UCML Groundwater Monitoring Results

Nov 2008-Oct 2009

Groundwater Chemical Analysis – North Monitoring Network

Obtained from:

North Monitoring Network Quarterly Monitoring and Annual Sampling Report – September 2009

Coffey Geotechnics Pty Ltd

Appendix B. Tabulated Groundwater Analytical Results

Sample Location	PZ04A	PZ06B	PZ06C	PZ07A	PZ07C	PZ08C	PZ09C	PZ10A	PZ10B	PZ11B	PZ12A	PZ14B	PZ14C	PZ24A	PZ24B	PZ28A	PZ28B	R752	R753A	R755A
Sample Date	24-Sep-09	23-Sep-09	23-Sep-09	25-Nov-09	25-Nov-09	24-Nov-09	24-Nov-09	24-Nov-09	24-Sep-09	24-Nov-09	24-Nov-09	24-Nov-09	24-Sep-09	24-Nov-09	24-Sep-09	23-Sep-09	23-Sep-09	23-Sep-09	24-Nov-09	25-Nov-09
Alkalinity - Bicarbonate mg CaCO3/L	29	273	<2	<2	86	90	59	71	183	2	198	<2	154	254	26	158	50	191	196	132
Alkalinity - Carbonate mg CaCO3/L	<2	<2	34	20	<2	<2	8	14	<2	<2	<2	40	<2	52	20	52	24	<2	<2	<2
Aluminium - filterable_ mg/L	<0.02	<0.02	<0.02	0.11	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Antimony - filterable_ mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	<0.003
Barium - filterable_ mg/L	0.075	0.48	0.011	0.18	0.008	0.0067	0.012	0.11	0.14	0.018	0.016	0.18	0.037	0.18	0.0075	0.0066	0.0067	0.0025	0.078	0.056
Cadmium - filterable_ mg/L	0.00017	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00005
Calcium - total mg/L	10	25	3.8	48	11	7.3	8.4	7.3	32	2.6	8.7	109	26	93	53	49	8	34	37	14
Chloride mg/L	64	28	43	57	74	152	61	42	514	39	78	120	220	117	71	39	794	170	106	71
Chromium - filterable_ mg/L	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.002	0.001
Copper - filterable_ mg/L	0.001	<0.0005	<0.0005	0.0009	<0.0005	0.0007	0.0016	<0.0005	<0.0005	0.0012	<0.0005	0.0018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.002	0.0076	0.079
Electrical Conductivity µS/cm - field	270	600	260	1900	470	670	390	290	2140	160	640	2200	1110	880	320	540	2820	1000	720	480
Iron- filterable_ mg/L	0.29	0.04	<0.01	0.03	0.02	0.06	0.03	0.02	0.01	27	0.34	0.02	0.18	0.04	<0.01	<0.01	<0.01	0.01	0.84	0.03
Lead - filterable_ mg/L	<0.00005	0.00005	<0.00005	0.00034	0.00006	0.00012	0.00007	0.00008	0.00005	0.00014	0.0003	0.00028	<0.00005	<0.00005	0.00005	<0.00005	<0.00005	0.027	0.00035	0.00036
Magnesium - total mg/L	8.6	5.8	1	3.2	20	40	16	6.3	84	3.1	3.9	26	34	7.3	12	27	66	49	34	29
Manganese - filterable_ mg/L	0.11	0.2	<0.001	<0.001	0.085	0.073	0.03	0.038	0.8	0.72	0.17	0.001	0.23	0.033	0.002	0.006	0.019	0.021	0.69	0.013
Mercury - filterable_ mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel - filterable_ mg/L	0.008	<0.001	<0.001	0.006	<0.001	0.002	<0.001	0.001	0.001	<0.001	<0.001	0.013	0.002	0.002	0.001	<0.001	<0.001	0.003	0.078	0.03
Nitrates_ mg/L N	0.24	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.01	0.02	0.01	0.01	<0.01	<0.01	<0.01	0.72	0.11	0.24
Nitrites_ mg/L N	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrogen Ammonia_ mg/L N	0.05	0.51	0.05	2.3	0.24	0.11	0.06	1.5	0.04	<0.01	0.81	0.28	0.03	1.4	0.1	0.37	0.08	0.04	0.22	0.06
pH - field	5.7	7.4	10.5	11.7	8.3	8.5	8.8	9	6	6.6	7.4	11.9	7.2	8.9	9.5	9.4	9.4	6.8	6.5	6.3
Potassium - total mg/L	1.9	16	29	31	4.2	3.9	3.7	14	11	1.4	13	8.7	8.8	24	17	15	24	2.1	4.8	1.9
Selenium - filterable_ mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silica_ mg/L	9.6	4.8	0.26	0.61	0.23	0.28	0.5	1.8	9.5	1.2	2.9	0.17	3.4	3.3	0.1	0.49	0.11	65	8.8	9.1
Silver - filterable_ mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - total mg/L	31	99	26	119	40	52	42	34	277	17	114	64	118	159	38	66	439	85	54	40
Sulfates mg/L	<2	<2	<2	4	<2	<2	<2	<2	53	<2	<2	<2	<2	<2	<2	<2	<2	28	3	6
Temperature (°C)	14.7	14.4	14.1	15.4	12.6	19.8	21.6	23.3	15.5	19.8	22.4	20	15.4	22.7	14.8	12	11.9	14.1	19.6	21.7
Time: (w)	1313	1516	1555	1050	1144	948	1325	1410	1158	1518	1626	1108	903	1229	1000	1222	1220	1626	1741	917
Total Dissolved Solids - calculation mg/L	180	400	175	1270	315	450	261	195	1430	105	430	1470	745	590	215	360	1890	670	480	320
Zinc - filterable_ mg/L	0.15	0.014	<0.005	0.022	0.032	0.06	0.033	0.013	0.044	0.13	0.009	0.052	0.032	0.014	<0.005	<0.005	<0.005	0.47	0.25	0.16

UCML Bobadeen Irrigation Scheme Groundwater Monitoring Results Nov 2008-Oct 2009

Obtained from:

Quarterly Monitoring Reports

Coffey Geotechnics Pty Ltd

September 2008 – December 2008

		Depth to Groundwater (mbgl)			Field pH		Electrical Conductivity (µS/cm)	
Piezometer ID	Total Depth	26/09/2008	11/12/2008	Difference* (m)	26/09/2008	12/12/2008	26/09/2008	12/12/2008
IMW01	2.23	0.42	1.34	-0.92	6.5	6.4	640	2130
IMW02	3.47	0.26	1.66	-1.40	5.9	5.0	240	1010
IMW03	7.4	4.98	7.3	-2.32	6.5	NS	280	1170
IMW04	2.68	0.11	1.61	-1.50	7.4	7.2	720	650
IMW05	11.41	0.76	1.17	-0.41	7.0	7.0	550	3920
IMW06	7.5	0.61	1.04	-0.43	7.1	7.2	4190	3830
IMW07	3.4	2.10	2.45	-0.35	5.1	5.2	1830	NS
IMW08	1.1	0.61	0.98	-0.37	6.8	NS	400	NS
IMW09	2.77	2.67	2.67	0	NS	NS	NS	NS

Notes:
NS – insufficient groundwater for sample
mbgl – metres below ground level
**Negative number indicates an increase in the depth to groundwater (i.e., a decrease in the groundwater level)*

December 2008-March 2009

		Depth to Groundwater (mbgl)			Field pH		Electrical Conductivity (µS/cm)	
Piezometer ID	Total Depth	11/12/2008	26/3/2009	Difference* (m)	12/12/2008	27/3/2009	12/12/2008	27/3/2009
IMW01	2.23	1.34	1.90	-0.56	6.4	NS	2130	NS
IMW02	3.47	1.66	2.64	-0.98	5.0	NS	1010	NS
IMW03	7.40	7.30	7.34	-0.04	NS	NS	1170	NS
IMW04	2.68	1.61	0.89	0.72	7.2	7.5	650	1700
IMW05	11.41	1.17	5.9	-4.73	7.0	7.2	3920	780
IMW06	7.50	1.04	1.83	-0.79	7.2	7.0	3830	4810
IMW07	3.40	2.45	2.38	0.07	5.2	5.5	NS	4610
IMW08	1.10	0.98	1.00	-0.02	NS	NS	NS	NS
IMW09	2.77	2.67	2.67	0.00	NS	NS	NS	NS

Notes:
NS – insufficient groundwater for sample
mbgl – metres below ground level
**Negative number indicates an increase in the depth to groundwater (i.e., a decrease in the groundwater level)*

March 2009- June 2009

		Depth to Groundwater (mbgl)			Field pH		Electrical Conductivity (µS/cm)	
Piezometer ID	Total Depth	26/3/2009	18/6/2009	Difference* (m)	27/3/2009	19/6/2009	27/3/2009	19/6/2009
IMW01	2.23	1.90	2.11	-0.21	NS	NS	NS	NS
IMW02	3.47	2.64	3.05	-0.41	NS	6.2	NS	3460
IMW03	7.40	7.34	7.22	0.12	NS	NS	NS	NS
IMW04	2.68	0.89	0.36	0.53	7.5	7.4	1700	1660
IMW05	11.41	5.9	0.99	4.92	7.2	7.0	780	860
IMW06	7.50	1.83	2.06	-0.23	7.0	7.1	4810	NS
IMW07	3.40	2.38	2.95	-0.57	5.5	5.4	4610	4940
IMW08	1.10	1.00	0.98	0.02	NS	NS	NS	NS
IMW09	2.77	2.67	2.66	0.01	NS	NS	NS	NS

Notes:
NS – insufficient groundwater for sample
mbgl – metres below ground level
**Negative number indicates an increase in the depth to groundwater (i.e., a decrease in the groundwater level)*

June 2009-September 2009

		Depth to Groundwater (mbgl)			Field pH		Electrical Conductivity (µS/cm)	
Piezometer ID	Total Depth	18/06/2009	17/09/2009	Difference* (m)	19/06/2009	18/09/2009	19/06/2009	18/09/2009
IMW01	2.23	2.11	Dry	NA	NS	NS	NS	NS
IMW02	3.47	3.05	Dry	NA	6.2	NS	3460	NS
IMW03	7.40	7.22	Dry	NA	NS	NS	NS	NS
IMW04	2.68	0.36	0.80	-0.44	7.4	7.4	1660	1370
IMW05	11.41	0.99	6.21	-5.22	7.0	7.0	860	890
IMW06	7.50	2.06	0.78	1.28	7.1	7.3	NS	3010
IMW07	3.40	2.95	Dry	NA	5.4	NS	4940	NS
IMW08	1.10	0.98	Dry	NA	NS	NS	NS	NS
IMW09	2.77	2.66	Dry	NA	NS	NS	NS	NS

Notes:
NA – not applicable
NS – insufficient groundwater for sample
mbgl – metres below ground level
**Negative number indicates an increase in the depth to groundwater (i.e., a decrease in the groundwater level)*