J Mine Waste

J1 Geochemical Report

J2 Alpha Coal Tailings Storage Facility — Concept Design Report

HANCOCK PROSPECTING PTY LTD

Alpha Coal Project Environmental Impact Statement

J1 Geochemical Report

Geochemical Characterisation of the Alpha Project

Report prepared by

SRK Consulting

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Geochemical Characterisation
of the Alpha Project
HCK002

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Executive Summary

Background

A geochemical assessment of materials from the Alpha Project was undertaken. Tests were conducted to determine potential for:

- Release of salinity
- Generation of acid and metalliferous drainage (AMD)
- Dispersivity.

Sample of overburden, raw coal and coal tailings were tested.

The Alpha Coal Project is a thermal coal deposit within the Galilee Basin located approximately 150 km west north-west of Emerald in Queensland. The Project is expected to generate 41 million tonnes per annum (Mtpa) Run of Mine (ROM) coal generating 30 Mtpa of product coal from an open cut pit with a projected 30 year life of mine.

The open pit will cover an area of approximately 24 km by 7 km and the total mined overburden volume is expected to approximate over 16 billion tonnes over a 30-year mine life. That is, approximately 530 million tonnes per year. In addition to the overburden, coal reject material will be generated by the Project. Coal reject material is segregated into two categories, coarse reject and tailings.

Sample selection

Samples were selected to represent material categorised according to:

1 Lithology.

2 State of weathering (fresh or weathered).

3 Location in relation to a coal seam (e.g. coal, roof and floor, overburden/interburden, tailings).

Samples of similar lithology were allocated to one of five lithology groups. The five groups were Carbonaceous, Sand and Gravel, Clay and Soil, Coal and Remainder (Rem).

Overburden samples collected from within the pit shell of the Project were from five lithology groups which, based on the lithological logging, are likely to represent more than 90% of the overburden. Coal samples were collected from economic coal seams and likely uneconomic coal seams and represent coal material that may be stockpiled or remain in the pit. Prepared coal tailings were characterised as were samples collected from the roof and floor regions adjacent to the coal seams. A total 277 samples were collected from 35 drillholes. In addition, samples collected for coal quality assessment and the Alpha Test Pit investigation were assessed.

Samples for geochemical characterisation were collected from drillholes at variable spacing over the pit area with spacings from 300 m to 5000 m. An approximate average for the North South drill spacing was 4000 m and an approximate average for the east west spacing was 1000 m. This information complimented more intensive existing drill hole information used to generate the geological model for the Alpha Project.

Conclusions

Composition of waste material

As a portion of the total mass of waste the lithology groups were Rem 63%, Clay and Soil 24%, Sand and Gravel 10% and Carbonaceous was 3%.

Acidity, Salinity and Potential AMD

The potential for acid generation was initially assessed using the conservative NPR and AMIRA methods and there was general agreement in the sample classification using the two schemes. However, a significant

number of PAF and UC samples had total sulphur contents of less than 0.1% and therefore had the potential to produce a maximum of 3 kg(H_2SO_4)/t acid. They were considered as a very low risk of contributing to acid production.

NAF material or material classed as very low risk of contributing to acid production made up 90.4% of the total mass of the waste. A further 3.9% was classed as UC and therefore, 5.7% of the waste was classed as PAF. Of the 5.7% classed as PAF material, 1.1% was from the Carbonaceous group, 3.8% was Rem and 0.8% was Clay and Soil.

As the Carbonaceous material made up a relatively small fraction of the total mass of waste the fraction of the Carbonaceous material that was PAF and not very low risk was relatively high (35% compared with 6% for the Rem material).

The majority of the coal roof and floor and coarse and fine washery waste samples were PAF. Significant fractions of Carbonaceous and Rem roof and floor materials were also UC or PAF. Therefore, the roof and floor materials should be kinetically tested to further quantify their potential effects on water quality and consideration should be given to strategically mining and managing these materials to control their impact on drainage waters.

Metal Solubility

Simple leach tests were carried out on 75 samples at a solid to liquid ratio of 1:3 over a period of 24 hours (Price, 2009). On the basis of simple leach extraction test results, waters contacting the overburden and interburden waste were generally expected to remain circum neutral. Salinity release (probably sourced from contained pore water) would be expected to occur over the short term (as a short term flush) but would be expected to diminish in the longer term.

While the leach extraction test results cannot be used to directly estimate the water quality that would be released from the mine waste materials, the results can be used to indentify solutes that could potentially be released at significant concentrations.

Although 16 samples contained solutes that exceeded ANZECC (2000) stock water guideline values the majority of these were for only 1 or 2 samples. Guideline values for Al, As, Cd, Co, F, and SO_4 were exceeded once (in separate samples), Ni exceeded the guideline value in two samples and Se in eight samples. For the few samples where guideline values were exceeded a higher concentration was exhibited from the overburden and interburden than from the roof and floor, coal and coal washery waste.

Dispersivity

The fresh carbonaceous mudstone, shale and sandstones were generally non-dispersive, but when weathered do show slightly dispersive behaviour.

The clay and soils were dispersive, with all samples giving dispersive or slightly dispersive results.

The coal and washery waste materials were generally nondispersive, but one sample (sooty coal) did give a dispersive result.

The Rem group was examined for each rock type. The claystone, mudstone and siltstone showed a large variability in dispersivity results for both weathered and fresh rock, with approximately equal numbers of samples showing dispersive, slightly and non-dispersive results. The sandstones and tuffs showed a lower potential for dispersion, with samples showing mostly non-dispersive behaviour, but with some slightly dispersive results.

Material Sampling

ANC

Experimental variography shows spatial correlation from 5000 m to 7000 m in all groups except the Fresh carbonaceous group. This indicates that current spacing is probably adequate for interpolation or extrapolation of ANC values at un-sampled locations for all groups except the fresh carbonaceous.

Sample spacing for ANC within the coal is adequate as the omnidirectional model range is approximately equal to the north south sample spacing of 5000 m and therefore probably suitable for interpolating total S values at locations not sampled.

Total S

Statistical and experimental variogram studies showed that for total S:

- Of the overburden wastes the fresh Carbonaceous and fresh Rem materials had the highest total S contents.
- Sample spacing in the coal was adequate (spacing was about 1000 m) for interpolating total S values at unsampled locations.
- For the fresh materials (excluding coal) considered together, the current sample spacing in the east west direction may be sufficient but because the total S is highly variable over short distances the sample spacing in the north south direction is probably too wide to interpolate values at unsampled locations.
- In the overall weathered, fresh Rem and the fresh Carbonaceous materials current drill spacing is insufficient to interpolate or extrapolate total S values at unsampled locations. Thus, the most representative value at an unknown location is the average total S value.

Although sample spacing may be too large to interpolate total S values at unsampled locations in some materials, statistical analysis of the total S content of all samples showed for a mining block of 100 x 100 x 2 m that:

- The probability of a block of fresh carbonaceous material having an average total S content greater than 0.3 wt% (i.e. approximately the average crustal abundance of S) was only 6% and
- For the fresh Rem material its was <1%. For fresh Rem there was also <1% chance of the average total S content of block being greater than 0.1 wt%.

Kinetic Columns

Kinetic leach columns were operated for coal and coarse/fine reject samples as bulk materials may represent some tangible risk of acid generation at the Alpha Project and will need to be well managed. Five samples comprising three samples of coarse reject, one sample of blended raw coal and a composite sample of fine tailings. The columns have been operated over a period of eight weeks to date although laboratory results are currently only available for five weeks. Initial indications from test work to date may be summarised as follows:

- Acid generation is occurring from coarse reject samples DLL_S1.60+0.25 and DU_S1.60+0.250 mm which have acidic leachate at pH 3.6 and pH 4.4 respectively.
- The pH of the leachate from the remaining columns is in the near neutral to mildly acidic range between pH 5.3 and 6.
- The concentration of sulphate from the coarse rejects columns has declined from greater than 300 mg/L to around 100 mg/L.
- The sulphate concentration in the leachates from the fine tailings is erratic ranging between 12 and 254 mg/L.

These data provide an initial indication of the materials characteristics. This and data obtained from continued column operation will be used to assess depletion rates of acid forming and acid neutralising materials. These rates and and site conditions would subsequently be used in predictions of water quality for the site.

Recommendations

Based on the information currently available:

- The majority of overburden could be managed as non-acid forming material. However, there is potential for existing salinity to be washed from the overburden in response to rainfall events. Consequently, containment of run-off and water quality monitoring may be required depending on the sensitivity of ground and surface water to salinity. The results indicate that water quality predictions for the disturbed mine waste is warranted.

- A better understanding of the spatial locations and thickness of the various carbonaceous units should be developed to determine whether they are likely to be mined in significant volumes and separately or will be mixed in with the majority of waste material. SRK understands that Hancock Coal Pty Ltd (HCPL) have committed to selective mining of potentially problematic units when they can be visually identified.

- Where it is demonstrated that the carbonaceous materials can be mined separately appropriate management strategies would be required for the carbonaceous units as they may have a capacity to generate acid. This may include segregation and isolation to reduce water contact with in these lithologies and possibly reduce the rate of oxidation.

- Coal tailings may need to be managed to control formation and release of acid drainage.

- Suitable precautions should taken to prevent water flow over or ponding on the waste dumps to minimise physical gully erosion of the dispersive materials, and to prevent leaching of the excessive salts, which act to prevent dispersive behaviour. Good compaction may also help prevent ingress of water into the slopes. The use of flat slopes (<5% gradient if possible) or concave slopes (with steepest gradient at the top of the slope and reducing the gradient as slope length and quantity of runoff increase) has been recommended to minimise gully formation. SRK understands that HCPL have committed to storing highly saline/sodic overburden within the core of out-of-pit and in-pit storage areas.

- Infill sampling in the north south direction is recommended to complete coverage of pit area at sub 5000 m spacing. SRK understands that an additional five holes are currently planned that would assist in addressing this and that HCPL has committed to an infill drilling program and sampling during pit development.

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (Australasia) Pty Ltd (SRK) by Hancock Coal Pty Ltd (Hancock). The opinions in this Report are provided in response to a specific request from Hancock to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them.

List of Abbreviations

Term	Definition
ABCC	Acid buffering characteristic curve
ALS	Australian Laboratory Services
AMD	Acid and metalliferous drainage
ANC	Acid neutralising capacity
AP	Acid potential calculated based on all non sulphate sulphur present as pyrite (kgH_2SO_4/tonne)
ARD	Acid rock drainage
BFS	Bankable Feasibility Study
CarbNP	Carbonate neutralisation potential estimated from the measured inorganic carbon concentration and assuming all carbon is present as carbonate (CO_3) (kgH_2SO_4/tonne)
DD	Diamond drilling
EC	Electrical conductivity
GAI	Global abundance index
HCPL	Hancock Coal Pty Ltd
ICP-MS	Inductively coupled plasma mass spectrometry
ICP-OES	Inductively coupled optical emission spectroscopy
kg	Kilogram
m	Metre
MPA	Maximum potential acidity calculated assuming that all sulphur is present as pyrite (kgH_2SO_4/tonne)
NAF	Non acid forming - a classification in regard to potential for rock to be acid forming
NAG	Net acid generation (kgH_2SO_4/tonne)
NAPP	Net acid producing potential (kgH_2SO_4/tonne)
NP	Acid neutralising capacity (kgH_2SO_4/tonne)
NPR	Net Potential Ratio
PAF	Potentially acid forming - a classification in regard to potential for rock to be acid forming
PAF-LC	Potentially acid forming and of low capacity to produce acid
PFS	Prefeasibility study
pH	Negative logarithm of the concentration of hydrogen ions
RC	Reverse circulation drilling
RL	Relative levels
SRK	SRK Consulting (Australasia) Pty Ltd
TIC	Total inorganic carbon
UC	Uncertain – a classification in regard to potential for rock to be acid forming

1. Introduction

1.1 Terms of Reference

The Hancock Coal Pty Ltd (HCPL) proposed Alpha Coal Project is located in the Galilee Basin, Queensland.

Hancock Prospecting Pty Ltd (Hancock) engaged SRK Consulting (Australasia) Pty Ltd (SRK) to carry out an initial assessment of the potential for acidic and metalliferous drainage (AMD) to be produced by the wastes generated as a result of mining.

1.2 Report scope

This report documents the findings of:

- The geochemical characterisation and dispersivity tests carried out on samples representative of waste material, blended raw coal and the coarse and fine fraction of coal washery wastes.
- An assessment of the of the samples tested to adequately represent the other materials at the site.

The geochemical investigation comprised acid base accounting, determination of elemental composition of wastes and distilled water extraction tests. The assessment included a geostatistical analysis of sample characteristics.

The scope of the testing programme is presented in Chapter 2 of this report. The outcomes of the geochemical investigation are presented and discussed in Chapter 3.

1.3 Background

The Alpha Coal Project is a thermal coal deposit within the Galilee Basin located approximately 150 km west north-west of Emerald in Queensland on two Mineral Development Licences (MDL 285 and MDL 333).

The Project is expected to generate 41 million tonnes per annum (Mtpa) Run of Mine (ROM) coal, generating 30 Mtpa of product coal from an open cut pit with a projected 30 year life of mine (LOM). The open pit will cover an area of approximately 24 km by 7 km and the total mined amount of overburden is expected to approximate over 16 billion tonnes LOM. That is, approximately 530 million tonnes of overburden per year.

In addition to the overburden, coal reject material will be generated by the Project. Coal reject material is segregated into two categories, coarse reject and tailings. The coarse reject as the name implies consists of the larger pieces of overburden and coal that are not suitable for product sale. The tailings material is the fine component of this waste material. Both coarse reject and tailings are segregated from the coal product in the project coal handling and processing plant (CHPP), or washplant.

1.3.1 Regional Setting and Climate

The Alpha Project is located is an arid region. The climate of Emerald is similar to that at the site. The average temperature ranges in Emerald are 7 to 22°C in winter and 20 to 35°C in summer. The average annual long-term rainfall is 640 mm/y and the average pan evaporation is between 2000 and 2400 mm/y. Rainfall generally occurs in the summer months and can be associated with cyclone-related events.

1.3.2 Geological setting

The Alpha deposit is within the Galilee Basin and consists of a sequence of Late Carboniferous to Middle Triassic sedimentary rocks overlying Late Devonian to early Carboniferous sedimentary and volcanic rocks of the Drummond Basin (Winsley, 2009) as illustrated in Figure 1-1.

Late Permian, coal bearing strata of the Galilee sub-crop in a linear, north trending belt in the central portion of the exposed section of the basin and are essentially flat lying (dip estimated at 0.5 degrees to the west). No major, regional scale fold and fault structures have been identified in regional mapping of the project area.

The stratigraphy of the Galilee Basin in the Alpha project area and the Late Permian coal measures stratigraphy are described in Table 1-1 and Table 1-2 respectively.

There are five seams in the region, however, only seams C and D are present in the Test Pit volume. Drill hole B414 (Figure 1-2) is on the eastern edge of the pit and B214 on the western side of the pit.

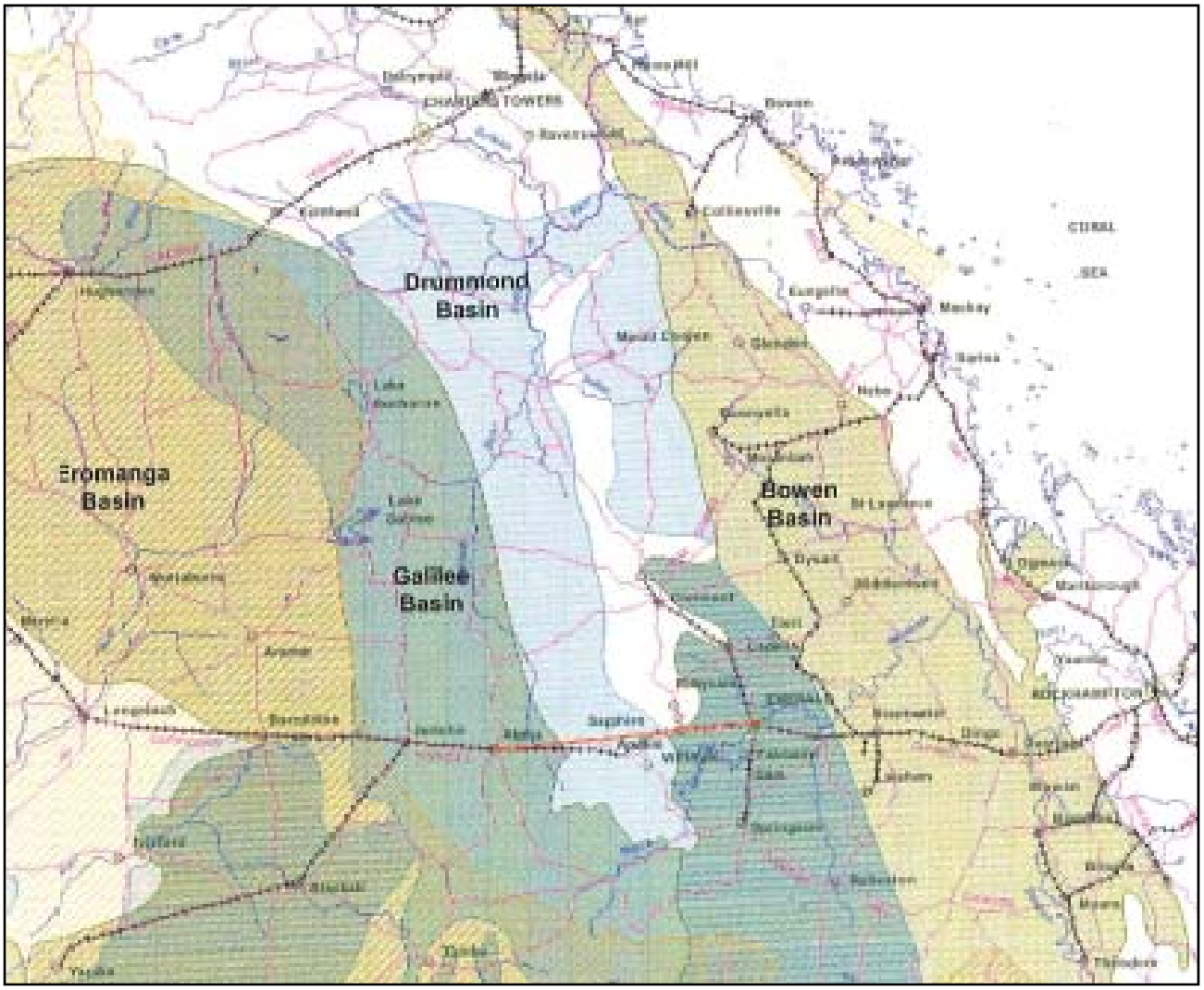

Figure 1-1: Galilee Basin, Central Queensland

Table 1-1: Galilee Basin stratigraphy – Alpha Area

Period	Unit	Rock Types	Comments	Tectonic Unit
Quaternary		Alluvium.	Partly lateritised	
Tertiary		Argillaceous sandstones and clays.		Eromanga Basin
Unconformity				
Triassic	Clematis Sandstone	Quartz sandstone, minor siltstone and mudstone.		Galilee Basin
	Dunda Beds	Labile sandstone, siltstone and mudstone		
	Rewan Formation	Green-grey mudstone, siltstone and labile sandstones.		
Late Permian	Bandanna Formation	5 coal seams (A-E), labile sandstones, siltstone and mudstone.	Coal Measures	
Early Permian	Colinlea Sandstone	Labile and quartz sandstone.		
Late Carboniferous to Early Permian	Joe Joe Formation	Mudstone, labile sandstone, siltstone, shale, thin carbonaceous beds.		
Unconformity				
Early Carboniferous				Drummond Basin

Table 1-2: Late Permian Coal measures stratigraphy – Galilee Basin

Age	Lithology	Stratigraphic Unit	Thickness	Comments
Triassic	Green-grey mudstone, siltstone and labile sandstone.	Rewan Formation		
Late Permian	Sandstone	Bandanna Formation	10 – 30 m	Increasingly argillaceous
	Coal – Seam A. Seam contains thin dirt bands that thicken from south to north.		2.0 – 3.0 m	
	Labile sandstone, siltstone and mudstone		10 m	
	Coal – Seam B. Seam contains numerous dirt bands that comprise between 14% to 28% of seam. Variable in quality.		6.0 – 8.0 m	
	Labile sandstone, siltstone and mudstone.		60 – 70 m	
	Coal – Seam C. Coal seam thins northward to become a thin, carbonaceous shale bed. Proportion of dirt bands present increases to the north from 3% in the south to 17% in the north.	Colinlea Sandstone	3.4 – 0.0 m	Increasingly arenaceous
	Labile sandstone, siltstone and mudstone.		5 – 20 m	
	Coal – Seam D. Dirt bands present within seam thicken westward.		4.5 – 6.0 m	
	Labile sandstone, siltstone and mudstone		30 m	
	Coal – Seam E. Comprises dirty coal to carbonaceous shale. Generally considered to be uneconomic and not investigated extensively by exploration drilling.		3.1 m	
	Labile sandstone, siltstone and mudstone.		Unknown	
Early Permian	Labile and quartz sandstone.			

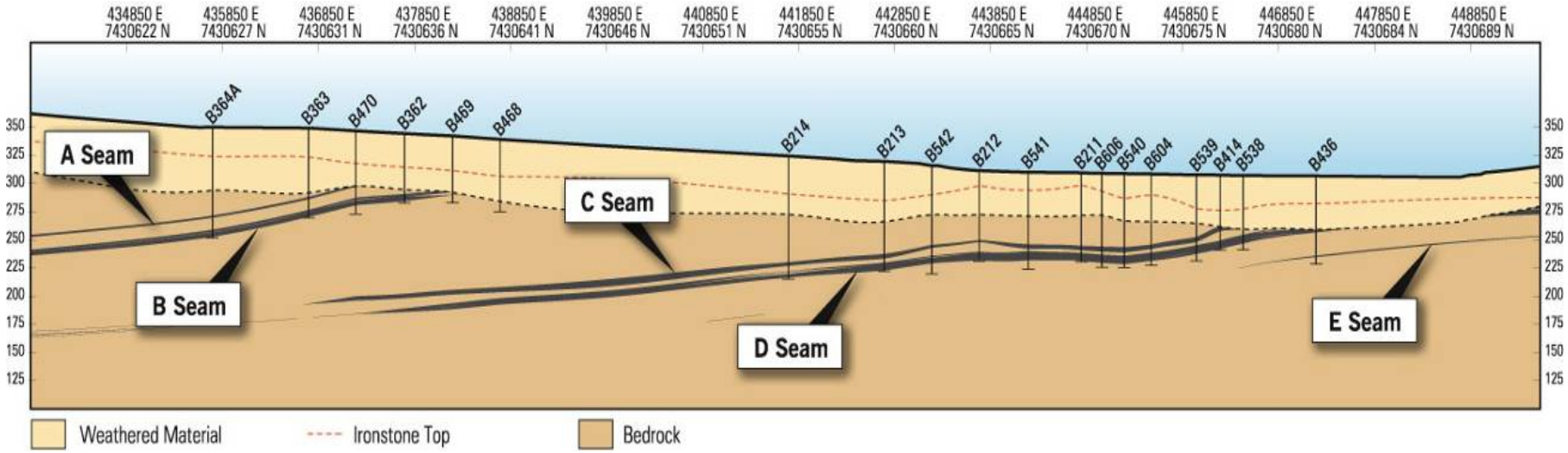

Figure 1-2: Cross-section showing coal seams

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1.3.3 Mineralogy

An assessment of the distribution of mineral assemblages across the broader Alpha Project area was made by comparing assemblages in two studies of drill core (taken from from six and 25 holes respectively (Pontual, 2008, AusSpec 2010)). Minerals were determined using the HyChips spectral reflectance method with visible, near infrared and short wavelength infrared light.

The observed minerals included kaolinite, montmorillonite, nontronite, white mica and iron oxide. Core from all 31 holes analysed had a consistent spatial distribution of the mineral assemblages and mineral characteristics. Figure 1-3 presents results from six drillholes in the first study. Results for the 25 holes of the second study are presented in Appendix 1. Although the six drillholes are unlikely to have been arranged in cross-section the mineral assemblages are presented alongside one another in Figure 1-3. The consistency of the spatial distribution of the mineral assemblages aligns well with the existing geological model for the site completed in the Pre-Feasibility Study and indicates that there would likely be consistency in AMD related parameters across the Project.

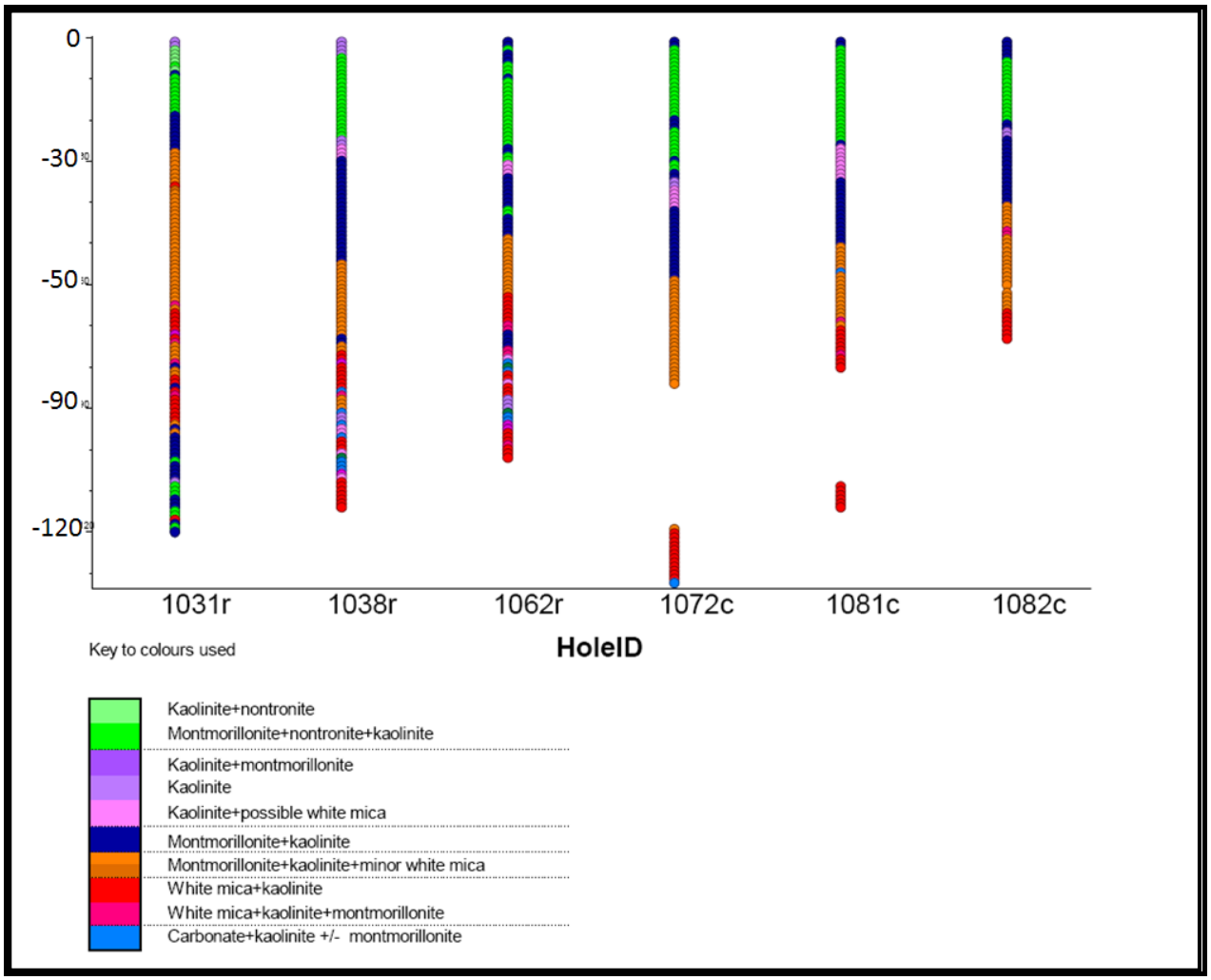

Figure 1-3: Mineral assemblages down six drillholes

2. Drilling and Sampling

Fifty five coal samples and 277 non coal waste material were selected from 35 holes at the locations shown in and in Appendix 2. Five of the holes were only drilled to the base of the weathered zone and therefore did not provide samples of fresh material.

The primary objectives of the drilling and sampling program were to obtain samples:

- From major domains and a range of spatial locations from within the planned pit shell so as to reflect the geological variability and complexity in rock types
- Representative of coal washery waste
- Representative of raw coal.

Also examined were 741 total sulphur records provided by Hancock of samples collected from the coal seams.

AMD sample drill spacing was highly variable over the pit area with spacings from 300 m to 5000 m. An approximate average for the North-South drill spacing was 4000 m and an approximate average for the East-West spacing was 1000 m. This information compliments more intensive existing drill hole information used to generate the geological model for the Alpha Project.

The records of total sulphur in coal samples provided data on a small interval grid of approximately 1000 m (Figure 2-2).

2.1 Lithology types and Groups

SRK grouped all lithologies listed in the resource database into sets of lithologies likely to have similar AMD properties. The major lithologies identified and the groups are shown in Table 2-1 together with an with estimate of the mass of lithologies and groups calculated from the drillhole data. A comprehensive listing of the lithology codes entered in the drill logs and their relation to the summary groups is given in Appendix 3.

Table 2-1: Groups and main lithologies identified in drillholes of the Alpha Project

GROUP	Total Mass (million tonnes)	Lithology	Volume (million cubic metres)	Assumed Density	Mass (million tonnes)	Lithology code
Carbonaceous	784	Carbonaceous mudstone	167	2.3	384	CM / XM
		Carbonaceous sandstone	145	2.3	334	XS
		Other	29	2.3	67	
Clay and Soil	5 498	Clay	2679	2	5358	CL
		Soil	67	2	134	SO
		Other	3	2	6	
Coal*	2 138	Coal	1276	1.5	1914	C* (except CM & CS)
		Other Coal	149	1.5	224	DC,IC,SU,ZC,ZH,ZM,ZS
Sand and Gravel	2 240	Sand	1087	2	2174	SA
		Gravel	33	2	66	GV
Remaining (Rem)	14 558	Sandstone	2748	2.15	5908	SS
		Siltstone	1764	2.15	3793	SL
		Claystone	985	2.15	2118	CS
		Silt	331	2.15	712	SI
		Other	943	2.15	2027	

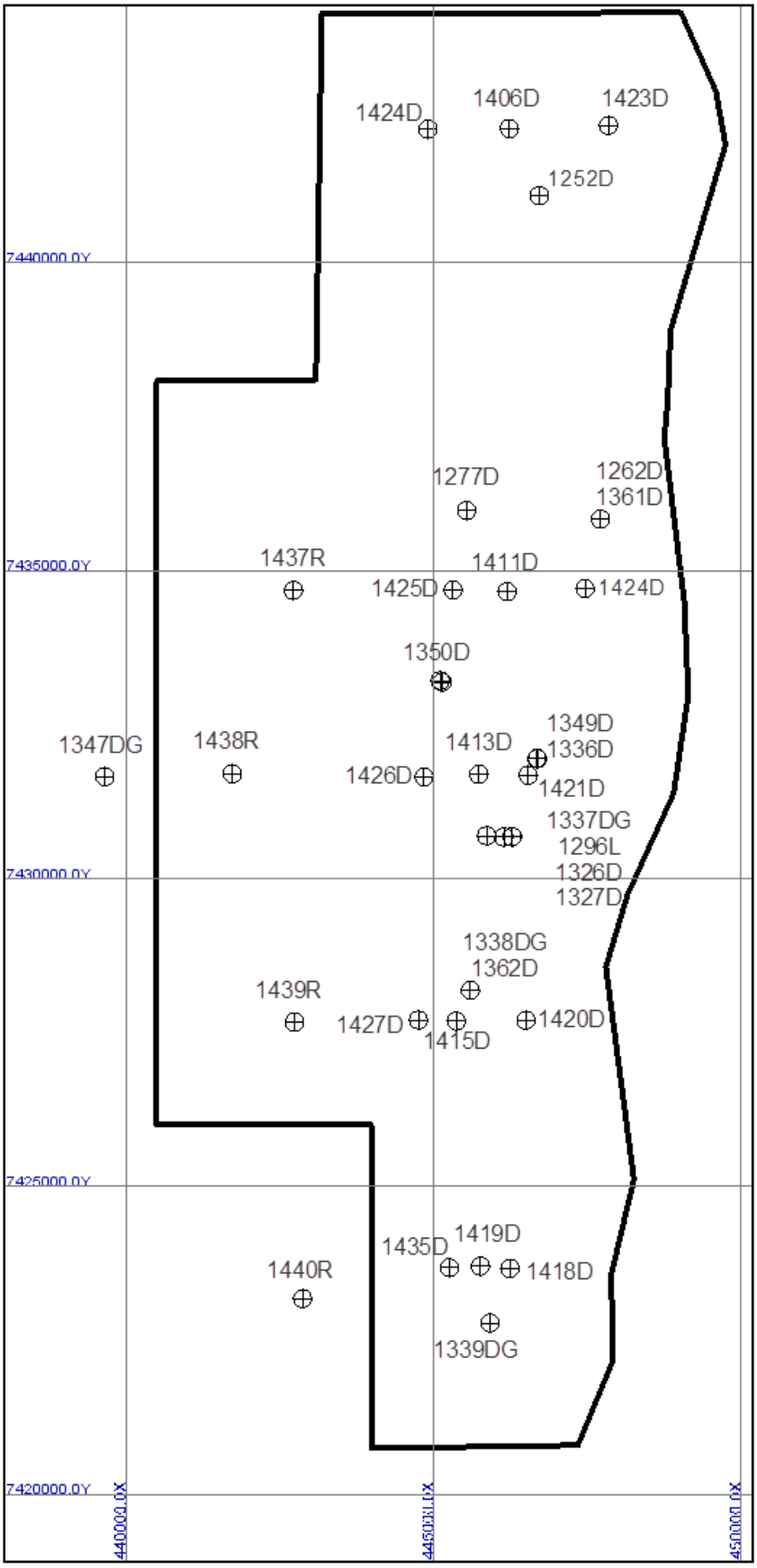

Figure 2-1: Locations of drill holes sampled for geochemical characterisation

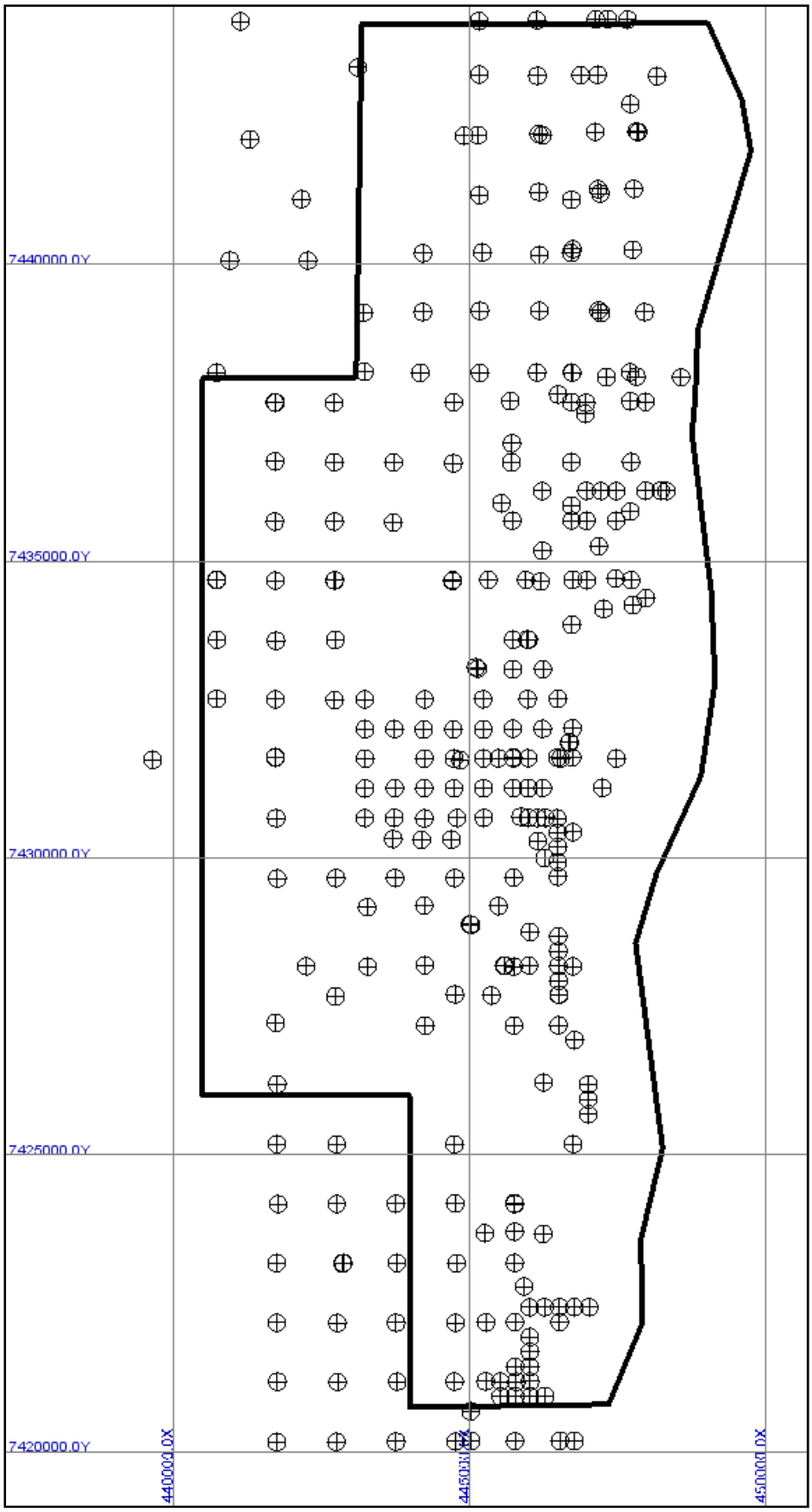

Figure 2-2: Locations of drill holes for recorded total S content for coal

3. Measurements

The following geochemical measurements were undertaken on all samples:

- Paste pH and electrical conductivity
- Total sulphur
- Acid neutralising capacity (ANC)
- Multi-element analysis (four acid digest/aqua regia digest, ICPAES, ICPMS).

The following measurements were undertaken on selected samples:

- Single addition net acid generation (NAG) test
- Modified NAG test with extended boil and solution assay
- Distilled water extracts (simple leach tests) on solid. Solid to de-ionised water at a ratio of 1:3 (s:w)
- Multi-element scans of the extracts
- Electrical conductivity (s:w ratio 1:5)
- Cation exchange capacity (CEC) and exchangeable sodium percentage (ESP)
- Emerson aggregate test
- Chromium reducible sulphur
- Sulphate sulphur
- Carbon speciation (TIC/TOC)
- Acid Buffering Characteristic Curve.

The modified NAG with extended boil test was conducted because there was potential for the total organic carbon content to be high in some samples.

All testing was coordinated by Australian Laboratory Services (ALS), Brisbane.

4. Geochemistry Results and Discussion

4.1 Paste pH and Electrical Conductivity

Paste parameters provide an indication of the inherent acidity and salinity of a sample, the degree of weathering the material has experienced as well as the availability of readily soluble salts.

Generally, paste pH ($pH_{1:2}$) values less than pH 5 indicate the presence of stored acidity (i.e. stored oxidation products) and net acid generating conditions, whereas high paste pH values suggest the presence of reactive neutralising minerals. High paste EC ($EC_{1:2}$) values indicate the potential for water contacting the waste to become saline.

Low $pH_{1:2}$ and elevated $EC_{1:2}$ values reflect the potential of a sample to impact the quality of water contacting the waste without the sample undergoing further chemical change or weathering. Such potential may exist whether the sample is classified as non acid forming (NAF), uncertain (UC) or potentially acid forming (PAF).

4.1.1 Overburden and Interburden

Sample descriptions are provided in Appendix 4 and the results of paste measurements are tabulated in Appendix 5 and plotted in Figure 4-1 and Figure 4-2 below. The paste pH values for all samples ranged from 3.8 to 9.4 (Figure 4-1), with 86% being between 6 and 9. The average and median paste pH values were 7.4 and 7.5 respectively. The seven samples below pH 5 which therefore contain stored oxidation products were from the Carbonaceous (1), Clay and Soil (1) and Rem (5) groups. The samples from the Clay and Soil and Rem groups comprised material from the clay and sandstone lithologies respectively.

The total S content ranged between <0.01 and 26.8 wt%. For samples with measured total S contents of less than the detection limit (0.01 wt%) the total S content is presented as 0.005 wt%. There was one sample with a total S content of 26.8 wt%. This sample was only 0.04 m long and was mistakenly collected and tested. Sample samples of this size may contain a 'nugget' of total S that is not diluted by the surrounding material of a full 1 m long sample. This sample came from immediately above the C coal seam. For the purpose of the subsequent reporting this sample should be considered anomalous.

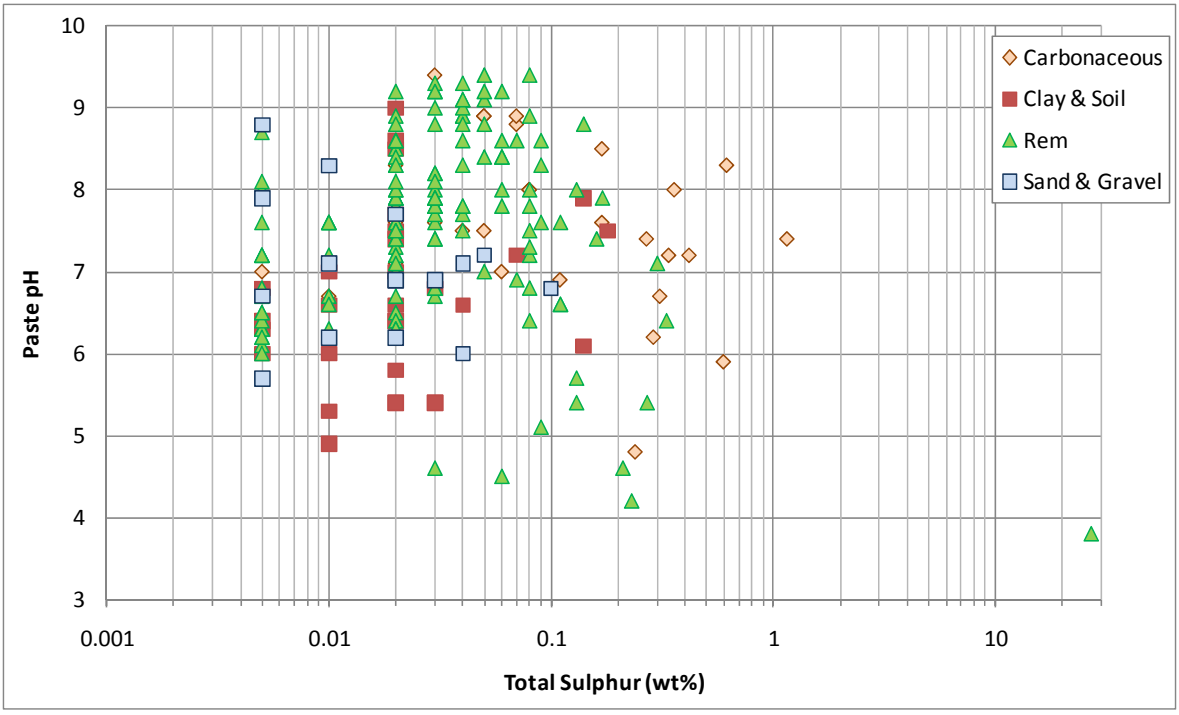

Figure 4-1: Paste pH as a function of total sulphur for overburden and interburden samples by group

The paste EC of the samples ranged from 1 to 5140 µS/cm with an average of 1166 µS/cm and median of 877 µS/cm. A plot of paste EC as a function of total sulphur for all samples is shown in Figure 4-2.

The paste EC of 98 samples was greater than 1000 µS/cm, suggesting that these samples could potentially be a source of soluble salts. Whilst elevated soluble salts may be released from the samples over a range of pH values, Figure 4-3 indicates that the greatest concentration of soluble salts will be released in the near neutral range between pH 5 and 8 (where paste EC > 3000 µS/cm). Samples from the Clay and Soils group (specifically the clay lithology) gave rise to the greatest spread of paste EC values.

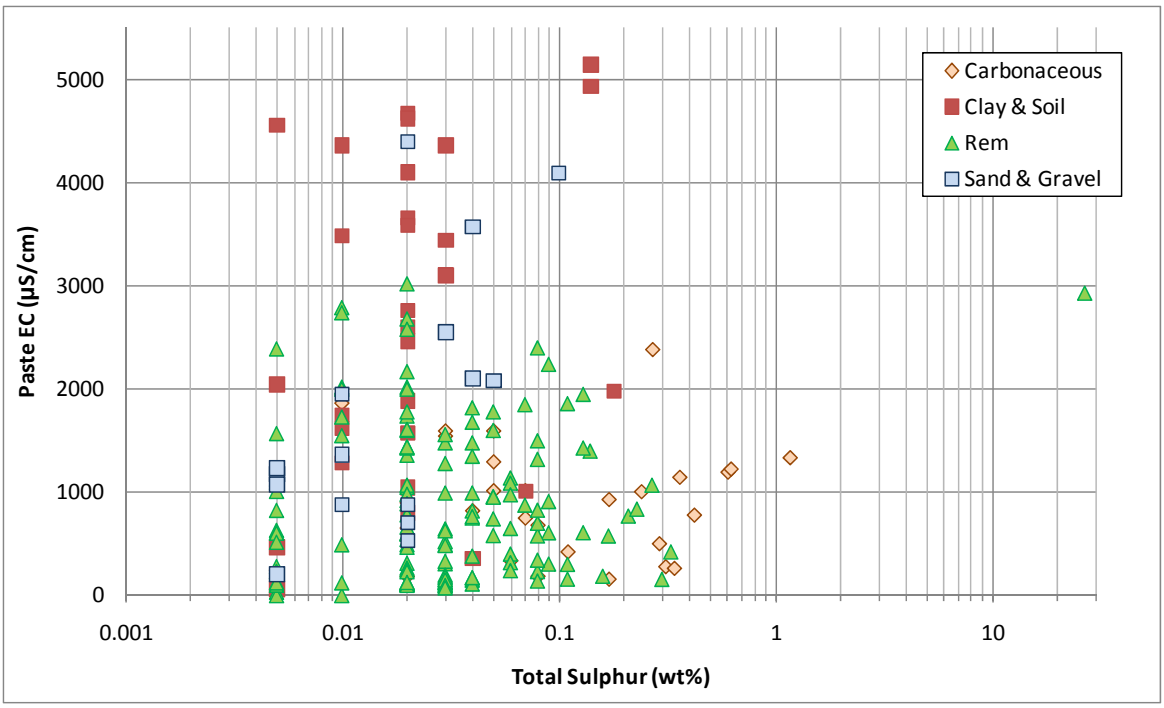

Figure 4-2: Paste EC as a function of total sulphur for overburden and interburden samples by group

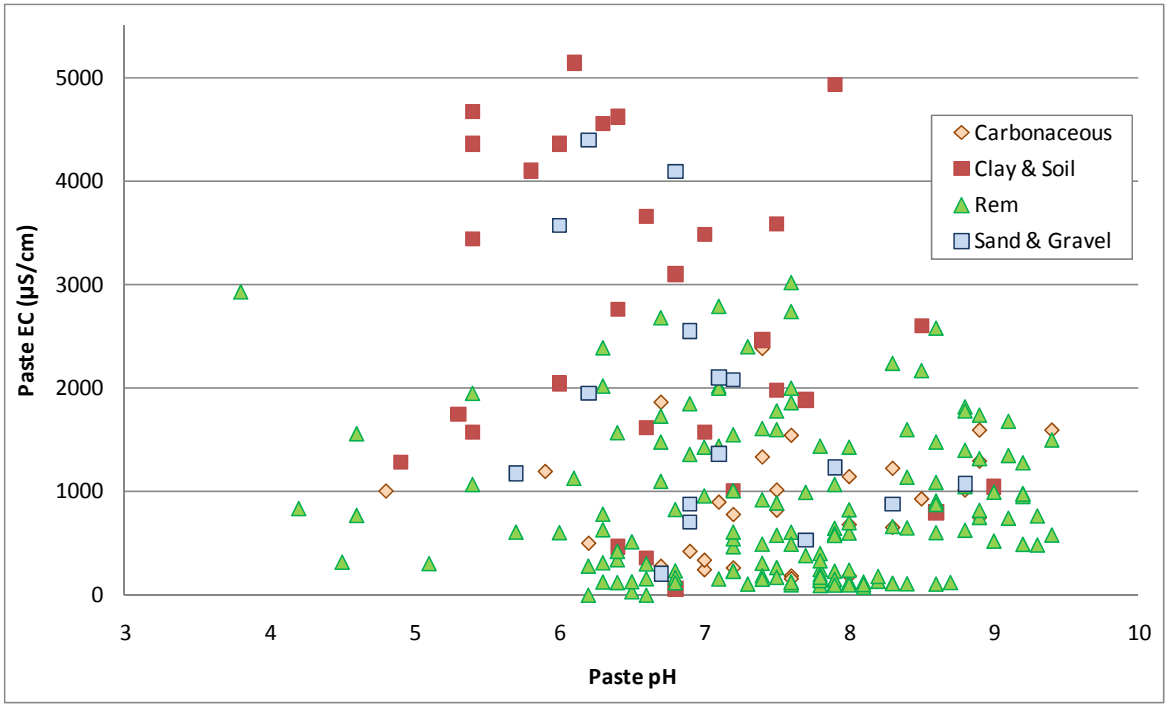

Figure 4-3: Paste EC as a function of paste pH for overburden and interburden samples by group

4.1.2 Roof and Floor, Coal and Washery Wastes

A plot of potential roof and floor, blended coal and coal washery waste material is shown in Figure 4-4. The paste pH of the 119 samples ranged from 3.3 to 10, with an average and median of 7.1. Of the 12 samples with a paste pH < 5, five were roof and floor, four were coarse reject material and three were product material.

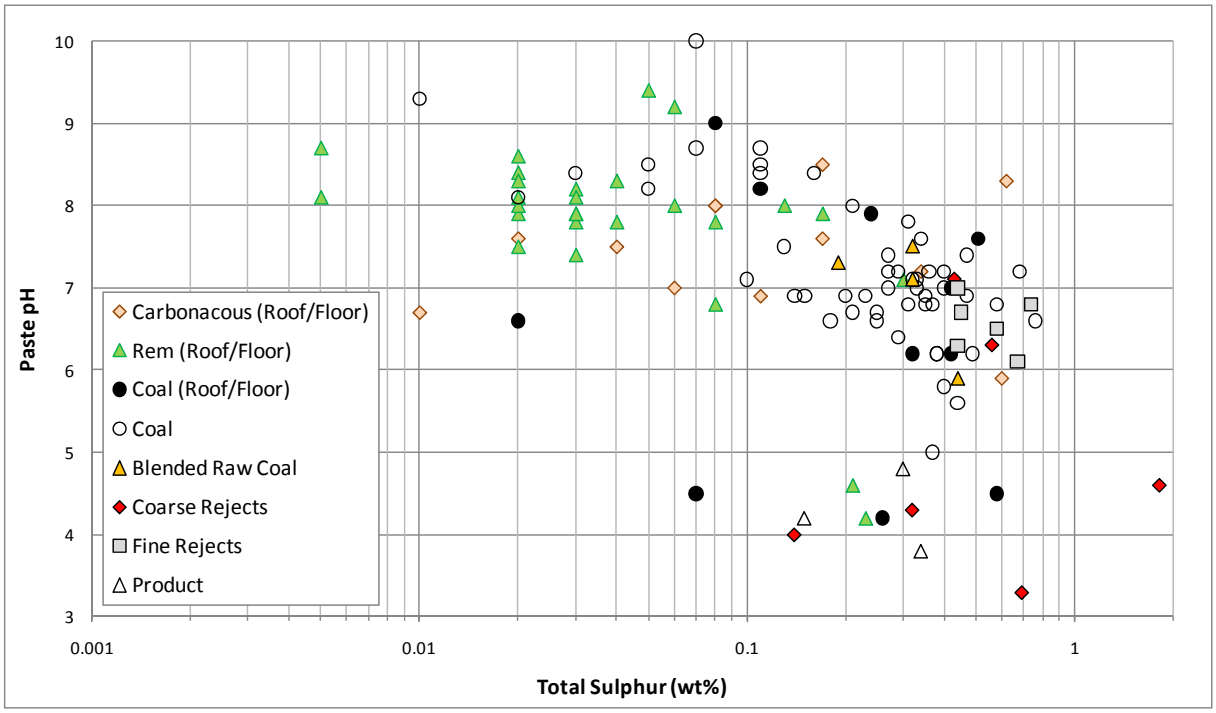

Figure 4-4: Paste pH as a function of total sulphur for coal washery waste samples

A plot of paste EC as a function of total sulphur for the coal washery waste samples is shown in Figure 4-5. The paste EC of the samples ranged from 76 to 3300 µS/cm with an average of 601 µS/cm and median of 392 µS/cm.

A plot of the paste EC as a function of paste pH is shown in Figure 4-6. The figure shows that the highest concentration of soluble salts are likely to be associated with the coal and and coal roof and floor material. However, soluble salts may be associated with non-coal materials and released over a range of pH values at lower concentrations.

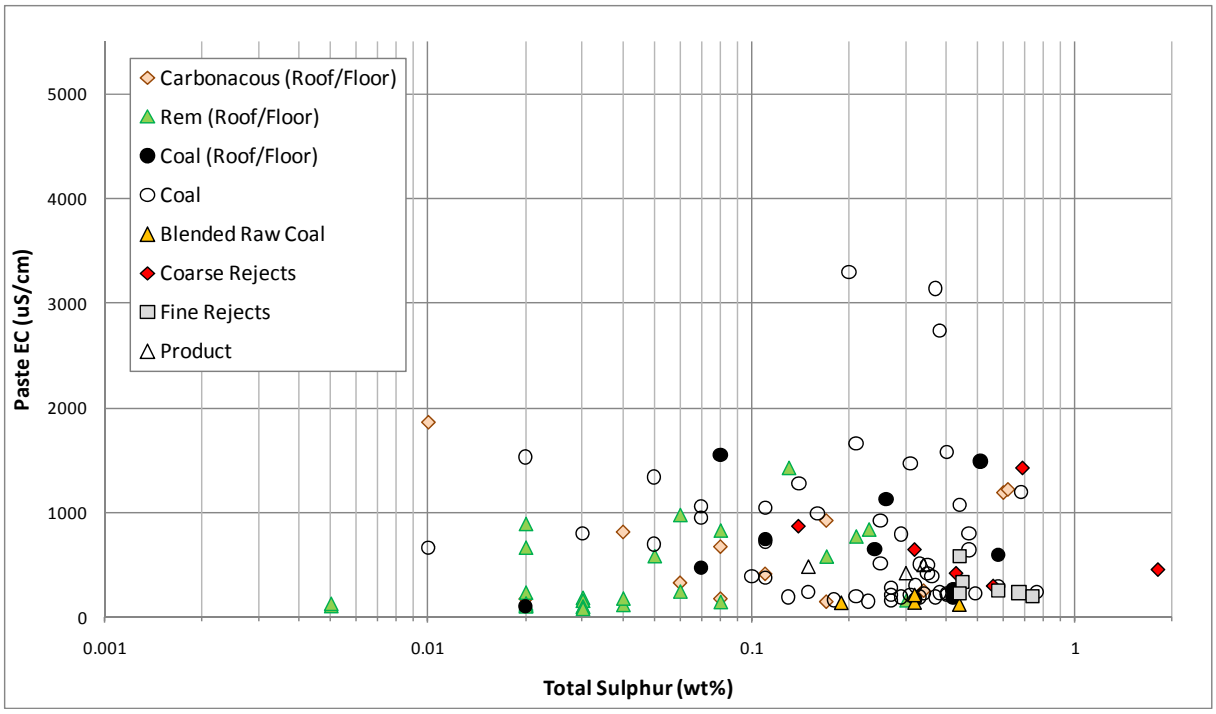

Figure 4-5: Paste EC as a function of total sulphur for coal washery waste samples

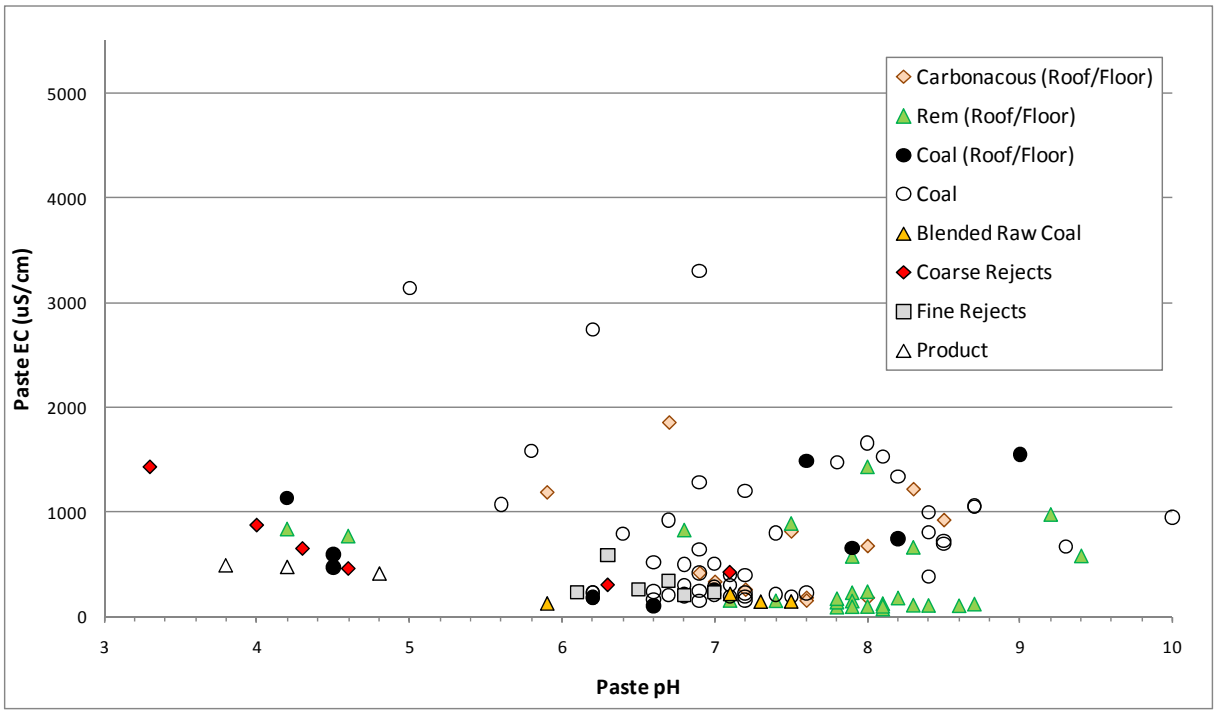

Figure 4-6: Paste pH vs paste EC

4.2 Acid Base Account

The net acid producing potential (NAPP) is the theoretical balance between the capacity of the sample to generate acid due to the oxidation of sulphides and its capacity to neutralise any acid formed, i.e. its acid neutralising capacity (ANC). The maximum potential acidity (MPA) of the sample is calculated from the total sulphur content, assuming that all sulphur is present as pyrite. The assumption that all sulphur in the sample is present as sulphide (pyrite) generally overestimates the amount of acid that may be generated, since sulphur may exist in other forms that are not acid generating (e.g. as sulphate).

The ANC of a sample may be sourced from both carbonate and silicate minerals. The endpoint pH after the addition of hydrochloric acid (HCl) in the ANC measurement is very low (typically between pH values of 1 and 2) and leads to reactions that will occur only at a low pH (i.e. neutralisation due to dissolution of the silicate minerals). The ANC measurement may therefore overestimate the neutralisation capacity that is available to maintain a near neutral pH.

The NAPP is calculated as follows:

$$NAPP = MPA - ANC \text{ (kg } H_2SO_4\text{/t)}$$

Where MPA = 30.6 x S% and the sulphur content is expressed as weight percent (wt%).

The MPA, ANC and NAPP are reported in Appendix 5.

4.2.1 Acid Potential

Where a significant portion of sulphur is present as sulphate, a more appropriate measure of the potential for acid generation is the acid potential (AP) of the material. The AP is calculated based on the sulphide content. The sulphide content may be estimated by subtracting the sulphate-sulphur content from the total sulphur content. Alternatively, the chromium reducible sulphur (CRS) test is a supplemental test applicable to coal material developed to differentiate between pyrite and other forms of sulphur, which may not be acid forming.

A subset of 121 and 80 samples were submitted for sulphate sulphur and CRS measurement respectively. Samples expected to contain organic sulphur due to their proximity to the coal seams (such as roof/floor and interburden samples) were selected for CRS test work. All samples subjected to CRS testing were also analysed for sulphate sulphur.

The total sulphur content of the samples is presented in the ABA table in Appendix 5. The total sulphur content for the samples ranged between <0.01 to 26.8% (average 0.4% and median 0.07%).

4.2.1.1 Overburden and Interburden

A plot of non sulphate sulphur as a function of total sulphur for the overburden and interburden is presented in Figure 4-7. The diagonal line represents a line of equivalence, where the non sulphate sulphur and total sulphur are equal. The sulphate sulphur content of the samples ranged between <0.003 and 0.3% and therefore comprises a small fraction of the total sulphur content.

A single sample of Rem material of the sandstone lithology contained a total sulphur concentration of 26.8%. Excluding the result for this sample, the average sulphur content of the overburden and interburden was low (0.06%) of which an average of 85% is present as non sulphate sulphur.

The CRS presented as a function of total sulphur is shown in Figure 4-8. The oxidisable sulphide sulphur content of the samples generally is less than the total sulphur content, ranging from <0.005 to 16.3 wt%, with a median value of 0.01 wt%. As with Figure 4-7, the line of equivalence indicates where the CRS (pyritic sulphur) and total sulphur are equal. For the samples shown below the line, it is expected that a portion of the total sulphur content exists in the form of non-oxidisable sulphur.

For samples with sulphur contents greater than 0.1 wt%, the majority of total S was present as non sulphate sulphur. However, only approximately 30% of the samples contain sulphur in oxidisable form at greater than 0.1% (based on CRS test results). This suggests that the majority of overburden and interburden samples contain a very low concentration of oxidisable sulphur.

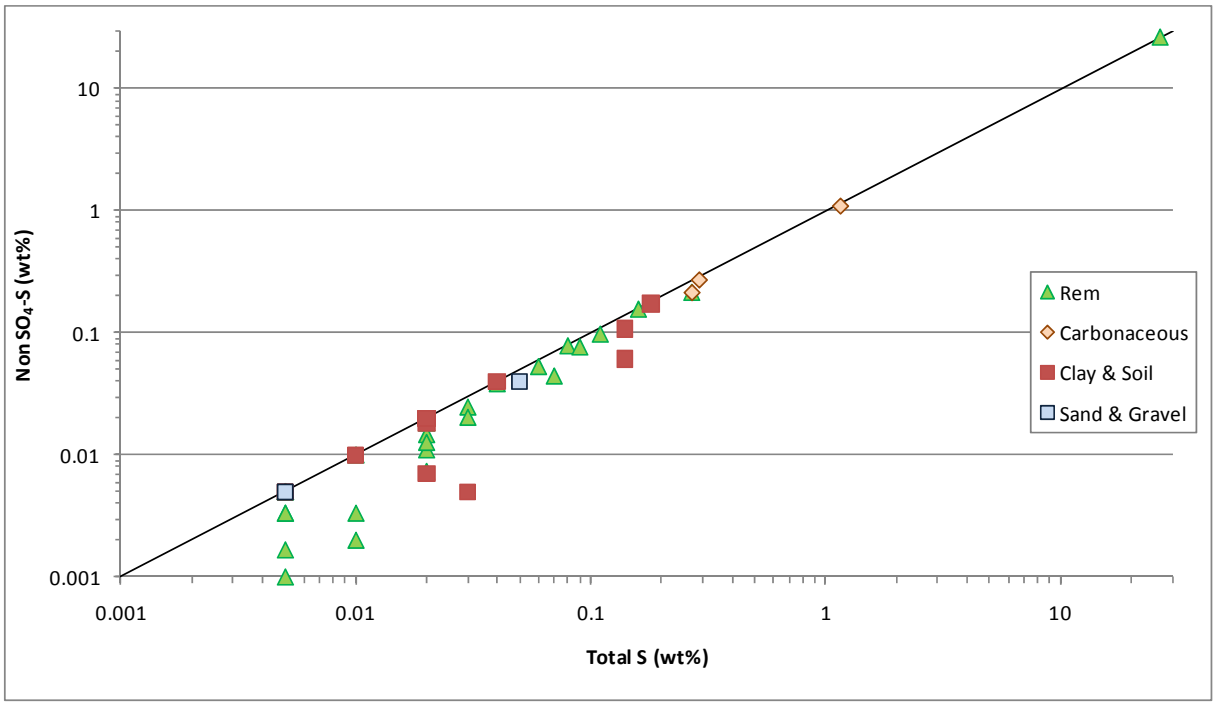

Figure 4-7: Non sulphate sulphur as a function of total sulphur content for overburden and interburden

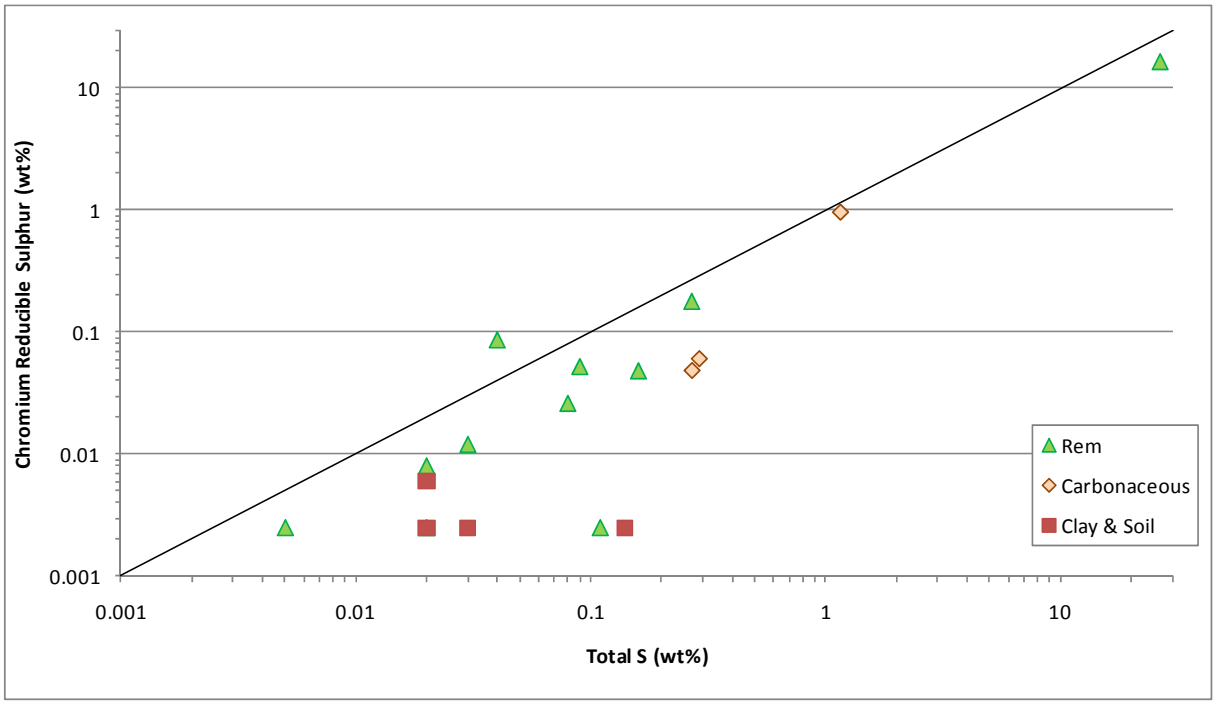

Figure 4-8: Chromium reducible sulphur as a function of total sulphur for overburden and interburden

4.2.1.2 Roof and Floor, Coal and Washery Wastes

Figure 4-9 and Figure 4-10 present the non sulphate and chromium reducible sulphur as a function of total sulphur respectively for the roof and floor, coal and washery waste material samples. The sulphate sulphur ranges between <0.03 and 0.2% and is a small fraction of the total sulphur (which ranges between <0.01 and 1.81%). The findings are similar to those of Salva Resources (Appendix 17) for raw coal 27 samples for which the average total S content, pyritic S and organic sulphur were 0.59, 0.27 and 0.31 adb%.

The oxidisable sulphur content of the samples ranged between <0.05 and 1.11%, with an average of 0.12% (based on the results of the CRS test). The CRS test results indicate that up to 60% of the sulphur is present in the samples as oxidisable sulphur.

Since some sulphur is possibly present as non-oxidisable species, the classification of the samples using the MPA is expected to be conservative.

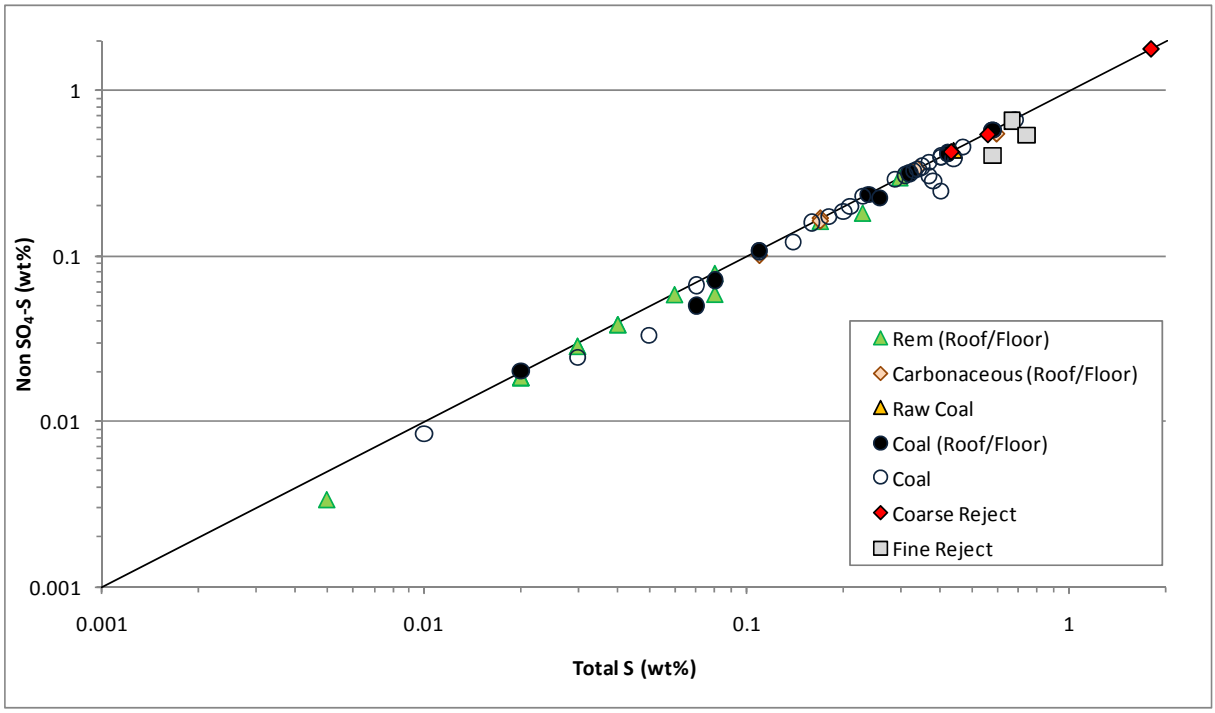

Figure 4-9: Non sulphate sulphur as a function of total sulphur content for roof and floor, coal and reject

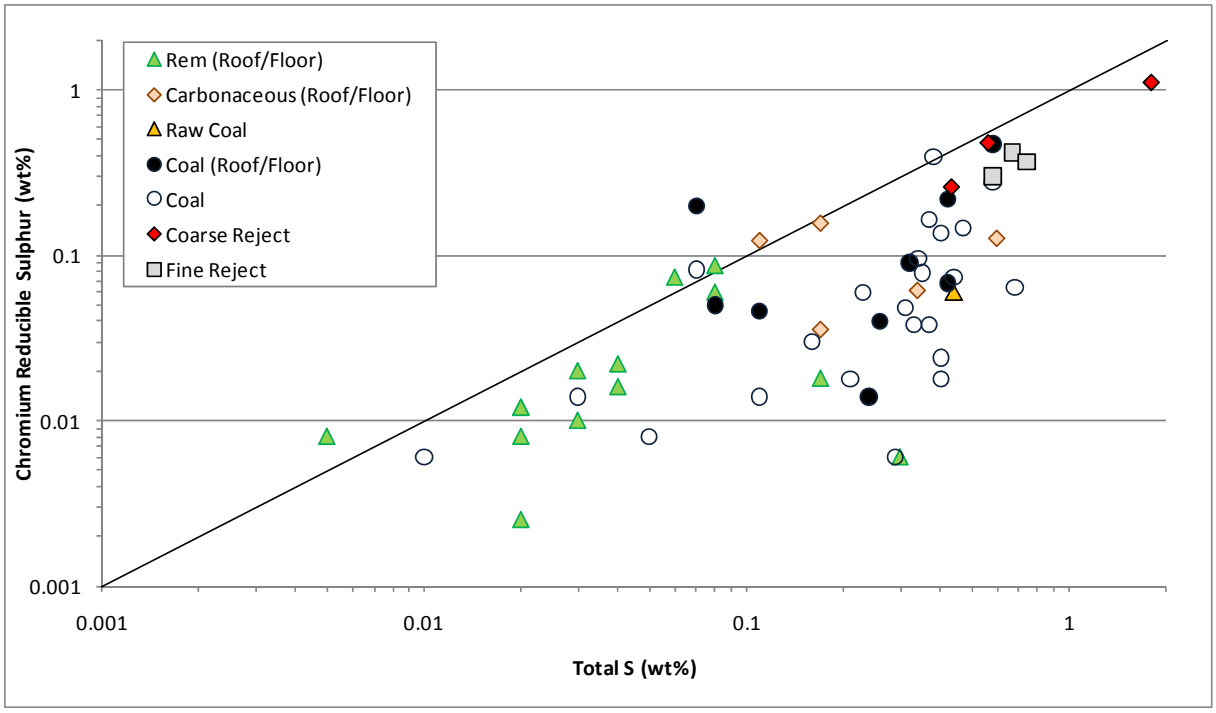

Figure 4-10: Chromium reducible sulphur as a function of total sulphur for roof and floor, coal and reject

4.2.2 Neutralisation Capacity

The ANC ranged from less than 0.5 to 222 kgH_2SO_4/t, with an average of 9.9 kgH_2SO_4/t and a median 3.7 kgH_2SO_4/t in the overburden and interburden. The values measured in the roof and floor, coal and coal waste samples were somewhat smaller, ranging from less than 0.5 to 161 kgH_2SO_4/t with an average value of 8.2 kgH_2SO_4/t. These results are shown in the ABA table in Appendix 5.

The Ca and Mg carbonate minerals are of greatest importance in terms of neutralising acidity generated as they react rapidly and buffer in the near neutral pH range. The total inorganic carbon content (TIC) can be used to infer the carbonate mineral content and estimate the carbonate neutralization potential (CarbNP). The CarbNP of some samples was larger than the ANC and ranged from 0.8 to 451 kgH_2SO_4/t, with an average of 36.5 kgH_2SO_4/t and median of 4.1 kgH_2SO_4/t.

The CarbNP is presented as a function of ANC in Figure 4-11 and Figure 4-12. A line of equivalence is also shown on the plots (diagonal line), which indicates where the ANC equals the CarbNP. Where the CarbNP equals or exceeds the ANC (below the line of equivalence) it may be assumed that a portion of the carbonate minerals present, do not contribute to acid neutralisation (e.g. siderite ($FeCO_3$)). Where the ANC exceeds the CarbNP (above the line) it may be assumed that slow reacting silicate minerals contribute to the ANC .

Carbon speciation measurements were carried out on 134 of the 303 samples tested. The 134 samples consisted of 93 samples of overburden and interburden and 41 samples of coal. Around 46% of the interburden and overburden samples and 88% of the roof and floor, coal and rejects had an ANC/CarbNP ratio that is less than 1.0 (suggesting some carbonate present does not contribute to ANC). For the other samples where the ANC/CarbNP was calculated, the majority of ANC is attributed to slow reacting silicate minerals. It is therefore expected that the ANC readily available to neutralise acidity for these samples is less than that indicated by the ANC test.

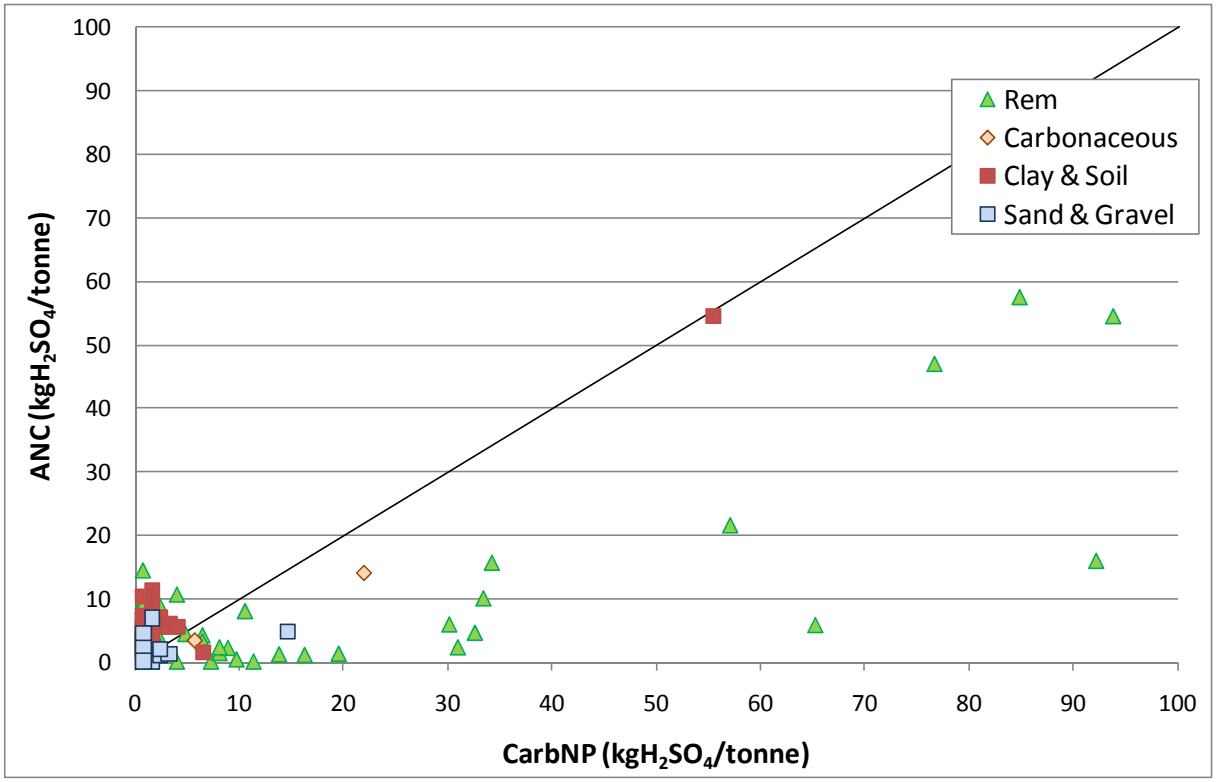

Figure 4-11: CarbNP plotted as a function of ANC for the overburden and interburden samples

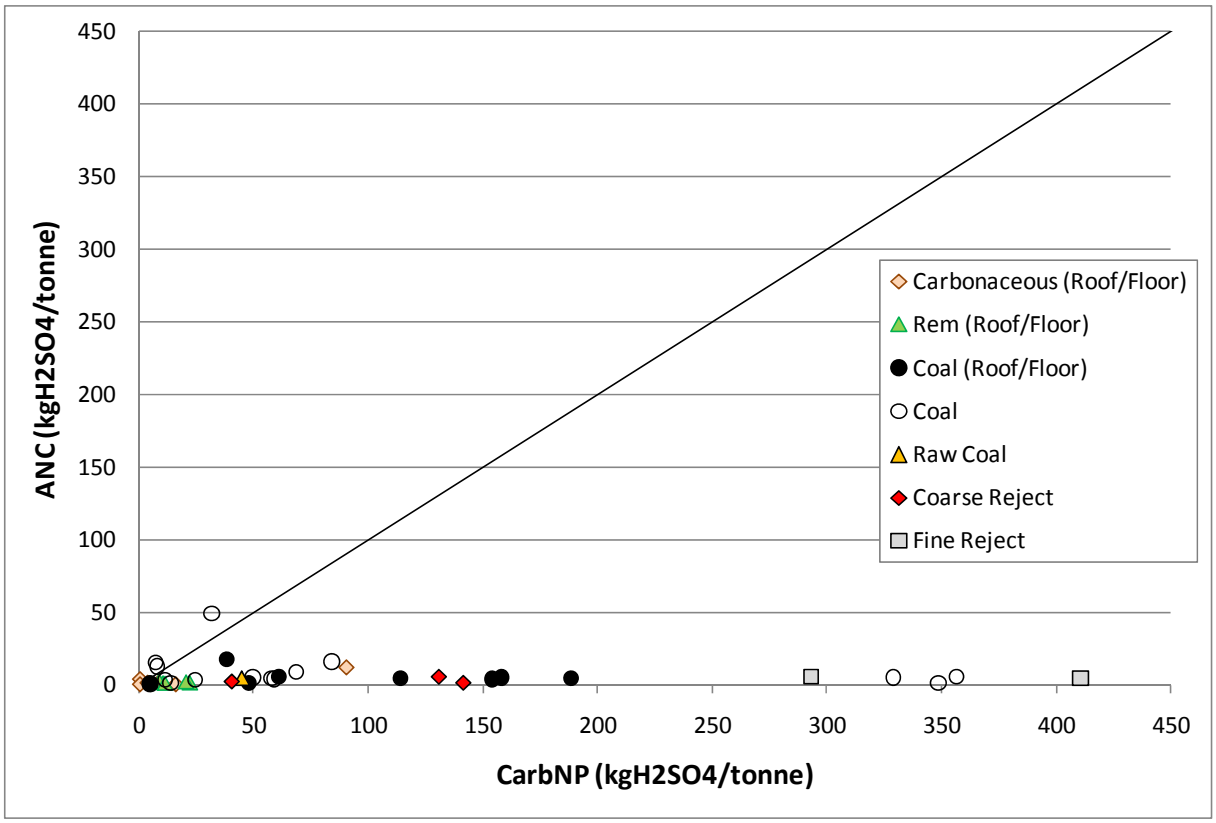

Figure 4-12: CarbNP plotted as a function of ANC for roof and floor, coal and reject samples

Samples with a broad range of ANC values were selected for acid buffering characteristics curve (ABCC) testing. This test provides an indication of the proportion of ANC within a sample that is readily available for acid neutralisation. It involves the slow titration of the sample with hydrochloric acid, whilst continuously monitoring pH.

The ABCC data may be used to infer the availability of the neutralisation potential by calculating the equivalent ANC to pH 6 and to pH 4.5. The ANC measured above pH 6 is indicative of buffering by calcium and magnesium carbonate minerals, such as calcite and dolomite.

The results of the ABCC tests are shown in Appendix 6. A summary of the measured and calculated neutralising potentials are shown in Table 4-1. The results show that the ABCC neutralisation potentials to pH 6 are significantly lower those predicted by the CarbNP and ANC. The neutralising capacity available to buffer above pH 6.0 ranges between <1 to 12 kgH_2SO_4/t and the fraction of ANC available ranges between 1 and 50% of the ANC, suggesting the balance of ANC is associated with aluminosilicates. Hence, the ANC and the CarbNP overestimate the neutralisation potential that is available immediately to buffer the pH to above 6 (i.e. to prevent the onset of acid generating conditions).

Table 4-1: Summary of neutralising capacity derived from ANC, CarbNP and ABCC test work

Sample ID	Group	Neutralising Capacity (kgH_2SO_4/t				Availiable ANC to pH 6
		ANC	CarbNP	To pH6	To pH 4.5	%
1252D-ARD03	Rem	54.6	93.8	3	6	5.5
1252D-ARD04	Rem	57.6	84.9	7	11.5	12.2
1252D-ARD10	Rem	6	65.3	0.125	0.8	2.1
1252D-ARD05	Coal	16	84.1	1.5	2.75	9.4
1277D-ARD03	Clay & Soil	6.9	0.82	0.75	1.9	10.9
1326D_ARD04	Sand & Gravel	7	1.63	0.82	2.2	11.7
1326D_ARD01	Clay & Soil	5.2	0.82	0.25	1.4	4.8
1337DG_ARD02	Rem	16.1	92.2	0.5	2	3.1
1337DG_ARD03	Coal	15.7	7.4	2.8	5.5	17.8
1339DG_ARD03	Carbonaceous	14	22	0.82	1.6	5.9
1349D_ARD01	Clay & Soil	54.6	55.5	2.4	9	4.4
1349D_ARD02	Rem	6.4	0.82	0.5	1.75	7.8
1350D_ARD04	Coal	12.8	8.16	1.1	2.1	8.6
1361D_ARD01	Rem	9	2.5	1.2	1.9	13.3
1362D_ARD01	Rem	9.8	0.82	1	1.9	10.2
1406D_ARD03	Rem	15.8	34.3	5	7.2	31.6
1349_ARD01	Clay & Soil	54.6	55.1	19.7	26	36.1
1362_ARD04	Rem	9	0.82	0.1	0.3	1.1
1406_ARD10	Rem	1.2	22.04	0.15	0.45	12.5
1419_ARD07	Rem	1.6	16.3	0.28	0.65	17.5
1420_ARD05	Carbonaceous	2.2	1.6	1.1	2.1	50.0
1421_ARD02	Rem	3.2	2.45	0.5	1.5	15.6
1421_ARD05	Coal	5.1	329	0.25	0.65	4.9
1421_ARD07	Coal	3.2	24.5	0.25	0.8	7.8
1423_ARD05	Carbonaceous	1.6	9	0.38	1	23.8
1427_ARD03	Rem	5.6	0.82	0.4	2.3	7.1
1427_ARD05	Rem	6.1	30.2	1.4	2.3	23.0
1427_ARD10	Coal	5.6	31.8	0.5	2	8.9
1426_ARD10	Rem	0.6	9.8	0.13	0.6	21.7
1426_ARD12	Coal	5.8	61.2	0.8	2.2	13.8
1435_ARD01	Sand & Gravel	0	0.82	0.5	1.2	-
1435_ARD10	Carbonaceous	0	16.3	0.5	1.7	-
1437_ARD04	Rem	21.7	57.14	8.6	11.5	39.6
1438_ARD01	Rem	0.9	0.82	0.3	0.5	33.3
1440_ARD02	Rem	2	0.82	0.3	1	15.0
1440_ARD05	Rem	10.2	33.5	1.9	3.4	18.6

4.3 Sample Classification Schemes

4.3.1 Net Potential Ratio

Sample classification is based on the acid generating potential of a material. Whilst the potential may be assessed using the NAPP as described earlier, an alternative method is based on the net potential ratio (NPR). The NPR is defined as the ratio of ANC to MPA (Price, 2009). For waste rock, a sample may be classified using the NPR as follows:

- NPR < 1 – potentially acid forming (PAF)
- 1 < NPR < 3 – uncertain (UC)
- NPR > 3 – non acid forming (NAF)

Although the acid generating potential and ANC of a subset of samples was investigated with more detailed static test work, classification was based on the total sulphur content and ANC for all samples.

4.3.1.1 Overburden and Interburden

The calculated NPR values and the sample classifications based on the NPR of overburden and interburden samples are summarised in Appendix 5 and shown in Figure 4-13. The blue dotted line in the plot differentiates samples with characteristics that are NAF (NPR>3) from those that are UC. The black line differentiates the samples with PAF (NPR<1) characteristics from those that are UC. The samples below the black line also have a positive NAPP.

The results in Figure 4-13 indicate that:

- The majority of the samples were classed as NAF.
- The Carbonaceous group was the group with the largest fraction of samples classed as PAF.
- The Clay and soil group had the smallest fraction of samples classed as PAF.

The risk of acid drainage is dependent on the acid producing potential. Materials with low total S contents are associated with lower risk. For example, materials with total S content of <0.03% (MPA<0.9 kgH_2SO_4/t) can be considered to represent materials with insignificant risk whilst those with total S content of <0.1 wt% (MPA<3 kgH_2SO_4/t) can be considered to represent materials with low risk (note the crustal abundance of sulphur in a mean sediment is approximately <0.3 wt%). On this basis the number of samples with more than low risk changes:

- PAF samples decreases from 45 to 19 and
- UC samples decreases from 54 to 10.

The PAF samples of insignificant and low risk are within the shaded regions of Figure 4-13. The figure shows that the compliment of samples with more than low risk come from the Carbonaceous (9), Rem and Clay (9) and Soil (1) groups.

Table 4-2: Summary of overburden and interburden sample classification (NPR method) by group

	Number of Samples						Percentage of Samples					
	NAF	UC - LR	UC	PAF - LR	PAF	Totals	NAF	UC-LR	UC	PAF - LR	PAF	Totals
Carbonaceous	11	2	3	4	9	29	38	7	10	14	31	100
Clay and Soil	26	2	1	0	1	30	87	7	3	0	3	100
Rem	78	37	5	19	9	148	53	25	3	13	6	100
Sand and Gravel	9	3	1	3	0	16	56	19	6	19	0	100
Totals	124	44	10	26	19	223						

LR = Low Risk

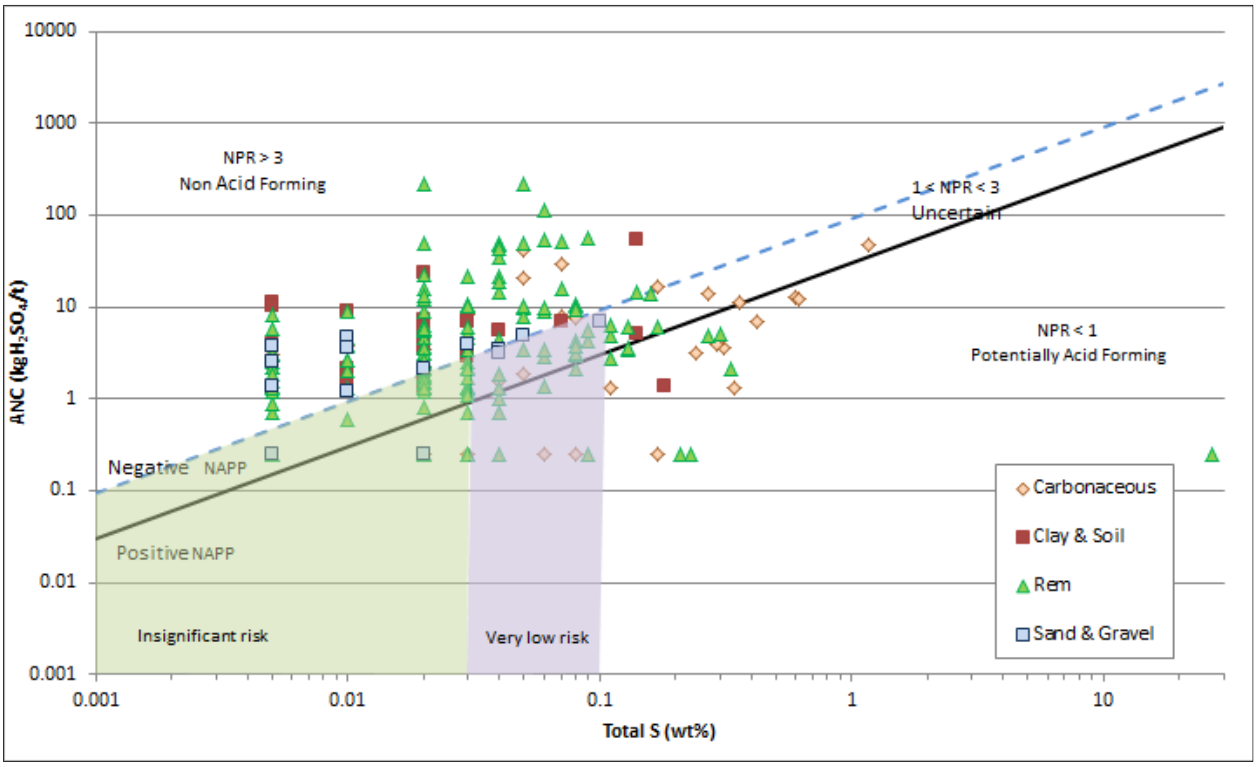

Figure 4-13: ABA plot for overburden and interburden samples

4.3.1.2 Roof and Floor, Coal and Washery Wastes

The distribution of NPR values of samples of roof and floor material, coal rejects, and coal and from are presented in Figure 4-14. The raw coal samples would potentially be representative of coal stockpile material or uneconomic coal that would be left in the pit. A portion of the roof and floor material, which may comprise non coal material immediately above and below the coal seams, would also remain in the pit if not selectively handled.

The calculated NAPP and NPR values and the sample classifications based on the NPR are shown in Appendix 5.

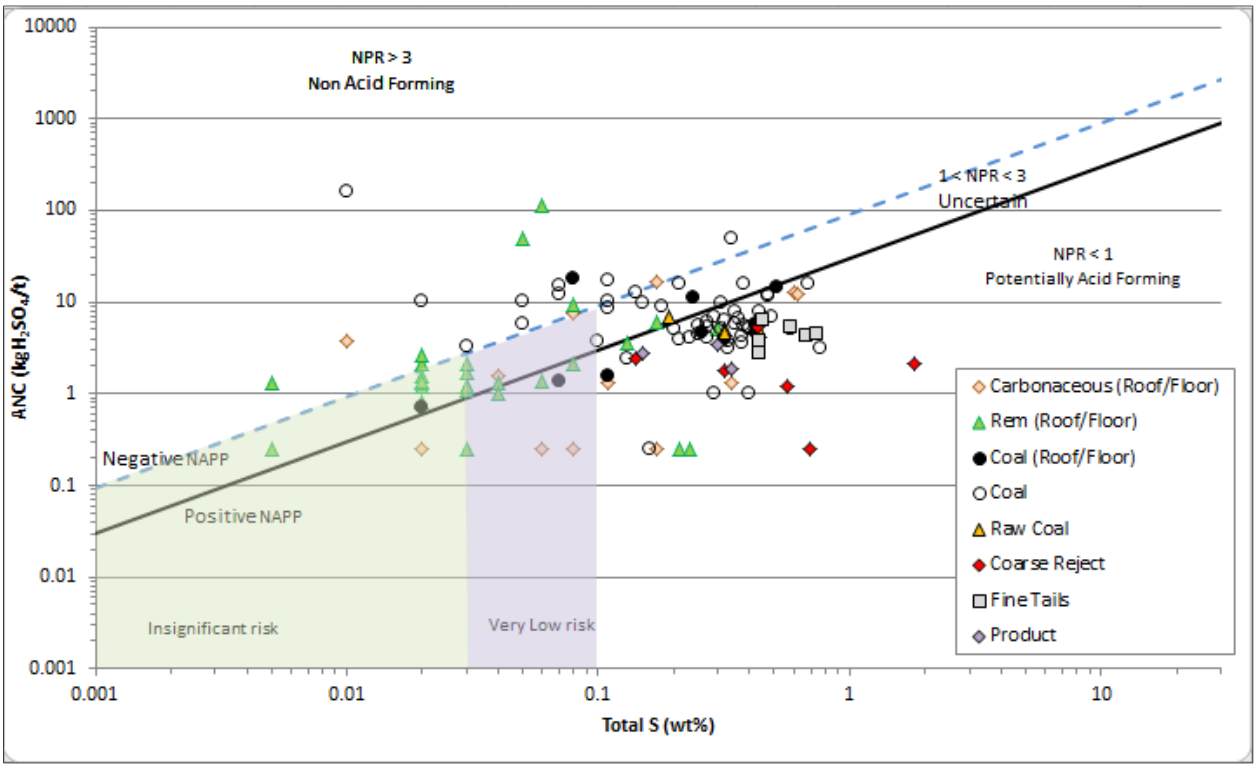

Figure 4-14: ABA plot for rejects, coal and roof and floor samples

Figure 4-14 shows only a minority of UC and PAF samples have total S contents that would be considered insignificant or very low risk (i.e. MPA<0.9 kgH_2SO_4/t and <3 kgH_2SO_4/t respectively). As the number of samples tested was relatively small no further distinction was made between the UC and PAF materials of lower and higher risk.

Table 4-3: Summary of roof and floor, coal and wastery waste sample classification (NPR method) by group

	Number of samples				Percentage of samples			
	NAF	UC	PAF	Totals	NAF	UC	PAF	Totals
Carbonaceous (Roof/Floor)	3	1	8	12	25	8	67	100
Coal (Roof/Floor)	1	2	8	11	9	18	73	100
Rem (Roof/Floor)	6	13	8	27	22	48	30	100
Coal	10	8	32	50	20	16	64	100
Raw Coal	0	1	3	4	0	25	75	100
Coarse Reject	0	0	6	6	0	0	100	100
Fine Reject	0	0	6	6	0	0	100	100
Product	0	0	3	3	0	0	100	100
Totals	20	25	74	119	-	-	-	-

4.3.2 Net Acid Generation Results

The single addition net acid generation (NAG) test measures how a sample could behave under highly oxidising conditions. The sample is contacted with the strong oxidant hydrogen peroxide. The peroxide oxidises the sulphides contained in the sample and thereby generates acid. Concurrently, neutralising minerals that may be present consume all or part of the acid generated. Following a predetermined contact time, the solution pH (NAGpH) is recorded and the NAG acidity of the sample is quantified by titration with a base (sodium hydroxide).

Titration to pH 4.5 generally accounts for acidity attributable to free acid (H_2SO_4) and ferric iron generated during the oxidation of sulphide minerals (that has not been neutralised by the contained ANC). Titration from pH 4.5 to pH 7 generally accounts for acidity associated with some metals, such as copper, that are soluble at pH 4.5 but practically insoluble at pH 7. Acidity attributed to unoxidised ferrous iron will also be accounted for in the titration up to pH 7 (ferrous iron remains soluble at pH 4.5; however oxidation to ferric by atmospheric oxygen accelerates as the pH increases).

There is a potential for generation of organic acids in the single addition NAG tests due to partial oxidation of carbonaceous materials (an effect that does not occur naturally in the environment). This can lead to misleadingly low NAGpH values and high acidities in the test, which is unrelated to acid generation from sulphide oxidation. This leads to misclassification of the samples acid forming potential. This effect is most likely to occur in samples where the organic carbon content is greater than 7% and the pyrite content is less than 0.7% (e.g. coal washery wastes (ACARP, 2008)).

The extended boil NAG test provides a more reliable measure of the acid forming potential of a carbonaceous sample. This test is carried out if the NAGpH of the single addition NAG test is less than 4.5. Additional hydrogen peroxide is added to a split of the NAG solution, which is boiled vigorously for several hours followed by a further measurement of the pH. A sample is classified as acid producing if the solution pH is still less than 4.5.

The acid potential of the sample is uncertain if the pH is greater than 4.5. A solution assay step is then carried out on the other split of the NAG solution for the main cations generated from acid generating (S) and acid neutralising (Ca, Mg, Na, K) processes. The net acid potential is calculated from the solution composition.

AMIRA (2002) described a method used to classify the rock samples according to their potential to be acid forming. The scheme takes account of both the NAGpH and the NAPP of the sample. The samples were classified according to the scheme shown in Table 4-4. The NAG results and the sample classifications are presented in Appendix 5.

Table 4-4: Acid-base accounting classification

Class	Sub-class	Description
NAF	NAF-Barren	As above, and also a low ANC (≤5 kgH_2SO_4/t). Such samples have little value with respect to mitigating the effects of acid production in other mine waste materials
	NAF	Samples with a negative NAPP value and a NAG pH of ≥4.5
PAF	PAF	Samples with a positive NAPP value and a NAG pH of <4.5
	PAF-LC	PAF materials associated with low NAG acidities ($NAG_{pH4.5}$ <5 kgH_2SO_4/t)
Uncertain	UC(PAF)	Samples with negative NAPP but giving NAG pH values <4.5
	UC(NAF)	Samples with NAPP ≥0 but giving NAG pH values ≥4.5. Possibly in these samples some of the sulphur present is in non-pyritic forms

S=sulphur; ANC=acid neutralisation capacity; NAPP=net acid producing potential; NAG pH=pH measured during net acid generation test.

4.3.2.1 Overburden and Interburden

NAG test results for 53 samples of overburden and interburden are shown in Figure 4-15. A second plot (Figure 4-16) shows more detail for samples within the NAPP range -60 to 60 kgH_2SO_4/t. Table 4-5 and Table 4-6 present the number and percentage of samples in each class.

The percentage of samples classified as PAF and UC in each lithology group is markedly less than in the NPR classification. For example, four percent of the Rem samples were PAF using the AMIRA classification scheme compared to 19% using the NPR scheme.

However, it should be noted that this may be a function of the smaller subset of samples chosen for NAG testing. In addition, due to the small number of samples in the Carbonaceous and Sand and Gravel groups the distribution of results may not be statistically representative of the wastes and more samples would need to be tested to confirm the result.

A summary of the sample classification using the AMIRA method is shown in Appendix 5.

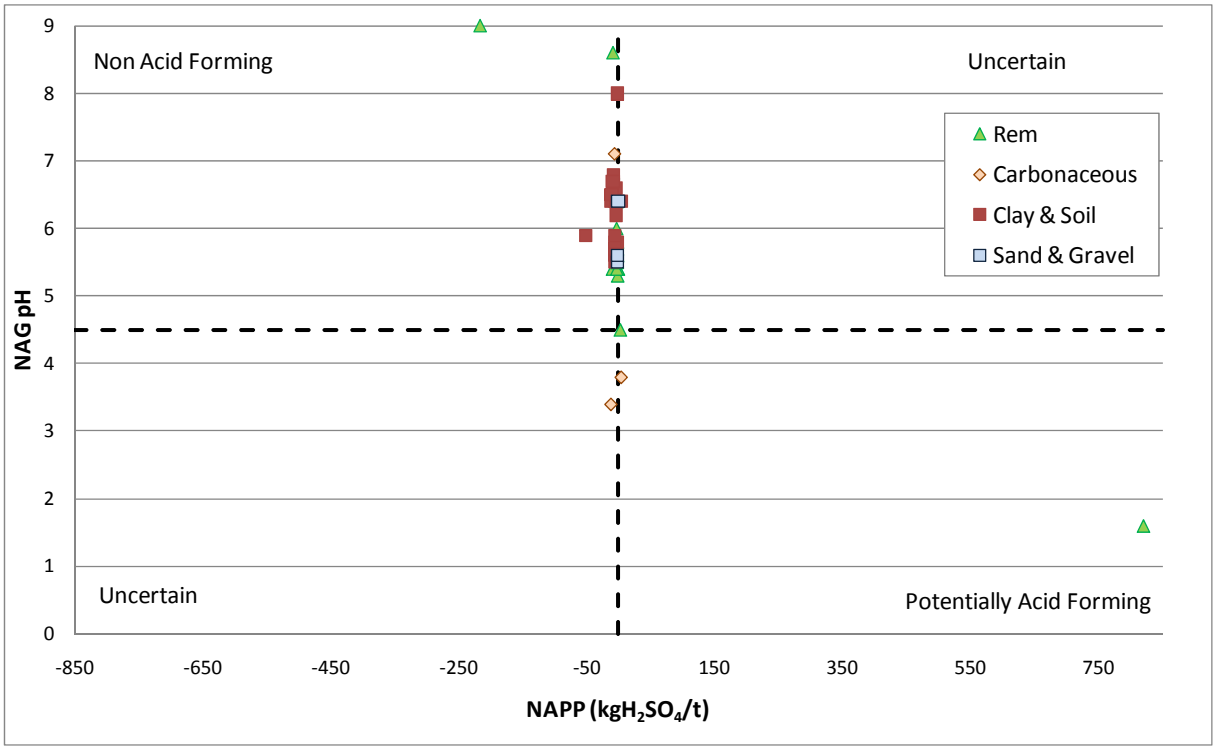

Figure 4-15: Geochemical classification plot for the overburden and interburden samples

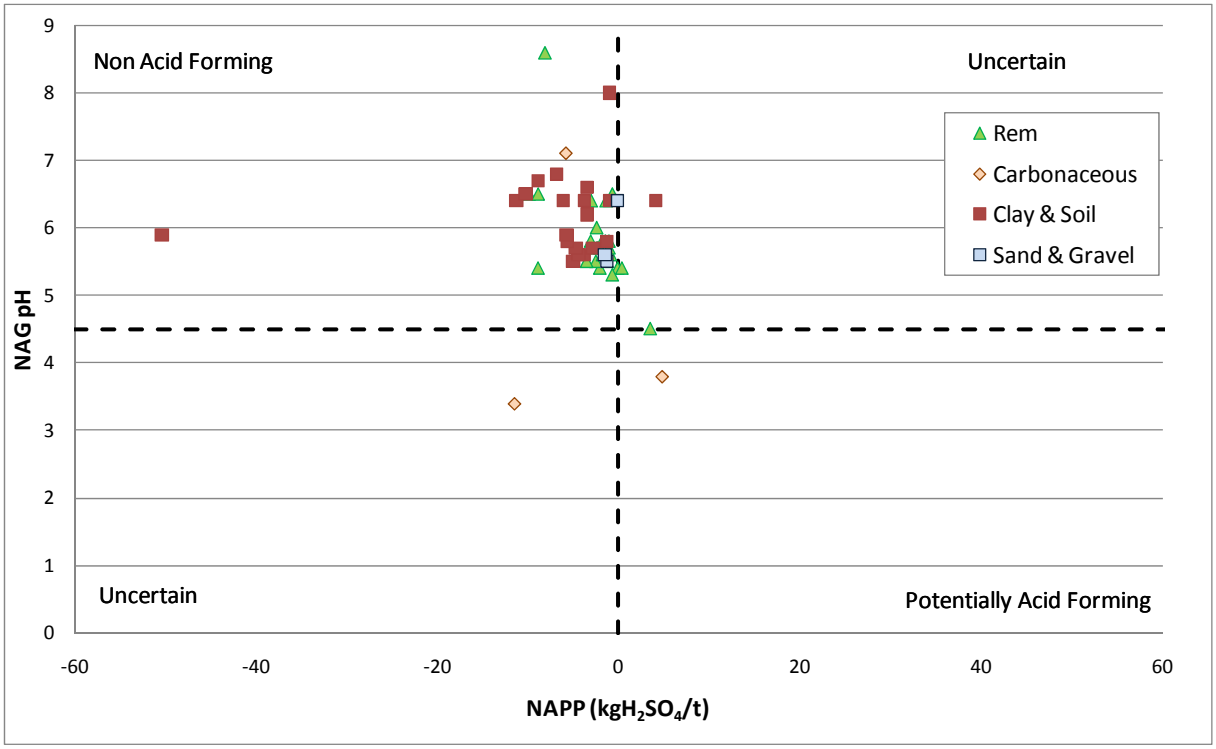

Figure 4-16: Geochemical classification plot for overburden and interburden samples (expanded scale)

Table 4-5: Summary of number of overburden and interburden samples in each AMIRA class

	NAF-Barren	NAF	UC (NAF)	UC (PAF)	PAF-LC	PAF	Totals
Carbonaceous	0	1	0	1	0	1	3
Clay & Soil	7	12	1	0	0	0	20
Rem	19	5	2	0	0	1	27
Sand & Gravel	3	0	0	0	0	0	3
Totals	29	18	3	1	0	2	53

Table 4-6: Summary of percentage of overburden and interburden samples in each AMIRA class

	NAF-Barren	NAF	UC (NAF)	UC (PAF)	PAF-LC	PAF	Total
Carbonaceous	0	33	0	33	0	33	100
Clay & Soil	35	60	5	0	0	0	100
Rem	70	19	7	0	0	4	100
Sand & Gravel	100	0	0	0	0	0	100

4.3.2.2 Roof and Floor, Coal and Washery Wastes

The classification of samples by the AMIRA method is presented in Figure 4-17. The number and percentage of samples in the various AMIRA classes are shown in Table 4-7 and Table 4-8.

The percentage of Rem group samples from the roof and floor material classed as PAF or PAF-LC is greater than that in the overburden and interburden samples (26% and 4% respectively), indicating that the Rem material in the roof and floor has a greater potential to form acid than the overburden and interburden materials.

The percentage of Carbonaceous group samples from the roof and floor material classed as PAF or PAF-LC was also greater than that in the overburden and interburden samples. However, the number of Carbonaceous samples from the overburden and roof and floor were only three and five respectively and the difference may not be statistically significant.

As for the overburden and interburden the percentage of samples of roof, floor and washery wastes classed as PAF or UC is less under the AMIRA classification scheme than the NPR scheme.

The majority of the coal roof and floor and coarse and fine washery waste samples were PAF. Significant fractions of Carbonaceous and Rem roof and floor materials were also UC or PAF. Therefore further investigation into the characteristics of the roof and floor materials should be carried out (i.e. kinetic testing) to further quantify their potential effects on water quality. The results of test work should be used to develop a waste management strategy to control the impact of these materials on drainage waters. SRK understands that HCPL have committed to selectively mining 1 m of roof and floor materials, where possible, and storing materials as per coarse rejects. They have also committed to completing a groundwater quality model for the final void by year five.

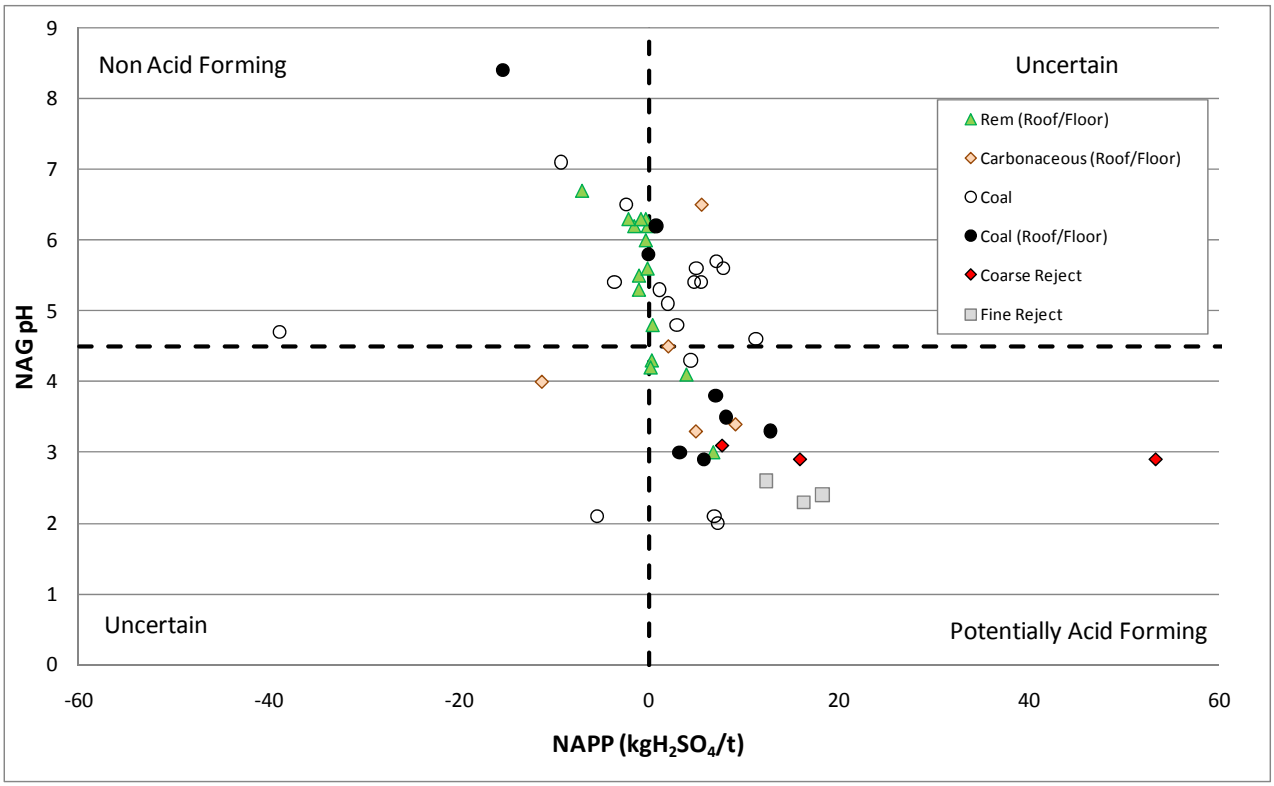

Figure 4-17: Geochemical classification plot for roof and floor, coal and reject samples

Table 4-7: Summary of number of roof and floor, coal and rejects samples in each AMIRA class

	NAF-Barren	NAF	UC(NAF)	UC(PAF)	PAF-LC	PAF	Totals
Carbonaceous (roof/floor)	0	0	2	1	1	1	5
Coal (Roof/Floor)	1	1	1	0	0	5	8
Coal	0	4	9	1	0	3	17
Fine Reject	0	0	0	0	0	3	3
Coarse Reject	0	0	0	0	0	3	3
Rem (Roof/Floor)	3	7	1	0	2	2	15
Totals	4	12	13	2	3	17	51

Table 4-8: Summary of percentage of roof and floor, coal and rejects samples in each AMIRA class

	NAF-Barren	NAF	UC(NAF)	UC(PAF)	PAF-LC	PAF	Total
Rem (Roof/Floor)	20	47	7	0	13	13	100
Carbonaceous (roof/floor)	0	0	40	20	20	20	100
Coal	0	24	53	6	0	18	100
Coal (Roof/Floor)	13	13	13	0	0	63	100
Coarse Reject	0	0	0	0	0	100	100
Fine Reject	0	0	0	0	0	100	100

4.4 Waste Classification

Masses of each lithology group were estimated based on information currently available and utilising the lithology logs from all resource holes within the proposed pit areas. Each hole was weighted by its respective area of influence determined by a cell de-clustering weighting methodology based on 900 m square cells.

The NPR and AMIRA classifications were then used to estimate the mass and the percentage of mass of each group in each class. The estimates are presented Table 4-9, Table 4-10, Table 4-11 and Table 4-12.

Material in the four non coal groups would be waste material. Some coal may lie in seams or plies that are not economic to mine and process and therefore may be a waste material. Some of the economic coal may be temporarily stockpiled and therefore may be a potential source of AMD while stored prior to being processed. The coal washery wastes produced from the coal will report to fine and coarse reject streams that will be disposed of on site and therefore may potentially form AMD.

NAF material or material classed as very low risk of contributing to acid production made up 90.4% of the total mass of the waste. A further 3.9% was classed as UC and therefore, 5.7% of the waste was classed as PAF. Of the 5.7% PAF material, 1.1% was from the Carbonaceous group, 3.8% was Rem and 0.8% was Clay and Soil.

Table 4-9: Mass (million tonnes) and percentage of mass of group in each NPR class

	Mass (million tonnes)						Percentage of Group Mass					
	NAF	UC - LR	UC	PAF - LR	PAF	Totals	NAF	UC - LR	UC	PAF - LR	PAF	Totals
Carbonaceous	297	54	81	108	243	784	38	7	10	14	31	100
Clay and Soil	4765	367	183	0	183	5498	87	7	3	0	3	100
Rem	7672	3640	492	1869	885	14558	53	25	3	13	6	100
Sand and Gravel	1260	420	140	420	0	2240	56	19	6	19	0	100
Totals	13,995	4,480	896	2,397	1,312	23,080	61	19	4	10	6	100

LR = Low Risk

Table 4-10: Percentage of total mass in each NPR class

	NAF	UC - LR	UC	PAF - LR	PAF	Totals
Carbonaceous	1.3	0.2	0.4	0.5	1.1	3.4
Clay and Soil	20.6	1.6	0.8	0.0	0.8	23.8
Rem	33.2	15.8	2.1	8.1	3.8	63.1
Sand and Gravel	5.5	1.8	0.6	1.8	0.0	9.7
Totals	60.6	19.4	3.9	10.4	5.7	100.0

Table 4-11: Mass (million tonnes) and percentage of mass of group in each AMIRA class

	Mass (million tonnes)								Percentage of group mass						
	NAF-Barren	NAF	UC (NAF)	UC (PAF)	PAF-LC	PAF	Total		NAF-Barren	NAF	UC (NAF)	UC (PAF)	PAF-LC	PAF	Total
Carbonaceous	0	261	0	261	0	261	784	Carbonaceous	0	33	0	33	0	33	100
Clay & Soil	1,924	3,299	275	0	0	0	5,498	Clay & Soil	35	60	5	0	0	0	100
Rem	10,245	2,696	1,078	0	0	539	14,558	Rem	70	19	7	0	0	4	100
Sand & Gravel	2,240	0	0	0	0	0	2,240	Sand & Gravel	100	0	0	0	0	0	100
Total waste	14,409	6,256	1,353	261	0	801	23,080	Total waste	62	27	6	1	0	3	100

Table 4-12: Percentage of total mass in each AMIRA class

Percentage	NAF-Barren	NAF	UC (NAF)	UC	UC (PAF)	PAF-LC	PAF	Total
Carbonaceous (roof/floor)	0	0	40	0	20	20	20	100
Coal (Roof/Floor)	13	13	13	0	0	0	63	100
Coal	0	24	53	0	6	0	18	100
Fine Reject	0	0	0	0	0	0	100	100
Coarse Reject	0	0	0	0	0	0	100	100
Rem (Roof/Floor)	20	47	7	0	0	13	13	100

4.5 Elemental Abundance and Solubility

4.5.1 Elemental Abundance

Quantitative elemental analysis of solid samples was undertaken to determine the abundance of elements in the samples. All samples were also leached with de-ionised water (solid:water ratio 1:3, Price, 2009) and quantitative elemental analysis was conducted on the leachate to identify readily soluble elements that may be flushed from the waste.

A direct comparison of the measured abundances of the elements was made with the average abundance of elements in the sediment documented by Bowen (1979). As the abundance of elements varies many-fold, a log base 2 index was developed to simplify comparison of measured abundances with average abundances. The index, called the global abundance index (GAI), was reported by Förstner (1993).

The GAI indicates which elements are 'enriched' in the sample with respect to a reference average abundance. The GAI is calculated using the following formula:

$$\text{GAI} = Int\left(\log_2\left(\frac{\text{Measured Concentration}}{1.5 \times \text{Average Abundance}}\right)\right)$$

An example of GAI values is provided in Table 4-13. In the table *n* is the ratio of the measured abundance in the sample to the reference material abundance.

Table 4-13: Ranges of the Ratio of the Measured Concentration to Average Abundance (n) and the Corresponding Global Abundance Index

n range	GAI
$1 < n < 3$	0
$3 \leq n < 6$	1
$6 \leq n < 12$	2
$12 \leq n < 24$	3

Zero or positive GAI values indicate enrichment of the element in the sample when compared to average-crustal abundances. As a general rule, a GAI of 3 or higher signifies enrichment that warrants further evaluation. GAI values are presented in Appendix.

Whole rock assay analysis of 304 samples determined that 1% of the samples had a GAI for Zn of 3, one sample had a GAI for Tl of 3 and 79% of samples had a GAI of greater than 3 for Te. Whilst these elements are enriched, further evaluation of their leachability is required (see Section 4.5.2) to assess whether they are present a risk to the environment as a result of being present in a leachable form.

4.5.2 Solute Release

Simple leach tests were carried out on 75 samples at a solid:water ratio 1:3 over a period of 24 hours (Price, 2009). The tests provide an indication of the solubility of elements and salts that may be present in the samples and a basis for an initial assessment of the potential for changes to water quality as a result of contact with the waste. Since the physical and chemical conditions of the leach test will not be the same as those expected in the 'as placed' environment (e.g. solubility constraints, liquid to solid ratio, etc), the leach composition is not expected to be representative of that which may develop in the field. The results cannot be directly extrapolated to predict the leachate quality expected to seep from a dump of the material, but are useful to provide an indication of the readily leachable elements that may be present.

The leachability of the elements was generally very low and the majority of resultant solutions had near neutral pH values as shown in Figure 4-18. Eight percent of solutions had acid pH (pH < 5). Twelve percent of solutions had a pH of less than 6 and all solutions had a pH of less than 8.

Some salinity was present in all the samples as indicated by the release of Na. Sulphate concentrations ranged from <1 (1 sample only) to 2940 mg/L. The average sulphate concentrations were 52 mg/L for the roof and floor, coal and coal washery waste samples and 34 mg/L for the overburden and interburden samples (excludes Rem sample containing 26.8% total sulphur).The presence of sulphates indicate that some sulphide mineral oxidation products were present in the samples. Only Na and SO_4 were present in the leach solution in any appreciable percentage of the element in the solid (i.e. around 10% or more). It is possible that these elements are associated with dissolution of readily soluble salts, or desorption from cation exchange sites on mineral surfaces (in the case of Na). Salinity release was expected to be short term since a comparatively large fraction of the Na was released into solution from the solid during the leach testing.

While the leach extraction test results cannot be used to directly estimate the water quality that would be released from the mine waste materials, the results can be used to indentify solutes that could potentially be released at significant concentrations. Therefore, the results are compared to Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC (2000)) only to identify solutes that potentially may be of significance. Note however that water quality predictions need to consider actual suite conditions and are not part of the current scope/report. Elements that exceeded ANZECC (2000) guideline values for human health or stock watering are shaded in Table 4-14.

Of the 75 samples submitted for leach testing, 16 contained elements that exceeded stock water guideline values. Parameters that exceeded the stock guideline values in some of the 16 samples are Al, As, Cd, Co, F, Ni, Se and SO_4. Generally, parameters that exceeded guideline values leached at a higher concentration from the overburden and interburden than from the roof and floor, coal and coal washery waste.

In summary, these results suggest that some solutes may potentially be released from the mine waste, coal and coal washery waste. The results indicate that some of the waste materials could release some solutes at concentrations that may exceed stock water quality guidelines. Understanding the potential implications on both surface and groundwater however will require that more detailed water quality predictions be completed to assess potential implications from these releases over time .

Table 4-14: Samples with parameter concentrations that exceed ANZECC guideline values

	Element	pH	Al	As	Cd	Co	F	Ni	Se	SO4
	Units	pH Unit	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	LOD	0.01	0.01	0.001	0.0001	0.001	0.1	0.001	0.01	1
ANZECC Stock Water Guideline		6.5 – 8.5	5	0.5	0.01	1	2	1	0.02	1000
Client Sample ID	SRK Group									
1252D_ARD05	Coal	7.95	0.25	0.002	<LOD	<LOD	0.4	0.002	0.04	35
1252D_ARD10	Rem	7.16	0.77	<LOD	<LOD	0.002	0.7	0.006	0.06	99
1262D_ARD05	Coal	6.5	0.57	0.002	0.001	0.616	0.3	0.682	0.14	293
1336D_ARD03	Rem	6.46	1.42	<LOD	<LOD	0.004	0.5	0.014	0.03	57
1339DG_ARD06	Rem	3	92.2	1.36	0.0076	0.622	<LOD	1.22	<LOD	2940
1419D_ARD03	Clay & Soil	6.16	0.55	0.001	<LOD	<LOD	0.2	<LOD	<LOD	56
1423D_ARD08	Rem	4.3	1.36	0.004	0.0028	1.06	0.6	1.17	0.01	233
1440R_ARD01	Clay & Soil	4.75	2	<LOD	<LOD	0.005	0.1	0.002	<LOD	5
75557	Rem	6.86	0.88	0.003	<LOD	<LOD	2.2	<LOD	<LOD	8
75567	Clay & Soil	6.08	0.23	<LOD	<LOD	0.002	0.4	0.001	<LOD	129
C3-4-5	Sand & Gravel	7.04	1.1	<LOD	0.0348	<LOD	0.2	<LOD	<LOD	10
Seam_C_Roof/Floor+0.250 mm	Coal	6.64	0.57	0.079	0.0021	0.14	0.5	0.031	0.3	19
Seam_DLL_S1.60+0.25	Coal	5.97	0.02	<LOD	0.0011	0.026	0.1	0.011	0.02	156
Roof/Floor_Seam_DLL	Coal	5.84	0.04	0.026	0.001	0.127	0.1	0.127	0.1	8
Seam_DU_S1.60+0.250 mm	Coal	6.37	0.02	0.001	<LOD	0.001	0.1	<LOD	0.05	125
Seam_DU_+0.250 mm_Roof/Floor	Coal	4.99	1.18	0.043	0.0031	0.288	1.1	0.323	0.17	34

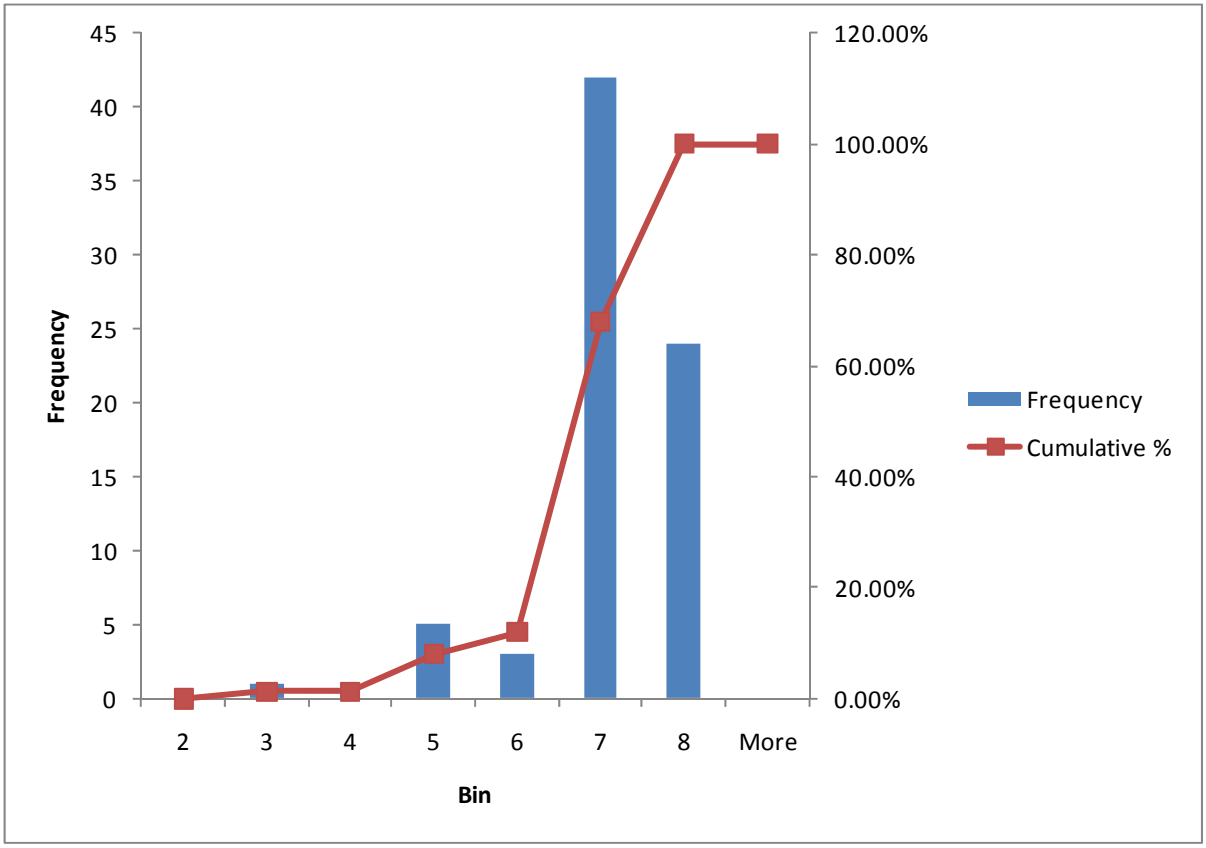

Figure 4-18: Distribution of pH of leach solutions

5. Geostatistical Analysis of AMD Properties

5.1 Definition of the problem

One objective of AMD testing is to identify material types that are PAF. Ultimately, knowledge of the locations and tonnages of PAF materials is required to enable planning of handling and placement during mining, stockpiling and backfilling. To address this on a step by step basis a series of questions need to be answered. These are listed in order of project stage (discovery through to operation) and in order of increasing sampling effort required. Step one relates to the definition of units or material types for AMD classification purposes. Step two relates to the sampling of those units.

1 Determine what needs to be sampled:

   a) Determine what defines the units in which are likely to be PAF

   b) Determine whether the units are present as discrete volumes that are selectable during waste mining or whether they are likely to be mixed in with other material when moved

   c) Define a level of material type classification at which AMD sampling and classification should take place.

2 Determine whether material classification data and AMD samples are sufficient in number and appropriately spaced to have:

   a) confidence in the global quantities/proportions of relevant units (from material classification information)

   b) confidence in the local sizes and locations of the relevant units (from material classification information)

   c) confidence in the global AMD parameter statistics (mean, variance and others) over the relevant units (from samples)

   d) confidence in the local spatial distribution and variability of AMD parameters within the relevant units (from samples and locations).

Geostatistical methods can assist in answering the questions listed under step two.

In most mining projects a much larger quantity of information is available on the material classification via geological logging than is available on the AMD parameters. Confidence in the quantities and proportions of specific geological units is often assumed to be adequate and not require verification by statistical or geostatistical methods.

The Alpha project has a large resource drilling database with the majority of holes geologically logged in detail. Therefore this geostatistical analysis report will not focus on the confidence in the quantities, proportions or locations of the geological units but will present the quantities as modelled (Appendix 3). The geostatistical analysis focusses on the confidence in the results derived from the AMD sampling and measurement of the total S content and ANC.

5.2 Methodology – assessing spatial variability

Geostatistical methods are best applied to ‘domains’ (or material types or units) that have a single statistical population with a single mode. These domains are typically defined by geological units each formed under a particular set of circumstances therefore potentially having a range of quality values distinctly different to other units.

The initial task in any geostatistical analysis is to group the available data into domains that have a logical rationale for containing similar values (eg. lithology). If sufficient data is available each potential domain is then analysed statistically to determine if the potential domain contains a ‘natural’ single population or if further classification is required. Also, domains are examined to see if they have similar enough statistics to be combined. For example two or more geologically different lithologies may have similar AMD properties and could therefore be assigned to a single domain for geostatistical analysis.

SRK grouped all lithology codes found in the resource database into sets of lithologies that are likely to have similar properties in terms of AMD characteristics. See Appendix 3 for listings of lithologies in each SRK group.

Histograms and summary statistics of lithology groups are presented in Appendix 11.

The spatial variability of values of total S and ANC were assessed using geostatistical techniques. These techniques are well established in the mining industry and used to estimate the spatial variability of parameters (regionalised variables) associated with resources and in quantifying the resource (e.g. coal, gold, iron ore).

If experimental variography does not show any structure or ranges beyond the smallest sample spacing then no spatial correlation exists between samples at or above the smallest sample spacing. This means that values of parameters at unknown locations cannot be interpolated or extrapolated with any confidence and the mean of all of the samples in the domain is the best estimate at any unknown location.

Experimental and model variograms for relevant SRK groups by weathering are presented in Appendix 13.

The NAPP and NPR were not assessed geostatistically as they are calculated values that rely on the underlying total S and ANC measurements. Decisions on the adequacy of the drill spacing are based on the estimated ranges of the total S and ANC experimental variograms (see technical notes section for discussion on variography).

EC and pH were not assessed geostatistically

It is not valid to calculate variograms on parameters that are non-additive such as pH and NPR (see technical notes section).

5.3 Methodology – assessing global statistics

In a classical statistical analysis a confidence interval on the mean of a distribution can be quoted. For example there is a 95% confidence that the mean of a particular group lies between X and Y. This is only valid if a distribution is near normal and not highly skewed or multi modal. It also requires a decision to be made on what is an appropriate interval for acceptance of what constitutes a ‘sufficient’ number of samples.

If the mean of a unit of interest is not well above or well below any threshold of interest then further analysis may be useful in determining the units overall properties.

To help understand the distribution of parameter values within groupings probabilities above any chosen threshold can be calculated from the available samples. The size of the selective mining unit also needs to be taken into consideration as this will change the variability of the parameter under consideration.

Probabilities of material being above certain Stot thresholds at sample and at likely selectivity volumes are presented in Appendix 11.

5.4 AMD Sampling

This analysis covers assay values for total S and Acid Neutralising Capacity (ANC) from 222 non coal and 55 coal samples selected by SRK. In addition to these one sample with extreme total sulphur of 26.8% was rejected as it appears to have come from a very small interval of only 4 cm length which was erroneously included in the sample requests.

These samples came from 35 holes as shown in . Five of the holes were only drilled to the base weathering and do not include any fresh material.

Also examined were 741 total sulphur records, from the coal seams, provided by Hancock Prospecting.

AMD sample drill spacing is highly variable () over the pit area with spacings from 300 m to 5000 m. An approximate average for the North South drill spacing is 4000 m and an approximate average for the east west spacing is 1000 m.

Coal total sulphur samples are available on a much denser grid of approximately 1000 m (Figure 2-2).

The samples were selected with the objectives of a) collecting sufficient samples to accurately characterise the variability and central tendency of AMD related parameters such as total S and ANC and b) achieving good spatial, geological and geochemical representation as recommended by Price, 2009 and DITR, 2007.

5.5 Conclusions

Of the total 222 samples excluding coal there is a discrete population of 20 samples with total S greater than 0.15 wt%. However, these do not fall completely into any SRK group or into any one Lithology.

The Fresh carbonaceous group contains low and high (average 0.3 wt%) total populations. The carbonaceous mudstone also contains both low and high populations evident from only 16 samples.

These bi-modal distributions affects the experimental variography. The variography must be treated with caution as mixing populations can confuse the apparent spatial continuity or lack of spatial continuity.

5.5.1 Sample Spacing for ANC

Experimental variography shows spatial correlation from 5000 m to 7000 m in all groups except the Fresh carbonaceous group. This indicates that current spacing is probably adequate for interpolation or extrapolation of ANC values at un-sampled locations for all groups except the fresh carbonaceous.

Sample spacing for ANC within the coal is adequate as the omnidirectional model range is approximately equal to the north south sample spacing of 5000 m.

5.5.2 Sample Spacing for Total S

Total S experimental variography shows no spatial correlation for the overall weathered material. Total S values in the weathered material average 0.03% with the probability of any one sample being greater than 0.1% total S of 9%. More detailed analysis of the weathered units is not considered necessary given the low levels of total S.

Experimental variography for total S in the fresh SRK Remaining (REM) lithology group shows no spatial correlation. This indicates that the total S in this group is highly variableover short distances and that the current drill spacing is insufficient to interpolate or extrapolate total S values at unsampled locations in the REM group with the number of samples currently available.

Experimental variography for total S in the fresh SRK Carbonaceous lithology group shows no spatial correlation. This indicates that the Total S in this group is highly variable over short distances and that the current drill spacing is insufficient to interpolate or extrapolate total S values at un-sampled locations in the carbonaceous group with the number of samples currently available. The predominant lithology in the carbonaceous group is carbonaceous mudstone (XM). SRK understands carbonaceous material will be visually identified, where practical, and stored in the pit with coarse reject materials.

The carbonaceous material makes up 3% of the total material 2.8% of which is in the fresh waste. It does not occur in a single well defined seam but occurs as multiple lenses of varying thickness and is in different positions in the profile in different holes (see graphical logs in Appendix 14).

Total S experimental variography for the overall fresh material (excluding coal) shows a range in the order of 3000 m (Figure A 28) but with a very high nugget effect. This indicates that the total S is highly variable over short distances but that the current sample spacing in the east west direction may be sufficient but that the sample spacing in the north south direction is probably too wide.

The distribution of the high total S within the overall fresh material is such that there are proportions of the material that may be problematic. This is quantified in Section 5.6.

Sample spacing for total S in the coal is adequate at 1000 m as modelled variogram ranges using both the SRK samples and the Hancock Prospecting samples are in the order of 4000 m to 6000 m.

5.6 Probabilities above thresholds and the support effect

It may not be always sufficient to make decisions on acid drainage potential from the average AMD parameter values of a rock group or lithology. Some samples within any one grouping may be above potentially problematic thresholds and some samples may be below. To help understand the distribution of parameter values within groupings probabilities above chosen threshold can be calculated from the available samples.

Experimental probabilities of a sample being above any selected threshold can be obtained from the inverse cumulative distribution of the samples in each group or lithology. The higher the number of samples, the higher the confidence in the probabilities.

Table 5-1: Total sulphur probabilities above thresholds by group (at sample volume)

		Thresholds			
Group / lithology	**number osf samples**	**0.10%**	**0.30%**	**0.50%**	**1%**
Weath all ex coal	105	9%	0%	0%	0%
Fresh all ex coal	117	17%	6%	1%	1%
Fresh Carbonaceous	27	41%	27%	8%	3%
Fresh REM	90	12%	1%	0%	0%
Coal SRK	55	80%	50%	14%	0%
Coal Other	741	100%	99%	70%	2%

The probabilities presented in Table 5-1 above relate to sample volumes. These are somewhat misleading as the waste will not be mined with a drill rig. As selective unit sizes (block sizes) increase any distribution will lose the highest highs and the lowest lows due to the volume variance effect. This 'squashes' the histogram of the distribution as the support size increases. The effect is termed the volume variance relationship and often referred to as the support effect (see Figure 5-1). This changes the proportions above any threshold that would be expected to result from selection of material at a particular volume (mining selectivity). If we can model a variogram then we can model the change of support effect and estimate distributions (histograms) at any given selectivity size.

In cases where no variogram can be modelled an almost pure nugget effect can be used or a likely model imposed.

Assuming a selective unit size of 100 m x 100 m x 2 m the probabilities are as shown in Table 5-2.

The results show that for a mining block of 100 x 100 x 2 m:

- The probability of a block of fresh carbonaceous material having an average total S content greater than 0.3 wt% (i.e. approximately the average crustal abundance of S) was only 6% and
- For the fresh Rem material its was <1%. For fresh Rem there was also <1% chance of the average total S content of block being greater than 0.1 wt%.

Table 5-2: Total sulphur probabilities above thresholds by group (100 m x 100 m x 2 m block)

		Thresholds			
Group / lithology	**number osf samples**	**0.10%**	**0.30%**	**0.50%**	**1%**
Weath all ex coal	105	0%	0%	0%	0%
Fresh all ex coal	117	23%	1%	0%	0%
Fresh Carbonaceous	27	92%	6%	0%	0%
Fresh REM	90	0%	0%	0%	0%
Coal SRK	55	100%	39%	0%	0%
Coal Other	741	100%	100%	86%	0%

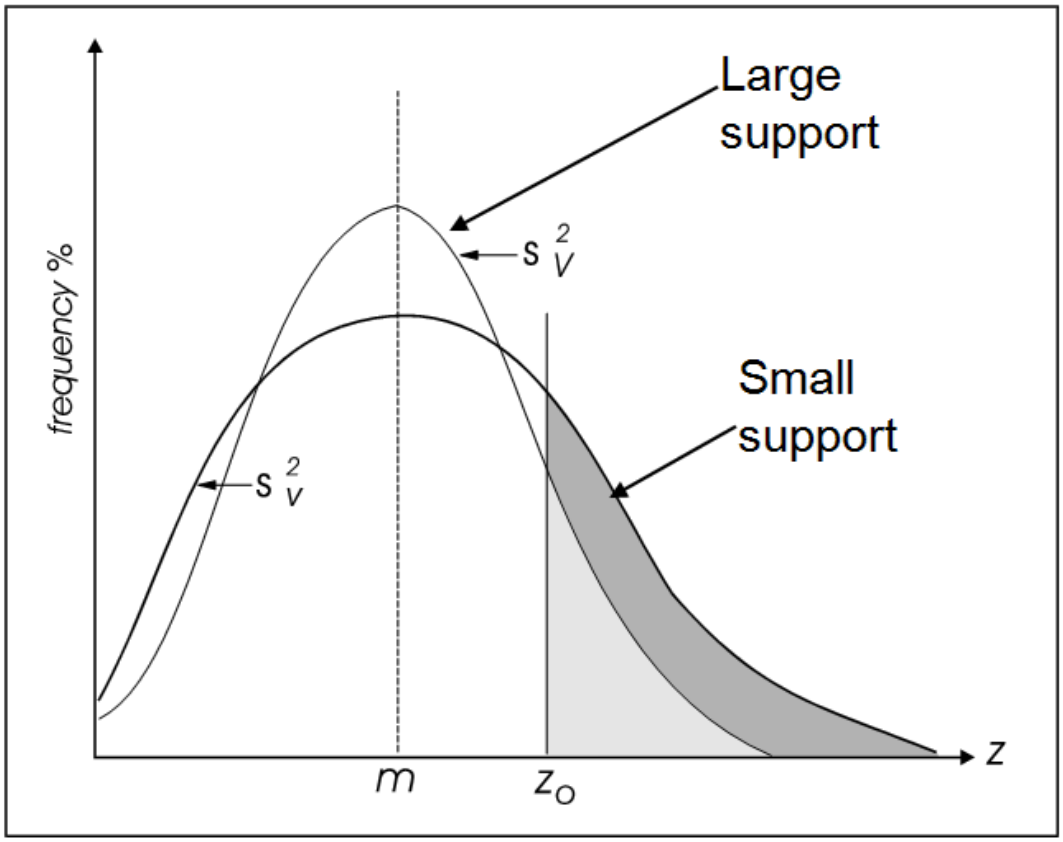

Figure 5-1: Support effect on the histogram

5.7 Recommendations

Infill sampling in the north south direction is recommended to complete coverage of pit area at sub 5000 m spacing. SRK understands that an additional 5 holes are currently planned that would assist in addressing this. SRK also understands HCPL have committed to an infill drilling program that will focus on the area to be mined during the first five years of mining when tailings will go to the TSF. The upcoming AMD assessment for Kevins Corner can also be utilised to add to the database for geostatistical assessment.

Aside from coal, the carbonaceous units contain the highest total S values but form a relatively small proportion, approximately 3%, of the fresh waste. A better understanding of the spatial locations and thickness of the various carbonaceous units is required to understand if they are likely to be mined in significant volumes and separately or will be mixed in with the majority of waste material. SRK understands that HCPL have committed to selective mining of potentially problematic units if they can be visually identified.

6. Kinetic Leach Columns

Kinetic testing is generally conducted on a small number of selected individual samples and/or composite samples after static testing (screening) of a larger number of samples has been completed. Kinetic tests are carried out to determine the rate of sulphide oxidation (estimated from sulphate production) and to verify the geochemical conditions that could lead to acid production, e.g. establishing the minimum ratio of acid neutralising potential (NP) to acid potential (AP) for which net neutral conditions would be maintained. The testing generally also yields information related to geochemical controls on solute release and relative rates of metals release that can potentially be used in scale up calculations for long term water quality predictions. Kinetic tests may require several months to several years of operation before they yield conclusive results.

Kinetic leach columns were operated for five samples of coal and coarse/fine reject samples as bulk materials may represent some tangible risk of acid generation at the Alpha Project and will need to be well managed. The five samples comprise three samples of coarse reject, one sample of blended raw coal and a composite sample of fine tailings. The columns have been operated over a period of eight weeks to date although laboratory results are currently only available for five weeks. Initial indications from test work to date may be summarised as follows:

The following washery waste samples arising from the Alpha test pit were submitted for mineralogical assessment and kinetic leach column test work:

- C_Seam_S1.60 +0.250 mm (Coarse Reject)
- Seam_DLL_ S1.60+0.25 (Coarse Reject)
- Seam_DU_ S1.60+0.250 mm (Coarse Reject)
- Blended raw coal
- Composite sample

The composite sample consisted of fine tailings material from samples Alpha_C-0.250 mm, Alpha_DLL-0.250 mm and Alpha_DU-0.250 mm.

6.1.1 Mineralogical Assessment

As the mineralogy is a control on the rates of acid production and acid neutralisation, subsamples of the the five column tested samples were submitted for powder XRD analysis. The assessment included determineation of the identity and concentration of sulphides (potentially acid forming) or carbonates (possibly acid neutralising). The samples were fine powders of about 5 g. Sub-samples were weighed and an internal standard (corundum) added to produce specimens that contained 10 wt% internal standard.

Any poorly diffracting, non-diffracting or unidentified phases were estimated in the residual as the amorphous/unidentified portion. There may exist unidentified minor phases which will be part of the residual.

The results of the mineralogical assessment are shown in Appendix 12 and summarised in Table 6-1.

Table 6-1: Results of the mineralogical assessment

	Phase Concentration (wt%) ** for Client Sample ID				
Phase	**C_Seam_S1.60 +0.250 mm**	**Seam_DLL_ S1.60+0.25**	**Seam_DU_ S1.60+0.250 mm**	**Blended raw coal**	**19880-1-2-3-Comp.**
Amorphous/Unknown*	43.1	28.5	42.1	85.4	81.3
Quartz	4.2	2.3	4.2	3.3	2
Pyrite	0.5	3	1.1	-	0.8
Siderite	1.9	5.9	2.6	1.8	3.9
Brookite	0.7	0.8	0.5	-	-
Magnetite	0.4	1	-	-	0.5
Titanium oxide, low	1.1	1.5	1.3	0.2	0.3
Muscovite	1.9	-	2	-	-
Kaolinite	46.2	57.1	46.2	9.2	11.2
Totals	100	100.1	100	99.9	100

* amorphous/non-diffracting/unknown is calculated by difference

** some values may not be significant (near estimated standard deviation ~ 0.2 wt%)

"– " not detected

Further, more detailed assessment was carried out to investigate the composition of the amorphous material by scanning electron microscopy (SEM) and XRD of the clay fraction present in the sample. The assessment concluded that the amorphous group generally comprised clay minerals and coal particles. The major clay was identified as kaolinite and the amorphous group as disordered smectite.

The majority of the amorphous phase in the fine tailings composite comprised coal with a bedding of aluminosilicate (phyllosilicate) minerals in a matrix. No disordered clays were identified in the XRD clay pattern.

Sulphides in the form of pyrite were identified in four of the five samples at concentrations between 0.5 and 3%. The complete oxidation of the pyrite in these samples would generate between 8 and 50 kgH_2SO_4/t acidity.

Carbonates in the form of siderite were also identified in the samples. Whilst some carbonates neutralise acidity, siderite is not expected to and is therefore unlikely to contribute to the ANC of the sample.

6.1.2 Column Set Up and Operation

The mass of sample packed into the columns ranged between 0.7 and 2 kg. Laboratory grade deionised water was applied to each column once a week. The leachate was tested for pH, EC, SO_4 and elemental composition. The full suite of analytes and the results of testing are shown in Appendix 13.

Plots of the molar ratio and pH of the leach solution for the first five weeks of operation are shown in Figure 6-1 and Figure 6-2 for a sample of coarse reject and the fine tailings composite respectively. Acid generation is occurring from the coarse reject samples DLL_S1.60+0.25 (Figure 6-1) and DU_S1.60+0.250 mm which have acidic leachate at pH 3.6 and pH 4.4 respectively. The pH of the leachate from the remaining columns is in the near neutral to mildly acidic range between pH 5.3 and 6.

The molar ratio greater than 1 indicates that rate of sulphate generation is in excess of dissolution of the neutralising potential. The rates of sulphate production and calcium and magnesium release can be used to infer depletion time of acid generation and neutralisation capacities when more data is available.

The concentration of sulphate in the leach solution from a sample of coarse reject and fine tailings is shown in Figure 6-3 and Figure 6-4. The concentration of sulphate from the coarse rejects columns was greater than 300 mg/L in the initial rinse but has since declined to around 100 mg/L. The sulphate concentration in the leachates from the fine tailings is erratic ranging between 12 and 254 mg/L.

These data only provide an initial indication of the materials characteristics. At this stage the results cannot be directly extrapolated to predict the leachate quality expected to seep from a dump of the material and should not be compared to water quality guideline values. Data generated from the longer term operation of the columns would be used to assess the characteristics of the material (e.g. depletion rates of acid generating and acid neutralising phases and elemental dissolution rates). The data should be used in conjunction with a number of assumptions to allow scale up from laboratory conditions to those expected in the field as part of a more detailed water quality assessment.

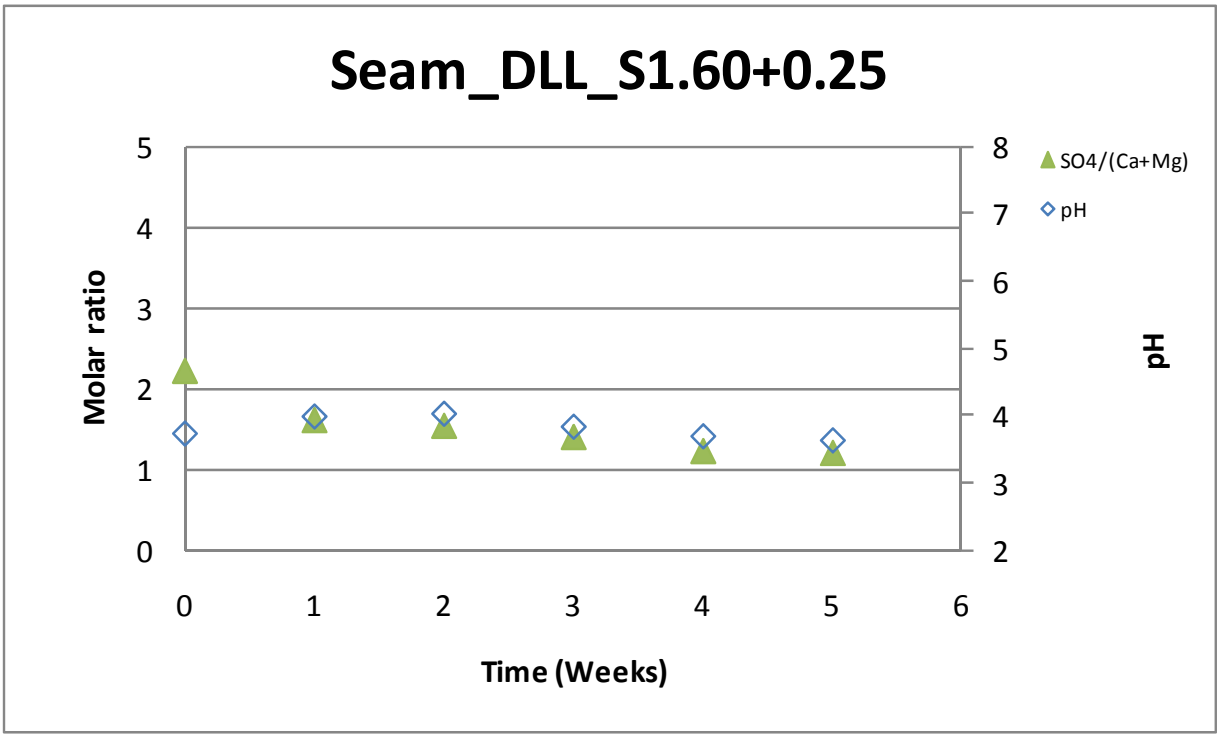

Figure 6-1: Molar ratio and pH of coarse reject leach solution for first five weeks of column operation

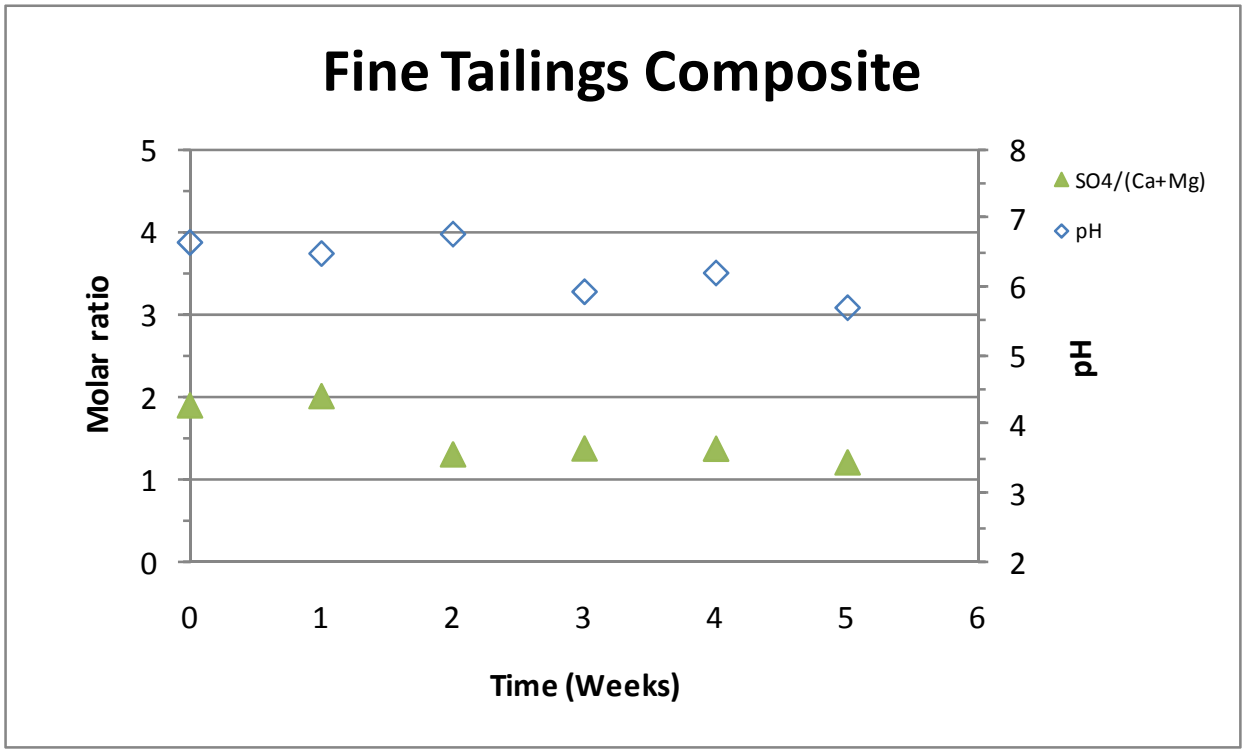

Figure 6-2: Molar ratio and pH of fine tailings leach solution for first five weeks of column operation

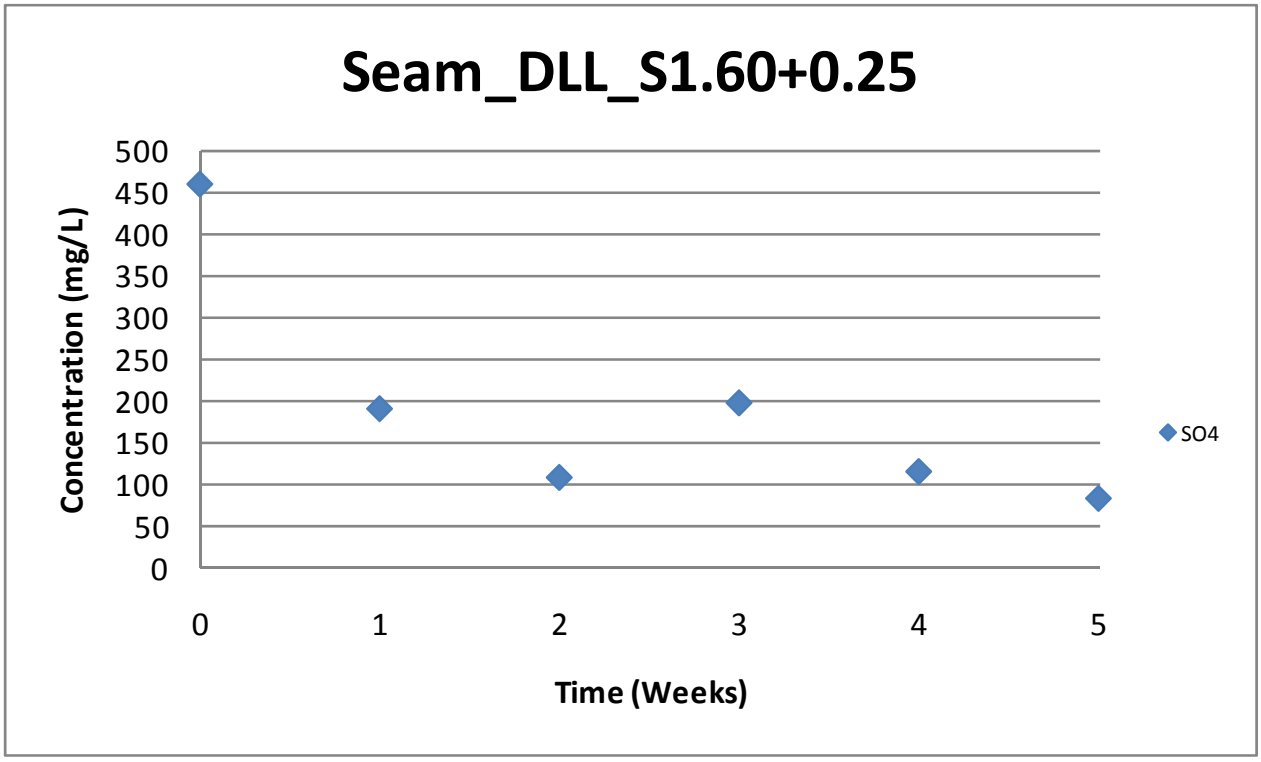

Figure 6-3: Sulphate concentration in coarse reject leach solution for first five weeks of column operation

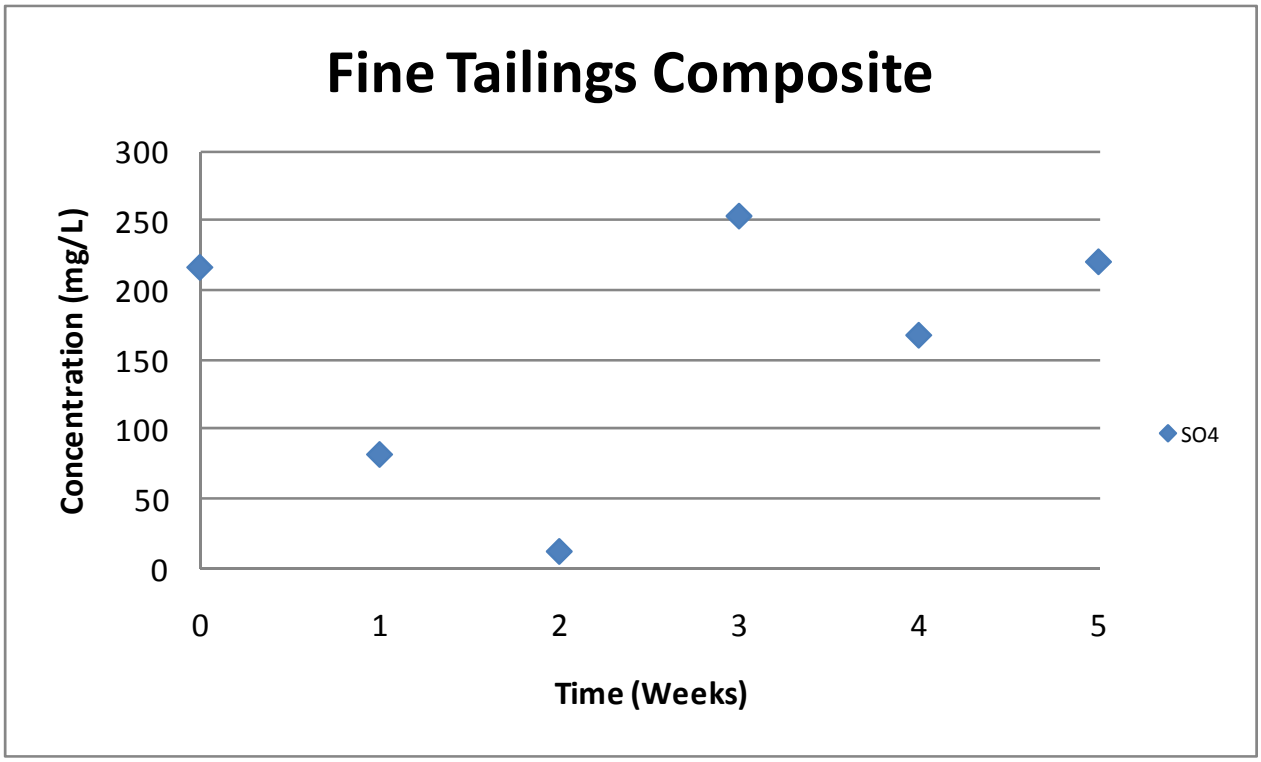

Figure 6-4: Sulphate concentration in fine tailings leach solution for first five weeks of column operation

7. Dispersivity Assessment

7.1.1 Introduction

Sodic soils can be dispersive when wet. In non-dispersive soil, the clay fraction remains flocculated in still water, and the water needs to be flowing above a threshold velocity to cause erosion. By contrast, there is no threshold velocity for dispersive soil, the clay particles go into suspension even in still water, and, therefore are highly susceptible to erosion and piping.

The potential for dispersivity is determined primarily by the mineralogy and chemistry of the clay fraction of the material, and by the dissolved salts in the pore and eroding fluids. The presence of exchangeable sodium is the principal chemical factor contributing to the soil dispersion. The exchangeable sodium percentage (ESP) is determined by measuring the concentration of all the exchangeable cations (Cation Exchange Capacity or CEC) in the soil and expressing the amount of exchangeable sodium as a percentage of the CEC.

Another property that governs the susceptibility of clayey soils to dispersion is the total content of dissolved salts (TDS, also assessed indirectly as electrical conductivity, EC) in the soil pore or eroding water. Generally, the lower the TDS or EC, the greater the susceptibility of sodium saturated soils to dispersion. Soils with high content of dissolved salts may remain flocculated even if the ESP is high.

Thus, for a given eroding fluid, the boundary between the flocculated and deflocculated (when dispersion can occur) states depends on the mineralogy and sodium content of the clay, the salt concentration of pore water and the eroding water.

Dispersion is assessed for mine waste materials as the rapid erosion of these materials can cause tunnel erosion and gullying in the waste dumps, which can affect their long term stability and sustainability. In addition to having a high susceptibility to gully erosion, sodic soils can also show severe surface crusting, low infiltration and hydraulic conductivity and hard, dense subsoils.

7.1.2 Testing for Dispersivity

Dispersivity can be assessed by means of chemical tests to ascertain potential causes of dispersion, or by physical tests to observe the effect of dispersion. It is recommended that a variety of tests be conducted, because dispersion is often not well identified by a single test.

For this project, three tests were conducted to determine the dispersion potential for the materials.

- Exchangeable sodium percentage (ESP) and cation exchange capacity (CEC)
- Electrical conductivity (EC)
- Emerson aggregate test.

For the ESP and CEC a sub-sample of material was dried and pulverised to better than 85% passing 75 microns as pulp. The EC (1:5) was also performed on the pulp. The Emerson aggregate test was tested “as received” with no further sample preparation.

An ESP greater than 6% may indicate dispersive properties, and greater than 15% indicates highly dispersive properties. However, factors such as clay type (determined indirectly from the CEC) and total dissolved salts (assessed using the EC) govern the overall behaviour of the material. Materials with a CEC less than 15 meq/100g are generally classified as non-dispersive (Gerber and von Maltitz Harmse, 1987). A high dissolved salt content may mask the effect of the high sodium content, which can cause soils with a high ESP to behave as a non-dispersive material.

A chart for predicting dispersion based on the ESP and EC is given in Figure 7-1 (Rengasamy et al. 1984). This takes the sodium percentage as well as the effect of dissolved salts into consideration. Materials with low ESP are classed as non-dispersive; materials with high ESP and low EC are classed as dispersive; and materials with high ESP and high EC are classed as potentially dispersive. Soils in the last category can revert to a dispersive behaviour by either leaching of the high salt content, or by mechanical re-working of

the materials. (The chart shows EC in units dS/m, converted from the laboratory test values reported in units of µS/cm by dividing by 1000.)

Figure 7-1 can be used as a guide for the dispersive nature of many soils. However, it was developed specifically for the surface soils for red-brown earths in south eastern Australia and this should be considered when using it to assess sub-surface materials.

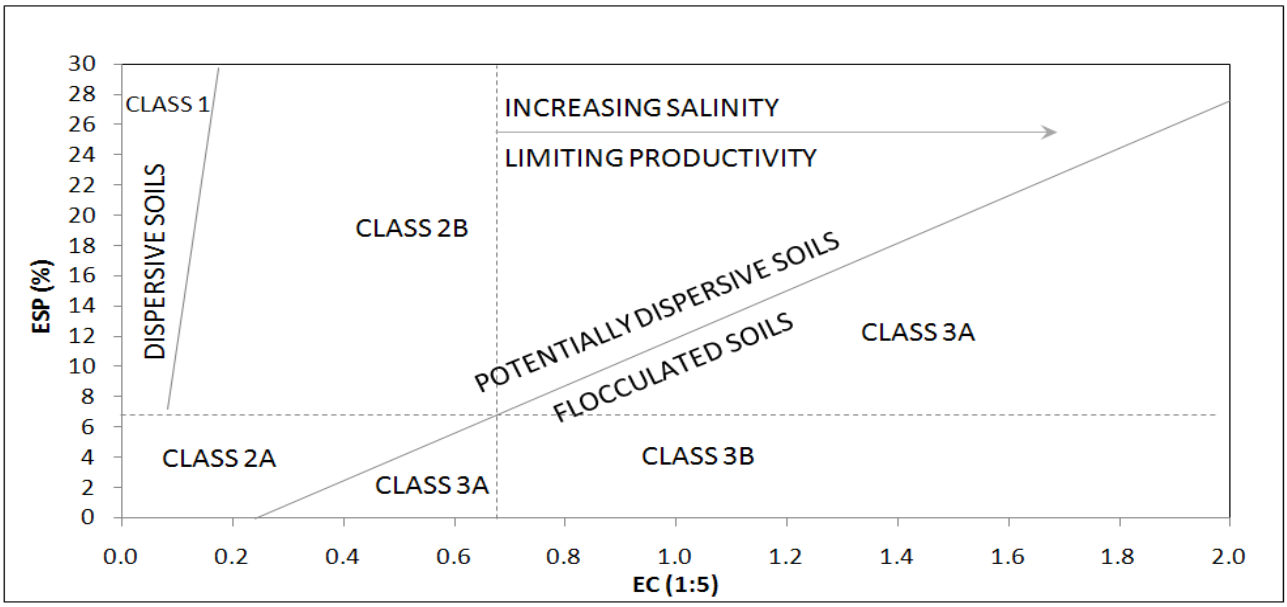

Figure 7-1: Chart for predicting soil dispersion based on exchangeable sodium percentage (ESP) and electrical conductivity (EC in dS/m)

The Emerson aggregate test (also called the crumb test) is a simple test in which a block of soil (about 2cm in diameter) is placed in still water and the reaction between soil and water (slaking or dispersion) noted. If no reaction occurs, the sample is remoulded, then shaken and the reaction observed, and also tested for gypsum Appendix 15 shows a flow chart for the testing and classification of soils in the Emerson aggregate test and also shows examples of highly dispersive, slightly dispersive and non-dispersive samples in the Emerson aggregate test.

7.1.3 Sample Selection

Fifteen samples from the Alpha test pit area were tested in January 2010. Thirty-nine samples were selected for dispersivity testing from the broader Alpha project area in June 2010. The samples were selected to cover all major material types and weathering grades, but with emphasis on materials more likely to show dispersive behaviour.

Table 7-1: Sample selection

Lithology Group	Rock type	Number of samples
Coal	Coal	4
	Washery waste	3
Clay and Soil		9
Carbonaceous		7
Remaining	Claystone	13
	Mudstone	4
	Siltstone	7
	Sandstone	5
	Tuff	2

7.1.4 Test Results

Test results are summarised in, Appendix 17 and an interpretation of the dispersivity of each sample given in Table 7-2.

Table 7-2: Interpretation of results

Sample ID	Lithology Group	Rock Type	ESP vs EC Chart	CEC and ESP	Emerson Test	Assessed Dispersivity
1440R_ARD09	Carbonaceous	Carb. clay	P	N	S	Slightly dispersive
1336D_ARD02	Carbonaceous	Carb. mudstone	D	N	S	Non-dispersive
1421D_ARD03	Carbonaceous	Carb. mudstone	P	D	D	Dispersive
1435D_ARD10	Carbonaceous	Carb. mudstone	D	N	P	Non-dispersive
1262D_ARD04	Carbonaceous	Carb. sandstone	P	N	N	Non-dispersive
1423D_ARD05	Carbonaceous	Carb. shale	P	N	S	Non-dispersive
1424D_ARD02	Carbonaceous	Carb. shale	P	D	P	Slightly dispersive
1277D_ARD03	Clay and soil	Clay	P	D	D	Dispersive
1349D_ARD01	Clay and soil	Clay		D	D	Dispersive
1411D_ARD01	Clay and soil	Clay	P	D	D	Dispersive
1419D_ARD03	Clay and soil	Clay	P	D	S	Slightly dispersive
1427D_ARD02	Clay and soil	Clay	P	D	D	Dispersive
1435D_ARD02	Clay and soil	Clay	P	D	D	Dispersive
1296L_ARD 10,11,12	Clay and soil	Clay	P	D	-	Slightly dispersive
1296L_ARD 19,20	Clay and soil	Clay	P	D	D	Dispersive
1296L_ARD36,37	Clay and soil	Clay	P	N	S	Slightly dispersive
1296L_ARD 23,24	Remaining	Claystone	D	N	P	Non-dispersive
1327D_ARD 10	Remaining	Claystone	D	N	N	Non-dispersive
1339DG_ARD0	Remaining	Claystone	P	N	N	Non-dispersive
1339DG_ARD0	Remaining	Claystone	P	D	D	Dispersive
1350D_ARD03	Remaining	Claystone	P	N	D	Dispersive
1362D_ARD02	Remaining	Claystone	P	D	N	Slightly dispersive
1413D_ARD03	Remaining	Claystone	P	N	N	Non-dispersive
1418D_ARD02	Remaining	Claystone	P	D	D	Dispersive
1437R_ARD01	Remaining	Claystone	P	N	S	Non-dispersive
1437R_ARD02	Remaining	Claystone	D	N	N	Non-dispersive
1439R_ARD01	Remaining	Claystone	P	N	S	Slightly dispersive
1439R_ARD08	Remaining	Claystone	P	N	S	Non-dispersive
1440R_ARD03	Remaining	Claystone	P	N	S	Non-dispersive
1252D_ARD10	Remaining	Mudstone	P	D	D	Dispersive
1277D_ARD04	Remaining	Mudstone	P	D	S	Slightly dispersive
1327D_ARD 9	Remaining	Mudstone	P	D	S	Slightly dispersive
1337DG_ARD 18	Remaining	Mudstone	P	D	S	Slightly dispersive
1262D_ARD03	Remaining	Sandstone	P	N	N	Non-dispersive
1296L_ARD 40,41	Remaining	Sandstone	P	D	D	Dispersive
1327D_ARD 12	Remaining	Sandstone	P	N	-	Non-dispersive
1337DG_ARD 17	Remaining	Sandstone	P	D	D	Dispersive

Sample ID	Lithology Group	Rock Type	ESP vs EC Chart	CEC and ESP	Emerson Test	Assessed Dispersivity
1411D_ARD04	Remaining	Sandstone	P	N	N	Non-dispersive
1419D_ARD07	Remaining	Sandstone	P	N	D	Slightly dispersive
1426D_ARD10	Remaining	Sandstone	D	N	P	Non-dispersive
1337DG_ARD 24	Remaining	Siltstone	P	D	-	Slightly dispersive
1406D_ARD03	Remaining	Siltstone	D	N	P	Non-dispersive
1419D_ARD04	Remaining	Siltstone	D	N	P	Non-dispersive
1435D_ARD04	Remaining	Siltstone	D	N	S	Non-dispersive
1438R_ARD01	Remaining	Siltstone	D	N	P	Non-dispersive
1423D_ARD10	Remaining	Tuff	P	D	S	Slightly dispersive
1438R_ARD03	Remaining	Tuff	P	D	D	Dispersive
1421D_ARD07	Coal	Coal, dull	P	D	S	Slightly dispersive
1426D_ARD12	Coal	Coal, dull	P	N	S	Slightly dispersive
1435D_ARD06	Coal	Coaly mudstone	P	D	P	Slightly dispersive
1425D_ARD03	Coal	Sooty coal	P	N	S	Non-dispersive
img-Z177437	Coal	Washery waste	P	N	N	Non-dispersive
img-Z177437	Coal	Washery waste	D	N	-	Non-dispersive
img-Z177437	Coal	Washery waste	D	N	-	Non-dispersive

Where D = dispersive, S = slightly dispersive, P = potentially dispersive and N = non-dispersive

ESP and EC CHART

The ESP versus EC chart given in shows that many samples would be classed as potentially dispersive (Class 2B) due to their exchangeable sodium and electrical conductivity characteristics. This indicates that the materials currently may show low dispersivity characteristics, but may become dispersive when leached without the addition of calcium compounds, and if there is no generation of electrolytes due to mineral weathering.

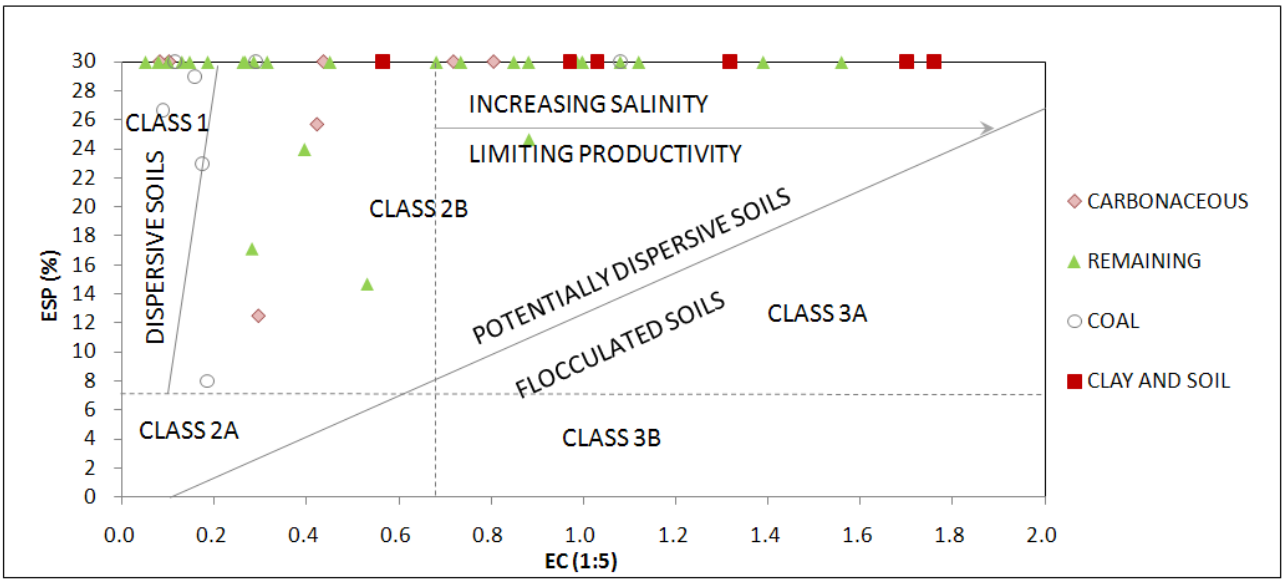

Figure 7-2: ESP and EC (dS/m) chart (after Rengasamy et al., 1984)

ESP and CEC

Samples with a CEC less than 15 meq/100 g are classified as non-dispersive because the material chemistry is not conducive to dispersive behaviour. The remaining samples all has ESP values greater than 12%, with the majority greater than 20%. These were classified as dispersive or highly dispersive.

EMERSON AGGREGATE TEST

A reasonable correlation was achieved between the Emerson aggregate test and chemical tests.

Samples which showed a highly dispersive results in the Emerson Test (Class 1) also classified as dispersive using the chemical tests and those which gave completely non-dispersive results (Class 5 and 6) also showed low CEC values. Samples which showed a slight or potential reaction (Class 2 and 3) showed variable CEC, EC and ESP values.

OVERALL CLASSFICATION

An overall classification of dispersive, slightly dispersive and non-dispersive was assigned according to results of the above tests. This is given in Table 7-2.

It should however be noted that most materials did show very high ESP values, and thus have the potential to become dispersive if leached without the addition of calcium compounds, and if there is no generation of electrolytes due to mineral weathering

7.1.5 Discussion and Conclusion

The fresh carbonaceous mudstone, shale and sandstones were generally non-dispersive, but when weathered do show slightly dispersive behaviour.

The clay and soils were dispersive- with all samples giving dispersive or slightly dispersive results.

The coal and washery waste materials were generally completely nondispersive, but one sample (sooty coal) was found to be dispersive.

The remaining group was examined for each rock type. The claystone, mudstone and siltstone showed a large variability in dispersivity results for both weathered and fresh rock, with approximately equal numbers of samples showing dispersive, slightly and non-dispersive results. The sandstones and tuffs showed a lower potential for dispersion, with samples showing mostly non-dispersive behaviour, but with some slightly dispersive results.

The results show that the dispersive nature of the materials may contribute to erosion of the waste dumps. It is recommended that suitable precautions are taken to prevent water flow over or ponding on the waste dumps to minimise physical gully erosion of the dispersive materials, and to prevent leaching of the excessive salts, which act to prevent dispersive behaviour. Good compaction may also help prevent ingress of water into the slopes. The use of flat slopes (<5% gradient if possible) or concave slopes (with steepest gradient at the top of the slope and reducing the gradient as slope length and quantity of runoff increase) has been recommended to minimise gully formation (Loch, 2005; Vacher et al, 2004). SRK understands that HCPL have committed to storing highly saline/sodic overburden within the core of out-of-pit and in-pit storage areas.

8. Conclusions and Recommendations

8.1 Conclusions

Composition of waste material

As a portion of the total mass of waste the lithology groups were Rem 63%, Clay and Soil 24%, Sand and Gravel 10% and Carbonaceous was 3%..

Acidity, Salinity and Potential AMD

The potential for acid generation was initially assessed using the conservative NPR and AMIRA methods and there was general agreement in the sample classification using the two schemes. However, a significant number of PAF and UC samples had total sulphur contents of less than 0.1% and therefore had the potential to produce a maximum of 3 kg(H_2SO_4)/t acid. They were considered as a very low risk of contributing to acid production.

NAF material or material classed as very low risk of contributing to acid production made up 90.4% of the total mass of the waste. A further 3.9% was classed as UC and therefore, 5.7% of the waste was classed as PAF. Of the 5.7% classed as PAF material, 1.1% was from the Carbonaceous group, 3.8% was Rem and 0.8% was Clay and Soil.

As the Carbonaceous material made up a relatively small fraction of the total mass of waste the fraction of the Carbonaceous material that was PAF and not very low risk was relatively high (35% compared with 6% for the Rem material).

The majority of the coal roof and floor and coarse and fine washery waste samples were PAF. Significant fractions of Carbonaceous and Rem roof and floor materials were also UC or PAF. Therefore, the roof and floor materials should be kinetically tested to further quantify their potential effects on water quality and consideration should be given to strategically mining and managing these materials to control their impact on drainage waters.

Metal Solubility

Simple leach tests were carried out on 75 samples at a solid to liquid ratio of 1:3 over a period of 24 hours (Price, 2009). On the basis of simple leach extraction test results, waters contacting the overburden and interburden waste were generally expected to remain circum neutral. Salinity release (probably sourced from contained pore water) would be expected to occur over the short term (as a short term flush) but would be expected to diminish in the longer term.

While the leach extraction test results cannot be used to directly estimate the water quality that would be released from the mine waste materials, the results can be used to indentify solutes that could potentially be released at significant concentrations.

Although 16 samples contained solutes that exceeded ANZECC (2000) stock water guideline values the majority of these were for only 1 or 2 samples. Guideline values for Al, As, Cd, Co, F, and SO_4 were exceeded once (in separate samples), Ni exceeded the guideline value in two samples and Se in eight samples. For the few samples where guideline values were exceeded a higher concentration was exhibited from the overburden and interburden than from the roof and floor, coal and coal washery waste.

Dispersivity

The fresh carbonaceous mudstone, shale and sandstones were generally non-dispersive, but when weathered do show slightly dispersive behaviour.

The clay and soils were dispersive, with all samples giving dispersive or slightly dispersive results.

The coal and washery waste materials were generally nondispersive, but one sample (sooty coal) did give a dispersive result.

The Rem group was examined for each rock type. The claystone, mudstone and siltstone showed a large variability in dispersivity results for both weathered and fresh rock, with approximately equal numbers of samples showing dispersive, slightly and non-dispersive results. The sandstones and tuffs showed a lower potential for dispersion, with samples showing mostly non-dispersive behaviour, but with some slightly dispersive results.

Material Sampling

ANC

Experimental variography shows spatial correlation from 5000 m to 7000 m in all groups except the Fresh carbonaceous group. This indicates that current spacing is probably adequate for interpolation or extrapolation of ANC values at un-sampled locations for all groups except the fresh carbonaceous.

Sample spacing for ANC within the coal is adequate as the omnidirectional model range is approximately equal to the north south sample spacing of 5000 m and therefore probably suitable for interpolating total S values at locations not sampled.

Total S

Statistical and experimental variogram studies showed that for total S:

- Of the overburden wastes the fresh Carbonaceous and fresh Rem materials had the highest total S contents.
- Sample spacing in the coal was adequate (spacing was about 1000 m) for interpolating total S values at unsampled locations.
- For the fresh materials (excluding coal) considered together, the current sample spacing in the east west direction may be sufficient but because the total S is highly variable over short distances the sample spacing in the north south direction is probably too wide to interpolate values at unsampled locations.
- In the overall weathered, fresh Rem and the fresh Carbonaceous materials current drill spacing is insufficient to interpolate or extrapolate total S values at unsampled locations. Thus, the most representative value at an unknown location is the average total S value.

Although sample spacing may be too large to interpolate total S values at unsampled locations in some materials, statistical analysis of the total S content of all samples showed for a mining block of 100 x 100 x 2 m that:

- The probability of a block of fresh carbonaceous material having an average total S content greater than 0.3 wt% (i.e. approximately the average crustal abundance of S) was only 6% and
- For the fresh Rem material its was <1%. For fresh Rem there was also <1% chance of the average total S content of block being greater than 0.1 wt%.

Kinetic Columns

Kinetic leach columns were operated for coal and coarse/fine reject samples as bulk materials may represent some tangible risk of acid generation at the Alpha Project and will need to be well managed. Five samples comprising three samples of coarse reject, one sample of blended raw coal and a composite sample of fine tailings. The columns have been operated over a period of eight weeks to date although laboratory results are currently only available for five weeks. Initial indications from test work to date may be summarised as follows:

- Acid generation is occurring from coarse reject samples DLL_S1.60+0.25 and DU_S1.60+0.250 mm which have acidic leachate at pH 3.6 and pH 4.4 respectively.
- The pH of the leachate from the remaining columns is in the near neutral to mildly acidic range between pH 5.3 and 6.
- The concentration of sulphate from the coarse rejects columns has declined from greater than 300 mg/L to around 100 mg/L.
- The sulphate concentration in the leachates from the fine tailings is erratic ranging between 12 and 254 mg/L.

These data provide an initial indication of the materials characteristics. This and data obtained from continued column operation will be used to assess depletion rates of acid forming and acid neutralising materials. These rates and and site conditions would subsequently be used in predictions of water quality for the site.

8.2 Recommendations

Based on the information currently available:

- The majority of overburden could be managed as non-acid forming material. However, there is potential for existing salinity to be washed from the overburden in response to rainfall events. Consequently, containment of run-off and water quality monitoring may be required depending on the sensitivity of ground and surface water to salinity. The results indicate that water quality predictions for the disturbed mine waste is warranted.

- A better understanding of the spatial locations and thickness of the various carbonaceous units should be developed to determine whether they are likely to be mined in significant volumes and separately or will be mixed in with the majority of waste material. SRK understands that Hancock Coal Pty Ltd (HCPL) have committed to selective mining of potentially problematic units when they can be visually identified.

- Where it is demonstrated that the carbonaceous materials can be mined separately appropriate management strategies would be required for the carbonaceous units as they may have a capacity to generate acid. This may include segregation and isolation to reduce water contact with in these lithologies and possibly reduce the rate of oxidation.

- Coal tailings may need to be managed to control formation and release of acid drainage.

- Suitable precautions should taken to prevent water flow over or ponding on the waste dumps to minimise physical gully erosion of the dispersive materials, and to prevent leaching of the excessive salts, which act to prevent dispersive behaviour. Good compaction may also help prevent ingress of water into the slopes. The use of flat slopes (<5% gradient if possible) or concave slopes (with steepest gradient at the top of the slope and reducing the gradient as slope length and quantity of runoff increase) has been recommended to minimise gully formation. SRK understands that HCPL have committed to storing highly saline/sodic overburden within the core of out-of-pit and in-pit storage areas.

- Infill sampling in the north south direction is recommended to complete coverage of pit area at sub 5000 m spacing. SRK understands that an additional five holes are currently planned that would assist in addressing this and that HCPL has committed to an infill drilling program and sampling during pit development.

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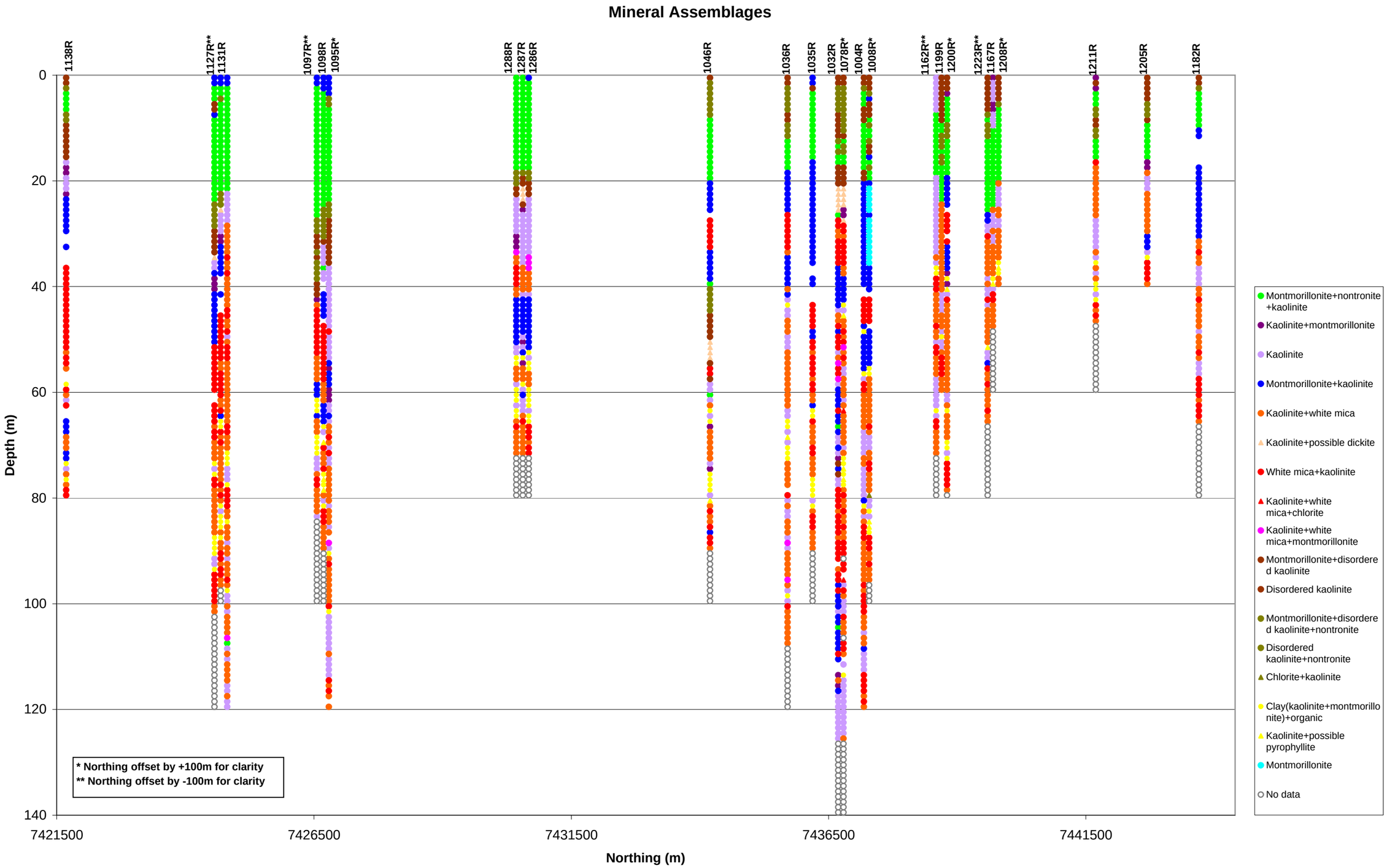
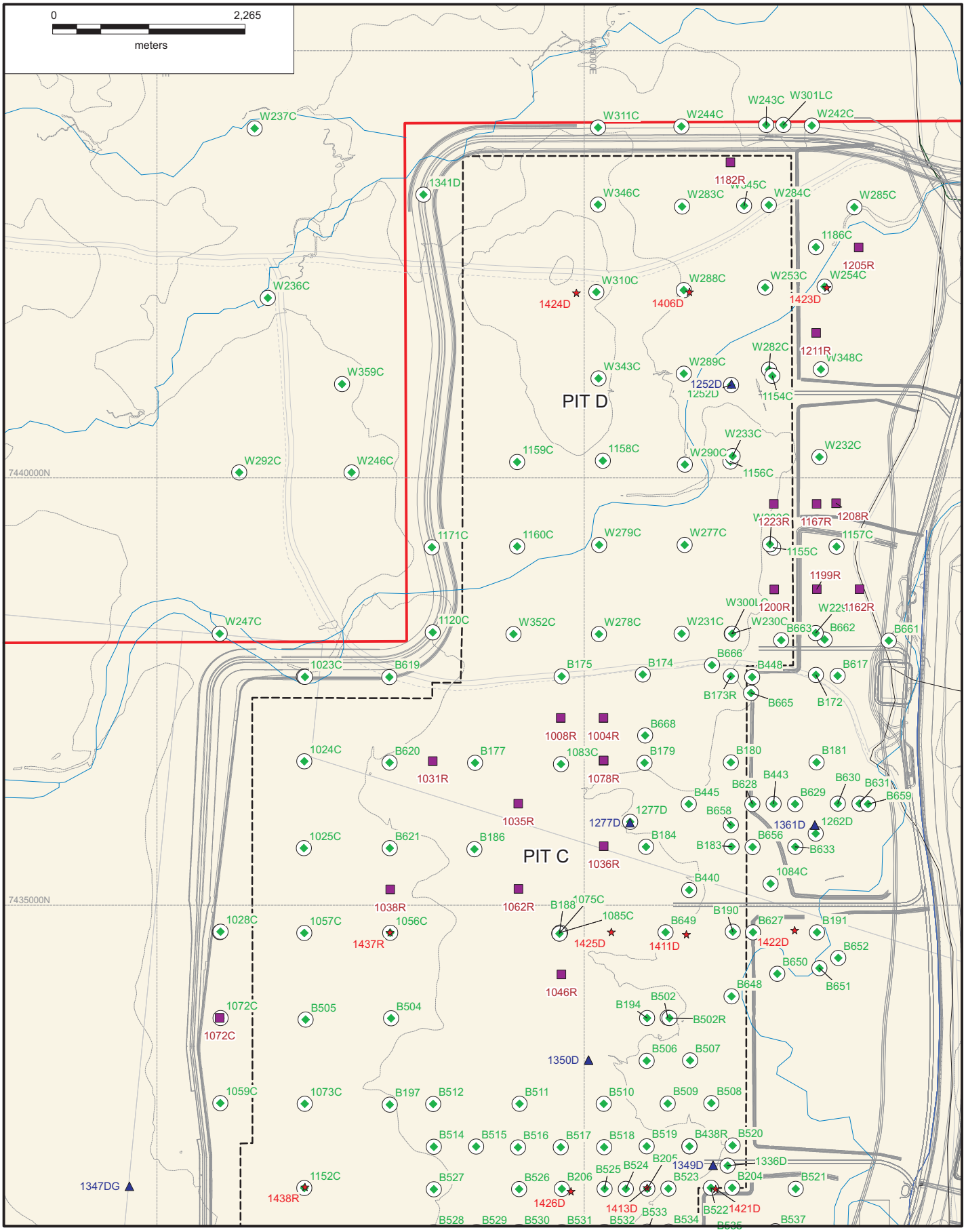
Appendices

Appendix 1: Hychips Mineral Assemblages


Mineral Assemblages
1138R
1127R**
1131R
1097R**
1098R
1095R*
1288R
1287R
1286R
1046R
1036R
1035R
1032R
1078R*
1004R
1008R*
1162R**
1199R
1200R*
1223R**
1167R
1208R*
1211R
1205R
1182R
Depth (m)
0
20
40
60
80
100
120
140
7421500
7426500
7431500
7436500
7441500
Northing (m)
* Northing offset by +100m for clarity
** Northing offset by -100m for clarity
Montmorillonite+nontronite +kaolinite
Kaolinite+montmorillonite
Kaolinite
Montmorillonite+kaolinite
Kaolinite+white mica
Kaolinite+possible dickite
White mica+kaolinite
Kaolinite+white mica+chlorite
Kaolinite+white mica+montmorillonite
Montmorillonite+disordered kaolinite
Disordered kaolinite
Montmorillonite+disordered kaolinite+nontronite
Disordered kaolinite+nontronite
Chlorite+kaolinite
Clay(kaolinite+montmorillonite)+organic
Kaolinite+possible pyrophyllite
Montmorillonite
No data

Appendix 2: Drillhole Locations – North and South Sections



Source: © Copyright Pitney Bowes Business Insight 2009
Data supplied by Hancock Prospecting Pty Ltd

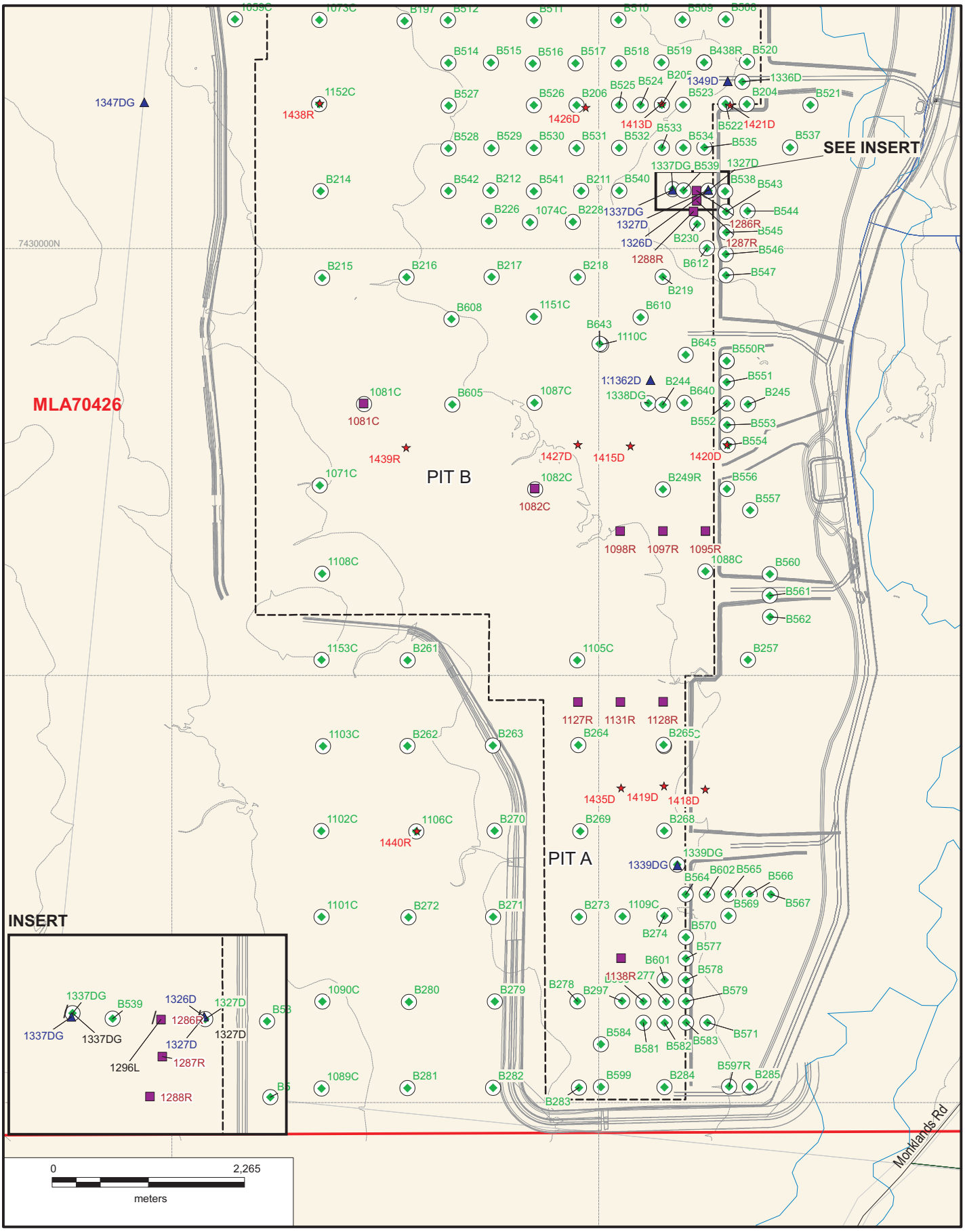
Mining Lease Application (MLA70426) Boundary
Contour (10m interval)
Pit Outline

Drill Hole Location
HyChips Hole Location
GT GeoChem Location
Drill Hole Location (2009)
Alpha Test Pit Location (2009)

DRILL HOLE LOCATIONS - NORTH SECTION

Figure: A

Drawing: 42626580-g-5016b.wor supplied by URS Australia Pty Ltd; Date 22-09-2010



Source: © Copyright Pitney Bowes Business Insight 2009
Data supplied by Hancock Prospecting Pty Ltd

Mining Lease Application (MLA70426) Boundary
Contour (10m interval)
Pit Outline

Drill Hole Location
HyChips Hole Location
GT GeoChem Location
Drill Hole Location (2009)
Alpha Test Pit Location (2009)

DRILL HOLE LOCATIONS - SOUTH SECTION

Figure: B

Drawing: 42626580-g-5016b.wor supplied by URS Australia Pty Ltd; Date 22-09-2010

Appendix 3: Lithology Groupings and Volumes

Groupings, Proportions and Volume Calculations

The resource drilling database was utilised to determine the proportions of lithologies and model the overall volumes of waste and coal likely to be contained in the proposed pit area.

Due to the wide variation in the sequence, frequency, thickness and distribution of downhole lithologies as logged it is not practical to try and create surfaces or closed solids that model each and every lithological code, or group. A statistical method was therefore used to estimate the overall proportions and volumes of each lithology group within each unit.

Many of the holes in the database were not logged for lithology. For the purposes of this exercise the maximum thickness of any NON ROCK code for each hole was calculated. Any holes with a maximum NON ROCK code thickness greater than ten metres was flagged to be excluded from the proportional calculations and assigned a weighting of zero.

All other holes were then assigned a weight based on their area of influence. This was done using a cell declustering routine in the Isatis geostatistical software package. A cell size of 1000 m by 1000 m was used as this appeared to be the maximum drill spacing over the Alpha pit area. All lithology codes in each hole were then assigned the weight attributed to their respective holes.

The thickness of each lithology interval was then multiplied by the weight. The weight-thicknesses were then summed for each group within each unit. The summed weight-thicknesses represent the relative proportions of each group within each unit. The volumes of each unit within the Alpha pit outline are known from wireframed solids created from the topography and various surfaces described above. The relative proportions and volumes of each group within each unit can then be calculated.

Lithologies coded as seam A or B were removed from the calculation as they represent a negligible proportion of the volume within the Alpha pit limits.

Some NON ROCK codes remain in the final proportions. These are split out but have not been assigned any assumed proportions or re-integrated as their overall proportions are relatively small.

Table A 1: Weathered Unit volumes and proportions

Volume M m^3	Group	Proportion of Unit
23.8	**CARBONACEOUS**	0.38%
2459.1	**CLAY AND SOIL**	39.09%
11.5	**COAL**	0.18%
2621.9	**REM**	41.68%
98.4	**NON ROCK**	1.56%
0.0	**POTENTIAL AN**	0.00%
1076.3	**SAND AND GRAVEL**	17.11%
6291.0	**Grand Total**	100.00%

Table A 2: Fresh overburden unit volumes and proportions

Volume M m^3	Group	Proportion of Unit
107.6	**CARBONACEOUS**	3.63%
216.4	**CLAY AND SOIL**	7.30%
14.5	**COAL**	0.49%
2598.5	**REM**	87.64%
3.0	**NON ROCK**	0.10%
1.2	**POTENTIAL AN**	0.04%
23.8	**SAND AND GRAVEL**	0.80%
2965.0	**Grand Total**	100.00%

Table A 3: C Seam unit volumes and proportions

Volume M m^3	Group	Proportion of Unit
105.8	CARBONACEOUS	10.74%
49.2	CLAY AND SOIL	4.99%
578.5	COAL	58.67%
240.6	REM	24.40%
5.6	NON ROCK	0.57%
0.0	POTENTIAL AN	0.00%
6.1	SAND AND GRAVEL	0.62%
0.0	SULFIDE	0.00%
986.0	Grand Total	100.00%

Table A 4: Fresh inter-burden volumes and proportions

Volume M m^3	Group	Proportion of Unit
53.8	CARBONACEOUS	3.96%
28.7	CLAY AND SOIL	2.11%
19.0	COAL	1.40%
1253.8	REM	92.24%
3.9	NON ROCK	0.29%
12.8	SAND AND GRAVEL	0.94%
0.0	SULFIDE	0.00%
1359.2	Grand Total	100.00%

Table A 5: D seam unit volumes and proportions

Volume M m^3	Group	Proportion of Unit
37.9	CARBONACEOUS	4.18%
12.6	CLAY AND SOIL	1.39%
696.1	COAL	76.75%
154.6	REM	17.05%
3.2	NON ROCK	0.35%
2.4	SAND AND GRAVEL	0.27%
0.1	SULFIDE	0.01%
907.0	Grand Total	100.00%

Appendix 4: Sample Descriptions

ALS Sample ID	Client Sample ID	Site no.	Sample Type	BATCH	HOLE-ID	FROM	TO	LITH	Description	Group	SEAM	Roof/Floor
EB0918873-001	75551	GT_008_09	HQ3 core	Test Pit	1327D	0.51	1	CL	clay	CLAY AND SOIL		
EB0918873-002	75552	GT_008_09	HQ3 core	Test Pit	1327D	3	3.49	CL	clay	CLAY AND SOIL		
EB0918873-003	75553	GT_008_09	HQ3 core	Test Pit	1327D	7.5	7.99	CL	clay	CLAY AND SOIL		
EB0918873-004	75554	GT_008_09	HQ3 core	Test Pit	1327D	11.89	12.28	CL	clay	CLAY AND SOIL		
EB0918873-005	75555	GT_008_09	HQ3 core	Test Pit	1327D	17.32	17.78	CL	clay	CLAY AND SOIL		
EB0918873-006	75556	GT_008_09	HQ3 core	Test Pit	1327D	21.35	21.83	CL	clay	CLAY AND SOIL		
EB0918873-007	75557	GT_008_09	HQ3 core	Test Pit	1327D	28.05	28.55	CS	claystone	REMAINING		
?????????	7558			Test Pit								
EB0918873-009	75559	GT_008_09	HQ3 core	Test Pit	1327D	39.09	39.58	CS	claystone	REMAINING		
EB0918873-010	75560	GT_008_09	HQ3 core	Test Pit	1327D	45.91	46.38	CS	claystone	REMAINING		
EB0918873-011	75561	GT_008_09	HQ3 core	Test Pit	1327D	51.02	51.47	SS	sandstone	REMAINING		
EB0918873-012	75562	GT_008_09	HQ3 core	Test Pit	1327D	54.95	55.45	SS	sandstone	REMAINING		
EB0918873-013	75563	GT_008_09	HQ3 core	Test Pit	1327D	66.42	66.95	SL/SS	siltstone/sandstone	REMAINING		
EB0918873-014	75564	GT_007_09	63 mm (HQ) core	Test Pit	1337DG	0.3	0.74	CL	clay	CLAY AND SOIL		
EB0918873-015	75565	GT_007_09	63 mm (HQ) core	Test Pit	1337DG	2.4	2.9	CL	clay	CLAY AND SOIL		
EB0918873-016	75566	GT_007_09	63 mm (HQ) core	Test Pit	1337DG	3.49	4	SA	sand	SAND AND GRAVEL		
EB0918873-017	75567	GT_007_09	63 mm (HQ) core	Test Pit	1337DG	9.07	9.5	CL	clay	CLAY AND SOIL		
EB0918873-018	75568	GT_007_09	63 mm (HQ) core	Test Pit	1337DG	12.45	12.94	CL	clay	CLAY AND SOIL		
EB0918873-019	75569	GT_007_09	63 mm (HQ) core	Test Pit	1337DG	22.29	22.69	CS	claystone	REMAINING		
EB0918873-020	75570	GT_007_09	63 mm (HQ) core	Test Pit	1337DG	35.06	35.59	CS	claystone	REMAINING		
EB0918873-021	75571	GT_007_09	63 mm (HQ) core	Test Pit	1337DG	39.6	40.05	CS	claystone	REMAINING		
EB0918873-022	75572	GT_007_09	63 mm (HQ) core	Test Pit	1337DG	43.54	44.06	CS	claystone	REMAINING		
EB0918873-023	75573	GT_007_09	63 mm (HQ) core	Test Pit	1337DG	51.98	52.46	CN	stony coal	COAL		
EB0918873-024	75574	GT_007_09	63 mm (HQ) core	Test Pit	1337DG	62.84	63.34	SS	sandstone	REMAINING		
EB0918873-025	75575	GT_007_09	63 mm (HQ) core	Test Pit	1337DG	76.15	76.65	SS	sandstone	REMAINING		
EB0918879-051	C3-4-5	Test pit	200 mm (8C) core	Test Pit	1296L	2	4	SA	sand	SAND AND GRAVEL		
EB0918879-052	C10-11-12	Test pit	200 mm (8C) core	Test Pit	1296L	9	12	CL	clay	CLAY AND SOIL		
EB0918879-053	C19-20	Test pit	200 mm (8C) core	Test Pit	1296L	18	20	CL	clay	CLAY AND SOIL		
EB0918879-054	C23-24	Test pit	200 mm (8C) core	Test Pit	1296L	22	24	CS	claystone	REMAINING		
EB0918879-055	C27-28	Test pit	200 mm (8C) core	Test Pit	1296L	26	28	CS	claystone	REMAINING		
EB0918879-056	C33-34	Test pit	200 mm (8C) core	Test Pit	1296L	32	34	CS	claystone	REMAINING		
EB0918879-057	C42	Test pit	200 mm (8C) core	Test Pit	1296L	41	42	SS	sandstone	REMAINING		
EB0918879-058	C45-46	Test pit	200 mm (8C) core	Test Pit	1296L	44	46	ZM	coaly mudstone	COAL		
EB0918879-059	C14-15-16	Test pit	200 mm (8C) core	Test Pit	1296L	13	16	CL	clay	CLAY AND SOIL		
EB0918879-060	C36-37	Test pit	200 mm (8C) core	Test Pit	1296L	35	37	CS	claystone	REMAINING		
EB0918879-061	C40-41	Test pit	200 mm (8C) core	Test Pit	1296L	39	41	SS	sandstone	REMAINING		
EB0919880-001	Alpha_C-0.250mm	washery waste	Waste	Test Pit	N/A	N/A	N/A	N/A	Alpha (washery waste)	COAL		
EB0919880-002	Alpha_DLL-0.250mm	washery waste	Waste	Test Pit	N/A	N/A	N/A	N/A	Alpha (washery waste)	COAL		
EB0919880-003	Alpha_DU-0.250mm	washery waste	Waste	Test Pit	N/A	N/A	N/A	N/A	Alpha (washery waste)	COAL		
EB0919880-004	C_Seam_S1.60+0.250mm	washery waste	Waste	Test Pit	N/A	N/A	N/A	N/A	S1.60 (coarse reject)	COAL		
EB0919880-005	Seam_C_Roof/Floor+0.250mm	washery waste	Waste	Test Pit	N/A	N/A	N/A	N/A	Roof/floor	COAL		
EB0919880-006	C_Seam-0.250mm_Roof/Floor	washery waste	Waste	Test Pit	N/A	N/A	N/A	N/A	Roof/floor	COAL		
EB0919880-007	Seam_DLL_S1.60+0.25	washery waste	Waste	Test Pit	N/A	N/A	N/A	N/A	S1.60 (coarse reject)	COAL		
EB0919880-008	Roof/Floor_Seam_DLL	washery waste	Waste	Test Pit	N/A	N/A	N/A	N/A	Roof/floor	COAL		
EB0919880-009	DLL_Seam-0.250mm_Roof/Floor	washery waste	Waste	Test Pit	N/A	N/A	N/A	N/A	Roof/floor	COAL		

ALS Sample ID	Client Sample ID	Site no.	Sample Type	BATCH	HOLE-ID	FROM	TO	LITH	Description	Group	SEAM	Roof/Floor
EB0919880-010	Seam_DU_S1.60+0.250mm	washery waste	Waste	Test Pit	N/A	N/A	N/A	N/A	S1.60 (coarse reject)	COAL		
EB0919880-011	Seam_DU_+0.250mm_Roof/Floor	washery waste	Waste	Test Pit	N/A	N/A	N/A	N/A	Roof/floor	COAL		
EB0919880-012	DU_Seam-0.250mm_Roof/Floor	washery waste	Waste	Test Pit	N/A	N/A	N/A	N/A	Roof/floor	COAL		
EB1000838001	Blended raw coal	Test pit	blended raw coal	Test Pit	N/A	N/A	N/A	N/A	blended raw coal	COAL		
EB1012396001	1252D_ARD03			1	1252D	23.89	27.82	SL	SILTSTONE	REMAINING		
EB1012396002	1252D_ARD04			1	1252D	30.28	31.16	SS	SANDSTONE	REMAINING		
EB1012396003	1252D_ARD05			1	1252D	33.39	33.92	ZH	COALY SHALE	COAL	CU	
EB1012396004	1252D_ARD07			1	1252D	42.93	43.55	SL	SILTSTONE	REMAINING		
EB1012396071	1252D_ARD08			1	1252D	45.28	55.83	SS	SANDSTONE	REMAINING		
EB1012396007	1252D_ARD09			1	1252D	57.76	60.91	SS	SANDSTONE	REMAINING		
EB1012396008	1252D_ARD10			1	1252D	61.76	64.1	MS	MUDSTONE	REMAINING		
EB1012396009	1252D_ARD11			1	1252D	64.48	65.7	C6	COAL, dull <1% bright	COAL	DLM1	
EB1012396010	1262D_ARD01			1	1262D	3	5.4	SA	SAND	SAND AND GRAVEL		
EB1012396011	1262D_ARD02			1	1262D	6.9	8.7	SA	SAND	SAND AND GRAVEL		
EB1012396012	1262D_ARD03			1	1262D	10.72	19.67	SS	SANDSTONE	REMAINING		
EB1012396013	1262D_ARD04			1	1262D	29.61	30.27	XS	CARBONACEOUS SANDSTONE	CARBONACEOUS		1
EB1012396014	1262D_ARD05			1	1262D	30.27	30.82	C5	COAL, <10% bright	COAL	DU	
EB1012396015	1277D_ARD01			1	1277D	7.04	8.24	CL	CLAY	CLAY AND SOIL		
EB1012396016	1277D_ARD02			1	1277D	9.08	9.86	SA	SAND	SAND AND GRAVEL		
EB1012396017	1277D_ARD03			1	1277D	12.27	17.38	CL	CLAY	CLAY AND SOIL		
EB1012396018	1277D_ARD04			1	1277D	18.76	22.41	MS	MUDSTONE	REMAINING		
EB1012396019	1277D_ARD05			1	1277D	22.64	23.45	SL	SILTSTONE	REMAINING		
EB1012396020	1277D_ARD10			1	1277D	37.55	40.22	SS	SANDSTONE	REMAINING		
EB1012396021	1277D_ARD11			1	1277D	55.38	57.84	SS	SANDSTONE	REMAINING		
EB1012396022	1326D_ARD01			1	1326D	0.2	2.27	CL	CLAY	CLAY AND SOIL		
EB1012396023	1326D_ARD02			1	1326D	2.36	3.57	CL	CLAY	CLAY AND SOIL		
EB1012396024	1326D_ARD03			1	1326D	5.77	7.59	SA	SAND	SAND AND GRAVEL		
EB1012396025	1326D_ARD04			1	1326D	8.36	10	SA	SAND	SAND AND GRAVEL		
EB1012396026	1326D_ARD05			1	1326D	29.36	33.56	CS	CLAYSTONE	REMAINING		
EB1012396027	1327D_ARD01			1	1327D	5.6	6.02	SA	SAND	SAND AND GRAVEL		
EB1012396028	1327D_ARD03			1	1327D	59	60.55	C6	COAL, dull <1% bright	COAL	DLM2	
EB1012396072	1336D_ARD01			1	1336D	32	56.9	SS	SANDSTONE	REMAINING		
EB1012396032	1336D_ARD02			1	1336D	56.9	58.22	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		
EB1012396033	1336D_ARD03			1	1336D	58.22	58.78	CS	CLAYSTONE	REMAINING		
EB1012396034	1337DG_ARD01			1	1337DG	3.24	5.24	SA	SAND	SAND AND GRAVEL		
EB1012396035	1337DG_ARD02			1	1337DG	47.62	48.6	CS	CLAYSTONE	REMAINING		
EB1012396036	1337DG_ARD03			1	1337DG	49.93	50.79	CN	STONY COAL	COAL	CU	
EB1012396037	1339DG_ARD01			1	1339DG	0.17	3.21	SS	SANDSTONE	REMAINING		
EB1012396038	1339DG_ARD02			1	1339DG	6.48	9.07	CS	CLAYSTONE	REMAINING		
EB1012396039	1339DG_ARD03			1	1339DG	24.19	24.68	XC	CARBONACEOUS CLAYSTONE	CARBONACEOUS		
EB1012396040	1339DG_ARD04			1	1339DG	27.54	29.78	SS	SANDSTONE	REMAINING		
EB1012396041	1339DG_ARD05			1	1339DG	31.69	33.5	CS	CLAYSTONE	REMAINING		
EB1012396042	1339DG_ARD06			1	1339DG	33.94	33.98	SS	SANDSTONE	REMAINING		
EB1012396073	1339DG_ARD08			1	1339DG	36.83	54.44	SS	SANDSTONE	REMAINING		
EB1013589074	1347DG_ARD001			1	1347DG	0.99	9.5	CL	CLAY	CLAY AND SOIL		

ALS Sample ID	Client Sample ID	Site no.	Sample Type	BATCH	HOLE-ID	FROM	TO	LITH	Description	Group	SEAM	Roof/Floor
EB1013589078	1347DG_ARD002			1	1347DG	16.56	24.45	CS	CLAYSTONE	REMAINING		
EB1013589082	1347DG_ARD003			1	1347DG	26.52	35.75	SS	SANDSTONE	REMAINING		
EB1013589083	1347DG_ARD004			1	1347DG	85.56	86.97	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		
EB1013589084	1347DG_ARD005			1	1347DG	89.88	99.87	SS	SANDSTONE	REMAINING		
EB1013589085	1347DG_ARD006			1	1347DG	99.87	100.3	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		
EB1013589090	1347DG_ARD007			1	1347DG	107.8	114.2	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		
EB1013589091	1347DG_ARD008			1	1347DG	114.35	116.05	SL	SILTSTONE	REMAINING		1
EB1013589092	1347DG_ARD010			1	1347DG	128.18	129.12	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		1
EB1013589093	1347DG_ARD011			1	1347DG	129.12	130.73	SS	SANDSTONE	REMAINING		
EB1013589094	1347DG_ARD012			1	1347DG	130.73	131.33	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		1
EB1012396074	1349D_ARD01			1	1349D	1.96	18.5	CL	CLAY	CLAY AND SOIL		
EB1012396075	1349D_ARD02			1	1349D	18.5	26.32	CS	CLAYSTONE	REMAINING		
EB1012396054	1349D_ARD03			1	1349D	36.58	39.5	SS	SANDSTONE	REMAINING		
EB1012396055	1350D_ARD01			1	1350D	1.59	4.83	SA	SAND	SAND AND GRAVEL		
EB1012396056	1350D_ARD02			1	1350D	32	34.31	SS	SANDSTONE	REMAINING		
EB1012396057	1350D_ARD03			1	1350D	37.24	38.5	CS	CLAYSTONE	REMAINING		
EB1012396058	1350D_ARD04			1	1350D	48.26	48.75	CW	COAL WEATHERED	COAL	A	
EB1012396059	1361D_ARD01			1	1361D	1.97	3.24	CS	CLAYSTONE	REMAINING		
EB1012396060	1361D_ARD02			1	1361D	6.2	7.3	SS	SANDSTONE	REMAINING		
EB1012396076	1361D_ARD03			1	1361D	12.19	28.05	SS	SANDSTONE	REMAINING		
EB1012396065	1362D_ARD01			1	1362D	0.45	3.02	SS	SANDSTONE	REMAINING		
EB1012396066	1362D_ARD02			1	1362D	30.15	32.54	CS	CLAYSTONE	REMAINING		
EB1012396067	1362D_ARD03			1	1362D	34.01	35.13	SS	SANDSTONE	REMAINING		
EB1012396068	1362D_ARD04			1	1362D	39.4	41.74	CS	CLAYSTONE	REMAINING		
EB1012396069	1362D_ARD05			1	1362D	47.53	51.4	CS	CLAYSTONE	REMAINING		1
EB1012396070	1362D_ARD06			1	1362D	52.13	53.07	CO	COAL, undifferentiated	COAL	A	
EB1013590-001	1406D_ARD01			2	1406D	2.09	2.97	CL	CLAY	CLAY AND SOIL		
EB1013590-002	1406D_ARD02			2	1406D	9.67	10.45	SS	SANDSTONE	REMAINING		
EB1013590-003	1406D_ARD03			2	1406D	21.92	22.86	SL	SILTSTONE	REMAINING		
EB1013590-004	1406D_ARD04			2	1406D	35.09	35.82	SS	SANDSTONE	REMAINING		
EB1013590-006	1406D_ARD06			2	1406D	42.93	44.29	CO	COAL, undifferentiated	COAL	C	
EB1013590-007	1406D_ARD07			2	1406D	46.66	47.82	SL	SILTSTONE	REMAINING		1
EB1013590-008	1406D_ARD08			2	1406D	56.82	59.41	SS	SANDSTONE	REMAINING		
EB1013590-009	1406D_ARD09			2	1406D	71.04	71.82	C4	COAL 10-40% bright	COAL	D	
EB1013590-010	1406D_ARD10			2	1406D	73.24	74.82	SS	SANDSTONE	REMAINING		1
EB1013590-011	1411D_ARD01			2	1411D	3.28	4.27	CL	CLAY	CLAY AND SOIL		
EB1013590-012	1411D_ARD02			2	1411D	14.84	16.98	CS	CLAYSTONE	REMAINING		
EB1013590-014	1411D_ARD04			2	1411D	36.78	37.84	SL	SILTSTONE	REMAINING		
EB1013590-015	1411D_ARD05			2	1411D	38.23	39.47	SS	SANDSTONE	REMAINING		1
EB1013590-016	1411D_ARD06			2	1411D	39.65	40.11	XS	CARBONACEOUS SANDSTONE	CARBONACEOUS		1
EB1013590-017	1411D_ARD07			2	1411D	43.7	44.53	C4	COAL 10-40% bright	COAL	DL1	
EB1013590-019	1413D_ARD02			2	1413D	26.12	29.49	GV	GRAVEL	SAND AND GRAVEL		
EB1013590-020	1413D_ARD03			2	1413D	45.03	46.01	CS	CLAYSTONE	REMAINING		
EB1013590-021	1413D_ARD04			2	1413D	52.67	53.23	SS	SANDSTONE	REMAINING		1
EB1013590-022	1413D_ARD05			2	1413D	56.12	56.7	C6	COAL, dull <1% bright	COAL	CU	

ALS Sample ID	Client Sample ID	Site no.	Sample Type	BATCH	HOLE-ID	FROM	TO	LITH	Description	Group	SEAM	Roof/Floor
EB1013590-023	1413D_ARD06			2	1413D	66.45	66.84	SL	SILTSTONE	REMAINING		1
EB1013590-024	1413D_ARD07			2	1413D	67.64	68.847	SS	SANDSTONE	REMAINING		
EB1013590-025	1413D_ARD08			2	1413D	73.71	74.58	C4	COAL 10-40% bright	COAL	DLM2	
EB1013590-026	1415D_ARD01			2	1415D	8.85	10.5	SA	SAND	SAND AND GRAVEL		
EB1013590-027	1415D_ARD02			2	1415D	14.16	15.57	CL	CLAY	CLAY AND SOIL		
EB1013590-028	1415D_ARD03			2	1415D	37.03	39.05	CS	CLAYSTONE	REMAINING		
EB1013590-029	1415D_ARD04			2	1415D	61.95	62.25	CW	COAL WEATHERED	COAL		
EB1013590-030	1415D_ARD05			2	1415D	76.68	77.52	C6	COAL, dull <1% bright	COAL	C3	
EB1013590-031	1415D_ARD06			2	1415D	78.1	79.78	SS	SANDSTONE	REMAINING		
EB1013590-032	1415D_ARD07			2	1415D	79.78	80.72	SL	SILTSTONE	REMAINING		1
EB1013590-033	1418D_ARD01			2	1418D	20	21	SS	SANDSTONE	REMAINING		
EB1013590-034	1418D_ARD02			2	1418D	48	50.9	CS	CLAYSTONE	REMAINING		1
EB1013590-035	1418D_ARD03			2	1418D	51.2	51.7	C5	COAL, <10% bright	COAL	DLM2	
EB1013590-036	1419D_ARD01			2	1419D	10.49	11.58	CL	CLAY	CLAY AND SOIL		
EB1013590-037	1419D_ARD02			2	1419D	20.77	21.57	SS	SANDSTONE	REMAINING		
EB1013590-038	1419D_ARD03			2	1419D	25.71	26.63	CL	CLAY	CLAY AND SOIL		
EB1013590-039	1419D_ARD04			2	1419D	39.73	40.26	SL	SILTSTONE	REMAINING		
EB1013590-040	1419D_ARD05			2	1419D	49.91	50.54	SS	SANDSTONE	REMAINING	BHWE	
EB1013590-041	1419D_ARD06			2	1419D	58.16	58.88	C7	COAL, dull, conchoidal	COAL	C3	
EB1013590-042	1419D_ARD07			2	1419D	60.37	62.09	SS	SANDSTONE	REMAINING		
EB1013590-043	1419D_ARD08			2	1419D	62.18	62.72	SS	SANDSTONE	REMAINING		1
EB1013590-044	1419D_ARD09			2	1419D	64.79	65.28	C7	COAL, dull, conchoidal	COAL	DLM2	
EB1013590-045	1419D_ARD10			2	1419D	70.03	71.37	SL	SILTSTONE	REMAINING		1
EB1013590-046	1420D_ARD01			2	1420D	3	6	SA	SAND	SAND AND GRAVEL		
EB1013590-047	1420D_ARD02			2	1420D	27	28	CL	CLAY	CLAY AND SOIL		
EB1013590-048	1420D_ARD03			2	1420D	40.5	42	SS	SANDSTONE	REMAINING		
EB1013590-049	1420D_ARD04			2	1420D	47.11	47.61	SS	SANDSTONE	REMAINING		
EB1013590-050	1420D_ARD05			2	1420D	54.16	54.62	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		
EB1013590-051	1420D_ARD06			2	1420D	58.2	59.5	SS	SANDSTONE	REMAINING		
EB1013590-052	1420D_ARD07			2	1420D	60	60.69	SS	SANDSTONE	REMAINING		1
EB1013590-053	1420D_ARD08			2	1420D	61.72	62.19	CO	COAL, undifferentiated	COAL		
EB1013590-054	1420D_ARD09			2	1420D	65.62	66.1	SS	SANDSTONE	REMAINING		
EB1013590-055	1420D_ARD10			2	1420D	67.19	68.59	CO	COAL, undifferentiated	COAL		
EB1013590-056	1420D_ARD11			2	1420D	68.59	69.1	SS	SANDSTONE	REMAINING		1
EB1013590-057	1421D_ARD01			2	1421D	27	29	CL	CLAY	CLAY AND SOIL		
EB1013590-058	1421D_ARD02			2	1421D	33	34	SS	SANDSTONE	REMAINING		
EB1013590-059	1421D_ARD03			2	1421D	47	48	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		
EB1013590-060	1421D_ARD04			2	1421D	49.6	49.84	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		
EB1013590-061	1421D_ARD05			2	1421D	52.11	53.26	C5	COAL, <10% bright	COAL		
EB1013590-062	1421D_ARD06			2	1421D	54.1	55.33	SS	SANDSTONE	REMAINING		
EB1013590-063	1421D_ARD07			2	1421D	58.02	58.78	C6	COAL, dull <1% bright	COAL		
EB1013590-064	1422D_ARD01			2	1422D	17	18	SS	SANDSTONE	REMAINING		
EB1013590-065	1422D_ARD02			2	1422D	27.68	28.23	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS	C	1
EB1013590-066	1422D_ARD03			2	1422D	28.73	29.17	C6	COAL, dull <1% bright	COAL	D	
EB1013590-067	1422D_ARD04			2	1422D	29.93	33	SS	SANDSTONE	REMAINING	BHWE	1

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EB1013590-068	1423D_ARD01			2	1423D	7	8	SS	SANDSTONE	REMAINING		
EB1013590-070	1423D_ARD03			2	1423D	25.05	25.61	SS	SANDSTONE	REMAINING		
EB1013590-071	1423D_ARD04			2	1423D	27.4	28	XS	CARBONACEOUS SANDSTONE	CARBONACEOUS	CU	
EB1013590-072	1423D_ARD05			2	1423D	30.2	31.05	XH	CARBONACEOUS SHALE	CARBONACEOUS		1
EB1013590-073	1423D_ARD06			2	1423D	31.52	32.01	XS	CARBONACEOUS SANDSTONE	CARBONACEOUS	DU	
EB1013590-074	1423D_ARD07			2	1423D	33.1	33.67	SS	SANDSTONE	REMAINING		1
EB1013590-075	1423D_ARD08			2	1423D	36.2	37.11	SS	SANDSTONE	REMAINING		1
EB1013590-076	1423D_ARD09			2	1423D	38.5	38.94	C6	COAL, dull <1% bright	COAL	DLM2	
EB1013590-077	1423D_ARD10			2	1423D	39.25	39.78	TF	TUFF	REMAINING		
EB1013590-078	1423D_ARD11			2	1423D	40.69	41.39	C5	COAL, <10% bright	COAL	DL2	
EB1013590-079	1423D_ARD12			2	1423D	41.57	42.2	SS	SANDSTONE	REMAINING		1
EB1013590-080	1423D_ARD13			2	1423D	42.23	43.73	SS	SANDSTONE	REMAINING		
EB1013590-081	1423D_ARD14			2	1423D	48.2	48.61	SS	SANDSTONE	REMAINING		1
EB1013590-082	1424D_ARD01			2	1424D	7	8	SS	SANDSTONE	REMAINING		
EB1013590-083	1424D_ARD02			2	1424D	20	22.2	XH	CARBONACEOUS SHALE	CARBONACEOUS	B1	1
EB1013590-084	1424D_ARD03			2	1424D	22.7	23.35	C6	COAL, dull <1% bright	COAL	B3	
EB1013590-085	1424D_ARD04			2	1424D	27.81	28.39	XH	CARBONACEOUS SHALE	CARBONACEOUS	B4	
EB1013590-086	1424D_ARD05			2	1424D	31.67	34.38	SS	SANDSTONE	REMAINING		
EB1013590-087	1424D_ARD06			2	1424D	49.2	50.52	SS	SANDSTONE	REMAINING		
EB1013590-088	1424D_ARD07			2	1424D	72.35	73.13	SS	SANDSTONE	REMAINING		
EB1013590-089	1424D_ARD08			2	1424D	83.76	84.09	SS	SANDSTONE	REMAINING		1
EB1013590-090	1424D_ARD09			2	1424D	90.95	91.05	CN	STONY COAL	COAL	CU	
EB1013590-091	1424D_ARD10			2	1424D	93.73	94.53	SS	SANDSTONE	REMAINING		
EB1013590-092	1424D_ARD11			2	1424D	99.48	101.82	SS	SANDSTONE	REMAINING		
EB1013590-093	1424D_ARD12			2	1424D	106.89	107.34	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		
EB1013590-094	1424D_ARD13			2	1424D	116.72	116.85	CN	STONY COAL	COAL	DLM2	
EB1013590-095	1424D_ARD14			2	1424D	117.86	118.44	C6	COAL, dull <1% bright	COAL	DL1	
EB1013590-096	1424D_ARD15			2	1424D	119.39	119.45	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		1
EB1013590-097	1425D_ARD01			2	1425D	14	15	GV	GRAVEL	SAND AND GRAVEL		
EB1013590-098	1425D_ARD02			2	1425D	32	33	SS	SANDSTONE	REMAINING		
EB1013590-099	1425D_ARD03			2	1425D	40	42	CY	SOOTY COAL	COAL		
EB1013590-100	1425D_ARD04			2	1425D	45.47	46.02	CW	COAL WEATHERED	COAL	C3	
EB1013590-101	1425D_ARD05			2	1425D	50.36	51.15	SS	SANDSTONE	REMAINING		
EB1013590-102	1425D_ARD06			2	1425D	60.57	62.76	SS	SANDSTONE	REMAINING		
EB1013590-103	1425D_ARD07			2	1425D	64.11	64.67	C6	COAL, dull <1% bright	COAL	DLM1	
EB1013590-104	1425D_ARD08			2	1425D	69.8	70.53	SS	SANDSTONE	REMAINING		1
EB1013590-105	1427D_ARD01			2	1427D	9	10	SA	SAND	SAND AND GRAVEL		
EB1013590-106	1427D_ARD02			2	1427D	10	24	CL	CLAY	CLAY AND SOIL		
EB1013590-107	1427D_ARD03			2	1427D	42.1	45.2	CS	CLAYSTONE	REMAINING		
EB1013590-108	1427D_ARD04			2	1427D	54.2	55.7	SL	SILTSTONE	REMAINING		
EB1013590-109	1427D_ARD05			2	1427D	56.56	57.1	SL	SILTSTONE	REMAINING		
EB1013590-110	1427D_ARD06			2	1427D	60.93	62.15	SS	SANDSTONE	REMAINING		1
EB1013590-111	1427D_ARD07			2	1427D	64.32	64.37	ZM	COALY MUDSTONE	COAL	CU	
EB1013590-112	1427D_ARD08			2	1427D	71.17	72.2	SL	SILTSTONE	REMAINING		1
EB1013590-113	1427D_ARD09			2	1427D	73.32	74	SL	SILTSTONE	REMAINING		

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EB1013590-114	1427D_ARD10			2	1427D	76.03	76.58	CN	STONY COAL	COAL		
EB1013589001	1426D_ARD01			3	1426D	25	26	CS	CLAYSTONE	REMAINING		
EB1013589002	1426D_ARD02			3	1426D	43.32	45.01	C5	COAL, <10% bright	COAL		
EB1013589003	1426D_ARD03			3	1426D	50.74	51.19	SL	SILTSTONE	REMAINING		
EB1013589004	1426D_ARD04			3	1426D	60.19	60.73	SL	SILTSTONE	REMAINING		
EB1013589005	1426D_ARD05			3	1426D	62.82	62.9	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		
EB1013589006	1426D_ARD06			3	1426D	65.8	66.06	TF	TUFF	REMAINING		
EB1013589007	1426D_ARD07			3	1426D	68.25	68.42	CN	STONY COAL	COAL	CU	
EB1013589008	1426D_ARD08			3	1426D	71.77	71.89	C5	COAL, <10% bright	COAL	C1	
EB1013589009	1426D_ARD09			3	1426D	75.18	75.23	ZM	COALY MUDSTONE	COAL		1
EB1013589010	1426D_ARD10			3	1426D	76.54	77.36	SS	SANDSTONE	REMAINING		
EB1013589011	1426D_ARD11			3	1426D	77.63	78.2	SL	SILTSTONE	REMAINING		
EB1013589012	1426D_ARD12			3	1426D	79.47	80.13	C7	COAL, dull, conchoidal	COAL		1
EB1013589013	1426D_ARD13			3	1426D	82.17	82.21	C7	COAL, dull, conchoidal	COAL	DLM2	
EB1013589014	1426D_ARD14			3	1426D	85.05	85.88	SS	SANDSTONE	REMAINING		1
EB1013589015	1435D_ARD01			3	1435D	6	9	SA	SAND	SAND AND GRAVEL		
EB1013589016	1435D_ARD02			3	1435D	15	17	CL	CLAY	CLAY AND SOIL		
EB1013589017	1435D_ARD03			3	1435D	28	30	CL	CLAY	CLAY AND SOIL		
EB1013589018	1435D_ARD04			3	1435D	32.79	33.77	SL	SILTSTONE	REMAINING		
EB1013589019	1435D_ARD05			3	1435D	46.17	47.22	SS	SANDSTONE	REMAINING		
EB1013589020	1435D_ARD06			3	1435D	48.25	49.51	ZM	COALY MUDSTONE	COAL		
EB1013589021	1435D_ARD07			3	1435D	59.74	60.32	SS	SANDSTONE	REMAINING		1
EB1013589022	1435D_ARD08			3	1435D	61.95	62.09	C5	COAL, <10% bright	COAL	CU	
EB1013589023	1435D_ARD09			3	1435D	65.4	66.02	SS	SANDSTONE	REMAINING		1
EB1013589024	1435D_ARD10			3	1435D	67.88	68.34	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		1
EB1013589025	1435D_ARD11			3	1435D	69.06	69.82	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		1
EB1013589026	1435D_ARD12			3	1435D	71.98	72.44	C7	COAL, dull, conchoidal	COAL	DLM2	
EB1013589027	1435D_ARD13			3	1435D	72.76	73.46	SL	SILTSTONE	REMAINING		1
EB1013589028	1435D_ARD14			3	1435D	75.32	76.62	SS	SANDSTONE	REMAINING		1
EB1013589029	1437R_ARD01			3	1437R	17	18	CS	CLAYSTONE	REMAINING		
EB1013589030	1437R_ARD02			3	1437R	28	29	CS	CLAYSTONE	REMAINING		
EB1013589031	1437R_ARD03			3	1437R	38	39	SL	SILTSTONE	REMAINING		
EB1013589032	1437R_ARD04			3	1437R	52	53	CS	CLAYSTONE	REMAINING		
EB1013589033	1437R_ARD05			3	1437R	67	68	CS	CLAYSTONE	REMAINING		
EB1013589034	1437R_ARD06			3	1437R	78	79	XH	CARBONACEOUS SHALE	CARBONACEOUS		
EB1013589035	1437R_ARD07			3	1437R	86.5	87	C5	COAL, <10% bright	COAL	C	
EB1013589036	1437R_ARD08			3	1437R	88.5	89	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		1
EB1013589037	1437R_ARD09			3	1437R	90	90.5	XM	CARBONACEOUS MUDSTONE	CARBONACEOUS		
EB1013589038	1437R_ARD10			3	1437R	92	92.5	ZH	COALY SHALE	COAL		1
EB1013589039	1437R_ARD11			3	1437R	102	102.5	C5	COAL, <10% bright	COAL	D	
EB1013589040	1438R_ARD01			3	1438R	3	4	SL	SILTSTONE	REMAINING		
EB1013589041	1438R_ARD02			3	1438R	17	18	CS	CLAYSTONE	REMAINING		
EB1013589042	1438R_ARD03			3	1438R	30	31	TF	TUFF	REMAINING		
EB1013589043	1438R_ARD04			3	1438R	41	42	CS	CLAYSTONE	REMAINING		
EB1013589044	1438R_ARD05			3	1438R	63	64	CS	CLAYSTONE	REMAINING		

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EB1013589045	1438R_ARD06			3	1438R	78	79	SL	SILTSTONE	REMAINING		
EB1013589046	1438R_ARD07			3	1438R	86	86.5	ZC	COALY CLAYSTONE	COAL		1
EB1013589047	1438R_ARD08			3	1438R	88.5	89	C4	COAL 10-40% bright	COAL	D	
EB1013589048	1439R_ARD01			3	1439R	15	16	CS	CLAYSTONE	REMAINING		
EB1013589049	1439R_ARD02			3	1439R	25	26	CS	CLAYSTONE	REMAINING		
EB1013589050	1439R_ARD03			3	1439R	46	47	CS	CLAYSTONE	REMAINING		
EB1013589051	1439R_ARD04			3	1439R	59	60	CS	CLAYSTONE	REMAINING		
EB1013589052	1439R_ARD05			3	1439R	73	74	ZS	COALY SILTSTONE	COAL		
EB1013589053	1439R_ARD06			3	1439R	80.5	81	C4	COAL 10-40% bright	COAL	C	
EB1013589054	1439R_ARD07			3	1439R	84.5	85	XH	CARBONACEOUS SHALE	CARBONACEOUS		1
EB1013589055	1439R_ARD08			3	1439R	86.5	87	XH	CARBONACEOUS SHALE	CARBONACEOUS		
EB1013589056	1439R_ARD09			3	1439R	91	91.5	C4	COAL 10-40% bright	COAL	D	
EB1013589057	1440R_ARD01			3	1440R	2	3	SO	SOIL	CLAY AND SOIL		
EB1013589058	1440R_ARD02			3	1440R	11	12	SS	SANDSTONE	REMAINING		
EB1013589059	1440R_ARD03			3	1440R	34	35	CS	CLAYSTONE	REMAINING		
EB1013589060	1440R_ARD04			3	1440R	50	51	CS	CLAYSTONE	REMAINING		
EB1013589061	1440R_ARD05			3	1440R	78	79	SL	SILTSTONE	REMAINING		
EB1013589062	1440R_ARD06			3	1440R	90.5	91	ZC	COALY CLAYSTONE	COAL		1
EB1013589063	1440R_ARD07			3	1440R	92	92.5	C5	COAL, <10% bright	COAL	c	
EB1013589064	1440R_ARD08			3	1440R	94.5	95	SL	SILTSTONE	REMAINING		
EB1013589065	1440R_ARD09			3	1440R	96	96.5	XY	CARBONACEOUS CLAY	CARBONACEOUS		
EB1013589066	1440R_ARD10			3	1440R	105.5	106	C5	COAL, <10% bright	COAL	D	
EB1015224001	201064	C Seam Raw Coal		4	1290L	N/A	N/A		Washery Waste	Washery Waste	C	
EB1015224002	201076	C Seam Product (-50 +.250 F1.60)		4	1290L	N/A	N/A		Washery Waste	Washery Waste	C	
EB1015224003	201077	C seam Coarse Reject (-50 +.250 S1.60)		4	1290L	N/A	N/A		Washery Waste	Washery Waste	C	
EB1015224004	201074	C seam Tailings (-.25mm)		4	1290L	N/A	N/A		Washery Waste	Washery Waste	C	
EB1015224005	201085	DU Seam Raw Coal		4	1290L	N/A	N/A		Washery Waste	Washery Waste	DU	
EB1015224006	201098	DU Seam Product (-50 +.250 F1.60)		4	1290L	N/A	N/A		Washery Waste	Washery Waste	DU	
EB1015224007	201099	DU Seam Coarse Reject (-50 +.250 S1.60)		4	1290L	N/A	N/A		Washery Waste	Washery Waste	DU	
EB1015224008	201096	DU Seam Tailings (-.25mm)		4	1290L	N/A	N/A		Washery Waste	Washery Waste	DU	
EB1015224009	201105	DLM/DLL Seam Raw Coal		4	1290L	N/A	N/A		Washery Waste	Washery Waste	DLM/DLL	
EB1015224010	201118	DLM/DLL Seam Product (-50 +.250 F1.60)		4	1290L	N/A	N/A		Washery Waste	Washery Waste	DLM/DLL	
EB1015224011	201119	DLM/DLL Seam Coarse Reject (-50 +.250 S1.60)		4	1290L	N/A	N/A		Washery Waste	Washery Waste	DLM/DLL	
EB1015224012	201116	DLM/DLL Seam Tailings (-.25mm)		4	1290L	N/A	N/A		Washery Waste	Washery Waste	DLM/DLL	

C = Composite

Appendix 5: Acid Base Accounting

Client Sample ID	Group	Paste pH	Paste EC	Total S	ANC	SO4	CRS	Total C	TIC	TOC	NAGpH	NAGpH4.5	NAGpH7	pH-2-Ext	CarbNP	MPA	NAPP	NPR	Classification	
		pH Unit	µS/cm	%	kgH_2SO_4/t	mg/kg	%	%	%	%	pH Unit	kgH_2SO_4/t		pH Unit	kgH_2SO_4/t				NPR	AMIRA
C = Composite		0.1	1	0.01	0.5	100	0.005	0.02	0.02	0.02	0.1	0.1	0.1				MPA - ANC	ANC/MPA		
75551	CLAY AND SOIL	5.4	1570	0.02	5.6	1010	0	0.21	0.05	0.16	5.5	<0.1	2.2		4.08	0.61	-5.0	9.2	NAF	NAF
75552	CLAY AND SOIL	4.9	1280	0.01	4	900	0	0.13	0.02	0.11	5.6	<0.1	2.3		1.63	0.31	-3.7	13.1	NAF	NAF-Barren
75553	CLAY AND SOIL	5.4	4670	0.02	6.3	1090	0	0.02	0.02	<0.02	5.9	<0.1	1.4		1.63	0.61	-5.7	10.3	NAF	NAF
75554	CLAY AND SOIL	6	2040	<0.01	11.4	790	0	0.02	0.02	<0.02	6.4	<0.1	0.8		1.63	0.15	-11.2	74.5	NAF	NAF
75555	CLAY AND SOIL	6.3	4560	<0.01	10.4	970	0	0.04	<0.02	0.03	6.5	<0.1	1.1		0.82	0.15	-10.2	68.0	NAF	NAF
75556	CLAY AND SOIL	6.4	463	<0.01	3.9	190	0	0.04	<0.02	0.04	6.4	<0.1	1.5		0.82	0.15	-3.7	25.5	NAF	NAF-Barren
75557	REMAINING	6.1	1130	<0.01	1.2	120	0	0.02	0.02	<0.02	5.7	<0.1	2		1.63	0.15	-1.0	7.8	NAF	NAF-Barren
75559	REMAINING	6.3	633	<0.01	1.4	420	0	0.05	<0.02	0.04	5.5	<0.1	3.1		0.82	0.15	-1.2	9.2	NAF	NAF-Barren
75560	REMAINING	6.2	282	<0.01	8.2	100	0	3.91	0.13	3.78	8.6	<0.1	<0.1		10.61	0.15	-8.0	53.6	NAF	NAF
75561	REMAINING	6.5	34	<0.01	2.5	<100	0	2.52	0.1	2.43	5.7	<0.1	1.9		8.16	0.15	-2.3	16.3	NAF	NAF-Barren
75562	REMAINING	6.3	128	<0.01	1.6	130	0	0.31	0.1	0.21	5.8	<0.1	1.8		8.16	0.15	-1.4	10.5	NAF	NAF-Barren
75563	REMAINING	6.5	131	0.02	2.4	160	0	2.4	0.11	2.29	5.8	<0.1	1.2		8.98	0.61	-1.8	3.9	NAF	NAF-Barren
75564	CLAY AND SOIL	6.6	353	0.04	5.6	1410	0	0.2	0.04	0.15	5.6	<0.1	2		3.27	1.22	-4.4	4.6	NAF	NAF
75565	CLAY AND SOIL	5.3	1740	0.01	1.6	630	0	0.07	<0.02	0.07	5.8	<0.1	2.4		0.82	0.31	-1.3	5.2	NAF	NAF-Barren
75566	SAND AND GRAVEL	5.7	1170	<0.01	1.4	320	0	0.04	0.04	<0.02	5.5	<0.1	2.2		3.27	0.15	-1.2	9.2	NAF	NAF-Barren
75567	CLAY AND SOIL	5.8	4100	0.02	3.4	920	0	<0.02	<0.02	<0.02	5.7	<0.1	2.9		0.82	0.61	-2.8	5.6	NAF	NAF-Barren
75568	CLAY AND SOIL	6	4360	0.01	9.1	1020	0	0.02	0.02	<0.02	6.7	<0.1	0.4		1.63	0.31	-8.8	29.7	NAF	NAF
75569	REMAINING	6.3	2390	<0.01	3.2	550	0	<0.02	<0.02	<0.02	5.8	<0.1	1.3		0.82	0.15	-3.0	20.9	NAF	NAF-Barren
75570	REMAINING	6.7	1730	0.01	9.1	500	0	0.06	<0.02	0.05	6.5	<0.1	0.6		0.82	0.31	-8.8	29.7	NAF	NAF
75571	REMAINING	6.7	1100	<0.01	2.2	260	0	0.04	<0.02	0.03	5.7	<0.1	2.2		0.82	0.15	-2.0	14.4	NAF	NAF-Barren
75572	REMAINING	6.7	1480	0.03	3.4	290	0	1.52	0.08	1.44	5.5	<0.1	2.7		6.53	0.92	-2.5	3.7	NAF	NAF-Barren
75573	COAL	6.6	168	0.18	9.1	200	0	17.8	<0.02	18.1	5.4	<0.1	4.5		0.82	5.51	-3.6	1.7	UC	NAF
75574	REMAINING	6.4	123	0.02	1.5	<100	0	2.44	0.24	2.2	5.6	<0.1	1.2		19.59	0.61	-0.9	2.5	UC	NAF-Barren
75575	REMAINING	6.3	314	0.02	<0.5	<100	0	1.64	0.14	1.5	5.4	<0.1	3.1		11.43	0.61	0.4	0.4	PAF	UC(NAF)
C3-4-5	SAND AND GRAVEL	6.2	4400	0.02	2.1	590	0	0.28	0.03	0.25	5.6	<0.1	2.5		2.45	0.61	-1.5	3.4	NAF	NAF-Barren
C10-11-12	CLAY AND SOIL	6.4	4620	0.02	4.1	730	0	0.05	<0.02	0.04	6.2	<0.1	1.8		0.82	0.61	-3.5	6.7	NAF	NAF-Barren
C19-20	CLAY AND SOIL	6.6	3660	0.02	5.3	640	0	0.08	<0.02	0.06	5.7	<0.1	3.1		0.82	0.61	-4.7	8.7	NAF	NAF
C23-24	REMAINING	6.3	2020	0.01	3.8	240	0	0.03	0.03	<0.02	5.5	<0.1	2.3		2.45	0.31	-3.5	12.4	NAF	NAF-Barren
C27-28	REMAINING	6.3	783	0.02	1.3	220	0	0.04	<0.02	0.02	5.3	<0.1	2.4		0.82	0.61	-0.7	2.1	UC	NAF-Barren
C33-34	REMAINING	6.2	1	<0.01	2.2	200	0	0.03	0.03	<0.02	5.4	<0.1	2.5		2.45	0.15	-2.0	14.4	NAF	NAF-Barren
C42	REMAINING	6.6	1	0.01	2.7	200	0	0.45	0.03	0.42	6	<0.1	0.7		2.45	0.31	-2.4	8.8	NAF	NAF-Barren
C45-46	COAL	6.9	3300	0.2	5	410	0	13.2	0.61	12.6	5.3	<0.1	6.2		49.79	6.12	1.1	0.8	PAF	UC(NAF)
C14-15-16	CLAY AND SOIL	6.4	2760	0.02	6.2	760	0	0.15	0.04	0.1	5.8	<0.1	1.8		3.27	0.61	-5.6	10.1	NAF	NAF
C36-37	REMAINING	6.4	1570	<0.01	1.9	210	0	0.05	0.02	0.03	5.6	<0.1	2		1.63	0.15	-1.7	12.4	NAF	NAF-Barren
C40-41	REMAINING	6.8	236	<0.01	1.2	150	0	0.1	0.03	0.07	5.8	<0.1	1.6		2.45	0.15	-1.0	7.8	NAF	NAF-Barren
Alpha_C-0.250mm	COAL	6.5	256	0.58	5.4	5250	0.3	39	3.59	35.5	2.6		8.2	2.6	293	17.7	12.3	0.3	PAF	PAF
Alpha_DLL-0.250mm	COAL	6.1	236	0.67	4.2	450	0.42	56.7	5.53	51.2	2.3		15.8	2.3	451	20.5	16.3	0.2	PAF	PAF
Alpha_DU-0.250mm	COAL	6.8	202	0.74	4.4	6040	0.37	51.2	5.03	46.1	2.4		14.5	2.4	411	22.6	18.2	0.2	PAF	PAF
C_Seam_S1.60+0.250mm	COAL	7.1	426	0.43	5.4	260	0.26	15.4	1.6	13.8	3.1		6.2	3.1	131	13.2	7.8	0.4	PAF	PAF
Seam_C_Roof/Floor+0.250mm	COAL	4.2	1130	0.26	4.7	1100	0.04	24.3	2.31	22	3		2.0	3	189	7.96	3.3	0.6	PAF	PAF-LC
C_Seam-0.250mm_Roof/Floor	COAL	6.2	174	0.32	4	110	0.09	25.3	1.89	23.4	2.9		3.5	2.9	154	9.79	5.8	0.4	PAF	PAF-LC
Seam_DLL_S1.60+0.25	COAL	4.6	461	1.81	2.1	1380	1.11	12.9	0.5	12.4	2.9		39.9	2.9	40.82	55.4	53.3	0.0	PAF	PAF
Roof/Floor_Seam_DLL	COAL	4.5	470	0.07	1.4	600	0.2	5.74	0.59	5.15	6.2			6.2	48.16	2.14	0.7	0.7	PAF	NAF
DLL_Seam-0.250mm_Roof/Floor	COAL	6.6	103	0.02	0.7	790	0	6.67	0.06	6.61	5.8			5.8	4.90	0.61	-0.1	1.1	UC	NAF
Seam_DU_S1.60+0.250mm	COAL	6.3	305	0.56	1.2	730	0.48	21.2	1.73	19.5	2.9		16.4	2.9	141	17.1	15.9	0.1	PAF	PAF

Client Sample ID	Group	Paste pH	Paste EC	Total S	ANC	SO4	CRS	Total C	TIC	TOC	NAGpH	NAGpH4.5	NAGpH7	pH-2-Ext	CarbNP	MPA	NAPP	NPR	Classification	
		pH Unit	µS/cm	%	kgH_2SO_4/t	mg/kg	%	%	%	%	pH Unit	kgH_2SO_4/t		pH Unit	kgH_2SO_4/t				NPR	AMIRA
C = Composite		0.1	1	0.01	0.5	100	0.005	0.02	0.02	0.02	0.1	0.1	0.1				MPA - ANC	ANC/MPA		
Seam_DU_+0.250mm_Roof/Floor	COAL	4.5	596	0.58	5	220	0.47	20.9	1.94	19	3.3		16.1	3.3	158	17.7	12.7	0.3	PAF	PAF
DU_Seam-0.250mm_Roof/Floor	COAL	6.2	183	0.42	4.7	180	0.22	15.8	1.4	14.4	3.5		5.6	3.5	114	12.9	8.2	0.4	PAF	PAF
Blended raw coal	COAL	5.9	127	0.44	4.8	100	0.06	55.3	0.55	54.8					44.90	13.5	8.7	0.4	PAF	
1252D_ARD03	REMAINING	8.4	1140	0.06	54.6	---	---	2.66	1.15	1.51	---	---	---		93.87	1.84	-52.8	29.7	NAF	
1252D_ARD04	REMAINING	8.6	911	0.09	57.6	400	0.052	1.31	1.04	0.27	---	---	---		84.90	2.75	-54.8	20.9	NAF	
1252D_ARD05	COAL	7.2	1200	0.68	16	470	0.064	29.6	1.03	28.6	---	---	---	5.4	84.08	20.8	4.8	0.8	PAF	UC(NAF)
1252D_ARD07	REMAINING	6.6	303	0.11	4.9											3.37	-1.5	1.5	UC	
1252D_ARD08	REMAINING	6.6	160	0.11	2.8											3.37	0.6	0.8	PAF	
1252D_ARD09	REMAINING	6.8	172	0.03	4.6											0.92	-3.7	5.0	NAF	
1252D_ARD10	REMAINING	5.7	610	0.13	6	---	---	5.09	0.8	4.29	---	---	---		65.30	3.98	-2.0	1.5	UC	
1252D_ARD11	COAL	5.8	1580	0.4	1	4630	0.136	7.71	0.17	7.54	---	---	---	4.6	13.88	12.2	11.2	0.1	PAF	UC(NAF)
1262D_ARD01	SAND AND GRAVEL	8.3	878	0.01	4.6	---	---	0.04	<0.02	0.03	---	---	---		0.82	0.31	-4.3	15.0	NAF	
1262D_ARD02	SAND AND GRAVEL	7.9	1230	<0.01	3.8											0.15	-3.6	24.8	NAF	
1262D_ARD03	REMAINING	7.1	2790	0.01	3.9	---	---	---	---	---	---	---	---			0.31	-3.6	12.7	NAF	
1262D_ARD04	CARBONACEOUS	6.7	1860	0.01	3.8	---	---	0.06	<0.02	0.04	---	---	---		0.82	0.31	-3.5	12.4	NAF	
1262D_ARD05	COAL	5	3140	0.37	4.2	1940	0.038	19	0.71	18.3	---	---	---	5.7	57.96	11.3	7.1	0.4	PAF	UC(NAF)
1277D_ARD01	CLAY AND SOIL	6.6	1610	0.01	4.2											0.31	-3.9	13.7	NAF	
1277D_ARD02	SAND AND GRAVEL	7.2	2080	0.05	4.9	300	---	0.18	0.18	<0.02	---	---	---		14.69	1.53	-3.4	3.2	NAF	
1277D_ARD03	CLAY AND SOIL	7.2	1010	0.07	6.9	---	---	0.05	<0.02	0.05	---	---	---		0.82	2.14	-4.8	3.2	NAF	
1277D_ARD04	REMAINING	8.3	2240	0.09	4.2	---	---	---	---	---	---	---	---			2.75	-1.4	1.5	UC	
1277D_ARD05	REMAINING	8.6	1480	0.04	4.4	---	---	0.76	0.08	0.68	---	---	---		6.53	1.22	-3.2	3.6	NAF	
1277D_ARD10	REMAINING	7.4	309	0.03	1.4	---	---	1.26	0.17	1.09	---	---	---		13.88	0.92	-0.5	1.5	UC	
1277D_ARD11	REMAINING	5.1	306	0.09	<0.5											2.75	2.5	0.1	PAF	
1326D_ARD01	CLAY AND SOIL	6.1	5140	0.14	5.2	2370	<0.005	0.12	<0.02	0.11	---	---	---	X	0.82	4.28	-0.9	1.2	UC	NAF
1326D_ARD02	CLAY AND SOIL	5.4	4360	0.03	3.6											0.92	-2.7	3.9	NAF	
1326D_ARD03	SAND AND GRAVEL	6	3570	0.04	3.4											1.22	-2.2	2.8	UC	
1326D_ARD04	SAND AND GRAVEL	6.8	4090	0.1	7	---	---	0.02	0.02	<0.02	---	---	---		1.63	3.06	-3.9	2.3	UC	
1326D_ARD05	REMAINING	7	960	0.05	3.4											1.53	-1.9	2.2	UC	
1327D_ARD01	SAND AND GRAVEL	6.9	2550	0.03	3.9											0.92	-3.0	4.2	NAF	
1327D_ARD03	COAL	7.1	392	0.1	3.8											3.06	-0.7	1.2	UC	
1336D_ARD01	REMAINING	7.2	234	0.08	3.1											2.45	-0.7	1.3	UC	
1336D_ARD02	CARBONACEOUS	7	238	<0.01	3	---	---	---	---	---	---	---	---			0.15	-2.8	19.6	NAF	
1336D_ARD03	REMAINING	6.4	344	0.08	3	---	---	0.13	<0.02	0.12	---	---	---		0.82	2.45	-0.6	1.2	UC	
1337DG_ARD01	SAND AND GRAVEL	6.2	1950	0.01	3.6											0.31	-3.3	11.8	NAF	
1337DG_ARD02	REMAINING	6.9	1850	0.07	16.1	770	---	2.84	1.13	1.71	---	---	---		92.24	2.14	-14.0	7.5	NAF	
1337DG_ARD03	COAL	8	1660	0.21	15.7	370	0.018	8.14	0.09	8.04	---	---	---	X	7.35	6.43	-9.3	2.4	UC	NAF
1339DG_ARD01	REMAINING	8	826	<0.01	5.9											0.15	-5.7	38.6	NAF	
1339DG_ARD02	REMAINING	5.4	1950	0.13	3.5	---	---	---	---	---	---	---	---			3.98	0.5	0.9	PAF	
1339DG_ARD03	CARBONACEOUS	7.4	2380	0.27	14	1700	0.048	8.79	0.27	8.52	---	---	---	7.1	22.04	8.26	-5.7	1.7	UC	NAF
1339DG_ARD04	REMAINING	7.6	609	0.09	5.5											2.75	-2.7	2.0	UC	
1339DG_ARD05	REMAINING	5.4	1070	0.27	4.8	1660	0.178	2.58	0.4	2.18	4.5	<0.1	4.7		32.65	8.26	3.5	0.6	PAF	UC(NAF)
1339DG_ARD06	REMAINING	3.8	2930	26.8	<0.5	8940	16.3	0.97	0.09	0.88	---	---	---	1.6	7.35	820	819.8	0.0	PAF	PAF
1339DG_ARD08	REMAINING	7.5	268	0.02	3.8	---	---	0.92	<0.02	0.9	---	---	---		0.82	0.61	-3.2	6.2	NAF	
1347DG_ARD001	CLAY AND SOIL	8.6	798	0.02	23.3											0.61	-22.7	38.1	NAF	
1347DG_ARD002	REMAINING	7.2	1550	0.01	2											0.31	-1.7	6.5	NAF	

Client Sample ID	Group	Paste pH	Paste EC	Total S	ANC	SO4	CRS	Total C	TIC	TOC	NAGpH	NAGpH4.5	NAGpH7	pH-2-Ext	CarbNP	MPA	NAPP	NPR	Classification	
		pH Unit	µS/cm	%	kgH_2SO_4/t	mg/kg	%	%	%	%	pH Unit	kgH_2SO_4/t		pH Unit	kgH_2SO_4/t				NPR	AMIRA
C = Composite		0.1	1	0.01	0.5	100	0.005	0.02	0.02	0.02	0.1	0.1	0.1				MPA - ANC	ANC/MPA		
1347DG_ARD003	REMAINING	7.4	923	0.02	<0.5											0.61	0.4	0.4	PAF	
1347DG_ARD004	CARBONACEOUS	8.9	1290	0.05	40.9											1.53	-39.4	26.7	NAF	
1347DG_ARD005	REMAINING	8.9	752	0.04	50											1.22	-48.8	40.8	NAF	
1347DG_ARD006	CARBONACEOUS	8.9	1590	0.05	20.3											1.53	-18.8	13.3	NAF	
1347DG_ARD007	CARBONACEOUS	8.8	1010	0.07	29											2.14	-26.9	13.5	NAF	
1347DG_ARD008	REMAINING	9.2	977	0.06	116											1.84	-114.2	63.2	NAF	
1347DG_ARD010	CARBONACEOUS	7.6	178	0.02	<0.5											0.61	0.4	0.4	PAF	
1347DG_ARD011	REMAINING	7.8	249	0.02	<0.5											0.61	0.4	0.4	PAF	
1347DG_ARD012	CARBONACEOUS	7	331	0.06	<0.5											1.84	1.6	0.1	PAF	
1349D_ARD01	CLAY AND SOIL	7.9	4930	0.14	54.6	950	<0.005	0.72	0.68	0.04	---	---	---	X	55.51	4.28	-50.3	12.7	NAF	NAF
1349D_ARD02	REMAINING	7.6	1860	0.11	6.4	370	<0.005	0.08	<0.02	0.07	---	---	---		0.82	3.37	-3.0	1.9	UC	
1349D_ARD03	REMAINING	7.2	231	<0.01	3											0.15	-2.8	19.6	NAF	
1350D_ARD01	SAND AND GRAVEL	6.7	203	<0.01	2.5	---	---	0.03	<0.02	0.02	---	---	---		0.82	0.15	-2.3	16.3	NAF	
1350D_ARD02	REMAINING	7.6	493	0.01	4.6											0.31	-4.3	15.0	NAF	
1350D_ARD03	REMAINING	7.5	579	0.08	4.3	---	---	0.03	<0.02	0.03	---	---	---		0.82	2.45	-1.9	1.8	UC	
1350D_ARD04	COAL	6.9	1280	0.14	12.8	540	---	2.57	0.1	2.46	---	---	---		8.16	4.28	-8.5	3.0	UC	
1361D_ARD01	REMAINING	8.6	1090	0.06	9	210	---	0.07	0.03	0.04	---	---	---		2.45	1.84	-7.2	4.9	NAF	
1361D_ARD02	REMAINING	7.2	1010	<0.01	3											0.15	-2.8	19.6	NAF	
1361D_ARD03	REMAINING	7.3	2400	0.08	3.1											2.45	-0.7	1.3	UC	
1362D_ARD01	REMAINING	8.4	651	0.06	9.8	---	---	0.1	<0.02	0.08	---	---	---		0.82	1.84	-8.0	5.3	NAF	
1362D_ARD02	REMAINING	7.8	403	0.06	2.9	---	---	---	---	---	---	---	---			1.84	-1.1	1.6	UC	
1362D_ARD03	REMAINING	4.5	320	0.06	3.4											1.84	-1.6	1.9	UC	
1362D_ARD04	REMAINING	7.4	494	0.02	9	---	---	0.03	<0.02	0.02	---	---	---		0.82	0.61	-8.4	14.7	NAF	
1362D_ARD05	REMAINING	8	1430	0.13	3.6											3.98	0.4	0.9	PAF	
1362D_ARD06	COAL	5.6	1070	0.44	8	1460	0.074	---	---	---	---	---	---	5.4		13.5	5.5	0.6	PAF	UC(NAF)
1406D_ARD01	CLAY AND SOIL	5.4	3440	0.03	2.9	---	---	0.15	<0.02	0.14	---	---	---		0.82	0.92	-2.0	3.2	NAF	
1406D_ARD02	REMAINING	8.5	2170	0.02	22.6											0.61	-22.0	36.9	NAF	
1406D_ARD03	REMAINING	8.9	1740	0.02	15.8	---	---	1.28	0.42	0.85	---	---	---		34.28	0.61	-15.2	25.8	NAF	
1406D_ARD04	REMAINING	8.9	821	0.04	14.7											1.22	-13.5	12.0	NAF	
1406D_ARD06	COAL	8.5	697	0.05	10.2											1.53	-8.7	6.7	NAF	
1406D_ARD07	REMAINING	8	242	0.06	1.4	<100	0.074	---	---	---	4.8	<0.1	5.2			1.84	0.4	0.8	PAF	UC(NAF)
1406D_ARD08	REMAINING	7.3	108	0.02	<0.5											0.61	0.4	0.4	PAF	
1406D_ARD09	COAL	6.9	242	0.15	9.7											4.59	-5.1	2.1	UC	
1406D_ARD10	REMAINING	7.8	94	0.03	1.2	<100	0.01	1.42	0.27	1.15	---	---	---	X	22.04	0.92	-0.3	1.3	UC	NAF
1411D_ARD01	CLAY AND SOIL	9	1040	0.02	1.6	<100	0.006	0.08	0.08	<0.02	8	<0.1	<0.1		6.53	0.61	-1.0	2.6	UC	NAF-Barren
1411D_ARD02	REMAINING	7.5	1780	0.02	1.7	---	---	0.03	<0.02	0.02	---	---	---		0.82	0.61	-1.1	2.8	UC	
1411D_ARD04	REMAINING	7.8	333	0.03	2.5	---	---	4.19	0.38	3.81	---	---	---		31.02	0.92	-1.6	2.7	UC	
1411D_ARD05	REMAINING	7.9	232	0.02	2.1	<100	0.012	1.7	0.25	1.44	---	---	---	X	20.41	0.61	-1.5	3.4	NAF	NAF
1411D_ARD06	CARBONACEOUS	6.9	416	0.11	1.3	280	0.124	9.41	0.05	9.36	---	---	---	X	4.08	3.37	2.1	0.4	PAF	UC(NAF)
1411D_ARD07	COAL	7.2	196	0.29	1	<100	0.006	65.6	4.27	61.3	---	---	---	5.6	349	8.87	7.9	0.1	PAF	UC(NAF)
1413D_ARD02	SAND AND GRAVEL	7.1	1360	0.01	1.2	---	---	0.08	0.03	0.05	---	---	---		2.45	0.31	-0.9	3.9	NAF	
1413D_ARD03	REMAINING	7.1	2020	0.02	12.5	---	---	---	---	---	---	---	---			0.61	-11.9	20.4	NAF	
1413D_ARD04	REMAINING	7.5	891	0.02	1.2											0.61	-0.6	2.0	UC	
1413D_ARD05	COAL	8.7	1060	0.07	12.5											2.14	-10.4	5.8	NAF	
1413D_ARD06	REMAINING	7.4	155	0.03	1.2	<100	0.02	---	---	---	---	---	---	X		0.92	-0.3	1.3	UC	NAF

Client Sample ID	Group	Paste pH	Paste EC	Total S	ANC	SO4	CRS	Total C	TIC	TOC	NAGpH	NAGpH4.5	NAGpH7	pH-2-Ext	CarbNP	MPA	NAPP	NPR	Classification	
		pH Unit	µS/cm	%	kgH_2SO_4/t	mg/kg	%	%	%	%	pH Unit	kgH_2SO_4/t		pH Unit	kgH_2SO_4/t				NPR	AMIRA
C = Composite		0.1	1	0.01	0.5	100	0.005	0.02	0.02	0.02	0.1	0.1	0.1				MPA - ANC	ANC/MPA		
1413D_ARD07	REMAINING	7.6	129	0.03	<0.5											0.92	0.7	0.3	PAF	
1413D_ARD08	COAL	6.7	205	0.21	3.9											6.43	2.5	0.6	PAF	
1415D_ARD01	SAND AND GRAVEL	6.9	874	0.02	<0.5											0.61	0.4	0.4	PAF	
1415D_ARD02	CLAY AND SOIL	7.5	3580	0.02	7.4	670	<0.005	0.03	<0.02	0.03	6.8	<0.1	0.5		0.82	0.61	-6.8	12.1	NAF	NAF
1415D_ARD03	REMAINING	6.9	1360	0.02	1.9	---	---	<0.02	<0.02	<0.02	---	---	---		0.82	0.61	-1.3	3.1	NAF	
1415D_ARD04	COAL	6.7	921	0.25	4.4											7.65	3.3	0.6	PAF	
1415D_ARD05	COAL	6.8	298	0.58	5.1	260	0.276	---	---	---	---	---	---			17.7	12.6	0.3	PAF	
1415D_ARD06	REMAINING	7.9	109	0.02	4.6	---	---	0.98	0.06	0.92	---	---	---		4.90	0.61	-4.0	7.5	NAF	
1415D_ARD07	REMAINING	8.4	111	0.02	1.4	<100	0.012	1.84	0.13	1.71	---	---	---	X	10.61	0.61	-0.8	2.3	UC	NAF
1418D_ARD01	REMAINING	8.8	1050	0.02	13.6											0.61	-13.0	22.2	NAF	
1418D_ARD02	REMAINING	8.3	664	0.02	1.6	<100	<0.005	---	---	---	5.5	<0.1	3.1			0.61	-1.0	2.6	UC	NAF-Barren
1418D_ARD03	COAL	6.6	517	0.25	5.6											7.65	2.1	0.7	PAF	
1419D_ARD01	CLAY AND SOIL	8.5	2600	0.02	5.8											0.61	-5.2	9.5	NAF	
1419D_ARD02	REMAINING	7.9	1070	0.02	2.5											0.61	-1.9	4.1	NAF	
1419D_ARD03	CLAY AND SOIL	7.5	1980	0.18	1.4	220	---	0.03	0.03	<0.02	---	---	---	X	2.45	5.51	4.1	0.3	PAF	UC(NAF)
1419D_ARD04	REMAINING	7.8	1440	0.02	5.9	---	---	---	---	---	---	---	---			0.61	-5.3	9.6	NAF	
1419D_ARD05	REMAINING	7.7	994	0.03	10.7	160	0.012	---	---	---	6.5	<0.1	0.4			0.92	-9.8	11.7	NAF	NAF
1419D_ARD06	COAL	7.2	392	0.36	6.7											11.0	4.3	0.6	PAF	
1419D_ARD07	REMAINING	7.8	199	0.03	1.3	---	---	2.8	0.2	2.6	---	---	---		16.33	0.92	-0.4	1.4	UC	
1419D_ARD08	REMAINING	8.2	182	0.03	1.1											0.92	-0.2	1.2	UC	
1419D_ARD09	COAL	7	285	0.27	6.1											8.26	2.2	0.7	PAF	
1419D_ARD10	REMAINING	8.6	108	0.02	2.7	<100	0.008	2.79	0.11	2.68	---	---	---	X	8.98	0.61	-2.1	4.4	NAF	NAF
1420D_ARD01	SAND AND GRAVEL	7.7	530	0.02	<0.5	---	---	0.02	0.02	<0.02	---	---	---		1.63	0.61	0.4	0.4	PAF	
1420D_ARD02	CLAY AND SOIL	7.7	1880	0.02	3.8											0.61	-3.2	6.2	NAF	
1420D_ARD03	REMAINING	8	601	0.02	<0.5	---	---	<0.02	<0.02	<0.02	---	---	---		0.82	0.61	0.4	0.4	PAF	
1420D_ARD04	REMAINING	7.9	647	0.03	<0.5											0.92	0.7	0.3	PAF	
1420D_ARD05	CARBONACEOUS	8.3	648	0.02	2.2	---	---	0.25	0.02	0.23	---	---	---		1.63	0.61	-1.6	3.6	NAF	
1420D_ARD06	REMAINING	7.8	151	0.04	0.7											1.22	0.5	0.6	PAF	
1420D_ARD07	REMAINING	7.9	153	0.03	1.7											0.92	-0.8	1.9	UC	
1420D_ARD08	COAL	7.4	214	0.27	4.1	---	---	42.2	0.72	41.5	---	---	---		58.77	8.26	4.2	0.5	PAF	
1420D_ARD09	REMAINING	7.5	173	0.04	1.9	<100	0.086	---	---	---	6.5	<0.1	0.3			1.22	-0.7	1.6	UC	NAF-Barren
1420D_ARD10	COAL	6.9	155	0.23	4.1	<100	0.06	---	---	---	---	---	---	4.8		7.04	2.9	0.6	PAF	UC(NAF)
1420D_ARD11	REMAINING	8	100	0.02	0.8											0.61	-0.2	1.3	UC	
1421D_ARD01	CLAY AND SOIL	7	1570	0.02	1.4	---	---	0.07	<0.02	0.06	---	---	---		0.82	0.61	-0.8	2.3	UC	
1421D_ARD02	REMAINING	7	1430	0.02	3.2	---	---	0.03	0.03	<0.02	---	---	---		2.45	0.61	-2.6	5.2	NAF	
1421D_ARD03	CARBONACEOUS	7.6	1540	0.03	<0.5	---	---	---	---	---	---	---	---			0.92	0.7	0.3	PAF	
1421D_ARD04	CARBONACEOUS	7.1	893	0.02	3.5	---	---	1.75	0.07	1.68	---	---	---		5.71	0.61	-2.9	5.7	NAF	
1421D_ARD05	COAL	6.8	210	0.31	5.1	<100	0.048	63.2	4.03	59.2	---	---	---	4.3	329	9.49	4.4	0.5	PAF	PAF
1421D_ARD06	REMAINING	8	129	0.03	<0.5											0.92	0.7	0.3	PAF	
1421D_ARD07	COAL	7.1	194	0.33	3.2	<100	0.038	38.6	0.3	38.4	---	---	---	2.1	24.49	10.1	6.9	0.3	PAF	PAF
1422D_ARD01	REMAINING	7.2	469	0.02	<0.5											0.61	0.4	0.4	PAF	
1422D_ARD02	CARBONACEOUS	5.9	1190	0.6	12.8	1780	0.128	---	---	---	6.5	<0.1	0.5			18.4	5.6	0.7	PAF	UC(NAF)
1422D_ARD03	COAL	6.6	238	0.76	3.2											23.3	20.1	0.1	PAF	
1422D_ARD04	REMAINING	7.8	142	0.08	2.1	<100	0.087	---	---	---	4.3	0.2	4.2			2.45	0.3	0.9	PAF	PAF-LC
1423D_ARD01	REMAINING	7.9	596	0.02	2.2	---	---	0.02	0.02	<0.02	---	---	---		1.63	0.61	-1.6	3.6	NAF	

Client Sample ID	Group	Paste pH	Paste EC	Total S	ANC	SO4	CRS	Total C	TIC	TOC	NAGpH	NAGpH4.5	NAGpH7	pH-2-Ext	CarbNP	MPA	NAPP	NPR	Classification	
		pH Unit	µS/cm	%	kgH_2SO_4/t	mg/kg	%	%	%	%	pH Unit	kgH_2SO_4/t		pH Unit	kgH_2SO_4/t				NPR	AMIRA
C = Composite		0.1	1	0.01	0.5	100	0.005	0.02	0.02	0.02	0.1	0.1	0.1				MPA - ANC	ANC/MPA		
1423D_ARD03	REMAINING	7.2	545	0.02	<0.5											0.61	0.4	0.4	PAF	
1423D_ARD04	CARBONACEOUS	7.5	1010	0.05	1.9											1.53	-0.4	1.2	UC	
1423D_ARD05	CARBONACEOUS	7.5	815	0.04	1.6	---	---	4.38	0.11	4.27	---	---	---		8.98	1.22	-0.4	1.3	UC	
1423D_ARD06	CARBONACEOUS	6.2	495	0.29	4	570	0.06	---	---	---	3.8	24.8	82.5			8.87	4.9	0.5	PAF	
1423D_ARD07	REMAINING	4.6	771	0.21	<0.5											6.43	6.2	0.0	PAF	
1423D_ARD08	REMAINING	4.2	838	0.23	<0.5	1440	<0.005	---	---	---	3	4.6	9.4			7.04	6.8	0.0	PAF	
1423D_ARD09	COAL	6.2	228	0.49	6.8											15.0	8.2	0.5	PAF	
1423D_ARD10	REMAINING	9.1	744	0.05	9.9	---	---	---	---	---	---	---	---			1.53	-8.4	6.5	NAF	
1423D_ARD11	COAL	6.2	234	0.38	5.6											11.6	6.0	0.5	PAF	
1423D_ARD12	REMAINING	8.1	128	0.02	1.3											0.61	-0.7	2.1	UC	
1423D_ARD13	REMAINING	7.6	101	<0.01	0.7											0.15	-0.5	4.6	NAF	
1423D_ARD14	REMAINING	7.9	99	0.03	2.1											0.92	-1.2	2.3	UC	
1424D_ARD01	REMAINING	4.6	1560	0.03	1.3											0.92	-0.4	1.4	UC	
1424D_ARD02	CARBONACEOUS	8	675	0.08	7.6	---	---	---	---	---	---	---	---			2.45	-5.2	3.1	NAF	
1424D_ARD03	COAL	6.4	796	0.29	6.8											8.87	2.1	0.8	PAF	
1424D_ARD04	CARBONACEOUS	7.4	1330	1.16	46.9	1830	0.962	---	---	---	3.4	77.8	235			35.5	-11.4	1.3	UC	UC(PAF)
1424D_ARD05	REMAINING	9.2	492	0.03	10.4											0.92	-9.5	11.3	NAF	
1424D_ARD06	REMAINING	9	523	0.03	5.4											0.92	-4.5	5.9	NAF	
1424D_ARD07	REMAINING	9.3	486	0.03	10.4											0.92	-9.5	11.3	NAF	
1424D_ARD08	REMAINING	7.9	578	0.17	6.2	230	0.018	---	---	---	5.3	<0.1	4.2			5.20	-1.0	1.2	UC	NAF
1424D_ARD09	COAL	8.4	380	0.11	8.8	120	0.014	20	0.84	19.1	---	---	---	2.1	68.57	3.37	-5.4	2.6	UC	UC(PAF)
1424D_ARD10	REMAINING	8.3	117	0.02	3.2											0.61	-2.6	5.2	NAF	
1424D_ARD11	REMAINING	7.9	107	0.03	2.2	---	---	0.21	0.02	0.19	---	---	---		1.63	0.92	-1.3	2.4	UC	
1424D_ARD12	CARBONACEOUS	4.8	1000	0.24	3.2											7.34	4.1	0.4	PAF	
1424D_ARD13	COAL	7	211	0.4	5.4	<100	0.024	---	---	---	---	---	---			12.2	6.8	0.4	PAF	
1424D_ARD14	COAL	7.2	159	0.27	5.3											8.26	3.0	0.6	PAF	
1424D_ARD15	CARBONACEOUS	7.6	151	0.17	<0.5	<100	0.158	2.44	<0.02	2.43	---	---	---	3.3	0.82	5.20	5.0	0.0	PAF	PAF-LC
1425D_ARD01	SAND AND GRAVEL	7.1	2100	0.04	3.2											1.22	-2.0	2.6	UC	
1425D_ARD02	REMAINING	8.6	605	0.02	1.3											0.61	-0.7	2.1	UC	
1425D_ARD03	COAL	8.1	1530	0.02	10.4	---	---	---	---	---	---	---	---			0.61	-9.8	17.0	NAF	
1425D_ARD04	COAL	6.2	2740	0.38	15.9	2960	0.393	---	---	---	---	---	---			11.6	-4.3	1.4	UC	
1425D_ARD05	REMAINING	7.7	383	0.04	<0.5	---	---	0.49	0.05	0.43	---	---	---		4.08	1.22	1.0	0.2	PAF	
1425D_ARD06	REMAINING	6.8	121	0.03	0.7											0.92	0.2	0.8	PAF	
1425D_ARD07	COAL	7.2	225	0.4	5	120	0.018	---	---	---	---	---	---	2		12.2	7.2	0.4	PAF	PAF
1425D_ARD08	REMAINING	8.1	76	0.03	<0.5											0.92	0.7	0.3	PAF	
1427D_ARD01	SAND AND GRAVEL	6.9	706	0.02	<0.5											0.61	0.4	0.4	PAF	
1427D_ARD02	CLAY AND SOIL	6.8	3100	0.03	7	750	<0.005	0.03	0.03	<0.02	6.4	<0.1	0.6		2.45	0.92	-6.1	7.6	NAF	NAF
1427D_ARD03	REMAINING	7.6	3020	0.02	5.6	---	---	0.04	<0.02	0.04	---	---	---		0.82	0.61	-5.0	9.2	NAF	
1427D_ARD04	REMAINING	8.6	877	0.07	50.8											2.14	-48.7	23.7	NAF	
1427D_ARD05	REMAINING	8.8	628	0.03	6.1	---	---	3.31	0.37	2.94	---	---	---		30.20	0.92	-5.2	6.6	NAF	
1427D_ARD06	REMAINING	9.4	582	0.05	48.6											1.53	-47.1	31.8	NAF	
1427D_ARD07	COAL	10	948	0.07	15.5	110	0.082	---	---	---	---	---	---			2.14	-13.4	7.2	NAF	
1427D_ARD08	REMAINING	8.3	113	0.04	1	<100	0.016	3.94	0.14	3.8	---	---	---	4.2	11.43	1.22	0.2	0.8	PAF	PAF
1427D_ARD09	REMAINING	8.2	135	0.03	1.3											0.92	-0.4	1.4	UC	

Client Sample ID	Group	Paste pH	Paste EC	Total S	ANC	SO4	CRS	Total C	TIC	TOC	NAGpH	NAGpH4.5	NAGpH7	pH-2-Ext	CarbNP	MPA	NAPP	NPR	Classification	
		pH Unit	µS/cm	%	kgH_2SO_4/t	mg/kg	%	%	%	%	pH Unit	kgH_2SO_4/t		pH Unit	kgH_2SO_4/t				NPR	AMIRA
C = Composite		0.1	1	0.01	0.5	100	0.005	0.02	0.02	0.02	0.1	0.1	0.1				MPA - ANC	ANC/MPA		
1427D_ARD10	COAL	7.6	227	0.34	49.2	160	0.096	36.3	0.39	35.9	---	---	---	4.7	31.84	10.4	-38.8	4.7	NAF	NAF
1426D_ARD01	REMAINING	7.6	2000	0.02	<0.5	---	---	0.02	0.02	<0.02	---	---	---		1.63	0.61	0.4	0.4	PAF	
1426D_ARD02	COAL	8.2	1340	0.05	5.8	510	0.008	---	---	---	---	---	---			1.53	-4.3	3.8	NAF	
1426D_ARD03	REMAINING	9.4	1500	0.08	10.8	---	---	0.77	0.05	0.72	---	---	---		4.08	2.45	-8.4	4.4	NAF	
1426D_ARD04	REMAINING	8.4	1600	0.05	8											1.53	-6.5	5.2	NAF	
1426D_ARD05	CARBONACEOUS	8	1140	0.36	11.3											11.0	-0.3	1.0	UC	
1426D_ARD06	REMAINING	7.4	188	0.16	13.7	110	0.048	---	---	---	---	---	---	5.4		4.90	-8.8	2.8	UC	NAF
1426D_ARD07	COAL	8.5	724	0.11	10.4											3.37	-7.0	3.1	NAF	
1426D_ARD08	COAL	7.1	301	0.32	6.3											9.79	3.5	0.6	PAF	
1426D_ARD09	COAL	8.2	746	0.11	1.6	<100	0.046	---	---	---	---	---	---			3.37	1.8	0.5	PAF	
1426D_ARD10	REMAINING	7.6	124	0.01	0.6	---	---	1.1	0.12	0.98	---	---	---		9.80	0.31	-0.3	2.0	UC	
1426D_ARD11	REMAINING	6.4	424	0.33	2.1											10.1	8.0	0.2	PAF	
1426D_ARD12	COAL	7	262	0.42	5.8	<100	0.068	43	0.75	42.2	---	---	---	3.8	61.22	12.9	7.1	0.5	PAF	PAF
1426D_ARD13	COAL	6.8	195	0.37	3.6	110	0.164	---	---	---	---	---	---			11.3	7.7	0.3	PAF	
1426D_ARD14	REMAINING	8.1	103	<0.01	<0.5	<100	0.008	---	---	---	5.6	<0.1	2.2			0.15	-0.1	1.6	UC	NAF-Barren
1435D_ARD01	SAND AND GRAVEL	8.8	1070	<0.01	<0.5	180	<0.005	0.03	<0.02	0.02	---	---	---	X	0.82	0.15	-0.1	1.6	UC	NAF
1435D_ARD02	CLAY AND SOIL	7	3480	0.01	2.1	---	---	0.03	<0.02	0.03	---	---	---		0.82	0.31	-1.8	6.9	NAF	
1435D_ARD03	CLAY AND SOIL	7.4	2460	0.02	4.1	390	<0.005	---	---	---	6.6	<0.1	1.6			0.61	-3.5	6.7	NAF	NAF-Barren
1435D_ARD04	REMAINING	9.2	954	0.05	10.2	---	---	1.9	<0.02	1.89	---	---	---		0.82	1.53	-8.7	6.7	NAF	
1435D_ARD05	REMAINING	8.8	1400	0.14	14.6	---	---	13.3	<0.02	13.3	---	---	---		0.82	4.28	-10.3	3.4	NAF	
1435D_ARD06	COAL	8.4	804	0.03	3.3	170	0.014	3.31	0.14	3.17	---	---	---	X	11.43	0.92	-2.4	3.6	NAF	NAF
1435D_ARD07	REMAINING	6.8	828	0.08	9.4	640	0.06	---	---	---	6.7	<0.1	0.6			2.45	-7.0	3.8	NAF	NAF
1435D_ARD08	COAL	6.9	642	0.47	12.4	550	0.146	---	---	---	---	---	---	5.1		14.4	2.0	0.9	PAF	UC(NAF)
1435D_ARD09	REMAINING	7.8	175	0.04	1.3	<100	0.022	---	---	---	6.2	<0.1	1			1.22	-0.1	1.1	UC	NAF-Barren
1435D_ARD10	CARBONACEOUS	8	179	0.08	<0.5	---	---	3.32	0.2	3.12	---	---	---		16.33	2.45	2.2	0.1	PAF	
1435D_ARD11	CARBONACEOUS	7.2	256	0.34	1.3	140	0.062	---	---	---	3.4	80.1	222			10.4	9.1	0.1	PAF	PAF
1435D_ARD12	COAL	7.5	194	0.13	2.4											3.98	1.6	0.6	PAF	
1435D_ARD13	REMAINING	7.1	158	0.3	5.2	<100	0.006	---	---	---	4.1	28.1	122			9.18	4.0	0.6	PAF	PAF
1435D_ARD14	REMAINING	8.7	124	<0.01	1.3											0.15	-1.1	8.5	NAF	
1437R_ARD01	REMAINING	7.5	1600	0.02	6.3	---	---	---	---	---	---	---	---			0.61	-5.7	10.3	NAF	
1437R_ARD02	REMAINING	7.2	611	<0.01	<0.5	<100	<0.005	---	---	---	5.4	<0.1	2.8			0.15	-0.1	1.6	UC	NAF-Barren
1437R_ARD03	REMAINING	7.4	1610	0.02	5.8	---	---	0.03	0.03	<0.02	---	---	---		2.45	0.61	-5.2	9.5	NAF	
1437R_ARD04	REMAINING	8.8	1820	0.04	21.7	---	---	1.11	0.7	0.41	---	---	---		57.14	1.22	-20.5	17.7	NAF	
1437R_ARD05	REMAINING	9.2	1280	0.03	21.3											0.92	-20.4	23.2	NAF	
1437R_ARD06	CARBONACEOUS	9.4	1590	0.03	8.4											0.92	-7.5	9.2	NAF	
1437R_ARD07	COAL	7.8	1470	0.31	9.7											9.49	-0.2	1.0	UC	
1437R_ARD08	CARBONACEOUS	8.5	924	0.17	16.4	240	0.036	---	---	---	4	2.3	19.8			5.20	-11.2	3.2	NAF	UC(PAF)
1437R_ARD09	CARBONACEOUS	7.2	773	0.42	7											12.9	5.9	0.5	PAF	
1437R_ARD10	COAL	7.9	655	0.24	11.4	120	0.014	---	---	---	---	---	---			7.34	-4.1	1.6	UC	
1437R_ARD11	COAL	7	508	0.33	3.8											10.1	6.3	0.4	PAF	
1438R_ARD01	REMAINING	6	605	<0.01	0.9	---	---	0.08	<0.02	0.07	---	---	---		0.82	0.15	-0.7	5.9	NAF	
1438R_ARD02	REMAINING	6.7	2680	0.02	1.8											0.61	-1.2	2.9	UC	
1438R_ARD03	REMAINING	7.1	2000	0.01	1.3	---	---	---	---	---	---	---	---			0.31	-1.0	4.2	NAF	
1438R_ARD04	REMAINING	7.1	1440	0.02	3.6	270	<0.005	---	---	---	6.4	<0.1	0.9			0.61	-3.0	5.9	NAF	NAF-Barren
1438R_ARD05	REMAINING	9.1	1350	0.04	34.6											1.22	-33.4	28.3	NAF	

Client Sample ID	Group	Paste pH	Paste EC	Total S	ANC	SO4	CRS	Total C	TIC	TOC	NAGpH	NAGpH4.5	NAGpH7	pH-2-Ext	CarbNP	MPA	NAPP	NPR	Classification	
		pH Unit	µS/cm	%	kgH_2SO_4/t	mg/kg	%	%	%	%	pH Unit	kgH_2SO_4/t		pH Unit	kgH_2SO_4/t				NPR	AMIRA
C = Composite		0.1	1	0.01	0.5	100	0.005	0.02	0.02	0.02	0.1	0.1	0.1				MPA - ANC	ANC/MPA		
1438R_ARD06	REMAINING	9	995	0.04	18.9											1.22	-17.7	15.4	NAF	
1438R_ARD07	COAL	9	1550	0.08	17.8	260	0.05	3.42	0.47	2.95	---	---	---	X	38.37	2.45	-15.4	7.3	NAF	NAF
1438R_ARD08	COAL	8.7	1050	0.11	17.4											3.37	-14.0	5.2	NAF	
1439R_ARD01	REMAINING	8.6	2580	0.02	50	---	---	---	---	---	---	---	---			0.61	-49.4	81.7	NAF	
1439R_ARD02	REMAINING	7.6	2740	0.01	2.6											0.31	-2.3	8.5	NAF	
1439R_ARD03	REMAINING	9.1	1680	0.04	47.1	---	---	1.54	0.94	0.6	---	---	---		76.73	1.22	-45.9	38.5	NAF	
1439R_ARD04	REMAINING	9.3	766	0.04	43.7											1.22	-42.5	35.7	NAF	
1439R_ARD05	COAL	9.3	668	0.01	161	<100	0.006	---	---	---	---	---	---			0.31	-160.7	526.1	NAF	
1439R_ARD06	COAL	8.4	996	0.16	<0.5	<100	0.03	---	---	---	---	---	---			4.90	4.6	0.1	PAF	
1439R_ARD07	CARBONACEOUS	8.3	1220	0.62	12	---	---	22.8	1.11	21.7	---	---	---		90.61	19.0	7.0	0.6	PAF	
1439R_ARD08	CARBONACEOUS	6.7	272	0.31	3.6											9.49	5.9	0.4	PAF	
1439R_ARD09	COAL	6.9	418	0.35	5.7	100	0.078	39.8	4.37	35.4	---	---	---	5.6	357	10.7	5.0	0.5	PAF	UC(NAF)
1440R_ARD01	CLAY AND SOIL	6.8	56	<0.01	1.3	---	---	0.06	0.03	0.03	---	---	---		2.45	0.15	-1.1	8.5	NAF	
1440R_ARD02	REMAINING	6.5	517	<0.01	<0.5	---	---	0.04	<0.02	0.03	---	---	---		0.82	0.15	-0.1	1.6	UC	
1440R_ARD03	REMAINING	9.2	982	0.02	216	380	0.008	---	---	---	9	<0.1	<0.1			0.61	-215.4	352.9	NAF	NAF
1440R_ARD04	REMAINING	8.8	1780	0.05	222											1.53	-220.5	145.1	NAF	
1440R_ARD05	REMAINING	8.9	1320	0.08	10.2	---	---	2.71	0.41	2.3	---	---	---		33.47	2.45	-7.8	4.2	NAF	
1440R_ARD06	COAL	7.6	1490	0.51	14.3											15.6	1.3	0.9	PAF	
1440R_ARD07	COAL	7.4	801	0.47	11.6											14.4	2.8	0.8	PAF	
1440R_ARD08	REMAINING	8	701	0.08	3.8	<100	0.026	---	---	---	6.4	<0.1	<0.1			2.45	-1.4	1.6	UC	NAF-Barren
1440R_ARD09	CARBONACEOUS	8.9	744	0.07	8	---	---	---	---	---	---	---	---			2.14	-5.9	3.7	NAF	
1440R_ARD10	COAL	6.8	499	0.35	8											10.7	2.7	0.7	PAF	
201064	Washery Waste	7.5	146	0.32	5.2											9.8	4.6	0.5	PAF	
201076	Washery Waste	3.8	496	0.34	1.9											10.4	8.5	0.2	PAF	
201077	Washery Waste	3.3	1430	0.69	<0.5											21.1	20.9	0.0	PAF	
201074	Washery Waste	6.3	585	0.44	2.8											13.5	10.7	0.2	PAF	
201085	Washery Waste	7.1	218	0.32	4.7											9.8	5.1	0.5	PAF	
201098	Washery Waste	4.8	417	0.3	3.4											9.2	5.8	0.4	PAF	
201099	Washery Waste	4.3	652	0.32	1.8											9.8	8.0	0.2	PAF	
201096	Washery Waste	6.7	341	0.45	6.3											13.8	7.5	0.5	PAF	
201105	Washery Waste	7.3	144	0.19	6.8											5.8	-1.0	1.2	UC	
201118	Washery Waste	4.2	480	0.15	2.8											4.6	1.8	0.6	PAF	
201119	Washery Waste	4	875	0.14	2.4											4.3	1.9	0.6	PAF	
201116	Washery Waste	7	231	0.44	3.8											13.5	9.7	0.3	PAF	

S = Sulphur, ANC = Acid Neutralising Capacity, CRS = Chromium Reducible Sulphur, C = Carbon, TIC = total Inorganic Carbon, TOC = Total Organic Carbon, NAG = Net Acid Generated,
pH-2-Ext = NAGpH after extended boil, CarbNP = Carbonate Neutralising Potential, MPA = Max Potential Acidity, NAPP = Net Acid Production Potential, NPR = Net Potential Ratio

Appendix 6: Acid Buffering Characteristic Curves

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1252D_ARD03**
	Client Sample Identification 2			**EB1012396_1**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				1
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.5**
Increments:	**mL**	**0.2**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**54.6**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0	9.54	36			
1	0.2	2.45	6.32	37			
2	0.4	4.9	5.03	38			
3	0.6	7.35	3.69	39			
4	0.8	9.8	3.28	40			
5	1	12.25	3.07	41			
6	1.2	14.7	2.94	42			
7	1.4	17.15	2.81	43			
8	1.6	19.6	2.68	44			
9	1.8	22.05	2.61	45			
10	2	24.5	2.61	46			
11	2.2	26.95	2.89	47			
12	2.4	29.4	2.7	48			
13	2.6	31.85	2.59	49			
14	2.8	34.3	2.49	50			
15	3	36.75	2.41	51			
16	3.2	39.2	2.34	52			
17	3.4	41.65	2.35	53			

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1252D_ARD04**
	Client Sample Identification 2			**EB1012396_2**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				2
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.5035**
Increments:	**mL**	**0.2**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**57.6**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	9.68				
1	0.2	2.47	7.55				
2	0.4	4.93	6.53				
3	0.6	7.40	5.88				
4	0.8	9.87	5.1				
5	1	12.34	4.27				
6	1.2	14.80	3.53				
7	1.4	17.27	3.14				
8	1.6	19.74	2.92				
9	1.8	22.20	2.75				
10	2	24.67	2.63				
11	2.2	27.14	2.55				
12	2.4	29.61	2.49				
13	2.6	32.07	2.42				
14	2.8	34.54	2.37				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1252D_ARD04**
	Client Sample Identification 2			**EB1012396_2**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				3
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.2**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**16**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	8.2	36			
1	0.2	0.48	7.39	37			
2	0.4	0.96	6.78	38			
3	0.6	1.44	6.11	39			
4	0.8	1.92	5.45	40			
5	1	2.40	5.07	41			
6	1.2	2.88	4.43	42			
7	1.4	3.36	4.03	43			
8	1.6	3.84	3.76	44			
9	1.8	4.32	3.54	45			
10	2	4.80	3.51	46			
11	2.2	5.28	3.38	47			
12	2.4	5.76	3.29	48			
13	2.6	6.24	3.42	49			
14	2.8	6.72	3.34	50			
15	3	7.20	3.27	51			
16	3.2	7.68	3.2	52			
17	3.4	8.16	3.13	53			
18	3.6	8.64	3.1	54			
19	3.8	9.12	3.08	55			
20	4	9.60	3.03	56			
21	4.2	10.08	2.93	57			
22	4.4	10.56	2.85	58			
23	4.6	11.04	2.8	59			
24	4.8	11.52	2.74	60			
25	5	12.01	2.68	61			
26	5.2	12.49	2.64	62			
27	5.4	12.97	2.6	63			
28	5.6	13.45	2.6	64			
29	5.8	13.93	2.56	65			
30	6	14.41	2.53	66			
31	6.2	14.89	2.49	67			
32	6.4	15.37	2.46	68			
33	6.6	15.85	2.44	69			

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1252D_ARD10**
	Client Sample Identification 2			**EB1012396_8**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				4
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**4.9**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	6.77	36	3.6	8.64	2.62
1	0.1	0.24	5.45	37	3.7	8.88	2.6
2	0.2	0.48	4.93	38	3.8	9.12	2.58
3	0.3	0.72	4.63	39	3.9	9.36	2.56
4	0.4	0.96	4.37	40	4	9.60	2.54
5	0.5	1.20	4.2	41	4.1	9.84	2.52
6	0.6	1.44	4.07	42	4.2	10.08	2.5
7	0.7	1.68	3.94	43	4.3	10.32	2.49
8	0.8	1.92	3.82	44	4.4	10.56	2.47
9	0.9	2.16	3.74	45	4.5	10.80	2.46
10	1	2.40	3.67				
11	1.1	2.64	3.61				
12	1.2	2.88	3.56				
13	1.3	3.12	3.52				
14	1.4	3.36	3.46				
15	1.5	3.60	3.46				
16	1.6	3.84	3.4				
17	1.7	4.08	3.34				
18	1.8	4.32	3.28				
19	1.9	4.56	3.24				
20	2	4.80	3.18				
21	2.1	5.04	3.18				
22	2.2	5.28	3.1				
23	2.3	5.52	3.04				
24	2.4	5.76	2.99				
25	2.5	6.00	2.94				
26	2.6	6.24	2.89				
27	2.7	6.48	2.85				
28	2.8	6.72	2.8				
29	2.9	6.96	2.8				
30	3	7.20	2.76				
31	3.1	7.44	2.76				
32	3.2	7.68	2.73				
33	3.3	7.92	2.71				
34	3.4	8.16	2.67				
35	3.5	8.40	2.64				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1277D_ARD03**
	Client Sample Identification 2			**EB1012396_17**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				11
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**6.9**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	7.86	36	3.6	8.64	2.81
1	0.1	0.24	6.75	37	3.7	8.88	2.78
2	0.2	0.48	6.28	38	3.8	9.12	2.76
3	0.3	0.72	5.97	39	3.9	9.36	2.73
4	0.4	0.96	5.64	40	4	9.60	2.72
5	0.5	1.20	5.34	41	4.1	9.84	2.68
6	0.6	1.44	5.03	42	4.2	10.08	2.64
7	0.7	1.68	4.73	43	4.3	10.32	2.63
8	0.8	1.92	4.52	44	4.4	10.56	2.63
9	0.9	2.16	4.36	45	4.5	10.80	2.6
10	1	2.40	4.22	46	4.6	11.04	2.59
11	1.1	2.64	4.1	47	4.7	11.28	2.56
12	1.2	2.88	4.16	48	4.8	11.52	2.55
13	1.3	3.12	4.07	49	4.9	11.76	2.54
14	1.4	3.36	3.96	50	5	12.01	2.53
15	1.5	3.60	3.94	51	5.1	12.25	2.52
16	1.6	3.84	3.87	52	5.2	12.49	2.52
17	1.7	4.08	3.78	53	5.3	12.73	2.52
18	1.8	4.32	3.69	54	5.4	12.97	2.51
19	1.9	4.56	3.62	55	5.5	13.21	2.51
20	2	4.80	3.53	56	5.6	13.45	2.5
21	2.1	5.04	3.44	57	5.7	13.69	2.48
22	2.2	5.28	3.36	58	5.8	13.93	2.47
23	2.3	5.52	3.29	59	5.9	14.17	2.46
24	2.4	5.76	3.22				
25	2.5	6.00	3.17				
26	2.6	6.24	3.11				
27	2.7	6.48	3.07				
28	2.8	6.72	3				
29	2.9	6.96	3				
30	3	7.20	2.96				
31	3.1	7.44	2.94				
32	3.2	7.68	2.93				
33	3.3	7.92	2.89				
34	3.4	8.16	2.88				
35	3.5	8.40	2.84				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1326D_ARD01**
	Client Sample Identification 2			**EB1012396_22**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				15
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**5.2**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	7.12	36	3.6	8.64	2.64
1	0.1	0.24	6.16	37	3.7	8.88	2.64
2	0.2	0.48	5.69	38	3.8	9.12	2.6
3	0.3	0.72	5.32	39	3.9	9.36	2.58
4	0.4	0.96	4.99	40	4	9.60	2.56
5	0.5	1.20	4.72	41	4.1	9.84	2.54
6	0.6	1.44	4.48	42	4.2	10.08	2.54
7	0.7	1.68	4.26	43	4.3	10.32	2.53
8	0.8	1.92	4.08	44	4.4	10.56	2.5
9	0.9	2.16	3.91	45	4.5	10.80	2.48
10	1	2.40	3.72	46	4.6	11.04	2.47
11	1.1	2.64	3.66	47	4.7	11.28	2.45
12	1.2	2.88	3.64				
13	1.3	3.12	3.07				
14	1.4	3.36	3.08				
15	1.5	3.60	3.1				
16	1.6	3.84	3.05				
17	1.7	4.08	3.03				
18	1.8	4.32	3.02				
19	1.9	4.56	3				
20	2	4.80	3				
21	2.1	5.04	2.98				
22	2.2	5.28	2.97				
23	2.3	5.52	2.94				
24	2.4	5.76	2.95				
25	2.5	6.00	2.91				
26	2.6	6.24	2.89				
27	2.7	6.48	2.87				
28	2.8	6.72	2.86				
29	2.9	6.96	2.84				
30	3	7.20	2.74				
31	3.1	7.44	2.72				
32	3.2	7.68	2.7				
33	3.3	7.92	2.69				
34	3.4	8.16	2.68				
35	3.5	8.40	2.66				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1326D_ARD04**
	Client Sample Identification 2			**EB1012396_25**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				16
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**7**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	7.86	36	3.6	8.64	2.74
1	0.1	0.24	7.08	37	3.7	8.88	2.71
2	0.2	0.48	6.66	38	3.8	9.12	2.68
3	0.3	0.72	6.25	39	3.9	9.36	2.64
4	0.4	0.96	5.85	40	4	9.60	2.64
5	0.5	1.20	5.55	41	4.1	9.84	2.61
6	0.6	1.44	5.26	42	4.2	10.08	2.56
7	0.7	1.68	4.96	43	4.3	10.32	2.55
8	0.8	1.92	4.71	44	4.4	10.56	2.53
9	0.9	2.16	4.51	45	4.5	10.80	2.5
10	1	2.40	4.28	46	4.6	11.04	2.47
11	1.1	2.64	4.1	47	4.7	11.28	2.45
12	1.2	2.88	4	48	4.8	11.52	2.43
13	1.3	3.12	3.78				
14	1.4	3.36	3.69				
15	1.5	3.60	3.62				
16	1.6	3.84	3.51				
17	1.7	4.08	3.46				
18	1.8	4.32	3.4				
19	1.9	4.56	3.3				
20	2	4.80	3.32				
21	2.1	5.04	3.28				
22	2.2	5.28	3.21				
23	2.3	5.52	3.17				
24	2.4	5.76	3.17				
25	2.5	6.00	3.16				
26	2.6	6.24	3.1				
27	2.7	6.48	3.05				
28	2.8	6.72	3.03				
29	2.9	6.96	2.98				
30	3	7.20	2.96				
31	3.1	7.44	2.86				
32	3.2	7.68	2.84				
33	3.3	7.92	2.8				
34	3.4	8.16	2.77				
35	3.5	8.40	2.75				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1326D_ARD04**
	Client Sample Identification 2			**EB1012396_25**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				19
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.2**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**16.1**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	7.69				
1	0.2	0.48	6.18				
2	0.4	0.96	5.26				
3	0.6	1.44	4.89				
4	0.8	1.92	4.59				
5	1	2.40	4.31				
6	1.2	2.88	4.09				
7	1.4	3.36	3.91				
8	1.6	3.84	3.75				
9	1.8	4.32	3.62				
10	2	4.80	3.47				
11	2.2	5.28	3.33				
12	2.4	5.76	3.33				
13	2.6	6.24	3.24				
14	2.8	6.72	3.16				
15	3	7.20	3.13				
16	3.2	7.68	3.04				
17	3.4	8.16	2.95				
18	3.6	8.64	2.93				
19	3.8	9.12	2.89				
20	4	9.60	2.86				
21	4.2	10.08	2.85				
22	4.4	10.56	2.82				
23	4.6	11.04	2.79				
24	4.8	11.52	2.73				
25	5	12.01	2.71				
26	5.2	12.49	2.69				
27	5.4	12.97	2.67				
28	5.6	13.45	2.62				
29	5.8	13.93	2.59				
30	6	14.41	2.58				
31	6.2	14.89	2.49				
32	6.4	15.37	2.48				
33	6.6	15.85	2.47				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1337DG_ARD03**
	Client Sample Identification 2			**EB1012396_36**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				20
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.2**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**15.7**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	9.34	36	7.2	17.29	2.5
1	0.2	0.48	8.72	37	7.4	17.77	2.46
2	0.4	0.96	7.78	38	7.6	18.25	2.45
3	0.6	1.44	6.94	39	7.8	18.73	2.43
4	0.8	1.92	6.65				
5	1	2.40	6.28				
6	1.2	2.88	5.96				
7	1.4	3.36	5.65				
8	1.6	3.84	5.4				
9	1.8	4.32	5.13				
10	2	4.80	4.91				
11	2.2	5.28	4.65				
12	2.4	5.76	4.41				
13	2.6	6.24	4.19				
14	2.8	6.72	3.99				
15	3	7.20	3.84				
16	3.2	7.68	3.69				
17	3.4	8.16	3.58				
18	3.6	8.64	3.4				
19	3.8	9.12	3.3				
20	4	9.60	3.22				
21	4.2	10.08	3.14				
22	4.4	10.56	3.08				
23	4.6	11.04	3.02				
24	4.8	11.52	2.97				
25	5	12.01	2.91				
26	5.2	12.49	2.9				
27	5.4	12.97	2.82				
28	5.6	13.45	2.8				
29	5.8	13.93	2.74				
30	6	14.41	2.72				
31	6.2	14.89	2.68				
32	6.4	15.37	2.64				
33	6.6	15.85	2.61				
34	6.8	16.33	2.56				
35	7	16.81	2.52				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1339DG_ARD03**
	Client Sample Identification 2			**EB1012396_39**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				22
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**14**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	8.23	36	3.6	8.64	2.45
1	0.1	0.24	7.48	37	3.7	8.88	2.43
2	0.2	0.48	6.72				
3	0.3	0.72	6.28				
4	0.4	0.96	5.73				
5	0.5	1.20	5.3				
6	0.6	1.44	4.84				
7	0.7	1.68	4.41				
8	0.8	1.92	4.02				
9	0.9	2.16	3.74				
10	1	2.40	3.51				
11	1.1	2.64	3.37				
12	1.2	2.88	3.32				
13	1.3	3.12	3.21				
14	1.4	3.36	3.14				
15	1.5	3.60	3.06				
16	1.6	3.84	2.99				
17	1.7	4.08	2.96				
18	1.8	4.32	2.91				
19	1.9	4.56	2.89				
20	2	4.80	2.85				
21	2.1	5.04	2.83				
22	2.2	5.28	2.8				
23	2.3	5.52	2.78				
24	2.4	5.76	2.74				
25	2.5	6.00	2.73				
26	2.6	6.24	2.7				
27	2.7	6.48	2.68				
28	2.8	6.72	2.67				
29	2.9	6.96	2.65				
30	3	7.20	2.63				
31	3.1	7.44	2.53				
32	3.2	7.68	2.51				
33	3.3	7.92	2.5				
34	3.4	8.16	2.48				
35	3.5	8.4035	2.45				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1349D_ARD01**
	Client Sample Identification 2			**EB1012396_74**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				26
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.5035**
Increments:	**mL**	**0.2**
Weight	**(g)**	**0**
ANC	**kgH2SO4/t**	**54.6**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	9.26				
1	0.2	2.47	8.03				
2	0.4	4.93	6.97				
3	0.6	7.40	6.81				
4	0.8	9.87	6.78				
5	1	12.34	6.58				
6	1.2	14.80	6.51				
7	1.4	17.27	6.47				
8	1.6	19.74	6.04				
9	1.8	22.20	5.71				
10	2	24.67	4.92				
11	2.2	27.14	4.1				
12	2.4	29.61	3.41				
13	2.6	32.07	3.13				
14	2.8	34.54	2.94				
15	3	37.01	2.7				
16	3.2	39.47	2.69				
17	3.4	41.94	2.56				
18	3.6	44.41	2.52				
19	3.8	46.88	2.46				
20	4	49.34	2.4				
21	4.2	51.81	2.34				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1349D_ARD02**
	Client Sample Identification 2			**EB1012396_75**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				27
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.098**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**6.4**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	7.73	36	3.6	8.64	2.62
1	0.1	0.24	6.89	37	3.7	8.88	2.61
2	0.2	0.48	5.99	38	3.8	9.12	2.6
3	0.3	0.72	5.39	39	3.9	9.36	2.59
4	0.4	0.96	4.94	40	4	9.60	2.58
5	0.5	1.20	4.9	41	4.1	9.84	2.52
6	0.6	1.44	4.9	42	4.2	10.08	2.53
7	0.7	1.68	4.6	43	4.3	10.32	2.51
8	0.8	1.92	4.3	44	4.4	10.56	2.5
9	0.9	2.16	4.05	45	4.5	10.80	2.48
10	1	2.40	3.99	46	4.6	11.04	2.47
11	1.1	2.64	3.84	47	4.7	11.28	2.46
12	1.2	2.88	3.73				
13	1.3	3.12	3.65				
14	1.4	3.36	3.55				
15	1.5	3.60	3.49				
16	1.6	3.84	3.43				
17	1.7	4.08	3.42				
18	1.8	4.32	3.27				
19	1.9	4.56	3.2				
20	2	4.80	3.18				
21	2.1	5.04	3.11				
22	2.2	5.28	2.9				
23	2.3	5.52	2.89				
24	2.4	5.76	2.88				
25	2.5	6.00	2.86				
26	2.6	6.24	2.86				
27	2.7	6.48	2.88				
28	2.8	6.72	2.86				
29	2.9	6.96	2.85				
30	3	7.20	2.81				
31	3.1	7.44	2.77				
32	3.2	7.68	2.67				
33	3.3	7.92	2.67				
34	3.4	8.16	2.65				
35	3.5	8.40	2.64				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1350D_ARD04**
	Client Sample Identification 2			**EB1012396_58**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				30
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**12.8**

EA046 -B - Curve information

Addition	**mLs added (total)**	**kg H2SO4/t**	**pH**	**Addition**	**mLs added (total)**	**kg H2SO4/t**	**2.53**
0	0	0.00	8.6	36	3.6	8.64	2.5
1	0.1	0.24	7.78	37	3.7	8.88	2.56
2	0.2	0.48	6.98	38	3.8	9.12	2.5
3	0.3	0.72	6.59	39	3.9	9.36	2.6
4	0.4	0.96	6.24	40	4	9.60	2.6
5	0.5	1.20	5.88	41	4.1	9.84	2.59
6	0.6	1.44	5.49	42	4.2	10.08	2.56
7	0.7	1.68	5.16	43	4.3	10.32	2.54
8	0.8	1.92	4.79	44	4.4	10.56	2.52
9	0.9	2.16	4.44	45	4.5	10.80	2.5
10	1	2.40	4.14	46	4.6	11.04	2.46
11	1.1	2.64	3.91	47	4.7	11.28	2.45
12	1.2	2.88	3.78	48	4.8	11.52	2.41
13	1.3	3.12	3.64				
14	1.4	3.36	3.52				
15	1.5	3.60	3.41				
16	1.6	3.84	3.41				
17	1.7	4.08	3.35				
18	1.8	4.32	3.28				
19	1.9	4.56	3.27				
20	2	4.80	3.2				
21	2.1	5.04	3.17				
22	2.2	5.28	3.19				
23	2.3	5.52	3.13				
24	2.4	5.76	3.06				
25	2.5	6.00	3.01				
26	2.6	6.24	2.94				
27	2.7	6.48	2.9				
28	2.8	6.72	2.86				
29	2.9	6.96	2.82				
30	3	7.20	2.79				
31	3.1	7.44	2.72				
32	3.2	7.68	2.66				
33	3.3	7.92	2.63				
34	3.4	8.16	2.59				
35	3.5	8.40	2.56				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1361D_ARD01**
	Client Sample Identification 2			**EB1012396_59**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				31
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**9**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	9	36	3.6	8.64	2.57
1	0.1	0.24	8.05	37	3.7	8.88	2.55
2	0.2	0.48	7.27	38	3.8	9.12	2.52
3	0.3	0.72	6.88	39	3.9	9.36	2.5
4	0.4	0.96	6.53	40	4	9.60	2.48
5	0.5	1.20	6.05	41	4.1	9.84	2.47
6	0.6	1.44	5.25	42	4.2	10.08	2.45
7	0.7	1.68	4.8				
8	0.8	1.92	4.43				
9	0.9	2.16	4.19				
10	1	2.40	4.01				
11	1.1	2.64	3.88				
12	1.2	2.88	3.94				
13	1.3	3.12	3.85				
14	1.4	3.36	3.7				
15	1.5	3.60	3.22				
16	1.6	3.84	3.12				
17	1.7	4.08	3.05				
18	1.8	4.32	3.03				
19	1.9	4.56	2.97				
20	2	4.80	2.92				
21	2.1	5.04	2.88				
22	2.2	5.28	2.98				
23	2.3	5.52	2.95				
24	2.4	5.76	2.92				
25	2.5	6.00	2.89				
26	2.6	6.24	2.87				
27	2.7	6.48	2.85				
28	2.8	6.72	2.81				
29	2.9	6.96	2.77				
30	3	7.20	2.75				
31	3.1	7.44	2.73				
32	3.2	7.68	2.7				
33	3.3	7.92	2.66				
34	3.4	8.16	2.73				
35	3.5	8.40	2.59				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1362D_ARD01**
	Client Sample Identification 2			**EB1012396_65**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				32
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**9.8**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	8.87	36	3.6	8.64	2.59
1	0.1	0.24	7.74	37	3.7	8.88	2.57
2	0.2	0.48	7.06	38	3.8	9.12	2.65
3	0.3	0.72	6.46	39	3.9	9.36	2.63
4	0.4	0.96	5.95	40	4	9.60	2.62
5	0.5	1.20	5.55	41	4.1	9.84	2.61
6	0.6	1.44	5.04	42	4.2	10.08	2.59
7	0.7	1.68	4.73	43	4.3	10.32	2.58
8	0.8	1.92	4.45	44	4.4	10.56	2.56
9	0.9	2.16	4.21	45	4.5	10.80	2.54
10	1	2.40	4.03	46	4.6	11.04	2.53
11	1.1	2.64	4.09	47	4.7	11.28	2.51
12	1.2	2.88	3.87	48	4.8	11.52	2.48
13	1.3	3.12	3.88	49	4.9	11.76	2.48
14	1.4	3.36	3.72	50	5	12.01	2.47
15	1.5	3.60	3.21				
16	1.6	3.84	3.11				
17	1.7	4.08	3.06				
18	1.8	4.32	2.99				
19	1.9	4.56	2.92				
20	2	4.80	2.86				
21	2.1	5.04	2.81				
22	2.2	5.28	2.8				
23	2.3	5.52	2.75				
24	2.4	5.76	2.73				
25	2.5	6.00	2.7				
26	2.6	6.24	2.67				
27	2.7	6.48	2.64				
28	2.8	6.72	2.62				
29	2.9	6.96	2.62				
30	3	7.20	2.62				
31	3.1	7.44	2.59				
32	3.2	7.68	2.57				
33	3.3	7.92	2.65				
34	3.4	8.16	2.63				
35	3.5	8.40	2.62				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1362D_ARD04**
	Client Sample Identification 2			**EB1012396_68**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				34
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**9**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	7.76				
1	0.1	0.24	4.94				
2	0.2	0.48	4.22				
3	0.3	0.72	3.88				
4	0.4	0.96	3.68				
5	0.5	1.20	3.54				
6	0.6	1.44	3.42				
7	0.7	1.68	3.35				
8	0.8	1.92	3.28				
9	0.9	2.16	3.22				
10	1	2.40	3.16				
11	1.1	2.64	3.11				
12	1.2	2.88	3.06				
13	1.3	3.12	3.06				
14	1.4	3.36	3				
15	1.5	3.60	2.53				
16	1.6	3.84	2.47				
17	1.7	4.08	2.47				
18	1.8	4.32	2.44				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1406D_ARD03**
	Client Sample Identification 2			**EB1013590_3**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				38
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.2**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**15.8**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	9.81	36	7.2	17.29	3.12
1	0.2	0.48	9.26	37	7.4	17.77	2.99
2	0.4	0.96	8.35	38	7.6	18.25	2.91
3	0.6	1.44	8.04	39	7.8	18.73	2.83
4	0.8	1.92	7.73	40	8	19.21	2.76
5	1	2.40	7.47	41	8.2	19.69	2.68
6	1.2	2.88	7.46	42	8.4	20.17	2.63
7	1.4	3.36	7.12	43	8.6	20.65	2.59
8	1.6	3.84	6.99	44	8.8	21.13	2.56
9	1.8	4.32	6.72	45	9	21.61	2.52
10	2	4.80	6.3	46	9.2	22.09	2.5
11	2.2	5.28	5.75	47	9.4	22.57	2.48
12	2.4	5.76	5.72	48	9.6	23.05	2.45
13	2.6	6.24	5.38	49	9.8	23.53	2.41
14	2.8	6.72	4.99				
15	3	7.20	4.52				
16	3.2	7.68	4.32				
17	3.4	8.16	4.08				
18	3.6	8.64	3.94				
19	3.8	9.12	3.76				
20	4	9.60	3.68				
21	4.2	10.08	3.56				
22	4.4	10.56	3.53				
23	4.6	11.04	3.53				
24	4.8	11.52	3.46				
25	5	12.01	3.42				
26	5.2	12.49	3.39				
27	5.4	12.97	3.38				
28	5.6	13.45	3.35				
29	5.8	13.93	3.22				
30	6	14.41	3.25				
31	6.2	14.89	3.23				
32	6.4	15.37	3.19				
33	6.6	15.85	3.17				
34	6.8	16.33	3.14				
35	7	16.81	3.16				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1406D_ARD10**
	Client Sample Identification 2			**EB1013590_10**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				41
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**0**
ANC	**kgH2SO4/t**	**1.2**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	7.16	36	3.6	8.64	2.45
1	0.1	0.24	5.36				
2	0.2	0.48	4.42				
3	0.3	0.72	4.03				
4	0.4	0.96	3.77				
5	0.5	1.20	3.6				
6	0.6	1.44	3.49				
7	0.7	1.68	3.39				
8	0.8	1.92	3.29				
9	0.9	2.16	3.24				
10	1	2.40	3.12				
11	1.1	2.64	3.06				
12	1.2	2.88	3.02				
13	1.3	3.12	2.98				
14	1.4	3.36	2.93				
15	1.5	3.60	2.89				
16	1.6	3.84	2.86				
17	1.7	4.08	2.8				
18	1.8	4.32	2.79				
19	1.9	4.56	2.76				
20	2	4.80	2.73				
21	2.1	5.04	2.71				
22	2.2	5.28	2.73				
23	2.3	5.52	2.68				
24	2.4	5.76	2.66				
25	2.5	6.00	2.63				
26	2.6	6.24	2.61				
27	2.7	6.48	2.59				
28	2.8	6.72	2.57				
29	2.9	6.96	2.55				
30	3	7.20	2.54				
31	3.1	7.44	2.52				
32	3.2	7.68	2.52				
33	3.3	7.92	2.5				
34	3.4	8.16	2.48				
35	3.5	8.40	2.46				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1419D_ARD07**
	Client Sample Identification 2			**EB1013590_42**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				62
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**1.6**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	7.98	36			
1	0.1	0.24	6.24	37			
2	0.2	0.48	5.01	38			
3	0.3	0.72	4.35	39			
4	0.4	0.96	4.01	40			
5	0.5	1.20	3.78	41			
6	0.6	1.44	3.65	42			
7	0.7	1.68	3.5	43			
8	0.8	1.92	3.4	44			
9	0.9	2.16	3.32	45			
10	1	2.40	3.24	46			
11	1.1	2.64	3.16	47			
12	1.2	2.88	3.15	48			
13	1.3	3.12	3.12	49			
14	1.4	3.36	3.07	50			
15	1.5	3.60	3.58	51			
16	1.6	3.84	3.51	52			
17	1.7	4.08	2.49	53			
18	1.8	4.32	2.51	54			
19	1.9	4.56	2.48	55			
20	2	4.80	2.45	56			
21	2.1	5.04	2.42	57			

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1420D_ARD05**
	Client Sample Identification 2			**EB1013590_50**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				66
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**2.2**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	8.91	36	3.6	8.64	2.73
1	0.1	0.24	8.13	37	3.7	8.88	2.73
2	0.2	0.48	7.23	38	3.8	9.12	2.71
3	0.3	0.72	6.4	39	3.9	9.36	2.69
4	0.4	0.96	6.29	40	4	9.60	2.66
5	0.5	1.20	5.84	41	4.1	9.84	2.65
6	0.6	1.44	5.44	42	4.2	10.08	2.63
7	0.7	1.68	5.06	43	4.3	10.32	2.61
8	0.8	1.92	4.74	44	4.4	10.56	2.6
9	0.9	2.16	4.46	45	4.5	10.80	2.58
10	1	2.40	4.23	46	4.6	11.04	2.57
11	1.1	2.64	4.03	47	4.7	11.28	2.55
12	1.2	2.88	3.86	48	4.8	11.52	2.54
13	1.3	3.12	3.71	49	4.9	11.76	2.53
14	1.4	3.36	3.58	50	5	12.01	2.51
15	1.5	3.60	3.46	51	5.1	12.25	2.5
16	1.6	3.84	3.38	52	5.2	12.49	2.49
17	1.7	4.08	3.29	53	5.3	12.73	2.47
18	1.8	4.32	3.22	54	5.4	12.97	2.46
19	1.9	4.56	3.25				
20	2	4.80	3.2				
21	2.1	5.04	3.15				
22	2.2	5.28	3.1				
23	2.3	5.52	3.06				
24	2.4	5.76	3.02				
25	2.5	6.00	2.98				
26	2.6	6.24	2.95				
27	2.7	6.48	2.92				
28	2.8	6.72	2.89				
29	2.9	6.96	2.87				
30	3	7.20	2.84				
31	3.1	7.44	2.82				
32	3.2	7.68	2.8				
33	3.3	7.92	2.8				
34	3.4	8.16	2.77				
35	3.5	8.40	2.75				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1421D_ARD02**
	Client Sample Identification 2			**EB1013590_58**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				71
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**3.2**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	7.48	36	3.6	8.64	2.7
1	0.1	0.24	6.51	37	3.7	8.88	2.69
2	0.2	0.48	6.04	38	3.8	9.12	2.66
3	0.3	0.72	5.57	39	3.9	9.36	2.64
4	0.4	0.96	5.28	40	4	9.60	2.62
5	0.5	1.20	4.85	41	4.1	9.84	2.61
6	0.6	1.44	4.5	42	4.2	10.08	2.6
7	0.7	1.68	4.24	43	4.3	10.32	2.58
8	0.8	1.92	4.07	44	4.4	10.56	2.57
9	0.9	2.16	3.88	45	4.5	10.80	2.56
10	1	2.40	3.75	46	4.6	11.04	2.54
11	1.1	2.64	3.64	47	4.7	11.28	2.52
12	1.2	2.88	3.52	48	4.8	11.52	2.51
13	1.3	3.12	3.42	49	4.9	11.76	2.5
14	1.4	3.36	3.37	50	5	12.01	2.49
15	1.5	3.60	3.28	51	5.1	12.25	2.48
16	1.6	3.84	3.22	52	5.2	12.49	2.46
17	1.7	4.08	3.16				
18	1.8	4.32	3.12				
19	1.9	4.56	3.12				
20	2	4.80	3.08				
21	2.1	5.04	3.03				
22	2.2	5.28	3.01				
23	2.3	5.52	2.98				
24	2.4	5.76	2.96				
25	2.5	6.00	2.93				
26	2.6	6.24	2.91				
27	2.7	6.48	2.89				
28	2.8	6.72	2.87				
29	2.9	6.96	2.84				
30	3	7.20	2.82				
31	3.1	7.44	2.81				
32	3.2	7.68	2.79				
33	3.3	7.92	2.77				
34	3.4	8.16	2.75				
35	3.5	8.40	2.73				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1421D_ARD05**
	Client Sample Identification 2			**EB1013590_61**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				74
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**5.1**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	6.5	36	3.6	8.64	2.68
1	0.1	0.24	6.04	37	3.7	8.88	2.66
2	0.2	0.48	5.04	38	3.8	9.12	2.67
3	0.3	0.72	4.32	39	3.9	9.36	2.65
4	0.4	0.96	3.94	40	4	9.60	2.64
5	0.5	1.20	3.74	41	4.1	9.84	2.62
6	0.6	1.44	3.58	42	4.2	10.08	2.61
7	0.7	1.68	3.47	43	4.3	10.32	2.6
8	0.8	1.92	3.38	44	4.4	10.56	2.58
9	0.9	2.16	3.29	45	4.5	10.80	2.58
10	1	2.40	3.23	46	4.6	11.04	2.57
11	1.1	2.64	3.2	47	4.7	11.28	2.57
12	1.2	2.88	3.13	48	4.8	11.52	2.56
13	1.3	3.12	3.08	49	4.9	11.76	2.54
14	1.4	3.36	3.03	50	5	12.01	2.53
15	1.5	3.60	3	51	5.1	12.25	2.54
16	1.6	3.84	3.05	52	5.2	12.49	2.53
17	1.7	4.08	3.02	53	5.3	12.73	2.51
18	1.8	4.32	2.99	54	5.4	12.97	2.5
19	1.9	4.56	2.96	55	5.5	13.21	2.48
20	2	4.80	2.93	56	5.6	13.45	2.48
21	2.1	5.04	2.9	57	5.7	13.69	2.45
22	2.2	5.28	2.88				
23	2.3	5.52	2.8				
24	2.4	5.76	2.85				
25	2.5	6.00	2.83				
26	2.6	6.24	2.8				
27	2.7	6.48	2.78				
28	2.8	6.72	2.78				
29	2.9	6.96	2.78				
30	3	7.20	2.77				
31	3.1	7.44	2.76				
32	3.2	7.68	2.75				
33	3.3	7.92	2.73				
34	3.4	8.16	2.71				
35	3.5	8.40	2.7				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1421D_ARD07**
	Client Sample Identification 2			**EB1013590_63**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				75
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**3.2**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	6.73	36	3.6	8.64	2.65
1	0.1	0.24	6.12	37	3.7	8.88	2.65
2	0.2	0.48	5.12	38	3.8	9.12	2.64
3	0.3	0.72	4.44	39	3.9	9.36	2.62
4	0.4	0.96	4.05	40	4	9.60	2.61
5	0.5	1.20	3.84	41	4.1	9.84	2.6
6	0.6	1.44	3.65	42	4.2	10.08	2.58
7	0.7	1.68	3.53	43	4.3	10.32	2.57
8	0.8	1.92	3.41	44	4.4	10.56	2.56
9	0.9	2.16	3.35	45	4.5	10.80	2.54
10	1	2.40	3.25	46	4.6	11.04	2.53
11	1.1	2.64	3.19	47	4.7	11.28	2.51
12	1.2	2.88	3.13	48	4.8	11.52	2.52
13	1.3	3.12	3.07	49	4.9	11.76	2.5
14	1.4	3.36	3.04	50	5	12.01	2.49
15	1.5	3.60	3.01	51	5.1	12.25	2.49
16	1.6	3.84	3.04	52	5.2	12.49	2.48
17	1.7	4.08	3.01	53	5.3	12.73	2.46
18	1.8	4.32	2.99				
19	1.9	4.56	2.96				
20	2	4.80	2.92				
21	2.1	5.04	2.89				
22	2.2	5.28	2.89				
23	2.3	5.52	2.85				
24	2.4	5.76	2.84				
25	2.5	6.00	2.82				
26	2.6	6.24	2.8				
27	2.7	6.48	2.78				
28	2.8	6.72	2.77				
29	2.9	6.96	2.74				
30	3	7.20	2.73				
31	3.1	7.44	2.73				
32	3.2	7.68	2.7				
33	3.3	7.92	2.68				
34	3.4	8.16	2.67				
35	3.5	8.40	2.67				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1423D_ARD05**
	Client Sample Identification 2			**EB1013590_72**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				79
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**1.6**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	7.79	36	3.6	8.64	2.73
1	0.1	0.24	6.65	37	3.7	8.88	2.73
2	0.2	0.48	5.62	38	3.8	9.12	2.72
3	0.3	0.72	4.76	39	3.9	9.36	2.71
4	0.4	0.96	4.56	40	4	9.60	2.69
5	0.5	1.20	4.18	41	4.1	9.84	2.68
6	0.6	1.44	4	42	4.2	10.08	2.75
7	0.7	1.68	3.79	43	4.3	10.32	2.53
8	0.8	1.92	3.62	44	4.4	10.56	2.71
9	0.9	2.16	3.65	45	4.5	10.80	2.69
10	1	2.40	3.1	46	4.6	11.04	2.67
11	1.1	2.64	3.49	47	4.7	11.28	2.69
12	1.2	2.88	3.42	48	4.8	11.52	2.71
13	1.3	3.12	3.36	49	4.9	11.76	2.71
14	1.4	3.36	3.31	50	5	12.01	2.69
15	1.5	3.60	3.25	51	5.1	12.25	2.68
16	1.6	3.84	3.23	52	5.2	12.49	2.66
17	1.7	4.08	3.27	53	5.3	12.73	2.65
18	1.8	4.32	3.1	54	5.4	12.97	2.56
19	1.9	4.56	3.02	55	5.5	13.21	2.57
20	2	4.80	2.98	56	5.6	13.45	2.59
21	2.1	5.04	2.92	57	5.7	13.69	2.58
22	2.2	5.28	2.91	58	5.8	13.93	2.54
23	2.3	5.52	2.95	59	5.9	14.17	2.58
24	2.4	5.76	2.91	60	6	14.41	2.6
25	2.5	6.00	2.96	61	6.1	14.65	2.54
26	2.6	6.24	2.92	62	6.2	14.89	2.53
27	2.7	6.48	2.91	63	6.3	15.13	2.52
28	2.8	6.72	2.89	64	6.4	15.37	2.51
29	2.9	6.96	2.85	65	6.5	15.61	2.52
30	3	7.20	2.83	66	6.6	15.85	2.51
31	3.1	7.44	2.81	67	6.7	16.09	2.51
32	3.2	7.68	2.8	68	6.8	16.33	2.5
33	3.3	7.92	2.78	69	6.9	16.57	2.49
34	3.4	8.16	2.76	70	7	16.81	2.48
35	3.5	8.40	2.75	71	7.1	17.05	2.46

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1427D_ARD03**
	Client Sample Identification 2			**EB1013590_107**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				95
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**5.6**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	8.12	36	3.6	8.64	3.05
1	0.1	0.24	6.61	37	3.7	8.88	3.04
2	0.2	0.48	5.79	38	3.8	9.12	3
3	0.3	0.72	5.99	39	3.9	9.36	2.97
4	0.4	0.96	5.36	40	4	9.60	2.96
5	0.5	1.20	5	41	4.1	9.84	2.91
6	0.6	1.44	4.81	42	4.2	10.08	2.92
7	0.7	1.68	4.53	43	4.3	10.32	2.88
8	0.8	1.92	4.6	44	4.4	10.56	2.86
9	0.9	2.16	4.65	45	4.5	10.80	2.83
10	1	2.40	4.43	46	4.6	11.04	2.81
11	1.1	2.64	4.424	47	4.7	11.28	2.83
12	1.2	2.88	4.11	48	4.8	11.52	2.84
13	1.3	3.12	4.16	49	4.9	11.76	2.81
14	1.4	3.36	4.04	50	5	12.01	2.79
15	1.5	3.60	4.14	51	5.1	12.25	2.77
16	1.6	3.84	3.98	52	5.2	12.49	2.75
17	1.7	4.08	3.88	53	5.3	12.73	2.73
18	1.8	4.32	3.69	54	5.4	12.97	2.64
19	1.9	4.56	3.6	55	5.5	13.21	2.65
20	2	4.80	3.65	56	5.6	13.45	2.58
21	2.1	5.04	3.54	57	5.7	13.69	2.57
22	2.2	5.28	3.56	58	5.8	13.93	2.58
23	2.3	5.52	3.52	59	5.9	14.17	2.57
24	2.4	5.76	3.48	60	6	14.41	2.56
25	2.5	6.00	3.46	61	6.1	14.65	2.55
26	2.6	6.24	3.41	62	6.2	14.89	2.55
27	2.7	6.48	3.38	63	6.3	15.13	2.54
28	2.8	6.72	3.32	64	6.4	15.37	2.53
29	2.9	6.96	3.3	65	6.5	15.61	2.53
30	3	7.20	3.23	66	6.6	15.85	2.5
31	3.1	7.44	3.21	67	6.7	16.09	2.47
32	3.2	7.68	3.14	68	6.8	16.33	2.46
33	3.3	7.92	3.15	69	6.9	16.57	2.43
34	3.4	8.16	3.1				
35	3.5	8.40	3.06				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1427D_ARD05**
	Client Sample Identification 2			**EB1013590_109**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				96
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**6.1**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	8.69	36	3.6	8.64	3.05
1	0.1	0.24	7.58	37	3.7	8.88	3.04
2	0.2	0.48	7.21	38	3.8	9.12	3.02
3	0.3	0.72	6.96	39	3.9	9.36	2.99
4	0.4	0.96	6.63	40	4	9.60	2.99
5	0.5	1.20	6.23	41	4.1	9.84	2.98
6	0.6	1.44	5.95	42	4.2	10.08	2.96
7	0.7	1.68	5.68	43	4.3	10.32	2.95
8	0.8	1.92	5.36	44	4.4	10.56	2.95
9	0.9	2.16	4.68	45	4.5	10.80	2.94
10	1	2.40	4.43	46	4.6	11.04	2.93
11	1.1	2.64	4.18	47	4.7	11.28	2.92
12	1.2	2.88	3.9	48	4.8	11.52	2.91
13	1.3	3.12	3.79	49	4.9	11.76	2.9
14	1.4	3.36	3.69	50	5	12.01	2.9
15	1.5	3.60	3.63	51	5.1	12.25	2.85
16	1.6	3.84	3.59	52	5.2	12.49	2.87
17	1.7	4.08	3.54	53	5.3	12.73	2.87
18	1.8	4.32	3.48	54	5.4	12.97	2.86
19	1.9	4.56	3.44	55	5.5	13.21	2.84
20	2	4.80	3.44	56	5.6	13.45	2.83
21	2.1	5.04	3.4	57	5.7	13.69	2.81
22	2.2	5.28	3.33	58	5.8	13.93	2.78
23	2.3	5.52	3.3	59	5.9	14.17	2.77
24	2.4	5.76	3.27	60	6	14.41	2.76
25	2.5	6.00	3.24	61	6.1	14.65	2.59
26	2.6	6.24	3.22	62	6.2	14.89	2.58
27	2.7	6.48	3.22	63	6.3	15.13	2.52
28	2.8	6.72	3.2	64	6.4	15.37	2.52
29	2.9	6.96	3.19	65	6.5	15.61	2.49
30	3	7.20	3.16	66	6.6	15.85	2.45
31	3.1	7.44	3.15	67	6.7	16.09	2.46
32	3.2	7.68	3.13				
33	3.3	7.92	3.06				
34	3.4	8.16	3.07				
35	3.5	8.40	3.07				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1427D_ARD10**
	Client Sample Identification 2			**EB1013590_114**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				99
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.2**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**5.6**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	6.71	36	7.2	17.29	2.73
1	0.2	0.48	6.01	37	7.4	17.77	2.71
2	0.4	0.96	5.68	38	7.6	18.25	2.7
3	0.6	1.44	5.1	39	7.8	18.73	2.71
4	0.8	1.92	4.62	40	8	19.21	2.7
5	1	2.40	4.32	41	8.2	19.69	2.69
6	1.2	2.88	4.09	42	8.4	20.17	2.67
7	1.4	3.36	3.93	43	8.6	20.65	2.65
8	1.6	3.84	3.93	44	8.8	21.13	2.64
9	1.8	4.32	3.66	45	9	21.61	2.62
10	2	4.80	3.57	46	9.2	22.09	2.61
11	2.2	5.28	3.46	47	9.4	22.57	2.6
12	2.4	5.76	3.46	48	9.6	23.05	2.59
13	2.6	6.24	3.35	49	9.8	23.53	2.58
14	2.8	6.72	3.3	50	10	24.01	2.57
15	3	7.20	3.26	51	10.2	24.49	2.57
16	3.2	7.68	3.21	52	10.4	24.97	2.56
17	3.4	8.16	3.16	53	10.6	25.45	2.53
18	3.6	8.64	3.12	54	10.8	25.93	2.53
19	3.8	9.12	3.09	55	11	26.41	2.51
20	4	9.60	3.06	56	11.2	26.89	2.51
21	4.2	10.08	3.03	57	11.4	27.37	2.49
22	4.4	10.56	3.04	58	11.6	27.85	2.49
23	4.6	11.04	3.01	59	11.8	28.33	2.48
24	4.8	11.52	2.98				
25	5	12.01	2.95				
26	5.2	12.49	2.92				
27	5.4	12.97	2.9				
28	5.6	13.45	2.88				
29	5.8	13.93	2.87				
30	6	14.41	2.85				
31	6.2	14.89	2.83				
32	6.4	15.37	2.81				
33	6.6	15.85	2.8				
34	6.8	16.33	2.75				
35	7	16.81	2.74				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1426D_ARD10**
	Client Sample Identification 2			**EB1013589_10**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				105
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**0.6**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	6.63	36	3.6	8.64	2.61
1	0.1	0.24	5.57	37	3.7	8.88	2.6
2	0.2	0.48	4.81	38	3.8	9.12	2.57
3	0.3	0.72	4.33	39	3.9	9.36	2.54
4	0.4	0.96	4.01	40	4	9.60	2.53
5	0.5	1.20	3.79	41	4.1	9.84	2.53
6	0.6	1.44	3.63	42	4.2	10.08	2.52
7	0.7	1.68	3.4	43	4.3	10.32	2.51
8	0.8	1.92	3.33	44	4.4	10.56	2.5
9	0.9	2.16	3.26	45	4.5	10.80	2.49
10	1	2.40	3.21	46	4.6	11.04	2.48
11	1.1	2.64	3.16	47	4.7	11.28	2.47
12	1.2	2.88	3.111				
13	1.3	3.12	3.07				
14	1.4	3.36	3.03				
15	1.5	3.60	2.99				
16	1.6	3.84	2.96				
17	1.7	4.08	2.92				
18	1.8	4.32	2.9				
19	1.9	4.56	2.85				
20	2	4.80	2.84				
21	2.1	5.04	2.8				
22	2.2	5.28	2.78				
23	2.3	5.52	2.78				
24	2.4	5.76	2.77				
25	2.5	6.00	2.74				
26	2.6	6.24	2.72				
27	2.7	6.48	2.74				
28	2.8	6.72	2.72				
29	2.9	6.96	2.69				
30	3	7.20	2.69				
31	3.1	7.44	2.67				
32	3.2	7.68	2.65				
33	3.3	7.92	2.64				
34	3.4	8.16	2.64				
35	3.5	8.40	2.63				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1426D_ARD12**
	Client Sample Identification 2			**EB1013589_12**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				106
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**5.8**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	7.51	36	3.6	8.64	3.25
1	0.1	0.24	7.3	37	3.7	8.88	3.24
2	0.2	0.48	6.85	38	3.8	9.12	3.21
3	0.3	0.72	6.25	39	3.9	9.36	3.2
4	0.4	0.96	5.6	40	4	9.60	3.19
5	0.5	1.20	5.12	41	4.1	9.84	3.16
6	0.6	1.44	4.94	42	4.2	10.08	3.17
7	0.7	1.68	4.77	43	4.3	10.32	3.14
8	0.8	1.92	4.65	44	4.4	10.56	3.12
9	0.9	2.16	4.56	45	4.5	10.80	3.13
10	1	2.40	4.53	46	4.6	11.04	3.12
11	1.1	2.64	4.41	47	4.7	11.28	3.11
12	1.2	2.88	4.38	48	4.8	11.52	3.1
13	1.3	3.12	4.25	49	4.9	11.76	3.09
14	1.4	3.36	4.12	50	5	12.01	3.07
15	1.5	3.60	4.03	51	5.1	12.25	3.03
16	1.6	3.84	4.03	52	5.2	12.49	3.01
17	1.7	4.08	4	53	5.3	12.73	2.99
18	1.8	4.32	4	54	5.4	12.97	2.98
19	1.9	4.56	3.9	55	5.5	13.21	2.95
20	2	4.80	3.8	56	5.6	13.45	2.88
21	2.1	5.04	3.72	57	5.7	13.69	2.84
22	2.2	5.28	3.68	58	5.8	13.93	2.79
23	2.3	5.52	3.64	59	5.9	14.17	2.75
24	2.4	5.76	3.6	60	6	14.41	2.7
25	2.5	6.00	3.55	61	6.1	14.65	2.68
26	2.6	6.24	3.5	62	6.2	14.89	2.56
27	2.7	6.48	3.51	63	6.3	15.13	2.52
28	2.8	6.72	3.48	64	6.4	15.37	2.5
29	2.9	6.96	3.46	65	6.5	15.61	2.49
30	3	7.20	3.43	66	6.6	15.85	2.48
31	3.1	7.44	3.41	67	6.7	16.09	2.47
32	3.2	7.68	3.37				
33	3.3	7.92	3.36				
34	3.4	8.16	3.29				
35	3.5	8.40	3.28				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1435D_ARD01**
	Client Sample Identification 2			**EB1013589_15**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				109
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**0**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	7.08	36	3.6	8.64	2.74
1	0.1	0.24	6.42	37	3.7	8.88	2.74
2	0.2	0.48	6.27	38	3.8	9.12	2.71
3	0.3	0.72	5.52	39	3.9	9.36	2.69
4	0.4	0.96	4.86	40	4	9.60	2.68
5	0.5	1.20	4.47	41	4.1	9.84	2.68
6	0.6	1.44	4.2	42	4.2	10.08	2.66
7	0.7	1.68	4	43	4.3	10.32	2.63
8	0.8	1.92	3.69	44	4.4	10.56	2.63
9	0.9	2.16	3.6	45	4.5	10.80	2.63
10	1	2.40	3.51	46	4.6	11.04	2.61
11	1.1	2.64	3.46	47	4.7	11.28	2.58
12	1.2	2.88	3.4	48	4.8	11.52	2.58
13	1.3	3.12	3.34	49	4.9	11.76	2.58
14	1.4	3.36	3.29	50	5	12.01	2.59
15	1.5	3.60	3.28	51	5.1	12.25	2.59
16	1.6	3.84	3.24	52	5.2	12.49	2.55
17	1.7	4.08	3.19	53	5.3	12.73	2.55
18	1.8	4.32	3.17	54	5.4	12.97	2.53
19	1.9	4.56	3.14	55	5.5	13.21	2.53
20	2	4.80	3.12	56	5.6	13.45	2.53
21	2.1	5.04	3.08	57	5.7	13.69	2.51
22	2.2	5.28	3.05	58	5.8	13.93	2.5
23	2.3	5.52	3.02	59	5.9	14.17	2.49
24	2.4	5.76	3	60	6	14.41	2.48
25	2.5	6.00	2.98				
26	2.6	6.24	2.97				
27	2.7	6.48	2.94				
28	2.8	6.72	2.92				
29	2.9	6.96	2.9				
30	3	7.20	2.88				
31	3.1	7.44	2.83				
32	3.2	7.68	2.81				
33	3.3	7.92	2.8				
34	3.4	8.16	2.78				
35	3.5	8.40	2.75				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1435D_ARD10**
	Client Sample Identification 2			**EB1013589_24**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				117
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**0**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	8.56	36	3.6	8.64	3.11
1	0.1	0.24	6.69	37	3.7	8.88	3.09
2	0.2	0.48	6.16	38	3.8	9.12	3.07
3	0.3	0.72	5.51	39	3.9	9.36	3.04
4	0.4	0.96	5.11	40	4	9.60	3.04
5	0.5	1.20	4.96	41	4.1	9.84	3.03
6	0.6	1.44	4.77	42	4.2	10.08	3.01
7	0.7	1.68	4.56	43	4.3	10.32	2.97
8	0.8	1.92	4.41	44	4.4	10.56	2.73
9	0.9	2.16	4.25	45	4.5	10.80	2.71
10	1	2.40	4.12	46	4.6	11.04	2.69
11	1.1	2.64	3.99	47	4.7	11.28	2.71
12	1.2	2.88	4.08	48	4.8	11.52	2.69
13	1.3	3.12	3.92	49	4.9	11.76	2.67
14	1.4	3.36	3.79	50	5	12.01	2.63
15	1.5	3.60	3.71	51	5.1	12.25	2.61
16	1.6	3.84	3.63	52	5.2	12.49	2.6
17	1.7	4.08	3.56	53	5.3	12.73	2.58
18	1.8	4.32	3.51	54	5.4	12.97	2.59
19	1.9	4.56	3.57	55	5.5	13.21	2.57
20	2	4.80	3.5	56	5.6	13.45	2.56
21	2.1	5.04	3.49	57	5.7	13.69	2.55
22	2.2	5.28	3.39	58	5.8	13.93	2.55
23	2.3	5.52	3.46	59	5.9	14.17	2.55
24	2.4	5.76	3.38	60	6	14.41	2.52
25	2.5	6.00	3.35	61	6.1	14.65	2.5
26	2.6	6.24	3.3	62	6.2	14.89	2.5
27	2.7	6.48	3.35	63	6.3	15.13	2.49
28	2.8	6.72	3.32	64	6.4	15.37	2.48
29	2.9	6.96	3.27	65	6.5	15.61	2.47
30	3	7.20	3.24				
31	3.1	7.44	3.22				
32	3.2	7.68	3.18				
33	3.3	7.92	3.16				
34	3.4	8.16	3.14				
35	3.5	8.40	3.13				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1437R_ARD04**
	Client Sample Identification 2			**EB1013589_32**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				123
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.1007**
Increments:	**mL**	**0.5**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**21.7**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	10.19	36	18	44.41	2.55
1	0.5	1.23	9.55	37	18.5	45.64	2.52
2	1	2.47	8.83	38	19	46.88	2.47
3	1.5	3.70	7.45	39	19.5	48.11	2.46
4	2	4.93	7.25	40	20	49.34	2.35
5	2.5	6.17	7.16				
6	3	7.40	6.75				
7	3.5	8.64	5.99				
8	4	9.87	5.14				
9	4.5	11.10	4.66				
10	5	12.34	4.18				
11	5.5	13.57	3.92				
12	6	14.80	3.7				
13	6.5	16.04	4.01				
14	7	17.27	3.9				
15	7.5	18.50	3.73				
16	8	19.74	3.74				
17	8.5	20.97	3.58				
18	9	22.20	3.47				
19	9.5	23.44	3.38				
20	10	24.67	3.3				
21	10.5	25.91	3.23				
22	11	27.14	3.19				
23	11.5	28.37	2.86				
24	12	29.61	2.8				
25	12.5	30.84	2.8				
26	13	32.07	2.8				
27	13.5	33.31	2.78				
28	14	34.54	2.78				
29	14.5	35.77	2.73				
30	15	37.01	2.63				
31	15.5	38.24	2.67				
32	16	39.47	2.66				
33	16.5	40.71	2.64				
34	17	41.94	2.62				
35	17.5	43.18	2.58				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1438R_ARD01**
	Client Sample Identification 2			**EB1013589_40**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				126
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**0.9**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	7.09	36	3.6	8.64	2.68
1	0.1	0.24	6.42	37	3.7	8.88	2.67
2	0.2	0.48	5.44	38	3.8	9.12	2.67
3	0.3	0.72	3.47	39	3.9	9.36	2.64
4	0.4	0.96	3.5	40	4	9.60	2.65
5	0.5	1.20	3.37	41	4.1	9.84	2.61
6	0.6	1.44	3.36	42	4.2	10.08	2.62
7	0.7	1.68	3.09	43	4.3	10.32	2.51
8	0.8	1.92	3.04	44	4.4	10.56	2.53
9	0.9	2.16	2.99	45	4.5	10.80	2.5
10	1	2.40	2.95	46	4.6	11.04	2.48
11	1.1	2.64	3.06	47	4.7	11.28	2.47
12	1.2	2.88	3.04	48	4.8	11.52	2.44
13	1.3	3.12	3.07				
14	1.4	3.36	3.05				
15	1.5	3.60	3.02				
16	1.6	3.84	3.01				
17	1.7	4.08	2.99				
18	1.8	4.32	2.97				
19	1.9	4.56	2.94				
20	2	4.80	2.91				
21	2.1	5.04	2.88				
22	2.2	5.28	2.86				
23	2.3	5.52	2.85				
24	2.4	5.76	2.84				
25	2.5	6.00	2.84				
26	2.6	6.24	2.81				
27	2.7	6.48	2.8				
28	2.8	6.72	2.79				
29	2.9	6.96	2.79				
30	3	7.20	2.77				
31	3.1	7.44	2.68				
32	3.2	7.68	2.71				
33	3.3	7.92	2.7				
34	3.4	8.16	2.68				
35	3.5	8.40	2.69				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

	Sub Matrix			Soil
	Client Sample Identification 1			**1440R_ARD02**
	Client Sample Identification 2			**EB1013589_58**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				138
				EB1014515

EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	7.14	36	3.6	8.64	2.55
1	0.1	0.24	6.16	37	3.7	8.88	2.54
2	0.2	0.48	5.39	38	3.8	9.12	2.52
3	0.3	0.72	5.19	39	3.9	9.36	2.51
4	0.4	0.96	4.57	40	4	9.60	2.5
5	0.5	1.20	4.2	41	4.1	9.84	2.48
6	0.6	1.44	3.95	42	4.2	10.08	2.47
7	0.7	1.68	3.78	43	4.3	10.32	2.47
8	0.8	1.92	3.64				
9	0.9	2.16	3.45				
10	1	2.40	3.31				
11	1.1	2.64	3.24				
12	1.2	2.88	3.17				
13	1.3	3.12	3.11				
14	1.4	3.36	3.06				
15	1.5	3.60	3.07				
16	1.6	3.84	2.94				
17	1.7	4.08	2.89				
18	1.8	4.32	2.87				
19	1.9	4.56	2.85				
20	2	4.80	2.83				
21	2.1	5.04	2.8				
22	2.2	5.28	2.78				
23	2.3	5.52	2.75				
24	2.4	5.76	2.73				
25	2.5	6.00	2.72				
26	2.6	6.24	2.7				
27	2.7	6.48	2.68				
28	2.8	6.72	2.67				
29	2.9	6.96	2.65				
30	3	7.20	2.64				
31	3.1	7.44	2.62				
32	3.2	7.68	2.61				
33	3.3	7.92	2.59				
34	3.4	8.16	2.58				
35	3.5	8.40	2.56				

Work Order :	EB1014515	Client ID:	URS AUSTRALIA PTY LTD (QLD)

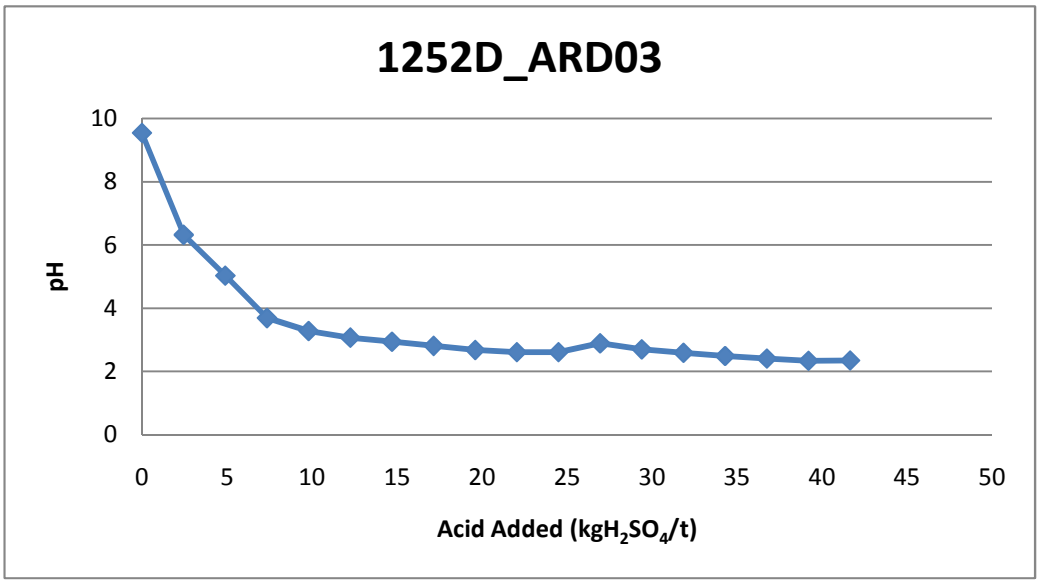
	Sub Matrix			Soil
	Client Sample Identification 1			**1440R_ARD05**
	Client Sample Identification 2			**EB1013589_61**
	Sample Date			27/07/2010
Method	Analyte	Units	LOR	
				140
				EB1014515

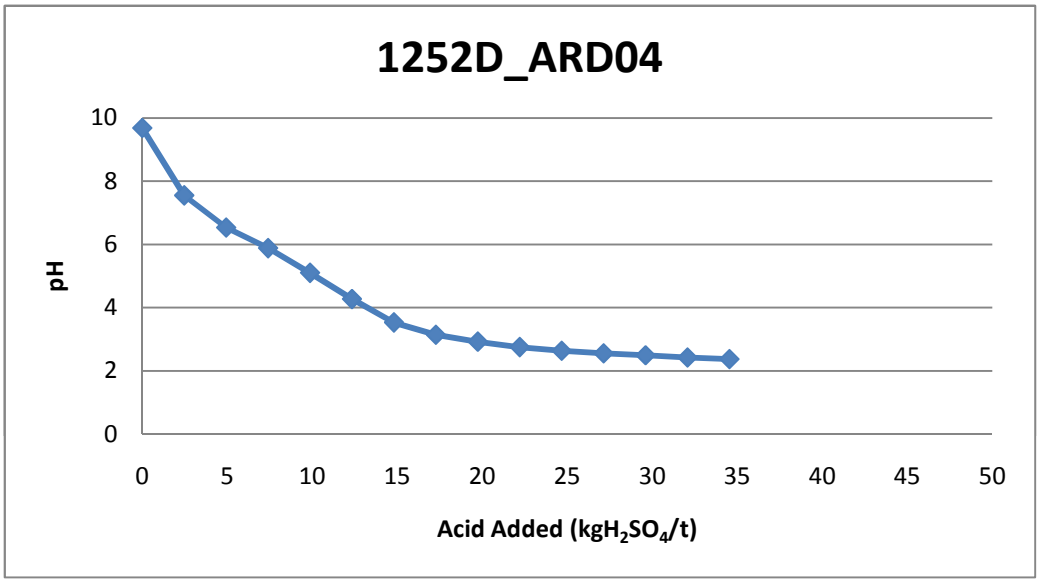
EA046 - A Titration information

HCl Molarity:	**M**	**0.0980**
Increments:	**mL**	**0.1**
Weight	**(g)**	**2**
ANC	**kgH2SO4/t**	**10.2**

EA046 -B - Curve information

Addition	mLs added (total)	kg H2SO4/t	pH	Addition	mLs added (total)	kg H2SO4/t	pH
0	0	0.00	9.58	36	3.6	8.64	2.99
1	0.1	0.24	8.81	37	3.7	8.88	2.97
2	0.2	0.48	7.86	38	3.8	9.12	2.96
3	0.3	0.72	7.62	39	3.9	9.36	2.93
4	0.4	0.96	7.37	40	4	9.60	2.91
5	0.5	1.20	7.2	41	4.1	9.84	2.92
6	0.6	1.44	6.95	42	4.2	10.08	2.89
7	0.7	1.68	6.48	43	4.3	10.32	2.87
8	0.8	1.92	5.98	44	4.4	10.56	2.86
9	0.9	2.16	5.55	45	4.5	10.80	2.85
10	1	2.40	5.16	46	4.6	11.04	2.83
11	1.1	2.64	4.88	47	4.7	11.28	2.81
12	1.2	2.88	4.3	48	4.8	11.52	2.74
13	1.3	3.12	4.5	49	4.9	11.76	2.75
14	1.4	3.36	4.41	50	5	12.01	2.74
15	1.5	3.60	4.11	51	5.1	12.25	2.72
16	1.6	3.84	3.92	52	5.2	12.49	2.72
17	1.7	4.08	3.76	53	5.3	12.73	2.68
18	1.8	4.32	3.69	54	5.4	12.97	2.66
19	1.9	4.56	3.62	55	5.5	13.21	2.63
20	2	4.80	3.54	56	5.6	13.45	2.61
21	2.1	5.04	3.48	57	5.7	13.69	2.59
22	2.2	5.28	3.43	58	5.8	13.93	2.57
23	2.3	5.52	3.38	59	5.9	14.17	2.54
24	2.4	5.76	3.32	60	6	14.41	2.52
25	2.5	6.00	3.3	61	6.1	14.65	2.51
26	2.6	6.24	3.27	62	6.2	14.89	2.5
27	2.7	6.48	3.24	63	6.3	15.13	2.49
28	2.8	6.72	3.21	64	6.4	15.37	2.49
29	2.9	6.96	3.19	65	6.5	15.61	2.48
30	3	7.20	3.15				
31	3.1	7.44	3.12				
32	3.2	7.68	3.09				
33	3.3	7.92	3.05				
34	3.4	8.16	3.04				
35	3.5	8.40	3				


1252D_ARD03
pH
10
8
6
4
2
0
0 5 10 15 20 25 30 35 40 45 50
Acid Added (kgH2SO4/t)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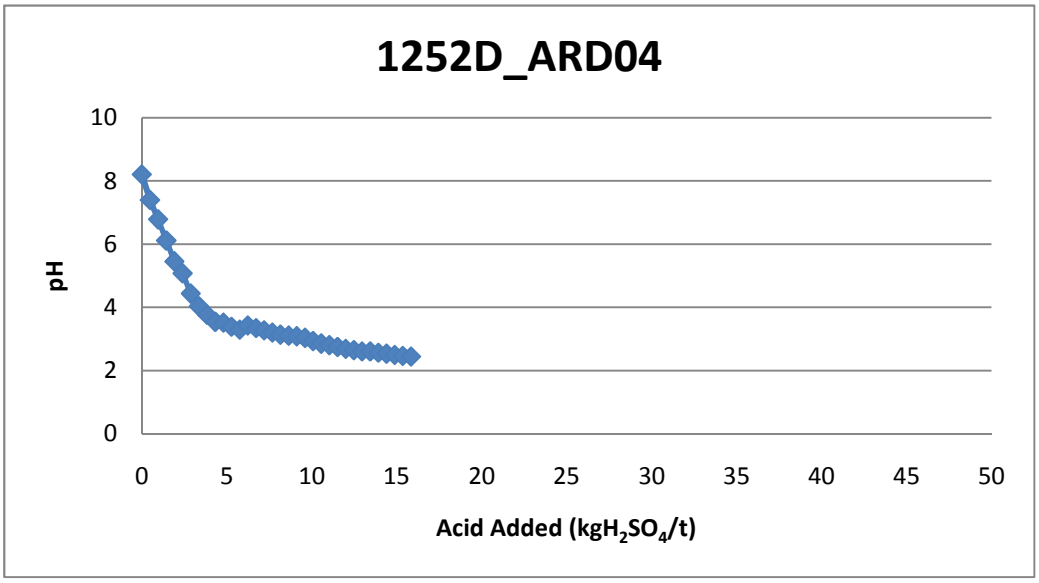
pH
10
8
6
4
2
0
0 5 10 15 20 25 30 35 40 45 50
Acid Added (kgH2SO4/t)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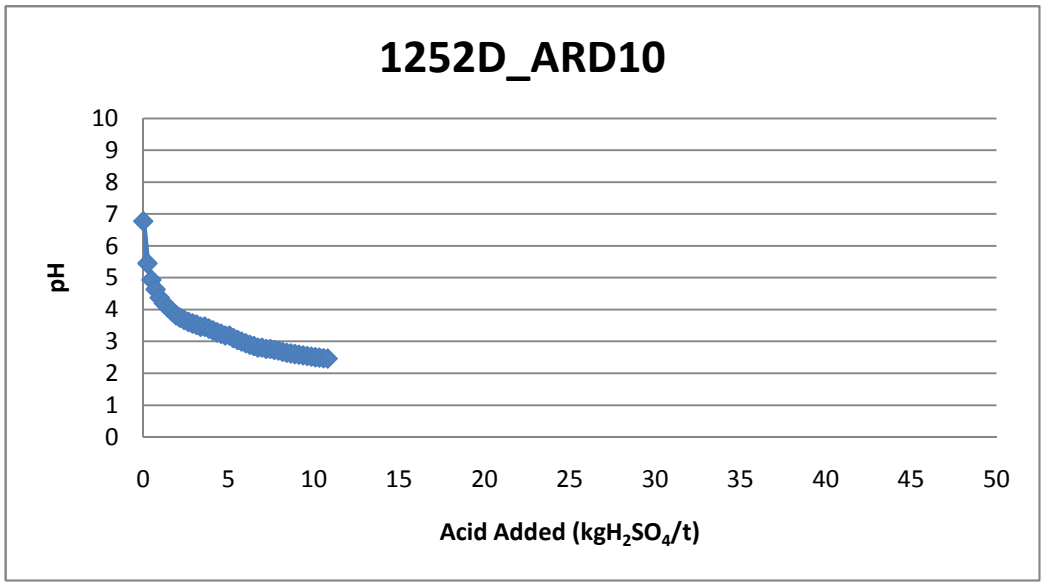
pH
10
8
6
4
2
0
0 5 10 15 20 25 30 35 40 45 50
Acid Added (kgH2SO4/t)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9
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7
6
5
4
3
2
1
0
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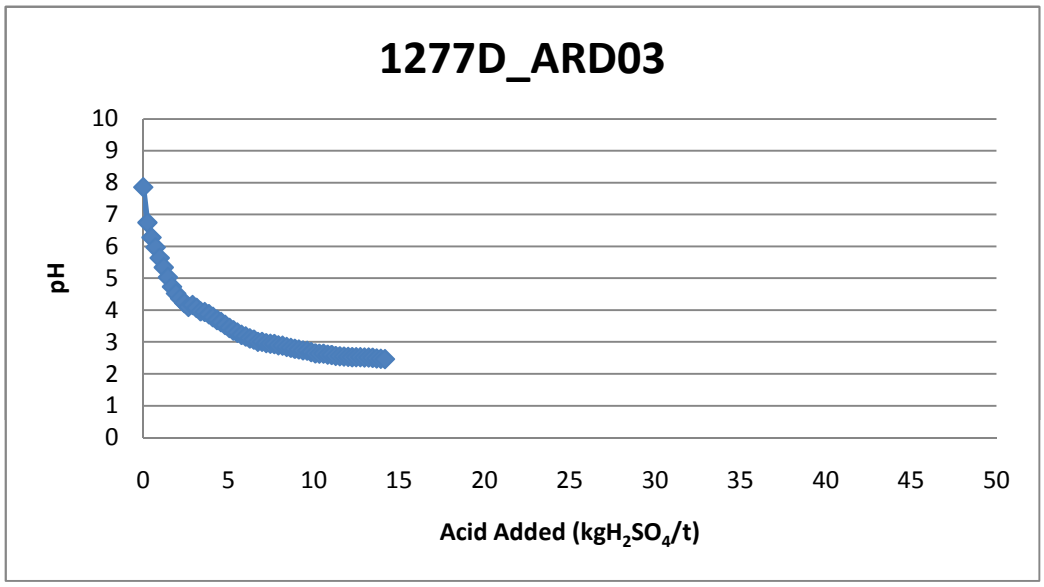
Acid Added (kgH2SO4/t)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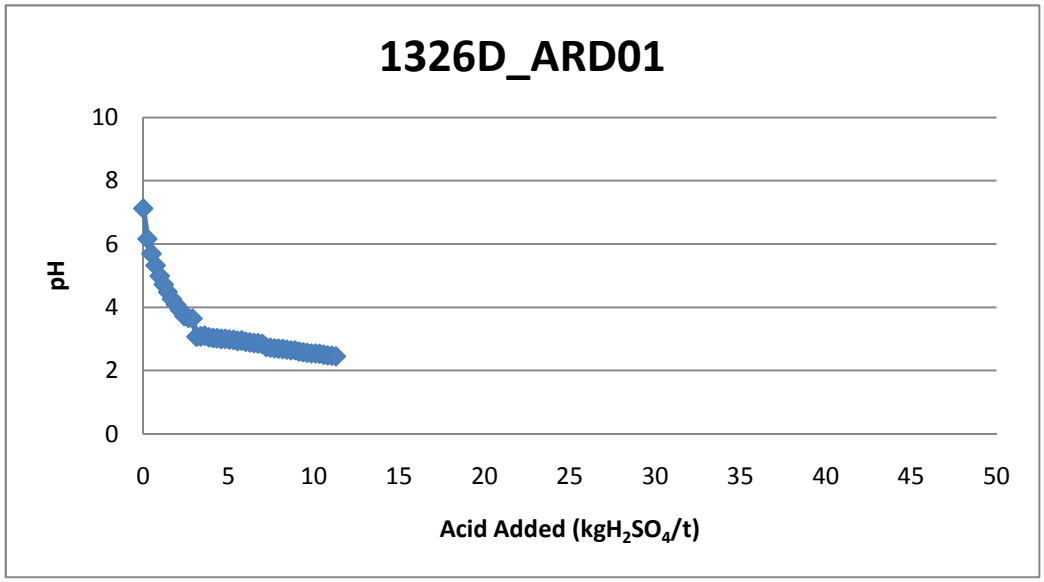
10
9
8
7
6
5
4
3
2
1
0
0 5 10 15 20 25 30 35 40 45 50
Acid Added (kgH2SO4/t)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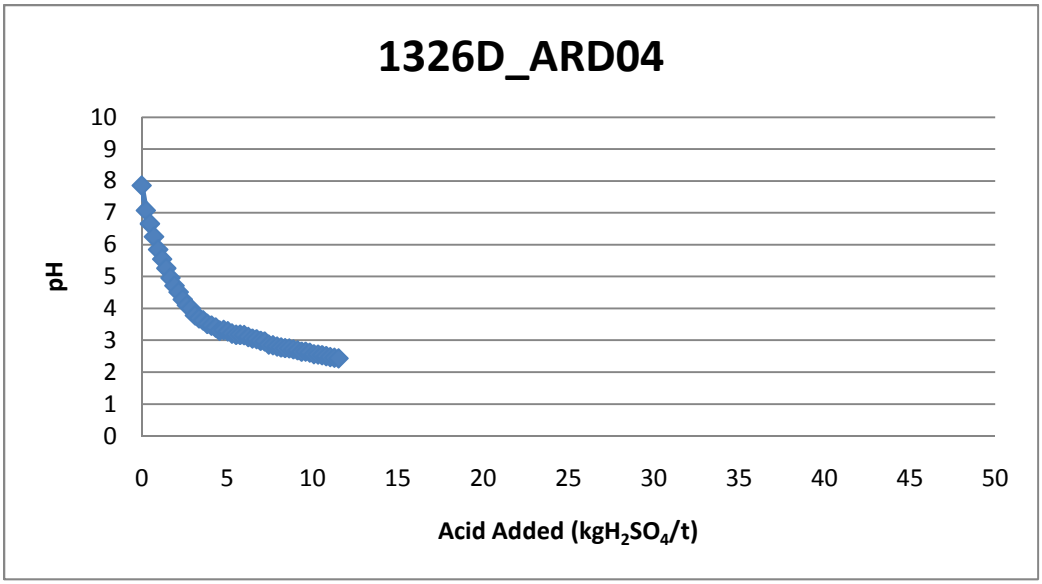
pH
10
8
6
4
2
0
0 5 10 15 20 25 30 35 40 45 50
Acid Added (kgH2SO4/t)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10
9
8
7
6
5
4
3
2
1
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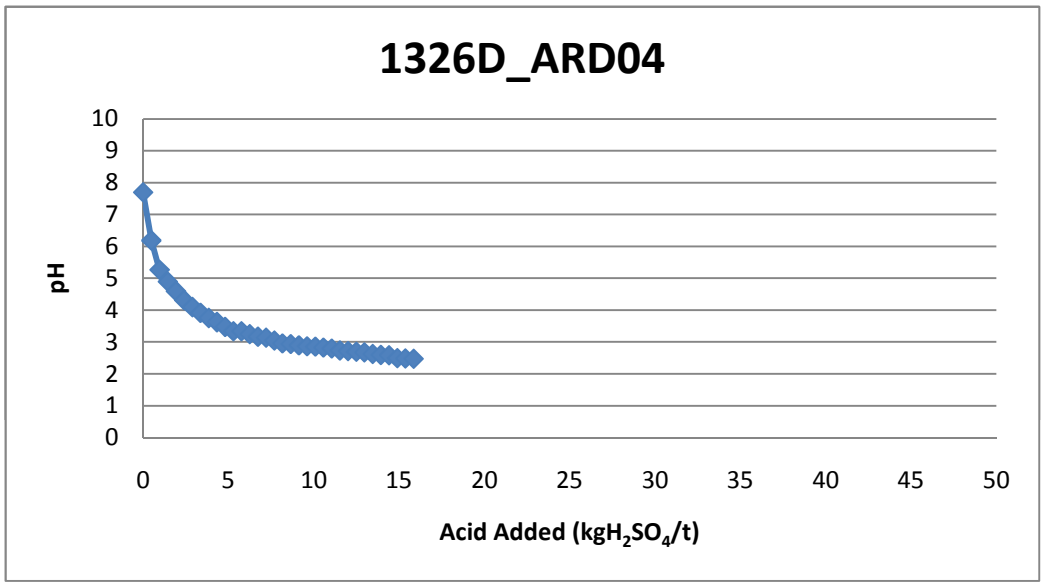
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)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10
9
8
7
6
5
4
3
2
1
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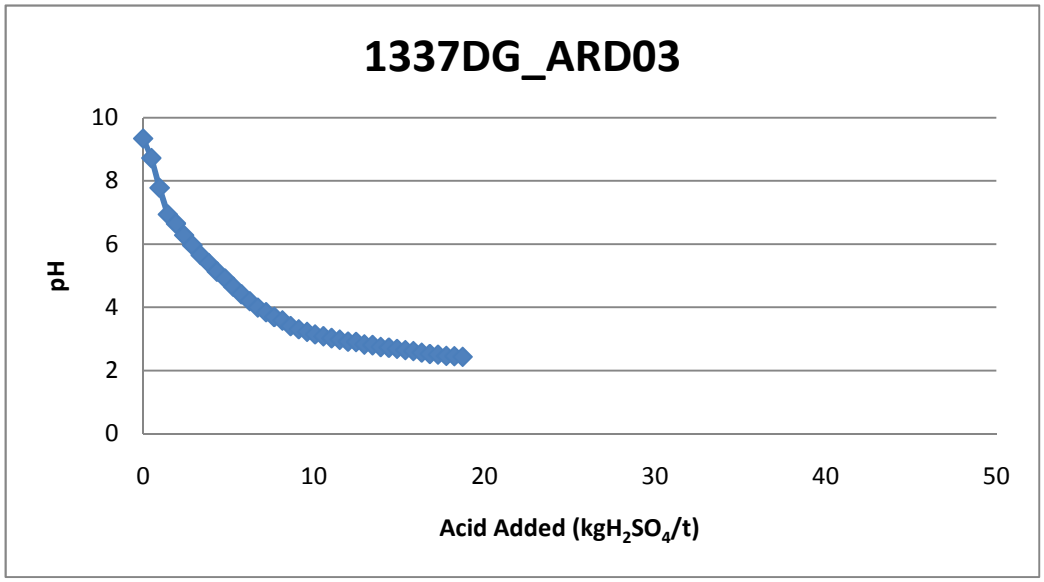
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)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pH
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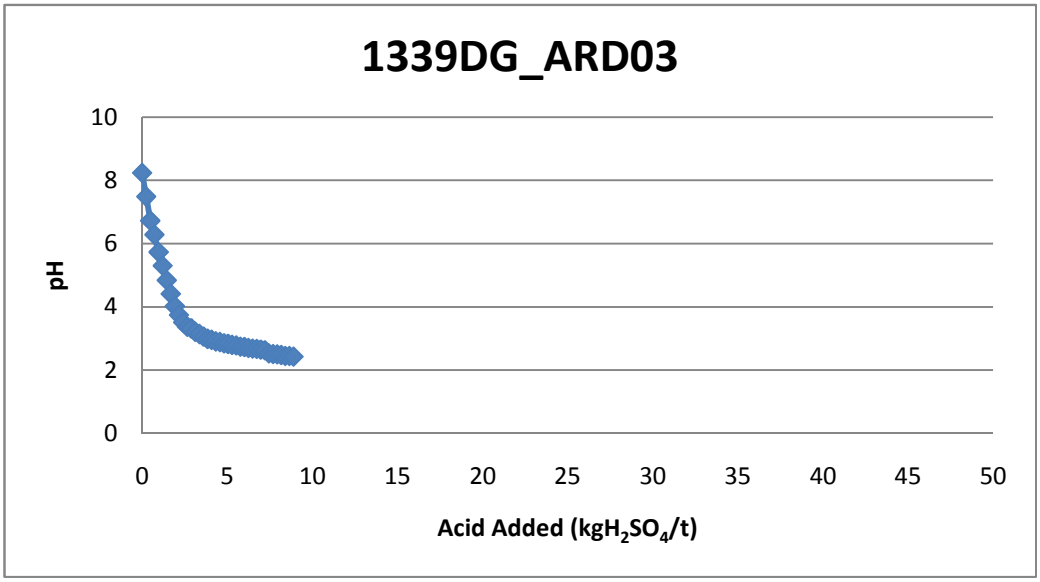
8
6
4
2
0
0
10
20
30
40
50
Acid Added (kgH2SO4/t)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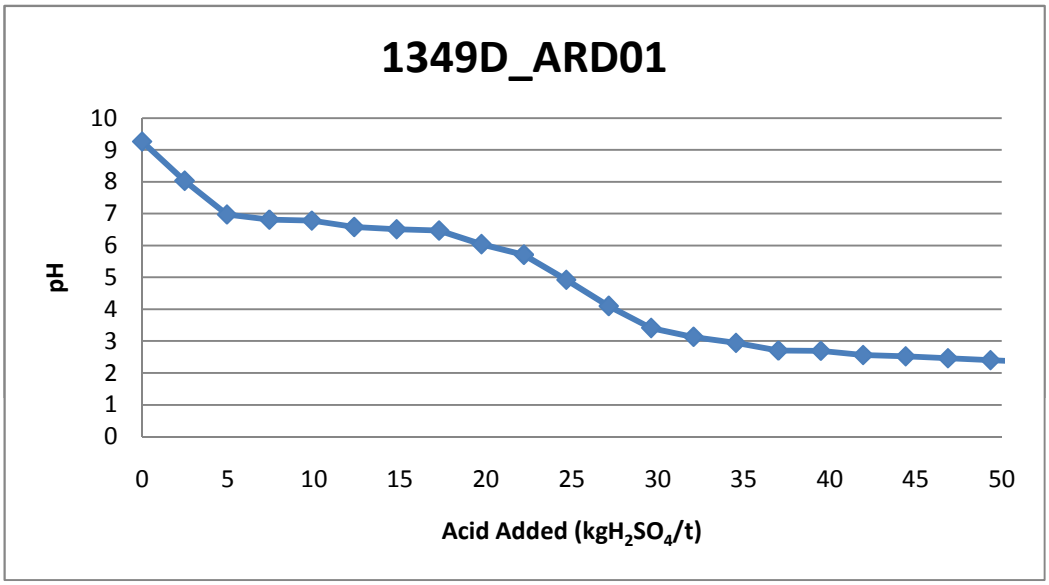
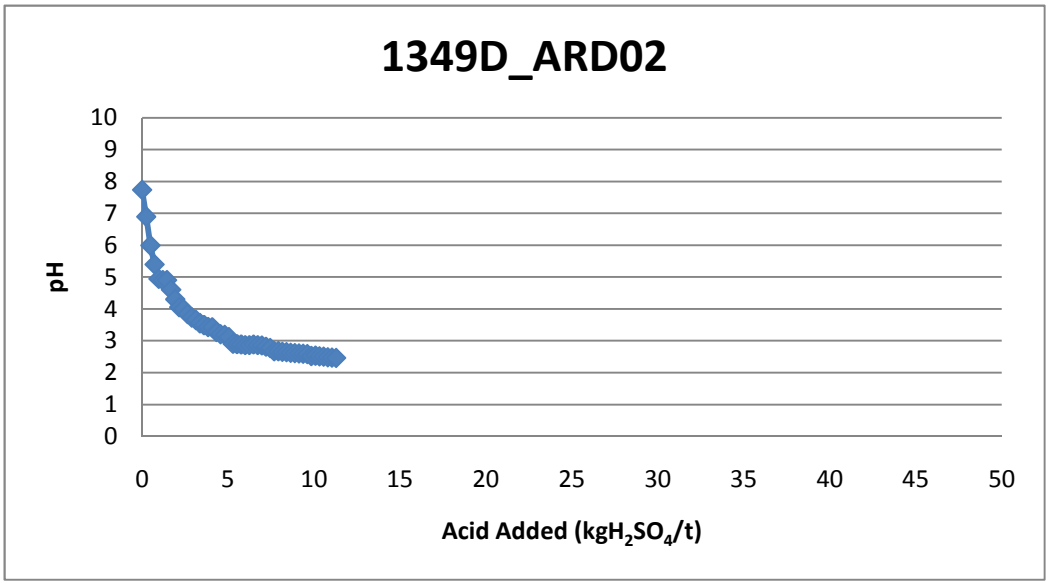
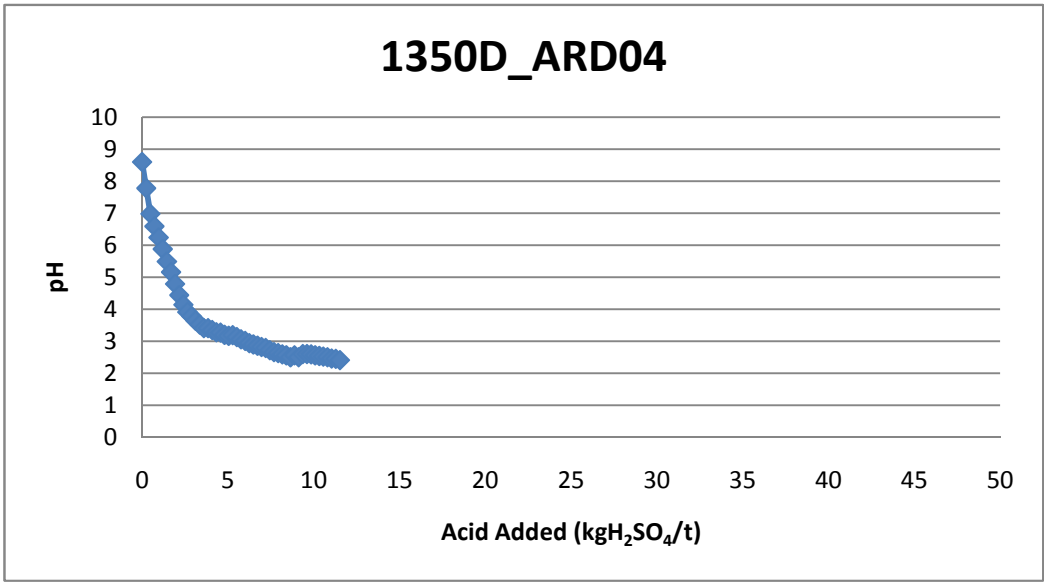
8
6
4
2
0
0 5 10 15 20 25 30 35 40 45 50
Acid Added (kgH2SO4/t)


1349D_ARD01
pH
10
9
8
7
6
5
4
3
2
1
0
0 5 10 15 20 25 30 35 40 45 50
Acid Added (kgH2SO4/t)


1349D_ARD02
pH
10
9
8
7
6
5
4
3
2
1
0
0 5 10 15 20 25 30 35 40 45 50
Acid Added (kgH2SO4/t)


1350D_ARD04
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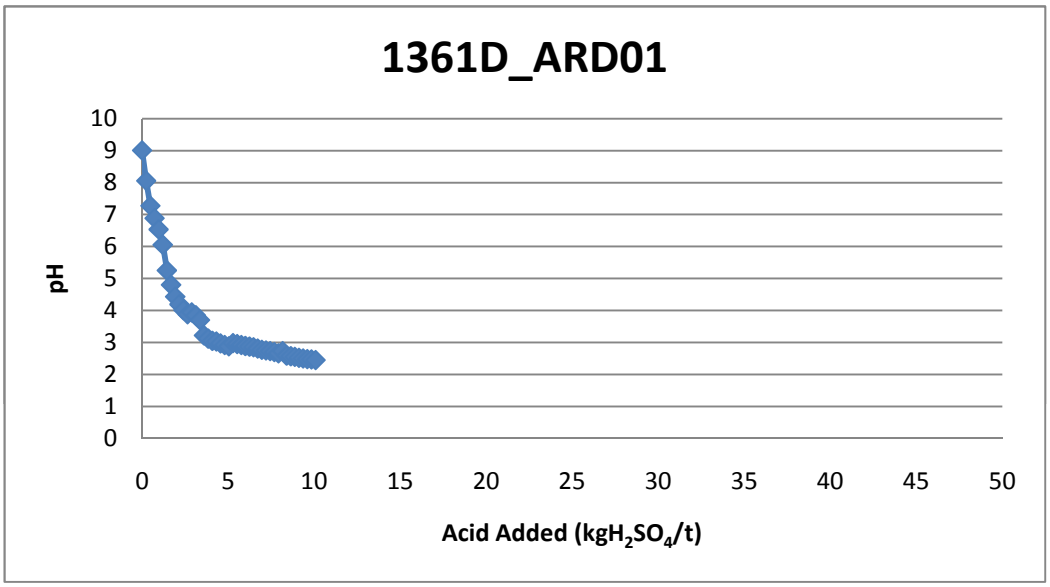
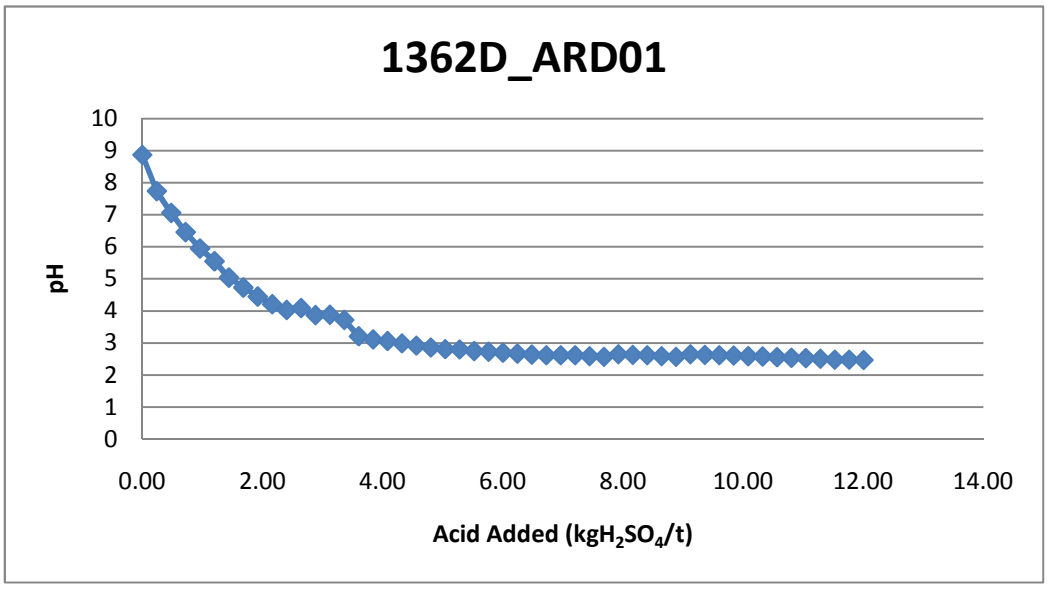
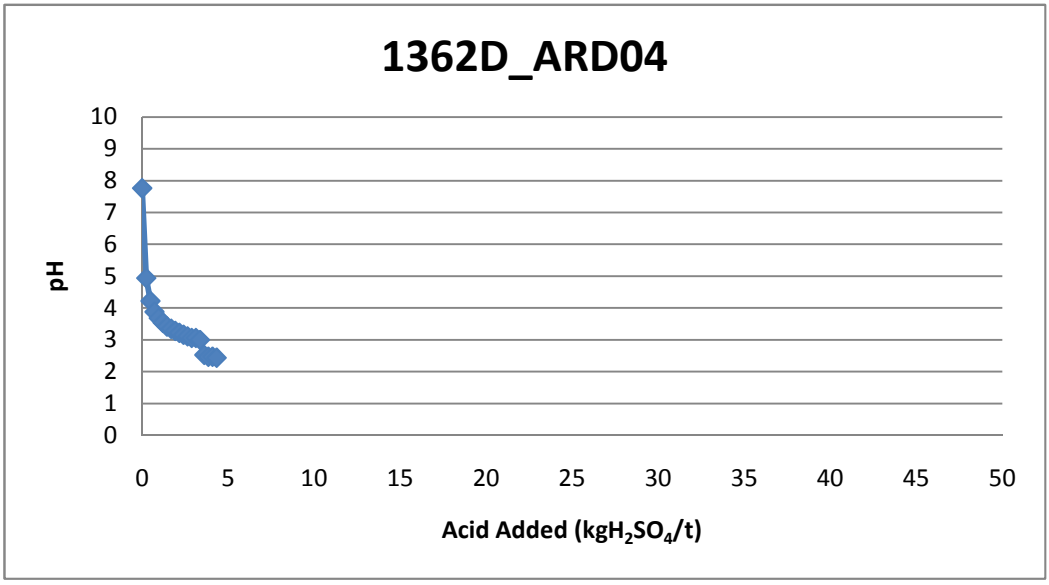
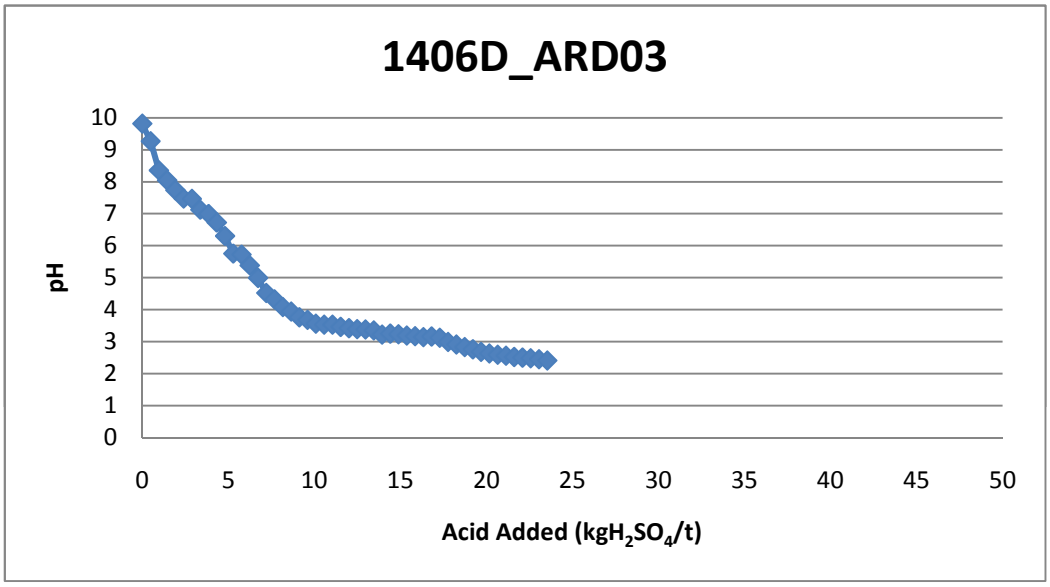
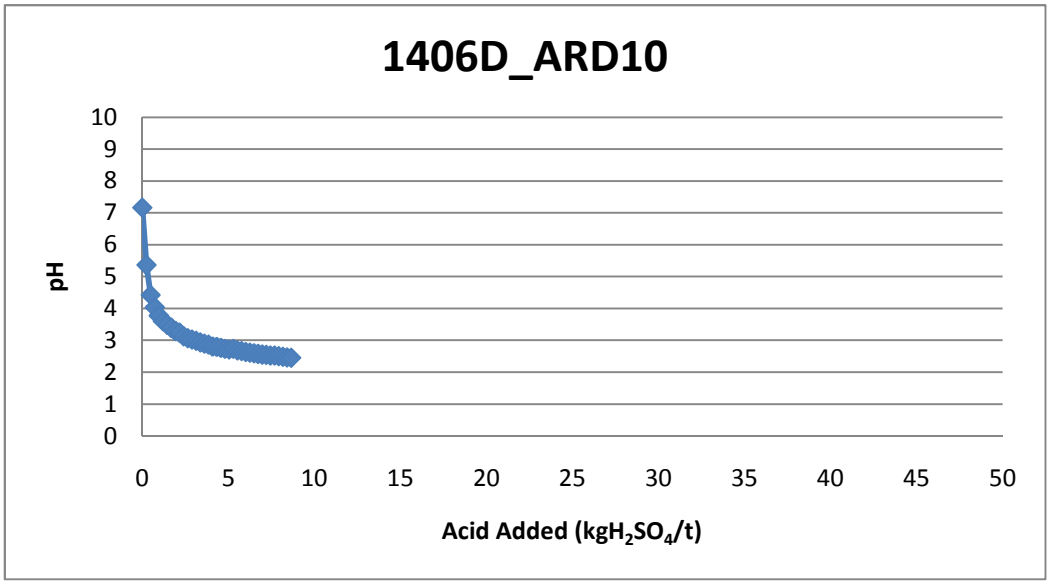
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)

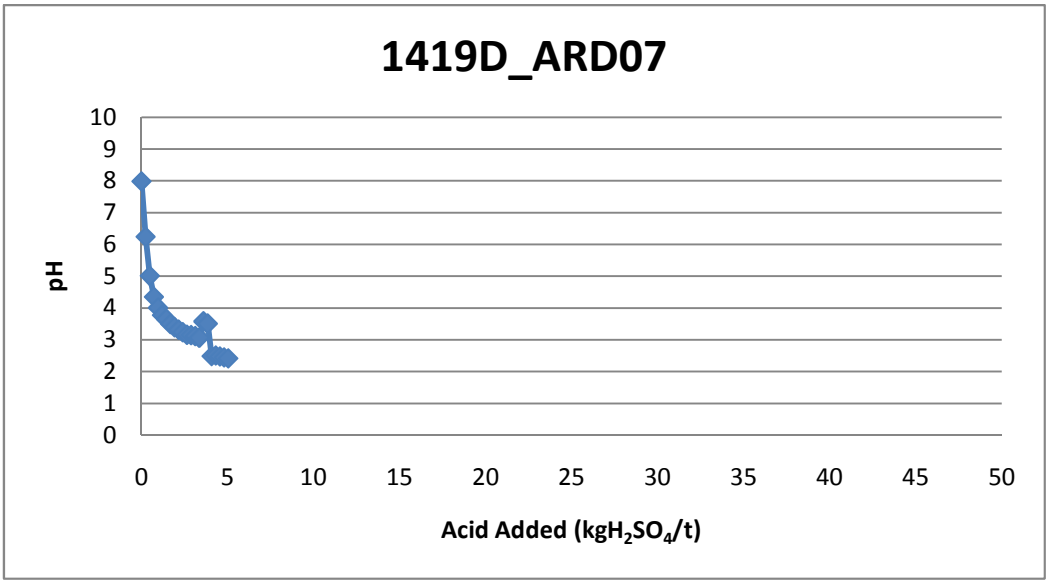

1361D_ARD01
pH
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)

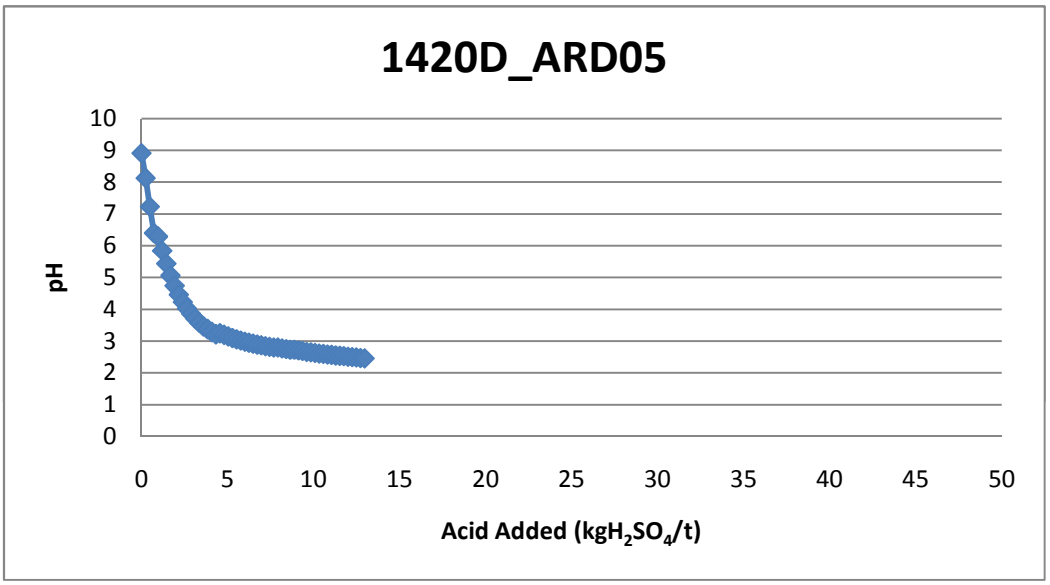

1362D_ARD01
pH
10
9
8
7
6
5
4
3
2
1
0
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
Acid Added (kgH2SO4/t)

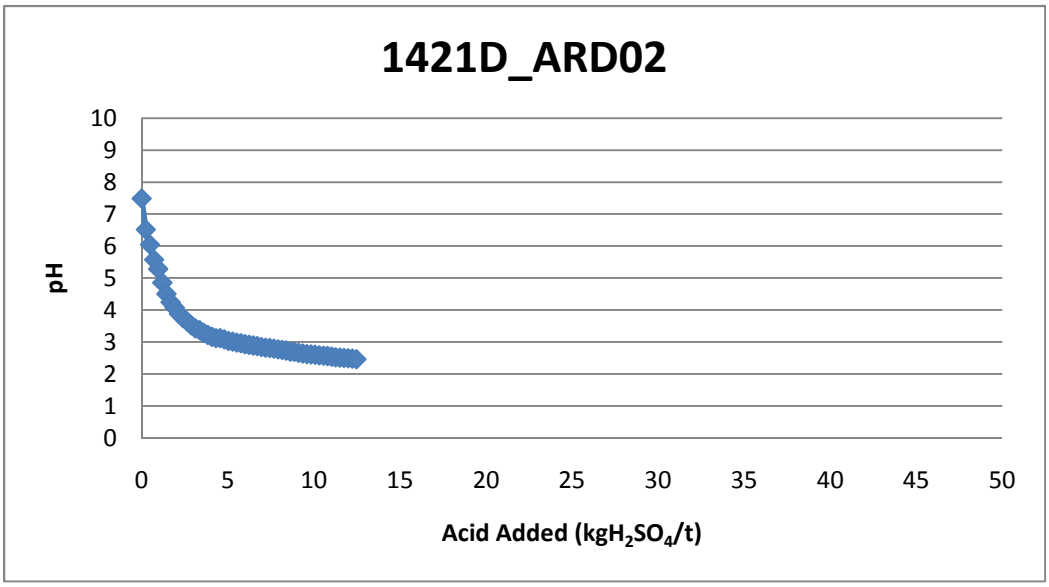

1362D_ARD04
pH
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)

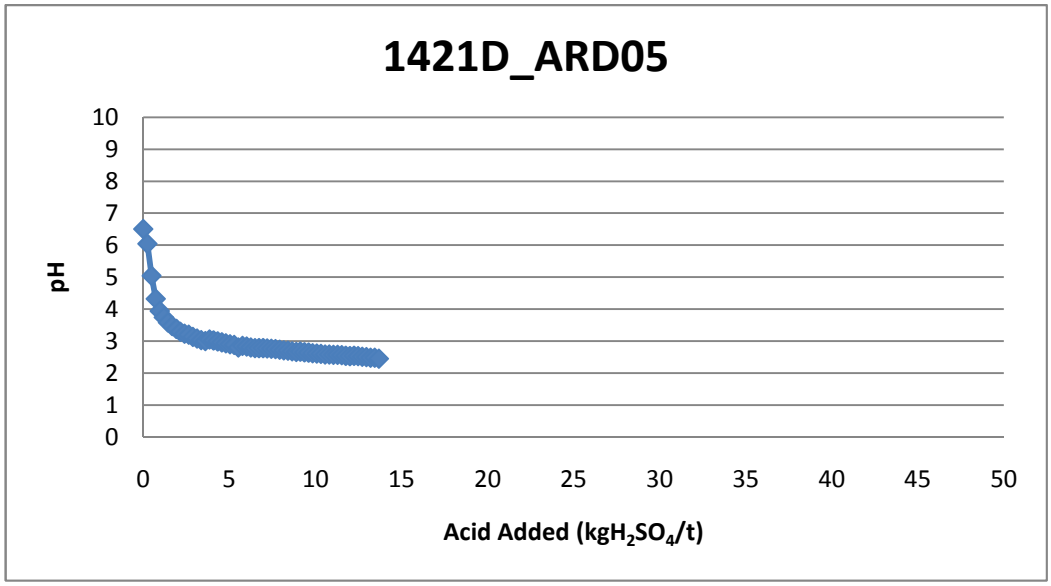

1406D_ARD03
pH
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)

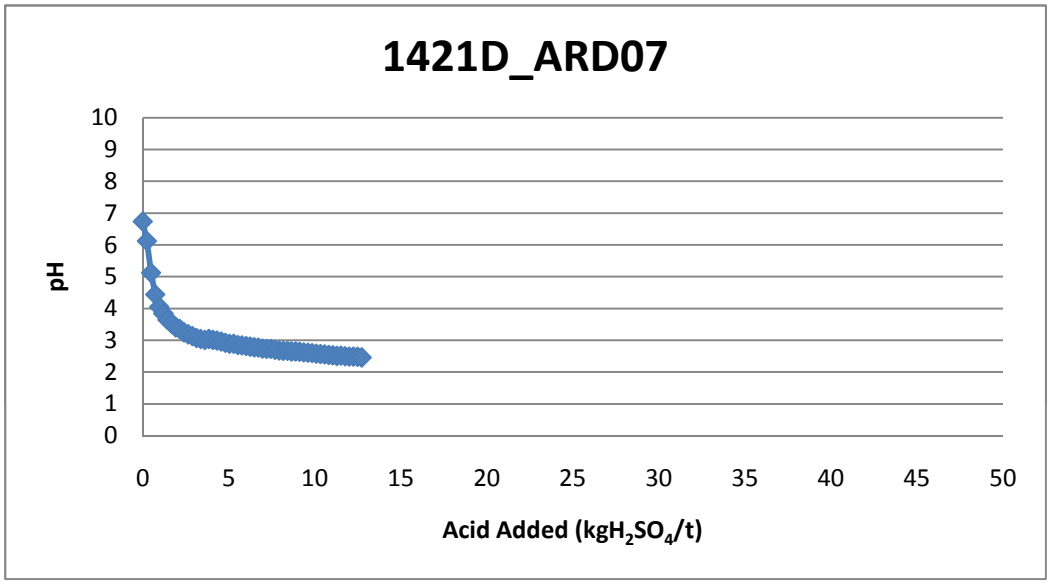

1406D_ARD10
pH
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)

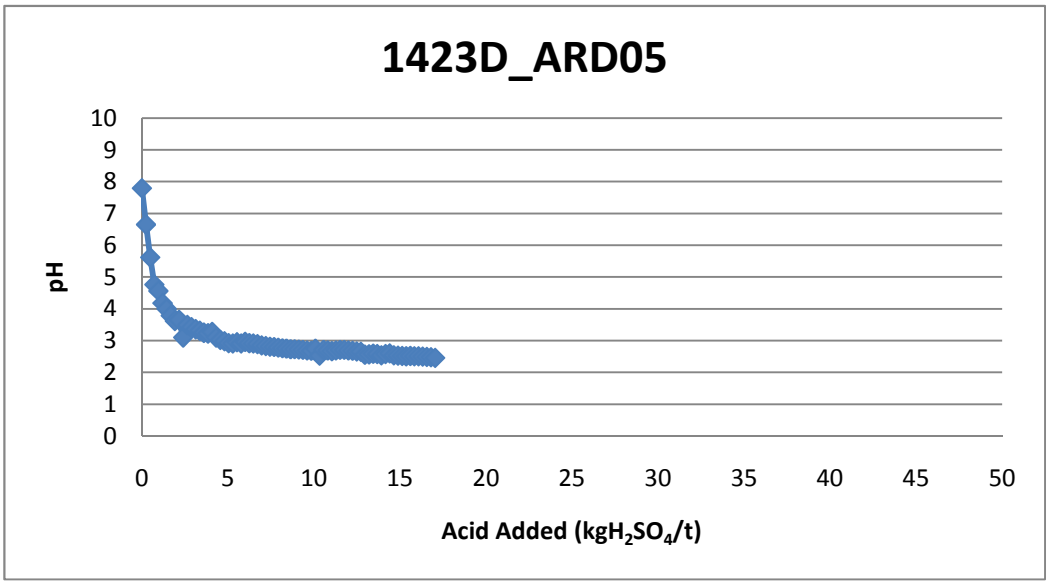

1419D_ARD07
pH
10
9
8
7
6
5
4
3
2
1
0
0 5 10 15 20 25 30 35 40 45 50
Acid Added (kgH2SO4/t)

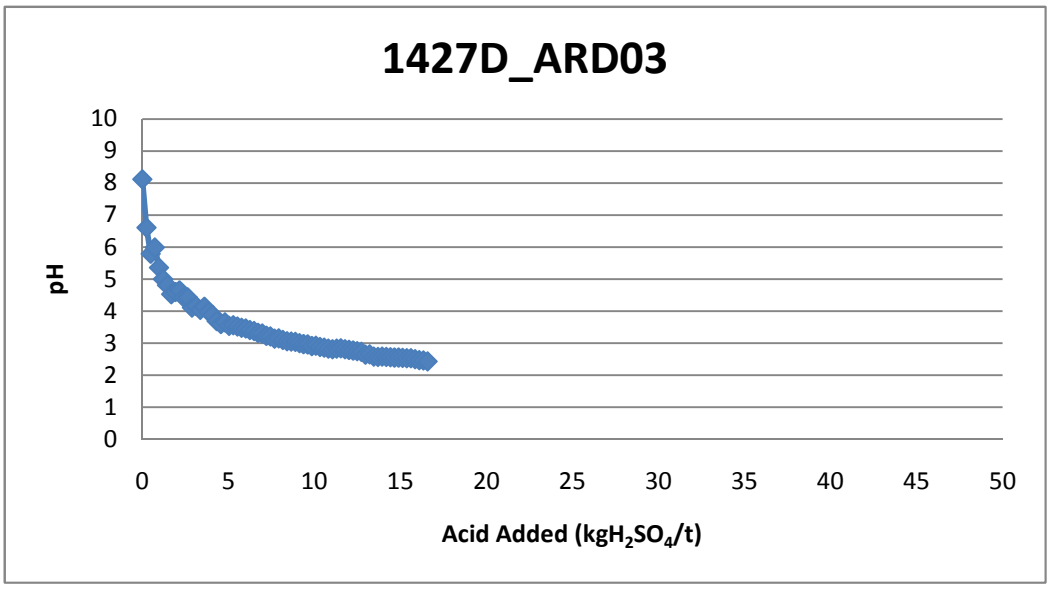

1420D_ARD05
pH
10
9
8
7
6
5
4
3
2
1
0
0 5 10 15 20 25 30 35 40 45 50
Acid Added (kgH2SO4/t)

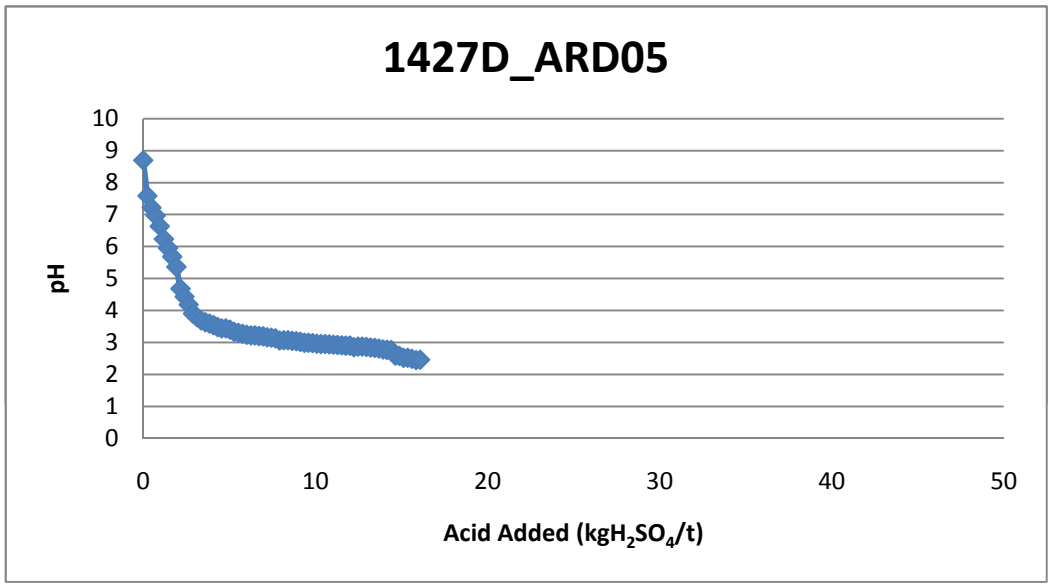

1421D_ARD02
pH
10
9
8
7
6
5
4
3
2
1
0
0 5 10 15 20 25 30 35 40 45 50
Acid Added (kgH2SO4/t)

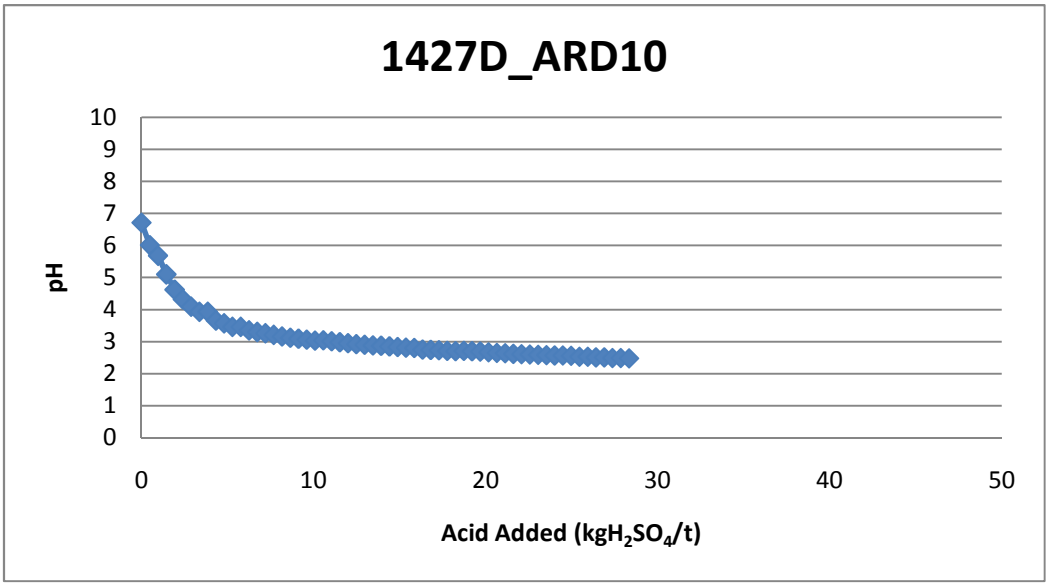

1421D_ARD05
pH
10
9
8
7
6
5
4
3
2
1
0
0 5 10 15 20 25 30 35 40 45 50
Acid Added (kgH2SO4/t)

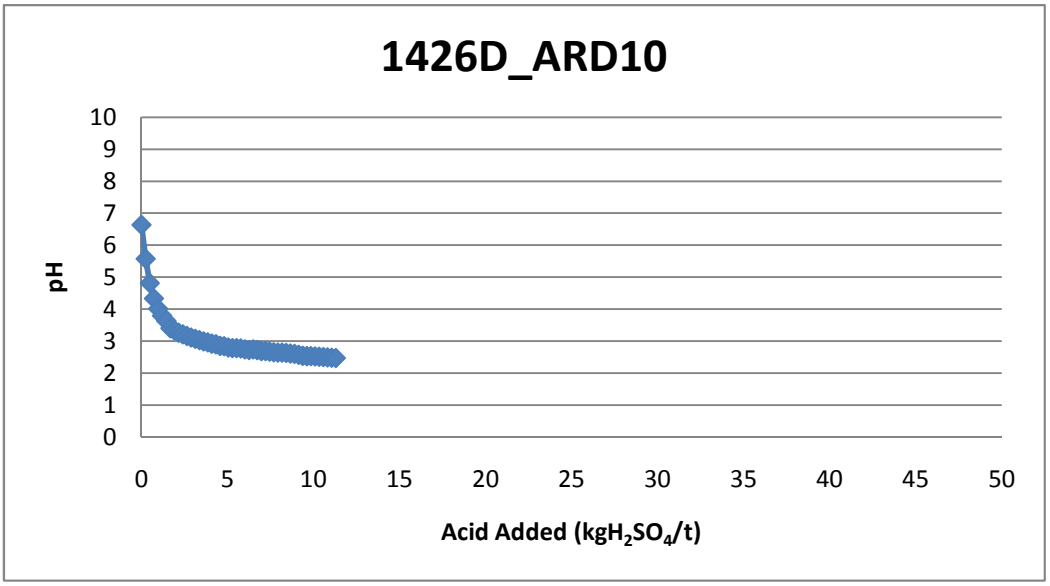

1421D_ARD07
pH
10
9
8
7
6
5
4
3
2
1
0
0 5 10 15 20 25 30 35 40 45 50
Acid Added (kgH2SO4/t)

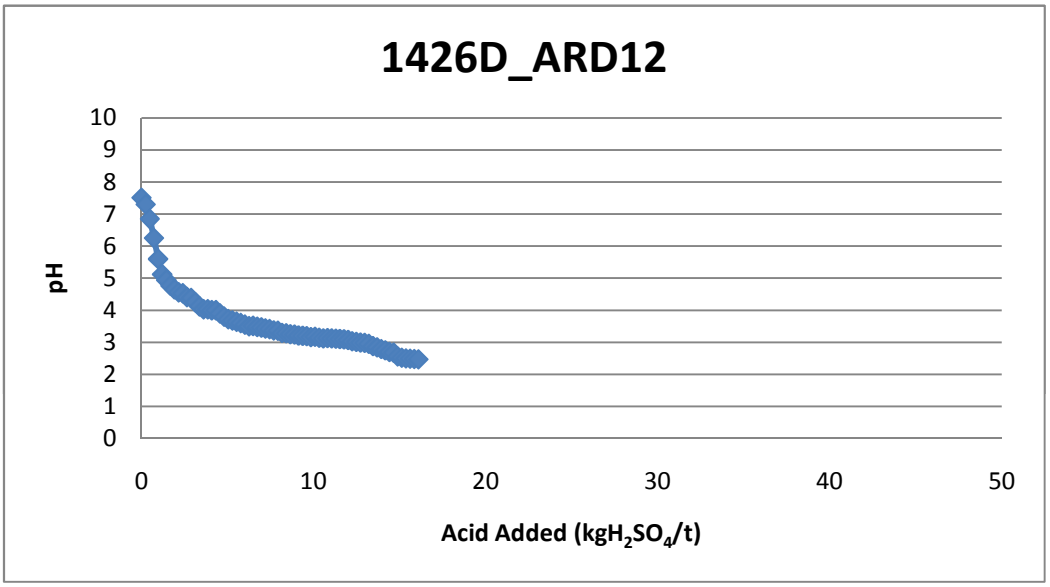

1423D_ARD05
pH
10
9
8
7
6
5
4
3
2
1
0
0 5 10 15 20 25 30 35 40 45 50
Acid Added (kgH2SO4/t)

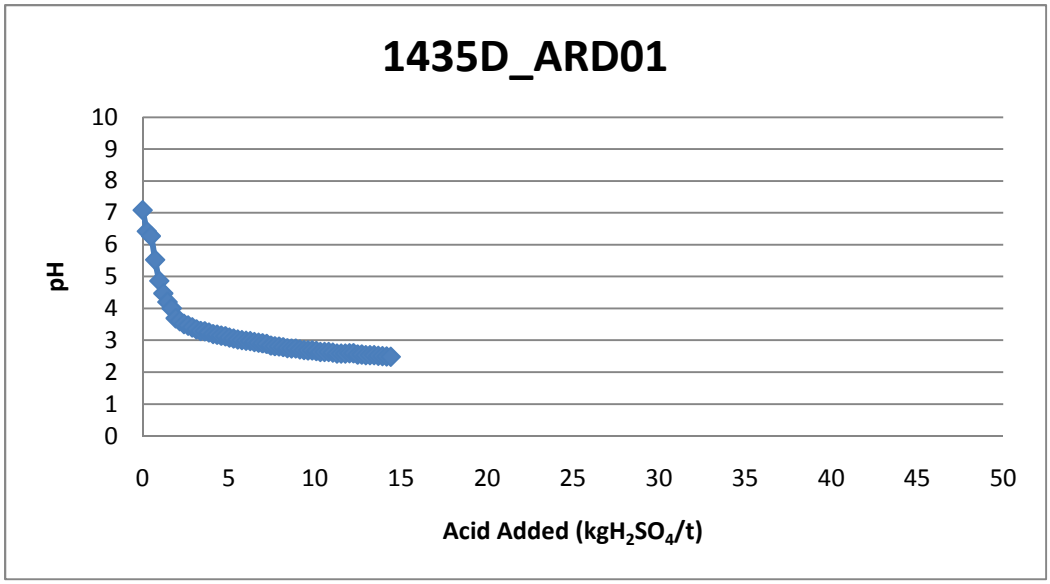

1427D_ARD03
pH
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)

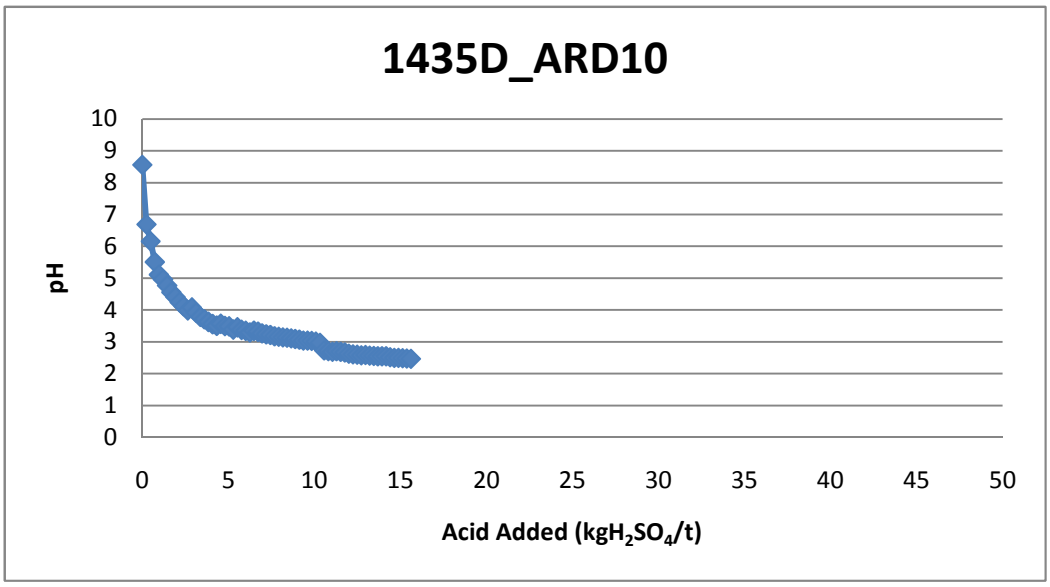

1427D_ARD05
pH
10
9
8
7
6
5
4
3
2
1
0
0
10
20
30
40
50
Acid Added (kgH2SO4/t)

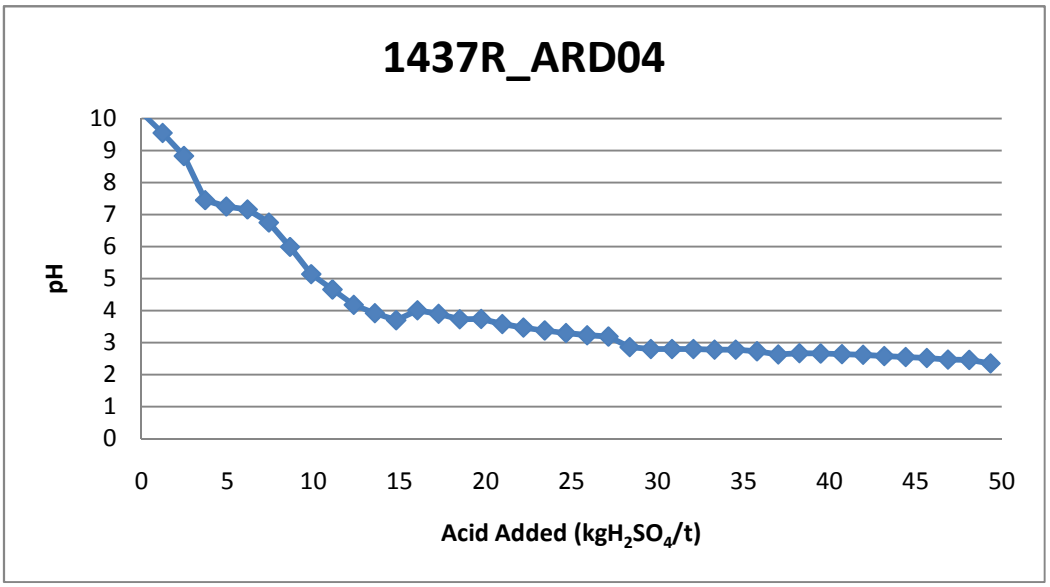

1427D_ARD10
pH
10
9
8
7
6
5
4
3
2
1
0
0
10
20
30
40
50
Acid Added (kgH2SO4/t)


1426D_ARD10
pH
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)


1426D_ARD12
pH
10
9
8
7
6
5
4
3
2
1
0
0
10
20
30
40
50
Acid Added (kgH2SO4/t)


1435D_ARD01
pH
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)


1435D_ARD10
pH
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)


1437R_ARD04
pH
10
9
8
7
6
5
4
3
2
1
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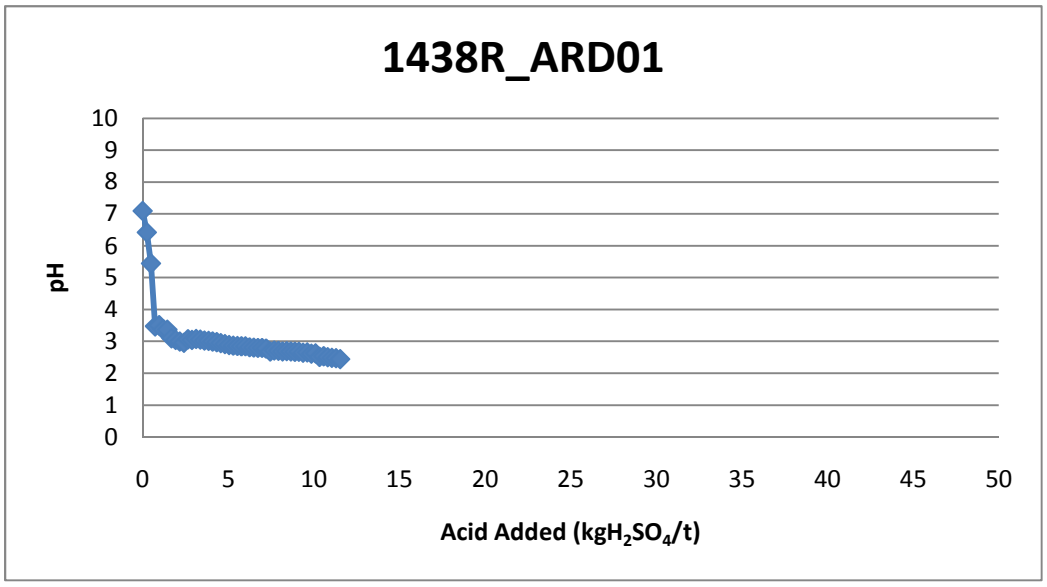
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)


1438R_ARD01
pH
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9
8
7
6
5
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3
2
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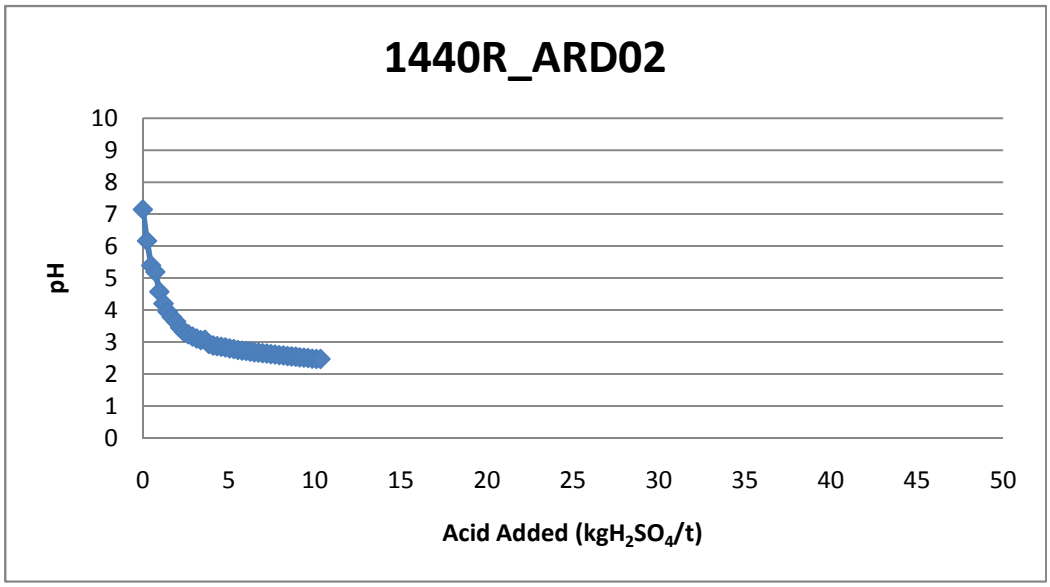
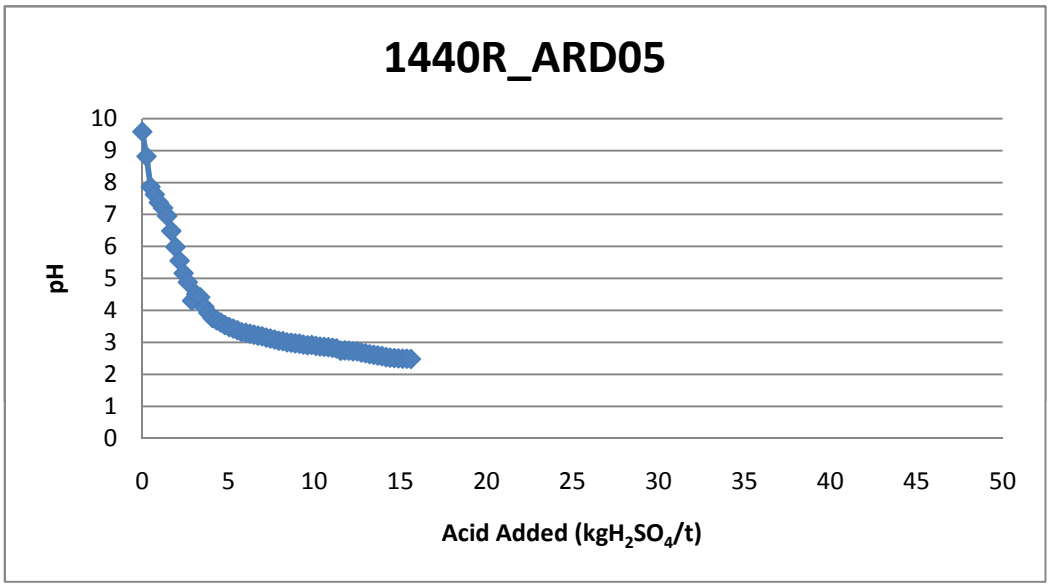
0
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)


1440R_ARD02
pH
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)


1440R_ARD05
pH
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
35
40
45
50
Acid Added (kgH2SO4/t)

Appendix 7: Whole Rock Multi-element Assay

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	C-IR07	ME-MS61	ME-MS61	ME-MS61
		Element	Ag	Al	As	As	Ba	Be	Bi	C	Ca	Cd	Ce
		Units	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm
		Mean Sediment	0.057	7.2	7.7	7.7	460	2	0.4	0	6.6	0.17	83
Client Sample ID	SRK Group	LOD	0.01	0.01	0.2	0.2	10	0.05	0.01	0	0.01	0.02	0.01
1252D_ARD03	REMAINING		0.1	8.66	6	0	420	2.52	0.54	0	1.91	0.19	91.6
1252D_ARD04	REMAINING		0.09	5.6	6.3	0	360	1.09	0.21	0	2.49	0.07	60.2
1252D_ARD05	COAL		0.04	3.86	2.4	0	630	2.44	0.4	0	0.48	0.14	27.2
1252D_ARD07	REMAINING		0.11	8.73	4.2	0	420	3.52	0.6	0	0.1	0.14	103.5
1252D_ARD09	REMAINING		0.04	4.83	4	0	410	1.19	0.13	0	0.16	0.03	35.2
1252D_ARD10	REMAINING		0.13	9.87	5.7	0	420	3.04	0.6	0	0.21	0.18	93.2
1252D_ARD11	COAL		0.12	10	14.8	0	390	2.93	0.91	0	0.09	0.36	127.5
1262D_ARD01	SAND AND GRAVEL		0.05	3.01	5.3	0	130	0.73	0.18	0	0.02	<0.02	38.3
1262D_ARD02	SAND AND GRAVEL		0.02	1.68	1.2	0	50	0.44	0.08	0	0.01	<0.02	19.6
1262D_ARD03	REMAINING		0.06	5.34	2.7	0	380	1.16	0.13	0	0.03	<0.02	43.6
1262D_ARD04	CARBONACEOUS		0.12	3.01	6.7	0	410	5.16	0.15	0	0.02	<0.02	44.8
1262D_ARD05	COAL		0.27	11.75	11.9	0	430	10.85	1.16	0	0.09	0.37	130.5
1277D_ARD01	CLAY AND SOIL		0.04	4.43	6.7	0	180	1.34	0.22	0	0.02	<0.02	74.1
1277D_ARD02	SAND AND GRAVEL		0.06	5.59	8	0	290	0.95	0.27	0	0.03	<0.02	34.7
1277D_ARD03	CLAY AND SOIL		0.06	9.62	27.1	0	260	1.98	0.37	0	0.13	<0.02	85
1277D_ARD04	REMAINING		0.16	9.46	2.5	0	1250	3.25	0.61	0	0.1	0.11	145.5
1277D_ARD05	REMAINING		0.06	7.2	3.2	0	830	2.33	0.41	0	0.08	<0.02	79.4
1277D_ARD10	REMAINING		0.03	5.47	5.2	0	330	1.88	0.16	0	0.02	0.04	62.8
1277D_ARD11	REMAINING		0.03	4.2	5	0	420	0.99	0.09	0	0.02	0.02	34
1326D_ARD01	CLAY AND SOIL		0.05	7.47	6.4	0	350	1.79	0.32	0	0.17	<0.02	75
1326D_ARD02	CLAY AND SOIL		0.06	7.16	6.4	0	310	1.54	0.29	0	0.07	<0.02	66.2
1326D_ARD03	SAND AND GRAVEL		0.04	5.62	7.1	0	480	1.13	0.23	0	0.05	<0.02	32.4
1326D_ARD04	SAND AND GRAVEL		0.05	8.13	8.9	0	410	1.84	0.32	0	0.07	<0.02	104
1326D_ARD05	REMAINING		0.04	9.04	17.8	0	430	1.17	0.66	0	0.03	<0.02	72.2
1327D_ARD01	SAND AND GRAVEL		0.04	3.64	3.5	0	1240	0.73	0.15	0	0.03	<0.02	21.7
1327D_ARD03	COAL		0.08	9.26	17.1	0	440	2.86	0.52	0	0.05	0.17	104.5
1336D_ARD02	CARBONACEOUS		0.04	5.01	1.5	0	340	0.69	0.11	0	0.02	<0.02	25.9
1336D_ARD03	REMAINING		0.04	4.25	3.8	0	360	1.28	0.19	0	0.02	<0.02	29.3
1337DG_ARD01	SAND AND GRAVEL		0.03	2.09	3.9	0	160	0.43	0.11	0	0.02	<0.02	14.8
1337DG_ARD02	REMAINING		0.07	6.26	8.4	0	210	3.03	0.23	0	0.83	0.14	52.7
1337DG_ARD03	COAL		0.07	10.6	3.4	0	200	1.08	0.25	0	0.41	0.2	21
1339DG_ARD01	REMAINING		0.04	4.14	4.4	0	160	1.37	0.17	0	0.1	<0.02	67.4
1339DG_ARD02	REMAINING		0.03	10.4	7.4	0	860	1.3	0.31	0	0.01	<0.02	128.5
1339DG_ARD03	CARBONACEOUS		0.11	9.55	18.3	0	320	4.01	0.59	0	0.13	0.22	111.5
1339DG_ARD04	REMAINING		0.04	6.28	10.1	0	370	1.83	0.22	0	0.08	0.06	72.8
1339DG_ARD05	REMAINING		0.12	7.46	9.2	0	400	2.54	0.39	0	0.1	0.16	97.2
1339DG_ARD06	REMAINING		0.09	4.43	985	0	60	0.48	0.12	0	0.02	0.07	28.1
1349D_ARD03	REMAINING		0.04	4.24	3.3	0	230	0.79	0.19	0	0.03	<0.02	80.9
1350D_ARD01	SAND AND GRAVEL		0.25	2.55	5.9	0	50	0.61	0.14	0	0.01	<0.02	26.2
1350D_ARD02	REMAINING		0.23	4.82	7.5	0	150	0.66	0.26	0	0.03	<0.02	31.6
1350D_ARD03	REMAINING		0.04	9.65	12.5	0	280	1.28	0.45	0	0.04	<0.02	15.15
1350D_ARD04	COAL		0.2	8.68	7.7	0	260	3.13	0.54	0	0.32	<0.02	339
1361D_ARD01	REMAINING		0.07	6.19	4.5	0	270	1.46	0.27	0	0.22	<0.02	78.9
1361D_ARD02	REMAINING		0.04	1.54	1.9	0	50	0.46	0.09	0	0.01	<0.02	22.2
1362D_ARD01	REMAINING		0.05	4.99	4.3	0	120	1.48	0.2	0	0.21	<0.02	62.9

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	C-IR07	ME-MS61	ME-MS61	ME-MS61
		Element	Ag	Al	As	As	Ba	Be	Bi	C	Ca	Cd	Ce
		Units	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm
		Mean Sediment	0.057	7.2	7.7	7.7	460	2	0.4	0	6.6	0.17	83
Client Sample ID	SRK Group	LOD	0.01	0.01	0.2	0.2	10	0.05	0.01	0	0.01	0.02	0.01
1362D_ARD02	REMAINING		0.07	7.73	16.6	0	210	0.61	0.4	0	0.03	<0.02	30.6
1362D_ARD03	REMAINING		0.04	3.35	0.9	0	240	0.39	0.2	0	0.01	<0.02	47.3
1362D_ARD04	REMAINING		0.04	8.49	14.4	0	550	1.37	0.57	0	0.04	<0.02	58.8
1362D_ARD05	REMAINING		0.05	10.65	4.7	0	280	3.33	0.4	0	0.32	0.02	102.5
1362D_ARD06	COAL		0.05	6.49	1.5	0	120	1.56	0.41	0	0.18	0.12	47.1
1252D_ARD08	REMAINING		0.04	4.43	4.7	0	380	1.1	0.11	0	0.04	0.02	33
1336D_ARD01	REMAINING		0.03	5.45	1.4	0	370	0.95	0.15	0	0.02	<0.02	47.7
1339DG_ARD08	REMAINING		0.04	5.22	4.4	0	310	1.59	0.18	0	0.03	0.03	56.6
1349D_ARD01	CLAY AND SOIL		0.08	9.19	9.8	0	670	1.68	0.41	0	1.54	<0.02	68.1
1349D_ARD02	REMAINING		0.12	8.53	6.3	0	360	1.31	0.4	0	0.12	<0.02	54.6
1361D_ARD03	REMAINING		0.05	4.55	2.7	0	380	1.15	0.1	0	0.02	<0.02	35.5
1406D_ARD01	CLAY AND SOIL	*	0.05	6.94	8	0	380	1.24	0.25	0.16	0.34	<0.02	53.4
1406D_ARD02	REMAINING	*	0.05	7.92	6.2	0	380	1.63	0.25	0.58	1.36	0.08	57.7
1406D_ARD03	REMAINING	*	0.06	8.08	7.4	0	380	1.51	0.23	1.37	0.96	0.1	55.5
1406D_ARD04	REMAINING	*	0.06	5.05	4.9	0	240	0.94	0.21	0.72	0.78	0.08	58.2
1406D_ARD06	COAL		0.43	8.51	4.2	3.2	260	1.55	0.54	10.35	0.38	0.1	27
1406D_ARD07	REMAINING	*	0.08	6.27	2	0	380	2.16	0.31	2.49	0.06	0.11	81.2
1406D_ARD08	REMAINING	*	0.04	3.6	2.9	0	350	0.64	0.08	0.39	0.02	<0.02	30.3
1406D_ARD09	COAL		0.29	2.13	1.1	0.6	50	1.65	0.29	>50	0.11	0.06	30
1406D_ARD10	REMAINING	*	0.05	4.16	0.9	0	260	1.22	0.19	1.39	0.03	0.03	44.6
1411D_ARD01	CLAY AND SOIL	*	0.04	4.77	5.6	0	160	1.22	0.33	0.08	0.16	<0.02	69.3
1411D_ARD02	REMAINING	*	0.03	9.33	5.4	0	370	2.57	0.59	0.01	0.04	<0.02	54.5
1411D_ARD04	REMAINING	*	0.13	9.74	8.8	0	500	3.26	0.7	4.39	0.07	0.23	134.5
1411D_ARD05	REMAINING	*	0.05	6.54	7.5	0	430	1.73	0.25	1.75	0.05	0.06	86.3
1411D_ARD06	CARBONACEOUS		0.18	9.77	17.5	11.5	440	2.76	0.7	10.2	0.06	0.2	102
1411D_ARD07	COAL		0.02	1.11	0.6	0.3	40	0.62	0.2	>50	0.08	0.02	8.79
1413D_ARD02	SAND AND GRAVEL	*	0.09	6.57	38.7	0	100	0.95	0.36	0.07	0.06	<0.02	22.7
1413D_ARD03	REMAINING	*	0.02	9.26	3.7	0	380	3.01	0.52	0.03	0.06	<0.02	164.5
1413D_ARD04	REMAINING	*	0.05	4.59	9.5	0	1110	6.24	0.16	0.24	0.09	0.02	464
1413D_ARD05	COAL		0.1	6.21	2.1	1.6	180	1.67	0.25	15.55	0.35	0.09	45.1
1413D_ARD06	REMAINING	*	0.09	8.01	2.9	0	420	2.12	0.48	4.89	0.07	0.16	74.9
1413D_ARD07	REMAINING	*	0.04	5.89	7.3	0	400	0.87	0.12	0.89	0.06	0.03	45.5
1413D_ARD08	COAL		0.13	2.59	0.7	0.4	20	0.72	0.34	>50	0.1	0.03	22.9
1415D_ARD01	SAND AND GRAVEL	*	0.02	2.09	5.5	0	110	0.63	0.1	0.09	0.02	<0.02	26.1
1415D_ARD02	CLAY AND SOIL	*	0.06	10.25	7.7	0	280	1.93	0.41	0.01	0.1	0.02	46.5
1415D_ARD03	REMAINING	*	0.03	8.74	17.7	0	100	0.59	0.26	<0.01	0.13	<0.02	23.1
1415D_ARD04	COAL		0.22	2.44	5.6	3.8	160	6.65	0.15	38.1	0.08	0.03	20.3
1415D_ARD05	COAL		0.03	1.6	1.8	1	20	1.73	0.15	>50	0.08	0.02	8.35
1415D_ARD06	REMAINING	*	0.05	5.57	7.7	0	300	1.15	0.2	1.07	0.06	0.05	65.1
1415D_ARD07	REMAINING	*	0.04	6.62	10.1	0	340	1.55	0.28	1.89	0.06	0.07	96.7
1418D_ARD01	REMAINING	*	0.12	7.04	6.5	0	100	0.85	0.34	0.17	0.6	0.02	34.4
1418D_ARD02	REMAINING	*	0.13	7.8	4.6	0	260	1.12	0.46	0.07	0.03	<0.02	84.3
1418D_ARD03	COAL		0.03	1.17	2.3	1.8	50	2.27	0.2	>50	0.06	0.17	29.5
1419D_ARD01	CLAY AND SOIL	*	0.1	7.27	7.7	0	40	0.59	0.27	0.07	0.28	<0.02	25.2
1419D_ARD02	REMAINING	*	0.07	7.92	12.2	0	120	0.46	0.42	0.01	0.03	<0.02	18.35

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	C-IR07	ME-MS61	ME-MS61	ME-MS61
		Element	Ag	Al	As	As	Ba	Be	Bi	C	Ca	Cd	Ce
		Units	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm
		Mean Sediment	0.057	7.2	7.7	7.7	460	2	0.4	0	6.6	0.17	83
Client Sample ID	SRK Group	LOD	0.01	0.01	0.2	0.2	10	0.05	0.01	0	0.01	0.02	0.01
1419D_ARD03	CLAY AND SOIL	*	0.08	8.75	3.1	0	200	0.88	0.46	<0.01	0.05	<0.02	27.7
1419D_ARD04	REMAINING	*	0.04	9.65	26.3	0	210	3.6	0.55	0.28	0.09	<0.02	260
1419D_ARD05	REMAINING	*	0.07	6.74	5.2	0	380	2.66	0.29	1.83	0.09	0.34	105
1419D_ARD06	COAL		0.13	0.95	0.8	0.3	10	0.54	0.11	>50	0.05	0.03	6.15
1419D_ARD07	REMAINING	*	0.06	6.67	9.4	0	330	1.75	0.38	2.82	0.04	0.08	86.6
1419D_ARD08	REMAINING	*	0.09	8.29	12.6	0	340	1.86	0.48	3.71	0.06	0.15	94.3
1419D_ARD09	COAL		0.02	1.13	0.6	0.3	10	0.38	0.21	>50	0.07	0.04	7.63
1419D_ARD10	REMAINING	*	0.06	7.66	4.3	0	380	2.58	0.4	2.82	0.06	0.13	118
1420D_ARD01	SAND AND GRAVEL	*	0.05	3.97	3.7	0	180	1.13	0.18	0.01	0.07	<0.02	62.5
1420D_ARD02	CLAY AND SOIL	*	0.12	10.9	7.1	0	310	2.11	0.41	0.02	0.16	<0.02	86
1420D_ARD03	REMAINING	*	0.12	5.96	1.8	0	70	0.42	0.21	<0.01	0.04	<0.02	8.25
1420D_ARD04	REMAINING	*	0.13	5.34	1.2	0	960	0.55	0.08	<0.01	0.02	<0.02	42.1
1420D_ARD05	CARBONACEOUS	*	0.13	12	4.6	3.4	100	1.72	0.61	0.28	0.13	0.05	230
1420D_ARD06	REMAINING	*	0.01	5.9	11.4	0	270	1.01	0.16	0.67	0.02	0.04	54.9
1420D_ARD07	REMAINING	*	0.01	7.29	12.3	0	350	1.72	0.34	2.77	0.04	0.1	99.5
1420D_ARD08	COAL		0.09	4.54	3.2	1.7	40	1.76	0.78	47.7	0.08	0.24	16.6
1420D_ARD09	REMAINING		0.16	8.02	1.5	0.4	320	1.7	0.28	7.79	0.06	0.13	61
1420D_ARD10	COAL		0.3	2.34	0.9	0.5	10	2.63	0.21	>50	0.07	0.12	5.28
1420D_ARD11	REMAINING	*	0.03	6.04	6	0	310	1.3	0.19	1.15	0.04	0.07	54.6
1421D_ARD01	CLAY AND SOIL	*	0.05	5.82	3.4	0	130	0.81	0.28	0.06	0.07	<0.02	18
1421D_ARD02	REMAINING	*	0.12	7.71	1.9	0	190	1.33	0.31	0.01	0.08	<0.02	12.35
1421D_ARD03	CARBONACEOUS	*	0.02	10.75	8.1	10.4	150	2.03	0.51	0.52	0.2	0.02	92.7
1421D_ARD04	CARBONACEOUS	*	0.04	13.75	1.4	0.5	190	2.86	0.44	1.84	0.19	1.94	63.2
1421D_ARD05	COAL		0.07	1.18	0.9	0.6	30	1.04	0.19	>50	0.09	0.04	14.4
1421D_ARD06	REMAINING	*	0.03	7.81	7.9	0	410	1.55	0.35	2.34	0.05	0.14	68.7
1421D_ARD07	COAL		0.12	5.01	3.8	1.8	70	1.71	0.87	44.1	0.07	0.29	15.7
1422D_ARD01	REMAINING	*	0.09	4.73	7.4	0	230	1.18	0.15	<0.01	0.02	<0.02	58.7
1422D_ARD02	CARBONACEOUS		0.41	8.79	6.1	3.4	360	7.73	0.51	10.9	0.65	0.81	103.5
1422D_ARD03	COAL		0.04	0.9	2.4	2.2	110	2.25	0.12	>50	0.11	0.04	11.45
1422D_ARD04	REMAINING	*	0.05	5.86	1.9	0	340	1.75	0.26	1.4	0.05	0.08	50.3
1423D_ARD01	REMAINING	*	0.07	5.2	7.5	0	160	1.16	0.28	0.01	0.04	<0.02	31.1
1423D_ARD03	REMAINING	*	0.04	4.8	1.5	0	410	1.04	0.1	<0.01	0.01	0.02	41.2
1423D_ARD04	CARBONACEOUS		0.15	9.43	3.7	1.2	590	4.56	0.63	5.76	0.05	0.37	71.6
1423D_ARD05	CARBONACEOUS	*	0.09	10.05	5.2	2.7	520	4.25	0.61	4.77	0.06	0.23	96.1
1423D_ARD06	CARBONACEOUS		1.93	4.07	5.8	3.5	80	5.67	0.43	>50	0.07	0.17	43.8
1423D_ARD07	REMAINING	*	0.02	6.43	13.2	0	360	1.81	0.27	2.1	0.02	0.11	77.1
1423D_ARD08	REMAINING	*	0.01	6.21	12.4	0	380	1.53	0.18	1.71	0.03	0.09	56.8
1423D_ARD09	COAL		0.17	0.91	1.9	1.6	40	3.42	0.09	>50	0.1	0.04	26
1423D_ARD10	REMAINING	*	0.1	10.2	1.8	0	160	0.72	0.52	3.48	0.54	0.06	52.9
1423D_ARD11	COAL		0.04	2.32	2.3	1.2	40	3.19	0.34	>50	0.11	0.05	21.6
1423D_ARD12	REMAINING	*	0.03	8.35	1.6	0	470	2.26	0.46	1.24	0.07	0.07	71
1423D_ARD13	REMAINING	*	0.04	6.38	3.4	0	420	1.99	0.39	2.42	0.05	0.08	73
1423D_ARD14	REMAINING	*	0.11	6.27	3.3	0	380	2.29	0.33	2.42	0.05	0.12	80.3
1424D_ARD01	REMAINING	*	0.07	8.49	7.6	0	480	2.31	0.26	0.08	0.23	0.05	148
1424D_ARD02	CARBONACEOUS		0.15	5.1	0.8	0.1	150	1.65	0.47	21.5	0.43	0.09	60.5

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	C-IR07	ME-MS61	ME-MS61	ME-MS61
		Element	Ag	Al	As	As	Ba	Be	Bi	C	Ca	Cd	Ce
		Units	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm
		Mean Sediment	0.057	7.2	7.7	7.7	460	2	0.4	0	6.6	0.17	83
Client Sample ID	SRK Group	LOD	0.01	0.01	0.2	0.2	10	0.05	0.01	0	0.01	0.02	0.01
1424D_ARD03	COAL		0.1	2.27	9.2	10.1	150	1.75	0.22	46.9	0.21	0.04	26.3
1424D_ARD04	CARBONACEOUS		0.23	4.1	69.2	68.6	180	1	0.22	27.9	2.18	0.1	42.3
1424D_ARD05	REMAINING	*	0.09	7.57	5	0	500	1.04	0.17	1.48	3.19	0.08	44.3
1424D_ARD06	REMAINING	*	0.09	7.91	6.9	0	520	1.74	0.26	1.69	1.01	0.14	59.2
1424D_ARD07	REMAINING	*	0.04	8.09	14.6	0	520	1.52	0.21	2.9	2.7	0.13	48.9
1424D_ARD08	REMAINING		0.06	4.19	4.4	3	240	2.41	0.14	27.7	2.31	0.07	28.4
1424D_ARD09	COAL		0.21	6.67	4.9	3.3	240	1.95	0.3	22	0.32	0.14	35.1
1424D_ARD10	REMAINING	*	0.06	6.35	6.4	0	410	2.03	0.39	1.73	0.08	0.11	79.3
1424D_ARD11	REMAINING	*	0.02	4.36	3.5	0	370	0.75	0.09	0.24	0.05	0.03	30.4
1424D_ARD12	CARBONACEOUS		0.15	10.15	22.7	15.6	400	4.56	0.68	9.28	0.17	0.24	63.6
1424D_ARD13	COAL		0.05	1.38	0.6	0.5	30	0.81	0.17	>50	0.1	0.05	13.05
1424D_ARD14	COAL		0.25	3.93	2.6	0.6	80	3.99	0.51	48.3	0.13	0.06	39.7
1424D_ARD15	CARBONACEOUS	*	0.03	6.05	4.2	3.1	360	2.56	0.43	2.64	0.05	0.12	89.8
1425D_ARD01	SAND AND GRAVEL	*	0.05	5.2	7.7	0	1330	1.15	0.25	0.01	0.02	0.02	48.6
1425D_ARD02	REMAINING	*	0.71	4.17	8.9	0	300	0.44	0.2	0.05	0.07	0.02	11.3
1425D_ARD03	COAL	*	0.07	10.15	11.5	10.2	100	0.88	0.4	0.13	0.2	0.02	8.93
1425D_ARD04	COAL		0.32	7.18	22.4	15.4	110	15	0.54	18.35	0.51	0.08	244
1425D_ARD05	REMAINING	*	0.05	5.69	8.6	0	370	1.65	0.16	0.51	0.02	0.06	58.8
1425D_ARD06	REMAINING	*	0.03	3.85	3.7	0	410	0.78	0.18	0.11	0.02	0.02	26.1
1425D_ARD07	COAL		0.07	4.01	1.5	0.7	50	3.1	0.69	>50	0.07	0.22	10.5
1425D_ARD08	REMAINING	*	<0.01	4.69	1	0	300	1.1	0.14	0.43	0.03	0.03	33.8
1427D_ARD01	SAND AND GRAVEL	*	<0.01	2.27	4.3	0	110	0.65	0.12	0.02	0.02	<0.02	34.8
1427D_ARD02	CLAY AND SOIL	*	0.03	10.15	8.4	0	250	1.77	0.37	0.01	0.1	0.03	28.9
1427D_ARD03	REMAINING	*	0.02	8.96	4.5	0	440	1.37	0.3	0.02	0.15	0.03	37.2
1427D_ARD04	REMAINING		1	5.54	17.2	15.1	230	2.32	0.33	5.09	1.55	0.17	67.1
1427D_ARD05	REMAINING	*	0.07	7.55	4.3	0	380	2.69	0.43	3.62	0.12	0.11	85.2
1427D_ARD06	REMAINING	*	0.03	5.15	3.2	0	240	1.2	0.15	1.6	1.53	0.07	55.6
1427D_ARD07	COAL		0.17	7.58	7.5	5.7	120	1.15	0.28	12	0.45	0.09	41.9
1427D_ARD08	REMAINING	*	0.07	8.48	12.2	0	410	2.27	0.54	4.23	0.1	0.13	89.4
1427D_ARD09	REMAINING	*	0.1	9.58	7.5	0	90	2.05	1.4	2.5	0.21	0.37	79.4
1427D_ARD10	COAL		0.07	6.74	18.5	13.8	370	1.69	0.31	41.7	0.07	0.09	67.3
1426D_ARD01	REMAINING	*	0.08	6.87	1.4	*	170	0.76	0.23	0.02	0.03	0.02	28.5
1426D_ARD02	COAL	*	0.01	9.3	2	1	1790	1.48	0.23	0.15	0.18	0.02	111
1426D_ARD03	REMAINING	*	0.07	8.81	27.2	*	200	4.76	0.3	0.67	0.27	1.7	145.5
1426D_ARD04	REMAINING	*	0.08	8.3	4.9	*	390	2.57	0.66	1.77	0.15	0.18	89.3
1426D_ARD05	CARBONACEOUS		0.09	5.08	5.8	3.9	130	2	0.31	18.3	0.21	0.15	32.5
1426D_ARD06	REMAINING		0.25	4.69	1.9	0.9	150	2.18	0.19	22.6	0.29	0.04	41.7
1426D_ARD07	COAL		0.08	6.6	2.1	1.1	180	1.95	0.32	16.75	0.3	0.1	62.5
1426D_ARD08	COAL		0.14	4.68	1.2	0.6	80	1	0.37	25.5	0.1	0.17	25.3
1426D_ARD09	COAL		0.09	7.34	4.4	2.6	360	2.51	0.39	12.2	0.07	0.15	46.8
1426D_ARD10	REMAINING	*	0.07	5.93	9.2	*	350	1.15	0.22	1.01	0.05	0.06	54.6
1426D_ARD11	REMAINING		0.13	7.27	122	109	290	3.79	0.93	16.45	0.08	0.18	96.5
1426D_ARD12	COAL		0.13	4.11	3	1.6	50	1.49	0.83	33.5	0.11	0.18	19.55
1426D_ARD13	COAL		0.03	2.03	1.4	1.4	20	0.84	0.23	38.5	0.07	0.02	6.52
1426D_ARD14	REMAINING	*	0.1	5.09	1.6	*	310	1.48	0.24	1.1	0.04	0.05	50.4

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	C-IR07	ME-MS61	ME-MS61	ME-MS61
		Element	Ag	Al	As	As	Ba	Be	Bi	C	Ca	Cd	Ce
		Units	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm
		Mean Sediment	0.057	7.2	7.7	7.7	460	2	0.4	0	6.6	0.17	83
Client Sample ID	SRK Group	LOD	0.01	0.01	0.2	0.2	10	0.05	0.01	0	0.01	0.02	0.01
1435D_ARD01	SAND AND GRAVEL	*	0.01	1.83	2.9	*	130	0.73	0.09	0.02	0.04	<0.02	25
1435D_ARD02	CLAY AND SOIL	*	<0.01	9.33	3.9	*	180	0.57	0.44	0.02	0.06	<0.02	15.95
1435D_ARD03	CLAY AND SOIL	*	0.05	8.6	5.3	*	1190	1.71	0.29	0.05	0.09	<0.02	69.5
1435D_ARD04	REMAINING	*	0.07	7.96	5.3	*	350	4.46	0.38	1.68	0.2	0.45	84.8
1435D_ARD05	REMAINING		0.1	7.75	3.1	1.6	140	4.64	0.58	14.3	0.18	0.16	21.1
1435D_ARD06	COAL	*	0.08	8.8	4.8	2.3	420	3.36	0.47	3.18	0.08	0.13	101.5
1435D_ARD07	REMAINING	*	0.05	6.94	6.1	*	310	1.69	0.21	1.64	0.7	0.07	89.3
1435D_ARD08	COAL		0.05	4.5	5.3	3.6	100	2.38	0.63	19.75	0.13	0.13	71.5
1435D_ARD09	REMAINING		0.11	9.24	2.8	0.6	470	3.17	0.62	5.18	0.07	0.12	84.3
1435D_ARD10	CARBONACEOUS	*	0.09	8.86	8.3	5.8	350	2.17	0.57	3.13	0.08	0.17	86
1435D_ARD11	CARBONACEOUS		0.32	5.36	3.1	1.7	50	1.98	1	24.8	0.09	0.26	30.6
1435D_ARD12	COAL		0.1	6.68	3.4	2	190	2.16	0.41	24.1	0.09	0.13	69.9
1435D_ARD13	REMAINING		0.02	0.57	0.4	0.3	10	2.07	0.09	28.3	0.12	<0.02	11.7
1435D_ARD14	REMAINING	*	0.05	6.33	2.5	*	350	1.77	0.41	0.84	0.05	0.09	78.5
1437R_ARD01	REMAINING	*	0.13	9.67	6.9	*	350	2.26	0.4	0.03	0.06	<0.02	124
1437R_ARD02	REMAINING	*	0.13	2.19	1.2	*	60	0.22	0.16	0.01	0.01	<0.02	12
1437R_ARD03	REMAINING	*	0.02	7.8	3.8	*	120	1.18	0.16	0.02	0.09	<0.02	55.8
1437R_ARD04	REMAINING	*	0.08	7.65	7.6	*	700	3.55	0.18	0.98	0.93	0.22	66.1
1437R_ARD05	REMAINING	*	0.03	7.99	11.5	*	440	1.63	0.18	1.33	1.36	0.09	46.3
1437R_ARD06	CARBONACEOUS	*	0.09	7.81	11.3	7.8	280	2.29	0.62	3.26	6.25	0.13	88.1
1437R_ARD07	COAL		0.06	6.29	4.1	2.3	260	1.87	0.29	23.1	0.41	0.1	44.2
1437R_ARD08	CARBONACEOUS		0.08	7.28	3.2	3	180	1.63	0.3	14	0.58	0.11	48.9
1437R_ARD09	CARBONACEOUS		0.06	4.45	2.2	0.9	90	1.27	0.32	21	0.15	0.08	40.9
1437R_ARD10	COAL		0.07	6.39	5.3	3.4	150	3.03	0.4	23.4	0.3	0.08	52.8
1437R_ARD11	COAL		0.09	5.46	8.5	5.4	160	3.93	0.52	21.7	0.11	0.1	49.2
1438R_ARD01	REMAINING	*	0.01	3.89	5.5	*	350	0.83	0.17	0.08	0.05	<0.02	26.3
1438R_ARD02	REMAINING	*	0.08	8.24	6.2	*	370	1.78	0.38	0.06	0.03	0.02	65.6
1438R_ARD03	REMAINING	*	0.05	5.16	2.4	*	90	0.42	0.23	0.02	0.02	0.02	14.2
1438R_ARD04	REMAINING	*	0.03	7.59	8	*	270	1.09	0.16	0.02	0.1	0.02	70.1
1438R_ARD05	REMAINING	*	0.11	7.87	8.6	*	830	1.51	0.18	1.12	1.16	0.1	47.1
1438R_ARD06	REMAINING	*	0.08	8.6	5.2	*	240	2.06	0.3	1.23	0.59	0.13	69.7
1438R_ARD07	COAL	*	0.1	8.56	10.4	7.6	380	2.38	0.52	3.17	0.77	0.19	92.6
1438R_ARD08	COAL		0.1	7.59	2.3	0.8	150	1.39	0.29	11.4	0.59	0.1	37.9
1439R_ARD01	REMAINING	*	0.04	7.06	6.6	*	350	1.46	0.28	0.4	1.65	0.02	69.3
1439R_ARD02	REMAINING	*	0.02	9.34	1.7	*	220	0.6	0.29	0.05	0.09	<0.02	50.1
1439R_ARD03	REMAINING	*	0.05	7.98	8.8	*	410	2.97	0.2	1.34	0.46	0.11	49.8
1439R_ARD04	REMAINING	*	0.12	8.14	5.6	*	350	2.15	0.29	1.77	0.82	0.15	75.3
1439R_ARD05	COAL	*	0.08	6.25	12.4	8.7	250	1.42	0.15	2.54	5.77	0.07	53.2
1439R_ARD06	COAL		0.08	7.18	1.4	1.5	130	1.72	0.38	19.5	0.33	0.11	35.6
1439R_ARD07	CARBONACEOUS		0.2	6.35	16.1	17.6	130	2.77	0.4	25.9	0.45	0.09	58
1439R_ARD08	CARBONACEOUS		0.04	2.38	18.4	7.7	30	1.87	0.13	21.4	0.13	0.02	10.2
1439R_ARD09	COAL		0.1	5.07	10.4	6.5	60	2.26	0.83	21.6	0.11	0.18	24.1
1440R_ARD01	CLAY AND SOIL	*	0.05	2.58	3	*	140	0.66	0.16	0.1	0.07	<0.02	30
1440R_ARD02	REMAINING	*	0.05	2.71	2.5	*	140	0.65	0.12	0.04	0.02	<0.02	17.75
1440R_ARD03	REMAINING	*	0.05	7.01	3.6	*	690	1.25	0.12	1.72	2.69	0.08	54

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	C-IR07	ME-MS61	ME-MS61	ME-MS61
		Element	Ag	Al	As	As	Ba	Be	Bi	C	Ca	Cd	Ce
		Units	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm
		Mean Sediment	0.057	7.2	7.7	7.7	460	2	0.4	0	6.6	0.17	83
Client Sample ID	SRK Group	LOD	0.01	0.01	0.2	0.2	10	0.05	0.01	0	0.01	0.02	0.01
1440R_ARD04	REMAINING	*	0.06	7.61	5.3	*	700	1.5	0.29	1.3	2.07	0.11	53.3
1440R_ARD05	REMAINING	*	0.11	8.9	10	*	390	2.45	0.47	2.17	0.33	0.14	97.4
1440R_ARD06	COAL	*	0.08	6.96	15.9	13.3	350	1.77	0.25	2.89	0.73	0.08	71.3
1440R_ARD07	COAL		0.09	4.77	2.7	1.7	80	1.79	0.41	28.8	0.16	0.1	17.85
1440R_ARD08	REMAINING		0.08	6.95	4.2	2	400	2.58	0.39	8.57	0.16	0.09	73.9
1440R_ARD09	CARBONACEOUS	*	0.08	5.4	7	5.4	320	1.29	0.28	1.71	0.31	0.09	62.7
1440R_ARD10	COAL		0.35	2.39	0.8	0.4	160	0.83	0.29	>50	0.14	0.06	41.8
1347DG_ARD004	CARBONACEOUS	*	0.12	8.21	9.7	6.1	2010	1.51	0.19	1.66	1.2	0.11	55.6
1347DG_ARD006	CARBONACEOUS	*	0.14	12.4	6.6	4.3	220	1.99	0.42	3.83	0.78	0.22	48.9
1347DG_ARD008	REMAINING	*	0.11	8.91	8.4	*	230	1.31	0.27	2.21	5.03	0.12	54.7
1347DG_ARD010	CARBONACEOUS	*	0.12	7.83	7.2	4.1	430	2.01	0.41	3.36	0.08	0.15	90.8
1347DG_ARD011	REMAINING	*	0.12	7.68	13.4	*	420	1.95	0.53	2.57	0.08	0.13	114.5
1347DG_ARD012	CARBONACEOUS	*	0.18	11.55	6.4	2.8	400	2.26	0.82	4.32	0.14	0.25	106.5
1347DG_ARD001	CLAY AND SOIL	*	0.06	3.89	4.3	*	780	1.05	0.28	0.25	0.72	<0.02	55.8
1347DG_ARD002	REMAINING	*	0.1	8.18	8.4	*	460	1.45	0.44	0.03	0.04	<0.02	51.5
1347DG_ARD003	REMAINING	*	0.07	5.7	7.9	*	350	0.62	0.32	0.01	0.03	<0.02	22.6
1347DG_ARD005	REMAINING	*	0.1	8.38	10.7	*	350	1.56	0.26	1.99	1.94	0.15	54.6
1347DG_ARD007	CARBONACEOUS	*	0.13	9.07	12.4	*	430	2.68	0.6	2.51	1.19	0.19	105
75551	CLAY AND SOIL		0.18	7.17	6	0	340	1.62	0.3	0	0.12	0.01	60.4
75552	CLAY AND SOIL		0.1	7.36	5.8	0	280	1.48	0.3	0	0.07	0.01	46.7
75553	CLAY AND SOIL		0.08	6.49	6.9	0	1120	1.3	0.26	0	0.06	0.01	34.2
75554	CLAY AND SOIL		0.1	9.34	7.2	0	230	1.57	0.33	0	0.08	0.01	65.5
75555	CLAY AND SOIL		0.13	9.94	5.7	0	1080	1.84	0.36	0	0.09	0.01	103.5
75556	CLAY AND SOIL		0.15	5.82	6.1	0	110	0.77	0.28	0	0.06	0.01	21.2
75557	REMAINING		0.08	8.09	8.5	0	360	0.7	0.32	0	0.03	0.01	18.75
7558	0		0.1	7	28.1	0	280	1.09	0.58	0	0.04	0.01	17.6
75559	REMAINING		0.07	12.65	13.5	0	540	0.79	0.64	0	0.04	0.01	41
75560	REMAINING		0.29	11.8	4.3	0	280	24.1	0.8	0	0.34	0.01	224
75561	REMAINING		0.14	8.61	13.4	0	410	2.71	0.44	0	0.07	0.13	85.9
75562	REMAINING		0.09	6.47	8.3	0	400	1.54	0.14	0	0.08	0.03	52.9
75563	REMAINING		0.1	6.81	3.9	0	400	2.59	0.32	0	0.05	0.1	91.4
75564	CLAY AND SOIL		0.1	6.34	5.8	0	370	1.72	0.26	0	0.13	0.01	91.6
75565	CLAY AND SOIL		0.11	5.21	5	0	230	1.05	0.21	0	0.04	0.01	31.8
75566	SAND AND GRAVEL		0.08	2.36	3.8	0	140	0.44	0.12	0	0.03	0.01	17.25
75567	CLAY AND SOIL		0.07	6.26	5.8	0	210	1.19	0.26	0	0.06	0.01	50
75568	CLAY AND SOIL		0.09	9.53	7.2	0	250	1.73	0.35	0	0.08	0.01	62
75569	REMAINING		0.05	9.4	4.7	0	150	0.5	0.27	0	0.05	0.01	17.1
75570	REMAINING		0.05	8.49	2.9	0	780	1.43	0.24	0	0.14	0.01	100
75571	REMAINING		0.08	7.85	11	0	260	2.69	0.34	0	0.05	0.01	56.5
75572	REMAINING		0.38	9.14	3.3	0	730	4.69	0.63	0	0.06	0.01	131.5
75573	COAL		0.07	4.7	2	0	170	2.31	0.29	0	0.26	0.09	48
75574	REMAINING		0.1	7.13	4.3	0	350	1.52	0.28	0	0.06	0.1	60.6
75575	REMAINING		0.12	4.94	5	0	300	1.64	0.22	0	0.05	0.04	49.3
C3-4-5	SAND AND GRAVEL		0.07	5.53	4.8	0	310	1.15	0.24	0	0.1	0.01	44.1
C10-11-12	CLAY AND SOIL		0.06	6.05	6.4	0	320	1.42	0.24	0	0.06	0.01	54.3

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	C-IR07	ME-MS61	ME-MS61	ME-MS61
		Element	Ag	Al	As	As	Ba	Be	Bi	C	Ca	Cd	Ce
		Units	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm
		Mean Sediment	0.057	7.2	7.7	7.7	460	2	0.4	0	6.6	0.17	83
Client Sample ID	SRK Group	LOD	0.01	0.01	0.2	0.2	10	0.05	0.01	0	0.01	0.02	0.01
C19-20	CLAY AND SOIL		0.14	9.4	6	0	290	1.72	0.36	0	0.09	0.01	72.7
C23-24	REMAINING		0.15	6.17	6.5	0	170	0.86	0.34	0	0.03	0.01	20.3
C27-28	REMAINING		0.13	6.12	7.4	0	270	0.68	0.32	0	0.03	0.01	22.1
C33-34	REMAINING		0.07	8.4	9.9	0	300	1.65	0.45	0	0.03	0.01	54.1
C42	REMAINING		0.15	6.79	14.7	0	830	2.91	0.42	0	0.07	0.01	112.5
C45-46	COAL		0.09	6.16	12	0	430	3.49	0.41	0	0.11	0.05	90.5
C14-15-16	CLAY AND SOIL		0.2	8.16	6.6	0	350	1.62	0.33	0	0.09	0.01	64.4
C36-37	REMAINING		0.12	9.06	9.2	0	370	2.38	0.5	0	0.06	0.02	138.5
C40-41	REMAINING		0.1	9.2	11.3	0	700	2.47	0.52	0	0.06	0.01	99.7
Alpha_C-0.250mm	COAL		0.19	6.17	1.2	0	90	1.35	0.74	0	0.23	0.21	64.9
Alpha_DLL-0.250mm	COAL		0.04	0.94	0.9	0	10	0.89	0.07	0	0.06	0.08	16.2
Alpha_DU-0.250mm	COAL		0.08	3.87	4.9	0	50	1.62	1.05	0	0.16	0.22	31.1
C_Seam_S1.60+0.250mm	COAL		0.13	13	3.1	0	150	0.88	0.62	0	0.21	0.29	63.6
Seam_C_Roof/Floor+0.250mm	COAL		0.1	8.22	1.7	0	220	2.12	0.49	0	0.25	0.15	60.5
C_Seam-0.250mm_Roof/Floor	COAL		0.13	7.53	1.1	0	250	2.66	0.78	0	0.19	0.22	62.8
Seam_DLL_S1.60+0.25	COAL		0.16	13.85	4.7	0	70	1.11	0.7	0	0.1	0.28	61
Roof/Floor_Seam_DLL	COAL		0.1	7.09	4.1	0	360	2.45	0.37	0	0.07	0.09	81.3
DLL_Seam-0.250mm_Roof/Floor	COAL		0.12	7.48	3.4	0	350	2.68	0.47	0	0.08	0.08	71.8
Seam_DU_S1.60+0.250mm	COAL		0.13	12.35	6.4	0	80	1.19	0.84	0	0.12	0.21	58.2
Seam_DU_+0.250mm_Roof/Floor	COAL		0.17	11.6	9.6	0	110	2.28	0.94	0	0.27	0.27	99.6
DU_Seam-0.250mm_Roof/Floor	COAL		0.17	9.69	25.9	0	260	3	0.83	0	0.3	0.22	96.6
Blended raw coal	COAL		0.37	2.12	1.3	0	30	1.77	0.3	0	0.11	0.06	24.8
201064	C		0.04	1.65	0.9	0.4	20	1.91	0.21		0.07	0.03	12.95
201076	C		0.03	1.43	1	0.7	20	1.9	0.21		0.08	0.03	22.1
201077	C		0.11	8.9	4.8	3.1	110	1.67	0.54		0.09	0.19	30.2
201074	C		0.11	6.95	4.4	3.1	100	1.43	0.39		0.11	0.22	18.05
201085	DU		0.09	3.72	2.4	1.4	40	1.97	0.68		0.09	0.18	14.8
201098	DU		0.06	2.51	2.8	1.1	30	2.11	0.48		0.08	0.11	12.55
201099	DU		0.12	7.1	5.3	3.6	80	1.49	1.09		0.12	0.29	26
201096	DU		0.11	4.02	4.3	3	70	1.87	0.67		0.1	0.17	18.2
201105	DLM/DLL		0.05	2.95	0.9	0.7	30	1.08	0.31		0.21	0.07	12.1
201118	DLM/DLL		0.02	1.25	0.7	0.4	10	1.4	0.22		0.09	0.03	10.1
201119	DLM/DLL		0.18	9.44	4.1	3.2	90	1.02	0.7		0.24	0.2	21.4
201116	DLM/DLL		0.09	3.66	2.5	1.8	100	1.34	1.61		0.13	0.24	12.1

MEMS61 - 4 acid digest

MEMS42 - Aqua regia digest

Samples with TOC > 5% were ashed prior to MEMS61

Aqua regia diegest was carried out on a split of samples with TOC > 5% to capture volatile elements (As, Sb, Se, Te and Tl)

Samples with TOC < 5% were submitted for MEMS61 only (denoted with a " * ")

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61
		Element	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K
		Units	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
		Mean Sediment	14	72	4.2	33	4.1	18	1.7	2.5	0.19	0.044	2
Client Sample ID	SRK Group	LOD	0.1	1	0.05	0.2	0.01	0.05	0.05	0.1	0.005	0.005	0.01
1252D_ARD03	REMAINING		15.5	48	9.63	42.8	3.83	22.9	0.19	4.5	0	0.081	2.28
1252D_ARD04	REMAINING		5.2	18	4.23	11.9	2.91	13.45	0.11	3.8	0	0.044	1.02
1252D_ARD05	COAL		1.7	9	2.19	34.4	1.1	10.05	0.06	2.3	0	0.064	0.17
1252D_ARD07	REMAINING		5	58	17.7	29.5	3.63	24.6	0.18	4.3	0	0.08	1.99
1252D_ARD09	REMAINING		4.9	21	3.99	7.3	1.47	11.05	0.07	2.4	0	0.03	1.96
1252D_ARD10	REMAINING		11	52	11.85	52.4	3.94	26.9	0.17	5.1	0	0.093	1.53
1252D_ARD11	COAL		16.2	63	14.65	32.3	1.61	29.7	0.17	5.6	0	0.121	1.73
1262D_ARD01	SAND AND GRAVEL		8.3	31	2.51	11.9	2.04	7.44	0.07	2.1	0	0.025	0.37
1262D_ARD02	SAND AND GRAVEL		1.7	34	1.4	5.9	0.58	4.22	<0.05	1	0	0.013	0.12
1262D_ARD03	REMAINING		2.1	23	4.71	9.1	0.75	13.1	0.07	3.2	0	0.043	1.49
1262D_ARD04	CARBONACEOUS		3.2	51	8.12	6.1	5.22	7.66	0.13	1.8	0	0.018	1.52
1262D_ARD05	COAL		32.2	62	5.23	105.5	2.04	29.2	0.2	7.4	0	0.129	0.62
1277D_ARD01	CLAY AND SOIL		9.1	42	3.62	14.9	2.8	11.2	0.12	2.5	0	0.037	0.45
1277D_ARD02	SAND AND GRAVEL		10.6	44	4.86	18.1	3.06	13.9	0.09	3.3	0	0.045	0.63
1277D_ARD03	CLAY AND SOIL		10.2	33	8.3	36.6	8.05	22.7	0.2	4.9	0	0.086	0.67
1277D_ARD04	REMAINING		3	50	9.93	84.4	0.81	25.1	0.17	5	0	0.096	2.01
1277D_ARD05	REMAINING		2.1	33	7.49	16	0.8	20.3	0.11	4.2	0	0.086	1.57
1277D_ARD10	REMAINING		3.6	36	7.87	8.8	0.65	14.7	0.08	3.8	0	0.037	1.56
1277D_ARD11	REMAINING		5.5	21	2.8	4.2	0.39	8.98	<0.05	2	0	0.021	1.77
1326D_ARD01	CLAY AND SOIL		16.5	56	6.47	23.1	3.6	18.35	0.11	3.8	0	0.061	0.7
1326D_ARD02	CLAY AND SOIL		7.6	54	6.04	20.6	3.5	17.25	0.11	3.6	0	0.056	0.6
1326D_ARD03	SAND AND GRAVEL		7.2	46	4.43	17.5	3.16	14	0.1	3	0	0.046	0.76
1326D_ARD04	SAND AND GRAVEL		19.1	58	6.52	26.7	3.91	22.6	0.17	3.9	0	0.068	1.14
1326D_ARD05	REMAINING		1.3	59	3.27	9.8	6.21	27.9	0.15	5.2	0	0.069	0.66
1327D_ARD01	SAND AND GRAVEL		3.6	41	2.77	12.7	1.95	8.74	0.06	1.9	0	0.028	0.39
1327D_ARD03	COAL		10	55	12	27.1	1.02	26.2	0.14	5.2	0	0.086	2.11
1336D_ARD02	CARBONACEOUS		0.6	21	2.84	2.6	0.29	10.4	<0.05	2.1	0	0.019	1.42
1336D_ARD03	REMAINING		0.9	24	2.68	11.2	0.97	10.6	0.06	1.9	0	0.031	1.39
1337DG_ARD01	SAND AND GRAVEL		2.7	38	1.66	6.7	1.59	4.93	<0.05	1.3	0	0.017	0.16
1337DG_ARD02	REMAINING		49	23	3.86	11.9	5.84	14.35	0.14	3.9	0	0.047	0.8
1337DG_ARD03	COAL		5	5	2.43	50.8	1.17	27.3	0.05	5.2	0	0.083	0.53
1339DG_ARD01	REMAINING		11.4	40	3.69	17.1	2.17	10	0.11	2.5	0	0.039	0.39
1339DG_ARD02	REMAINING		1.7	52	3.83	8.5	3.91	22.8	0.17	4.5	0	0.049	0.42
1339DG_ARD03	CARBONACEOUS		30.3	37	10.35	48.6	3.06	26.6	0.18	5.4	0	0.103	1.58
1339DG_ARD04	REMAINING		6.9	41	7.75	9.2	1.94	16.5	0.11	4.8	0	0.045	1.8
1339DG_ARD05	REMAINING		11.8	52	9.94	20.3	3.19	20.6	0.15	5.4	0	0.087	1.92
1339DG_ARD06	REMAINING		6.2	57	1.15	5.5	21.9	7.27	0.4	1.8	0	0.027	0.37
1349D_ARD03	REMAINING		2	50	3.67	4.6	0.56	10.75	0.1	2.4	0	0.03	0.15
1350D_ARD01	SAND AND GRAVEL		2.8	39	1.75	8.5	2.21	6.26	0.07	1.5	0	0.022	0.12
1350D_ARD02	REMAINING		3.4	50	2.24	12.5	2.8	13.95	0.07	2.9	0	0.065	0.15
1350D_ARD03	REMAINING		2.3	56	4.14	15	8.86	26.2	0.15	5.5	0	0.084	0.78
1350D_ARD04	COAL		1.1	10	1.57	62.2	0.95	25.7	0.58	6.8	0	0.128	0.15
1361D_ARD01	REMAINING		11.6	45	4.99	17	2.61	15.4	0.11	3.1	0	0.05	0.61
1361D_ARD02	REMAINING		2.3	57	1.34	5	0.91	4.11	<0.05	1.2	0	0.016	0.12
1362D_ARD01	REMAINING		7.2	33	3.63	13.3	2.42	12.1	0.11	2.9	0	0.039	0.38

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61
		Element	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K
		Units	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
		Mean Sediment	14	72	4.2	33	4.1	18	1.7	2.5	0.19	0.044	2
Client Sample ID	SRK Group	LOD	0.1	1	0.05	0.2	0.01	0.05	0.05	0.1	0.005	0.005	0.01
1362D_ARD02	REMAINING		3.4	60	1.41	7.7	3.24	19.5	0.07	3.7	0	0.067	0.08
1362D_ARD03	REMAINING		0.8	26	1.19	3.3	0.3	8.63	<0.05	2.3	0	0.022	0.09
1362D_ARD04	REMAINING		2.7	46	6.93	16.2	7.44	23	0.17	5.2	0	0.077	0.84
1362D_ARD05	REMAINING		8.5	6	3	21.7	3.51	24.7	0.19	7.3	0	0.081	0.19
1362D_ARD06	COAL		6.8	10	1.36	21	0.55	14.75	0.06	4.5	0	0.054	0.2
1252D_ARD08	REMAINING		4.7	19	4.26	4.2	0.86	10.05	0.05	2.4	0	0.026	1.74
1336D_ARD01	REMAINING		1.3	21	3.29	3.8	0.52	12.55	<0.05	2.5	0	0.03	1.2
1339DG_ARD08	REMAINING		5	36	6.46	8.6	0.9	13.65	0.08	2.9	0	0.038	1.53
1349D_ARD01	CLAY AND SOIL		11.2	61	6.78	23.2	4.01	24.5	0.13	3.8	0	0.081	1.27
1349D_ARD02	REMAINING		7	59	5.96	22.1	3.41	23	0.11	4.1	0	0.08	0.41
1361D_ARD03	REMAINING		2.1	24	3.95	4.3	1.08	10.4	0.06	2.5	0	0.027	1.53
1406D_ARD01	CLAY AND SOIL	*	8.3	48	3.9	19.6	3.28	15.95	0.12	4.1	0	0.052	0.53
1406D_ARD02	REMAINING	*	17.9	44	5.92	36.8	4.58	18.45	0.16	3.9	0	0.057	1.99
1406D_ARD03	REMAINING	*	10.6	43	6.1	42.7	2.47	19.8	0.13	3.9	0	0.057	2.07
1406D_ARD04	REMAINING	*	6	36	4.91	12.2	2.08	12.65	0.12	4.3	0	0.046	0.97
1406D_ARD06	COAL		1.9	10	2.34	28.9	1.07	22	0.13	5.4	0.13	0.08	0.47
1406D_ARD07	REMAINING	*	5.3	50	11.7	15.8	1.72	16.95	0.12	4.2	0	0.06	1.77
1406D_ARD08	REMAINING	*	4.9	47	2.8	4.2	0.33	7.82	0.09	2.2	0	0.02	1.61
1406D_ARD09	COAL		5	10	0.2	12.2	0.86	7.18	0.07	1.9	0.064	0.035	0.05
1406D_ARD10	REMAINING	*	1.8	46	10.85	8.5	0.96	11.75	0.09	3.2	0	0.031	1.23
1411D_ARD01	CLAY AND SOIL	*	9	42	4.12	16.1	2.49	13.05	0.12	3	0	0.042	0.61
1411D_ARD02	REMAINING	*	1.7	47	6.12	10	2.12	23.9	0.11	5.3	0	0.054	1.17
1411D_ARD04	REMAINING	*	8.9	63	10.95	43.5	1.2	27.8	0.19	6.7	0	0.107	1.71
1411D_ARD05	REMAINING	*	6	59	7.69	14.7	1.73	17.35	0.14	5.5	0	0.052	1.8
1411D_ARD06	CARBONACEOUS		18.3	43	9.57	61.8	1.1	25.7	0.24	5.2	0.161	0.096	1.47
1411D_ARD07	COAL		2.3	10	<0.05	9.8	0.41	5.29	<0.05	1	<0.005	0.022	0.01
1413D_ARD02	SAND AND GRAVEL	*	5	95	3.81	20.1	7.6	16.95	0.16	3.6	0	0.102	0.2
1413D_ARD03	REMAINING	*	1.3	53	8.29	11.9	1.42	22.4	0.17	5.2	0	0.047	1.32
1413D_ARD04	REMAINING	*	42.6	29	7.22	18.1	7.12	12.5	0.57	2.9	0	0.081	0.66
1413D_ARD05	COAL		1.9	6	1.72	12.1	1.16	16.75	0.16	4.5	0.15	0.061	0.27
1413D_ARD06	REMAINING	*	3.1	53	14.2	24.4	1.48	22.8	0.15	4.7	0	0.084	2.03
1413D_ARD07	REMAINING	*	4.2	36	4.28	7.7	1.29	13.95	0.11	3.2	0	0.034	1.76
1413D_ARD08	COAL		1.7	4	0.28	11.6	3.13	9.58	0.14	1.6	0.012	0.037	0.03
1415D_ARD01	SAND AND GRAVEL	*	4.1	73	1.63	9.3	2	5.17	0.1	1.4	0	0.018	0.17
1415D_ARD02	CLAY AND SOIL	*	11.6	70	8.21	33.5	4.81	28	0.18	5	0	0.091	1.59
1415D_ARD03	REMAINING	*	1.5	69	2.42	8	5.58	22.9	0.13	4.7	0	0.055	0.31
1415D_ARD04	COAL		26	16	1.73	9.2	0.44	14.55	0.08	1.5	0.033	0.023	0.53
1415D_ARD05	COAL		11.4	5	0.13	7.5	1.34	8.17	0.06	1.2	0.018	0.023	0.02
1415D_ARD06	REMAINING	*	4.3	71	6.87	11.5	1.38	14.05	0.14	4.6	0	0.042	1.42
1415D_ARD07	REMAINING	*	5.5	53	9.37	14.7	1.91	18.2	0.19	4.6	0	0.052	1.66
1418D_ARD01	REMAINING	*	8.4	61	1.45	12.8	3.15	17.8	0.13	4.4	0	0.083	0.19
1418D_ARD02	REMAINING	*	2	44	6.68	28.9	1.17	19.85	0.14	5.8	0	0.067	0.78
1418D_ARD03	COAL		13.8	7	0.25	13	0.07	6.99	0.06	1.2	0.044	0.023	0.02
1419D_ARD01	CLAY AND SOIL	*	5.3	53	1.81	14.2	2.39	17.05	0.09	4	0	0.067	0.13
1419D_ARD02	REMAINING	*	1.4	82	2.8	15.7	6.49	18.75	0.13	5.3	0	0.053	0.13

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61
		Element	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K
		Units	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
		Mean Sediment	14	72	4.2	33	4.1	18	1.7	2.5	0.19	0.044	2
Client Sample ID	SRK Group	LOD	0.1	1	0.05	0.2	0.01	0.05	0.05	0.1	0.005	0.005	0.01
1419D_ARD03	CLAY AND SOIL	*	1.1	40	5.27	13.6	1.46	25.5	0.1	7.2	0	0.04	0.48
1419D_ARD04	REMAINING	*	5.6	24	9.01	40.7	2.33	23.4	0.38	5.8	0	0.101	0.89
1419D_ARD05	REMAINING	*	12.7	53	10.7	24.9	2.66	18.5	0.19	5.8	0	0.062	1.83
1419D_ARD06	COAL		11.2	4	0.12	7	0.08	3.58	<0.05	0.7	0.009	0.012	0.01
1419D_ARD07	REMAINING	*	5.6	60	9.72	16.4	1.24	17.45	0.17	4.3	0	0.056	1.56
1419D_ARD08	REMAINING	*	7.9	80	12.2	28.1	1.54	20.6	0.18	5.1	0	0.074	1.6
1419D_ARD09	COAL		2.5	5	0.09	17.6	0.4	5.99	<0.05	1	0.018	0.026	0.01
1419D_ARD10	REMAINING	*	5.6	63	10.7	22.8	1.34	21.1	0.19	5.1	0	0.071	1.92
1420D_ARD01	SAND AND GRAVEL	*	8.8	47	3.54	13	2.01	9.44	0.14	2.4	0	0.027	0.43
1420D_ARD02	CLAY AND SOIL	*	11.6	81	7.92	31.5	4.16	29.8	0.18	5.1	0	0.103	0.74
1420D_ARD03	REMAINING	*	10.9	45	0.39	8.5	0.64	15.55	0.07	3.4	0	0.047	0.02
1420D_ARD04	REMAINING	*	1.9	26	0.84	3.3	0.47	11.4	0.09	2	0	0.025	0.08
1420D_ARD05	CARBONACEOUS	*	3.8	14	1	21.3	2.35	33.5	0.29	9.8	0.128	0.102	0.12
1420D_ARD06	REMAINING	*	6	38	4.59	9.1	0.65	14.95	0.08	3.9	0	0.037	1.15
1420D_ARD07	REMAINING	*	5.2	53	8.83	17	1.17	21.5	0.15	5.1	0	0.056	1.63
1420D_ARD08	COAL		12.1	14	0.82	43	0.28	12.85	0.07	3.7	0.08	0.081	0.08
1420D_ARD09	REMAINING		1.9	33	8.87	14.2	0.96	22.6	0.16	3.8	0.116	0.072	1.42
1420D_ARD10	COAL		10.4	9	0.08	7	0.49	9.63	0.05	1.7	0.011	0.037	0.01
1420D_ARD11	REMAINING	*	3.8	48	7.91	9	0.91	16.45	0.1	4.6	0	0.044	1.53
1421D_ARD01	CLAY AND SOIL	*	5.8	44	2.48	17.8	1.65	15.45	0.08	3.8	0	0.045	0.09
1421D_ARD02	REMAINING	*	10.6	45	2.44	17.3	1.64	19.65	0.08	4.4	0	0.06	0.06
1421D_ARD03	CARBONACEOUS	*	6.6	6	1.25	23.7	2.6	26.2	0.22	6.9	0.229	0.116	0.1
1421D_ARD04	CARBONACEOUS	*	6.4	11	1.61	25.5	0.41	34.2	0.09	6.8	0.229	0.076	0.19
1421D_ARD05	COAL		4.4	4	0.08	12.5	1.2	4.93	0.06	1.5	0.006	0.027	0.01
1421D_ARD06	REMAINING	*	4.3	45	9.03	16.6	0.94	22.4	0.12	4.5	0	0.06	1.78
1421D_ARD07	COAL		11.2	15	0.84	48.9	0.31	14.85	0.06	3.9	0.087	0.094	0.12
1422D_ARD01	REMAINING	*	2.6	30	7.46	4.7	1.14	12.95	0.12	3.4	0	0.035	1.07
1422D_ARD02	CARBONACEOUS		2	26	2.1	26.4	1.11	30	0.26	5.9	0.849	0.083	0.56
1422D_ARD03	COAL		5.3	4	<0.05	4.8	0.56	3.83	<0.05	0.9	0.041	0.015	0.01
1422D_ARD04	REMAINING	*	3.7	40	8.31	11.8	0.56	17.3	0.12	4.5	0	0.045	1.45
1423D_ARD01	REMAINING	*	7.3	40	3.43	13.6	3.08	14.35	0.13	3.2	0	0.043	0.34
1423D_ARD03	REMAINING	*	1.3	26	2.37	3.9	0.36	13.4	0.11	2.4	0	0.024	1.7
1423D_ARD04	CARBONACEOUS		12	44	10.8	56.6	0.72	27.5	0.22	4.6	0.068	0.089	1.45
1423D_ARD05	CARBONACEOUS	*	10.8	58	9.95	53.6	1.29	27.9	0.17	5.1	0.091	0.088	1.39
1423D_ARD06	CARBONACEOUS		55.4	15	2.65	36	0.23	13.2	0.12	2.4	0.052	0.067	0.24
1423D_ARD07	REMAINING	*	15	40	6	10.8	0.78	18.15	0.13	5.1	0	0.047	1.61
1423D_ARD08	REMAINING	*	10.2	40	5.77	7.9	0.94	15.95	0.11	3.7	0	0.042	1.72
1423D_ARD09	COAL		2.9	3	0.19	4	1.08	3.72	0.08	1.1	0.018	0.01	0.02
1423D_ARD10	REMAINING	*	4.3	2	3.12	5.8	5.76	21.2	0.21	6.1	0	0.046	0.22
1423D_ARD11	COAL		9.7	5	0.12	10.5	0.32	9.91	0.07	1.8	0.019	0.041	0.02
1423D_ARD12	REMAINING	*	6.8	53	17.2	17.4	1.04	23.4	0.16	4	0	0.065	2.05
1423D_ARD13	REMAINING	*	4.4	60	9.83	15.3	2.31	18.05	0.17	3.9	0	0.053	1.7
1423D_ARD14	REMAINING	*	5.3	53	9.73	15.6	1.31	18.5	0.16	4.7	0	0.052	1.68
1424D_ARD01	REMAINING	*	10.1	34	10.4	40.4	3.05	20.3	0.27	4.5	0	0.055	1.11
1424D_ARD02	CARBONACEOUS		1.3	3	1.06	6.3	0.68	13.4	0.16	4.2	0.01	0.05	0.14

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61
		Element	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K
		Units	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
		Mean Sediment	14	72	4.2	33	4.1	18	1.7	2.5	0.19	0.044	2
Client Sample ID	SRK Group	LOD	0.1	1	0.05	0.2	0.01	0.05	0.05	0.1	0.005	0.005	0.01
1424D_ARD03	COAL		2.4	3	0.68	11.7	0.44	6.65	0.09	1.3	0.057	0.027	0.11
1424D_ARD04	CARBONACEOUS		4.9	3	1.22	16.7	5.82	9.63	0.26	1.8	0.158	0.035	0.37
1424D_ARD05	REMAINING	*	11.8	43	3.02	23.2	1.85	18.85	0.15	3.3	0	0.048	1.4
1424D_ARD06	REMAINING	*	13.3	43	5.67	35.6	3.86	20.5	0.23	4	0	0.059	1.83
1424D_ARD07	REMAINING	*	10.5	43	5.04	36.7	4.35	18.55	0.21	3.5	0	0.049	1.76
1424D_ARD08	REMAINING		8.2	22	2.74	15.2	2.08	10.5	0.19	1.9	0.056	0.033	0.65
1424D_ARD09	COAL		5	10	1.94	15.4	0.92	17.05	0.14	4.1	0.104	0.064	0.47
1424D_ARD10	REMAINING	*	8.4	56	10.85	18.6	1.81	20.1	0.19	4.8	0	0.062	1.92
1424D_ARD11	REMAINING	*	4.4	35	3.16	4.8	0.56	10.2	0.11	2.1	0	0.023	1.71
1424D_ARD12	CARBONACEOUS		53.7	46	8.46	74.8	1.38	28.9	0.26	6.2	0.16	0.094	1.85
1424D_ARD13	COAL		1	5	0.13	4.6	3.36	6.91	0.38	1.6	0.009	0.023	0.04
1424D_ARD14	COAL		4.2	16	1.42	19	1.27	15.05	0.12	3.1	0.022	0.056	0.12
1424D_ARD15	CARBONACEOUS	*	6.6	54	11.6	17.2	1.05	22.3	0.17	4.2	0.03	0.057	1.8
1425D_ARD01	SAND AND GRAVEL	*	11.5	49	3.97	17.5	3.1	14.5	0.18	3.1	0	0.041	0.78
1425D_ARD02	REMAINING	*	2.7	49	1.25	19.6	4.02	10.25	0.15	2.5	0	0.037	0.09
1425D_ARD03	COAL	*	5.2	7	1.87	21.2	5.43	25	0.18	6	0.077	0.085	0.12
1425D_ARD04	COAL		4	12	1.11	32.6	0.68	24.2	0.55	3.6	0.372	0.085	0.07
1425D_ARD05	REMAINING	*	6.2	38	5.57	9.1	0.76	15.6	0.15	3.9	0	0.04	1.59
1425D_ARD06	REMAINING	*	7.7	31	2.67	3.2	0.66	9.49	0.11	2.3	0	0.024	1.88
1425D_ARD07	COAL		7.9	15	0.58	38.9	0.4	12.25	0.06	3.9	0.041	0.082	0.12
1425D_ARD08	REMAINING	*	1.3	45	4.64	6.4	0.5	12.65	0.11	2.8	0	0.029	1.27
1427D_ARD01	SAND AND GRAVEL	*	4.8	56	1.54	6.8	1.89	5.98	0.1	1.4	0	0.021	0.15
1427D_ARD02	CLAY AND SOIL	*	11	70	6.71	32.9	4.87	28.5	0.21	4.6	0	0.081	1.59
1427D_ARD03	REMAINING	*	7.9	44	6.97	34	3.3	21.4	0.2	4.4	0	0.057	1.03
1427D_ARD04	REMAINING		22.4	26	5.65	17.9	16.3	13.65	0.54	3.1	0.063	0.052	0.98
1427D_ARD05	REMAINING	*	16.2	40	11.55	27.8	2.53	22.2	0.22	3.6	0	0.065	1.78
1427D_ARD06	REMAINING	*	4.9	32	3.53	7.1	2.97	12.9	0.21	4.7	0	0.04	1.04
1427D_ARD07	COAL		2.8	7	2.74	18.3	1.56	19.15	0.18	5.7	0.213	0.059	0.35
1427D_ARD08	REMAINING	*	5.9	57	12.15	26.1	1.47	23.6	0.19	4.7	0	0.073	1.98
1427D_ARD09	REMAINING	*	15.2	24	1.76	61.9	1.24	24.5	0.17	6.1	0	0.133	0.22
1427D_ARD10	COAL		6.7	48	8.61	15.4	1.52	18.55	0.24	2.6	0.038	0.056	1.8
1426D_ARD01	REMAINING	*	6.2	58	1.7	6.7	0.82	22.1	0.11	3.4	*	0.046	0.08
1426D_ARD02	COAL	*	1	35	3.29	11.3	1.59	19.5	0.18	4.1	<0.005	0.031	0.84
1426D_ARD03	REMAINING	*	11.1	16	2.88	24.2	1.18	21.9	0.29	5.1	*	0.057	0.49
1426D_ARD04	REMAINING	*	11.4	44	10.65	40	3.11	24.3	0.26	4.8	*	0.079	1.84
1426D_ARD05	CARBONACEOUS		6.2	7	1.23	39.7	0.72	15.6	0.12	3.4	0.138	0.073	0.22
1426D_ARD06	REMAINING		2.3	6	1.01	9.3	1.24	13.75	0.16	3.8	0.067	0.051	0.16
1426D_ARD07	COAL		4.1	7	1.8	14.3	0.98	18.8	0.18	5	0.131	0.065	0.33
1426D_ARD08	COAL		2.5	4	0.81	21.4	0.53	14.7	0.09	2.9	0.036	0.049	0.2
1426D_ARD09	COAL		6	35	10.4	23.5	1.05	22.8	0.17	2.9	0.045	0.069	1.67
1426D_ARD10	REMAINING	*	5.5	41	5.77	12.2	0.97	16.55	0.15	3.7	*	0.04	1.59
1426D_ARD11	REMAINING		16.1	57	7.93	49.7	1.31	23.2	0.25	4	0.219	0.086	1.26
1426D_ARD12	COAL		9.4	17	0.74	44.7	2.41	16.65	0.13	3.5	0.067	0.091	0.1
1426D_ARD13	COAL		1.8	4	0.08	8.1	0.86	9.92	0.05	1.2	0.013	0.026	0.02
1426D_ARD14	REMAINING	*	1.9	45	7.32	12.3	0.59	15.85	0.13	4.8	*	0.039	1.51

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61
		Element	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K
		Units	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
		Mean Sediment	14	72	4.2	33	4.1	18	1.7	2.5	0.19	0.044	2
Client Sample ID	SRK Group	LOD	0.1	1	0.05	0.2	0.01	0.05	0.05	0.1	0.005	0.005	0.01
1435D_ARD01	SAND AND GRAVEL	*	7.7	44	1.57	6.6	1.08	5.33	0.11	1.3	*	0.016	0.14
1435D_ARD02	CLAY AND SOIL	*	1.8	29	2.47	15.8	2.71	22	0.15	5.3	*	0.027	0.31
1435D_ARD03	CLAY AND SOIL	*	5.9	47	9.46	35.9	3.05	21.8	0.24	4.3	*	0.065	2.34
1435D_ARD04	REMAINING	*	26.1	42	7.73	29.3	1.19	22.1	0.2	5	*	0.068	1.8
1435D_ARD05	REMAINING		4.6	13	3.51	44.6	1.02	25.8	0.16	5.5	0.114	0.1	0.68
1435D_ARD06	COAL	*	16.2	51	13.45	27.5	2.46	27	0.24	4.5	0.032	0.077	2.27
1435D_ARD07	REMAINING	*	6.8	36	5.3	11	5.38	16.8	0.31	6.4	*	0.051	1.36
1435D_ARD08	COAL		14	11	1.33	33.2	0.39	17.45	0.16	2.3	0.147	0.066	0.48
1435D_ARD09	REMAINING		5	64	18.9	27.3	1.76	28.8	0.26	2.9	0.091	0.089	2.3
1435D_ARD10	CARBONACEOUS	*	8.4	58	13.65	36.5	2.26	25.3	0.23	5	0.078	0.076	1.7
1435D_ARD11	CARBONACEOUS		11.4	16	1.13	50.8	0.86	17.15	0.11	4.4	0.13	0.102	0.11
1435D_ARD12	COAL		5.4	27	5.74	16.5	1.52	19.95	0.2	3.2	0.053	0.064	0.92
1435D_ARD13	REMAINING		16	4	<0.05	5.2	0.42	6.5	<0.05	0.6	<0.005	0.011	<0.01
1435D_ARD14	REMAINING	*	3.4	45	8.87	18.5	0.9	18.1	0.17	6.2	*	0.049	1.72
1437R_ARD01	REMAINING	*	12.2	68	7.9	28.2	4.14	26.9	0.28	4.2	*	0.079	1.34
1437R_ARD02	REMAINING	*	1.7	62	0.57	3.4	0.28	7.21	0.08	2.2	*	0.01	0.04
1437R_ARD03	REMAINING	*	9.2	54	2.64	16.6	4.73	18.35	0.22	3.3	*	0.043	0.31
1437R_ARD04	REMAINING	*	21.1	58	4.48	32.3	3.6	18.2	0.29	3.3	*	0.046	1.56
1437R_ARD05	REMAINING	*	12.8	43	4.84	27.2	3.2	19.35	0.21	3.7	*	0.048	1.66
1437R_ARD06	CARBONACEOUS	*	8.9	31	6.86	24.6	2.78	21.6	0.23	5.3	0.041	0.079	1.3
1437R_ARD07	COAL		10.5	8	1.47	43.5	0.89	18.2	0.17	4	0.093	0.066	0.47
1437R_ARD08	CARBONACEOUS		5	5	1.97	13.9	2.1	19.75	0.23	4.6	0.108	0.071	0.3
1437R_ARD09	CARBONACEOUS		4.1	8	1	21.5	0.64	14.65	0.12	3.7	0.053	0.046	0.28
1437R_ARD10	COAL		3	10	2.01	19.7	1.03	18.1	0.18	4.8	0.143	0.061	0.35
1437R_ARD11	COAL		13.4	28	5.81	39.3	0.86	21.3	0.17	3.4	0.112	0.065	0.83
1438R_ARD01	REMAINING	*	7.8	44	2.75	10.4	2.14	10.1	0.16	2.2	*	0.033	0.23
1438R_ARD02	REMAINING	*	34.1	56	6.91	23	3.51	22.4	0.24	3.7	*	0.065	0.77
1438R_ARD03	REMAINING	*	3.9	42	0.89	7.4	0.92	15.4	0.08	3.2	*	0.04	0.06
1438R_ARD04	REMAINING	*	11.4	53	4.2	17.7	4.97	19.4	0.24	3.1	*	0.042	0.6
1438R_ARD05	REMAINING	*	15.6	50	4.49	28.6	3.34	18.75	0.22	3.6	*	0.053	1.65
1438R_ARD06	REMAINING	*	9.3	25	4.71	27.3	2.2	21.6	0.2	5.2	*	0.063	1
1438R_ARD07	COAL	*	11.8	45	9.14	32.7	2.53	22	0.22	5.3	0.076	0.079	1.84
1438R_ARD08	COAL		2.7	4	2.49	23	1.3	21.7	0.21	5.7	0.15	0.06	0.38
1439R_ARD01	REMAINING	*	16	53	4.95	16.6	3.16	18.65	0.22	3.2	*	0.064	0.57
1439R_ARD02	REMAINING	*	2.9	41	0.99	7.1	1.26	27.4	0.12	5.7	*	0.046	0.15
1439R_ARD03	REMAINING	*	26.1	53	4.67	30.4	4.28	19	0.27	3.5	*	0.05	3.57
1439R_ARD04	REMAINING	*	13.7	40	7.24	32.1	2.96	21.2	0.19	4.7	*	0.064	1.73
1439R_ARD05	COAL	*	7.4	27	4.27	7.8	3.04	14.4	0.16	3.8	0.021	0.042	1.23
1439R_ARD06	COAL		2.1	6	2.92	12.6	1.7	19	0.18	4	0.154	0.053	0.3
1439R_ARD07	CARBONACEOUS		8	6	1.89	21.4	1.57	18.3	0.21	4.9	0.301	0.055	0.33
1439R_ARD08	CARBONACEOUS		10.2	4	0.2	8.9	2.17	7.46	0.09	1.1	0.01	0.02	0.04
1439R_ARD09	COAL		11.8	13	1.16	42.9	0.93	16.8	0.1	3.7	0.156	0.084	0.16
1440R_ARD01	CLAY AND SOIL	*	5.1	39	2.16	9.1	1.48	6.78	0.09	1.9	*	0.02	0.41
1440R_ARD02	REMAINING	*	3.9	36	1.79	7.4	1.4	7.12	0.08	1.7	*	0.021	0.16
1440R_ARD03	REMAINING	*	23.5	44	3.47	16.1	4.43	17.2	0.23	3.5	*	0.05	1.52

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61
		Element	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K
		Units	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
		Mean Sediment	14	72	4.2	33	4.1	18	1.7	2.5	0.19	0.044	2
Client Sample ID	SRK Group	LOD	0.1	1	0.05	0.2	0.01	0.05	0.05	0.1	0.005	0.005	0.01
1440R_ARD04	REMAINING	*	11.2	30	4.16	27.6	3.05	18	0.19	4	*	0.049	1.09
1440R_ARD05	REMAINING	*	14.9	40	9.95	26.2	2.87	22.6	0.24	6.2	*	0.078	1.98
1440R_ARD06	COAL	*	7.2	37	6.55	11.7	8.03	17	0.34	4.4	0.089	0.054	1.53
1440R_ARD07	COAL		4.4	5	0.94	16.1	1.16	16.25	0.11	3.9	0.185	0.069	0.28
1440R_ARD08	REMAINING		5.9	47	12.45	19.8	1.49	21.6	0.25	2.8	0.05	0.062	1.89
1440R_ARD09	CARBONACEOUS	*	6.6	44	6.68	15.5	1.64	14.75	0.16	3.7	0.032	0.04	1.49
1440R_ARD10	COAL		1.8	4	0.4	9.5	0.83	7.56	0.1	1.9	0.037	0.032	0.04
1347DG_ARD004	CARBONACEOUS	*	19.4	59	5.59	33.1	5.7	19.5	0.26	3.6	0.033	0.055	2.51
1347DG_ARD006	CARBONACEOUS	*	9.4	14	3.02	69.1	3.75	33.6	0.2	6.7	0.101	0.118	0.69
1347DG_ARD008	REMAINING	*	9.5	25	4	18.2	1.34	21.8	0.17	5.3	*	0.068	1.09
1347DG_ARD010	CARBONACEOUS	*	5	67	11.65	21	2.19	23.1	0.19	4.5	0.035	0.07	1.98
1347DG_ARD011	REMAINING	*	4.9	62	11.95	24.6	1.91	23.7	0.19	4.9	*	0.068	1.94
1347DG_ARD012	CARBONACEOUS	*	12	62	14.05	62.7	1.82	33	0.17	5.9	0.144	0.113	2.19
1347DG_ARD001	CLAY AND SOIL	*	10.9	42	2.74	11.6	1.97	10.55	0.15	2.3	*	0.034	0.25
1347DG_ARD002	REMAINING	*	5.3	55	6.81	21.2	3.91	22.9	0.2	4.3	*	0.074	0.58
1347DG_ARD003	REMAINING	*	4.3	49	1.78	8.4	2.18	18.65	0.12	3.7	*	0.053	0.16
1347DG_ARD005	REMAINING	*	13	46	6	35.4	3.57	20	0.23	3.8	*	0.052	2.01
1347DG_ARD007	CARBONACEOUS	*	14.5	49	11.35	38.5	3.44	25	0.25	5.1	*	0.086	2.25
75551	CLAY AND SOIL		14.1	55	5.59	23	3.46	17.65	0.13	3.3	0.0025	0.053	0.67
75552	CLAY AND SOIL		7.2	69	5.8	20.3	3.51	17.85	0.12	3.4	0.0025	0.05	0.64
75553	CLAY AND SOIL		7.8	57	4.6	17.3	3.16	16.05	0.13	2.9	0.0025	0.045	0.92
75554	CLAY AND SOIL		10.3	64	6.25	25.8	4.18	24.1	0.15	3.6	0.005	0.063	1.29
75555	CLAY AND SOIL		9.4	67	6.89	24.3	4.11	26.4	0.26	4	0.0025	0.075	1.12
75556	CLAY AND SOIL		4.3	59	3.65	19.1	3.45	14.2	0.07	3	0.0025	0.045	0.26
75557	REMAINING		1.3	48	2.43	5.6	2.33	20.7	0.07	4.7	0.005	0.034	0.47
7558			1.8	101	3.85	15.8	14.05	22.9	0.14	4	0.005	0.107	0.82
75559	REMAINING		1.1	21	0.61	4.7	3.61	34.5	0.12	7.8	0.006	0.064	0.09
75560	REMAINING		2.4	32	3.82	58.5	3.2	37.9	0.57	9.8	0.124	0.155	0.48
75561	REMAINING		6.7	60	8.98	24.5	1.55	23.7	0.18	4.8	0.037	0.066	1.99
75562	REMAINING		5.6	42	4.15	8.9	1.23	15.9	0.15	3.3	0.03	0.037	1.94
75563	REMAINING		4.8	74	10.35	16.3	1.15	20.6	0.19	4.4	0.028	0.055	2.09
75564	CLAY AND SOIL		15.5	65	5.06	17.6	2.98	16.05	0.2	3.2	0.005	0.043	0.64
75565	CLAY AND SOIL		5.7	63	3.85	16	2.56	12.65	0.11	2.7	0.0025	0.033	0.43
75566	SAND AND GRAVEL		3.2	52	1.7	8.1	1.32	5.85	0.08	1.5	0.0025	0.013	0.23
75567	CLAY AND SOIL		14.6	56	4.88	17.1	2.91	16.3	0.17	2.8	0.0025	0.043	0.92
75568	CLAY AND SOIL		17.1	68	6.76	27	4.16	25.9	0.17	4	0.0025	0.066	1.28
75569	REMAINING		2.1	52	2.79	8.2	2.79	25	0.08	5.1	0.0025	0.028	0.29
75570	REMAINING		1.3	33	3.79	13	1.59	19.85	0.24	4.2	0.008	0.024	0.78
75571	REMAINING		16.2	43	14	13.5	4.46	17.4	0.14	4.1	0.046	0.073	1.14
75572	REMAINING		5.8	48	9.79	264	0.83	25.4	0.31	4.3	0.118	0.094	1.79
75573	COAL		2	7	1.99	13	1.03	13.55	0.15	3.4	0.067	0.052	0.24
75574	REMAINING		3	45	8.38	16.8	0.94	19.1	0.14	4	0.053	0.05	1.65
75575	REMAINING		3.8	54	6.1	10.2	0.79	14.6	0.12	2.9	0.018	0.033	1.57
C3-4-5	SAND AND GRAVEL		8.6	44	4.15	15.8	2.64	13.35	0.14	2.9	0.0025	0.034	0.55
C10-11-12	CLAY AND SOIL		9.5	50	4.33	17	3.22	15.9	0.16	2.8	0.0025	0.037	0.82

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61
		Element	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K
		Units	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
		Mean Sediment	14	72	4.2	33	4.1	18	1.7	2.5	0.19	0.044	2
Client Sample ID	SRK Group	LOD	0.1	1	0.05	0.2	0.01	0.05	0.05	0.1	0.005	0.005	0.01
C19-20	CLAY AND SOIL		9.9	68	6.44	25.9	3.71	25.6	0.2	3.7	0.0025	0.074	0.94
C23-24	REMAINING		4.8	46	2.09	10.4	2.04	20.8	0.1	4.4	0.0025	0.049	0.2
C27-28	REMAINING		3.4	40	1.97	7.6	2.17	24.6	0.1	4.9	0.0025	0.038	0.22
C33-34	REMAINING		3.7	36	3.45	18.1	2.76	24.8	0.13	5.2	0.0025	0.052	0.61
C42	REMAINING		12.1	47	6.09	26.4	4.85	20.7	0.29	4.3	0.011	0.078	0.71
C45-46	COAL		7.8	53	1.98	23.2	2.8	18.05	0.24	4.1	0.042	0.061	0.27
C14-15-16	CLAY AND SOIL		15	59	6.05	24.2	3.63	23.4	0.17	3.6	0.0025	0.062	1.05
C36-37	REMAINING		8.8	47	7.36	23.9	3.37	24.3	0.3	4.6	0.005	0.068	1.05
C40-41	REMAINING		10.1	41	8.42	20.1	3.78	23.7	0.23	5	0.013	0.079	1.18
Alpha_C-0.250mm	COAL		3.7	12	3.87	180	2.97	15.4	0.23	4	0.138	0.072	0.22
Alpha_DLL-0.250mm	COAL		2.6	6	0.38	31	1.09	3.53	0.16	0.8	0.081	0.011	0.02
Alpha_DU-0.250mm	COAL		6.2	12	1.19	30.2	3.82	12.35	0.16	3.5	0.109	0.051	0.05
C_Seam_S1.60+0.250mm	COAL		2.2	6	2.68	33.7	2.53	24.6	0.19	4.7	0.35	0.09	0.46
Seam_C_Roof/Floor+0.250mm	COAL		9.6	24	8.66	32	3.04	17.7	0.18	3.2	0.077	0.058	0.85
C_Seam-0.250mm_Roof/Floor	COAL		6.4	40	11.95	44.9	2.32	17.65	0.15	3.8	0.104	0.071	1.06
Seam_DLL_S1.60+0.25	COAL		3.7	4	0.87	11	6.05	33.7	0.33	4.9	0.219	0.108	0.08
Roof/Floor_Seam_DLL	COAL		6.5	40	12.15	16.9	1.13	18.9	0.15	4.7	0.035	0.055	1.72
DLL_Seam-0.250mm_Roof/Floor	COAL		5	44	12.8	24.4	1.35	20.5	0.14	5.1	0.049	0.056	1.64
Seam_DU_S1.60+0.250mm	COAL		4.6	10	1.22	28.2	2.66	25.2	0.16	5.2	0.219	0.093	0.14
Seam_DU_+0.250mm_Roof/Floor	COAL		9.8	26	2.89	36.4	3.23	24.4	0.2	6.9	0.214	0.124	0.36
DU_Seam-0.250mm_Roof/Floor	COAL		15.5	47	7.53	55.6	3.64	22.4	0.22	5.8	0.235	0.091	1.03
Blended raw coal	COAL		5.3	8	0.99	15.6	0.86	7.84	0.06	2.2	0.03	0.035	0.05
201064	C		4	7	0.2	9.3	0.34	6.76	<0.05	1.7	0.012	0.028	0.03
201076	C		5.6	7	0.19	11	0.36	6.05	0.05	1.9	0.012	0.028	0.03
201077	C		8.3	10	3.42	25	1.34	23.4	0.11	3.4	0.147	0.08	0.35
201074	C		12.6	9	1.5	43.6	0.93	19.65	0.09	3.5	0.131	0.075	0.24
201085	DU		13.4	13	0.58	36.3	1.02	14	0.07	3.3	0.057	0.073	0.09
201098	DU		13.8	11	0.36	26.3	0.56	10.9	0.05	2.9	0.04	0.05	0.06
201099	DU		10.5	21	1.49	51.8	2.09	18.45	0.12	4	0.131	0.105	0.2
201096	DU		10.5	22	1.27	37.3	1.33	13.65	0.08	3	0.092	0.058	0.16
201105	DLM/DLL		4	7	0.38	10.8	2.19	9.9	0.08	2.5	0.032	0.037	0.07
201118	DLM/DLL		4.9	5	0.08	9.6	0.51	5.71	<0.05	1.7	0.014	0.025	0.01
201119	DLM/DLL		3.4	12	2.39	19.7	5.55	25.2	0.19	5.4	0.088	0.096	0.32
201116	DLM/DLL		4.7	18	3.72	17.6	2.67	12.35	0.09	2.7	0.062	0.048	0.39

MEMS61 - 4 acid digest

MEMS42 - Aqua regia digest

Samples with TOC > 5% were ashed prior to MEMS61

Aqua regia diegest was carried out on a split of samples with TOC > 5% to capture volatile elements (As, Sb, Se, Te and Tl)

Samples with TOC < 5% were submitted for MEMS61 only (denoted with a " * ")

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb
		Units	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	41	56	1.4	770	2	0.57	13	52	670	19	135
Client Sample ID	SRK Group	LOD	0.5	0.2	0.01	5	0.05	0.01	0.1	0.2	10	0.5	0.1
1252D_ARD03	REMAINING		43.8	32.7	0.69	750	1.31	0.2	12.5	28.2	1070	30.6	144
1252D_ARD04	REMAINING		27.7	21.7	0.45	546	1.78	0.15	6.7	7.7	790	15.4	69.6
1252D_ARD05	COAL		12.4	15.1	0.43	160	0.92	0.18	3.4	2.5	90	5.9	11.2
1252D_ARD07	REMAINING		49.6	40.9	0.42	457	0.46	0.08	14.5	19.1	140	30.9	164.5
1252D_ARD09	REMAINING		17.5	15.1	0.11	302	0.51	0.08	5.9	6.8	530	19.7	116.5
1252D_ARD10	REMAINING		43	37.2	0.37	422	0.61	0.07	12.2	22	720	27.4	124.5
1252D_ARD11	COAL		58.4	46.1	0.41	84	4.85	0.08	16.8	60.8	170	40.2	158
1262D_ARD01	SAND AND GRAVEL		16.4	13	0.14	173	0.42	0.18	6.9	10	80	13.1	34.5
1262D_ARD02	SAND AND GRAVEL		9.5	13.3	0.06	15	0.23	0.1	1.9	5.2	40	6.6	15
1262D_ARD03	REMAINING		22.3	10.7	0.11	19	0.37	0.19	8.2	5.1	100	16.6	98.5
1262D_ARD04	CARBONACEOUS		23.2	10.4	0.06	41	0.99	0.14	3.4	7.4	360	15.2	91.8
1262D_ARD05	COAL		57.5	33.6	0.13	33	2.48	0.27	14.4	52.5	350	44.6	48.3
1277D_ARD01	CLAY AND SOIL		33.8	17.1	0.26	143	0.43	0.32	8	14.1	120	14.7	47.3
1277D_ARD02	SAND AND GRAVEL		18.9	18.6	0.32	461	0.43	0.42	10.5	15.1	100	19.9	63.2
1277D_ARD03	CLAY AND SOIL		42.9	8.7	0.82	206	2.47	0.67	9.2	19.3	780	22.5	73.6
1277D_ARD04	REMAINING		68.8	22.9	0.38	26	0.72	0.32	14.2	13.6	510	28.5	148
1277D_ARD05	REMAINING		38.2	17.7	0.39	18	0.55	0.33	9.6	8.5	310	21.1	110.5
1277D_ARD10	REMAINING		31.9	18.1	0.22	48	0.39	0.07	10.1	10	100	16.2	108.5
1277D_ARD11	REMAINING		17.1	11.8	0.07	38	0.75	0.07	4.3	6.1	80	20.8	96.2
1326D_ARD01	CLAY AND SOIL		27.4	26.2	0.31	486	0.66	0.5	11.5	21.3	180	24.3	82.5
1326D_ARD02	CLAY AND SOIL		25.7	23.6	0.28	166	0.62	0.48	10.6	18.6	190	17.8	71.2
1326D_ARD03	SAND AND GRAVEL		21.8	17.9	0.3	99	0.39	0.4	8.2	19.7	110	13.7	59.8
1326D_ARD04	SAND AND GRAVEL		36.2	28.1	0.47	1030	0.57	0.53	11.6	32.2	140	28.6	88.2
1326D_ARD05	REMAINING		38.3	12.1	0.13	31	1.37	0.11	13	4.9	210	32.1	46.4
1327D_ARD01	SAND AND GRAVEL		14.1	15.1	0.17	46	0.3	0.23	4.5	11.4	80	8.6	33.7
1327D_ARD03	COAL		49.4	32.8	0.32	72	0.68	0.09	15.2	23.3	130	31	153.5
1336D_ARD02	CARBONACEOUS		13.3	14.7	0.04	19	0.25	0.07	4.5	1.9	60	14.8	81.9
1336D_ARD03	REMAINING		15.6	15	0.04	39	0.76	0.07	3.7	3.7	130	22.4	79.7
1337DG_ARD01	SAND AND GRAVEL		8.2	12.7	0.09	41	0.34	0.16	3.4	6.8	60	7	17.2
1337DG_ARD02	REMAINING		25.7	18.9	0.41	3030	1.54	0.22	6.7	60.7	2510	14.1	55
1337DG_ARD03	COAL		10.2	32.3	0.77	66	1.39	0.64	10.5	1.8	480	23.4	19.2
1339DG_ARD01	REMAINING		27.1	23	0.28	466	0.47	0.16	6.7	19.3	110	13.1	42.6
1339DG_ARD02	REMAINING		70.1	10.8	0.28	21	0.47	0.3	9.6	5.1	580	23.1	33.6
1339DG_ARD03	CARBONACEOUS		51.2	36.9	0.75	764	1.93	0.41	12.5	28.9	230	33.1	120
1339DG_ARD04	REMAINING		36.6	30.2	0.44	131	0.43	0.15	11.1	15.7	270	17.5	128
1339DG_ARD05	REMAINING		47.9	37.6	0.54	296	1.53	0.13	13.8	26	220	32.8	144
1339DG_ARD06	REMAINING		13.4	8.6	0.05	21	11.5	0.02	3.2	13.1	100	21.4	25.8
1349D_ARD03	REMAINING		38.8	16.9	0.04	13	0.44	0.04	4	8.6	140	15.2	17.4
1350D_ARD01	SAND AND GRAVEL		11.3	12.1	0.06	32	0.51	0.04	3.2	8.9	60	10.7	16.3
1350D_ARD02	REMAINING		14.8	13.3	0.07	23	0.82	0.08	5.7	12.2	60	14.9	14.5
1350D_ARD03	REMAINING		9.1	10.2	0.16	31	2.13	0.1	12.1	5.7	130	14.6	59.4
1350D_ARD04	COAL		100	18	0.6	10	1.96	0.28	8.1	3.6	280	18.2	10.1
1361D_ARD01	REMAINING		31.2	21.3	0.35	760	0.46	0.22	10.4	20.4	110	20.1	68
1361D_ARD02	REMAINING		10.3	12.4	0.05	25	0.41	0.08	2	5.2	60	7.6	14.2
1362D_ARD01	REMAINING		23.7	14.9	0.33	100	0.56	0.13	6.4	12.5	170	13.6	38.5

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb
		Units	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	41	56	1.4	770	2	0.57	13	52	670	19	135
Client Sample ID	SRK Group	LOD	0.5	0.2	0.01	5	0.05	0.01	0.1	0.2	10	0.5	0.1
1362D_ARD02	REMAINING		14.7	15.9	0.03	48	1.22	0.07	8	10.5	60	31.7	6.6
1362D_ARD03	REMAINING		26.4	14.9	0.02	6	0.21	0.04	3.9	4.7	70	20.6	7.2
1362D_ARD04	REMAINING		31.3	15.7	0.15	39	2.64	0.09	11.6	6.6	120	17.4	67.9
1362D_ARD05	REMAINING		44.3	15	0.73	18	2.84	0.36	9.5	9.5	570	25.1	9.7
1362D_ARD06	COAL		21.4	22.8	0.22	50	1.99	0.14	7.2	4.6	70	21.8	10.9
1252D_ARD08	REMAINING		16.8	15.9	0.14	80	0.42	0.07	5.9	7.9	120	17.4	101.5
1336D_ARD01	REMAINING		22.2	13.9	0.05	24	0.23	0.06	6.3	3.4	100	19.7	75.5
1339DG_ARD08	REMAINING		27.9	21	0.21	80	0.42	0.07	8.5	10.4	130	18.6	110.5
1349D_ARD01	CLAY AND SOIL		28.3	26.9	1.36	363	0.54	0.46	11.4	30.2	120	20	77.5
1349D_ARD02	REMAINING		24.4	22.1	0.31	46	1.01	0.27	15.2	20.5	90	27.2	45.2
1361D_ARD03	REMAINING		17.7	9.3	0.07	20	0.45	0.16	5.9	4	100	16.2	94.3
1406D_ARD01	CLAY AND SOIL	*	25.3	16.3	0.61	143	1.01	0.53	8.3	18.4	140	21	51.9
1406D_ARD02	REMAINING	*	24.1	12.7	0.94	982	0.7	0.74	7.1	24.3	680	17.2	111.5
1406D_ARD03	REMAINING	*	23.9	10.7	1.08	376	0.83	0.69	7.2	18	920	15.6	108.5
1406D_ARD04	REMAINING	*	24.6	24.1	0.48	238	1.38	0.21	7	8.4	330	14.3	71.9
1406D_ARD06	COAL		10.8	21	0.43	80	0.9	0.17	8.3	3.5	200	26.5	14.3
1406D_ARD07	REMAINING	*	36.7	30.3	0.34	131	0.52	0.06	12	12.1	110	24.1	141.5
1406D_ARD08	REMAINING	*	13.9	13.3	0.08	43	0.51	0.07	4.1	5.5	50	15.9	95.8
1406D_ARD09	COAL		12.5	10.5	0.04	61	0.87	0.03	3.3	5.4	40	13.1	2.4
1406D_ARD10	REMAINING	*	20.6	16.4	0.17	72	0.23	0.04	8.6	6.3	60	14.6	99.5
1411D_ARD01	CLAY AND SOIL	*	25.8	18.9	0.47	598	0.33	0.26	8.9	16	70	16.4	55.9
1411D_ARD02	REMAINING	*	27.5	20.4	0.37	77	0.73	0.27	15.1	7.3	120	16.1	88.6
1411D_ARD04	REMAINING	*	54.9	38.6	0.27	109	1.05	0.1	17.5	19.9	340	39.5	132.5
1411D_ARD05	REMAINING	*	37.7	25.5	0.26	175	1.17	0.08	11.7	22.5	200	23.4	127.5
1411D_ARD06	CARBONACEOUS		42.8	32.8	0.28	78	0.91	0.09	12.4	47.4	380	29.2	99.3
1411D_ARD07	COAL		3.5	6.5	0.03	41	0.81	0.03	1.4	2.6	40	4.2	0.3
1413D_ARD02	SAND AND GRAVEL	*	11.2	20.6	0.13	35	1.17	0.2	12.1	17.2	100	31.7	24.9
1413D_ARD03	REMAINING	*	76.5	19.1	0.32	23	1.18	0.21	14	14.9	390	28.3	110
1413D_ARD04	REMAINING	*	140	13.1	0.18	590	1.04	0.12	5.6	69.1	2090	18	56.8
1413D_ARD05	COAL		19.8	19	0.57	124	1.26	0.29	6.4	1.4	140	14.3	12.7
1413D_ARD06	REMAINING	*	34.4	37	0.28	177	0.37	0.07	14.2	12.3	100	31.2	153.5
1413D_ARD07	REMAINING	*	19.9	20.1	0.12	170	0.87	0.07	8	8.5	180	21.6	108.5
1413D_ARD08	COAL		9.5	9.9	0.03	457	1.14	0.03	2.7	2.6	60	7.8	1.3
1415D_ARD01	SAND AND GRAVEL	*	12.2	13	0.12	50	0.51	0.13	2.5	10.9	70	10.4	19.9
1415D_ARD02	CLAY AND SOIL	*	19	34	0.53	312	0.71	0.52	14.1	41.7	200	24.5	88.4
1415D_ARD03	REMAINING	*	11.6	7.6	0.43	34	0.86	0.33	8.6	6.3	70	11.4	25.2
1415D_ARD04	COAL		10.1	11.5	0.09	92	1.84	0.15	3.1	51	50	8.1	29.6
1415D_ARD05	COAL		3.5	5.9	0.03	71	0.89	0.04	1.1	8.5	30	6.2	0.9
1415D_ARD06	REMAINING	*	29.6	23.5	0.24	77	0.82	0.06	10.5	10.5	200	19.7	103.5
1415D_ARD07	REMAINING	*	42	31.2	0.33	88	1.21	0.06	13.2	16	180	25.1	128.5
1418D_ARD01	REMAINING	*	12	16.9	0.13	146	0.93	0.21	14	19.3	90	21.3	16.1
1418D_ARD02	REMAINING	*	39.2	21.5	0.13	25	1.17	0.09	13.3	11.2	140	24.4	66.3
1418D_ARD03	COAL		14.2	9	0.01	15	1.22	0.06	2.3	18.7	70	8.5	1.5
1419D_ARD01	CLAY AND SOIL	*	9.1	76.7	0.22	76	0.59	0.31	11.5	20.7	90	11.8	14
1419D_ARD02	REMAINING	*	6.8	19	0.06	39	1.01	0.16	10.8	8	50	14.2	13.8

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb
		Units	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	41	56	1.4	770	2	0.57	13	52	670	19	135
Client Sample ID	SRK Group	LOD	0.5	0.2	0.01	5	0.05	0.01	0.1	0.2	10	0.5	0.1
1419D_ARD03	CLAY AND SOIL	*	16.9	18.2	0.27	18	0.85	0.31	15.5	4.9	70	8.2	40.7
1419D_ARD04	REMAINING	*	92	30.1	0.36	48	1.5	0.33	11.1	13.1	270	20	84.4
1419D_ARD05	REMAINING	*	46.1	35.5	0.43	143	0.93	0.18	13.6	22.4	220	20.9	146
1419D_ARD06	COAL		2.5	5.8	0.01	12	0.8	0.05	0.9	11.2	10	2.6	0.8
1419D_ARD07	REMAINING	*	38.2	29.6	0.32	76	0.9	0.07	12.8	17.9	100	25.9	124.5
1419D_ARD08	REMAINING	*	41.7	35.3	0.38	98	1.36	0.08	14.1	21.5	180	35.2	131.5
1419D_ARD09	COAL		3.1	6	0.02	33	0.86	0.05	1.6	5.9	20	4.3	0.5
1419D_ARD10	REMAINING	*	52.8	33.8	0.32	73	0.72	0.07	17.1	16.1	110	29.7	141.5
1420D_ARD01	SAND AND GRAVEL	*	27.1	19.8	0.24	257	0.31	0.15	6.2	15	100	13	46
1420D_ARD02	CLAY AND SOIL	*	27.9	30.8	0.41	112	0.98	0.37	15.2	40.9	120	28.3	80.4
1420D_ARD03	REMAINING	*	3.2	23.3	0.04	9	0.42	0.1	11.1	22.2	20	12.7	2
1420D_ARD04	REMAINING	*	24.2	16.1	0.02	7	0.19	0.05	3.4	7.8	60	18.6	7.5
1420D_ARD05	CARBONACEOUS	*	71.6	40.3	0.18	18	4.29	0.1	18.6	8.3	410	37.7	5.3
1420D_ARD06	REMAINING	*	26.4	16.6	0.18	44	0.86	0.05	11.6	11.3	80	19.5	80.5
1420D_ARD07	REMAINING	*	46.3	25.1	0.33	61	1.23	0.06	16.1	16.4	110	22.7	117
1420D_ARD08	COAL		6.1	20.2	0.03	37	0.98	0.03	7.1	15.7	70	19.5	4.5
1420D_ARD09	REMAINING		32	36.2	0.14	56	0.56	0.07	17.3	6.6	80	33.6	111
1420D_ARD10	COAL		1.9	10.1	0.01	34	1.19	0.03	3.3	14.1	20	8.9	0.4
1420D_ARD11	REMAINING	*	27.9	19.1	0.21	49	0.71	0.05	14.6	9.7	60	20.3	107
1421D_ARD01	CLAY AND SOIL	*	8.5	14.9	0.13	16	0.63	0.2	16.4	12.2	50	20	10.2
1421D_ARD02	REMAINING	*	5.4	21.9	0.13	21	0.54	0.24	18.6	17.6	40	37.7	8
1421D_ARD03	CARBONACEOUS	*	33.2	29.8	0.36	18	3.08	0.23	12.4	5.2	390	34.3	6.2
1421D_ARD04	CARBONACEOUS	*	24.1	39.3	0.19	9	1.27	0.15	11.8	6.7	190	29.5	13.1
1421D_ARD05	COAL		5.9	4.4	0.03	264	0.85	0.03	1.6	5.8	40	5.5	0.6
1421D_ARD06	REMAINING	*	33	26.5	0.26	66	0.66	0.07	15	10.8	110	23.8	122.5
1421D_ARD07	COAL		5.8	24.4	0.04	27	1.14	0.04	7.6	14.4	110	23.5	6
1422D_ARD01	REMAINING	*	27.5	12.5	0.12	30	0.7	0.06	9.4	8.4	150	14.4	87.8
1422D_ARD02	CARBONACEOUS		37.2	40.6	0.14	56	2.66	0.09	12.8	12.7	170	34.2	27.6
1422D_ARD03	COAL		4.5	7.1	0.02	26	1.08	0.03	1.1	9.8	110	2.8	0.2
1422D_ARD04	REMAINING	*	26.3	19.1	0.2	31	0.49	0.05	13.9	9.2	90	18.6	108
1423D_ARD01	REMAINING	*	15.6	16.1	0.23	77	0.4	0.18	11.1	12.8	90	14.5	36.4
1423D_ARD03	REMAINING	*	18.9	10.9	0.04	16	0.3	0.09	6	2.3	80	15	90.6
1423D_ARD04	CARBONACEOUS		31.5	30.6	0.26	49	0.53	0.15	11.6	18	550	30	104
1423D_ARD05	CARBONACEOUS	*	42.4	30.4	0.36	106	0.76	0.13	15.2	21	450	27.5	104.5
1423D_ARD06	CARBONACEOUS		17.5	23.9	0.06	23	1.27	0.07	6.5	82.8	100	20.1	16.7
1423D_ARD07	REMAINING	*	35.8	21.6	0.18	47	1.33	0.07	14.5	23.1	110	22.5	107.5
1423D_ARD08	REMAINING	*	27.9	21	0.22	57	0.96	0.07	12.4	16.6	100	17.5	109
1423D_ARD09	COAL		12.1	6.4	0.04	168	1.08	0.03	0.9	3.8	30	2.6	1.5
1423D_ARD10	REMAINING	*	22.1	12.5	0.89	720	5.22	0.2	11.1	5.3	90	33.7	7.1
1423D_ARD11	COAL		8.5	18.4	0.02	24	0.9	0.03	6.5	14.2	40	9.5	1.2
1423D_ARD12	REMAINING	*	36.1	31.8	0.39	65	0.67	0.06	18	15.3	110	26.9	159.5
1423D_ARD13	REMAINING	*	35.6	20.3	0.33	236	0.61	0.05	15.6	12.9	130	21.8	124.5
1423D_ARD14	REMAINING	*	38.8	20.8	0.36	102	0.44	0.05	16	17.5	110	21.8	125.5
1424D_ARD01	REMAINING	*	47	6.8	0.94	57	3.64	0.46	8	42	670	33.4	80.1
1424D_ARD02	CARBONACEOUS		30.2	12.2	0.78	22	0.47	0.16	8.1	1.5	100	22.5	9.2

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb
		Units	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	41	56	1.4	770	2	0.57	13	52	670	19	135
Client Sample ID	SRK Group	LOD	0.5	0.2	0.01	5	0.05	0.01	0.1	0.2	10	0.5	0.1
1424D_ARD03	COAL		13.2	13.3	0.26	13	0.98	0.08	1.8	2.5	190	8.9	7.6
1424D_ARD04	CARBONACEOUS		19	11	0.51	1420	2.49	0.1	3	2.7	4340	9.3	16.7
1424D_ARD05	REMAINING	*	20.7	11.1	0.77	581	1.13	0.68	7.1	16.5	630	12.5	60.1
1424D_ARD06	REMAINING	*	27.5	13.9	0.99	625	0.97	0.56	9.2	21.6	680	15.4	98.8
1424D_ARD07	REMAINING	*	22.8	10	1.03	900	0.91	0.53	7.7	19.3	910	14.4	76.9
1424D_ARD08	REMAINING		13.5	13.7	0.32	597	1.12	0.14	3.9	8	410	7.7	39.5
1424D_ARD09	COAL		15.6	28	0.3	36	1.64	0.1	7.3	5.9	160	17	25.7
1424D_ARD10	REMAINING	*	38.5	29	0.4	125	1.33	0.06	16.1	18.6	140	24.8	139.5
1424D_ARD11	REMAINING	*	14.7	12.6	0.13	53	0.47	0.06	6.1	6.5	190	15.6	94.3
1424D_ARD12	CARBONACEOUS		25	48.3	0.26	78	1.9	0.11	13.3	97.2	490	35.6	104
1424D_ARD13	COAL		5.6	6.5	0.07	432	0.86	0.03	2.7	1.7	20	6.5	1.6
1424D_ARD14	COAL		17.5	12.7	0.05	100	1.8	0.04	14.6	8.2	60	22.8	9.3
1424D_ARD15	CARBONACEOUS	*	41.7	25	0.29	56	1	0.06	17.1	14.6	100	25.4	148.5
1425D_ARD01	SAND AND GRAVEL	*	23.1	13.6	0.32	497	0.45	0.31	9.7	20	110	15.3	56.6
1425D_ARD02	REMAINING	*	5.5	9.3	0.07	58	0.96	0.09	5.7	9	50	13.3	8.2
1425D_ARD03	COAL	*	4.3	8.5	0.86	31	3.24	0.59	11	12.1	420	13.9	9.2
1425D_ARD04	COAL		89.6	22.3	0.29	13	6.53	0.39	7.1	11	70	47.1	6.2
1425D_ARD05	REMAINING	*	28.7	14.4	0.22	51	0.58	0.07	11.6	15.2	110	17	105
1425D_ARD06	REMAINING	*	12.4	11.4	0.11	81	0.79	0.08	6.2	6.9	110	16.8	104
1425D_ARD07	COAL		3.8	18.2	0.04	32	1.4	0.04	6.2	14.1	60	18.8	3.9
1425D_ARD08	REMAINING	*	17.4	13.7	0.15	33	0.51	0.04	12.6	5.5	90	12.1	87.4
1427D_ARD01	SAND AND GRAVEL	*	12	12.8	0.1	44	0.44	0.1	2.6	8.3	80	9.5	17.2
1427D_ARD02	CLAY AND SOIL	*	10.7	26.5	0.51	346	0.85	0.48	15.8	39.1	230	24.2	65.3
1427D_ARD03	REMAINING	*	19.8	11.9	0.7	81	1.03	0.48	11.5	19.3	210	22.9	71.8
1427D_ARD04	REMAINING		32.5	13.5	1.34	5330	1.08	0.22	6.7	29.4	3490	15.8	69.9
1427D_ARD05	REMAINING	*	41	27.8	0.51	712	0.51	0.25	12.8	21.7	130	25.3	132
1427D_ARD06	REMAINING	*	26.4	12.7	0.3	932	0.83	0.22	9	5.1	470	15.5	63.2
1427D_ARD07	COAL		17.4	16.8	0.76	86	1.97	0.41	8.3	4.3	380	19.9	9.4
1427D_ARD08	REMAINING	*	41.6	32.4	0.34	80	0.45	0.08	16.5	17.3	190	27.8	139.5
1427D_ARD09	REMAINING	*	34.1	36.8	0.08	88	1.74	0.81	13	17.9	190	31.7	14.5
1427D_ARD10	COAL		33.7	26.8	0.29	76	2.11	0.07	11.2	21.2	180	24.3	126
1426D_ARD01	REMAINING	*	15.6	29.9	0.09	13	0.43	0.19	10.6	17.3	50	7.3	9.2
1426D_ARD02	COAL	*	56.3	6.9	0.82	32	0.74	0.66	9	3.9	660	17.6	46.4
1426D_ARD03	REMAINING	*	51.1	8.5	1.13	12	1.18	0.85	9.6	14.9	450	21.6	25.4
1426D_ARD04	REMAINING	*	42.1	28.7	0.55	756	1.3	0.26	14.3	22.1	290	27.4	130.5
1426D_ARD05	CARBONACEOUS		13.8	19	0.35	38	2.13	0.32	4	4.2	180	18.6	9.7
1426D_ARD06	REMAINING		18.4	13.5	0.45	271	1.98	0.28	10.3	2.3	140	12.2	8.7
1426D_ARD07	COAL		25.5	23.2	0.44	43	2.38	0.25	8.2	2.7	230	18.1	11.6
1426D_ARD08	COAL		12.1	24.3	0.07	50	1.42	0.07	7.6	2.4	90	16.6	11.3
1426D_ARD09	COAL		22.7	29.5	0.21	92	0.86	0.08	12.6	12.1	120	26.5	121
1426D_ARD10	REMAINING	*	26.8	18.3	0.16	92	0.88	0.06	11.5	9.9	150	20.7	102
1426D_ARD11	REMAINING		43.3	29.4	0.2	92	2.36	0.06	14.1	68.5	160	35.4	91.4
1426D_ARD12	COAL		7.4	19	0.04	884	2.26	0.04	7.6	16.2	130	20.6	4.5
1426D_ARD13	COAL		2.7	18.1	0.02	47	0.99	0.04	2.4	3.4	30	6.2	0.6
1426D_ARD14	REMAINING	*	26.1	15	0.19	33	0.31	0.05	13.7	7	70	18.3	105.5

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb
		Units	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	41	56	1.4	770	2	0.57	13	52	670	19	135
Client Sample ID	SRK Group	LOD	0.5	0.2	0.01	5	0.05	0.01	0.1	0.2	10	0.5	0.1
1435D_ARD01	SAND AND GRAVEL	*	12.1	13.2	0.14	140	0.3	0.12	2.5	6.3	60	7.3	18.2
1435D_ARD02	CLAY AND SOIL	*	10	10.3	0.41	38	1.06	0.43	10.9	4.8	80	7	24.3
1435D_ARD03	CLAY AND SOIL	*	30.2	10.9	0.52	116	1.05	0.5	10.8	18.1	320	11.7	150
1435D_ARD04	REMAINING	*	39.3	18.3	0.79	55	1.23	0.57	13.8	27.7	480	21.4	116
1435D_ARD05	REMAINING		7.8	24.1	0.47	29	1.1	0.5	10.5	8.7	160	24.3	20.8
1435D_ARD06	COAL	*	49.8	40.5	0.58	184	1.29	0.25	16.7	20.2	160	25	164
1435D_ARD07	REMAINING	*	41.5	22.8	0.43	1120	0.92	0.14	12	9.9	2500	16	86.4
1435D_ARD08	COAL		31.1	24.2	0.09	23	1.43	0.13	4.8	11	220	12.1	24
1435D_ARD09	REMAINING		39.8	41.6	0.49	164	0.32	0.1	16.7	20.3	120	30.3	178.5
1435D_ARD10	CARBONACEOUS	*	41.5	35.1	0.44	107	1.95	0.08	16.9	18.9	230	28.6	133.5
1435D_ARD11	CARBONACEOUS		12.5	24.1	0.05	46	1.14	0.06	8.9	14.8	100	23.5	7.3
1435D_ARD12	COAL		31.5	27.3	0.13	83	0.85	0.06	12.2	15.2	110	27.2	66.4
1435D_ARD13	REMAINING		5	2.1	0.02	47	1.1	0.05	2.4	20.4	10	2.8	0.2
1435D_ARD14	REMAINING	*	39.6	19.4	0.25	54	0.55	0.06	16.7	9.4	90	22.8	120.5
1437R_ARD01	REMAINING	*	34.4	22.2	0.44	348	0.61	0.45	15.7	31.3	170	25.1	96.9
1437R_ARD02	REMAINING	*	6	10.9	0.02	13	0.43	0.05	3.8	5.3	30	6.8	3.5
1437R_ARD03	REMAINING	*	26.8	6.2	0.5	73	0.63	0.53	7.7	16.1	340	22	25.7
1437R_ARD04	REMAINING	*	28.3	8.2	0.92	628	0.91	1.09	7.2	26.7	650	12.2	79.2
1437R_ARD05	REMAINING	*	21.6	8.2	1.08	552	1.12	1.07	8.3	19.9	800	14.6	79.2
1437R_ARD06	CARBONACEOUS	*	39.3	20.9	0.57	585	1.83	0.52	13.3	16.4	670	31.3	71.5
1437R_ARD07	COAL		18.4	24.7	0.31	124	1.94	0.36	5.7	4.8	250	13.6	18.7
1437R_ARD08	CARBONACEOUS		21.7	17.9	0.66	374	2.38	0.51	6.7	4.3	350	20.1	15.2
1437R_ARD09	CARBONACEOUS		19.4	20.9	0.11	73	1.7	0.14	6.6	4.5	180	14.4	16.1
1437R_ARD10	COAL		21.8	24.2	0.32	116	1.65	0.29	7.1	3.9	310	21.2	14.9
1437R_ARD11	COAL		19.8	28.9	0.13	89	1.45	0.1	8.7	20.1	220	21	48.4
1438R_ARD01	REMAINING	*	13.4	13	0.26	73	0.37	0.16	6.8	13.4	60	11.6	30.3
1438R_ARD02	REMAINING	*	34.4	23.5	0.32	1210	0.79	0.38	13.8	29.8	150	49.6	86.5
1438R_ARD03	REMAINING	*	7.2	25.5	0.04	28	0.83	0.16	9.2	10.9	40	11.5	6.2
1438R_ARD04	REMAINING	*	32.2	6.1	0.68	90	0.84	0.59	7.4	18.8	430	20.4	44.3
1438R_ARD05	REMAINING	*	22	8	1.07	702	0.77	1.07	8.1	21.5	690	13.3	74.2
1438R_ARD06	REMAINING	*	31.4	10.7	1.11	278	4.39	0.91	10.8	15.4	480	21.3	58
1438R_ARD07	COAL	*	42.1	28.5	0.56	380	1.69	0.44	13.5	20.9	510	24.9	111
1438R_ARD08	COAL		16.2	17.5	0.71	61	2.17	0.65	9.1	2.4	780	22	14.7
1439R_ARD01	REMAINING	*	27.8	17.4	0.5	858	0.41	0.43	11.6	20.7	140	18.3	50.1
1439R_ARD02	REMAINING	*	24.1	23	0.27	16	0.93	0.36	12.7	9.2	190	14.2	10.1
1439R_ARD03	REMAINING	*	23.4	13.3	0.84	1570	0.88	0.56	8.3	27.7	760	14	137.5
1439R_ARD04	REMAINING	*	35.6	14.7	1.05	486	2.43	0.75	11.7	21.1	650	29	105.5
1439R_ARD05	COAL	*	25.9	14.3	0.38	897	1.56	0.27	9.3	6.5	370	20.6	75.6
1439R_ARD06	COAL		16.1	25.7	0.54	192	1.85	0.39	8.2	2.6	90	21.7	13.3
1439R_ARD07	CARBONACEOUS		25	17.9	0.45	68	3.36	0.34	10.4	5.8	260	22.4	14.4
1439R_ARD08	CARBONACEOUS		4	8.1	0.05	520	1.89	0.06	1.5	20.9	80	5.2	1.8
1439R_ARD09	COAL		10.2	25.6	0.05	99	1.17	0.06	7.9	13.7	90	21.1	8.2
1440R_ARD01	CLAY AND SOIL	*	13.1	10.9	0.1	142	0.42	0.05	5	5.6	90	10.4	32
1440R_ARD02	REMAINING	*	9.8	12	0.11	28	0.32	0.13	4.2	5.1	60	8.6	19.1
1440R_ARD03	REMAINING	*	24.7	15.7	0.89	948	1.02	0.87	7.6	18.7	660	12.7	76.6

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb
		Units	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	41	56	1.4	770	2	0.57	13	52	670	19	135
Client Sample ID	SRK Group	LOD	0.5	0.2	0.01	5	0.05	0.01	0.1	0.2	10	0.5	0.1
1440R_ARD04	REMAINING	*	25.3	15.3	1.23	565	2.29	1.07	8.2	12.4	670	15.3	62.1
1440R_ARD05	REMAINING	*	46.8	35.4	0.59	374	2.25	0.45	14.4	18.3	390	27	134
1440R_ARD06	COAL	*	34.3	28	0.54	2350	1.4	0.3	10.8	10	1410	21.6	97.3
1440R_ARD07	COAL		6.6	27.4	0.13	112	1.22	0.18	7.5	7.2	110	21.4	8.4
1440R_ARD08	REMAINING		36.2	32.3	0.39	136	0.52	0.12	13.1	16.4	130	21.5	139
1440R_ARD09	CARBONACEOUS	*	30.7	19.9	0.38	179	0.96	0.17	10.3	11.1	290	17.2	100
1440R_ARD10	COAL		19.4	19.2	0.04	73	0.79	0.08	3.1	6.7	60	8.2	4
1347DG_ARD004	CARBONACEOUS	*	25.9	13.9	1.13	921	1.09	0.9	8.4	23.4	770	14.7	120
1347DG_ARD006	CARBONACEOUS	*	21	36.3	0.87	553	1.56	0.59	11.1	4.2	500	28.2	28.9
1347DG_ARD008	REMAINING	*	23.4	20.9	0.51	250	1.76	0.48	10.5	6.7	640	20.4	42
1347DG_ARD010	CARBONACEOUS	*	43.7	29.6	0.34	401	1.35	0.08	16.3	10.4	120	29.6	142
1347DG_ARD011	REMAINING	*	53.5	28.1	0.36	265	2.71	0.07	16.1	17.3	130	27	138.5
1347DG_ARD012	CARBONACEOUS	*	46.1	37	0.36	124	1.23	0.09	17.6	18.5	300	36.3	140
1347DG_ARD001	CLAY AND SOIL	*	27.9	16.3	0.27	94	0.49	0.13	7.6	20.8	60	13	34.1
1347DG_ARD002	REMAINING	*	29.3	18	0.23	98	0.82	0.26	17.7	13.1	180	24	75.2
1347DG_ARD003	REMAINING	*	13.5	16.4	0.11	36	0.53	0.13	11.9	12.3	60	18.4	15.4
1347DG_ARD005	REMAINING	*	26.1	10.8	1.02	661	1.05	0.93	8.7	20.5	790	15.3	103.5
1347DG_ARD007	CARBONACEOUS	*	48.6	31	0.71	650	1.69	0.46	15.1	23.7	670	27.8	145
75551	CLAY AND SOIL		23.5	22.1	0.28	601	1.02	0.43	10.6	20.9	150	21.7	73.1
75552	CLAY AND SOIL		21.8	22.2	0.26	167	0.82	0.43	11	18.4	180	15.8	68.5
75553	CLAY AND SOIL		22.8	17.6	0.33	135	0.41	0.42	9	20.8	110	12.8	62.5
75554	CLAY AND SOIL		27.8	24.7	0.48	506	0.63	0.54	11.8	33.7	150	21.8	81.5
75555	CLAY AND SOIL		47.2	23.3	0.46	139	0.56	0.52	12.8	32.2	150	18.1	72.7
75556	CLAY AND SOIL		11	12.7	0.16	49	1.24	0.24	11.2	16.7	70	22.9	27.4
75557	REMAINING		11.1	9.1	0.1	29	0.73	0.11	11.7	3.4	50	10.5	28.7
7558			10.1	10.7	0.14	51	2.44	0.11	10.7	4.1	280	23.3	52.8
75559	REMAINING		21	35.6	0.06	12	2.09	0.12	10.4	2.8	150	27.3	5.4
75560	REMAINING		100.5	47.1	0.17	33	4.19	0.14	16.6	13.8	490	42.4	31.3
75561	REMAINING		42.5	26.8	0.31	149	1.02	0.08	13.3	16.6	230	25.2	133.5
75562	REMAINING		25.5	17.5	0.16	105	0.84	0.08	8.9	8.4	280	16.5	108.5
75563	REMAINING		46.8	23.4	0.33	67	0.92	0.06	14.5	13.2	100	22.2	145.5
75564	CLAY AND SOIL		34.7	22.6	0.29	855	0.64	0.34	9.7	21	120	18.5	66.1
75565	CLAY AND SOIL		16.7	18	0.19	158	0.6	0.28	8.5	15.4	120	10.2	48.8
75566	SAND AND GRAVEL		9.2	11.2	0.1	74	0.43	0.17	4.9	6.6	60	6.9	21.5
75567	CLAY AND SOIL		27.3	19.1	0.35	347	0.43	0.47	8.7	21.2	100	14.2	62.3
75568	CLAY AND SOIL		29.2	24.3	0.48	634	0.88	0.63	12.9	36.1	150	20.7	80.2
75569	REMAINING		10.5	11.5	0.19	37	0.69	0.36	11.4	5.5	50	4.9	21.4
75570	REMAINING		49	7.3	0.79	26	0.66	0.69	9.2	2.5	570	19.6	53.2
75571	REMAINING		31.1	16	0.3	52	1.52	0.28	10.6	28.5	290	15.1	98.2
75572	REMAINING		59.4	26.3	0.3	27	0.45	0.25	13.9	8.3	380	24	134.5
75573	COAL		22	17.1	0.34	125	1.19	0.27	4.1	1	90	12.6	14.6
75574	REMAINING		30.1	26.8	0.2	83	0.73	0.07	12.2	7.1	110	20.9	118
75575	REMAINING		25.4	17.3	0.22	55	0.84	0.06	10.4	9.5	90	15.8	106.5
C3-4-5	SAND AND GRAVEL		20	17.7	0.22	299	0.48	0.3	9.4	14.9	130	12.8	54.3
C10-11-12	CLAY AND SOIL		25.6	19.5	0.33	180	0.41	0.41	8.6	20.9	110	14	58.2

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb
		Units	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	41	56	1.4	770	2	0.57	13	52	670	19	135
Client Sample ID	SRK Group	LOD	0.5	0.2	0.01	5	0.05	0.01	0.1	0.2	10	0.5	0.1
C19-20	CLAY AND SOIL		31.7	23.5	0.41	204	0.72	0.51	12.6	32	130	20.7	66.8
C23-24	REMAINING		10.7	18	0.09	36	0.6	0.18	11.7	14.4	50	16.2	18.2
C27-28	REMAINING		12.4	13.4	0.07	37	0.93	0.14	11.3	10	60	14.5	18.6
C33-34	REMAINING		32.3	14.1	0.13	30	1.05	0.15	13.3	9	160	21.9	49.6
C42	REMAINING		56.7	15.3	0.21	153	1.87	0.17	9.4	21.9	600	24.2	65.5
C45-46	COAL		45.2	12.9	0.18	57	1.7	0.22	7.7	10.4	250	26.2	22
C14-15-16	CLAY AND SOIL		28.7	26	0.42	615	0.62	0.48	11.6	31.2	140	19.5	78.7
C36-37	REMAINING		69	17.1	0.27	90	1.22	0.2	12.7	18.7	470	35.5	87.5
C40-41	REMAINING		54.6	18.5	0.31	109	1.5	0.19	12.4	20.7	520	22.1	96.2
Alpha_C-0.250mm	COAL		28.1	21.3	0.13	693	1.63	0.04	5.2	6.9	140	36.3	18.1
Alpha_DLL-0.250mm	COAL		6.2	3.1	0.01	287	0.31	0.01	1.4	5.4	50	5.1	1.2
Alpha_DU-0.250mm	COAL		14.4	14.8	0.05	726	1.68	0.04	5.3	9.9	90	21.8	3.6
C_Seam_S1.60+0.250mm	COAL		28	44.8	0.14	551	0.75	0.1	10.4	2.8	200	24.6	21.6
Seam_C_Roof/Floor+0.250mm	COAL		28.5	29.8	0.23	742	0.79	0.1	6	8.5	280	20	65
C_Seam-0.250mm_Roof/Floor	COAL		31.6	30.5	0.25	378	0.92	0.04	9.1	15	160	34	87.7
Seam_DLL_S1.60+0.25	COAL		23.8	44.9	0.05	574	0.93	0.03	11.7	4.2	230	37.9	4.6
Roof/Floor_Seam_DLL	COAL		41.3	26.4	0.25	79	0.64	0.06	14.1	13.1	100	20.8	126
DLL_Seam-0.250mm_Roof/Floor	COAL		37.1	28	0.24	105	1	0.05	15.1	15.4	100	23.6	127
Seam_DU_S1.60+0.250mm	COAL		26.1	48	0.07	343	1.72	0.04	10.2	5.7	160	27.2	10.1
Seam_DU_+0.250mm_Roof/Floor	COAL		45.3	35.4	0.11	817	1.55	0.04	11.7	14.9	680	33.7	25.9
DU_Seam-0.250mm_Roof/Floor	COAL		47.1	35.9	0.24	745	1.5	0.04	11.5	30.5	900	29.7	77
Blended raw coal	COAL		11.2	8.8	0.03	160	1.92	0.05	3.3	11.1	50	13	3.6
201064	C		4.9	8.3	0.02	78	1.32	0.03	2	4.7	30	7.1	1.1
201076	C		9.1	6.6	0.02	73	1.28	0.04	2.4	5.6	30	6.8	1.4
201077	C		11.3	43.4	0.09	165	0.96	0.05	8	6.7	170	25	22.3
201074	C		7	35.8	0.08	114	2.39	0.05	7.6	8.1	150	22.3	12.4
201085	DU		5.4	17.6	0.03	257	1.42	0.04	6.1	13.4	80	16.7	4
201098	DU		4.7	12.8	0.02	109	1.69	0.03	4.6	13.6	50	11.9	2.5
201099	DU		9.6	31.3	0.06	531	1.39	0.04	8.8	11.8	150	24.3	10.8
201096	DU		6.6	19.9	0.05	218	2.11	0.04	5.9	13.5	110	20.4	8.3
201105	DLM/DLL		4.7	11.5	0.03	751	0.98	0.03	4.6	6.2	650	11.2	2.6
201118	DLM/DLL		3.8	6.9	0.01	63	1.02	0.03	2.2	7.7	30	5.7	0.4
201119	DLM/DLL		8.3	32.7	0.08	1910	1.27	0.03	11.2	6.3	680	30.2	16.7
201116	DLM/DLL		4.7	14.1	0.07	316	1.62	0.05	6.5	9.9	90	17.8	23.1

MEMS61 - 4 acid digest

MEMS42 - Aqua regia digest

Samples with TOC > 5% were ashed prior to MEMS61

Aqua regia diegest was carried out on a split of samples with TOC > 5% to capture volatile elements (As, Sb, Se, Te and Tl)

Samples with TOC < 5% were submitted for MEMS61 only (denoted with a " * ")

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	Re	S	Sb	Sb	Sc	Se	Se	Sn	Sr	Ta	Te
		Units	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	0.0004	0.22	1.2	1.2	10	0.42	0.42	4.6	320	1.5	0.005
Client Sample ID	SRK Group	LOD	0.002	0.01	0.05	0.05	0.1	1	1	0.2	0.2	0.05	0.05
1252D_ARD03	REMAINING		0.002	0.06	0.9	0	15.2	2	0	4.2	82.2	1.05	0.09
1252D_ARD04	REMAINING		<0.002	0.11	0.43	0	10.1	1	0	2.2	70.1	0.57	<0.05
1252D_ARD05	COAL		0.004	0.44	0.54	0	9.8	2	0	1	76.3	0.18	0.18
1252D_ARD07	REMAINING		<0.002	0.09	1.1	0	14.1	2	0	4.8	51	1.24	0.05
1252D_ARD09	REMAINING		<0.002	0.02	0.51	0	4.7	1	0	2.3	39.3	0.54	<0.05
1252D_ARD10	REMAINING		<0.002	0.08	0.94	0	19.3	3	0	4.2	144.5	1.02	0.1
1252D_ARD11	COAL		0.002	0.37	0.69	0	16	4	0	6	68.1	1.47	0.09
1262D_ARD01	SAND AND GRAVEL		<0.002	0.01	0.59	0	5.3	1	0	1.6	27.1	0.62	0.07
1262D_ARD02	SAND AND GRAVEL		<0.002	0.01	0.4	0	2.7	<1	0	1	11.3	0.19	<0.05
1262D_ARD03	REMAINING		<0.002	0.02	0.51	0	6.6	1	0	3.1	34.4	0.76	<0.05
1262D_ARD04	CARBONACEOUS		<0.002	0.01	0.6	0	4.2	2	0	1.6	42.4	0.39	<0.05
1262D_ARD05	COAL		0.025	0.26	1.38	0	20.9	8	0	4.5	97.8	1.14	0.33
1277D_ARD01	CLAY AND SOIL		<0.002	0.01	0.66	0	7.9	2	0	1.9	35.1	0.68	0.06
1277D_ARD02	SAND AND GRAVEL		<0.002	0.02	0.79	0	10.4	1	0	2.3	48.2	0.84	0.08
1277D_ARD03	CLAY AND SOIL		<0.002	0.02	0.87	0	14.9	1	0	2.7	283	0.71	0.24
1277D_ARD04	REMAINING		<0.002	0.03	1.15	0	15.5	2	0	4.8	183.5	1.19	0.11
1277D_ARD05	REMAINING		<0.002	0.02	0.79	0	13.3	2	0	3.3	134.5	0.8	0.07
1277D_ARD10	REMAINING		<0.002	0.03	0.49	0	7.2	1	0	3.4	38	0.91	<0.05
1277D_ARD11	REMAINING		<0.002	0.06	0.47	0	3.8	1	0	1.6	43.7	0.41	<0.05
1326D_ARD01	CLAY AND SOIL		<0.002	0.09	0.84	0	13.9	2	0	3.1	91.3	0.95	0.19
1326D_ARD02	CLAY AND SOIL		<0.002	0.04	0.8	0	12.6	1	0	3	69.1	0.89	0.22
1326D_ARD03	SAND AND GRAVEL		<0.002	0.03	0.72	0	9.7	1	0	2.3	49.2	0.68	0.05
1326D_ARD04	SAND AND GRAVEL		<0.002	0.03	0.91	0	14.6	1	0	3.2	66.4	0.91	0.07
1326D_ARD05	REMAINING		<0.002	0.01	1.05	0	11.1	2	0	4.6	102	1.12	0.13
1327D_ARD01	SAND AND GRAVEL		<0.002	0.04	0.61	0	5.9	1	0	1.5	38.1	0.39	0.05
1327D_ARD03	COAL		<0.002	0.06	0.86	0	14.9	2	0	5.1	43.3	1.33	0.06
1336D_ARD02	CARBONACEOUS		<0.002	0.01	0.56	0	3.4	1	0	2	34.7	0.45	<0.05
1336D_ARD03	REMAINING		<0.002	0.08	0.7	0	4.3	2	0	1.8	41.4	0.41	<0.05
1337DG_ARD01	SAND AND GRAVEL		<0.002	0.01	0.51	0	3.5	1	0	1	16.7	0.32	<0.05
1337DG_ARD02	REMAINING		0.003	0.09	0.45	0	9.8	2	0	2.1	47.5	0.56	0.08
1337DG_ARD03	COAL		<0.002	0.11	0.37	0	13.5	2	0	2.3	98.5	0.71	0.07
1339DG_ARD01	REMAINING		<0.002	0.01	0.64	0	7.6	1	0	1.8	45.9	0.56	0.1
1339DG_ARD02	REMAINING		<0.002	0.04	0.76	0	11	2	0	3	377	0.82	0.13
1339DG_ARD03	CARBONACEOUS		0.002	0.18	1.61	0	17.5	3	0	4.2	52	1.02	0.13
1339DG_ARD04	REMAINING		<0.002	0.1	0.58	0	8.1	1	0	4.2	30.4	1.02	<0.05
1339DG_ARD05	REMAINING		<0.002	0.21	0.77	0	12.1	1	0	4.5	34.9	1.22	<0.05
1339DG_ARD06	REMAINING		<0.002	>10.0	3.15	0	4.4	19	0	0.8	9.5	0.28	0.19
1349D_ARD03	REMAINING		<0.002	0.04	0.57	0	5.7	1	0	1.7	61.6	0.66	<0.05
1350D_ARD01	SAND AND GRAVEL		<0.002	0.01	0.53	0	4.3	1	0	1.2	12.4	0.29	<0.05
1350D_ARD02	REMAINING		<0.002	0.01	0.9	0	10.7	1	0	1.9	22.7	0.6	0.06
1350D_ARD03	REMAINING		<0.002	0.01	0.95	0	16.3	1	0	3.9	29.8	0.98	0.12
1350D_ARD04	COAL		0.006	0.05	0.98	0	18.2	10	0	3.1	115.5	0.73	0.18
1361D_ARD01	REMAINING		<0.002	0.01	0.7	0	10.6	1	0	2.8	68.4	0.86	0.05
1361D_ARD02	REMAINING		<0.002	0.01	0.4	0	2.8	<1	0	0.8	10.8	0.2	<0.05
1362D_ARD01	REMAINING		<0.002	0.01	0.64	0	7.7	1	0	1.8	55.6	0.54	<0.05

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	Re	S	Sb	Sb	Sc	Se	Se	Sn	Sr	Ta	Te
		Units	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	0.0004	0.22	1.2	1.2	10	0.42	0.42	4.6	320	1.5	0.005
Client Sample ID	SRK Group	LOD	0.002	0.01	0.05	0.05	0.1	1	1	0.2	0.2	0.05	0.05
1362D_ARD02	REMAINING		<0.002	0.01	1.24	0	7.2	2	0	2.3	28.1	0.68	0.15
1362D_ARD03	REMAINING		<0.002	0.01	0.55	0	4.2	<1	0	1.6	30	0.35	<0.05
1362D_ARD04	REMAINING		<0.002	0.01	0.87	0	14.6	2	0	4.1	35.1	0.99	0.12
1362D_ARD05	REMAINING		<0.002	0.02	0.81	0	14.3	3	0	3	115.5	0.83	0.1
1362D_ARD06	COAL		0.002	0.35	0.63	0	9.7	2	0	1.9	47.6	0.5	0.13
1252D_ARD08	REMAINING		<0.002	0.01	0.43	0	4.2	<1	0	2.3	33.8	0.57	<0.05
1336D_ARD01	REMAINING		<0.002	0.01	0.59	0	6	1	0	2.3	39	0.56	<0.05
1339DG_ARD08	REMAINING		<0.002	0.02	0.52	0	6.9	1	0	3.2	30	0.79	<0.05
1349D_ARD01	CLAY AND SOIL		<0.002	0.04	0.81	0	15.8	1	0	3.5	169.5	0.9	0.07
1349D_ARD02	REMAINING		<0.002	0.01	1.03	0	17.5	1	0	3.9	59.7	1.24	0.05
1361D_ARD03	REMAINING		<0.002	0.01	0.49	0	4.4	1	0	2.1	35.8	0.54	<0.05
1406D_ARD01	CLAY AND SOIL	*	<0.002	0.02	0.62	0	14.1	1	0	2.4	160.5	0.65	<0.05
1406D_ARD02	REMAINING	*	<0.002	0.03	0.51	0	16.9	1	0	2.2	174.5	0.55	0.05
1406D_ARD03	REMAINING	*	<0.002	0.04	0.51	0	15.5	1	0	2.2	187	0.54	0.06
1406D_ARD04	REMAINING	*	<0.002	0.06	0.4	0	9.3	1	0	2.3	71.7	0.6	<0.05
1406D_ARD06	COAL		<0.002	0.11	0.45	0.26	11.7	2	1.2	2.6	135	0.79	0.13
1406D_ARD07	REMAINING	*	<0.002	0.08	0.59	0	11.1	1	0	4.1	54.1	1.03	<0.05
1406D_ARD08	REMAINING	*	<0.002	0.02	0.45	0	3.6	<1	0	1.8	35.3	0.39	<0.05
1406D_ARD09	COAL		0.002	0.14	0.3	0.07	4.1	1	1.2	0.9	24.6	0.29	0.08
1406D_ARD10	REMAINING	*	<0.002	0.02	0.37	0	6	1	0	3.2	31.1	0.81	<0.05
1411D_ARD01	CLAY AND SOIL	*	<0.002	<0.01	0.67	0	10.1	1	0	3.3	54.4	0.72	<0.05
1411D_ARD02	REMAINING	*	<0.002	0.01	0.91	0	13.5	1	0	4.9	52.3	1.25	0.05
1411D_ARD04	REMAINING	*	0.002	0.04	0.93	0	20.1	2	0	5.6	63.5	1.51	0.07
1411D_ARD05	REMAINING	*	<0.002	0.02	0.52	0	11.5	1	0	3.8	44.9	0.98	<0.05
1411D_ARD06	CARBONACEOUS		0.002	0.1	1.03	0.39	18.7	2	1.6	4.2	123.5	1.11	0.16
1411D_ARD07	COAL		0.002	0.12	0.14	<0.05	2	<1	1.2	0.5	21.1	0.12	0.07
1413D_ARD02	SAND AND GRAVEL	*	<0.002	0.01	1.07	0	18.5	3	0	3	39.9	0.96	0.1
1413D_ARD03	REMAINING	*	<0.002	0.01	0.9	0	15.3	1	0	4.4	209	1.15	0.09
1413D_ARD04	REMAINING	*	0.002	0.02	0.59	0	11.6	3	0	1.8	508	0.46	<0.05
1413D_ARD05	COAL		0.002	0.11	0.41	0.15	12	1	0.6	2.1	79.9	0.5	0.06
1413D_ARD06	REMAINING	*	<0.002	0.05	0.67	0	12.9	1	0	4.7	44.6	1.23	0.06
1413D_ARD07	REMAINING	*	<0.002	0.04	0.49	0	7.3	1	0	2.5	35.8	0.68	<0.05
1413D_ARD08	COAL		0.002	0.14	0.23	0.05	2.5	1	1.3	1.9	14.9	0.34	0.07
1415D_ARD01	SAND AND GRAVEL	*	<0.002	0.01	0.41	0	4.1	<1	0	1.2	22	0.22	<0.05
1415D_ARD02	CLAY AND SOIL	*	<0.002	0.03	0.86	0	20	1	0	4.1	80.2	1.08	0.05
1415D_ARD03	REMAINING	*	<0.002	0.01	0.73	0	16.3	1	0	2.6	62	0.68	0.05
1415D_ARD04	COAL		0.003	0.13	3.73	0.66	6.1	<1	0.3	0.9	29.2	0.19	0.05
1415D_ARD05	COAL		<0.002	0.09	0.2	<0.05	2.7	<1	0.7	0.5	14.1	0.1	0.06
1415D_ARD06	REMAINING	*	<0.002	0.01	0.45	0	8.2	1	0	3.4	27.7	0.88	<0.05
1415D_ARD07	REMAINING	*	<0.002	0.02	0.53	0	11.2	1	0	4.3	33.3	1.1	<0.05
1418D_ARD01	REMAINING	*	<0.002	0.01	0.96	0	15.3	1	0	3.6	28.9	1.13	0.07
1418D_ARD02	REMAINING	*	<0.002	0.01	0.84	0	14.2	1	0	4.4	38	1.11	0.09
1418D_ARD03	COAL		0.002	0.09	0.41	0.05	3.5	1	1.2	0.7	22.5	0.18	0.05
1419D_ARD01	CLAY AND SOIL	*	<0.002	0.02	0.89	0	17.5	1	0	3.1	25.9	0.92	0.06
1419D_ARD02	REMAINING	*	<0.002	0.01	0.97	0	13.2	1	0	3.2	26.5	0.89	0.11

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	Re	S	Sb	Sb	Sc	Se	Se	Sn	Sr	Ta	Te
		Units	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	0.0004	0.22	1.2	1.2	10	0.42	0.42	4.6	320	1.5	0.005
Client Sample ID	SRK Group	LOD	0.002	0.01	0.05	0.05	0.1	1	1	0.2	0.2	0.05	0.05
1419D_ARD03	CLAY AND SOIL	*	<0.002	0.01	0.88	0	11.9	1	0	4.6	45.8	1.26	0.06
1419D_ARD04	REMAINING	*	<0.002	0.01	0.85	0	19.8	4	0	3.7	54	0.9	0.16
1419D_ARD05	REMAINING	*	0.002	0.03	0.77	0	12	1	0	4.4	44.5	1.18	<0.05
1419D_ARD06	COAL		<0.002	0.07	0.09	<0.05	2	<1	0.6	0.3	9.6	0.06	0.05
1419D_ARD07	REMAINING	*	<0.002	0.04	0.54	0	11	1	0	4.1	39.6	1.06	<0.05
1419D_ARD08	REMAINING	*	<0.002	0.05	0.6	0	13.1	2	0	4.5	58.7	1.16	0.07
1419D_ARD09	COAL		<0.002	0.11	0.09	<0.05	2.5	<1	1	0.6	11.8	0.17	0.07
1419D_ARD10	REMAINING	*	<0.002	0.02	0.63	0	13.2	1	0	4.8	37.8	1.39	<0.05
1420D_ARD01	SAND AND GRAVEL	*	<0.002	<0.01	0.53	0	8.1	1	0	1.8	46.2	0.5	<0.05
1420D_ARD02	CLAY AND SOIL	*	<0.002	0.02	0.91	0	24.5	1	0	4.3	87.1	1.12	<0.05
1420D_ARD03	REMAINING	*	<0.002	0.01	0.8	0	15.4	1	0	2.9	15.5	0.86	<0.05
1420D_ARD04	REMAINING	*	<0.002	0.03	0.52	0	8.1	<1	0	1.4	42.7	0.28	<0.05
1420D_ARD05	CARBONACEOUS	*	<0.002	0.03	0.94	0.41	14.1	3	3.1	4.3	50.1	1.4	0.14
1420D_ARD06	REMAINING	*	<0.002	0.04	0.52	0	7.4	1	0	3.1	29.9	0.97	<0.05
1420D_ARD07	REMAINING	*	<0.002	0.05	0.61	0	11.5	2	0	4.6	32.5	1.33	0.05
1420D_ARD08	COAL		0.002	0.08	0.22	<0.05	8.3	1	4.1	2.8	19	0.63	0.31
1420D_ARD09	REMAINING		<0.002	0.03	0.4	0.14	11.1	2	0.4	4.4	30.4	1.55	<0.05
1420D_ARD10	COAL		<0.002	0.09	0.62	0.1	2.6	<1	1.2	1	11.9	0.26	0.06
1420D_ARD11	REMAINING	*	<0.002	0.01	0.52	0	7.8	1	0	3.8	30.7	1.2	0.08
1421D_ARD01	CLAY AND SOIL	*	<0.002	0.01	0.84	0	14.4	1	0	2.9	34.3	1.29	<0.05
1421D_ARD02	REMAINING	*	<0.002	0.01	0.85	0	16.7	1	0	3.3	40	1.47	<0.05
1421D_ARD03	CARBONACEOUS	*	0.002	0.12	1.47	0.8	14.8	3	2.4	3.2	105	0.95	0.17
1421D_ARD04	CARBONACEOUS	*	0.003	0.06	0.69	0.26	13	3	1.4	3.6	70.9	0.93	0.13
1421D_ARD05	COAL		<0.002	0.13	0.14	<0.05	3.9	<1	0.8	0.6	19.6	0.11	0.07
1421D_ARD06	REMAINING	*	<0.002	0.03	0.59	0	11.1	1	0	4.2	41.6	1.25	0.05
1421D_ARD07	COAL		0.003	0.07	0.26	0.05	8.2	2	4.6	3.1	29	0.71	0.33
1422D_ARD01	REMAINING	*	<0.002	<0.01	0.48	0	6.9	1	0	3.2	27.3	0.85	<0.05
1422D_ARD02	CARBONACEOUS		0.023	0.63	0.86	0.31	10.3	5	3.6	4.8	167.5	1.24	0.14
1422D_ARD03	COAL		0.002	0.14	0.17	<0.05	2.1	<1	0.7	0.4	42.5	0.08	0.05
1422D_ARD04	REMAINING	*	<0.002	0.09	0.53	0	7.5	1	0	3.8	37.7	1.17	<0.05
1423D_ARD01	REMAINING	*	<0.002	<0.01	0.87	0	8.7	1	0	2.7	39.2	0.9	0.09
1423D_ARD03	REMAINING	*	<0.002	<0.01	0.45	0	5.2	1	0	1.9	36.9	0.53	<0.05
1423D_ARD04	CARBONACEOUS		0.002	0.07	0.91	0.28	19.5	3	0.9	3.9	238	1.08	0.12
1423D_ARD05	CARBONACEOUS	*	0.002	0.07	0.92	0.26	19.3	2	0.8	4.3	177	1.19	0.1
1423D_ARD06	CARBONACEOUS		0.002	0.09	0.44	0.07	8.1	2	2.8	2	29.9	0.56	0.14
1423D_ARD07	REMAINING	*	<0.002	0.29	0.5	0	9.2	1	0	3.7	40	1.17	0.05
1423D_ARD08	REMAINING	*	<0.002	0.29	0.46	0	7.8	1	0	3.4	37.3	1.05	<0.05
1423D_ARD09	COAL		<0.002	0.12	0.53	0.09	3.9	1	0.7	0.3	20	0.07	<0.05
1423D_ARD10	REMAINING	*	<0.002	0.12	0.62	0	4.9	1	0	3.3	166.5	1.12	0.09
1423D_ARD11	COAL		0.002	0.12	0.36	<0.05	4.1	1	1.5	1.2	19.9	0.45	0.12
1423D_ARD12	REMAINING	*	<0.002	0.01	0.59	0	11.6	1	0	5.2	48.4	1.49	0.07
1423D_ARD13	REMAINING	*	<0.002	0.02	0.6	0	10	1	0	4.4	47.2	1.27	0.05
1423D_ARD14	REMAINING	*	<0.002	0.03	0.64	0	9.5	1	0	4.5	42.4	1.35	<0.05
1424D_ARD01	REMAINING	*	<0.002	0.05	1.19	0	13	1	0	2.1	665	0.59	0.33
1424D_ARD02	CARBONACEOUS		0.002	0.1	0.68	0.24	6.1	1	0.7	3.1	99.3	0.62	0.06

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	Re	S	Sb	Sb	Sc	Se	Se	Sn	Sr	Ta	Te
		Units	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	0.0004	0.22	1.2	1.2	10	0.42	0.42	4.6	320	1.5	0.005
Client Sample ID	SRK Group	LOD	0.002	0.01	0.05	0.05	0.1	1	1	0.2	0.2	0.05	0.05
1424D_ARD03	COAL		<0.002	0.13	0.32	0.08	3.8	<1	1.2	1	160.5	0.22	0.07
1424D_ARD04	CARBONACEOUS		0.002	0.75	0.26	0.15	5.8	2	1.3	0.8	192.5	0.18	0.09
1424D_ARD05	REMAINING	*	<0.002	0.03	0.47	0	13.6	1	0	1.9	313	0.55	0.05
1424D_ARD06	REMAINING	*	0.002	0.06	0.65	0	14.9	1	0	2.4	348	0.67	0.1
1424D_ARD07	REMAINING	*	<0.002	0.04	0.61	0	12.9	1	0	2	386	0.56	0.09
1424D_ARD08	REMAINING		0.002	0.22	1.15	0.37	6.7	1	0.6	1.1	145	0.31	0.05
1424D_ARD09	COAL		0.003	0.12	0.72	0.24	8.9	2	0.8	2	140.5	0.56	0.09
1424D_ARD10	REMAINING	*	<0.002	0.02	0.64	0	10.9	1	0	4.4	47.6	1.28	0.05
1424D_ARD11	REMAINING	*	<0.002	0.01	0.42	0	4.1	<1	0	2.1	35.4	0.54	<0.05
1424D_ARD12	CARBONACEOUS		0.002	0.15	1.77	0.97	19.3	3	2.2	4	94.4	1.1	0.21
1424D_ARD13	COAL		<0.002	0.13	0.31	0.07	2.8	<1	0.7	1.1	17.5	0.26	<0.05
1424D_ARD14	COAL		<0.002	0.12	0.56	0.12	5.2	1	1	4.7	26.8	1.43	0.12
1424D_ARD15	CARBONACEOUS	*	<0.002	0.16	0.67	0.22	10.4	1	0.5	5	38.4	1.36	0.05
1425D_ARD01	SAND AND GRAVEL	*	<0.002	0.04	0.8	0	10.1	1	0	2.2	62	0.74	0.06
1425D_ARD02	REMAINING	*	<0.002	0.01	0.59	0	5.7	1	0	1.5	29.3	0.45	0.07
1425D_ARD03	COAL	*	<0.002	0.02	0.74	0.33	17.7	2	0.8	2.6	78.1	0.75	0.15
1425D_ARD04	COAL		0.013	0.51	1.1	0.48	12	12	9.2	2.2	160.5	0.53	0.22
1425D_ARD05	REMAINING	*	<0.002	0.04	0.54	0	8.7	1	0	3.3	35.1	0.98	<0.05
1425D_ARD06	REMAINING	*	<0.002	0.02	0.48	0	3.7	<1	0	2.6	35	0.61	<0.05
1425D_ARD07	COAL		0.002	0.09	0.28	0.05	8.1	1	3.8	2.4	21.2	0.51	0.25
1425D_ARD08	REMAINING	*	<0.002	0.01	0.36	0	5	1	0	3	32.6	1.1	<0.05
1427D_ARD01	SAND AND GRAVEL	*	<0.002	0.01	0.42	0	4.1	<1	0	1	19.5	0.23	<0.05
1427D_ARD02	CLAY AND SOIL	*	<0.002	0.03	0.93	0	17	1	0	3.9	75.2	1.18	0.08
1427D_ARD03	REMAINING	*	<0.002	0.02	0.76	0	13.5	1	0	3	93.8	1.06	0.1
1427D_ARD04	REMAINING		0.002	0.15	0.72	0.4	10.7	2	0.6	2.2	81.7	0.55	0.07
1427D_ARD05	REMAINING	*	0.002	0.03	0.62	0	12.9	1	0	4.3	50.7	1.14	0.09
1427D_ARD06	REMAINING	*	<0.002	0.04	0.36	0	7.3	1	0	2.4	57.8	0.73	0.08
1427D_ARD07	COAL		<0.002	0.13	0.78	0.29	10.4	1	0.7	2.3	97.6	0.69	0.06
1427D_ARD08	REMAINING	*	<0.002	0.05	0.91	0	13.6	1	0	4.8	43.9	1.35	0.09
1427D_ARD09	REMAINING	*	0.003	1.14	0.34	0	16.3	10	0	4.2	39.4	0.93	0.52
1427D_ARD10	COAL		<0.002	0.02	1.46	0.14	10.5	1	0.4	3.5	36.3	0.98	<0.05
1426D_ARD01	REMAINING	*	<0.002	0.02	0.7	*	10.5	1	*	3.1	27	0.88	<0.05
1426D_ARD02	COAL	*	<0.002	0.04	0.61	0.18	11.8	1	0.2	2.4	271	0.71	0.06
1426D_ARD03	REMAINING	*	0.016	0.09	0.58	*	10.8	2	*	2.5	250	0.72	0.07
1426D_ARD04	REMAINING	*	<0.002	0.05	0.98	*	15.7	2	*	4.4	58.2	1.12	0.15
1426D_ARD05	CARBONACEOUS		0.003	0.13	0.59	0.16	10.7	1	0.9	2.3	53.2	0.34	0.08
1426D_ARD06	REMAINING		0.002	0.16	0.77	0.18	11.7	1	0.5	1.1	66.6	0.3	<0.05
1426D_ARD07	COAL		0.002	0.1	0.53	0.2	11.7	1	0.8	2	64.6	0.56	0.08
1426D_ARD08	COAL		<0.002	0.07	0.27	0.06	6.7	1	1.7	1.7	25.2	0.67	0.13
1426D_ARD09	COAL		0.002	0.04	0.94	0.23	12.8	2	0.5	4	34.2	1.04	0.05
1426D_ARD10	REMAINING	*	<0.002	0.02	0.52	*	8.2	1	*	3.2	33.3	0.95	<0.05
1426D_ARD11	REMAINING		<0.002	0.06	1.09	0.57	16.6	2	3	4.3	39.9	1.09	0.23
1426D_ARD12	COAL		0.002	0.16	0.37	0.08	8.5	1	3.8	2.6	17.7	0.58	0.26
1426D_ARD13	COAL		<0.002	0.09	0.19	<0.05	2.3	<1	1.1	1	11.4	0.3	0.08
1426D_ARD14	REMAINING	*	<0.002	0.01	0.46	*	7.2	1	*	3.6	30.5	1.16	0.05

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	Re	S	Sb	Sb	Sc	Se	Se	Sn	Sr	Ta	Te
		Units	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	0.0004	0.22	1.2	1.2	10	0.42	0.42	4.6	320	1.5	0.005
Client Sample ID	SRK Group	LOD	0.002	0.01	0.05	0.05	0.1	1	1	0.2	0.2	0.05	0.05
1435D_ARD01	SAND AND GRAVEL	*	<0.002	0.01	0.33	*	3.6	<1	*	1	23.4	0.22	<0.05
1435D_ARD02	CLAY AND SOIL	*	<0.002	0.02	0.68	*	8.1	1	*	2.9	52.1	0.95	0.11
1435D_ARD03	CLAY AND SOIL	*	<0.002	0.04	0.71	*	15.2	2	*	3	108.5	0.84	0.32
1435D_ARD04	REMAINING	*	0.008	0.05	0.84	*	13.2	2	*	3.9	77.8	1.11	0.07
1435D_ARD05	REMAINING		0.003	0.09	1.01	0.41	13.5	3	1.2	3.5	58.8	0.8	0.17
1435D_ARD06	COAL	*	<0.002	0.04	0.75	0.19	16	2	0.6	5.2	43.8	1.39	0.1
1435D_ARD07	REMAINING	*	<0.002	0.09	0.54	*	11.3	1	*	3.4	48.4	1	0.11
1435D_ARD08	COAL		0.002	0.1	0.37	0.1	14.3	2	1.5	2	28.6	0.45	0.26
1435D_ARD09	REMAINING		0.002	0.04	0.67	0.21	16.6	2	0.5	5.5	41.4	1.41	0.06
1435D_ARD10	CARBONACEOUS	*	<0.002	0.08	0.69	0.2	13.6	2	0.9	5.2	59	1.4	0.11
1435D_ARD11	CARBONACEOUS		0.002	0.08	0.27	0.07	11.1	2	4.5	3.3	21.5	0.7	0.34
1435D_ARD12	COAL		<0.002	0.06	0.51	0.14	9.9	1	1.2	3.9	26.7	1.04	0.06
1435D_ARD13	REMAINING		<0.002	0.12	0.4	<0.05	3.1	<1	0.6	0.3	14.4	0.13	<0.05
1435D_ARD14	REMAINING	*	<0.002	0.01	0.6	*	9.1	1	*	4.4	35	1.36	0.05
1437R_ARD01	REMAINING	*	<0.002	0.02	1	*	17.4	1	*	4.2	65.6	1.21	0.1
1437R_ARD02	REMAINING	*	<0.002	0.01	0.35	*	2.4	<1	*	1.2	13.9	0.43	<0.05
1437R_ARD03	REMAINING	*	<0.002	0.02	0.65	*	12.5	1	*	2	312	0.55	0.1
1437R_ARD04	REMAINING	*	0.004	0.05	0.51	*	14	2	*	2	138.5	0.56	0.09
1437R_ARD05	REMAINING	*	<0.002	0.04	0.54	*	12.4	1	*	2.2	136	0.62	0.1
1437R_ARD06	CARBONACEOUS	*	<0.002	0.07	0.92	0.41	11.2	1	0.7	4.9	136	1.18	0.12
1437R_ARD07	COAL		0.003	0.16	0.47	0.12	16.6	2	1	1.7	62.4	0.42	0.08
1437R_ARD08	CARBONACEOUS		0.003	0.15	0.55	0.22	12.5	2	0.7	2.2	106	0.53	0.06
1437R_ARD09	CARBONACEOUS		<0.002	0.1	0.35	0.09	8.7	1	1	1.8	29.4	0.59	0.1
1437R_ARD10	COAL		0.003	0.16	0.6	0.19	11.2	2	1.3	2.2	62.3	0.67	0.11
1437R_ARD11	COAL		<0.002	0.08	0.93	0.22	13.1	2	1.7	2.8	40.9	0.69	0.11
1438R_ARD01	REMAINING	*	<0.002	0.01	0.64	*	7.2	1	*	1.8	50.3	0.55	0.1
1438R_ARD02	REMAINING	*	<0.002	0.02	0.94	*	15.1	1	*	3.6	68	1.08	0.11
1438R_ARD03	REMAINING	*	<0.002	0.01	0.76	*	6.4	1	*	2.6	24.4	0.78	0.05
1438R_ARD04	REMAINING	*	<0.002	0.02	0.54	*	15.4	1	*	1.9	423	0.54	0.1
1438R_ARD05	REMAINING	*	<0.002	0.06	0.6	*	13.2	1	*	2	161.5	0.6	0.09
1438R_ARD06	REMAINING	*	<0.002	0.04	0.71	*	12.2	1	*	2.8	130	0.78	0.1
1438R_ARD07	COAL	*	0.002	0.08	0.88	0.33	15.1	2	0.9	4	76.6	1.05	0.11
1438R_ARD08	COAL		<0.002	0.09	0.6	0.21	9.6	2	0.6	2.4	132	0.76	0.05
1439R_ARD01	REMAINING	*	<0.002	0.02	0.81	*	14.2	1	*	2.8	85.4	0.89	0.11
1439R_ARD02	REMAINING	*	<0.002	0.02	0.79	*	13.3	1	*	3.4	200	0.97	0.05
1439R_ARD03	REMAINING	*	0.003	0.04	0.6	*	14.4	1	*	2.1	96.8	0.62	0.08
1439R_ARD04	REMAINING	*	<0.002	0.05	0.77	*	13.3	1	*	3.2	121.5	1.04	0.07
1439R_ARD05	COAL	*	<0.002	0.02	0.51	0.14	7.7	1	0.2	2.9	94.9	0.79	0.05
1439R_ARD06	COAL		0.002	0.15	0.95	0.3	8.3	2	0.9	2.4	73.5	0.61	0.08
1439R_ARD07	CARBONACEOUS		0.002	0.18	0.89	0.34	10.7	2	1	3.1	103	0.77	0.08
1439R_ARD08	CARBONACEOUS		<0.002	0.15	0.21	<0.05	2.9	1	0.5	0.6	18.7	0.12	0.08
1439R_ARD09	COAL		0.002	0.09	0.33	0.07	9.2	2	3.6	3	28.3	0.63	0.3
1440R_ARD01	CLAY AND SOIL	*	<0.002	<0.01	0.59	*	5	<1	*	1.2	35.4	0.44	0.05
1440R_ARD02	REMAINING	*	<0.002	0.01	0.57	*	5.1	<1	*	1.2	33.8	0.37	0.06
1440R_ARD03	REMAINING	*	<0.002	0.04	0.57	*	13.7	1	*	2.1	168.5	0.6	0.09

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	Re	S	Sb	Sb	Sc	Se	Se	Sn	Sr	Ta	Te
		Units	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	0.0004	0.22	1.2	1.2	10	0.42	0.42	4.6	320	1.5	0.005
Client Sample ID	SRK Group	LOD	0.002	0.01	0.05	0.05	0.1	1	1	0.2	0.2	0.05	0.05
1440R_ARD04	REMAINING	*	<0.002	0.05	0.61	*	12.6	1	*	2.1	187.5	0.68	0.09
1440R_ARD05	REMAINING	*	<0.002	0.09	1.38	*	15.5	2	*	4.6	71.5	1.24	0.09
1440R_ARD06	COAL	*	<0.002	0.54	0.83	0.3	10.5	1	0.5	3.4	60.9	0.92	0.16
1440R_ARD07	COAL		<0.002	0.1	0.47	0.12	6.5	1	1.5	3.4	43.2	0.67	0.09
1440R_ARD08	REMAINING		0.002	0.05	0.63	0.2	12.6	2	0.3	4.2	46.1	1.1	0.05
1440R_ARD09	CARBONACEOUS	*	<0.002	0.07	0.58	0.19	8.5	1	0.3	3.2	47.5	0.9	0.06
1440R_ARD10	COAL		<0.002	0.13	0.23	0.05	5.1	1	1.3	1	28	0.25	0.08
1347DG_ARD004	CARBONACEOUS	*	<0.002	0.08	0.63	0.18	16.2	1	0.4	2.2	211	0.63	0.12
1347DG_ARD006	CARBONACEOUS	*	<0.002	0.07	0.6	0.24	22.6	2	0.8	3.4	174.5	0.78	0.23
1347DG_ARD008	REMAINING	*	0.002	0.07	0.73	*	12.3	1	*	2.9	169.5	0.84	0.08
1347DG_ARD010	CARBONACEOUS	*	<0.002	0.02	0.7	0.19	13.2	1	0.4	5.1	45.9	1.38	0.08
1347DG_ARD011	REMAINING	*	<0.002	0.02	0.82	*	14.6	2	*	4.9	45.8	1.34	0.06
1347DG_ARD012	CARBONACEOUS	*	<0.002	0.07	1.08	0.34	22.2	2	0.8	5.7	93.8	1.4	0.17
1347DG_ARD001	CLAY AND SOIL	*	<0.002	0.02	1.33	*	7.2	1	*	1.9	124.5	0.62	0.08
1347DG_ARD002	REMAINING	*	<0.002	0.02	1.31	*	16.6	1	*	4.1	80	1.41	0.13
1347DG_ARD003	REMAINING	*	<0.002	0.02	1.13	*	11.2	1	*	2.6	53.3	0.96	0.06
1347DG_ARD005	REMAINING	*	<0.002	0.04	0.83	*	15.1	1	*	2.3	194	0.65	0.09
1347DG_ARD007	CARBONACEOUS	*	0.002	0.08	1	*	15.8	2	*	4.6	116	1.21	0.13
75551	CLAY AND SOIL		0.002	0.04	0.57	0	13.8	2	0	2.7	85	0.81	0.06
75552	CLAY AND SOIL		0.002	0.03	0.54	0	14.2	1	0	2.8	68.5	0.82	0.06
75553	CLAY AND SOIL		0.001	0.05	0.56	0	11.7	1	0	2.3	69.9	0.66	0.025
75554	CLAY AND SOIL		0.001	0.03	0.64	0	16.5	1	0	3.2	68.7	0.85	0.05
75555	CLAY AND SOIL		0.002	0.05	0.6	0	18.9	2	0	3.6	74.5	0.94	0.06
75556	CLAY AND SOIL		0.002	0.01	0.57	0	12.2	1	0	2.4	33.8	0.83	0.025
75557	REMAINING		0.001	0.01	0.53	0	9.4	1	0	3.5	32.8	0.9	0.025
7558			0.001	0.02	0.85	0	13.7	3	0	3.4	35.5	0.81	0.25
75559	REMAINING		0.001	0.02	0.93	0	21.9	2	0	4.8	59.1	0.93	0.16
75560	REMAINING		0.001	0.02	1.98	0	28.7	8	0	5.1	155	1.07	0.23
75561	REMAINING		0.001	0.02	0.58	0	14.2	2	0	4.2	42.6	1.04	0.05
75562	REMAINING		0.001	0.02	0.34	0	9.2	1	0	2.6	34.7	0.68	0.025
75563	REMAINING		0.001	0.04	0.48	0	11.6	2	0	4.4	37.1	1.13	0.025
75564	CLAY AND SOIL		0.001	0.05	0.64	0	12.3	2	0	2.5	84.8	0.74	0.07
75565	CLAY AND SOIL		0.001	0.02	0.48	0	9.9	1	0	1.9	44.8	0.63	0.025
75566	SAND AND GRAVEL		0.001	0.01	0.38	0	4.5	1	0	1	23.1	0.38	0.025
75567	CLAY AND SOIL		0.001	0.03	0.5	0	11.5	1	0	2.3	49.9	0.64	0.025
75568	CLAY AND SOIL		0.001	0.04	0.67	0	17.6	1	0	3.4	72.1	0.95	0.025
75569	REMAINING		0.001	0.02	0.65	0	9.9	1	0	3.2	37	0.81	0.025
75570	REMAINING		0.001	0.02	0.44	0	12.7	1	0	2.6	334	0.67	0.025
75571	REMAINING		0.001	0.01	0.51	0	10.6	2	0	3.1	88.4	0.81	0.06
75572	REMAINING		0.003	0.03	0.68	0	16	4	0	4.3	146	1.07	0.08
75573	COAL		0.002	0.14	0.44	0	11.6	2	0	1.6	65.2	0.37	0.06
75574	REMAINING		0.001	0.02	0.38	0	10.3	1	0	3.7	35.5	0.94	0.025
75575	REMAINING		0.002	0.02	0.52	0	7.8	1	0	3.3	29.9	0.82	0.025
C3-4-5	SAND AND GRAVEL		0.001	0.02	0.44	0	10.6	1	0	2.2	60.3	0.72	0.05
C10-11-12	CLAY AND SOIL		0.001	0.03	0.42	0	11.4	1	0	2.2	50.6	0.63	0.025

		Method	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	Re	S	Sb	Sb	Sc	Se	Se	Sn	Sr	Ta	Te
		Units	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	0.0004	0.22	1.2	1.2	10	0.42	0.42	4.6	320	1.5	0.005
Client Sample ID	SRK Group	LOD	0.002	0.01	0.05	0.05	0.1	1	1	0.2	0.2	0.05	0.05
C19-20	CLAY AND SOIL		0.001	0.02	0.58	0	19.5	2	0	3.5	65.2	0.92	0.05
C23-24	REMAINING		0.001	0.01	0.76	0	15.2	1	0	3.2	31.9	0.9	0.025
C27-28	REMAINING		0.002	0.02	0.7	0	12	1	0	3.3	40.7	0.89	0.05
C33-34	REMAINING		0.001	0.01	0.62	0	13.2	1	0	4	81.9	1	0.08
C42	REMAINING		0.002	0.01	0.67	0	16.9	3	0	3	135.5	0.72	0.09
C45-46	COAL		0.004	0.16	0.62	0	12.2	3	0	2.2	122.5	0.51	0.09
C14-15-16	CLAY AND SOIL		0.001	0.03	0.56	0	16.4	2	0	3.1	75.5	0.84	0.025
C36-37	REMAINING		0.001	0.02	0.88	0	15.1	1	0	4	221	1.06	0.08
C40-41	REMAINING		0.001	0.01	0.91	0	18	2	0	4	115.5	1.02	0.1
Alpha_C-0.250mm	COAL		0.002	0.61	0.5	0	7.1	3	0	10.2	40.6	0.63	0.11
Alpha_DLL-0.250mm	COAL		0.001	0.09	0.16	0	1.8	1	0	0.4	7.6	0.06	0.025
Alpha_DU-0.250mm	COAL		0.003	0.82	0.85	0	6.8	3	0	3.1	27.4	0.36	0.11
C_Seam_S1.60+0.250mm	COAL		0.002	0.46	0.31	0	9.2	3	0	3.4	60.1	1.12	0.12
Seam_C_Roof/Floor+0.250mm	COAL		0.002	0.23	0.61	0	12.8	2	0	2.3	59	0.57	0.12
C_Seam-0.250mm_Roof/Floor	COAL		0.002	0.3	1.24	0	12.3	2	0	5.1	40.6	0.86	0.09
Seam_DLL_S1.60+0.25	COAL		0.002	1.53	0.61	0	7.4	3	0	5	18.3	1.22	0.07
Roof/Floor_Seam_DLL	COAL		0.001	0.04	0.6	0	10	1	0	3.9	38.3	1.27	0.025
DLL_Seam-0.250mm_Roof/Floor	COAL		0.002	0.09	0.71	0	10.5	1	0	5.5	33.6	1.48	0.025
Seam_DU_S1.60+0.250mm	COAL		0.003	0.71	0.34	0	9.4	5	0	3.5	29	0.96	0.16
Seam_DU_+0.250mm_Roof/Floor	COAL		0.002	0.7	0.64	0	14.9	5	0	3.8	35.6	0.96	0.18
DU_Seam-0.250mm_Roof/Floor	COAL		0.003	0.39	0.74	0	16.4	3	0	4.5	66	0.95	0.14
Blended raw coal	COAL		0.001	0.14	0.7	0	6.1	1	0	1	17.9	0.2	0.07
201064	C		0.002	0.07	0.29	0.05	4.3	1	0.9	1	16.7	16.7	0.17
201076	C		0.002	0.07	0.3	<0.05	5.1	1	1.7	0.8	18.3	18.3	0.15
201077	C		<0.002	0.12	0.36	0.14	8.5	3	4.3	4.3	30.4	30.4	0.99
201074	C		0.002	0.12	0.39	0.15	9.7	2	1.9	2.7	35.9	35.9	0.67
201085	DU		0.002	0.1	0.47	0.09	7.8	4	3.4	2.2	21	21	0.49
201098	DU		0.002	0.08	0.57	0.08	6.4	3	2.8	1.6	18.1	18.1	0.34
201099	DU		0.003	0.15	0.32	0.12	10.1	6	5.2	3	26.1	26.1	0.74
201096	DU		0.002	0.14	0.74	0.19	7.8	3	2.9	2.2	29.6	29.6	0.43
201105	DLM/DLL		0.002	0.14	0.41	0.11	4.3	2	1.4	1.4	17.2	17.2	0.35
201118	DLM/DLL		0.002	0.06	0.46	0.05	3.5	1	1.7	0.8	13.4	13.4	0.18
201119	DLM/DLL		<0.002	0.21	0.37	0.18	7.9	3	2.9	3.9	24	24	0.98
201116	DLM/DLL		0.002	0.16	0.68	0.19	6.1	2	1.6	2.3	22.6	22.6	0.5

MEMS61 - 4 acid digest

MEMS42 - Aqua regia digest

Samples with TOC > 5% were ashed prior to MEMS61

Aqua regia diegest was carried out on a split of samples with TOC > 5% to capture volatile elements (As, Sb, Se, Te and Tl)

Samples with TOC < 5% were submitted for MEMS61 only (denoted with a " * ")

		Method	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	Te	Th	Ti	Tl	Tl	U	V	W	Y	Zn	Zr
		Units	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	0.005	9.6	0.38	0.95	0.95	3.1	105	1.7	40	95	150
Client Sample ID	SRK Group	LOD	0.05	0.2	0.005	0.02	0.02	0.1	1	0.1	0.1	2	0.5
1252D_ARD03	REMAINING		0	16.4	0.4	0.84	0	4.2	95	2.5	30	136	141.5
1252D_ARD04	REMAINING		0	8.1	0.262	0.45	0	2	37	1.5	27.4	54	115.5
1252D_ARD05	COAL		0	3.1	0.232	0.34	0	1	83	0.7	17.6	37	100
1252D_ARD07	REMAINING		0	19.9	0.398	0.78	0	4.7	75	3	28.9	84	143.5
1252D_ARD09	REMAINING		0	7.3	0.17	0.62	0	1.8	33	1.4	12.3	47	67.7
1252D_ARD10	REMAINING		0	15.8	0.493	0.58	0	4.3	117	3.2	35.1	111	161
1252D_ARD11	COAL		0	25.9	0.475	1.02	0	4.8	112	3.4	26.3	132	167
1262D_ARD01	SAND AND GRAVEL		0	7.7	0.276	0.2	0	1.7	55	1.8	9.7	207	62.3
1262D_ARD02	SAND AND GRAVEL		0	3.7	0.08	0.08	0	0.8	24	2.7	4.8	1280	26.2
1262D_ARD03	REMAINING		0	9.8	0.247	0.49	0	2.4	37	2.3	13.1	179	94.4
1262D_ARD04	CARBONACEOUS		0	6	0.09	0.44	0	4.9	24	0.8	14.5	74	52.9
1262D_ARD05	COAL		0	26.9	0.662	0.83	0	13.3	165	4.5	43	186	234
1277D_ARD01	CLAY AND SOIL		0	8.8	0.339	0.25	0	2.2	71	1.5	20.3	30	77.4
1277D_ARD02	SAND AND GRAVEL		0	11.5	0.451	0.34	0	2.4	84	1.8	14.5	36	107
1277D_ARD03	CLAY AND SOIL		0	13.5	0.441	0.42	0	3.3	104	1.8	17	281	158.5
1277D_ARD04	REMAINING		0	18.2	0.454	0.64	0	10.7	104	2.9	28.7	131	161.5
1277D_ARD05	REMAINING		0	12.2	0.375	0.48	0	3.8	89	2	30.7	97	147.5
1277D_ARD10	REMAINING		0	11.6	0.291	0.53	0	2.7	45	2.2	12.2	79	114.5
1277D_ARD11	REMAINING		0	6.1	0.123	0.54	0	1.6	22	1.2	9	34	58.2
1326D_ARD01	CLAY AND SOIL		0	13.8	0.501	0.42	0	3	96	2.5	16.6	57	120.5
1326D_ARD02	CLAY AND SOIL		0	12.9	0.478	0.39	0	2.6	89	2.4	14	153	111
1326D_ARD03	SAND AND GRAVEL		0	9.3	0.347	0.28	0	1.9	82	1.9	12.5	150	91.4
1326D_ARD04	SAND AND GRAVEL		0	12.8	0.449	0.46	0	2.4	106	2.1	21	1340	122
1326D_ARD05	REMAINING		0	17.4	0.433	0.24	0	3	168	2.7	14.3	513	161
1327D_ARD01	SAND AND GRAVEL		0	5.9	0.203	0.17	0	1.1	44	1.3	6.9	768	54.2
1327D_ARD03	COAL		0	20	0.451	0.8	0	5.4	92	3.4	28.2	139	159
1336D_ARD02	CARBONACEOUS		0	6.1	0.131	0.42	0	1.3	28	1.7	7.9	574	55.8
1336D_ARD03	REMAINING		0	6.4	0.113	0.45	0	2.5	60	2.4	12	257	51.5
1337DG_ARD01	SAND AND GRAVEL		0	4.9	0.149	0.11	0	0.8	40	0.9	4.2	333	37.9
1337DG_ARD02	REMAINING		0	9.1	0.302	0.53	0	2.3	45	1.5	30.1	255	116.5
1337DG_ARD03	COAL		0	5.6	0.687	0.52	0	3.3	60	2.4	16.1	165	116
1339DG_ARD01	REMAINING		0	8.5	0.306	0.27	0	1.4	55	1.5	19.3	71	75.3
1339DG_ARD02	REMAINING		0	10.1	0.511	0.2	0	2.2	135	2	10.7	303	142
1339DG_ARD03	CARBONACEOUS		0	17.5	0.474	1.25	0	4.9	101	2.9	37.9	374	208
1339DG_ARD04	REMAINING		0	13.4	0.304	0.98	0	3.2	46	2.4	17.1	243	144.5
1339DG_ARD05	REMAINING		0	18.3	0.407	0.92	0	4.7	66	3	23	135	170.5
1339DG_ARD06	REMAINING		0	6.3	0.134	16.65	0	1.9	19	0.7	11.9	38	67.1
1349D_ARD03	REMAINING		0	9	0.173	0.34	0	0.9	26	4.5	13.6	439	67.1
1350D_ARD01	SAND AND GRAVEL		0	6.1	0.139	0.16	0	1	52	7.6	6.3	685	40.7
1350D_ARD02	REMAINING		0	14.4	0.251	0.14	0	2.2	92	12.9	8.2	1480	84.1
1350D_ARD03	REMAINING		0	16.6	0.461	0.3	0	2.8	124	2.7	15.2	247	176
1350D_ARD04	COAL		0	11.2	0.549	0.18	0	7.1	65	3.6	192.5	330	227
1361D_ARD01	REMAINING		0	12.6	0.4	0.39	0	1.8	72	2	18	98	95.4
1361D_ARD02	REMAINING		0	4.1	0.081	0.08	0	1.1	28	2.1	5.5	766	31.8
1362D_ARD01	REMAINING		0	9	0.296	0.22	0	1.8	52	1.4	18.1	30	77.5

		Method	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	Te	Th	Ti	Tl	Tl	U	V	W	Y	Zn	Zr
		Units	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	0.005	9.6	0.38	0.95	0.95	3.1	105	1.7	40	95	150
Client Sample ID	SRK Group	LOD	0.05	0.2	0.005	0.02	0.02	0.1	1	0.1	0.1	2	0.5
1362D_ARD02	REMAINING		0	14.3	0.372	0.07	0	2.5	235	1.8	9.3	17	110.5
1362D_ARD03	REMAINING		0	7.7	0.191	0.08	0	1	14	3.5	5.8	27	64.7
1362D_ARD04	REMAINING		0	16.1	0.4	0.34	0	4.9	114	3	27.4	37	163.5
1362D_ARD05	REMAINING		0	14.8	0.458	0.18	0	4.7	64	2.5	41.9	176	215
1362D_ARD06	COAL		0	8.7	0.357	0.47	0	3.1	45	1.6	18	76	141
1252D_ARD08	REMAINING		0	6.4	0.158	0.55	0	1.6	26	1.3	9.4	42	66
1336D_ARD01	REMAINING		0	9.3	0.178	0.39	0	1.7	41	3.3	11.2	216	69.4
1339DG_ARD08	REMAINING		0	11.6	0.227	0.57	0	2.3	41	1.9	12.2	117	82.8
1349D_ARD01	CLAY AND SOIL		0	13.3	0.455	0.45	0	2.3	130	2	17.6	102	117
1349D_ARD02	REMAINING		0	18.4	0.589	0.33	0	3.6	99	3.1	14.4	200	130
1361D_ARD03	REMAINING		0	7.6	0.174	0.5	0	1.9	26	1.3	9.8	302	69.2
1406D_ARD01	CLAY AND SOIL	*	0	11.1	0.435	0.33	0	3	89	1.4	16.7	60	131.5
1406D_ARD02	REMAINING	*	0	9.2	0.438	0.47	0	2.5	110	1.2	21.4	218	124
1406D_ARD03	REMAINING	*	0	8.9	0.448	0.49	0	2.3	109	1.2	19.3	103	130.5
1406D_ARD04	REMAINING	*	0	10.2	0.266	0.42	0	2.4	38	1.3	21.2	64	125.5
1406D_ARD06	COAL		0.12	8.8	0.404	0.23	0.1	4.2	66	2.4	15	37	168
1406D_ARD07	REMAINING	*	0	16.2	0.325	0.72	0	3.8	58	2.2	15.6	84	126
1406D_ARD08	REMAINING	*	0	6.3	0.108	0.56	0	1.4	20	0.8	9.1	20	65
1406D_ARD09	COAL		0.06	7.1	0.114	0.57	0.03	1.8	25	0.5	15.9	32	71.4
1406D_ARD10	REMAINING	*	0	8.6	0.22	0.49	0	2	30	1.7	8.6	30	93.5
1411D_ARD01	CLAY AND SOIL	*	0	11.8	0.329	0.3	0	1.5	74	1.7	17.6	78	91.7
1411D_ARD02	REMAINING	*	0	12.3	0.488	0.47	0	2.9	100	2.8	25	39	164
1411D_ARD04	REMAINING	*	0	26	0.519	0.75	0	7.1	105	4.2	37.6	157	198.5
1411D_ARD05	REMAINING	*	0	16.6	0.334	0.62	0	3.9	64	2.6	23.3	99	165
1411D_ARD06	CARBONACEOUS		0.1	15.9	0.516	0.86	0.12	5.3	131	3.9	29.4	81	186
1411D_ARD07	COAL		0.05	1.6	0.062	0.1	<0.02	0.6	17	0.5	4.8	6	35.7
1413D_ARD02	SAND AND GRAVEL	*	0	22.6	0.473	0.19	0	3.7	488	2.3	10.5	23	120
1413D_ARD03	REMAINING	*	0	18.7	0.457	0.51	0	3.3	92	2.6	19.3	14	163
1413D_ARD04	REMAINING	*	0	8.5	0.201	0.52	0	3.6	47	1	81.4	217	101
1413D_ARD05	COAL		0.04	6.9	0.366	0.33	0.16	2	55	1.4	19.8	153	162
1413D_ARD06	REMAINING	*	0	20.4	0.389	0.79	0	4.7	57	2.7	16	61	145
1413D_ARD07	REMAINING	*	0	10.7	0.225	0.7	0	2.4	34	1.7	13.1	63	91
1413D_ARD08	COAL		0.06	5.2	0.108	0.13	<0.02	1.8	14	1	8	30	52.7
1415D_ARD01	SAND AND GRAVEL	*	0	5.2	0.11	0.1	0	1	51	0.6	7.6	54	43.3
1415D_ARD02	CLAY AND SOIL	*	0	13.1	0.534	0.56	0	2.8	124	2.2	19.6	87	158.5
1415D_ARD03	REMAINING	*	0	11.7	0.464	0.12	0	2.1	188	1.5	11.9	43	151.5
1415D_ARD04	COAL		0.03	3.6	0.086	1.09	0.22	0.9	37	1.8	10.1	105	118.5
1415D_ARD05	COAL		0.04	2.3	0.083	0.52	0.04	0.8	15	1.6	3.9	6	46.9
1415D_ARD06	REMAINING	*	0	13.4	0.302	0.52	0	3.1	44	2.5	14.3	65	141
1415D_ARD07	REMAINING	*	0	16.4	0.342	0.61	0	4	61	2.8	19.7	67	138.5
1418D_ARD01	REMAINING	*	0	16.5	0.551	0.09	0	2.7	93	4.9	16	14	139.5
1418D_ARD02	REMAINING	*	0	16.8	0.417	0.36	0	5.4	73	3.3	20.6	16	178.5
1418D_ARD03	COAL		0.04	3	0.081	0.52	0.08	1.1	19	1.1	10.5	139	40.4
1419D_ARD01	CLAY AND SOIL	*	0	14.2	0.486	0.1	0	1.7	67	2.4	9.4	134	127.5
1419D_ARD02	REMAINING	*	0	16.9	0.437	0.23	0	2.2	143	2.2	11.4	72	170.5

		Method	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	Te	Th	Ti	Tl	Tl	U	V	W	Y	Zn	Zr
		Units	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	0.005	9.6	0.38	0.95	0.95	3.1	105	1.7	40	95	150
Client Sample ID	SRK Group	LOD	0.05	0.2	0.005	0.02	0.02	0.1	1	0.1	0.1	2	0.5
1419D_ARD03	CLAY AND SOIL	*	0	10.2	0.666	0.23	0	3	53	3	17.1	128	226
1419D_ARD04	REMAINING	*	0	15	0.431	0.55	0	5.4	74	2.3	59.9	134	183.5
1419D_ARD05	REMAINING	*	0	18.4	0.396	0.76	0	4.5	61	2.7	25.7	131	190
1419D_ARD06	COAL		0.03	1	0.042	0.11	<0.02	0.4	15	1	3.6	7	25.5
1419D_ARD07	REMAINING	*	0	15.6	0.338	0.64	0	4	60	2.5	19.6	76	131.5
1419D_ARD08	REMAINING	*	0	19.8	0.434	0.66	0	4.8	73	3.3	23.1	81	153.5
1419D_ARD09	COAL		0.05	1.9	0.11	0.1	<0.02	0.6	29	1.5	3.5	10	34.8
1419D_ARD10	REMAINING	*	0	21.1	0.396	0.72	0	5.4	73	3.3	25.4	120	156.5
1420D_ARD01	SAND AND GRAVEL	*	0	9	0.265	0.25	0	1.6	54	1.2	18.1	26	74
1420D_ARD02	CLAY AND SOIL	*	0	16.9	0.611	0.47	0	3.5	125	2.4	21.6	47	165
1420D_ARD03	REMAINING	*	0	11.3	0.515	0.04	0	1.4	30	2.3	9.6	796	111
1420D_ARD04	REMAINING	*	0	7.6	0.152	0.05	0	0.8	44	2.9	8.7	764	59
1420D_ARD05	CARBONACEOUS	*	0.11	15.8	0.635	0.07	0.02	5.2	75	4.5	74	494	297
1420D_ARD06	REMAINING	*	0	11.4	0.283	0.53	0	2.6	42	2.4	15.3	130	130
1420D_ARD07	REMAINING	*	0	18.2	0.38	0.61	0	4	70	3.2	27.8	169	169
1420D_ARD08	COAL		0.21	5.3	0.344	0.2	<0.02	2.5	74	2.7	9.2	52	125
1420D_ARD09	REMAINING		0.01	18.8	0.38	0.63	0.06	5.1	43	3.9	17.7	167	126
1420D_ARD10	COAL		0.05	2.3	0.075	0.17	<0.02	1	22	0.9	3.3	73	65
1420D_ARD11	REMAINING	*	0	14.1	0.312	0.57	0	3.1	39	2.9	13.7	82	159
1421D_ARD01	CLAY AND SOIL	*	0	13.6	0.57	0.13	0	2.6	53	3.6	11	8	137
1421D_ARD02	REMAINING	*	0	11.6	0.695	0.12	0	2.8	44	3.1	11.4	11	163.5
1421D_ARD03	CARBONACEOUS	*	0.1	11.3	0.395	0.07	0.08	3.4	52	2.6	72.2	21	230
1421D_ARD04	CARBONACEOUS	*	0.08	11.4	0.726	0.17	0.09	3.7	84	3.2	36.9	774	184.5
1421D_ARD05	COAL		0.06	2.9	0.078	0.08	<0.02	0.7	31	0.6	8.6	21	57.7
1421D_ARD06	REMAINING	*	0	16.7	0.365	0.68	0	3.8	62	2.9	15.8	80	145
1421D_ARD07	COAL		0.23	6.2	0.369	0.25	0.02	2.9	74	2.2	7.2	69	129.5
1422D_ARD01	REMAINING	*	0	10.6	0.213	0.49	0	2.1	34	2	14.2	28	110.5
1422D_ARD02	CARBONACEOUS		0.06	9.9	0.372	0.35	0.1	4.7	59	7.7	36.8	28	219
1422D_ARD03	COAL		0.04	1.1	0.037	0.75	0.03	0.4	14	0.6	7.7	32	34
1422D_ARD04	REMAINING	*	0	13.3	0.306	0.64	0	2.9	42	2.9	10.7	43	151.5
1423D_ARD01	REMAINING	*	0	11.8	0.347	0.27	0	1.9	74	2	10.1	22	110.5
1423D_ARD03	REMAINING	*	0	6.8	0.141	0.5	0	1.7	34	2.7	15.1	124	83.6
1423D_ARD04	CARBONACEOUS		0.05	13.7	0.473	0.8	0.15	4.3	116	3.3	31.6	164	166.5
1423D_ARD05	CARBONACEOUS	*	0.05	18.1	0.512	0.72	0.18	4.5	124	3.2	37.1	186	177.5
1423D_ARD06	CARBONACEOUS		0.09	6.4	0.318	1.08	0.12	3	30	1.3	17.8	327	83.5
1423D_ARD07	REMAINING	*	0	16.1	0.302	1.05	0	3	65	2.5	22.2	78	162
1423D_ARD08	REMAINING	*	0	11.9	0.276	0.97	0	2.3	57	2.2	17.3	94	118
1423D_ARD09	COAL		0.02	2.1	0.029	0.72	0.11	0.5	7	1.4	19.1	35	40.3
1423D_ARD10	REMAINING	*	0	19.3	0.212	0.8	0	6.2	13	1.9	22.7	39	170.5
1423D_ARD11	COAL		0.08	4	0.188	0.93	0.11	2.2	22	1.3	13.4	9	59.4
1423D_ARD12	REMAINING	*	0	19	0.385	0.8	0	3.5	67	3.1	15.7	43	136.5
1423D_ARD13	REMAINING	*	0	15.9	0.322	0.63	0	3.3	59	2.7	16.5	66	130
1423D_ARD14	REMAINING	*	0	16.2	0.332	0.63	0	3.5	53	2.6	18.8	71	163.5
1424D_ARD01	REMAINING	*	0	11.6	0.379	0.39	0	4	99	1.9	34.9	143	167
1424D_ARD02	CARBONACEOUS		0.05	14.5	0.094	0.16	0.04	3.9	11	0.6	15.6	80	129

		Method	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	Te	Th	Ti	Tl	Tl	U	V	W	Y	Zn	Zr
		Units	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	0.005	9.6	0.38	0.95	0.95	3.1	105	1.7	40	95	150
Client Sample ID	SRK Group	LOD	0.05	0.2	0.005	0.02	0.02	0.1	1	0.1	0.1	2	0.5
1424D_ARD03	COAL		0.06	4.3	0.061	0.54	0.16	0.9	12	1.8	10.9	28	35.2
1424D_ARD04	CARBONACEOUS		0.09	2.9	0.209	2.71	0.72	1	49	1.1	22.8	55	77.6
1424D_ARD05	REMAINING	*	0	8.1	0.398	0.41	0	2	116	1.3	17.1	83	110.5
1424D_ARD06	REMAINING	*	0	9.8	0.421	0.46	0	2.5	106	1.6	22.2	81	142
1424D_ARD07	REMAINING	*	0	7.8	0.41	0.44	0	2.1	111	1.3	19	84	126.5
1424D_ARD08	REMAINING		0.04	4.6	0.204	0.44	0.07	1.4	38	0.9	12.4	31	70.2
1424D_ARD09	COAL		0.07	9.2	0.279	0.28	0.05	3.4	44	1.7	17.6	82	175.5
1424D_ARD10	REMAINING	*	0	17.8	0.348	0.73	0	3.7	57	3.1	20.4	68	158
1424D_ARD11	REMAINING	*	0	6.5	0.146	0.52	0	1.4	25	1.4	9.5	32	70.1
1424D_ARD12	CARBONACEOUS		0.16	16.7	0.588	1.06	0.19	6.3	129	4	24.5	102	212
1424D_ARD13	COAL		0.03	4.2	0.044	0.31	<0.02	1.3	8	0.8	9.3	26	50.1
1424D_ARD14	COAL		0.06	12.9	0.423	0.47	0.04	3.8	30	3.9	20.5	20	94.2
1424D_ARD15	CARBONACEOUS	*	0.02	19	0.282	0.94	0.3	3.8	75	4.1	25.7	109	133
1425D_ARD01	SAND AND GRAVEL	*	0	10.4	0.32	0.31	0	1.9	78	2.6	16.7	32	105
1425D_ARD02	REMAINING	*	0	9.6	0.241	0.09	0	1.2	106	61.3	6.3	16	86.8
1425D_ARD03	COAL	*	0.08	11.3	0.54	0.06	0.07	3	80	3	22.4	314	191.5
1425D_ARD04	COAL		0.13	6.4	0.384	0.15	0.04	3.6	66	2.3	129	207	129.5
1425D_ARD05	REMAINING	*	0	12.5	0.28	0.58	0	2.5	45	3.1	14.8	107	129.5
1425D_ARD06	REMAINING	*	0	6.7	0.132	0.61	0	1.4	21	1.4	10.1	23	73.2
1425D_ARD07	COAL		0.22	3.9	0.283	0.16	<0.02	2.2	72	2.8	6.7	47	146
1425D_ARD08	REMAINING	*	0	7.2	0.218	0.44	0	1.7	27	2	7	30	100
1427D_ARD01	SAND AND GRAVEL	*	0	5.7	0.095	0.12	0	1.2	43	0.7	7	12	45.6
1427D_ARD02	CLAY AND SOIL	*	0	8.7	0.549	0.52	0	2.3	132	2.3	13.3	73	163
1427D_ARD03	REMAINING	*	0	11.2	0.408	0.39	0	2.5	92	2	13.6	63	154.5
1427D_ARD04	REMAINING		0.06	9.6	0.211	0.72	0.52	2.2	54	1.5	39.2	98	120
1427D_ARD05	REMAINING	*	0	17.6	0.341	0.77	0	3.6	66	3.4	25	98	119.5
1427D_ARD06	REMAINING	*	0	10.7	0.299	0.5	0	2.2	37	1.8	19.2	111	149.5
1427D_ARD07	COAL		0.04	8.9	0.354	0.32	0.14	3.6	38	2.2	17.3	67	182
1427D_ARD08	REMAINING	*	0	20	0.405	0.78	0	4.5	78	3.6	25	94	160.5
1427D_ARD09	REMAINING	*	0	18.7	0.517	0.59	0	4.8	110	4.2	28.6	83	215
1427D_ARD10	COAL		0.01	12.9	0.306	0.62	0.08	3.1	63	2.8	16	82	82.7
1426D_ARD01	REMAINING	*	*	8.5	0.395	0.08	*	1.7	28	2.2	11.3	11	119.5
1426D_ARD02	COAL	*	0.01	8.1	0.377	0.25	0.02	2.8	77	1.6	12.4	81	148.5
1426D_ARD03	REMAINING	*	*	9.4	0.358	0.53	*	3.4	67	1.9	76.9	313	191
1426D_ARD04	REMAINING	*	*	18.3	0.385	0.85	*	3.8	95	2.7	30.5	410	175.5
1426D_ARD05	CARBONACEOUS		0.08	6.1	0.306	1.06	0.32	1.9	74	1	21.1	109	169
1426D_ARD06	REMAINING		0.03	5.6	0.231	0.2	0.06	1.9	124	1.1	21.6	32	277
1426D_ARD07	COAL		0.07	8.5	0.333	0.32	0.11	3.4	70	2.1	21.7	67	212
1426D_ARD08	COAL		0.11	7.1	0.273	0.15	0.02	3	20	1.5	9.6	32	88.5
1426D_ARD09	COAL		0.03	13.9	0.338	0.74	0.11	3.9	61	2.5	11.5	90	106
1426D_ARD10	REMAINING	*	*	12.6	0.264	0.59	*	2.7	48	2.3	15.3	80	124.5
1426D_ARD11	REMAINING		0.2	19.5	0.445	2.88	1.06	5.4	111	3.4	28	88	161.5
1426D_ARD12	COAL		0.21	6.4	0.33	0.22	<0.02	3.2	61	1.7	9.6	59	133.5
1426D_ARD13	COAL		0.05	1.9	0.079	0.17	<0.02	1	14	0.8	3.9	17	39.3
1426D_ARD14	REMAINING	*	*	12.7	0.288	0.56	*	2.7	38	2.4	9.7	61	169

		Method	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	Te	Th	Ti	Tl	Tl	U	V	W	Y	Zn	Zr
		Units	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	0.005	9.6	0.38	0.95	0.95	3.1	105	1.7	40	95	150
Client Sample ID	SRK Group	LOD	0.05	0.2	0.005	0.02	0.02	0.1	1	0.1	0.1	2	0.5
1435D_ARD01	SAND AND GRAVEL	*	*	4.5	0.085	0.11	*	0.8	28	1.9	7.9	14	41.5
1435D_ARD02	CLAY AND SOIL	*	*	11	0.36	0.17	*	2.6	68	2.3	13	10	176.5
1435D_ARD03	CLAY AND SOIL	*	*	11.5	0.418	0.74	*	3.1	101	1.9	37.2	68	155.5
1435D_ARD04	REMAINING	*	*	15.4	0.39	0.66	*	4.1	80	2.5	49	166	180
1435D_ARD05	REMAINING		0.13	5.4	0.461	0.43	0.09	3.3	87	2.6	14.1	93	206
1435D_ARD06	COAL	*	0.03	20.7	0.399	0.96	0.17	4.4	79	3.4	34.4	104	158.5
1435D_ARD07	REMAINING	*	*	16.7	0.368	0.57	*	3.9	54	2.7	36.6	80	215
1435D_ARD08	COAL		0.22	9.2	0.406	0.67	0.09	2.3	100	3.2	22.1	49	80.4
1435D_ARD09	REMAINING		0.04	18.9	0.429	0.96	0.07	4.2	92	4.3	20.8	67	99.9
1435D_ARD10	CARBONACEOUS	*	0.05	19.5	0.429	0.83	0.17	4.3	85	4.5	21.4	96	165
1435D_ARD11	CARBONACEOUS		0.27	8.6	0.387	0.48	0.03	3.3	86	3.9	12.4	58	150.5
1435D_ARD12	COAL		0.04	14.3	0.27	0.51	0.05	3.9	41	2.7	18.7	68	112
1435D_ARD13	REMAINING		0.02	1.2	0.03	0.04	<0.02	0.4	11	1	7.7	5	28.3
1435D_ARD14	REMAINING	*	*	19.1	0.348	0.64	*	3.6	52	3	17.4	73	211
1437R_ARD01	REMAINING	*	*	14.2	0.515	0.61	*	2.6	112	2.6	25.6	59	153.5
1437R_ARD02	REMAINING	*	*	5.4	0.138	0.03	*	0.9	9	2.4	4.6	8	72.1
1437R_ARD03	REMAINING	*	*	7.6	0.509	0.13	*	1.4	113	1.8	8.7	54	120.5
1437R_ARD04	REMAINING	*	*	8.9	0.404	0.43	*	3	110	1.4	57.2	96	117
1437R_ARD05	REMAINING	*	*	8.2	0.393	0.49	*	2	89	1.4	19	77	135
1437R_ARD06	CARBONACEOUS	*	0.04	19.9	0.265	0.64	0.13	4.4	58	2.1	32.8	71	155
1437R_ARD07	COAL		0.08	5.9	0.441	0.59	0.15	2	122	1.3	23.1	57	166.5
1437R_ARD08	CARBONACEOUS		0.05	8.6	0.34	0.32	0.14	2.8	43	1.5	25.2	58	176.5
1437R_ARD09	CARBONACEOUS		0.07	10	0.228	0.2	0.03	2.9	37	1.5	15.2	25	125.5
1437R_ARD10	COAL		0.09	9.8	0.297	0.36	0.08	3.3	40	1.9	20.5	36	164.5
1437R_ARD11	COAL		0.08	9.3	0.305	0.62	0.07	3.5	79	2.3	23.4	41	128
1438R_ARD01	REMAINING	*	*	7.8	0.24	0.23	*	1.5	57	1.9	9	16	81.1
1438R_ARD02	REMAINING	*	*	15.6	0.459	0.57	*	3.7	112	2.8	26.9	44	132.5
1438R_ARD03	REMAINING	*	*	10.1	0.297	0.06	*	1.5	32	6.8	7.5	14	108
1438R_ARD04	REMAINING	*	*	7.5	0.426	0.24	*	1.4	121	1.4	9.1	57	115.5
1438R_ARD05	REMAINING	*	*	8.8	0.412	0.44	*	2	106	1.5	18.1	79	129.5
1438R_ARD06	REMAINING	*	*	11.8	0.394	0.44	*	3.4	75	2	22.9	77	194
1438R_ARD07	COAL	*	0.07	16	0.415	0.7	0.17	3.7	87	2.7	34.1	97	189
1438R_ARD08	COAL		0.04	9.5	0.333	0.25	0.1	3.9	30	2.1	25.3	68	183.5
1439R_ARD01	REMAINING	*	*	13.3	0.428	0.36	*	1.6	99	2.2	20.5	38	119.5
1439R_ARD02	REMAINING	*	*	10	0.692	0.07	*	1.9	44	2.4	11.1	15	199.5
1439R_ARD03	REMAINING	*	*	8.4	0.432	0.57	*	2.3	114	1.5	31.2	120	131.5
1439R_ARD04	REMAINING	*	*	13.6	0.392	0.64	*	3.3	86	2.1	23.2	82	167
1439R_ARD05	COAL	*	0.01	10.5	0.255	0.38	0.06	2.2	39	2.1	16.7	65	132
1439R_ARD06	COAL		0.06	11.8	0.268	0.16	0.09	3.7	33	1.7	16.2	52	151.5
1439R_ARD07	CARBONACEOUS		0.06	12.8	0.233	0.7	0.34	3.9	49	1.8	25.6	45	181.5
1439R_ARD08	CARBONACEOUS		0.05	2.2	0.111	0.16	0.07	0.9	15	1.5	5.1	5	44
1439R_ARD09	COAL		0.2	7.3	0.354	0.62	0.08	3.2	76	2.6	9.5	33	135
1440R_ARD01	CLAY AND SOIL	*	*	6.5	0.182	0.18	*	1.3	36	1.4	8.3	15	70.5
1440R_ARD02	REMAINING	*	*	5.7	0.15	0.12	*	1.6	38	1.5	4.6	11	60.1
1440R_ARD03	REMAINING	*	*	8.4	0.409	0.43	*	2	114	1.3	16.6	76	125

		Method	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	Te	Th	Ti	Tl	Tl	U	V	W	Y	Zn	Zr
		Units	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	0.005	9.6	0.38	0.95	0.95	3.1	105	1.7	40	95	150
Client Sample ID	SRK Group	LOD	0.05	0.2	0.005	0.02	0.02	0.1	1	0.1	0.1	2	0.5
1440R_ARD04	REMAINING	*	*	10.9	0.352	0.32	*	2.8	78	1.6	19.6	67	145
1440R_ARD05	REMAINING	*	*	19.1	0.381	0.78	*	4.2	72	3	32.6	83	198
1440R_ARD06	COAL	*	0.02	13.9	0.306	1.21	0.59	3.4	58	2.2	24.8	64	156.5
1440R_ARD07	COAL		0.07	5.6	0.236	0.45	0.07	3.1	35	1.5	9.3	36	125
1440R_ARD08	REMAINING		0.03	15.3	0.351	0.78	0.1	3.5	63	2.8	16.5	61	101
1440R_ARD09	CARBONACEOUS	*	0.02	13.2	0.262	0.69	0.32	2.6	49	2.3	15.1	55	127.5
1440R_ARD10	COAL		0.06	6.5	0.096	0.12	<0.02	1.5	15	0.7	14.6	17	66.5
1347DG_ARD004	CARBONACEOUS	*	0.03	9.5	0.442	0.54	0.09	2.2	129	1.4	19.1	243	133
1347DG_ARD006	CARBONACEOUS	*	0.12	10.9	0.795	0.66	0.37	3.7	128	2.8	23.3	123	218
1347DG_ARD008	REMAINING	*	*	9.6	0.396	0.49	*	2.4	66	2	19.4	81	183.5
1347DG_ARD010	CARBONACEOUS	*	0.02	21.6	0.367	0.7	0.07	4.4	77	3.3	18.1	100	155.5
1347DG_ARD011	REMAINING	*	*	20.3	0.382	0.7	*	4.6	90	3.3	25.7	81	171
1347DG_ARD012	CARBONACEOUS	*	0.07	21	0.561	0.77	0.12	4.9	149	5	30.5	114	207
1347DG_ARD001	CLAY AND SOIL	*	*	9.9	0.251	0.2	*	1.4	50	1.7	19	281	84.5
1347DG_ARD002	REMAINING	*	*	19.1	0.533	0.42	*	2.8	111	3.2	13.9	670	156
1347DG_ARD003	REMAINING	*	*	11.2	0.375	0.1	*	2	71	2.3	8.2	603	134
1347DG_ARD005	REMAINING	*	*	9.7	0.417	0.51	*	2.4	111	1.5	19	123	140.5
1347DG_ARD007	CARBONACEOUS	*	*	20	0.412	0.86	*	4.4	99	2.9	30.5	94	186
75551	CLAY AND SOIL		0	12.2	0.456	0.41	0	2.4	92	2	15.6	37	120
75552	CLAY AND SOIL		0	12.2	0.479	0.39	0	2.3	90	2	13.3	35	125
75553	CLAY AND SOIL		0	9.6	0.375	0.32	0	1.7	82	1.6	13.3	57	107
75554	CLAY AND SOIL		0	11.9	0.473	0.41	0	1.9	113	1.9	21.1	72	134
75555	CLAY AND SOIL		0	15	0.507	0.41	0	2.2	101	2.1	21.7	42	140.5
75556	CLAY AND SOIL		0	11.6	0.452	0.2	0	1.8	91	2	11.5	107	111
75557	REMAINING		0	10	0.427	0.17	0	1.8	87	2.4	11.8	44	165.5
7558			0	22.7	0.361	0.28	0	2.8	237	2.2	14	26	148.5
75559	REMAINING		0	12	0.617	0.03	0	3.1	155	2.3	25.2	107	245
75560	REMAINING		0	24.1	0.564	0.17	0	5.7	140	5.6	171.5	68	379
75561	REMAINING		0	17.8	0.414	0.65	0	4	87	3	25.9	89	169.5
75562	REMAINING		0	9.3	0.309	0.58	0	2.1	54	2	16.7	54	115
75563	REMAINING		0	16.3	0.366	0.69	0	3.4	75	2.8	18.6	75	156
75564	CLAY AND SOIL		0	11.3	0.417	0.38	0	2.4	80	1.9	25.7	39	115.5
75565	CLAY AND SOIL		0	9.3	0.369	0.27	0	1.4	68	1.5	11.3	77	97.9
75566	SAND AND GRAVEL		0	5.4	0.208	0.13	0	0.8	35	1.2	5.7	175	53.7
75567	CLAY AND SOIL		0	9.7	0.357	0.32	0	1.7	80	1.8	18.4	60	101.5
75568	CLAY AND SOIL		0	13.1	0.506	0.42	0	2.1	110	2.2	20.5	102	143.5
75569	REMAINING		0	6.7	0.618	0.13	0	1.7	68	2.1	11.2	72	181.5
75570	REMAINING		0	9.1	0.391	0.25	0	1.7	74	1.6	12.2	64	151.5
75571	REMAINING		0	13.3	0.335	0.53	0	2.4	74	2	16.6	235	147
75572	REMAINING		0	17.7	0.408	0.63	0	6.2	93	2.7	48.3	90	153
75573	COAL		0	7.8	0.246	0.24	0	1.7	43	0.9	18.8	67	133.5
75574	REMAINING		0	13.6	0.331	0.56	0	3.3	54	2.7	14	64	132
75575	REMAINING		0	9.4	0.244	0.52	0	2	41	2.1	10.7	44	104
C3-4-5	SAND AND GRAVEL		0	10.4	0.415	0.3	0	1.7	72	1.9	13.1	26	105.5
C10-11-12	CLAY AND SOIL		0	9.5	0.356	0.29	0	1.7	82	3.8	15.9	32	101.5

		Method	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
		Element	Te	Th	Ti	Tl	Tl	U	V	W	Y	Zn	Zr
		Units	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Mean Sediment	0.005	9.6	0.38	0.95	0.95	3.1	105	1.7	40	95	150
Client Sample ID	SRK Group	LOD	0.05	0.2	0.005	0.02	0.02	0.1	1	0.1	0.1	2	0.5
C19-20	CLAY AND SOIL		0	15.1	0.484	0.4	0	1.9	96	2.4	19.4	38	136.5
C23-24	REMAINING		0	12.3	0.395	0.14	0	1.8	68	3.2	11	11	150
C27-28	REMAINING		0	11	0.448	0.14	0	1.8	61	17.7	11.5	7	171.5
C33-34	REMAINING		0	15.1	0.388	0.26	0	2.3	75	3.5	16	15	170
C42	REMAINING		0	14.3	0.325	0.35	0	2.9	96	9.1	37.5	54	155.5
C45-46	COAL		0	11.9	0.293	0.34	0	1.9	98	1.8	39.5	39	171.5
C14-15-16	CLAY AND SOIL		0	12.6	0.438	0.41	0	1.8	98	2.4	19.8	42	130
C36-37	REMAINING		0	15.4	0.424	0.46	0	2.4	92	3.6	18.7	66	156
C40-41	REMAINING		0	15.3	0.438	0.49	0	3.2	91	3	26.7	61	175
Alpha_C-0.250mm	COAL		0	13.5	0.237	0.54	0	2.4	27	1.6	20.4	94	79.5
Alpha_DLL-0.250mm	COAL		0	1.7	0.033	0.27	0	0.5	9	0.4	7.7	55	28.5
Alpha_DU-0.250mm	COAL		0	6.4	0.189	0.99	0	2	40	1.5	16	107	118.5
C_Seam_S1.60+0.250mm	COAL		0	12.7	0.559	1.15	0	4.4	22	2.9	18.5	47	83.6
Seam_C_Roof/Floor+0.250mm	COAL		0	11	0.354	0.66	0	2.9	66	1.6	20.6	23	93.5
C_Seam-0.250mm_Roof/Floor	COAL		0	12.5	0.344	0.79	0	3.3	73	1.9	21.6	84	132
Seam_DLL_S1.60+0.25	COAL		0	13.3	0.551	2.83	0	4.2	25	4.2	24.8	83	90.3
Roof/Floor_Seam_DLL	COAL		0	14.8	0.342	0.64	0	3.7	52	2.9	19.6	53	141.5
DLL_Seam-0.250mm_Roof/Floor	COAL		0	15.4	0.364	0.73	0	3.8	51	3.2	19.2	117	153.5
Seam_DU_S1.60+0.250mm	COAL		0	13.5	0.44	1.38	0	4.1	34	3.1	18.9	22	113
Seam_DU_+0.250mm_Roof/Floor	COAL		0	18.7	0.412	0.92	0	4.8	68	4	32.2	117	162
DU_Seam-0.250mm_Roof/Floor	COAL		0	16.5	0.45	1.1	0	4.5	103	3.5	38.4	106	181.5
Blended raw coal	COAL		0	4.5	0.117	0.31	0	1.3	37	1.2	15.4	14	102.5
201064	C		0.07	0.04	2.8	0.077	0.09	<0.02	0.9	28	1	8.7	9
201076	C		0.07	0.04	3.3	0.096	0.14	<0.02	1	42	1	12.6	10
201077	C		0.13	0.11	8.7	0.385	1.17	0.34	3.6	30	2.2	14	38
201074	C		0.14	0.13	4.4	0.5	0.69	0.19	2.8	56	2.7	11.1	131
201085	DU		0.19	0.16	5.2	0.264	0.2	0.02	2.3	61	2	8.2	33
201098	DU		0.15	0.1	4.1	0.184	0.26	0.02	1.8	53	1.5	8	22
201099	DU		0.29	0.25	7.9	0.427	0.49	0.11	3.4	70	2.9	10.8	53
201096	DU		0.17	0.15	5	0.233	0.81	0.07	2.3	59	1.9	9	81
201105	DLM/DLL		0.07	0.07	3.7	0.136	0.2	0.02	1.6	21	1.4	8.3	15
201118	DLM/DLL		0.06	0.05	2.3	0.071	0.08	<0.02	0.9	18	0.8	7	6
201119	DLM/DLL		0.12	0.09	8.7	0.354	0.63	0.21	3.9	30	3.4	10.4	48
201116	DLM/DLL		0.08	0.05	3.9	0.172	0.75	0.11	1.8	34	1.7	6.4	109

MEMS61 - 4 acid digest

MEMS42 - Aqua regia digest

Samples with TOC > 5% were ashed prior to MEMS61

Aqua regia diegest was carried out on a split of samples with TOC > 5% to capture volatile elements (As, Sb, Se, Te and Tl)

Samples with TOC < 5% were submitted for MEMS61 only (denoted with a " * ")

Appendix 8: Global Abundance Indices

Client Sample ID	Group	Ag	As	Be	Re	Se
1252D_ARD03	REMAINING				1	1
1252D_ARD05	COAL				2	1
1252D_ARD07	REMAINING					1
1252D_ARD10	REMAINING					2
1252D_ARD11	COAL				1	2
1262D_ARD01	SAND AND GRAVEL					
1262D_ARD02	SAND AND GRAVEL					
1262D_ARD04	CARBONACEOUS					1
1262D_ARD05	COAL	1		1	5	3
1277D_ARD01	CLAY AND SOIL					1
1277D_ARD02	SAND AND GRAVEL					
1277D_ARD03	CLAY AND SOIL		1			
1277D_ARD04	REMAINING					1
1277D_ARD05	REMAINING					1
1326D_ARD01	CLAY AND SOIL					1
1326D_ARD02	CLAY AND SOIL					
1326D_ARD03	SAND AND GRAVEL					
1326D_ARD04	SAND AND GRAVEL					
1326D_ARD05	REMAINING					1
1327D_ARD01	SAND AND GRAVEL					
1327D_ARD03	COAL					1
1336D_ARD02	CARBONACEOUS					
1336D_ARD03	REMAINING					1
1337DG_ARD01	SAND AND GRAVEL					
1337DG_ARD02	REMAINING				2	1
1337DG_ARD03	COAL					1
1339DG_ARD01	REMAINING					
1339DG_ARD02	REMAINING					1
1339DG_ARD03	CARBONACEOUS				1	2
1339DG_ARD06	REMAINING		6			4
1349D_ARD03	REMAINING					
1350D_ARD01	SAND AND GRAVEL	1				
1350D_ARD02	REMAINING	1				
1350D_ARD03	REMAINING					
1350D_ARD04	COAL	1			3	3
1361D_ARD01	REMAINING					
1361D_ARD02	REMAINING					
1362D_ARD02	REMAINING					1
1362D_ARD04	REMAINING					1
1362D_ARD05	REMAINING					2
1362D_ARD06	COAL				1	1
1349D_ARD01	CLAY AND SOIL					
1349D_ARD02	REMAINING					
1361D_ARD03	REMAINING					
1406D_ARD02	REMAINING					
1406D_ARD03	REMAINING					
1406D_ARD06	COAL	2				1
1406D_ARD09	COAL	1			1	
1411D_ARD02	REMAINING					
1411D_ARD04	REMAINING				1	1
1411D_ARD06	CARBONACEOUS	1			1	1
1411D_ARD07	COAL				1	
1413D_ARD02	SAND AND GRAVEL		1			2
1413D_ARD03	REMAINING					
1413D_ARD04	REMAINING			1	1	2
1413D_ARD05	COAL				1	
1413D_ARD06	REMAINING					
1413D_ARD08	COAL				1	
1415D_ARD02	CLAY AND SOIL					
1415D_ARD03	REMAINING					
1415D_ARD04	COAL	1		1	2	
1415D_ARD05	COAL					
1418D_ARD01	REMAINING					
1418D_ARD02	REMAINING					
1418D_ARD03	COAL				1	

Client Sample ID	Group	Ag	As	Be	Re	Se
1419D_ARD01	CLAY AND SOIL					
1419D_ARD02	REMAINING					
1419D_ARD03	CLAY AND SOIL					
1419D_ARD04	REMAINING		1			2
1419D_ARD05	REMAINING				1	
1419D_ARD06	COAL					
1419D_ARD08	REMAINING					1
1419D_ARD09	COAL					
1420D_ARD03	REMAINING					
1420D_ARD04	REMAINING					
1420D_ARD05	CARBONACEOUS					2
1420D_ARD07	REMAINING					1
1420D_ARD08	COAL				1	
1420D_ARD09	REMAINING					1
1420D_ARD10	COAL	1				
1420D_ARD11	REMAINING					
1421D_ARD03	CARBONACEOUS				1	2
1421D_ARD04	CARBONACEOUS				2	2
1421D_ARD05	COAL					
1421D_ARD06	REMAINING					
1421D_ARD07	COAL				2	1
1422D_ARD02	CARBONACEOUS	2		1	5	2
1422D_ARD03	COAL				1	
1423D_ARD01	REMAINING					
1423D_ARD04	CARBONACEOUS				1	2
1423D_ARD05	CARBONACEOUS				1	1
1423D_ARD06	CARBONACEOUS	4			1	1
1423D_ARD07	REMAINING					
1423D_ARD10	REMAINING					
1423D_ARD11	COAL				1	
1423D_ARD12	REMAINING					
1423D_ARD13	REMAINING					
1424D_ARD01	REMAINING					
1424D_ARD02	CARBONACEOUS				1	
1424D_ARD03	COAL					
1424D_ARD04	CARBONACEOUS	1	2		1	1
1424D_ARD05	REMAINING					
1424D_ARD06	REMAINING				1	
1424D_ARD07	REMAINING					
1424D_ARD08	REMAINING				1	
1424D_ARD09	COAL	1			2	1
1424D_ARD10	REMAINING					
1424D_ARD12	CARBONACEOUS				1	2
1424D_ARD14	COAL	1				
1424D_ARD15	CARBONACEOUS					
1425D_ARD01	SAND AND GRAVEL					
1425D_ARD02	REMAINING	3				
1425D_ARD03	COAL					1
1425D_ARD04	COAL	1		2	4	4
1425D_ARD07	COAL				1	
1427D_ARD02	CLAY AND SOIL					
1427D_ARD03	REMAINING					
1427D_ARD04	REMAINING	3			1	1
1427D_ARD05	REMAINING				1	
1427D_ARD06	REMAINING					
1427D_ARD07	COAL					
1427D_ARD08	REMAINING					
1427D_ARD09	REMAINING				2	3
1426D_ARD02	COAL					
1426D_ARD03	REMAINING		1		4	1
1426D_ARD04	REMAINING					1
1426D_ARD05	CARBONACEOUS				2	
1426D_ARD06	REMAINING	1			1	
1426D_ARD07	COAL				1	
1426D_ARD08	COAL					

Client Sample ID	Group	Ag	As	Be	Re	Se
1426D_ARD09	COAL				1	1
1426D_ARD11	REMAINING		3			1
1426D_ARD12	COAL				1	
1426D_ARD13	COAL					
1426D_ARD14	REMAINING					
1435D_ARD02	CLAY AND SOIL					
1435D_ARD03	CLAY AND SOIL					1
1435D_ARD04	REMAINING				3	1
1435D_ARD05	REMAINING				2	2
1435D_ARD06	COAL					1
1435D_ARD07	REMAINING					
1435D_ARD08	COAL				1	1
1435D_ARD09	REMAINING				1	1
1435D_ARD10	CARBONACEOUS					1
1435D_ARD11	CARBONACEOUS	1			1	1
1435D_ARD12	COAL					
1435D_ARD14	REMAINING					
1437R_ARD01	REMAINING					
1437R_ARD03	REMAINING					
1437R_ARD04	REMAINING				2	1
1437R_ARD05	REMAINING					
1437R_ARD06	CARBONACEOUS					
1437R_ARD07	COAL				2	1
1437R_ARD08	CARBONACEOUS				2	1
1437R_ARD09	CARBONACEOUS					
1437R_ARD10	COAL				2	1
1437R_ARD11	COAL					1
1438R_ARD01	REMAINING					
1438R_ARD02	REMAINING					
1438R_ARD03	REMAINING					
1438R_ARD04	REMAINING					
1438R_ARD05	REMAINING					
1438R_ARD06	REMAINING					
1438R_ARD07	COAL				1	1
1438R_ARD08	COAL					1
1439R_ARD01	REMAINING					
1439R_ARD02	REMAINING					
1439R_ARD03	REMAINING				2	
1439R_ARD04	REMAINING					
1439R_ARD05	COAL					
1439R_ARD06	COAL				1	1
1439R_ARD07	CARBONACEOUS	1			1	1
1439R_ARD08	CARBONACEOUS					
1439R_ARD09	COAL				1	1
1440R_ARD01	CLAY AND SOIL					
1440R_ARD02	REMAINING					
1440R_ARD03	REMAINING					
1440R_ARD04	REMAINING					
1440R_ARD05	REMAINING					1
1440R_ARD06	COAL					
1440R_ARD07	COAL					
1440R_ARD08	REMAINING				1	1
1440R_ARD09	CARBONACEOUS					
1440R_ARD10	COAL	2				
1347DG_ARD004	CARBONACEOUS					
1347DG_ARD006	CARBONACEOUS					1
1347DG_ARD008	REMAINING				1	
1347DG_ARD010	CARBONACEOUS					
1347DG_ARD011	REMAINING					1
1347DG_ARD012	CARBONACEOUS	1				1
1347DG_ARD001	CLAY AND SOIL					
1347DG_ARD002	REMAINING					
1347DG_ARD003	REMAINING					
1347DG_ARD005	REMAINING					
1347DG_ARD007	CARBONACEOUS				1	1

Client Sample ID	Group	Ag	As	Be	Re	Se
75551	CLAY AND SOIL	1			1	1
75552	CLAY AND SOIL				1	
75553	CLAY AND SOIL					
75554	CLAY AND SOIL					
75555	CLAY AND SOIL				1	1
75556	CLAY AND SOIL				1	
75557	REMAINING					
7558	0		1			2
75559	REMAINING					1
75560	REMAINING	1		3		3
75561	REMAINING					1
75562	REMAINING					
75563	REMAINING					1
75564	CLAY AND SOIL					1
75565	CLAY AND SOIL					
75566	SAND AND GRAVEL					
75567	CLAY AND SOIL					
75568	CLAY AND SOIL					
75569	REMAINING					
75570	REMAINING					
75571	REMAINING					1
75572	REMAINING	2			2	2
75573	COAL				1	1
75574	REMAINING					
75575	REMAINING				1	
C3-4-5	SAND AND GRAVEL					
C10-11-12	CLAY AND SOIL					
C19-20	CLAY AND SOIL					1
C23-24	REMAINING					
C27-28	REMAINING				1	
C33-34	REMAINING					
C42	REMAINING				1	2
C45-46	COAL				2	2
C14-15-16	CLAY AND SOIL	1				1
C36-37	REMAINING					
C40-41	REMAINING					1
Alpha_C-0.250mm	COAL	1			1	2
Alpha_DLL-0.250mm	COAL					
Alpha_DU-0.250mm	COAL				2	2
C_Seam_S1.60+0.250mm	COAL				1	2
Seam_C_Roof/Floor+0.250mm	COAL				1	1
C_Seam-0.250mm_Roof/Floor	COAL				1	1
Seam_DLL_S1.60+0.25	COAL				1	2
Roof/Floor_Seam_DLL	COAL					
DLL_Seam-0.250mm_Roof/Floor	COAL				1	
Seam_DU_S1.60+0.250mm	COAL				2	2
Seam_DU_+0.250mm_Roof/Floor	COAL				1	2
DU_Seam-0.250mm_Roof/Floor	COAL		1		2	2
Blended raw coal	COAL	2				
201064	C				1	
201076	C				1	
201077	C					2
201074	C				1	1
201085	DU				1	2
201098	DU				1	2
201099	DU				2	3
201096	DU				1	2
201105	DLM/DLL				1	1
201118	DLM/DLL				1	
201119	DLM/DLL	1				2
201116	DLM/DLL				1	1

Client Sample ID	Group	Te	Tl	W	Zn
1252D_ARD03	REMAINING	3			
1252D_ARD05	COAL	4			
1252D_ARD07	REMAINING	2			
1252D_ARD10	REMAINING	3			
1252D_ARD11	COAL	3			
1262D_ARD01	SAND AND GRAVEL	3			
1262D_ARD02	SAND AND GRAVEL				3
1262D_ARD04	CARBONACEOUS				
1262D_ARD05	COAL	5			
1277D_ARD01	CLAY AND SOIL	3			
1277D_ARD02	SAND AND GRAVEL	3			
1277D_ARD03	CLAY AND SOIL	5			
1277D_ARD04	REMAINING	3			
1277D_ARD05	REMAINING	3			
1326D_ARD01	CLAY AND SOIL	4			
1326D_ARD02	CLAY AND SOIL	4			
1326D_ARD03	SAND AND GRAVEL	2			
1326D_ARD04	SAND AND GRAVEL	3			3
1326D_ARD05	REMAINING	4			1
1327D_ARD01	SAND AND GRAVEL	2			2
1327D_ARD03	COAL	3			
1336D_ARD02	CARBONACEOUS				2
1336D_ARD03	REMAINING				
1337DG_ARD01	SAND AND GRAVEL				1
1337DG_ARD02	REMAINING	3			
1337DG_ARD03	COAL	3			
1339DG_ARD01	REMAINING	3			
1339DG_ARD02	REMAINING	4			1
1339DG_ARD03	CARBONACEOUS	4			1
1339DG_ARD06	REMAINING	4	3		
1349D_ARD03	REMAINING				1
1350D_ARD01	SAND AND GRAVEL			1	2
1350D_ARD02	REMAINING	3		2	3
1350D_ARD03	REMAINING	4			
1350D_ARD04	COAL	4			1
1361D_ARD01	REMAINING	2			
1361D_ARD02	REMAINING				2
1362D_ARD02	REMAINING	4			
1362D_ARD04	REMAINING	4			
1362D_ARD05	REMAINING	3			
1362D_ARD06	COAL	4			
1349D_ARD01	CLAY AND SOIL	3			
1349D_ARD02	REMAINING	2			
1361D_ARD03	REMAINING				1
1406D_ARD02	REMAINING	2			
1406D_ARD03	REMAINING	3			
1406D_ARD06	COAL	4			
1406D_ARD09	COAL	3			
1411D_ARD02	REMAINING	2			
1411D_ARD04	REMAINING	3			
1411D_ARD06	CARBONACEOUS	4			
1411D_ARD07	COAL	3			
1413D_ARD02	SAND AND GRAVEL	3			
1413D_ARD03	REMAINING	3			
1413D_ARD04	REMAINING				
1413D_ARD05	COAL	3			
1413D_ARD06	REMAINING	3			
1413D_ARD08	COAL	3			
1415D_ARD02	CLAY AND SOIL	2			
1415D_ARD03	REMAINING	2			
1415D_ARD04	COAL	2			
1415D_ARD05	COAL	3			
1418D_ARD01	REMAINING	3			
1418D_ARD02	REMAINING	3			
1418D_ARD03	COAL	2			

Client Sample ID	Group	Te	Tl	W	Zn
1419D_ARD01	CLAY AND SOIL	3			
1419D_ARD02	REMAINING	3			
1419D_ARD03	CLAY AND SOIL	3			
1419D_ARD04	REMAINING	4			
1419D_ARD05	REMAINING				
1419D_ARD06	COAL	2			
1419D_ARD08	REMAINING	3			
1419D_ARD09	COAL	3			
1420D_ARD03	REMAINING				2
1420D_ARD04	REMAINING				2
1420D_ARD05	CARBONACEOUS	4			1
1420D_ARD07	REMAINING	2			
1420D_ARD08	COAL	5			
1420D_ARD09	REMAINING				
1420D_ARD10	COAL	3			
1420D_ARD11	REMAINING	3			
1421D_ARD03	CARBONACEOUS	4			
1421D_ARD04	CARBONACEOUS	4			2
1421D_ARD05	COAL	3			
1421D_ARD06	REMAINING	2			
1421D_ARD07	COAL	5			
1422D_ARD02	CARBONACEOUS	4		1	
1422D_ARD03	COAL	2			
1423D_ARD01	REMAINING	3			
1423D_ARD04	CARBONACEOUS	4			
1423D_ARD05	CARBONACEOUS	3			
1423D_ARD06	CARBONACEOUS	4			1
1423D_ARD07	REMAINING	2			
1423D_ARD10	REMAINING	3			
1423D_ARD11	COAL	4			
1423D_ARD12	REMAINING	3			
1423D_ARD13	REMAINING	2			
1424D_ARD01	REMAINING	5			
1424D_ARD02	CARBONACEOUS	3			
1424D_ARD03	COAL	3			
1424D_ARD04	CARBONACEOUS	3			
1424D_ARD05	REMAINING	2			
1424D_ARD06	REMAINING	3			
1424D_ARD07	REMAINING	3			
1424D_ARD08	REMAINING	2			
1424D_ARD09	COAL	3			
1424D_ARD10	REMAINING	2			
1424D_ARD12	CARBONACEOUS	4			
1424D_ARD14	COAL	4			
1424D_ARD15	CARBONACEOUS	2			
1425D_ARD01	SAND AND GRAVEL	3			
1425D_ARD02	REMAINING	3		4	
1425D_ARD03	COAL	4			1
1425D_ARD04	COAL	4			
1425D_ARD07	COAL	5			
1427D_ARD02	CLAY AND SOIL	3			
1427D_ARD03	REMAINING	3			
1427D_ARD04	REMAINING	3			
1427D_ARD05	REMAINING	3			
1427D_ARD06	REMAINING	3			
1427D_ARD07	COAL	3			
1427D_ARD08	REMAINING	3			
1427D_ARD09	REMAINING	6			
1426D_ARD02	COAL	3			
1426D_ARD03	REMAINING	3			1
1426D_ARD04	REMAINING	4			1
1426D_ARD05	CARBONACEOUS	3			
1426D_ARD06	REMAINING				
1426D_ARD07	COAL	3			
1426D_ARD08	COAL	4			

Client Sample ID	Group	Te	Tl	W	Zn
1426D_ARD09	COAL	2			
1426D_ARD11	REMAINING	4	1		
1426D_ARD12	COAL	5			
1426D_ARD13	COAL	3			
1426D_ARD14	REMAINING	2			
1435D_ARD02	CLAY AND SOIL	3			
1435D_ARD03	CLAY AND SOIL	5			
1435D_ARD04	REMAINING	3			
1435D_ARD05	REMAINING	4			
1435D_ARD06	COAL	3			
1435D_ARD07	REMAINING	3			
1435D_ARD08	COAL	5			
1435D_ARD09	REMAINING	3			
1435D_ARD10	CARBONACEOUS	3			
1435D_ARD11	CARBONACEOUS	5			
1435D_ARD12	COAL	3			
1435D_ARD14	REMAINING	2			
1437R_ARD01	REMAINING	3			
1437R_ARD03	REMAINING	3			
1437R_ARD04	REMAINING	3			
1437R_ARD05	REMAINING	3			
1437R_ARD06	CARBONACEOUS	4			
1437R_ARD07	COAL	3			
1437R_ARD08	CARBONACEOUS	3			
1437R_ARD09	CARBONACEOUS	3			
1437R_ARD10	COAL	3			
1437R_ARD11	COAL	3			
1438R_ARD01	REMAINING	3			
1438R_ARD02	REMAINING	3			
1438R_ARD03	REMAINING	2		1	
1438R_ARD04	REMAINING	3			
1438R_ARD05	REMAINING	3			
1438R_ARD06	REMAINING	3			
1438R_ARD07	COAL	3			
1438R_ARD08	COAL	2			
1439R_ARD01	REMAINING	3			
1439R_ARD02	REMAINING	2			
1439R_ARD03	REMAINING	3			
1439R_ARD04	REMAINING	3			
1439R_ARD05	COAL	2			
1439R_ARD06	COAL	3			
1439R_ARD07	CARBONACEOUS	3			
1439R_ARD08	CARBONACEOUS	3			
1439R_ARD09	COAL	5			
1440R_ARD01	CLAY AND SOIL	2			
1440R_ARD02	REMAINING	3			
1440R_ARD03	REMAINING	3			
1440R_ARD04	REMAINING	3			
1440R_ARD05	REMAINING	3			
1440R_ARD06	COAL	4			
1440R_ARD07	COAL	3			
1440R_ARD08	REMAINING	2			
1440R_ARD09	CARBONACEOUS	3			
1440R_ARD10	COAL	3			
1347DG_ARD004	CARBONACEOUS	4			
1347DG_ARD006	CARBONACEOUS	4			
1347DG_ARD008	REMAINING	3			
1347DG_ARD010	CARBONACEOUS	3			
1347DG_ARD011	REMAINING	3			
1347DG_ARD012	CARBONACEOUS	4			
1347DG_ARD001	CLAY AND SOIL	3			
1347DG_ARD002	REMAINING	4			2
1347DG_ARD003	REMAINING	3			2
1347DG_ARD005	REMAINING	3			
1347DG_ARD007	CARBONACEOUS	4			

Client Sample ID	Group	Te	Tl	W	Zn
75551	CLAY AND SOIL	3			
75552	CLAY AND SOIL	3			
75553	CLAY AND SOIL	1			
75554	CLAY AND SOIL	2			
75555	CLAY AND SOIL	3			
75556	CLAY AND SOIL	1			
75557	REMAINING	1			
7558	0	5			
75559	REMAINING	4			
75560	REMAINING	4		1	
75561	REMAINING	2			
75562	REMAINING	1			
75563	REMAINING	1			
75564	CLAY AND SOIL	3			
75565	CLAY AND SOIL	1			
75566	SAND AND GRAVEL	1			
75567	CLAY AND SOIL	1			
75568	CLAY AND SOIL	1			
75569	REMAINING	1			
75570	REMAINING	1			
75571	REMAINING	3			
75572	REMAINING	3			
75573	COAL	3			
75574	REMAINING	1			
75575	REMAINING	1			
C3-4-5	SAND AND GRAVEL	2			
C10-11-12	CLAY AND SOIL	1			
C19-20	CLAY AND SOIL	2			
C23-24	REMAINING	1			
C27-28	REMAINING	2		2	
C33-34	REMAINING	3			
C42	REMAINING	3		1	
C45-46	COAL	3			
C14-15-16	CLAY AND SOIL	1			
C36-37	REMAINING	3			
C40-41	REMAINING	3			
Alpha_C-0.250mm	COAL	3			
Alpha_DLL-0.250mm	COAL	1			
Alpha_DU-0.250mm	COAL	3			
C_Seam_S1.60+0.250mm	COAL	4			
Seam_C_Roof/Floor+0.250mm	COAL	4			
C_Seam-0.250mm_Roof/Floor	COAL	3			
Seam_DLL_S1.60+0.25	COAL	3			
Roof/Floor_Seam_DLL	COAL	1			
DLL_Seam-0.250mm_Roof/Floor	COAL	1			
Seam_DU_S1.60+0.250mm	COAL	4			
Seam_DU_+0.250mm_Roof/Floor	COAL	4			
DU_Seam-0.250mm_Roof/Floor	COAL	4			
Blended raw coal	COAL	3			
201064	C	3			
201076	C	3			
201077	C	4			
201074	C	4			
201085	DU	4			
201098	DU	4			
201099	DU	5			
201096	DU	4			
201105	DLM/DLL	3			
201118	DLM/DLL	3			
201119	DLM/DLL	4			
201116	DLM/DLL	3			

Appendix 9: Elemental Composition of Leachate

Appendix 17: Coal Sulphur Speciation

Element		pH	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce	Cl
Units		pH Unit	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.01	0.001	0.01	0.001	0.05	0.001	0.001	0.001	1	0.0001	0.001	1
Australian Drinking Water Guideline	Human Health	-	0.1	-	0.007	4	0.7	-	-	-	0.002	-	-
	Aesthetic	6.5 - 8.5	-	0.2	-	-	-	-	-	-	-	-	250
	Stock	-	-	5	0.5	5	-	-	-	1000	0.01	-	-
Client Sample ID	SRK Group												
1252D_ARD05	COAL	7.95	<0.001	0.25	0.002	0.66	0.407	<0.001	<0.001	2	<0.0001	<0.001	14
1252D_ARD10	REMAINING	7.16	<0.001	0.77	<0.001	0.52	0.147	<0.001	<0.001	2	<0.0001	0.003	8
1262D_ARD01	SAND AND GRAVEL	7.2	<0.001	1.18	0.004	0.64	0.665	<0.001	<0.001	<1	<0.0001	0.01	24
1262D_ARD05	COAL	6.5	<0.001	0.57	0.002	0.53	0.203	<0.001	<0.001	16	0.001	<0.001	431
1277D_ARD05	REMAINING	6.89	<0.001	0.88	<0.001	0.11	0.073	<0.001	<0.001	<1	<0.0001	0.001	17
1326D_ARD01	CLAY AND SOIL	6.39	<0.001	0.22	<0.001	0.16	0.071	<0.001	<0.001	4	<0.0001	<0.001	54
1326D_ARD04	SAND AND GRAVEL	6.72	<0.001	0.71	<0.001	0.17	0.051	<0.001	<0.001	<1	<0.0001	<0.001	85
1336D_ARD02	CARBONACEOUS	7.04	<0.001	1.03	<0.001	0.17	0.37	<0.001	<0.001	2	<0.0001	0.004	10
1336D_ARD03	REMAINING	6.46	<0.001	1.42	<0.001	0.15	0.268	<0.001	<0.001	7	<0.0001	0.006	18
1337DG_ARD03	COAL	6.92	<0.001	0.28	<0.001	0.1	0.022	<0.001	<0.001	<1	<0.0001	<0.001	8
1339DG_ARD03	CARBONACEOUS	6.88	<0.001	0.38	<0.001	0.13	0.073	<0.001	<0.001	<1	<0.0001	<0.001	20
1339DG_ARD06	REMAINING	3	<0.001	92.2	1.36	0.44	0.144	0.014	<0.001	50	0.0076	0.163	41
1350D_ARD04	COAL	6.41	<0.001	0.42	0.002	0.23	0.358	<0.001	<0.001	<1	<0.0001	0.034	9
1362D_ARD05	REMAINING	6.95	<0.001	0.62	0.007	0.19	0.053	<0.001	<0.001	<1	<0.0001	0.001	19
1362D_ARD06	COAL	6.68	<0.001	0.35	<0.001	0.2	0.069	<0.001	<0.001	8	<0.0001	<0.001	7
1406D_ARD10	REMAINING	7.01	<0.001	1.17	0.003	0.14	0.862	<0.001	<0.001	<1	<0.0001	0.004	3
1411D_ARD01	CLAY AND SOIL	7.12	<0.001	0.83	0.001	0.12	0.229	<0.001	<0.001	<1	<0.0001	0.003	7
1411D_ARD06	CARBONACEOUS	7.08	<0.001	1.06	0.041	0.21	0.768	0.001	<0.001	<1	<0.0001	0.018	26
1411D_ARD07	COAL	7.4	<0.001	0.95	<0.001	0.42	0.339	<0.001	<0.001	<1	<0.0001	0.006	31
1413D_ARD02	SAND AND GRAVEL	6.72	<0.001	1.24	<0.001	0.2	0.176	<0.001	<0.001	<1	<0.0001	<0.001	56
1415D_ARD01	SAND AND GRAVEL	6.82	<0.001	1.04	<0.001	0.13	0.238	<0.001	<0.001	<1	<0.0001	0.012	7
1415D_ARD04	COAL	6.81	<0.001	0.7	0.001	0.43	0.173	<0.001	<0.001	<1	<0.0001	0.002	40
1418D_ARD02	REMAINING	6.63	<0.001	0.97	0.002	0.19	0.226	<0.001	<0.001	2	<0.0001	0.002	96
1419D_ARD03	CLAY AND SOIL	6.16	<0.001	0.55	0.001	0.14	0.085	<0.001	<0.001	5	<0.0001	<0.001	425
1419D_ARD07	REMAINING	7.17	<0.001	0.78	0.012	0.19	0.24	<0.001	<0.001	<1	<0.0001	0.011	11
1419D_ARD10	REMAINING	7.02	<0.001	0.93	0.073	0.19	0.282	<0.001	<0.001	<1	<0.0001	0.017	4
1423D_ARD05	CARBONACEOUS	6.11	<0.001	0.64	0.003	0.16	0.17	<0.001	<0.001	<1	<0.0001	0.005	17
1423D_ARD08	REMAINING	4.3	<0.001	1.36	0.004	0.25	0.279	0.022	<0.001	21	0.0028	0.002	16
1424D_ARD09	COAL	6.87	<0.001	0.53	0.001	0.16	0.112	<0.001	<0.001	<1	<0.0001	0.003	15
1424D_ARD15	CARBONACEOUS	6.85	<0.001	0.74	0.002	0.16	0.143	<0.001	<0.001	<1	<0.0001	0.012	5
1427D_ARD07	COAL	6.29	<0.001	0.22	<0.001	0.07	0.028	<0.001	<0.001	<1	<0.0001	<0.001	<1
1427D_ARD10	COAL	6.86	<0.001	1.24	<0.001	0.21	0.255	<0.001	<0.001	<1	<0.0001	0.015	3
1426D_ARD06	REMAINING	7.29	<0.001	0.19	0.004	0.16	0.094	<0.001	<0.001	2	<0.0001	<0.001	16
1426D_ARD12	COAL	7.25	<0.001	1.03	<0.001	0.25	0.308	<0.001	<0.001	<1	<0.0001	0.014	4
1435D_ARD01	SAND AND GRAVEL	6.77	<0.001	0.52	0.001	0.16	0.177	<0.001	<0.001	<1	<0.0001	0.003	16
1435D_ARD06	COAL	6.54	<0.001	0.17	0.009	0.88	0.355	<0.001	<0.001	1	0.0002	<0.001	20
1435D_ARD11	CARBONACEOUS	7.19	<0.001	1.05	<0.001	0.25	0.258	<0.001	<0.001	<1	<0.0001	0.015	6
1435D_ARD13	REMAINING	7.23	<0.001	0.63	<0.001	0.31	0.369	<0.001	<0.001	<1	<0.0001	0.008	10

Element		pH	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce	Cl
Units		pH Unit	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.01	0.001	0.01	0.001	0.05	0.001	0.001	0.001	1	0.0001	0.001	1
Australian Drinking Water Guideline	Human Health	-	0.1	-	0.007	4	0.7	-	-	-	0.002	-	-
	Aesthetic	6.5 - 8.5	-	0.2	-	-	-	-	-	-	-	-	250
	Stock	-	-	5	0.5	5	-	-	-	1000	0.01	-	-
Client Sample ID	SRK Group												
1437R_ARD08	CARBONACEOUS	7.11	<0.001	0.22	0.003	0.13	0.092	<0.001	<0.001	<1	<0.0001	<0.001	3
1438R_ARD07	COAL	7.85	<0.001	0.34	0.015	0.18	0.142	<0.001	<0.001	<1	<0.0001	0.001	22
1439R_ARD08	CARBONACEOUS	7.25	<0.001	1.65	0.015	0.63	0.543	<0.001	<0.001	<1	<0.0001	0.005	16
1440R_ARD01	CLAY AND SOIL	4.75	<0.001	2	<0.001	0.23	0.972	<0.001	<0.001	<1	<0.0001	0.01	2
1440R_ARD03	REMAINING	7.18	<0.001	0.35	0.002	0.1	0.065	<0.001	<0.001	<1	<0.0001	<0.001	6
75553	CLAY AND SOIL	6.67	<0.001	1.96	0.007	0.67	0.303	<0.001	<0.001	3	0.0005	0.001	416
75557	REMAINING	6.86	<0.001	0.88	0.003	0.42	0.67	<0.001	<0.001	2	<0.0001	<0.001	238
75559	REMAINING	4.56	<0.001	0.13	0.002	0.37	0.589	<0.001	<0.001	2	<0.0001	<0.001	192
75561	REMAINING	6.89	<0.001	1.87	0.011	0.26	0.351	<0.001	<0.001	<1	0.0001	0.01	19
75564	CLAY AND SOIL	6.8	<0.001	0.35	0.002	0.71	0.396	<0.001	<0.001	10	<0.0001	<0.001	248
75565	CLAY AND SOIL	6.66	<0.001	0.31	<0.001	0.65	0.252	<0.001	<0.001	2	<0.0001	<0.001	377
75566	SAND AND GRAVEL	5.25	<0.001	2.7	0.002	0.34	0.311	<0.001	<0.001	<1	<0.0001	0.002	124
75567	CLAY AND SOIL	6.08	<0.001	0.23	<0.001	0.61	0.279	<0.001	<0.001	4	<0.0001	<0.001	537
75568	CLAY AND SOIL	6.66	<0.001	0.08	0.001	0.66	0.183	<0.001	<0.001	5	<0.0001	<0.001	758
75573	COAL	7.01	<0.001	0.68	<0.001	0.26	0.173	<0.001	<0.001	<1	<0.0001	0.002	10
75575	REMAINING	7.15	<0.001	2.24	0.026	0.31	0.373	<0.001	<0.001	<1	<0.0001	0.01	14
C3-4-5	SAND AND GRAVEL	7.04	<0.001	1.1	<0.001	0.23	0.13	<0.001	<0.001	1	0.0348	0.001	47
C10-11-12	CLAY AND SOIL	6.89	<0.001	0.66	<0.001	0.24	0.131	<0.001	<0.001	<1	<0.0001	<0.001	130
C19-20	CLAY AND SOIL	6.77	<0.001	0.43	<0.001	0.3	0.154	<0.001	<0.001	<1	<0.0001	<0.001	175
C23-24	REMAINING	6.71	<0.001	0.77	<0.001	0.33	0.274	<0.001	<0.001	<1	<0.0001	<0.001	177
C27-28	REMAINING	6.58	<0.001	1.11	<0.001	0.36	0.388	<0.001	<0.001	<1	<0.0001	<0.001	185
C33-34	REMAINING	6.65	<0.001	0.94	<0.001	0.52	0.653	<0.001	<0.001	3	<0.0001	<0.001	490
C42	REMAINING	6.62	<0.001	0.64	<0.001	0.26	0.177	<0.001	<0.001	<1	0.0002	0.002	32
C45-46	COAL	7.03	<0.001	0.62	0.001	0.53	0.379	<0.001	<0.001	1	<0.0001	0.002	191
Alpha_C-0.250mm	COAL	7.63	<0.001	0.19	<0.001	0.46	0.255	<0.001	<0.001	17	0.0001	<0.001	23
Alpha_DLL-0.250mm	COAL	6.87	<0.001	0.18	<0.005	0.52	0.203	<0.005	<0.001	13	<0.0005	<0.001	18
Alpha_DU-0.250mm	COAL	6.64	<0.001	0.9	<0.001	0.53	0.284	<0.001	<0.001	5	<0.0001	0.002	12
C_Seam_S1.60+0.250mm	COAL	7.79	<0.001	0.63	<0.001	0.21	0.155	<0.001	<0.001	<1	0.0002	0.011	9
Seam_C_Roof/Floor+0.250mm	COAL	6.64	0.002	0.57	0.079	0.45	0.892	0.002	<0.001	83	0.0021	0.001	745
C_Seam-0.250mm_Roof/Floor	COAL	4.93	<0.001	0.64	0.002	0.22	0.225	<0.001	<0.001	4	<0.0001	0.004	18
Seam_DLL_S1.60+0.25	COAL	5.97	<0.001	0.02	<0.001	0.24	0.146	<0.001	<0.001	20	0.0011	<0.001	24
Roof/Floor_Seam_DLL	COAL	5.84	<0.001	0.04	0.026	0.17	0.586	<0.001	<0.001	34	0.001	<0.001	213
DLL_Seam-0.250mm_Roof/Floor	COAL	6.64	<0.001	1.25	0.002	0.14	0.278	<0.001	<0.001	2	<0.0001	0.01	6
Seam_DU_S1.60+0.250mm	COAL	6.37	<0.001	0.02	0.001	0.29	0.199	<0.001	<0.001	6	<0.0001	<0.001	26
Seam_DU_+0.250mm_Roof/Floor	COAL	4.99	<0.001	1.18	0.043	0.33	0.618	0.003	<0.001	72	0.0031	0.001	380
DU_Seam-0.250mm_Roof/Floor	COAL	6.79	<0.001	0.61	0.003	0.17	0.19	<0.001	<0.001	7	<0.0001	0.001	12
Blended raw coal	COAL	6.65	<0.001	0.07	<0.001	0.07	0.09	<0.001	<0.001	<1	<0.0001	<0.001	8

	Element	Co	Cr	Cs	Cu	Dy	Er	Eu	F	Fe	Ga	Gd	Hf
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	LOD	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.1	0.05	0.001	0.001	0.01
Australian Drinking Water Guideline	Human Health	-	0.05*	-	2	-	-	-	1.5	-	-	-	-
	Aesthetic	-	-	-	1	-	-	-	-	0.3	-	-	-
	Stock	1	1**	-	0.5*	-	-	-	2	-	-	-	-
Client Sample ID	SRK Group												
1252D_ARD05	COAL	<0.001	<0.001	<0.001	0.007	<0.001	<0.001	<0.001	0.4	<0.05	<0.001	<0.001	<0.01
1252D_ARD10	REMAINING	0.002	<0.001	<0.001	0.007	<0.001	<0.001	<0.001	0.7	0.4	<0.001	<0.001	<0.01
1262D_ARD01	SAND AND GRAVEL	<0.001	0.002	<0.001	0.004	<0.001	<0.001	<0.001	0.6	0.61	<0.001	0.001	<0.01
1262D_ARD05	COAL	0.616	<0.001	<0.001	0.004	<0.001	<0.001	<0.001	0.3	0.25	<0.001	<0.001	<0.01
1277D_ARD05	REMAINING	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.8	0.08	<0.001	<0.001	<0.01
1326D_ARD01	CLAY AND SOIL	0.003	<0.001	<0.001	0.006	<0.001	<0.001	<0.001	0.2	<0.05	<0.001	<0.001	<0.01
1326D_ARD04	SAND AND GRAVEL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1	0.15	<0.001	<0.001	<0.01
1336D_ARD02	CARBONACEOUS	<0.001	<0.001	<0.001	0.004	<0.001	<0.001	<0.001	0.7	0.24	<0.001	<0.001	<0.01
1336D_ARD03	REMAINING	0.004	0.001	<0.001	0.007	<0.001	<0.001	<0.001	0.5	1.27	<0.001	0.001	<0.01
1337DG_ARD03	COAL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.4	<0.05	<0.001	<0.001	<0.01
1339DG_ARD03	CARBONACEOUS	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	0.4	0.1	<0.001	<0.001	<0.01
1339DG_ARD06	REMAINING	0.622	0.211	<0.001	0.004	0.033	0.015	0.01	<0.1	1170	0.005	0.041	<0.01
1350D_ARD04	COAL	<0.001	<0.001	<0.001	0.01	0.003	0.001	0.001	0.5	0.36	<0.001	0.005	<0.01
1362D_ARD05	REMAINING	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.8	0.26	<0.001	<0.001	<0.01
1362D_ARD06	COAL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.4	0.05	<0.001	<0.001	<0.01
1406D_ARD10	REMAINING	0.002	<0.001	0.002	0.011	<0.001	<0.001	<0.001	0.4	1.47	<0.001	<0.001	<0.01
1411D_ARD01	CLAY AND SOIL	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.4	0.31	<0.001	<0.001	<0.01
1411D_ARD06	CARBONACEOUS	0.041	<0.001	0.001	0.013	0.001	<0.001	<0.001	0.8	1.22	<0.001	0.002	<0.01
1411D_ARD07	COAL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.4	1.31	<0.001	<0.001	<0.01
1413D_ARD02	SAND AND GRAVEL	<0.001	0.001	<0.001	0.003	<0.001	<0.001	<0.001	0.5	0.31	<0.001	<0.001	<0.01
1415D_ARD01	SAND AND GRAVEL	<0.001	0.002	<0.001	0.009	<0.001	<0.001	<0.001	0.2	0.64	<0.001	0.001	<0.01
1415D_ARD04	COAL	0.002	<0.001	<0.001	0.012	<0.001	<0.001	<0.001	0.4	0.21	<0.001	<0.001	<0.01
1418D_ARD02	REMAINING	<0.001	<0.001	<0.001	0.005	<0.001	<0.001	<0.001	1	0.14	<0.001	<0.001	<0.01
1419D_ARD03	CLAY AND SOIL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.2	0.09	<0.001	<0.001	<0.01
1419D_ARD07	REMAINING	<0.001	0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.4	0.99	<0.001	<0.001	<0.01
1419D_ARD10	REMAINING	<0.001	0.001	<0.001	0.007	<0.001	<0.001	<0.001	0.4	0.86	<0.001	0.001	<0.01
1423D_ARD05	CARBONACEOUS	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.7	0.16	<0.001	<0.001	<0.01
1423D_ARD08	REMAINING	1.06	0.001	<0.001	0.096	<0.001	<0.001	<0.001	0.6	8.73	<0.001	<0.001	<0.01
1424D_ARD09	COAL	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.5	0.42	<0.001	<0.001	<0.01
1424D_ARD15	CARBONACEOUS	0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.4	0.34	<0.001	0.001	<0.01
1427D_ARD07	COAL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.2	<0.05	<0.001	<0.001	<0.01
1427D_ARD10	COAL	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.4	1.35	<0.001	0.001	<0.01
1426D_ARD06	REMAINING	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.6	<0.05	<0.001	<0.001	<0.01
1426D_ARD12	COAL	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.4	0.68	<0.001	<0.001	<0.01
1435D_ARD01	SAND AND GRAVEL	<0.001	0.001	<0.001	0.005	<0.001	<0.001	<0.001	0.3	0.25	<0.001	<0.001	<0.01
1435D_ARD06	COAL	0.002	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.6	0.06	<0.001	<0.001	<0.01
1435D_ARD11	CARBONACEOUS	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.3	1.25	<0.001	0.001	<0.01
1435D_ARD13	REMAINING	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.2	0.76	<0.001	<0.001	<0.01

	Element	Co	Cr	Cs	Cu	Dy	Er	Eu	F	Fe	Ga	Gd	Hf
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	LOD	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.1	0.05	0.001	0.001	0.01
Australian Drinking Water Guideline	Human Health	-	0.05*	-	2	-	-	-	1.5	-	-	-	-
	Aesthetic	-	-	-	1	-	-	-	-	0.3	-	-	-
	Stock	1	1**	-	0.5*	-	-	-	2	-	-	-	-
Client Sample ID	SRK Group												
1437R_ARD08	CARBONACEOUS	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.3	0.05	<0.001	<0.001	<0.01
1438R_ARD07	COAL	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	0.4	0.16	<0.001	<0.001	<0.01
1439R_ARD08	CARBONACEOUS	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.2	2.04	<0.001	<0.001	<0.01
1440R_ARD01	CLAY AND SOIL	0.005	0.002	<0.001	0.007	<0.001	<0.001	<0.001	0.1	1.83	<0.001	0.002	<0.01
1440R_ARD03	REMAINING	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.2	0.17	<0.001	<0.001	<0.01
75553	CLAY AND SOIL	0.001	0.003	<0.001	0.004	<0.001	<0.001	<0.001	1.6	1.85	<0.001	<0.001	<0.01
75557	REMAINING	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	2.2	0.71	<0.001	<0.001	<0.01
75559	REMAINING	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1	0.07	<0.001	<0.001	<0.01
75561	REMAINING	0.001	0.006	<0.001	0.005	<0.001	<0.001	<0.001	0.8	1.11	<0.001	<0.001	<0.01
75564	CLAY AND SOIL	0.002	0.001	<0.001	0.004	<0.001	<0.001	<0.001	0.4	0.27	<0.001	<0.001	<0.01
75565	CLAY AND SOIL	0.002	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.4	0.31	<0.001	<0.001	<0.01
75566	SAND AND GRAVEL	0.001	0.006	<0.001	0.002	<0.001	<0.001	<0.001	0.3	3.86	<0.001	<0.001	<0.01
75567	CLAY AND SOIL	0.002	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.4	0.17	<0.001	<0.001	<0.01
75568	CLAY AND SOIL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.6	0.06	<0.001	<0.001	<0.01
75573	COAL	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.3	0.23	<0.001	<0.001	<0.01
75575	REMAINING	0.001	0.002	<0.001	0.001	<0.001	<0.001	<0.001	0.7	1.52	<0.001	<0.001	<0.01
C3-4-5	SAND AND GRAVEL	<0.001	0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.2	1.01	<0.001	<0.001	<0.01
C10-11-12	CLAY AND SOIL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.4	0.36	<0.001	<0.001	<0.01
C19-20	CLAY AND SOIL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.7	0.2	<0.001	<0.001	<0.01
C23-24	REMAINING	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1	0.32	<0.001	<0.001	<0.01
C27-28	REMAINING	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.1	0.3	<0.001	<0.001	<0.01
C33-34	REMAINING	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.7	0.31	<0.001	<0.001	<0.01
C42	REMAINING	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.5	0.32	<0.001	<0.001	<0.01
C45-46	COAL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.6	0.31	<0.001	<0.001	<0.01
Alpha_C-0.250mm	COAL	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.3	<0.05	<0.001	<0.001	<0.01
Alpha_DLL-0.250mm	COAL	<0.005	0.006	<0.001	0.006	<0.001	<0.001	<0.001	0.2	<0.26	<0.001	<0.001	<0.01
Alpha_DU-0.250mm	COAL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.2	0.71	<0.001	<0.001	<0.01
C_Seam_S1.60+0.250mm	COAL	<0.001	<0.001	<0.001	0.004	<0.001	<0.001	<0.001	0.1	0.78	<0.001	0.001	<0.01
Seam_C_Roof/Floor+0.250mm	COAL	0.14	<0.001	0.002	0.054	<0.001	<0.001	<0.001	0.5	10.1	<0.001	<0.001	<0.01
C_Seam-0.250mm_Roof/Floor	COAL	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.2	0.16	<0.001	<0.001	<0.01
Seam_DLL_S1.60+0.25	COAL	0.026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.1	0.46	<0.001	<0.001	<0.01
Roof/Floor_Seam_DLL	COAL	0.127	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	0.1	0.8	<0.001	<0.001	<0.01
DLL_Seam-0.250mm_Roof/Floor	COAL	0.002	0.002	0.001	0.002	<0.001	<0.001	<0.001	0.3	0.53	<0.001	<0.001	<0.01
Seam_DU_S1.60+0.250mm	COAL	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.1	<0.05	<0.001	<0.001	<0.01
Seam_DU_+0.250mm_Roof/Floor	COAL	0.288	0.001	<0.001	0.03	<0.001	<0.001	<0.001	1.1	2.96	<0.001	<0.001	<0.01
DU_Seam-0.250mm_Roof/Floor	COAL	0.015	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.2	0.09	<0.001	<0.001	<0.01
Blended raw coal	COAL	<0.001	<0.001	<0.001	0.005	<0.001	<0.001	<0.001	0.3	<0.05	<0.001	<0.001	<0.01

	Element	Hg	Ho	In	K	La	Li	Lu	Mg	Mn	Mo	Na	Nd
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	LOD	0.0001	0.001	0.001	1	0.001	0.001	0.001	1	0.001	0.001	1	0.001
Australian Drinking Water Guideline	Human Health	0.001	-	-	-	-	-	-	-	0.5	0.05	-	-
	Aesthetic	-	-	-	-	-	-	-	-	0.1	-	180	-
	Stock	0.002	-	-	-	-	-	-	-	-	0.15	-	-
Client Sample ID	SRK Group												
1252D_ARD05	COAL	<0.0001	<0.001	<0.001	4	<0.001	0.009	<0.001	1	0.004	0.014	70	<0.001
1252D_ARD10	REMAINING	<0.0001	<0.001	<0.001	4	0.001	0.015	<0.001	<1	0.011	0.002	54	0.002
1262D_ARD01	SAND AND GRAVEL	<0.0001	<0.001	<0.001	<1	0.004	<0.001	<0.001	<1	0.016	0.001	34	0.006
1262D_ARD05	COAL	<0.0001	<0.001	<0.001	6	<0.001	0.019	<0.001	15	0.139	<0.001	378	<0.001
1277D_ARD05	REMAINING	<0.0001	<0.001	<0.001	<1	<0.001	<0.001	<0.001	<1	0.001	<0.001	16	<0.001
1326D_ARD01	CLAY AND SOIL	<0.0001	<0.001	<0.001	1	0.002	<0.001	<0.001	2	0.004	<0.001	52	<0.001
1326D_ARD04	SAND AND GRAVEL	<0.0001	<0.001	<0.001	<1	<0.001	<0.001	<0.001	<1	0.003	<0.001	68	<0.001
1336D_ARD02	CARBONACEOUS	<0.0001	<0.001	<0.001	1	0.001	0.008	<0.001	<1	0.015	<0.001	19	0.002
1336D_ARD03	REMAINING	<0.0001	<0.001	<0.001	3	0.003	0.011	<0.001	4	0.198	<0.001	26	0.004
1337DG_ARD03	COAL	<0.0001	<0.001	<0.001	<1	<0.001	<0.001	<0.001	<1	0.002	0.006	12	<0.001
1339DG_ARD03	CARBONACEOUS	<0.0001	<0.001	<0.001	<1	<0.001	0.001	<0.001	<1	0.002	0.003	37	<0.001
1339DG_ARD06	REMAINING	<0.0001	0.006	<0.001	7	0.059	0.202	0.002	43	3.97	0.001	16	0.134
1350D_ARD04	COAL	<0.0001	<0.001	<0.001	<1	0.01	<0.001	<0.001	<1	0.003	0.002	17	0.024
1362D_ARD05	REMAINING	<0.0001	<0.001	<0.001	<1	<0.001	<0.001	<0.001	<1	0.001	0.002	20	<0.001
1362D_ARD06	COAL	<0.0001	<0.001	<0.001	6	<0.001	0.002	<0.001	3	<0.001	<0.001	167	<0.001
1406D_ARD10	REMAINING	<0.0001	<0.001	<0.001	<1	0.002	0.001	<0.001	<1	0.028	0.001	8	0.002
1411D_ARD01	CLAY AND SOIL	<0.0001	<0.001	<0.001	<1	0.002	<0.001	<0.001	<1	0.021	<0.001	11	0.002
1411D_ARD06	CARBONACEOUS	<0.0001	<0.001	<0.001	<1	0.006	0.003	<0.001	<1	0.041	0.014	26	0.01
1411D_ARD07	COAL	<0.0001	<0.001	<0.001	<1	0.002	0.004	<0.001	<1	0.006	0.004	35	0.002
1413D_ARD02	SAND AND GRAVEL	<0.0001	<0.001	<0.001	<1	<0.001	<0.001	<0.001	<1	<0.001	<0.001	45	<0.001
1415D_ARD01	SAND AND GRAVEL	<0.0001	<0.001	<0.001	<1	0.005	<0.001	<0.001	<1	0.006	<0.001	8	0.006
1415D_ARD04	COAL	<0.0001	<0.001	<0.001	1	<0.001	0.002	<0.001	<1	0.003	0.005	51	<0.001
1418D_ARD02	REMAINING	<0.0001	<0.001	<0.001	4	<0.001	<0.001	<0.001	<1	0.001	0.002	106	0.001
1419D_ARD03	CLAY AND SOIL	<0.0001	<0.001	<0.001	8	<0.001	<0.001	<0.001	2	<0.001	<0.001	354	<0.001
1419D_ARD07	REMAINING	<0.0001	<0.001	<0.001	<1	0.005	0.002	<0.001	<1	0.009	0.019	21	0.005
1419D_ARD10	REMAINING	<0.0001	<0.001	<0.001	<1	0.008	0.001	<0.001	<1	0.006	0.026	13	0.008
1423D_ARD05	CARBONACEOUS	<0.0001	<0.001	<0.001	<1	0.002	<0.001	<0.001	<1	0.002	0.005	20	0.003
1423D_ARD08	REMAINING	<0.0001	<0.001	<0.001	10	<0.001	0.018	<0.001	18	0.408	<0.001	47	0.001
1424D_ARD09	COAL	<0.0001	<0.001	<0.001	<1	0.001	0.001	<0.001	<1	0.002	0.014	13	0.001
1424D_ARD15	CARBONACEOUS	<0.0001	<0.001	<0.001	<1	0.005	0.003	<0.001	<1	0.002	0.018	14	0.006
1427D_ARD07	COAL	<0.0001	<0.001	<0.001	<1	<0.001	<0.001	<0.001	<1	<0.001	0.006	5	<0.001
1427D_ARD10	COAL	<0.0001	<0.001	<0.001	<1	0.006	0.002	<0.001	<1	0.008	0.003	15	0.007
1426D_ARD06	REMAINING	<0.0001	<0.001	<0.001	4	<0.001	<0.001	<0.001	<1	<0.001	0.018	140	<0.001
1426D_ARD12	COAL	<0.0001	<0.001	<0.001	<1	0.006	0.004	<0.001	<1	0.007	0.002	21	0.006
1435D_ARD01	SAND AND GRAVEL	<0.0001	<0.001	<0.001	<1	0.002	<0.001	<0.001	<1	0.01	<0.001	18	0.002
1435D_ARD06	COAL	<0.0001	<0.001	<0.001	2	<0.001	0.009	<0.001	<1	0.007	0.005	106	<0.001
1435D_ARD11	CARBONACEOUS	<0.0001	<0.001	<0.001	<1	0.006	0.002	<0.001	<1	0.007	0.002	26	0.007
1435D_ARD13	REMAINING	<0.0001	<0.001	<0.001	<1	0.004	0.002	<0.001	<1	0.003	0.005	26	0.004

	Element	Hg	Ho	In	K	La	Li	Lu	Mg	Mn	Mo	Na	Nd
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	LOD	0.0001	0.001	0.001	1	0.001	0.001	0.001	1	0.001	0.001	1	0.001
Australian Drinking Water Guideline	Human Health	0.001	-	-	-	-	-	-	-	0.5	0.05	-	-
	Aesthetic	-	-	-	-	-	-	-	-	0.1	-	180	-
	Stock	0.002	-	-	-	-	-	-	-	-	0.15	-	-
Client Sample ID	SRK Group												
1437R_ARD08	CARBONACEOUS	<0.0001	<0.001	<0.001	<1	<0.001	<0.001	<0.001	<1	<0.001	0.011	14	<0.001
1438R_ARD07	COAL	<0.0001	<0.001	<0.001	<1	<0.001	<0.001	<0.001	<1	0.001	0.037	46	<0.001
1439R_ARD08	CARBONACEOUS	<0.0001	<0.001	<0.001	1	0.002	0.004	<0.001	<1	0.019	0.01	48	0.003
1440R_ARD01	CLAY AND SOIL	<0.0001	<0.001	<0.001	<1	0.006	0.001	<0.001	<1	0.167	<0.001	6	0.008
1440R_ARD03	REMAINING	<0.0001	<0.001	<0.001	<1	<0.001	<0.001	<0.001	<1	0.002	0.003	10	<0.001
75553	CLAY AND SOIL	<0.0001	<0.001	<0.001	7	<0.001	0.026	<0.001	3	0.018	<0.001	289	<0.001
75557	REMAINING	<0.0001	<0.001	<0.001	4	<0.001	0.002	<0.001	1	0.004	<0.001	130	<0.001
75559	REMAINING	<0.0001	<0.001	<0.001	2	<0.001	0.006	<0.001	1	0.002	0.001	107	<0.001
75561	REMAINING	<0.0001	<0.001	<0.001	3	0.004	0.002	<0.001	<1	0.005	0.027	26	0.004
75564	CLAY AND SOIL	<0.0001	<0.001	<0.001	6	<0.001	0.027	<0.001	7	0.877	<0.001	269	<0.001
75565	CLAY AND SOIL	<0.0001	<0.001	<0.001	5	<0.001	0.047	<0.001	2	0.248	<0.001	252	<0.001
75566	SAND AND GRAVEL	<0.0001	<0.001	<0.001	2	<0.001	0.012	<0.001	<1	0.037	<0.001	57	<0.001
75567	CLAY AND SOIL	<0.0001	<0.001	<0.001	12	<0.001	0.051	<0.001	6	0.136	0.001	448	<0.001
75568	CLAY AND SOIL	<0.0001	<0.001	<0.001	11	<0.001	0.036	<0.001	6	0.037	<0.001	462	<0.001
75573	COAL	<0.0001	<0.001	<0.001	<1	<0.001	<0.001	<0.001	<1	<0.001	0.006	18	<0.001
75575	REMAINING	<0.0001	<0.001	<0.001	4	0.005	0.003	<0.001	<1	0.006	0.043	22	0.004
C3-4-5	SAND AND GRAVEL	<0.0001	<0.001	<0.001	1	<0.001	0.003	<0.001	<1	0.025	<0.001	42	<0.001
C10-11-12	CLAY AND SOIL	<0.0001	<0.001	<0.001	2	<0.001	0.005	<0.001	<1	0.01	<0.001	69	<0.001
C19-20	CLAY AND SOIL	<0.0001	<0.001	<0.001	3	<0.001	0.004	<0.001	<1	0.006	<0.001	109	<0.001
C23-24	REMAINING	<0.0001	<0.001	<0.001	2	<0.001	0.002	<0.001	<1	0.004	<0.001	99	<0.001
C27-28	REMAINING	<0.0001	<0.001	<0.001	3	<0.001	0.002	<0.001	<1	0.005	<0.001	109	<0.001
C33-34	REMAINING	<0.0001	<0.001	<0.001	10	<0.001	0.002	<0.001	3	0.015	<0.001	274	<0.001
C42	REMAINING	<0.0001	<0.001	<0.001	<1	<0.001	<0.001	<0.001	<1	0.002	<0.001	37	0.001
C45-46	COAL	<0.0001	<0.001	<0.001	3	<0.001	0.002	<0.001	1	0.006	0.002	118	0.001
Alpha_C-0.250mm	COAL	<0.0001	<0.001	<0.001	3	<0.001	0.014	<0.001	5	0.195	0.001	34	<0.001
Alpha_DLL-0.250mm	COAL	<0.0001	<0.001	<0.001	2	<0.001	0.011	<0.001	3	0.511	<0.005	44	<0.001
Alpha_DU-0.250mm	COAL	<0.0001	<0.001	<0.001	2	<0.001	0.014	<0.001	2	0.099	0.002	54	<0.001
C_Seam_S1.60+0.250mm	COAL	<0.0001	<0.001	<0.001	<1	0.005	0.002	<0.001	<1	0.009	<0.001	21	0.006
Seam_C_Roof/Floor+0.250mm	COAL	<0.0001	<0.001	<0.001	14	<0.001	0.065	<0.001	24	4.4	<0.001	161	<0.001
C_Seam-0.250mm_Roof/Floor	COAL	<0.0001	<0.001	<0.001	1	0.002	0.005	<0.001	1	0.039	0.001	12	0.002
Seam_DLL_S1.60+0.25	COAL	<0.0001	<0.001	<0.001	3	<0.001	0.056	<0.001	5	1.51	<0.001	51	<0.001
Roof/Floor_Seam_DLL	COAL	<0.0001	<0.001	<0.001	14	<0.001	0.037	<0.001	6	0.413	<0.001	55	<0.001
DLL_Seam-0.250mm_Roof/Floor	COAL	<0.0001	<0.001	<0.001	1	0.005	0.005	<0.001	<1	0.01	0.005	7	0.004
Seam_DU_S1.60+0.250mm	COAL	<0.0001	<0.001	<0.001	3	<0.001	0.03	<0.001	2	0.223	<0.001	69	<0.001
Seam_DU_+0.250mm_Roof/Floor	COAL	<0.0001	<0.001	<0.001	8	<0.001	0.077	<0.001	17	2.79	<0.001	70	<0.001
DU_Seam-0.250mm_Roof/Floor	COAL	<0.0001	<0.001	<0.001	1	<0.001	0.008	<0.001	2	0.102	0.001	10	<0.001
Blended raw coal	COAL	<0.0001	<0.001	<0.001	4	<0.001	0.003	<0.001	<1	0.001	0.004	21	<0.001

	Element	Ni	Total P	Pb	Pr	Rb	S	Sb	Se	Sm	Sn	SO4	Sr
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	LOD	0.001	0.01	0.001	0.001	0.001	1	0.001	0.01	0.001	0.001	1	0.001
Australian Drinking Water Guideline	Human Health	0.02	-	0.01	-	-	-	0.003	0.01	-	-	500	-
	Aesthetic	-	-	-	-	-	-	-	-	-	-	250	-
	Stock	1	-	0.1	-	-	-	-	0.02	-	-	1000	-
Client Sample ID	SRK Group												
1252D_ARD05	COAL	0.002	0.18	<0.001	<0.001	0.006	0	0.001	0.04	<0.001	<0.001	35	0.059
1252D_ARD10	REMAINING	0.006	0.06	0.003	<0.001	0.006	0	0.001	0.06	<0.001	<0.001	99	0.051
1262D_ARD01	SAND AND GRAVEL	0.001	0.1	0.002	0.001	0.002	0	<0.001	<0.01	0.001	<0.001	16	0.026
1262D_ARD05	COAL	0.682	0.06	<0.001	<0.001	0.009	0	<0.001	0.14	<0.001	<0.001	293	0.348
1277D_ARD05	REMAINING	0.002	0.16	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	7	0.005
1326D_ARD01	CLAY AND SOIL	0.004	<0.01	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	46	0.05
1326D_ARD04	SAND AND GRAVEL	<0.001	0.05	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	23	0.015
1336D_ARD02	CARBONACEOUS	0.001	0.16	0.006	<0.001	0.002	0	0.003	<0.01	<0.001	<0.001	10	0.049
1336D_ARD03	REMAINING	0.014	0.28	0.007	<0.001	0.003	0	0.001	0.03	0.001	<0.001	57	0.161
1337DG_ARD03	COAL	<0.001	0.03	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	6	0.003
1339DG_ARD03	CARBONACEOUS	<0.001	0.01	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	50	0.01
1339DG_ARD06	REMAINING	1.22	1.59	0.009	0.026	0.025	0	0.002	<0.01	0.038	<0.001	2940	0.23
1350D_ARD04	COAL	<0.001	0.06	0.002	0.005	<0.001	0	<0.001	0.01	0.006	<0.001	16	0.028
1362D_ARD05	REMAINING	<0.001	<0.01	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	9	0.005
1362D_ARD06	COAL	<0.001	<0.01	<0.001	<0.001	<0.001	0	<0.001	0.01	<0.001	<0.001	306	0.011
1406D_ARD10	REMAINING	0.003	0.27	0.037	<0.001	0.011	0	<0.001	<0.01	<0.001	<0.001	6	0.056
1411D_ARD01	CLAY AND SOIL	<0.001	<0.01	0.001	<0.001	0.001	0	<0.001	<0.01	<0.001	<0.001	4	0.014
1411D_ARD06	CARBONACEOUS	0.06	0.7	0.034	0.002	0.007	0	0.001	0.02	0.002	<0.001	28	0.091
1411D_ARD07	COAL	<0.001	0.11	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	10	0.013
1413D_ARD02	SAND AND GRAVEL	<0.001	<0.01	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	8	0.014
1415D_ARD01	SAND AND GRAVEL	<0.001	0.02	0.003	0.002	0.002	0	<0.001	<0.01	0.001	<0.001	4	0.013
1415D_ARD04	COAL	0.005	0.01	0.002	<0.001	0.001	0	0.002	<0.01	<0.001	<0.001	35	0.01
1418D_ARD02	REMAINING	<0.001	0.26	0.002	<0.001	0.001	0	<0.001	<0.01	<0.001	<0.001	15	0.008
1419D_ARD03	CLAY AND SOIL	<0.001	<0.01	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	0.003	56	0.005
1419D_ARD07	REMAINING	0.002	<0.01	0.005	0.001	0.002	0	0.001	<0.01	<0.001	<0.001	9	0.011
1419D_ARD10	REMAINING	0.001	0.06	0.006	0.002	0.002	0	0.003	<0.01	0.002	0.001	7	0.012
1423D_ARD05	CARBONACEOUS	0.001	0.01	0.001	<0.001	0.001	0	<0.001	<0.01	<0.001	<0.001	9	0.01
1423D_ARD08	REMAINING	1.17	0.5	0.016	<0.001	0.045	0	<0.001	0.01	<0.001	<0.001	233	0.593
1424D_ARD09	COAL	0.001	<0.01	0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	7	0.016
1424D_ARD15	CARBONACEOUS	0.001	<0.01	0.003	0.001	0.002	0	0.001	<0.01	0.001	0.001	14	0.01
1427D_ARD07	COAL	<0.001	<0.01	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	3	0.002
1427D_ARD10	COAL	<0.001	0.04	0.002	0.002	<0.001	0	<0.001	<0.01	0.001	<0.001	11	0.018
1426D_ARD06	REMAINING	<0.001	<0.01	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	38	0.005
1426D_ARD12	COAL	<0.001	<0.01	0.001	0.002	<0.001	0	<0.001	<0.01	0.001	<0.001	9	0.014
1435D_ARD01	SAND AND GRAVEL	<0.001	0.02	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	8	0.008
1435D_ARD06	COAL	0.004	0.05	<0.001	<0.001	0.005	0	0.002	0.02	<0.001	<0.001	179	0.027
1435D_ARD11	CARBONACEOUS	<0.001	0.02	0.002	0.002	<0.001	0	<0.001	0.01	0.001	<0.001	17	0.011
1435D_ARD13	REMAINING	<0.001	0.09	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	4	0.012

	Element	Ni	Total P	Pb	Pr	Rb	S	Sb	Se	Sm	Sn	SO4	Sr
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	LOD	0.001	0.01	0.001	0.001	0.001	1	0.001	0.01	0.001	0.001	1	0.001
Australian Drinking Water Guideline	Human Health	0.02	-	0.01	-	-	-	0.003	0.01	-	-	500	-
	Aesthetic	-	-	-	-	-	-	-	-	-	-	250	-
	Stock	1	-	0.1	-	-	-	-	0.02	-	-	1000	-
Client Sample ID	SRK Group												
1437R_ARD08	CARBONACEOUS	<0.001	0.1	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	5	0.004
1438R_ARD07	COAL	<0.001	<0.01	0.001	<0.001	<0.001	0	0.002	<0.01	<0.001	<0.001	14	0.009
1439R_ARD08	CARBONACEOUS	0.002	<0.01	0.002	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	8	0.021
1440R_ARD01	CLAY AND SOIL	0.002	0.19	0.008	0.002	0.003	0	<0.001	<0.01	0.002	<0.001	5	0.078
1440R_ARD03	REMAINING	<0.001	0.02	<0.001	<0.001	<0.001	0	<0.001	<0.01	<0.001	<0.001	4	0.003
75553	CLAY AND SOIL	0.003	0.03	0.002	<0.001	0.006	26	<0.001	<0.01	<0.001	<0.001	78	0.065
75557	REMAINING	<0.001	<0.01	<0.001	<0.001	0.004	3	<0.001	<0.01	<0.001	<0.001	8	0.045
75559	REMAINING	<0.001	0.02	<0.001	<0.001	0.001	1	<0.001	<0.01	<0.001	<0.001	4	0.051
75561	REMAINING	0.004	<0.01	0.013	<0.001	0.007	1	0.002	<0.01	<0.001	<0.001	3	0.014
75564	CLAY AND SOIL	0.004	<0.01	0.009	<0.001	0.009	61	<0.001	<0.01	<0.001	<0.001	184	0.236
75565	CLAY AND SOIL	0.002	<0.01	<0.001	<0.001	0.009	27	<0.001	<0.01	<0.001	<0.001	81	0.06
75566	SAND AND GRAVEL	0.002	<0.01	0.001	<0.001	0.006	6	<0.001	<0.01	<0.001	<0.001	18	0.017
75567	CLAY AND SOIL	0.001	<0.01	<0.001	<0.001	0.007	43	<0.001	<0.01	<0.001	<0.001	129	0.136
75568	CLAY AND SOIL	<0.001	<0.01	<0.001	<0.001	0.005	41	<0.001	<0.01	<0.001	<0.001	123	0.137
75573	COAL	<0.001	<0.01	<0.001	<0.001	<0.001	<1	<0.001	<0.01	<0.001	<0.001	<1	0.007
75575	REMAINING	0.003	0.02	0.01	0.001	0.012	2	0.01	<0.01	<0.001	<0.001	5	0.014
C3-4-5	SAND AND GRAVEL	<0.001	<0.01	<0.001	<0.001	0.003	4	<0.001	<0.01	<0.001	<0.001	10	0.019
C10-11-12	CLAY AND SOIL	<0.001	<0.01	<0.001	<0.001	0.002	7	<0.001	<0.01	<0.001	<0.001	20	0.021
C19-20	CLAY AND SOIL	<0.001	<0.01	<0.001	<0.001	0.002	7	<0.001	<0.01	<0.001	<0.001	21	0.026
C23-24	REMAINING	<0.001	0.02	<0.001	<0.001	0.002	4	<0.001	<0.01	<0.001	<0.001	11	0.028
C27-28	REMAINING	<0.001	0.15	<0.001	<0.001	0.002	4	<0.001	<0.01	<0.001	<0.001	12	0.038
C33-34	REMAINING	<0.001	<0.01	<0.001	<0.001	0.007	8	<0.001	<0.01	<0.001	<0.001	23	0.094
C42	REMAINING	<0.001	<0.01	<0.001	<0.001	0.001	1	<0.001	<0.01	<0.001	<0.001	3	0.011
C45-46	COAL	<0.001	0.11	<0.001	<0.001	0.003	6	<0.001	<0.01	<0.001	<0.001	17	0.047
Alpha_C-0.250mm	COAL	<0.001	<0.01	<0.001	<0.001	0.003	24	<0.001	0.02	<0.001	<0.001	72	0.243
Alpha_DLL-0.250mm	COAL	<0.005	<0.01	<0.005	<0.001	0.002	28	<0.005	<0.05	<0.001	<0.005	86	0.156
Alpha_DU-0.250mm	COAL	<0.001	<0.01	0.001	<0.001	0.002	29	<0.001	0.01	<0.001	<0.001	88	0.07
C_Seam_S1.60+0.250mm	COAL	<0.001	0.02	0.003	0.001	0.001	8	<0.001	0.01	0.001	<0.001	26	0.014
Seam_C_Roof/Floor+0.250mm	COAL	0.031	<0.01	0.041	<0.001	0.043	6	<0.001	0.3	<0.001	<0.001	19	1.96
C_Seam-0.250mm_Roof/Floor	COAL	<0.001	<0.01	0.001	<0.001	0.003	4	<0.001	0.01	<0.001	<0.001	13	0.05
Seam_DLL_S1.60+0.25	COAL	0.011	<0.01	0.002	<0.001	0.006	52	<0.001	0.02	<0.001	<0.001	156	0.334
Roof/Floor_Seam_DLL	COAL	0.127	<0.01	0.003	<0.001	0.042	2	<0.001	0.1	<0.001	<0.001	8	0.666
DLL_Seam-0.250mm_Roof/Floor	COAL	0.003	0.03	0.002	0.001	0.006	3	<0.001	<0.01	<0.001	<0.001	8	0.03
Seam_DU_S1.60+0.250mm	COAL	<0.001	<0.01	<0.001	<0.001	0.006	42	<0.001	0.05	<0.001	<0.001	125	0.122
Seam_DU_+0.250mm_Roof/Floor	COAL	0.323	0.05	0.016	<0.001	0.024	11	<0.001	0.17	<0.001	<0.001	34	1.09
DU_Seam-0.250mm_Roof/Floor	COAL	0.018	0.02	<0.001	<0.001	0.002	8	<0.001	0.02	<0.001	<0.001	25	0.061
Blended raw coal	COAL	<0.001	<0.01	0.002	<0.001	<0.001	8	<0.001	<0.01	<0.001	<0.001	24	0.004

	Element	Tb	Te	Th	Ti	Tl	Tm	U	V	Yb	Yt	Zn	Zr
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	LOD	0.001	0.005	0.001	0.01	0.001	0.001	0.001	0.01	0.001	0.001	0.005	0.005
Australian Drinking Water Guideline	Human Health	-	-	-		-	-	0.02	-	-	-	-	-
	Aesthetic	-	-	-		-	-	-	-	-	-	3	-
	Stock	-	-	-		-	-	0.2	-	-	-	20	-
Client Sample ID	SRK Group												
1252D_ARD05	COAL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	0.07	<0.001	<0.001	0.136	<0.005
1252D_ARD10	REMAINING	<0.001	<0.005	<0.001	0.03	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.202	<0.005
1262D_ARD01	SAND AND GRAVEL	<0.001	<0.005	<0.001	0.01	<0.001	<0.001	<0.001	0.03	<0.001	0.002	0.484	<0.005
1262D_ARD05	COAL	<0.001	<0.005	<0.001	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	1.7	<0.005
1277D_ARD05	REMAINING	<0.001	<0.005	<0.001	0.02	<0.001	<0.001	<0.001	0.01	<0.001	<0.001	0.019	<0.005
1326D_ARD01	CLAY AND SOIL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.016	<0.005
1326D_ARD04	SAND AND GRAVEL	<0.001	<0.005	<0.001	0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.013	<0.005
1336D_ARD02	CARBONACEOUS	<0.001	<0.005	0.002	0.03	<0.001	<0.001	<0.001	<0.01	<0.001	0.001	1.03	<0.005
1336D_ARD03	REMAINING	<0.001	<0.005	0.002	0.11	<0.001	<0.001	0.001	0.03	<0.001	0.005	2.06	<0.005
1337DG_ARD03	COAL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.024	<0.005
1339DG_ARD03	CARBONACEOUS	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.031	<0.005
1339DG_ARD06	REMAINING	0.006	<0.005	0.003	0.02	0.011	0.002	0.009	0.35	0.011	0.138	14.8	0.006
1350D_ARD04	COAL	<0.001	<0.005	<0.001	0.01	<0.001	<0.001	<0.001	<0.01	0.001	0.01	0.119	<0.005
1362D_ARD05	REMAINING	<0.001	<0.005	<0.001	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.022	<0.005
1362D_ARD06	COAL	<0.001	<0.005	<0.001	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.008	<0.005
1406D_ARD10	REMAINING	<0.001	<0.005	0.001	0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.108	<0.005
1411D_ARD01	CLAY AND SOIL	<0.001	<0.005	<0.001	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	0.001	0.03	<0.005
1411D_ARD06	CARBONACEOUS	<0.001	<0.005	0.002	0.02	<0.001	<0.001	0.002	0.07	<0.001	0.004	0.268	<0.005
1411D_ARD07	COAL	<0.001	<0.005	<0.001	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.033	<0.005
1413D_ARD02	SAND AND GRAVEL	<0.001	<0.005	<0.001	0.04	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.018	<0.005
1415D_ARD01	SAND AND GRAVEL	<0.001	<0.005	<0.001	0.03	<0.001	<0.001	<0.001	<0.01	<0.001	0.002	0.09	<0.005
1415D_ARD04	COAL	<0.001	<0.005	<0.001	0.05	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.032	<0.005
1418D_ARD02	REMAINING	<0.001	<0.005	<0.001	0.04	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.03	<0.005
1419D_ARD03	CLAY AND SOIL	<0.001	<0.005	<0.001	0.03	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.01	<0.005
1419D_ARD07	REMAINING	<0.001	<0.005	0.004	0.03	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.022	<0.005
1419D_ARD10	REMAINING	<0.001	<0.005	0.004	0.02	<0.001	<0.001	<0.001	0.01	<0.001	0.001	0.034	<0.005
1423D_ARD05	CARBONACEOUS	<0.001	<0.005	0.002	0.02	<0.001	<0.001	<0.001	0.02	<0.001	<0.001	0.027	<0.005
1423D_ARD08	REMAINING	<0.001	<0.005	<0.001	0.01	<0.001	<0.001	0.001	<0.01	<0.001	0.003	8.33	<0.005
1424D_ARD09	COAL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.03	<0.005
1424D_ARD15	CARBONACEOUS	<0.001	<0.005	0.003	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	0.001	0.03	<0.005
1427D_ARD07	COAL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.006	<0.005
1427D_ARD10	COAL	<0.001	<0.005	0.002	0.03	<0.001	<0.001	<0.001	0.02	<0.001	0.002	0.035	<0.005
1426D_ARD06	REMAINING	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	0.01	<0.001	<0.001	0.017	<0.005
1426D_ARD12	COAL	<0.001	<0.005	0.002	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	0.001	0.04	<0.005
1435D_ARD01	SAND AND GRAVEL	<0.001	<0.005	<0.001	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.019	<0.005
1435D_ARD06	COAL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.253	<0.005
1435D_ARD11	CARBONACEOUS	<0.001	<0.005	0.002	0.02	<0.001	<0.001	<0.001	0.03	<0.001	0.001	0.036	<0.005
1435D_ARD13	REMAINING	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.018	<0.005

	Element	Tb	Te	Th	Ti	Tl	Tm	U	V	Yb	Yt	Zn	Zr
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	LOD	0.001	0.005	0.001	0.01	0.001	0.001	0.001	0.01	0.001	0.001	0.005	0.005
Australian Drinking Water Guideline	Human Health	-	-	-		-	-	0.02	-	-	-	-	-
	Aesthetic	-	-	-		-	-	-	-	-	-	3	-
	Stock	-	-	-		-	-	0.2	-	-	-	20	-
Client Sample ID	SRK Group												
1437R_ARD08	CARBONACEOUS	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	0.01	<0.001	<0.001	0.011	<0.005
1438R_ARD07	COAL	<0.001	<0.005	<0.001	0.01	<0.001	<0.001	<0.001	0.01	<0.001	<0.001	0.016	<0.005
1439R_ARD08	CARBONACEOUS	<0.001	<0.005	<0.001	0.09	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.044	<0.005
1440R_ARD01	CLAY AND SOIL	<0.001	<0.005	<0.001	0.05	<0.001	<0.001	<0.001	0.02	<0.001	0.004	0.161	<0.005
1440R_ARD03	REMAINING	<0.001	<0.005	<0.001	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.013	<0.005
75553	CLAY AND SOIL	<0.001	<0.005	<0.001	0.01	0.002	<0.001	<0.001	<0.01	<0.001	<0.001	0.085	<0.005
75557	REMAINING	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.057	<0.005
75559	REMAINING	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.036	<0.005
75561	REMAINING	<0.001	<0.005	0.004	0.03	<0.001	<0.001	<0.001	<0.01	<0.001	0.001	0.065	0.006
75564	CLAY AND SOIL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.064	<0.005
75565	CLAY AND SOIL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.061	<0.005
75566	SAND AND GRAVEL	<0.001	<0.005	<0.001	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.132	<0.005
75567	CLAY AND SOIL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.055	<0.005
75568	CLAY AND SOIL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.023	<0.005
75573	COAL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.049	<0.005
75575	REMAINING	<0.001	<0.005	0.003	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.056	0.005
C3-4-5	SAND AND GRAVEL	<0.001	<0.005	<0.001	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.037	<0.005
C10-11-12	CLAY AND SOIL	<0.001	<0.005	<0.001	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.023	<0.005
C19-20	CLAY AND SOIL	<0.001	<0.005	<0.001	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.02	<0.005
C23-24	REMAINING	<0.001	<0.005	<0.001	0.04	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.025	<0.005
C27-28	REMAINING	<0.001	<0.005	<0.001	0.04	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.036	<0.005
C33-34	REMAINING	<0.001	<0.005	<0.001	0.04	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.037	<0.005
C42	REMAINING	<0.001	<0.005	<0.001	0.03	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.035	<0.005
C45-46	COAL	<0.001	<0.005	<0.001	0.03	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.032	<0.005
Alpha_C-0.250mm	COAL	<0.001	<0.005	<0.001	0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.042	<0.005
Alpha_DLL-0.250mm	COAL	<0.001	<0.005	<0.001	<0.01	<0.005	<0.001	<0.001	<0.05	<0.001	<0.001	0.072	<0.005
Alpha_DU-0.250mm	COAL	<0.001	<0.005	<0.001	0.04	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.039	<0.005
C_Seam_S1.60+0.250mm	COAL	<0.001	<0.005	0.002	0.01	<0.001	<0.001	<0.001	<0.01	<0.001	0.002	0.038	<0.005
Seam_C_Roof/Floor+0.250mm	COAL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	0.002	0.476	<0.005
C_Seam-0.250mm_Roof/Floor	COAL	<0.001	<0.005	<0.001	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.03	<0.005
Seam_DLL_S1.60+0.25	COAL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.331	<0.005
Roof/Floor_Seam_DLL	COAL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.36	<0.005
DLL_Seam-0.250mm_Roof/Floor	COAL	<0.001	<0.005	0.003	0.02	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.038	<0.005
Seam_DU_S1.60+0.250mm	COAL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.078	<0.005
Seam_DU_+0.250mm_Roof/Floor	COAL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	0.003	0	<0.005
DU_Seam-0.250mm_Roof/Floor	COAL	<0.001	<0.005	<0.001	0.03	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.036	<0.005
Blended raw coal	COAL	<0.001	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	0.093	<0.005

Appendix 10: Kinetic Leach Column Data

Scanning electron microscopy analysis of three powder samples

INTRODUCTION

Three soil samples received from SRK to the Electron Microscopy unit, Queensland University of Technology to perform SEM EDX for elemental analysis of minerals and high amorphous content.

Sample 1	**(C_Seam_S1.60+0.250mm)**
Sample 2	**(DLL_S1.60+0.25)**
Sample 5	**(19880-1-2-3-Comp)**

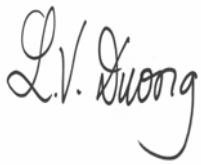
METHODS

The samples were dried in the oven at 60°C and transferred on to the surface of carbon tape. Surfaces of samples were coated with carbon.
Backscattered electron images and Energy dispersive X –ray microanalysis have been used at 20kV to analyse for randomly selected 20 particles from different areas
The scanning electron microscope using for this report is the Quanta 200
XRD of the extracted clay samples were collected to check for disordered clay phases.

RESULTS

Sample1 shows amorphous group (43.1) belongs to the Al Si group of clay minerals. SEM and clay XRD pattern shows major clay is kaolinite and the amouphous group is disordered smectite.
In sample2 the amorphous group (28.5%) seems to belong to both coal particles and disordered smectite.
In sample5 the major phase of this sample is coal with bedding of AlSi phyllosilicate minerals in a matrix. The SEM analysis and clay pattern show the amorphous phase (81.3%) belongs to the coal. No disordered clays were seen in the XRD clay pattern

Regards



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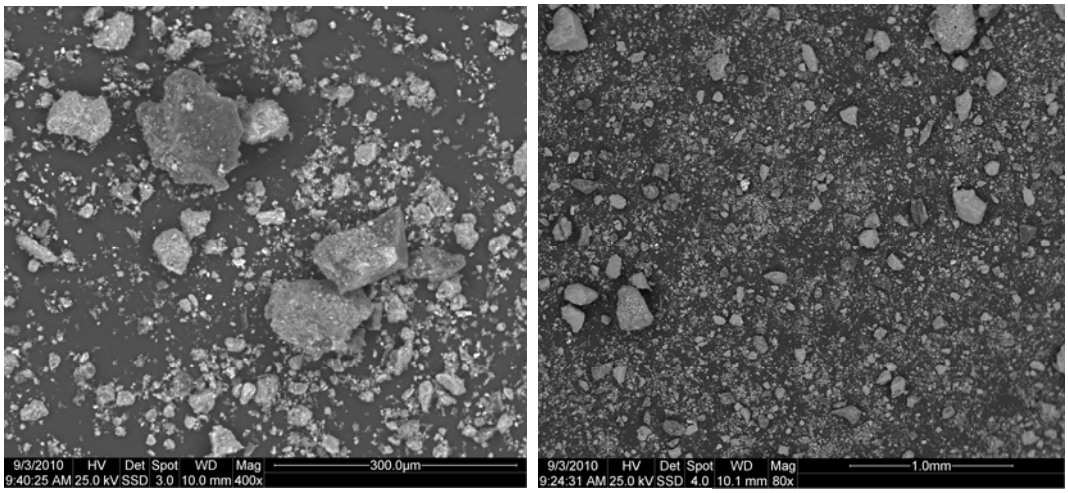


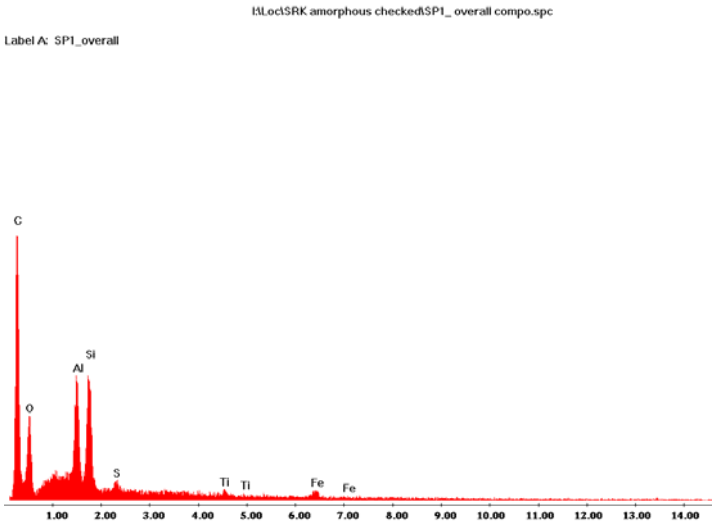


Figure 1 Backscattered electron image sample C_Seam_S1.60+0.250mm. Bottom spectrum show overall composition of the sample is Coal and clay mixture. The extra intensity of the carbon peak comes from the carbon tape

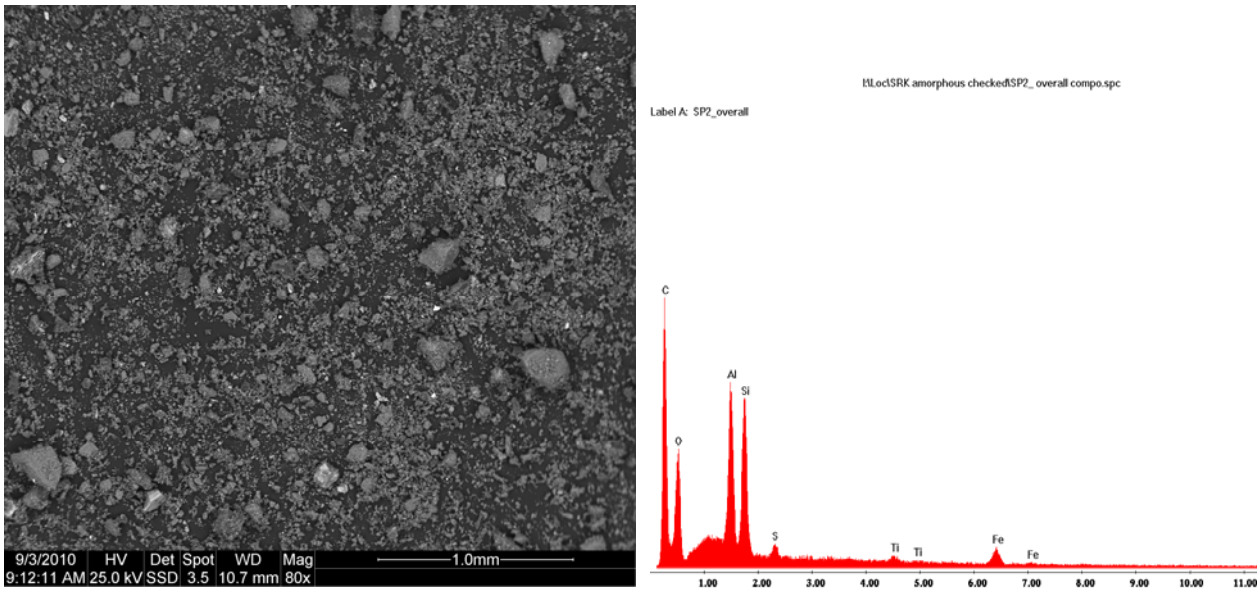
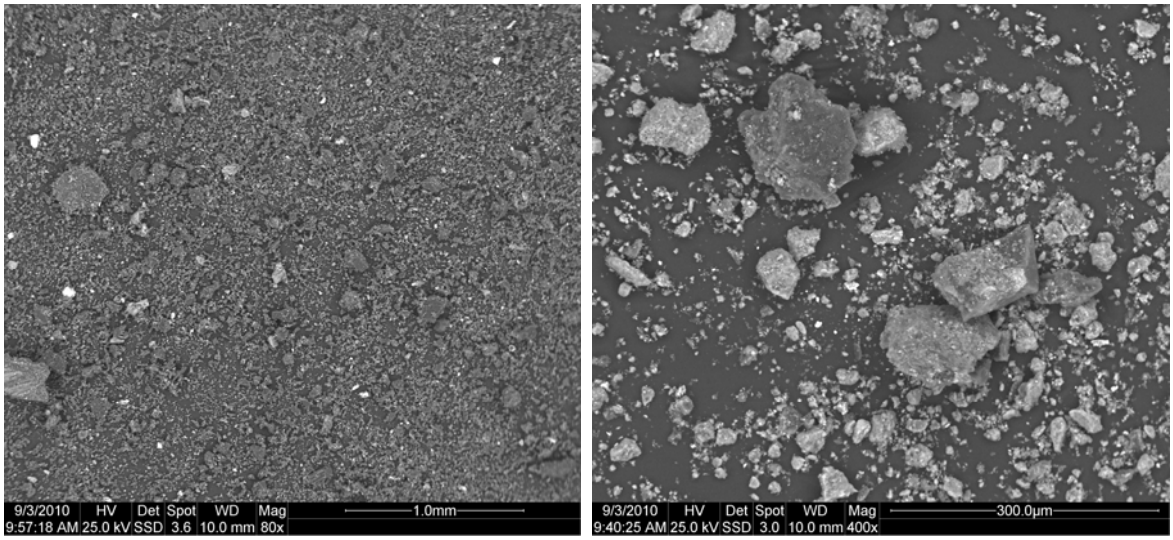


Figure 2 Backscattered electron image sample DLL_S1.60+0.25.
Right spectrum shows overall composition of the sample is Coal and clay mixture with some Fe and S, possibly pyrite



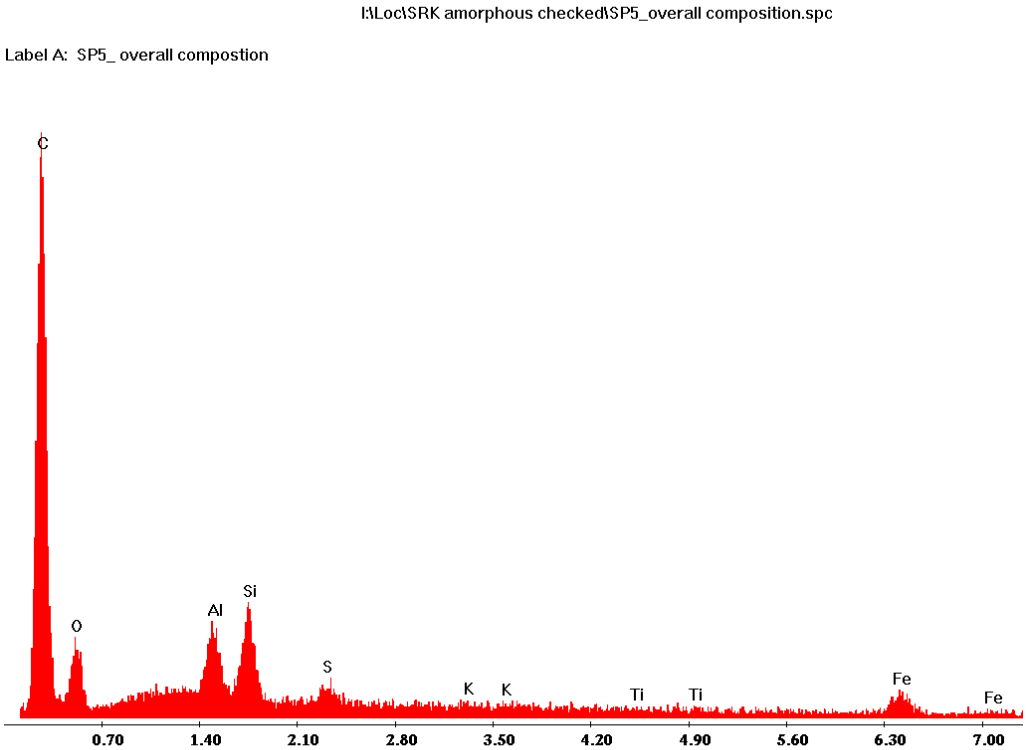


Figure 3 Backscattered electron images of sample 19880-1-2-3-Comp show high content coal particles
Bottom spectrum show overall composition of the sample is mainly coal and small amount of clay mixed with some Fe and S, possibly pyrite

SRK Consulting

Kinetic Column Data

Sample ID C_Seam_S1.60+0.250mm

Date	Cycle	Volume ml		pH	Cond.	Acidity	Alkalinity	Sulphate	Chloride	Fluoride	Ag	Al	As	B	Ba	Be	Bi	Ca
		Input	Output		umhos/cm	(pH 4.5)												
						mgCaCO3	mgCaCO3	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD				0.1	2	5	5	1	1	0.5	0.00001	0.01	0.0001	0	0.00005	0.0001	0	0.01
26-Jul-10	0	4200	3780	4.9	837	29	0	309	23	0.5	0.0005	0.06	0.004	0.11	0.043	0.0005	0.0005	19
02-Aug-10	1	600	450	6.79	551	8	0	212	41	0.5	0.0005	0.01	0.005	0.09	0.023	0.0005	0.0005	7
09-Aug-10	2	600	420	7.51	328	5	0	102	12	0.5	0.0005	0.01	0.0005	0.025	0.015	0.0005	0.0005	2
16-Aug-10	3	600	440	6.23	442	5	0	152	22	0.5	0.0005	0.01	0.0005	0.07	0.016	0.0005	0.0005	4
23-Aug-10	4	600	370	6.13	315	6	0	95	10	0.5	0.0005	0.01	0.0005	0.06	0.018	0.0005	0.0005	2
30-Aug-10	5	600	300	5.38	219	6	0	80	5	0.5	0.0005	0.01	0.0005	0.025	0.014	0.0005	0.0005	2

SRK Consulting

Kinetic Column Data
Sample ID C_Seam_S1

Date	Cycle	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.00002	0	0.0001	0.01	0	0.01	0.01	0	0	0.0001	0	0.1	0	0	0.01	0.01	0.00005	0.1
26-Jul-10	0	0.0005	0.0005	0.01	0.01	0.0005	0.01	3.13	0.0005	0.005	0.0001	0.0005	3	0.0005	0.017	4	0.487	0.0005	136
02-Aug-10	1	0.0002	0.0005	0.001	0.01	0.0005	0.01	0.025	0.0005	0.005	0.0001	0.0005	2	0.0005	0.012	2	0.226	0.0005	113
09-Aug-10	2	0.00005	0.0005	0.0005	0.01	0.0005	0.01	0.025	0.0005	0.005	0.0001	0.0005	1	0.0005	0.006	0.5	0.096	0.0005	51
16-Aug-10	3	0.00005	0.0005	0.0005	0.01	0.0005	0.01	0.025	0.0005	0.005	0.0001	0.0005	2	0.0005	0.009	1	0.184	0.0005	81
23-Aug-10	4	0.00005	0.0005	0.0005	0.01	0.0005	0.01	0.025	0.0005	0.005	0.0001	0.0005	1	0.0005	0.007	0.5	0.109	0.0005	48
30-Aug-10	5	0.00005	0.0005	0.0005	0.01	0.0005	0.01	0.16	0.0005	0.005	0.0001	0.0005	1	0.0005	0.005	0.5	0.081	0.0005	38

SRK Consulting

Kinetic Column Data
Sample ID C_Seam_S1

Date	Cycle	Ni	P	Pb	Sb	Se	Sn	Sr	Te	Th	Ti	Tl	U	V	Y	Zn	Zr
		mg/l	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.01	0.1	0.0005	0.00001	0.0005	0.0001	0.00002	0	0.000005	0	0.00001	0.000005	0.01	0	0.01	0
26-Jul-10	0	0.01	0.1	0.0005	0.0005	0.1	0.0005	0.394	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.063	0.0025
02-Aug-10	1	0.01	0.1	0.0005	0.0005	0.1	0.0005	0.164	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.01	0.0025
09-Aug-10	2	0.01	0.1	0.0005	0.0005	0.04	0.0005	0.064	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.01	0.0025
16-Aug-10	3	0.01	0.1	0.0005	0.0005	0.05	0.0005	0.109	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.01	0.0025
23-Aug-10	4	0.01	0.1	0.0005	0.0005	0.03	0.0005	0.06	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.01	0.0025
30-Aug-10	5	0.01	0.1	0.0005	0.0005	0.02	0.0005	0.049	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.01	0.0025

SRK Consulting

Kinetic Column Data

Sample ID Seam_DLL_S1.60+0.25

Date	Cycle	Volume ml		pH	Cond.	Acidity	Alkalinity	Sulphate	Chloride	Fluoride	Ag	Al	As	B	Ba	Be	Bi	Ca
		Input	Output		umhos/cm	(pH 4.5)												
						mgCaCO3	mgCaCO3	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD				0.1	2	5	5	1	1	0.5	0.00001	0.01	0.0001	0	0.00005	0.0001	0	0.01
26-Jul-10	0	4800	4330	3.73	1040	78	0	458	13	0.5	0.0005	2.17	0.005	0.08	0.043	0.003	0.0005	65
02-Aug-10	1	600	450	3.98	509	53	0	190	9	0.5	0.0005	0.72	0.002	0.08	0.032	0.002	0.0005	36
09-Aug-10	2	600	370	4.02	322	29	0	108	4	0.5	0.0005	0.43	0.0005	0.025	0.027	0.001	0.0005	21
16-Aug-10	3	600	440	3.83	500	32	0	197	6	0.5	0.0005	1.06	0.0005	0.06	0.022	0.002	0.0005	42
23-Aug-10	4	600	350	3.69	376	29	0	115	4	0.5	0.0005	0.9	0.0005	0.025	0.028	0.002	0.0005	29
30-Aug-10	5	600	275	3.63	283	24	0	83	2	0.5	0.0005	0.7	0.0005	0.025	0.013	0.002	0.0005	22

SRK Consulting

Kinetic Column Data
Sample ID Seam_DLL_

Date	Cycle	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Ni
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l
LOD		0.00002	0	0.0001	0.01	0	0.01	0.01	0	0	0.0001	0	0.1	0	0	0.01	0.01	0.00005	0.1	0.01
26-Jul-10	0	0.0056	0.006	0.132	0.01	0.0005	0.016	53.6	0.0005	0.005	0.0001	0.0005	3	0.003	0.033	13	4.21	0.0005	79	0.052
02-Aug-10	1	0.0053	0.002	0.071	0.01	0.0005	0.01	1.44	0.0005	0.005	0.0001	0.0005	2	0.0005	0.059	8	3.12	0.0005	39	0.033
09-Aug-10	2	0.0039	0.001	0.05	0.01	0.0005	0.01	0.13	0.0005	0.005	0.0001	0.0005	1	0.0005	0.038	5	2.35	0.0005	17	0.023
16-Aug-10	3	0.0078	0.004	0.095	0.01	0.0005	0.012	0.23	0.0005	0.005	0.0001	0.0005	2	0.002	0.071	10	4.76	0.0005	29	0.045
23-Aug-10	4	0.0061	0.003	0.066	0.01	0.0005	0.011	0.21	0.0005	0.005	0.0001	0.0005	2	0.001	0.053	6	3.52	0.0005	10	0.031
30-Aug-10	5	0.004	0.003	0.046	0.01	0.0005	0.01	1.15	0.0005	0.005	0.0001	0.0005	2	0.001	0.032	4	2.36	0.0005	5	0.023

SRK Consulting

Kinetic Column Data

Sample ID Seam_DLL_

Date	Cycle	P	Pb	Sb	Se	Sn	Sr	Te	Th	Ti	Tl	U	V	Y	Zn	Zr
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.1	0.0005	0.00001	0.0005	0.0001	0.00002	0	0.000005	0	0.00001	0.000005	0.01	0	0.01	0
26-Jul-10	0	0.1	0.094	0.0005	0.04	0.004	0.777	0.0025	0.0005	0.005	0.004	0.0005	0.01	0.018	1.45	0.0025
02-Aug-10	1	0.1	0.037	0.0005	0.03	0.0005	0.501	0.0025	0.0005	0.005	0.002	0.0005	0.01	0.006	1.44	0.0025
09-Aug-10	2	0.1	0.026	0.0005	0.01	0.0005	0.346	0.0025	0.0005	0.005	0.002	0.0005	0.01	0.003	1.18	0.0025
16-Aug-10	3	0.1	0.045	0.0005	0.02	0.0005	0.572	0.0025	0.0005	0.005	0.003	0.0005	0.01	0.01	2.43	0.0025
23-Aug-10	4	0.1	0.046	0.0005	0.005	0.0005	0.424	0.0025	0.0005	0.005	0.003	0.0005	0.01	0.007	1.78	0.0025
30-Aug-10	5	0.1	0.041	0.0005	0.005	0.0005	0.32	0.0025	0.0005	0.005	0.003	0.0005	0.01	0.006	1.22	0.0025

SRK Consulting

Kinetic Column Data

Sample ID Seam_DUL_S1.60+0.250mm

Date	Cycle	Volume ml		pH	Cond.	Acidity	Alkalinity	Sulphate	Chloride	Fluoride	Ag	Al	As	B	Ba	Be	Bi	Ca
		Input	Output		umhos/cm	(pH 4.5)												
						mgCaCO3	mgCaCO3	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD				0.1	2	5	5	1	1	0.5	0.00001	0.01	0.0001	0	0.00005	0.0001	0	0.01
26-Jul-10	0	3000	2560	4.28	942	8	0	352	25	0.5	0.0005	0.58	0.003	0.13	0.049	0.0005	0.0005	39
02-Aug-10	1	600	440	4.87	701	27	0	274	26	0.5	0.0005	0.06	0.009	0.14	0.031	0.0005	0.0005	28
09-Aug-10	2	600	370	5.05	405	27	0	134	22	0.5	0.0005	0.02	0.0005	0.07	0.032	0.0005	0.0005	12
16-Aug-10	3	600	430	4.74	516	14	0	180	5	0.5	0.0005	0.03	0.0005	0.09	0.026	0.0005	0.0005	16
23-Aug-10	4	600	310	4.46	226	6	0	72	10	0.5	0.0005	0.02	0.0005	0.06	0.042	0.0005	0.0005	6
30-Aug-10	5	600	250	4.39	178	6	0	66	4	0.5	0.0005	0.03	0.0005	0.025	0.017	0.0005	0.0005	7

SRK Consulting

Kinetic Column Data

Sample ID Seam_DUL_

Date	Cycle	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Ni
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l
LOD		0.00002	0	0.0001	0.01	0	0.01	0.01	0	0.0001	0	0.1	0	0	0.01	0.01	0.00005	0.1	0.01
26-Jul-10	0	0.0014	0.001	0.032	0.01	0.0005	0.019	25.4	0.0005	0.0001	0.0005	4	0.0005	0.027	10	1.63	0.0005	97	0.014
02-Aug-10	1	0.0007	0.0005	0.042	0.01	0.0005	0.01	0.25	0.0005	0.0001	0.0005	4	0.0005	0.034	8	1.49	0.0005	103	0.01
09-Aug-10	2	0.0003	0.0005	0.022	0.01	0.0005	0.01	0.06	0.0005	0.0001	0.0005	2	0.0005	0.02	4	0.836	0.0005	56	0.01
16-Aug-10	3	0.0004	0.0005	0.034	0.01	0.0005	0.01	0.025	0.0005	0.0001	0.0005	2	0.0005	0.031	6	1.3	0.0005	62	0.01
23-Aug-10	4	0.0002	0.0005	0.016	0.01	0.0005	0.01	0.05	0.0005	0.0001	0.0005	1	0.0005	0.017	2	0.512	0.0005	25	0.01
30-Aug-10	5	0.0002	0.0005	0.013	0.01	0.0005	0.01	0.53	0.0005	0.0001	0.0005	2	0.0005	0.013	2	0.495	0.0005	20	0.01

SRK Consulting

Kinetic Column Data

Sample ID Seam_DUL_

Date	Cycle	P	Pb	Sb	Se	Sn	Sr	Te	Th	Ti	Tl	U	V	Y	Zn	Zr
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.1	0.0005	0.00001	0.0005	0.0001	0.00002	0	0.000005	0	0.00001	0.000005	0.01	0	0.01	0
26-Jul-10	0	0.1	0.008	0.0005	0.12	0.0005	0.543	0.0025	0.0005	0.005	0.002	0.0005	0.01	0.002	0.092	0.0025
02-Aug-10	1	0.1	0.001	0.0005	0.17	0.0005	0.39	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.037	0.0025
09-Aug-10	2	0.12	0.0005	0.0005	0.06	0.0005	0.203	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.019	0.0025
16-Aug-10	3	0.1	0.0005	0.0005	0.08	0.0005	0.272	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.029	0.0025
23-Aug-10	4	0.1	0.0005	0.0005	0.02	0.0005	0.108	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.015	0.0025
30-Aug-10	5	0.1	0.001	0.0005	0.01	0.0005	0.124	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.014	0.0025

SRK Consulting

Kinetic Column Data

Sample ID Blended Raw Coal

Date	Cycle	Volume m		pH	Cond.	Acidity	Alkalinity	Sulphate	Chloride	Fluoride	Ag	Al	As	B	Ba	Be	Bi	Ca
		Input	Output		umhos/cm	(pH 4.5)												
						mgCaCO3	mgCaCO3	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD				0.1	2	5	5	1	1	0.5	0.00001	0.01	0.0001	0	0.00005	0.0001	0	0.01
26-Jul-10	0	840	660	7.15	118	5	11	18	4	0.5	0.0005	0.04	0.0005	0.06	0.022	0.0005	0.0005	2
02-Aug-10	1	420	330	6.8	407	12	21	118	21	0.5	0.0005	0.02	0.0005	0.2	0.02	0.0005	0.0005	4
09-Aug-10	2	420	310	6.51	58	5	0	14	3	0.5	0.0005	0.06	0.0005	0.025	0.004	0.0005	0.0005	0.5
16-Aug-10	3	420	340	6.04	66	5	0	15	11	0.5	0.0005	0.08	0.0005	0.025	0.003	0.0005	0.0005	0.5
23-Aug-10	4	420	320	6.91	65	5	0	18	2	0.5	0.0005	0.15	0.0005	0.05	0.002	0.0005	0.0005	0.5
30-Aug-10	5	420	310	5.95	32	5	0	10	1	0.5	0.0005	0.12	0.0005	0.025	0.002	0.0005	0.0005	0.5

SRK Consulting

Kinetic Column Data
Sample ID Blended Ra

Date	Cycle	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.00002	0	0.0001	0.01	0	0.01	0.01	0	0	0.0001	0	0.1	0	0	0.01	0.01	0.00005	0.1
26-Jul-10	0	0.00005	0.0005	0.0005	0.01	0.01	0.01	0.025	0.0005	0.005	0.0001	0.0005	0.5	0.0005	0.002	0.5	0.019	0.0005	16
02-Aug-10	1	0.00005	0.0005	0.0005	0.01	0.04	0.01	0.025	0.0005	0.005	0.0001	0.0005	2	0.0005	0.007	2	0.01	0.001	70
09-Aug-10	2	0.00005	0.0005	0.0005	0.01	0.009	0.01	0.025	0.0005	0.005	0.0001	0.0005	0.5	0.0005	0.0005	0.5	0.01	0.0005	9
16-Aug-10	3	0.00005	0.0005	0.0005	0.01	0.008	0.01	0.025	0.0005	0.005	0.0001	0.0005	0.5	0.0005	0.0005	0.5	0.01	0.0005	12
23-Aug-10	4	0.00005	0.0005	0.0005	0.01	0.007	0.01	0.025	0.0005	0.005	0.0001	0.0005	0.5	0.0005	0.0005	0.5	0.01	0.0005	9
30-Aug-10	5	0.00005	0.0005	0.0005	0.01	0.006	0.01	0.025	0.0005	0.005	0.0001	0.0005	0.5	0.0005	0.0005	0.5	0.01	0.0005	6

SRK Consulting

Kinetic Column Data

Sample ID Blended Ra

Date	Cycle	Ni	P	Pb	Sb	Se	Sn	Sr	Te	Th	Ti	Tl	U	V	Y	Zn	Zr
		mg/l	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.01	0.1	0.0005	0.00001	0.0005	0.0001	0.00002	0	0.000005	0	0.00001	0.000005	0.01	0	0.01	0
26-Jul-10	0	0.01	0.1	0.0005	0.0005	0.01	0.0005	0.024	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.01	0.0025
02-Aug-10	1	0.01	0.1	0.0005	0.0005	0.08	0.0005	0.056	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.01	0.0025
09-Aug-10	2	0.01	0.1	0.0005	0.0005	0.005	0.0005	0.013	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.01	0.0025
16-Aug-10	3	0.01	0.42	0.0005	0.0005	0.005	0.0005	0.012	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.01	0.0025
23-Aug-10	4	0.01	0.1	0.0005	0.0005	0.005	0.0005	0.009	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.01	0.0025
30-Aug-10	5	0.01	0.1	0.0005	0.0005	0.005	0.0005	0.006	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.01	0.0025

SRK Consulting

Kinetic Column Data

Sample ID Alpha C, Alpha DLL & Alpha DU -0.250mm

Date	Cycle	Volume ml		pH	Cond.	Acidity	Alkalinity	Sulphate	Chloride	Fluoride	Ag	Al	As	B	Ba	Be	Bi	Ca
		Input	Output		umhos/cm	(pH 4.5)												
						mgCaCO3	mgCaCO3	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD				0.1	2	5	5	1	1	0.5	0.00001	0.01	0.0001	0	0.00005	0.0001	0	0.01
26-Jul-10	0	1575	893	6.63	713	10	27	217	21	0.5	0.0005	0.01	0.0005	0.82	0.055	0.0005	0.0005	31
02-Aug-10	1	260	160	6.47	-	18	-	82	8	-	0.0005	0.01	0.0005	0.31	0.027	0.0005	0.0005	12
09-Aug-10	2	260	160	6.75	62	9	0	12	1	0.5	0.0005	0.02	0.0005	0.025	0.006	0.0005	0.0005	3
16-Aug-10	3	260	160	5.92	606	5	0	254	8	0.5	0.0005	0.01	0.0005	0.28	0.079	0.0005	0.0005	52
23-Aug-10	4	260	160	6.19	-	10	-	168	4	0.5	0.0005	0.01	0.0005	0.2	0.058	0.0005	0.0005	36
30-Aug-10	5	260	260	5.69	504	8	0	221	4	0.5	0.0005	0.01	0.0005	0.025	0.008	0.0005	0.0005	53

SRK Consulting

Kinetic Column Data

Sample ID Alpha C, Alp

Date	Cycle	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Ni
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l
LOD		**0.00002**	**0**	**0.0001**	**0.01**	**0**	**0.01**	**0.01**	**0**	**0**	**0.0001**	**0**	**0.1**	**0**	**0**	**0.01**	**0.01**	**0.00005**	**0.1**	**0.01**
26-Jul-10	0	0.00005	0.0005	0.003	0.01	0.0005	0.01	0.025	0.0005	0.005	0.0001	0.0005	4	0.0005	0.02	10	0.754	0.0005	77	0.01
02-Aug-10	1	0.00005	0.0005	0.0005	0.01	0.0005	0.01	0.025	0.0005	0.005	0.0001	0.0005	2	0.0005	0.013	3	0.534	0.0005	27	0.01
09-Aug-10	2	0.00005	0.0005	0.0005	0.01	0.0005	0.01	0.025	0.0005	0.005	0.0001	0.0005	0.5	0.0005	0.002	0.5	0.187	0.0005	3	0.01
16-Aug-10	3	0.00005	0.0005	0.005	0.01	0.0005	0.01	0.025	0.0005	0.005	0.0001	0.0005	3	0.0005	0.026	15	3.96	0.0005	39	0.01
23-Aug-10	4	0.00005	0.0005	0.005	0.01	0.0005	0.01	0.025	0.0005	0.005	0.0001	0.0005	1	0.0005	0.018	9	3.68	0.0005	19	0.01
30-Aug-10	5	0.00005	0.0005	0.0005	0.01	0.0005	0.01	0.025	0.0005	0.005	0.0001	0.0005	2	0.0005	0.003	14	0.673	0.0005	24	0.01

SRK Consulting

Kinetic Column Data

Sample ID Alpha C, Alp

Date	Cycle	P	Pb	Sb	Se	Sn	Sr	Te	Th	Ti	Tl	U	V	Y	Zn	Zr
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		**0.1**	**0.0005**	**0.00001**	**0.0005**	**0.0001**	**0.00002**	**0**	**0.000005**	**0**	**0.00001**	**0.000005**	**0.01**	**0**	**0.01**	**0**
26-Jul-10	0	0.1	0.0005	0.0005	0.04	0.0005	0.414	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.041	0.0025
02-Aug-10	1	0.1	0.0005	0.0005	0.005	0.0005	0.154	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.015	0.0025
09-Aug-10	2	0.11	0.0005	0.0005	0.005	0.0005	0.032	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.01	0.0025
16-Aug-10	3	0.1	0.0005	0.0005	0.01	0.0005	0.609	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.113	0.0025
23-Aug-10	4	0.1	0.0005	0.0005	0.005	0.004	0.449	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.111	0.0025
30-Aug-10	5	0.1	0.0005	0.0005	0.005	0.0005	0.059	0.0025	0.0005	0.005	0.0005	0.0005	0.01	0.0005	0.018	0.0025

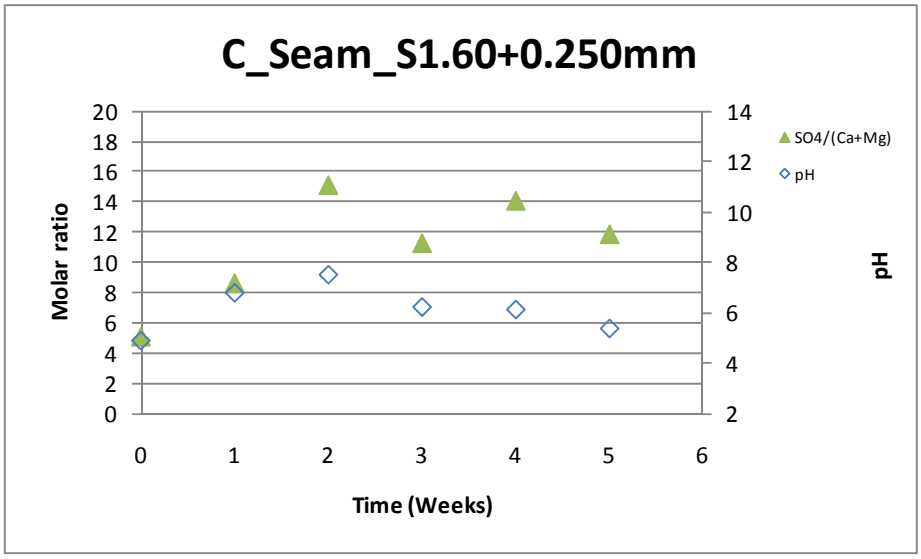


Figure A 1: Molar ratio and pH results for sample C_Seam_S1.60+0.250 mm

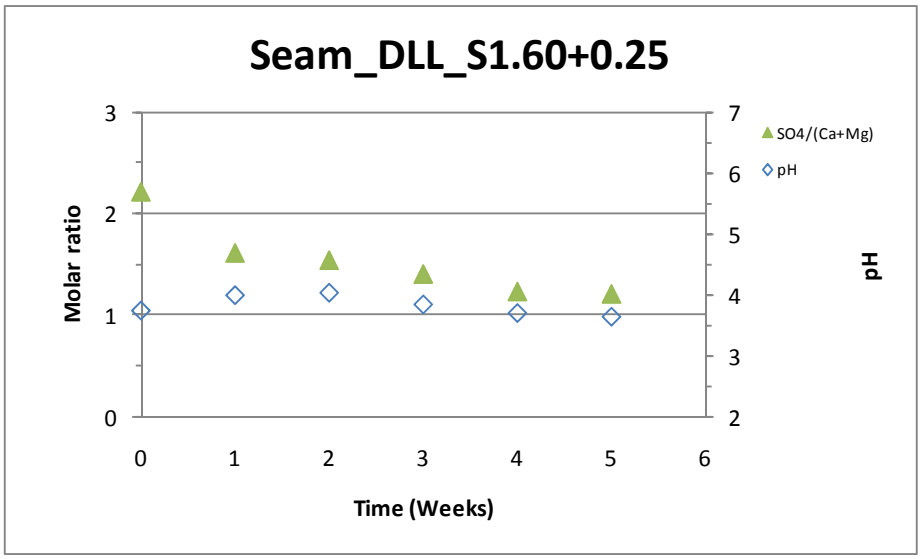


Figure A 2: Molar ratio and pH results for sample DLL_Seam_S1.60+0.25

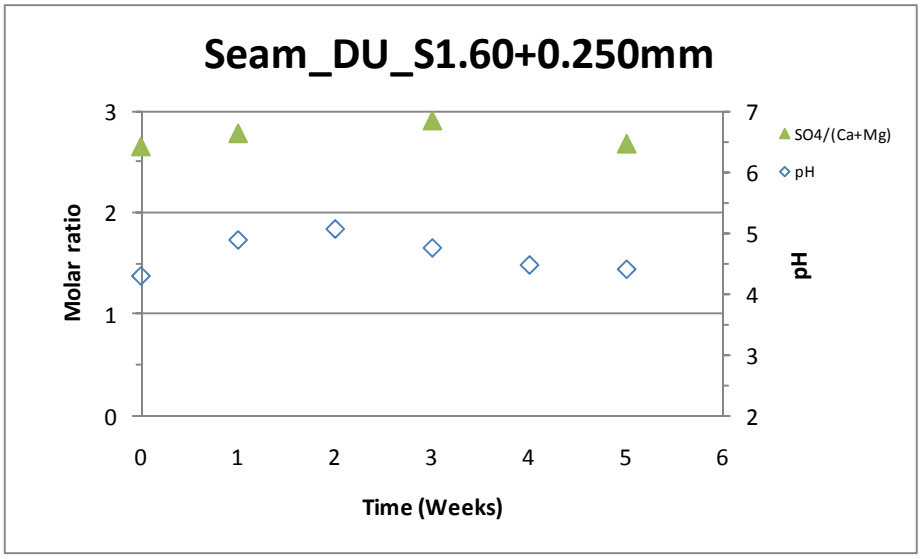


Figure A 3: Molar ratio and pH results for sample DU_Seam_S1.60+0.250 mm

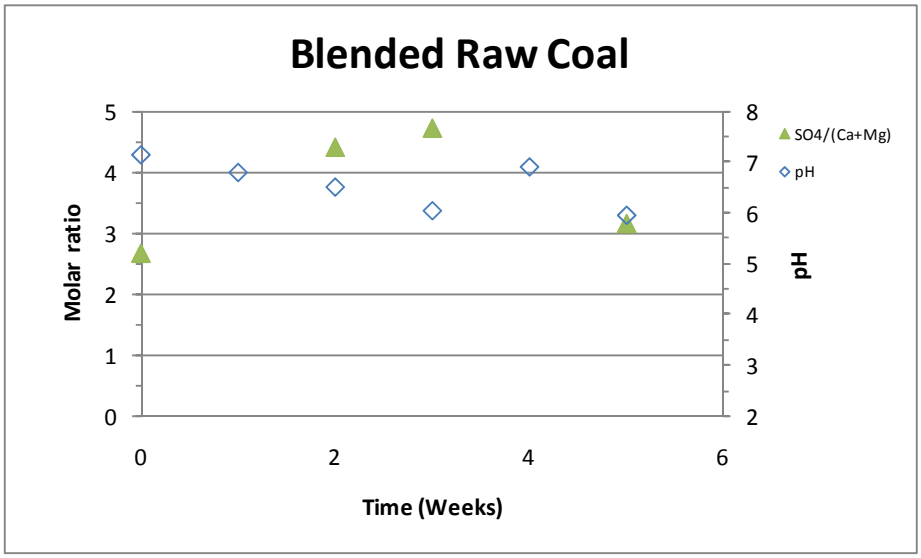


Figure A 4: Molar ratio and pH results for the blended raw coal sample

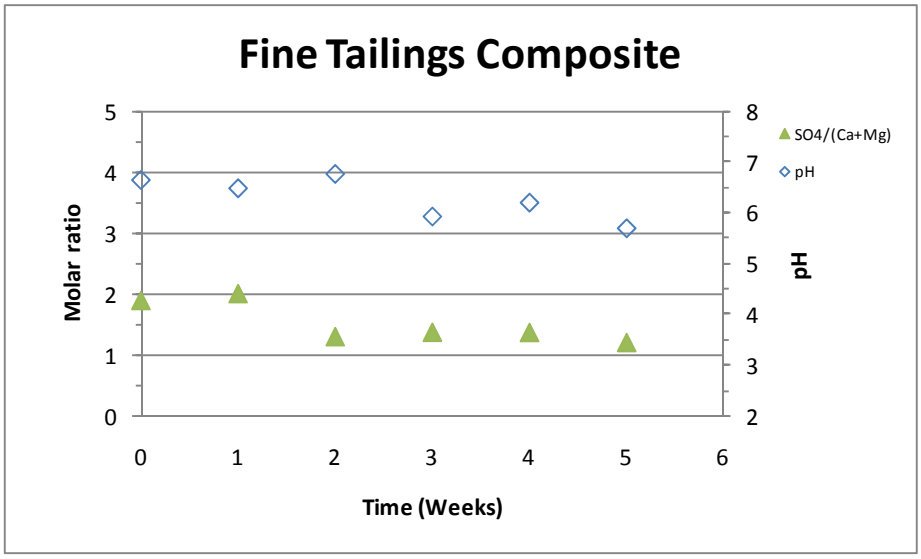


Figure A 5: Molar ratio and pH results for the fine tailings composite

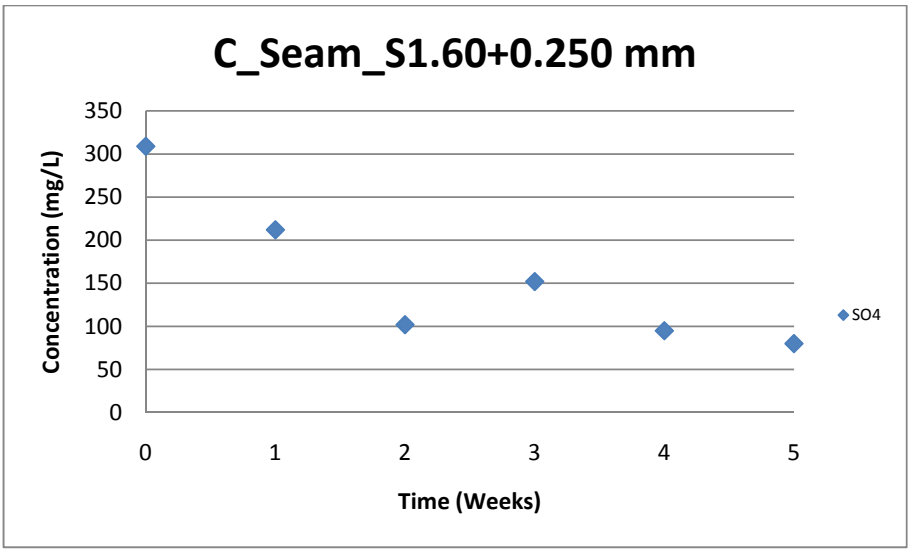


Figure A 6: Sulphate concentration for sample C_Seam_S1.60+0.250 mm

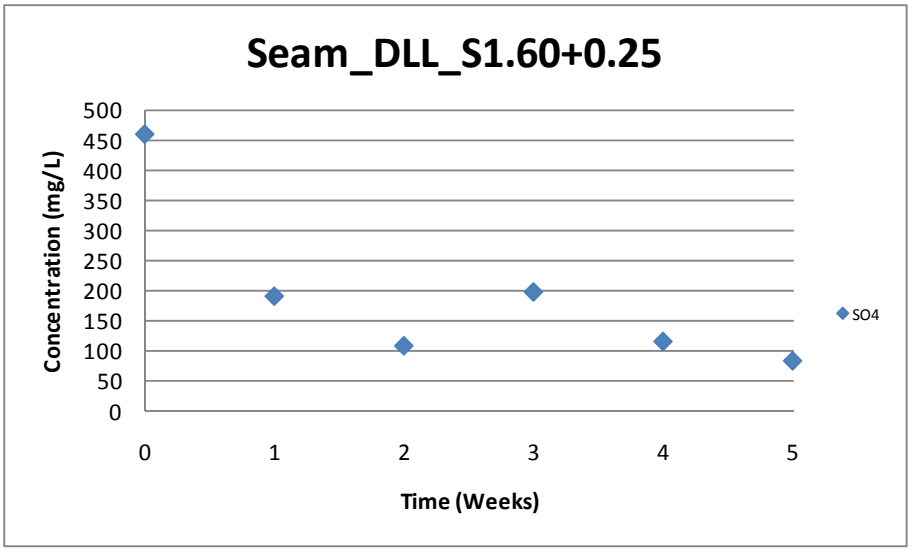


Figure A 7: Sulphate concentration for sample DLL_Seam_S1.60+0.25

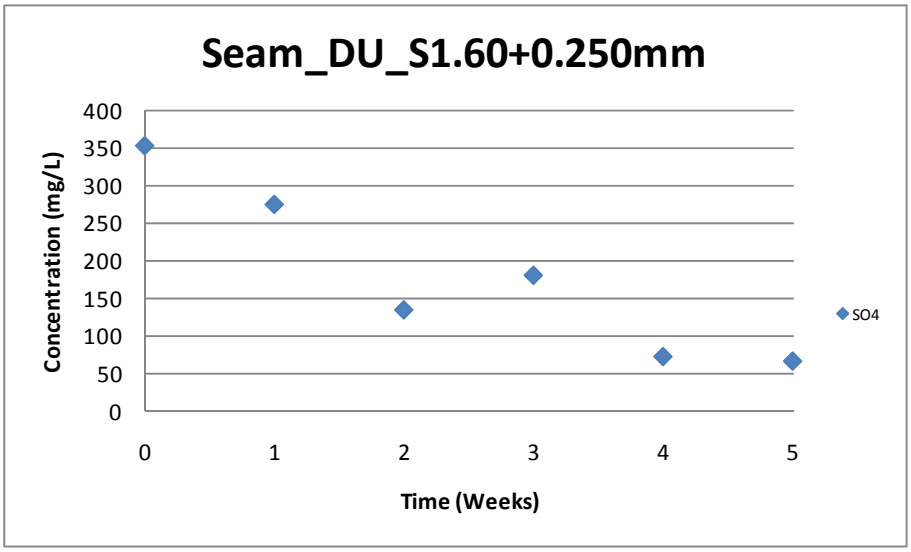


Figure A 8: Sulphate concentration for sample DU_Seam_S1.60+0.250 mm

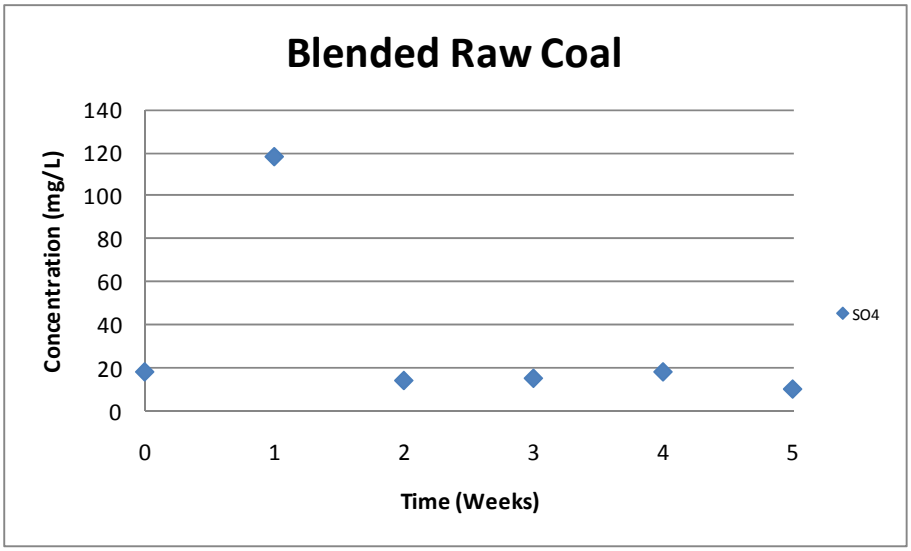


Figure A 9: Sulphate concentration for the blended raw coal sample

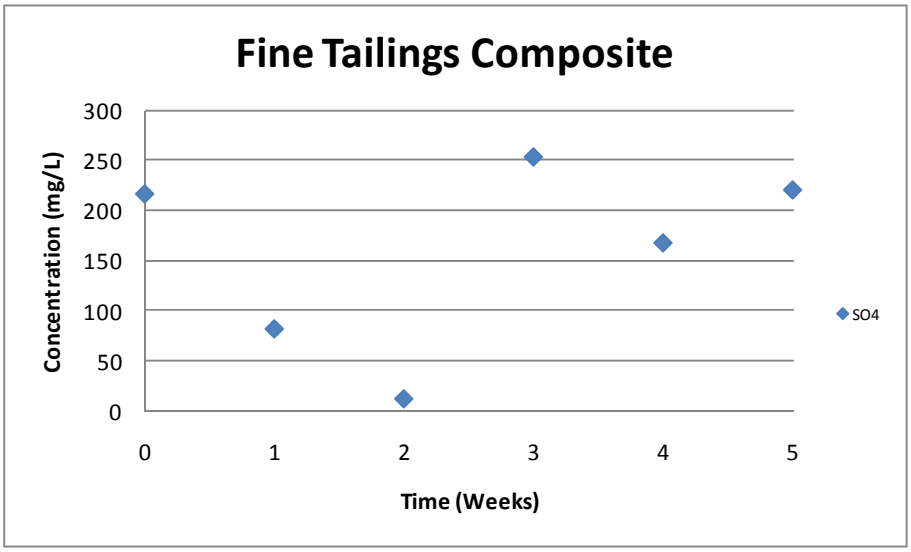


Figure A 10: Sulphate concentration for the fine tailings sample

Appendix 11: Summary Statistics

All statistics are length weighted assuming a maximum sample length of 2 m. The figures in this section typically show two sets of histograms for each group. The right hand set have a higher resolution on the x axis to show detail of the lower value cluster. Number of samples, minimum, maximum, mean and standard deviation are shown on each histogram.

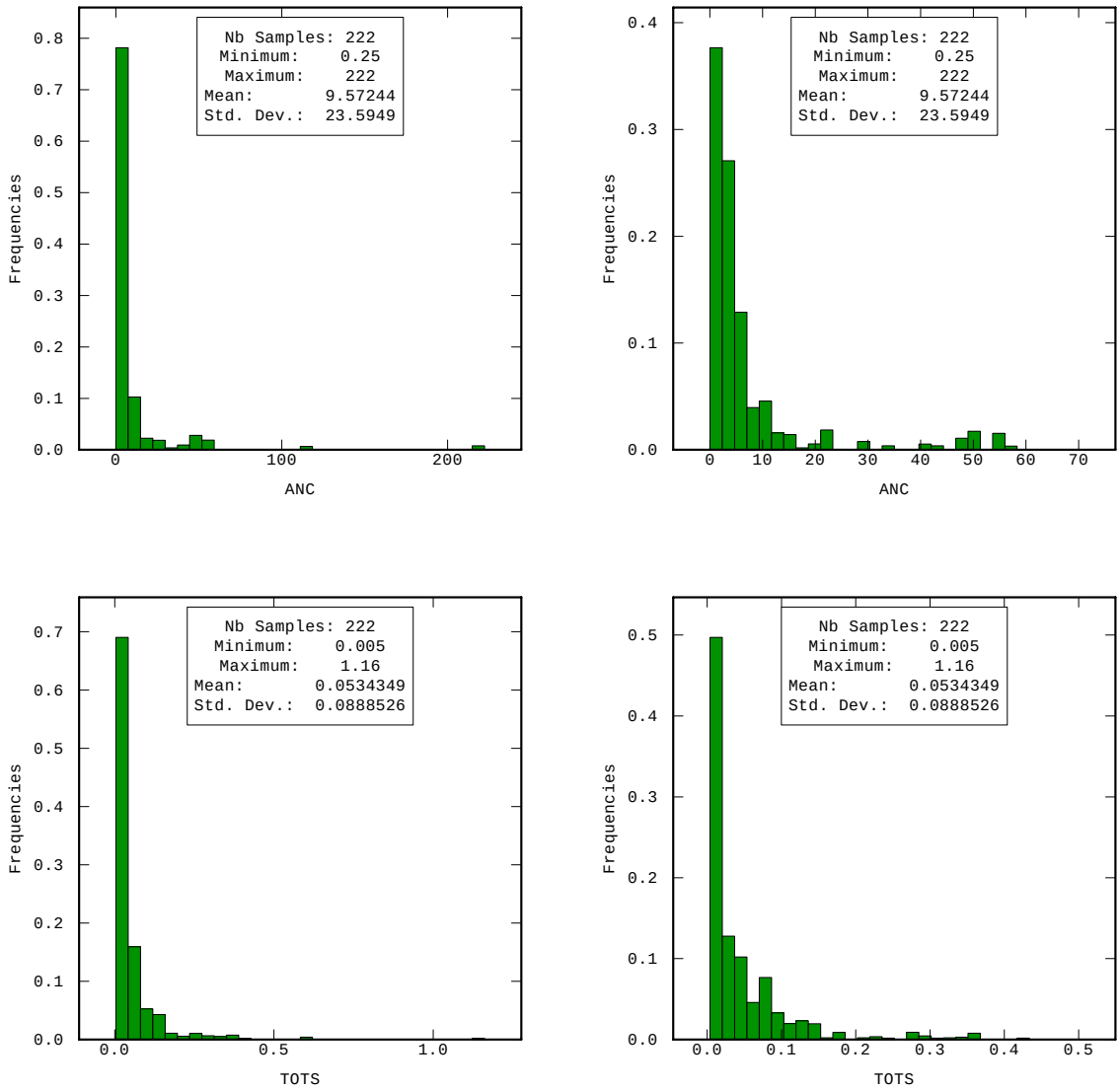


Figure A 11: Histograms for all samples ex coal

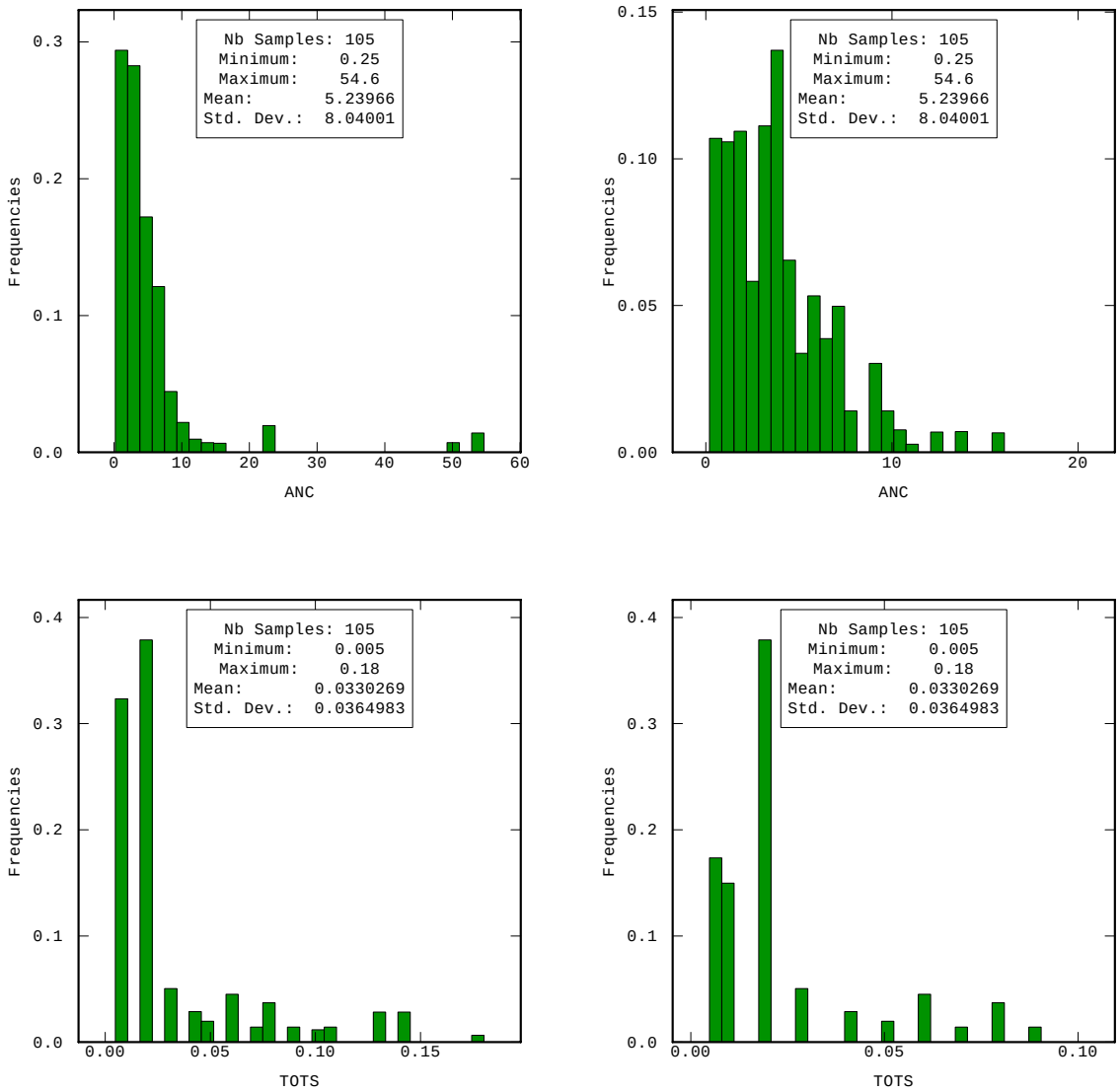


Figure A 12: Histograms for Weathered ex coal

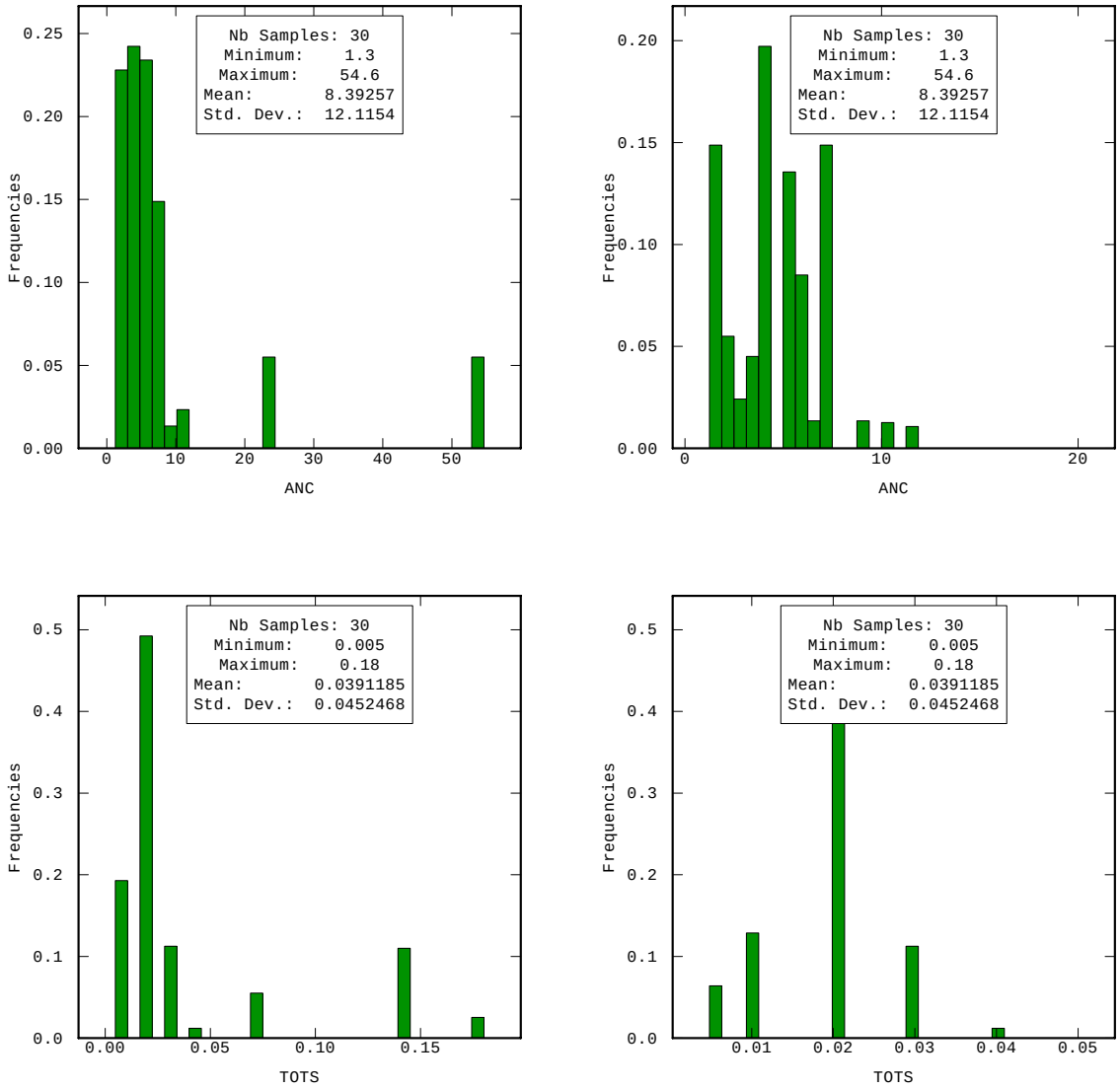
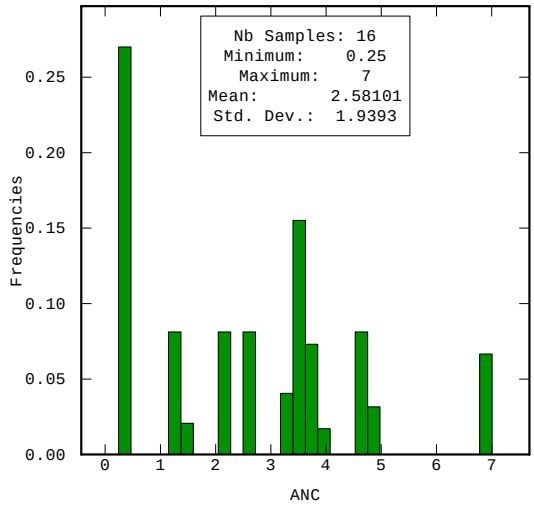


Figure A 13: Histograms for weathered Clay and Soil



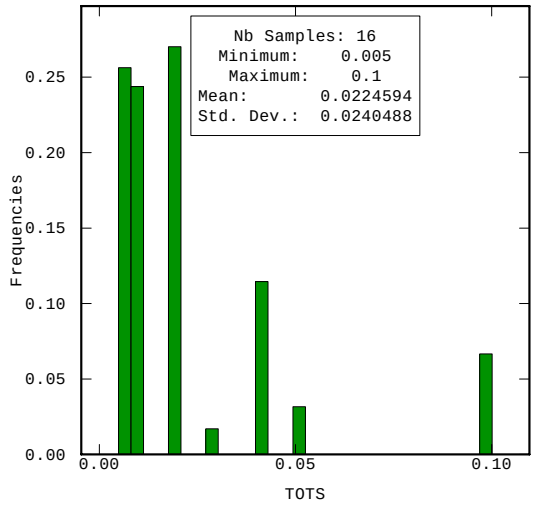


Figure A 14: Histograms for weathered Sand and Gravel

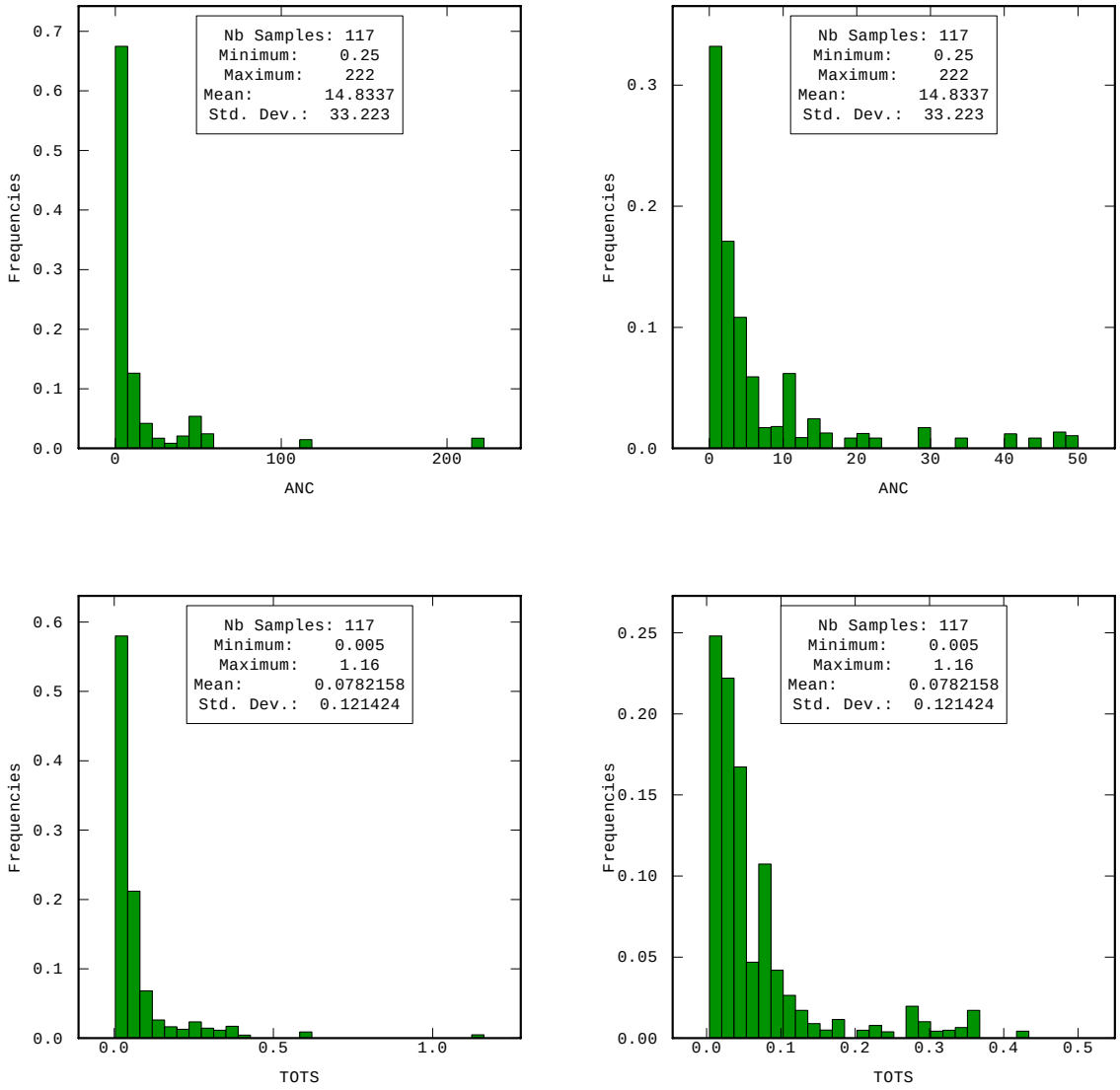


Figure A 15: Histograms for fresh ex coal

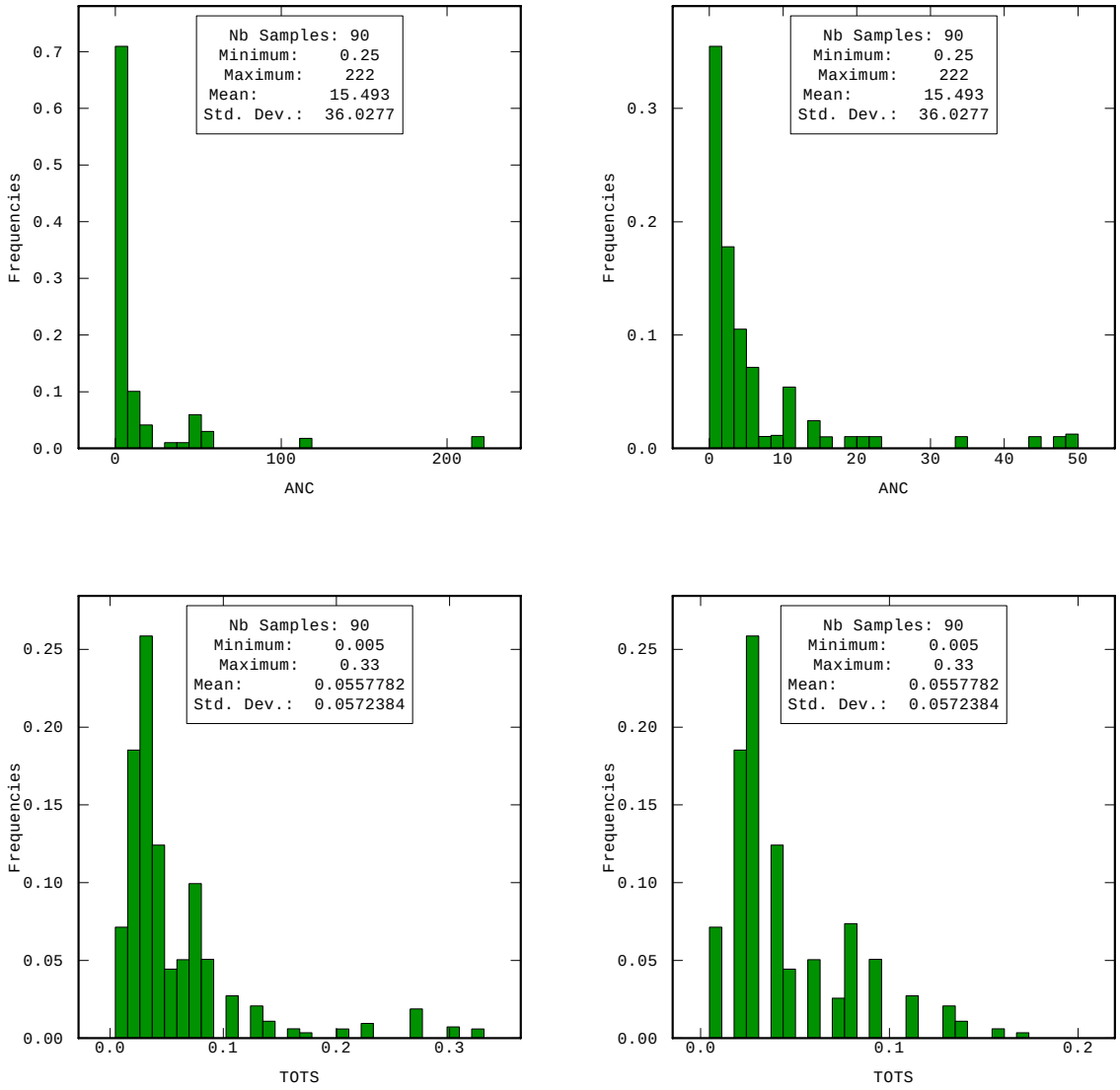


Figure A 16: Histograms for Fresh REM

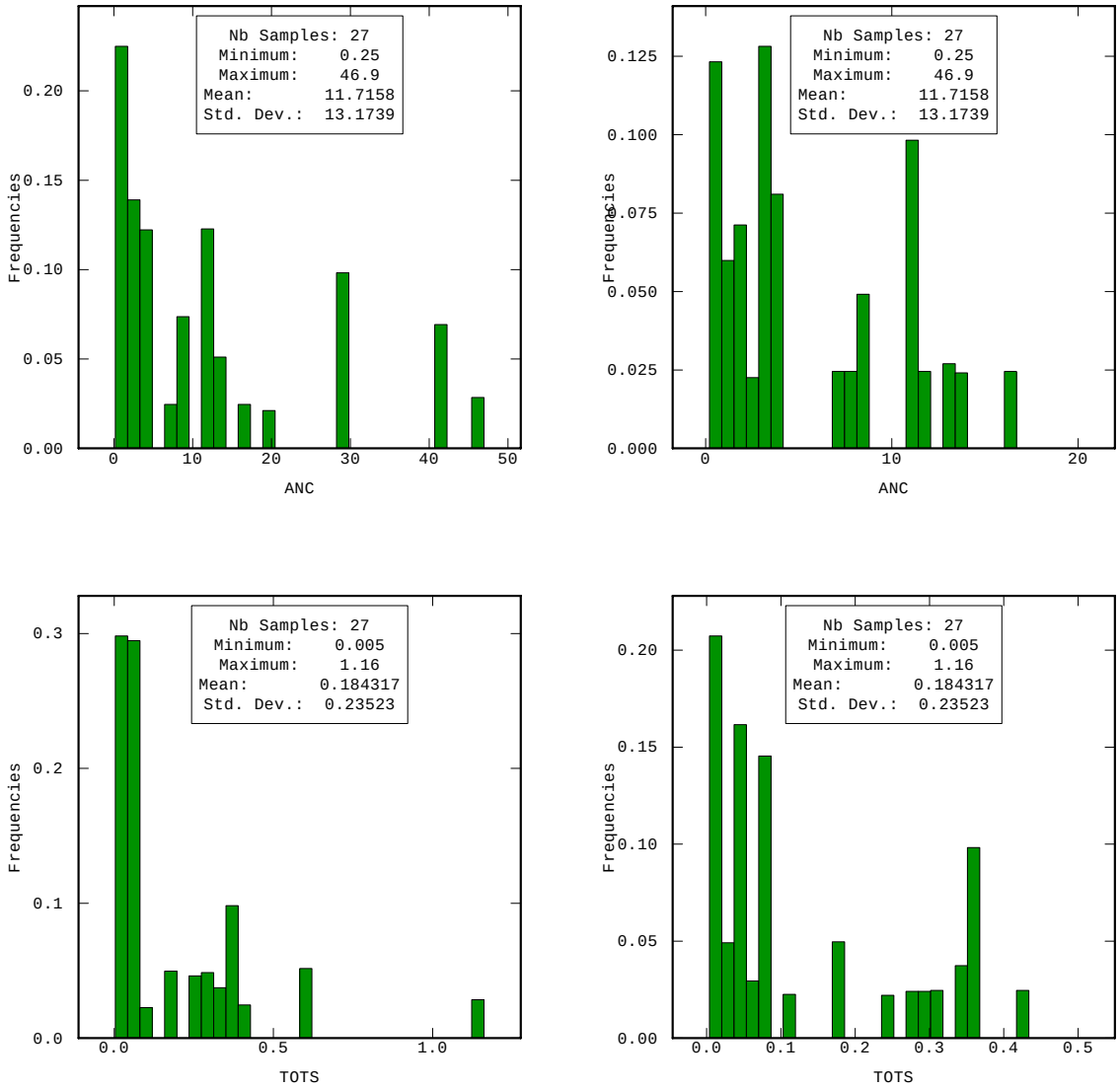


Figure A 17: Histograms for Fresh Carbonaceous

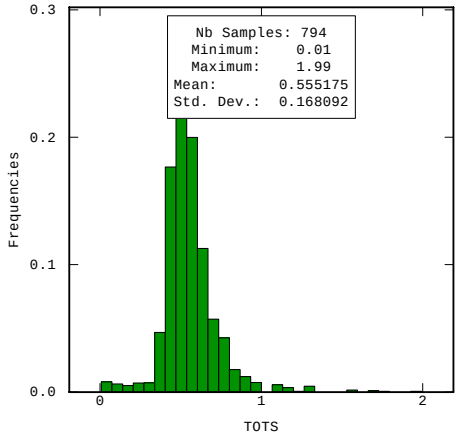


Figure A 18: Histogram for all Coal

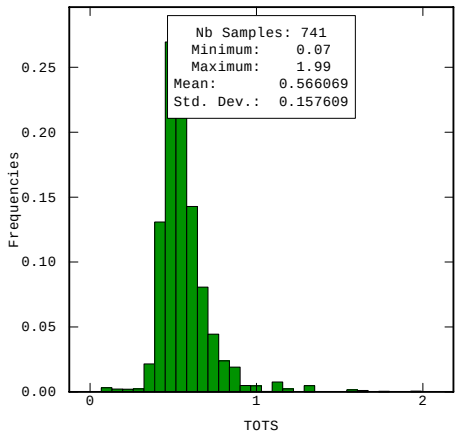


Figure A 19: Histogram for coal other

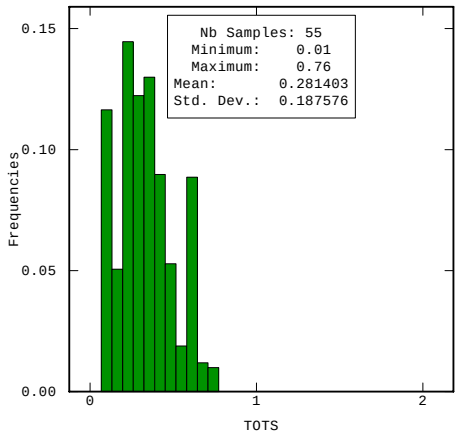
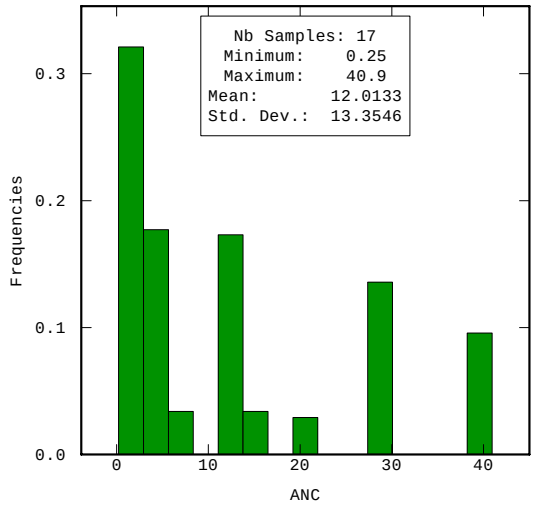


Figure A 20: Histogram for Coal SRK



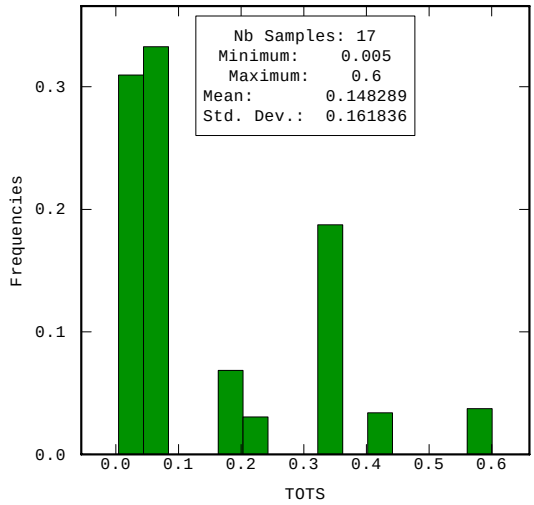
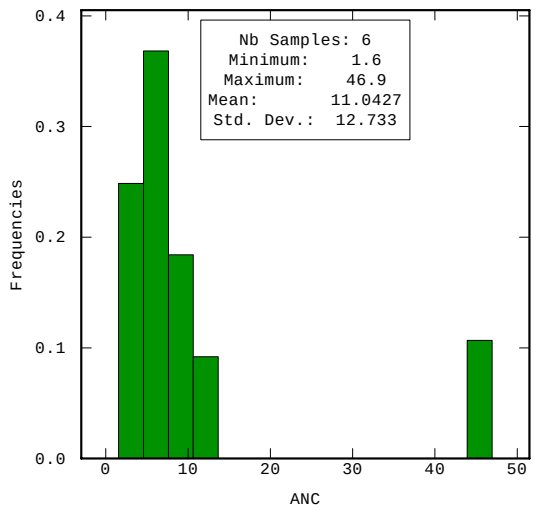


Figure A 21: Histograms for Carbonaceous mudstone lithology



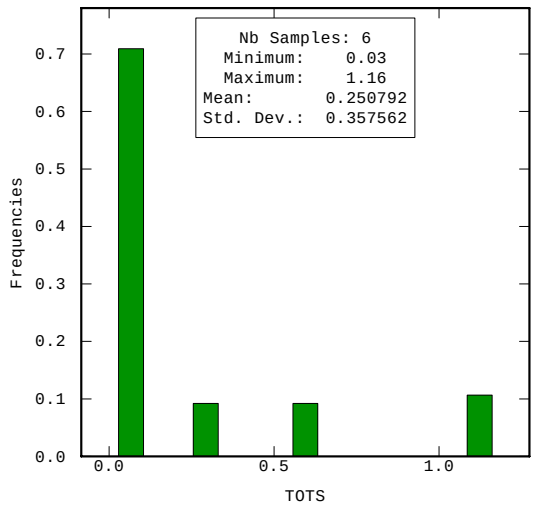


Figure A 22: Histograms for Carbonaceous shale lithology

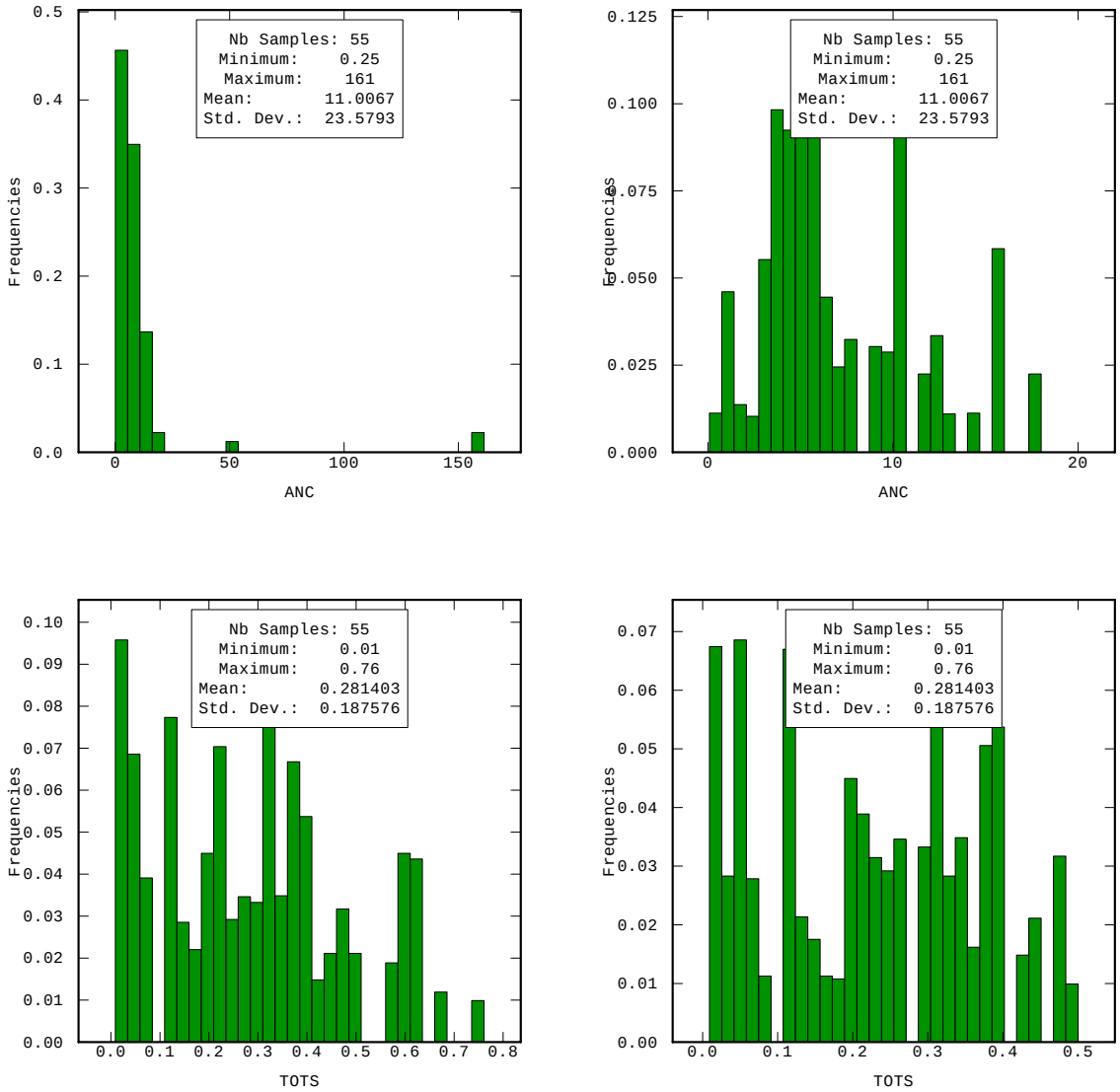


Figure A 23: Histograms for Coal SRK

Roof and Floor

The Roof and floor sample average Stot is 0.1 %. This is only slightly higher than the background fresh material whose Stot average is 0.08%.

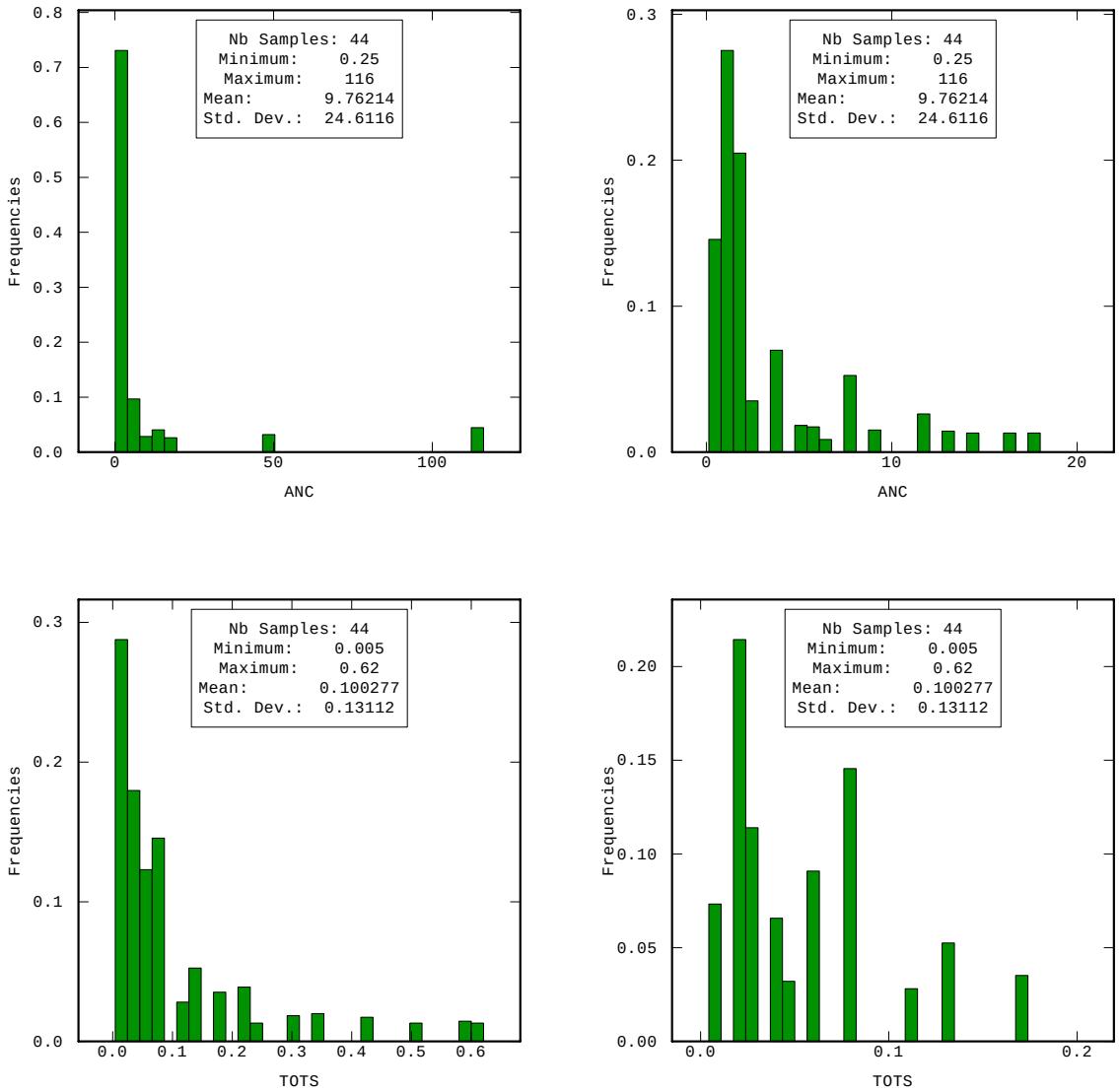


Figure A 24: Histograms for roof and floor

Appendix 12: Variography and Spatial Variability – Technical Note

The average value and variance of a population can often be confidently estimated GLOBALLY from a relatively small number of samples. Confidence in a global average is not always sufficient and knowledge of the localised values of a parameter and its local variability are often required for waste characterisation purposes and mine planning.

A general outcome of the in-homogeneity of geological conditions across a project region is variation of the geological properties that potentially cause the formation of AMD. Geostatistics provides means of:

1. Estimating the spatial correlation and variability of AMD related geological properties in a project region.

2. Characterising the representativeness of tested samples of AMD related properties across the region.

3. Estimating (kriging) property values at unmeasured locations (local values).

Geostatistical methods are best applied to 'domains' that have a single statistical population with a single mode. These domains are typically defined by geological units each formed under a particular set of circumstances therefore potentially having a range of quality values distinctly different to other units.

The initial task in any geostatistical analysis is to group the available data into domains that have a logical rationale for containing similar values (eg. lithology). If sufficient data is available, each potential domain is then analysed statistically (summary statistics, histogram, probability plot etc.) to determine if the potential domain contains a 'natural' single population or if further classification is required. Also, domains are examined to see if they have similar enough statistics to be combined. For example two or more geologically different lithologies may have similar AMD properties and could therefore be assigned to a single domain for geostatistical analysis.

The fundamental basis of most geostatistics is the experimental semi-variogram, $\tilde{\gamma}(h)$ (from here forward referred to as the variogram). The variogram is the basic diagnostic tool for spatially characterising a property (z) and measures the average dissimilarity between data separated by a distance, h. It is also central to geostatistical estimation or interpolation methods (Kriging**{** XE "kriging" **}**) and the more advanced methods of conditional simulation**{** XE "conditional simulation" **}**.

An experimental variogram is computed as half the average squared difference between the components of every data pair. That is $\tilde{\gamma}(h)$ is gven by:

$$\tilde{\gamma}(\boldsymbol{h}) = \frac{1}{2N(h)} \sum_{\alpha=1}^{N(h)} [z(\boldsymbol{u}_\alpha) - z(\boldsymbol{u}_\alpha + \boldsymbol{h})]^2$$

Here $z(\boldsymbol{u}_\alpha)$ and $z(\boldsymbol{u}_\alpha + \boldsymbol{h})$ are the property values of the pair of points and the summation is over all *N* pairs separated by distance, $(\boldsymbol{h})$. In general $\boldsymbol{h}$ is a vector, having both an amplitude and direction.

Another way of saying this is that the experimental variogram is the plot of the separation distance $(\boldsymbol{h})$ of paired points against the variance of the property value for all pairs of samples separated by distance, **h**. An idealised variogram is shown in Figure A 25.

Spatial correlation exists when the average variance of pairs of data at low separation distances (compared to the dimensions of the area sampled), is smaller than the variance of the entire population (In simple language, things close together tend to be similar, things far apart tend to be different.)

At some sufficiently large separation distance, known as the range (a), the average variance of the pairs will be approximately the same as that of the overall population σ^2 indicating that spatial correlation no longer exists beyond that distance.

For example coal resources typically have coal quality ranges in the order of hundreds to thousands of metres, Iron ore resource chemistry will typically have ranges in the order of tens to hundreds of metres and gold resources typically have gold content ranges in the order of metres to tens of metres.

These characteristic ranges are in line with our intuitive understanding of the continuity of geology and commodity content / quality distributions within various different resources. They also reflect the typical drill spacings of these various types of deposits.

A variogram that rises consistently from low separation distances and then flattens is a typical form of spatial correlation. A variogram that is flat or very irregular from low separation distances indicates lack of spatial correlation or insufficient data.

If experimental variography does not show any structure or ranges beyond the smallest sample spacing then no spatial correlation exists between samples at or above the smallest sample spacing. This means that values of parameters at unknown locations cannot be interpolated or extrapolated with any confidence and the mean of all of the samples in the domain is the best estimate at any unknown location.

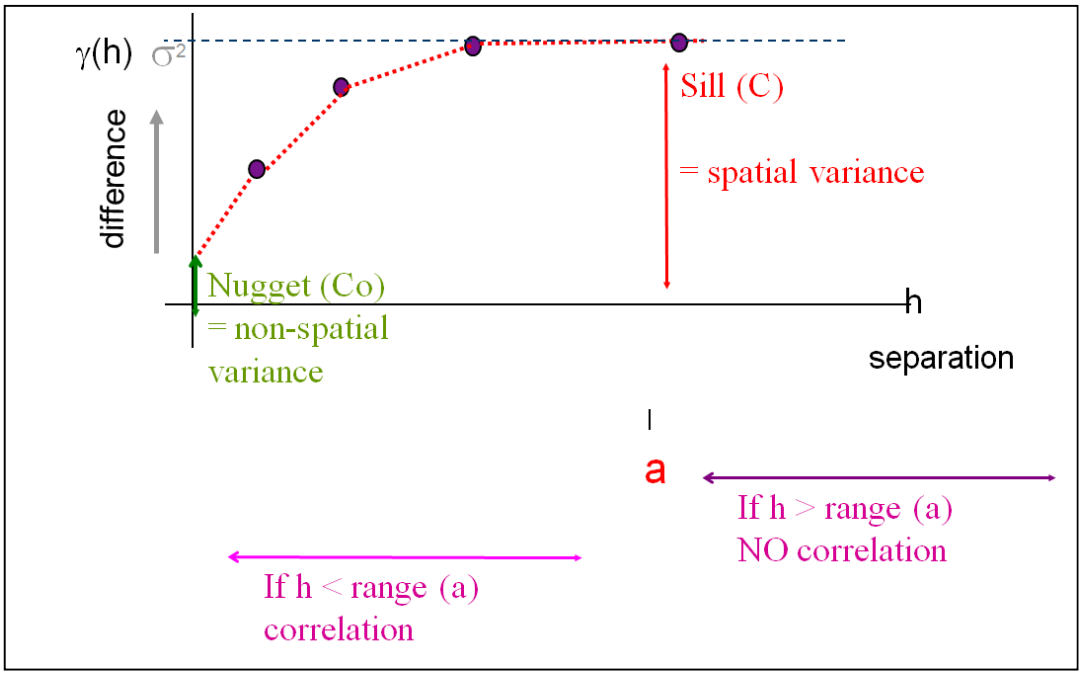


Figure A 25: Variogram components

The ANC and Stot variograms are shown utilising a pairwise relative transform that was used to reduce some of the noise in the data. The pairwise relative variogram where the value at separation distance, h is ;

$$\tilde{\gamma}_{PR}(\boldsymbol{h}) = \frac{1}{2N(h)} \sum_{\alpha=1}^{N(h)} \frac{[z(\boldsymbol{u}_\alpha) - z(\boldsymbol{u}_\alpha + \boldsymbol{h})]^2}{[z(\boldsymbol{u}_\alpha) + z(\boldsymbol{u}_\alpha + \boldsymbol{h})]^2}$$

Pairwise relative variograms are useful as a quick filter for determining ranges but cannot be used nugget or sill determinations or for geostatistical estimation. If pairwise relative variograms are found to be useful and estimation (interpolation and extrapolation) are required there are further more complex techniques for transforming the data that will yield correct ranges sills and nuggets from noisy data. The main one of these techniques is based on Gaussian transforms as associated back transforms.

The Gaussian transform, together with a variogram model, is also the basis of the change of support calculations.

Non Additive variables

The NAPP and NPR not assessed geostatistically as they are calculated values that rely on the underlying Stot and ANC measurements. Decisions on the adequacy of the drill spacing are based on the estimated ranges of the Stot and ANC experimental variograms. It is not valid to calculate variograms on parameters that are non-additive such as PH and NPR. NAPP is an additive variable.

For example take two 1 m long samples one of which has a PH of 7 and the other has a PH of 3. If you physically combine the two samples the resultant PH will not be

(7 + 3) / 2 = 5

But, because PH measurements come from a log scale, is in fact [in terms of hydrogen ion concentration H+]

(0.0000001 + 0.001)/2 = 0.00050005 which equates to a PH of 3.5.

Another example of a non-additive is the addition of NPR values. NPR is a ratio and summing or averaging ratios does not give a correct total ratio unless appropriate weights are applied. Again take two 1 m long samples, one has an ANC of 27 and a Stot of 0.2 and the other has ANC of 87 and Stot of 0.03. Using

NPR = ANC / Stot * 30.6

gives NPRs of 4.41 and 94.77 respectively. Averaging these gives 45.59.

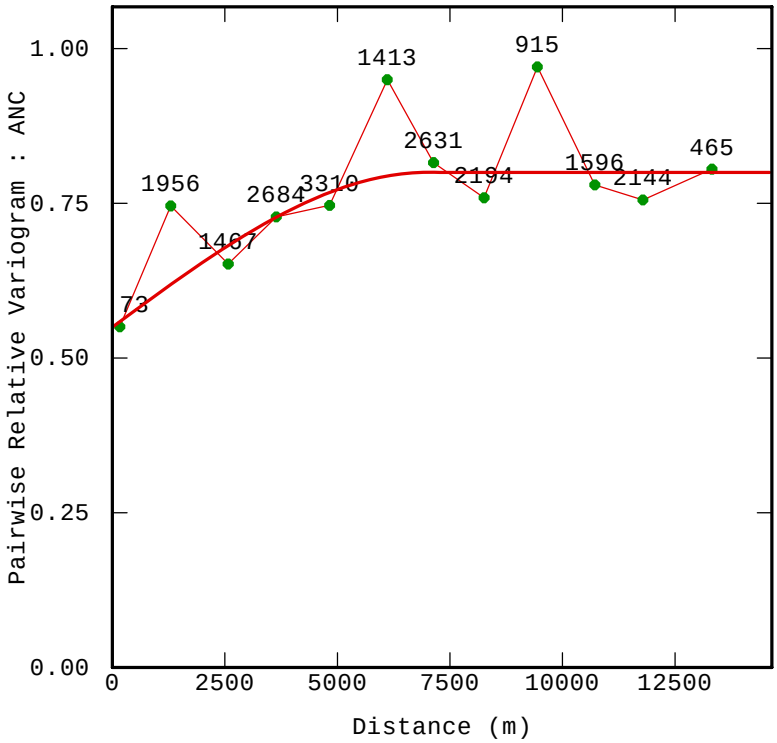
However if the two samples are physically combined then the ANC is

(27+87) / 2 = 57 and the Stot is (0.2+0.03) / 2 = 0.115.

The NPR then becomes (57 / 0.115*30.6) = 16.19

Appendix 13: Variograms

Experimental and model, pairwise relative, omnidirectional variograms are presented in this section. Directional experimental variograms were calculated for some of the groups with higher sample numbers but none showed coherent structure or interpretable ranges. The 741 Stot samples from the coal seams from HP did show some structure in the north south and east west directions. These are not presented in this report but are available if required.



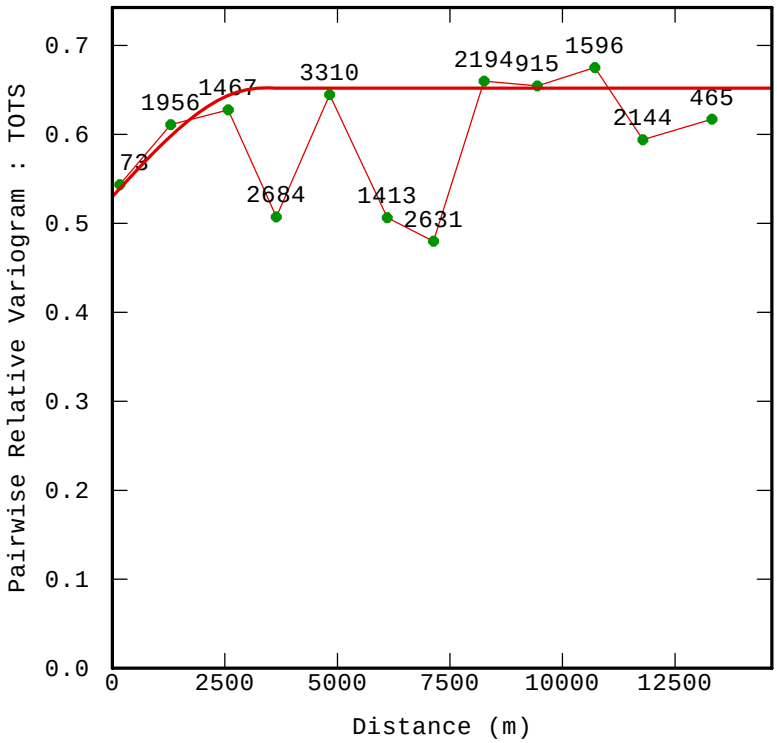
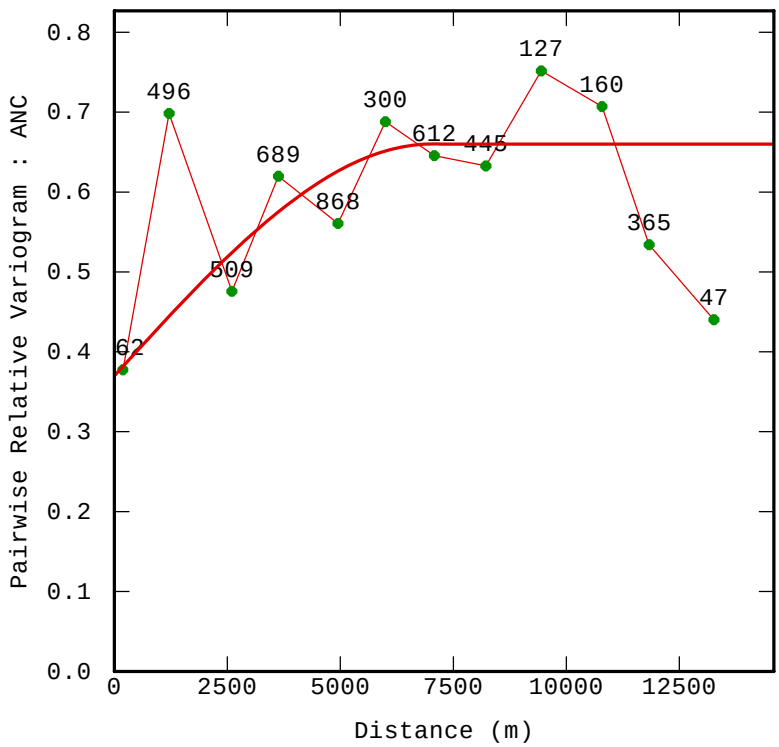


Figure A 26: Experimental and model variograms for ANC and Stot all material excluding coal



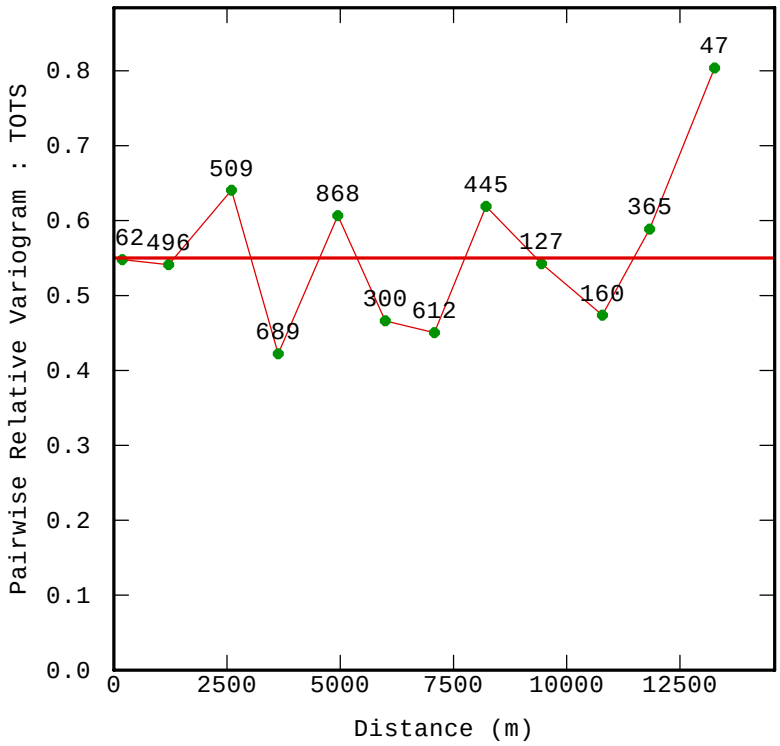
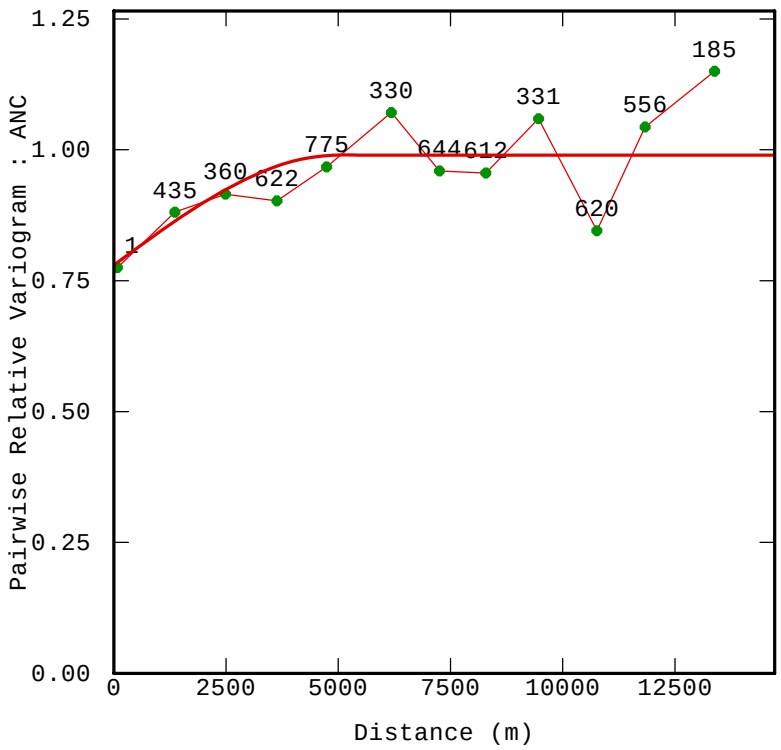


Figure A 27: Experimental and model variograms for ANC and Stot weathered material excluding coal



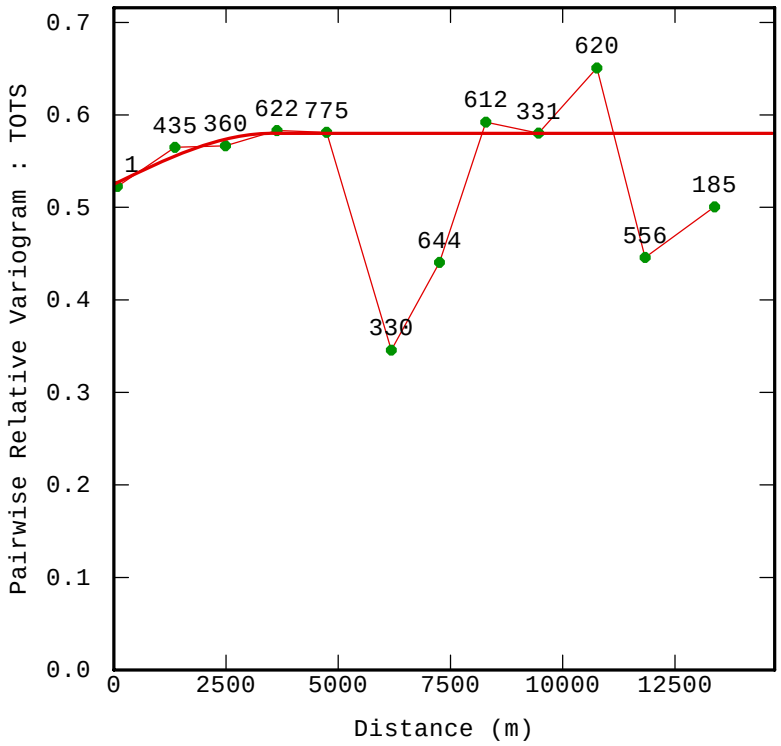
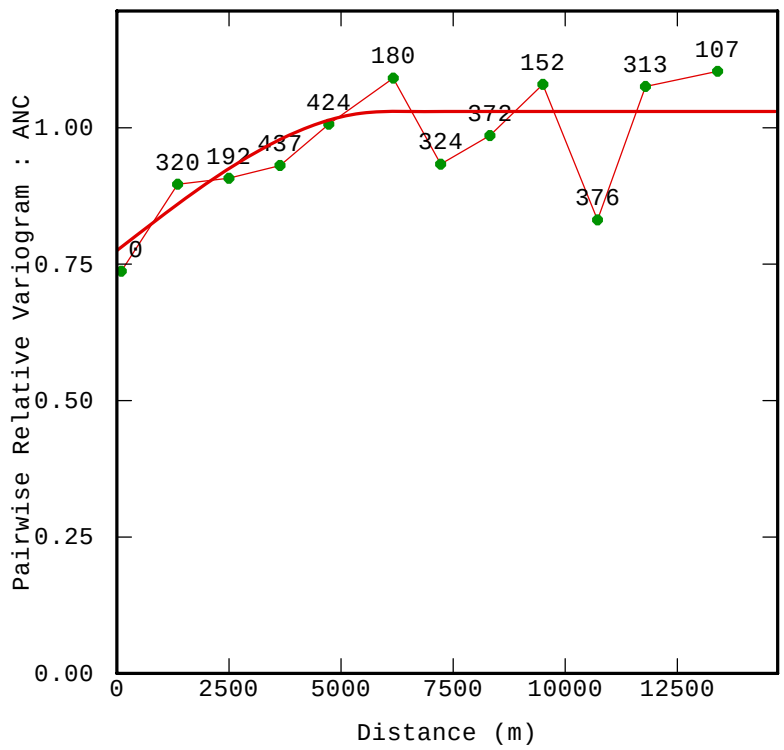


Figure A 28: Experimental and model variograms for ANC and Stot fresh material excluding coal



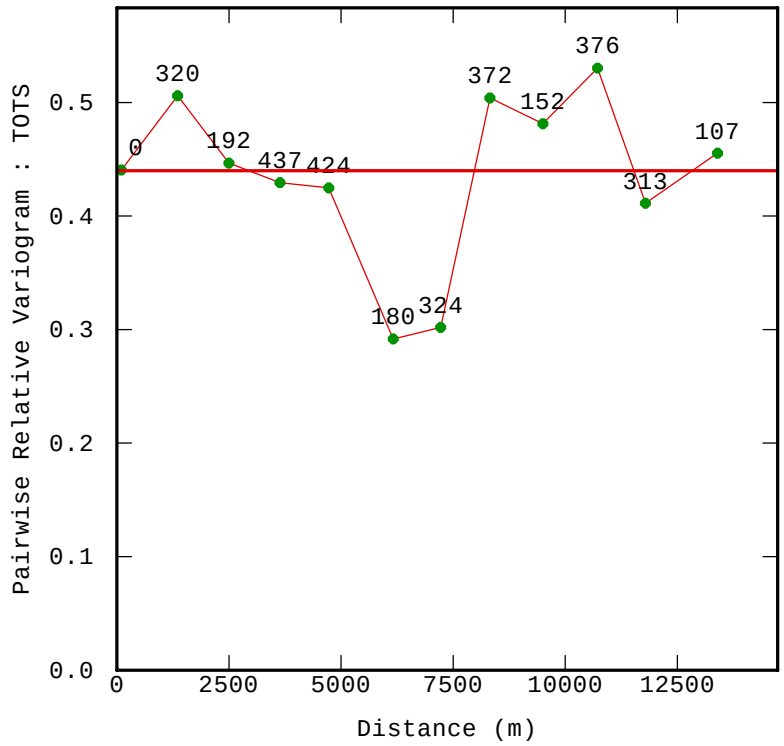
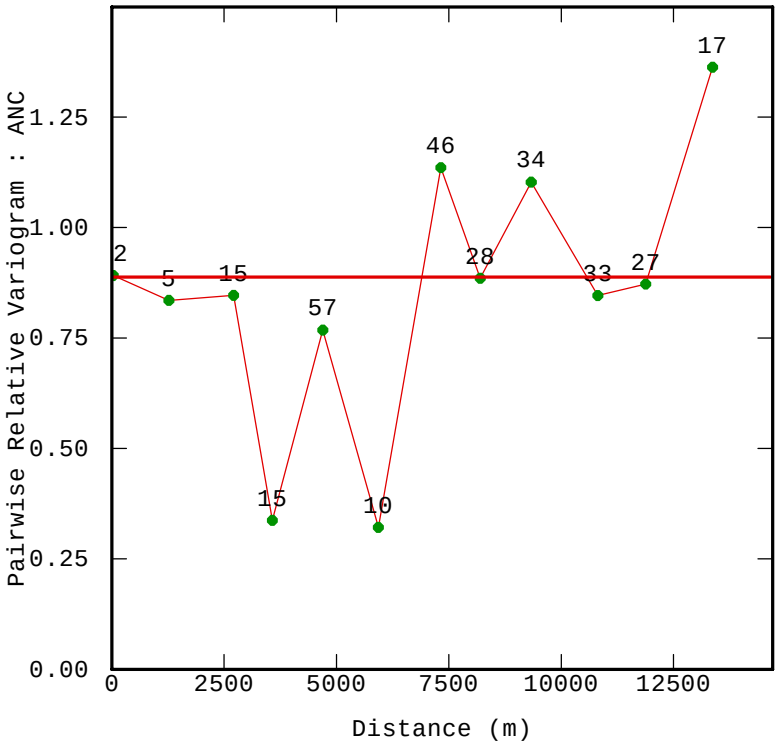


Figure A 29: Experimental and model variograms for ANC and Stot fresh REM group



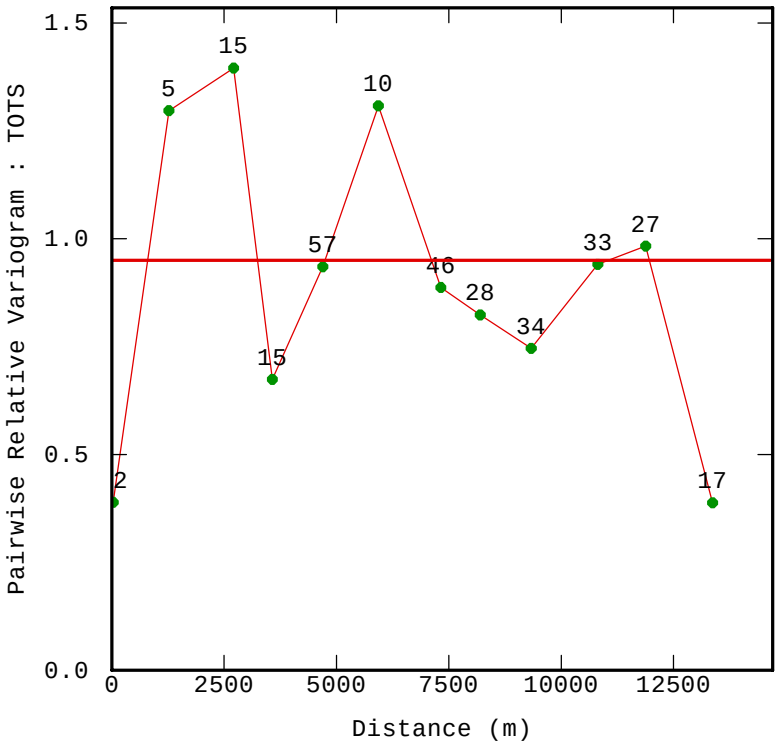
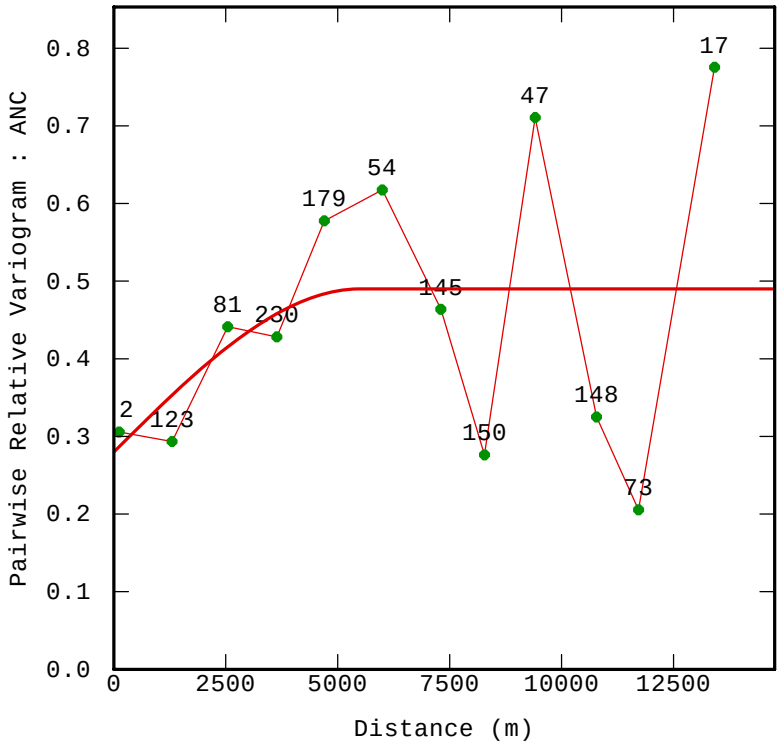


Figure A 30: Experimental and model variograms for ANC and Stot fresh carbonaceous group



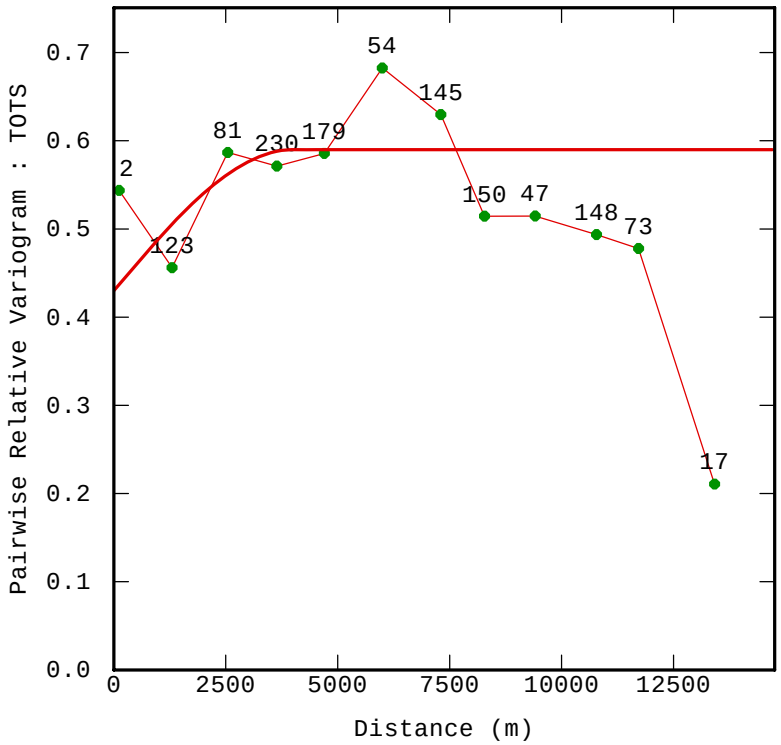


Figure A 31: Experimental and model variograms for ANC and Stot for SRK coal samples

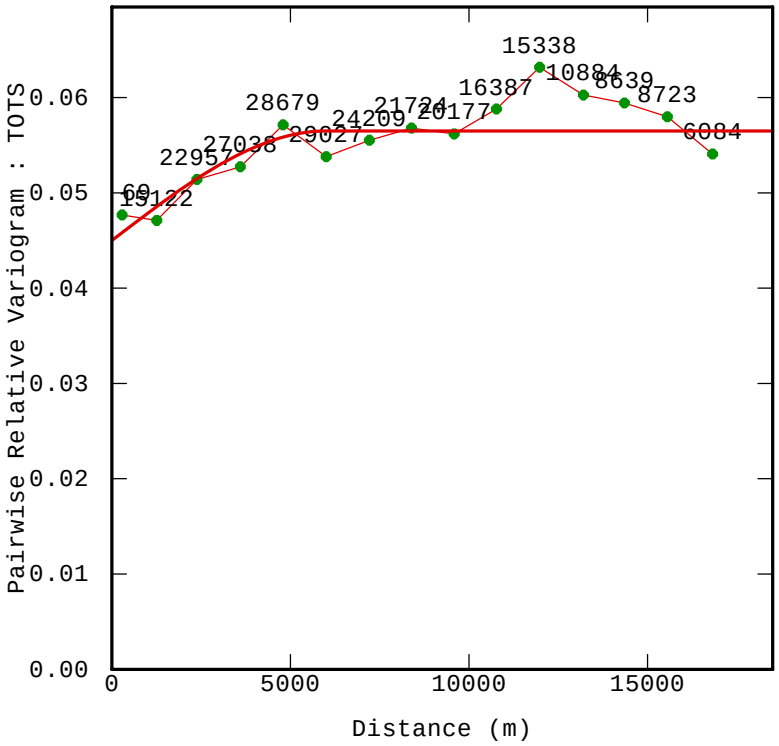


Figure A 32: Experimental and model variograms for Stot for other coal samples

Appendix 14: Graphical Drill Logs

The following graphical logs show, from left to right;

- SRK group (black text)
- Total sulphur value (red number)
- ANC value (green number)
- Lithology colour (as per Figure 1)
- Lithology code (as per Figure 1)
- Weathering code
    - CW = completly weathered
    - HW = highly weathered
    - WE = weathered
    - MW = moderately weathered
    - SW = slightly weathered
    - FR = Fresh

The grid squares on the log plots are 20m by 20m.

Note that the carbonaceous group units do not occur as a uniform layer across the area of the deposit. They often occur just above the uppermost coal seam but are highly variable in thickness, number of beds, and may occur anywhere in the sequence or be absent altogether.

Some holes contain up to 40m of clay and soil from surface whereas others may be sandstone, siltstone and claystone from surface.

Five holes do not penetrate into the fresh material and test only the weathered material.

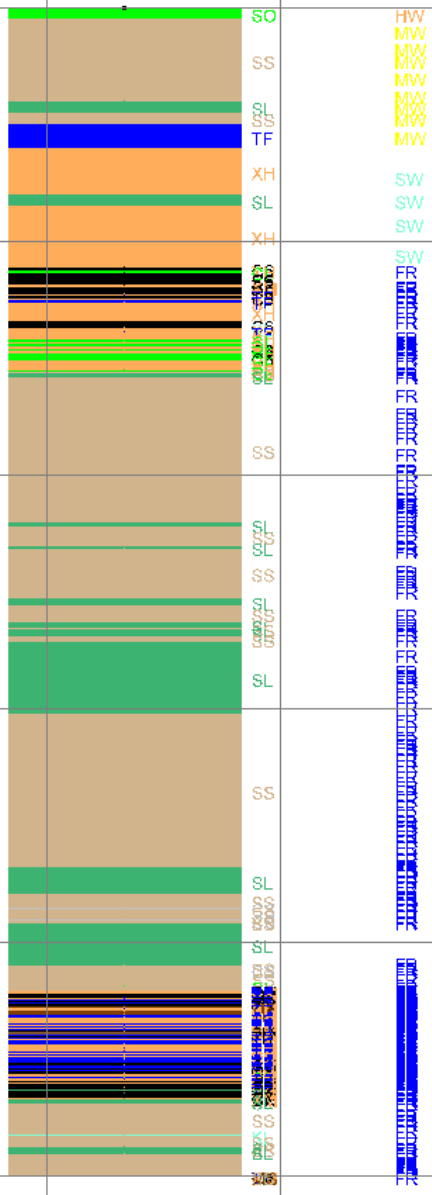
	COAL GROUP
C1	COAL, >90% bright
C2	COAL, 60-90% bright
C3	COAL, 40-60% bright
C4	COAL 10-40% bright
C5	COAL, <10% bright
C6	COAL, dull <1% bright
C7	COAL, dull, conchoidal
C8	COAL, fibrous
C9	COAL, weathered
CI	COAL, mid lustrous
CN	STONY COAL
CO	COAL, undifferentiated
CP	COAL SAPROPELIC
CR	COAL FIBROUS
CU	COAL UNDIFFERENTIATED
CW	COAL WEATHERED
CY	SOOTY COAL
CZ	COALY SHALE
DC	DIRTY COAL
ZC	COALY CLAYSTONE
ZH	COALY SHALE
ZM	COALY MUDSTONE
ZS	COALY SILTSTONE
	NON ROCK GROUP
KL	CORE LOSS
LC	CORE LOST
NK	NOT CORED
NL	NOT LOGGED
NO	NO SAMPLE RETURN
NS	NO SAMPLE

	CARBONACEOUS GROUP
CM	CARBONACEOUS MUDSTONE
XA	CARBONACEOUS SAND
XC	CARBONACEOUS CLAYSTONE
XE	CARBONACEOUS LAMELLE
XH	CARBONACEOUS SHALE
XM	CARBONACEOUS MUDSTONE
XS	CARBONACEOUS SANDSTONE
XT	CARBONACEOUS SILTSTONE
XY	CARBONACEOUS CLAY
	CLAY & SOIL GROUP
CL	CLAY
DT	DIRT
SO	SOIL
MU	MUD
MV	MUD
MZ	MUD
	REMAINING GROUP
CS	CLAYSTONE
MS	MUDSTONE
SC	SCHIST
SK	SILCRETE
SL	SILTSTONE
SS	SANDSTONE
TF	TUFF
IS	IRONSTONE
LA	LATERITE
LT	LATERITE
	SAND & GRAVEL GROUP
CG	CONGLOMERATE
GV	GRAVEL
PC	PEBBLE CONGLOMERATE
SA	SAND

Figure 1: Lithology codes and grouping legend for graphical logs

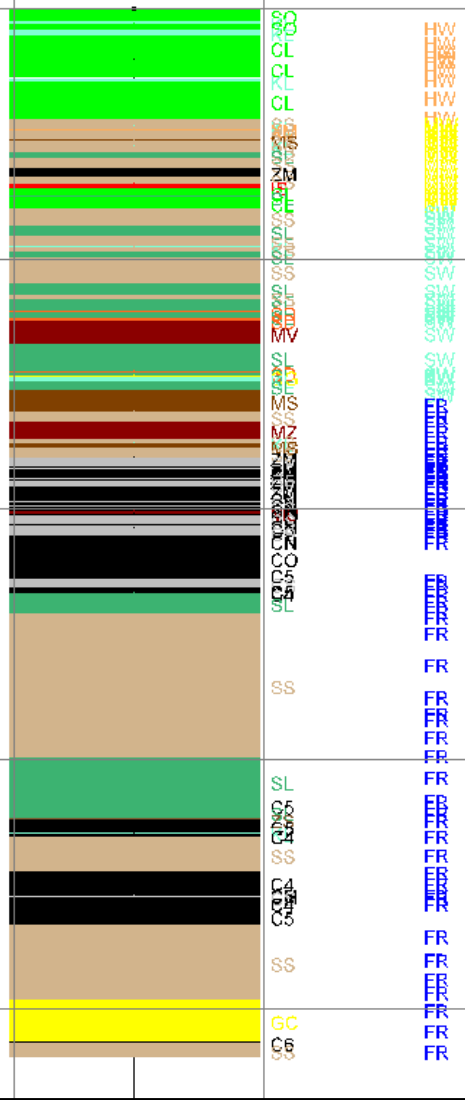
1424D

REMAINING	0.03	1.3
CARBONACEOUS	0.08	7.6
COAL	0.29	6.8
CARBONACEOUS	1.16	46.9
REMAINING	0.03	10.4
REMAINING	0.03	5.4
REMAINING	0.03	10.4
REMAINING	0.17	6.2
COAL	0.11	8.8
REMAINING	0.02	3.2
CARBONACEOUS	[illegible]	[illegible]



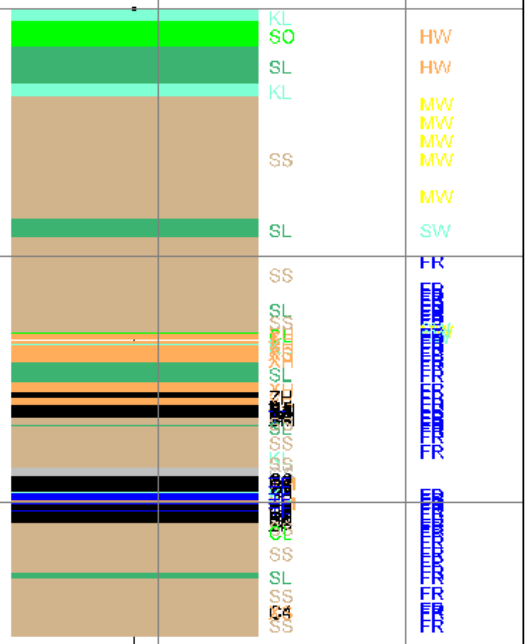
1406D

CLAY AND SOIL	0.03	2.9
REMAINING	0.02	22.6
REMAINING	0.02	15.8
REMAINING	0.04	14.7
COAL	0.05	10.2
REMAINING	0.06	1.4
REMAINING	0.02	0.3
COAL	0.15	9.7
REMAINING	0.03	1.2

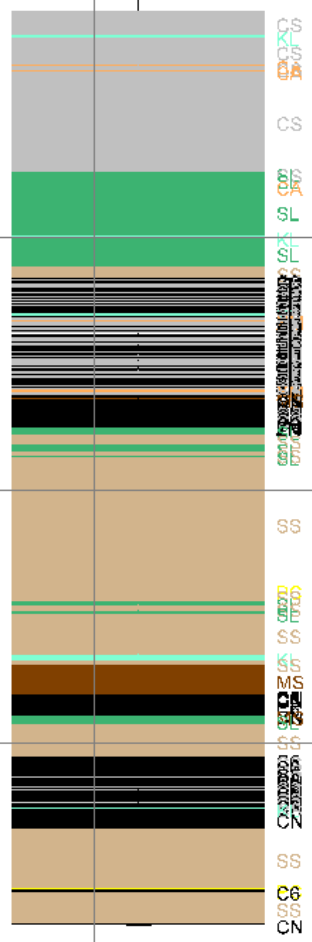


1423D

REMAINING	0.02	2.2	
REMAINING	0.02	0.3	
CARBONACEOUS	0.05	1.9	
CARBONACEOUS	0.04	1.6	
CARBONACEOUS	0.29	4.0	
REMAINING	0.21	0.3	
REMAINING	0.23	0.3	
COAL	0.49	6.8	
REMAINING	0.05	5.0	
COAL	0.38	5.6	
REMAINING	0.02	3.9	
REMAINING	0.01	0.7	
REMAINING	0.03	2.1	



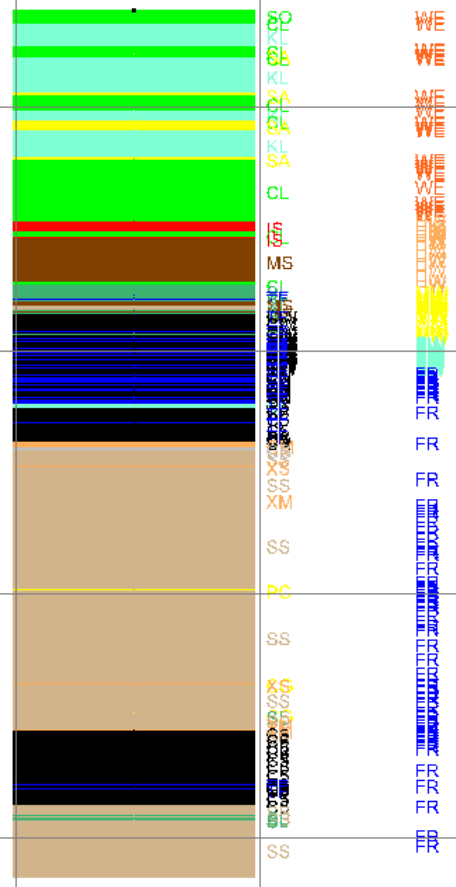
1252D



			CW HW HW HW HW HW WE
REMAINING	0.06	54.6	
REMAINING COAL REMAINING	0.09 0.57 0.68 0.66 0.11	57.6 16.0 4.9	
REMAINING REMAINING REMAINING COAL	0.11 0.03 0.13 0.45 0.40	2.8 4.6 6.0 1.0	
	1.29 0.60 1.14		

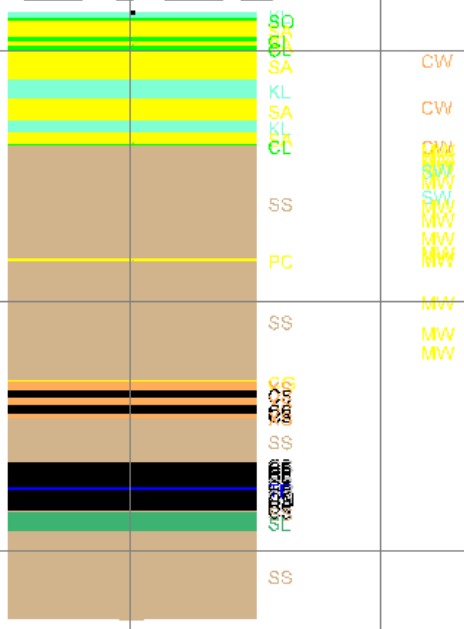
1277D

CLAY AND SOIL	0.01	4.2	SO	WE
SAND AND GRAVEL	0.05	4.9	GL	WE
CLAY AND SOIL	0.07	6.9	CL	
REMAINING	0.09	4.2	MS	
REMAINING	0.04	4.4	SL	
	0.56			FR
REMAINING	0.03	1.4	SS	FR
REMAINING	0.09	0.3	SS	FR
	0.60			FR
	0.65			FR



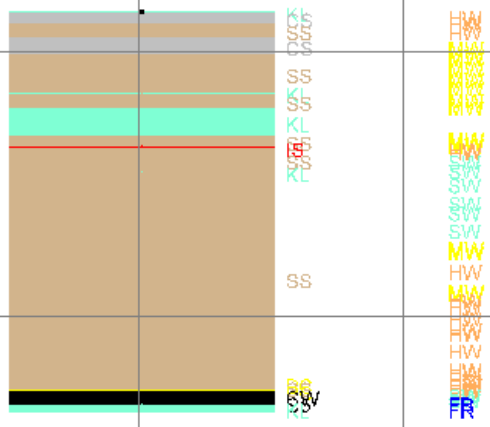
1262D

SAND AND GRAVEL	0.01	4.6	
SAND AND GRAVEL	0.01	3.8	
REMAINING	0.01	3.9	
CARBONACEOUS	0.01	3.8	
COAL	0.62	4.2	
	0.61		
	0.62		



1361D

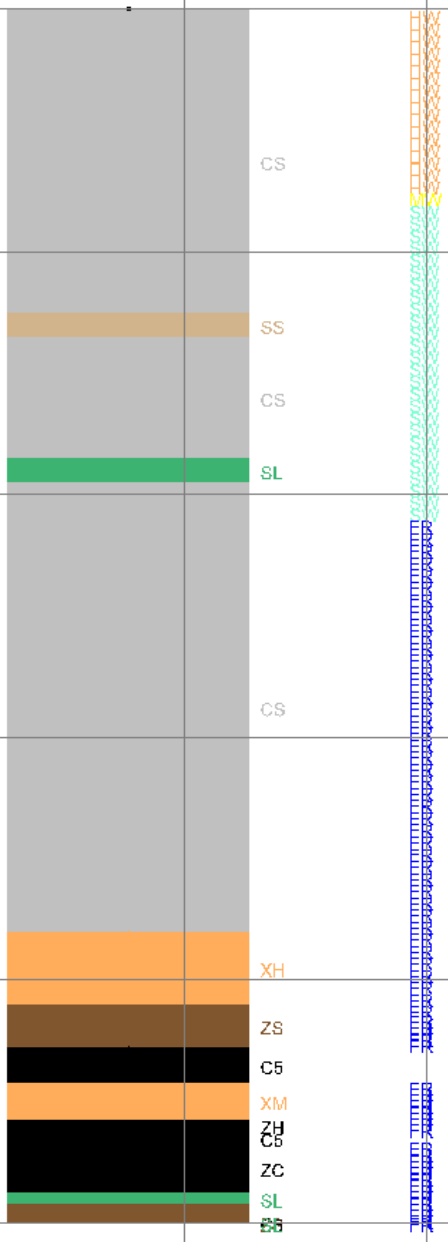
REMAINING	0.06	9.0	
REMAINING	0.01	3.0	
REMAINING	0.08	3.1	



Twins

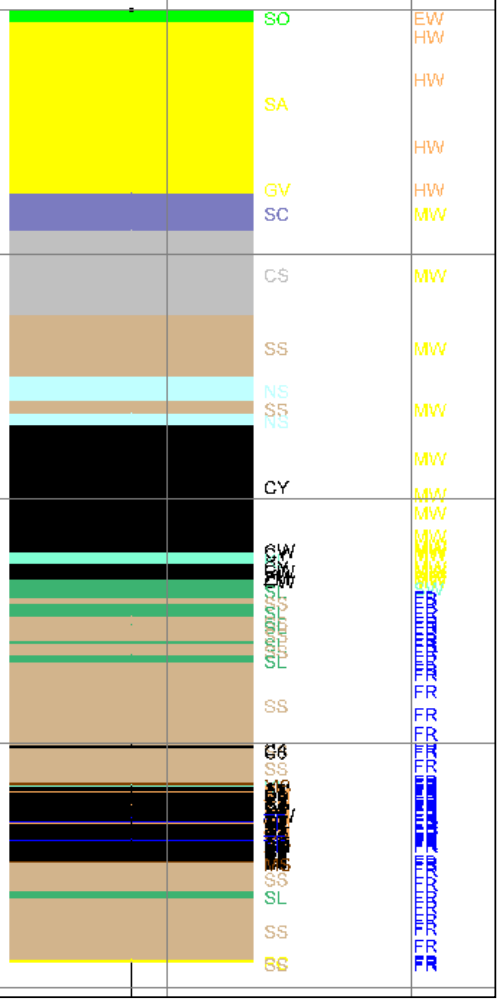
1437R

REMAINING	0.02	6.3
REMAINING	0.01	0.3
REMAINING	0.02	5.8
REMAINING	0.04	21.7
REMAINING	0.03	21.3
CARBONACEOUS	0.03	8.4
COAL	0.31	9.7
CARBONACEOUS	0.17	16.4
CARBONACEOUS	0.42	7.0
COAL	0.24	11.4
COAL	0.33	3.8



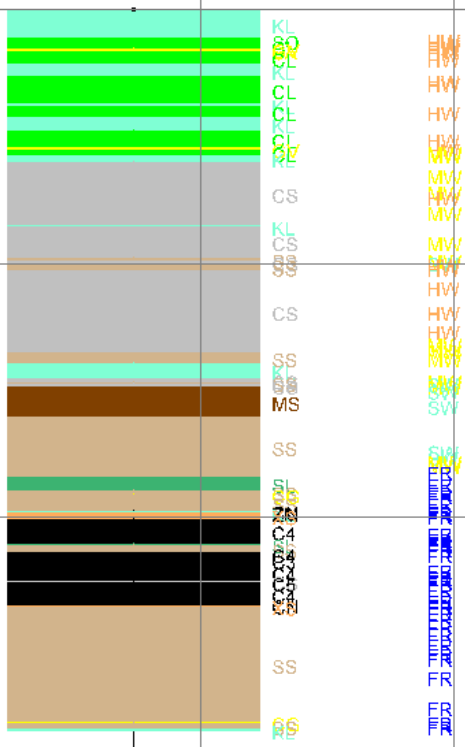
1425D

SAND AND GRAVEL	0.04	3.2
REMAINING	0.02	1.3
COAL	0.02	10.4
COAL	0.38	15.9
REMAINING	0.04	0.3
REMAINING	0.03	0.7
COAL	0.40	5.0
REMAINING	0.03	0.3



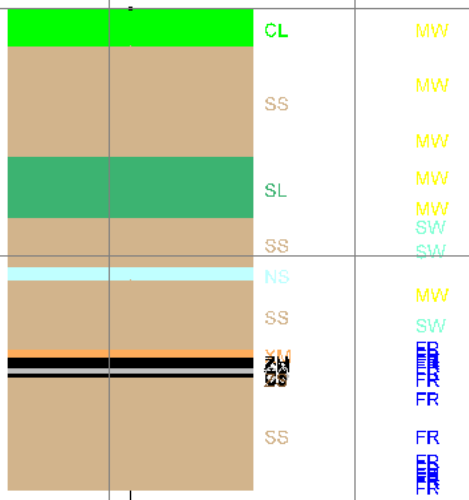
1411D

CLAY AND SOIL	0.02	1.6
REMAINING	0.02	1.7
REMAINING	0.03	2.5
REMAINING	0.02	2.1
CARBONACEOUS	0.11	1.3
COAL	0.29	1.0



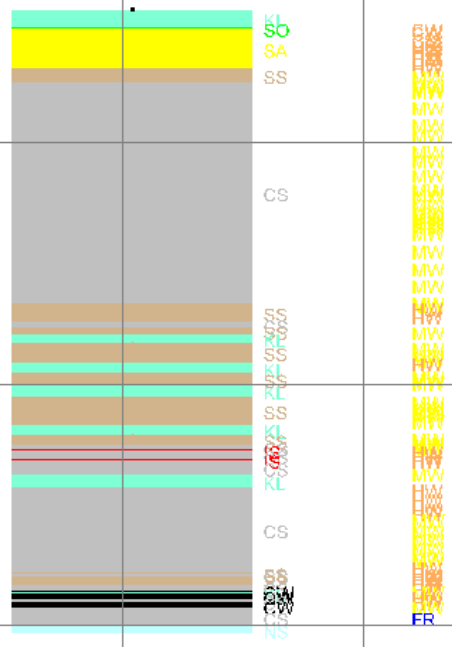
1422D

REMAINING	0.02	0.3
CARBONACEOUS	0.60	12.8
COAL	0.76	3.2
REMAINING	0.08	2.1



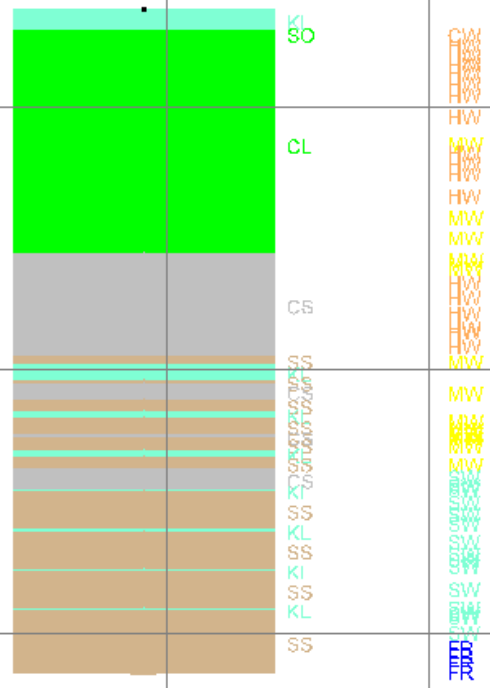
1350D

SAND AND GRAVEL	0.01	2.5
REMAINING	0.01	4.6
REMAINING	0.08	4.3
COAL	0.14	12.8

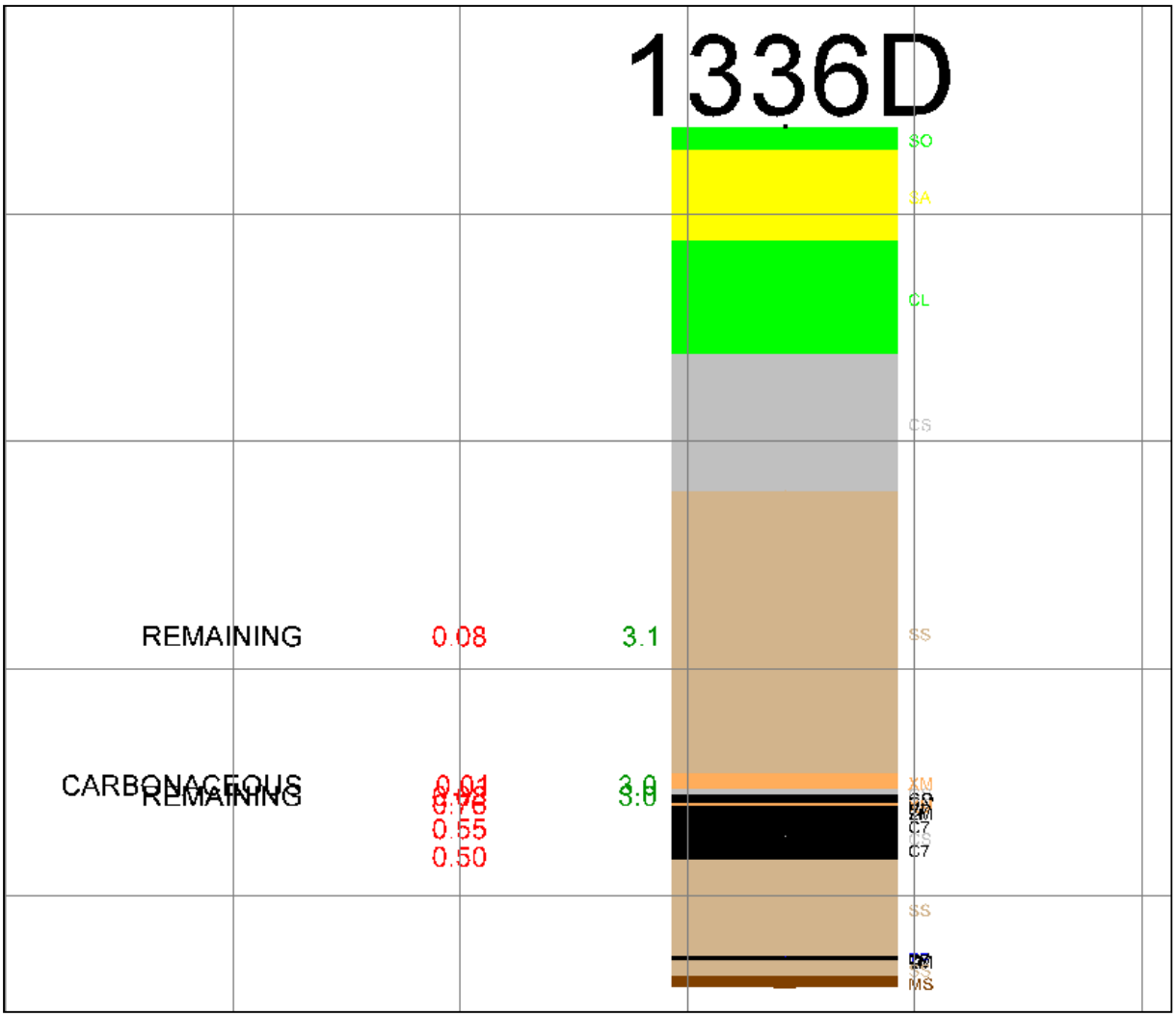


1349D

CLAY AND SOIL	0.14	54.6
REMAINING	0.11	6.4
REMAINING	0.01	3.0



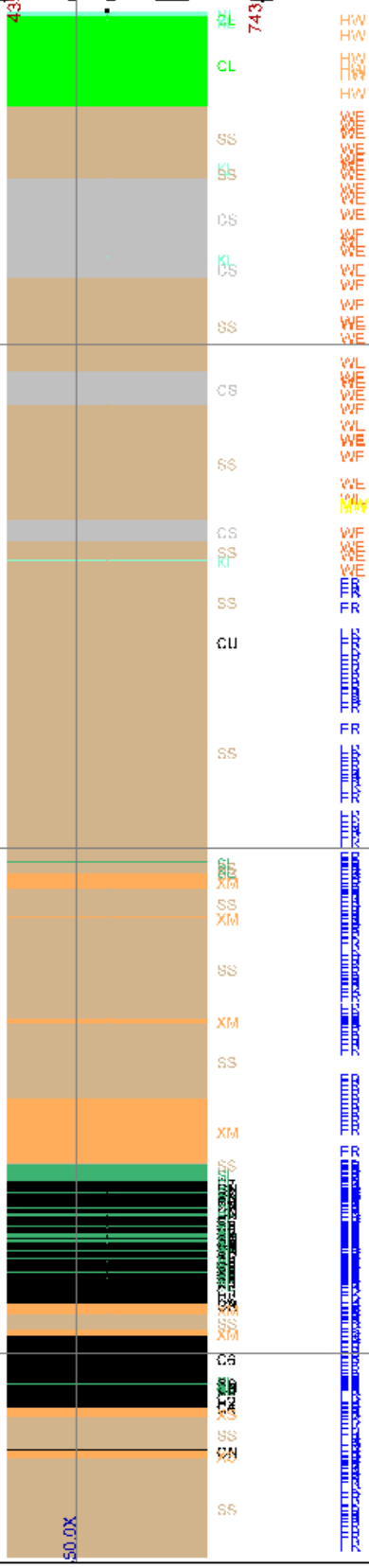
1336D


SO
SA
CL
CS
REMAINING
0.08
3.1
SS
CARBONACEOUS
REMAINING
0.01
0.08
0.55
0.50
3.0
3.0
XM
C7
C7
SS
MS

1347DG

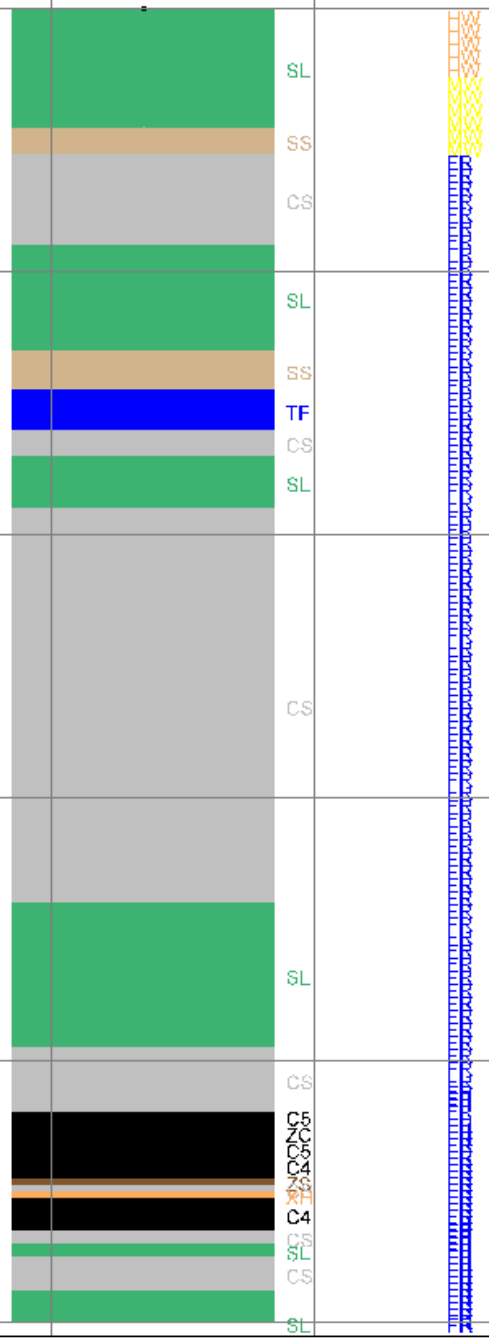
7431607.8 N

CLAY AND SOIL	0.02	23.3
REMAINING	0.01	2.0
REMAINING	0.02	0.3
CARBONACEOUS	0.05	40.9
REMAINING	0.04	50.0
CARBONACEOUS	0.05	20.3
CARBONACEOUS	0.07	29.0
REMAINING	0.06	116.0
CARBONACEOUS	0.02	0.3
REMAINING	0.06	0.3
CARBONACEOUS		



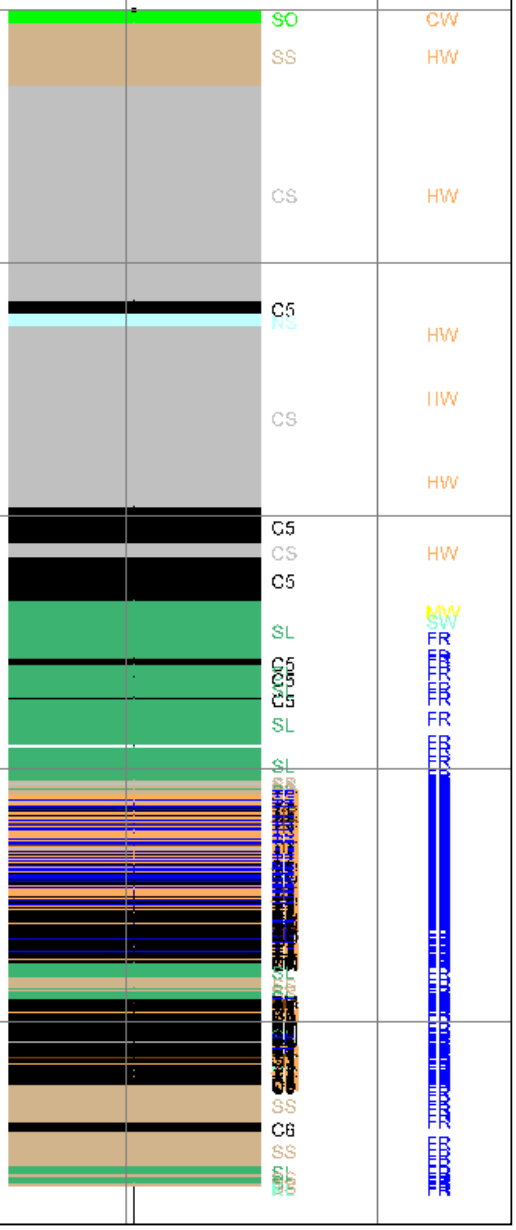
1438R

REMAINING	0.01	0.9
REMAINING	0.02	1.8
REMAINING	0.01	1.3
REMAINING	0.02	3.6
REMAINING	0.04	34.6
REMAINING	0.04	18.9
COAL	0.08	17.8
COAL	0.11	17.4



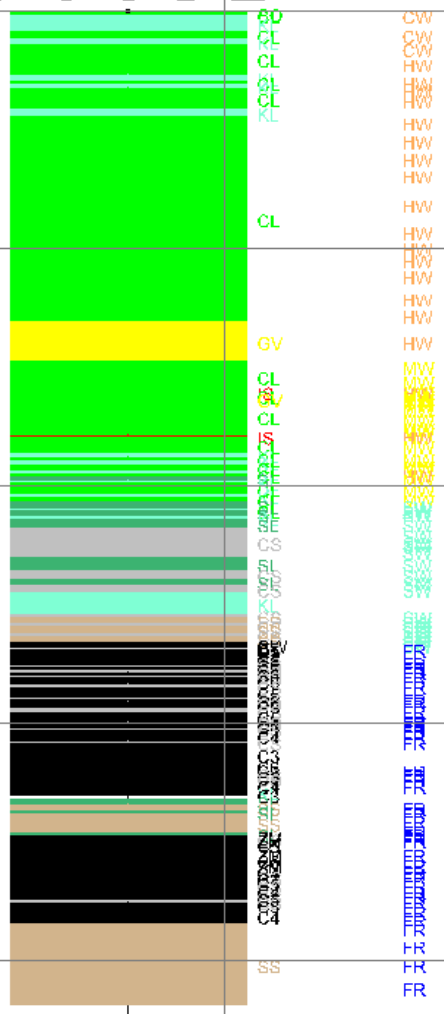
1426D

REMAINING	0.02	0.3
COAL	0.05	5.8
REMAINING	0.08	10.8
REMAINING	0.05	8.0
CARBONACEOUS	0.36	11.3
REMAINING	0.16	13.7
COAL	0.11	10.4
COAL	0.32	6.3
COAL	0.11	1.6
REMAINING	0.01	0.6
REMAINING	0.33	2.1
COAL	0.42	5.8
COAL	0.37	3.6
REMAINING	0.01	0.3



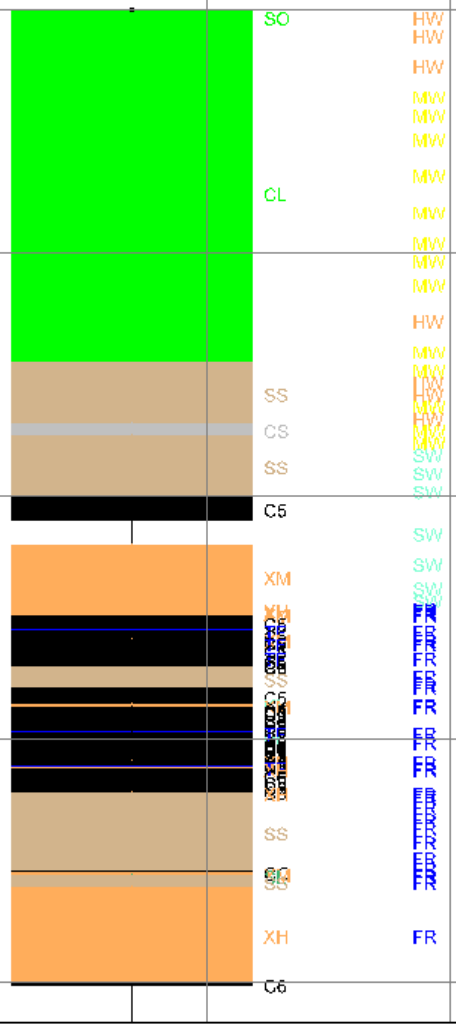
1413D

SAND AND GRAVEL	0.01	1.2
REMAINING	0.02	12.5
REMAINING	0.02	1.2
COAL	0.07	12.5
REMAINING	0.03	1.2
REMAINING	0.03	0.3
COAL	0.21	3.9



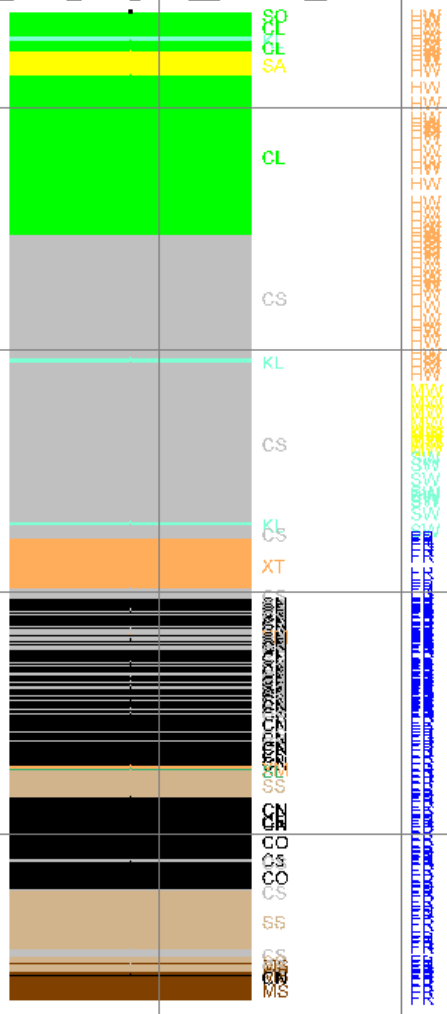
1421D

CLAY AND SOIL	0.02	1.4
REMAINING	0.02	3.2
CARBONACEOUS	0.03	0.3
CARBONACEOUS	0.02	3.5
COAL	0.31	5.1
REMAINING	0.03	0.3
COAL	0.33	3.2



1337DG

CLAY AND SOIL	0.04	5.6
CLAY AND SOIL	0.01	1.6
SAND AND GRAVEL	0.01	3.6
CLAY AND SOIL	0.02	3.4
CLAY AND SOIL	0.01	9.1
REMAINING	0.01	3.2
REMAINING	0.01	9.1
REMAINING	0.01	2.2
REMAINING	0.03	3.4
REMAINING	0.07	16.1
COAL	0.21	15.7
COAL	0.18	9.1
	0.54	
	0.49	
REMAINING	0.02	1.5
	0.52	
	0.56	
	0.82	
REMAINING	0.02	0.3

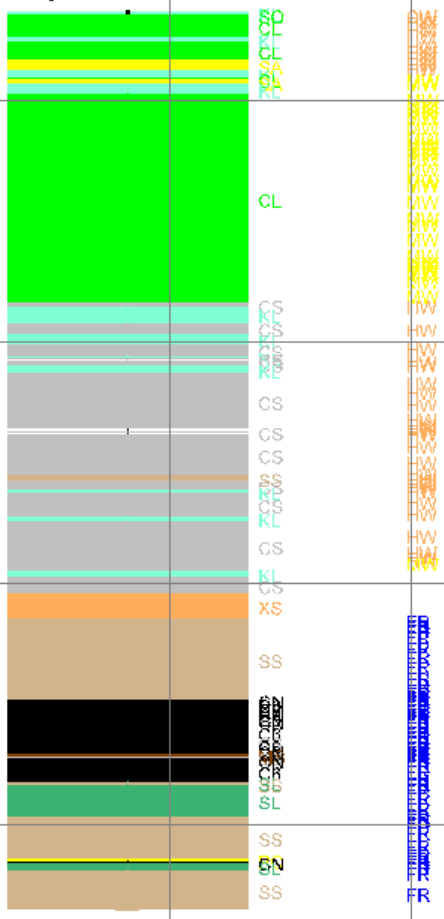


1296L

SAND AND GRAVEL	0.02	2.1	SO	CW
			SA	HW HW
CLAY AND SOIL	0.02	4.1		
CLAY AND SOIL	0.02	6.2	CL	MW
CLAY AND SOIL	0.02	5.3		
REMAINING	0.01	3.8		MW HW
REMAINING	0.02	1.3		HW
REMAINING	0.01	2.2	CS	WE WE WE
REMAINING	0.01	1.9		WE
REMAINING	0.01	1.2		WE
REMAINING	0.01	2.7	SS	WE WE
COAL	0.20	5.0	ZM	FR
			CS	FR
			SL	FR
			SS	FR

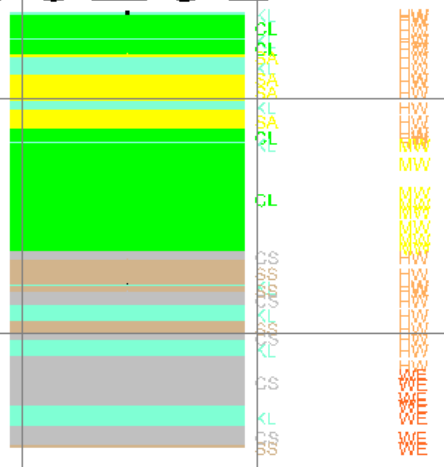
1327D

CLAY AND SOIL	0.02	5.6
CLAY AND SOIL	0.01	4.0
SAND AND GRAVEL	0.03	3.9
CLAY AND SOIL	0.02	6.3
CLAY AND SOIL	0.01	11.4
CLAY AND SOIL	0.01	10.4
CLAY AND SOIL	0.01	3.9
REMAINING	0.01	1.2
REMAINING	0.01	1.4
REMAINING	0.01	8.2
REMAINING	0.01	2.5
REMAINING	0.01	1.6
COAL	0.50 0.59 0.51	3.8
REMAINING	0.02	2.4



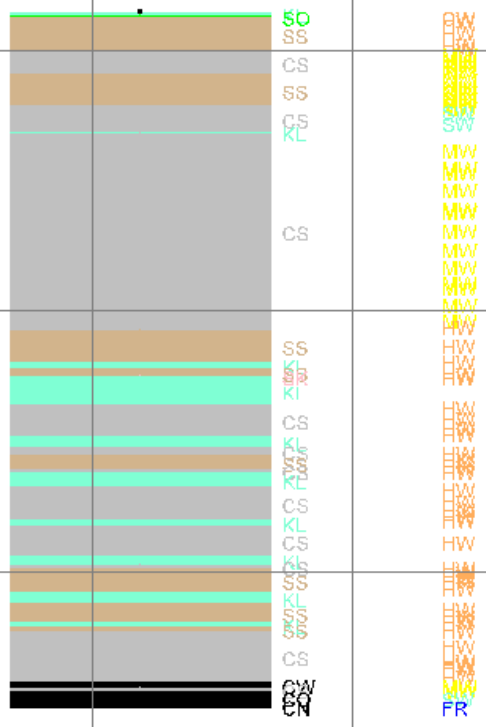
1326D

CLAY AND SOIL	0.14	5.2
CLAY AND SOIL	0.03	3.6
SAND AND GRAVEL	0.04	3.4
SAND AND GRAVEL	0.10	7.0
REMAINING	0.05	3.4



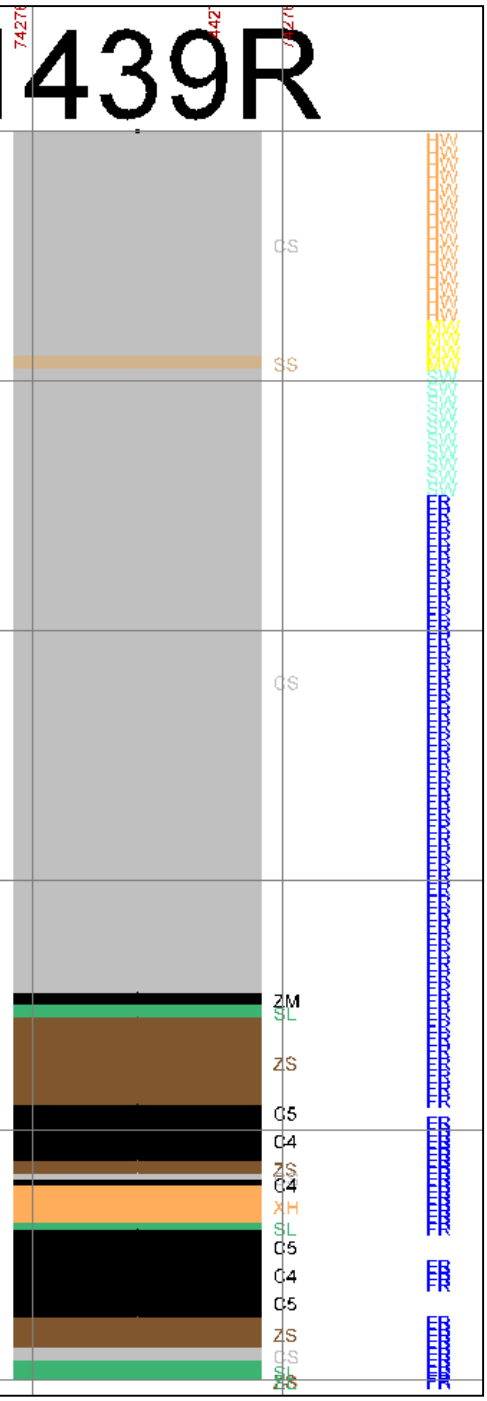
1362D

REMAINING	0.06	9.8
REMAINING	0.06	2.9
REMAINING	0.06	3.4
REMAINING	0.02	9.0
REMAINING	0.13	3.6
COAL	0.44	8.0



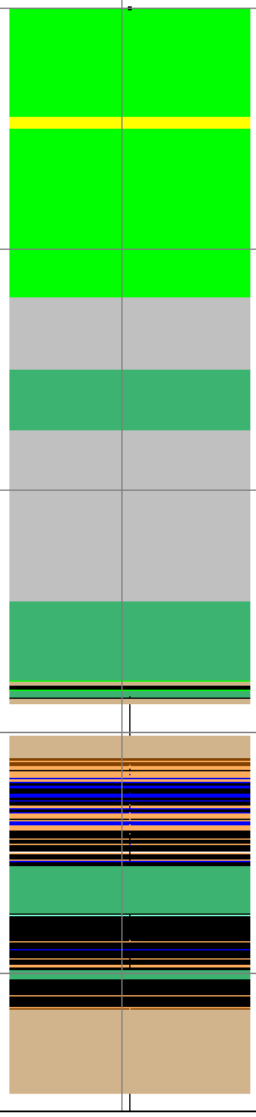
1439R

REMAINING	0.02	50.0
REMAINING	0.01	2.6
REMAINING	0.04	47.1
REMAINING	0.04	43.7
COAL	0.01	161.0
COAL	0.16	0.3
CARBONACEOUS	0.62	12.0
CARBONACEOUS	0.31	3.6
COAL	0.35	5.7



1427D

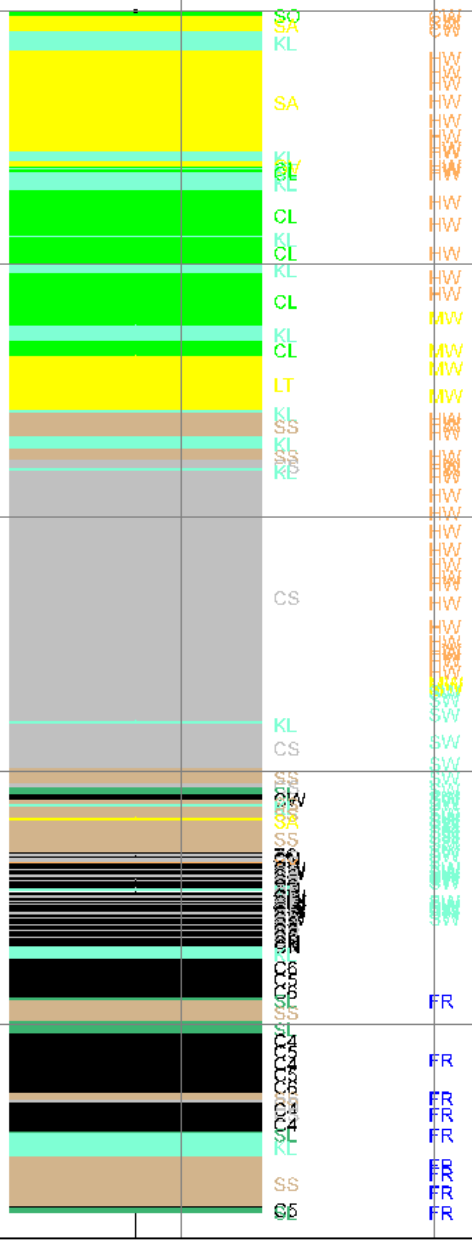
SAND AND GRAVEL	0.02	0.3	SO, CL, SA
CLAY AND SOIL	0.03	7.0	CL
			CS, SL
REMAINING	0.02	5.6	CS, CL, CS
REMAINING	0.07	50.8	SL
REMAINING	0.03	6.1	SL
REMAINING	0.05	48.6	SS
COAL	0.07	15.5	
REMAINING	0.04	1.0	
REMAINING	0.03	1.3	SL
COAL	0.34	49.2	
			SS



CW
HW
HW
HW
HW
HW
HW
HW
HW
HW
HW
MW
FR
FR
FR
FR
FR
FR
FR
FR
FR
FR
FR
FR
FR

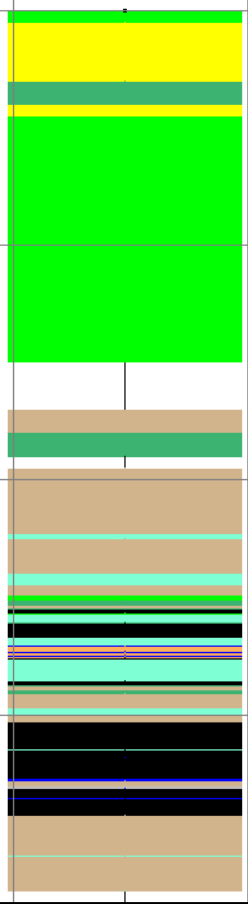
1415D

SAND AND GRAVEL	0.02	0.3
CLAY AND SOIL	0.02	7.4
REMAINING	0.02	1.9
COAL	0.25	4.4
COAL	0.58	5.1
REMAINING	0.02	4.6
REMAINING	0.02	1.4



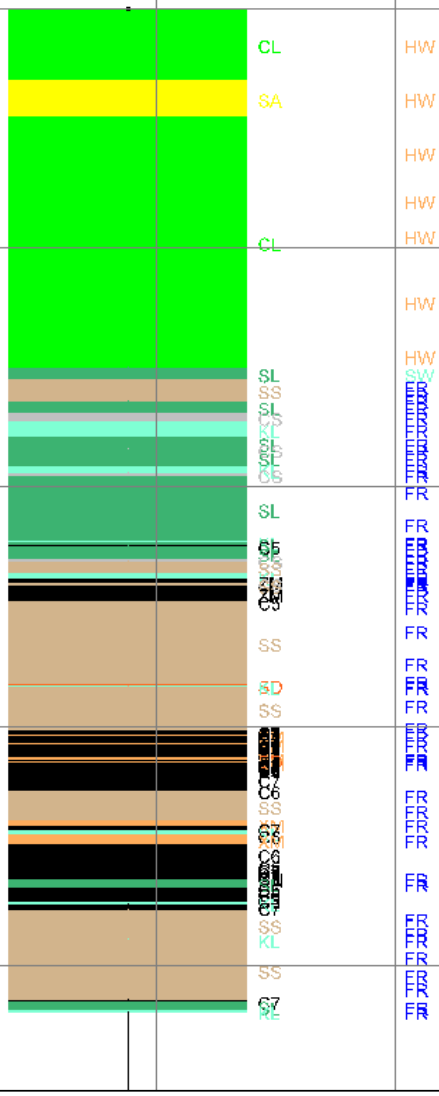
1420D

SAND AND GRAVEL	0.02	0.3
CLAY AND SOIL	0.02	3.8
REMAINING	0.02	0.3
REMAINING	0.03	0.3
CARBONACEOUS	0.02	2.2
REMAINING	0.04	0.7
REMAINING	0.03	1.7
COAL	0.27	4.1
REMAINING	0.04	1.9
COAL	0.23	4.1
REMAINING	0.02	0.8



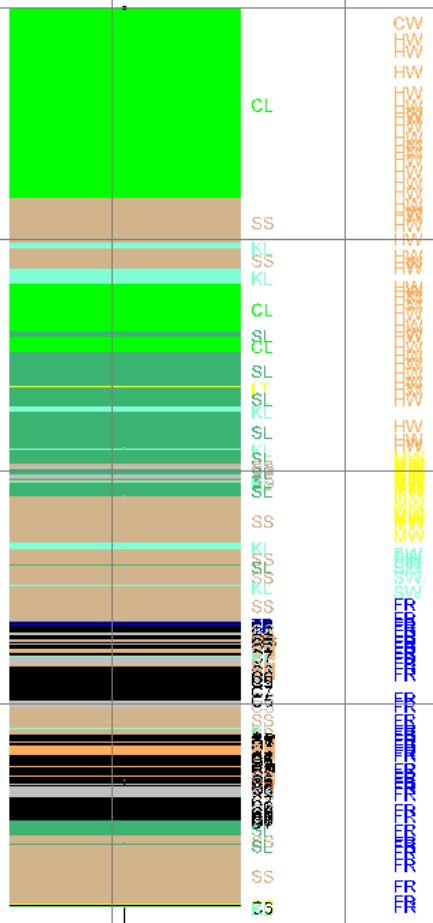
1435D

SAND AND GRAVEL	0.01	0.3
CLAY AND SOIL	0.01	2.1
CLAY AND SOIL	0.02	4.1
REMAINING	0.05	10.2
REMAINING	0.14	14.6
COAL	0.03	3.3
REMAINING	0.08	9.4
COAL	0.47	12.4
REMAINING	0.04	1.3
CARBONACEOUS	0.08	0.3
CARBONACEOUS	0.34	1.3
COAL	0.13	2.4
REMAINING	0.36	5.2
REMAINING	0.01	1.3



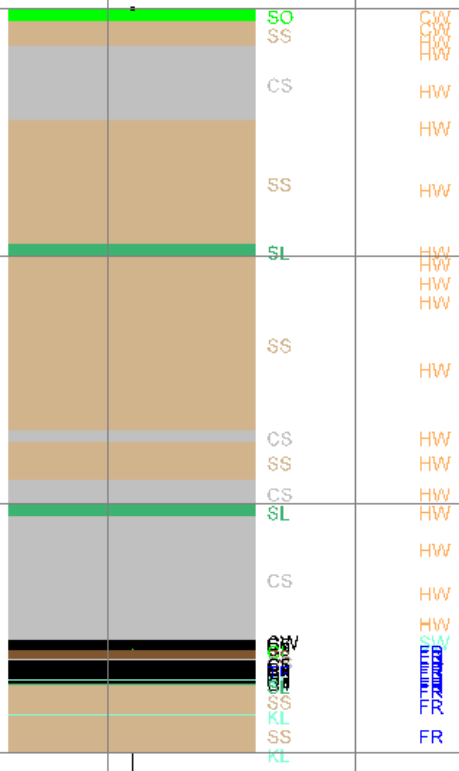
1419D

CLAY AND SOIL	0.02	5.8
REMAINING	0.02	2.5
CLAY AND SOIL	0.18	1.4
REMAINING	0.02	5.9
REMAINING	0.03	10.7
COAL	0.36	6.7
REMAINING	0.03	1.3
REMAINING	0.03	1.1
COAL	0.27	6.1
REMAINING	0.02	2.7



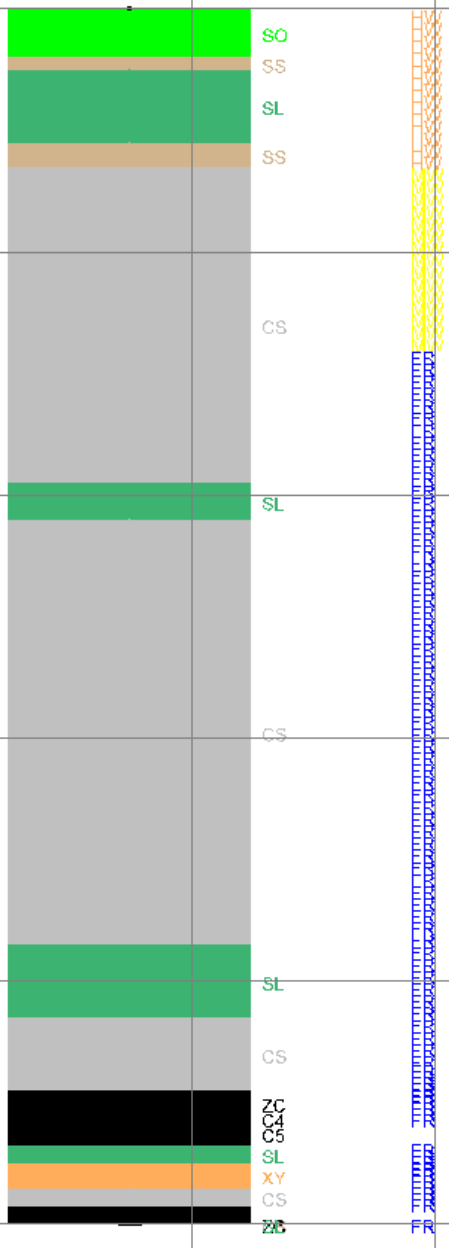
1418D

REMAINING	0.02	13.6	
REMAINING COAL	0.02 0.25	1.6 5.6	

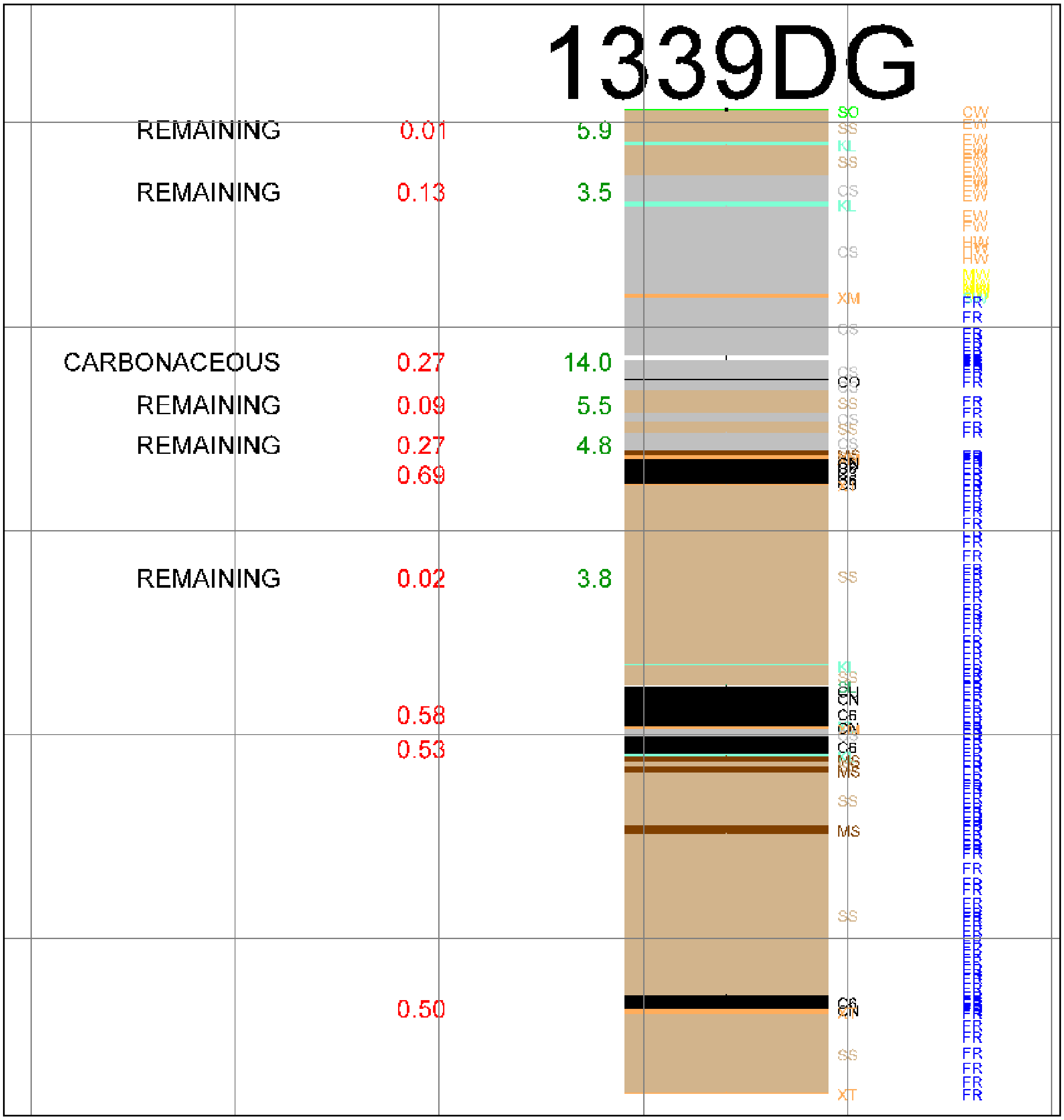


1440R

CLAY AND SOIL	0.01	1.3	SO
			SS
			SL
REMAINING	0.01	0.3	SS
			CS
REMAINING	0.02	216.0	
			SL
REMAINING	0.05	222.0	
			CS
REMAINING	0.08	10.2	
			SL
			CS
COAL	0.51	14.3	ZC
COAL	0.47	11.6	C4
			C5
REMAINING	0.08	3.8	SL
CARBONACEOUS	0.07	8.0	XY
			CS
COAL	0.35	8.0	ZC



1339DG


REMAINING 0.01 5.9
REMAINING 0.13 3.5
CARBONACEOUS 0.27 14.0
REMAINING 0.09 5.5
REMAINING 0.27 4.8
0.69
REMAINING 0.02 3.8
0.58
0.53
0.50
SO
SS
KL
SS
CS
KL
CS
XM
CS
CS
CO
SS
CS
SS
CS
SS
KL
SS
CN
CS
CN
CS
MS
MS
SS
MS
SS
CS
CN
SS
XT
CW
EW
HW
MW
FR

Appendix 15: Emerson Test Classification Scheme

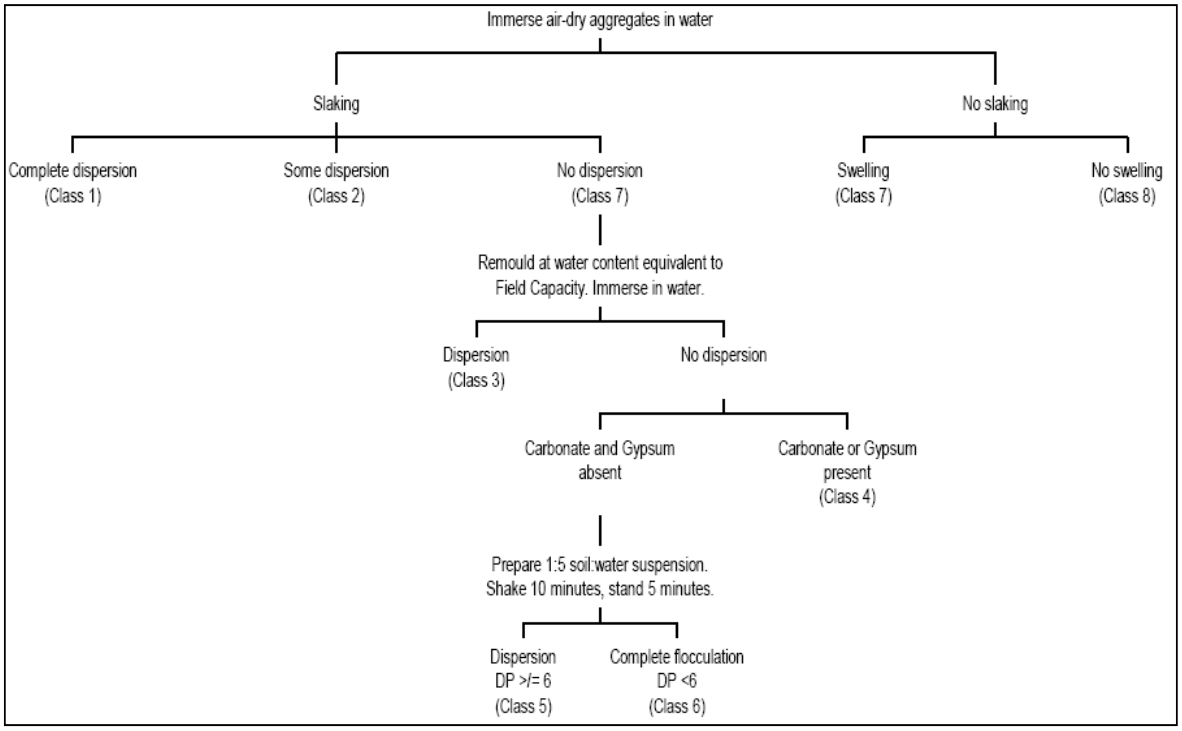


Figure A 33: Diagram for determining the Emerson class number

(Adapted from AS 1289.3.8.1-1997)

Figure A 34: Example of Emerson tests showing highly dispersive (Class 1), slightly dispersive (Class 2 or 3) and non-dispersive (Class 4, 5 or 6) results

Appendix 16: Dispersivity Test Results

Table A 6: Results from testing

Sample ID	Lithology Group	Rock Type	Weath-ering	EC (dS/m)	CEC (meq/100g)	Exch. Na (meq/100g)	ESP (%)	Emerson Class
1440R_ARD09	Carbonaceous	Carb. clay	FR	0.422	14.4	3.7	26	2
1336D_ARD02	Carbonaceous	Carb. mudstone	FR	0.101	1.3	0.4	31	2
1421D_ARD03	Carbonaceous	Carb. mudstone	SW	0.718	26.5	8.3	31	1
1435D_ARD10	Carbonaceous	Carb. mudstone	FR	0.081	5	1.6	32	3
1262D_ARD04	Carbonaceous	Carb. sandstone	FR	0.805	4.3	3.3	77	5
1423D_ARD05	Carbonaceous	Carb. shale	FR	0.436	8.3	3.4	41	2
1424D_ARD02	Carbonaceous	Carb. shale	SW	0.295	39.9	5	12	3
1277D_ARD03	Clay and soil	Clay	HW	1.318	46.2	28.1	61	1
1349D_ARD01	Clay and soil	Clay	HW					1
1411D_ARD01	Clay and soil	Clay	HW	0.565	22.7	10	44	1
1419D_ARD03	Clay and soil	Clay	HW	1.03	18.3	11.5	62	2
1427D_ARD02	Clay and soil	Clay	HW	1.76	32.1	17	52	1
1435D_ARD02	Clay and soil	Clay	HW	1.7	27	17	63	1
1296L_ARD 10,11,12	Clay and soil	Clay		2.1	24.8	14.7	59	-
1296L_ARD 19,20	Clay and soil	Clay	MW	2.38	35.6	20	56	1
1296L_ARD36,37	Clay and soil	Clay	MW	0.971	13	6.9	53	2
1296L_ARD 23,24	Remaining	Claystone	FR	1.17	11	7	64	1
1327D_ARD 10	Remaining	Claystone	MW	0.395	19	4.6	24	-
1339DG_ARD0	Remaining	Claystone	FR	0.45	5.9	2.2	37	6
1339DG_ARD0	Remaining	Claystone	HW	0.986	17.7	11.6	65	1
1350D_ARD03	Remaining	Claystone	HW	0.285	5.5	2.6	47	2
1362D_ARD02	Remaining	Claystone	HW	0.185	3.1	1.5	48	6
1413D_ARD03	Remaining	Claystone	SW	0.997	14.6	7.1	48	2
1418D_ARD02	Remaining	Claystone	HW	0.314	4.5	2.4	53	2
1437R_ARD01	Remaining	Claystone	SW	0.266	2	1.4	70	2
1437R_ARD02	Remaining	Claystone	SW	1.56	28.8	17.1	59	1
1439R_ARD01	Remaining	Claystone	MW	0.881	30.6	11	36	2
1439R_ARD08	Remaining	Claystone	MW	1.39	47.9	15.8	33	2
1440R_ARD03	Remaining	Claystone	FR	0.978	46	18.1	39	2
1252D_ARD10	Remaining	Mudstone	FR	0.281	7	1.2	17	5
1277D_ARD04	Remaining	Mudstone	HW	1.08	19.1	10.5	55	1
1327D_ARD 9	Remaining	Mudstone	FR	0.734	7.7	4	52	-
1337DG_ARD 18	Remaining	Mudstone	FR	3.37	40.3	25.5	63	1
1262D_ARD03	Remaining	Sandstone	HW	1.12	7.6	5.3	70	6
1296L_ARD 40,41	Remaining	Sandstone	FR	0.849	13.8	6.7	49	1
1327D_ARD 12	Remaining	Sandstone	FR	0.129	2.7	0.7	26	3
1337DG_ARD 17	Remaining	Sandstone	FR	2.55	26.9	17.2	64	-
1411D_ARD04	Remaining	Sandstone	MW	0.146	5.7	2.2	39	3
1419D_ARD07	Remaining	Sandstone	FR	0.078	3.2	1.1	35	3

Sample ID	Lithology Group	Rock Type	Weath-ering	EC (dS/m)	CEC (meq/100g)	Exch. Na (meq/100g)	ESP (%)	Emerson Class
1426D_ARD10	Remaining	Sandstone	FR	0.05	2	0.6	30	2
1337DG_ARD 24	Remaining	Siltstone	FR	0.099	3.5	0.9	26	3
1406D_ARD03	Remaining	Siltstone	SW	0.882	60	14.8	25	2
1419D_ARD04	Remaining	Siltstone	MW	0.681	25.8	13.6	53	1
1435D_ARD04	Remaining	Siltstone	FR	0.998	33.5	19.4	58	2
1438R_ARD01	Remaining	Siltstone	HW	0.262	13.4	5.7	42	2
1423D_ARD10	Remaining	Tuff	FR	0.531	46.2	6.8	14	3
1438R_ARD03	Remaining	Tuff	FR	0.973	6.9	5	72	2
1421D_ARD07	Coal	Coal, dull	FR	0.089	4.5	1.2	27	3
1426D_ARD12	Coal	Coal, dull	FR	0.115	3.5	1.4	40	5
1435D_ARD06	Coal	Coaly mudstone	FR	0.289	11.5	5.9	51	5
1425D_ARD03	Coal	Sooty coal	MW	1.08	52.8	23.5	45	1
img-Z177437	Coal	Washery waste	FR	0.185	8.4	0.7	8	5
img-Z177437	Coal	Washery waste	FR	0.174	3.6	0.8	24	-
img-Z177437	Coal	Washery waste	FR	0.158	3.7	1.1	29	-

Appendix 17: Coal Sulphur Speciation

ALPHA - forms of sulphur

Salva Resources - 2 Aug 10

Simple Average (% adb)						0.59	0.27	0.02	0.31
						TOTAL SULPHUR	Pyritic Sulphur	Sulphate Sulphur	Organic Sulphur
				Sulphur Distribution - %			45%	3%	52%
POHOLENAME	**POTOP**	**POBASE**	**POINTERVAL**	**SASAMPNO**	**SACOALTYPE**	**SUTOT**	**SUPY**	**SULPHATE**	**ULSUORG**
1105C	77.73	79.91	C3	813061_63	RW	0.49	0.13	0.01	0.35
1090C	110.34	112.1	C3	813526_27	RW	0.5	0.07	0.01	0.42
1106C	93.51	95.44	C3	813083_84	RW	0.5	0.14	0.01	0.35
1085C	82.74	84.19	DL2	813642_43	RW	1.3	0.91	0.05	0.34
1108C	118.87	121.41	DLL	813020_22	RW	0.42	0.13	0.01	0.28
1105C	91.91	94.19	DLL	813074_75	RW	0.45	0.14	0.01	0.30
1109C	74.66	76.36	DLL	20131	RW	0.48	0.17	0.01	0.30
1109C	74.66	76.36	DLL	20132	RW	0.58	0.14	0.01	0.43
1087C	80.04	82.02	DLL	813677_78	RW	0.72	0.37	0.01	0.34
1087C	75.71	76.69	DLM1	813671	RW	0.48	0.27	0.01	0.20
1087C	75.71	76.69	DLM1	813672	RW	0.58	0.28	0.01	0.29
1109C	70.15	70.98	DLM1	20120_21	RW	0.7	0.42	0.01	0.27
1154C	50.31	51.4	DLM1	20002	RW	0.75	0.19	0.01	0.55
1110C	63.52	66.58	DLM2	20181_87	RW	0.38	0.15	0.01	0.22
1109C	70.98	73.8	DLM2	20123_28	RW	0.42	0.20	0.01	0.21
1105C	89.13	90.99	DLM2	813070_71	RW	0.44	0.17	0.01	0.26
1087C	76.69	79.59	DLM2	813673_75	RW	0.48	0.18	0.01	0.29
1110C	63.52	66.58	DLM2	20180	RW	0.53	0.09	0.01	0.43
1109C	70.98	73.8	DLM2	20122	RW	0.54	0.16	0.01	0.37
1103C	117.07	119.95	DLM2	813576_78	RW	0.56	0.41	0.09	0.06
1085C	79.41	82.4	DLM2	813638_40	RW	0.57	0.48	0.02	0.07
1154C	54.95	56.71	DLM2	20005_06	RW	0.61	0.38	0.01	0.22
1102C	127.72	130.68	DLM2	813559_61	RW	0.8	0.53	0.01	0.26
1088C	63.93	67.13	DLM2	813695_96	RW	0.94	0.63	0.09	0.22
1087C	74.91	75.71	DU	813670	RW	0.55	0.19	0.01	0.35
1109C	69.6	70.15	DU	20117_19	RW	0.57	0.13	0.01	0.43
1102C	126.57	127.03	DU	813557	RW	0.65	0.12	0.01	0.52