

**Table H1: Laboratory Column Leach Test Results for Sample TP4/6-12 (NAF)
Highly weathered siltstone**

Sample Weight (kg)	1.56	ANC (kg H ₂ SO ₄ /t) [#]		6		
pH	6.60	NAPP (kg H ₂ SO ₄ /t) [#]		95		
EC (µS/cm)	569	NAG (kg H ₂ SO ₄ /t) [#]		<0.01		
Total S (%) [#]	3.3	NAG pH [#]		9.3		
Date	15-Feb-06	15-Mar-06	11-Apr-06	17-May-06		
Round Number	1	2	3	4	5	
Volume Leached (L)	0.255	0.270	0.360	0.360		
Cum. Volume (L)	0.255	0.525	0.885	1.245		
Pore Volumes	0.2	0.4	0.7	0.9		
pH	7.76	7.88	7.71	7.84		
EC (µS/cm)	1,170	618	791	185		
Acidity (mg/L)*	4	16	5	4		
Alkalinity (mg/L)*	95	449	171	30	ANZECC ¹ /NEPM ² Guidelines	ANZECC ¹ HMTV ⁴ (mg/L)
Net Alkalinity (mg/L)*	91	433	166	26		
Dissolved elements (mg/L)						
Al	<0.01	<0.01	<0.01	<0.01	5	
As	---	---	---	---	0.5	
Ca	68	36	44	8	1,000	
Cd	0.0005	0.0004	0.0007	0.0002	0.01	0.07
Cl	---	---	---	---	-	
Co	<0.001	<0.001	<0.001	<0.001	1	
Cr	---	---	---	---	1	6
Cu	0.02	0.002	0.003	0.003	0.5	3.1
Fe ³	<0.05	<0.05	<0.05	<0.05	1 (irrigation) ³	
Hg	---	---	---	---	0.002	
K	---	---	---	---	-	
Mg	74	32	39	6	-	
Mn ³	0.017	0.001	0	<0.001	2 (irrigation) ³	
Na	---	---	---	---	-	
Ni	0.002	<0.001	<0.001	<0.001	1	6
Pb	0.028	0.018	0.011	0.014	0.1	0.6
SO ₄	336	160	198	30	1,000	
Sb	---	---	---	---	-	
Se	<0.010	<0.010	<0.010	<0.010	0.02	
TI	---	---	---	---	-	
Zn	0.0151	0.0670	0.1590	0.0380	20	122
RESULTS**						
SO ₄ Generation Rate	55	28	46	7		
Cumulative SO ₄ Gen.	55	83	128	135		
Ca Generation Rate	11.1	6.2	10.2	1.8		
Cumulative Ca Gen.	11.1	17.3	27.5	29.3		
Mg Generation Rate	12.1	5.5	9.0	1.4		
Cumulative Mg Gen.	12.1	17.6	26.6	28.0		
Residual ANC (%)	100	100	100	100		
SO ₄ /Ca	2.1	1.9	1.9	1.6		
Cd generation rate	0.001	0.001	0.001	0.001		
Cumulative Cd Gen.	0.001	0.002	0.003	0.004		
Fe generation rate	0.002	0.002	0.002	0.002		
Cumulative Fe Gen.	0.002	0.003	0.006	0.008		
Mn generation rate	0.003	0.000	0.001	0.000		
Cumulative Mn Gen.	0.003	0.003	0.004	0.004		
Zn generation rate	0.002	0.002	0.002	0.002		
Cumulative Zn Gen.	0.002	0.003	0.006	0.008		
Hardness*	475	222	270	45		

Avg. Hardness = 253

< indicates less than the analytical detection limit.

Shaded cells indicate values which exceed applied ANZECC / NEPM livestock drinking water guideline values.

* Acidity, Alkalinity and Hardness reported as mg CaCO₃/L

** SO₄, Ca, Mg, Cd, Fe, Mn and Zn generation rates calculated in mg/kg/flush.

1. Australian and New Zealand Environment and Conservation Council (ANZECC). Australian Water Quality Guidelines for Fresh and Marine Waters (Livestock Drinking Water). October 2000.

2. National Environment Protection Measure (Assessment of Site Contamination) Measure (NEPM). Guideline on Investigation Levels for Soil and Groundwater. December 1999.

3. ANZECC / NEPM livestock drinking water guideline values are not available for Fe and Mn (i.e. these metals are insufficiently toxic to livestock).

Fe and Mn guideline values shown are for recommended concentrations of these elements in water to be used for irrigation.

Total S, ANC and NAG data calculated for mix of materials in each column

4. HMTV = Hardness-modified Trigger Values. Algorithms used include the following: Cd: HMTV = TV (H/30)^{0.85}, Cr(III): TV(H/30)^{0.82}, Cu: TV(H/30)^{0.85}, Pb: TV(H/30)^{1.27}, Ni: TV(H/30)^{0.85}, Zn: HMTV = TV(H/30)^{0.85} where TV = trigger values, and H = hardness

**Table H2: Laboratory Column Leach Test Results for Sample TP4/13-18 (PAF)
Partially weathered siltstone and predominantly fresh siltstone**

Sample Weight (kg)	1.78	ANC (kg H ₂ SO ₄ /t) [†]	10			
pH	6.00	NAPP (kg H ₂ SO ₄ /t) [‡]	602			
EC (µS/cm)	845	NAG (kg H ₂ SO ₄ /t) [‡]	-			
Total S (%) [†]	20	NAG pH [†]	-			
Date	15-Feb-06	15-Mar-06	10-Apr-06	17-May-06		
Round Number	1	2	3	4	5	
Volume Leached (L)	0.540	0.550	0.565	0.570		
Cum. Volume (L)	0.540	1.090	1.655	2.225		
Pore Volumes	0.4	0.8	1.2	1.6		
pH	6.84	6.34	6.17	5.65		
EC (µS/cm)	1,420	994	1,560	1,380		
Acidity (mg/L) [*]	195	11	159	210		
Alkalinity (mg/L) [*]	32	15	12	3		
Net Alkalinity (mg/L) [*]	---	4	---	---		
					ANZECC ¹ /NEPM ² Guidelines	ANZECC ¹ HMTV ⁴ (mg/L)
Dissolved elements (mg/L)						
Al	<0.01	<0.01	<0.01	<0.01	5	
As	---	---	---	---	0.5	
Ca	121	43	81	80	1,000	
Cd	0.568	0.276	0.658	1.02	0.01	0.13
Cl	---	---	---	---	-	
Co	0.496	0.263	0.525	0.603	1	
Cr	---	---	---	---	1	10
Cu	0.004	0.009	0.005	0.006	0.5	5.7
Fe ³	<0.05	<0.05	<0.05	<0.05	1 (irrigation) ³	
Hg	---	---	---	---	0.002	
K	---	---	---	---	-	
Mg	67	66	102	78	-	
Mn ³	1.95	2.02	4.45	4.29	2 (irrigation) ³	
Na	---	---	---	---	-	
Ni	0.214	0.096	0.144	0.156	1	11
Pb	0.082	0.483	1.36	2.64	0.1	1.1
SO ₄	841	594	1,040	913	1,000	
Sb	---	---	---	---	-	
Se	<0.010	<0.010	<0.010	<0.010	0.02	
TI	---	---	---	---	-	
Zn	139	72.4	125	144	20	228
RESULTS**						
SO ₄ Generation Rate	255	184	330	292		
Cumulative SO ₄ Gen.	255	439	769	1061		
Ca Generation Rate	36.7	13.3	25.7	25.6		
Cumulative Ca Gen.	36.7	50.0	75.7	101.3		
Mg Generation Rate	20.3	20.4	32.4	25.0		
Cumulative Mg Gen.	20.3	40.7	73.1	98.1		
Residual ANC (%)	100	100	100	100		
SO ₄ /Ca	2.9	5.8	5.3	4.8		
Cd generation rate	0.002	0.002	0.002	0.002		
Cumulative Cd Gen.	0.002	0.003	0.005	0.006		
Fe generation rate	0.003	0.003	0.003	0.003		
Cumulative Fe Gen.	0.003	0.006	0.009	0.013		
Mn generation rate	0.592	0.624	1.413	1.374		
Cumulative Mn Gen.	0.592	1.216	2.628	4.002		
Zn generation rate	0.003	0.003	0.003	0.003		
Cumulative Zn Gen.	0.003	0.006	0.009	0.013		
Hardness [*]	578	379	622	521		
					Avg. Hardness =	525

< indicates less than the analytical detection limit.

Shaded cells indicate values which exceed applied ANZECC / NEPM livestock drinking water guideline values.

* Acidity, Alkalinity and Hardness reported as mg CaCO₃/L

** SO₄, Ca, Mg, Cd, Fe, Mn and Zn generation rates calculated in mg/kg/flush.

1. Australian and New Zealand Environment and Conservation Council (ANZECC). Australian Water Quality Guidelines for Fresh and Marine Waters (Livestock Drinking Water). October 2000.
2. National Environment Protection Measure (Assessment of Site Contamination) Measure (NEPM). Guideline on Investigation Levels for Soil and Groundwater. December 1999.
3. ANZECC / NEPM livestock drinking water guideline values are not available for Fe and Mn (i.e. these metals are insufficiently toxic to livestock).

Fe and Mn guideline values shown are for recommended concentrations of these elements in water to be used for irrigation.

Total S, ANC and NAG data calculated for mix of materials in each column

⁴ HMTV = Hardness-modified Trigger Values. Algorithms used include the following: Cd: HMTV = TV (H/30)^{0.85}, Cr(III): TV(H/30)^{0.82}, Cu: TV(H/30)^{0.85}, Pb: TV(H/30)^{1.27}, Ni: TV(H/30)^{0.85}, Zn: HMTV = TV(H/30)^{0.85} where TV = trigger values, and H = hardness

**Table H3: Laboratory Column Leach Test Results for Sample PER 1 (NAF)
Hanging Wall Overburden Material - Upper Pyritic Shale 45-50 m**

Sample Weight (kg)	3	ANC (kg H ₂ SO ₄ /t)	206							
pH (1:5)	6.90	NAPP (kg H ₂ SO ₄ /t)	-60							
EC (µS/cm) (1:5)	4,050	NAG (kg H ₂ SO ₄ /t)	<0.1							
Total Oxidisable S (%)	4.78	NAG pH	6.5							
Date	29-Apr-06	17-May-06	14-Jun-06							
Round Number	1	2	3	4	5	6	7	8	9	10
Volume Leached (L)	0.410	0.415	0.445							
Cum. Volume (L)	0.410	0.825	1.270							
Pore Volumes	0.3	0.6	0.9							
Leachate pH	4.36	5.65	5.30							
Leachate EC (µS/cm)	12,300	10,500	11,600							
Acidity (mg/L)*	1970	<1	68							
Alkalinity (mg/L)*	<1	9	13							
Net Alkalinity (mg/L)*	-1970	8	-55							
ANZECC ¹ /NEPM ² Guidelines (mg/L)										
ANZECC ¹ HMTV ⁴ (mg/L)										
Dissolved elements (mg/L)										
Al	5.14	0.03	0.91							5
As	0.0004	0.005	<0.001							1
Ca	425	334	290							1,000
Cd	0.361	0.0224	0.0417							0.01
Cl	24	18	9							1.70
Co	2.42	0.302	0.327							-
Cr	<0.001	<0.001	<0.001							1
Cu	0.036	0.002	0.038							114
Fe ³	1,030	1	7.34							0.5
K	10	5	5							67.5
Mg	1,960	2,140	2,280							1 (irrigation) ³
Mn ³	37	12.7	13							-
Na	36	19	24							2 (irrigation) ³
Ni	2.91	0.21	0.187							-
Pb	0.002	<0.001	<0.001							1
SO ₄	15,500	9,840	11,200							135
Se	0.047	0.053	0.068							0.1
Zn	652	27	36							1,000
										0.02
										20
										2,701
RESULTS**										
SO ₄ Generation Rate	2,118	1,361	1,661							
Cumulative SO ₄ Gen.	2,118	3,480	5,141							
Ca Generation Rate	58	46	43							
Cumulative Ca Gen.	58	104	147							
Mg Generation Rate	268	296	338							
Cumulative Mg Gen.	268	564	902							
Residual ANC (%)	100	100	100							
SO ₄ /Ca	15.2	12.3	16.1							
Fe generation rate	141	0.13	1.09							
Cumulative Fe Gen.	141	141	142							
Mn generation rate	5.1	1.8	1.9							
Cumulative Mn Gen.	5.1	6.8	8.7							
Zn generation rate	89	3.7	5.3							
Cumulative Zn Gen.	89	93	98							
Hardness*	9,133	9,647	10,113							

Avg. Hardness = 9,631

< indicates less than the analytical detection limit. Shaded cells indicate values which exceed applied ANZECC / NEPM livestock drinking water guideline values.

* Acidity, Alkalinity and Hardness reported as mg CaCO₃/L

** SO₄, Ca, Mg, Fe, Mn, and Zn generation rates calculated in mg/kg/flush.

1. Australian and New Zealand Environment and Conservation Council (ANZECC). Australian Water Quality Guidelines for Fresh and Marine Waters (Livestock Drinking Water). October 2000.

2. National Environment Protection Measure (Assessment of Site Contamination) Measure (NEPM). Guideline on Investigation Levels for Soil and Groundwater. December 1999.

3. ANZECC / NEPM livestock drinking water guideline values are not available for Fe and Mn (i.e. these metals are insufficiently toxic to livestock).

Fe and Mn guideline values shown are for recommended concentrations of these elements in water to be used for irrigation.

4. HMTV = Hardness-modified Trigger Values. Algorithms used include the following: Cd: HMTV = TV (H/30)^{0.89}, Cr(III): TV(H/30)^{0.82}, Cu: TV(H/30)^{0.85}, Pb: TV(H/30)^{1.27}, Ni: TV(H/30)^{0.85},

Zn: HMTV = TV(H/30)^{0.85} where TV = trigger values, and H = hardness

**Table H4: Laboratory Column Leach Test Results for Sample PER 2 (PAF)
Hanging Wall Overburden Material - Upper Pyritic Shale 25-30 m**

Sample Weight (kg)	3.02	ANC (kg H ₂ SO ₄ /t)	167										
pH (1:5)	6.60	NAPP (kg H ₂ SO ₄ /t)	141										
EC (µS/cm) (1:5)	4,570	NAG (kg H ₂ SO ₄ /t)	61.2										
Total Oxidisable S (%)	10.1	NAG pH	2.4										
Date	29-Apr-06	17-May-06	14-Jun-06										
Round Number	1	2	3	4	5	6	7	8	9	10			
Volume Leached (L)	0.440	0.370	0.360										
Cum. Volume (L)	0.440	0.810	1.170										
Pore Volumes	0.3	0.6	0.9										
Leachate pH	3.65	4.18	4.60										
Leachate EC (µS/cm)	17,000	11,800	17,600										
Acidity (mg/L)*	8380	195	199										
Alkalinity (mg/L)*	<1	14	<1										
Net Alkalinity (mg/L)*	-8380	-181	-199										
												ANZECC ¹ /NEPM ² Guidelines (mg/L)	ANZECC ¹ HMTV ⁴ (mg/L)
Dissolved elements (mg/L)													
Al	370	2.84	4.57									5	
As	0.006	0.096	<0.001									1	
Ca	405	429	416									1,000	
Cd	2.04	0.196	0.168									0.01	2.13
Cl	22	36	23									-	
Co	2.85	0.527	0.583									1	
Cr	0.009	0.094	<0.001									1	140
Cu	0.316	0.158	0.044									0.5	83.7
Fe ³	3,530	17	31.3									1 (irrigation) ³	
K	<1	1	2									-	
Mg	2,080	2,380	3,810									-	
Mn ³	58.1	29.9	36.7									2 (irrigation) ³	
Na	9	4	9									-	
Ni	2.86	0.288	0.249									1	167
Pb	0.004	0.123	0.01									0.1	16.7
SO ₄	19,900	11,300	17,700									1,000	
Se	0.058	0.16	0.085									0.02	
Zn	1,150	59	67.3									20	3,347
RESULTS**													
SO ₄ Generation Rate	2,899	1,384	2,110										
Cumulative SO ₄ Gen.	2,899	4,284	6,394										
Ca Generation Rate	59	53	50										
Cumulative Ca Gen.	59	112	161										
Mg Generation Rate	303	292	454										
Cumulative Mg Gen.	303	595	1049										
Residual ANC (%)	100	100	99										
SO ₄ /Ca	20	11	18										
Fe generation rate	514	2.0	3.7										
Cumulative Fe Gen.	514	516	520										
Mn generation rate	8.5	3.7	4.4										
Cumulative Mn Gen.	8.5	12.1	16.5										
Zn generation rate	168	7.2	8.0										
Cumulative Zn Gen.	168	175	183										
Hardness*	9,577	10,872	16,728										

Avg. Hardness = 12,392

< indicates less than the analytical detection limit.

Shaded cells indicate values which exceed applied ANZECC / NEPM livestock drinking water guideline values and HMTV values

* Acidity, Alkalinity and Hardness reported as mg CaCO₃/L

** SO₄, Ca, Mg and Se generation rates calculated in mg/kg/flush.

1. Australian and New Zealand Environment and Conservation Council (ANZECC). Australian Water Quality Guidelines for Fresh and Marine Waters (Livestock Drinking Water). October 2000.

2. National Environment Protection Measure (Assessment of Site Contamination) Measure (NEPM). Guideline on Investigation Levels for Soil and Groundwater. December 1999.

3. ANZECC / NEPM livestock drinking water guideline values are not available for Fe and Mn (i.e. these metals are insufficiently toxic to livestock).

Fe and Mn guideline values shown are for recommended concentrations of these elements in water to be used for irrigation.

4. HMTV = Hardness-modified Trigger Values. Algorithms used include the following: Cd: HMTV = TV (H/30)^{0.89}, Cr(III): TV(H/30)^{0.82}, Cu: TV(H/30)^{0.85}, Pb: TV(H/30)^{1.27}, Ni: TV(H/30)^{0.85},

Zn: HMTV = TV(H/30)^{0.85} where TV = trigger values, and H = hardness

**Table H5: Laboratory Column Leach Test Results for Sample PER 3 (NAF)
Hanging Wall Overburden Material - Bituminous Shale 100-105 m**

Sample Weight (kg)	3	ANC (kg H ₂ SO ₄ /t)	313												
pH (1:5)	7.60	NAPP (kg H ₂ SO ₄ /t)	-177												
EC (µS/cm) (1:5)	3,080	NAG (kg H ₂ SO ₄ /t)	<0.1												
Total Oxidisable S (%)	4.43	NAG pH	8.3												
Date	29-Apr-06	17-May-06	14-Jun-06												
Leach Number	1	2	3	4	5	6	7	8	9	10					
Volume Leached (L)	0.445	0.440	0.480												
Cum. Volume (L)	0.445	0.885	1.365												
Pore Volumes	0.3	0.7	1.0												
Leachate pH	6.88	6.71	6.50												
Leachate EC (µS/cm)	2,290	3,100	3,300												
Acidity (mg/L)*	10	19	33												
Alkalinity (mg/L)*	27	14	8												
Net Alkalinity (mg/L)*	17	-5	-25												
Dissolved elements (mg/L)													ANZECC ¹ /NEPM ² Guidelines (mg/L)	ANZECC ¹ HMTV ⁴ (mg/L)	
Al	0.11	<0.01	<0.01											5	
As	0.001	0.002	<0.001											1	
Ca	380	212	216											1,000	
Cd	0.0344	0.0111	0.0151											0.01	0.43
Cl	2	6	2											-	
Co	0.062	0.068	0.152											1	
Cr	<0.001	<0.001	<0.001											1	32
Cu	0.005	0.001	<0.001											0.5	18.2
Fe ³	0.25	<0.05	0.3											1 (irrigation) ³	
K	6	6	8											-	
Mg	145	442	425											-	
Mn ³	1.45	0.786	2.29											2 (irrigation) ³	
Na	10	7	10											-	
Ni	0.064	0.07	0.128											1	36
Pb	<0.001	<0.001	<0.001											0.1	3.6
SO ₄	1,450	2,240	2,170											1,000	
Se	<0.010	0.012	0.02											0.02	
Zn	1	6	16.6											20	729
RESULTS**															
SO ₄ Generation Rate	215	329	347												
Cumulative SO ₄ Gen.	215	544	891												
Ca Generation Rate	56	31	35												
Cumulative Ca Gen.	56	87	122												
Mg Generation Rate	22	65	68												
Cumulative Mg Gen.	22	86	154												
Residual ANC (%)	100	100	100												
SO ₄ /Ca	1.6	4.4	4.2												
Fe generation rate	0.04	0.01	0.01												
Cumulative Fe Gen.	0.04	0.04	0.05												
Mn generation rate	0.22	0.12	0.37												
Cumulative Mn Gen.	0.22	0.33	0.70												
Zn generation rate	0.17	0.85	2.66												
Cumulative Zn Gen.	0.17	1.02	3.68												
Hardness*	1,546	2,350	2,290												
													Avg. Hardness =	2,062	

< indicates less than the analytical detection limit.

Shaded cells indicate values which exceed applied ANZECC / NEPM livestock drinking water guideline values and HMTV values

* Acidity, Alkalinity and Hardness reported as mg CaCO₃/L

** SO₄, Ca, Mg, Fe, Mn, and Zn generation rates calculated in mg/kg/flush.

1. Australian and New Zealand Environment and Conservation Council (ANZECC), Australian Water Quality Guidelines for Fresh and Marine Waters (Livestock Drinking Water), October 2000.

2. National Environment Protection Measure (Assessment of Site Contamination) Measure (NEPM), Guideline on Investigation Levels for Soil and Groundwater, December 1999.

3. ANZECC / NEPM livestock drinking water guideline values are not available for Fe and Mn (i.e. these metals are insufficiently toxic to livestock).

Fe and Mn guideline values shown are for recommended concentrations of these elements in water to be used for irrigation.

4. HMTV = Hardness-modified Trigger Values. Algorithms used include the following: Cd: HMTV = TV (H/30)^{0.85}, Cr(III): TV(H/30)^{0.85}, Cu: TV(H/30)^{0.85}, Pb: TV(H/30)^{1.27}, Ni: TV(H/30)^{0.85}, Zn: HMTV = TV(H/30)^{0.85} where TV = trigger values, and H = hardness

**Table H6: Laboratory Column Leach Test Results for Sample PER 4 (PAF)
Hanging Wall Overburden Material - Bituminous shale 90-95 m**

Sample Weight (kg)	3	ANC (kg H ₂ SO ₄ /t)	167												
pH (1:5)	7.60	NAPP (kg H ₂ SO ₄ /t)	240												
EC (µS/cm) (1:5)	3,210	NAG (kg H ₂ SO ₄ /t)	60.5												
Total Oxidisable S (%)	13.3	NAG pH	2.2												
Date	29-Apr-06	17-May-06	14-Jun-06												
Leach Number	1	2	3	4	5	6	7	8	9	10					
Volume Leached (L)	0.520	0.475	0.500												
Cum. Volume (L)	0.520	0.995	1.495												
Pore Volumes	0.4	0.7	1.1												
Leachate pH	6.97	6.71	6.40												
Leachate EC (µS/cm)	3,470	3,700	4,210												
Acidity (mg/L)*	9	19	55												
Alkalinity (mg/L)*	27	11	6												
Net Alkalinity (mg/L)*	18	-8	-49												
Dissolved elements (mg/L)													ANZECC ¹ /NEPM ² Guidelines (mg/L)	ANZECC ¹ HMTV ⁴ (mg/L)	
Al	0.1	<0.01	<0.01											5	
As	<0.001	0.001	<0.001											1	
Ca	432	178	190											1,000	
Cd	0.0025	0.0117	0.0222											0.01	0.57
Cl	5	4	1											-	
Co	0.022	0.062	0.204											1	
Cr	<0.001	<0.001	<0.001											1	41
Cu	<0.001	<0.001	<0.001											0.5	23.6
Fe ³	<0.05	<0.05	0.73											1 (irrigation) ³	
K	10	6	8											-	
Mg	308	583	659											-	
Mn ³	0.694	1.02	3.1											2 (irrigation) ³	
Na	46	24	27											-	
Ni	0.025	0.055	0.153											1	47
Pb	<0.001	<0.001	0.003											0.1	4.7
SO ₄	2,330	2,780	3,040											1,000	
Se	<0.010	<0.010	<0.010											0.02	
Zn	3	9	32.4											20	943
RESULTS**															
SO ₄ Generation Rate	404	440	507												
Cumulative SO ₄ Gen.	404	844	1351												
Ca Generation Rate	75	28	32												
Cumulative Ca Gen.	75	103	135												
Mg Generation Rate	53	92	110												
Cumulative Mg Gen.	53	146	256												
Residual ANC (%)	100	100	100												
SO ₄ /Ca	2.2	6.5	6.7												
Fe generation rate	0.01	0.01	0.01												
Cumulative Fe Gen.	0.01	0.02	0.02												
Mn generation rate	0.12	0.16	0.52												
Cumulative Mn Gen.	0.12	0.28	0.80												
Zn generation rate	0.46	1.43	5.40												
Cumulative Zn Gen.	0.46	1.89	7.29												
Hardness*	2,347	2,845	3,188												
													Avg. Hardness =	2,794	

< indicates less than the analytical detection limit.

Shaded cells indicate values which exceed applied ANZECC / NEPM livestock drinking water guideline values and HMTV values

* Acidity, Alkalinity and Hardness reported as mg CaCO₃/L

** SO₄, Ca, Mg, Fe, Mn, and Zn generation rates calculated in mg/kg/flush.

1. Australian and New Zealand Environment and Conservation Council (ANZECC). Australian Water Quality Guidelines for Fresh and Marine Waters (Livestock Drinking Water). October 2000.

2. National Environment Protection Measure (Assessment of Site Contamination) Measure (NEPM). Guideline on Investigation Levels for Soil and Groundwater. December 1999.

3. ANZECC / NEPM livestock drinking water guideline values are not available for Fe and Mn (i.e. these metals are insufficiently toxic to livestock).

Fe and Mn guideline values shown are for recommended concentrations of these elements in water to be used for irrigation.

4. HMTV = Hardness-modified Trigger Values. Algorithms used include the following: Cd: HMTV = TV (H/30)^{0.85}, Cr(III): TV(H/30)^{0.85}, Cu: TV(H/30)^{0.85}, Pb: TV(H/30)^{1.27}, Ni: TV(H/30)^{0.85}, Zn: HMTV = TV(H/30)^{0.85} where TV = trigger values, and H = hardness

**Table H7: Laboratory Column Leach Test Results for Sample PER 5 (NAF)
Hanging Wall Overburden Material - Lower Pyritic Shale 125-130 m**

Sample Weight (kg)	3	ANC (kg H ₂ SO ₄ /t)	272												
pH (1:5)	7.90	NAPP (kg H ₂ SO ₄ /t)	-95												
EC (µS/cm) (1:5)	1,860	NAG (kg H ₂ SO ₄ /t)	<0.1												
Total Oxidisable S (%)	5.79	NAG pH	8.2												
Date	29-Apr-06	17-May-06	14-Jun-06												
Leach Number	1	2	3	4	5	6	7	8	9	10					
Volume Leached (L)	0.495	0.470	0.470												
Cum. Volume (L)	0.495	0.965	1.435												
Pore Volumes	0.4	0.7	1.1												
Leachate pH	7.32	6.97	7.10												
Leachate EC (µS/cm)	1,100	1,340	1,730												
Acidity (mg/L)*	4	3	2												
Alkalinity (mg/L)*	26	12	12												
Net Alkalinity (mg/L)*	22	9	10												
Dissolved elements (mg/L)													ANZECC ¹ /NEPM ² Guidelines (mg/L)	ANZECC ¹ HMTV ⁴ (mg/L)	
Al	0.05	<0.01	<0.01											5	
As	<0.001	0.003	<0.001											1	
Ca	174	87	78											1,000	
Cd	0.0003	0.0005	0.0014											0.01	0.17
Cl	4	4	1											-	
Co	0.003	0.006	0.016											1	
Cr	<0.001	<0.001	<0.001											1	14
Cu	<0.001	<0.001	<0.001											0.5	7.7
Fe ³	<0.05	<0.05	<0.05											1 (irrigation) ³	
K	7	6	7											-	
Mg	29	126	183											-	
Mn ³	0.132	0.07	0.146											2 (irrigation) ³	
Na	18	29	47											-	
Ni	0.005	0.01	0.018											1	15
Pb	<0.001	<0.001	<0.001											0.1	1.5
SO ₄	528	727	933											1,000	
Se	<0.010	0.015	0.019											0.02	
Zn	0.127	0.189	0.392											20	307
RESULTS**															
SO ₄ Generation Rate	87	114	146												
Cumulative SO ₄ Gen.	87	201	347												
Ca Generation Rate	29	14	12												
Cumulative Ca Gen.	29	42	55												
Mg Generation Rate	5	20	29												
Cumulative Mg Gen.	5	25	53												
Residual ANC (%)	100	100	100												
SO ₄ /Ca	1.3	3.5	5.0												
Fe generation rate	0.01	0.01	0.01												
Cumulative Fe Gen.	0.01	0.02	0.02												
Mn generation rate	0.02	0.01	0.02												
Cumulative Mn Gen.	0.02	0.03	0.06												
Zn generation rate	0.02	0.03	0.06												
Cumulative Zn Gen.	0.02	0.05	0.11												
Hardness*	554	736	948												
													Avg. Hardness =	746	

< indicates less than the analytical detection limit.

* Acidity, Alkalinity and Hardness reported as mg CaCO₃/L

** SO₄, Ca, Mg, Fe, Mn, and Zn generation rates calculated in mg/kg/flush.

1. Australian and New Zealand Environment and Conservation Council (ANZECC), Australian Water Quality Guidelines for Fresh and Marine Waters (Livestock Drinking Water), October 2000.

2. National Environment Protection Measure (Assessment of Site Contamination) Measure (NEPM), Guideline on Investigation Levels for Soil and Groundwater, December 1999.

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