

HPP-RM-20141023

A14-08392

Acid-Base Accounting and Toxicity Characterization Leach Procedure Report

Prepared for: Tata Steel

Prepared by: Activation Laboratories Ltd.

A total of 52 samples were submitted in batches of 43 and 9 samples for Acid Base Accounting (modified Sobek) and Toxicity Characterization Leach Procedure (EPA 1311) for inorganic analytes.

Results of Acid-Base Accounting

Paste pH, measured in a mixture of deionized water and pulverized samples, ranged from 5.7 to 8.5. 62% of the samples prior to analysis are acidic, with a paste pH less than 7.0.

Classical acid-base accounting is based on the use of total sulphur to estimate acid generating potential (AP), results which ranged from below detection, <0.01% to 0.06%. Potential acidity for the samples is very low according to low total S concentrations.

Modified Sobek Neutralization Potential (NP) ranged from -1 kg CaCO₃ equivalent/tonne to a maximum of 17 kg/t, with mean and median values of 0.8 and 0.2 kg/t.

The Acid Potential (AP) ranged from 0 to 2 kg CaCO₃ equivalent/tonne, with mean and median values of 0.4 and 0.1 kg/t.

The Net Neutralization Potential (NNP) ranged from -2.6 to 15.6, and samples can be classified according to the following (ASTM E1915):

Table 1: Classifications

Classification	Specifications
Highly Acidic	$NNP \leq -10$
Acidic	$-10 < NNP \leq -2$
Slightly Acidic	$-2 < NNP \leq -0.2$
Neutral	$-0.2 < NNP \leq 0.2$ and $AP \leq -0.2$ or $NP \geq 0.2$
Inert	$-0.2 < NNP \leq 0.2$ and $AP > -0.2$ or $NP < 0.2$
Slightly Basic	$0.2 \geq NNP < 2.0$
Basic	$2.0 \geq NNP < 10$
Highly Basic	$NNP \geq 10$

Table 2: Sample Classification

Sample ID	Classification
HW-DD14-19 34.5 - 36	Basic
HW-DD14-19 52.5 - 54	Slightly Basic
HW-DD14-19 70.5 - 72	Neutral
HW-DD14-21 157.5 - 159	Slightly Basic
HW-DD14-23 69.41 - 69.52	Slightly Basic
HW-DD14-24 53.8 - 53.94	Slightly Basic
HW-DD14-24 81 - 82.5	Slightly Acidic
HW-DD14-25 30.6 - 30.76	Inert
HW-DD14-25 78.8 - 79	Slightly Acidic
HW-DD14-25 81.9 - 82	Slightly Basic
HW-DD14-26 43.8 - 43.96	Acidic
HW-DD14-26 57.1 - 57.24	Slightly Acidic
HW-DD14-27B 114.2 - 114.33	Slightly Basic
HW-DD14-28 35.28 - 35.4	Slightly Acidic
HW-DD14-28 67.5 - 67.64	Neutral
HW-DD14-29 12 - 13.5	Slightly Basic
HW-DD14-29 22.5 - 24	Neutral
HW-DD14-29 35.5 - 36	Slightly Basic
HW-DD14-29 45 - 46.5	Slightly Acidic
HW-DD14-29 69 - 70.5	Inert
HW-DD14-29 81 - 82.5	Slightly Acidic
HW-DD14-29 84 - 85.5	Slightly Acidic
HW-DD14-29 106.5 - 107	Slightly Acidic
HW-DD14-29 118.5 - 120	Slightly Basic
HW-DD14-30 31.6 - 31.71	Slightly Acidic
HW-DD14-30 50.2 - 50.32	Acidic
HW-DD14-31 15 - 16.6	Basic

Sample ID	Classification
HW-DD14-31 28.5 - 30	Slightly Acidic
HW-DD14-31 66 - 67.5	Slightly Basic
HW-DD14-31 70.5 - 72	Slightly Acidic
HW-DD14-31 109.5 - 111	Slightly Acidic
HW-DD14-32 52.5 - 54	Slightly Acidic
HW-DD14-32 84 - 85.5	Inert
HW-DD14-33 33 - 34.5	Inert
HW-DD14-33 48 - 49.5	Slightly Acidic
HW-DD14-34 18.3 - 18.46	Highly Basic
HW-DD14-34 64.5 - 64.67	Slightly Basic
HW-DD14-34 96.2 - 96.37	Inert
HW-DD14-35 31.13 - 31.29	Basic
HW-DD14-35 45.21 - 45.36	Inert
HW-DD14-35 69 - 69.16	Slightly Acidic
HW-DD14-35 90.77 - 90.99	Slightly Basic
HW-DD14-35 94 - 94.14	Inert
1345228 (1)	Inert
236522	Slightly Acidic
236537	Slightly Basic
236561	Slightly Basic
1329983	Inert
1330762+1330763	Slightly Basic
1330786+1330787	Slightly Basic
1345437	Slightly Acidic
1345306	Inert

Figure 1: Paste pH vs. Modified Sobek neutralization Potential

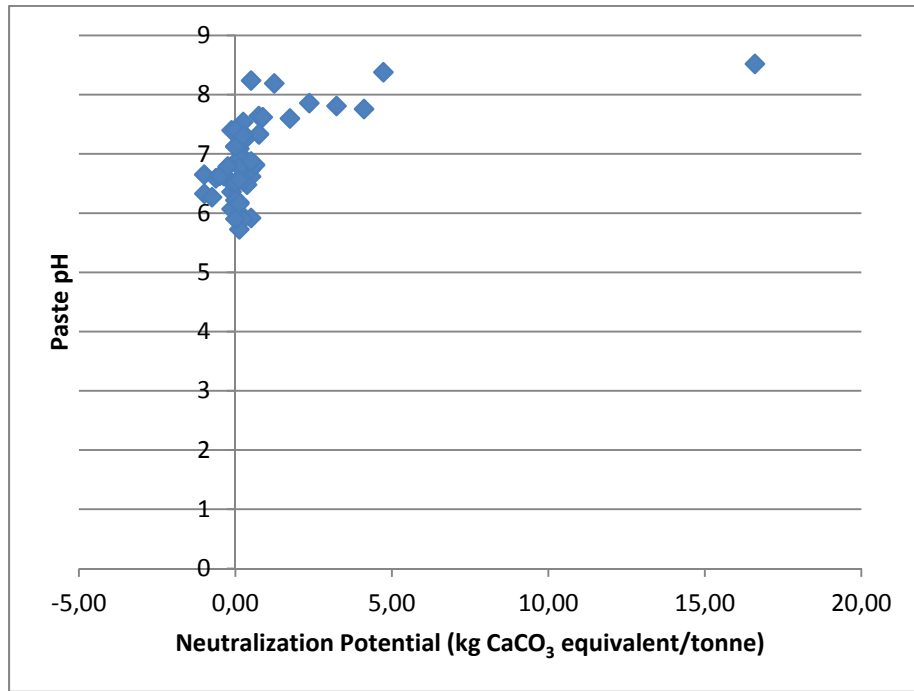


Figure 2 HCl-leachable sulphate vs total sulphur:

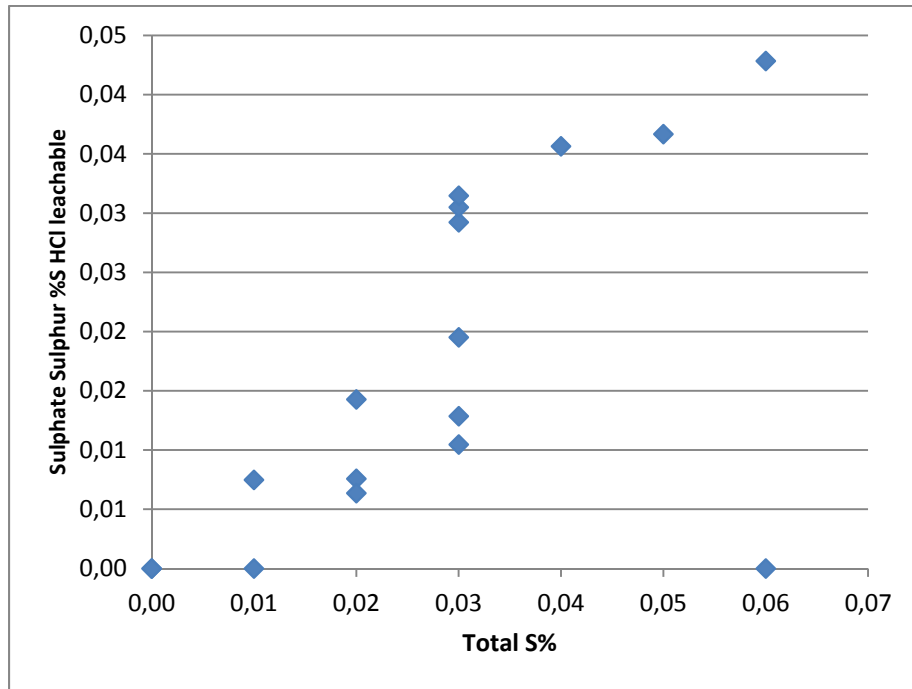


Table 3:

Acid-base accounting sample results (pH > 7 highlighted in green, pH<7 highlighted in red)

Analyte Symbol	AP	NNP	NP		Fizz Rating	Volume HCl	Volume NaOH
Analyte Name	Acid Potential	Net Neutralization Potential	Neutralization Potential	Paste pH		0.10 N	0.50 N
						(mL)	(mL)
Unit Symbol	kg CaCO ₃ /t	no units	kg CaCO ₃ /t	no units			
Total Samples				43			
Acidic Count				25			
% samples acidic				58%			
min	0	-2.620	-1.0	5.9			
max	2	15.600	16.6	8.5			
mean	0.4	0.467	0.9	7.0			
median	0.0	-0.063	0.2	6.8			
HW-DD14-19 34.5 - 36	0.625	4.1	4.73	8.38	None	4.40	0.50
HW-DD14-19 52.5 - 54	0	1.24	1.24	8.19	None	3.50	0.60
HW-DD14-19 70.5 - 72	0.625	0.121	0.746	7.64	None	2.30	0.40
HW-DD14-21 157.5 - 159	0	0.498	0.498	8.24	None	3.20	0.60
HW-DD14-23 69.41 - 69.52	0	1.74	1.74	7.60	None	3.20	0.50
HW-DD14-24 53.8 - 53.94	0	0.249	0.249	7.54	None	2.60	0.50
HW-DD14-24 81 - 82.5	0.938	-0.813	0.125	6.81	None	2.30	0.45
HW-DD14-25 30.6 - 30.76	0	-0.124	-0.124	7.40	None	2.20	0.45
HW-DD14-25 78.8 - 79	0.313	-0.437	-0.124	6.36	None	3.20	0.65
HW-DD14-25 81.9 - 82	0	0.498	0.498	6.62	None	3.20	0.60
HW-DD14-26 43.8 - 43.96	1.56	-2.19	-0.623	6.59	None	3.00	0.65
HW-DD14-26 57.1 - 57.24	0.938	-1.06	-0.125	6.52	None	3.20	0.65
HW-DD14-27B 114.2 - 114.33	0	0.374	0.374	6.48	None	2.40	0.45
HW-DD14-28 35.28 - 35.4	0.938	-0.813	0.125	7.09	None	1.80	0.35

Analyte Symbol	AP	NNP	NP		Fizz Rating	Volume HCl	Volume NaOH
Analyte Name	Acid Potential	Net Neutralization Potential	Neutralization Potential	Paste pH		0.10 N	0.50 N
						(mL)	(mL)
Unit Symbol	kg CaCO3/t	no units	kg CaCO3/t	no units			
Total Samples				43			
Acidic Count				25			
% samples acidic				58%			
min	0	-2.620	-1.0	5.9			
max	2	15.600	16.6	8.5			
mean	0.4	0.467	0.9	7.0			
median	0.0	-0.063	0.2	6.8			
HW-DD14-28 67.5 - 67.64	0.313	-0.063	0.25	5.94	None	5.10	1.00
HW-DD14-29 12 - 13.5	0.625	1.74	2.36	7.86	None	8.70	1.55
HW-DD14-29 22.5 - 24	0.938	-0.189	0.749	7.34	None	1.80	0.30
HW-DD14-29 35.5 - 36	0	0.249	0.249	6.94	None	2.10	0.40
HW-DD14-29 45 - 46.5	0	-0.999	-0.999	6.65	None	2.10	0.50
HW-DD14-29 69 - 70.5	0.313	-0.188	0.124	6.18	None	3.80	0.75
HW-DD14-29 81 - 82.5	1.25	-0.627	0.623	6.81	None	2.50	0.45
HW-DD14-29 84 - 85.5	0	-0.995	-0.995	6.33	None	2.60	0.60
HW-DD14-29 106.5 - 107	0.938	-0.688	0.249	6.54	None	2.60	0.50
HW-DD14-29 118.5 - 120	0	0.498	0.498	6.74	None	2.20	0.40
HW-DD14-30 31.6 - 31.71	0.938	-0.938	0	7.13	None	2.50	0.50
HW-DD14-30 50.2 - 50.32	1.88	-2.62	-0.747	6.27	None	2.70	0.60
HW-DD14-31 15 - 16.6	0.625	3.49	4.11	7.76	None	10.40	1.75
HW-DD14-31 28.5 - 30	0.625	-0.251	0.374	7.28	None	1.90	0.35
HW-DD14-31 66 - 67.5	0	0.748	0.748	7.33	None	1.80	0.30
HW-DD14-31 70.5 - 72	0.938	-0.563	0.374	6.84	None	1.90	0.35
HW-DD14-31 109.5 - 111	0	-0.374	-0.374	6.63	None	2.10	0.45
HW-DD14-32 52.5 - 54	0.625	-1.12	-0.5	6.63	None	2.80	0.60

Analyte Symbol	AP	NNP	NP		Fizz Rating	Volume HCl	Volume NaOH
Analyte Name	Acid Potential	Net Neutralization Potential	Neutralization Potential	Paste pH		0.10 N	0.50 N
						(mL)	(mL)
Unit Symbol	kg CaCO3/t	no units	kg CaCO3/t	no units			
Total Samples				43			
Acidic Count				25			
% samples acidic				58%			
min	0	-2.620	-1.0	5.9			
max	2	15.600	16.6	8.5			
mean	0.4	0.467	0.9	7.0			
median	0.0	-0.063	0.2	6.8			
HW-DD14-32 84 - 85.5	0	0.125	0.125	6.93	None	1.80	0.35
HW-DD14-33 33 - 34.5	0	0	0	7.41	None	2.00	0.40
HW-DD14-33 48 - 49.5	0.625	-0.501	0.124	6.78	None	2.30	0.45
HW-DD14-34 18.3 - 18.46	0.938	15.6	16.6	8.52	None	13.40	1.35
HW-DD14-34 64.5 - 64.67	0	0.623	0.623	6.82	None	1.50	0.25
HW-DD14-34 96.2 - 96.37	0	-0.125	-0.125	6.07	None	5.70	1.15
HW-DD14-35 31.13 - 31.29	0	3.23	3.23	7.81	None	8.80	1.50
HW-DD14-35 45.21 - 45.36	0	0	0	6.52	None	2.00	0.40
HW-DD14-35 69 - 69.16	0	-0.249	-0.249	6.79	None	1.90	0.40
HW-DD14-35 90.77 - 90.99	0	0.871	0.871	7.62	None	5.60	1.05
HW-DD14-35 94 - 94.14	0	0	0	6.22	None	5.00	1.00
1345228	0.25	-0.13	0.12	6.16	None	1.30	0.25
236522	0.66	-0.66	0.00	7.12	None	1.50	0.30
236537	0.19	0.31	0.50	6.87	None	1.20	0.20
236561	0.00	0.25	0.25	7.31	None	1.60	0.30
1329983	0.13	0.00	0.12	6.56	None	1.30	0.25
1330762+1330763	0.00	0.50	0.50	5.92	None	1.20	0.20
1330786+1330787	0.00	0.25	0.25	5.90	None	1.60	0.30

Analyte Symbol	AP	NNP	NP		Fizz Rating	Volume HCl	Volume NaOH
Analyte Name	Acid Potential	Net Neutralization Potential	Neutralization Potential	Paste pH		0.10 N (mL)	0.50 N (mL)
Unit Symbol	kg CaCO3/t	no units	kg CaCO3/t	no units			
Total Samples				43			
Acidic Count				25			
% samples acidic				58%			
min	0	-2.620	-1.0	5.9			
max	2	15.600	16.6	8.5			
mean	0.4	0.467	0.9	7.0			
median	0.0	-0.063	0.2	6.8			
1345437	0.44	-0.31	0.12	5.73	None	1.30	0.25
1345306	0.00	0.00	0.00	5.90	None	3.00	0.60

Sulphur Speciation

Both total sulphur and acid soluble sulphate sulphur using HCl leach were performed with the following results.

There are very low concentrations of total sulphur, reporting limit is 0.01%, estimated error at this limit is $\pm 100\%$.

Table 4: Sulphur Speciation results

Analyte Symbol	Total S	S-SO4(HCl)
Analyte Name	Total Sulphur	Acid Soluble S
Unit Symbol	%	
HW-DD14-19 34.5 - 36	0.02	< 0.01
HW-DD14-19 52.5 - 54	< 0.01	< 0.01

Analyte Symbol	Total S	S-SO4(HCl)
Analyte Name	Total Sulphur	Acid Soluble S
Unit Symbol	%	
HW-DD14-19 70.5 - 72	0.02	0.01
HW-DD14-21 157.5 - 159	< 0.01	< 0.01
HW-DD14-23 69.41 - 69.52	< 0.01	0.01
HW-DD14-24 53.8 - 53.94	< 0.01	< 0.01
HW-DD14-24 81 - 82.5	0.03	0.03
HW-DD14-25 30.6 - 30.76	< 0.01	< 0.01
HW-DD14-25 78.8 - 79	0.01	0.01
HW-DD14-25 81.9 - 82	< 0.01	0.01
HW-DD14-26 43.8 - 43.96	0.05	0.04
HW-DD14-26 57.1 - 57.24	0.03	< 0.01
HW-DD14-27B 114.2 - 114.33	< 0.01	< 0.01
HW-DD14-28 35.28 - 35.4	0.03	0.03
HW-DD14-28 67.5 - 67.64	0.01	< 0.01
HW-DD14-29 12 - 13.5	0.02	< 0.01
HW-DD14-29 22.5 - 24	0.03	0.03
HW-DD14-29 35.5 - 36	< 0.01	< 0.01
HW-DD14-29 45 - 46.5	< 0.01	0.02
HW-DD14-29 69 - 70.5	0.01	< 0.01
HW-DD14-29 81 - 82.5	0.04	0.04
HW-DD14-29 84 - 85.5	< 0.01	< 0.01
HW-DD14-29 106.5 - 107	0.03	0.01
HW-DD14-29 118.5 - 120	< 0.01	< 0.01
HW-DD14-30 31.6 - 31.71	0.03	< 0.01
HW-DD14-30 50.2 - 50.32	0.06	0.04
HW-DD14-31 15 - 16.6	0.02	< 0.01
HW-DD14-31 28.5 - 30	0.02	0.01

Analyte Symbol	Total S	S-SO4(HCl)
Analyte Name	Total Sulphur	Acid Soluble S
Unit Symbol	%	
HW-DD14-31 66 - 67.5	< 0.01	< 0.01
HW-DD14-31 70.5 - 72	0.03	0.01
HW-DD14-31 109.5 - 111	< 0.01	< 0.01
HW-DD14-32 52.5 - 54	0.02	< 0.01
HW-DD14-32 84 - 85.5	< 0.01	< 0.01
HW-DD14-33 33 - 34.5	< 0.01	< 0.01
HW-DD14-33 48 - 49.5	0.02	0.01
HW-DD14-34 18.3 - 18.46	0.03	0.02
HW-DD14-34 64.5 - 64.67	< 0.01	0.01
HW-DD14-34 96.2 - 96.37	< 0.01	< 0.01
HW-DD14-35 31.13 - 31.29	< 0.01	< 0.01
HW-DD14-35 45.21 - 45.36	< 0.01	< 0.01
HW-DD14-35 69 - 69.16	< 0.01	< 0.01
HW-DD14-35 90.77 - 90.99	< 0.01	< 0.01
HW-DD14-35 94 - 94.14	< 0.01	< 0.01
1345228	< 0.01	< 0.01
236522	0.02	< 0.01
236537	< 0.01	< 0.01
236561	< 0.01	< 0.01
1329983	< 0.01	< 0.01
1330762+1330763	< 0.01	< 0.01
1330786+1330787	< 0.01	< 0.01
1345437	0.01	< 0.01
1345306	< 0.01	< 0.01

Results of TCLP

Table 5: TCLP Results

Analysis for Hg performed using cold-vapour AA, Fluoride, nitrite and nitrate using ion chromatography, and all other results using ICP-OES.

Estimated error at reporting limit is $\pm 100\%$.

Other than nitrate/nitrite, no significant concentrations were detected.

	Ag	As	B	Ba	Cd	Cr	Hg	Pb	Se	U	F	NO2 (as N)	NO3 (as N)
	Silver	Arsenic	Boron	Barium	Cadmium	Chromium	Mercury	Lead	Selenium	Uranium	Fluoride	Nitrite	Nitrate
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ng/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
HW-DD14-19 34.5 - 36	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-19 52.5 - 54	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	10.2
HW-DD14-19 70.5 - 72	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-21 157.5 - 159	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-23 69.41 - 69.52	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-24 53.8 - 53.94	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-24 81 - 82.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-25 30.6 - 30.76	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-25 78.8 - 79	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-25 81.9 - 82	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-26 43.8 - 43.96	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-26 57.1 - 57.24	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-27B 114.2 - 114.33	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-28 35.28 - 35.4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-28 67.5 - 67.64	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1

	Ag	As	B	Ba	Cd	Cr	Hg	Pb	Se	U	F	NO2 (as N)	NO3 (as N)
	Silver	Arsenic	Boron	Barium	Cadmium	Chromium	Mercury	Lead	Selenium	Uranium	Fluoride	Nitrite	Nitrate
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ng/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
HW-DD14-29 12 - 13.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-29 22.5 - 24	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-29 35.5 - 36	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-29 45 - 46.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-29 69 - 70.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-29 81 - 82.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-29 84 - 85.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-29 106.5 - 107	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-29 118.5 - 120	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-30 31.6 - 31.71	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-30 50.2 - 50.32	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-31 15 - 16.6	< 0.1	< 0.1	< 0.1	0.7	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-31 28.5 - 30	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-31 66 - 67.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-31 70.5 - 72	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-31 109.5 - 111	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-32 52.5 - 54	< 0.1	< 0.1	0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-32 84 - 85.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-33 33 - 34.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-33 48 - 49.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-34 18.3 - 18.46	< 0.1	< 0.1	< 0.1	0.5	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-34 64.5 - 64.67	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-34 96.2 - 96.37	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-35 31.13 - 31.29	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-35 45.21 - 45.36	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1

	Ag	As	B	Ba	Cd	Cr	Hg	Pb	Se	U	F	NO2 (as N)	NO3 (as N)
	Silver	Arsenic	Boron	Barium	Cadmium	Chromium	Mercury	Lead	Selenium	Uranium	Fluoride	Nitrite	Nitrate
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ng/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
HW-DD14-35 69 - 69.16	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	16.7
HW-DD14-35 90.77 - 90.99	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
HW-DD14-35 94 - 94.14	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
1345228	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	1.1	28.8
236522	< 0.1	< 0.1	0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	1.48	14.8
236537	< 0.1	< 0.1	0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	1.14	23.1
236561	< 0.1	< 0.1	0.1	0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	30.5
1329983	< 0.1	< 0.1	0.2	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	1.56	13.6
1330762+1330763	< 0.1	< 0.1	0.2	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	30.7
1330786+1330787	< 0.1	< 0.1	0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	< 1
1345437	< 0.1	< 0.1	0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	2.56	31.6
1345306	< 0.1	< 0.1	0.1	< 0.1	< 0.01	< 0.1	< 6	< 0.1	< 0.1	< 1	< 1	< 1	30.5

Conclusions

From the ABA analysis, the maximum acid potential result was 2 kg CaCO₃/t, indicating the samples are not acid generating.

From the sample classifications, 4% of the samples are acidic, 33% are slightly acidic, 6% are neutral, 19% are inert, 31% are slightly basic, 6% are basic, and 2% are highly basic.

From the TCLP analysis, other than nitrate/nitrite, no significant concentrations were detected.