



## **SADCMET PTS July 2004**

PTS Provider: Umgeni Water Laboratory Services

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Date: 22 October 2004

Name removed

Laboratory Code: 003

### **CONFIDENTIAL**

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#### **UMGENI WATER**

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## INTRODUCTION

The July 2004 SADC MET PTS consisted of the analysis of 6 synthetic water samples, 3 of which contained the cations calcium, magnesium, sodium, potassium, iron, manganese and aluminium, and 3 contained the anions sulphate, chloride, fluoride and nitrate.

### 1. STUDY DESIGN

#### 1.1 SAMPLE PREPARATION

Samples 2004/06/1, 2 and 3 were constituted as follows and preserved with 1.5 mL HNO<sub>3</sub> (conc) per litre of sample:

		Cation samples (constituted to 25L)		
Determinand	Chemical	2004/06/1	2004/06/2	2004/06/3
Calcium	CaCl <sub>2</sub> .2H <sub>2</sub> O	2.3489 g	4.4224 g	7.0465 g
Magnesium	MgCl <sub>2</sub> .6H <sub>2</sub> O	2.7041 g	4.3243 g	9.8145 g
Sodium	NaCl	0.6726 g	1.6555 g	3.2398 g
Potassium	KCl	0.1638 g	0.3658 g	0.4620 g
Iron	Fe Spectroscopic Grade Stock Solution (1000mg/L)	2.50 mL	30.0 mL	100 mL
Manganese	Mn Spectroscopic Grade Stock Solution (1000mg/L)	2.50 mL	10.0 mL	25.0 mL
Aluminium	Al Spectroscopic Grade Stock Solution (1000mg/L)	2.50 mL	15.0 mL	25.0 mL
Preservative	HNO <sub>3</sub> (conc)	37.5 mL	37.5 mL	37.5 mL

Samples 2004/06/4, 5 and 6 were constituted as follows:

		Anion samples (constituted to 25L)		
Determinand	Chemical	2004/06/4	2004/06/5	2004/06/6
Sulphate	K <sub>2</sub> SO <sub>4</sub>	0.7521 g	1.2808 g	2.2274 g
Chloride	KCl	1.5316 g	2.2499 g	3.4558 g
Fluoride	NaF	0.6517g in 500mL water (Stock) 5.00mL Stock used	2.0127g in 500mL water (Stock) 5.00mL Stock used	2.0127g in 500mL water (Stock) 20.0mL Stock used
Nitrate	KNO <sub>3</sub>	0.3831 g	0.6401 g	1.265 g

#### NOTES:

1. Grade A volumetric glassware and calibrated autopipettes, verified as complying to the relevant standard specification, were used in the preparation of stocks and samples.

2. AR grade chemicals, supplied by Merck, Riedel-de Haën and BDH, were used.
3. Grade I quality laboratory water (ISO 3696: 1987, Water for analytical laboratory use - Specification and test methods) was used for the preparation of the stocks and samples.

## 1.2 SAMPLE DISPATCH

Samples were dispatched to the participating laboratories on 22 July 2004. Single test analysis of the samples, as supplied, was requested. A Result Template was included. The return date for results was set as 31 August 2004.

## 2. STATISTICAL EVALUATION

2.1 The participants' results were statistically evaluated using z-scores based on robust summary statistics (the median and normalized interquartile ratios). Robust statistics minimize the effect of extreme results without excluding such data from the evaluation. The assigned value was calculated using the median of all results obtained.

## 3. RESULTS

The results are detailed in the following Appendices:

Appendix A: Individual Participant's results and evaluation assessment

Appendix B: All results received, and summary statistics

Appendix C: Z-scores for all Participants

Appendix D: Graphical display of all results per parameter

Appendix E: Graphical display of frequency and performance of methodologies used

## 4. COMMENTS

Please use the email system as the preferred medium of communication. All queries, comments and feedback may be forwarded to the PTS Provider.

M Smuts

PTS Provider : SADC MET PTS July 2004

## APPENDIX A: Individual Participant's results and evaluation assessment

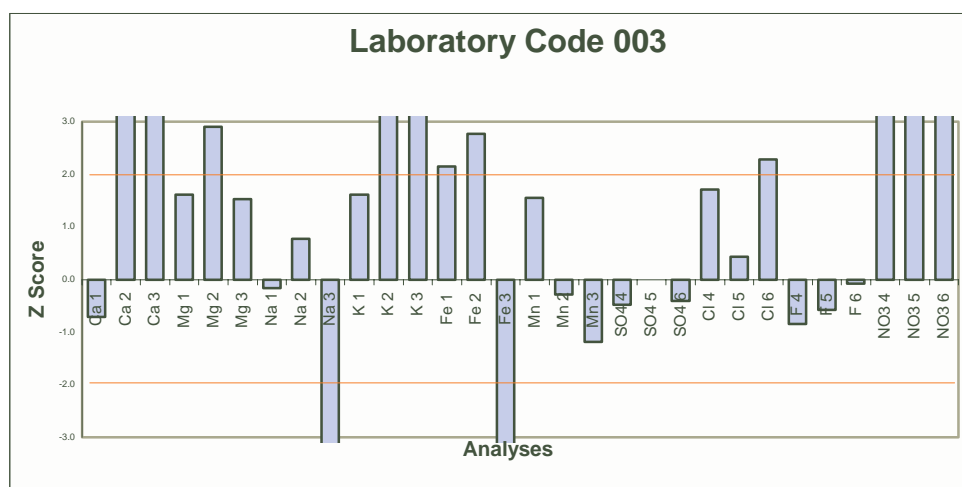
### LABORATORY CODE 003

Parameter	Sample No.	Laboratory Results	Assigned value	z-score	% Satisfactory Results per parameter
Calcium as Ca in mg/L	1	24.9	26.7	-0.71	<b>33</b>
	2	62.5	50.6	3.48	
	3	119	78.2	4.54	
Magnesium as Mg in mg/L	1	16.2	13.4	1.61	<b>67</b>
	2	30.0	21.0	2.90	
	3	56.0	47.5	1.52	
Sodium as Na in mg/L	1	10.7	10.9	-0.16	<b>67</b>
	2	30.5	28.0	0.78	
	3	24.0	52.1	-3.60	
Potassium as K in mg/L	1	4.90	3.59	1.61	<b>33</b>
	2	19.0	7.80	9.57	
	3	21.0	9.93	8.69	
Iron as Fe in mg/L	1	0.37	0.11	2.15	<b>0</b>
	2	1.66	1.23	2.76	
	3	0.30	4.01	-8.34	
Manganese as Mn in mg/L	1	0.15	0.10	1.56	<b>100</b>
	2	0.38	0.40	-0.29	
	3	0.87	1.03	-1.18	
Aluminium as Al in mg/L	1	--		-	<b>-</b>
	2	--		-	
	3	--		-	

Parameter	Sample No.	Laboratory Results	Assigned value	z-score	% Satisfactory Results per parameter
Sulphate as SO <sub>4</sub> in mg/L	4	15.4	18.5	-0.48	<b>100</b>
	5	29.6	29.6	0.00	
	6	45.9	49.7	-0.41	
Chloride as Cl in mg/L	4	35.7	31.3	1.71	<b>67</b>
	5	47.6	45.7	0.43	
	6	76.0	67.6	2.29	
Fluoride as F in mg/L	4	0.09	0.16	-0.85	<b>100</b>
	5	0.30	0.37	-0.57	
	6	1.40	1.42	-0.08	
Nitrate as N in mg/L	4	9.34	2.19	14.25	<b>0</b>
	5	14.6	3.47	24.7	
	6	30.7	6.88	15.97	

% Satisfactory Results Overall	
	<b>57%</b>

Z-score Graph for individual parameters



#### Performance Assessment

- |z-Score| ≤ 2: Satisfactory
- 2 < |z-Score| ≤ 3: Questionable
- |z-Score| > 3: Unsatisfactory

**APPENDIX B: All results received and summary statistics**

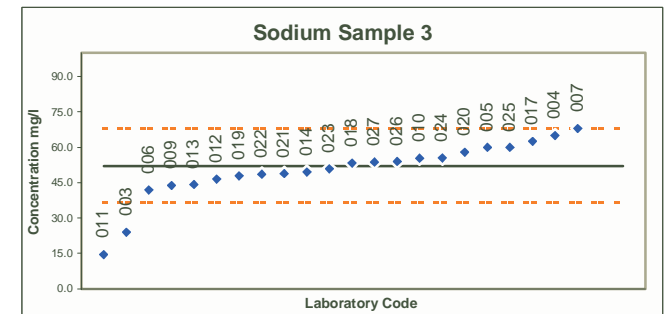
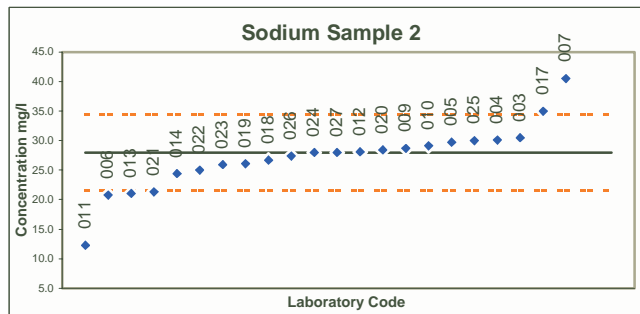
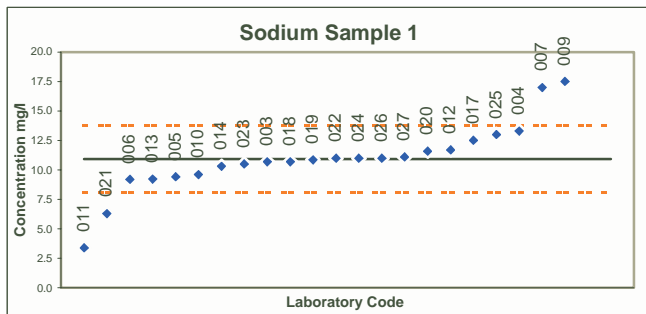
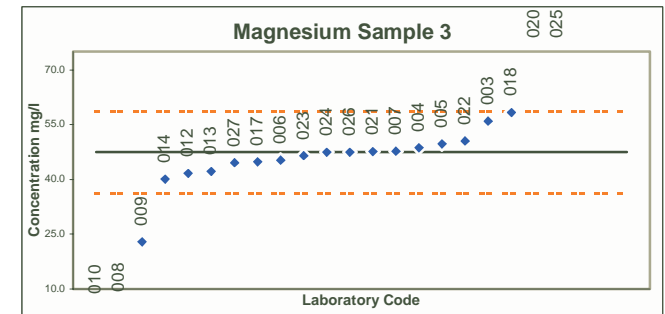
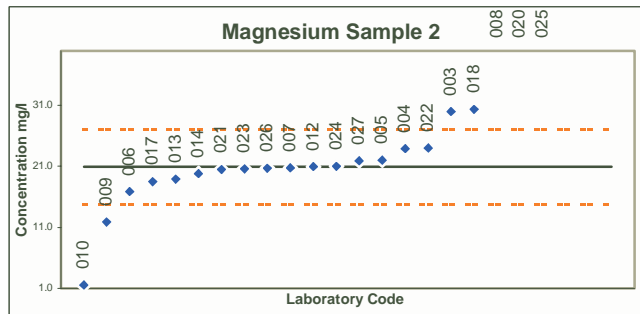
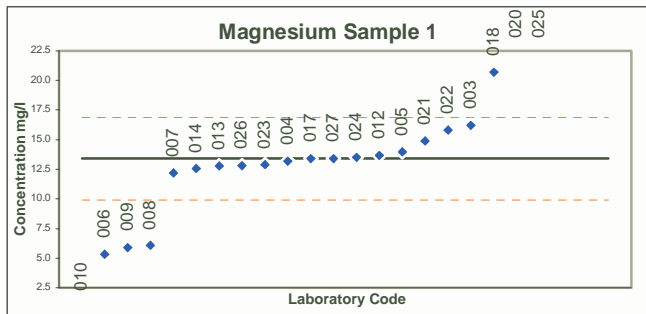
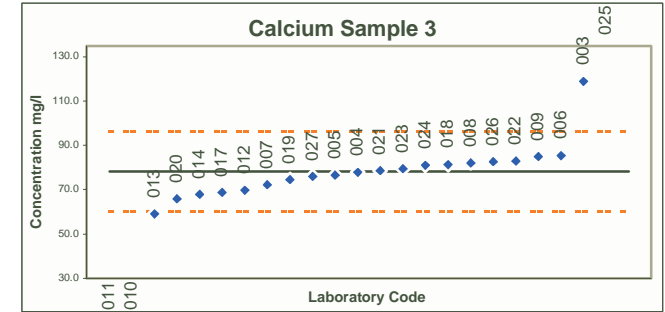
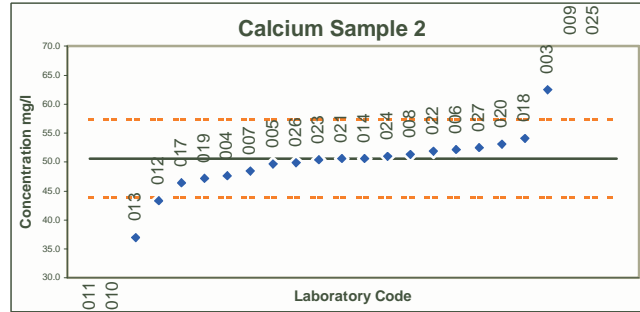
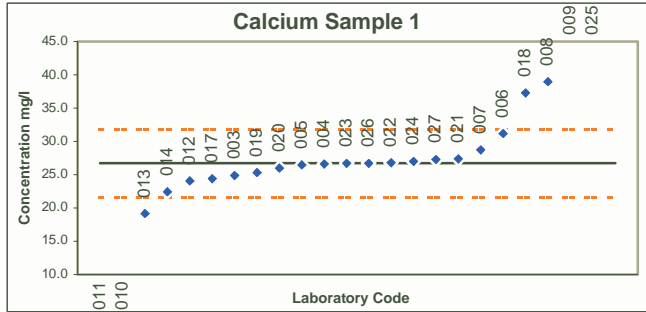
Lab Code		003	004	005	006	007	008	009	010	011	012	013	014	016	017	018	019	020	021	022	023	024	025	026	027	Assigned value (mg/L)	Robust Std Dev (mg/L)	Upper limit (mg/L)	Lower limit (mg/L)	Rel.STD (%)	Number of values	Outside limits (high)	Outside limits (low)	Outside limits (%)	Results acceptable (%)
Calcium as Ca in mg/L	1	24.9	26.6	26.5	31.2	28.7	39.0	47.7	2.20	0.0	24.1	19.2	22.4	-	24.4	37.3	25.3	26.0	27.4	26.8	26.7	27.0	356	26.7	27.3	26.7	2.52	31.7	21.7	9.4	22	4	3	32	68
	2	62.5	47.6	49.7	52.1	48.4	51.3	73.8	3.80	0.0	43.3	37.0	50.6	-	46.4	54.1	47.2	53.1	50.6	51.9	50.4	51.0	675	49.9	52.5	50.6	3.41	57.4	43.8	6.7	22	3	4	32	68
	3	119	77.8	76.5	85.3	72.2	82.1	85.0	6.00	0.0	69.7	59.0	67.9	-	68.8	81.4	74.5	65.8	78.6	83.0	79.4	81.0	1070	82.6	76.0	78.2	8.99	96.2	60.2	11.5	22	2	3	23	77
Magnesium as Mg in mg/L	1	16.2	13.2	14.0	5.34	12.2	6.08	5.89	0.90	-	13.7	12.8	12.6	-	13.4	20.7	-	35.0	14.9	15.8	12.9	13.5	172	12.8	13.4	13.4	1.73	16.9	9.93	12.9	21	3	4	33	67
	2	30.0	23.9	22.0	16.9	20.8	51.0	11.9	1.50	-	21.0	18.9	19.8	-	18.5	30.4	-	57.4	20.5	24.0	20.6	21.0	271	20.7	21.9	21.0	3.11	27.2	14.8	14.8	21	5	2	33	67
	3	56.0	48.7	49.7	45.3	47.7	4.86	22.9	4.30	-	41.6	42.2	40.1	-	44.8	58.3	-	130	47.6	50.5	46.5	47.5	656	47.5	44.6	47.5	5.58	58.7	36.3	11.7	21	2	3	24	76
Sodium as Na in mg/L	1	10.7	13.3	9.43	9.20	17.0	-	17.5	9.60	3.38	11.7	9.23	10.3	-	12.5	10.7	10.9	11.6	6.30	11.0	10.5	11.0	13.0	11.0	11.1	10.9	1.40	13.7	8.12	12.8	22	2	2	18	82
	2	30.5	30.1	29.7	20.8	40.5	-	28.7	29.1	12.3	28.1	21.0	24.4	-	35.0	26.7	26.1	28.4	21.3	25.0	25.9	28.0	30.0	27.4	28.0	28.0	3.22	34.4	21.6	11.5	22	2	4	27	73
	3	24.0	65.0	60.0	41.9	68.0	-	43.8	55.4	14.5	46.5	44.2	49.5	-	62.5	53.3	47.9	58.0	48.8	48.6	50.9	55.5	60.0	54.0	53.7	52.1	7.81	67.7	36.5	15.0	22	1	2	14	86
Potassium as K in mg/L	1	4.90	3.21	3.33	4.30	1.50	-	10.0	4.20	1.30	2.81	3.01	5.35	-	5.00	3.70	4.28	3.15	2.12	3.93	3.40	4.00	3.40	3.62	3.56	3.59	0.81	5.21	1.97	22.6	22	2	2	18	82
	2	19.0	8.90	7.75	7.44	3.99	-	8.00	5.40	6.20	5.89	7.50	9.18	-	11.2	9.20	7.73	7.20	5.08	8.65	7.70	8.00	9.00	7.86	7.90	7.80	1.17	10.1	5.47	15.0	22	2	3	23	77
	3	21.0	7.66	9.44	9.86	5.41	-	3.80	11.7	5.75	9.79	10.1	11.5	-	12.5	12.4	9.11	9.20	7.90	11.0	9.70	10.0	10.0	10.4	10.2	9.93	1.27	12.5	7.38	12.8	22	2	3	23	77
Iron as Fe in mg/L	1	0.37	0.97	0.10	0.12	0.43	0.20	0.01	0.00	0.15	0.01	0.11	0.11	0.26	0.25	0.08	-	-	0.05	0.28	0.10	0.10	-	0.09	0.08	0.11	0.12	0.35	-0.14	114	20	3	0	15	85
	2	1.66	1.22	1.23	1.35	1.40	1.10	0.01	1.90	1.35	1.17	1.24	0.89	1.62	3.20	1.29	-	-	1.08	1.09	1.19	1.15	-	1.14	1.23	1.23	0.16	1.54	0.92	12.7	21	4	2	29	71
	3	0.30	4.05	3.95	4.08	4.17	3.12	3.40	10.00	4.04	4.02	4.37	2.85	3.30	4.90	3.92	-	-	4.01	3.52	3.88	4.17	-	3.74	4.12	4.01	0.44	4.90	3.12	11.1	21	2	3	24	76
Manganese as Mn in mg/L	1	0.15	0.11	0.09	0.08	0.11	0.50	-	0.10	0.14	-	0.09	0.08	0.30	0.10	0.10	-	0.10	0.02	0.19	-	0.10	0.14	0.10	0.12	0.10	0.03	0.16	0.04	31.2	20	3	1	20	80
	2	0.38	0.44	0.37	0.33	0.45	0.60	-	0.20	0.42	-	0.36	0.26	0.30	0.40	0.47	-	1.08	0.20	0.53	-	0.38	0.41	0.40	0.43	0.40	0.07	0.54	0.26	17.2	20	2	3	25	75
	3	0.87	1.07	0.94	0.85	4.17	1.20	-	1.10	1.02	-	0.92	0.64	1.10	0.90	1.10	-	3.66	1.06	1.11	-	0.93	0.84	0.96	1.04	1.03	0.14	1.30	0.76	13.2	20	2	1	15	85
Aluminium as Al in mg/L	1	-	0.10	0.31	0.04	-	0.08	-	-	-	-	0.41	-	-	0.05	-	-	0.13	0.03	0.59	-	0.10	0.08	0.12	0.11	0.10	0.04	0.18	0.02	41.5	13	3	0	23	77
	2	-	0.65	0.81	0.26	-	0.39	-	-	-	-	1.62	-	-	0.37	-	-	0.68	0.10	0.99	-	0.68	0.44	0.70	0.67	0.67	0.23	1.13	0.21	34.5	13	1	1	15	85
	3	-	1.08	1.22	0.56	-	0.88	-	-	-	-	2.30	-	-	0.61	-	-	1.07	0.16	1.17	-	1.16	0.58	1.17	1.06	1.07	0.42	1.90	0.24	38.8	13	1	1	15	85
Sulphate as SO4 in mg/L	4	15.4	16.3	15.2	16.8	4.3	37.0	15.4	24.7	0.00	24.5	50.2	27.0	19.0	20.5	8.64	5.15	21.2	24.7	18.5	16.9	27.0	20.3	16.3	16.5	18.5	6.50	31.5	5.51	35.1	23	2	3	22	78
	5	29.6	30.4	25.9	31.0	15.9	55.0	27.5	30.8	0.00	44.7	61.7	43.0	30.0	34.5	16.5	11.3	8.23	29.9	26.8	29.1	46.0	22.2	28.1	28.1	29.6	4.76	39.1	20.1	16.1	23	5	5	43	57
	6	45.9	56.8	45.5	50.0	29.6	72.0	45.7	39.1	0.01	62.6	74.9	63.0	49.0	58.8	50.6	20.6	24.7	42.6	49.4	50.7	72.0	48.6	50.1	50.2	49.7	9.3	68.3	31.1	18.7	24	3	4	29	71
Chloride as Cl in mg/L	4	35.7	29.4	29.4	31.2	31.3	34.9	41.0	29.6	28.5	31.3	32.0	30.0	41.6	32.3	30.1	28.1	36.9	39.0	31.7	28.1	28.0	31.6	29.8	28.8	31.3	2.61	36.5	26.0	8.34	24	4	0	17	83
	5	47.6	45.6	42.7	48.3	51.7	45.8	64.0	40.2	43.7	44.7	44.7	47.0	49.5	46.5	42.5	39.7	51.8	51.0	47.5	42.4	40.5	49.2	42.3	42.6	45.7	4.40	54.5	36.9	9.63	24	1	0	4	96
	6	76.0	67.0	65.5	66.7	72.3	67.7	86.0	60.6	65.9	65.4	69.5	70.0	71.6	69.6	67.4	60.9	72.6	71.0	68.6	66.9	61.5	70.3	65.5	65.4	67.6	3.70	74.9	60.2	5.47	24	2	0	8	92
Fluoride as F in mg/L	4	0.09	0.19	0.25	0.42	0.16	0.20	0.30	-	-	0.18	0.50	<0.01	22.6	0.15	0.10	-	0.21	-	-	0.15	0.12	0.11	0.11	0.124	0.16	0.08	0.33	-0.01	51.7	19	3	0	16	84
	5	0.30	0.57	0.31	0.71	0.40	0.40	0.10	-	-	0.52	0.45	0.33	22.6	0.26	0.24	-	1.50	-	-	0.34	0.32	0.34	0.39	0.372	0.37	0.13	0.62	0.12	33.7	19	3	1	21	79
	6	1.40	1.45	0.85	3.60	1.40	1.50	1.10	-	-	1.46	0.51	1.49	22.6	0.76	0.96	-	2.00	-	-	1.33	1.27	1.42	1.56	1.52	1.42	0.24	1.90	0.94	16.9	19	3	3	32	68
Nitrate as N in mg/L	4	9.34	1.94	2.54	-	1.18	1.70	0.01	-	-	2.17	-	1.90	16.7	2.20	0.84	2.40	2.75	3.61	5.88	1.92	2.52	2.21	2.00	2.16	2.19	0.50	3.19	1.18	23.0	20	4	3	35	65
	5	14.6	3.43	3.78	-	1.93	2.10	0.01	-	-	3.68	-	3.20	49.3	3.20	1.46	3.60	5.10	5.65	3.30	3.15	3.75	3.84	3.35	3.50	3.47	0.45	4.37	2.56	13.0	20	4	4	40	60
	6	30.7	7.21	7.15	-	3.50	2.50	0.01	-	-	7.14	-	7.50	29.5	5.60	3.08	7.00	5.00	7.45	6.65	6.41	7.59	7.99	6.25	6.76	6.88	1.49	9.86	3.90	21.7	20	2	4	30	70
																	<b>SUM</b>										681	87	74	24	76				

**APPENDIX C: Z-scores for all participants**

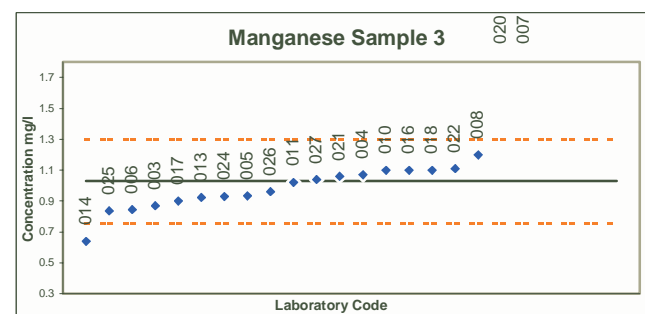
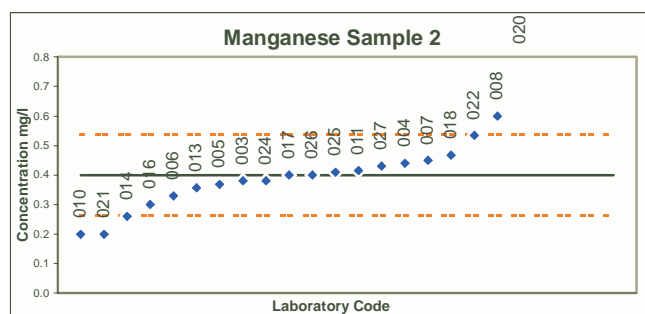
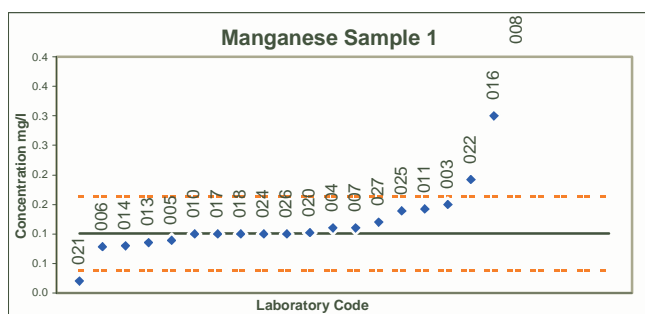
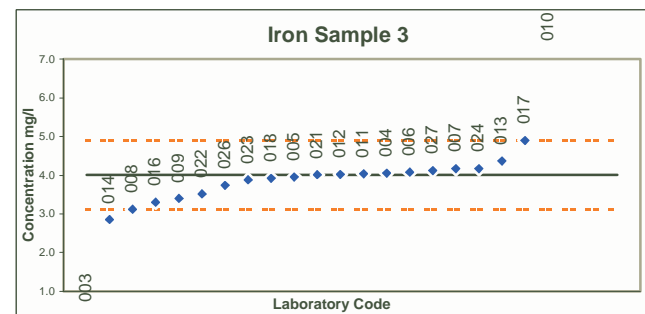
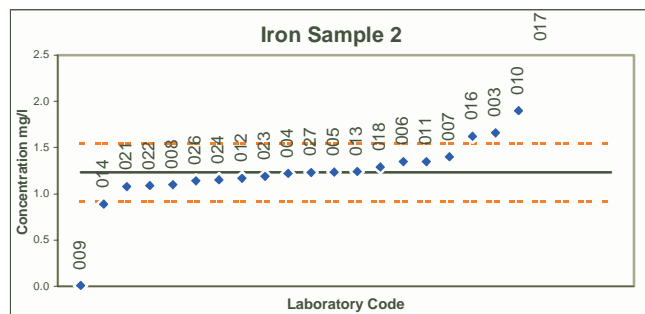
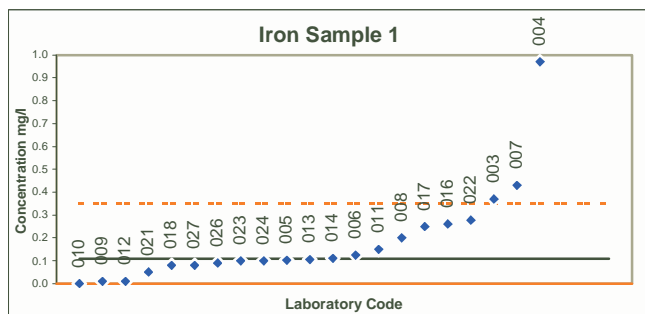
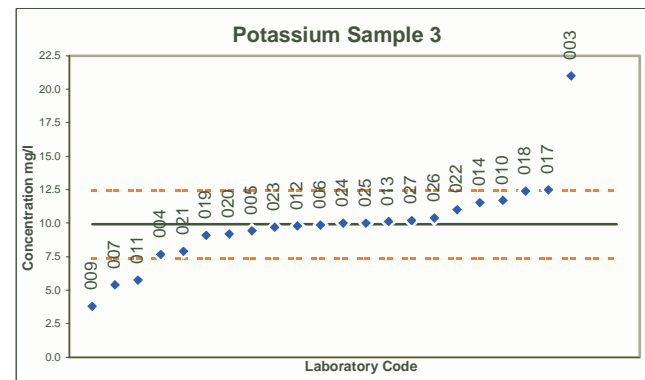
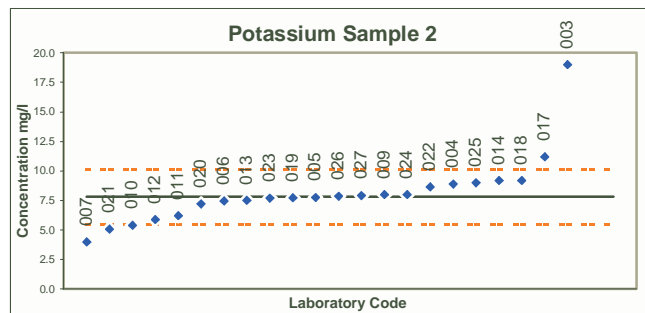
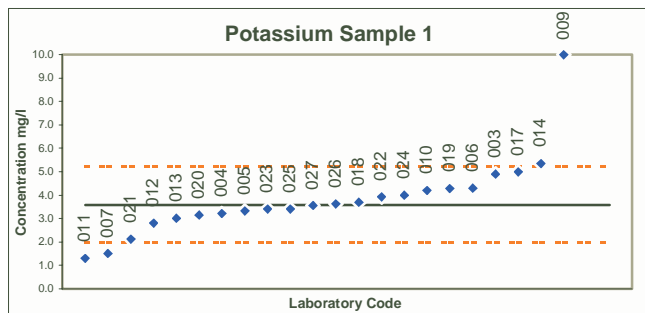
Lab Code		003	004	005	006	007	008	009	010	011	012	013	014	016	017	018	019	020	021	022	023	024	025	026	027
Calcium as Ca in mg/L	1	-0.71	-0.04	-0.09	1.79	0.81	4.88	8.34	-9.73	-10.6	-1.05	-2.99	-1.70	-	-0.91	4.21	-0.56	-0.28	0.28	0.04	0.00	0.12	131	0.00	0.24
	2	3.48	-0.88	-0.28	0.45	-0.64	0.20	6.80	-13.7	-14.8	-2.15	-4.00	0.00	-	-1.24	1.02	-1.01	0.73	0.00	0.38	-0.06	0.11	183	-0.21	0.55
	3	4.54	-0.04	-0.19	0.79	-0.67	0.43	0.76	-8.03	-8.70	-0.94	-2.14	-1.15	-	-1.05	0.36	-0.41	-1.38	0.04	0.53	0.13	0.31	110	0.49	-0.24
Magnesium as Mg in mg/L	1	1.61	-0.12	0.34	-4.65	-0.69	-4.22	-4.33	-7.21	-	0.16	-0.36	-0.48	-	0.00	4.21	-	12.45	0.86	1.38	-0.29	0.06	91	-0.35	0.00
	2	2.90	0.94	0.33	-1.32	-0.07	9.67	-2.92	-6.27	-	0.00	-0.66	-0.38	-	-0.80	3.03	-	11.73	-0.15	0.97	-0.12	0.01	80	-0.09	0.30
	3	1.52	0.22	0.40	-0.39	0.04	-7.64	-4.41	-7.74	-	-1.05	-0.95	-1.32	-	-0.48	1.94	-	14.77	0.02	0.54	-0.18	0.00	109	0.00	-0.52
Sodium as Na in mg/L	1	-0.16	1.69	-1.07	-1.23	4.33	-	4.69	-0.94	-5.38	0.55	-1.21	-0.45	-	1.12	-0.16	-0.05	0.48	-3.30	0.05	-0.30	0.05	1.48	0.05	0.12
	2	0.78	0.65	0.54	-2.25	3.88	-	0.22	0.34	-4.89	0.02	-2.16	-1.12	-	2.17	-0.40	-0.60	0.12	-2.08	-0.93	-0.65	0.00	0.62	-0.19	0.00
	3	-3.60	1.65	1.01	-1.31	2.04	-	-1.06	0.42	-4.82	-0.72	-1.01	-0.34	-	1.33	0.15	-0.53	0.76	-0.42	-0.45	-0.15	0.44	1.01	0.24	0.20
Potassium as K in mg/L	1	1.61	-0.47	-0.33	0.87	-2.57	-	7.90	0.75	-2.82	-0.96	-0.71	2.17	-	1.74	0.14	0.85	-0.54	-1.81	0.42	-0.23	0.51	-0.23	0.04	-0.04
	2	9.57	0.94	-0.05	-0.31	-3.26	-	0.17	-2.06	-1.37	-1.64	-0.26	1.18	-	2.90	1.19	-0.06	-0.52	-2.33	0.72	-0.09	0.17	1.02	0.05	0.08
	3	8.69	-1.78	-0.39	-0.05	-3.55	-	-4.81	1.39	-3.28	-0.11	0.16	1.26	-	2.02	1.94	-0.64	-0.57	-1.59	0.84	-0.18	0.05	0.05	0.37	0.21
Iron as Fe in mg/L	1	2.15	7.05	-0.04	0.13	2.64	0.76	-0.80	-0.88	0.35	-0.80	-0.02	0.02	1.25	1.17	-0.22	-	-	-0.47	1.39	-0.06	-0.06	-	-0.14	-0.22
	2	2.76	-0.06	0.03	0.77	1.09	-0.84	-7.84	4.30	0.77	-0.39	0.08	-2.18	2.51	12.65	0.39	-	-	-0.96	-0.90	-0.26	-0.51	-	-0.58	0.00
	3	-8.34	0.09	-0.13	0.15	0.36	-2.00	-1.37	13.5	0.07	0.02	0.81	-2.61	-1.60	2.00	-0.20	-	-	0.00	-1.10	-0.29	0.36	-	-0.61	0.25
Manganese as Mn in mg/L	1	1.56	0.29	-0.38	-0.73	0.29	12.66	-	-0.03	1.30	-	-0.50	-0.67	6.32	-0.03	-0.03	-	0.03	-2.57	2.89	-	-0.03	1.21	-0.03	0.60
	2	-0.29	0.58	-0.45	-1.03	0.73	2.91	-	-2.91	0.22	-	-0.63	-2.04	-1.46	0.00	0.98	-	9.91	-2.91	1.95	-	-0.29	0.15	0.00	0.44
	3	-1.18	0.29	-0.70	-1.36	23.15	1.25	-	0.52	-0.07	-	-0.79	-2.88	0.52	-0.96	0.52	-	19.39	0.22	0.59	-	-0.74	-1.43	-0.52	0.07
Aluminium as Al in mg/L	1	-	0.00	5.03	-1.45	-	-0.48	-	-	-	-	7.36	-	-	-1.20	-	-	0.82	-1.69	11.83	-	0.00	-0.53	0.48	0.17
	2	-	-0.07	0.64	-1.77	-	-1.20	-	-	-	-	4.16	-	-	-1.29	-	-	0.07	-2.46	1.41	-	0.06	-0.97	0.15	0.00
	3	-	0.02	0.36	-1.23	-	-0.46	-	-	-	-	2.96	-	-	-1.11	-	-	0.00	-2.19	0.24	-	0.22	-1.18	0.24	-0.02
Sulphate as SO4 in mg/L	4	-0.48	-0.34	-0.50	-0.26	-2.19	2.85	-0.48	0.95	-2.85	0.93	4.88	1.31	0.08	0.31	-1.52	-2.05	0.42	0.95	0.00	-0.25	1.31	0.28	-0.34	-0.31
	5	0.00	0.17	-0.78	0.29	-2.88	5.34	-0.44	0.25	-6.22	3.17	6.76	2.82	0.08	1.03	-2.75	-3.84	-4.49	0.06	-0.59	-0.11	3.45	-1.56	-0.32	-0.32
	6	-0.41	0.76	-0.45	0.03	-2.16	2.40	-0.43	-1.14	-5.34	1.39	2.71	1.43	-0.08	0.98	0.10	-3.13	-2.69	-0.76	-0.03	0.11	2.40	-0.12	0.04	0.05
Chloride as Cl in mg/L	4	1.71	-0.71	-0.69	-0.01	0.03	1.40	3.74	-0.63	-1.06	0.01	0.27	-0.48	3.96	0.40	-0.44	-1.23	2.17	2.97	0.17	-1.21	-1.25	0.13	-0.56	-0.94
	5	0.43	-0.02	-0.68	0.59	1.36	0.02	4.16	-1.25	-0.45	-0.23	-0.22	0.30	0.85	0.18	-0.73	-1.35	1.39	1.20	0.41	-0.75	-1.18	0.80	-0.77	-0.70
	6	2.29	-0.15	-0.57	-0.22	1.28	0.04	4.99	-1.88	-0.45	-0.57	0.53	0.66	1.09	0.55	-0.04	-1.80	1.37	0.93	0.28	-0.18	-1.64	0.74	-0.55	-0.58
Fluoride as F in mg/L	4	-0.85	0.36	1.04	3.15	0.00	0.48	1.69	-	-	0.24	4.11	-1.81	271	-0.12	-0.73	-	0.60	-	-	-0.12	-0.45	-0.65	-0.60	-0.44
	5	-0.57	1.58	-0.50	2.70	0.22	0.22	-2.17	-	-	1.18	0.62	-0.34	177	-0.89	-1.05	-	9.00	-	-	-0.26	-0.39	-0.22	0.14	0.00
	6	-0.08	0.12	-2.38	9.08	-0.08	0.33	-1.33	-	-	0.17	-3.79	0.29	88.2	-2.75	-1.92	-	2.41	-	-	-0.37	-0.62	0.00	0.58	0.41
Nitrate as N in mg/L	4	14.25	-0.49	0.71	-	-2.00	-0.97	-4.33	-	-	-0.03	-	-0.57	28.9	0.03	-2.68	0.43	1.12	2.84	7.36	-0.53	0.67	0.05	-0.37	-0.05
	5	24.7	-0.08	0.70	-	-3.40	-3.02	-7.65	-	-	0.48	-	-0.59	101	-0.59	-4.44	0.30	3.62	4.84	-0.37	-0.70	0.63	0.83	-0.25	0.08
	6	15.97	0.22	0.18	-	-2.27	-2.94	-4.60	-	-	0.17	-	0.42	15.15	-0.86	-2.55	0.08	-1.26	0.38	-0.15	-0.32	0.48	0.74	-0.42	-0.08

# APPENDIX D: Graphical display of all results per parameter

**LEGEND:** \_\_\_\_\_ Assigned value      - - - - - Limits

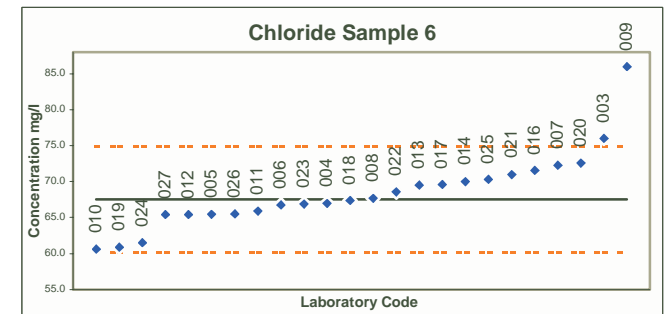
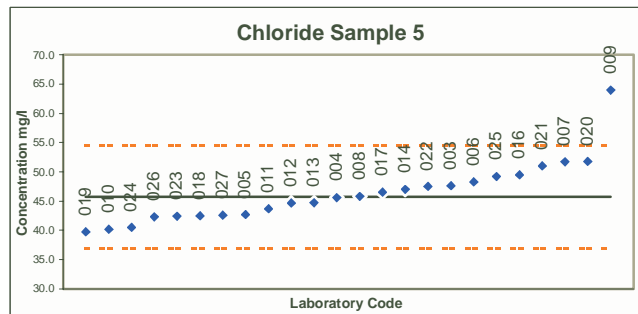
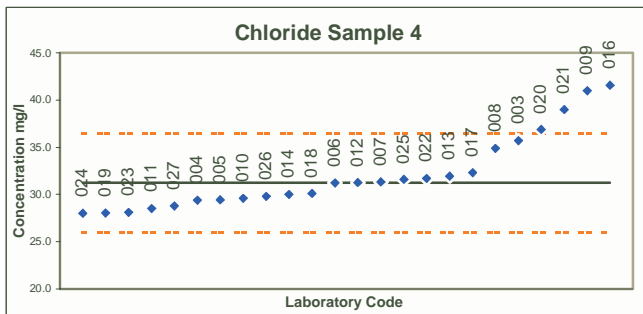
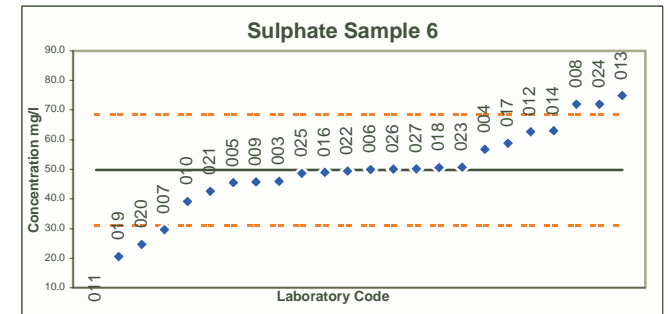
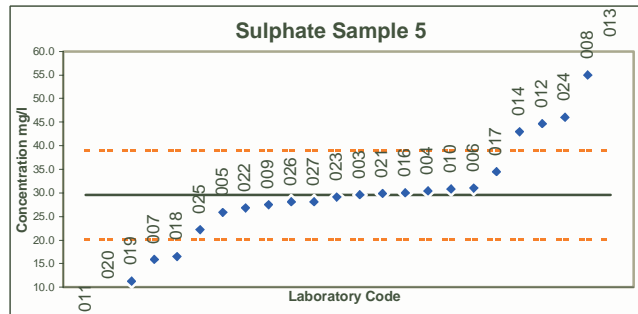
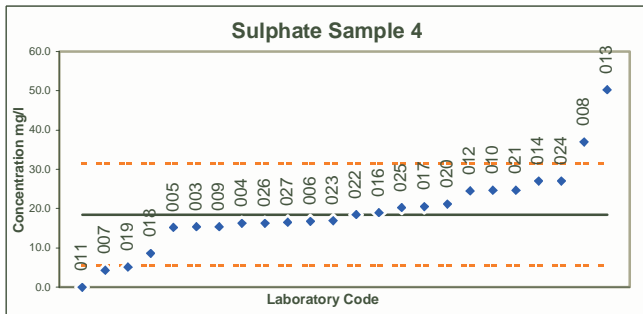
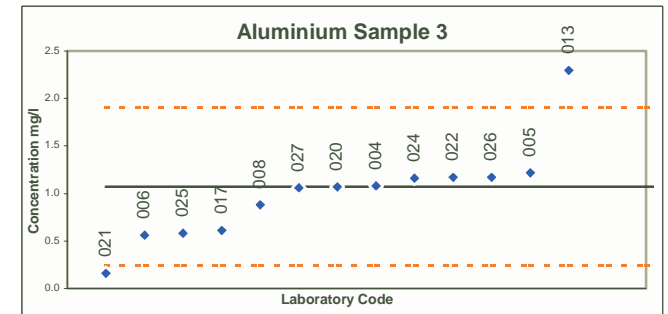
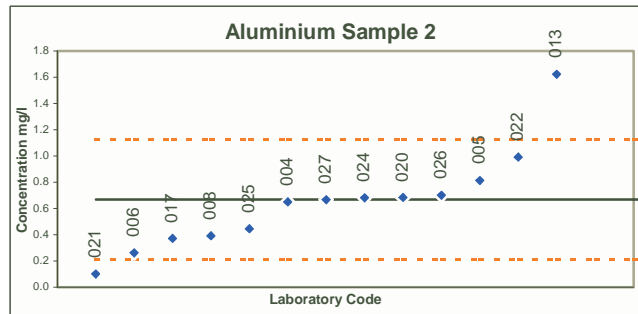
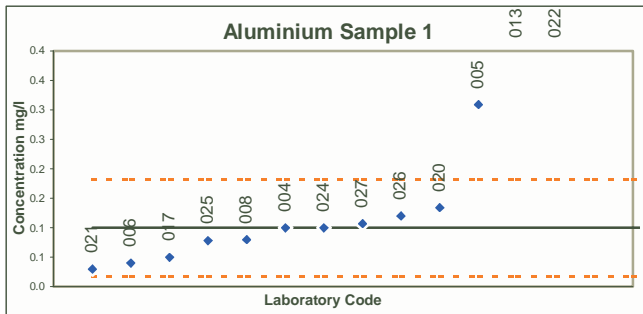


# APPENDIX D: Graphical display of all results per parameter

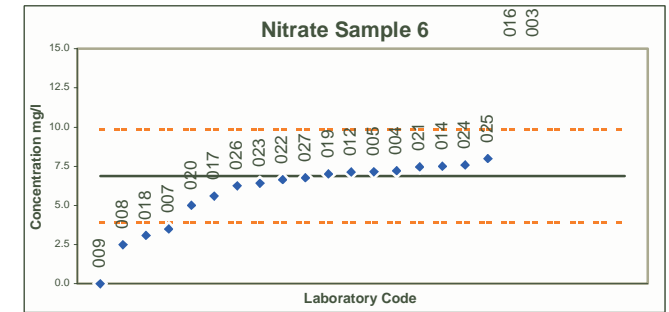
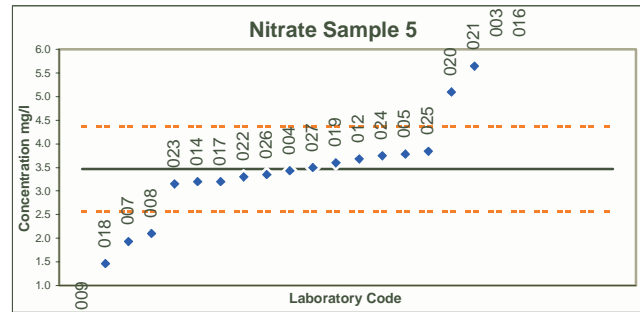
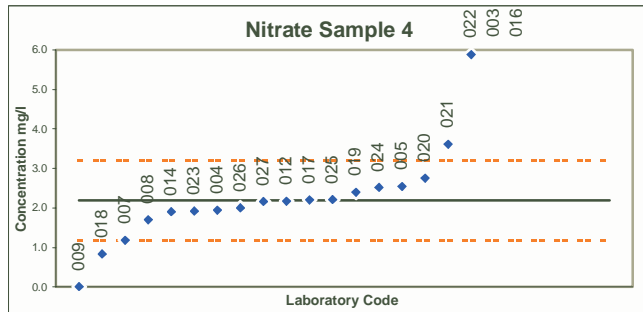
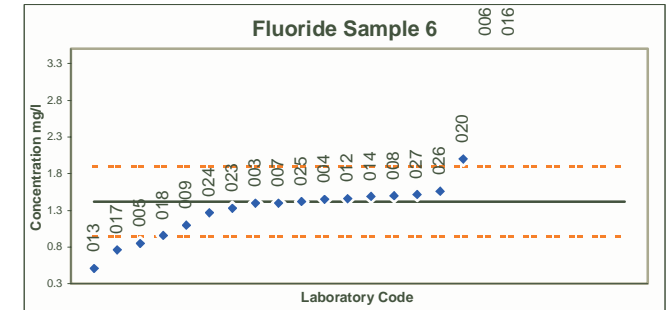
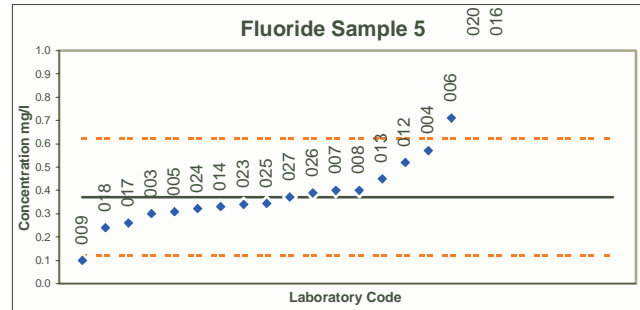
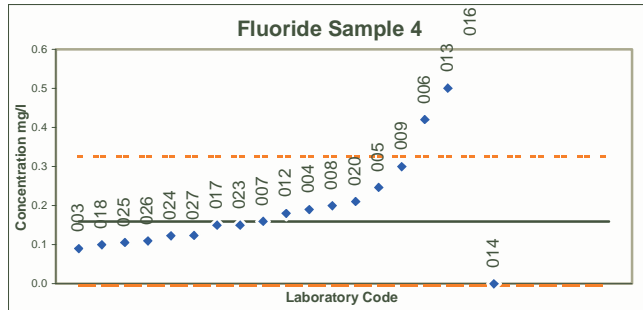




# APPENDIX D: Graphical display of all results per parameter

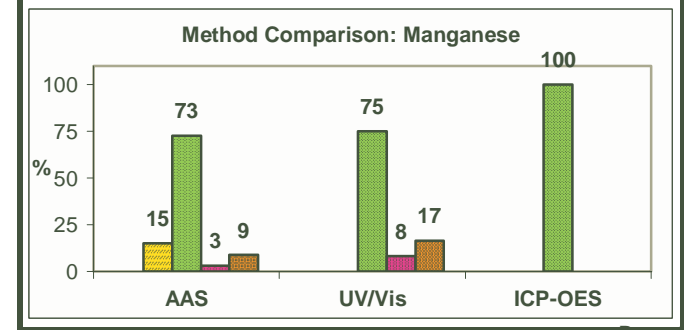
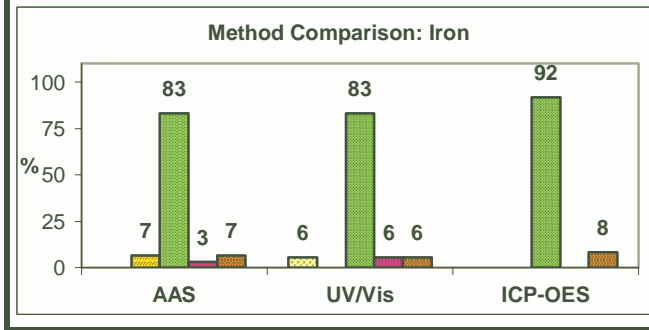
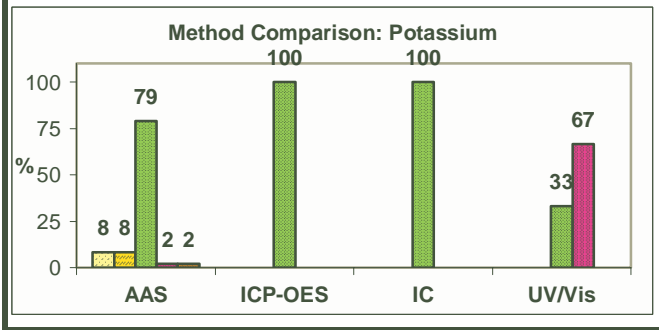
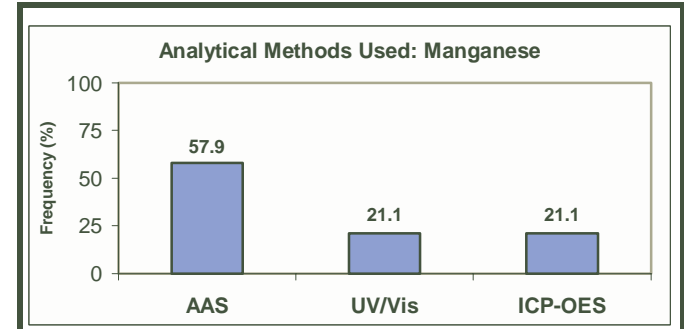
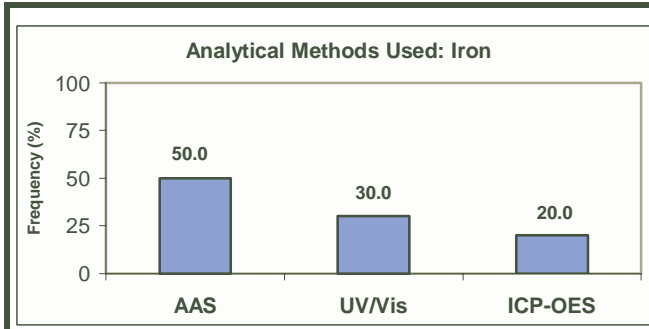
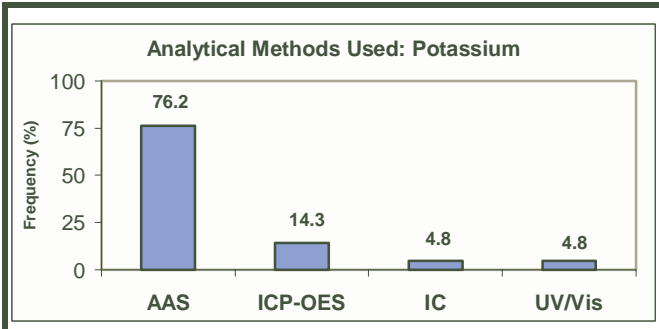
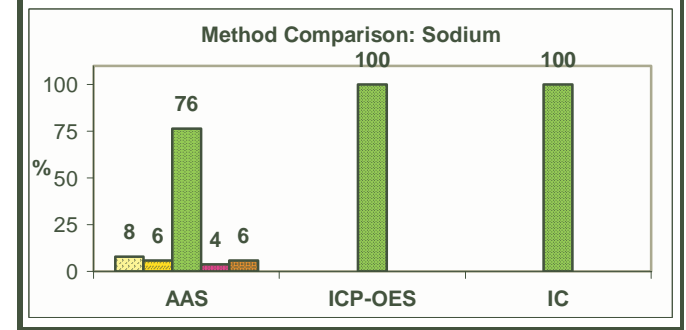
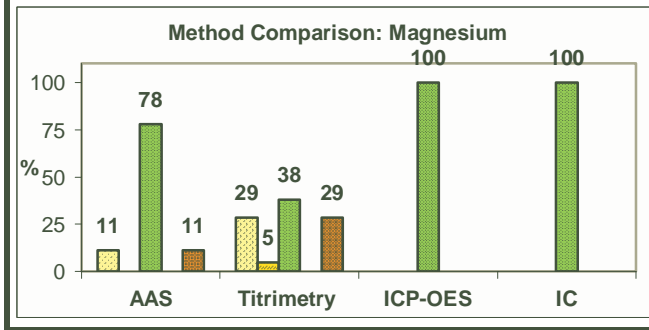
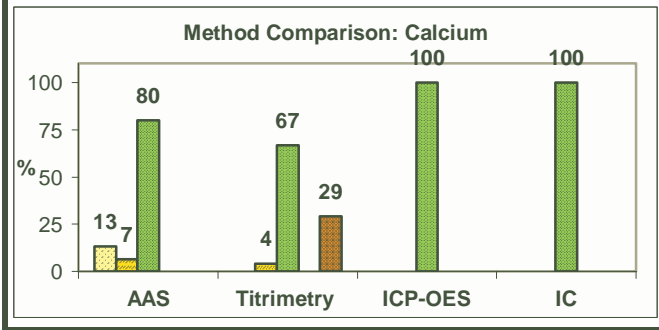
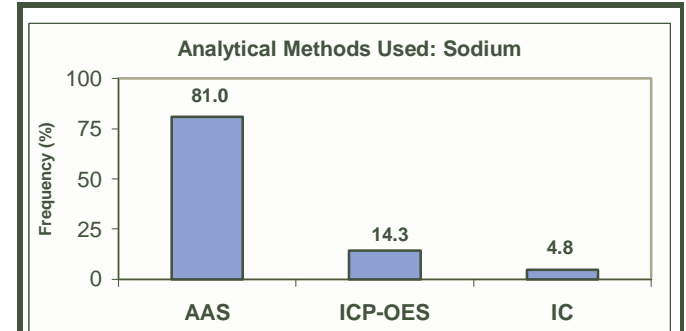
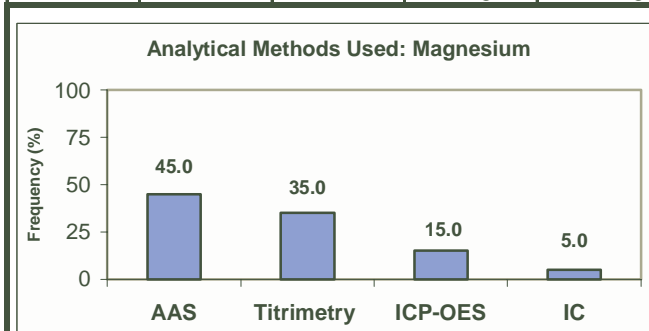
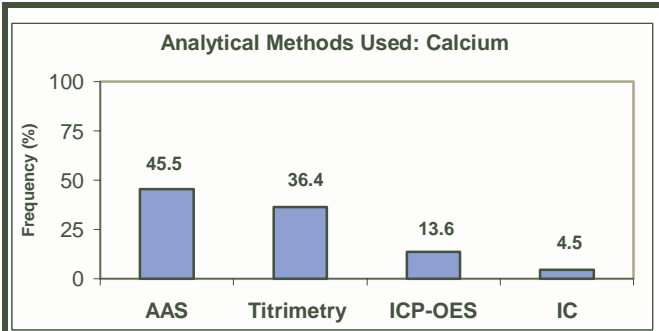


APPENDIX D: Graphical display of all results per parameter



Method Comparison LEGEND:

%Too Low	%Low	%Correct	%High	%Too high
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ANNEX E: Graphical display of frequency and performance of methodologies used

