DSM Design Group, LLC

NEUTRALIZATION POTENTIAL AND ACID-BASE ACCOUNT

Company Name: Birmingham Coal & Coke Co., Inc
Mine Name: KNIGHT MINE
Sample I.D.: OB/MW-1
Sample Date: 01/04/12

Analyzed By: KF
Date Analyzed: 01/11/12

Test I.D.	Sample Interval	pH (s.u.)	HCl (ml)	NaOH (ml)	Neuralization Potential	Sulfur (%)	Acid-Base Account
1	0 - 5	5.78	20.0	19.8	0.5	0.0570	-1.280
2	5 - 10	5.56	20.0	20.0	0.0	0.0341	-1.064
3	10 - 15	5.64	20.0	19.7	0.8	0.0717	-1.489
4	15 - 20	5.38	20.0	20.0	0.0	0.0410	-1.283
5	20 - 25	5.16	20.0	19.8	0.5	0.0178	-0.055
6	25 - 30	5.32	20.0	20.0	0.0	0.0084	-0.262
7	30 - 35	5.18	20.0	20.0	0.0	0.0377	-1.178
8	35 - 40	5.77	20.0	17.6	6.0	0.2066	-0.455
9	40 - 45	6.33	20.0	16.0	10.0	0.1450	5.468
10	45 - 50	6.94	20.0	15.2	12.0	0.0189	11.410
11	50 - 55	7.19	20.0	16.0	10.0	0.0000	10.000
12	55 - 60	7.43	20.0	14.0	15.0	0.1626	9.918
13	60 - 65	7.33	20.0	14.0	15.0	0.0532	13.338
14	65 - 70	7.30	20.0	14.2	14.5	0.0000	14.500
15	70 - 75	7.23	20.0	13.8	15.5	0.0000	15.500
16	75 - 80	7.18	20.0	12.0	20.0	0.0196	19.386
17	80 - 82	7.24	20.0	12.6	18.5	0.0000	18.500
18	82 - 83.65	Coal Seam					
19	83.65 - 89	7.16	20.0	15.6	11.0	0.0155	10.517
20	89 - 94	7.17	20.0	18.0	5.0	0.0145	4.546

Constant (C) = (ml acid added in blank)/(ml base added in blank
ml acid consumed = (ml acid added) - (ml base added x C
Tons CaCO3 equiv./1000 tons of mat. = acid consumed x 25.0 x (N of acid)
Acid-Base Account = (%Sulfur x -31.25) + Neutralization Potentia

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TOTAL SULFUR

Company Name: Birmingham Coal & Coke Co., Inc. Page: 2 of 2
Mine Name: KNIGHT MINE
Sample I.D.: OB/MW-1 Analyzed By: KF
Sample Date: 01/04/12 Date Analyzed: 01/11/12

Test I.D.	Sample Interval	Weight (g)	NaOH (ml)	meq H+/100g (meq)	Sulfur (%)
1	0 - 5	1.6139	1.2	7.4	0.0570
2	5 - 10	1.6136	1.0	6.2	0.0341
3	10 - 15	1.4580	1.2	8.2	0.0717
4	15 - 20	1.5208	1.0	6.6	0.0410
5	20 - 25	1.5046	0.8	5.3	0.0178
6	25 - 30	1.6630	0.8	4.8	0.0084
7	30 - 35	1.8765	1.2	6.4	0.0377
8	35 - 40	1.5462	2.4	15.5	0.2066
9	40 - 45	1.6398	2.0	12.2	0.1450
10	45 - 50	1.8597	1.0	5.4	0.0189
11	50 - 55	1.9284	0.2	1.0	0.0000
12	55 - 60	1.9777	2.6	13.1	0.1626
13	60 - 65	1.6595	1.2	7.2	0.0532
14	65 - 70	1.9109	0.2	1.0	0.0000
15	70 - 75	1.8830	0.6	3.2	0.0000
16	75 - 80	1.8457	1.0	5.4	0.0196
17	80 - 82	1.9017	0.6	3.2	0.0000
18	82 - 83.65	Coal Seam			
19	83.65 - 89	1.9257	1.0	5.2	0.0155
20	89 - 94	1.5556	0.8	5.1	0.0145

meq H+/100g = (ml NaOH) x (N NaOH) x (100g/weight of sample)
% S = 0.0185 (meq H+/100g) - 0.0806 (Grube, et al., 1973).

DSM Design Group, LLC

NEUTRALIZATION POTENTIAL AND ACID-BASE ACCOUNT

Company Name: Birmingham Coal & Coke Co., Inc
Mine Name: KNIGHT MINE
Sample I.D.: OB/MW-2
Sample Date: 01/05/12

Analyzed By: KF
Date Analyzed: 01/11/12

Test I.D.	Sample Interval	pH (s.u.)	HCl (ml)	NaOH (ml)	Neuralization Potential	Sulfur (%)	Acid-Base Account
1	0 - 5	4.78	20.0	20.0	0.0	0.0331	-1.033
2	5 - 10	4.03	20.0	19.4	1.5	0.0487	-0.021
3	10 - 15	4.09	20.0	18.4	4.0	0.0801	1.498
4	15 - 20	4.36	20.0	19.4	1.5	0.0220	0.812
5	20 - 22	5.58	20.0	19.0	2.5	0.1392	-1.850
6	22 - 24	Coal Seam					
7	24 - 25	5.20	20.0	19.0	2.5	0.1658	-2.681
8	25 - 30	5.13	20.0	19.0	2.5	0.0790	0.033
9	30 - 35	6.09	20.0	18.6	3.5	0.0668	1.412
10	35 - 40	6.02	20.0	18.6	3.5	0.0190	2.905
11	40 - 45	6.04	20.0	20.0	0.0	0.0300	-0.938
12	45 - 50	5.99	20.0	19.4	1.5	0.0572	-0.289
13	50 - 55	6.18	20.0	20.0	0.0	0.0328	-1.026
14	55 - 60	6.16	20.0	20.0	0.0	0.0000	0.000
15	60 - 65	6.16	20.0	20.2	-0.5	0.0000	-0.500
16	65 - 70	5.77	20.0	19.8	0.5	0.0264	-0.326
17	70 - 75	5.89	20.0	20.0	0.0	0.0006	-0.019

Constant (C) = (ml acid added in blank)/(ml base added in blank
ml acid consumed = (ml acid added) - (ml base added x C
Tons CaCO3 equiv./1000 tons of mat. = acid consumed x 25.0 x (N of acid)
Acid-Base Account = (%Sulfur x -31.25) + Neutralization Potentia

DSM Design Group, LLC

TOTAL SULFUR

Company Name: Birmingham Coal & Coke Co., Inc. Page: 2 of 2
Mine Name: KNIGHT MINE
Sample I.D.: OB/MW-2 Analyzed By: KF
Sample Date: 01/05/12 Date Analyzed: 01/11/12

Test I.D.	Sample Interval	Weight (g)	NaOH (ml)	meq H+/100g (meq)	Sulfur (%)
1	0 - 5	1.9531	1.2	6.1	0.0331
2	5 - 10	2.0035	1.4	7.0	0.0487
3	10 - 15	1.8422	1.6	8.7	0.0801
4	15 - 20	1.8030	1.0	5.5	0.0220
5	20 - 22	1.0942	1.3	11.9	0.1392
6	22 - 24	Coal Seam			
7	24 - 25	1.5016	2.0	13.3	0.1658
8	25 - 30	1.8552	1.6	8.6	0.0790
9	30 - 35	1.7568	1.4	8.0	0.0668
10	35 - 40	1.8565	1.0	5.4	0.0190
11	40 - 45	1.6726	1.0	6.0	0.0300
12	45 - 50	1.3421	1.0	7.5	0.0572
13	50 - 55	1.6311	1.0	6.1	0.0328
14	55 - 60	1.8406	0.8	4.3	0.0000
15	60 - 65	1.7584	0.6	3.4	0.0000
16	65 - 70	1.7282	1.0	5.8	0.0264
17	70 - 75	1.8228	0.8	4.4	0.0006

meq H+/100g = (ml NaOH) x (N NaOH) x (100g/weight of sample)
% S = 0.0185 (meq H+/100g) - 0.0806 (Grube, et al., 1973).

DSM Design Group, LLC

NEUTRALIZATION POTENTIAL AND ACID-BASE ACCOUNT

Company Name: Birmingham Coal & Coke Co., Inc
Mine Name: KNIGHT MINE
Sample I.D.: OB-1
Sample Date: 01/03/12

Analyzed By: KF
Date Analyzed: 01/11/12

Test I.D.	Sample Interval	pH (s.u.)	HCl (ml)	NaOH (ml)	Neuralization Potential	Sulfur (%)	Acid-Base Account
1	0 - 5	6.20	20.0	19.4	1.5	0.0884	-1.263
2	5 - 10	7.07	20.0	19.2	2.0	0.1054	-1.292
3	10 - 15	5.59	20.0	19.6	1.0	0.0556	-0.737
4	15 - 20	5.49	20.0	19.2	2.0	0.1066	-1.332
5	20 - 25	5.41	20.0	19.8	0.5	0.0213	-0.166
6	25 - 30	5.24	20.0	19.4	1.5	0.0730	-0.781
7	30 - 35	5.25	20.0	19.8	0.5	0.0490	-1.030
8	35 - 40	4.95	20.0	19.4	1.5	0.0882	-1.256
9	40 - 45	5.19	20.0	16.4	9.0	0.1758	3.508
10	45 - 50	5.77	20.0	14.8	13.0	0.0263	12.177
11	50 - 55	5.74	20.0	13.6	16.0	0.0000	16.000
12	55 - 60	6.34	20.0	14.4	14.0	0.0227	13.290
13	60 - 65	6.38	20.0	14.0	15.0	0.0000	15.000
14	65 - 70	6.47	20.0	14.0	15.0	0.0000	15.000
15	70 - 75	6.64	20.0	14.0	15.0	0.0000	15.000
16	75 - 79	6.65	20.0	13.0	17.5	0.0000	17.500
17	79 - 81.5	Coal Seam					
18	81.5 - 86	6.59	20.0	18.6	3.5	0.0186	2.920
19	86 - 91	6.65	20.0	18.2	4.5	0.0829	1.909

Constant (C) = (ml acid added in blank)/(ml base added in blank
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Tons CaCO3 equiv./1000 tons of mat. = acid consumed x 25.0 x (N of acid)
Acid-Base Account = (%Sulfur x -31.25) + Neutralization Potentia

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Sample I.D.: OB-1 Analyzed By: KF
Sample Date: 01/03/12 Date Analyzed: 01/11/12

Test I.D.	Sample Interval	Weight (g)	NaOH (ml)	meq H+/100g (meq)	Sulfur (%)
1	0 - 5	1.5325	1.4	9.1	0.0884
2	5 - 10	1.5918	1.6	10.1	0.1054
3	10 - 15	1.3584	1.0	7.4	0.0556
4	15 - 20	1.3833	1.4	10.1	0.1066
5	20 - 25	1.8152	1.0	5.5	0.0213
6	25 - 30	1.4455	1.2	8.3	0.0730
7	30 - 35	1.1423	0.8	7.0	0.0490
8	35 - 40	1.9729	1.8	9.1	0.0882
9	40 - 45	1.4433	2.0	13.9	0.1758
10	45 - 50	1.7301	1.0	5.8	0.0263
11	50 - 55	1.6916	0.2	1.2	0.0000
12	55 - 60	1.7904	1.0	5.6	0.0227
13	60 - 65	1.6444	0.6	3.6	0.0000
14	65 - 70	1.6344	0.4	2.4	0.0000
15	70 - 75	1.6628	0.6	3.6	0.0000
16	75 - 79	1.6803	0.4	2.4	0.0000
17	79 - 81.5	Coal Seam			
18	81.5 - 86	1.8657	1.0	5.4	0.0186
19	86 - 91	1.3576	1.2	8.8	0.0829

meq H+/100g = (ml NaOH) x (N NaOH) x (100g/weight of sample)
% S = 0.0185 (meq H+/100g) - 0.0806 (Grube, et al., 1973).