

## **APPENDIX 2.11**

### **ACID ROCK DRAINAGE ANALYSIS**

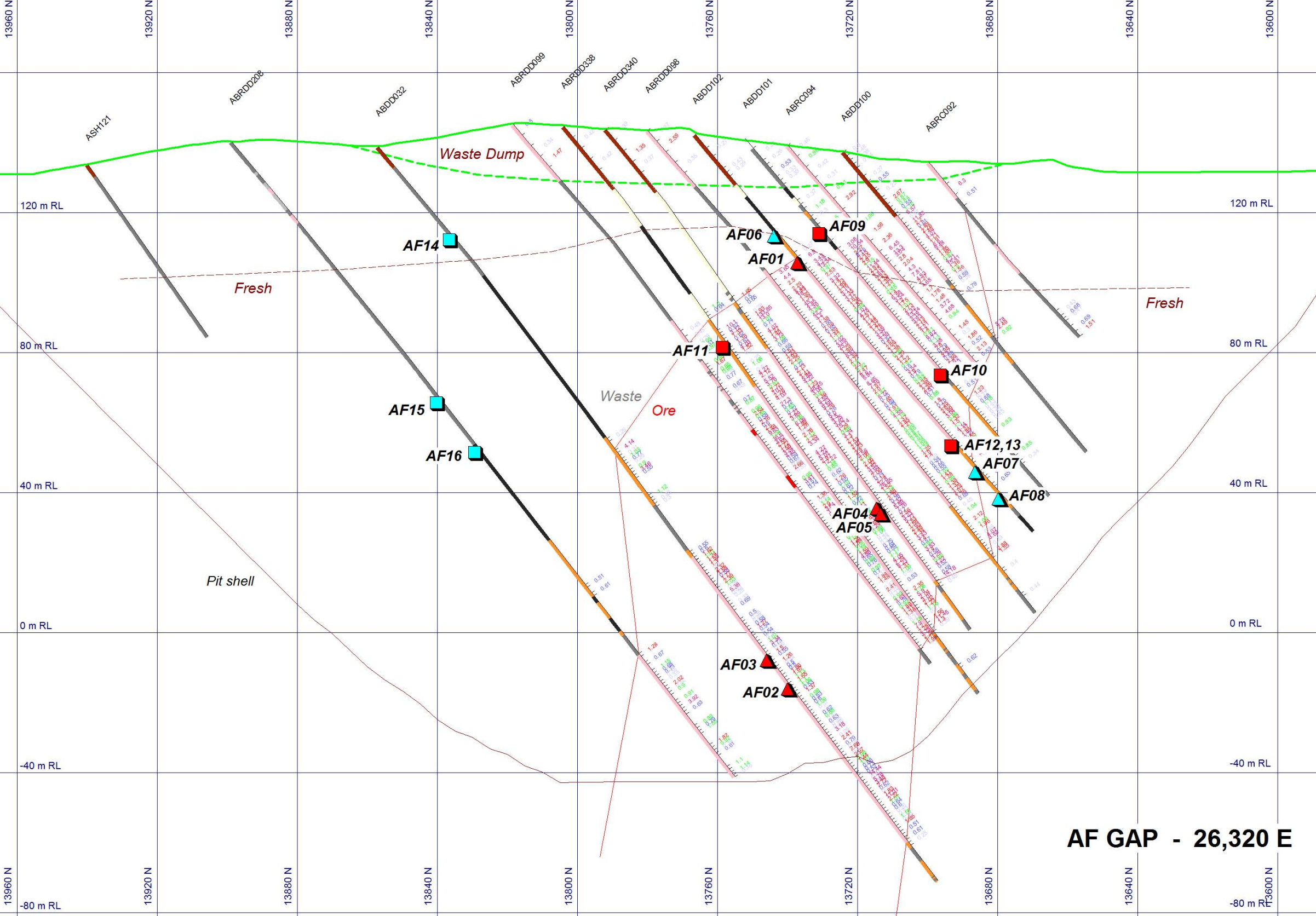
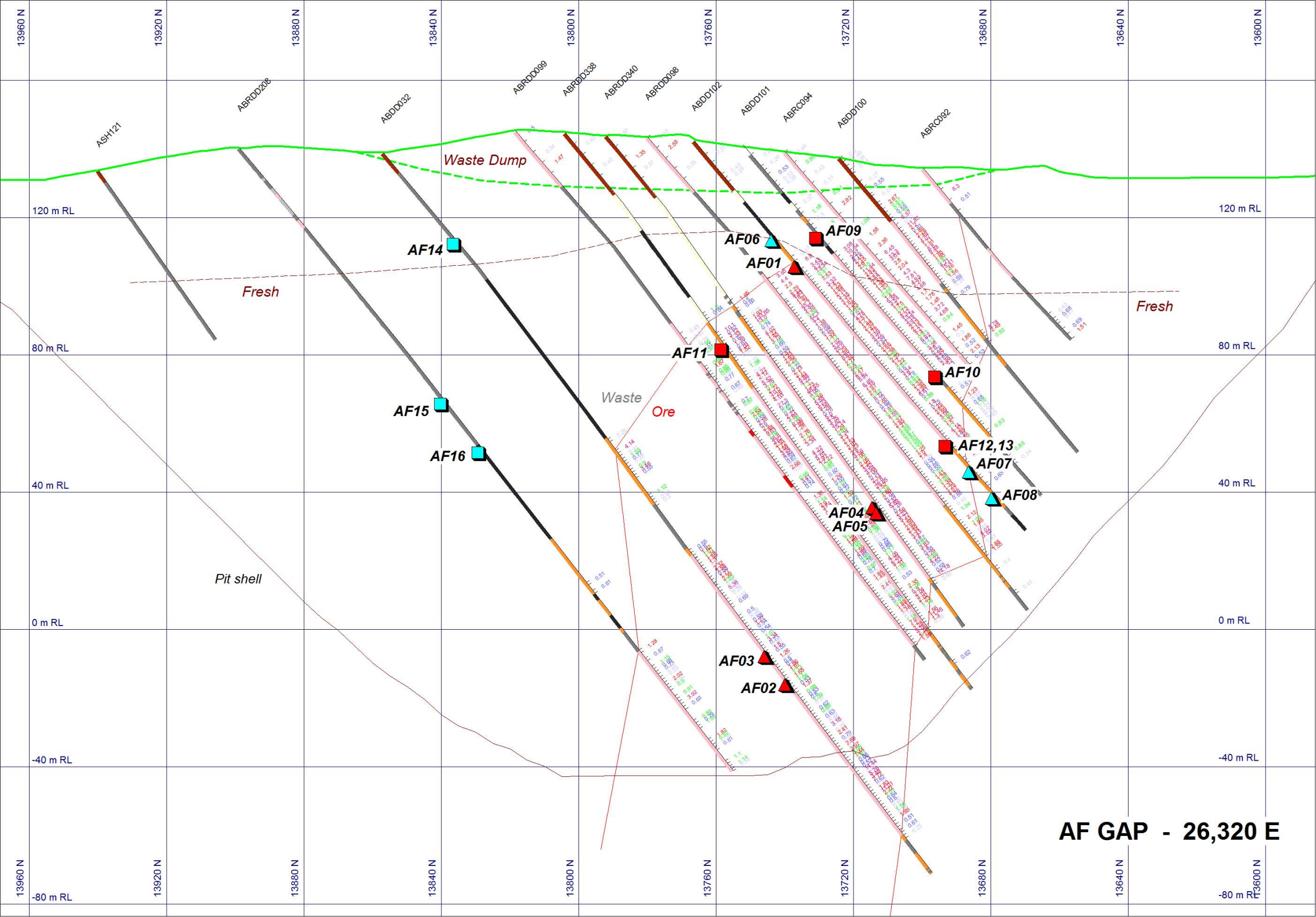
#### **DESCRIPTION OF SAMPLES**

#### **PIT SECTIONS SHOWING SAMPLE POSITION**

**(One Section only – Other available on Request)**

#### **SGS ANALYTICAL REPORT**

**(One page only – Full Report on Request)**



**AF GAP - 26,320 E**



REFERENCE: E001769

### Acid Base Accounting Screening Test

Test information									
Test Method: Modified EPA ABA									
#	1	2	3	4	5	6	7	8	9
Sample ID:	ABDD089(79.96-80.46)	ABDD089(94.28-94.50)	ABPT044(74.26-74.76)	ABDD089(64-64.7)	ABDD089(60.29-60.49)	ABDD163(129.20-129.67)	ABRDD165(129.32-129.80)	ABDD089(83.51-83.76)	ABDD089(80.74-81)
Fizz Rating:	2	2	1	1	2	3	3	1	2
Paste pH:	9.2	10.0	9.6	9.2	9.3	9.8	9.9	9.9	9.4
Sample Weight (g):	2.01	2.00	2.01	2.00	2.00	2.01	3.01	1.99	1.98
Normality HCl (N):	0.111	0.111	0.111	0.111	0.111	0.109	0.109	0.111	0.111
Total HCl added (ml):	33.5	20.0	31.5	20.0	20.0	40.0	40.0	27.3	43.6
Normality NaOH (N):	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Total NaOH added (ml):	14.0	8.0	12.1	8.5	10.5	19.8	18.1	11.3	15.6
NP:	57.0	35.1	56.3	33.8	28.7	58.2	62.5	47.2	82.0
AP:	10.3	0.31	10.9	5.94	1.56	3.44	21.3	1.25	19.4
Net NP:	46.7	34.8	45.3	27.9	27.2	54.8	41.3	45.9	62.7
NP/AP:	5.5	112	5.1	5.7	18.4	16.9	2.9	37.7	4.2
Total S(%):	0.44	0.03	0.40	0.23	0.07	0.17	0.75	0.12	0.81
Sulphide S (%):	0.33	<0.01	0.35	0.19	0.05	0.11	0.68	0.04	0.62
SO <sub>4</sub> (%):	0.35	0.07	0.15	0.10	0.05	0.18	0.22	0.21	0.57
CO <sub>3</sub> (%):	4.08	1.26	2.92	2.08	1.15	2.84	2.93	1.96	3.71

REFERENCE: E001769

### Acid Base Accounting Screening Test

Test information									
Test Method: Modified EPA ABA									
#	10	11	12	13	14	15	16	17	18
Sample ID:	ABRDD165(129.32-129.80)	ABPT044(69.30-69.79)	ABDD089(79.68-79.93)	ABDD089(11.90-12.16)	ABDD089(19.60-19.97)	ABDD013(7-8)	ADD036(213.58-213.87)	ADD074(199.19-119.48)	ADD086(116.3-116.84)
Fizz Rating:	1	2	2	1	1	1	1	1	1
Paste pH:	9.2	9.9	9.4	6.4	6.0	5.1	9.4	9.9	9.2
Sample Weight (g):	2.00	1.99	2.00	2.01	2.01	1.99	1.99	2.00	1.98
Normality HCl (N):	0.111	0.111	0.111	0.111	0.111	0.111	0.109	0.109	0.111
Total HCl added (ml):	35.6	35.1	32.5	20.0	20.0	20	35.3	37.8	20.0
Normality NaOH (N):	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Total NaOH added (ml):	12	14.5	14.0	17.7	18.9	19.1	16.2	15.2	12.5
NP:	68.2	60.7	54.5	10.3	7.27	6.83	55.2	64.2	23.9
AP:	5.31	14.1	6.25	0.31	0.31	0.31	16.9	3.13	6.56
Net NP:	62.9	46.7	48.2	10.0	7.0	6.5	38.3	61.1	17.3
NP/AP:	12.8	4.3	8.7	33.0	23.3	21.9	3.3	20.6	3.6
Total S(%):	0.24	0.53	0.32	<0.01	<0.01	<0.01	0.84	0.17	0.32
Sulphide S (%):	0.17	0.45	0.20	<0.01	<0.01	<0.01	0.54	0.10	0.21
SO4 (%):	0.22	0.26	0.37	<0.03	<0.03	<0.03	0.90	0.21	0.33
CO3 (%):	3.73	2.84	3.33	<0.05	<0.05	<0.05	2.59	3.12	1.23

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### Acid Base Accounting Screening Test

Test information									
Test Method: Modified EPA ABA									
#	19	20	21	22	23	24	25	26	27
Sample ID:	ADD086(139.48-140.00)	ADD036(205.05-205.30)	AKRDD 227(133.48-134)	ADD074(158.8-159.3)	115(114-114.63)	ADD086(126.49-126.99)	ADD115(129-129.54)	ADD074(283.74-284)	AKRC068(78-80)
Fizz Rating:	3	1	1	1	1	1	1	1	1
Paste pH:	9.6	9.4	9.4	9.9	9.7	9.7	9.8	9.9	5.6
Sample Weight (g):	1.98	2.01	2.01	1.98	1.98	2.00	2.01	2.01	2.01
Normality HCl (N):	0.109	0.111	0.109	0.109	0.109	0.109	0.109	0.109	0.109
Total HCl added (ml):	87.3	33.0	45.3	35.1	24.7	38.3	36.4	43.5	20.0
Normality NaOH (N):	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Total NaOH added (ml):	27.6	12.5	19.4	18.6	12.2	17.7	15.8	19.6	12.4
NP:	169	59.4	73.6	48.7	36.6	59.2	58.6	68.2	22.8
AP:	42.2	26.9	31.6	13.8	31.3	5.00	11.6	8.44	9.06
Net NP:	127	32.5	42.0	35.0	5.3	54.2	47	59.8	13.7
NP/AP:	4.0	2.2	2.3	3.5	1.2	11.8	5.1	8.1	2.5
Total S(%):	1.46	1.14	1.15	0.55	1.04	0.28	0.49	0.46	0.45
Sulphide S (%):	1.35	0.86	1.01	0.44	1.00	0.16	0.37	0.27	0.29
SO4 (%):	0.33	0.81	0.41	0.32	0.12	0.37	0.34	0.57	0.47
CO3 (%):	10.2	5.28	3.87	3.47	2.49	3.48	3.16	3.52	1.71

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### Acid Base Accounting Screening Test

Test information									
Test Method: <u>Modified EPA ABA</u>									
#	28	29	30	31	32	33	34	35	36
Sample ID:	AKRC 009(30-32)	ADD 074(6.76-6.87)	AKRC 068 (16-18)	AKRC 065 (18-20)	ADD 118(32.22-32.48)	ADD 007(85.16-85.41)	ADD 118(103.0-103.5)	ADD 065(37-37.55)	ADD(86.59-86.79)
Fizz Rating:	1	1	1	1	3	3	2	2	2
Paste pH:	8.3	5.1	5.9	6.7	9.4	9.9	10.0	9.4	9.9
Sample Weight (g):	1.98	2.00	2.01	2.01	2.01	1.99	1.99	1.99	1.98
Normality HCl (N):	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
Total HCl added (ml):	20.0	20.0	20.0	20.0	29.9	35.7	23.9	40.9	23.5
Normality NaOH (N):	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Total NaOH added (ml):	19.5	19.6	20.1	19.0	14.0	13.2	13.1	15.1	12.6
NP:	4.8	4.5	3.2	6.0	45.5	63.9	31.9	73.3	32.2
AP:	0.31	0.31	0.31	0.31	18.8	0.31	20.6	22.8	10.0
Net NP:	4.5	4.2	2.9	5.7	26.8	63.6	11.3	50.5	22.2
NP/AP:	15.4	14.5	10.3	19.3	2.4	205	1.5	3.2	3.2
Total S(%):	0.01	<0.01	0.01	<0.01	0.65	0.03	0.7	0.92	0.49
Sulphide S (%):	<0.01	<0.01	<0.01	<0.01	0.6	0.01	0.66	0.73	0.32
SO4 (%):	0.04	<0.03	<0.03	<0.03	0.16	0.06	0.09	0.57	0.51
CO3 (%):	0.21	0.06	<0.05	<0.05	2.56	3.93	1.62	4.51	3.05

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### Acid Base Accounting Screening Test

Test information									
Test Method: <u>Modified EPA ABA</u>									
#	37	38	39	40	41	42	43	44	45
Sample ID:	ADD 065(80.63-81.08)	ADD007(104-104.63)	ADD007(76.18-76.84)	ADD065(86.56-87)	ADD065(61.09-61.29)	AKRDD116(8-12)	ADD008(4-57-12.19)	ADD 009(8-8.12)	AKRDD105(3-4)
Fizz Rating:	2	2	3	3	2	1	1	1	1
Paste pH:	10.0	9.7	10.0	10.0	8.3	7.0	5.1	4.2	5.9
Sample Weight (g):	1.99	1.98	1.98	1.98	2.01	1.99	1.99	1.98	2.01
Normality HCl (N):	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
Total HCl added (ml):	33.5	24.3	30.2	35.5	20.0	20.0	20.0	20.0	20.0
Normality NaOH (N):	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Total NaOH added (ml):	14.5	10.6	14.3	15.3	11.6	18.7	19.2	19.5	20
NP:	54.6	39.6	46.3	58.3	24.8	6.8	5.6	4.8	3.5
AP:	21.6	10.6	7.81	5.63	26.3	0.63	0.31	0.31	0.31
Net NP:	33.0	29.0	38.5	52.7	-1.5	6.2	5.3	4.5	3.2
NP/AP:	2.5	3.7	5.9	10.4	0.9	11.0	17.8	15.4	11.1
Total S(%):	0.76	0.47	0.35	0.26	0.87	0.04	<0.01	<0.01	0.02
Sulphide S (%):	0.69	0.34	0.25	0.18	0.84	0.02	<0.01	<0.01	<0.01
SO4 (%):	0.19	0.38	0.29	0.24	0.09	0.09	<0.03	<0.03	0.07
CO3 (%):	3.24	6.09	2.91	3.55	1.38	<0.05	<0.05	<0.05	<0.05



REFERENCE: E001769

<b>Test information</b>
<b>Test Method:</b>
<b>#</b>
<b>Sample ID:</b>
<b>Fizz Rating:</b>
<b>Paste pH:</b>
<b>Sample Weight (g):</b>
<b>Normality HCl (N):</b>
<b>Total HCl added (ml):</b>
<b>Normality NaOH (N):</b>
<b>Total NaOH added (ml):</b>
<b>NP:</b>
<b>AP:</b>
<b>Net NP:</b>
<b>NP/AP:</b>
<b>Total S(%):</b>
<b>Sulphide S (%):</b>
<b>SO4 (%):</b>
<b>CO3 (%):</b>

REFERENCE: E001769

### Acid Base Accounting Screening Test

Test information								
Test Method: Modified EPA ABA								
#	55	56	57	58	59	60	61	62
Sample ID:	ABRDD340(133.0-133.52)	ABRD340(134.7-135.28)	ABDD032(195.0-195.54)	ABDD032(186.10-186.60)	ABDD102(47-48.5)	ARBDD208(92-93)	ABDD102(38.0-39.5)	ABDD032(31.88-31.98)
Fizz Rating:	2	2	2	3	1	1	1	1
Paste pH:	9.6	8.3	9.6	9.8	7.5	2.6	7.2	7.0
Sample Weight (g):	1.99	2.00	1.98	1.99	1.99	1.99	1.99	1.98
Normality HCl (N):	0.109	0.109	0.109	0.109	0.1	0.109	0.109	0.109
Total HCl added (ml):	20.0	20.0	32.0	34.6	20.0	20.0	20.0	20.0
Normality NaOH (N):	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Total NaOH added (ml):	11.6	11.1	13.8	15.5	19.0	20.7	19.1	19.4
NP:	25	26.2	52.5	55	6.1	1.7	5.8	5.1
AP:	11.9	45.9	7.5	2.8	13.1	4.69	0.31	0.31
Net NP:	13.2	-19.7	45	52.2	-7.0	-3.0	5.5	4.8
NP/AP:	2.1	0.6	7.0	19.6	0.5	0.4	18.6	16.3
Total S(%):	0.41	1.51	0.33	0.14	0.47	0.35	0.01	<0.01
Sulphide S (%):	0.38	1.47	0.24	0.09	0.42	0.15	<0.01	<0.01
SO4 (%):	0.06	0.12	0.26	0.16	0.16	0.59	0.04	<0.03
CO3 (%):	1.55	1.58	3.51	3.61	0.52	<0.05	0.15	<0.05

REFERENCE: E001769

### Acid Base Accounting Screening Test

Test information								
Test Method: Modified EPA ABA								
#	63	64	65	66	67	68	69	70
Sample ID:	AABDD101(33.5-35)	FDD038(109.0-109.5)	FBDD008(146.32-146.62)	FDD039(80.0-80.28)	FBDD039(92.42-92.64)	ABDD020(71.63-71.93)	FBDD187.05-187.65)	FBDD039(125.51-126.14)
Fizz Rating:	1	3	2	1	2	1	3	3
Paste pH:	8.2	9.7	9.7	9.3	9.5	7.2	9.9	9.8
Sample Weight (g):	1.99	2.01	1.98	1.98	2.01	1.99	1.98	2.01
Normality HCl (N):	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
Total HCl added (ml):	20.0	40.0	34.2	20.0	23.7	20.0	20.0	29.2
Normality NaOH (N):	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Total NaOH added (ml):	19.2	18.0	13.6	17.1	16.5	21.2	10.1	12.1
NP:	5.6	62.8	59.1	11.0	22.4	0.4	29	48.5
	0.31	2.19	5.94	8.13	1.56	1.25	0.31	4.38
Net NP:	5.3	60.6	53.2	2.9	20.8	-0.8	28.7	44.1
NP/AP:	17.8	28.7	10.0	1.4	14.3	0.40	92.9	11.1
Total S(%):	<0.01	0.15	0.22	0.34	0.09	0.07	0.02	0.23
Sulphide S (%):	<0.01	0.07	0.19	0.26	0.05	0.04	0.01	0.14
SO4 (%):	<0.03	0.26	0.09	0.26	0.13	0.10	0.04	0.25
CO3 (%):	<0.05	3.93	4.33	0.50	1.35	0.18	1.89	2.79

REFERENCE: E001769

### Acid Base Accounting Screening Test

Test information									
Test Method: Midified EPA ABA									
#	71	72	73	74	75	76	77	78	79
Sample ID:	FBDD038(84.16-84.72)	FBDD038(123.13-123.38)	FBDD008(193.58-193.86)	FBDD008(192.46-192.76)	FBDD039(156.12-156.7)	FBDD009(32.0-33.21)	FBDD(25.91-26.90)	FBDD039(11-12.5)	AFRC012(32-36)
Fizz Rating:	1	3	2	2	3	1	1	1	1
Paste pH:	10.0	10.2	9.6	9.3	9.9	7.5	7.3	5.2	7.1
Sample Weight (g):	1.98	2	2.01	1.98	2.0	1.98	1.98	1.99	2.00
Normality HCl (N):	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
Total HCl added (ml):	20.0	23.7	45.7	51.9	35.1	20.0	20.0	20.0	20.0
Normality NaOH (N):	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Total NaOH added (ml):	11.1	10	15.8	9.8	16.0	19.6	19.6	19.2	18.9
NP:	26.5	39.1	83.8	118	54.8	4.6	4.6	5.6	6.3
AP:	4.38	0.31	15.3	50.3	9.06	0.31	0.31	0.31	0.31
Net NP:	22.1	38.8	68.5	67.3	45.8	4.3	4.3	5.3	6.0
NP/AP:	6.0	125	5.5	2.3	6.1	14.6	14.6	17.8	20.2
Total S(%):	0.25	<0.01	0.58	1.93	0.42	<0.01	<0.01	<0.01	<0.01
Sulphide S (%):	0.14	<0.01	0.49	1.61	0.29	<0.01	<0.01	<0.01	<0.01
SO4 (%):	0.33	<0.03	0.29	0.97	0.41	<0.03	<0.03	<0.03	<0.03
CO3 (%):	1.36	2.55	6.28	9.33	3.16	0.22	<0.05	<0.05	<0.05