16304 SO4 DISS AUTO BA MG/L	16306 SO4 DISS AA MTB MG/L	16307 SO4 DISS AAN MBUF MG/L	16990 SULFATE COMBINED MG/L SO4	17203 CL DISS AA UF FE MG/L	17204 CL DISS AG TITN MG/L	17205 CL DISS ION EL MG/L
1	--	--	0.006L	0.006L	--	5. L	--	5. L	2.	--	--
2	--	0.001L	--	0.001L	3.2	--	--	3.2	--	--	1.4
3	--	--	--	--	--	--	3.3	3.3	--	--	--
4	--	--	--	0.003L	--	--	--	--	--	--	--
5	--	--	--	--	--	2.8	--	2.8	--	--	--
6	0.02	--	--	→ 0.02 HDL	10. L	--	--	→ 10. L HDL	--	2. L	--
7	--	--	--	--	--	--	--	--	1.2	--	--
8	--	0.001L	--	0.001L	--	3.40	--	3.40	--	--	--
MEAN	.0200	--	--	.0200	3.2000	3.1000	3.3000	3.1750	1.6000	--	1.4000
STD. DEV.	--	--	--	--	--	.4243	--	.2630	.5657	--	--
REL. STD.	--	--	--	--	--	13.7	--	8.3	35.4	--	--
DES. VAL.	--	--	--	.004	--	--	--	3.322	--	--	--

LAB	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17990 CHLORIDE COMBINED MG/L	19102 K DISS AAS MG/L K	19103 K DISS F LM PHOT MG/L	19107 K DIS UF FLM PHOT MG/L	19301 K EXTBL HNO3 AA MG/L	19990 PTASSIUM COMBINED MG/L	20100 CA DISS CALC+D MG/L CA	20101 CA DISS TIT EDTA MG/L	20103 CA DISS AAS MG/L
1	--	--	2.	--	0.5	--	--	0.5	--	--	--
2	--	--	1.4	--	0.45	--	--	0.45	--	--	--
3	--	1.15	1.15	--	--	0.53	--	0.53	--	--	--
4	1.2	--	1.2	--	0.4	--	--	0.4	--	13.9	--
5	--	--	2. L	0.6	--	--	--	0.6	12.8	--	--
6	--	--	1.2	0.5	--	--	--	0.5	--	--	13.2
7	--	--	--	--	--	--	5.0 L	→ 5.0 L HDL	--	--	--
8	--	--	--	--	--	--	--	--	--	--	--
MEAN	1.2000	1.1500	1.3900	.5500	.4500	.5300	--	.4967	12.8000	13.9000	13.2000
STD. DEV.	--	--	.3543	.0707	.0500	--	--	.0683	--	--	--
REL. STD.	--	--	25.5	12.9	11.1	--	--	13.8	--	--	--
DES. VAL.	--	--	1.244	--	--	--	--	.488	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 034 DATE: 01/06/85 DISTRIBUTED: 29/04/85

SAMPLE = 4 NATURAL SAMPLE. MAJOR IONS 4 C.

LAB	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20311 CA EXTBL HNO3 ICP MG/L	20990 CALCIUM COMBINED MG/L CA
1	--	13.	--	13.
2	--	13.	--	13.
3	13.1	--	--	13.1
5	--	--	--	13.9
6	--	--	--	12.8
7	--	--	--	13.2
8	--	--	13.7	13.7
MEAN	13.1000	13.0000	13.7000	13.2429
STD. DEV.	--	0.0000	--	.4036
REL. STD.	--	0.0	--	3.0
DES. VAL.	--	--	--	12.413

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 034 DATE: 01/06/85 DISTRIBUTED: 29/04/85

SAMPLE = 5 SPIKED SAMPLE. TRACE METALS D/A.

LAB	13009 AL TOT ICAP 5X MG/L	13302 AL EXTBL AAS DA MG/L	13311 AL EXTBL ICAP DA MG/L	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP CA MG/L V	23011 V TOTAL 5X ICAP UG/L V	23311 V EXTBL ICAP DA MG/L	23999 VANADIUM COMBINED MG/L V	24004 CR TOTAL AAS G F MG/L	24009 CR TOTAL ICAP DA MG/L CR	24011 CR TOTAL 5X ICAP UG/L CR
1	--	--	--	--	2.170	--	--	2.170	--	0.294	--
2	--	2.8	--	2.8	--	--	--	--	--	--	--
3	--	--	2.71	2.71	--	--	2.32	2.32	--	--	--
6	2.6	--	--	2.6	--	2.3	--	2.3	--	--	0.30
8	--	2.6	--	2.6	--	--	--	--	0.30	--	--
MEAN	2.6000	2.7000	2.7100	2.6775	2.1700	2.3000	2.3200	2.2633	.3000	.2940	.3000
STD. DEV.	--	.1414	--	.0967	--	--	--	.0814	--	--	--
REL. STD.	--	5.2	--	3.6	--	--	--	3.6	--	--	--
DES. VAL.	--	--	--	2.697	--	--	--	2.347	--	--	--

LAB	24311 CR EXTBL ICAP DA MG/L	24999 CHROMIUM COMBINED MG/L CR	25003 MN TOTAL ICAP DA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25311 MN EXTBL ICAP DA MG/L	25999 MANGNESE COMBINED MG/L MN	26011 FE TOTAL 5X ICAP UG/L FE	26304 FE EXTBL AAS DA MG/L	26311 FE EXTBL ICAP DA MG/L	26999 IRON COMBINED MG/L FE
1	--	0.294	0.252	--	--	--	0.252	--	1.14	--	1.14
2	--	--	--	--	0.26	--	0.26	--	1.1	--	1.1
3	0.32	0.32	--	--	0.28	0.27	0.27	--	1.14	1.12	1.12
6	--	0.30	--	0.27	--	--	0.27	1.1	--	--	1.1
8	--	0.30	--	--	--	0.27	0.27	--	--	1.18	1.16
MEAN	.3200	.3035	.2520	.2700	.2700	.2700	.2644	1.1000	1.1267	1.1100	1.1120
STD. DEV.	--	.0114	--	--	.0141	0.0000	.0082	--	.0231	.0141	.0179
REL. STD.	--	3.7	--	--	5.2	0.0	3.1	--	2.0	1.3	1.6
DES. VAL.	--	.299	--	--	--	--	.262	--	--	--	1.094

LAB	27003 CO TOTAL AAS G F MG/L	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO	27311 CO EXTBL ICAP DA MG/L	27999 COBALT COMBINED MG/L CO	28009 NI TOTAL ICAP DA MG/L NI	28011 NI TOTAL 5X ICAP UG/L NI	28311 NI EXTBL ICAP DA MG/L	28999 NICKEL COMBINED MG/L NI	29009 CU TOTAL ICAP MG/L CU	29011 CU TOTAL 5X ICAP UG/L CU
1	--	1.020	--	--	1.020	1.190	--	--	1.190	0.279	--
3	--	--	--	1.07	1.07	--	--	1.28	1.28	--	--
6	--	--	1.0	--	1.0	--	1.3	--	1.3	--	0.29
8	1.10	--	--	--	1.10	--	--	1.28	1.28	--	--
MEAN	1.1000	1.0200	1.0000	1.0700	1.0475	1.1900	1.3000	1.2800	1.2625	.2790	.2900
STD. DEV.	--	--	--	--	.0457	--	--	0.0000	.0492	--	--
REL. STD.	--	--	--	--	4.4	--	--	0.0	3.9	--	--
DES. VAL.	--	--	--	--	1.071	--	--	--	1.229	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 034 DATE: 01/06/85 DISTRIBUTED: 29/04/85

SAMPLE = 5 SPIKED SAMPLE.

TRACE METALS D/A.

LAB	29306 CU EXTBL AAS DA MG/L	29311 CU EXTBL ICAP DA MG/L	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN	30011 ZN TOTAL 5X ICAP UG/L ZN	30334 ZN EXTBL AAS DA MG/L	30311 ZN EXTBL ICAP DA MG/L	30999 ZINC COMBINED MG/L ZN	38311 SR EXTBL ICAP DA MG/L	38999 STRNTIUM COMBINED MG/L SR	42009 MO TOTAL ICAP MG/L MO
1	--	--	0.279	0.321	--	--	--	0.321	--	--	4.28
2	0.29	--	0.29	--	--	0.33	--	0.33	--	--	--
3	--	0.30	0.30	--	--	--	0.32	0.32	0.50	0.50	--
6	--	--	0.29	--	0.30	--	--	0.30	--	--	--
8	--	0.28	0.28	--	--	--	0.33	0.33	--	--	--
MEAN	.2900	.2900	.2878	.3210	.3000	.3300	.3250	.3202	.5000	.5000	4.2800
STD. DEV.	--	.0141	.0086	--	--	--	.0071	.0123	--	--	--
REL. STD.	--	4.9	3.0	--	--	--	2.2	3.8	--	--	--
DES. VAL.	--	--	.289	--	--	--	--	.313	--	.485	--

LAB	42011 MO TOTAL 5X ICAP UG/L MO	42311 MO EXTBL ICAP DA MG/L	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD	48011 CD TOTAL 5X ICAP UG/L CD	48301 CD EXTBL AAS DA MG/L	48311 CD EXTBL ICAP DA MG/L	48999 CADMIUM COMBINED MG/L CD	56011 BA TOTAL 5X ICAP UG/L BA	56301 BA EXTBL AAS DA MG/L	56311 BA EXTBL ICAP DA MG/L
1	--	--	4.28	0.223	--	--	--	0.223	--	--	--
2	--	--	--	--	--	0.24	--	0.24	--	--	--
3	--	4.56	4.56	--	--	--	0.23	0.23	--	2.5	2.53
6	4.2	--	4.2	--	0.22	--	--	0.22	2.5	--	--
8	--	--	--	--	--	0.24	--	0.24	--	--	--
MEAN	4.2000	4.5600	4.3467	.2230	.2200	.2400	.2300	.2306	2.5000	2.5000	2.5300
STD. DEV.	--	--	.1890	--	--	0.0000	--	.0093	--	--	--
REL. STD.	--	--	4.3	--	--	0.0	--	4.0	--	--	--
DES. VAL.	--	--	4.768	--	--	--	--	.239	--	--	--

LAB	56999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB	82302 PB EXTBL AAS SE MG/L	82301 PB EXTBL AAS DA MG/L	82311 PB EXTBL ICAP DA MG/L	82999 LEAD COMBINED MG/L PB
1	--	--	1.380	--	--	1.380
2	--	--	--	1.5	--	1.5
3	2.53	--	--	--	1.33	1.33
6	2.5	1.4	--	--	--	1.4
8	--	--	--	--	1.40	1.40
MEAN	2.5150	1.4000	1.3800	1.5000	1.3650	1.4020
STD. DEV.	.0212	--	--	--	.0495	.0618
REL. STD.	.8	--	--	--	3.6	4.4
DES. VAL.	2.558	--	--	--	--	1.336

DATES RECEIVED 1 85/06/06 2 85/06/18 3 85/06/20 3 85/07/02 3 85/07/04
4 85/05/22 5 85/07/22 6 85/06/05 7 85/07/18 8 85/06/20

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DATE	23 October 1985

TO / À: Distribution

FROM / DE: H. Alkema
Quality Assurance and Methods Section
AMD/NWRI, Burlington

SUBJECT / OBJET: Final Summary Report on Prairie Provinces Water Board Quality Control (PPQC) PPQC Studies 35 and 36

I have enclosed the final report for PP35-36.

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

Harry A.

H. Alkema

SUMMARY REPORT

PPQC STUDIES 35 AND 36

for July and August, 1985

TRACE METALS, MAJOR IONS, NUTRIENTS AND PHYSICAL PARAMETERS IN SPIKED SAMPLES

by

H. Alkema

Quality Assurance and Methods Section
National Water Research Institute
Burlington, Ontario

October 1985

Introduction

As part of an on-going study, the Quality Assurance and Methods Section, N.W.R.I. 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 inter-laboratory quality control studies: PP 35 and 36, for the months July and August, 1985. These two studies dealt with trace metals, major ions, nutrients and physical parameters. The levels were mainly low.

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:

PPWB 35 - Sample 1 - 125 ml, D/A * for trace metals (3% HNO_3)
Sample 2 - up to 1L, major ions etc., stored at 4°C

PPWB 36 - Sample 3 - 1L, S/E * for trace metals (0.2% HNO_3)
Sample 4 - up to 1L, major ions, etc., stored at 4°C
Sample 5 - 125 ml, D/A for trace metals (3.0% 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 PPWB 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 Tables 1-5.

Preliminary data summaries, including problematic results, were sent September 3 and 30, 1985. Each laboratory was given three weeks to notify us of any errors in data transcription or compilation.

Performance Indicators

For an analysis where only 5 - 8 laboratories have reported results and two or more of these have their results greater than 10% from the mean, then it is not reasonable to use the mean as a comparator. Under these conditions, the design value is used instead.

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

A result which deviates more than 10% from the mean is circled in the data tables and its value is noted in the comments. 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 2 of a previous report dated February 1, 1985.

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 circled on the data summaries. 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 Cobalt in sample 3.

Individual laboratory deviations are listed below:

Lab 1
- biased high results for Al, by D/A: +28%, +69% and by S/E: +170% (R)
- biased high results for Zn, by D/A: +17%, +400% (R), and by S/E: +68%
- biased high results for DIC, +135% (R), +16%
- biased high results for Ni, by S/E: +15%, and by D/A: +55%
- individual low results for DOC, -63%; Cl, -20%, and SO_4, -13%
- individual high results for Na; +51%; and K, +22%
- an individual low result for Fe; -98%
- individual high results for V; +30% and Cu, +16%

Lab 2
- low results for Mn by D/A; -14%; and Cu by D/A, -25%

Lab 3
- individual high results for Co by D/A, +19%; and Zn by D/A, +19%
- a low result for Mn by D/A, -30%
- biased low results for Si, -67%, and -25%
- two HDL's for Ba by D/A, and by S/E

Lab 4
- an HDL for NH_3.

Lab 5
- biased high results for DOC, +110% and +388% (R)
- an individual high result for DIC, +17%

Lab 6
- biased results for Sr, by D/A: -54% and -22%; and by S/E: -54%
- biased low results for Mo by D/A, -15% and -27%

(R) = rejectable by Grubb's procedure for statistical calculation

- biased low results for pH, -10% and -13% (R)
- biased high results for Cl, +218% (R) and +56% (R)
- biased high results for K, +63% and +17%
- biased high results for Ca, +10% and +13%
- individual high results for TKN, +410% (R) and Na, +124% (R)
- two HDL's for V, one by S/E and one by D/A
- and HDL each for Cr, Cu and Cd, all by D/A

Lab 7
- an individual high result for Colour, +275% (R)
- individual low results for Mg, -14% and K, -17%

Lab 8
- biased high results for DOC, +95% and +604% (R)
- biased high results for Turb, +111% and +446% (R)
- erratic results for Cu, by D/A: -12%, and by S/E: +27%
- individual low results for Al by D/A, -21%; Mn by D/A, -14%; Ni by D/A, -12%
- individual low results for DIC, -16%; and SO_4, -14%
- an individual high result for Zn by S/E, +24%
- an individual low result for Pb by S/E, -46%
- two HDL's for Mn, one by S/E and one by D/A
- two HDL's for Al, one by S/E and one by D/A
- an HDL for TKN
- an HDL for Cr by D/A

PPWB laboratories average number of deviations per sample was 3.9

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 035 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 1 SPIKED SAMPLE. TRACE METALS D/A.

LAB	13009 AL TOTAL 5X ICAP MG/L	13302 AL EXTBL AAS DA MG/L	13305 AL EXTBL AAS SE MG/L AL	13306 AL UFAAS SE OX/EP MG/L AL	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP DA MG/L V	23011 V TOTAL 5X ICAP UG/L V	23301 V EXTRBL AAS DA MG/L	23999 VANADIUM COMBINED MG/L V	24004 CR TOTAL AAS G F MG/L	24009 CR TOTAL ICAP DA MG/L CR
1	--	--	--	0.646	0.646	0.480	--	--	0.480	--	0.055
2	--	--	0.52	--	0.52	--	--	--	--	--	--
3	--	0.51	--	--	0.51	--	--	0.53	0.53	--	--
6	0.49	--	--	--	0.49	--	0.48	--	0.48	--	--
8	--	0.4	--	--	0.4	--	--	--	--	0.057	--
9	--	--	--	--	0.5	--	--	--	0.50	--	--
10	--	--	--	--	0.46	--	--	--	0.44	--	--
MEAN	.4900	.4550	.5200	.6460	.5037	.4800	.4800	.5300	.4860	.0570	.0550
STD. DEV.	--	.0778	--	--	.0746	--	--	--	.0329	--	--
REL. STD.	--	17.1	--	--	14.8	--	--	--	6.8	--	--
DES. VAL.	--	--	--	--	.537	--	--	--	.507	--	--

LAB	24011 CR TOTAL 5X ICAP UG/L CR	24999 CHROMIUM COMBINED MG/L CR	25003 MN TOTAL ICAP DA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25311 MN EXTBL ICAP DA MG/L	25999 MANGNESE COMBINED MG/L MN	26011 FE TOTAL 5X ICAP UG/L FE	26304 FE EXTBL AAS DA MG/L	26311 FE EXTBL ICAP DA MG/L	26999 IRON COMBINED MG/L FE
1	--	0.055	0.048	--	--	--	0.048	--	0.27	--	0.27
2	--	--	--	--	0.04	--	0.04	--	0.26	--	0.26
3	--	--	--	--	0.06	--	0.06	--	0.26	--	0.26
6	0.056	0.056	--	0.042	--	--	0.042	0.25	--	--	0.25
8	--	0.057	--	--	--	0.04	0.04	--	--	0.24	0.24
9	--	0.078R	--	--	--	--	0.05	--	--	--	0.27
10	--	0.053	--	--	--	--	0.044	--	--	--	0.227
MEAN	.0560	.0553	.0480	.0420	.0500	.0400	.0463	.2500	.2633	.2400	.2539
STD. DEV.	--	.0017	--	--	.0141	--	.0072	--	.0058	--	.0159
REL. STD.	--	3.1	--	--	28.3	--	15.5	--	2.2	--	6.3
DES. VAL.	--	.056	--	--	--	--	.046	--	--	--	.251

LAB	27003 CO TOTAL AAS GF MG/L CO	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO	27302 CO EXTBL AAS SE MG/L	27999 COBALT COMBINED MG/L CO	28009 NI TOTAL ICAP DA MG/L NI	28011 NI TOTAL 5X ICAP UG/L NI	28302 NI EXTBL AAS SE MG/L	28311 NI EXTBL ICAP DA MG/L	28999 NICKEL COMBINED MG/L NI	29009 CU TOTAL ICAP MG/L CU
1	--	0.229	--	--	0.229	0.271	--	--	--	0.271	0.051
3	--	--	--	0.27	0.27	--	--	0.30	--	0.30	--
6	--	--	0.21	--	0.21	--	0.27	--	--	0.27	--
8	0.24	--	--	--	0.24	--	--	--	0.24	0.24	--
9	--	--	--	--	0.20	--	--	--	--	0.30	--
10	--	--	--	--	0.215	--	--	--	--	0.249	--
MEAN	.2400	.2290	.2100	.2700	.2273	.2710	.2700	.3000	.2400	.2717	.0510
STD. DEV.	--	--	--	--	.0252	--	--	--	--	.0250	--
REL. STD.	--	--	--	--	11.1	--	--	--	--	9.2	--
DES. VAL.	--	--	--	--	.236	--	--	--	--	.273	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 035 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 1 SPIKED SAMPLE. TRACE METALS D/A.

LAB	29011 CU TOTAL 5X ICAP UG/L CU	29305 CU EXTBL AAS SE MG/L	29306 CU EXTBL AAS DA MG/L	29311 CU EXTBL ICAP DA MG/L	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN	30011 ZN TOTAL 5X ICAP UG/L ZN	30304 ZN EXTBL AAS DA MG/L	30311 ZN EXTBL ICAP DA MG/L	30999 ZINC COMBINED MG/L ZN	38301 SR EXTBL AAS DA MG/L
1	--	--	--	--	0.051	0.069	--	--	--	0.069	--
2	--	--	0.04	--	0.04	--	--	0.057	--	0.057	--
3	--	0.05	--	--	0.05	--	--	0.07	--	0.07	--
6	0.047	--	--	--	0.047	--	0.052	--	--	0.052	0.07
8	--	--	--	0.06	0.06	--	--	--	0.05	0.05	--
9	--	--	--	--	0.08 R	--	--	--	--	0.06	--
10	--	--	--	--	0.047	--	--	--	--	0.055	--
MEAN	.0470	.0500	.0400	.0600	.0492	.0690	.0520	.0635	.0500	.0590	.0700
STD. DEV.	--	--	--	--	.0066	--	--	.0092	--	.0079	--
REL. STD.	--	--	--	--	13.3	--	--	14.5	--	13.3	--
DES. VAL.	--	--	--	--	.047	--	--	--	--	.057	--

LAB	38999 STRNTIUM COMBINED MG/L SR	42009 MO TOTAL ICAP MG/L MO	42011 MO TOTAL 5X ICAP UG/L MO	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD	48011 CD TOTAL 5X ICAP UG/L CD	48301 CD EXTBL AAS DA MG/L	48302 CD EXTBL AAS SE MG/L	48309 CD EXTBL AAS G F MG/L CD	48999 CADMIUM COMBINED MG/L CD	56011 BA TOTAL 5X ICAP UG/L BA
1	--	0.856	--	0.856	0.042	--	--	--	--	0.042	--
2	--	--	--	--	--	--	0.04	--	--	0.04	--
3	--	--	--	--	--	--	--	0.04	--	0.04	--
6	0.07	--	0.78	0.78	--	0.038	--	--	--	0.038	0.44
8	--	--	--	--	--	--	--	--	0.046	0.046	--
9	0.2	--	--	0.9	--	--	--	--	--	0.04	--
10	0.17	--	--	0.83	--	--	--	--	--	0.036	--
MEAN	.1467	.8560	.7800	.8415	.0420	.0380	.0400	.0400	.0460	.0403	.4400
STD. DEV.	.0681	--	--	.0502	--	--	--	--	--	.0031	--
REL. STD.	46.4	--	--	6.0	--	--	--	--	--	7.8	--
DES. VAL.	.180	--	--	.922	--	--	--	--	--	.043	--

LAB	56999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB	82301 PB EXTBL AAS DA MG/L	82302 PB EXTBL AAS SE MG/L	82311 PB EXTBL ICAP DA MG/L	82999 LEAD COMBINED MG/L PB
2	--	--	0.26	--	--	0.26
3	--	--	--	0.28	--	0.28
6	0.44	0.29	--	--	--	0.29
8	--	--	--	--	0.24	0.24
9	0.5	--	--	--	--	0.18
10	0.42	--	--	--	--	0.253
MEAN	.4533	.2900	.2600	.2800	.2400	.2505
STD. DEV.	.0416	--	--	--	--	.0390
REL. STD.	9.2	--	--	--	--	15.6
DES. VAL.	.489	--	--	--	--	.289

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 035 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 2 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR APPAR REL UNIT	02021 COLOUR VIS COMP REL UNIT	02040 COLOUR COMBINED REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02060 CONDUCT COMBINED USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLMTRIC NTU	02090 TURBIDTY COMBINED JTU/NTU
1	-3.06	0.95	1.01	--	--	--	96.	96.	--	--	--
2	0.925	0.938	0.921	5. L	--	5. L	94.	94.	0.2	--	0.2
3	1.23	0.950	0.927	5.	--	5.	104.	104.	0.12	--	0.12
4	--	--	--	--	5. L	5. L	93.	93.	0.1 L	--	0.1 L
5	2.00	0.979	0.941	5. L	--	5. L	93.4	93.4	0.14	--	0.14
6	0.5	0.98	0.97	--	--	--	94.	94.	--	0.15	0.15
7	--	--	--	4.	--	4.	95.0	95.0	0.1	--	0.1
8	1.62	0.96	0.93	5. L	--	5. L	96.6	96.6	--	0.35	0.35
9	6.19	0.97	0.91	--	--	--	--	90.	--	--	--
10	--	--	--	--	--	1.	--	95.	--	--	1.
MEAN	1.3436	.9610	.9441	4.5000	--	3.3333	95.7500	95.1000	.1400	.2500	.2943
STD. DEV.	2.7168	.0160	.0347	.7071	--	2.0817	3.5581	3.6212	.0432	.1414	.3222
REL. STD.	202.2	1.7	3.7	15.7	--	62.4	3.7	3.8	30.9	56.6	109.5
DES. VAL.	--	--	--	--	--	3.903	--	93.873	--	--	.238

LAB	05105 BORON AA CARM MG/L	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 DOC UV CO2 EV MG/L C	06150 D O C COMBINED MG/L	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06490 D I C COMBINED MG/L	07010 TKN AUTAN MG/L N
1	--	--	--	--	0.6	0.6	--	--	24.0 R	24.0 R	--
2	--	--	--	--	1.2	1.2	--	--	--	--	--
3	--	--	--	1.2	--	1.2	--	9.4	--	9.4	0.060
4	0.05	0.05	--	1.0	--	1.0	--	9.4	--	9.4	--
5	--	--	3.40	--	--	3.40	12.0	--	--	12.0	--
6	--	--	--	1.2	--	1.2	--	--	--	--	--
8	--	--	3.16	--	--	3.16	8.59	--	--	8.59	--
9	--	0.01	--	--	--	2. L	--	--	--	12.	--
10	--	0.01	--	--	--	1.2	--	--	--	10.0	--
MEAN	.0500	.0233	3.2800	1.1333	.9000	1.6200	10.2950	9.4000	--	10.2317	.0600
STD. DEV.	--	.0231	.1697	.1155	.4243	1.0468	2.4112	0.0000	--	1.4413	--
REL. STD.	--	99.0	5.2	10.2	47.1	64.6	23.4	0.0	--	14.1	--
DES. VAL.	--	.050	--	--	--	--	--	--	--	9.671	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 035 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 2 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG AA 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3 NO2 F AA HYD MG/L N	07110 NO3 NO2 AA2 CD MG/L N	07111 NO3 NO2 DIS SPEC MG/L N	07112 NO3 NO2 UF AA CD MG/L	07390 NITRATE COMBINED MG/L	07505 TOT HN3 AA BERT MG/L N	07506 TOT NH3 SPEC EL MG/L N
1	--	--	0.065	0.065	--	--	0.310	--	0.310	--	--
2	--	--	--	--	--	0.29	--	--	0.29	--	--
3	--	--	--	0.060	--	--	--	0.306	0.306	0.001L	--
4	--	--	--	--	--	0.28	--	--	0.28	--	0.05 L
5	--	--	--	--	--	0.298	--	--	0.298	--	--
6	--	0.3	--	0.3	0.27	--	--	--	0.27	--	--
7	--	--	--	--	--	--	--	0.30	0.30	--	--
8	0.20 L	--	--	0.20 L HDL	--	0.30	--	--	0.30	--	--
9	--	--	--	0.8	--	--	--	--	0.3	--	--
10	--	--	--	--	--	--	--	--	0.290	--	--
MEAN	--	.3000	.0650	.3063	.2700	.2920	.3100	.3030	.2944	--	--
STD. DEV.	--	--	--	.3477	--	.0091	--	.0042	.0121	--	--
REL. STD.	--	--	--	113.5	--	3.1	--	1.4	4.1	--	--
DES. VAL.	--	--	--	.084	--	--	--	--	.306	--	--

LAB	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07601 TOTAL N AA UV MG/L	07602 TOTAL N CALC'D MG/L N	07651 TOT N F UV AA MG/L	07655 TOT N F UV EDTA MG/L	07690 TOTAL N COMBINED MG/L N	07790 T N DISS COMBINED MG/L N	09103 FLUORIDE DIS COLR MG/L F
1	--	--	0.002L	0.002L	--	--	--	--	--	--	--
2	--	--	--	--	0.33	--	--	--	--	0.33	--
3	--	--	--	0.001L	--	--	--	--	--	--	--
4	--	--	--	0.05 L	--	--	0.32	--	--	0.32	--
5	--	0.002L	--	0.002L	--	--	--	0.345	--	0.345	--
6	--	0.01 L	--	0.01 L	--	--	--	--	--	--	0.1 L
8	0.004	--	--	0.004	--	0.50 L	--	--	0.50 L	--	--
9	--	--	--	0.02 L	--	--	--	--	--	--	--
10	--	--	--	0.010L	--	--	--	--	0.32	--	--
MEAN	.0040	--	--	.0040	.3300	--	.3200	.3450	.3200	.3317	--
STD. DEV.	--	--	--	--	--	--	--	--	--	.0126	--
REL. STD.	--	--	--	--	--	--	--	--	--	3.8	--
DES. VAL.	--	--	--	.007	--	--	--	--	.395	.329	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 035 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 2 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L	09107 FLUOR F AUTO POT MG/L F	09108 F DISS SPEC EL MG/L	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR'N MG/L CAC	10106 ALKLINTY IR CO2 MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10111 ALKLINTY TITROPRO MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC	10301 PH UNITS
1	--	--	0.05 L	--	0.05 L	43.	--	--	--	43.	6.9
2	0.05 L	--	--	--	0.05 L	39.6	--	--	--	39.6	7.7
3	--	--	--	0.047	0.047	--	42.2	--	40.2	40.2	8.03
4	--	--	--	--	--	40.5	--	--	--	40.5	7.7
5	--	0.05	--	--	0.05	40.4	--	--	--	40.4	7.65
6	--	--	--	--	0.1 L	--	--	43.	--	43.	6.8
7	--	--	--	--	--	40.7	--	--	--	40.7	7.9
8	--	--	--	--	--	--	--	41.0	--	41.0	7.75
9	--	--	--	--	0.06	--	--	--	--	40.	--
10	--	--	--	--	0.05	--	--	--	--	41.3	--
MEAN	--	.0500	--	.0470	.0518	40.8400	42.2000	42.0000	40.2000	40.9700	7.5538
STD. DEV.	--	--	--	--	.0057	1.2779	--	1.4142	--	1.1729	.4524
REL. STD.	--	--	--	--	11.0	3.1	--	3.4	--	2.9	6.0
DES. VAL.	--	--	--	--	.220	--	--	--	--	41.135	--

LAB	10390 PH COMBINED UNITS	10602 HARDNESS CALC'D MG/L	10603 HARDNESS TITR'N MG/L	10690 HARDNESS COMBINED MG/L	11102 SODIUM AAS F MG/L NA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS DA MG/L	11107 SODIUM FL PH UF MG/L	11311 NA EXTBL HN03 ICP MG/L	11990 SODIUM COMBINED MG/L	12101 MG DISS CALC'D MG/L
1	6.9	42.	--	42.	--	2.	--	--	--	2.	--
2	7.7	--	--	--	--	1.3	--	--	--	1.3	--
3	8.03	--	44.2	44.2	--	--	--	1.3	--	1.3	--
4	7.7	--	--	--	--	--	--	--	--	--	--
5	7.65	--	45.9	45.9	--	1.2	--	--	--	1.2	--
6	6.8	--	48.	48.	1. L	--	--	--	--	1. L	2.9
7	7.9	--	44.0	44.0	--	--	1.1	--	--	1.1	--
8	7.75	44.6	--	44.6	--	--	--	--	1.24	1.24	--
9	--	--	--	45.	--	--	--	--	--	1.2	--
10	7.80	--	--	--	--	--	--	--	--	1.29	--
MEAN	7.5811	43.3000	45.5250	44.8143	--	1.5000	1.1000	1.3000	1.2400	1.3288	2.9000
STD. DEV.	.4311	1.8385	1.8572	1.8425	--	.4359	--	--	--	.2796	--
REL. STD.	5.7	4.2	4.1	4.1	--	29.1	--	--	--	21.0	--
DES. VAL.	7.696	--	--	44.340	--	--	--	--	--	1.286	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 035 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 2 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	12102 MG FIL AAS DA MG/L	12106 MG UF AAS DA MG/L	12107 MG DISS AAS AUTO MG/L	12108 MG HARDN CALC'D MG/L	12303 MG UF AAS AUTO MG/L MG	12311 MG EXTBL HNO3 ICP MG/L	12990 MGNESIUM COMBINED MG/L MG	14102 SILICA R ANSA AA MG/L	14105 SILICA R MOLY AA MG/L	14106 SILICA R MOLY UF MG/L	14190 SILICA COMBINED MG/L
1	--	--	--	--	3.	--	3.	2.3	--	--	2.3
2	--	--	2.8	--	--	--	2.8	2.5	--	--	2.5
3	--	2.6	--	--	--	--	2.6	--	--	0.65	0.65
5	--	--	--	2.71	--	--	2.71	--	2.3	--	2.3
6	--	--	--	--	--	--	2.9	--	--	--	--
7	2.4	--	--	--	--	--	2.4	--	--	--	--
8	--	--	--	--	--	3.01	3.01	--	2.6	--	2.6
9	--	--	--	--	--	--	2.8	--	--	--	--
10	--	--	--	--	--	--	2.77	--	--	--	2.3
MEAN	2.4000	2.6000	2.8000	2.7100	3.0000	3.0100	2.7767	2.4000	2.4500	.6500	2.1083
STD. DEV.	--	--	--	--	--	--	.1931	.1414	.2121	--	.7255
REL. STD.	--	--	--	--	--	--	7.0	5.9	8.7	--	34.4
DES. VAL.	--	--	--	--	--	--	2.737	--	--	--	2.383

LAB	15406 T P UF AA ASC MG/L P	15409 T P BLK AA ASC MG/L P	15413 TOTAL P AA SNCL2 MG/L P	15490 TOTAL P COMBINED MG/L	16304 SO4 DISS AUTO BA MG/L	16306 SO4 DISS AA MTB MG/L	16307 SO4 DISS AAN MBUF MG/L	16990 SULFATE COMBINED MG/L SO4	17203 CL DISS AA UF FE MG/L	17204 CL DISS AG TITN MG/L	17205 CL DISS ION EL MG/L
1	--	--	--	--	--	5. L	--	5. L	1. L	--	--
2	--	--	0.001L	0.001L	3.2	--	--	3.2	--	--	1.4
3	--	--	--	--	--	--	3.3	3.3	--	--	--
4	0.003L	--	--	0.003L	--	--	--	--	--	--	--
5	--	--	--	--	--	3.5	--	3.5	--	--	--
6	--	0.01 L	--	0.01 L	10. L	--	--	10. L	--	4. R	--
7	--	--	--	--	--	3.5	--	3.5	1.1	--	--
8	--	--	0.003	0.003	--	2.80	--	2.80	--	--	--
9	--	--	--	4.5 R	--	--	--	3.0	--	--	--
10	--	--	--	0.010	--	--	--	3.4	--	--	--
MEAN	--	--	.0030	.0065	3.2000	3.2667	3.3000	3.2429	1.1000	--	1.4000
STD. DEV.	--	--	--	.0049	--	.4041	--	.2637	--	--	--
REL. STD.	--	--	--	76.1	--	12.4	--	8.1	--	--	--
DES. VAL.	--	--	--	.006	--	--	--	3.318	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 035 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 2 SPIKED SAMPLE. MAJOR IONS 4 C.

LAB	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17990 CHLORIDE COMBINED MG/L	19102 K DISS AAS MG/L K	19103 K DISS F LM PHOT MG/L	19107 K DIS UF FLM PHOT MG/L	19301 K EXTBL HNO3 AA MG/L	19990 PTASSIUM COMBINED MG/L	20100 CA DISS CALC'D MG/L CA	20101 CA DISS TIT EDTA MG/L	20103 CA DISS AAS MG/L
1	--	--	1. L	--	0.6	--	--	0.6	--	--	--
2	--	--	1.4	--	0.48	--	--	0.48	--	--	--
3	--	1.1	1.1	--	--	0.44	--	0.44	--	--	--
5	1.3	--	1.3	--	0.4	--	--	0.4	--	13.9	--
6	--	--	4. R	0.8 R	--	--	--	0.8 R	14.4	--	--
7	--	--	1.1	0.4	--	--	--	0.4	--	--	11.8
8	1.0	--	1.0	--	--	--	0.50	0.50	--	--	--
9	--	--	1.1	--	--	--	--	0.6	--	--	--
10	--	--	1.8	--	--	--	--	0.51	--	--	--
MEAN	1.1500	1.1000	1.2571	.4000	.4933	.4400	.5000	.4913	14.4000	13.9000	11.8000
STD. DEV.	.2121	--	.2760	--	.1007	--	--	.0788	--	--	--
REL. STD.	18.4	--	22.0	--	20.4	--	--	16.0	--	--	--
DES. VAL.	--	--	1.249	--	--	--	--	.488	--	--	--

LAB	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20311 CA EXTBL HNO3 ICP MG/L	20990 CALCIUM COMBINED MG/L CA
1	--	12.	--	12.
2	--	12.8	--	12.8
3	13.4	--	--	13.4
5	--	--	--	13.9
6	--	--	--	14.4
7	--	--	--	11.8
8	--	--	12.9	12.9
9	--	--	--	13.4
10	--	--	--	13.2
MEAN	13.4000	12.4000	12.9000	13.0889
STD. DEV.	--	.5657	--	.8328
REL. STD.	--	4.6	--	6.4
DES. VAL.	--	--	--	12.456

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 036 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 3 SPIKED SAMPLE. TRACE METALS S/E.

LAB	13009 AL TOTAL 5X ICAP MG/L	13302 AL EXTBL AAS DA MG/L	13305 AL EXTBL AAS SE MG/L AL	13306 AL UFAAS SE OX/EP MG/L AL	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP DA MG/L V	23011 V TOTAL 5X ICAP UG/L V	23302 V EXTRBL SE PH1.6 MG/L	23999 VANADIUM COMBINED MG/L V	24004 CR TOTAL AAS G F MG/L	24009 CR TOTAL ICAP DA MG/L CR
1	--	--	--	0.102R	0.102R	0.016	--	--	0.016	--	0.016
2	--	--	0.03	--	0.03	--	--	--	--	--	--
3	--	--	0.031	--	0.031	--	--	0.011	0.011	--	--
6	0.04	--	--	--	0.04	--	0.05 L	--	HDL 0.05 L	--	--
8	--	0.2 L	--	-- HDL	0.2 L	--	--	--	--	0.017	--
9	--	--	--	-- HDL	0.05 L	--	--	--	0.01	--	--
10	--	--	--	--	0.05	--	--	--	0.012	--	--
MEAN	.0400	--	.0305	--	.0378	.0160	--	.0110	.0123	.0170	.0160
STD. DEV.	--	--	.0007	--	.0093	--	--	--	.0026	--	--
REL. STD.	--	--	2.3	--	24.7	--	--	--	21.5	--	--
DES. VAL.	--	--	--	--	.033	--	--	--	.011	--	--

LAB	24011 CR TOTAL 5X ICAP UG/L CR	24303 CR EXTBL AAS SE MG/L	24999 CHROMIUM COMBINED MG/L CR	25003 MN TOTAL ICAP DA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25311 MN EXTBL ICAP DA MG/L	25999 MANGNESE COMBINED MG/L MN	26011 FE TOTAL 5X ICAP UG/L FE	26304 FE EXTBL AAS DA MG/L	26305 FE EXTBL AAS SE MG/L
1	--	--	0.016	0.014	--	--	--	0.014	--	0.05 R	--
2	--	--	--	--	--	0.01	--	0.01	--	--	0.028
3	--	0.013	0.013	--	--	0.013	--	0.013	--	--	0.030
6	0.014	--	0.014	--	0.014	--	--	0.014	0.031	--	--
8	--	--	0.017	--	--	--	0.02 L	HDL 0.02 L	--	--	--
9	--	--	0.012	--	--	--	--	0.01	--	--	--
10	--	--	0.021	--	--	--	--	0.013	--	--	--
MEAN	.0140	.0130	.0155	.0140	.0140	.0115	--	.0123	.0310	--	.0290
STD. DEV.	--	--	.0033	--	--	.0021	--	.0019	--	--	.0014
REL. STD.	--	--	21.1	--	--	18.4	--	15.1	--	--	4.9
DES. VAL.	--	--	.013	--	--	--	--	.012	--	--	--

LAB	26311 FE EXTBL ICAP DA MG/L	26999 IRON COMBINED MG/L FE	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO	27302 CO EXTBL AAS SE MG/L	27309 CO EXTBL AAS G F MG/L CO	27999 COBALT COMBINED MG/L CO	28009 NI TOTAL ICAP DA MG/L NI	28011 NI TOTAL 5X ICAP UG/L NI	28302 NI EXTBL AAS SE MG/L	28309 NI EXTR AAS G F MG/L NI
1	--	0.05 R	0.014	--	--	--	0.014	0.019	--	--	--
2	--	0.028	--	--	--	--	--	--	--	--	--
3	--	0.030	--	--	0.011	--	0.011	--	--	0.015	--
6	--	0.031	--	0.009	--	--	0.009	--	0.015	--	--
8	0.03	0.03	--	--	--	0.015	0.015	--	--	--	0.014
9	-- HDL	0.05 L	--	--	--	--	0.01 L	--	--	--	--
10	--	0.027	--	--	--	--	0.014	--	--	--	--
MEAN	.0300	.0292	.0140	.0090	.0110	.0150	.0126	.0190	.0150	.0150	.0140
STD. DEV.	--	.0016	--	--	--	--	.0025	--	--	--	--
REL. STD.	--	5.6	--	--	--	--	19.9	--	--	--	--
DES. VAL.	--	.029	--	--	--	--	.011	--	--	--	--

high C.V.

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 036 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 3 SPIKED SAMPLE. TRACE METALS S/E.

LAB	28999 NICKEL COMBINED MG/L NI	29009 CU TOTAL ICAP MG/L CU	29011 CU TOTAL 5X ICAP UG/L CU	29305 CU EXTBL AAS SE MG/L	29309 CU EXTBL AAS G F MG/L CU	29311 CU EXTBL ICAP DA MG/L	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN	30011 ZN TOTAL 5X ICAP UG/L ZN	30304 ZN EXTBL AAS DA MG/L	30305 ZN EXTBL AAS SE MG/L
1	0.019	0.019	--	--	--	--	0.019	0.027	--	--	--
2	--	--	--	0.014	--	--	0.014	--	--	0.011	--
3	0.015	--	--	0.014	--	--	0.014	--	--	--	0.016
6	0.015	--	0.014	--	--	--	0.014	--	0.014	--	--
8	0.014	--	--	--	--	0.02	0.02	--	--	--	--
9	0.02	--	--	--	--	--	0.02	--	--	--	--
10	0.016	--	--	--	--	--	0.014	--	--	--	--
MEAN	.0165	.0190	.0140	.0140	--	.0200	.0164	.0270	.0140	.0110	.0160
STD. DEV.	.0024	--	--	0.0000	--	--	.0030	--	--	--	--
REL. STD.	14.7	--	--	0.0	--	--	18.5	--	--	--	--
DES. VAL.	.013	--	--	--	--	--	.013	--	--	--	--

LAB	30311 ZN EXTBL ICAP DA MG/L	30999 ZINC COMBINED MG/L ZN	38301 SR EXTBL AAS DA MG/L	38999 STRNTIUM COMBINED MG/L SR	42009 MO TOTAL ICAP MG/L MO	42011 MO TOTAL 5X ICAP UG/L MO	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD	48011 CD TOTAL 5X ICAP UG/L CD	48302 CD EXTBL AAS SE MG/L	48309 CD EXTBL AAS G F MG/L CD
1	--	0.027	--	--	0.015	--	0.015	0.013	--	--	--
2	--	0.011	--	--	--	--	--	--	--	0.011	--
3	--	0.016	--	--	--	--	--	--	--	0.012	--
6	--	0.014	0.13	0.13	--	0.009	0.009	--	0.012	--	--
8	0.02	0.02	--	--	--	--	--	--	--	--	0.011
9	--	0.01	--	0.2	--	-- HDL	0.1 L	--	--	--	--
10	--	0.015	--	0.17	--	--	0.013	--	--	--	--
MEAN	.0200	.0161	.1300	.1667	.0150	.0090	.0123	.0130	.0120	.0115	.0110
STD. DEV.	--	.0058	--	.0351	--	--	.0031	--	--	.0007	--
REL. STD.	--	36.0	--	21.1	--	--	24.8	--	--	6.1	--
DES. VAL.	--	.014	--	.189	--	--	.015	--	--	--	--

LAB	48999 CADMIUM COMBINED MG/L CD	56011 BA TOTAL 5X ICAP UG/L BA	56301 BA EXTBL AAS DA MG/L	56999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB	82302 PB EXTBL AAS SE MG/L	82309 PB EXTBL AAS G F MG/L PB	82999 LEAD COMBINED MG/L PB
1	0.013	--	--	--	--	0.014	--	0.014
2	0.011	--	--	--	--	0.011	--	0.011
3	0.012	--	0.1 L HDL	0.1 L	--	0.012	--	0.012
6	0.012	0.025	--	0.025	0.01	--	--	0.01
8	0.011	--	--	--	--	--	0.005	0.005
9	0.012	--	-- HDL	0.1 L	--	--	--	0.006
10	0.009	--	--	0.02	--	--	--	0.007
MEAN	.0114	.0250	--	.0225	.0100	.0123	.0050	.0093
STD. DEV.	.0013	--	--	.0035	--	.0015	--	.0034
REL. STD.	11.1	--	--	15.7	--	12.4	--	36.1
DES. VAL.	.011	--	--	.029	--	--	--	.011

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 036 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 4 NATURAL SAMPLE. MAJOR IONS 4 C.

LAB	00110 IONIC BALANC %	00120 SUM OF CATIONS MEQ/L	00125 SUM OF ANIONS MEQ/L	02011 COLOUR APPAR REL UNIT	02021 COLOUR VIS COMP REL UNIT	02040 COLOUR COMBINED REL UNIT	02041 CONDUCT SPEC 25C USIE/CM	02060 CONDUCT COMBINED USIE/CM	02073 TURBIDTY JTU	02074 TURBIDTY NPLMTRIC NTU	02090 TURBIDTY COMBINED JTU/NTU
1	0.45	2.23	2.21	--	--	--	234.	234.	--	--	--
2	0.005	2.245	2.244	0.5 L	--	0.5 L	231.	231.	0.1	--	0.1
3	0.22	2.223	2.213	5.	--	5.	245.9	245.9	0.12	--	0.12
4	--	--	--	--	5. L	5. L	230.	230.	0.1 L	--	0.1 L
5	0.93	2.31	2.27	5.	--	5.	220.	220.	0.26	--	0.26
6	5.9	2.7	2.4	--	--	--	246.	246.	--	0.12	0.12
7	--	--	--	15. R	--	15. R	220.	220.	0.1	--	0.1
8	2.38	2.38	2.27	5. L	--	5. L	232.	232.	--	1.0 R	1.0 R
9	7.05	2.41	2.24	--	--	--	--	210.	--	--	--
10	--	--	--	--	--	2.	--	228.	--	--	2.
MEAN	2.4193	2.3569	2.2639	5.0000	--	4.0000	232.3625	229.6900	.1450	.1200	.4500
STD. DEV.	2.8960	.1682	.0646	0.0000	--	1.7321	9.8934	11.2193	.0772	--	.7618
REL. STD.	119.7	7.1	2.9	0.0	--	43.3	4.3	4.9	53.3	--	169.3
DES. VAL.	--	--	--	--	--	5.400	--	227.755	--	--	.262

LAB	05105 BORON AA CARM MG/L	05190 BORON COMBINED MG/L B	06101 DOC IR /DIFF MG/L	06104 DOC UV CO2 EV MG/L	06107 DOC UV CO2 EV MG/L C	06150 D O C COMBINED MG/L	06151 DIC IR COMBUST MG/L	06152 DIC IR UV CO2EV MG/L C	06154 DIC AA CO2 PHEN MG/L C	06490 D I C COMBINED MG/L	07010 TKN AUTAN MG/L N
1	--	--	--	--	0.9	0.9	--	--	24.0	24.0	--
2	--	--	--	--	1.4	1.4	--	--	--	--	--
3	--	--	--	1.4	--	1.4	--	19.0	--	19.0	0.096
4	0.03	0.03	--	1.1	--	1.1	--	19.	--	19.	--
5	--	--	6.10 R	--	--	6.10 R	21.0	--	--	21.0	--
6	--	--	--	1.3	--	1.3	--	--	--	--	--
8	--	--	8.80 R	--	--	8.80 R	11.4 R	--	--	11.4 R	--
9	--	0.01	--	--	--	2. L	--	--	--	22.	--
10	--	0.02	--	--	--	1.4	--	--	--	19.0	--
MEAN	.0300	.0200	--	1.2667	1.1500	1.2500	21.0000	19.0000	24.0000	20.6667	.0960
STD. DEV.	--	.0100	--	.1528	.3536	.2074	--	0.0000	--	2.0656	--
REL. STD.	--	50.0	--	12.1	30.7	16.6	--	0.0	--	10.0	--
DES. VAL.	--	.052	--	--	--	--	--	--	--	19.408	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 036 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 4 NATURAL SAMPLE. MAJOR IONS 4 C.

LAB	07015 TKN DIG AUTOAN MG/L N	07016 TKN BLK DIG AA 2 MG/L N	07021 TKN BLK DIG BERT MG/L N	07090 TKN COMBINED MG/L N	07109 NO3 NO2 F AA HYD MG/L N	07110 NO3 NO2 AA2 CD MG/L N	07111 NO3 NO2 DIS SPEC MG/L N	07112 NO3 NO2 UF AA CD MG/L	07390 NITRATE COMBINED MG/L	07505 TOT HN3 AA BERT MG/L N	07506 TOT NH3 SPEC EL MG/L N
1	--	--	0.100	0.100	--	--	0.354	--	0.354	--	--
2	--	--	--	--	--	0.32	--	--	0.32	--	--
3	--	--	--	0.096	--	--	--	0.353	0.353	0.007	--
4	--	--	--	--	--	0.32	--	--	0.32	--	0.05 L
5	--	--	--	--	--	0.334	--	--	0.334	--	--
6	--	0.5 R	--	0.5 R	0.30	--	--	--	0.30	--	--
7	--	--	--	--	--	--	--	0.34	0.34	--	--
8	0.20 L	--	--	0.20 L	--	0.35	--	--	0.35	--	--
9	--	--	--	0.3 R	--	--	--	--	0.3	--	--
10	--	--	--	--	--	--	--	--	0.315	--	--
MEAN	--	--	.1000	.0980	.3000	.3310	.3540	.3465	.3286	.0070	--
STD. DEV.	--	--	--	.0028	--	.0143	--	.0092	.0206	--	--
REL. STD.	--	--	--	2.9	--	4.3	--	2.7	6.3	--	--
DES. VAL.	--	--	--	.179	--	--	--	--	.329	--	--

LAB	07555 NH3 DISS AA PHEN MG/L N	07557 AMM DIS INPHENOL MG/L N	07562 AMMONIA AUT EDTA MG/L N	07590 AMMONIA COMBINED MG/L	07601 TOTAL N AA UV MG/L	07602 TOTAL N CALC'D MG/L N	07651 TOT N F UV AA MG/L	07655 TOT N F UV EDTA MG/L	07690 TOTAL N COMBINED MG/L N	07790 T N DISS COMBINED MG/L N	09103 FLUORIDE DIS COLR MG/L F
1	--	--	0.002L	0.002L	--	--	--	--	--	--	--
2	--	--	--	--	0.38	--	--	--	--	0.38	--
3	--	--	--	0.007	--	--	--	--	--	--	--
4	--	--	--	HDL 0.05 L	--	--	0.40	--	--	0.40	--
5	--	0.004	--	0.004	--	--	--	0.415	--	0.415	--
6	--	0.01 L	--	0.01 L	--	--	--	--	--	--	0.1 L
8	0.009	--	--	0.009	--	0.55 L	--	--	0.55 L	--	--
9	--	--	--	0.02 L	--	--	--	--	--	--	--
10	--	--	--	0.010L	--	--	--	--	0.40	--	--
MEAN	.0090	.0040	--	.0067	.3800	--	.4000	.4150	.4000	.3983	--
STD. DEV.	--	--	--	.0025	--	--	--	--	--	.0176	--
REL. STD.	--	--	--	37.7	--	--	--	--	--	4.4	--
DES. VAL.	--	--	--	.014	--	--	--	--	.424	.417	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 036 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 4 NATURAL SAMPLE. MAJOR IONS 4 C.

LAB	09105 F DIS UF SPEC EL MG/L	09106 F DISS EL POT MG/L	09107 FLUOR F AUTO POT MG/L F	09108 F DISS SPEC EL MG/L	09190 FLOURIDE COMBINED MG/L	10101 ALKLINTY TITR'N MG/L CAC	10106 ALKLINTY IR CO2 MG/L CAC	10109 ALKLINTY POT TITN MG/L CAC	10111 ALKLINTY TITROPRO MG/L CAC	10190 ALKLINTY COMBINED MG/L CAC	10301 PH UNITS
1	--	--	0.07	--	0.07	79.	--	--	--	79.	7.9
2	0.07	--	--	--	0.07	76.0	--	--	--	76.0	7.7
3	--	--	--	0.090	0.090	--	79.6	--	77.1	77.1	8.21
4	--	--	--	--	--	78.3	--	--	--	78.3	8.0
5	--	0.101	--	--	0.101	78.0	--	--	--	78.0	8.0
6	--	--	--	--	0.1 L	--	--	82.	--	82.	7.0 R
7	--	--	--	--	--	77.7	--	--	--	77.7	8.1
8	--	--	--	--	--	--	--	79.0	--	79.0	8.05
9	--	--	--	--	0.1 L	--	--	--	--	78.	--
10	--	--	--	--	0.10	--	--	--	--	79.	--
MEAN	.0700	.1010	.0700	.0900	.0862	77.8000	79.6000	80.5000	77.1000	78.4100	7.9943
STD. DEV.	--	--	--	--	.0154	1.1158	--	2.1213	--	1.5744	.1614
REL. STD.	--	--	--	--	17.9	1.4	--	2.6	--	2.0	2.0
DES. VAL.	--	--	--	--	.083	--	--	--	--	79.134	--

LAB	10390 PH COMBINED UNITS	10602 HARDNESS CALC'D MG/L	10603 HARDNESS TITR'N MG/L	10690 HARDNESS COMBINED MG/L	11102 SODIUM AAS F MG/L NA	11103 SODIUM F FL PH MG/L	11105 SODIUM AAS DA MG/L	11107 SODIUM FL PH UF MG/L	11311 NA EXTBL HN03 ICP MG/L	11990 SODIUM COMBINED MG/L	12101 MG DISS CALC'D MG/L
1	7.9	99.	--	99.	--	4.	--	--	--	4.	--
2	7.7	--	--	--	--	4.4	--	--	--	4.4	--
3	8.21	--	97.4	97.4	--	--	--	4.6	--	4.6	--
4	8.0	--	--	--	--	--	--	--	--	--	--
5	8.0	--	102.	102.	--	4.5	--	--	--	4.5	--
6	7.0 R	--	108.	108.	10. R	--	--	--	--	10. R	6.8
7	8.1	--	102.5	102.5	--	--	4.1	--	--	4.1	--
8	8.05	105.	--	105.	--	--	--	--	4.71	4.71	--
9	--	--	--	105.	--	--	--	--	--	4.7	--
10	8.05	--	--	--	--	--	--	--	--	4.70	--
MEAN	8.0013	102.0000	102.4750	102.7000	--	4.3000	4.1000	4.6000	4.7100	4.4638	6.8000
STD. DEV.	.1508	4.2426	4.3400	3.6738	--	.2646	--	--	--	.2787	--
REL. STD.	1.9	4.2	4.2	3.6	--	6.2	--	--	--	6.2	--
DES. VAL.	7.900	--	--	103.415	--	--	--	--	--	4.569	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 036 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 4 NATURAL SAMPLE. MAJOR IONS 4 C.

LAB	12102 MG FIL AAS DA MG/L	12106 MG UF AAS DA MG/L	12107 MG DISS AAS AUTO MG/L	12108 MG HARDN CALC'D MG/L	12303 MG UF AAS AUTO MG/L MG	12311 MG EXTBL HNO3 ICP MG/L	12990 MGNESIUM COMBINED MG/L MG	14102 SILICA R ANSA AA MG/L	14105 SILICA R MOLY AA MG/L	14106 SILICA R MOLY UF MG/L	14190 SILICA COMBINED MG/L
1	--	--	--	--	7.	--	7.	1.3	--	--	1.3
2	--	--	7.8	--	--	--	7.8	1.4	--	--	1.4
3	--	7.1	--	--	--	--	7.1	--	--	0.96	0.96
5	--	--	--	7.06	--	--	7.06	--	1.3	--	1.3
6	--	--	--	--	--	--	6.8	--	--	--	--
7	6.8	--	--	--	--	--	6.8	--	--	--	--
8	--	--	--	--	--	8.13	8.13	--	1.5	--	1.5
9	--	--	--	--	--	--	7.8	--	--	--	--
10	--	--	--	--	--	--	7.41	--	--	--	1.25
MEAN	6.8000	7.1000	7.8000	7.0600	7.0000	8.1300	7.3222	1.3500	1.4000	.9600	1.2920
STD. DEV.	--	--	--	--	--	--	.4853	.0707	.1414	--	.2033
REL. STD.	--	--	--	--	--	--	6.6	5.2	10.1	--	15.7
DES. VAL.	--	--	--	--	--	--	7.387	--	--	--	1.292

LAB	15406 T P UF AA ASC MG/L P	15409 T P BLK AA ASC MG/L P	15413 TOTAL P AA SNCL2 MG/L P	15490 TOTAL P COMBINED MG/L	16304 SO4 DISS AUTO BA MG/L	16306 SO4 DISS AA MTB MG/L	16307 SO4 DISS AAN MBUF MG/L	16990 SULFATE COMBINED MG/L SO4	17203 CL DISS AA UF FE MG/L	17204 CL DISS AG TITN MG/L	17205 CL DISS ION EL MG/L
1	--	--	--	--	--	14.	--	14.	11.	--	--
2	--	--	0.001	0.001	17.2	--	--	17.2	--	--	12.1
3	--	--	--	--	--	--	15.3	15.3	--	--	--
4	0.003L	--	--	0.003L	--	--	--	--	--	--	--
5	--	--	--	--	--	16.4	--	16.4	--	--	--
6	--	0.01 L	--	0.01 L	15.	--	--	15.	--	18. R	--
7	--	--	--	--	--	17.2	--	17.2	11.7	--	--
8	--	--	0.003	0.003	--	17.0	--	17.0	--	--	--
9	--	--	--	0.4 R	--	--	--	17.	--	--	--
10	--	--	--	0.010L	--	--	--	15.8	--	--	--
MEAN	--	--	.0020	.0020	16.1000	16.1500	15.3000	16.1000	11.3500	--	12.1000
STD. DEV.	--	--	.0014	.0014	1.5556	1.4731	--	1.1446	.4950	--	--
REL. STD.	--	--	70.7	70.7	9.7	9.1	--	7.1	4.4	--	--
DES. VAL.	--	--	--	.004	--	--	--	16.240	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 036 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 4 NATURAL SAMPLE. MAJOR IONS 4 C.

LAB	17206 CL DISS AA AG MG/L	17208 CL DISS AA UF AG MG/L	17990 CHLORIDE COMBINED MG/L	19102 K DISS AAS MG/L K	19103 K DISS F LM PHOT MG/L	19107 K DIS UF FLM PHOT MG/L	19301 K EXTBL HNO3 AA MG/L	19990 PTASSIUM COMBINED MG/L	20100 CA DISS CALC'D MG/L CA	20101 CA DISS TIT EDTA MG/L	20103 CA DISS AAS MG/L
1	--	--	11.	--	3.3	--	--	3.3	--	--	--
2	--	--	12.1	--	3.1	--	--	3.1	--	--	--
3	--	11.5	11.5	--	--	3.00	--	3.00	--	--	--
5	12.1	--	12.1	--	3.1	--	--	3.1	--	29.2	--
6	--	--	18. R	3.8	--	--	--	3.8	32.	--	--
7	--	--	11.7	2.7	--	--	--	2.7	--	--	25.2
8	11.0	--	11.0	--	--	--	3.30	3.30	--	--	--
9	--	--	11.	--	--	--	--	3.6	--	--	--
10	--	--	12.	--	--	--	--	3.21	--	--	--
MEAN	11.5500	11.5000	11.5500	3.2500	3.1667	3.0000	3.3000	3.2344	32.0000	29.2000	25.2000
STD. DEV.	.7778	--	.4986	.7778	.1155	--	--	.3239	--	--	--
REL. STD.	6.7	--	4.3	23.9	3.6	--	--	10.0	--	--	--
DES. VAL.	--	--	11.892	--	--	--	--	3.131	--	--	--

LAB	20108 CA DISS AAS UF MG/L	20110 CA DISS AAS AUTO MG/L	20311 CA EXTBL HNO3 ICP MG/L	20990 CALCIUM COMBINED MG/L CA
1	--	28.	--	28.
2	--	26.7	--	26.7
3	27.3	--	--	27.3
5	--	--	--	29.2
6	--	--	--	32.
7	--	--	--	25.2
8	--	--	28.5	28.5
9	--	--	--	29.4
10	--	--	--	27.9
MEAN	27.3000	27.3500	28.5000	28.2444
STD. DEV.	--	.9192	--	1.9086
REL. STD.	--	3.4	--	6.8
DES. VAL.	--	--	--	28.239

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 036 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 5 SPIKED SAMPLE. TRACE METALS S/E.

LAB	13009 AL TOTAL 5X ICAP MG/L	13302 AL EXTBL AAS DA MG/L	13305 AL EXTBL AAS SE MG/L AL	13306 AL UFAAS SE OX/EP MG/L AL	13999 ALUMINUM COMBINED MG/L AL	23009 V TOTAL ICAP DA MG/L V	23011 V TOTAL 5X ICAP UG/L V	23302 V EXTRBL SE PH1.6 MG/L	23999 VANADIUM COMBINED MG/L V	24004 CR TOTAL AAS G F MG/L	24009 CR TOTAL ICAP DA MG/L CR
1	--	--	--	0.022	0.022	0.004	--	--	0.004	--	0.005
2	--	--	0.01 L	--	0.01 L	--	--	--	--	--	--
3	--	--	0.004	--	0.004	--	--	0.001L	0.001L	--	--
6	0.02 L	--	--	--	0.02 L	--	0.05 L	-- HDL	0.05 L	--	--
8	--	0.2 L	--	-- HDL	0.2 L	--	--	--	--	0.005L	--
9	--	--	--	-- HDL	0.05 L	--	--	-- HDL	0.01 L	--	--
10	--	--	--	--	0.02 L	--	--	--	0.005L	--	--
MEAN	--	--	.0040	.0220	.0130	.0040	--	--	.0040	--	.0050
STD. DEV.	--	--	--	--	.0127	--	--	--	--	--	--
REL. STD.	--	--	--	--	97.9	--	--	--	--	--	--
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

LAB	24011 CR TOTAL 5X ICAP UG/L CR	24303 CR EXTBL AAS SE MG/L	24999 CHROMIUM COMBINED MG/L CR	25003 MN TOTAL ICAP DA MG/L MN	25011 MN TOTAL 5X ICAP UG/L MN	25304 MN EXTBL AAS DA MG/L	25311 MN EXTBL ICAP DA MG/L	25999 MANGNESE COMBINED MG/L MN	26011 FE TOTAL 5X ICAP UG/L FE	26304 FE EXTBL AAS DA MG/L	26305 FE EXTBL AAS SE MG/L
1	--	--	0.005	0.008L	--	--	--	0.008L	--	0.02 L	--
2	--	--	--	--	--	0.01 L	--	0.01 L	--	--	0.002
3	--	0.001	0.001	--	--	0.005L	--	0.005L	--	--	0.004
6	0.05 L	-- HDL	0.05 L	--	0.005L	--	--	0.005L	0.005L	--	--
8	--	-- HDL	0.005L	--	--	--	0.02 L HDL	0.02 L	--	--	--
9	--	--	0.005	--	--	--	-- HDL	0.01 L	--	--	--
10	--	--	0.005	--	--	--	--	0.001	--	--	--
MEAN	--	.0010	.0040	--	--	--	--	.0010	--	--	.0030
STD. DEV.	--	--	.0020	--	--	--	--	--	--	--	.0014
REL. STD.	--	--	50.0	--	--	--	--	--	--	--	47.1
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

LAB	26311 FE EXTBL ICAP DA MG/L	26999 IRON COMBINED MG/L FE	27009 CO TOTAL ICAP DA MG/L CO	27011 CO TOTAL 5X ICAP UG/L CO	27302 CO EXTBL AAS SE MG/L	27309 CO EXTBL AAS G F MG/L CO	27999 COBALT COMBINED MG/L CO	28009 NI TOTAL ICAP DA MG/L NI	28011 NI TOTAL 5X ICAP UG/L NI	28302 NI EXTBL AAS SE MG/L	28309 NI EXTR AAS G F MG/L NI
1	--	0.02 L	0.001L	--	--	--	0.001L	0.007	--	--	--
2	--	0.002	--	--	--	--	--	--	--	--	--
3	--	0.004	--	--	0.001L	--	0.001L	--	--	0.002	--
6	--	0.005L	--	0.005L	--	--	0.005L	--	0.005L	--	--
8	0.02 L	0.02 L	--	--	--	0.005L	0.005L	--	--	--	0.005L
9	-- HDL	0.05 L	--	--	--	--	0.01 L	--	--	--	--
10	--	0.004	--	--	--	--	0.005L	--	--	--	--
MEAN	--	.0033	--	--	--	--	--	.0070	--	.0020	--
STD. DEV.	--	.0012	--	--	--	--	--	--	--	--	--
REL. STD.	--	34.6	--	--	--	--	--	--	--	--	--
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

DATA SUMMARY

PRAIRIE PROVINCES AND INTER REGIONAL QUALITY CONTROL PROGRAM

STUDY NO. 036 DATE: 01/07/85 DISTRIBUTED: 24/06/85

SAMPLE = 5 SPIKED SAMPLE. TRACE METALS S/E.

LAB	28999 NICKEL COMBINED MG/L NI	29009 CU TOTAL ICAP MG/L CU	29011 CU TOTAL 5X ICAP UG/L CU	29305 CU EXTBL AAS SE MG/L	29309 CU EXTBL AAS G F MG/L CU	29999 COPPER COMBINED MG/L CU	30009 ZN TOTAL ICAP MG/L ZN	30011 ZN TOTAL 5X ICAP UG/L ZN	30304 ZN EXTBL AAS DA MG/L	30305 ZN EXTBL AAS SE MG/L	30311 ZN EXTBL ICAP DA MG/L
1	0.007	0.005	--	--	--	0.005	0.010R	--	--	--	--
2	--	--	--	0.002	--	0.002	--	--	0.01 L	--	--
3	0.002	--	--	0.001	--	0.001	--	--	--	0.002	--
6	0.005L	--	0.005L	--	--	0.005L	--	0.005L	--	--	--
8	0.005L	--	--	--	0.005L	0.005L	--	--	--	--	0.01 L
9	HDL 0.01 L	--	--	--	-- HDL	0.01 L	--	--	--	--	--
10	HDL 0.010L	--	--	--	--	0.005L	--	--	--	--	--
MEAN	.0045	.0050	--	.0015	--	.0027	--	--	--	.0020	--
STD. DEV.	.0035	--	--	.0007	--	.0021	--	--	--	--	--
REL. STD.	78.6	--	--	47.1	--	78.1	--	--	--	--	--
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

LAB	30999 ZINC COMBINED MG/L ZN	38301 SR EXTBL AAS DA MG/L	38999 STRNTIUM COMBINED MG/L SR	42009 MO TOTAL ICAP MG/L MO	42011 MO TOTAL 5X ICAP UG/L MO	42999 MOLYBNUM COMBINED MG/L MO	48009 CD TOTAL ICAP MG/L CD	48011 CD TOTAL 5X ICAP UG/L CD	48301 CD EXTBL AAS DA MG/L	48302 CD EXTBL AAS SE MG/L	48999 CADMIUM COMBINED MG/L CD
1	0.010R	--	--	0.001L	--	0.001L	0.002	--	--	--	0.002
2	0.01 L	--	--	--	--	--	--	--	--	0.001L	0.001L
3	0.002	--	--	--	--	--	--	--	--	0.001L	0.001L
6	0.005L	0.13	0.13	--	0.02 L	0.02 L	--	0.005L	--	--	0.005L
8	0.01 L	--	--	--	--	--	--	--	0.001L	--	0.001L
9	0.01 L	--	0.2	--	-- HDL	0.1 L	--	--	--	--	0.001L
10	0.002	--	0.17	--	--	0.005L	--	--	--	--	0.001L
MEAN	.0020	.1300	.1667	--	--	--	.0020	--	--	--	.0020
STD. DEV.	0.0000	--	.0351	--	--	--	--	--	--	--	--
REL. STD.	0.0	--	21.1	--	--	--	--	--	--	--	--
DES. VAL.	--	--	--	--	--	--	--	--	--	--	--

LAB	56011 BA TOTAL 5X ICAP UG/L BA	56301 BA EXTBL AAS DA MG/L	56999 BARIUM COMBINED MG/L BA	82011 PB TOTAL 5X ICAP UG/L PB	82302 PB EXTBL AAS SE MG/L	82309 PB EXTBL AAS G F MG/L PB	82999 LEAD COMBINED MG/L PB
1	--	--	HDL --	--	0.003L	--	0.003L
2	--	--	--	--	0.002	--	0.002
3	--	0.1 L	0.1 L	--	0.001	--	0.001
6	0.024	--	0.024	0.02 L	--	-- HDL	0.02 L
8	--	--	HDL --	--	--	0.005L	0.005L
9	--	--	0.1 L	--	--	--	0.001L
10	--	--	0.02	--	--	--	0.002L
MEAN	.0240	--	.0220	--	.0015	--	.0015
STD. DEV.	--	--	.0028	--	.0007	--	.0007
REL. STD.	--	--	12.9	--	47.1	--	47.1
DES. VAL.	--	--	--	--	--	--	--

DATES RECEIVED 1 85/08/19 2 85/09/18 3 85/08/19 3 85/08/27 4 85/08/20
5 85/09/16 6 85/08/15 7 85/09/13 9 85/09/06 10 85/09/05

PEEK(2[illegible]5

Appendix I

Definitions of Types of Metals Analysis

1. D/A - Direct Aspiration

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

2. S/E - Code for low level analysis.

Analysis is presently 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 followed by ICAP.
4. Graphite tube (flameless) AAS.

Appendix II

Performance Indicators

1. Unacceptable results are circled. A result is deemed unacceptable when it deviates more than 10 percent from the mean result. Near the detection limit a greater deviation is usually allowed. Presently, deviant results are mostly compared to the mean of the parameter in the study, but may also be compared to a mean value from a previous study if it is available. In the future, the design values will be known for certified reference samples and an absolute comparison will be made. When there is a high % CV or when only a few results are reported for a parameter and a previously analysed mean is used, a footnote will indicate the previous mean.

2. When a high detection limit occurs, compared to the other labs, this is marked with a "HDL" to indicate lack of comparability.

3. In the case of systemmatic anomoly, when two analyses of a parameter have the same % deviation from the mean, this is noted by the word "biased" high or low.

4. A percent deviation is written to show the severity of the anomoly. Generally the comments indicate differences from the mean above 10%.

5. The "R" flag beside a result in the tables or in the comments indicates that this result is an outlier according to Grubbs* and is rejected in statistical calculations.

* Reference: Frank E. Grubbs, Technometrics, 1969, P.1