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Geochemical Assessment of Potential Mineral Waste

DAUNIA WEST INFRASTRUCTURE PROJECT

Prepared for:

SLR Consulting, on behalf of Whitehaven Daunia Pty Ltd

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www.terrenus.com.au

PO Box 132, Wilston QLD 4051
Ph. 0414 924 233

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EXECUTIVE SUMMARY

This report serves to document and discuss the environmental geochemical characteristics of mineral waste materials associated with the Daunia West Infrastructure Project (the Project), being developed by Whitehaven Daunia Pty Ltd (WHC). The Project – as relevant to the geochemical assessment – proposes the construction of an out-of-pit dump (OOPD) at WHC's existing Daunia Mine (DNM), as a continuation of DNM operations. The proposed OOPD will be located to the west of, and adjacent to, the currently approved mining area and will receive mineral waste from nearby Pandora Pit. The geochemical assessment was completed to assist with mine planning and as part of the environmental regulatory documentation for the Project.

The objective of the assessment is to evaluate the geochemical nature of mineral waste expected to be disposed into the proposed OOPD, and identify relevant environmental issues/opportunities that may be associated with the OOPD to inform appropriate rehabilitation and management strategies.

Material Types

DNM has two main types of mineral waste:

- Spoil (overburden and interburden) comprises approximately 98.5 per cent of all mineral waste at DNM (BHP, 2023) and includes Tertiary- and Permian-age weathered waste and Permian-age fresh (unweathered) waste. About 91 per cent of spoil from Pandora Pit (and reporting to the OOPD at the Project) is expected to be non-carbonaceous material. Carbonaceous spoil, of which almost all is fresh/unweathered, is expected to comprise up to nine per cent of the spoil reporting to the OOPD.
- Rejects (fine and coarse) are generated at the coal handling and preparation plant (CHPP) from processing ROM coal, and currently comprise less than 1.5 per cent of all mineral waste at DNM. No rejects will be disposed into the new OOPD. The Project (including the OOPD) will not contain any rejects as all mineral waste from the CHPP will remain within the current approved mining lease at DNM.

Coal is also included in the geochemical assessment; however, coal is generally not considered mineral waste, with the exception of small quantities of sub-economic seams that may report to the spoil dumps – including the proposed OOPD.

Based on the above, the OOPD is expected to be comprised almost entirely of spoil (overburden and interburden) – of which most will be non-carbonaceous; and with a conservative assumption that a minor proportion of waste coal may also be disposed into the OOPD. As such, the assessment has focused on the geochemical characteristics of spoil and waste coal likely to report to the OOPD.

Sample Collection (data sources)

Sampling and laboratory test-work has been undertaken by BHP (the previous owners of DNM) throughout the development and operation of DNM. WHC acquired DNM from BHP in 2024. The DNM geochemical database contains all available geochemical data for mineral waste samples at DNM, and was provided to Terrenus for this assessment.

Drillhole sampling was used to collect spoil and coal samples for geochemical assessment. Geochemical data of relevance to the Project is available for 633 spoil samples and 78 coal samples collected from 31 drill-holes located throughout DNM – including Pandora Pit area – dating from 2008 to 2022.

AMP Potential of Spoil and Coal

Mineral waste samples have undergone environmental geochemical characterisation and assessment with regard to their potential to generate acid and metalliferous drainage (AMD), which comprises acid drainage (AD), neutral and metalliferous drainage (NMD) and/or saline drainage (SD) [salinity due to sulfate derived from sulfide oxidation]. Additionally, samples have been assessed with regard to their potential to generate salinity (non-oxidative) and, for spoil materials, their sodicity and dispersion potential.

AMD Potential of Spoil

Spoil, which is expected to comprise about 99 per cent of the mineral waste within the proposed OOPD, is expected to generate pH-alkaline to highly alkaline contact water (run-off and seepage), which is typical for mine spoil in the Bowen Basin.

Based on the results of 633 samples, spoil has a very low potential to generate AMD as either AD and/or NMD and/or SD.

The total sulfur (S) concentration of spoil is very low, with a 95th percentile total S concentration of 0.19 per cent. As such, and combined with generally moderate to high acid neutralising capacity (ANC) values [median = 24 kilograms of sulfuric acid per tonne of rock (kg H_2SO_4/t)], which is significantly higher than the maximum potential acidity (MPA) [median 0.6 kg H_2SO_4/t], approximately 98 per cent of spoil samples tested were classified as non-acid forming (NAF) or UC(NAF) [uncertain, but expected to be NAF]. Less than two per cent of spoil samples were classified as potentially acid forming (PAF), PAF-LC [PAF, low capacity] or UC(PAF) [uncertain, but expected to be PAF or PAF-LC]. No spoil samples were classified as NAF-S [NAF, but with total S greater than one per cent]. Almost all of the 10 spoil samples classified as 'PAF' (of any type) were closely associated with coal seams and could potentially end up as coal reject if mined with ROM coal.

The test-work undertaken has demonstrated that the ANC for the non-carbonaceous spoil is generally expected to be about 35-95 per cent available under field conditions (median 67 per cent), with iron-dolomite and dolomite being the main carbonate mineral contributing to the acid buffering potential of the spoil. Overall, spoil has excess acid neutralising capacity and is expected to be bulk acid consuming.

Total metal and metalloid concentrations from 107 spoil samples tested are very low compared to average element abundance in unmineralised soil/rock in the earth's crust, with only one sample being significantly enriched with regard to arsenic (As). About seven per cent of spoil samples showed minor enrichment with regard to one or more of As, barium (Ba), sulfur (S) and/or molybdenum (Mo).

Soluble multi-element results from 107 spoil samples indicate that leachate from spoil is expected to contain low concentrations of soluble metals and metalloids. Five samples produced leachate with low-moderate soluble metal concentrations, primarily due to low-moderate concentrations of aluminium (Al) and/or As. One extremely weathered spoil sample was weakly acidic (pH 5.8) with low soluble metals concentrations.

The assessment has demonstrated that spoil from Pandora Pit (based on 198 samples) has AMD characteristics that are comparable to spoil from outside Pandora Pit (based on 435 samples). For the key geochemical parameters assessed, the Pandora Pit spoil samples had concentrations/values within the same range as spoil samples from outside Pandora Pit. As such, the low AMD hazard posed by DNM spoil, generally, can be equally applied to spoil from Pandora Pit to be disposed with the OOPD at the Project.

AMD Potential of Coal

Coal is not regarded as waste and ROM coal remains on-site for a relatively short period of time. It is reasonably assumed that almost all coal mined from Pandora Pit will report as ROM coal. However, the assessment has conservatively assumed that some minor coal ply's from Pandora Pit may be mined with spoil (as waste coal) and will therefore be broadly disposed within the OOPD at the Project. The amount of waste coal that may be disposed into the OOPD is unknown, however we have conservatively assumed that waste coal will represent up to one percent of mineral waste in the OOPD.

Based on the results, and as a bulk material, coal is assessed as having a low-moderate potential to generate AMD as either AD, NMD and/or SD. Coal, as a bulk material, is expected to generate pH-neutral to alkaline contact water (run-off and seepage).

The total S concentration of coal is generally low with samples from Pandora Pit having generally similar total S concentration compared to coal samples from outside Pandora Pit. Approximately 29 per cent (median value) of the total S is present as sulfide (Scr), with the bulk of the total S likely present as organic S, which does not contribute to AMD. Coal samples have a wide range of ANC values; however, the median ANC, overall, is low. The Pandora coal samples have generally lower ANC values compared to Other coal samples. As such, approximately 55 per cent of coal samples were classified as NAF or UC(NAF), with a much lower proportion of Pandora coal samples being classified as NAF or UC(NAF) (27 per cent) compared to Other coal samples (73 per cent). The remaining samples were classified as PAF, PAF-LC or UC(PAF) – noting that the AMD classification is based on total S, which for coal samples likely leads to a highly conservative classification.

These results suggest that potentially un-economic coal seam material reporting to the OOPD as spoil (mixed with non-coal spoil) would conservatively pose a low-moderate AMD source hazard.

Assay data for 17 coal samples show that the total metal and metalloid concentrations are very low compared to average element abundance in soil in the earth's crust. One Pandora coal sample was significantly enriched with regard to S and an additional Pandora coal sample was moderately enriched with regard to Mo.

Soluble multi-element results from 18 coal samples tested (with a range of NAF to PAF classifications) indicate that contact water (run-off and seepage) from coal is generally expected to contain low concentrations of soluble metals and metalloids. Two PAF Pandora coal samples have moderate metals concentrations associated with weakly acidic conditions; and one PAF Other coal sample had low soluble metals concentrations associated with weakly acidic conditions.

Salinity, Sodicity and Dispersion Potential of Spoil and Coal

Salinity, Sodicity and Dispersion Potential of Spoil

Spoil has low median and low 95th percentile electrical conductivity (EC)$_{1:5}$ values of 284 and 612 microSiemens per centimetre (μS/cm), respectively, and has very low total S concentrations. Similarly, saturated extract (ECse) data for 196 samples resulted in a 95th percentile ECse value of 1660 μS/cm. On this basis, contact water (run-off and seepage) from spoil is expected to be generally non-saline to slightly saline, as a result of dissolution of geogenic salts more so than from sulfide oxidation (sulfate salinity). Weathered spoil generally has higher EC$_{1:5}$ and ECse values compared to fresh spoil. The Pandora samples (n=219) had EC$_{1:5}$ and ECse values within the same range as the Other spoil samples (n=600) – i.e. generally non-saline to slightly saline.

Spoil has moderate cation exchange capacity (CEC) values and generally high exchangeable sodium percentage (ESP) values, resulting about 90 per cent of samples being classified as 'sodic' to 'strongly sodic' and, therefore, with potential for dispersion. Based on Emerson aggregate class testing to directly measure dispersion, about 84 per cent of spoil samples displayed some degree of dispersion – consistent with the dispersion predictions from the ESP results. The Pandora spoil samples had a similar range and distribution of CEC and ESP values (results from 83 samples) compared to Other spoil samples (results from 287 samples).

Salinity Potential of Coal

Coal has low median and 95th percentile $EC_{1:5}$ values of 119 and 378 μS/cm, respectively; and has generally low total S concentrations. On this basis, contact water (run-off and seepage) from coal, as a bulk material, is expected to be non-saline to slightly saline, either as a result of dissolution of geogenic salts and/or from sulfide oxidation (sulfate salinity).

Geochemical Source Hazard Assessment

A geochemical source hazard assessment was applied to the source material types within the proposed OOPD, which are expected to comprise: non-carbonaceous spoil, carbonaceous spoil, and coal. The AMD source hazard score takes into account the propensity to generate AMD, the AMD capacity (severity) and the quantity (volume/tonnage) of material that could produce AMD. The source hazard assessment used data from Pandora samples only (i.e. excluded data from outside Pandora Pit area). The AMD source hazard assessment has found that non-carbonaceous spoil poses a **Low** AMD source hazard, carbonaceous spoil poses a **Low-Moderate** AMD source hazard and coal also poses a **Low-Moderate** AMD source hazard.

When combined, and taking into account the proportion of each material that could generate AMD relative to the total proportion of all materials in the OOPD final landform, the proposed OOPD landform is expected to pose a **Low** AMD hazard, with AMD generation rated as **Highly Unlikely**.

The 'Low' AMD hazard for the OOPD is largely a result of the OOPD being comprised of 90 per cent non-carbonaceous spoil, of which approximately 1.2 per cent (based on sample numbers) has been conservatively classified as PAF of some type. Although a significant proportion of coal samples were conservatively classified as PAF, coal will comprise a very minor proportion of the landform, with spoil comprising essentially all of the mineral waste within the landform.

Management and Rehabilitation Measures

The OOPD is proposed to be constructed from spoil (overburden and interburden) mined from Pandora Pit. About 90 per cent of the spoil is expected to be non-carbonaceous and the remainder carbonaceous. The Project conservatively assumes that a very small proportion (up to one per cent) of waste coal may also report to the OOPD, which is consistent with open-cut coal mining methods where minor waste coal reports as 'spoil', including current mining undertaken at DNM. The assessment has found no significant difference between the geochemical characteristics of spoil from Pandora Pit compared to the spoil from outside of Pandora Pit at DNM.

Spoil is overwhelmingly NAF with excess ANC and has a negligible risk of developing AMD, including AD, NMD and/or SD. Furthermore, surface water run-off and seepage from bulk spoil is expected to be non-saline to slightly saline with low soluble metal/metalloid concentrations. Taking into account material quantities (proportions) and the geochemical characteristics of the mineral wastes reporting to the proposed OOPD landform, the OOPD landform is expected to pose a **Low** AMD hazard, with AMD

generation rated as **Highly Unlikely**. However, spoil is expected to be sodic to strongly sodic with potential for dispersion and erosion.

It is unlikely that sodic and potentially dispersive spoil will be able to be selectively handled and emplaced during operation of the OOPD, as is the case at DNM. Therefore, in the absence of such selective handling, the OOPD will be designed to a maximum final slope angle of around 3H:1V (≈18°) or flatter to ensure long-term erosion control. Benches will be constructed at 10 - 20 m lifts to break slope length and manage run-off. Drainage and runoff will be managed through appropriately designed contour drains and drop structures. The final landform will be shaped to ensure long-term stability and compatibility with surrounding land uses.

Surface water run-off and seepage from the OOPD, including any rehabilitated areas, should be monitored for 'standard' water quality parameters including, but not limited to, pH, EC, major anions, major cations and a broad suite of soluble metals/metalloids at high resolution analysis.

With the implementation of the proposed management and mitigation measures the proposed OOPD is regarded as posing a low risk of environmental harm.

Validation of Spoil Characteristics

The AMD hazard posed by existing spoil at DNM is understood, and the geochemical characteristics (AMD hazard) of future spoil generated from Pandora Pit are expected to be very similar to the current spoil being produced at DNM. Nevertheless, WHC will continue to undertake geochemical test-work of overburden and interburden throughout development of the Project. Test-work would likely focus on long-term (kinetic) processes associated with spoil seepage to validate the static geochemical data.

Coal Rejects Management Strategy

No coal rejects will not be disposed into the proposed OOPD nor anywhere within the Project. Coal rejects generated at the DNM CHPP from processing ROM coal from DNM will continue to be disposed within spoil at DNM under the current approved disposal and management arrangements.

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GLOSSARY of TERMS

ABA	Acid-base account. Evaluation of the balance between acid generation and acid neutralisation processes. Generally determined by the maximum potential acidity (MPA) and the inherent acid neutralising capacity (ANC), as defined below. See also MPA and ANC.
Acid	A measure of hydrogen ion (H^+) concentration in water; generally expressed as pH.
Acidity	A measure of hydrogen concentration and latent acidity generated by metal hydroxylation, expressed as mg/L.
AD	Acid drainage. A component of AMD, AD occurs where drainage is acidic as a result of sulfide oxidation reactions, and contains elevated trace metals and metalloids in solution.
AMD	Acid and metalliferous drainage. AMD has three components: acid drainage (AD), pH-neutral and metalliferous drainage (NMD) and/or sulfide-derived saline drainage (SD) – and/or any combination of these, all generated by sulfide oxidation processes +/- neutralisation reactions.
ANC	Acid neutralising capacity, expressed as kg H_2SO_4 per tonne of rock/material. A measure of a sample's maximum potential ability to neutralise acid.
ANC/MPA ratio	Ratio of the acid neutralising capacity (ANC) to the maximum potential acidity (MPA) of a sample. Used to assess the risk of a sample generating acid conditions. See also ANC and MPA.
CHPP	Coal handling and preparation plant.
Co-Disposal	The practice of disposing different waste types together. For example, disposing rejects amongst spoil.
DNM	Daunia Mine.
DWIP	Daunia West Infrastructure Project (the Project).
EA	Environmental Authority. A permit issued by the Queensland Department of the Environment, Tourism, Science and Innovation (DETSI) to allow the EA holder to undertake an 'environmentally relevant activity'. Mining is an example of an environmentally relevant activity.
EC	Electrical conductivity, expressed as μS/cm.
Interburden	Potential spoil material located between mined coal seams. See also Overburden, Mineral waste and Spoil.
Kinetic test	Procedure used to measure the geochemical/weathering behaviour of a sample of mine material over time.
Mineral waste	Material comprising mine spoil (waste rock), ± coarse/fine reject, ± waste coal. Sometimes called 'mine waste' or 'mining waste'.

MPA	Maximum potential acidity. Calculated by multiplying the total sulfur (S) content of a sample by 30.6 (stoichiometric factor) and expressed as kg H_2SO_4 per tonne of rock/material (kg H_2SO_4/t). Assumes all sulfur is present as sulfide and will oxidise to generate acid.
NAG	Net acid generating test. A pulp sample is reacted with hydrogen peroxide to encourage rapid oxidation. Any acid generated through oxidation may be consumed by neutralising components in the sample. Any remaining acidity (after neutralising material is consumed) is measured and expressed as kg H_2SO_4/t. At the conclusion of the NAG test the resulting liquor is called peroxide (NAG) leachate, and can be analysed for various parameters, such as soluble metals.
NAPP	Net acid producing potential, expressed as kg H_2SO_4 per tonne of rock/material (kg H_2SO_4/t). Calculated by subtracting the ANC from the MPA.
NMD	Neutral and metalliferous drainage. A component of AMD, NMD occurs where drainage is pH-neutral or higher yet contains elevated trace metals and metalloids in solution.
Org S	Organic sulfur.
Overburden	Mineral (mining) waste located above (overburden proper) or between (interburden) coal seams and reports to spoil dumps. Typically comprises non-coaly and non-carbonaceous material, such as sandstone, siltstone and claystone/mudstone, but also includes a small percentage of carbonaceous material (e.g. carbonaceous siltstone) and sub-economic waste coal.
OOPD	Out-of-pit dump. A mineral waste disposal facility situated outside of a pit shell.
PAF	Potentially acid forming. Geochemical classification criterion for a sample that has the potential to generate acid conditions. A sample classified as PAF has an acid generating potential (MPA) that exceeds the inherent acid neutralising capacity (ANC) of the material. This means that such a material is likely to generate acidic drainage (AD) if exposed to atmospheric conditions. See also PAF-LC.
PAF-LC	Potentially acid forming (low capacity). Geochemical classification criterion for a sample that has the potential to generate relatively low-level AD.
PRCP	Progressive rehabilitation and closure plan.
Ply(s)	The individual coal seams within a seam group and separated by interburden. A seam group is typically comprised of several plys.
Product coal	Coal produced from the CHPP after being washed/processed. Coal that is ready for sale.
Rejects	The general term given to solid waste produced from a CHPP during the processing of coal. Rejects can be produced in different size fractions – fine (such as dewatered tailings) through to very coarse (such as breaker rejects) and combinations thereof, 'rejects' refers to all coal reject other than tailings.
ROM	Run-of-Mine. The term given to mined coal before being processed at the CHPP.

ROM pad	Location where ROM coal is temporarily stored pending processing at the CHPP.
S	Sulfur.
Scr	Chromium reducible sulfur. Analytical procedure to determine the sulfide-sulfur concentration in a sample. This typically represents the proportion of sulfur associated with sulfide (reactive) minerals.
SD	Saline drainage. A component of AMD, SD occurs where drainage is saline due to elevated sulfate as a result of sulfide oxidation and neutralisation reactions.
SO4	Sulfate.
Spoil	Rock material overlying and between 'target' coal seams, which will report as waste. Waste rock overlying a coal seam is called overburden. Waste rock between mined coal seams is called interburden. See also Overburden and Interburden.
Static test	Procedure for characterising the geochemical nature of a sample at one point in time. Static tests may include measurements of mineral and chemical composition of a sample and the Acid-Base Account.
Tailings	Very fine-grained mineral waste produced from the CHPP as part of the processing and washing of coal, and which have not been dewatered [dewatered tailings are regarded as fine rejects]. Tailings typically comprises mud/clay, silt and fine coal present in CHPP wastewater.
Uncertain	In the context of classifying a material or sample as NAF or PAF. An 'Uncertain' (UC) classification applies when there is an apparent conflict in results such that neither NAF nor PAF classification can be given, or there is insufficient information to unequivocally classify as NAF or PAF. UC samples are given a tentative sub-classification as UC(NAF) or UC(PAF) where preliminary data suggests the sample is expected to be NAF or PAF, respectively.
UC(NAF)	In the context of classifying a material or sample as NAF or PAF. A material or sample has an uncertain geochemical classification, but the available data suggests the sample is expected to be NAF.
UC(PAF)	In the context of classifying a material or sample as NAF or PAF. A material or sample has an uncertain geochemical classification, but the available data suggests the sample is expected to be PAF.
Waste coal	Sub-economical coal that reports directly to the spoil dumps as waste (i.e. not ROM coal). Waste coal can be fresh or weathered (oxidised). All weathered/oxidised and coked (cindered) coal is waste.
Water extract	A method to determine the water-soluble parameters in soil. Solid samples undergo a bottle leach method where 10 g of pulped solid (85 per cent passing 75 μm) is combined with deionised water (leaching fluid) into a glass bottle. The volume of water will depend on the specific method – for example, 10 g of solid to 50 g of water for a 1:5 water extract. The solution is tumbled end-over-end for at least one hour. Solutes are leached from the soil by the continuous suspension and agitation. The water extract solution is measured for pH and electrical conductivity (EC) prior to filtering for solute analysis (e.g. metals/metalloids and major ions).

1 Introduction and Context

Terrenus Earth Sciences (Terrenus) has completed a geochemical assessment of potential mineral waste (sub-soil and rock) from the Daunia West Infrastructure Project (the Project), being developed by Whitehaven Daunia Pty Ltd (WHC). The Project – as relevant to the geochemical assessment – proposes the construction of an out-of-pit dump (OOPD) at WHC's existing Daunia Mine (DNM), as a continuation of DNM operations. The proposed OOPD will be located to the west of, and adjacent to, the currently approved mining area. The geochemical assessment was completed to assist with mine planning and as part of the environmental regulatory documentation for the Project. The Project setting is shown at Figure 1-1.

The proposed OOPD dump will comprise spoil (overburden and interburden) mined by conventional open-cut methods from the nearby Pandora Pit. Run-of-mine (ROM) coal from Pandora Pit will be trucked to the existing DNM Coal Handling and Preparation Plant (CHPP) for processing – consistent with existing ROM coal processing from DNM. Coal rejects from the CHPP, comprising fine and coarse rejects, will continue to be co-disposed at DNM under DNM's approved management measures for such materials. The Project (including the OOPD) will not contain any rejects as all mineral waste from the CHPP will remain within the current approved mining lease at DNM.

1.1 Objective

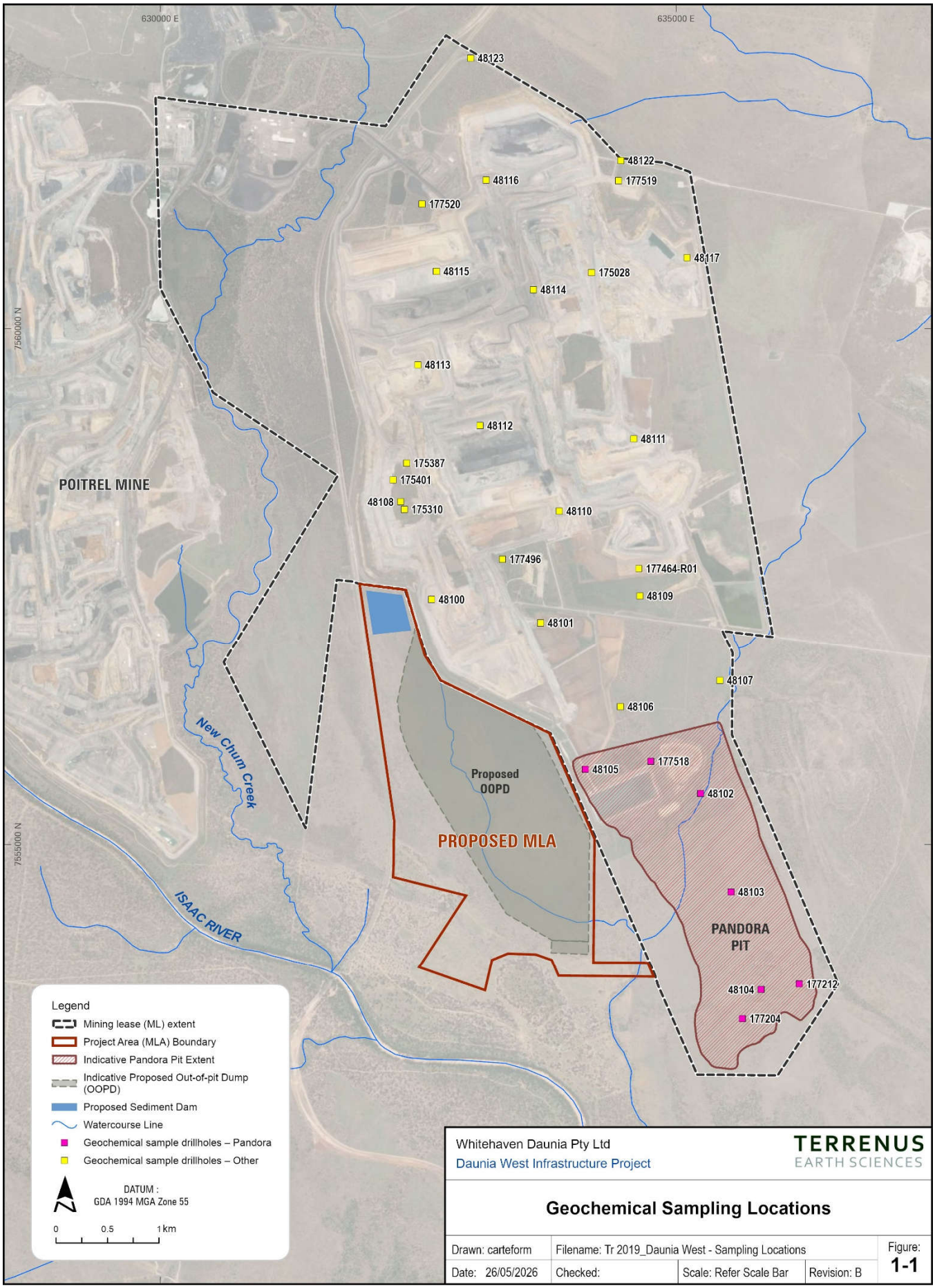
The objective of the assessment is to evaluate the geochemical nature of mineral waste expected to be disposed into the proposed OOPD, and identify relevant environmental issues/opportunities that may be associated with the OOPD to inform appropriate rehabilitation and management strategies.

1.2 Material Types and Quantities

DNM has two main types of mineral waste, however only spoil (including minor waste coal) will be disposed into the OOPD:

- Spoil (overburden and interburden) comprises approximately 98.5 per cent of all mineral waste at DNM (BHP, 2023) and includes Tertiary- and Permian-age weathered waste and Permian-age fresh (unweathered) waste. Spoil at DNM is comprised of approximately 94 per cent non-carbonaceous material and about six per cent as carbonaceous spoil. Spoil generated at Pandora Pit (that will be disposed into the new OOPD) is expected to produce non-carbonaceous and carbonaceous spoil in proportions similar to the current DNM operations.
- Rejects are generated at the CHPP from processing ROM coal, and currently comprise less than 1.5 per cent of all mineral waste at DNM. Rejects is generated and disposed as mixed plant rejects (MPR), which comprises approximately 80 per cent coarse rejects and 20 per cent fine rejects mixed together at the CHPP. The OOPD will not contain any rejects.

Coal is also included in the geochemical assessment; however, coal is generally not considered mineral waste, with the exception of small quantities of sub-economic seams that may report to the spoil dumps – including the proposed OOPD.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7555000 N
48123
48122
48116
177519
177520
48117
48115
175028
48114
48113
48112
48111
175387
175401
48108
175310
48110
177496
177464-R01
48109
48100
48101
48107
48106
48105
177518
48102
48103
48104
177212
177204
POITREL MINE
New Chum Creek
ISAAC RIVER
Proposed
OOPD
PROPOSED MLA
PANDORA
PIT
Legend
Mining lease (ML) extent
Project Area (MLA) Boundary
Indicative Pandora Pit Extent
Indicative Proposed Out-of-pit Dump (OOPD)
Proposed Sediment Dam
Watercourse Line
Geochemical sample drillholes – Pandora
Geochemical sample drillholes – Other
DATUM :
GDA 1994 MGA Zone 55
0
0.5
1 km
Whitehaven Daunia Pty Ltd
Daunia West Infrastructure Project
TERRENUS
EARTH SCIENCES
Geochemical Sampling Locations
Drawn: carteform
Filename: Tr 2019_Daunia West - Sampling Locations
Figure:
1-1
Date: 26/05/2026
Checked:
Scale: Refer Scale Bar
Revision: B

1.3 Geological Background

The lithology at Pandora Pit (where all spoil for the OOPD will be sourced) is consistent with the lithology of all other pits at DNM.

DNM is located on the western limb of the northern Bowen Basin, and lies near the western boundary of a sedimentary trough – the Taroom Trough – which was filled by a thick accumulation of mainly terrestrial sediments during the Permo-Triassic period. DNM is located within a shallow basin structure immediately east of the New Chum fault, which separates DNM from Poitrel Mine to the west. New Chum Creek, which flows from north to south between DNM and Poitrel Mine, broadly follows the New Chum fault line.

The coal bearing sequences at DNM are the late Permian-age Rangal Coal Measures (RCM) and the very upper seam of the Fort Cooper Coal Measures (FCCM), comprising the following seam groups in stratigraphic order, from youngest to oldest:

- Leichhardt Seam (RCM): L1, L2 and L3 ply's (when combined, L1 and L3 ply's are referred as L13 ply).
- Lower Leichhardt Seam (RCM): L4 ply.
- Upper Vermont Seam (RCM): V1, V2 and V3 ply's (when combined V2 and V3 ply's together are referred as V23 ply. V23 is sub-economic and not mined).
- Lower Vermont Seam (FCCM): VL ply (not mined).

The lithology at DNM (and Pandora Pit) is characterised by typical basin-fill sediments, comprising mudstone, claystone, siltstone, sandstone (typically fine- to medium-grained), carbonaceous sediments and coal seams. Interbedded and interlaminated siltstone occurs within some sandstone units. The Yarrabee Tuff 'marker horizon' is widespread throughout the RCM and marks the top of the FCCM. At DNM, the Yarrabee Tuff is located immediately below the V3/V23 ply and immediately above the VL ply (i.e. between the V3/V23 and the VL ply's).

In coal environments (i.e. at coal mines) fresh carbonaceous materials typically have higher sulfide concentrations compared with fresh non-carbonaceous materials and, as such, typically pose a greater environmental geochemical hazard compared with fresh non-carbonaceous material. Comparatively, non-carbonaceous lithologies are essentially void of (or have negligible) carbonaceous material and thus have low or nil sulfide mineral concentration. The key exception is that non-carbonaceous materials located within coal seams or immediately above and below (within, say, 0.5 m of) coal seams tend to have a higher sulfide concentration compared to bulk overburden/interburden located away from seams.

Overlying the RCM is a thin veneer of Quaternary- and Tertiary-age sediments. Throughout the region, the Quaternary and Tertiary sediments are highly weathered, semi-consolidated and typically comprise sand, clay and gravel.

Underlying the RCM are the FCCM, which has geological similarities with the host rock of the RCM (i.e. quartzose to lithic sandstone, siltstone, carbonaceous shale and minor coal).

2 Potential Environmental Geochemical Hazards

2.1 Acid and Metalliferous Drainage

The term 'AMD' is used to describe low-quality seepage or drainage (from soil and rock) that has been affected by the oxidation of sulfide minerals (primarily pyrite and marcasite) and/or by the dissolution of acid generating sulfate minerals and associated neutralisation reactions, if any. The term AMD is used to describe any drainage type affected by this process.

AMD may be produced when sulfide minerals (such as pyrite) are exposed to oxygen and water. Oxidation of sulfide minerals may result in the production of acid(ity), sulfate (SO_4) and, depending on mineralogy, the release of metals and salinity. AMD comprises three key components, which are defined below as per recognised Australian and international guidelines (INAP, 2009[1], DIIS, 2016[2]).

- Acid drainage (AD): where contact water is acidic and, in most cases, also contains 'elevated' concentrations of metals and metalloids. This drainage type is generated when the acid generating capacity exceeds the acid neutralisation capacity of a sample.
- Neutral and metalliferous drainage (NMD): where contact water is pH-neutral/alkaline and contains 'elevated' concentrations of metals and metalloids. This drainage type is generated when the acid neutralising capacity exceeds the acid generating capacity of a sample.
- Saline drainage (SD): where contact water contains elevated sulfate concentration due to oxidation of sulfide minerals, and very low metal/metalloid concentration. This drainage type is generated when the acid neutralising capacity vastly exceeds the acid generating capacity of a sample with high sulfide concentration.

Whether contact water is impacted by AD, NMD and/or SD largely depends on the relative proportion of acid generating minerals (sulfide/sulfate) and acid neutralising minerals (carbonate) in the source materials. In this assessment unless specified otherwise, the term AMD is broadly used to describe AD, NMD and/or SD.

2.2 Salinity, Sodicity and Dispersion

An assessment of salinity characteristics of mineral waste materials has been undertaken on materials using available electrical conductivity (EC) data. An assessment of sodicity and dispersion characteristics of potential spoil materials has also been undertaken using exchangeable cation and Emerson Class data from overburden/interburden samples. Salinity released from the dissolution of geogenic salts (non-oxidative) is a separate and distinct process from SD associated with sulfide oxidation.

1 INAP, 2009. Global Acid Rock Drainage Guide. https://www.gardguide.com/index.php?title=Main_Page.

2 DIIS, 2016, Preventing Acid and Metalliferous Drainage. Handbook from Australian Federal Government's Leading Practice Sustainable Development Program for the Mining Industry. https://www.industry.gov.au/data-and-publications/leading-practice-handbook-preventing-acid-and-metalliferous-drainage.

3 Assessment Methodology

This section provides the methodology used for the geochemical assessment of spoil (and potential waste coal) expected to be mined from Pandora Pit as being representative of potential spoil (and waste coal) to be disposed into the proposed OOPD. Data from Pandora pit are referred to herein as 'Pandora'.

By way of comparison, geochemical data for spoil and coal being mined at DNM *outside* of Pandora Pit are included in the assessment to highlight the potential similarities and differences between Pandora materials likely to be disposed into the proposed OOPD versus spoil (and potential waste coal) currently disposed at DNM under the currently approved disposal arrangements. Data from outside Pandora Pit are referred to herein as 'Other'.

3.1 Information Review

WHC acquired DNM from BHP in 2024. All data used in this assessment is existing geochemical data collected by BHP (and their consultants) throughout the development and operation of DNM. The DNM geochemical database contains all available geochemical data for mineral waste samples at DNM, and was provided to Terrenus for this assessment. The geochemical database also contains data for coal rejects; however, as no rejects will be disposed into the proposed OOPD, the assessment of coal rejects is not required for (or applicable to) the Project.

The proposed OOPD will host the same type of spoil (and potential waste coal) as is currently mined and disposed at DNM. Therefore, drillhole samples from, or associated with, the current approved mining area (DNM) are representative of these same materials to be mined from Pandora Pit. Hence, geochemical data from DNM is representative of spoil (and potential waste coal) expected to be disposed into the proposed OOPD.

3.2 Sample Collection

Drill-hole Samples – representing spoil and coal

All data used to assess spoil and coal has been derived from drill-hole sampling. Drill-hole samples of relevance to the Project have been collected from 31 drill-holes located throughout DNM – including Pandora Pit area – dating from 2008 to 2022 (shown in **Figure 1-1**).

These drill-holes intersect all current and likely future mined geological units. In 11 of the drillholes (those drilled and sampled from 2020 to 2022, sampling has been undertaken from surface to full drill-hole depth (approximately to below the lowest mined seam). The remaining drillholes (those sampled in 2008 and 2012) had limited sampling data. The drill-hole samples that have undergone test-work are representative of the geology/stratigraphy at DNM from existing mining (disturbance) areas) and the Pandora Pit associated with spoil (and potential waste coal) expected to report to the proposed OOPD.

Geochemical data with detail to enable a geochemical classification to be made is available for 711 drill-hole samples collected from 31 drill-holes. Geochemical samples collected and tested were sourced from the key mineral waste domains listed below. Carbonaceous samples typically include carbonaceous siltstone, carbonaceous sandstone, carbonaceous mudstone, weathered coal and coaly shale.

- Weathered, non-carbonaceous spoil: Pandora – 59 samples; Other – 80 samples.
- Weathered, carbonaceous spoil: Pandora – 9 samples; Other – 2 samples.
- Fresh, non-carbonaceous spoil: Pandora – 114 samples; Other – 276 samples.
- Fresh, carbonaceous spoil: Pandora – 16 samples; Other – 77 samples.
- Fresh, coal: Pandora – 30 samples; Other – 48 samples.

Approximately 88 per cent of the samples were collected from drill-core, with the remainder collected from drill-chips. Drill-chip samples were typically collected at set intervals (e.g. every 1 or 2 m) or within targeted sampling zones. Drill-core samples were collected as discrete samples – typically a 15-25 cm interval of core within targeted sampling zones. Most drill-core samples were collected semi-continuously across the entire stratigraphic sequence, with greater emphasis placed on those stratigraphy's posing a greater AMD hazard, such as carbonaceous spoil plus material located within and very close to coal seams, which includes roof/parting/floor (carbonaceous and non-carbonaceous), and coal.

A significant proportion of the spoil samples were sampled close to seams – typically interburden or parting between plys of the same seam group. As such, seam and near-seam zones were proportionally oversampled (relative to sampling of thick overburden/interburden areas well away from seams) to target seam zones that were interpreted as posing a higher AMD hazard compared to general spoil well away from seams. Therefore, this sampling technique is potentially biased towards higher AMD hazard materials.

Most fresh coal will report to ROM coal and be processed. A small fraction of coal will be mined as spoil (waste) due to coal quality and mining considerations. The coal samples discussed herein represent 'pure' coal and do not include associated roof, parting and floor samples that would ordinarily be mined with the seam as ROM coal.

The geochemical sampling (drillhole) locations are shown on **Figure 1-1** (site layout). Drill-hole information is provided in **Appendix A**.

3.3 Sample Characterisation

The aim of the environmental geochemical test-work is to understand the geochemical characteristics of the mineral waste materials with respect to AMD, geogenic salinity, erosion and dispersion potential; and to inform management and closure options for these materials.

A phased approach was implemented to define the geochemical behaviour of the key material types generated at DNM (and expected to be disposed at the OOPD), as discussed below. All geochemical data available as relevant to the Project (i.e. potential spoil and coal) was obtained from static geochemical test methods.

Test-work was generally undertaken in stages, with most samples being subjected to 'screening' tests followed by more detailed test-work undertaken on selected samples. Almost all samples have undergone 'screening' tests (stage 1 tests) for:

- pH and electrical conductivity (EC) on either a 1:5 w:v water extract, which is an end-over-end bottle leach at 1:5 weight:volume [w:v] solid:water ratio using deionised water; or a saturated paste extract, which is approximately equivalent to a 1:2 w:v water extract. The procedures were undertaken on pulped samples.

- Net acid producing potential (NAPP) test, which comprises total sulfur (total S) and acid neutralising capacity (ANC) determination. The NAPP test provides the fundamental information about the theoretical maximum amount of acid-producing and acid-neutralising material that a sample could produce.

Based on the results of the screening tests, selected samples were subjected to some or all of the following tests:

- Total sulfate (SO_4);
- Sulfide (chromium reducible sulfur – Scr) – a test to determine the proportion of total S present as sulfide;
- Acid buffering characterisation curve (ABCC) – a test to determine the proportion of ANC that's in a readily-available form, and to provide an indication of the carbonate mineralogy of the neutralising material;
- Net acid generation (NAG) [single addition] – a test that encourages the oxidation of a sample to determine if acid can be produced, and how much acid could be produced.
- Sequential net acid generation test (S-NAG) – a refinement of the single addition NAG test to resolve potential issues associated with incomplete oxidation of samples with high sulfide concentrations;
- Extended boil net acid generation test (NAG extended) – a refinement of the NAG test to resolve uncertainty due to potential organic acid interference (where non-acid generating organic acids can provide false positive results in the NAG test);
- Total metals and metalloids by 4-acid (mixed) or 2-acid (aqua regia) digest with analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS) and/or Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES) and Flow Injection Mercury System (FIMS);
- Quantitative x-ray diffraction (QXRD) – to determine the mineralogical composition;
- Short-term leaching tests under a deionised water extract leach procedure – a one hour end-over-end bottle leach at 1:5 w:v (solid:water) ratio using de-ionised water, with filtered leachate analysed for:
    - major and minor ions [calcium (Ca), magnesium (Mg), sodium (Na), potassium (K), SO_4, chloride (Cl) and fluoride (F)];
    - alkalinity [total alkalinity, bicarbonate (HCO_3) and carbonate (CO_3)] and acidity (pH dependent);
    - soluble metals and metalloids [approximately 28 elements by ICP-MS, ICP-AES and FIMS.
- Exchangeable cations (Ca, Mg, Na, K) with pre-treatment for salinity, if required. Results were used to calculate the cation exchange capacity (CEC);
- Emerson Aggregate Class testing.

For most samples, laboratory test work was undertaken by ALS Environmental (ALS) Brisbane, using National Association of Testing Authorities (NATA) accredited methods (where such accreditation exists). Mineralogical analysis (QXRD) was undertaken by a university (research) mineralogical laboratory in Melbourne (via Earth Systems Consulting).

3.4 Geochemical Source Hazard Assessment

Geochemical data was assessed with regard to the samples potential to generate AMD. Only after making such an assessment to understand the potential AMD hazard can appropriate AMD specific management measures be formulated to adequately mitigate the risks, as required.

AMD Classification

The Acid-Base Account (ABA) method was used to assess the acid-neutralising and acid-generating characteristics of the samples in order to determine an acid (AD) classification for the mineral waste materials.

The maximum potential acidity (MPA) and acid neutralising capacity (ANC) represent each side of the acid-base account. MPA is calculated from total S and is the theoretical maximum potential acidity that can be generated if all of the S, assumed to be associated entirely with pyritic sulfide, is able to oxidise and generate acid (H_2SO_4). ANC represents the theoretical maximum amount of acid-neutralising capacity of a sample assuming all neutralising material is in a readily available form. The net acid producing potential (NAPP) is the difference between the MPA and the ANC. In simple terms, a negative NAPP indicates an excess of ANC and the sample is likely to be non-acid forming (NAF) and a positive NAPP indicates an excess of MPA and the sample is likely to be potentially acid forming (PAF) – though there can be exceptions to this simplified interpretation. Note that NAF samples have potential to generate NMD and SD, depending on the sulfur concentration.

Sample classification of mineral waste material follows some general rules. Samples were initially classified using NAPP and ANC/MPA ratio (and NAG data, where available) into three broad categories:

- NAF Non-acid Forming;
- PAF Potentially Acid Forming.
- Uncertain Those samples with inconclusive results, leading to a degree of uncertainty about their ability to generate acid.

Where available, additional geochemical information such as pH, Scr, ABCC, NAG extended and NAG sequential results were used to resolve acid classification uncertainties. The general approach was to build in a level of conservatism in the preliminary classification, as shown in **Table 3-1**.

Samples with an uncertain NAF or PAF classification are given a tentative sub-classification of UC(NAF) or UC(PAF), where preliminary data suggests the sample is expected to be NAF or PAF, respectively.

Table 3-1. Preliminary AMD classification criteria

Preliminary Classification	Sulfur %	NAPP kg H_2SO_4/t	ANC/MPA ratio	NAG pH (if data available)
NAF	≤ 0.01	-	-	-
	≤ 1	< 0	≥ 2	-
	≤ 1	< 0	-	≥ 4.5
NAF-Sulfur (NAF-S)	> 1	< 0	≥ 2	-
	> 1	< 0	-	≥ 4.5
PAF – Low Capacity (PAF-LC)	≤ 1	≥ 0 and < 10	< 2	-
	-	≥ 0 and < 10	-	< 4.5
PAF	-	≥ 10	< 2	-
	-	≥ 10	-	< 4.5
Uncertain	Any result outside of the above criteria, or results that appear to significantly conflict with the expected result based on lithology or mineralogy			

Sulfur Category

To ensure a consistent approach to describe the samples geochemical characteristics, specific total S cut-off values were used to discuss sulfur data, as shown in Table 3-2.

Table 3-2. Sulfur category

Sulfur category	Total S wt. %	Sulfur category	Total S wt. %
Very low	< 0.1	Moderate	1.0 – 1.5
Low	0.1 – 0.5	High	> 1.5
Low-moderate	0.5 – 1.0		

ANC Category

To ensure a consistent approach to describe the samples geochemical characteristics, specific ANC cut-off values were used to discuss ANC data as shown in Table 3-3.

Table 3-3. ANC category

ANC category	ANC kg H2SO4/t	ANC category	ANC kg H2SO4/t
Very low	< 5	High	30 - 50
Low	5 - 15	Very high	> 50
Moderate	15 - 30		

Soil Salinity

The term 'soil' salinity (and 'soil' pH – refer below) is an industry-adopted term to refer to the salinity and pH measured on any solid geologic matrix, such as soil, spoil, rock, sediment, tailings, reject, *etc*. That is, in this context, the term 'soil' applies to all solid samples, not just shallow surface (root zone) material.

Classifying whether a sample/material is non-saline, highly saline, or somewhere in between will depend upon the methods used to measure soil salinity. Soil salinity data is available from a 1:5 (w:v) water extract procedure ($EC_{1:5}$) on pulp samples (pulping the sample minimises the potential to underestimate salinity on sandy samples/materials) and also from a saturated extract procedure (ECse). The soil salinity classes shown in **Table 3-4** are expressed in units of microSiemens per centimetre (μS/cm). These soil salinity classes are used as an indicative guide. The classes are broadly based on soil salinity classes reported by DME (1995a).

Table 3-4. Soil salinity classification

Soil salinity classification	EC1:5 µS/cm	ECse µS/cm
Non-saline	< 450	< 2000
Slightly saline	450 - 900	2000 - 4000
Moderately saline	900 - 2000	4000 - 6000
Saline	2000 - 4000	6000 - 8000
Strongly saline	> 4000	> 8000

Soil pH Type

Classifying whether a sample/material is acid, pH-neutral or alkaline or somewhere in between will depend upon the methods used to measure soil pH. Soil pH data is available from a 1:5 (w:v) water extract procedure ($pH_{1:5}$) on pulp samples and also from a saturated extract procedure (pHse). The soil pH types shown in **Table 3-5** are based on the 1:5 water extract procedure and used as an indicative guide. The classes are broadly based on soil pH classes reported by DME (1995b).

Table 3-5. Soil pH type

Soil pH type	pH1:5	Soil pH type	pH1:5
Highly acid	< 3.0	Near neutral	6.0 – 7.5
Moderately acid	3.0 – 4.5	Alkaline	7.5 – 9.0
Weakly acid	4.5 – 6.0	Highly alkaline	> 9.0

There is no standard procedure for adjusting or comparing the results from $pH_{1:5}$ to pHse, and the interpretation of laboratory test results and their application to the field situation needs to take account of both the physical and chemical characteristics of a material. For pH, it is reasonably assumed that a water extract solution from these unmineralised samples is in equilibrium (or close to it) and, as such, any differences in pH between $pH_{1:5}$ and pHse methods would be minimal. Therefore, the above soil pH types applied to $pH_{1:5}$ data are broadly applicable to pHse data.

Mineralogy

Mineralogical data (QXRD) provides supporting information for the geochemical data, particularly with regard to sulfide and carbonate mineralogy of a sample, showing results for mineralogical forms (e.g. what sulfide or carbonate minerals are present) and their concentrations (reported in weight per cent). These data are also used to validate the results from ABCC test-work and assist with interpretation of the ABA data.

Element Enrichment

The total concentration result for each element were compared to average element abundance in soil in the earth's crust (AusIMM 2011; Bowen 1979) to measure how the total elemental concentrations in the samples compare against average elemental concentrations in unmineralised soil (worldwide). Such a comparison is undertaken to identify samples that contain what may be regarded as 'elevated' concentrations of metals and metalloids to identify potential elements of concern. However, enrichment in any metals/metalloids in the solids does not translate to enhanced leachability or mobilisation and/or bioavailability of that specific element.

From the comparison with average crustal abundance in rocks a geochemical abundance index (GAI) was calculated. The GAI quantifies an assay result for a particular element in terms of the average abundance for that element (in sedimentary rocks). The index, based on a log two scale, is expressed in seven integer increments (0 to 6), which correspond to enrichment factors from zero to over 96 times average crustal abundance, as shown in **Table 3-6**.

Table 3-6. Geochemical Abundance Index (GAI)

GAI	Enrichment factor	GAI	Enrichment factor
0	Less than 3-fold enrichment	4	24 to 48-fold enrichment
1	3 to 6-fold enrichment	5	48 to 96-fold enrichment
2	6 to 12-fold enrichment	6	Greater than 96-fold enrichment
3	12 to 24-fold enrichment		

As a general rule, a GAI greater than or equal to three indicates enrichment compared to unmineralised soil that may warrant further investigation to assess the mobility of the element under laboratory conditions.

Elements identified as enriched may not necessarily be a concern for revegetation and rehabilitation, human and animal health or drainage water quality. Similarly, if an element is not enriched it does not mean it would not be mobilised, because under some conditions (e.g. low pH, reducing conditions) the geochemical behaviour of metals/metalloids such as Al, As, Cu, Cd and Zn can change (i.e. become less or more mobile).

Solubility

Metal/metalloid mobility from samples has been assessed using a deionised water bottle leaching method. The deionised water leach assesses the initial solubility under fresh water conditions. The solubility data from bottle leaching provides an indication of likely solubility/release of salt and metals/metalloids under field pH and redox (oxidation) conditions (and/or saline or low-pH conditions, where applicable).

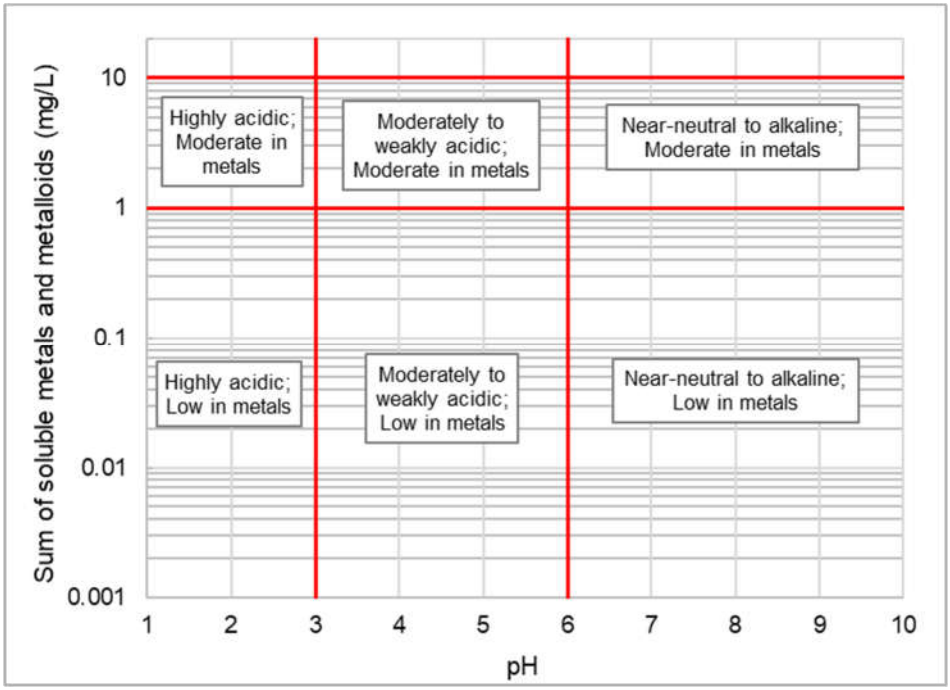
To ensure a consistent approach to describe the samples geochemical characteristics, specific concentration cut-off values were used to discuss leachate composition as shown in **Table 3-7**.

Table 3-7. Soluble trace element concentration category and associated cut-off values

Classification	Trace element soluble concentration mg/L	Classification	Trace element soluble concentration mg/L
Close to detection	≤ 0.001	Moderate	>0.1 – 1.0
Very low	>0.001 – 0.05	High	> 1.0 - 10
Low	>0.05 – 0.1	Very high	> 10

A classification scheme initially developed by Ficklin *et al*. (1992) has been adapted to summarise major attributes of the solubility data by plotting pH against soluble metal and metalloid concentrations for groups of elements, with the classification scheme shown in Figure 3-1. The soluble metal and metalloid concentrations are shown as the sum of soluble (dissolved) metal and metalloid concentrations for aluminium (Al), antimony (Sb), arsenic (As), cadmium (Cd), cobalt (Co), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), manganese (Mn), molybdenum (Mo), nickel (Ni), selenium (Se), tin (Sn), uranium (U) vanadium (V) and zinc (Zn). These elements are chosen because they're potentially environmentally important elements (as relevant to Permian coal deposits) and/or many of the elements remain in solution across a wide range of pH and are not only potentially associated with AD conditions, but also with NMD/SD conditions.

Figure 3-1. Classification of soluble metals and metalloids as a function of pH



No comparison is made between leachate results and water quality guideline values, such as ANZG (2018) (or the draft ANZG 2023 guidelines), as such a comparison is inappropriate. The guideline values provided in ANZG (2018/2023) are for receiving water environments (e.g. creeks), whereas the soluble element data in this assessment is 'point source' obtained from a finely pulped sample subjected to rigorous and artificial extraction to obtain a concentration approaching 'near maximum'. Furthermore, contact water will undergo a number of geochemical reactions along a pathway from source to receptor, including retardation, adsorption and precipitation – and also likely dilution, which will attenuate the concentration as seepage/contact water migrates from the source. These processes are not accounted for in a laboratory setting.

Sodicity and Dispersion

Potential spoil samples are broadly classified with respect to sodicity on the basis of the exchangeable sodium percentage (ESP) value, as shown in Table 3-8 (after Northcote and Skene, 1972; and Isbell, 2002).

The sodicity will depend upon a range of factors, such as clay mineralogy, soil sodium concentration, soil salinity and irrigation water (rainwater) chemistry, which may enhance or limit that potential for soil to be sodic or become sodic over time. Therefore, values of six per cent ESP and 14 per cent ESP to represent soils as being sodic or strongly sodic are used as a general guide only and should not be taken as definitive.

Table 3-8. Sodicity classification

Sodicity classification	ESP %
Non-sodic	≤ 6
Sodic	6 - 14
Strongly sodic	> 14

Sodicity information is broadly used to understand potential revegetation and dispersion aspects, and is supported by Emerson aggregate test information, which provides a direct measure of soil slaking and dispersion based on the Standards Australia (2017) classification. Soils are divided into classes on the basis of their coherence in water and presence (or absence) of calcium-rich minerals (Table 3-9). Slaking occurs when dry soil crumbs, after being immersed in deionised water, break up and run along the bottom of the beaker into a flat pile. Most dry soil crumbs slake when immersed in deionised water. Dispersion describes the tendency for the clay fraction of a soil to go into colloidal suspension in deionised water. Materials are generally regarded as being dispersive (or prone to dispersion) if they have an Emerson aggregate class number of three or less.

Table 3-9. Emerson aggregate classification

Class	Description	Class	Description
1	Slaking and complete dispersion	5	No calcite or gypsum present; dispersion
2	Slaking and some dispersion	6	No calcite or gypsum present; flocculation
3	Dispersion [remoulded]	7	Non-slaking and swelling
4	Calcite or gypsum present; no dispersion	8	Non-slaking and non-swelling

3.5 AMD Hazard Scoring and Assessment of the Proposed Out-of-Pit Dump

Estimating the AMD hazard is the first step in estimating the geochemical risk associated with potential sulfide oxidation of mineral wastes. A procedure has been developed[3] to standardise the AMD hazard assessment across material domains, with the process described below.

[3] The AMD hazard scoring matrix was developed by the author in conjunction with Dr. Marilena Stimpfl (BHP Closure Planning) for use in coal mining assessments.

AMD hazard scoring and the AMD geochemical likelihood describe the Geochemical Hazard. The former describes the hazard for AMD generation and the latter describes the likelihood of an AMD event to occur.

A source material is a distinct material type (e.g. non-carbonaceous spoil or rejects), whereas a landform is a domain comprising one or more source material types (e.g. rejects disposed within non-carbonaceous spoil). AMD hazard scorings are assigned for individual source materials reporting to a landform as well as to landforms as a whole (i.e. landform AMD hazard score).

The likelihood of a landform developing AMD was determined based on the landform AMD hazard score. AMD hazard scores (Table 3-10) are estimated by analysing three key components, which are used to describe the geochemical hazard of a source material/landform:

- Geochemical propensity to generate AMD;
- AMD capacity; and
- AMD quantity.

The scoring assumes the various mineral waste types are broadly distributed (mixed) throughout the landform. However, if specific mineral wastes (e.g. rejects) were concentrated within a zone of a landform, then the hazard scoring is applied separately to the zone where the 'higher risk' materials are located. This process removes the dilution effect potentially related to having the AMD hazard associated with a moderate or higher AMD source material being potentially misrepresented by assuming it's widely distributed throughout the landform. An example is where a rejects dump may be located in a corner of a large waste rock dump, and the rejects dump will be buried by waste rock during rehabilitation and become part of the overall landform. In this example, the AMD hazard scoring would be undertaken for part of the landform where the rejects are located as well as the remainder of the landform containing no rejects.

In undertaking the AMD hazard assessment, the assumption is that the source materials (within the landforms) will predominantly be dry or moist, but not wet or saturated. That is, the landforms will be unsaturated. This assumption is realistic for out-of-pit landforms, since most waste rock landforms, rejects landforms and aged/inactive TSF landforms are generally unsaturated. This assumption is also conservative, since the potential for oxidation (to some degree) is assumed.

Table 3-10. AMD hazard scoring matrix for landforms

Component	Rating		Definition
Propensity for AMD generation Per material type: - non-carb. - carb. - rejects - tailings - coal	1	Implausible	Geochemical properties suggest that the vast majority of the source material has a negligible potential for AMD generation (less than 5 % of the samples classified as 'PAF' or NAF-S)
	5	Plausible	Geochemical properties suggest that a significant proportion of the source material may have potential for AMD generation (5-40 % of the samples classified as 'PAF' or NAF-S)
	7	Expected	Geochemical properties suggest that the source material has a high potential for AMD generation, but AMD has not yet been observed in the field (due to lag time) - (greater than 40 % of the samples classified as 'PAF' or NAF-S)
	15	Certain	Evidence of AMD processes have been observed in the field from the source material
AMD **Capacity** Per material type: - non-carb. - carb - rejects - tailings - coal	1	Low	Source material has a negligible potential for AMD generation. 'PAF' and NAF-S samples have 75th percentile total S less than 0.1 %
	3	Low-Moderate	Assumed to be bulk NAF but sulfide bearing, with NAF samples having 75th percentile total S greater than 1 % (i.e. the material is predominantly NAF-S but has high readily available neutralising capacity). AMD generated will be NMD and/or SD (related to sulfide oxidation), not AD.
	5	Moderate	'PAF' and NAF-S samples have 75th percentile total S ranging from 0.1 % to 1.0 % and with potential to generate AD.
	7	Moderate-High	'PAF' and NAF-S samples have 75th percentile total S ranging from 1.0 % to 1.5 % and with potential to generate AD.
	10	High	'PAF' and NAF-S samples have 75th percentile total S greater than 1.5 % and with potential to generate AD.
AMD **Quantity** Per material type: - non-carb. - carb - rejects - tailings - coal	1	Low	Source material rated Low for AMD capacity; or less than 5 % of source material reporting to a landform is rated Low-Moderate for AMD Capacity.
	3	Low-Moderate	Less than 5 % of source material (in the landform) rated as Moderate for AMD capacity
	5	Moderate	Greater than 5 % of source material (in the landform) rated as Low-Moderate or Moderate for AMD capacity
	7	Moderate-High	Less than 5 % of source material (in the landform) rated as Moderate-High or High for AMD capacity
	10	High	Greater than 5 % of source material (in the landform) rated as Moderate-High or High for AMD capacity

AMD Propensity is the geochemical propensity of a given material type to generate AMD. The propensity to generate AMD is determined based on the proportion of samples that have potential for AMD as determined from laboratory test-work and the subsequent assessment – the higher the percentage of materials that can generate AMD within a sample set, the greater the AMD propensity. This approach is conservative, since sampling is slightly skewed towards material types considered to pose a potentially higher AMD hazard, such as carbonaceous materials.

AMD Capacity represents the 'severity' of AMD generation, with total S concentrations used as a proxy for scoring this component, which represents a conservative approach as some sulfur is associated with non-acid generating minerals. For example, the higher the total S concentration in materials with potential for AMD, the higher the hazard, the higher the score. Furthermore, the AMD capacity also takes

into account the type of drainage a source material can produce, i.e. AD, NMD and/or SD, where discrimination or prediction is possible. The various drainage types should be differentiated (where the data allows) to reflect the difference in impact severity and difficulty to manage or treat. For example, on an equal quantity basis, AD is likely going to cause more severe impacts than NMD or SD and therefore is assigned a higher score.

As a first approximation the AMD Capacity of each material type is estimated based on 75th percentile value of the total S concentration for the samples classified as PAF and NAF-S. This is a conservative assumption, as not all total S is associated with reactive minerals and choosing the 75th percentile total S value of PAF and NAF-S samples to assess the AMD capacity will attract a higher AMD Capacity scoring. For example, if two material types had the same proportion of samples with the same propensity for AMD, but one has a higher total S concentration associated with PAF and NAF-S materials, then this sample would receive a higher AMD Capacity score.

Generally, amongst Bowen Basin Permian- and Tertiary-age materials, a very small number of samples are classified as NAF-S – almost all samples with high total S (greater than one per cent) are typically classified as 'PAF' of some type. Therefore, AMD Capacity does take into consideration potential NMD/SD by including NAF-S samples with PAF samples, however the very few NAF-S samples (compared to PAF samples) means that NAF-S samples typically have a negligent bearing on the AMD Capacity of a material. For example, of the 711 samples at DNM of relevance to the Project where geochemical data is available, none were classified as NAF-S.

AMD Quantity is the amount of material that has the potential to generate AMD. The greater the volume of AMD generating material the greater the hazard scoring. The AMD Quantity scores are assigned to material types for each landform.

Landform AMD likelihood scoring

The likelihood of a landform generating AMD is estimated by analysing two key components:

- Source material AMD hazard score; and
- Landform AMD hazard score.

Source material AMD hazard score: Describes the potential for AMD generation by the respective material types within each landform. It is estimated from the weighted combined scores of each component used to describe the AMD source hazard:

  - Propensity to generate AMD. Assigned a 50 per cent weighting (weighting = 1);
  - AMD capacity. Assigned a 25 per cent weighting (weighting = 0.5); and
  - AMD quantity. Assigned a 25 per cent weighting (weighting = 0.5).

Landform AMD hazard score: Describes the likelihood for AMD generation by each final landform. It is estimated from the weighted average source material AMD hazard and the proportion of PAF and NAF-S waste expected to report to the landform from each material type.

To support the assessment of the AMD closure risks, the landform AMD hazard score is assigned a likelihood score (**Table 3-11**), which is broadly aligned with ISO 31000. ISO 31000 is a family of standards relating to risk management codified by the International Organization for Standardization. For landforms and residual voids with AMD hazard scores between greater than 10 and 20 (i.e. a 'Moderate' or greater AMD hazard rating) a preliminary likelihood of 'Probable / Likely' is assigned

unless/until kinetic data are available to provide a time frame for AMD generation. This likelihood can be revised as more data, such as kinetic or field data, becomes available.

Table 3-11. AMD hazard ranking and landform AMD likelihood ranking

Landform AMD hazard scores	Landform AMD likelihood
0 - 5	Highly Unlikely: Highly unusual; may occur in extreme circumstances
>5 - 10	Unlikely: Known to occur, but only rarely
>10 - 15	Probable: May reasonably occur
>15 - 20	Likely: Could easily occur
>20	Highly Likely: Expected to occur

The AMD hazard scoring matrix can also be applied to residual voids (i.e. not just spoil dumps), however void assessments are not relevant to the Project. Void assessments have been undertaken for the PRCP (BHP, 2023).

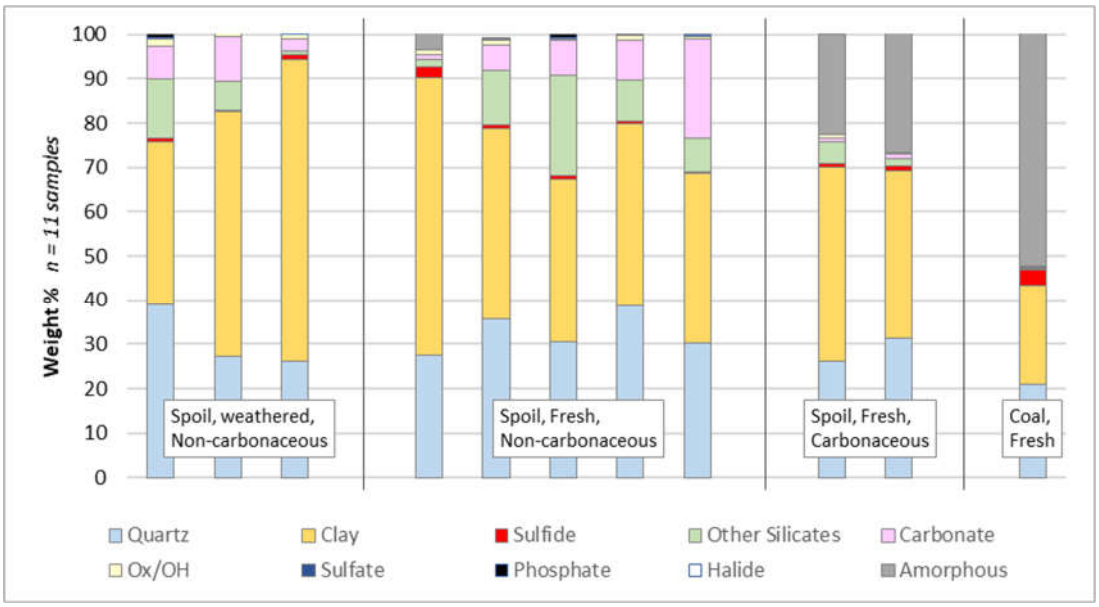
4 Results

The geochemical results are graphically presented by way of comparison between data collected from drill-holes within the Pandora Pit shell – representing the likely source of mineral wastes to be disposed into the OOPD – versus data collected from drill-holes outside Pandora Pit representing mineral wastes that will not report to the OOPD (Other). The results are tabulated in **Appendix B** and discussed below.

4.1 Mineralogy

Data is available for 11 Pandora samples that underwent mineralogical analysis by Quantitative X-Ray Diffraction (QXRD), with the results summarised in **Figure 4-1**. The samples comprised 10 spoil samples and one fresh coal sample.

Figure 4-1. Mineral distribution within Pandora spoil and coal samples



Across all material types, the key acid generating minerals present are pyrite and marcasite (marcasite is a form of FeS_2, similar to pyrite), and the key acid neutralising minerals present are calcite and ankerite (iron dolomite). Siderite (an iron carbonate mineral) is present, however it provides no net acid neutralising capacity. In particular:

- Spoil samples, particularly the non-carbonaceous spoil materials, are dominated by clay and quartz minerals (silicate group minerals) with very little non-crystalline (amorphous) material. Comparatively, carbonaceous spoil and coal samples have a significant proportion of amorphous material, as expected. The nature of the non-crystalline material is largely unknown, although given it's almost only present in coal and highly carbonaceous samples, it's likely associated with organic carbon.
- There is little difference between the weathered versus the fresh non-carbonaceous spoil material.
- All samples have low sulfide mineral proportions. Sulfide is present almost equally as pyrite and marcasite. All samples have low/negligible sulfate concentrations.
- Carbonate group minerals comprise calcite, ankerite and siderite in variable proportions. ABCC data suggested that iron-dolomite (i.e. ankerite), dolomite and siderite were the likely dominant carbonate minerals, which is broadly consistent with the mineralogy data.

4.2 Acid-Base Accounting (Potential for Acid Generation)

The ABA is the theoretical balance between the potential for a sample to generate acid and neutralise acid and is expressed in units of kilograms of sulfuric acid per tonne of sample (kg H_2SO_4/t). The ABA results for the samples that underwent geochemical characterisation are statistically summarised in Table 4-1 and discussed in the following sections.

Table 4-1. ABA results statistics for all samples

		Total S[1]	Scr[2]	ANC	MPA	NAPP	ANC/MPA	NAGpH[3]
		%	%	kg H_2SO_4/t			ratio	pH units
Spoil Pandora	Count (n)	*198*	*35 (35)*	*197*	*198*	*197*	*197*	*20*
	Maximum	0.76	0.73 (0.76)	490	23	19	3200	9.7
	95th percentile	0.19	0.37 (0.52)	108	5.9	-2.7	433	9.3
	75th percentile	0.04	0.10 (0.22)	54	1.2	-8.9	121	8.3
	Median	**0.02**	**0.06 (0.14)**	**21**	**0.6**	**-19**	**41**	**6.8**
	25th percentile	0.01	0.04 (0.11)	11	0.3	-53	12	4.8
	5th percentile	<0.01	0.02 (0.05)	5.2	<0.3	-108	1.6	2.5
	Minimum	<0.01	0.01 (0.04)	<0.5	<0.3	-490	<0.1	2.2
Spoil Other	Count (n)	*435*	*61 (61)*	*412*	*435*	*411*	*411*	*11*
	Maximum	0.91	0.87 (0.91)	259	28	15	1469	8.0
	95th percentile	0.11	0.16 (0.23)	129	3.5	-4.6	486	7.9
	75th percentile	0.03	0.07 (0.13)	56	0.9	-13	127	6.9
	Median	**0.02**	**0.03 (0.07)**	**27**	**0.6**	**-26**	**49**	**6.0**
	25th percentile	0.01	0.01 (0.05)	15	0.3	-55	18	4.4
	5th percentile	<0.01	0.01 (0.05)	5.8	<0.3	-129	4.2	2.9
	Minimum	<0.01	0.01 (0.04)	<0.5	<0.3	-259	0.1	2.3
Coal Pandora	Count (n)	*30*	*30 (30)*	*30*	*30*	*30*	*30*	*27*
	Maximum	2.21	1.80 (2.21)	36	68	66	7.4	9.1
	95th percentile	0.69	0.56 (0.69)	13	21	17	2.2	7.8
	75th percentile	0.46	0.22 (0.46)	9.4	14	12	1.3	5.4
	Median	**0.29**	**0.08 (0.29)**	**4.3**	**8.9**	**5.3**	**0.4**	**2.7**
	25th percentile	0.23	0.04 (0.23)	1.3	6.9	-2	0.1	2.4
	5th percentile	0.15	0.03 (0.15)	0.4	4.7	-6.8	<0.1	2.1
	Minimum	0.15	0.02 (0.15)	<0.5	4.6	-31	<0.1	1.8
Coal Other	Count (n)	*47*	*46 (46)*	*48*	*47*	*47*	*47*	*27*
	Maximum	0.47	0.23 (0.47)	114	14	7.4	27	8.4
	95th percentile	0.33	0.19 (0.33)	61	10	5.5	13	7.5
	75th percentile	0.26	0.10 (0.26)	26	7.8	0.2	3.5	6.4
	Median	**0.21**	**0.04 (0.22)**	**10**	**6.4**	**-4.9**	**1.8**	**5.2**
	25th percentile	0.16	0.02 (0.16)	7.3	4.9	-19	1.0	3.6
	5th percentile	0.11	0.02 (0.11)	<0.5	3.4	-54	<0.1	2.5
	Minimum	0.04	0.01 (0.07)	<0.5	1.2	-110	<0.1	2.4

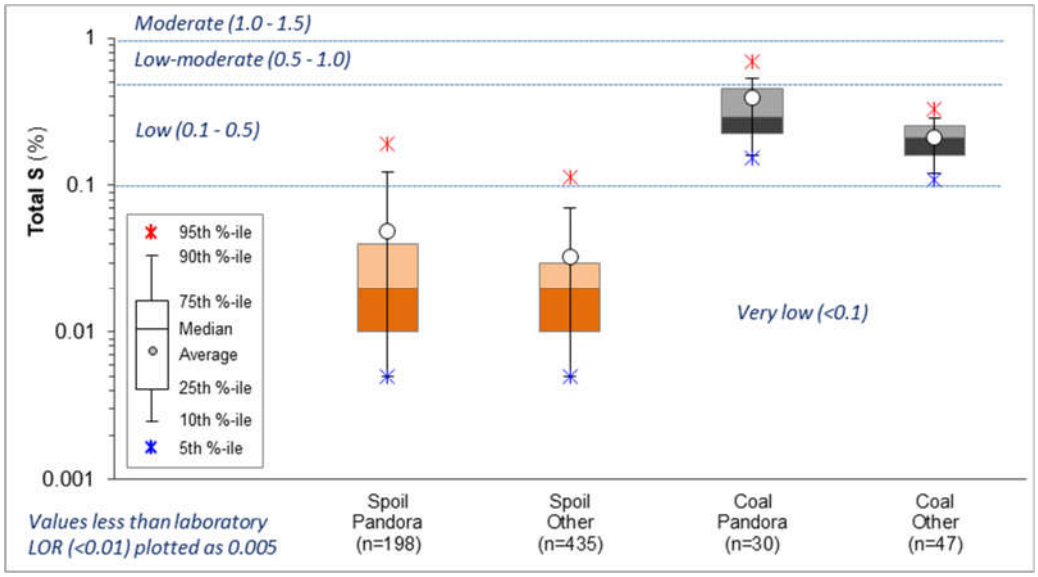
1. Total S values less than laboratory limit of reporting (LOR) were assigned a value of 0.5xLOR for statistical calculations.
2. In spoil samples, Scr was generally measured on samples with total S greater than 0.1 per cent. In coal samples, Scr was generally measured on most samples. Values in parentheses are the total S statistics for samples with Scr results.
3. NAGpH is final pH as NAG single addition and/or NAG extended and/or Stage 1 Seq. NAG.

Sulfur and Sulfide

The total sulfur (total S) distribution is presented in **Figure 4-2** for spoil and coal samples (drillhole samples), which shows the total S concentration for spoil samples was generally very low and for coal samples was generally low. The total S distribution for both spoil and coal is comparable between Pandora samples versus Other samples.

The Pandora spoil samples have a very low median total S of 0.02 per cent and a low 95th percentile value of 0.19 per cent. The Pandora coal samples have a low median total S of 0.29 per cent and a low-moderate 95th percentile value of 0.69 per cent.

Figure 4-2. Total sulfur (S) distribution of spoil and coal samples



Chromium reducible sulfur (Scr) data is available for 96 spoil samples and 76 coal samples (**Table 4-1**). Scr was measured on most coal samples; and generally measured on spoil samples with total S values greater than 0.1 per cent. The total S and Scr distribution for spoil and coal samples is shown at Figure 4-4. Total S values are shown only for the same samples that underwent Scr tests.

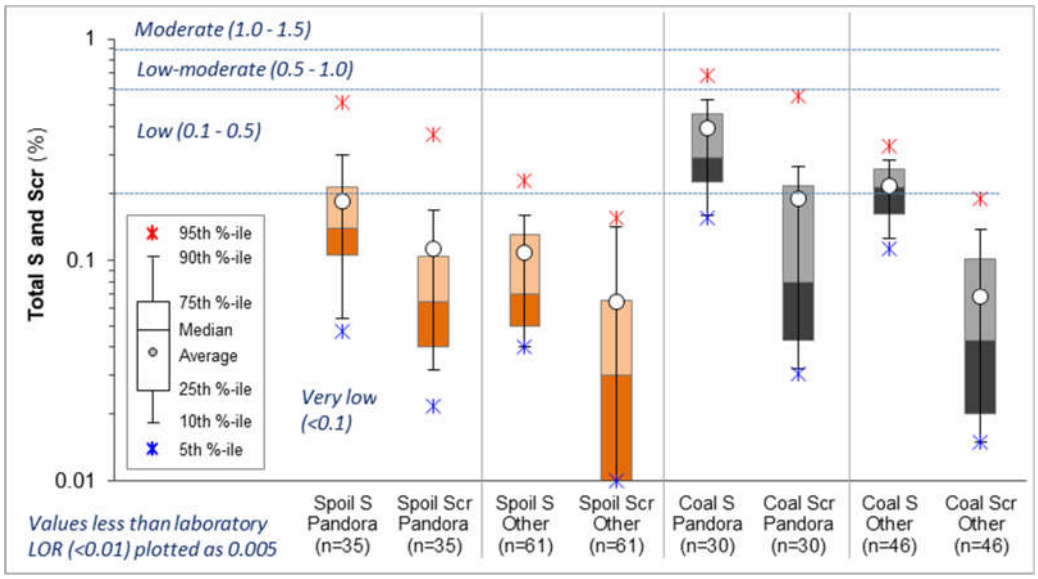
As evident in **Figure 4-3** the spoil and coal samples had Scr distributions that were lower than the total S distributions from the same group of spoil samples. The Scr values for coal samples was much lower compared to the total S values from the same samples, which is expected, as a significant proportion of the total S in coal samples is likely present as organic S.

As a proportion of total S, Scr accounts for:

- Spoil samples: 52 per cent (median value) of total S in spoil (n=96 samples), with 25th and 75th percentile values of 25 and 80 per cent, respectively.
- Coal samples: 29 per cent (median value) of total S in coal (n= 76 samples), with 25th and 75th percentile values of 15 and 48 per cent, respectively. The low proportion of Scr in coal (compared to spoil) is likely due to a significant proportion of total S being present as organic sulfur in the coal samples.

These results indicate that the maximum potential acidity (MPA) that could be generated by most samples from these material domains is generally low and that using total S as an indication of AMD hazard will result in a conservative outcome.

Figure 4-3. Total sulfur (S) and sulfide (Scr) distribution of spoil and coal samples



Maximum Potential Acidity

The MPA is calculated from total S, therefore the MPA distribution for each material type mimics the total S distribution for the same samples (refer to **Figure 4-2**). Due to the very low total S (and Scr) values for spoil samples the MPA was correspondingly very low, with 75th and 95th percentile MPA values for the Pandora samples of 1.2 and 5.9 kg H_2SO_4/t, respectively (n=198 Pandora spoil samples). As such, spoil represented by these samples that will report to the proposed OOPD is expected to have negligible potential to generate acid/acidity and negligible potential to release sulfate-derived salinity from sulfide oxidation.

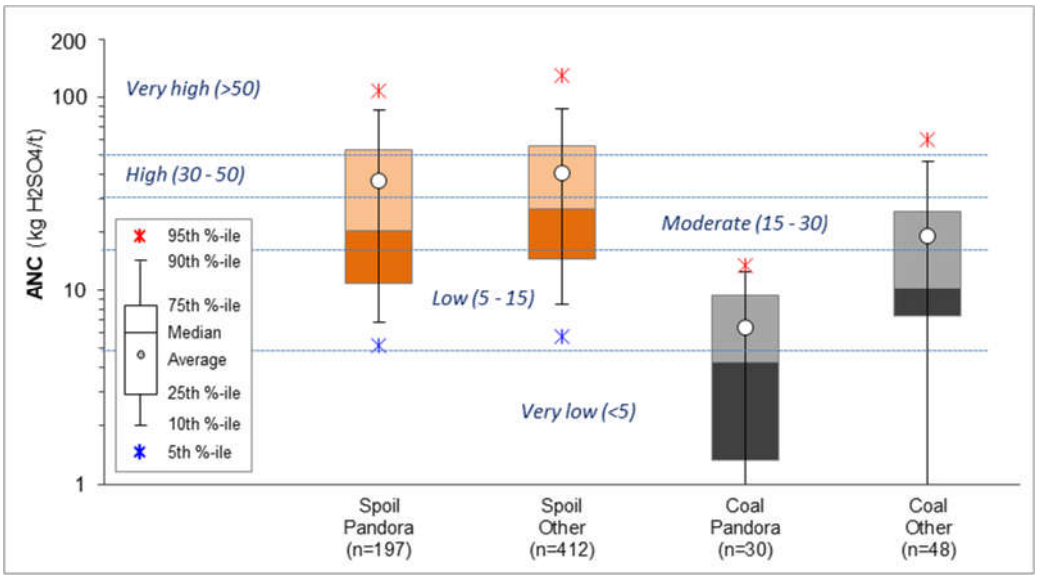
Coal samples from Pandora (n=30) produced MPA values generally higher than spoil – as expected by the higher overall total S values of coal samples – however, the MPA values were still generally low (mimicking the generally low total S values). Pandora coal samples had 75th and 95th percentile MPA values of 14 and 21 kg H_2SO_4/t, respectively. As discussed above, the proportion of total S associated with sulfide minerals in coal samples is low (about 15 to 48 per cent of total S as Scr), with most sulfur likely to be associated with organic sulfur. Therefore, MPA values calculated from total S for coal samples is conservative.

Acid Neutralising Capacity

The ANC distribution is presented in **Figure 4-4**, which shows that ANC values of spoil samples are typically well in excess of the MPA values and span a very large range, from less than 0.5 to 490 kg H_2SO_4/t, with a moderate median ANC value of 24 kg H_2SO_4/t.

Over 90 per cent of spoil samples have an ANC greater than 8.0 kg H_2SO_4/t which, if all ANC was readily available, would neutralise the acidity generated by material containing 0.26 weight per cent S. Less than 1.3 per cent of spoil samples had total S values greater than 0.26 per cent – from approximately equal proportions of carbonaceous and non-carbonaceous spoil samples. Pandora spoil samples had comparable ANC values, overall, compared to Other spoil samples.

Figure 4-4. Distribution of Acid Neutralising Capacity (ANC)

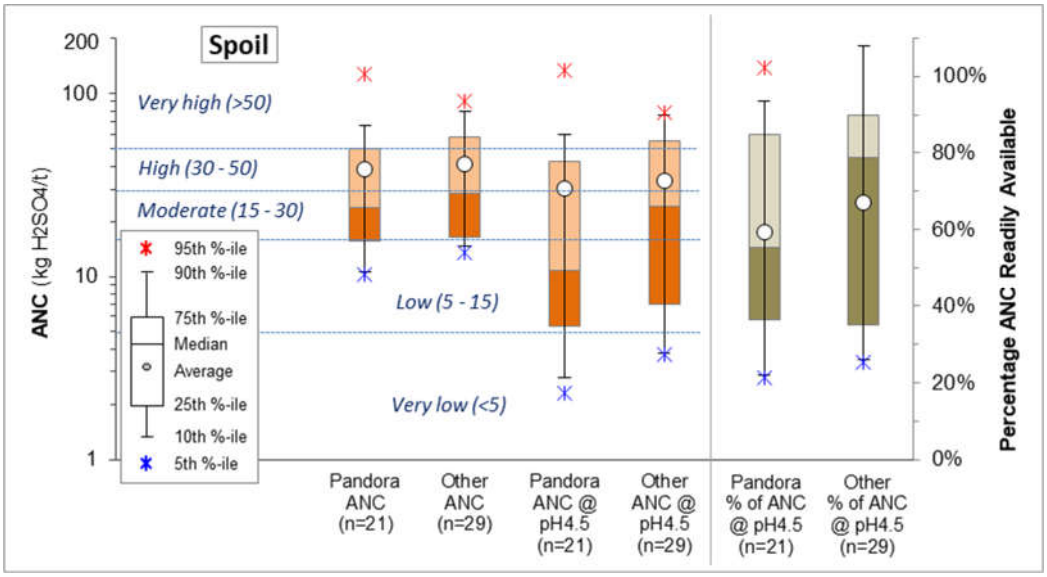


Coal samples had a wide range of ANC values from very low to high, but the overall ANC was lower in the Pandora samples compared to the Other samples, with the Pandora samples having very low 10th percentile and median ANC values of 0.9 and 4.3 kg H_2SO_4/t, respectively.

Available Acid Neutralising Capacity in Spoil

Acid buffering characterisation curve (ABCC) tests were undertaken on spoil samples to assess the proportion of ANC that may be 'readily available' (i.e. short-acting) in these materials under field conditions. 'Ready availability' is regarded as the proportion of ANC that is available for buffering reaction at pH 4.5. The results are summarised in Figure 4-5.

Figure 4-5. Distribution of Acid Neutralising Capacity (ANC) [total], ANC at pH4.5 and proportion (%) of ANC expected to be readily available for spoil.



The proportion of ANC in spoil that is likely available under field conditions ranged from 14 per cent to nominally 100 per cent of the ANC, with a median of approximately 67 per cent[4].

The shape of the ABCC curves (the reaction rate) can also be used to infer potential carbonate mineralogy based on standard curves/data for different carbonate minerals at varying ANC values. For the spoil samples, iron dolomite (Fe-dolomite / ankerite) appears to be the dominant carbonate mineral based on the ABCC curves, with minor siderite. Siderite is fairly common throughout the Permian sediments of the Bowen Basin, albeit in generally relatively small amounts.

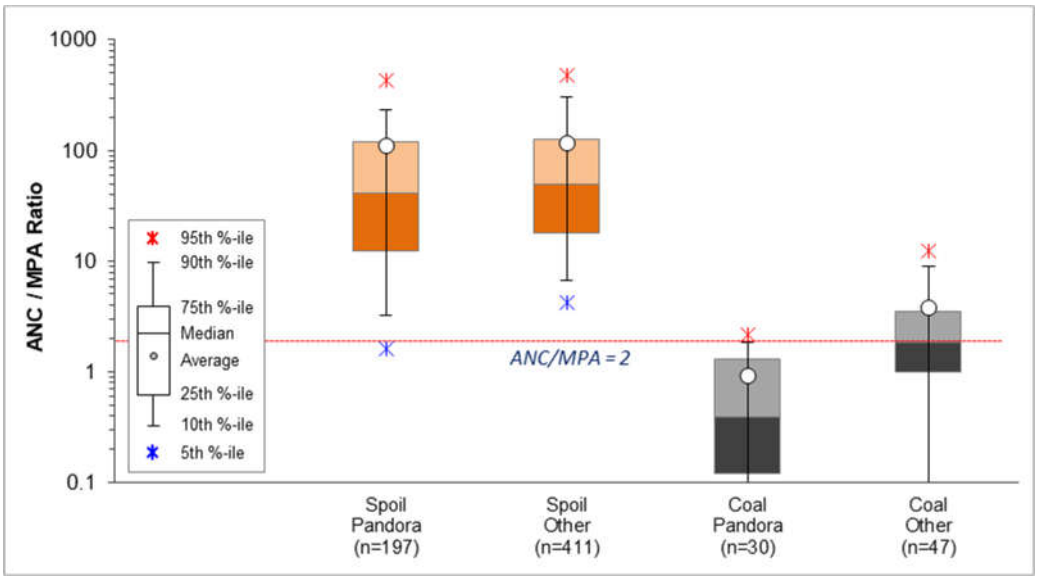
Based on the above, and supported by the mineralogy data (**Section 4.1**), the carbonate mineral in bulk spoil is likely to be Fe-dolomite +/- siderite with varying influence from dolomite and calcite.

ANC/MPA Ratios

Generally, those samples with an ANC/MPA mass ratio greater than two are considered to have a negligible/low risk of acid generation (DIIS, 2016; INAP, 2009[5]), especially where sulfide concentrations are very low and reactive ANC is very high – as is the case with the spoil samples. The results are illustrated in **Figure 4-6**.

Almost all spoil samples (96 percent of 608 samples) have an ANC/MPA ratio greater than two. Of the Pandora spoil samples, 94 per cent have an ANC/MPA ratio greater than two. Less than 30 per cent of coal samples had ANC/MPA ratios greater than two and only three out of 30 Pandora samples had an ANC/MPA ratio greater than two.

Figure 4-6. Distribution of the ratio of Acid Neutralising Capacity (ANC) to Maximum Potential Acidity (MPA) [ANC/MPA ratio]



4 The ABCC test is a separate test to the ANC test – performed on different sample splits. Therefore, it is possible to achieve results with greater than 100 per cent ANC being readily available for the same sample. Such a result effectively means that all of the ANC for that sample is in a readily available form (i.e. a practical maximum of 100 per cent availability). Similarly, at the lower end, the lowest 'readily available' amount may actually be slightly greater.

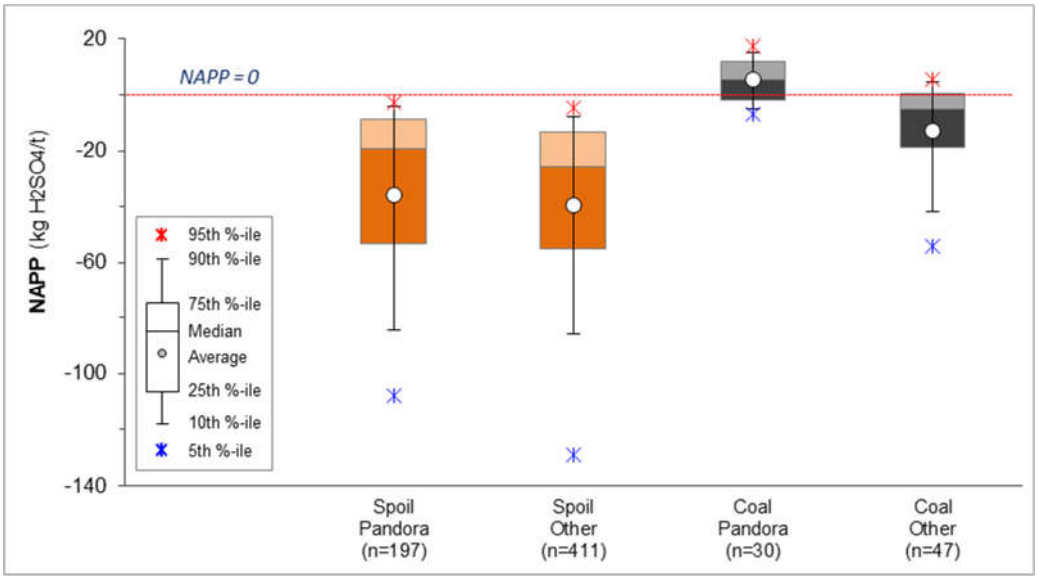
5 INAP (2009) considers that mine materials with an ANC/MPA ratio greater than two are likely to be NAF unless significant preferential exposure of sulfide minerals occurs along fracture planes, in combination with insufficiently reactive ANC.

Net Acid Producing Potential

Based on the generally low MPA and much higher ANC values (relative to the MPA), the calculated NAPP values are negative for essentially all spoil samples. Less than two per cent of Pandora and Other spoil samples had positive NAPP values. The results, shown in **Figure 4-7**, indicate that overall, there is significantly excess neutralising capacity (ANC) compared to potential acidity (MPA) for spoil samples.

About 63 per cent of the Pandora coal samples had positive NAPP values (mostly low-positive), compared with about 26 per cent of Other coal samples.

Figure 4-7. Distribution of Net Acid Producing Potential (NAPP)



Net Acid Generation Capacity

NAG test results are used in conjunction with NAPP values in determining the acid classification of samples. The calculated NAPP value assumes that all sulfur (or sulfide) will oxidise to generate acid (MPA) and that all neutralising material in a sample is in a readily available form to neutralise any acid that could be generated (ANC). Unlike the theoretical basis of the NAPP test, in a NAG test a sample is encouraged to oxidise by reaction with hydrogen peroxide and any acid generated through oxidation may be consumed by neutralising components in the sample. Any remaining acidity is measured and expressed as kg H_2SO_4/t.

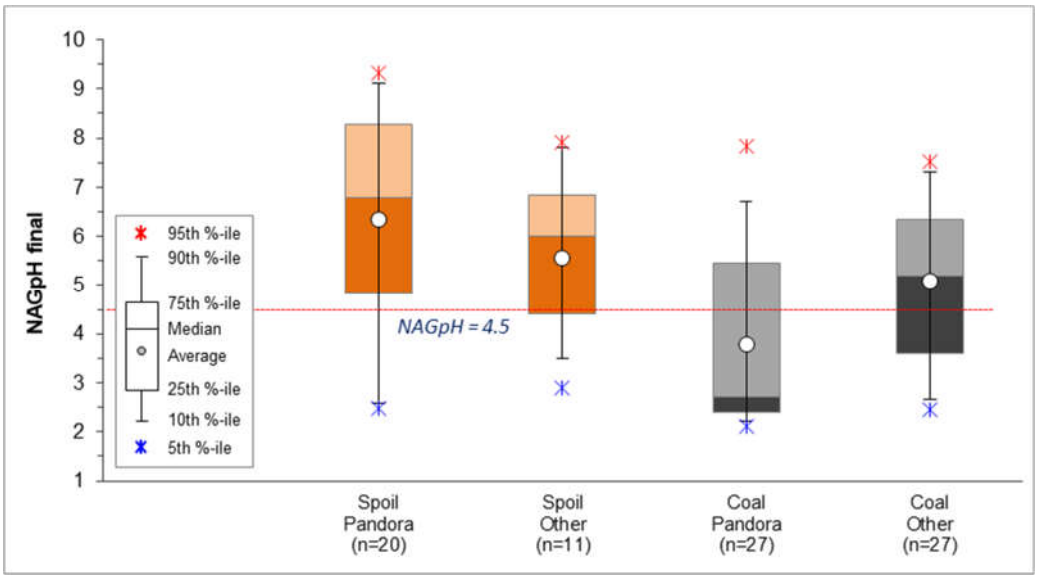
Samples with NAGpH values greater than pH 4.5 are considered to be NAF. Samples with NAGpH values less than or equal to pH 4.5 (i.e. acid-generating) would also be expected to have measurable NAG capacity (i.e. NAG capacity greater than 0.1 kg H_2SO_4/t). As a guide, NAG capacity values between 0.1 and five kg H_2SO_4/t are considered 'low capacity' (AMIRA, 2002).

NAG test data (a combination of single addition, extended boil and sequential NAG) is available for 31 spoil samples and 54 coal samples (**Table 4-1**) – with the NAGpH distribution for these samples shown in **Figure 4-8**.

Eight spoil samples (out of 31) had NAGpH values less than pH 4.5 and, of these eight samples, six samples were located close to coal seams. For spoil samples, NAG tests were typically undertaken on samples that had an 'uncertain' preliminary AMD classification and/or had moderate or higher total S.

As such, the number of spoil samples that underwent NAG testing is not a proportional representation of all spoil.

Figure 4-8. Distribution of Net Acid Generation pH (NAG single or NAG extended or Stage 1 NAG sequential)



About 43 per cent of coal samples tested had NAGpH values greater than pH 4.5. Of the 27 Pandora coal samples with NAGpH data, 19 samples (70 per cent of Pandora coal samples) have NAGpH values less than pH 4.5; compared to 12 samples (44 per cent of Other coal samples) with NAGpH values less than pH 4.5.

The NAG test can be influenced by organic acid (i.e. organic acid can produce NAGpH between approximately pH 4 to 4.5, thus providing a 'false positive' for sulfuric acid. Organic acid is typically produced by samples with high organic carbon content, such as coal and highly carbonaceous samples. To attempt to resolve some of the uncertainty with the 'single addition' NAG test for coaly and highly carbonaceous samples, 53 coal samples underwent an Extended Boil NAG method (NAG extended). Approximately half of these coal samples returned Extended NAGpH values greater than pH4.5, suggesting that for about half of the coal samples tested the acidity generated in the 'single addition' NAG test was likely associated – to some extent – with the oxidation of organic carbon and potentially less so with sulfide oxidation.

AMD Classification

The ABA results presented in this section have been used to classify the acid forming nature of the samples following the classification criteria outlined in **Section 3.4**. Additional relevant data, such as ABCC and Extended NAG test results were used to aid in the classification of samples where there was uncertainty following the preliminary AMD classification. The acid forming nature of these samples is summarised in **Table 4-2**.

Potential Spoil

The classifications in **Table 4-2** show that 98 per cent of all spoil samples at DNM (and 97 per cent of Pandora samples) were classified as NAF or were expected to be NAF [and have been classified as UC(NAF)]. These spoil samples (and spoil material represented by these samples) – including Pandora

samples – have very low sulfur concentration, significant excess ANC (relative to the MPA) and clearly have negligible capacity to generate AMD. Approximately two per cent of spoil samples (10 out of 633 samples) were classified as 'PAF' of some type. Five of these samples were from Pandora Pit. No spoil samples were classified as NAF-S. Of the 104 carbonaceous spoil samples tested, only seven were classified as 'PAF' of some type [mostly UC(PAF) or PAF-LC] – indicating little difference in the AMD hazard at DNM posed by carbonaceous spoil compared to non-carbonaceous spoil.

Table 4-2. Geochemical classification of samples

Material Type	NAF	UC(NAF)	NAF-S	UC(PAF)	PAF-LC	PAF
	No. and percentage of samples					
Spoil samples						
Spoil: Pandora (n=198)	190 (96 %)	3 (1.5 %)	0	2 (1 %)	2 (1 %)	1 (0.5 %
Spoil: Other (n=435)	403 (93 %)	27 (6.2 %)	0	3 (0.7 %)	1 (0.2 %)	1 (0.2 %)
All Spoil (n=633)	*593 (94 %)*	*30 (4. 7%)*	*0*	*5 (0.8 %)*	*3 (0.5 %)*	*2 (0.3 %)*
	623 (98 %)		*10 (2 %)*			
Coal samples						
Coal: Pandora (n=30)	5 (17 %)	3 (10 %)	0	3 (10 %)	12 (40 %)	7 (23 %)
Coal: Other (n=48)	28 (58 %)	7 (15 %)	0	3 (6.3 %)	9 (19 %)	1 (2.1 %)
All Coal (n=78)	33 (42 %)	10 (13 %)	0	6 (8 %)	21 (27 %)	8 (10 %)
	43 (55 %)		*35 (45 %)*			

Data show that potential spoil from Pandora Pit that is expected to be disposed into the proposed OOPD would be overwhelmingly NAF. Furthermore, the very low sulfur concentrations in spoil indicates that the sulfate concentration that could be generated in spoil from sulfide oxidation (in addition to any salinity unrelated to sulfide oxidation) would also be very low. What little PAF spoil may exist within the OOPD will be broadly distributed (mixed) throughout bulk NAF spoil.

Taking into consideration the greater sample numbers from the broader DNM area (Other samples) compared to the Pandora samples, the proportions of 'NAF' and 'PAF' spoil from Pandora is near identical to the 'Other' samples, suggesting that the AMD hazard (with respect to acid forming) posed by spoil from Pandora (that will be disposed into the OOPD) is expected to be very similar to that posed by Other spoil at DNM.

Potential Waste Coal

Approximately 55 per cent of coal samples tested (43 out of 78 samples) were classified as NAF or UC(NAF), and coal seam material represented by these samples has low sulfur values, excess ANC (relative to the MPA) and has low capacity to generate acidity or release significant sulfate from sulfide oxidation. The coal samples from Pandora had a much lower proportion of samples classified as NAF or UC(NAF) [27 per cent] compared to Other coal samples [73 per cent classified as NAF or UC(NAF)].

It is worth noting that 27 out of 35 coal samples classified as some form of 'PAF' showed limited or uncertain capacity to generate acidity, suggesting that 'PAF' coal is unlikely to generate significant acid(ity). Furthermore, the Scr content of fresh coal samples was generally low – with a significant

proportion of total S likely present as organic S. Thus, the 'PAF' classification is conservative for most coal samples. To illustrate, if the MPA for fresh coal samples was calculated using Scr (sulfide) instead of total S, the proportion of 'PAF' coal samples decreases significantly from 45 per cent of all coal samples down to 27 per cent.

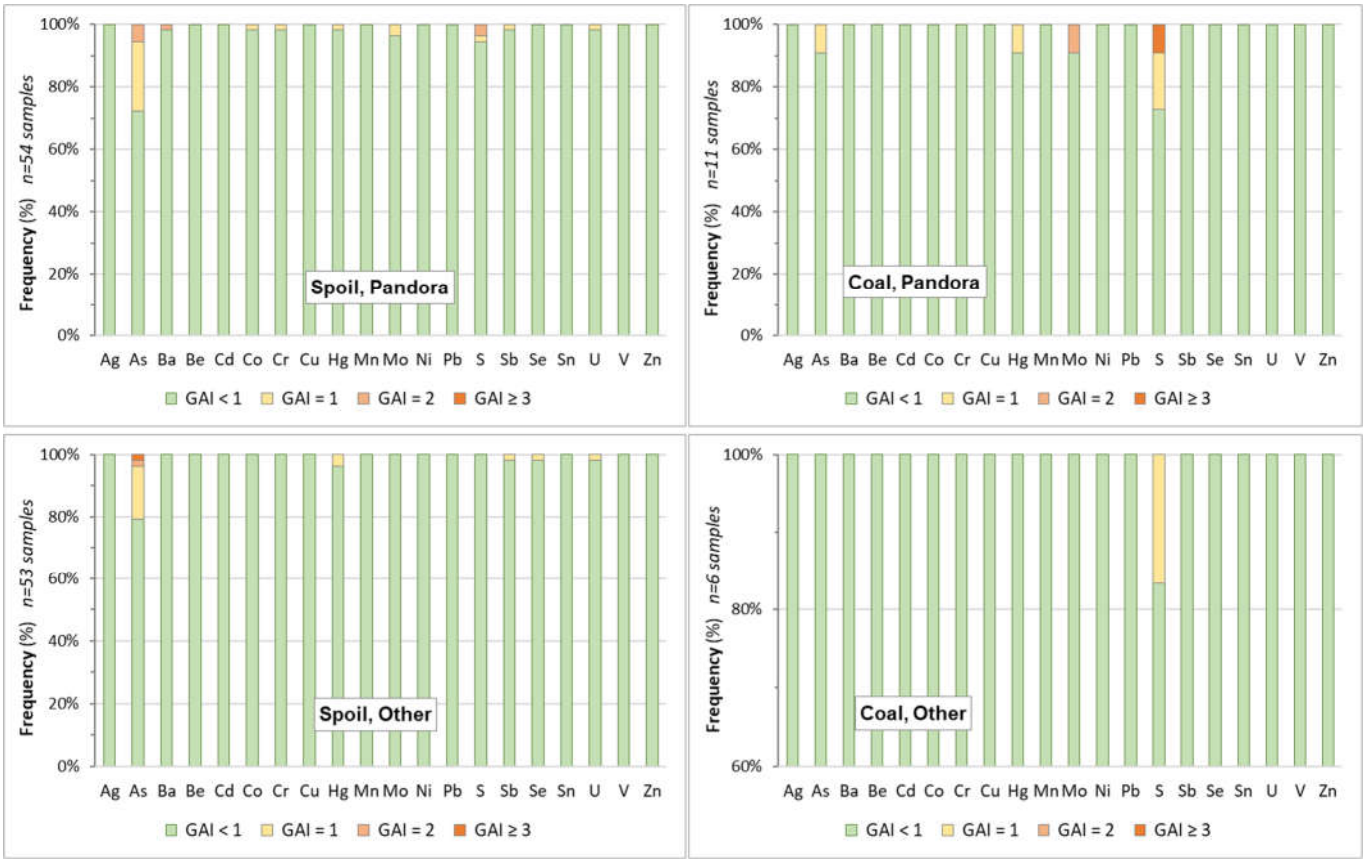
On the other side of the acid-base account, it is recognised that ANC is likely an overestimate, however the AMD classification already takes this into account by requiring an ANC/MPA ratio greater than two for a sample to be assessed as NAF.

These results suggest that potentially un-economic coal seam material reporting to the OOPD as spoil (mixed with non-coal spoil) would likely pose a low to low-moderate AMD source hazard.

4.3 Total Metals and Metalloids

Multi-element (metal and metalloid) data is available for 124 samples comprising 107 spoil samples (54 Pandora and 53 Other) and 17 coal samples (11 Pandora and 6 Other). The degree of enrichment with respect to elements potentially of environmental interest for these samples is shown in Figure 4-9.

Figure 4-9. Frequency distribution of geochemical abundance indices (GAI) of selected elements



The GAI values show that one spoil sample was significantly enriched [GAI ≥3] with regard to arsenic (As) and one coal sample was significantly enriched with regard to S (and the level of S enrichment in this coal sample was consistent with the ABA data for this sample). The GAI values also show that a small number of samples tested (spoil and coal) had moderate enrichment (GAI = 2) with regard to As, barium (Ba), S and/or molybdenum (Mo).

Overall, the results suggest that spoil (and potential waste coal) likely to report to the OOPD have low levels of metal and metalloid enrichment, which is consistent with Permian-age coal measures throughout eastern Australia. A very small proportion of samples have a higher degree of enrichment in some metals – notably As, Ba, S and Mo – however, enrichment in these elements in a very small proportion of spoil and/or waste coal is not cause for concern.

4.4 Initial Solubility in Deionised Water

Test results for pH and EC are available for 911 samples and test results for major ions and soluble metals/metalloids are available for 125 samples – the same samples (plus one additional coal sample) that underwent multi-element assay (**Table 4-3**). Therefore, a large dataset is available to assess the potential for leaching of salt and environmentally important elements from spoil and coal at DNM and as relevant to spoil (and potential waste coal) likely to report to the OOPD. Water extract tests provide a preliminary indication of the elements that may be readily mobilised from any given material type.

The geochemical database contains EC and pH data measured using different methods – either a 1:5 (w:v) water extract [data represented as $pH_{1:5}$ and $EC_{1:5}$] or a saturated extract [data represented as pHse and ECse].

Table 4-3. Samples subjected to deionised water solubility tests

Material type	pH and EC saturated extract	pH and EC 1:5	Soluble metals and metalloids
	Number of samples		
Spoil: Pandora	32	187	54
Spoil: Other	164	436	53
Coal: Pandora	1	29	11
Coal: Other	2	60	7

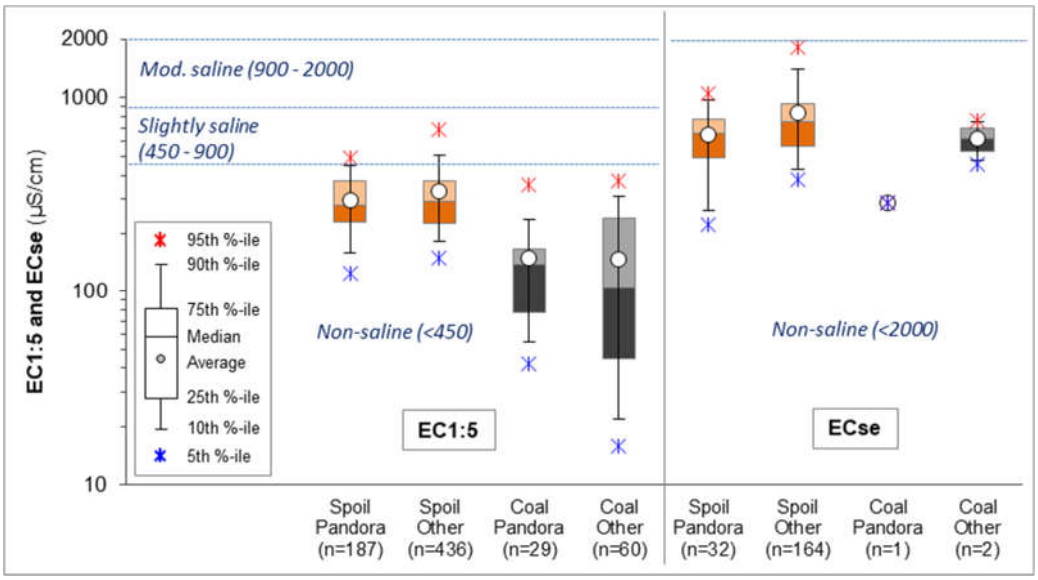
The 1:5 w:v (solid:water) deionised water leach procedure (to measure $pH_{1:5}$, $EC_{1:5}$ and soluble metals/metalloids) was undertaken on fine pulps. Note that the use of fine pulped materials in water extract tests enables a high level of reaction and dissolution. The saturated extract tests were undertaken on an unknown size fraction. The results from these tests are summarised and discussed below.

The test-work has found that the mineral wastes are pH-alkaline, generally non-saline to slightly saline and have very low concentrations of soluble metals and metalloid concentrations – within the range typical for Permian sedimentary materials in the Bowen Basin. For most samples, the soluble metals and metalloids are at concentrations below or marginally above the laboratory limit of reporting (LOR).

Electrical Conductivity (EC) and pH

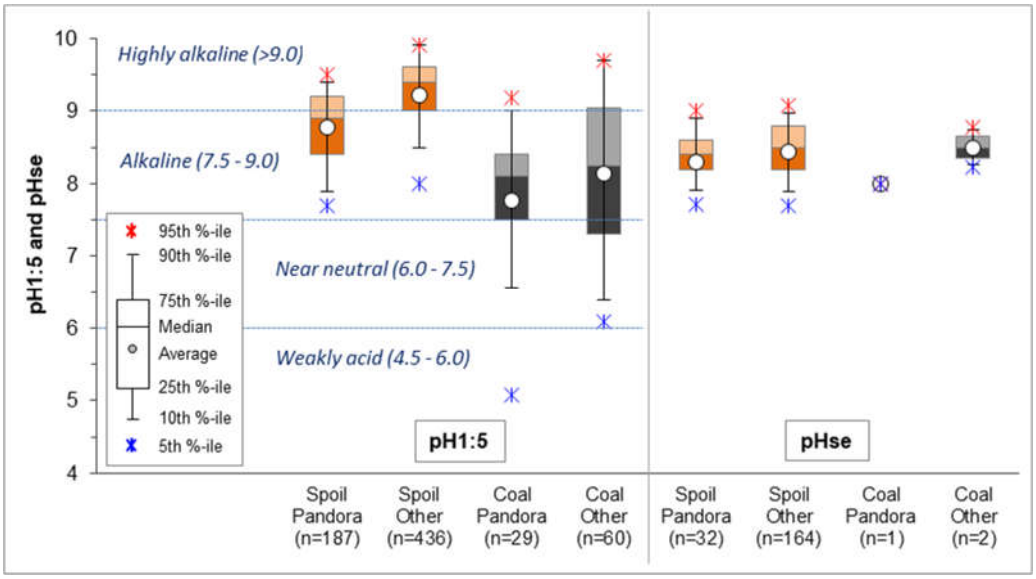
EC data as either $EC_{1:5}$ or ECse are available for 819 spoil samples and 92 coal samples (**Figure 4-10** and **Table 4-3**). Applying the soil salinity criteria from **Section 3.4** (**Table 3-4**), 90 per cent of the spoil samples were classified as non-saline and a further nine per cent were classified as slightly saline. The remaining one per cent of spoil samples were classified as moderately saline. These low EC results are common (if not typical) for Bowen Basin Permian-age and Tertiary-age spoil in the region. All except two coal samples were classified as non-saline.

Figure 4-10. Electrical Conductivity (EC) distribution



Soil pH data as $pH_{1:5}$ or pHse are available for 819 spoil samples and 92 coal samples (**Figure 4-11** and **Table 4-3**). Applying the soil pH criteria from **Section 3.4** (**Table 3-5**) to data from both pH methods, 97 per cent of the spoil samples were classified as alkaline to highly alkaline and a further two per cent had near-neutral pH. The remaining four spoil samples were moderately to weakly acidic. The Pandora spoil samples, generally, had lower pH compared to the Other spoil samples. These pH results are common (if not typical) for Bowen Basin Permian-age and Tertiary-age spoil in the region.

Figure 4-11. pH distribution



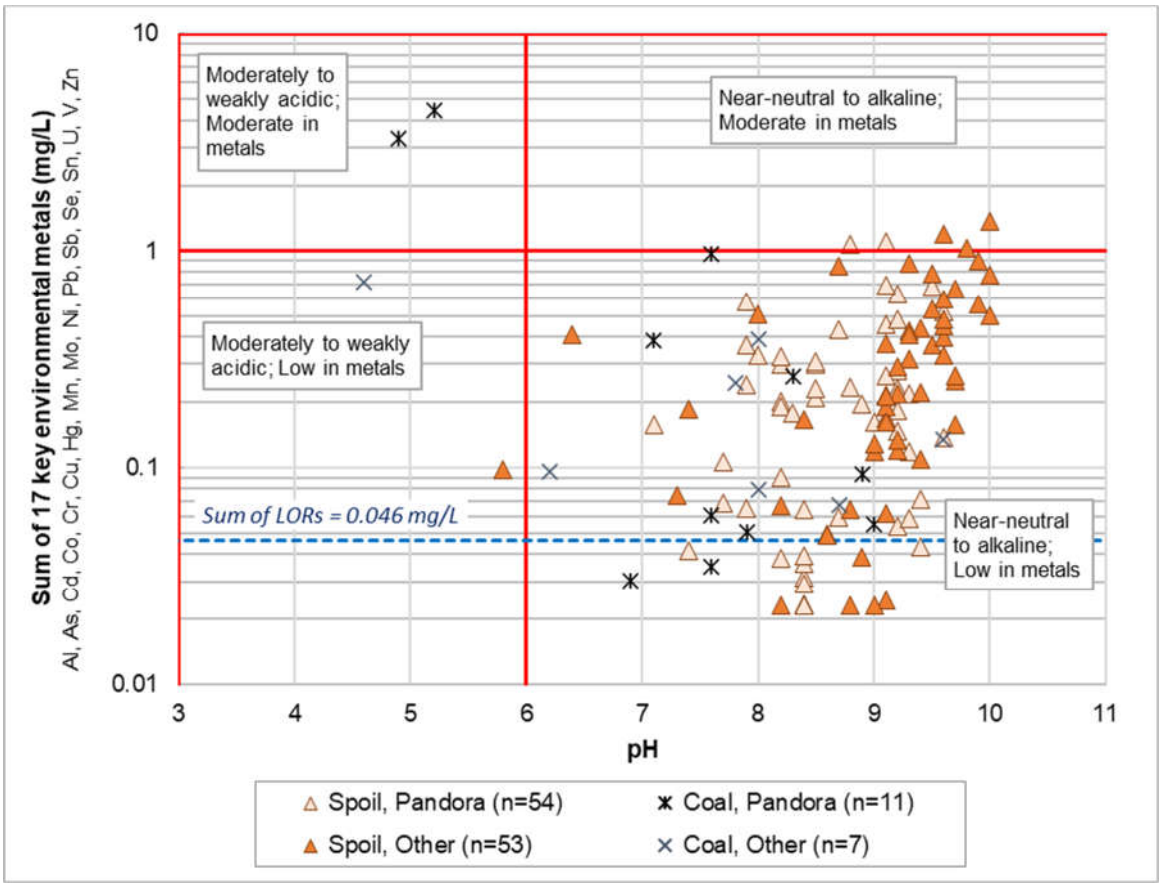
Most coal samples had near-neutral to alkaline pH and about 20 per cent of coal samples were highly alkaline. Six coal samples (3 samples each from Pandora and Other) were weakly acidic with pH values between pH 4.5 and 6.0.

Soluble Metals and Metalloids

Deionised water extract (leaching) data for major ions and a broad suite of metals/metalloids are available for 125 samples (**Table 4-3**) – the same spoil and coal samples (plus one additional coal sample) that underwent assay analysis (**Section 4.3**). All samples underwent a 1:5 w:v (solid:water) water extract procedure on pulps, and were analysed under ICP-MS method. The sum of 17 environmentally important elements are plotted as a function of pH in **Figure 4-12** in a modified version of what is referred to as a Ficklin plot (after Ficklin et al., 1992). The 17 selected metals/metalloids comprise: Al, As, Cd, Co, Cr, Cu, Hg, Mn, Mo, Pb, Ni, Sb, Se, Sn, U, V and Zn.

Of the 107 spoil samples, 101 samples (94 per cent of spoil samples tested) have low soluble metals concentrations and have near-neutral to alkaline pH – indicating that under freshwater leaching conditions soluble metals concentrations are low for most spoil materials (bulk spoil). One extremely weathered spoil sample was weakly acidic (pH 5.8) with low soluble metals concentrations; and five spoil samples have low-moderate metals concentrations associated with pH-neutral to alkaline conditions.

Figure 4-12. Sum of key environmental metals versus pH in deionised water extracts



Of the 18 coal samples, 15 samples (83 per cent of coal samples tested) have low soluble metals concentrations and have near-neutral to alkaline pH – indicating that under freshwater leaching conditions soluble metals concentrations are low for most coal materials. One Other coal sample was weakly acidic (pH 4.6) with low soluble metals concentrations – and was classified as PAF; and two Pandora coal samples have moderate metals concentrations associated with weakly acidic conditions (pH 4.9 and pH 5.2) – and were also classified as PAF.

In pH-neutral to alkaline waters, many metals/metalloids cannot remain in solution and, thus, trace metal/metalloid concentrations are generally low. Comparatively, in acid(ic) waters, many metals/metalloids are moderately to highly soluble and remain in solution and, thus, trace metal/metalloid concentrations are generally high. Notable exceptions to these general rules include elements such as As, Mn, Sb and Se, which remain soluble through a wide pH range. Other trace metals that are somewhat soluble under pH-neutral to alkaline conditions include Cd, Cr, Mo and Zn. As such, under the pH-alkaline conditions of the leach, the mobility of these elements would not be inhibited.

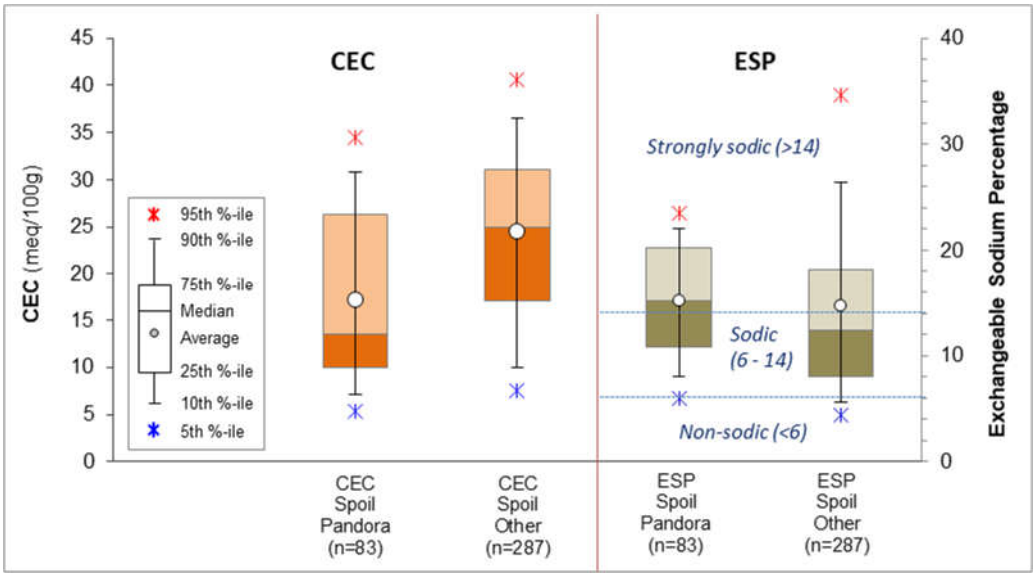
4.5 Cation Exchange Capacity, Sodicity and Dispersion of Spoil

Exchangeable cation concentrations are used to evaluate the potential 'soil quality' of materials. Exchangeable cation data [as cation exchange capacity (CEC)] and exchangeable sodium percentage (ESP) data are available for 370 spoil samples – 83 samples from Pandora and 287 Other samples. The results are summarised in Figure 4-13.

The CEC spans a large range from 2.4 milliequivalents per 100 grams (meq/100g) to 76 meq/100g, with a moderate median CEC value of 24 meq/100g. The CEC for Pandora spoil was generally lower than Other spoil.

The ESP results ranged from less than one per cent to 55 per cent, with a median ESP of 13 per cent. Approximately 45 per cent of samples had ESP values greater than 14 per cent and a further 45 per cent of samples had ESP values between six per cent and 14 per cent. That is, about 90 per cent of spoil samples had ESP values greater than six per cent.

Figure 4-13. Cation Exchange Capacity (CEC) and Exchangeable Sodium Percentage (ESP) of spoil



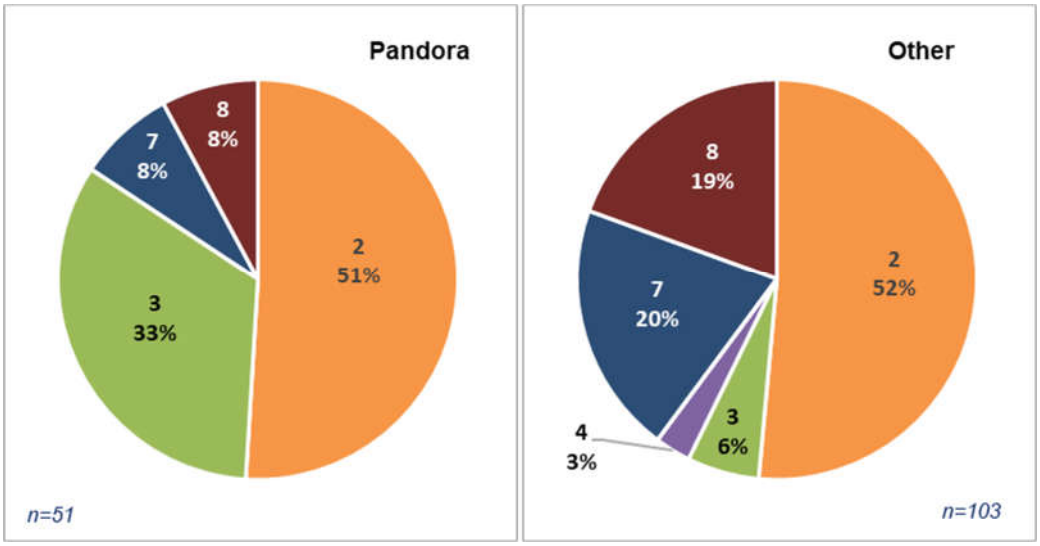
Specific to Pandora samples, approximately 55 per cent of 83 samples had ESP values greater than 14 per cent and a further 39 per cent of Pandora samples had ESP values between six per cent and 14 per cent. Therefore, based on the ESP values alone, approximately 94 per cent of the spoil samples from Pandora are regarded as being 'sodic' to 'strongly sodic' and, as such, a significant proportion of mine spoil that is expected to be disposed into the OOPD can be expected to have potential for dispersion.

Data is available for 154 spoil samples (51 Pandora samples and 103 Other samples) that underwent Emerson aggregate class testing to determine whether these samples were dispersive. Emerson

aggregate class tests are a direct measure of soil dispersion, whereas ESP values are used as an indirect measure of the potential for a sample to have structural stability problems and hence may be dispersive.

The Emerson aggregate class results, summarised in **Figure 4-14**, show that about half of all spoil – approximately equal between Pandora and Other samples – had some dispersion [slaking] (Class 2); and about 15 per cent of samples (23 out of 154 samples) had an Emerson Class of three [dispersion; calcite or gypsum present] – of which significantly more Pandora samples had a Class 3 compared to Other samples. Refer to **Section 3.4** for class descriptions. The results suggest that about 84 per cent of Pandora samples and about 57 per cent of Other samples were dispersive. The remaining samples had Emerson Class values of 4, 7 or 8, which indicates no dispersion. These results are generally consistent with the dispersion predictions from the ESP results, which suggested that most spoil would be dispersive.

Figure 4-14. Emerson aggregate class summaries of spoil



The reason(s) for the large difference in the proportion of samples with Class 3, Class 7 and Class 8 results between the Pandora samples compared to the Other samples is unknown. The data for most of the samples from each area (i.e. Pandora vs Other) were from different characterisation campaigns managed by different organisations. The samples may have been prepared differently for the Emerson Aggregate tests between the different campaigns, which may account for the difference.

Based on the CEC, ESP and Emerson aggregate class test results, a significant proportion of spoil at DNM and the Project (i.e. spoil from Pandora Pit that is expected to report to the proposed OOPD) is expected to be sodic to strongly sodic and variably prone to dispersion.

These exchangeable cation and Emerson aggregate class results are common for Bowen Basin Permian and Tertiary material in the region.

The environmental significance of exchangeable cation values and sodicity levels in spoil material in terms of potential erosion and dispersion is outlined in **Section 7**, however readers should consult the separate soils assessment undertaken as part of the environmental approvals for the Project for a detailed assessment of soil properties with regard to rehabilitation.

5 Summary of Geochemical Characteristics

The geochemical characteristics of overburden/interburden (spoil) from DNM have been assessed. Also assessed were coal samples that may report as waste to the spoil dumps (acknowledging that most coal report is expected to report as ROM coal). The assessment was undertaken to understand the environmental geochemical characteristics of these samples, as being representative of their respective mineral waste types that are expected to be disposed into the new OOPD.

Based on drillhole logs, approximately 91 per cent of spoil from Pandora Pit (and reporting to the OOPD at the Project) is expected to be non-carbonaceous. Carbonaceous spoil, of which almost all is fresh/unweathered, is expected to comprise up to nine per cent of the spoil reporting to the OOPD. In addition to the spoil, the assessment has conservatively assumed that the OOPD will conservatively contain up to one percent waste coal.

5.1 AMD Potential of Spoil and Coal

AMD Potential of Spoil

Spoil is expected to generate pH-alkaline to highly alkaline contact water (run-off and seepage), which is typical for mine spoil in the Bowen Basin.

Based on the results of 633 samples, spoil has a very low potential to generate AMD as either AD and/or NMD and/or SD.

The total S concentration of spoil is very low, with a 95th percentile total S concentration of 0.19 per cent. As such, and combined with generally moderate to moderate-high ANC values (median 24 kg H_2SO_4/t), which is significantly higher than the MPA (median 0.6 kg H_2SO_4/t), approximately 98 per cent of spoil samples tested were classified as NAF or were expected to be NAF [and have been classified as UC(NAF)]. Less than two per cent of spoil samples were classified as PAF, PAF-LC or UC(PAF) [no samples were classified as NAF-S]. Almost all of the 10 spoil samples classified as 'PAF' (of any type) were closely associated with coal seams and could potentially end up as coal reject if mined with ROM coal.

The test-work undertaken has demonstrated that the ANC for the spoil is generally expected to be about 35-95 per cent available (median 67 per cent available) under field conditions, with iron-dolomite and dolomite being the main carbonate minerals contributing to the acid buffering potential of the spoil. Overall, spoil has excess acid neutralising capacity and is expected to be bulk acid consuming.

Total metal and metalloid concentrations from 107 spoil samples tested are very low compared to average element abundance in unmineralised soil/rock in the earth's crust, with only one sample being significantly enriched with regard to As. About seven per cent of samples showing minor enrichment with regard to one or more of As, Ba, S and/or Mo.

Soluble multi-element results from 107 samples indicate that leachate from spoil is expected to contain low concentrations of soluble metals and metalloids. Five samples produced leachate with low-moderate soluble metal concentrations, primarily due to low-moderate concentrations of Al and/or As. One extremely weathered spoil sample was weakly acidic (pH 5.8) with low soluble metals concentrations.

The assessment has demonstrated that spoil from Pandora Pit (based on 198 samples) has AMD characteristics that are comparable to spoil from outside Pandora Pit (based on 435 samples). For the key aspects assessed, including ABA components (total S, Scr, ANC), total metals/metalloids and soluble

metals/metalloids, the Pandora Pit spoil samples had concentrations/values within the same range as spoil samples from outside Pandora Pit. As such, the low AMD hazard posed by DNM spoil, generally, can be equally applied to spoil from Pandora Pit to be disposed with the OOPD at the Project.

AMD Potential of Coal

Coal is not regarded as waste and ROM coal remains on-site for a relatively short period of time. It is reasonably assumed that almost all coal mined from Pandora Pit will report to the CHPP as ROM coal (with waste reporting as coal rejects). However, the assessment has conservatively assumed that some minor coal ply's from Pandora Pit may be mined with spoil (as waste coal) and will therefore be broadly disposed within the OOPD at the Project. The amount of waste coal that may be disposed into the OOPD is unknown, however we have conservatively assumed that waste coal will represent up to one percent of mineral waste in the OOPD.

Based on the results, and as a bulk material, coal is assessed as having a low-moderate potential to generate AMD as either AD, NMD and/or SD. Coal, as a bulk material, is expected to generate pH-neutral to alkaline contact water (run-off and seepage).

The total S concentration of coal is generally low with samples from Pandora Pit having generally similar total S concentration compared to coal samples from outside Pandora Pit. Approximately 29 per cent (median value) of the total S is present as sulfide (Scr), with the bulk of the total S likely present as organic S, which does not contribute to AMD. Coal samples have a wide range of ANC values; however, the median ANC, overall, is low. The Pandora coal samples have generally lower ANC values compared to Other coal samples. As such, approximately 55 per cent of coal samples were classified as NAF or UC(NAF), with a much lower proportion of Pandora coal samples being classified as NAF or UC(NAF) (27 per cent) compared to Other coal samples (73 per cent). The remaining samples were classified as PAF, PAF-LC or UC(PAF) – noting that the AMD classification is based on total S, which for coal samples likely leads to a highly conservative classification.

These results suggest that potentially un-economic coal seam material reporting to the OOPD as spoil (mixed with non-coal spoil) would conservatively pose a low-moderate AMD source hazard.

Assay data for 17 coal samples show that the total metal and metalloid concentrations are very low compared to average element abundance in soil in the earth's crust. One Pandora coal sample was significantly enriched with regard to S and an additional Pandora coal sample was moderately enriched with regard to Mo.

Soluble multi-element results from 18 coal samples tested (with a range of NAF to PAF classifications) indicate that contact water (run-off and seepage) from coal is generally expected to contain low concentrations of soluble metals and metalloids. Two PAF Pandora coal samples have moderate metals concentrations associated with weakly acidic conditions; and one PAF Other coal sample had low soluble metals concentrations associated with weakly acidic conditions.

5.2 Salinity, Sodicity and Dispersion Potential of Spoil and Coal

Salinity, Sodicity and Dispersion Potential of Spoil

Spoil has low median and low 95th percentile $EC_{1:5}$ values of 284 and 612 μS/cm, respectively, and has very low total S concentrations. Similarly, saturated extract data (ECse) for 196 samples resulted in a 95th percentile ECse value of 1660 μS/cm. On this basis, contact water (run-off and seepage) is expected to be generally non-saline to slightly saline, as a result of dissolution of geogenic salts more so than from

sulfide oxidation (sulfate salinity). Weathered spoil generally has higher $EC_{1:5}$ and ECse values compared to fresh spoil. The Pandora samples (n=219) had $EC_{1:5}$ and ECse values within the same range as the Other spoil samples (n=600) – i.e. generally non-saline to slightly saline.

Spoil has moderate CEC values and generally high ESP values, resulting about 90 per cent of samples being classified as 'sodic' to 'strongly sodic' and, therefore, with potential for dispersion. Based on Emerson aggregate class testing to directly measure dispersion, about 84 per cent of spoil samples displayed some degree of dispersion – consistent with the dispersion predictions from the ESP results. The Pandora spoil samples had a similar range and distribution of CEC and ESP values (results from 83 samples) compared to Other spoil samples (results from 287 samples).

Salinity Potential of Coal

Coal has low median and 95th percentile $EC_{1:5}$ values of 119 and 378 μS/cm, respectively; and has generally low total S concentrations. On this basis, contact water (run-off and seepage) from coal, as a bulk material, is expected to be non-saline to slightly saline, either as a result of dissolution of geogenic salts and/or from sulfide oxidation (sulfate salinity).

6 Geochemical Source Hazard Assessment

The Project proposes to construct a new OOPD. The source materials within the OOPD will predominantly comprise weathered and fresh spoil, with an assumed small proportion of waste coal. The geochemical assessment has found that, from an environmental geochemical perspective, the geochemical differences between weathered and fresh materials are relatively minor. As such, the geochemical source hazard assessment has combined weathered and fresh non-carbonaceous spoil, and weathered and fresh carbonaceous spoil, as appropriate.

The source hazard assessment methodology outlined in **Section 3.5** has been applied to the spoil and coal within the proposed OOPD landform. The source hazard assessment used data from Pandora samples only (i.e. excluded data from Other samples). The estimated proportion of carbonaceous lithologies, non-carbonaceous lithologies and coal at Pandora Pit area (the source of the OOPD material) was obtained from drillhole logs at Pandora and from the DNM PRCP (BHP, 2023) – and from this, the same proportions were assigned to the OOPD landform. The source materials, and their approximate expected proportions within the OOPD landform are as follows:

- Spoil, non-carbonaceous = 90 per cent. A mix of weathered and fresh material.
- Spoil, carbonaceous = nine per cent. Almost all fresh.
- Coal = one per cent. All fresh.

The source hazard assessment, which describes the AMD hazard of individual material domains within the proposed OOPD landform (i.e. also takes into account material quantity), has found that non-carbonaceous spoil poses a **Low** AMD source hazard, carbonaceous spoil poses a **Low-Moderate** AMD source hazard and coal also poses a **Low-Moderate** AMD source hazard. The AMD hazard scoring table for the proposed OOPD landform at the Project is provided in **Appendix C**.

Three per cent of Pandora spoil samples have been classified as PAF of some type – and half of this is from carbonaceous material, which comprises a minor proportion of spoil. Notably, most of the 'PAF' samples in overburden/interburden from drill-hole sampling were associated with seams as either roof, parting, floor or otherwise near-seam material (less than 1.5 m above or below coal). As such, it is likely that a significant proportion of PAF spoil samples would be mined as part of ROM coal and would therefore end up as rejects instead of general spoil. Therefore, the AMD hazard score for spoil materials is considered to be conservative and consequently the final landform AMD hazard score also conservative.

Approximately 73 per cent of Pandora coal samples have been conservatively classified as PAF of some type (mostly low-capacity). However, coal (as waste coal) has been conservatively assumed to comprise up to one per cent of the landform.

On this basis, and taking into account material quantities (proportions) and expected proportion of 'PAF' materials reporting to the landform, the proposed OOPD landform is expected to pose a **Low** AMD hazard, with AMD generation rated as **Highly Unlikely**. The 'Low' AMD hazard is largely a result of approximately three per cent of spoil samples being classified as PAF of some type and coal being only a very minor proportion of the landform – with spoil comprising almost all of the mineral waste within the landform.

7 Management and Rehabilitation Measures

The OOPD is proposed to be constructed from spoil (overburden and interburden) mined from Pandora Pit. About 90 per cent of the spoil is expected to be non-carbonaceous and the remainder carbonaceous. The Project conservatively assumes that a very small proportion (up to one per cent) of waste coal may also report to the OOPD, which is consistent with open-cut coal mining methods where minor waste coal reports as 'spoil', including current mining undertaken at DNM. The assessment has found no significant difference between the geochemical characteristics of spoil from Pandora Pit compared to the spoil from outside of Pandora Pit at DNM.

Spoil is overwhelmingly NAF with excess ANC and has a negligible risk of developing AMD, including AD, NMD and/or SD. Furthermore, surface water run-off and seepage from bulk spoil is expected to be non-saline to slightly saline with low soluble metal/metalloid concentrations. Taking into account material quantities (proportions) and the geochemical characteristics of the mineral wastes reporting to the proposed OOPD landform, the OOPD landform is expected to pose a **Low** AMD hazard, with AMD generation rated as **Highly Unlikely**. However, spoil is expected to be sodic to strongly sodic with potential for dispersion and erosion.

It is unlikely that sodic and potentially dispersive spoil will be able to be selectively handled and emplaced during operation of the OOPD, as is the case at DNM. Therefore, in the absence of such selective handling, the OOPD will be designed to a maximum final slope angle of around 3H:1V (≈18°) or flatter to ensure long-term erosion control. Benches will be constructed at 10 - 20 m lifts to break slope length and manage run-off. Drainage and runoff will be managed through appropriately designed contour drains and drop structures. The final landform will be shaped to ensure long-term stability and compatibility with surrounding land uses.

Surface water run-off and seepage from the OOPD, including any rehabilitated areas, should be monitored for 'standard' water quality parameters including, but not limited to, pH, EC, major anions, major cations and a broad suite of soluble metals/metalloids at high resolution analysis.

With the implementation of the proposed management and mitigation measures the proposed OOPD is regarded as posing a low risk of environmental harm.

7.1 Validation of Spoil Characteristics

The AMD hazard posed by existing spoil at DNM is understood, and the geochemical characteristics (AMD hazard) of future spoil generated from Pandora Pit are expected to be very similar to the current spoil being produced at DNM. Nevertheless, WHC will continue to undertake geochemical test-work of overburden and interburden throughout development of the Project. Test-work would likely focus on long-term (kinetic) processes associated with spoil seepage to validate the static geochemical data.

7.2 Coal Rejects Management Strategy

No coal rejects will not be disposed into the proposed OOPD nor anywhere within the Project. Coal rejects generated at the DNM CHPP from processing ROM coal from DNM will continue to be disposed within spoil at DNM under the current approved disposal and management arrangements.

8 References

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Appendix A

Drill-hole Information

Table A1. Drill-hole Information

Drill-hole ID	Drill-hole Location	Easting (m)	Northing (m)	Collar RL (mAHD)	Depth (m)	Type of Samples	Total No. of Samples	No. of Weath. Spoil Samples	No. of Fresh Spoil Samples	No. of Fresh Coal Samples	Year Drilled & Sampled
48102	Pandora pit	635237	7555494	193.76	198	chips	8	2	5	1	2008
48103	Pandora pit	635533	7554541	193.33	140	chips	8	1	7	0	2008
48104	Pandora pit	635824	7553591	198.90	79	chips	8	3	5	0	2008
48105	Pandora pit	634120	7555728	196.19	81	chips	9	5	4	0	2008
177204	Pandora pit	635642	7553309	198	68	core	70	25	34	11	2020
177212	Pandora pit	636193	7553645	199	77	core	67	23	33	11	2020
177518	Pandora pit	634755	7555805	194.32	147.78	core	79	19	53	7	2022
48100	Other	632629	7557379	204.03	36	chips	6	2	4	0	2008
48101	Other	633687	7557151	207.02	125	chips	11	2	9	0	2008
48106	Other	634460	7556335	197.76	133	chips	11	3	8	0	2008
48107	Other	635425	7556589	197.82	103	chips	10	3	7	0	2008
48108	Other	632331	7558324	214.91	69	chips	8	6	2	0	2008
48109	Other	634649	7557413	204.28	150	chips	12	4	8	0	2008
48110	Other	633867	7558234	212.16	86	chips	9	4	5	0	2008
48111	Other	634590	7558934	219.30	77	chips	10	4	6	0	2008
48112	Other	633100	7559062	213.73	127	chips	15	2	13	0	2008
48113	Other	632497	7559649	216.23	115	chips	12	2	10	0	2008
48114	Other	633617	7560385	223.06	56	chips	8	3	5	0	2008
48115	Other	632677	7560562	223.51	148	chips	10	2	8	0	2008

Drill-hole ID	Drill-hole Location	Easting (m)	Northing (m)	Collar RL (mAHD)	Depth (m)	Type of Samples	Total No. of Samples	No. of Weath. Spoil Samples	No. of Fresh Spoil Samples	No. of Fresh Coal Samples	Year Drilled & Sampled
48116	Other	633158	7561448	231.70	80	chips	10	3	7	0	2008
48117	Other	635106	7560694	228.17	175	chips	12	2	9	1	2008
48122	Other	634464	7561638	231.27	201	chips	13	4	9	0	2008
48123	Other	633009	7562631	241.72	100	chips	9	2	6	1	2008
175028	Other	634180	7560551	231.86	74	chips	25	2	15	8	2012
175310	Other	632367	7558251	215.23	90	chips	26	6	16	4	2012
175387	Other	632388	7558698	211.64	78	chips	12	9	2	1	2012
175401	Other	632257	7558536	213.94	78	chips	22	9	11	2	2012
177464-R01	Other	634638	7557678	209.92	150	core	126	29	86	11	2022
177496	Other	633318	7557769	203.22	150.27	core	114	22	84	8	2022
177519	Other	634442	7561442	232.17	153.28	core	120	16	91	13	2022
177520	Other	632537	7561216	231.63	73.42	core	51	9	29	13	2022

* All drill-holes are vertical (dip = 90 degrees). Datum and projection = GDA94, zone 55.

Appendix B

Geochemical Results Tables

- Table B1 – Acid-Base Characteristics
- Table B2 – Total Element Concentrations
- Table B3 – Geochemical Abundance Indices (GAI)
- Table B4 – Mineralogy – Quantitative X-Ray Diffraction (QXRD)
- Table B5 – Soluble Major Ions, pH, Electrical Conductivity, Metal and Metalloid Concentrations in Fresh Water Extracts
- Table B6 – Exchangeable Cations, Cation Exchange Capacity (CEC), Exchangeable Sodium Percentage (ESP) and Emerson Aggregate Class

Table B1. Acid-Base Characteristics of Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t			kg H_2SO_4/t	
48100_1-3	Other	Distinctly	Sandstone, fine-medium	8.0	2070														
48100_10.612-13	Other	Slightly	Sandstone, medium; minor claystone	8.0	720														
48100_13-20	Other	Fresh	Sandstone, fine-medium; with siltstone	7.7	850			0.03		0.9									UC(NAF)
48100_23.337-26.556	Other	Fresh	Claystone	8.3	935			0.07	0.04	2.1	26.9	-24.8	13						NAF
48100_26-29	Other	Fresh	Claystone; with coal	7.8	950			0.13	<0.02	4.0	14.4	-10.4	4						NAF
48100_29-36	Other	Fresh	Sandstone, fine; with siltstone	8.5	815			0.06	0.03	1.8	34.2	-32.4	19						NAF
48101_1-4	Other	Extremely	Siltstone	8.2	1230														
48101_6-20	Other	Distinctly	Siltstone	8.3	682														
48101_33-43	Other	Fresh	Sandstone, fine-medium	8.7	366														
48101_44.717-53.783	Other	Fresh	Siltstone	8.9	408														
48101_54-63	Other	Fresh	Sandstone, fine-medium	8.9	376														
48101_62.498-67.182	Other	Fresh	Siltstone	8.4	51														
48101_71.628-75.801	Other	Fresh	Claystone	8.3	194			0.03		0.9									UC(NAF)
48101_89-98	Other	Fresh	Siltstone	8.8	371														
48101_102.372-103.551	Other	Fresh	Siltstone	8.5	586			0.03		0.9									UC(NAF)
48101_108-114	Other	Fresh	Siltstone; with coal	8.8	129														
48101_119.114-123.074	Other	Fresh	Siltstone	8.8	428														
48102_7.242-15.137	Pandora	Distinctly	Claystone	7.9	639														
48102_27.431-36.855	Pandora	Slightly	Siltstone; sandstone abundant	8.4	676														
48102_57.68-72.748	Pandora	Fresh	Siltstone	8.2	384														
48102_97.023-109.772	Pandora	Fresh	Sandstone, medium-coarse	8.5	602														
48102_116-120	Pandora	Fresh	Coal; with claystone [L13/L12]	8.0	287			0.27	0.21	8.3	9.5	-1.2	1.1						UC(PAF)
48102_122-126	Pandora	Fresh	Siltstone; with coal	8.2	382			0.04	0.04	1.2	38	-36.8	31						NAF
48102_129-138	Pandora	Fresh	Siltstone; sandstone common	8.6	250			0.06	0.05	1.8	55.7	-53.9	30						NAF
48102_148.925-165.375	Pandora	Fresh	Sandstone, medium-coarse	8.8	812			0.04	0.04	1.2	85.5	-84.3	70						NAF
48103_17.125-21.962	Pandora	Distinctly	Siltstone	8.5	993														
48103_32-41	Pandora	Fresh	Siltstone; with sandstone	8.6	463														
48103_60.091-68.597	Pandora	Fresh	Sandstone, fine-medium	8.4	751														
48103_92.641-95.306	Pandora	Fresh	Siltstone	8.0	892														
48103_95-97	Pandora	Fresh	Claystone; with tuff	7.6	843			0.11	0.03	3.4	10.9	-7.5	3						NAF
48103_104.157-109.028	Pandora	Fresh	Sandstone, medium-coarse	8.2	1020			0.05	0.04	1.5	46.2	-44.7	30						NAF
48103_111-123	Pandora	Fresh	Sandstone, medium	8.6	745														
48103_123.333-125.264	Pandora	Fresh	Claystone	8.2	747			0.06	0.04	1.8	23.1	-21.3	13						NAF
48104_3.108-6.261	Pandora	Extremely	Sandstone, fine-medium	8.5	553														
48104_8-14	Pandora	Distinctly	Siltstone; clayey abundant	7.8	774														
48104_17-20	Pandora	Slightly	Siltstone; sandstone abundant	8.2	628														
48104_19.635-21.795	Pandora	Fresh	Sandstone, medium-coarse; siltstone; minor gravel	8.2	499														
48104_28-31	Pandora	Fresh	Siltstone; clayey abundant	8.1	245			0.05	0.05	1.5	5.3	-3.8	3						NAF
48104_34-41	Pandora	Fresh	Sandstone, fine; clayey abundant cement	8.9	448														
48104_51-58	Pandora	Fresh	Siltstone; clayey abundant	8.7	672			0.03		0.9									UC(NAF)
48104_60.514-61.186	Pandora	Fresh	Tuff; coal common [YT]	8.2	664			0.11	0.1	3.4	12.2	-8.8	4						NAF
48105_2-4	Pandora	Extremely	Siltstone	4.7	1520														
48105_5-8.705	Pandora	Distinctly	Siltstone; sandstone abundant	8.2	1110														
48105_8.705-9.869	Pandora	Distinctly	Sandstone, medium	8.4	773														
48105_14.116-15.055	Pandora	Distinctly	Sandstone, fine; siltstone abundant	8.4	501														

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t				kg H_2SO_4/t	
48105_16.536-18.19	Pandora	Slightly	Carbonaceous Claystone; claystone; minor siltstone	8.4	196			0.15	0.08	4.6	15.7	-11.1	3						NAF
48105_17-22	Pandora	Fresh	Carbonaceous Claystone; tuff, minor coal	8.9	156			0.23	0.07	7.0	6.8	0.2	1						UC(PAF)
48105_24-31	Pandora	Fresh	Sandstone, medium-coarse; coal fragments rare	9.0	511														
48105_35-46	Pandora	Fresh	Siltstone; sandstone common coal rare	9.0	657														
48105_51-52	Pandora	Fresh	Tuff; coal [YT]	9.1	692														
48106_1-3	Other	Extremely	Siltstone	7.2	1830														
48106_4-10.001	Other	Distinctly	Siltstone	8.0	1060														
48106_10.001-13.97	Other	Distinctly	Sandstone, fine-medium	7.9	953														
48106_32-42.714	Other	Fresh	Siltstone; sandstone abundant	8.6	470														
48106_42-53	Other	Fresh	Sandstone, fine; siltstone common	8.7	425														
48106_75-81	Other	Fresh	Sandstone, fine-medium	8.4	601														
48106_83-84	Other	Fresh	Carbonaceous Claystone; coal abundant	8.9	64			0.91	0.87	27.9	13.3	14.6	0						PAF
48106_100.5-108	Other	Fresh	Siltstone	9.0	632														
48106_108-110.048	Other	Fresh	Sandstone, medium; siltstone abundant	9.1	517			0.05	0.05	1.5	214	-212.5	140						NAF
48106_115-116	Other	Fresh	Claystone; carbonaceous common	9.1	435			0.03		0.9									UC(NAF)
48106_116-117	Other	Fresh	Claystone; tuffaceous common sandstone rare	9.2	598														
48107_1.931-3.873	Other	Distinctly	Siltstone; sandstone common	7.9	1340														
48107_11.638-15.52	Other	Distinctly	Siltstone	8.9	386														
48107_21.344-23.285	Other	Distinctly	Siltstone; sandstone abundant	8.8	513														
48107_33.181-41.722	Other	Fresh	Sandstone, fine-medium	8.9	389														
48107_41.722-43.467	Other	Fresh	Siltstone	8.6	608														
48107_44-52	Other	Fresh	Claystone; with sandstone	8.3	827			0.03		0.9									UC(NAF)
48107_59.631-65.501	Other	Fresh	Siltstone; tuffaceous minor	8.7	1060			0.04	<0.02	1.2	40	-38.8	33						NAF
48107_67.459-79.894	Other	Fresh	Sandstone, fine-medium; tuffaceous minor	8.9	864														
48107_79.894-81.465	Other	Fresh	Siltstone	9.0	792			0.04	<0.02	1.2	37.5	-36.3	31						NAF
48107_86.564-91.267	Other	Fresh	Siltstone; tuffaceous rare	8.9	888			0.04	<0.02	1.2	8.4	-7.2	7						NAF
48108_3.15-7.2	Other	Distinctly	Sandstone, fine-medium	8.4	752														
48108_7.2-13.1	Other	Distinctly	Claystone; sandstone abundant	8.5	628														
48108_13.1-14.7	Other	Distinctly	Coal, weathered [L13]	7.5	2200			0.08	<0.02	2.5	30.4	-28.0	12						NAF
48108_14.7-16.11	Other	Distinctly	Claystone	7.2	738														
48108_16.11-16.51	Other	Distinctly	Coal, weathered [L4]	7.4	833			0.07	<0.02	2.1	23	-20.9	11						NAF
48108_17-23	Other	Distinctly	Claystone	8.2	658			0.12	<0.02	3.7	83.4	-79.7	23						NAF
48108_27.661-28.24	Other	Fresh	Carbonaceous Claystone; claystone abundant	8.3	873			0.14	0.07	4.3	13.3	-9.0	3						NAF
48108_32-35	Other	Fresh	Claystone; siltstone	8.2	252			0.05	0.03	1.5	32.7	-31.2	21						NAF
48109_1-4.5	Other	Extremely	Basalt	5.4	2220														
48109_9-12	Other	Distinctly	Siltstone; sandstone abundant	8.0	1290														
48109_12-14	Other	Distinctly	Claystone	8.1	1180														
48109_20-24	Other	Distinctly	Siltstone	8.2	749														
48109_43-54	Other	Fresh	Sandstone, fine-medium	8.5	432														
48109_80-83	Other	Fresh	Claystone; with tuff	8.1	519														
48109_90-93	Other	Fresh	Claystone; carbonaceous minor	8.1	1210			0.03		0.9									UC(NAF)
48109_106-114	Other	Fresh	Sandstone, medium-coarse	8.8	692														
48109_114-115	Other	Fresh	Carbonaceous Claystone	7.7	710			0.04	0.04	1.2	38.7	-37.5	32						NAF
48109_118-12	Other	Fresh	Siltstone; sandstone minor	8.2	904			0.05	<0.02	1.5	12.9	-11.4	8						NAF
48109_123-125	Other	Fresh	Carbonaceous Claystone; coal minor [YT]	8.4	1150			0.06	0.02	1.8	10.2	-8.4	6						NAF

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t				kg H_2SO_4/t	
48109_125-131	Other	Fresh	Siltstone	8.8	1620														
48110_1.6-3.2	Other	Distinctly	Siltstone	8.4	1250														
48110_18.47-19.24	Other	Distinctly	Claystone	8.1	1850			0.03		0.9									UC(NAF)
48110_19.24-25.7	Other	Distinctly	Sandstone, fine-medium; clayey abundant cement	8.1	1000														
48110_31-34	Other	Slightly	Sandstone, fine-medium; siltstone abundant	8.4	763			0.08	0.1	2.5	79.7	-77.3	33						NAF
48110_37-43	Other	Fresh	Siltstone	8.6	774			0.03		0.9									UC(NAF)
48110_43-46	Other	Fresh	Sandstone, fine	8.6	732														
48110_53.02-58.412	Other	Fresh	Sandstone, fine-medium	8.7	654														
48110_69-73	Other	Fresh	Claystone; carbonaceous rare coal	9.0	739			0.04	0.03	1.2	76.9	-75.7	63						NAF
48110_75.817-77.211	Other	Fresh	Siltstone	8.9	852														
48111_1.007-5.033	Other	Extremely	Sandstone, coarse to very coarse	8.6	543														
48111_16.106-18.119	Other	Distinctly	Siltstone	8.3	1290														
48111_18.119-21.139	Other	Distinctly	Sandstone, fine-medium	8.4	911														
48111_27.18-30.779	Other	Slightly	Sandstone, fine-medium	8.7	621														
48111_30.78-32.21	Other	Fresh	Siltstone	8.5	655														
48111_35-45	Other	Fresh	Siltstone	8.9	634			0.03		0.9									UC(NAF)
48111_45.339-51.448	Other	Fresh	Sandstone, fine; siltstone abundant	9.0	739														
48111_52-55	Other	Fresh	Claystone; with coal	9.5	710														
48111_59.291-62.411	Other	Fresh	Siltstone	9.1	740														
48111_63-67	Other	Fresh	Siltstone; carbonaceous claystone	9.1	843			0.07	0.03	2.1	41.8	-39.7	19						NAF
48112_1.03-3.1	Other	Extremely	Siltstone	7.7	2520			0.03		0.9									UC(NAF)
48112_11.38-13.45	Other	Distinctly	Siltstone	8.0	958														
48112_28.97-41.38	Other	Fresh	Siltstone	8.7	443														
48112_59-70	Other	Fresh	Sandstone, fine-medium; with claystone	8.8	407														
48112_66.22-73.041	Other	Fresh	Claystone	8.8	625														
48112_73.05-73.63	Other	Fresh	Tuff; coal common	8.8	551			0.04	0.02	1.2	76	-74.8	62						NAF
48112_79-81	Other	Fresh	Carbonaceous Claystone; with coal	8.9	605			0.04	<0.02	1.2	12.3	-11.1	10						NAF
48112_86-91	Other	Fresh	Siltstone	8.9	918			0.03		0.9									UC(NAF)
48112_93.4-94.54	Other	Fresh	Siltstone	8.6	789			0.06	<0.02	1.8	66.4	-64.6	36						NAF
48112_97-99	Other	Fresh	Claystone; coal common carbonaceous	8.8	599			0.03		0.9									UC(NAF)
48112_99-105	Other	Fresh	Claystone; coal minor	8.8	891			0.03		0.9									UC(NAF)
48112_105.18-109.21	Other	Fresh	Sandstone, coarse; siltstone common coal minor	8.5	538			0.03		0.9									UC(NAF)
48112_109.21-111.22	Other	Fresh	Sandstone, coarse; coal abundant	9.2	578			0.09	<0.02	2.8	78.5	-75.7	28						
48112_115-116	Other	Fresh	Sandstone, coarse; coal abundant	9.4	551			0.07	<0.02	2.1	88.2	-86.1	41						NAF
48112_120.885-121.85	Other	Fresh	Siltstone; coal abundant	9.0	820			0.07	<0.02	2.1	62.3	-60.2	29						NAF
48113_1.97-3.94	Other	Extremely	Siltstone	6.0	1520														
48113_19.957-24.421	Other	Distinctly	Sandstone, medium; clayey abundant cement	8.2	787														
48113_34.524-36.544	Other	Fresh	Siltstone	8.6	607														
48113_37-48	Other	Fresh	Siltstone	8.5	562														
48113_59-64	Other	Fresh	Sandstone, fine-medium; siltstone abundant	7.7	1050														
48113_64-66	Other	Fresh	Siltstone	7.9	893			0.06	0.06	1.8	17.6	-15.8	10						NAF
48113_72.23-72.82	Other	Fresh	Carbonaceous Claystone; carbonaceous abundant coal	8.2	754			0.43	0.36	13.2	1.9	11.3	0						PAF-LC
48113_73.462-80.653	Other	Fresh	Siltstone	8.2	899			0.07	0.05	2.1	13.2	-11.1	6						NAF
48113_88-92	Other	Fresh	Siltstone	8.5	1310			0.07	0.04	2.1	47.2	-45.1	22						NAF
48113_98-102	Other	Fresh	Siltstone	8.5	1420														

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Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t				kg H_2SO_4/t	
48113_101.423-102.693	Other	Fresh	Claystone; carbonaceous abundant	8.4	904			0.08	<0.02	2.5	21.2	-18.8	9						NAF
48113_102.91-106.185	Other	Fresh	Siltstone	8.4	1330			0.05	0.02	1.5	12.3	-10.8	8						NAF
48114_2.17-3.81	Other	Distinctly	Claystone; carbonaceous abundant	8.0	822														
48114_7-9	Other	Distinctly	Claystone; carbonaceous abundant	7.7	1490														
48114_10.276-18.008	Other	Distinctly	Sandstone, medium-coarse	8.4	897														
48114_24.68-26.18	Other	Fresh	Sandstone, medium	8.6	620														
48114_26-27	Other	Fresh	Siltstone; with sandstone	8.4	603			0.05	0.04	1.5	95	-93.5	62						NAF
48114_26.81-27.41	Other	Fresh	Claystone; coal abundant	8.4	469			0.23	0.15	7.0	55.6	-48.6	8						NAF
48114_30-40	Other	Fresh	Siltstone	8.4	565			0.03		0.9									UC(NAF)
48114_42-43	Other	Fresh	Tuff; coal abundant [YT]	8.8	367			0.13	0.02	4.0	71.4	-67.4	18						NAF
48115_7.291-14.581	Other	Distinctly	Sandstone, medium-coarse; minor siltstone	7.8	887														
48115_19.902-22.804	Other	Distinctly	Siltstone; sandstone common	8.0	656														
48115_31-43	Other	Fresh	Sandstone, medium-coarse; siltstone	8.4	461														
48115_73-85	Other	Fresh	Siltstone; sandstone common; micaceous	8.5	476														
48115_92-98	Other	Fresh	Claystone; siltstone abundant	8.2	773			0.06	0.05	1.8	46.7	-44.9	25						NAF
48115_98-100	Other	Fresh	Sandstone, fine-medium; minor siltstone	8.7	554														
48115_102-103	Other	Fresh	Siltstone; claystone	8.6	571			0.03		0.9									UC(NAF)
48115_106-112	Other	Fresh	Siltstone	9.1	715														
48115_112-120	Other	Fresh	Claystone; cabonaceous claystone	8.8	880														
48115_122-130	Other	Fresh	Claystone; siltstone; tuffaceous	8.8	1070			0.03		0.9									UC(NAF)
48116_3-6	Other	Distinctly	Siltstone; sandstone abundant	7.8	2090														
48116_10-14	Other	Distinctly	Sandstone, fine-medium; siltstone common	8.3	920														
48116_19-20	Other	Distinctly	Siltstone; sandstone abundant	8.4	558														
48116_23-31	Other	Fresh	Siltstone	8.5	496														
48116_38-39	Other	Fresh	Claystone	8.3	587			0.15	0.12	4.6	9.4	-4.8	2						NAF
48116_42-44	Other	Fresh	Sandstone, fine; siltstone abundant near top of unit	8.8	484			0.03		0.9									UC(NAF)
48116_53-58	Other	Fresh	Siltstone; sandstone abundant	8.8	526														
48116_63-64	Other	Fresh	Siltstone	8.6	757			0.03		0.9									UC(NAF)
48116_66-67	Other	Fresh	Tuff; carbonaceous abundant [YT]	9.0	670			0.04	<0.02	1.2	89.4	-88.2	73						NAF
48116_68-72	Other	Fresh	Claystone; siltstone common	9.0	793			0.04	<0.02	1.2	31.4	-30.2	26						NAF
48117_1.001-3.004	Other	Extremely	Siltstone; sandstone rare	7.4	1870														
48117_11.016-14.02	Other	Distinctly	Siltstone	7.5	1520														
48117_26.038-28.041	Other	Fresh	Siltstone; sandstone minor near base of unit	8.2	933			0.07	<0.02	2.1	15.8	-13.7	7						NAF
48117_30-42	Other	Fresh	Siltstone; sandstone rare	8.2	724														
48117_52.89-60.219	Other	Fresh	Sandstone, medium	8.3	400														
48117_70.94-83.569	Other	Fresh	Sandstone, medium; siltstone minor	8.4	499														
48117_84-87	Other	Fresh	Claystone	8.4	761														
48117_93.403-99.65	Other	Fresh	Siltstone; clayey common	8.5	845			0.03		0.9									UC(NAF)
48117_106-120	Other	Fresh	Sandstone, medium-coarse	8.8	751														
48117_137-145	Other	Fresh	Siltstone; clayey abundant	8.8	1370														
48117_156-158	Other	Fresh	Coal, inferior [V23]	8.8	788			0.11	0.02	3.4	42.2	-38.8	13						NAF
48117_159-162	Other	Fresh	Claystone; carbonaceous abundant	9.0	1140			0.07	0.02	2.1	37.4	-35.3	17						NAF
48122_1.5-4	Other	Extremely	Sandstone, medium; siltstone common	8.2	1180														
48122_6-13	Other	Distinctly	Siltstone; sandstone abundant near top of unit	8.3	1840														
48122_14-27	Other	Distinctly	Claystone; siltstone common	8.2	1720														

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t				kg H_2SO_4/t	
48122_38-41	Other	Slightly	Claystone; siltstone common	8.4	860														
48122_58.437-61.398	Other	Fresh	Sandstone, fine; claystone	8.6	566														
48122_73.641-81.052	Other	Fresh	Siltstone; clayey abundant	8.6	679														
48122_109-118	Other	Fresh	Siltstone; clayey; tuffaceous; calcite	8.4	893														
48122_127-134	Other	Fresh	Claystone; calcite minor near top of unit near middle of unit	8.4	874														
48122_135-140	Other	Fresh	Claystone; coal	8.4	394			0.15	<0.02	4.6	19.9	-15.3	4						NAF
48122_151-154	Other	Fresh	Sandstone, fine-medium; siltstone	8.6	879														
48122_160-162	Other	Fresh	Siltstone; claystone minor coal	8.6	734			0.05	<0.02	1.5	43.4	-41.9	28						NAF
48122_164-178	Other	Fresh	Claystone; siltstone common; minor coal	8.6	980			0.03		0.9									UC(NAF)
48122_185-190	Other	Fresh	Claystone; carbonaceous; minor coal; minor tuff	8.6	1470			0.05	<0.02	1.5	56.7	-55.2	37						NAF
48123_1.5-3	Other	Extremely	Sandstone, medium	8.3	1640														
48123_15-21	Other	Distinctly	Claystone; siltstone common	8.2	1040														
48123_33-44	Other	Slightly	Claystone; siltstone common sandstone minor	8.4	525														
48123_43.84-46.221	Other	Fresh	Coal [L13/L12]	8.2	441			0.07	0.02	2.1	11.3	-9.2	5						NAF
48123_51-58	Other	Fresh	Claystone	8.3	757			0.08	0.06	2.5	38.1	-35.7	16						NAF
48123_64-74	Other	Fresh	Sandstone, medium	8.6	666			0.03		0.9									UC(NAF)
48123_74-79	Other	Fresh	Claystone	8.6	695			0.03		0.9									UC(NAF)
48123_83-85	Other	Fresh	Claystone	8.6	527			0.04	0.02	1.2	15.7	-14.5	13						NAF
48123_89-92	Other	Fresh	Sandstone, medium; siltstone	8.6	875			0.06	<0.02	1.8	27.3	-25.5	15						NAF
175028_2-6	Other	Extremely	Sand			8.5	120												
175028_9-13	Other	Extremely	Claystone; minor sandstone bands throughout			8.6	510												
175028_15-18	Other	Fresh	Sandstone, fine-medium; coarser bands throughout			8.8	380												
175028_18-21	Other	Fresh	Sandstone, fine; coarser bands throughout			8.8	310												
175028_21-24	Other	Fresh	Siltstone; carbonaceous near base of unit			8.6	260												
175028_24-25	Other	Fresh	Coal [L13/L12]			8.2	270												
175028_25-26	Other	Fresh	Coal [L13/L12]			7.9	300												
175028_26-30	Other	Fresh	Coal [L13/L3]			4.5	360				0.2			2.4		25			UC(PAF)
175028_30-31	Other	Fresh	Carbonaceous Siltstone; minor sandstone			3.1	1000				<0.1			2.3		22			UC(PAF)
175028_31-32	Other	Fresh	Coal [L4]			7.9	290												
175028_32-33	Other	Fresh	Sandstone, fine; finer bands throughout			8.2	400												
175028_33-38	Other	Fresh	Sandstone, fine-medium			8.8	340												
175028_42-48	Other	Fresh	Sandstone, fine-medium; finer bands near base of unit			9.1	240												
175028_48.24-50.24	Other	Fresh	Sandstone, very fine; minor siltstone bands			9.2	240												
175028_50-51	Other	Fresh	Carbonaceous Siltstone; coaly bands			9.0	340												
175028_51-52	Other	Fresh	Coal [V1]			9.0	250												
175028_52-54	Other	Fresh	Coal [V1]			9.2	190												
175028_54-55	Other	Fresh	Carbonaceous Siltstone			9.4	280												
175028_55.24-59.24	Other	Fresh	Sandstone, very fine; carbonaceous			9.3	310												
175028_59.24-61.24	Other	Fresh	Sandstone, fine			9.4	310												
175028_61.24-62.15	Other	Fresh	Carbonaceous Siltstone; minor sandstone bands			9.5	320												
175028_62-64	Other	Fresh	Coal [V3]			9.6	240												
175028_64-65	Other	Fresh	Coal [VL]			9.8	350												
175028_65-66	Other	Fresh	Carbonaceous Siltstone; coaly well sorted throughout			9.5	420												
175028_66.24-68.24	Other	Fresh	Sandstone, very fine; carbonaceous			9.6	440												
175310_0-1	Other	Extremely	Soil			7.7	210												

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t				kg H_2SO_4/t	
175310_1-9	Other	Extremely	Sandstone, fine-medium; coarser bands throughout			8.4	180												
175310_9-11	Other	Extremely	Siltstone; sandstone bands throughout			8.7	280												
175310_11-15	Other	Distinctly	Siltstone; sandstone bands throughout			8.6	260												
175310_15-16	Other	Slightly	Siltstone; occasional carbonaceous bands			8.6	220												
175310_16-18	Other	Slightly	Coal, weath.; carb. bands near top of unit [L13/L12]			8.4	180												
175310_18-21	Other	Fresh	Coal [L13/L3]			7.5	160												
175310_21-23	Other	Fresh	Carbonaceous Siltstone; coaly wisps			7.8	180												
175310_23-24	Other	Fresh	Coal; abundant carbonaceous bands [L4]			8.3	190												
175310_24.001-26	Other	Fresh	Siltstone; occasional sandstone bands			8.7	400												
175310_26-34	Other	Fresh	Siltstone; sandstone bands			8.9	290												
175310_34-35	Other	Fresh	Siltstone; sandstone bands			9.0	330												
175310_35-36	Other	Fresh	Siltstone			8.2	590												
175310_36-38	Other	Fresh	Coal; carbonaceous bands throughout [V1]			7.8	550												
175310_38-41	Other	Fresh	Siltstone; occasional carbonaceous bands			8.7	380												
175310_41-49	Other	Fresh	Siltstone; sandstone bands throughout			9.2	280												
175310_49-52	Other	Fresh	Sandstone, medium; siltstone bands throughout			9.4	230												
175310_52-54	Other	Fresh	Tuff [YT]			9.3	250												
175310_53.999-55.998	Other	Fresh	Sandstone, medium			9.3	290												
175310_55.998-64	Other	Fresh	Siltstone; occasional carbonaceous bands sandstone			9.2	320												
175310_64-72	Other	Fresh	Sandstone, medium			9.4	240												
175310_72-75	Other	Fresh	Siltstone; sandstone bands near base of unit			9.3	380												
175310_75-78	Other	Fresh	Siltstone; coaly with carbonaceous bands			9.4	300												
175310_78-80	Other	Fresh	Coal; occasional siltstone bands carbonaceous [UN]			9.4	420												
175310_80-80.998	Other	Fresh	Siltstone; carbonaceous bands near top of unit			9.5	330												
175310_80.998-90	Other	Fresh	Sandstone, medium; siltstone bands near top of unit			9.4	360												
175387_0-3	Other	Extremely	Soil; clayey near base of unit			8.3	380												
175387_3-5	Other	Extremely	Clay; sandy bands throughout			8.8	810												
175387_5-9	Other	Extremely	Claystone; occasional sandstone bands throughout			8.5	820												
175387_9-11	Other	Extremely	Sandstone, fine; claystone bands; minor siltstone			8.5	740												
175387_11-11.961	Other	Extremely	Siltstone; carbonaceous bands near base of unit			8.5	680												
175387_12-15	Other	Extremely	Carbonaceous Siltstone; coaly bands throughout			7.3	920												
175387_15-16	Other	Extremely	Coal; siltstone [L4]			6.9	110												
175387_16-18	Other	Distinctly	Siltstone; sandstone bands throughout			7.7	970												
175387_18-26	Other	Slightly	Siltstone; occasional sandstone bands			8.6	640												
175387_26-28.771	Other	Fresh	Sandstone, medium; siltstone bands throughout			9.2	350												
175387_28-29	Other	Fresh	Sandstone, medium; siltstone bands throughout			9.1	370												
175387_29.168-31.041	Other	Fresh	Coal; carbonaceous bands throughout [V1]			9.0	370												
175401_0-2	Other	Extremely	Soil			8.3	730												
175401_2-4	Other	Extremely	Clay			7.1	1400												
175401_4-6	Other	Extremely	Claystone			6.4	1200												
175401_6-8	Other	Extremely	Sandstone, fine			8.6	750												
175401_8-12	Other	Extremely	Siltstone			8.7	670												
175401_11.575-15.101	Other	Extremely	Sandstone, fine-medium			8.8	540												
175401_15-16	Other	Slightly	Coal, weathered; sandstone [V1]			8.2	540												
175401_16-17	Other	Slightly	Coal, weathered; carbonaceous siltstone [V1]			8.6	340												

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t				kg H_2SO_4/t	
175401_17-18	Other	Slightly	Carbonaceous Siltstone			8.5	530												
175401_18-25	Other	Fresh	Siltstone; sandstone			9.0	450												
175401_25.001-26.023	Other	Fresh	Sandstone, medium			9.2	340												
175401_26.023-27.846	Other	Fresh	Siltstone			9.2	350												
175401_27.846-33.492	Other	Fresh	Sandstone, medium			9.4	270												
175401_33.492-36.503	Other	Fresh	Siltstone			9.3	310												
175401_36-39	Other	Fresh	Sandstone, medium			9.4	250												
175401_39-47	Other	Fresh	Siltstone			9.2	310												
175401_46.418-54.495	Other	Fresh	Sandstone, medium			9.5	220												
175401_54-63	Other	Fresh	Siltstone			9.4	280												
175401_63-64	Other	Fresh	Carbonaceous Siltstone [V23]			9.4	270												
175401_64-65	Other	Fresh	Coal [V23]			9.6	270												
175401_65-66	Other	Fresh	Coal [VL]			9.5	250												
175401_66-78	Other	Fresh	Sandstone, medium			9.6	230												
177204_1.5-1.7	Pandora	Weathered	Sandy Clay			8.5	170	0.42	0.012	12.9	139	-126.1	10.8						NAF
				ABCC ANC@pH4.5 = 142 kg H2SO4/t; % ANC readily avail. = 102%; Likely carbonate mineral = Dolomite														
177204_2.5-2.7	Pandora	Weathered	Clayey Sand			8.4	145	0.01		0.3	103	-102.7	336.3						NAF
177204_3.8-4	Pandora	Weathered	Sandstone, fine-medium; ferruginous nodules			8.4	187	<0.01		0.2	50	-50.0	327.8						NAF
177204_5.7-5.9	Pandora	Weathered	Sandstone, fine-medium; ferruginous nodules			8.5	232	<0.01		0.2	68	-67.3	440.8						NAF
177204_6.7-6.9	Pandora	Weathered	Sandstone, fine-medium; ferruginous			8.7	178	<0.01		0.2	88	-88.2	577.3						NAF
177204_8.4-8.6	Pandora	Weathered	Mudstone; clayey throughout			8.4	419	0.09		2.8	93	-90.2	33.7						NAF
177204_9.3-9.5	Pandora	Weathered	Mudstone; clayey throughout			8.3	414	<0.01		0.2	15	-14.8	98.0						NAF
177204_9.7-9.9	Pandora	Weathered	Siltstone; clayey throughout			8.2	494	<0.01		0.2	65	-64.8	424.5						NAF
177204_11-11.2	Pandora	Weathered	Sandstone, fine; siltstone bands throughout			8.4	408	<0.01		0.2	75	-74.4	487.2						NAF
177204_12-12.2	Pandora	Weathered	Sandstone, fine; siltstone bands throughout			8.4	377	<0.01		0.2	66	-65.8	431.0						NAF
177204_13-13.3	Pandora	Weathered	Sandstone, very fine; abundant siltstone throughout			8.4	371	<0.01		0.2	20	-19.4	128.0						NAF
177204_14-14.3	Pandora	Weathered	Sandstone, very fine; abundant siltstone throughout			8.4	414	0.02		0.6	60	-59.3	97.8						NAF
177204_15-15.2	Pandora	Weathered	Sandstone, fine; siltstone laminae			8.6	320	<0.01		0.2	78	-77.6	508.1						NAF
177204_16-16.2	Pandora	Weathered	Siltstone; mudstone throughout			8.4	311	<0.01		0.2	17	-17.2	113.6						NAF
177204_16.4-16.6	Pandora	Weathered	Siltstone			8.6	280	<0.01		0.2	54	-53.6	351.3						NAF
177204_17.4-17.6	Pandora	Weathered	Sandstone, fine; siltstone bands throughout			8.4	300	<0.01		0.2	23	-22.8	150.2						NAF
177204_18.06-18.26	Pandora	Weathered	Siltstone			8.5	271	<0.01		0.2	22	-22.2	146.3						NAF
177204_18.81-19	Pandora	Weathered	Sandstone, fine; siltstone laminae throughout			8.7	246	<0.01		0.2	84	-83.4	546.0						NAF
177204_19.4-19.6	Pandora	Weathered	Sandstone, fine; siltstone nodules near base of unit			8.6	277	<0.01		0.2	108	-107.8	705.3						NAF
177204_20.1-20.3	Pandora	Weathered	Siltstone; mudstone throughout			8.5	239	<0.01		0.2	12	-11.5	76.4						NAF
177204_21.1-21.3	Pandora	Weathered	Siltstone; sandstone mudstone bands			8.2	128	0.02		0.6	16	-14.9	25.3						NAF
177204_22.4-22.6	Pandora	Weathered	Mudstone			7.6	160	0.02		0.6	11	-10.1	17.5						NAF
177204_23-23.2	Pandora	Weathered	Carbonaceous Mudstone			7.9	196	0.09	0.026	2.8	11	-8.1	4.0	5.1	<0.1	2.8			NAF
				ABCC ANC@pH4.5 = 2.3 kg H2SO4/t; % ANC readily avail. = 21%; Likely carbonate mineral = Siderite														
177204_23.26-23.41	Pandora	Weathered	Coal, weathered; heat affected [L1]			7.7	112	0.09		2.8	9.7	-6.9	3.5						NAF
177204_23.41-23.54	Pandora	Weathered	Coal, weathered; heat affected [L1]			7.4	96	0.2	0.012	6.1	9.5	-3.4	1.6				2.2	<0.1	PAF-LC
177204_24.2-24.4	Pandora	Fresh	Coal, 10-40% bright; heat affected [L1]			8.1	129	0.6	0.03	18.4	9.4	9.0	0.5				2.4	0.9	PAF-LC
177204_24.7-24.9	Pandora	Fresh	Claystone [L1]			7.1	546	0.76	0.729	23.3	16	7.3	0.7	2.6	12.6	16.6			PAF-LC
				ABCC ANC@pH4.5 = 2.2 kg H2SO4/t; % ANC readily avail. = 14%; Likely carbonate mineral = Siderite														

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t			kg H_2SO_4/t	
177204_25.7-26	Pandora	Fresh	Coal, <10% bright; heat affected [L1]			7.3	78	0.22	0.015	6.7	9.0	-2.3	1.3				2.6	<0.1	PAF-LC
177204_26.33-26.6	Pandora	Fresh	Coal, <10% bright [L1]			6.9	70	0.26	0.033	8.0	11	-2.6	1.3				2.7	<0.1	PAF-LC
177204_26.8-27.13	Pandora	Fresh	Coal, 10-40% bright [L1]			7.5	36	0.27	0.046	8.3	8.4	-0.1	1.0				2.7	<0.1	PAF-LC
177204_28-28.26	Pandora	Fresh	Coal, <10% bright [L1]			7.5	215	0.52	0.259	15.9	0.6	15.3	0.0				2.8	5.9	PAF
177204_28.26-28.5	Pandora	Fresh	Carbonaceous Mudstone			8.2	187	0.28	0.092	8.6	9.3	-0.7	1.1	3.1	7.6	17.6			UC(PAF)
177204_29.4-29.6	Pandora	Fresh	Mudstone			8.2	225	0.06		1.8	10	-8.3	5.5						NAF
177204_31.5-31.7	Pandora	Fresh	Mudstone; siltstone in part; clayey in part			8.0	386	0.04		1.2	15	-14.0	12.4						NAF
177204_33-33.2	Pandora	Fresh	Mudstone; siltstone in part; clayey in part			8.2	317	0.1	0.08	3.1	24	-21.1	7.9	7.8	<0.1	<0.1			NAF
				ABCC ANC@pH4.5 = 5.3 kg H2SO4/t; % ANC readily avail. = 22%; Likely carbonate mineral = Siderite														
177204_34.5-34.7	Pandora	Fresh	Sandstone, fine-medium; rare siltstone laminae			8.7	437	0.12	0.103	3.7	68	-64.0	18.4	9.3	<0.1	<0.1			NAF
177204_35.8-36	Pandora	Fresh	Sandstone, fine-medium			8.9	335	0.06		1.8	68	-66.0	36.9						NAF
177204_37-37.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands			9.1	280	0.02		0.6	62	-61.1	100.7						NAF
177204_38.5-38.7	Pandora	Fresh	Sandstone, fine-medium; carbonaceous wisps			9.2	248	0.01		0.3	62	-62.0	203.4						NAF
177204_40.6-40.8	Pandora	Fresh	Sandstone, fine-medium; carb. wisps; calcite cement			9.2	242	0.02		0.6	58	-57.3	94.5						NAF
177204_41.2-41.4	Pandora	Fresh	Sandstone, fine-medium			9.1	248	0.02		0.6	55	-54.5	90.0						NAF
177204_42.2-42.4	Pandora	Fresh	Sandstone, fine; siltstone throughout			9.1	235	0.03		0.9	25	-24.3	27.4						NAF
177204_42.8-43	Pandora	Fresh	Sandstone, fine; siltstone bands throughout			9.2	266	0.03		0.9	32	-30.6	34.3						NAF
177204_43.5-43.7	Pandora	Fresh	Sandstone, fine-medium; siltstone in part; calcite in veins			9.3	240	0.14	0.044	4.3	51	-46.6	11.9	8.8	<0.1	<0.1			NAF
177204_44.29-44.48	Pandora	Fresh	Sandstone, fine; siltstone wisps			9.1	285	0.15	0.129	4.6	30	-24.9	6.4	8.5	<0.1	<0.1			NAF
				ABCC ANC@pH4.5 = 11 kg H2SO4/t; % ANC readily avail. = 36%; Likely carbonate mineral = Fe-Dolomite & Siderite														
177204_45.5-45.7	Pandora	Fresh	Sandstone, fine-medium; siltstone bands; calcite cement			9.2	246	0.02		0.6	24	-23.5	39.3						NAF
177204_47.5-47.7	Pandora	Fresh	Sandstone, fine-medium; siltstone bands; calcite cement			9.2	254	0.03		0.9	28	-27.1	30.5						NAF
177204_49-49.2	Pandora	Fresh	Sandstone, fine; siltstone throughout			9.2	277	0.04		1.2	94	-92.8	76.7						NAF
177204_50-50.2	Pandora	Fresh	Sandstone, fine; siltstone throughout			9.3	248	0.02		0.6	55	-54.0	89.1						NAF
177204_50.9-51.1	Pandora	Fresh	Sandstone, fine; siltstone throughout			9.2	254	0.03		0.9	29	-28.2	31.7						NAF
177204_52.5-52.7	Pandora	Fresh	Sandstone, fine; siltstone laminae; calcite in veins			9.2	296	0.02		0.6	37	-36.4	60.4						NAF
177204_53.1-53.36	Pandora	Fresh	Sandstone, fine; siltstone throughout			9.2	261	0.02		0.6	28	-27.6	46.0						NAF
177204_54-54.2	Pandora	Fresh	Sandstone, fine; siltstone laminae throughout			9.2	267	0.02		0.6	66	-65.2	107.4						NAF
177204_55-55.2	Pandora	Fresh	Sandstone, fine; siltstone bands; calcite cement			9.1	297	0.05		1.5	28	-26.2	18.1						NAF
177204_56.5-56.7	Pandora	Fresh	Sandstone, fine; siltstone bands; calcite cement			9.3	279	0.02		0.6	85	-84.5	138.9						NAF
177204_57.6-57.8	Pandora	Fresh	Sandstone, fine; siltstone throughout; calcite cement			9.1	312	0.02		0.6	111	-110.4	181.2						NAF
177204_58.2-58.4	Pandora	Fresh	Siltstone; mudstone throughout			9.1	321	0.02		0.6	54	-53.1	87.7						NAF
177204_59-59.2	Pandora	Fresh	Carbonaceous Mudstone; mudstone near top of unit			7.9	544	0.28	0.157	8.6	11	-2.0	1.2	4.0	1.1	12.2			UC(NAF)
				ABCC ANC@pH4.5 = 2.8 kg H2SO4/t; % ANC readily avail. = 26%; Likely carbonate mineral = Siderite														
177204_59.2-59.36	Pandora	Fresh	Coal, dull <1% bright [V1]			9.0	192	0.45	0.211	13.8	13	1.3	0.9				9.1	<0.1	UC(NAF)
177204_59.9-60.2	Pandora	Fresh	Coal, 10-40% bright			9.0	139	0.31	0.091	9.5	8.1	1.4	0.9				6.2	<0.1	UC(NAF)
177204_62.26-62.66	Pandora	Fresh	Coal, <10% bright [V1]			8.4	56	0.36	0.079	11.0	1.4	9.6	0.1				2.8	<0.1	PAF-LC
177204_63.78-63.86	Pandora	Fresh	Tuff			8.7	255	0.04		1.2	13	-12.2	10.9						NAF
177204_64.32-64.64	Pandora	Fresh	Coal, dull <1-10% bright [V1]			8.9	95	0.29	0.042	8.9	2.7	6.2	0.3				5.3	<0.1	UC(PAF)
177204_65.74-65.87	Pandora	Fresh	Mudstone			9.0	347	0.16	0.149	4.9	49	-44.1	10.0	8.2	<0.1	<0.1			NAF
				ABCC ANC@pH4.5 = 33 kg H2SO4/t; % ANC readily avail. = 67%; Likely carbonate mineral = Fe-Dolomite														
177204_66.16-66.36	Pandora	Fresh	Coal, <10% bright [V1]			8.4	156	0.52	0.234	15.9	3.3	12.6	0.2				3.5	2.5	PAF-LC
177204_66.36-66.64	Pandora	Fresh	Mudstone; carbonaceous bands throughout			8.5	323	0.08		2.5	14	-11.3	5.6						NAF
177204_66.7-66.9	Pandora	Fresh	Siltstone; mudstone laminae throughout			9.3	349	0.05		1.5	19	-17.5	12.4						NAF
177204_67-67.2	Pandora	Fresh	Sandstone, very fine; siltstone laminae throughout			9.2	410	0.02		0.6	22	-21.4	35.9						NAF

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t				kg H_2SO_4/t	
177204_67.51-67.65	Pandora	Fresh	Coal, inferior; sparse disseminated nodules			9.3	383	0.16	0.078	4.9	36	-31.4	7.4				8.1	<0.1	NAF
			ABCC ANC@pH4.5 = 21 kg H2SO4/t; % ANC readily avail. = 58%; Likely carbonate mineral = Fe-Dolomite																
177204_68-68.2	Pandora	Fresh	Mudstone			9.2	351	0.31	0.217	9.5	15	-5.9	1.6	5.8	<0.1	0.7			NAF
177212_0.5-0.7	Pandora	Weathered	Alluvium; muddy sub angular in part			8.1	285	0.01		0.3	40.3	-40.0	131.6						NAF
177212_2-2.2	Pandora	Weathered	Sandstone, fine-medium; soft clayey			8.4	338	0.01		0.3	70.6	-70.3	230.5						NAF
177212_3-3.2	Pandora	Weathered	Sandstone, fine-medium; soft clayey			8.7	272	<0.01		0.2	87	-86.8	568.2						NAF
177212_4.2-4.4	Pandora	Weathered	Siltstone; sub angular bands throughout			8.6	361	0.01		0.3	23.4	-23.1	76.4						NAF
177212_5.8-6	Pandora	Weathered	Siltstone; rare sub angular bands near top of unit			8.0	263	<0.01		0.2	5.7	-5.5	37.2						NAF
177212_7-7.2	Pandora	Weathered	Siltstone; sub angular in part			7.9	311	0.01		0.3	7.7	-7.4	25.1						NAF
177212_8-8.2	Pandora	Weathered	Siltstone; sub angular in part			8.6	512	0.01		0.3	49.8	-49.5	162.6						NAF
			ABCC ANC@pH4.5 = 42 kg H2SO4/t; % ANC readily avail. = 85%; Likely carbonate mineral = Dolomite																
177212_9.3-9.5	Pandora	Weathered	Sandstone, fine; minor clayey bands			8.1	403	0.01		0.3	8	-7.7	26.1						NAF
177212_11-11.2	Pandora	Weathered	Sandstone, medium; rare calcareous veins			7.9	477	0.01		0.3	10.8	-10.5	35.3						NAF
177212_11.9-12.1	Pandora	Weathered	Sandstone, medium			7.8	421	<0.01		0.2	6.8	-6.6	44.4						NAF
177212_13-13.2	Pandora	Weathered	Siltstone; occasional sandstone bands			8.2	582	<0.01		0.2	10.2	-10.0	66.6						NAF
			ABCC ANC@pH4.5 = 8.6 kg H2SO4/t; % ANC readily avail. = 84%; Likely caronate mineral = Fe-Dolomite																
177212_14.2-14.4	Pandora	Weathered	Siltstone; occasional sandstone bands			7.6	401	0.01		0.3	6.4	-6.1	20.9						NAF
177212_15.5-15.7	Pandora	Weathered	Siltstone; sub angular laminae throughout			7.5	377	0.01		0.3	3	-2.7	9.8						NAF
177212_16.5-16.75	Pandora	Weathered	Carbonaceous Siltstone			7.6	295	0.01		0.3	6	-5.7	19.6						NAF
177212_18.3-18.5	Pandora	Weathered	Carbonaceous Mudstone			7.7	254	0.01		0.3	5.4	-5.1	17.6						NAF
177212_19.06-19.25	Pandora	Weathered	Carbonaceous Siltstone			7.6	237	0.01		0.3	6	-5.7	19.6						NAF
177212_19.5-19.7	Pandora	Weathered	Siltstone; siderite sporadic bands			7.7	232	0.01		0.3	4.3	-4.0	14.0						NAF
177212_20.22-20.42	Pandora	Weathered	Carbonaceous Siltstone; carbonaceous in part			7.6	262	0.01		0.3	3.4	-3.1	11.1						NAF
177212_21.06-21.28	Pandora	Weathered	Mudstone			7.8	282	<0.01		0.2	7	-6.8	45.7						NAF
177212_21.28-21.48	Pandora	Weathered	Siltstone			7.9	253	0.01		0.3	6.6	-6.3	21.6						NAF
177212_22.2-22.4	Pandora	Weathered	Carbonaceous Mudstone			7.6	263	0.03		0.9	3.9	-3.0	4.2						NAF
177212_23-23.2	Pandora	Weathered	Mudstone; siltstone in part throughout			8.0	323	0.02		0.6	4.4	-3.8	7.2						NAF
177212_24.09-24.21	Pandora	Weathered	Clay			8.2	315	0.03		0.9	30.4	-29.5	33.1						NAF
177212_24.21-24.42	Pandora	Fresh	Coal, <10% bright [L12]			7.6	173	0.46	0.219	14.1	1.3	12.8	0.1				2.3	5.5	PAF
177212_24.75-24.95	Pandora	Fresh	Coal, 10-40% bright [L12]			7.1	167	0.5	0.262	15.3	1.1	14.2	0.1				2.5	7.3	PAF
177212_26-26.2	Pandora	Fresh	Coal, 10-40% bright [L12]			5.2	140	0.44	0.237	13.5	0.9	12.6	0.1				2.5	7.0	PAF
177212_28.18-28.39	Pandora	Fresh	Coal, <10% bright [L12]			5.0	138	0.5	0.302	15.3	<0.5	15.3	0.0				2.3	10.2	PAF
177212_28.8-29	Pandora	Fresh	Coal, 40-60% bright [L12]			4.9	324	2.21	1.8	67.7	1.4	66.3	0.0				1.8	54.2	PAF
177212_29.02-29.18	Pandora	Fresh	Mudstone			7.7	363	0.74	0.722	22.7	3.2	19.5	0.1	2.5	19.6	24.5			PAF
177212_29.8-30	Pandora	Fresh	Mudstone			8.2	314	0.04		1.2	3.9	-2.7	3.2						NAF
177212_31-31.2	Pandora	Fresh	Mudstone; coaly wisps throughout			8.2	352	0.04		1.2	7.4	-6.2	6.0						NAF
177212_31.31-31.53	Pandora	Fresh	Carbonaceous Mudstone			8.4	432	0.11	0.062	3.4	10.3	-6.9	3.1	6.6	<0.1	0.2			NAF
			ABCC ANC@pH4.5 = 2.9 kg H2SO4/t; % ANC readily avail. = 28%; Likely carbonate mineral = Siderite																
177212_32.14-32.43	Pandora	Fresh	Mudstone			8.3	465	0.04		1.2	9.4	-8.2	7.7						NAF
177212_33.45-33.65	Pandora	Fresh	Mudstone			8.4	459	0.02		0.6	7.4	-6.8	12.1						NAF
177212_35-35.2	Pandora	Fresh	Siltstone; mudstone throughout			7.9	690	0.11	0.081	3.4	5	-1.6	1.5	6.6	<0.1	0.2			NAF
177212_35.81-35.96	Pandora	Fresh	Siltstone; mudstone throughout; trace siderite			8.5	400	0.03		0.9	23.9	-23.0	26.0						NAF
			ABCC ANC@pH4.5 = 9.5 kg H2SO4/t; % ANC readily avail. = 40%; Likely carbonate mineral = Fe-Dolomite																
177212_36.24-36.45	Pandora	Fresh	Sandstone, fine; siltstone bands throughout			8.8	385	0.02		0.6	83.1	-82.5	135.7						NAF

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t				kg H_2SO_4/t	
177212_38-38.2	Pandora	Fresh	Sandstone, fine; siltstone bands throughout			8.8	408	0.04		1.2	15.7	-14.5	12.8						NAF
			ABCC ANC@pH4.5 = 8.6 kg H2SO4/t; % ANC readily avail. = 55%; Likely carbonate mineral = Fe-Dolomite																
177212_39.5-39.7	Pandora	Fresh	Sandstone, fine-medium; carb. siltstone wisps			8.9	513	0.03		0.9	48.9	-48.0	53.2						NAF
177212_41-41.2	Pandora	Fresh	Sandstone, medium; carb. laminae; calcite rare			9.0	415	0.02		0.6	57.4	-56.8	93.7						NAF
			ABCC ANC@pH4.5 = 54 kg H2SO4/t; % ANC readily avail. = 93%; Likely carbonate mineral = Dolomite																
177212_42.25-42.45	Pandora	Fresh	Sandstone, medium			8.6	459	0.03		0.9	48.4	-47.5	52.7						NAF
177212_43.1-43.3	Pandora	Fresh	Sandstone, medium; sideritic nodules			9.2	384	0.02		0.6	110	-109.4	179.6						NAF
177212_44.1-44.28	Pandora	Fresh	Sandstone, fine; siltstone bands throughout			9.1	433	0.03		0.9	36.5	-35.6	39.7						NAF
177212_44.88-45.08	Pandora	Fresh	Sandstone, medium; carb. laminae; siderite lenses			9.2	376	0.02		0.6	148	-147.4	241.6						NAF
177212_45.6-45.8	Pandora	Fresh	Sandstone, fine; siltstone bands; siderite lenses			9.1	434	0.03		0.9	21.7	-20.8	23.6						NAF
			ABCC ANC@pH4.5 = 17 kg H2SO4/t; % ANC readily avail. = 76%; Likely carbonate mineral = Fe-Dolomite																
177212_46.8-46.98	Pandora	Fresh	Sandstone, fine-medium			9.2	401	0.03		0.9	90.7	-89.8	98.7						NAF
177212_48-48.2	Pandora	Fresh	Siltstone; calcite abundant cement			9.0	413	<0.01		0.2	27.5	-27.3	179.6						NAF
177212_49-49.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands			9.1	445	0.05		1.5	66.3	-64.8	43.3						NAF
			ABCC ANC@pH4.5 = 60 kg H2SO4/t; % ANC readily avail. = 90%; Likely carbonate mineral = Dolomite																
177212_50-50.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous laminae			9.2	400	0.03		0.9	58	-57.1	63.1						NAF
177212_50.8-51.04	Pandora	Fresh	Siltstone			8.8	431	0.03		0.9	37.6	-36.7	40.9						NAF
177212_51.8-52	Pandora	Fresh	Sandstone, medium; sideritic nodules			8.8	493	0.02		0.6	126	-125.4	205.7						NAF
			ABCC ANC@pH4.5 = 134 kg H2SO4/t; % ANC readily avail. = 106%; Likely carbonate mineral = Dolomite																
177212_52.54-52.73	Pandora	Fresh	Sandstone, fine-medium; siltstone nodules			8.9	514	0.05		1.5	14.4	-12.9	9.4						NAF
177212_53.11-53.31	Pandora	Fresh	Sandstone, very fine; abundant siltstone throughout			8.4	336	0.04		1.2	19.4	-18.2	15.8						NAF
177212_54-54.2	Pandora	Fresh	Siltstone; sandstone laminae near base of unit			8.5	453	0.03		0.9	10.7	-9.8	11.6						NAF
			ABCC ANC@pH4.5 = 3.9 kg H2SO4/t; % ANC readily avail. = 36%; Likely carbonate mineral = Siderite																
177212_55.18-55.42	Pandora	Fresh	Mudstone			8.5	475	0.04		1.2	11.8	-10.6	9.6						NAF
177212_55.66-55.86	Pandora	Fresh	Coal, inferior; mudstone			7.6	582	0.19	0.089	5.8	6.6	-0.8	1.1				3.9	<0.1	PAF-LC
177212_55.86-56.07	Pandora	Fresh	Coal, <10% bright [V1]			8.2	161	0.33	0.123	10.1	1.2	8.9	0.1				2.5	2.8	PAF-LC
177212_56.85-57.03	Pandora	Fresh	Coal, <10% bright [V1]			7.6	59	0.26	0.038	8.0	2	6.0	0.3				2.1	1.4	PAF-LC
177212_58.35-58.64	Pandora	Fresh	Coal, <10-40% bright; trace soot [V1]			8.1	84	0.24	0.037	7.4	1.3	6.1	0.2				2.1	0.9	PAF-LC
177212_59.89-60.07	Pandora	Fresh	Coal, dull <1-10% bright; minor tuff & carb. siltstone [V1]			8.3	205	0.15	0.08	4.6	<0.5	4.6	0.1				2.6	0.8	PAF-LC
177212_60.3-60.38	Pandora	Fresh	Carbonaceous Mudstone; clayey in part [YT]			8.7	329	0.23	0.106	7.0	7.2	-0.2	1.0	9.7	<0.1	<0.1			NAF
177212_60.38-60.87	Pandora	Fresh	Coal, 10-40% bright; minor clayey inferior coal [VL]			8.1	119	0.3	0.068	9.2	1.7	7.5	0.2				2.3	1.1	PAF-LC
177212_60.87-61.05	Pandora	Fresh	Mudstone; part clayey			8.8	360	0.04		1.2	6.9	-5.7	5.6						NAF
177212_61.3-61.5	Pandora	Fresh	Mudstone; carbonaceous bands near top of unit			9.2	422	0.13	0.038	4.0	<0.5	4.0	0.1	7.0	<0.1	<0.1			UC(NAF)
177212_62.5-62.7	Pandora	Fresh	Carbonaceous Mudstone; coaly lenses throughout			9.3	315	0.11	0.064	3.4	7.9	-4.5	2.3	7.1	<0.1	<0.1			NAF
177212_63.03-63.18	Pandora	Fresh	Carbonaceous Mudstone; clayey matrix			9.0	316	0.1	0.034	3.1	6.8	-3.7	2.2	7.0	<0.1	<0.1			NAF
177212_64-64.2	Pandora	Fresh	Sandstone, fine; siltstone laminae throughout			8.8	483	0.04		1.2	19.9	-18.7	16.2						NAF
177496_0-0.3	Other	Weathered	Soil; clasts; roots in top 0.5m			8.6	441	<0.01		0.2	70.4	-70.2	459.8						NAF
177496_0.5-0.8	Other	Weathered	Soil; clasts; roots in top 0.5m			8.5	906	0.02		0.6	52.8	-52.2	86.2						NAF
177496_1.2-1.5	Other	Weathered	Sand; clayey in part common clasts oxidised			8.6	834	0.01		0.3	15.4	-15.1	50.3						NAF
177496_2.5-2.77	Other	Weathered	Sand; clayey in part common clasts oxidised			6.8	511	0.02		0.6	1.8	-1.2	2.9						NAF
177496_3.5-3.8	Other	Weathered	Sand; common clasts oxidised			9.0	463	<0.01		0.2	26.9	-26.7	175.7						NAF
177496_4.7-5	Other	Weathered	Sandstone, very fine; siltstone in part oxidised			9.1	493	<0.01		0.2	14.5	-14.3	94.7						NAF
177496_5.7-6	Other	Weathered	Siltstone; sandstone in part			8.9	365	<0.01		0.2	7.8	-7.6	50.9						NAF
177496_7-7.26	Other	Weathered	Sandstone, fine-medium; oxidised siltstone in part			9.3	326	<0.01		0.2	124	-123.8	809.8						NAF
177496_7.7-8	Other	Weathered	Sandstone, fine-medium; oxidised siltstone in part			9.2	310	<0.01		0.2	107	-106.8	698.8						NAF

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t				kg H_2SO_4/t	
177496_9.5-9.8	Other	Weathered	Sandstone, fine-medium; oxidised siltstone in part			9.1	458	<0.01		0.2	10	-9.8	65.3						NAF
177496_11-11.26	Other	Weathered	Sandstone, fine; oxidised			9.0	480	0.05		1.5	11.4	-9.9	7.4						NAF
177496_11.84-12.14	Other	Weathered	Sandstone, fine-medium; oxidised			9.3	376	<0.01		0.2	225	-224.8	1469.4						NAF
177496_12.5-12.8	Other	Weathered	Sandstone, fine-medium; oxidised			9.1	441	<0.01		0.2	9	-8.8	58.8						NAF
177496_14-14.26	Other	Weathered	Sandstone, fine-medium; oxidised			8.2	382	<0.01		0.2	5.7	-5.5	37.2						NAF
177496_15.5-15.8	Other	Weathered	Sandstone, very fine; oxidised siltstone in part			8.9	506	<0.01		0.2	12.5	-12.3	81.6						NAF
177496_17-17.32	Other	Weathered	Sandstone, fine; oxidised			8.8	325	<0.01		0.2	8.1	-7.9	52.9						NAF
177496_18.5-18.8	Other	Weathered	Sandstone, fine; oxidised			8.8	335	<0.01		0.2	9.2	-9.0	60.1						NAF
177496_19.95-20.2	Other	Weathered	Sandstone, fine-medium; oxidised; minor calcite			9.0	361	<0.01		0.2	15.6	-15.4	101.9						NAF
177496_20.7-21	Other	Weathered	Sandstone, fine-medium; oxidised; minor calcite			9.1	334	<0.01		0.2	51.9	-51.7	338.9						NAF
177496_22.2-22.5	Other	Weathered	Sandstone, fine-medium; oxidised; minor calcite			9.1	325	0.01		0.3	8.5	-8.2	27.8						NAF
177496_23.5-23.8	Other	Weathered	Sandstone, fine-medium; oxidised; minor calcite			9.1	332	0.01		0.3	21.8	-21.5	71.2						NAF
177496_24.26-24.5	Other	Weathered	Sandstone, fine-medium; oxidised; minor calcite			9.1	325	<0.01		0.2	14.7	-14.5	96.0						NAF
177496_26-26.25	Other	Fresh	Sandstone, fine-medium; minor calcite			9.1	261	<0.01		0.2	22.9	-22.7	149.6						NAF
177496_27.5-27.82	Other	Fresh	Sandstone, fine; calcite sporadic infill fractures			9.1	250	<0.01		0.2	39.2	-39.0	256.0						NAF
177496_29-29.3	Other	Fresh	Sandstone, fine; calcite sporadic infill fractures			9.2	301	<0.01		0.2	62.5	-62.3	408.2						NAF
177496_30.4-30.68	Other	Fresh	Sandstone, fine; oxidised bands siltstone			9.2	269	<0.01		0.2	16.8	-16.6	109.7						NAF
177496_32.5-32.8	Other	Fresh	Sandstone, very fine; calcite infill fractures			9.4	240	<0.01		0.2	23.8	-23.6	155.4						NAF
177496_34-34.28	Other	Fresh	Sandstone, very fine; calcite infill fractures			9.2	206	<0.01		0.2	10.2	-10.0	66.6						NAF
177496_36.35-36.6	Other	Fresh	Sandstone, medium; calcite infill fractures			9.1	216	0.03		0.9	77.2	-76.3	84.0						NAF
				ABCC ANC@pH4.5 = 76 kg H2SO4/t; % ANC readily avail. = 98%; Likely carbonate mineral = Dolomite														
177496_38-38.25	Other	Fresh	Sandstone, medium; calcite infill fractures			9.3	213	<0.01		0.2	32	-31.8	209.0						NAF
177496_39.5-39.75	Other	Fresh	Sandstone, medium; calcite infill fractures			9.3	214	0.01		0.3	259	-258.7	845.7						NAF
177496_40.5-40.77	Other	Fresh	Sandstone, very fine			9.4	228	0.01		0.3	12	-11.7	39.2						NAF
				ABCC ANC@pH4.5 = 3.8 kg H2SO4/t; % ANC readily avail. = 32%; Likely carbonate mineral = Siderite														
177496_42-42.22	Other	Fresh	Sandstone, very fine; siltstone laminae in part			9.3	248	0.01		0.3	16.4	-16.1	53.6						NAF
177496_43.54-43.8	Other	Fresh	Sandstone, fine; sandstone bands in part			9.5	241	<0.01		0.2	20.7	-20.5	135.2						NAF
177496_44.96-45.23	Other	Fresh	Sandstone, fine; sandstone bands in part			9.4	255	<0.01		0.2	104	-103.8	679.2						NAF
177496_46.5-46.74	Other	Fresh	Sandstone, fine; sandstone bands in part			9.4	237	<0.01		0.2	16	-15.8	104.5						NAF
177496_47.86-48.2	Other	Fresh	Sandstone, fine; sandstone bands in part			9.3	181	0.02		0.6	8.8	-8.2	14.4						NAF
177496_49.5-49.75	Other	Fresh	Sandstone, fine-medium			9.3	180	<0.01		0.2	143	-142.8	933.9						NAF
177496_51.5-51.78	Other	Fresh	Sandstone, fine-medium			9.4	231	<0.01		0.2	29.2	-29.0	190.7						NAF
				ABCC ANC@pH4.5 = 20 kg H2SO4/t; % ANC readily avail. = 68%; Likely carbonate mineral = Fe-Dolomite														
177496_52-52.25	Other	Fresh	Sandstone, fine-medium; calcite infill fractures			9.4	184	<0.01		0.2	72.5	-72.3	473.5						NAF
177496_53.5-53.75	Other	Fresh	Sandstone, fine-medium; calcite infill fractures			9.4	217	0.02		0.6	113	-112.4	184.5						NAF
177496_55-55.25	Other	Fresh	Sandstone, fine-medium; calcite infill fractures			9.3	234	0.05		1.5	75.4	-73.9	49.2						NAF
				ABCC ANC@pH4.5 = 71 kg H2SO4/t; % ANC readily avail. = 94%; Likely carbonate mineral = Dolomite														
177496_55.61-55.91	Other	Fresh	Carbonaceous Sandstone; carb. siltstone; minor claystone			9.4	219	0.02		0.6	9	-8.4	14.7						NAF
177496_57-57.28	Other	Fresh	Carbonaceous Sandstone; carb. siltstone; minor claystone			9.5	228	<0.01		0.2	12.5	-12.3	81.6						NAF
177496_58.79-59.1	Other	Fresh	Carbonaceous Siltstone			8.7	144	0.02		0.6	5.1	-4.5	8.3						NAF
177496_59.1-59.4	Other	Fresh	Coal, inferior; siltstone; minor calcite [L1]			8.6	231	0.21	0.17	6.4	59.7	-53.3	9.3						NAF
177496_60-60.3	Other	Fresh	Coal, <10% bright; calcite sporadic infill fractures [L2]			7.8	306	0.23	0.108	7.0	7.4	-0.4	1.1				5.6	<0.1	UC(NAF)
177496_61-61.3	Other	Fresh	Coal, 10-40% bright; calcite infill fractures [L3]			8.8	101	0.15	0.047	4.6	10.3	-5.7	2.2				7.3	<0.1	NAF
177496_62-62.3	Other	Fresh	Coal, 10-40% bright; calcite infill fractures [L3]			4.6	158	0.24	0.115	7.4	<0.5	7.4	0.0				3.0	3.6	PAF-LC
177496_62.5-62.84	Other	Fresh	Coal, 40-60% bright; calcite infill fractures [L3]			7.2	221	0.26	0.127	8.0	6.4	1.6	0.8				5.2	<0.1	UC(PAF)

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t			kg H_2SO_4/t	
177496_63.53-63.76	Other	Fresh	Carbonaceous Sandstone			9.1	97	0.12	0.128	3.7	3.2	0.5	0.9	4.7	<0.1	2.0			UC(PAF)
177496_64-64.25	Other	Fresh	Carbonaceous Sandstone			9.4	101	0.02		0.6	3.7	-3.1	6.0						NAF
177496_65.41-65.62	Other	Fresh	Sandstone, fine-medium			9.2	179	0.04		1.2	10.7	-9.5	8.7						NAF
177496_67.23-67.5	Other	Fresh	Sandstone, fine-medium; clasts;			9.9	340	0.02		0.6	37	-36.4	60.4						NAF
177496_69-69.27	Other	Fresh	Sandstone, fine-medium; siltstone laminae			10.0	330	0.02		0.6	37.9	-37.3	61.9						NAF
177496_70.34-70.6	Other	Fresh	Sandstone, medium; carb.laminae; minor coal			9.9	319	0.03		0.9	31.4	-30.5	34.2						NAF
177496_72-72.26	Other	Fresh	Sandstone, medium; minor coal			9.8	353	0.03		0.9	72.8	-71.9	79.2						NAF
177496_74-74.3	Other	Fresh	Sandstone, medium; minor coal			10.0	340	0.02		0.6	67.4	-66.8	110.0						NAF
177496_75.7-76	Other	Fresh	Sandstone, medium; carb. wisps; minor coal			9.8	340	0.03		0.9	59.5	-58.6	64.8						NAF
177496_77.5-77.8	Other	Fresh	Sandstone, fine-medium; siltstone clasts			10.0	331	0.02		0.6	34.2	-33.6	55.8						NAF
177496_79-79.3	Other	Fresh	Sandstone, medium; carbonaceous wisps			9.9	336	0.02		0.6	38.6	-38.0	63.0						NAF
177496_80.57-80.87	Other	Fresh	Sandstone, fine; calcite rare infill fractures			9.9	323	0.02		0.6	22.8	-22.2	37.2						NAF
177496_82-82.25	Other	Fresh	Sandstone, medium; carbonaceous wisps			9.9	346	0.01		0.3	58.4	-58.1	190.7						NAF
				ABCC ANC@pH4.5 = 50 kg H2SO4/t; % ANC readily avail. = 85%; Likely carbonate mineral = Fe-Dolomite														
177496_83.5-83.75	Other	Fresh	Sandstone, medium; carbonaceous wisps			9.9	319	0.01		0.3	49.1	-48.8	160.3						NAF
177496_85.5-85.8	Other	Fresh	Sandstone, medium-coarse			10.0	350	0.02		0.6	35.6	-35.0	58.1						NAF
177496_87.5-87.75	Other	Fresh	Sandstone, medium-coarse			9.8	339	0.01		0.3	96.9	-96.6	316.4						NAF
177496_88.25-88.5	Other	Fresh	Sandstone, medium-coarse			9.9	331	0.04		1.2	41.5	-40.3	33.9						NAF
177496_90-90.27	Other	Fresh	Sandstone, medium-coarse			9.9	352	0.01		0.3	84	-83.7	274.3						NAF
177496_91.5-91.75	Other	Fresh	Sandstone, medium-coarse			9.9	359	0.02		0.6	49.1	-48.5	80.2						NAF
177496_91.9-92.16	Other	Fresh	Sandstone, medium-coarse			9.9	376	0.03		0.9	82.1	-81.2	89.4						NAF
177496_92.43-92.77	Other	Fresh	Carbonaceous Sandstone			9.7	244	0.09		2.8	15.9	-13.1	5.8						NAF
177496_92.9-93.27	Other	Fresh	Carbonaceous Sandstone			9.8	347	0.03		0.9	18.7	-17.8	20.4						NAF
177496_94.13-94.41	Other	Fresh	Sandstone, fine; carb. siltstone laminae			9.8	363	0.02		0.6	36.8	-36.2	60.1						NAF
177496_95.7-96	Other	Fresh	Sandstone, fine; carb. siltstone laminae			9.9	359	0.03		0.9	44.3	-43.4	48.2						NAF
177496_96.32-96.68	Other	Fresh	Sandstone, very fine; carb. siltstone laminae			9.7	338	0.02		0.6	19.6	-19.0	32.0						NAF
177496_97.63-98	Other	Fresh	Coal, <10% bright [V1]			8.1	16	0.16	0.027	4.9	3.6	1.3	0.7				4.5	<0.1	PAF-LC
177496_98.5-98.85	Other	Fresh	Coal, 40-60% bright [V1]			8.0	12	0.18	0.023	5.5	3.6	1.9	0.7				4.1	<0.1	PAF-LC
177496_99-99.27	Other	Fresh	Carbonaceous Mudstone			9.3	170	0.12	0.065	3.7	8.4	-4.7	2.3	3.5	5.6	19.6			UC(NAF)
177496_99.27-99.52	Other	Fresh	Carbonaceous Siltstone; sandstone laminae; minor coal			9.7	195	0.06		1.8	10	-8.2	5.4						NAF
177496_100.7-100.96	Other	Fresh	Carbonaceous Sandstone; siltstone laminae			9.5	157	0.03		0.9	18.4	-17.5	20.0						NAF
177496_102.5-102.75	Other	Fresh	Sandstone, fine; siltstone laminae; carb. & sideritic in part			9.5	191	0.02		0.6	18.3	-17.7	29.9						NAF
177496_104.02-104.27	Other	Fresh	Sandstone, fine; siltstone laminae; carb. & sideritic in part			9.9	399	0.02		0.6	25.3	-24.7	41.3						NAF
177496_105.47-105.68	Other	Fresh	Sandstone, medium; carbonaceous laminae			10.0	411	0.02		0.6	39.4	-38.8	64.3						NAF
177496_107.05-107.35	Other	Fresh	Sandstone, medium; carbonaceous laminae			9.9	391	0.02		0.6	45.7	-45.1	74.6						NAF
177496_108.5-108.78	Other	Fresh	Sandstone, very fine; carb. siltstone laminae; minor coal			10.0	384	0.03		0.9	33.1	-32.2	36.0						NAF
177496_110.5-110.75	Other	Fresh	Sandst., fine-med.; carb. siderite bands; minor calcite			9.8	423	0.02		0.6	63.6	-63.0	103.8						NAF
177496_111.75-112	Other	Fresh	Sandst., fine-med.; carb. siderite bands; minor calcite			10.0	396	0.04		1.2	32.1	-30.9	26.2						NAF
177496_113.09-113.4	Other	Fresh	Sandstone, medium; carbonaceous wisps			9.9	403	0.02		0.6	25.4	-24.8	41.5						NAF
177496_115.5-115.75	Other	Fresh	Sandstone, medium; carbonaceous clasts; minor calcite			10.0	375	0.02		0.6	55.4	-54.8	90.4						NAF
				ABCC ANC@pH4.5 = 46 kg H2SO4/t; % ANC readily avail. = 84%; Likely carbonate mineral = Fe-Dolomite														
177496_117-117.3	Other	Fresh	Sandstone, medium; carbonaceous clasts; minor calcite			10.0	379	0.01		0.3	50.5	-50.2	164.9						NAF
177496_119-119.24	Other	Fresh	Sandstone, medium; carbonaceous clasts; minor calcite			9.9	390	0.03		0.9	32.9	-32.0	35.8						NAF
177496_119.39-119.75	Other	Fresh	Sandstone, medium; carb. laminae & clasts; minor calcite			9.8	332	0.02		0.6	28.2	-27.6	46.0						NAF
177496_119.87-120.25	Other	Fresh	Carbonaceous Sandstone; sandstone laminae; minor calcite			9.7	225	0.03		0.9	8.1	-7.2	8.8						NAF

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t				kg H_2SO_4/t	
177496_121.5-121.75	Other	Fresh	Carbonaceous Sandstone; calcite rare on bedding surfaces			9.8	226	0.03		0.9	13.8	-12.9	15.0						NAF
			ABCC ANC@pH4.5 = 3.7 kg H2SO4/t; % ANC readily avail. = 27%; Likely carbonate mineral = Siderite																
177496_122.5-122.75	Other	Fresh	Carbonaceous Sandstone; calcite on bedding surfaces			9.7	228	0.03		0.9	18.6	-17.7	20.2						NAF
177496_124-124.25	Other	Fresh	Carbonaceous Sandstone; calcite on bedding surfaces			9.8	384	0.02		0.6	13.6	-13.0	22.2						NAF
177496_125.52-125.8	Other	Fresh	Sandstone, medium-coarse; carb. laminae; minor calcite			9.9	423	0.04		1.2	28.4	-27.2	23.2						NAF
			ABCC ANC@pH4.5 = 14 kg H2SO4/t; % ANC readily avail. = 48%; Likely carbonate mineral = Fe-Dolomite																
177496_126.92-127.22	Other	Fresh	Sandstone, medium-coarse; carb. wisps; minor calcite			9.9	388	0.02		0.6	52.4	-51.8	85.6						NAF
177496_128.5-128.75	Other	Fresh	Sandstone, medium-coarse; carb. wisps; minor calcite			10.0	375	0.01		0.3	73.5	-73.2	240.0						NAF
177496_129.75-130	Other	Fresh	Sandstone, medium-coarse; carb. wisps; minor calcite			9.7	355	0.02		0.6	53.2	-52.6	86.9						NAF
177496_131.45-131.67	Other	Fresh	Sandstone, medium-coarse; carb. wisps; minor calcite			9.9	388	0.01		0.3	68.7	-68.4	224.3						NAF
177496_133.5-133.8	Other	Fresh	Sandstone, medium-coarse; carb. wisps; minor calcite			9.9	390	0.02		0.6	63.1	-62.5	103.0						NAF
177496_134.71-135	Other	Fresh	Carbonaceous Sandstone; minor coaly bands; minor calcite			9.9	414	0.04		1.2	19.5	-18.3	15.9						NAF
177496_135.5-136.75	Other	Fresh	Carbonaceous Sandstone; minor coaly bands; minor calcite			10.0	435	0.04		1.2	24.8	-23.6	20.2						NAF
177496_138-138.25	Other	Fresh	Carbonaceous Sandstone; minor coaly bands; minor calcite			9.9	425	0.03		0.9	18	-17.1	19.6						NAF
177496_138.27-138.6	Other	Fresh	Carbonaceous Sandstone; minor coaly bands; minor calcite			10.0	436	0.03		0.9	60.8	-59.9	66.2						NAF
177496_139.6-139.9	Other	Fresh	Carbonaceous Siltstone; minor coaly bands; minor calcite			9.9	300	0.05		1.5	10.9	-9.4	7.1						NAF
177496_140.5-140.77	Other	Fresh	Carbonaceous Siltstone; minor coaly bands; minor calcite			9.9	283	0.05		1.5	9.6	-8.1	6.3						NAF
177496_141.5-141.8	Other	Fresh	Coal, inferior; clayst. & siltst. bands; minor coaly shale [VL]			10.0	408	0.12	0.03	3.7	31.1	-27.4	8.5						NAF
177496_142.8-143.12	Other	Fresh	Carbonaceous Siltstone; common minor coaly bands			10.0	353	0.13	0.066	4.0	19.2	-15.2	4.8						NAF
177496_143.2-143.5	Other	Fresh	Sandstone, fine; carbonaceous laminae; minor calcite			10.0	425	0.02		0.6	76.5	-75.9	124.9						NAF
177496_145-145.25	Other	Fresh	Sandstone, medium; carbonaceous laminae; minor calcite			10.1	394	0.02		0.6	68.6	-68.0	112.0						NAF
177496_146.75-147	Other	Fresh	Sandstone, medium; carbonaceous laminae; minor calcite			10.0	394	0.02		0.6	67.8	-67.2	110.7						NAF
177496_149-149.25	Other	Fresh	Sandstone, medium; carbonaceous laminae; minor calcite			10.0	381	0.01		0.3	50	-49.7	163.3						NAF
177518_1-1.24	Pandora	Weathered	Clayey Sand & gravel; carb. fragments; oxidised			8.9	707	0.02		0.6	28.5	-27.9	47						NAF
177518_3-3.25	Pandora	Weathered	Clayey Sand; oxidised carb. fragments; gravelly			8.5	534	0.01		0.3	9	-8.7	29						NAF
177518_5-5.25	Pandora	Weathered	Sand; oxidised clayey in part			9.2	284	<0.01		0.2	64.4	-64.2	421						NAF
177518_8.5-8.75	Pandora	Weathered	Sandy Clay; oxidised sandy bands			9.2	428	<0.01		0.2	64.3	-64.1	420						NAF
			ABCC ANC@pH4.5 = 57 kg H2SO4/t; % ANC readily avail. = 88%; Likely carbonate mineral = Dolomite																
177518_11.1-11.35	Pandora	Weathered	Clayey Sand; oxidised clayey bands			9.0	420	<0.01		0.2	31.9	-31.7	208						NAF
177518_13-13.25	Pandora	Weathered	Siltstone; oxidised minor sandstone bands			8.3	302	<0.01		0.2	9.1	-8.9	59						NAF
177518_14.81-15.05	Pandora	Weathered	Sandstone, very fine; oxidised; minor mudstone bands			9.0	463	<0.01		0.2	25.9	-25.7	169						NAF
177518_17.1-17.35	Pandora	Weathered	Sandstone, very fine; oxidised			8.4	237	<0.01		0.2	8.4	-8.2	55						NAF
177518_18.8-19.07	Pandora	Weathered	Mudstone; oxidised			8.4	209	<0.01		0.2	19.4	-19.2	127						NAF
177518_20.5-20.75	Pandora	Weathered	Siltstone; sandstone laminae; minor mudstone; calcite			8.6	253	<0.01		0.2	12.2	-12.0	80						NAF
177518_22.3-22.55	Pandora	Weathered	Siltstone; sandstone laminae; minor mudstone; calcite			8.9	327	<0.01		0.2	15.4	-15.2	101						NAF
177518_24-24.25	Pandora	Weathered	Siltstone; sandstone laminae; minor mudstone bands			9.0	349	<0.01		0.2	17	-16.8	111						NAF
177518_26-26.25	Pandora	Weathered	Sandstone, very fine; siltstone bands; oxidised			9.1	289	<0.01		0.2	19.4	-19.2	127						NAF
177518_28-28.28	Pandora	Weathered	Siltstone; occasional minor siltstone bands; oxidised			9.3	298	<0.01		0.2	20.5	-20.3	134						NAF
177518_29.9-30.2	Pandora	Weathered	Sandstone, fine; siltstone laminae finer near base of unit			9.2	298	<0.01		0.2	34.3	-34.1	224						NAF
			ABCC ANC@pH4.5 = 19 kg H2SO4/t; % ANC readily avail. = 55%; Likely carbonate mineral = Fe-Dolomite																
177518_31.9-32.2	Pandora	Weathered	Sandstone, fine; minor siltstone bands; calcite fragments			9.1	302	0.01		0.3	60.8	-60.5	199						NAF
177518_33.5-33.75	Pandora	Weathered	Siltstone; bands siltstone sandstone; calcite fragments			9.3	281	0.01		0.3	16.6	-16.3	54						NAF
177518_33.5-33.75	Pandora	Weathered	Siltstone; bands siltstone sandstone; calcite fragments			9.3	209	<0.01		0.2	15.4	-15.2	101						NAF
177518_42.2-42.45	Pandora	Weathered	Siltstone; common sandstone bands			9.3	185	<0.01		0.2	25.7	-25.5	168						NAF
177518_44.5-44.75	Pandora	Fresh	Sandstone, very fine			9.4	148	<0.01		0.2	17.6	-17.4	115						NAF

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t				kg H_2SO_4/t	
177518_46-46.25	Pandora	Fresh	Sandstone, very fine; siltstone bands; calcite fragments			9.4	222	0.01		0.3	21.2	-20.9	69						NAF
177518_48-48.25	Pandora	Fresh	Sandstone, very fine; common siltstone laminae bands			9.4	242	<0.01		0.2	18.6	-18.4	121						NAF
177518_50-50.25	Pandora	Fresh	Sandstone, fine; carb. wisps; calcite sporadic fragments			9.2	228	0.02		0.6	97.2	-96.6	159						NAF
177518_52-52.25	Pandora	Fresh	Sandstone, fine; carb. laminae; calcite common fragments			9.2	201	0.03		0.9	110	-109.1	120						NAF
177518_54-54.25	Pandora	Fresh	Sandstone, fine; carb. laminae; calcite common fragments			8.8	265	0.05		1.5	28.9	-27.4	19						NAF
177518_56-56.25	Pandora	Fresh	Sandstone, fine; carb. laminae; calcite common fragments			9.0	266	0.03		0.9	31.2	-30.3	34						NAF
177518_58-58.25	Pandora	Fresh	Siltstone; bands sandstone laminae bands throughout			9.0	191	0.01		0.3	13	-12.7	42						NAF
177518_60-60.25	Pandora	Fresh	Siltstone; bands carb. laminae; calcite fragments			9.3	259	<0.01		0.2	19.8	-19.6	129						NAF
177518_62-62.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite fragments			9.4	213	<0.01		0.2	17.6	-17.4	115						NAF
177518_64-64.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite fragments			9.4	159	0.01		0.3	13.4	-13.1	44						NAF
177518_65.53-65.78	Pandora	Fresh	Sandstone, very fine; pyrite sporadic fragments			9.3	275	0.19	0.177	5.8	21.3	-15.5	4						NAF
177518_66-66.3	Pandora	Fresh	Sandstone, very fine; calcite common fragments			9.2	206	0.01		0.3	13.4	-13.1	44						NAF
177518_67.8-68.06	Pandora	Fresh	Sandstone, very fine; calcite common fragments			9.5	213	0.01		0.3	17.8	-17.5	58						NAF
177518_70-70.25	Pandora	Fresh	Sandstone, fine; carb. bands; calcite common fragments			9.4	188	<0.01		0.2	141	-140.8	921						NAF
177518_72-72.28	Pandora	Fresh	Sandstone, fine; carb. bands; calcite common fragments			9.2	149	0.02		0.6	101	-100.4	165						NAF
177518_74-74.25	Pandora	Fresh	Sandstone, very fine; carb. siltstone laminae; minor calcite			9.5	232	0.01		0.3	17.2	-16.9	56						NAF
177518_76.11-76.35	Pandora	Fresh	Sandstone, fine; carb. laminae; calcite common fragments			9.6	232	<0.01		0.2	29.4	-29.2	192						NAF
177518_77.95-78.25	Pandora	Fresh	Sandstone, fine; carb. laminae; calcite common fragments			9.5	208	<0.01		0.2	490	-489.8	3200						NAF
177518_80-80.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; minor calcite			9.4	215	<0.01		0.2	18.5	-18.3	121						NAF
177518_82-82.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; minor calcite			9.5	243	<0.01		0.2	35.6	-35.4	232						NAF
177518_84-84.3	Pandora	Fresh	Sandstone, very fine; carb. laminae; minor calcite			9.5	226	0.01		0.3	29.6	-29.3	97						NAF
177518_86-86.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; minor calcite			9.5	217	0.01		0.3	18.2	-17.9	59						NAF
177518_88-88.3	Pandora	Fresh	Sandstone, very fine; carb. laminae; minor calcite			9.4	225	0.01		0.3	45.7	-45.4	149						NAF
177518_90.1-90.35	Pandora	Fresh	Sandstone, fine; occasional carbonaceous laminae bands			9.3	230	0.01		0.3	44.2	-43.9	144						NAF
177518_92-92.25	Pandora	Fresh	Sandstone, fine; carbonaceous wisps & clasts			8.4	160	0.01		0.3	11.7	-11.4	38						NAF
177518_94-94.25	Pandora	Fresh	Sandstone, very fine; common carbonaceous laminae			8.9	102	0.02		0.6	12.2	-11.6	20						NAF
177518_96-96.25	Pandora	Fresh	Sandstone, fine-medium; carbonaceous laminae & clasts			8.4	262	0.02		0.6	13	-12.4	21						NAF
177518_98-98.25	Pandora	Fresh	Sandstone, fine-medium; carbonaceous laminae & clasts			8.2	185	0.01		0.3	10.1	-9.8	33						NAF
177518_100-100.25	Pandora	Fresh	Sandstone, fine-medium; carbonaceous laminae & clasts			8.8	129	0.02		0.6	10.2	-9.6	17						NAF
177518_102-102.25	Pandora	Fresh	Sandstone, fine; common carbonaceous laminae bands			9.2	186	0.02		0.6	63.5	-62.9	104						NAF
177518_104-104.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite common			9.2	235	0.02		0.6	19.3	-18.7	32						NAF
				ABCC ANC@pH4.5 = 13 kg H2SO4/t; % ANC readily avail. = 67%; Likely carbonate mineral = Fe-Dolomite														
177518_105.95-106.2	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite common			8.9	124	0.01		0.3	12	-11.7	39						NAF
177518_107.2-107.45	Pandora	Fresh	Siltstone; sandstone laminae; carbonaceous in part			8.6	86	0.01		0.3	8.8	-8.5	29						NAF
177518_108-108.25	Pandora	Fresh	Carbonaceous Siltstone; occasional coaly laminae			8.4	83	0.04		1.2	4.4	-3.2	4						NAF
177518_109-109.5	Pandora	Fresh	Coal; pyrite common in cleats [L2/3]			7.0	102	0.76	0.763	23.3	4.3	19.0	0				2.4	26.3	PAF
177518_112-112.4	Pandora	Fresh	Coal, 10-60% bright [L3/2]			7.6	62	0.19	0.056	5.8	9.8	-4.0	2				6.4	<0.1	NAF
177518_113.64-113.9	Pandora	Fresh	Coal, inferior; common carbonaceous siltstone [L4]			8.3	142	0.29	0.106	8.9	4.2	4.7	0				5.6	<0.1	UC(PAF)
177518_114.3-114.65	Pandora	Fresh	Carbonaceous Sandstone; occasional coaly laminae			8.9	90	0.06		1.8	5.2	-3.4	3						NAF
177518_116-116.24	Pandora	Fresh	Sandstone, very fine; minor coaly bands; minor calcite			9.2	244	0.03		0.9	46.3	-45.4	50						NAF
177518_118-118.25	Pandora	Fresh	Sandstone, very fine; minor coaly bands; minor calcite			9.5	256	0.03		0.9	17.7	-16.8	19						NAF
				ABCC ANC@pH4.5 = 9.3 kg H2SO4/t; % ANC readily avail. = 53%; Likely carbonate mineral = Fe-Dolomite														
177518_119.95-120.2	Pandora	Fresh	Sandstone, very fine; minor coaly bands; minor calcite			9.5	267	0.03		0.9	60.1	-59.2	65						NAF
177518_121-121.25	Pandora	Fresh	Carbonaceous Sandstone; calcite fragments			9.5	290	0.04		1.2	20.6	-19.4	17						NAF
177518_122.92-123.18	Pandora	Fresh	Sandstone, very fine; carb. siltst. laminae; minor calcite			9.6	277	0.03		0.9	24.1	-23.2	26						NAF

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t			kg H_2SO_4/t	
177518_124.93-125.2	Pandora	Fresh	Sandstone, very fine; carb. siltst. laminae; minor calcite			9.7	261	0.03		0.9	48.3	-47.4	53						NAF
177518_127.08-127.33	Pandora	Fresh	Sandstone, very fine; carb. laminae; minor calcite			9.6	269	0.02		0.6	235	-234.4	384						NAF
177518_129-129.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; minor calcite			9.6	284	0.01		0.3	147	-146.7	480						NAF
177518_131-131.32	Pandora	Fresh	Carbonaceous Siltstone; minor coaly laminae			8.8	213	0.17	0.111	5.2	13.4	-8.2	3						NAF
177518_132.5-133	Pandora	Fresh	Coal, 40-60% bright; claystone in cleats [V1]			7.9	33	0.2	0.031	6.1	14	-7.9	2						NAF
177518_133.2-133.4	Pandora	Fresh	Carbonaceous Mudstone; coaly			8.7	69	0.17	0.04	5.2	9.4	-4.2	2	9.1	<0.1	<0.1			NAF
177518_133.4-133.8	Pandora	Fresh	Coal, 10-40% bright [V23]			8.4	51	0.24	0.046	7.4	12.8	-5.5	2				5.8	<0.1	UC(NAF)
177518_134.24-134.5	Pandora	Fresh	Carbonaceous Siltstone; with coal, inferior			9.3	120	0.13	0.078	4.0	8	-4.0	2						NAF
177518_134.5-134.83	Pandora	Fresh	Carbonaceous Siltstone; sandstone laminae; minor calcite			9.6	237	0.15	0.062	4.6	11.8	-7.2	3						NAF
177518_134.83-135.13	Pandora	Fresh	Coal, inferior; some carbonaceous siltstone [UN]			9.4	166	0.16	0.05	4.9	8.8	-3.9	2				7.2	<0.1	NAF
177518_135.7-135.95	Pandora	Fresh	Carbonaceous Sandstone; carb. siltstone laminae			9.3	109	0.03		0.9	11	-10.1	12						NAF
177518_136.75-137	Pandora	Fresh	Tuff [YT]			8.9	143	0.01		0.3	13.9	-13.6	45						NAF
177518_137.33-137.58	Pandora	Fresh	Coal; partly inferior [VL]			8.6	81	0.15	0.032	4.6	9.4	-4.8	2						NAF
177518_137.63-138	Pandora	Fresh	Carbonaceous Mudstone; occasional coaly laminae			9.3	190	0.25	0.062	7.7	8.7	-1.0	1	6.0	<0.1	1.8			NAF
177518_138.9-139.15	Pandora	Fresh	Sandstone, very fine; carb. siltst. laminae; minor calcite			9.4	150	0.03		0.9	11.2	-10.3	12						NAF
177518_141-141.25	Pandora	Fresh	Sandstone, fine-medium; rare carbonaceous wisps			9.7	295	0.01		0.3	64.9	-64.6	212						NAF
177519_1.3-1.66	Other	Weathered	Sandstone, fine; calcite sporadic fragments			9.0	191	0.01		0.3	134	-133.7	438						NAF
177519_2-2.25	Other	Weathered	Clay; common sandstone siltstone fragments			8.3	1460	0.01		0.3	13	-12.7	42						NAF
177519_2.7-3	Other	Weathered	Clay; common sandstone siltstone fragments			7.3	1460	0.01		0.3	8.1	-7.8	26						NAF
177519_4.3-4.5	Other	Weathered	Clay; siltstone sandstone fragments			6.5	933	<0.01		0.2	3.7	-3.5	24						NAF
177519_6.3-6.5	Other	Weathered	Sandstone, very fine; mudstone bands			9.0	656	<0.01		0.2	13.6	-13.4	89						NAF
177519_8-8.3	Other	Weathered	Gravel; abundant pebbly			9.2	373	<0.01		0.2	25.8	-25.6	168						NAF
177519_8.95-9.2	Other	Weathered	Sandstone, very fine; siltstone bands; calcite fragments			9.0	674	<0.01		0.2	10.3	-10.1	67						NAF
177519_11-11.25	Other	Weathered	Sandstone, very fine; minor siltstone & mudstone bands			8.3	373	<0.01		0.2	7.6	-7.4	50						NAF
177519_11.92-12.2	Other	Weathered	Sandstone, very fine; minor siltstone & mudstone bands			8.2	416	<0.01		0.2	7.9	-7.7	52						NAF
177519_13.5-13.75	Other	Weathered	Siltstone; common mudstone sandstone bands			8.1	450	<0.01		0.2	8.7	-8.5	57						NAF
177519_15.5-15.75	Other	Weathered	Mudstone; siltstone in part			8.9	554	<0.01		0.2	19.8	-19.6	129						NAF
177519_17-17.3	Other	Weathered	Sandstone, very fine; siltstone bands; calcite fragments			8.7	436	<0.01		0.2	37.3	-37.1	244						NAF
177519_18.3-18.5	Other	Weathered	Siltstone; common sandstone laminae bands			8.2	296	<0.01		0.2	26.2	-26.0	171						NAF
177519_20-20.3	Other	Weathered	Siltstone; occasional minor sandstone bands			9.0	428	<0.01		0.2	29.4	-29.2	192						NAF
177519_21.5-21.76	Other	Weathered	Sandstone, very fine; siltstone & mudst. bands; coal rare			9.1	533	0.01		0.3	49.4	-49.1	161						NAF
177519_22.5-22.75	Other	Weathered	Sandstone, fine; minor siltstone bands near top of unit			9.5	310	<0.01		0.2	58.5	-58.3	382						NAF
177519_24.5-24.8	Other	Fresh	Sandstone, fine; minor siltstone bands; calcite fragments			9.4	328	<0.01		0.2	41.4	-41.2	270						NAF
177519_26-26.25	Other	Fresh	Sandstone, fine; minor siltstone bands near base of unit			9.5	283	0.02		0.6	53.2	-52.6	87						NAF
177519_27.23-27.5	Other	Fresh	Sandstone, very fine; siltstone laminae; calcite fragments			9.6	296	<0.01		0.2	18	-17.8	118						NAF
177519_28-28.3	Other	Fresh	Sandstone, very fine; siltstone laminae; calcite fragments			9.6	312	<0.01		0.2	136	-135.8	888						NAF
177519_29.5-29.75	Other	Fresh	Sandstone, very fine; siltstone laminae; calcite fragments			9.5	278	<0.01		0.2	21.5	-21.3	140						NAF
177519_31-31.25	Other	Fresh	Sandstone, very fine; siltstone laminae; calcite fragments			9.5	283	0.01		0.3	107	-106.7	349						NAF
177519_32.5-32.75	Other	Fresh	Sandstone, very fine; siltstone laminae; calcite fragments			9.4	275	0.01		0.3	135	-134.7	441						NAF
177519_34-34.3	Other	Fresh	Sandstone, very fine; minor siltstone bands; minor calcite			9.4	219	<0.01		0.2	20.7	-20.5	135						NAF
177519_35.5-35.76	Other	Fresh	Sandstone, very fine; minor siltstone bands; minor calcite			9.4	245	<0.01		0.2	27.2	-27.0	178						NAF
177519_37-37.26	Other	Fresh	Sandstone, very fine; minor siltstone bands; minor calcite			9.4	225	<0.01		0.2	21.4	-21.2	140						NAF
177519_38.5-38.75	Other	Fresh	Sandstone, very fine; minor siltstone bands; minor calcite			9.3	279	0.04		1.2	29	-27.8	24						NAF
177519_40-40.25	Other	Fresh	Sandstone, fine			9.4	273	<0.01		0.2	15.1	-14.9	99						NAF
177519_41.5-41.75	Other	Fresh	Sandstone, fine-medium; calcite sporadic fragments			9.2	204	0.02		0.6	11.9	-11.3	19						NAF

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t			kg H_2SO_4/t	
177519_42.86-43.2	Other	Fresh	Sandstone, fine-medium; calcite sporadic fragments			9.1	209	0.04		1.2	138	-136.8	113						NAF
177519_44.5-44.7	Other	Fresh	Sandstone, very fine; minor carb. bands; calcite fragments			9.1	248	0.01		0.3	17	-16.7	56						NAF
177519_45.3-45.6	Other	Fresh	Sandstone, very fine; minor carb. bands; calcite fragments			9.3	260	0.04		1.2	20.9	-19.7	17						NAF
177519_47-47.27	Other	Fresh	Sandstone, very fine; minor carb. bands; calcite fragments			9.5	252	0.01		0.3	33.2	-32.9	108						NAF
177519_49-49.27	Other	Fresh	Sandstone, very fine; calcite sporadic fragments			9.5	246	0.02		0.6	129	-128.4	211						NAF
177519_50-50.26	Other	Fresh	Sandstone, very fine; calcite sporadic fragments			9.5	239	0.02		0.6	22.9	-22.3	37						NAF
			ABCC ANC@pH4.5 = 7.5 kg H2SO4/t; % ANC readily avail. = 33%; Likely carbonate mineral = Fe-Dolomite & Siderite																
177519_51.25-51.5	Other	Fresh	Sandstone, fine-medium; calcite sporadic fragments			9.5	210	<0.01		0.2	88.9	-88.7	581						NAF
177519_52-52.25	Other	Fresh	Sandstone, fine; common carbonaceous siltstone laminae			9.4	230	0.02		0.6	25.4	-24.8	41						NAF
177519_53.75-54	Other	Fresh	Sandstone, fine-medium			9.4	188	<0.01		0.2	134	-133.8	875						NAF
177519_55-55.25	Other	Fresh	Sandstone, very fine; common carbonaceous laminae			9.5	250	0.02		0.6	23.7	-23.1	39						NAF
177519_55.7-56	Other	Fresh	Sandstone, very fine; common carbonaceous laminae			9.6	248	0.01		0.3	18.9	-18.6	62						NAF
177519_56.53-56.81	Other	Fresh	Sandstone, fine; occasional carbonaceous laminae			9.4	240	0.01		0.3	112	-111.7	366						NAF
177519_57.5-57.8	Other	Fresh	Sandstone, fine; occasional carbonaceous laminae			9.7	266	0.01		0.3	45.2	-44.9	148						NAF
177519_58.34-58.66	Other	Fresh	Sandstone, very fine; carb. laminae; minor calcite			9.7	222	0.02		0.6	19.7	-19.1	32						NAF
177519_59.5-59.75	Other	Fresh	Sandstone, very fine; carb. laminae; minor calcite			9.6	231	<0.01		0.2	25.1	-24.9	164						NAF
177519_60.25-60.5	Other	Fresh	Sandstone, very fine; carb. laminae; minor calcite			9.7	243	<0.01		0.2	23	-22.8	150						NAF
177519_61.25-61.5	Other	Fresh	Sandstone, fine; calcite on bedding surfaces			9.6	228	<0.01		0.2	76.2	-76.0	498						NAF
177519_62.5-62.75	Other	Fresh	Sandstone, fine; calcite on bedding surfaces			9.7	235	<0.01		0.2	66	-65.8	431						NAF
177519_63.2-63.5	Other	Fresh	Sandstone, fine; calcite on bedding surfaces			9.6	216	0.02		0.6	74.8	-74.2	122						NAF
177519_64-64.26	Other	Fresh	Sandstone, fine; calcite on bedding surfaces			9.6	219	0.02		0.6	11.7	-11.1	19						NAF
177519_65-65.25	Other	Fresh	Sandstone, very fine; common carb. laminae; minor calcite			9.6	226	0.01		0.3	17.6	-17.3	57						NAF
177519_66.2-66.52	Other	Fresh	Sandstone, very fine; common carb. laminae; minor calcite			9.5	218	0.04		1.2	22	-20.8	18						NAF
177519_66.7-67	Other	Fresh	Sandstone, very fine; common carb. laminae; minor calcite			9.6	212	0.02		0.6	26.2	-25.6	43						NAF
177519_68-68.27	Other	Fresh	Sandstone, fine; carbonaceous wisps; calcite fragments			9.5	201	0.01		0.3	65.8	-65.5	215						NAF
177519_68.75-69	Other	Fresh	Sandstone, fine; carbonaceous wisps; calcite fragments			9.6	204	0.01		0.3	51.8	-51.5	169						NAF
177519_69.5-69.8	Other	Fresh	Sandstone, fine; carbonaceous wisps; calcite fragments			9.5	201	0.01		0.3	41.5	-41.2	136						NAF
177519_70.5-70.8	Other	Fresh	Sandstone, fine; carb. laminae; calcite on bedding surfaces			9.5	211	0.01		0.3	166	-165.7	542						NAF
177519_71.3-71.61	Other	Fresh	Sandstone, fine; carb. laminae; calcite on bedding surfaces			9.4	211	0.01		0.3	62.6	-62.3	204						NAF
177519_72.8-73.06	Other	Fresh	Sandstone, fine; carb. laminae; calcite on bedding surfaces			9.4	205	0.01		0.3	59.7	-59.4	195						NAF
177519_73.36-73.63	Other	Fresh	Carbonaceous Sandstone			9.5	223	0.02		0.6	19.2	-18.6	31						NAF
177519_74.3-74.55	Other	Fresh	Carbonaceous Sandstone			9.4	163	0.02		0.6	19	-18.4	31						NAF
177519_75.53-75.79	Other	Fresh	Carbonaceous Sandstone			9.5	198	0.02		0.6	23.9	-23.3	39						NAF
177519_76-76.27	Other	Fresh	Carbonaceous Siltstone; calcite on bedding surfaces			9.3	124	0.03		0.9	12.6	-11.7	14						NAF
177519_77.34-77.67	Other	Fresh	Sandstone, very fine; carb. laminae; minor calcite			9.5	257	0.02		0.6	43.9	-43.3	72						NAF
177519_78.5-78.75	Other	Fresh	Sandstone, very fine; carb. laminae; minor calcite			9.6	249	0.02		0.6	98.5	-97.9	161						NAF
			ABCC ANC@pH4.5 = 78 kg H2SO4/t; % ANC readily avail. = 79%; Likely carbonate mineral = Fe-Dolomite																
177519_80-80.25	Other	Fresh	Sandstone, very fine; carb. laminae; minor calcite			9.7	243	0.01		0.3	64.6	-64.3	211						NAF
177519_81.75-82	Other	Fresh	Sandstone, very fine; carb. laminae; minor calcite			9.6	231	0.02		0.6	37.1	-36.5	61						NAF
177519_83.75-84	Other	Fresh	Sandstone, fine; carb. laminae; minor calcite			9.6	228	0.02		0.6	83.5	-82.9	136						NAF
177519_85.75-86	Other	Fresh	Sandstone, fine; carb. laminae; minor calcite			9.5	210	0.01		0.3	169	-168.7	552						NAF
177519_87.5-88.5	Other	Fresh	Carbonaceous Sandstone; carb. siltstone; minor calcite			9.5	254	0.02		0.6	16	-15.4	26						NAF
177519_88.5-88.7	Other	Fresh	Carbonaceous Sandstone; carb. siltstone; minor calcite			9.5	252	0.02		0.6	19.3	-18.7	32						NAF
177519_90-90.3	Other	Fresh	Carbonaceous Sandstone; carb. siltstone; minor calcite			9.2	256	0.02		0.6	22	-21.4	36						NAF
177519_91.5-91.75	Other	Fresh	Carbonaceous Sandstone; carb. siltstone; minor calcite			9.2	169	0.02		0.6	13.3	-12.7	22						NAF

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t			kg H_2SO_4/t	
177519_92.45-92.7	Other	Fresh	Carbonaceous Sandstone; carb. siltstone; minor calcite			9.0	143	0.01		0.3	13.5	-13.2	44						NAF
				ABCC ANC@pH4.5 = 3.4 kg H2SO4/t; % ANC readily avail. = 25%; Likely carbonate mineral = Siderite														
177519_93-93.29	Other	Fresh	Carbonaceous Siltstone; coaly in part			8.8	140	0.04		1.2	11	-9.8	9						NAF
177519_93.57-93.95	Other	Fresh	Coal [L2/1]			8.9	24	0.14	0.039	4.3	114	-109.7	27						NAF
177519_95-95.4	Other	Fresh	Coal [L2/2]			8.8	28	0.17	0.018	5.2	10.1	-4.9	2				6.1	<0.1	UC(NAF)
177519_95.5-96	Other	Fresh	Coal, 60-90% bright [L2/3]			8.7	24	0.19	0.015	5.8	8.8	-3.0	2				6.0	<0.1	UC(NAF)
177519_98-98.4	Other	Fresh	Coal, 60-90% bright [L3/2]			7.4	22	0.21	0.013	6.4	7.7	-1.3	1				4.5	<0.1	UC(NAF)
177519_98.7-99	Other	Fresh	Coaly Shale; minor coaly bands; some carb. sandstone			9.2	75	0.06		1.8	5.7	-3.9	3						NAF
177519_99.5-99.75	Other	Fresh	Carbonaceous Sandstone; occasional minor coaly bands			9.1	58	0.03		0.9	7.2	-6.3	8						NAF
177519_100.6-100.94	Other	Fresh	Coal, 60-90% bright; claystone in cleats [L4]			8.7	36	0.26	0.023	8.0	7.1	0.9	1				6.1	<0.1	UC(NAF)
177519_101-101.25	Other	Fresh	Sandstone, very fine; claystone siltstone coaly laminae			9.3	97	0.06		1.8	10.2	-8.4	6						NAF
177519_102.5-102.75	Other	Fresh	Sandstone, fine; common carbonaceous laminae bands			9.4	142	0.03		0.9	35.3	-34.4	38						NAF
177519_104.25-104.5	Other	Fresh	Sandstone, fine; carb. siltstone laminae; calcite fragments			9.3	130	0.04		1.2	15.4	-14.2	13						NAF
				ABCC ANC@pH4.5 = 7.4 kg H2SO4/t; % ANC readily avail. = 48%; Likely carbonate mineral = Fe-Dolomite														
177519_105.5-105.75	Other	Fresh	Sandstone, very fine; carb. siltst. laminae; calcite fragments			9.4	131	0.07		2.1	18	-15.9	8						NAF
177519_107.57-107.85	Other	Fresh	Sandstone, fine; carbonaceous siltstone laminae			9.6	266	0.03		0.9	56.8	-55.9	62						NAF
177519_109-109.25	Other	Fresh	Sandstone, fine; carbonaceous laminae; calcite fragments			9.5	194	0.03		0.9	32	-31.1	35						NAF
177519_111.28-111.5	Other	Fresh	Sandstone, very fine; carb. siltst. laminae; calcite fragments			9.6	218	0.03		0.9	26.7	-25.8	29						NAF
177519_112.5-112.75	Other	Fresh	Sandstone, very fine; carb. siltst. laminae; calcite fragments			9.6	238	0.03		0.9	18.7	-17.8	20						NAF
177519_114-115.75	Other	Fresh	Sandstone, fine; carb. siltstone laminae; calcite fragments			9.7	326	0.02		0.6	113	-112.4	184						NAF
177519_115.75-116	Other	Fresh	Sandstone, fine; carb. siltstone laminae; calcite fragments			9.7	306	0.02		0.6	56.6	-56.0	92						NAF
177519_117.5-117.75	Other	Fresh	Sandstone, fine; carb. siltstone laminae; calcite fragments			9.7	295	0.02		0.6	78.7	-78.1	128						NAF
177519_119-119.25	Other	Fresh	Carbonaceous Siltstone; abundant carbonaceous			9.4	164	0.1	0.062	3.1	13.5	-10.4	4						NAF
177519_119.25-119.62	Other	Fresh	Coal; minor carbonaceous mudstone [VT]			9.7	135	0.26	0.100	8.0	23.8	-15.8	3				8.4	<0.1	NAF
177519_119.79-120.15	Other	Fresh	Coal [V1]			8.8	42	0.33	0.060	10.1	14.2	-4.1	1				7.3	<0.1	NAF
177519_121.5-121.92	Other	Fresh	Coal, 60-90% bright [V1]			8.2	23	0.29	0.015	8.9	7.6	1.3	1				5.7	<0.1	UC(NAF)
177519_122.5-122.75	Other	Fresh	Carbonaceous Siltst.; minor coal & sandst.; minor calcite			9.5	112	0.03		0.9	13.7	-12.8	15						NAF
177519_123.5-123.75	Other	Fresh	Sandstone, very fine; carb. siltstone laminae; minor calcite			9.7	294	0.03		0.9	53.3	-52.4	58						NAF
				ABCC ANC@pH4.5 = 43 kg H2SO4/t; % ANC readily avail. = 80%; Likely carbonate mineral = Fe-Dolomite														
177519_124.52-124.76	Other	Fresh	Carbonaceous Siltstone; sandstone laminae; minor calcite			9.5	151	0.03		0.9	15.6	-14.7	17						NAF
177519_126-126.25	Other	Fresh	Sandstone, very fine; carb. clasts; calcite fragments			9.8	297	0.04		1.2	60.2	-59.0	49						NAF
177519_126.8-127	Other	Fresh	Coal, 10-40% bright [V1R]			9.0	96	0.25	0.031	7.7	25.2	-17.5	3						NAF
177519_130-130.4	Other	Fresh	Coal, >90% bright; partly inferior [V1R]			8.9	62	0.23	0.015	7.0	8.1	-1.1	1				6.1	<0.1	UC(NAF)
177519_130.4-130.85	Other	Fresh	Carbonaceous Siltstone; sandstone laminae			9.4	140	0.03		0.9	14.6	-13.7	16						NAF
177519_131-131.25	Other	Fresh	Sandstone, very fine; carb. siltstone laminae & clasts			9.5	183	0.02		0.6	19	-18.4	31						NAF
177519_132-132.25	Other	Fresh	Sandstone, very fine; carb. siltstone laminae & clasts			9.8	321	0.03		0.9	39.2	-38.3	43						NAF
177519_134-134.25	Other	Fresh	Sandstone, very fine; carb. siltstone laminae; minor calcite			9.8	334	0.02		0.6	26.7	-26.1	44						NAF
177519_135.25-135.5	Other	Fresh	Sandstone, very fine; carb. siltstone laminae; minor calcite			9.8	272	0.02		0.6	20.6	-20.0	34						NAF
177519_137-137.25	Other	Fresh	Sandstone, very fine; carb. siltstone laminae; minor calcite			9.8	352	0.03		0.9	39.2	-38.3	43						NAF
177519_139-139.25	Other	Fresh	Sandstone, very fine; carbonaceous laminae			9.7	194	0.03		0.9	15	-14.1	16						NAF
				ABCC ANC@pH4.5 = 3.8 kg H2SO4/t; % ANC readily avail. = 25%; Likely carbonate mineral = Siderite														
177519_139.55-139.82	Other	Fresh	Sandstone, very fine; carbonaceous laminae			9.7	199	0.03		0.9	13.9	-13.0	15						NAF
177519_140-140.25	Other	Fresh	Coal, 40-60% bright; calc. in cleats; minor calcite [V23]			9.8	163	0.24	0.020	7.4	44.3	-37.0	6						NAF
177519_140.7-140.99	Other	Fresh	Coal, 10-40% bright [V23]			9.6	160	0.19	0.015	5.8	72.7	-66.9	12						NAF
177519_142-142.25	Other	Fresh	Tuff; occasional carbonaceous clasts; calcite fragments [YT]			9.7	391	0.02		0.6	64	-63.4	104						NAF

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t			kg H_2SO_4/t	
177519_142.4-142.65	Other	Fresh	Coal; calcite common fragments [VL]			9.5	65	0.23	0.015	7.0	30.2	-23.2	4						NAF
177519_142.65-142.9	Other	Fresh	Carbonaceous Sandstone; coal sporadic fragments			9.6	200	0.02		0.6	13.5	-12.9	22						NAF
177519_143.7-144	Other	Fresh	Sandstone, very fine; carbonaceous in part siltstone bands			9.9	360	0.02		0.6	27	-26.4	44						NAF
177519_145.25-145.5	Other	Fresh	Sandstone, fine; common carbonaceous laminae			9.9	396	0.02		0.6	23.9	-23.3	39						NAF
177519_146-146.25	Other	Fresh	Sandstone, fine; common carbonaceous laminae bands			9.9	391	0.02		0.6	35.4	-34.8	58						NAF
177519_149.2-149.44	Other	Fresh	Sandstone, fine; siltstone bands; carbonaceous laminae			9.9	370	0.03		0.9	20.9	-20.0	23						NAF
177519_150.75-151	Other	Fresh	Sandstone, very fine; carbonaceous siltstone laminae			9.9	378	0.04		1.2	24.1	-22.9	20						NAF
177520_1.5-1.75	Other	Weathered	Sandy Clay; sandy in part			5.8	850	0.02		0.6	8.2	-7.6	13						NAF
177520_3.5-3.75	Other	Weathered	Sandy Clay; sandy in part			6.9	806	0.02		0.6	9.7	-9.1	16						NAF
177520_5.5-5.75	Other	Weathered	Sandstone, fine-medium; oxidised; carbonaceous wisps			9.3	476	<0.01		0.2	156	-155.8	1019						NAF
177520_7.5-7.75	Other	Weathered	Sandstone, fine-medium; oxidised; carbonaceous wisps			9.1	478	0.01		0.3	33.8	-33.5	110						NAF
177520_9.5-9.75	Other	Weathered	Sandstone, fine-medium; oxidised; carbonaceous wisps			9.0	378	<0.01		0.2	56.7	-56.5	370						NAF
177520_11.5-11.75	Other	Weathered	Sandstone, fine-medium; oxidised; carbonaceous wisps			9.0	364	<0.01		0.2	45.3	-45.1	296						NAF
				ABCC ANC@pH4.5 = 41 kg H2SO4/t; % ANC readily avail. = 89%; Likely carbonate mineral = Fe-Dolomite / Dolomite														
177520_13.5-13.75	Other	Weathered	Sandstone, fine-medium; oxidised; carbonaceous wisps			8.9	308	<0.01		0.2									NAF
177520_15.45-15.7	Other	Weathered	Sandstone, fine-medium; oxidised; carbonaceous wisps			8.9	311	<0.01		0.2	52.4	-52.2	342						NAF
177520_17.25-17.5	Other	Weathered	Siltstone; oxidised sandstone laminae bands			8.8	283	<0.01		0.2	16.6	-16.4	108						NAF
177520_19.25-19.5	Other	Fresh	Sandstone, very fine; common siltstone laminae bands			9.0	234	0.02		0.6	26.9	-26.3	44						NAF
177520_21.5-21.75	Other	Fresh	Sandstone, fine; bands minor siltstone bands			9.1	201	0.01		0.3	61.9	-61.6	202						NAF
177520_23.5-23.75	Other	Fresh	Sandstone, very fine; siltstone laminae			8.9	206	0.02		0.6	40.6	-40.0	66						NAF
177520_25.5-25.75	Other	Fresh	Sandstone, very fine; common siltstone laminae			8.7	203	0.04		1.2	50.2	-49.0	41						NAF
				ABCC ANC@pH4.5 = 42 kg H2SO4/t; % ANC readily avail. = 83%; Likely carbonate mineral = Fe-Dolomite														
177520_26.49-26.77	Other	Fresh	Coal, inferior; with carbonaceous mudstone [L1]			7.2	105	0.12	0.076	3.7	10.3	-6.6	3						NAF
177520_26.88-27.2	Other	Fresh	Coal, 10-40% bright [L2/1]			7.3	65	0.27	0.087	8.3	16	-7.7	2				6.6	2.6	NAF
177520_27.7-28	Other	Fresh	Coal, 10-40% bright [L2/2]			5.7	16	0.21	0.101	6.4	10.2	-3.8	2						NAF
177520_28.5-28.8	Other	Fresh	Coal, 40-60% bright [L2/3]			6.1	23	0.24	0.109	7.4	13.5	-6.2	2						NAF
177520_29-29.25	Other	Fresh	Coal, 60-90% bright [L3/1]			6.8	24	0.2	0.084	6.1	11.9	-5.8	2						NAF
177520_29.7-30	Other	Fresh	Coal, 60-90% bright [L3/1]			6.4	12	0.23	0.083	7.0	10.3	-3.3	1				4.0	2.3	PAF-LC
177520_30.5-30.8	Other	Fresh	Coal, 40-60% bright [L3/2]			6.5	46	0.26	0.141	8.0	13.5	-5.5	2						NAF
177520_31.71-32	Other	Fresh	Siltstone; carbonaceous; minor coaly bands			8.4	95	0.23	0.155	7.0	8.4	-1.4	1	4.2	1.0	6.4			UC(PAF)
177520_32.74-33	Other	Fresh	Coal, inferior; mudstone laminae [L4]			8.4	92	0.26	0.05	8.0	10.4	-2.4	1				7.6	<0.1	NAF
177520_33.24-33.5	Other	Fresh	Sandstone, fine; siltstone laminae			8.5	198	0.06		1.8	9.2	-7.4	5						NAF
177520_34.8-35.2	Other	Fresh	Sandstone, fine-medium			9.2	238	0.05		1.5	186	-184.5	121						NAF
177520_35.83-36.17	Other	Fresh	Siltstone; abundant carbonaceous laminae			9.1	300	0.14	0.109	4.3	72.4	-68.1	17						NAF
				ABCC ANC@pH4.5 = 59 kg H2SO4/t; % ANC readily avail. = 82%; Likely carbonate mineral = Fe-Dolomite / Dolomite														
177520_37-37.25	Other	Fresh	Siltstone; common sandstone laminae			9.1	257	0.07		2.1	20	-17.9	9						NAF
				ABCC ANC@pH4.5 = 7.0 kg H2SO4/t; % ANC readily avail. = 35%; Likely carbonate mineral = Fe-Dolomite / Siderite														
177520_38.75-39	Other	Fresh	Sandstone, fine; siltstone; carbonaceous laminae			9.2	210	0.02		0.6	139	-138.4	227						NAF
177520_41-41.25	Other	Fresh	Sandstone, fine; carbonaceous			9.2	171	0.02		0.6	33.6	-33.0	55						NAF
177520_43-43.25	Other	Fresh	Sandstone, fine; minor carbonaceous laminae & clasts			9.3	189	0.02		0.6	45.4	-44.8	74						NAF
177520_44.95-45.2	Other	Fresh	Sandstone, fine-medium; carbonaceous wisps			9.3	206	0.04		1.2	42.3	-41.1	35						NAF
177520_47-47.25	Other	Fresh	Sandstone, fine; carbonaceous siltstone laminae			9.3	182	0.03		0.9	30	-29.1	33						NAF
177520_48.5-48.75	Other	Fresh	Sandstone, fine; carbonaceous siltstone laminae			9.3	177	0.03		0.9	30.4	-29.5	33						NAF
177520_50.5-50.75	Other	Fresh	Sandstone, fine; carbonaceous siltstone laminae			9.4	208	0.02		0.6	102	-101.4	167						NAF

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t			kg H_2SO_4/t	
177520_51.28-51.56	Other	Fresh	Siltstone; common sandstone laminae throughout			9.3	222	0.04		1.2	25.1	-23.9	20						NAF
			ABCC ANC@pH4.5 = 10 kg H2SO4/t; % ANC readily avail. = 41%; Likely carbonate mineral = Fe-Dolomite / Siderite																
177520_51.56-51.81	Other	Fresh	Carbonaceous Siltstone; coaly laminae			8.7	232	0.16	0.121	4.9	15.5	-10.6	3						NAF
177520_52.08-52.32	Other	Fresh	Carbonaceous Mudstone; bands siltstone with coal			9.0	302	0.16	0.151	4.9	15.5	-10.6	3						NAF
177520_52.5-52.8	Other	Fresh	Coal, 10-40% bright; occasional calcareous veins [V1]			8.4	59	0.47	0.232	14.4	38.7	-24.3	3						NAF
177520_53.5-53.8	Other	Fresh	Coal, 40-60% bright [V1]			8.9	22	0.28	0.026	8.6	12.8	-4.2	1						NAF
177520_54.33-54.59	Other	Fresh	Carbonaceous Siltstone			9.0	247	0.07		2.1	14.5	-12.4	7						NAF
177520_56-56.25	Other	Fresh	Sandstone, fine; with siltstone			9.5	243	0.02		0.6	53	-52.4	87						NAF
177520_58-58.25	Other	Fresh	Siltstone; sandstone laminae; partly carbonaceous			9.4	238	0.03		0.9	17.9	-17.0	19						NAF
177520_59.73-60	Other	Fresh	Carbonaceous Siltstone; carbonaceous throughout			9.2	232	0.04		1.2	15.2	-14.0	12						NAF
			ABCC ANC@pH4.5 = 6.5 kg H2SO4/t; % ANC readily avail. = 43%; Likely carbonate mineral = Fe-Dolomite / Siderite																
177520_60.25-60.5	Other	Fresh	Coal, <10% bright [V2]			9.7	163	0.22	0.02	6.7	61.5	-54.8	9						NAF
177520_61-61.25	Other	Fresh	Coal, dull <1% bright [V3]			7.4	12	0.14	0.015	4.3	9.4	-5.1	2				6.9	<0.1	NAF
177520_61.5-61.78	Other	Fresh	Tuff [YT]			9.2	92	0.01		0.3	18	-17.7	59						NAF
177520_62-62.3	Other	Fresh	Coal, 10-40% bright [VL]			9.4	54	0.21	0.018	6.4	52.8	-46.4	8						NAF
177520_62.75-63	Other	Fresh	Carbonaceous Siltstone; minor coaly bands			9.5	155	0.09		2.8	26.5	-23.7	10						NAF
177520_65-65.25	Other	Fresh	Siltstone; carbonaceous in part; sandstone laminae			9.4	186	0.05		1.5	13.9	-12.4	9						NAF
177520_66.5-66.75	Other	Fresh	Siltstone; carbonaceous in part; sandstone laminae			9.5	253	0.07		2.1	14.3	-12.2	7						NAF
177520_68.5-68.75	Other	Fresh	Siltstone; sandstone & carbonaceous laminae			9.5	328	0.12	0.102	3.7	15.3	-11.6	4						NAF
177520_70.5-70.75	Other	Fresh	Sandstone, very fine; siltstone laminae; minor carb.			9.7	287	0.03		0.9	18.4	-17.5	20						NAF
177464_R01_0-0.3	Other	Weathered	Soil; roots in top 0.15m			8.1	384	0.02		0.6	32.6	-32.0	53.2						NAF
177464_R01_0.54-0.85	Other	Weathered	Soil; clayey in part oxidised			7.9	455	0.02		0.6	18.1	-17.5	29.6						NAF
177464_R01_1.2-1.5	Other	Weathered	Soil; clayey in part oxidised			8.0	452	0.01		0.3	40.8	-40.5	133.2						NAF
177464_R01_3.5-3.8	Other	Weathered	Soil; clayey in part; roots throughout			8.6	532	0.02		0.6	74.8	-74.2	122.1						NAF
177464_R01_4.4-4.67	Other	Weathered	Alluvium; clayey sandstone in part oxidised			8.6	1080	0.02		0.6	124	-123.4	202.4						NAF
177464_R01_5.5-5.8	Other	Weathered	Alluvium; clayey sandstone in part oxidised			6.6	949	0.02		0.6	6.1	-5.5	10.0						NAF
177464_R01_7-7.3	Other	Weathered	Claystone; oxidised			6.4	858	0.02		0.6	6	-5.4	9.8						NAF
177464_R01_8-8.3	Other	Weathered	Siltstone; oxidised			6.3	701	0.01		0.3	6.7	-6.4	21.9						NAF
177464_R01_10-10.3	Other	Weathered	Claystone; oxidised			7.6	612	<0.01		0.2	10	-9.8	65.3						NAF
177464_R01_11-11.3	Other	Weathered	Siltstone; claystone bands in part oxidised			8.8	611	<0.01		0.2	21.1	-20.9	137.8						NAF
177464_R01_13-13.3	Other	Weathered	Sandstone, very fine; oxidised siltstone in part			7.8	518	<0.01		0.2	9.9	-9.7	64.7						NAF
177464_R01_14.5-14.8	Other	Weathered	Siltstone; oxidised sandstone bands in part			8.8	609	<0.01		0.2	16.6	-16.4	108.4						NAF
177464_R01_16-16.3	Other	Weathered	Siltstone; oxidised sandstone bands in part			8.9	501	<0.01		0.2	91.8	-91.6	599.5						NAF
177464_R01_17.5-17.8	Other	Weathered	Siltstone; oxidised sandstone bands in part			8.2	484	<0.01		0.2	<0.5	0.2	1.6	8.0	<0.1	<0.1			NAF
177464_R01_19-19.3	Other	Weathered	Sandstone, very fine; oxidised siltstone bands; partly carb.			8.0	452	<0.01		0.2	7.1	-6.9	46.4						NAF
177464_R01_20.5-20.8	Other	Weathered	Sandstone, very fine; oxidised siltstone bands; partly carb.			8.9	568	<0.01		0.2	80.5	-80.3	525.7						NAF
177464_R01_22-22.3	Other	Weathered	Siltstone; oxidised sandstone claystone bands in part			8.7	624	<0.01		0.2	32.7	-32.5	213.6						NAF
177464_R01_23.5-23.8	Other	Weathered	Siltstone; oxidised sandstone claystone bands in part			8.0	598	<0.01		0.2	9.9	-9.7	64.7						NAF
177464_R01_24.57-24.88	Other	Weathered	Sandstone, medium; ox. siltstone bands; calcite fractures			8.8	487	<0.01		0.2	31.5	-31.3	205.7						NAF
177464_R01_25.5-25.8	Other	Weathered	Sandstone, medium; ox. siltstone bands; calcite fractures			8.9	431	<0.01		0.2	53.2	-53.0	347.4						NAF
177464_R01_27.2-27.5	Other	Weathered	Sandstone, medium; ox. siltstone bands; calcite fractures			9.0	441	<0.01		0.2	130	-129.8	849.0						NAF
177464_R01_28-28.3	Other	Weathered	Sandstone, medium; ox. siltstone bands; calcite fractures			8.9	362	0.03		0.9	70.7	-69.8	77.0						NAF
177464_R01_29.5-29.76	Other	Weathered	Sandstone, medium; ox. siltstone bands; calcite fractures			9.2	261	<0.01		0.2	54.9	-54.7	358.5						NAF
			ABCC ANC@pH4.5 = 66 kg H2SO4/t; % ANC readily avail. = 121%; Likely carbonate mineral = Fe-Dolomite																
177464_R01_30.88-31.17	Other	Weathered	Sandstone, medium; ox. siltstone bands; calcite fractures			9.0	247	<0.01		0.2	46.3	-46.1	302.4						NAF

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t				kg H_2SO_4/t	
177464_R01_32.5-32.8	Other	Weathered	Sandstone, medium; ox. siltstone bands; calcite fractures			9.1	212	<0.01		0.2	48.3	-48.1	315.4						NAF
177464_R01_34.6-34.93	Other	Weathered	Sandstone, fine-medium; carb. wisps; calcite fractures			8.9	195	0.01		0.3	30.2	-29.9	98.6						NAF
177464_R01_35.64-35.9	Other	Weathered	Sandstone, fine-medium; carb. wisps; calcite fractures			8.8	217	<0.01		0.2	11.8	-11.6	77.1						NAF
177464_R01_37.5-37.8	Other	Weathered	Sandstone, fine-medium; carb. wisps; calcite fractures			9.1	184	<0.01		0.2	84.6	-84.4	552.5						NAF
177464_R01_38-38.25	Other	Weathered	Sandstone, fine-medium; carb. wisps; calcite fractures			8.9	200	0.03		0.9	131	-130.1	142.6						NAF
177464_R01_39.5-39.8	Other	Fresh	Sandstone, fine			9.0	248	0.02		0.6	17.9	-17.3	29.2						NAF
177464_R01_41-41.27	Other	Fresh	Siltstone; sandstone in part; carbonaceous in part			9.0	257	0.01		0.3	18.5	-18.2	60.4						NAF
177464_R01_42.55-42.8	Other	Fresh	Sandstone, fine			9.2	242	0.01		0.3	26.1	-25.8	85.2						NAF
177464_R01_44.5-44.75	Other	Fresh	Sandstone, fine-medium; calcite sporadic infill fractures			9.1	252	0.01		0.3	16.4	-16.1	53.6						NAF
			ABCC ANC@pH4.5 = 9.4 kg H2SO4/t; % ANC readily avail. = 57%; Likely carbonate mineral = Fe-Dolomite																
177464_R01_46-46.26	Other	Fresh	Sandstone, fine-medium; calcite sporadic infill fractures			9.1	230	0.01		0.3	15.5	-15.2	50.6						NAF
177464_R01_48-48.25	Other	Fresh	Sandstone, fine-medium; calcite sporadic infill fractures			9.2	206	<0.01		0.2	140	-139.8	914.3						NAF
177464_R01_49.41-49.7	Other	Fresh	Sandstone, medium; occasional carbonaceous wisps			9.1	176	<0.01		0.2	92.2	-92.0	602.1						NAF
			ABCC ANC@pH4.5 = 105 kg H2SO4/t; % ANC readily avail. = 114%; Likely carbonate mineral = Dolomite																
177464_R01_50.9-51.15	Other	Fresh	Sandstone, medium; occasional carbonaceous wisps			9.0	199	<0.01		0.2	11.7	-11.5	76.4						NAF
177464_R01_52.75-53	Other	Fresh	Sandstone, fine-medium; common carbonaceous wisps			9.0	183	<0.01		0.2	32	-31.8	209.0						NAF
177464_R01_54.5-54.8	Other	Fresh	Sandstone, fine-medium; common carbonaceous wisps			9.0	186	<0.01		0.2	22.8	-22.6	148.9						NAF
			ABCC ANC@pH4.5 = 24 kg H2SO4/t; % ANC readily avail. = 106%; Likely carbonate mineral = Fe-Dolomite																
177464_R01_56-56.26	Other	Fresh	Sandstone, fine-medium; common carbonaceous wisps			9.0	188	<0.01		0.2	30.3	-30.1	197.9						NAF
177464_R01_57-57.25	Other	Fresh	Sandstone, fine-medium; common carbonaceous wisps			9.1	181	0.01		0.3	31.2	-30.9	101.9						NAF
177464_R01_59-59.3	Other	Fresh	Sandstone, fine; siltstone laminae & carbonaceous wisps			8.5	189	0.01		0.3	6.1	-5.8	19.9						NAF
177464_R01_60.97-61.23	Other	Fresh	Carbonaceous Mudstone; siltstone in part			8.2	127	0.01		0.3	<0.5	0.3	0.8	7.8	<0.1	<0.1			NAF
177464_R01_61.67-61.96	Other	Fresh	Carbonaceous Mudstone; siltstone in part			7.4	175	0.02		0.6	<0.5	0.6	0.4	6.5	<0.1	1.0			UC(NAF)
177464_R01_62.2-62.5	Other	Fresh	Coal, <10% bright [L2]			6.8	108	0.24	0.196	7.4	7.9	-0.6	1.1				4.2	<0.1	PAF-LC
177464_R01_62.85-63.18	Other	Fresh	Coal, 10-40% bright; calcite on bedding surfaces [L2]			6.2	48	0.18	0.097	5.5	<0.5	5.5	0.0				2.6	3.3	PAF-LC
177464_R01_63.45-63.74	Other	Fresh	Coal, 10-40% bright [L2]			6.3	56	0.18	0.1	5.5	<0.5	5.5	0.0				2.4	6.4	PAF
177464_R01_64-64.3	Other	Fresh	Coal; and Claystone [L2]			7.2	73	0.13	0.056	4.0	<0.5	4.0	0.1				3.2	<0.1	PAF-LC
177464_R01_65-65.3	Other	Fresh	Coal, 10-40% bright [L3]			6.4	60	0.24	0.106	7.4	<0.5	7.4	0.0				2.7	3.3	PAF-LC
177464_R01_65.7-66	Other	Fresh	Coal, 10-40% bright [L3]			7.3	49	0.16	0.039	4.9	<0.5	4.9	0.1				2.7	<0.1	PAF-LC
177464_R01_66.97-67.24	Other	Fresh	Carbonaceous Sandstone; sandstone in part; minor calcite			8.5	99	0.01		0.3	1.6	-1.3	5.2						NAF
177464_R01_67.79-68.07	Other	Fresh	Sandstone, fine			8.7	127	0.03		0.9	2.4	-1.5	2.6	6.5	<0.1	1.0			NAF
177464_R01_69.29-69.54	Other	Fresh	Sandstone, fine; siltstone laminae; minor calcite			8.8	145	0.03		0.9	4.7	-3.8	5.1						NAF
177464_R01_71.25-71.53	Other	Fresh	Sandstone, coarse to very coarse; carbonaceous wisps			9.1	231	0.02		0.6	18.8	-18.2	30.7						NAF
177464_R01_73-73.3	Other	Fresh	Sandstone, coarse to very coarse; carbonaceous wisps			9.3	233	0.02		0.6	27.1	-26.5	44.2						NAF
177464_R01_74.5-74.75	Other	Fresh	Sandstone, coarse to very coarse; carbonaceous wisps			9.5	249	0.01		0.3	77.9	-77.6	254.4						NAF
177464_R01_75.73-76	Other	Fresh	Sandstone, coarse to very coarse; carbonaceous wisps			9.4	266	0.02		0.6	42.1	-41.5	68.7						NAF
177464_R01_76-76.3	Other	Fresh	Carbonaceous Siltstone; minor coaly bands; minor calcite			9.4	240	0.18		5.5	5.1	0.4	0.9	6.0	<0.1	1.2			UC(NAF)
177464_R01_76.92-77.25	Other	Fresh	Sandstone, fine-medium; calcite on bedding surfaces			9.3	206	0.02		0.6	5.8	-5.2	9.5						NAF
177464_R01_78.5-78.8	Other	Fresh	Sandstone, fine-medium; calcite on bedding surfaces			9.6	222	0.02		0.6	20.9	-20.3	34.1						NAF
177464_R01_79.2-79.5	Other	Fresh	Sandstone, fine-medium; calcite on bedding surfaces			9.6	266	0.03		0.9	51.1	-50.2	55.6						NAF
177464_R01_82-82.35	Other	Fresh	Sandstone, coarse to very coarse; carb. wisps; minor calcite			9.6	239	0.02		0.6	59.8	-59.2	97.6						NAF
177464_R01_83.37-83.66	Other	Fresh	Sandstone, coarse to very coarse; carb. wisps; minor calcite			9.6	263	0.02		0.6	36.6	-36.0	59.8						NAF
177464_R01_84.5-84.75	Other	Fresh	Sandstone, coarse to very coarse; carb. wisps; minor calcite			9.6	256	0.01		0.3	87.7	-87.4	286.4						NAF
			ABCC ANC@pH4.5 = 79 kg H2SO4/t; % ANC readily avail. = 90%; Likely carbonate mineral = Fe-Dolomite / Dolomite																
177464_R01_86-86.27	Other	Fresh	Sandstone, coarse to very coarse; carb. wisps; minor calcite			9.6	267	0.01		0.3	82.4	-82.1	269.1						NAF

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t			kg H_2SO_4/t	
177464_R01_87.3-87.61	Other	Fresh	Carbonaceous Siltstone; pyrite sporadic on bedding surfaces			9.6	260	0.04		1.2	17.6	-16.4	14.4						NAF
177464_R01_89.2-89.5	Other	Fresh	Sandstone, fine; carbonaceous wisps; calcite infill fractures			9.6	227	0.02		0.6	24.3	-23.7	39.7						NAF
177464_R01_91-91.3	Other	Fresh	Sandstone, fine; carbonaceous wisps; calcite infill fractures			9.5	240	0.02		0.6	24.4	-23.8	39.8						NAF
			ABCC ANC@pH4.5 = 5.3 kg H2SO4/t; % ANC readily avail. = 22%; Likely carbonate mineral = Siderite																
177464_R01_92.83-93.11	Other	Fresh	Sandstone, fine-medium; carb. wisps; calcite infill fractures			9.6	288	0.01		0.3	97.1	-96.8	317.1						NAF
177464_R01_94.24-94.5	Other	Fresh	Sandstone, fine-medium; carb. wisps; calcite infill fractures			9.6	279	0.01		0.3	75.2	-74.9	245.6						NAF
177464_R01_95.5-95.8	Other	Fresh	Sandstone, fine-medium; carb. wisps; calcite infill fractures			9.6	279	0.02		0.6	79.1	-78.5	129.1						NAF
177464_R01_97-97.31	Other	Fresh	Sandstone, fine-medium; carb. wisps; calcite infill fractures			9.6	285	<0.01		0.2	143	-142.8	933.9						NAF
177464_R01_98.5-98.76	Other	Fresh	Sandstone, fine-medium; carb. wisps; calcite infill fractures			9.6	299	0.01		0.3	132	-131.7	431.0						NAF
177464_R01_99-99.25	Other	Fresh	Carbonaceous Sandstone; calcite on bedding surfaces			9.6	273	0.02		0.6	37.1	-36.5	60.6						NAF
177464_R01_100.25-100.5	Other	Fresh	Coal, 10-40% bright; calcite common infill fractures [V1]			8.0	106	0.33	0.133	10.1	30.3	-20.2	3.0						NAF
177464_R01_100.5-100.8	Other	Fresh	Coal, 10-40% bright; calcite common infill fractures [V1]			8.0	147	0.42	0.214	12.9	12.2	0.7	0.9				4.7	<0.1	UC(PAF)
177464_R01_101-101.3	Other	Fresh	Coal, 10-40% bright; calcite common infill fractures [V1]			8.0	202	0.04		1.2	27.2	-26.0	22.2						NAF
177464_R01_102.7-103	Other	Fresh	Siltstone; sandstone in part			9.3	236	0.02		0.6	<0.5	0.6	0.4	7.2	<0.1	<0.1			NAF
177464_R01_104.5-104.8	Other	Fresh	Sandstone, very fine; siltstone in part; calcite infill fractures			9.6	321	0.03		0.9	7	-6.1	7.6						NAF
177464_R01_106-106.3	Other	Fresh	Sandstone, very fine; siltstone in part; calcite infill fractures			9.6	326	0.01		0.3	20.8	-20.5	67.9						NAF
177464_R01_107.5-107.78	Other	Fresh	Sandstone, very fine; siltstone in part; calcite infill fractures			9.7	328	0.02		0.6	23.4	-22.8	38.2						NAF
			ABCC ANC@pH4.5 = 27 kg H2SO4/t; % ANC readily avail. = 116%; Likely carbonate mineral = Fe-Dolomite																
177464_R01_107.88-108.14	Other	Fresh	Sandstone, very fine; siltstone in part; calcite infill fractures			9.1	836	0.03		0.9	19.9	-19.0	21.7						NAF
177464_R01_108.75-109	Other	Fresh	Carbonaceous Siltstone; sandst. laminae; calcite fractures			9.3	635	0.03		0.9	17.5	-16.6	19.0						NAF
177464_R01_109.72-110	Other	Fresh	Sandstone, very fine; siltstone laminae; carb. in part			9.6	375	0.02		0.6	17	-16.4	27.8						NAF
177464_R01_110.74-111	Other	Fresh	Sandstone, very fine; siltstone laminae; carb. in part			9.7	330	0.02		0.6	17.1	-16.5	27.9						NAF
177464_R01_111.24-111.5	Other	Fresh	Sandstone, fine; siltstone in part; calcite infill fractures			9.6	350	0.01		0.3	108	-107.7	352.7						NAF
177464_R01_111.84-112.1	Other	Fresh	Carbonaceous Mudstone; occasional siltstone bands			9.8	311	0.05		1.5	11	-9.5	7.2						NAF
177464_R01_112.5-112.75	Other	Fresh	Carbonaceous Siltstone; occasional sandstone laminae			9.5	230	0.04		1.2	9.5	-8.3	7.8						NAF
177464_R01_113.09-113.35	Other	Fresh	Carbonaceous Siltstone; some coal, inferior			9.8	280	0.11	0.024	3.4	42.5	-39.1	12.6						NAF
177464_R01_113.5-113.8	Other	Fresh	Carbonaceous Siltstone; sandstone laminae; minor calcite			9.5	159	0.04		1.2	8.4	-7.2	6.9						NAF
177464_R01_114.25-114.5	Other	Fresh	Carbonaceous Siltstone; sandstone laminae; minor calcite			9.5	159	0.02		0.6	6	-5.4	9.8						NAF
177464_R01_114.69-115	Other	Fresh	Carbonaceous Siltstone; sandstone laminae; minor calcite			9.5	164	0.02		0.6	3.2	-2.6	5.2						NAF
177464_R01_115.88-116.16	Other	Fresh	Sandstone, very fine; siltstone; carb. laminae			9.6	241	0.02		0.6	14	-13.4	22.9						NAF
177464_R01_117.5-117.76	Other	Fresh	Siltstone; calcite sporadic infill fractures			9.6	231	0.02		0.6	5	-4.4	8.2						NAF
177464_R01_118.15-118.56	Other	Fresh	Siltstone; some sandstone, fine-medium			9.6	325	0.02		0.6	22.2	-21.6	36.2						NAF
177464_R01_119-119.25	Other	Fresh	Sandstone, medium; occasional siltstone bands			9.7	342	0.02		0.6	26.6	-26.0	43.4						NAF
177464_R01_119.5-119.77	Other	Fresh	Sandstone, medium; occasional siltstone bands			9.8	318	0.02		0.6	57.5	-56.9	93.9						NAF
			ABCC ANC@pH4.5 = 55 kg H2SO4/t; % ANC readily avail. = 95%; Likely carbonate mineral = Fe-Dolomite / Dolomite																
177464_R01_120.5-120.8	Other	Fresh	Carbonaceous Sandstone; siltstone in part			9.6	312	0.03		0.9	34.1	-33.2	37.1						NAF
177464_R01_121.2-121.5	Other	Fresh	Carbonaceous Sandstone; siltstone in part			9.7	311	0.03		0.9	18.8	-17.9	20.5						NAF
177464_R01_122.25-122.5	Other	Fresh	Sandstone, fine-medium; carb. sandstone; minor calcite			9.7	306	0.02		0.6	71.2	-70.6	116.2						NAF
177464_R01_122.92-123.15	Other	Fresh	Sandstone, fine-medium; calcite infill fractures			9.8	304	0.02		0.6	42.8	-42.2	69.9						NAF
177464_R01_124.35-124.62	Other	Fresh	Siltstone; sandstone bands; minor calcite			9.6	340	0.04		1.2	15	-13.8	12.2						NAF
			ABCC ANC@pH4.5 = 3.9 kg H2SO4/t; % ANC readily avail. = 26%; Likely carbonate mineral = Siderite																
177464_R01_125.1-125.4	Other	Fresh	Sandstone, coarse to v. coarse; carb. bands; minor calcite			9.8	304	0.02		0.6	193	-192.4	315.1						NAF
177464_R01_126.6-126.75	Other	Fresh	Sandstone, coarse to v. coarse; carb. bands; minor calcite			9.7	311	0.01		0.3	83.8	-83.5	273.6						NAF
177464_R01_127.25-127.5	Other	Fresh	Sandstone, medium; part coarse; minor carb. bands			9.7	344	0.02		0.6	36.9	-36.3	60.2						NAF
177464_R01_128.5-128.76	Other	Fresh	Sandstone, medium; carbonaceous bands			9.7	329	0.01		0.3	72	-71.7	235.1						NAF

Table B1. Acid-Base Characteristics of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH se	EC se	pH 1:5	EC 1:5	S	Scr	MPA	ANC	NAPP	ANC/ MPA ratio	NAG pH	NAG@ pH4.5	NAG@ pH7.0	Ext. NAGpH	Ext. NAG Capacity	Acid Classification
					µS/cm		µS/cm	%		kg H_2SO_4/t					kg H_2SO_4/t			kg H_2SO_4/t	
177464_R01_130.32-130.6	Other	Fresh	Carb. Claystone and carb. sandst.; siltst. in part; tuffaceous?			9.7	322	0.02		0.6	3	-2.4	4.9						NAF
177464_R01_130.9-131.2	Other	Fresh	Carbonaceous Sandstone; siltstone bands			9.6	257	0.03		0.9	16.5	-15.6	18.0						NAF
177464_R01_132.33-132.5	Other	Fresh	Sandstone, fine-medium; carb. bands; minor calcite			9.8	324	0.01		0.3	26.9	-26.6	87.8						NAF
177464_R01_134.2-134.45	Other	Fresh	Claystone; sandstone in part; tuffaceous?			9.8	335	<0.01		0.2	8.5	-8.3	55.5						NAF
177464_R01_134.82-135.04	Other	Fresh	Claystone; sandstone in part; tuffaceous?			9.9	412	<0.01		0.2	139	-138.8	907.8						NAF
177464_R01_135.2-135.5	Other	Fresh	Carbonaceous Siltstone; sandstone in part			9.8	303	0.05		1.5	17.3	-15.8	11.3						NAF
177464_R01_136.13-136.44	Other	Fresh	Carbonaceous Siltstone; sandstone in part			9.8	315	0.06		1.8	10.2	-8.4	5.6						NAF
177464_R01_136.85-137.1	Other	Fresh	Carbonaceous Mudstone; sparse disseminated in part			9.7	314	0.02		0.6	8	-7.4	13.1						NAF
177464_R01_138-138.26	Other	Fresh	Carbonaceous Mudstone; sparse disseminated in part			9.7	295	<0.01		0.2	8.3	-8.1	54.2						NAF
177464_R01_138.65-138.95	Other	Fresh	Carbonaceous Sandstone; minor coal; siltstone in part			9.8	316	0.05		1.5	9.2	-7.7	6.0						NAF
177464_R01_139.5-139.8	Other	Fresh	Carbonaceous Siltstone			9.7	302	0.04		1.2	8.1	-6.9	6.6						NAF
177464_R01_140.2-140.5	Other	Fresh	Coal, inferior; siltstone/sandstone laminae; coaly shale [VL]			9.7	302	0.11	0.026	3.4	6.9	-3.5	2.0				7.2	<0.1	NAF
177464_R01_140.7-141	Other	Fresh	Coaly Shale; minor coaly claystone bands [VL]			9.5	177	0.1	0.024	3.1	5.6	-2.5	1.8				4.6	<0.1	UC(NAF)
177464_R01_141.5-141.8	Other	Fresh	Coaly Shale; common claystone bands [VL]			9.8	306	0.16	0.032	4.9	19	-14.1	3.9						NAF
177464_R01_142.4-142.7	Other	Fresh	Coal, inferior; some carb. siltstone; minor sandstone [VL]			9.7	245	0.13	0.028	4.0	14.9	-10.9	3.7						NAF
177464_R01_142.8-143.2	Other	Fresh	Carbonaceous Siltstone; sandstone in part			9.8	272	0.14	0.031	4.3	49.1	-44.8	11.5						NAF
177464_R01_144-144.25	Other	Fresh	Carbonaceous Sandstone; coaly minor coaly bands			9.9	358	0.14	0.141	4.3	66.4	-62.1	15.5						NAF
177464_R01_145.75-146	Other	Fresh	Sandstone, fine-medium; common siltstone bands			9.8	328	0.04		1.2	26.2	-25.0	21.4						NAF
177464_R01_147-147.25	Other	Fresh	Sandstone, medium; calcite sporadic infill fractures			9.8	316	0.02		0.6	58.5	-57.9	95.5						NAF
177464_R01_149.24-149.5	Other	Fresh	Sandstone, medium; calcite sporadic infill fractures			9.8	343	0.16	0.164	4.9	64	-59.1	13.1						NAF

pHse & ECse = saturated extract; pH & EC 1:5 (w:v) water extracts [on pulp]; S = total sulfur; Scr = sulfide [chromium reducible sulfur]; MPA = maximum potential acidity [calculated from total S]; ANC = acid neutralising capacity; NAPP = net acid producing potential [calculated from MPA and ANC]; NAG = net acid generation; Selected samples underwent extended boil NAG test and/or acid buffering characterisation curve (ABCC) test to refine the acid classification. Refer to report body for further explanation.

Table B2. Total Element Concentrations of Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo
				mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	%	mg/kg	mg/kg
177204_2.5-2.7	Pandora	Weathered	Clayey Sand	0.023	6.34	8.9	740	1.13	0.176	3.9	0.046	29.4	16.15	46.5	2.1	19.15	3.86	16.4	0.15	2.85	0.005	0.043	0.7	13.25	22.5	0.43	738	0.34
177204_6.7-6.9	Pandora	Weathered	Sandstone, fine-medium; ferruginous	0.179	5.76	10.9	314	0.81	0.167	3.43	0.047	44.6	15.2	113	1.72	14.7	5.35	14.25	0.16	2.8	0.102	0.059	0.46	20.6	25	0.59	731	0.61
177204_8.4-8.6	Pandora	Weathered	Mudstone; clayey throughout	0.029	10.1	10.1	4680	2.8	0.607	3.56	0.229	39.7	17.95	46.4	4.66	46.3	4.23	26.7	0.2	6.08	0.071	0.092	1	16.2	60.7	0.33	1245	0.56
177204_11-11.2	Pandora	Weathered	Sandstone, fine; siltstone bands throughout	0.103	9.09	23.1	417	1.97	0.306	2.86	0.224	41.1	26.8	53.4	3.34	40	6.53	23.4	0.22	4.54	0.01	0.073	0.91	17.85	36.3	0.61	1065	1.11
177204_14-14.3	Pandora	Weathered	Sandstone, very fine; abundant siltstone throughout	0.171	10.7	15.45	163	2.16	0.416	2.27	0.126	58.9	15.1	56.5	5.88	49.8	2.59	26	0.2	5.34	0.043	0.093	1.35	26	40.5	0.6	519	0.71
177204_17.4-17.6	Pandora	Weathered	Sandstone, fine; siltstone bands throughout	0.068	9.5	25.2	149	2.16	0.44	0.58	0.089	52.6	15.5	53.2	4.28	50.4	2.41	28.2	0.24	5.88	0.025	0.084	1.07	22.3	44.8	0.38	297	1.42
177204_21.1-21.3	Pandora	Weathered	Siltstone; sandstone mudstone bands	0.076	10.5	32.9	162	2.01	0.381	0.42	0.192	72.3	23.1	60.3	5.42	50.4	8.82	26.2	0.3	5.27	0.033	0.085	1.19	33.6	34.7	0.6	1855	0.53
177204_23-23.2	Pandora	Weathered	Carbonaceous Mudstone	0.063	0.62	28.8	48.1	0.74	0.569	0.19	0.044	13.05	9.4	6.55	4.1	45.5	1.43	2.7	0.036	0.085	0.011	0.07	0.16	5.24	4.5	0.11	17	2.9
177204_23.41-23.54	Pandora	Weathered	Coal, weathered; heat affected [L1]	0.012	0.19	65.1	108.5	0.75	0.134	0.05	0.004	1.655	2.04	1.5	0.641	11.1	3.3	0.477	0.059	0.041	0.01	0.017	0.02	0.564	2	0.02	28.9	4.62
177204_24.7-24.9	Pandora	Fresh	Claystone [L1]	0.067	11	1.26	31	1.17	0.142	0.64	0.024	115	30.3	317	0.2	79.5	0.98	26.9	0.24	4.96	0.034	0.05	0.02	46	55.2	0.37	22.7	0.88
177204_26.33-26.6	Pandora	Fresh	Coal, <10% bright [L1]	0.009	0.52	0.67	162	0.28	0.13	0.24	0.009	1.39	0.649	2.83	0.372	12.95	0.31	1.37	0.03	0.048	0.017	0.011	0.01	0.497	15.2	0.11	3.6	0.22
177204_28.26-28.5	Pandora	Fresh	Carbonaceous Mudstone	0.097	0.37	6.92	1490	0.6	0.37	0.13	0.152	4.02	2.8	2.09	4.98	65.1	0.121	0.908	0.019	0.115	0.062	0.047	0.1	1.635	2.6	0.08	5.6	1.06
177204_29.4-29.6	Pandora	Fresh	Mudstone	0.087	11.8	13.6	429	2.23	0.467	0.11	0.123	70.1	7.65	46.8	18.6	67.9	0.83	28.8	0.15	5.03	0.066	0.085	1.87	31.1	29.3	0.44	59.7	0.87
177204_33-33.2	Pandora	Fresh	Mudstone; siltstone in part; clayey in part	0.059	8.88	10.5	389	1.62	0.245	0.49	0.108	51.7	23.8	55.4	6.68	44.5	2.28	21.2	0.21	3.69	0.047	0.045	1.57	24.5	24.5	0.71	363	1.79
177204_37-37.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands	0.046	7.73	13.3	224	1.23	0.134	1.65	0.103	40.8	15.25	62.9	4.19	26.1	2.53	18.5	0.2	2.79	0.036	0.051	1.57	19.4	13.5	0.83	546	0.75
177204_41.2-41.4	Pandora	Fresh	Sandstone, fine-medium	0.043	7.88	21.2	280	1.25	0.129	1.37	0.082	42.5	19	54.2	4.11	26	3.22	18.9	0.24	2.91	0.032	0.051	1.66	20.6	13.5	0.88	633	0.79
177204_47.5-47.7	Pandora	Fresh	Sandstone, fine-medium; siltstone bands; calcite cement	0.09	9.13	14.8	248	1.91	0.311	0.64	0.165	59.9	15.25	64.4	10.5	65.2	3.12	23.2	0.27	4.19	0.046	0.068	2.19	28.2	18.6	0.89	406	0.73
177204_50.9-51.1	Pandora	Fresh	Sandstone, fine; siltstone throughout	0.086	8.7	10	347	1.88	0.308	0.72	0.148	61	14.95	55.9	10.25	55.7	4.57	22.6	0.3	3.95	0.041	0.067	1.96	28.9	21.2	0.93	714	0.59
177204_54-54.2	Pandora	Fresh	Sandstone, fine; siltstone laminae throughout	0.068	8.68	23.9	227	1.61	0.205	1.87	0.131	48.3	16.8	57.9	7.02	42.2	4.32	21.2	0.27	3.56	0.044	0.062	1.91	22.6	18.8	1.12	964	0.89
177204_57.6-57.8	Pandora	Fresh	Sandstone, fine; siltstone throughout; calcite cement	0.083	8.28	29.6	210	1.65	0.237	3.55	0.157	41.1	16.5	57.2	6.48	49.5	3.71	20.8	0.28	3.73	0.046	0.063	1.47	18.35	29.1	1.29	985	0.82
177204_59-59.2	Pandora	Fresh	Carbonaceous Mudstone; mudstone near top of unit	0.131	1.05	25.5	22	1.11	0.464	0.24	0.229	7.42	33.7	7.82	3.74	49.3	1.31	3.31	0.044	0.078	0.158	0.068	0.13	2.78	12.5	0.39	99	8.22
177204_59.9-60.2	Pandora	Fresh	Coal, 10-40% bright	0.009	0.34	1.5	13.5	0.21	0.112	0.6	0.035	1.885	1.435	3.21	0.523	11.15	0.59	0.921	0.038	0.045	0.017	0.011	0.04	0.693	4.3	0.14	90.4	0.09
177204_64.32-64.64	Pandora	Fresh	Coal, dull <1-10% bright [V1]	0.015	0.87	0.07	10.1	0.65	0.303	0.1	0.031	8.78	1.29	3.18	0.593	12.65	1.38	2.59	0.042	0.107	0.02	0.018	0.03	3.2	11.7	0.31	103	0.47
177204_65.74-65.87	Pandora	Fresh	Mudstone	0.079	1.01	1.8	66.3	1.4	0.33	1.25	0.152	11.05	3.91	1.28	2.5	35.2	1.44	1.67	0.038	0.069	0.046	0.047	0.11	4.28	12.7	0.61	325	3.12
177204_66.36-66.64	Pandora	Fresh	Mudstone; carbonaceous bands throughout	0.13	1.1	5.35	145	1.83	0.453	0.28	0.145	2.46	16.25	0.56	2.41	74.8	0.31	1.305	0.018	0.052	0.073	0.093	0.13	0.948	11	0.41	5.1	3.42
177212_2-2.2	Pandora	Weathered	Sandstone, fine-medium; soft clayey	0.058	7.21	10.05	204	1.09	0.174	2.75	0.033	42.4	15.2	56.9	3.35	20.9	3.61	16.6	0.14	3.27	<0.005	0.051	0.67	19.75	19.1	0.53	663	0.38
177212_5.8-6	Pandora	Weathered	Siltstone; rare sub angular bands near top of unit	0.032	11.4	2.8	172	2.33	0.511	0.2	0.019	48.1	11.8	44	5.75	54.5	2.29	30.2	0.17	6.04	0.008	0.083	1.16	19.55	42	0.49	161	0.33
177212_8-8.2	Pandora	Weathered	Siltstone; sub angular in part	0.065	11.3	11.8	168	2.02	0.471	1.64	0.114	67.7	11.9	49	5.83	52.9	1.92	27.9	0.22	6.01	0.006	0.093	1.11	30.4	41.7	0.58	135	0.34
177212_13-13.2	Pandora	Weathered	Siltstone; occasional sandstone bands	0.065	10.4	6.12	398	2.47	0.442	0.53	0.148	65.5	20.2	46.4	8.36	46.4	6.83	24.9	0.26	4.85	0.041	0.077	1.68	30.4	27.6	0.56	1870	0.42
177212_18.3-18.5	Pandora	Weathered	Carbonaceous Mudstone	0.121	14.8	5.88	148	2.54	0.822	0.2	0.086	89.5	9.05	48.9	4.95	47.3	2.04	36.5	0.22	9.37	0.052	0.142	0.58	36.6	87.9	0.23	141.5	0.83
177212_21.28-21.48	Pandora	Weathered	Siltstone	0.115	10.5	15.35	164	1.94	0.438	0.25	0.267	54.4	23.8	71.9	4.34	57.3	4.01	27.8	0.2	5.7	0.058	0.098	1.08	21.6	39.6	0.33	643	0.67
177212_24.09-24.21	Pandora	Weathered	Clay	0.092	11.1	15.3	234	2.2	0.524	1.23	0.079	82.6	16.9	60	6.46	57.1	4.34	26.2	0.22	5.54	0.021	0.096	0.97	38.5	43.3	0.45	645	1.32
177212_24.75-24.95	Pandora	Fresh	Coal, 10-40% bright [L12]	0.013	0.08	2.35	15.6	0.18	0.112	0.04	0.036	3.17	9.49	0.86	0.097	18.1	0.232	0.271	0.09	0.038	0.021	0.014	0.01	0.802	1.1	0.01	10.9	0.82
177212_26-26.2	Pandora	Fresh	Coal, 10-40% bright [L12]	0.014	0.07	2.18	7.8	0.16	0.108	0.02	0.032	2.35	28.1	0.62	0.135	19.7	0.157	0.257	0.103	0.038	0.033	0.018	0.01	0.634	1	0.01	7.1	1.6
177212_28.8-29	Pandora	Fresh	Coal, 40-60% bright [L12]	0.023	0.08	9.52	5.4	0.22	0.112	0.02	0.061	8.7	30.3	1.39	1.605	17.35	1.49	0.451	0.075	0.063	0.061	0.008	0.04	3.25	0.3	0.01	21.4	1.08
177212_29.02-29.18	Pandora	Fresh	Mudstone	0.111	11.2	3.04	198	1.83	0.375	0.07	0.108	48.6	4.72	44.3	13	66.7	1.03	28.8	0.21	4.16	0.068	0.073	1.37	25.3	33.4	0.25	15.3	0.86
177212_32.14-32.43	Pandora	Fresh	Mudstone	0.081	10.5	11.5	257	2.16	0.327	0.24	0.13	69.7	9.42	52.4	10.55	56.3	1.52	25.3	0.19	4.55	0.068	0.07	2.08	31.6	25.5	0.63	134.5	0.37
177212_35-35.2	Pandora	Fresh	Siltstone; mudstone throughout	0.09	10.3	44.1	247	1.97	0.239	0.25	0.106	57.4	64.8	67.1	8.89	47.7	1.77	24.1	0.17	4.15	0.125	0.069	2.16	26.8	25.1	0.73	157	2.26
177212_38-38.2	Pandora	Fresh	Sandstone, fine; siltstone bands throughout	0.067	9.2	27.9	227	1.77	0.212	0.47	0.109	50.4	16.85	76.4	7.13	51.3	3.48	21.1	0.21	3.8	0.063	0.055	2.09	23.5	18.9	0.79	592	0.84
177212_43.1-43.3	Pandora	Fresh	Sandstone, medium; sideritic nodules	0.028	7.01	8.47	185	1.19	0.118	3.89	0.041	32.4	15.3	32.2	3.67	19.1	4.69	15.7	0.21	2.49	0.029	0.032	1.6	15.5	13.4	1.55	1015	0.54
177212_45.6-45.8	Pandora	Fresh	Sandstone, fine; siltstone bands; siderite lenses	0.07	8.66	9.38	221	1.62	0.249	0.71	0.125	53.9	13.05	54.4	9.08	47.2	3.04	21	0.25	3.57	0.031	0.055	2.01	25.1	18	0.88	462	0.97
177212_49-49.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands	0.063	8.49	36.1	207	1.43	0.166	1.82	0.191	56.4	26.2	65.9	5.22	35.9	3.91	19.55	0.25	3.25	0.05	0.048	1.88	26.4	16.2	1.18	842	1.56
177212_51.8-52	Pandora	Fresh	Sandstone, medium; sideritic nodules	0.031	7.01	14.9	204	1.13	0.112	3.94	0.049	34.9	15	39.3	3.42	18.2	4.52	16.65	0.23	2.37	0.038	0.036	1.45	17.15	16.8	1.64	1230	0.66
177212_54-54.2	Pandora	Fresh	Siltstone; sandstone laminae near base of unit	0.093	9.14	14.5	275	2.27	0.315	0.29	0.162	49.6	11.45	54.8	9.43	62.5	3.16	23.8	0.27	4.36	0.058	0.062	2.13	21.9	23.5	0.67	533	0.67
177212_55.18-55.42	Pandora	Fresh	Mudstone	0.077	9.68	6.38	470	2.22	0.365	0.34	0.156	65.8	14.05	41.8	11.3	57.8	2.26	23.7	0.14	4.31	0.056	0.063	2.24	30.8	23.6	0.72	288	0.57
177212_55.66-55.86	Pandora	Fresh	Coal, inferior; mudstone	0.135	0.47	28.8	20.7	1.35	0.457	0.2	0.224	10.45	53.6	4.09	3.35	51.5	0.109	1.31	0.024	0.089	0.286	0.073	0.15	3.92	2.8	0.13	7.4	10.4
177212_56.85-57.03	Pandora	Fresh	Coal, <10% bright [V1]	0.006	0.06	0.18	48.8	0.23	0.0716	0.08	0.02	2.43	0.273	0.43	0.082	9.94	0.051	0.278	0.073	0.017	0.044	0.006	0.01	0.803	0.6	0.01	1.2	0.14
177212_59.89-60.07	Pandora	Fresh	Coal, dull <1-10% bright; minor tuff & carb. siltst. [V1]	0.036	0.35	1.27	14.2	0.92	0.439	0.08	0.115	22.9	1.8	1.16	1.35	20.8	0.05	0.55	0.034	0.118	0.054	0.034	0.06	9.94	4.2	0.07	2.9	4.16
177212_60.3-60.38	Pandora	Fresh	Carbonaceous Mudstone; clayey in part [YT]	0.076	0.47	0.87	14.8	0.94	0.779	0.17	0.248	111	1.405	0.98	1.95	10.35	0.094	0.728	0.123	0.224	0.194	0.055	0.12	47	4.2	0.16	3.1	0.82
177212_62.5-62.7	Pandora	Fresh	Carbonaceous Mudstone; coaly lenses throughout	0.084	0.47	1.41	15.9	0.86	0.366	0.16	0.109	4.43	1.535	3.36	8.42	32.6	0.36	1.25	0.016	0.088	0.054	0.039	0.15	1.77	3.3	0.17	8.6	0.64

Table B2. Total Element Concentrations of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
				%	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
177204_2.5-2.7	Pandora	Weathered	Clayey Sand	0.078	6.06	30.9	0.041	13.6	21.7	<0.0004	0.01	1.02	10.5	0.061	1.54	117.5	0.44	0.066	5.22	0.376	0.286	1.77	117	1.255	13.25	66.8	99.3
177204_6.7-6.9	Pandora	Weathered	Sandstone, fine-medium; ferruginous	0.06	9.66	23.1	0.085	15.45	28.1	<0.0004	<0.01	0.66	12.45	0.359	1.93	112.5	0.65	0.051	9.45	0.791	0.173	2.2	163	2.08	16.65	73.7	99.5
177204_8.4-8.6	Pandora	Weathered	Mudstone; clayey throughout	0.069	12.95	32.7	0.081	46	29.7	<0.0004	0.1	0.61	14.6	0.1	3.22	224	1.01	0.085	9.71	0.573	0.533	2.63	115	2.61	19.55	65.6	206
177204_11-11.2	Pandora	Weathered	Sandstone, fine; siltstone bands throughout	0.212	8.85	34	0.118	19.65	26.3	<0.0004	0.01	0.69	17.45	0.251	2.01	160	0.64	0.061	8.3	0.528	0.355	2.55	134	1.785	24.9	110	172
177204_14-14.3	Pandora	Weathered	Sandstone, very fine; abundant siltstone throughout	0.191	10.65	29.5	0.071	22	51.3	<0.0004	0.02	1.09	18.1	0.138	2.62	200	0.76	0.11	11.5	0.586	0.431	2.92	131	1.96	28.4	95.7	186
177204_17.4-17.6	Pandora	Weathered	Sandstone, fine; siltstone bands throughout	0.153	12	30.8	0.052	27.3	45.2	<0.0004	0.01	1.05	16.2	0.1	2.89	122	0.87	0.092	10.9	0.66	0.434	4.04	144	2.29	21.2	93.8	196
177204_21.1-21.3	Pandora	Weathered	Siltstone; sandstone mudstone bands	0.057	10.5	40.8	0.077	26.3	68.1	0.0004	0.02	0.91	22.5	0.37	2.51	107	0.76	0.067	13.2	0.557	0.428	4.47	143	2.18	36.1	132	189
177204_23-23.2	Pandora	Weathered	Carbonaceous Mudstone	0.06	0.012	18.35	0.04	14.65	10.45	<0.0002	0.02	0.53	4.35	0.559	0.83	145	<0.005	0.08	4.07	<0.001	0.06	0.464	22.7	0.011	4.27	34.4	2.83
177204_23.41-23.54	Pandora	Weathered	Coal, weathered; heat affected [L1]	0.016	0.023	6.15	0.061	1.955	1.37	<0.0002	0.01	0.397	2.15	0.223	0.1	37	<0.005	0.041	0.528	0.001	<0.001	0.157	8	0.022	3.29	46.7	1.56
177204_24.7-24.9	Pandora	Fresh	Claystone [L1]	0.088	4.81	232	0.246	9.31	0.68	0.0005	0.77	0.42	15.45	0.45	1.11	124.5	0.28	0.02	7.98	0.639	0.05	2.57	155	0.528	17.4	6	196
177204_26.33-26.6	Pandora	Fresh	Coal, <10% bright [L1]	0.01	0.004	4.24	0.081	3.87	0.69	0.0003	0.04	0.081	1.315	0.418	0.12	445	<0.005	0.019	1.365	<0.001	<0.001	0.29	4.7	0.012	4.6	5.5	1.4
177204_28.26-28.5	Pandora	Fresh	Carbonaceous Mudstone	0.042	0.013	8.15	0.015	13.65	8.09	0.0004	0.14	0.193	2.95	0.301	0.37	65	<0.005	0.075	1.48	0.001	0.027	0.643	7.5	0.007	2.28	53.2	4.14
177204_29.4-29.6	Pandora	Fresh	Mudstone	0.089	10.35	33.8	0.021	22	102.5	0.0005	0.07	0.64	20.6	0.424	2.57	144.5	0.76	0.119	12.75	0.542	0.612	3.01	137	1.975	25.3	91.2	158
177204_33-33.2	Pandora	Fresh	Mudstone; siltstone in part; clayey in part	0.469	7.71	41.3	0.067	17.55	74.9	0.0007	0.1	0.81	16.8	0.219	1.79	165.5	0.56	0.058	8.34	0.47	0.524	2.28	136	1.41	19.3	86.4	126
177204_37-37.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands	1.18	6.65	28.1	0.07	15.65	67	0.0006	0.04	0.73	14.5	0.063	1.48	218	0.46	0.028	6.32	0.487	0.398	1.67	128	1.1	15.5	90.9	101
177204_41.2-41.4	Pandora	Fresh	Sandstone, fine-medium	1.24	6.04	33.6	0.069	12.1	72.6	<0.0004	0.03	0.67	14.75	0.075	1.38	218	0.44	0.027	6.41	0.413	0.428	1.69	122	1	16.75	77.4	101
177204_47.5-47.7	Pandora	Fresh	Sandstone, fine-medium; siltstone bands; calcite cement	0.568	8.57	39.4	0.071	18.1	108	0.0007	0.03	0.56	18.6	0.312	2.09	207	0.63	0.072	9.65	0.502	0.607	2.66	140	1.455	22.1	94.7	146
177204_50.9-51.1	Pandora	Fresh	Sandstone, fine; siltstone throughout	0.565	8.47	35.9	0.092	19.1	101.5	0.0005	0.03	0.48	18.3	0.263	1.95	200	0.61	0.069	9.59	0.488	0.547	2.54	139	1.55	24.3	93.1	138
177204_54-54.2	Pandora	Fresh	Sandstone, fine; siltstone laminae throughout	0.653	7.62	36.2	0.077	13.6	79.9	0.0007	0.02	0.53	16.95	0.209	1.64	259	0.54	0.043	7.57	0.465	0.51	2.04	131	1.41	20.9	92.6	125
177204_57.6-57.8	Pandora	Fresh	Sandstone, fine; siltstone throughout; calcite cement	0.342	8.2	36.3	0.084	18.2	39.7	0.0005	0.03	0.62	15.1	0.267	1.94	250	0.59	0.049	6.45	0.48	0.436	1.88	128	1.715	21.2	95.8	131
177204_59-59.2	Pandora	Fresh	Carbonaceous Mudstone; mudstone near top of unit	0.079	0.012	28.9	0.041	26.2	7.75	0.0005	0.21	3.51	4.38	1.03	0.76	110	<0.005	0.104	2.21	0.001	0.046	0.327	19.5	0.015	6.85	104	2.71
177204_59.9-60.2	Pandora	Fresh	Coal, 10-40% bright	0.019	0.01	3.43	0.011	3.18	2.2	<0.0002	0.1	0.149	1.545	0.335	0.2	33.8	<0.005	0.028	0.512	0.001	<0.001	0.08	6.2	0.036	1.275	9	1.24
177204_64.32-64.64	Pandora	Fresh	Coal, dull <1-10% bright [V1]	0.022	0.008	1.13	0.003	4.72	1.305	0.0007	0.05	0.168	1.545	0.329	0.78	31.5	<0.005	0.042	3.78	<0.001	<0.001	0.526	12.6	0.01	2.55	25.4	2.03
177204_65.74-65.87	Pandora	Fresh	Mudstone	0.104	0.004	4.93	0.026	17.15	4.3	0.0009	0.09	0.335	4.01	0.394	0.83	249	<0.005	0.084	3.15	<0.001	0.012	0.615	7.3	0.01	4	62.7	2.81
177204_66.36-66.64	Pandora	Fresh	Mudstone; carbonaceous bands throughout	0.158	0.002	8.76	0.007	20.9	4.63	0.0003	0.07	0.738	3.9	0.563	0.83	326	<0.005	0.089	1.755	<0.001	0.095	0.544	4.1	0.005	1.47	110	1.23
177212_2-2.2	Pandora	Weathered	Sandstone, fine-medium; soft clayey	0.154	7.19	27.6	0.038	14.9	44.5	<0.0004	0.01	0.75	12.95	0.071	1.68	102	0.53	0.037	8.84	0.449	0.315	2.35	116	1.57	16.9	57.1	113
177212_5.8-6	Pandora	Weathered	Siltstone; rare sub angular bands near top of unit	0.114	12	28.7	0.038	18.05	52.2	<0.0004	0.01	0.61	19.05	0.048	2.95	117	0.88	0.091	11.65	0.659	0.486	3.33	143	2.25	17.2	70.8	199
177212_8-8.2	Pandora	Weathered	Siltstone; sub angular in part	0.119	12	27.5	0.055	26.9	48.6	<0.0004	0.01	0.74	19.05	0.067	2.89	140.5	0.89	0.079	13.65	0.653	0.438	3.76	137	2.4	26.8	79.5	203
177212_13-13.2	Pandora	Weathered	Siltstone; occasional sandstone bands	0.105	10.1	29.6	0.115	18.05	94.1	<0.0004	0.01	0.8	19.4	0.104	2.42	128.5	0.74	0.071	13.15	0.516	0.65	3.79	125	1.89	29.9	83.3	173
177212_18.3-18.5	Pandora	Weathered	Carbonaceous Mudstone	0.094	17.2	27.8	0.035	26.3	30.5	<0.0004	0.01	0.88	23.2	0.191	4.55	186.5	1.33	0.179	24.4	0.786	0.248	7	149	3.32	32.9	43.2	305
177212_21.28-21.48	Pandora	Weathered	Siltstone	0.073	11.65	37.7	0.083	25.8	48.9	0.0006	0.02	0.86	21	0.346	2.78	118	0.86	0.082	11.35	0.656	0.406	3.61	158	2.34	24.5	96.5	194
177212_24.09-24.21	Pandora	Weathered	Clay	0.078	11.95	36.6	0.102	26.4	59	0.0004	0.03	1.63	19.2	0.153	3.28	156	0.87	0.089	15.55	0.612	0.418	4.11	132	7.73	33.7	90.9	192
177212_24.75-24.95	Pandora	Fresh	Coal, 10-40% bright [L12]	0.015	0.009	11.4	0.006	2.35	0.751	0.0002	0.28	0.132	1.615	0.338	0.09	20.5	<0.005	0.023	0.647	<0.001	0.002	0.446	3.9	0.054	4.58	9.8	1.25
177212_26-26.2	Pandora	Fresh	Coal, 10-40% bright [L12]	0.011	0.011	63.9	0.004	4.38	0.713	0.0002	0.24	0.069	1.525	0.617	0.08	15.55	<0.005	0.031	0.954	<0.001	0.004	0.978	3.6	0.013	5.17	15.8	1.47
177212_28.8-29	Pandora	Fresh	Coal, 40-60% bright [L12]	0.023	0.046	27.4	0.002	4.59	3.64	<0.0002	2.12	0.097	1.105	0.281	0.09	9.9	<0.005	0.016	0.864	0.001	0.009	0.552	5.8	0.048	2.26	36.4	2.05
177212_29.02-29.18	Pandora	Fresh	Mudstone	0.092	9.71	18.4	0.016	15.95	80.7	<0.0004	0.74	0.6	16.95	0.314	2.5	117.5	0.76	0.089	11.7	0.6	0.554	4.52	110	2.02	16.2	23.5	147
177212_32.14-32.43	Pandora	Fresh	Mudstone	0.116	9.68	36.9	0.072	22.7	106.5	0.0004	0.04	0.62	19.3	0.293	2.26	151.5	0.71	0.073	10.85	0.568	0.606	2.77	151	1.925	26.3	132	157
177212_35-35.2	Pandora	Fresh	Siltstone; mudstone throughout	0.126	8.67	94.6	0.065	18.65	99.9	0.0006	0.12	2.54	18.35	0.249	2.07	150	0.62	0.047	9.15	0.557	0.88	2.42	154	1.685	23.9	104.5	145
177212_38-38.2	Pandora	Fresh	Sandstone, fine; siltstone bands throughout	0.124	7.46	48	0.057	17	87	0.0004	0.05	1.08	16.55	0.218	1.8	158.5	0.54	0.041	7.67	0.479	0.569	2.13	177	1.275	20.5	85.6	129
177212_43.1-43.3	Pandora	Fresh	Sandstone, medium; sideritic nodules	0.66	4.92	29.6	0.07	11.3	58.6	<0.0004	0.01	0.5	10.05	0.028	1.12	302	0.36	0.023	5.48	0.314	0.39	1.37	102	0.84	14.6	52.9	85.3
177212_45.6-45.8	Pandora	Fresh	Sandstone, fine; siltstone bands; siderite lenses	0.299	7.94	39.8	0.075	13.95	95.3	0.0005	0.02	0.52	15.7	0.128	1.83	184.5	0.56	0.048	8.46	0.483	0.545	2.34	158	1.39	18.85	85.1	127
177212_49-49.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands	0.264	6.81	47.8	0.068	15.5	80.3	0.0008	0.04	0.71	14.75	0.201	1.5	230	0.49	0.031	7.33	0.445	0.517	2.02	147	1.08	20.4	82.9	115
177212_51.8-52	Pandora	Fresh	Sandstone, medium; sideritic nodules	0.492	5.02	24.7	0.079	11.95	53.3	<0.0004	0.02	0.51	10.85	0.031	1.16	274	0.37	0.02	5.46	0.339	0.371	1.41	102	0.837	15.95	64.4	80.6
177212_54-54.2	Pandora	Fresh	Siltstone; sandstone laminae near base of unit	0.132	9.04	28.6	0.09	20.9	93.5	0.0004	0.03	0.57	18.6	0.322	2.19	204	0.66	0.068	8.57	0.544	0.605	2.89	150	1.715	20.9	98.9	148
177212_55.18-55.42	Pandora	Fresh	Mudstone	0.132	8.87	28.9	0.107	20.8	114.5	0.0005	0.04	0.5	17.45	0.401	2.12	227	0.65	0.089	10.95	0.475	0.656	3.26	136	1.67	29.1	95.4	141
177212_55.66-55.86	Pandora	Fresh	Coal, inferior; mudstone	0.092	0.016	44.4	0.031	25.3	8.02	0.0003	0.13	2.62	4.48	0.954	0.59	109.5	<0.005	0.103	2.36	0.001	0.041	1.365	16.6	0.022	5.97	114.5	2.95
177212_56.85-57.03	Pandora	Fresh	Coal, <10% bright [V1]	0.017	0.007	0.63	0.019	2.17	0.297	<0.0002	0.03	0.024	0.664	0.239	0.06	103	<0.005	0.009	0.481	<0.001	<0.001	0.132	1.5	0.005	2.22	1.3	0.6
177212_59.89-60.07	Pandora	Fresh	Coal, dull <1-10% bright; minor tuff & carb. siltst. [V1]	0.051	0.026	3.34	0.005	23.2	2.91	<0.0002	0.09	0.254	3.24	0.652	1.1	62	<0.005	0.028	11.1	<0.001	0.001	1.91	10.7	0.009	5.01	37.8	3.37
177212_60.3-60.38	Pandora	Fresh	Carbonaceous Mudstone; clayey in part [YT]	0.097	0.012	3.69	0.009	22.5	4.56	<0.0002	0.11	0.254	3.84	0.347	1.2	121	<0.005	0.033	21.2	<0.001	0.01	4.53	9.4	0.016	17.95	100	5.33
177212_62.5-62.7	Pandora	Fresh	Carbonaceous Mudstone; coaly lenses throughout	0.083	0.011	7.44	0.003	21.7	11.45	<0.0002	0.06	0.109	2.44	0.297	0.47	112.5	<0.005	0.046	1.3	<0.001	0.028	0.352	11.7	0.029	3.98	127.5	3.01

Table B2. Total Element Concentrations of Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo
				mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	%	mg/kg	mg/kg
177496_1.2-1.5	Other	Weathered	Sand; clayey in part common clasts oxidised	0.04	6.8	7.7	300	1.5	0.3	0.63	0.03	48.2	16.8	79	5.38	32.7	3.71	17.55	0.12	3.7	0.008	0.047	0.4	21.8	30.7	0.47	746	0.78
177496_7.7-8	Other	Weathered	Sandstone, fine-medium; oxidised siltstone in part	0.09	6.24	2.2	350	0.95	0.14	4.27	0.25	41.8	19.9	156	3.63	23	4.06	14.15	<0.05	2.9	0.005	0.046	0.67	18.5	26.4	0.64	2680	0.59
177496_15.5-15.8	Other	Weathered	Sandstone, very fine; oxidised siltstone in part	0.06	7.62	3	240	2.26	0.41	0.37	0.08	30.5	13.6	49	8.49	32.7	3.51	20.6	0.25	4.5	<0.005	0.068	1.73	13	28.8	0.54	294	0.28
177496_23.5-23.8	Other	Weathered	Sandstone, fine-medium; oxidised; minor calcite	0.07	7.9	7.3	160	2.25	0.31	0.56	0.05	27.8	20	48	5.28	42.4	4.61	21	0.17	3.8	<0.005	0.074	1.29	11.9	35.4	0.58	752	0.3
177496_27.5-27.82	Other	Fresh	Sandstone, fine; calcite sporadic infill fractures	0.07	7.89	5.2	170	1.65	0.23	1.38	0.16	46.5	20.4	129	4.75	36.8	6.04	17.9	0.05	3.9	<0.005	0.06	1.27	21.6	25.2	0.84	1205	0.42
177496_40.5-40.77	Other	Fresh	Sandstone, very fine	0.1	9.88	18.4	450	2.7	0.38	0.37	0.05	35.6	19	52	8.07	52.8	2.89	22.6	0.17	4.6	0.007	0.077	1.96	15.6	36.8	0.61	460	0.27
177496_55-55.25	Other	Fresh	Sandstone, fine-medium; calcite infill fractures	0.04	7.54	18	130	1.54	0.22	3.15	0.06	48.8	19.4	156	3.47	23.5	4.79	21.1	0.3	3.5	0.025	0.051	0.83	23.7	29.6	0.55	1230	0.46
177496_60-60.3	Other	Fresh	Coal, <10% bright; calcite sporadic infill fractures [L2]	0.006	0.25	0.44	10.3	0.17	0.175	0.43	0.034	1.08	0.506	5.42	0.104	13.95	0.29	0.706	0.037	0.052	0.014	0.022	0.01	0.419	5.8	0.05	25.4	1.82
177496_63.53-63.76	Other	Fresh	Carbonaceous Sandstone	0.1	12.3	1.7	380	1.94	0.41	0.12	0.06	25	1.3	67	9.05	68.9	0.66	27.7	<0.05	4.3	0.054	0.092	1.4	15.1	50.9	0.25	20	0.97
177496_82-82.25	Other	Fresh	Sandstone, medium; carbonaceous wisps	0.04	7.96	6.2	390	1.24	0.09	2.12	0.05	31.5	11.9	90	3.39	16.4	2.25	17.3	<0.05	2.4	0.022	0.035	1.49	16	16.6	0.76	690	0.6
177496_94.13-94.41	Other	Fresh	Sandstone, fine; carb. siltstone laminae	0.07	8.74	15.5	520	1.68	0.26	1.11	0.12	50.7	13	108	7.61	42.6	2.81	23.1	0.17	4.2	0.062	0.068	2	24	26.4	0.79	544	0.65
177496_98.5-98.85	Other	Fresh	Coal, 40-60% bright [V1]	0.005	0.62	0.26	11.7	0.17	0.0588	0.1	0.018	2.38	2.25	2.35	0.115	6.54	2.96	1.455	0.14	0.03	0.02	0.006	0.01	0.815	10.4	0.25	885	0.03
177496_105.47-105.68	Other	Fresh	Sandstone, medium; carbonaceous laminae	0.04	9.73	9.1	560	1.5	0.08	1.63	0.04	27.7	9.5	49	5.09	11.2	2.03	21.4	0.13	2.7	0.068	0.043	1.75	13.7	30.8	0.52	390	0.41
177496_115.5-115.75	Other	Fresh	Sandstone, medium; carbonaceous clasts; minor calcite	0.04	8.07	7.7	430	1.36	0.07	2.01	0.04	26.3	9.5	38	3.41	10.6	2.8	19.05	0.2	2.1	0.02	0.03	1.2	13.2	34	0.58	335	0.45
177496_125.52-125.8	Other	Fresh	Sandstone, medium-coarse; carb. laminae; minor calcite	0.08	8.37	14.2	600	2.49	0.3	0.78	0.1	30.8	35	65	6.05	30.7	2.44	22.2	0.19	4.9	0.089	0.078	1.62	13.4	48.3	0.49	284	3.38
177496_135.5-136.75	Other	Fresh	Carbonaceous Sandstone; minor coal; minor calcite	0.13	8.42	19.2	610	2.5	0.44	1.01	0.17	57.6	18.1	46	9.94	73.1	2.11	23.6	0.26	5.1	0.052	0.073	2.38	25.8	29.3	0.66	304	1.5
177518_3-3.25	Pandora	Weathered	Clayey Sand; oxidised carb. fragments; gravelly	0.035	5.04	10.45	480	1.38	0.216	0.25	0.029	51.4	20.1	74.7	3.46	25.3	3.89	11.05	0.08	2.6	<0.005	0.04	0.36	20.9	19.9	0.38	1485	0.76
177518_8.5-8.75	Pandora	Weathered	Sandy Clay; oxidised sandy bands	0.069	9.05	6.94	224	2.11	0.418	2.44	0.073	38.6	12.3	50.1	8.51	48.6	4.13	20.6	0.09	3.78	<0.005	0.066	2.03	17.35	23.9	0.95	364	0.18
177518_17.1-17.35	Pandora	Weathered	Sandstone, very fine; oxidised	0.06	8.89	4.5	196	2	0.284	0.14	0.046	33.6	11.1	52.6	5.97	39	3.27	24.4	0.09	3.9	0.013	0.065	1.67	13.5	27.7	0.68	281	0.25
177518_29.9-30.2	Pandora	Weathered	Sandstone, fine; siltstone laminae finer near base of unit	0.034	7.86	6.55	125	1.44	0.154	0.87	0.27	37.9	14.45	52.6	2.77	25.7	4.36	18.75	0.13	3.35	<0.005	0.055	0.96	16.45	28	0.74	732	0.26
177518_42.2-42.45	Pandora	Weathered	Siltstone; common sandstone bands	0.097	9.83	2.51	202	2.07	0.274	1.01	0.047	74	17.55	60.6	7.2	49.4	4.78	22.3	0.15	4.28	<0.005	0.067	1.79	31.7	32.1	0.87	341	0.21
177518_48-48.25	Pandora	Fresh	Sandstone, very fine; common siltstone laminae bands	0.085	10.5	3	178	2.19	0.277	0.33	0.022	49.7	18.95	57.6	6.27	44.5	4.68	23.8	0.1	4.23	<0.005	0.076	1.62	23.4	35.6	0.82	266	0.23
177518_62-62.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite fragments	0.081	9.36	3.9	161	2.11	0.489	0.4	0.027	30.1	15.55	44.9	7.95	50.7	5.12	23.5	0.11	3.89	<0.005	0.063	1.77	12.55	32.9	0.82	209	0.16
177518_76.11-76.35	Pandora	Fresh	Sandstone, fine; carb. laminae; calcite fragments	0.073	8.8	7.42	141	1.88	0.26	0.85	0.03	37.9	17.75	66.3	4.09	41.5	4.14	20.9	0.13	3.98	<0.005	0.069	1.32	16.1	36.4	0.78	476	0.28
177518_90.1-90.35	Pandora	Fresh	Sandstone, fine; occasional carbonaceous laminae bands	0.067	8.05	5.67	182	1.63	0.187	1.73	0.051	42.6	13.65	73.1	3.44	32.4	3.54	18.3	0.11	3.52	<0.005	0.056	1.16	19.15	25.9	0.67	594	0.34
177518_104-104.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite common	0.074	8.29	21.1	167	1.98	0.326	0.62	0.082	39.8	16.1	71	3.37	37.6	3.68	20.6	0.14	3.98	0.021	0.066	1.25	15.85	32.4	0.55	663	0.47
177518_112-112.4	Pandora	Fresh	Coal, 10-60% bright [L3/2]	0.006	0.17	0.22	146	0.13	0.0797	0.31	0.017	3.74	0.545	3.06	0.037	16.1	0.028	0.221	0.091	0.042	0.014	0.012	<0.01	1.13	3.5	0.01	2.9	0.1
177518_118-118.25	Pandora	Fresh	Sandstone, very fine; minor coaly bands; minor calcite	0.092	9.44	20.1	225	1.77	0.323	0.55	0.152	50.3	16.8	44.1	10.15	55.8	1.85	22.5	0.1	3.67	0.052	0.068	1.88	22.1	28.5	0.74	204	1.06
177518_129-129.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; minor calcite	0.037	7.29	18.4	190	1.06	0.096	5.97	0.042	35.9	11.75	57.6	2.77	18.25	3.83	15.2	0.13	2.22	0.044	0.038	1.27	16.7	20.6	2.1	1005	0.61
177518_132.5-133	Pandora	Fresh	Coal, 40-60% bright; claystone in cleats [V1]	0.012	0.42	0.37	15.8	0.18	0.105	0.48	0.03	5.19	0.891	3.84	0.102	20	1.83	1.235	0.118	0.065	0.016	0.015	0.01	1.85	6.5	0.19	484	0.19
177518_136.75-137	Pandora	Fresh	Tuff [YT]	0.111	8.24	0.28	316	2.61	0.796	0.23	0.092	53.5	3.54	12.1	4.68	1.25	1.09	24.4	0.15	5.95	0.128	0.051	3.13	22.3	8.7	0.75	66.8	1.68
177519_2.7-3	Other	Weathered	Clay; common sandstone siltstone fragments	0.032	8.21	4.28	309	1.83	0.349	0.16	0.016	59.5	15.9	54.3	8.45	37.5	4.02	21.6	0.78	4.02	0.007	0.065	1.28	27.3	28.2	0.55	327	0.38
177519_11.92-12.2	Other	Weathered	Sandstone, very fine; minor siltstone & mudstone bands	0.043	10.5	3.5	220	1.94	0.479	0.17	0.017	58.3	19.05	41.5	11.05	31.8	5.43	26.3	0.76	4.44	0.007	0.07	1.56	28.8	44	0.94	313	0.25
177519_21.5-21.76	Other	Weathered	Sandstone, very fine; siltstone & mudst. bands; coal rare	0.048	9.9	3.9	347	1.94	0.301	1.77	0.136	58.9	21.1	50.9	8.48	43.2	5.04	24.3	0.78	4.19	<0.005	0.066	1.11	27.7	42.7	0.7	883	0.5
177519_35.5-35.76	Other	Fresh	Sandstone, very fine; minor siltst. bands; minor calcite	0.101	10.4	3.67	175	2.13	0.414	0.7	0.083	67.4	20.3	54.6	7.17	48.2	5.27	25.6	0.73	4.51	<0.005	0.089	1.32	31.2	42.4	0.86	582	0.29
177519_50-50.26	Other	Fresh	Sandstone, very fine; calcite sporadic fragments	0.101	10.2	25.7	228	2.19	0.336	0.63	0.114	63.2	19.95	57.2	7.32	48.9	4.44	24.1	0.78	4.56	0.006	0.075	1.68	29.2	33.9	0.83	706	0.79
177519_63.2-63.5	Other	Fresh	Sandstone, fine; calcite on bedding surfaces	0.042	7.85	13.8	171	1.23	0.192	2.9	0.085	52.8	21.5	66.3	2.88	22.1	4.56	18.05	0.68	2.77	0.006	0.053	0.96	24.1	22.7	0.71	807	0.38
177519_78.5-78.75	Other	Fresh	Sandstone, very fine; carb. laminae; minor calcite	0.107	8.42	29.7	296	1.78	0.312	4.21	0.156	54.6	27.6	62.8	5.16	37.7	6.22	20.6	0.79	3.66	0.021	0.047	1.2	25.5	27.9	1.02	1615	1.39
177519_92.45-92.7	Other	Fresh	Carbonaceous Sandstone; carb. siltstone; minor calcite	0.097	11.8	9.24	314	2.49	0.542	0.39	0.163	86.7	10.95	61.6	9.13	55.8	4.13	34.1	0.74	6.37	0.071	0.089	1.43	39.2	51.7	0.43	722	0.5
177519_95.5-96	Other	Fresh	Coal, 60-90% bright [L2/3]	0.01	0.33	0.38	5.7	0.14	0.0948	0.12	0.035	2.21	0.474	2.93	0.036	14.55	0.4	0.945	0.127	0.04	0.024	0.013	<0.01	0.572	12.1	0.06	5.8	0.57
177519_99.5-99.75	Other	Fresh	Carbonaceous Sandstone; occasional minor coaly bands	0.119	11.5	15.65	399	2.29	0.509	0.14	0.212	79.9	6.82	53.9	14	62.7	1.12	29.7	0.67	5.01	0.117	0.089	1.7	37.7	41.3	0.43	92.6	0.67
177519_104.25-104.5	Other	Fresh	Sandstone, fine; carb. siltst. laminae; calcite fragments	0.083	10.3	31.6	470	1.91	0.3	0.52	0.161	64.8	12.7	71.3	9.24	60.2	2.61	25.1	0.68	4.44	0.069	0.066	1.71	30.3	33.8	0.54	531	0.95
177519_123.5-123.75	Other	Fresh	Sandstone, very fine; carb. siltst. laminae; minor calcite	0.085	9.05	9.2	480	1.91	0.318	1.61	0.119	61.3	14.35	46.2	9.08	52.1	5.14	22.8	0.73	3.92	0.085	0.06	1.95	29.4	31	1.12	967	1.08
177519_139-139.25	Other	Fresh	Sandstone, very fine; carbonaceous laminae	0.086	9.74	9.11	610	1.99	0.404	0.29	0.097	59	19.9	38.5	16.25	53.5	2.02	25.4	0.62	4.4	0.065	0.072	2.75	27.5	22.7	0.74	189.5	0.71
177519_140.7-140.99	Other	Fresh	Coal, 10-40% bright [V23]	0.019	0.37	0.17	97.2	0.54	0.169	2.62	0.027	13.05	1.895	5.98	2.74	17.1	2.64	0.868	0.069	0.084	0.016	0.024	0.1	5.3	4	0.51	547	0.39
177519_142-142.25	Other	Fresh	Tuff; occasional carb. clasts; calcite fragments [YT]	0.144	9.56	0.42	870	2.7	0.845	1.83	0.124	120.5	1.675	7.5	3	1.41	1.19	26	0.74	6.3	0.309	0.066	3.17	58.7	5.5	1.02	197	0.18
177520_1.5-1.75	Other	Weathered	Sandy Clay; sandy in part	0.037	10.4	13.2	200	1.41	0.436	0.13	<0.005	56.9	4.18	62.2	6.82	30.4	3.26	25.1	0.19	5.26	<0.005	0.063	1.67	27	16.2	0.42	50.7	0.37
177520_11.5-11.75	Other	Weathered	Sandstone, fine-medium; oxidised; carbonaceous wisps	0.052	6.96	11.75	103	1.09	0.151	1.79	0.017	38	13.65	58.7	2.65	17.9	4.17	16.4	0.19	2.78	<0.005	0.044	0.88	17.4	25.1	0.46	245	0.35
177520_17.25-17.5	Other	Weathered	Siltstone; oxidised sandstone laminae bands	0.016	11.5	8.2	176	2.43	0.411	0.45	<0.005	69	10.95	68.6	4.93	49.3	1.49	29.2	0.2	5.97	0.009	0.083	1.55	32.3	37.7	0.39	86.4	0.42
177520_25.5-25.75	Other	Fresh	Sandstone, very fine; common siltstone laminae	0.126	10.8	88.3	310	1.95	0.368	1.53	0.219	62.7	38.7	66.1	4.32	49.4	4.64	26.5	0.3	4.96	0.165	0.081	1	26.9	43.3	0.69	751	1.87

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
				%	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
177496_1.2-1.5	Other	Weathered	Sand; clayey in part common clasts oxidised	0.26	8	29.8	160	20.6	49.2	<0.002	0.02	0.97	12.8	1	1.9	129.5	0.68	<0.05	9.17	0.457	0.43	2.5	107	1.7	19.8	51	116
177496_7.7-8	Other	Weathered	Sandstone, fine-medium; oxidised siltstone in part	0.3	5.6	35.8	430	13.2	39.8	<0.002	<0.01	0.58	11.6	<1	1.7	142	0.44	<0.05	6.88	0.328	0.23	1.7	92	1.2	18.1	71	98.3
177496_15.5-15.8	Other	Weathered	Sandstone, very fine; oxidised siltstone in part	0.24	9.4	25.4	250	24.2	86	<0.002	0.01	0.9	14.5	<1	2.4	101.5	0.68	0.05	8.25	0.535	0.66	2.5	122	1.8	14.2	83	153
177496_23.5-23.8	Other	Weathered	Sandstone, fine-medium; oxidised; minor calcite	0.29	7.9	31.2	490	28.8	49.5	<0.002	0.01	0.81	14.2	<1	2.1	123.5	0.56	<0.05	6.2	0.502	0.45	2.3	129	1.5	15.8	104	139
177496_27.5-27.82	Other	Fresh	Sandstone, fine; calcite sporadic infill fractures	0.3	7.9	46.3	930	18.6	68.1	<0.002	0.01	0.93	13.5	<1	2.3	122.5	0.63	<0.05	8.71	0.429	0.39	2.5	117	1.6	28.1	116	129
177496_40.5-40.77	Other	Fresh	Sandstone, very fine	0.15	9.3	32.3	940	17	94.9	<0.002	0.02	1.49	16.9	<1	2.5	168.5	0.67	0.06	9.03	0.549	0.71	2.3	141	1.8	20.3	73	162
177496_55-55.25	Other	Fresh	Sandstone, fine-medium; calcite infill fractures	0.21	6.6	37.3	720	18.8	49.7	<0.002	0.07	0.76	14.6	<1	1.7	169.5	0.56	0.05	9.18	0.403	0.4	2.3	115	1.5	22.8	85	117
177496_60-60.3	Other	Fresh	Coal, <10% bright; calcite sporadic infill fractures [L2]	0.013	0.012	1.23	0.006	7.45	0.607	0.0002	0.2	0.152	1.355	0.568	0.29	20.4	<0.005	0.031	0.646	0.001	<0.001	0.111	6.5	0.007	1.76	9.3	1.56
177496_63.53-63.76	Other	Fresh	Carbonaceous Sandstone	0.14	10.6	13	110	19.6	75.6	<0.002	0.15	0.63	11.6	1	2.7	255	0.84	0.08	12.25	0.698	0.52	3.3	112	2.1	9.6	27	145
177496_82-82.25	Other	Fresh	Sandstone, medium; carbonaceous wisps	2.09	4.5	26.3	620	11.8	60.6	<0.002	0.02	0.51	11	<1	1.1	483	0.35	<0.05	5.58	0.301	0.38	1.4	95	0.8	13.9	64	89
177496_94.13-94.41	Other	Fresh	Sandstone, fine; carb. siltstone laminae	0.95	8.4	33.5	930	13.8	87.1	<0.002	0.03	0.62	15.4	1	2.2	444	0.68	0.06	9.38	0.514	0.62	2.5	128	1.9	20	100	131
177496_98.5-98.85	Other	Fresh	Coal, 40-60% bright [V1]	0.013	0.024	1.21	0.021	1.27	0.656	0.0002	0.01	0.039	1.125	0.06	0.17	18.55	<0.005	0.004	0.484	0.001	<0.001	0.091	3.7	0.004	2.7	7.4	0.84
177496_105.47-105.68	Other	Fresh	Sandstone, medium; carbonaceous laminae	1.69	5.6	16	210	15.8	65.2	<0.002	0.03	0.5	9.2	<1	1.4	756	0.35	<0.05	5.42	0.334	0.44	1.1	80	0.8	8.2	72	94.6
177496_115.5-115.75	Other	Fresh	Sandstone, medium; carbonaceous clasts; minor calcite	2.23	4.9	12.9	680	11.8	41.9	<0.002	0.03	0.37	7.5	<1	1	691	0.31	<0.05	4.17	0.329	0.31	1	78	0.8	8.8	69	79.4
177496_125.52-125.8	Other	Fresh	Sandstone, medium-coarse; carb. laminae; minor calcite	1.33	10.4	47.8	340	21	50.3	<0.002	0.05	1.8	13.2	1	2.6	601	0.72	0.05	8.31	0.662	0.5	2.4	143	1.6	11.6	110	153
177496_135.5-136.75	Other	Fresh	Carbonaceous Sandstone; minor coal; minor calcite	1.16	9.1	40.7	770	21.5	97.2	<0.002	0.05	0.96	16.7	1	2.6	595	0.78	0.07	10.6	0.5	0.7	3.3	135	2	21.1	102	155
177518_3-3.25	Pandora	Weathered	Clayey Sand; oxidised carb. fragments; gravelly	0.361	6.26	22.7	0.023	21.1	36.6	<0.0004	0.02	1.02	9.48	0.084	1.34	92.5	0.45	0.058	6.6	0.351	0.291	1.84	99.1	1.655	17.25	39.3	95.1
177518_8.5-8.75	Pandora	Weathered	Sandy Clay; oxidised sandy bands	0.257	8.54	27.5	0.028	13.75	72.2	<0.0004	0.01	0.77	16.2	0.039	2.59	122	0.64	0.052	7.71	0.485	0.651	1.92	134	1.745	19.45	79.4	143
177518_17.1-17.35	Pandora	Weathered	Sandstone, very fine; oxidised	0.262	8.73	23	0.013	16.95	74.7	<0.0004	0.01	0.75	17.1	0.058	2.33	88.3	0.63	0.036	7.29	0.548	0.575	2.59	134	1.935	14.5	72.2	145
177518_29.9-30.2	Pandora	Weathered	Sandstone, fine; siltstone laminae finer near base of unit	0.506	6.93	22.9	0.038	10.1	43.7	0.0006	0.01	1.71	14.55	0.06	1.98	86.5	0.51	0.025	6.65	0.496	0.301	1.88	117	1.54	14.85	91.5	121
177518_42.2-42.45	Pandora	Weathered	Siltstone; common sandstone bands	0.301	9.58	35.9	0.368	17.15	99.1	0.0004	0.01	0.61	19.1	0.054	2.6	132	0.7	0.047	10.05	0.519	0.55	3.45	124	1.835	48.9	99.4	160
177518_48-48.25	Pandora	Fresh	Sandstone, very fine; common siltstone laminae bands	0.24	9.16	25.2	0.04	11.45	89.2	<0.0004	0.01	0.68	19.4	0.04	2.46	126.5	0.64	0.043	9.43	0.57	0.536	2.58	155	1.655	19.45	97.7	163
177518_62-62.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite fragments	0.143	8.18	25.9	0.068	26.2	68.5	<0.0004	0.01	0.64	16.7	0.115	2.33	124.5	0.61	0.054	7.29	0.494	0.638	2.26	114	1.61	16.35	96.2	144
177518_76.11-76.35	Pandora	Fresh	Sandstone, fine; carb. laminae; calcite fragments	0.22	7.93	31.7	0.059	16.85	57.2	<0.0004	0.01	0.93	16.95	0.093	2.14	140.5	0.56	0.039	7.48	0.552	0.41	2.17	132	1.59	16.4	88.1	147
177518_90.1-90.35	Pandora	Fresh	Sandstone, fine; occasional carbonaceous laminae bands	0.124	7.61	30.5	0.061	23.2	49.7	<0.0004	0.02	0.57	15.4	0.225	1.88	146	0.55	0.031	7.79	0.476	0.362	1.77	113	1.505	17.95	76	129
177518_104-104.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite common	0.069	8.58	32.5	0.061	20	49.1	<0.0004	0.02	0.79	14.8	0.161	2.25	110.5	0.62	0.053	7.63	0.541	0.399	2.64	123	1.725	18.05	86.9	150
177518_112-112.4	Pandora	Fresh	Coal, 10-60% bright [L3/2]	0.015	0.01	0.63	0.132	1.71	0.202	0.0004	0.08	0.03	1.57	0.276	0.1	52.5	<0.005	0.016	1.3	0.001	<0.001	0.319	4.2	0.011	5.89	4.5	1.86
177518_118-118.25	Pandora	Fresh	Sandstone, very fine; minor coaly bands; minor calcite	0.258	8.05	34.5	0.077	17.45	85.5	0.0006	0.04	0.83	15.55	0.24	2.19	215	0.58	0.062	8.67	0.462	0.592	2.49	137	1.585	17.45	101.5	142
177518_129-129.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; minor calcite	0.587	5.12	20.5	0.08	8.82	44.9	<0.0004	0.02	0.56	12.55	0.045	1.31	389	0.36	0.018	5.2	0.363	0.33	1.32	95.6	1.005	15.05	58.9	86.1
177518_132.5-133	Pandora	Fresh	Coal, 40-60% bright; claystone in cleats [V1]	0.013	0.014	1.2	0.19	2.77	0.559	0.0004	0.06	0.117	1.455	0.314	0.15	48.7	<0.005	0.017	0.996	0.001	<0.001	0.302	6.5	0.007	4.52	11.4	2.08
177518_136.75-137	Pandora	Fresh	Tuff [YT]	0.198	14.45	8.59	0.012	53.2	81.6	<0.0004	0.01	0.23	4.13	0.2	5.69	367	1.32	0.005	19.15	0.118	0.702	9.88	4.8	0.465	25.3	54.1	152
177519_2.7-3	Other	Weathered	Clay; common sandstone siltstone fragments	0.4	8.72	23.8	0.038	21.3	99.2	<0.0004	0.01	0.71	18.25	0.162	2.25	97.4	0.68	0.051	11	0.484	0.545	2.73	117	1.88	24.7	74.4	147
177519_11.92-12.2	Other	Weathered	Sandstone, very fine; minor siltstone & mudstone bands	0.363	8.86	29.4	0.037	17.55	110	<0.0004	<0.01	0.76	21.7	0.076	2.48	96.6	0.68	0.056	12.85	0.497	0.58	2.84	122	1.88	22.3	116	162
177519_21.5-21.76	Other	Weathered	Sandstone, very fine; siltstone & mudst. bands; coal rare	0.3	8.31	30.6	0.055	16.25	69.2	<0.0004	0.01	0.71	21.4	0.032	2.14	141.5	0.63	0.057	10.15	0.521	0.455	2.54	137	1.69	26.9	99.9	155
177519_35.5-35.76	Other	Fresh	Sandstone, very fine; minor siltst. bands; minor calcite	0.39	9.3	31.5	0.091	15.6	88.8	<0.0004	0.01	0.86	21.8	0.088	2.35	143.5	0.7	0.053	12.8	0.549	0.463	3.09	129	1.98	32.2	111	168
177519_50-50.26	Other	Fresh	Sandstone, very fine; calcite sporadic fragments	0.42	9.25	29.8	0.084	20.5	95	0.0007	0.03	4.42	21.1	0.191	2.48	159	0.74	0.063	11.25	0.524	0.499	2.89	130	1.89	26.3	87.7	162
177519_63.2-63.5	Other	Fresh	Sandstone, fine; calcite on bedding surfaces	0.37	6.42	24.2	0.048	19.35	52.2	0.0004	0.03	0.84	14.6	0.058	1.52	182.5	0.47	0.045	8.1	0.412	0.29	2.05	118	1.275	18.85	76.1	108
177519_78.5-78.75	Other	Fresh	Sandstone, very fine; carb. laminae; minor calcite	0.33	7.53	33	0.179	23.9	63.9	0.0004	0.02	1.26	17.25	0.239	1.99	295	0.57	0.049	9.29	0.474	0.386	2.31	112	1.66	33.8	105	135
177519_92.45-92.7	Other	Fresh	Carbonaceous Sandstone; carb. siltstone; minor calcite	0.075	12.25	28.7	0.104	27.9	86.4	0.0005	0.02	0.97	23	0.589	3.31	178.5	0.95	0.087	16.5	0.597	0.555	4.5	140	2.62	42.6	105.5	220
177519_95.5-96	Other	Fresh	Coal, 60-90% bright [L2/3]	0.016	0.016	0.66	0.043	2.95	0.228	0.0004	0.01	0.075	1.265	0.358	0.08	15.25	<0.005	0.025	0.736	0.001	<0.001	0.134	6.3	0.008	4.59	10.1	1.23
177519_99.5-99.75	Other	Fresh	Carbonaceous Sandstone; occasional minor coaly bands	0.48	11.2	26.5	0.018	25.2	102	0.0005	0.03	0.89	22.6	0.381	2.95	263	0.85	0.11	13.55	0.57	0.577	3.33	141	2.35	29.9	101	168
177519_104.25-104.5	Other	Fresh	Sandstone, fine; carb. siltst. laminae; calcite fragments	0.994	8.99	31.1	0.08	18.25	79.8	0.0005	0.04	0.81	20.2	0.273	2.23	334	0.69	0.067	10	0.547	0.507	2.75	152	1.905	24.6	105	156
177519_123.5-123.75	Other	Fresh	Sandstone, very fine; carb. siltst. laminae; minor calcite	0.771	7.82	28.8	0.093	16.9	93.5	0.0009	0.03	0.92	18.5	0.314	2.05	405	0.61	0.067	9.58	0.439	0.508	2.44	128	1.705	28.7	86.1	141
177519_139-139.25	Other	Fresh	Sandstone, very fine; carbonaceous laminae	0.908	8.43	38.1	0.059	24.5	134.5	0.0005	0.03	1.2	17.75	0.391	2.42	459	0.69	0.082	11.3	0.443	0.792	2.41	127	1.945	21.8	91.8	151
177519_140.7-140.99	Other	Fresh	Coal, 10-40% bright [V23]	0.05	0.02	1.42	0.373	5.5	7.94	0.0004	0.01	0.053	3.68	0.203	0.24	338	<0.005	0.029	1.855	<0.001	0.001	0.553	10.2	0.024	13.7	11.9	3.99
177519_142-142.25	Other	Fresh	Tuff; occasional carb. clasts; calcite fragments [YT]	0.327	11.2	3.63	0.025	51.1	87.5	0.0004	0.01	0.11	5.4	0.378	5.51	1015	1.4	0.008	34.9	0.114	0.587	7.71	3.9	0.43	38.6	65.8	142
177520_1.5-1.75	Other	Weathered	Sandy Clay; sandy in part	0.219	10.35	11.6	0.032	12.5	96.2	<0.0004	0.02	1.94	19.2	0.207	2.76	92.3	0.83	0.067	12.7	0.573	0.584	2.87	137	2.17	18.15	39.4	176
177520_11.5-11.75	Other	Weathered	Sandstone, fine-medium; oxidised; carbonaceous wisps	0.11	5.66	29.2	0.046	13	51.7	<0.0004	0.01	0.63	12.65	0.115	1.56	84.4	0.45	0.032	7.2	0.338	0.28	1.75	95.5	1.19	14.9	79.1	102
177520_17.25-17.5	Other	Weathered	Siltstone; oxidised sandstone laminae bands	0.089	11.7	28.1	0.056	19.95	84.9	0.0008	0.01	0.8	19.95	0.087	3.01	96.8	0.87	0.076	13.8	0.677	0.511	3.77	149	2.23	23.4	60	207
177520_25.5-25.75	Other	Fresh	Sandstone, very fine; common siltstone laminae	0.055	9.74	57.3	0.116	34.6	46.7	0.0008	0.05	1.63	21.9	0.568	2.35	118.5	0.73	0.06	11.05	0.596	0.403	3.88	157	2.14	33.7	159.5	183

Table B2. Total Element Concentrations of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo
				mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	%	mg/kg	mg/kg
177520_31.71-32	Other	Fresh	Siltstone; carbonaceous; minor coaly bands	0.129	0.47	4.29	88.2	1.14	0.553	0.11	0.225	3.64	1.98	3.07	4.67	77.4	0.163	0.948	0.025	0.162	0.072	0.044	0.15	1.545	2.4	0.06	13.8	1.14
177520_37-37.25	Other	Fresh	Siltstone; common sandstone laminae	0.07	9.76	6.71	251	2.18	0.445	0.54	0.145	65.3	16.65	46.8	21.3	62.1	2.85	25.3	0.25	4.75	0.067	0.076	2.09	29.5	24.5	0.7	780	1.12
177520_51.28-51.56	Other	Fresh	Siltstone; common sandstone laminae throughout	0.079	8.92	14.75	239	1.97	0.344	0.88	0.139	59.5	12.55	47.5	9.72	54.5	5.25	21.2	0.35	3.87	0.101	0.067	1.78	26.9	24.9	0.7	1805	0.95
177520_59.73-60	Other	Fresh	Carbonaceous Siltstone; carbonaceous throughout	0.099	10.8	5.71	310	2.07	0.547	0.19	0.132	64.5	9.08	45.2	20.2	55	2.3	27.7	0.3	4.85	0.081	0.074	2.83	28.1	28.9	0.91	122	2.06
177520_61.5-61.78	Other	Fresh	Tuff [YT]	0.081	8.97	0.51	550	2.35	0.786	0.16	0.059	100.5	0.641	14	3.49	1.15	0.56	22.8	0.28	5.2	0.2	0.05	2.75	49.8	5.1	0.58	5.9	1.15
177464_R01_1.2-1.5	Other	Weathered	Soil; clayey in part oxidised	0.112	7.38	13.45	230	1.76	0.281	1.91	0.117	44.1	19.25	74.1	4.67	39.3	4.94	16.65	0.18	3.26	0.018	0.056	0.62	18.25	31.9	0.33	1305	0.73
177464_R01_7-7.3	Other	Weathered	Claystone; oxidised	0.047	9.24	4.35	312	1.65	0.314	0.18	0.006	53.1	14.05	69.2	7.15	39.9	4.38	19.95	0.17	3.88	<0.005	0.066	0.81	23.5	34.5	0.49	277	0.44
177464_R01_17.5-17.8	Other	Weathered	Siltstone; oxidised sandstone bands in part	0.066	10.2	7.91	221	2.18	0.366	0.26	0.015	58.2	14.35	70	7.25	54.9	3.93	22.8	0.19	4.55	<0.005	0.077	2	26.6	32.1	0.79	283	0.33
177464_R01_29.5-29.76	Other	Weathered	Sandstone, medium; ox. siltst. bands; calcite fractures	0.035	7.67	11	114	1.41	0.137	2.89	0.081	49.9	19.55	57.1	2.31	17.45	4.2	15.75	0.16	2.87	<0.005	0.046	1	21.7	23.7	0.7	1250	0.28
177464_R01_35.64-35.9	Other	Weathered	Sandstone, fine-medium; carb. wisps; calcite fractures	0.065	8.2	36	116	1.13	0.188	0.74	0.077	52.8	17.85	68	2.32	24.9	3.28	16.05	0.16	3.11	0.007	0.045	0.92	23.1	25.7	0.52	209	1.12
177464_R01_44.5-44.75	Other	Fresh	Sandstone, fine-medium; calcite sporadic infill fractures	0.085	10.2	11	204	2.7	0.397	0.59	0.079	57.1	17.3	58	8.23	47.1	4.4	23.3	0.2	4.28	<0.005	0.073	2.15	25	30.4	0.9	410	0.22
177464_R01_54.5-54.8	Other	Fresh	Sandstone, fine-medium; common carbonaceous wisps	0.037	7.33	17.75	122	1.54	0.19	1.5	0.075	47.7	23.9	61.5	2.99	23.3	7.28	16.1	0.2	2.77	0.007	0.045	0.99	20.5	22.9	0.72	1400	0.37
177464_R01_61.67-61.96	Other	Fresh	Carbonaceous Mudstone; siltstone in part	0.123	15	15.85	231	3.6	1.05	0.17	0.179	117.5	17.9	73	6.84	64.5	0.56	42.7	0.2	7.76	0.074	0.144	0.81	57.6	223	0.22	18	0.99
177464_R01_62.85-63.18	Other	Fresh	Coal, 10-40% bright; calcite on bedding surfaces [L2]	0.004	0.23	0.97	302	0.24	0.1185	0.09	0.025	2.51	0.943	3.78	0.067	13.6	0.111	0.658	0.063	0.05	0.017	0.017	<0.01	0.788	2.2	0.04	2.1	1.79
177464_R01_76-76.3	Other	Fresh	Carbonaceous Siltstone; minor coal; minor calcite	0.05	1	3.52	56.6	0.91	0.225	0.26	0.057	2.91	4.58	13.85	5.4	34.9	1.42	3.35	0.025	0.068	0.016	0.03	0.18	1.29	11.4	0.4	127.5	0.16
177464_R01_83.37-83.66	Other	Fresh	Sandstone, coarse to v. coarse; carb. wisps; minor calcite	0.033	8.43	18.6	308	1.39	0.129	1.39	0.074	40.5	15.15	81.4	4.76	24.3	2.26	18.6	0.15	2.87	0.034	0.049	1.66	18.9	17.3	0.86	413	0.78
177464_R01_91-91.3	Other	Fresh	Sandstone, fine; carb. wisps; calcite in fractures	0.122	9.34	22.4	430	1.95	0.284	0.67	0.14	57.3	34.8	78.6	8.55	49.1	3.37	21.2	0.2	3.95	0.041	0.063	2.03	26.8	28.2	0.88	560	1.69
177464_R01_100.5-100.8	Other	Fresh	Coal, 10-40% bright; calcite common infill fractures [V1]	0.005	0.46	0.06	7.5	0.1	0.0597	0.55	0.025	2.04	0.513	2.93	0.054	8.22	1.33	0.864	0.104	0.027	0.005	0.011	0.01	0.689	7.6	0.16	318	0.02
177464_R01_102.7-103	Other	Fresh	Siltstone; sandstone in part	0.102	11.1	3.52	510	2.07	0.4	0.19	0.17	60.9	26.2	44.1	12.65	57.8	1.55	25.6	0.17	4.65	0.097	0.074	2.14	28.2	43.2	0.57	81.6	1.73
177464_R01_111.24-111.5	Other	Fresh	Sandstone, fine; siltstone in part; calcite infill fractures	0.059	9.08	23.4	404	1.92	0.179	5.67	0.074	41	20.2	37	5.77	22.8	4.9	19.2	0.12	2.88	0.056	0.061	1.27	18.6	53.6	0.8	1355	2.58
177464_R01_115.88-116.16	Other	Fresh	Sandstone, very fine; siltstone; carb. laminae	0.082	11.8	5.93	580	2.86	0.385	0.38	0.101	57.5	18.75	54.1	9.25	41.9	3.4	26.3	0.15	5.05	0.051	0.074	1.99	24.4	66.1	0.7	694	0.61
177464_R01_124.35-124.62	Other	Fresh	Siltstone; sandstone bands; minor calcite	0.104	12.4	5.46	650	3.1	0.537	0.41	0.134	66.6	22.2	52.2	8.94	42	1.67	28.4	0.14	6.15	0.051	0.077	2.17	29.3	67.5	0.56	288	2.17
177464_R01_138-138.26	Other	Fresh	Carbonaceous Mudstone; sparse disseminated in part	0.057	10.2	7.18	560	2.28	0.326	0.3	0.077	51.4	6.52	37.1	14.75	44.3	2.41	22.5	0.12	3.88	0.033	0.052	2.38	23.3	35.2	0.86	113	0.95
177464_R01_140.7-141	Other	Fresh	Coaly Shale; minor coaly claystone bands [VL]	0.07	0.96	1.1	221	1.02	0.315	0.24	0.089	5.45	3.09	15.75	5.85	45.7	2.09	2.73	0.032	0.063	0.045	0.035	0.18	2.14	12.2	0.33	235	0.82

Table B2. Total Element Concentrations of Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
				%	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
177520_31.71-32	Other	Fresh	Siltstone; carbonaceous; minor coaly bands	0.032	0.011	3.79	0.002	32.9	11.25	0.0005	0.16	0.237	3.4	0.528	0.32	32.1	<0.005	0.106	1.38	<0.001	0.019	0.221	7.6	0.006	2.38	80.1	5.57
177520_37-37.25	Other	Fresh	Siltstone; common sandstone laminae	0.331	8.5	36.4	0.048	24.2	122	0.0005	0.06	0.8	19.6	0.37	2.45	181.5	0.67	0.086	11.3	0.452	0.78	2.73	157	1.735	27.5	97.7	161
177520_51.28-51.56	Other	Fresh	Siltstone; common sandstone laminae throughout	0.475	7.94	28.9	0.104	18.25	98.3	0.0006	0.04	0.63	16.3	0.306	2.05	203	0.6	0.074	9.63	0.425	0.584	2.46	125	1.615	23.9	96.3	135
177520_59.73-60	Other	Fresh	Carbonaceous Siltstone; carbonaceous throughout	0.532	8.58	25	0.023	24.6	155	0.0006	0.04	1.07	19.65	0.472	2.85	312	0.72	0.097	12.45	0.434	0.944	2.98	142	2.25	23.8	115.5	167
177520_61.5-61.78	Other	Fresh	Tuff [YT]	0.208	6.8	0.9	0.016	48.2	90.3	<0.0004	0.02	0.16	4.22	0.364	4.9	477	1.07	<0.005	32.2	0.102	0.575	5.18	3.1	0.91	23.9	56	86.9
177464_R01_1.2-1.5	Other	Weathered	Soil; clayey in part oxidised	0.094	7.34	34.5	0.055	21.9	45.8	0.0004	0.03	0.99	13.95	0.468	1.88	93	0.55	0.063	7.14	0.472	0.402	1.75	120	1.435	19.9	73.7	119
177464_R01_7-7.3	Other	Weathered	Claystone; oxidised	0.303	8.14	25.7	0.02	18.9	57.5	<0.0004	0.03	0.85	20.1	0.086	2.11	91.8	0.61	0.04	11.05	0.591	0.412	3.97	160	1.735	19.2	82.9	140
177464_R01_17.5-17.8	Other	Weathered	Siltstone; oxidised sandstone bands in part	0.2	10.05	42.1	0.053	15.1	111.5	<0.0004	0.01	1.27	20.4	0.028	2.74	101.5	0.77	0.053	11.05	0.564	0.594	2.79	136	1.945	21.3	93.6	165
177464_R01_29.5-29.76	Other	Weathered	Sandstone, medium; ox. siltst. bands; calcite fractures	0.266	5.6	25.1	0.047	15.45	54.9	0.0004	0.01	1.12	13.05	0.102	1.58	115.5	0.44	0.038	7.04	0.398	0.309	1.74	117	1.155	17.6	70.8	99.4
177464_R01_35.64-35.9	Other	Weathered	Sandstone, fine-medium; carb. wisps; calcite fractures	0.073	6.26	30.1	0.063	20.5	51.7	0.0005	0.01	2.49	13.65	0.069	1.69	92.4	0.49	0.047	7.25	0.423	0.28	2.13	124	1.195	17.15	62.2	108
177464_R01_44.5-44.75	Other	Fresh	Sandstone, fine-medium; calcite sporadic infill fractures	0.177	8.95	31.5	0.065	17.5	110.5	<0.0004	0.02	0.68	20.5	0.112	2.47	114	0.7	0.057	10.75	0.545	0.715	2.71	139	1.81	25.4	97.5	158
177464_R01_54.5-54.8	Other	Fresh	Sandstone, fine-medium; common carbonaceous wisps	0.061	5.61	34.7	0.102	13.95	55.8	<0.0004	0.02	0.61	16.25	0.073	1.54	101.5	0.43	0.043	6.98	0.371	0.318	1.67	134	1.1	21.1	83.2	102
177464_R01_61.67-61.96	Other	Fresh	Carbonaceous Mudstone; siltstone in part	0.084	22.5	39.1	0.093	43.6	49.9	<0.0004	0.04	0.96	26.1	1.315	6.29	356	1.87	0.141	33.6	0.845	0.352	6.3	129	3.83	33.8	111.5	258
177464_R01_62.85-63.18	Other	Fresh	Coal, 10-40% bright; calcite on bedding surfaces [L2]	0.021	0.01	1.29	0.044	2.38	0.313	0.0003	0.11	0.075	1.725	0.319	0.19	214	<0.005	0.021	0.51	0.001	<0.001	0.084	7.4	0.01	1.44	6.9	1.37
177464_R01_76-76.3	Other	Fresh	Carbonaceous Siltstone; minor coal; minor calcite	0.066	0.011	17.2	0.001	10.2	10.8	0.0004	0.08	0.063	2.9	0.124	0.43	128	<0.005	0.037	0.774	0.001	0.04	0.178	18	0.015	1.585	62.4	2.41
177464_R01_83.37-83.66	Other	Fresh	Sandstone, coarse to v. coarse; carb. wisps; minor calcite	1.83	6.09	29.6	0.071	12.05	74.9	<0.0004	0.03	1.12	16.25	0.059	1.49	326	0.46	0.017	6.25	0.49	0.442	1.53	141	1.1	15.55	85.4	99.3
177464_R01_91-91.3	Other	Fresh	Sandstone, fine; carb. wisps; calcite in fractures	0.914	8.05	50.4	0.087	21.9	101	0.0005	0.03	0.95	18.3	0.271	2.23	347	0.61	0.053	9.69	0.544	0.595	2.49	150	1.465	21.6	102.5	141
177464_R01_100.5-100.8	Other	Fresh	Coal, 10-40% bright; calcite common infill fractures [V1]	0.016	0.009	1	0.009	1.37	0.33	0.0002	0.31	0.017	1.14	0.158	0.14	32.4	<0.005	0.013	0.405	0.001	<0.001	0.091	5.4	0.002	1.625	4.2	0.8
177464_R01_102.7-103	Other	Fresh	Siltstone; sandstone in part	0.552	9.36	39.8	0.018	23	116.5	<0.0004	0.05	0.93	19.35	0.364	2.62	421	0.74	0.082	11.6	0.547	0.676	2.68	135	1.845	21.6	128	155
177464_R01_111.24-111.5	Other	Fresh	Sandstone, fine; siltstone in part; calcite infill fractures	0.727	5.88	29.6	0.061	16.65	53.2	<0.0004	0.03	1.35	11.25	0.189	1.54	587	0.42	0.035	6.45	0.365	0.365	1.53	94.5	1.105	15.5	79.6	97.8
177464_R01_115.88-116.16	Other	Fresh	Sandstone, very fine; siltstone; carb. laminae	0.737	9.96	31.3	0.055	23.5	82.7	<0.0004	0.03	0.42	18.2	0.24	2.79	549	0.74	0.067	11.35	0.614	0.531	2.99	137	1.915	24.1	110	179
177464_R01_124.35-124.62	Other	Fresh	Siltstone; sandstone bands; minor calcite	0.955	11.9	27.1	0.036	32.5	84.4	0.0006	0.05	0.87	17.75	0.366	3.51	646	0.93	0.07	17.35	0.637	0.596	4.24	133	1.95	21.9	105.5	200
177464_R01_138-138.26	Other	Fresh	Carbonaceous Mudstone; sparse disseminated in part	0.924	7.4	20.7	0.041	19.4	120	<0.0004	0.04	0.47	15.05	0.213	2.11	516	0.59	0.057	9.21	0.432	0.637	2.3	99.5	1.895	16.35	79	130
177464_R01_140.7-141	Other	Fresh	Coaly Shale; minor coaly claystone bands [VL]	0.108	0.012	8.64	0.006	11.1	10.75	0.0006	0.02	0.186	2.91	0.241	0.38	303	<0.005	0.06	0.856	0.001	0.013	0.178	15.9	0.013	3.01	55.4	2.18

Table B3. Geochemical Abundance Indices (GAI) of Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Avg. abundance in soil (units shown)	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo
					mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg
					0.07	7.1	6	500	2.6	0.2	1.5	0.35	68	20	100	4	50	4	20	1.8	6	0.06	1	1.4	40	25	0.5	1000	1.5
177204_2.5-2.7	Pandora	Weathered	Clayey Sand		-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_6.7-6.9	Pandora	Weathered	Sandstone, fine-medium; ferruginous		0.8	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_8.4-8.6	Pandora	Weathered	Mudstone; clayey throughout		-	-	-	2.6	-	1.0	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	-	-	-
177204_11-11.2	Pandora	Weathered	Sandstone, fine; siltstone bands throughout		-	-	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_14-14.3	Pandora	Weathered	Sandstone, very fine; abundant siltstone throughout		0.7	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_17.4-17.6	Pandora	Weathered	Sandstone, fine; siltstone bands throughout		-	-	1.5	-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_21.1-21.3	Pandora	Weathered	Siltstone; sandstone mudstone bands		-	-	1.9	-	-	-	-	-	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-	-	-
177204_23-23.2	Pandora	Weathered	Carbonaceous Mudstone		-	-	1.7	-	-	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_23.41-23.54	Pandora	Weathered	Coal, weathered; heat affected [L1]		-	-	2.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0
177204_24.7-24.9	Pandora	Fresh	Claystone [L1]		-	-	-	-	-	-	-	-	-	-	1.1	-	-	-	-	-	-	-	-	-	0.6	-	-	-
177204_26.33-26.6	Pandora	Fresh	Coal, <10% bright [L1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_28.26-28.5	Pandora	Fresh	Carbonaceous Mudstone		-	-	-	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_29.4-29.6	Pandora	Fresh	Mudstone		-	-	0.6	-	-	0.6	-	-	-	-	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_33-33.2	Pandora	Fresh	Mudstone; siltstone in part; clayey in part		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_37-37.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands		-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_41.2-41.4	Pandora	Fresh	Sandstone, fine-medium		-	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_47.5-47.7	Pandora	Fresh	Sandstone, fine-medium; siltstone bands; calcite cement		-	-	0.7	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_50.9-51.1	Pandora	Fresh	Sandstone, fine; siltstone throughout		-	-	-	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_54-54.2	Pandora	Fresh	Sandstone, fine; siltstone laminae throughout		-	-	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	-	-
177204_57.6-57.8	Pandora	Fresh	Sandstone, fine; siltstone throughout; calcite cement		-	-	1.7	-	-	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	-	-
177204_59-59.2	Pandora	Fresh	Carbonaceous Mudstone; mudstone near top of unit		-	-	1.5	-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	1.9
177204_59.9-60.2	Pandora	Fresh	Coal, 10-40% bright		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_64.32-64.64	Pandora	Fresh	Coal, dull <1-10% bright [V1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_65.74-65.87	Pandora	Fresh	Mudstone		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_66.36-66.64	Pandora	Fresh	Mudstone; carbonaceous bands throughout		-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
177212_2-2.2	Pandora	Weathered	Sandstone, fine-medium; soft clayey		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_5.8-6	Pandora	Weathered	Siltstone; rare sub angular bands near top of unit		-	-	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_8-8.2	Pandora	Weathered	Siltstone; sub angular in part		-	-	-	-	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_13-13.2	Pandora	Weathered	Siltstone; occasional sandstone bands		-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_18.3-18.5	Pandora	Weathered	Carbonaceous Mudstone		-	-	-	-	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	-	-	-
177212_21.28-21.48	Pandora	Weathered	Siltstone		-	-	0.8	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_24.09-24.21	Pandora	Weathered	Clay		-	-	0.8	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_24.75-24.95	Pandora	Fresh	Coal, 10-40% bright [L12]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_26-26.2	Pandora	Fresh	Coal, 10-40% bright [L12]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_28.8-29	Pandora	Fresh	Coal, 40-60% bright [L12]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_29.02-29.18	Pandora	Fresh	Mudstone		-	-	-	-	-	-	-	-	-	-	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_32.14-32.43	Pandora	Fresh	Mudstone		-	-	-	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_35-35.2	Pandora	Fresh	Siltstone; mudstone throughout		-	-	2.3	-	-	-	-	-	-	1.1	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_38-38.2	Pandora	Fresh	Sandstone, fine; siltstone bands throughout		-	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_43.1-43.3	Pandora	Fresh	Sandstone, medium; sideritic nodules		-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	-
177212_45.6-45.8	Pandora	Fresh	Sandstone, fine; siltstone bands; siderite lenses		-	-	-	-	-	-	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_49-49.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands		-	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	-	-
177212_51.8-52	Pandora	Fresh	Sandstone, medium; sideritic nodules		-	-	0.7	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	-	-
177212_54-54.2	Pandora	Fresh	Siltstone; sandstone laminae near base of unit		-	-	0.7	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_55.18-55.42	Pandora	Fresh	Mudstone		-	-	-	-	-	-	-	-	-	-	-	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_55.66-55.86	Pandora	Fresh	Coal, inferior; mudstone		-	-	1.7	-	-	0.6	-	-	-	0.8	-	-	-	-	-	-	-	1.7	-	-	-	-	-	-	2.2
177212_56.85-57.03	Pandora	Fresh	Coal, <10% bright [V1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_59.89-60.07	Pandora	Fresh	Coal, dull <1-10% bright; minor tuff & carb. siltst. [V1]		-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9
177212_60.3-60.38	Pandora	Fresh	Carbonaceous Mudstone; clayey in part [YT]		-	-	-	-	-	1.4	-	-	-	-	-	-	-	-	-	-	-	1.1	-	-	-	-	-	-	-

Table B3. Geochemical Abundance Indices (GAI) of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Avg. abundance in soil (units shown)	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
					%	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
					0.5	20	80	0.08	35	150	0.0004	0.07	1	16	0.4	4	370	2	0.01	12	0.56	0.6	2.4	160	1.5	40	90	400
177204_2.5-2.7	Pandora	Weathered	Clayey Sand		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	-	-	-	-	-	-	-	-	-
177204_6.7-6.9	Pandora	Weathered	Sandstone, fine-medium; ferruginous		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-	-	-	-	-	-	-
177204_8.4-8.6	Pandora	Weathered	Mudstone; clayey throughout		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	-	-	-	-	-	-	-	-	-
177204_11-11.2	Pandora	Weathered	Sandstone, fine; siltstone bands throughout		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	-	-	-	-	-	-	-	-	-
177204_14-14.3	Pandora	Weathered	Sandstone, very fine; abundant siltstone throughout		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.9	-	-	-	-	-	-	-	-	-
177204_17.4-17.6	Pandora	Weathered	Sandstone, fine; siltstone bands throughout		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.6	-	-	-	-	-	-	-	-	-
177204_21.1-21.3	Pandora	Weathered	Siltstone; sandstone mudstone bands		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-	-	-	-	-	-	-	-	-
177204_23-23.2	Pandora	Weathered	Carbonaceous Mudstone		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.4	-	-	-	-	-	-	-	-	-
177204_23.41-23.54	Pandora	Weathered	Coal, weathered; heat affected [L1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	-	-	-	-	-	-	-	-	-
177204_24.7-24.9	Pandora	Fresh	Claystone [L1]		-	-	1.0	1.0	-	-	-	2.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_26.33-26.6	Pandora	Fresh	Coal, <10% bright [L1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177204_28.26-28.5	Pandora	Fresh	Carbonaceous Mudstone		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	-	-	-	-	-	-	-	-	-
177204_29.4-29.6	Pandora	Fresh	Mudstone		-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.0	-	-	-	-	-	-	-	-	-
177204_33-33.2	Pandora	Fresh	Mudstone; siltstone in part; clayey in part		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	-	-	-	-	-	-	-	-	-
177204_37-37.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands		0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	-	-	-	-	-	-	-	-	-
177204_41.2-41.4	Pandora	Fresh	Sandstone, fine-medium		0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	-	-
177204_47.5-47.7	Pandora	Fresh	Sandstone, fine-medium; siltstone bands; calcite cement		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	-	-	-	-	-	-	-	-	-
177204_50.9-51.1	Pandora	Fresh	Sandstone, fine; siltstone throughout		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-	-	-	-	-	-	-	-	-
177204_54-54.2	Pandora	Fresh	Sandstone, fine; siltstone laminae throughout		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	-	-	-	-	-	-	-	-	-
177204_57.6-57.8	Pandora	Fresh	Sandstone, fine; siltstone throughout; calcite cement		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	-	-	-	-	-	-	-	-	-
177204_59-59.2	Pandora	Fresh	Carbonaceous Mudstone; mudstone near top of unit		-	-	-	-	-	-	-	1.0	1.2	-	0.8	-	-	-	2.8	-	-	-	-	-	-	-	-	-
177204_59.9-60.2	Pandora	Fresh	Coal, 10-40% bright		-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	-	-	-	-	-	-	-	-	-
177204_64.32-64.64	Pandora	Fresh	Coal, dull <1-10% bright [V1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	-	-	-	-	-	-	-	-	-
177204_65.74-65.87	Pandora	Fresh	Mudstone		-	-	-	-	-	-	0.6	-	-	-	-	-	-	-	2.5	-	-	-	-	-	-	-	-	-
177204_66.36-66.64	Pandora	Fresh	Mudstone; carbonaceous bands throughout		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.6	-	-	-	-	-	-	-	-	-
177212_2-2.2	Pandora	Weathered	Sandstone, fine-medium; soft clayey		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3	-	-	-	-	-	-	-	-	-
177212_5.8-6	Pandora	Weathered	Siltstone; rare sub angular bands near top of unit		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.6	-	-	-	-	-	-	-	-	-
177212_8-8.2	Pandora	Weathered	Siltstone; sub angular in part		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.4	-	-	-	-	-	-	-	-	-
177212_13-13.2	Pandora	Weathered	Siltstone; occasional sandstone bands		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-	-	-	-	-	-	-	-	-
177212_18.3-18.5	Pandora	Weathered	Carbonaceous Mudstone		-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.6	-	-	-	1.0	-	0.6	-	-	-
177212_21.28-21.48	Pandora	Weathered	Siltstone		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	-	-	-	-	-	-	-	-	-
177212_24.09-24.21	Pandora	Weathered	Clay		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.6	-	-	-	-	-	1.8	-	-	-
177212_24.75-24.95	Pandora	Fresh	Coal, 10-40% bright [L12]		-	-	-	-	-	-	-	1.4	-	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-
177212_26-26.2	Pandora	Fresh	Coal, 10-40% bright [L12]		-	-	-	-	-	-	-	1.2	-	-	-	-	-	-	1.0	-	-	-	-	-	-	-	-	-
177212_28.8-29	Pandora	Fresh	Coal, 40-60% bright [L12]		-	-	-	-	-	-	-	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_29.02-29.18	Pandora	Fresh	Mudstone		-	-	-	-	-	-	-	2.8	-	-	-	-	-	-	2.6	-	-	-	-	-	-	-	-	-
177212_32.14-32.43	Pandora	Fresh	Mudstone		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	-	-	-	-	-	-	-	-	-
177212_35-35.2	Pandora	Fresh	Siltstone; mudstone throughout		-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	1.6	-	-	-	-	-	-	-	-	-
177212_38-38.2	Pandora	Fresh	Sandstone, fine; siltstone bands throughout		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	-	-	-	-	-	-	-	-	-
177212_43.1-43.3	Pandora	Fresh	Sandstone, medium; sideritic nodules		-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-
177212_45.6-45.8	Pandora	Fresh	Sandstone, fine; siltstone bands; siderite lenses		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	-	-	-	-	-	-	-	-	-
177212_49-49.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	-	-	-	-	-	-	-	-
177212_51.8-52	Pandora	Fresh	Sandstone, medium; sideritic nodules		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_54-54.2	Pandora	Fresh	Siltstone; sandstone laminae near base of unit		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-	-	-	-	-	-	-	-	-
177212_55.18-55.42	Pandora	Fresh	Mudstone		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.6	-	-	-	-	-	-	-	-	-
177212_55.66-55.86	Pandora	Fresh	Coal, inferior; mudstone		-	-	-	-	-	-	-	-	0.8	-	0.7	-	-	-	2.8	-	-	-	-	-	-	-	-	-
177212_56.85-57.03	Pandora	Fresh	Coal, <10% bright [V1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177212_59.89-60.07	Pandora	Fresh	Coal, dull <1-10% bright; minor tuff & carb. siltst. [V1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	-	-	-	-	-	-	-	-	-
177212_60.3-60.38	Pandora	Fresh	Carbonaceous Mudstone; clayey in part [YT]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	-	-	-	-	-	-	-	-	-

Table B3. Geochemical Abundance Indices (GAI) of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo
			Avg. abundance in soil (units shown)	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	%	mg/kg	mg/kg
				0.07	7.1	6	500	2.6	0.2	1.5	0.35	68	20	100	4	50	4	20	1.8	6	0.06	1	1.4	40	25	0.5	1000	1.5
177212_62.5-62.7	Pandora	Fresh	Carbonaceous Mudstone; coaly lenses throughout	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_1.2-1.5	Other	Weathered	Sand; clayey in part common clasts oxidised	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_7.7-8	Other	Weathered	Sandstone, fine-medium; oxidised siltstone in part	-	-	-	-	-	-	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	-
177496_15.5-15.8	Other	Weathered	Sandstone, very fine; oxidised siltstone in part	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_23.5-23.8	Other	Weathered	Sandstone, fine-medium; oxidised; minor calcite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_27.5-27.82	Other	Fresh	Sandstone, fine; calcite sporadic infill fractures	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_40.5-40.77	Other	Fresh	Sandstone, very fine	-	-	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_55-55.25	Other	Fresh	Sandstone, fine-medium; calcite infill fractures	-	-	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_60-60.3	Other	Fresh	Coal, <10% bright; calcite sporadic infill fractures [L2]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_63.53-63.76	Other	Fresh	Carbonaceous Sandstone	-	-	-	-	-	-	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_82-82.25	Other	Fresh	Sandstone, medium; carbonaceous wisps	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_94.13-94.41	Other	Fresh	Sandstone, fine; carb. siltstone laminae	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_98.5-98.85	Other	Fresh	Coal, 40-60% bright [V1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_105.47-105.68	Other	Fresh	Sandstone, medium; carbonaceous laminae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_115.5-115.75	Other	Fresh	Sandstone, medium; carbonaceous clasts; minor calcite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_125.52-125.8	Other	Fresh	Sandstone, medium-coarse; carb. laminae; minor calcite	-	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
177496_135.5-136.75	Other	Fresh	Carbonaceous Sandstone; minor coal; minor calcite	-	-	1.1	-	-	0.6	-	-	-	-	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_3-3.25	Pandora	Weathered	Clayey Sand; oxidised carb. fragments; gravelly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_8.5-8.75	Pandora	Weathered	Sandy Clay; oxidised sandy bands	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_17.1-17.35	Pandora	Weathered	Sandstone, very fine; oxidised	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_29.9-30.2	Pandora	Weathered	Sandstone, fine; siltstone laminae finer near base of unit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_42.2-42.45	Pandora	Weathered	Siltstone; common sandstone bands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_48-48.25	Pandora	Fresh	Sandstone, very fine; common siltstone laminae bands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_62-62.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite fragments	-	-	-	-	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_76.11-76.35	Pandora	Fresh	Sandstone, fine; carb. laminae; calcite fragments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_90.1-90.35	Pandora	Fresh	Sandstone, fine; occasional carbonaceous laminae bands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_104-104.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite common	-	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_112-112.4	Pandora	Fresh	Coal, 10-60% bright [L3/2]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_118-118.25	Pandora	Fresh	Sandstone, very fine; minor coaly bands; minor calcite	-	-	1.2	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_129-129.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; minor calcite	-	-	1.0	-	-	-	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	-	-
177518_132.5-133	Pandora	Fresh	Coal, 40-60% bright; claystone in cleats [V1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_136.75-137	Pandora	Fresh	Tuff [YT]	-	-	-	-	-	1.4	-	-	-	-	-	-	-	-	-	-	-	0.5	-	0.6	-	-	-	-	-
177519_2.7-3	Other	Weathered	Clay; common sandstone siltstone fragments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177519_11.92-12.2	Other	Weathered	Sandstone, very fine; minor siltstone & mudstone bands	-	-	-	-	-	0.7	-	-	-	-	-	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-
177519_21.5-21.76	Other	Weathered	Sandstone, very fine; siltstone & mudst. bands; coal rare	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177519_35.5-35.76	Other	Fresh	Sandstone, very fine; minor siltst. bands; minor calcite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177519_50-50.26	Other	Fresh	Sandstone, very fine; calcite sporadic fragments	-	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177519_63.2-63.5	Other	Fresh	Sandstone, fine; calcite on bedding surfaces	-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177519_78.5-78.75	Other	Fresh	Sandstone, very fine; carb. laminae; minor calcite	-	-	1.7	-	-	-	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177519_92.45-92.7	Other	Fresh	Carbonaceous Sandstone; carb. siltstone; minor calcite	-	-	-	-	-	0.9	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-
177519_95.5-96	Other	Fresh	Coal, 60-90% bright [L2/3]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177519_99.5-99.75	Other	Fresh	Carbonaceous Sandstone; occasional minor coaly bands	-	-	0.8	-	-	0.8	-	-	-	-	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-
177519_104.25-104.5	Other	Fresh	Sandstone, fine; carb. siltst. laminae; calcite fragments	-	-	1.8	-	-	-	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-
177519_123.5-123.75	Other	Fresh	Sandstone, very fine; carb. siltst. laminae; minor calcite	-	-	-	-	-	-	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-	-	0.6	-	-
177519_139-139.25	Other	Fresh	Sandstone, very fine; carbonaceous laminae	-	-	-	-	-	-	-	-	-	-	-	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-
177519_140.7-140.99	Other	Fresh	Coal, 10-40% bright [V23]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177519_142-142.25	Other	Fresh	Tuff; occasional carb. clasts; calcite fragments [YT]	-	-	-	-	-	1.5	-	-	-	-	-	-	-	-	-	-	-	1.8	-	0.6	-	-	-	-	-
177520_1.5-1.75	Other	Weathered	Sandy Clay; sandy in part	-	-	0.6	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177520_11.5-11.75	Other	Weathered	Sandstone, fine-medium; oxidised; carbonaceous wisps	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table B3. Geochemical Abundance Indices (GAI) of Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
			Avg. abundance in soil (units shown)	%	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
				0.5	20	80	0.08	35	150	0.0004	0.07	1	16	0.4	4	370	2	0.01	12	0.56	0.6	2.4	160	1.5	40	90	400
177212_62.5-62.7	Pandora	Fresh	Carbonaceous Mudstone; coaly lenses throughout	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6	-	-	-	-	-	-	-	-	-
177496_1.2-1.5	Other	Weathered	Sand; clayey in part common clasts oxidised	-	-	-	10.4	-	-	-	-	-	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_7.7-8	Other	Weathered	Sandstone, fine-medium; oxidised siltstone in part	-	-	-	11.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_15.5-15.8	Other	Weathered	Sandstone, very fine; oxidised siltstone in part	-	-	-	11.0	-	-	-	-	-	-	-	-	-	-	1.7	-	-	-	-	-	-	-	-	-
177496_23.5-23.8	Other	Weathered	Sandstone, fine-medium; oxidised; minor calcite	-	-	-	12.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_27.5-27.82	Other	Fresh	Sandstone, fine; calcite sporadic infill fractures	-	-	-	12.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_40.5-40.77	Other	Fresh	Sandstone, very fine	-	-	-	12.9	-	-	-	-	-	-	-	-	-	-	2.0	-	-	-	-	-	-	-	-	-
177496_55-55.25	Other	Fresh	Sandstone, fine-medium; calcite infill fractures	-	-	-	12.6	-	-	-	-	-	-	-	-	-	-	1.7	-	-	-	-	-	-	-	-	-
177496_60-60.3	Other	Fresh	Coal, <10% bright; calcite sporadic infill fractures [L2]	-	-	-	-	-	-	-	0.9	-	-	-	-	-	-	1.0	-	-	-	-	-	-	-	-	-
177496_63.53-63.76	Other	Fresh	Carbonaceous Sandstone	-	-	-	9.8	-	-	-	0.5	-	-	0.7	-	-	-	2.4	-	-	-	-	-	-	-	-	-
177496_82-82.25	Other	Fresh	Sandstone, medium; carbonaceous wisps	1.5	-	-	12.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_94.13-94.41	Other	Fresh	Sandstone, fine; carb. siltstone laminae	-	-	-	12.9	-	-	-	-	-	-	0.7	-	-	-	2.0	-	-	-	-	-	-	-	-	-
177496_98.5-98.85	Other	Fresh	Coal, 40-60% bright [V1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_105.47-105.68	Other	Fresh	Sandstone, medium; carbonaceous laminae	1.2	-	-	10.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_115.5-115.75	Other	Fresh	Sandstone, medium; carbonaceous clasts; minor calcite	1.6	-	-	12.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177496_125.52-125.8	Other	Fresh	Sandstone, medium-coarse; carb. laminae; minor calcite	0.8	-	-	11.5	-	-	-	-	-	-	0.7	-	-	-	1.7	-	-	-	-	-	-	-	-	-
177496_135.5-136.75	Other	Fresh	Carbonaceous Sandstone; minor coal; minor calcite	0.6	-	-	12.6	-	-	-	-	-	-	0.7	-	-	-	2.2	-	-	-	-	-	-	-	-	-
177518_3-3.25	Pandora	Weathered	Clayey Sand; oxidised carb. fragments; gravelly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	-	-	-	-	-	-	-	-	-
177518_8.5-8.75	Pandora	Weathered	Sandy Clay; oxidised sandy bands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-	-	-	-	-	-	-
177518_17.1-17.35	Pandora	Weathered	Sandstone, very fine; oxidised	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3	-	-	-	-	-	-	-	-	-
177518_29.9-30.2	Pandora	Weathered	Sandstone, fine; siltstone laminae finer near base of unit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	-	-	-	-
177518_42.2-42.45	Pandora	Weathered	Siltstone; common sandstone bands	-	-	-	1.6	-	-	-	-	-	-	-	-	-	-	1.6	-	-	-	-	-	-	-	-	-
177518_48-48.25	Pandora	Fresh	Sandstone, very fine; common siltstone laminae bands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	-	-	-	-	-	-	-	-	-
177518_62-62.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite fragments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-	-	-	-	-	-	-
177518_76.11-76.35	Pandora	Fresh	Sandstone, fine; carb. laminae; calcite fragments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	-	-	-	-	-	-	-	-	-
177518_90.1-90.35	Pandora	Fresh	Sandstone, fine; occasional carbonaceous laminae bands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	-	-	-	-	-	-	-	-
177518_104-104.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite common	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-	-	-	-	-	-	-
177518_112-112.4	Pandora	Fresh	Coal, 10-60% bright [L3/2]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_118-118.25	Pandora	Fresh	Sandstone, very fine; minor coaly bands; minor calcite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	-	-	-	-	-	-	-	-	-
177518_129-129.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; minor calcite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_132.5-133	Pandora	Fresh	Coal, 40-60% bright; claystone in cleats [V1]	-	-	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177518_136.75-137	Pandora	Fresh	Tuff [YT]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	-	-	-	-	-
177519_2.7-3	Other	Weathered	Clay; common sandstone siltstone fragments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-	-	-	-	-	-	-
177519_11.92-12.2	Other	Weathered	Sandstone, very fine; minor siltstone & mudstone bands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9	-	-	-	-	-	-	-	-	-
177519_21.5-21.76	Other	Weathered	Sandstone, very fine; siltstone & mudst. bands; coal rare	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9	-	-	-	-	-	-	-	-	-
177519_35.5-35.76	Other	Fresh	Sandstone, very fine; minor siltst. bands; minor calcite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-	-	-	-	-	-	-
177519_50-50.26	Other	Fresh	Sandstone, very fine; calcite sporadic fragments	-	-	-	-	-	-	-	-	1.6	-	-	-	-	-	2.1	-	-	-	-	-	-	-	-	-
177519_63.2-63.5	Other	Fresh	Sandstone, fine; calcite on bedding surfaces	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6	-	-	-	-	-	-	-	-	-
177519_78.5-78.75	Other	Fresh	Sandstone, very fine; carb. laminae; minor calcite	-	-	-	0.6	-	-	-	-	-	-	-	-	-	-	1.7	-	-	-	-	-	-	-	-	-
177519_92.45-92.7	Other	Fresh	Carbonaceous Sandstone; carb. siltstone; minor calcite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	-	-	-	-	-	-	-	-	-
177519_95.5-96	Other	Fresh	Coal, 60-90% bright [L2/3]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	-	-	-	-
177519_99.5-99.75	Other	Fresh	Carbonaceous Sandstone; occasional minor coaly bands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.9	-	-	-	-	-	-	-	-	-
177519_104.25-104.5	Other	Fresh	Sandstone, fine; carb. siltst. laminae; calcite fragments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-	-	-	-	-	-	-	-	-
177519_123.5-123.75	Other	Fresh	Sandstone, very fine; carb. siltst. laminae; minor calcite	-	-	-	-	-	-	0.6	-	-	-	-	-	-	-	2.2	-	-	-	-	-	-	-	-	-
177519_139-139.25	Other	Fresh	Sandstone, very fine; carbonaceous laminae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	-	-	-	-	-	-	-	-	-
177519_140.7-140.99	Other	Fresh	Coal, 10-40% bright [V23]	-	-	-	1.6	-	-	-	-	-	-	-	-	-	-	1.0	-	-	-	-	-	-	-	-	-
177519_142-142.25	Other	Fresh	Tuff; occasional carb. clasts; calcite fragments [YT]	-	-	-	-	-	-	-	-	-	-	-	-	0.9	-	-	1.0	-	-	1.1	-	-	-	-	-
177520_1.5-1.75	Other	Weathered	Sandy Clay; sandy in part	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-	-	-	-	-	-	-	-	-
177520_11.5-11.75	Other	Weathered	Sandstone, fine-medium; oxidised; carbonaceous wisps	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	-	-	-	-	-	-	-	-	-

Table B3. Geochemical Abundance Indices (GAI) of Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Avg. abundance in soil (units shown)	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo
					mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	%	mg/kg	mg/kg
					0.07	7.1	6	500	2.6	0.2	1.5	0.35	68	20	100	4	50	4	20	1.8	6	0.06	1	1.4	40	25	0.5	1000	1.5
177520_17.25-17.5	Other	Weathered	Siltstone; oxidised sandstone laminae bands		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177520_25.5-25.75	Other	Fresh	Sandstone, very fine; common siltstone laminae		-	-	3.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	-	-	-	-	-	-	-
177520_31.71-32	Other	Fresh	Siltstone; carbonaceous; minor coaly bands		-	-	-	-	-	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177520_37-37.25	Other	Fresh	Siltstone; common sandstone laminae		-	-	-	-	-	0.6	-	-	-	-	-	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-
177520_51.28-51.56	Other	Fresh	Siltstone; common sandstone laminae throughout		-	-	0.7	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-
177520_59.73-60	Other	Fresh	Carbonaceous Siltstone; carbonaceous throughout		-	-	-	-	-	0.9	-	-	-	-	-	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-
177520_61.5-61.78	Other	Fresh	Tuff [YT]		-	-	-	-	-	1.4	-	-	-	-	-	-	-	-	-	-	-	1.2	-	-	-	-	-	-	-
177464_R01_1.2-1.5	Other	Weathered	Soil; clayey in part oxidised		-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_7-7.3	Other	Weathered	Claystone; oxidised		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_17.5-17.8	Other	Weathered	Siltstone; oxidised sandstone bands in part		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_29.5-29.76	Other	Weathered	Sandstone, medium; ox. siltst. bands; calcite fractures		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_35.64-35.9	Other	Weathered	Sandstone, fine-medium; carb. wisps; calcite fractures		-	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_44.5-44.75	Other	Fresh	Sandstone, fine-medium; calcite sporadic infill fractures		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_54.5-54.8	Other	Fresh	Sandstone, fine-medium; common carbonaceous wisps		-	-	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_61.67-61.96	Other	Fresh	Carbonaceous Mudstone; siltstone in part		-	-	0.8	-	-	1.8	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	2.6	-	-	-
177464_R01_62.85-63.18	Other	Fresh	Coal, 10-40% bright; calcite on bedding surfaces [L2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_76-76.3	Other	Fresh	Carbonaceous Siltstone; minor coal; minor calcite		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_83.37-83.66	Other	Fresh	Sandstone, coarse to v. coarse; carb. wisps; minor calcite		-	-	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_91-91.3	Other	Fresh	Sandstone, fine; carb. wisps; calcite in fractures		-	-	1.3	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_100.5-100.8	Other	Fresh	Coal, 10-40% bright; calcite common infill fractures [V1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_102.7-103	Other	Fresh	Siltstone; sandstone in part		-	-	-	-	-	-	-	-	-	-	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_111.24-111.5	Other	Fresh	Sandstone, fine; siltstone in part; calcite infill fractures		-	-	1.4	-	-	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-
177464_R01_115.88-116.16	Other	Fresh	Sandstone, very fine; siltstone; carb. laminae		-	-	-	-	-	-	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-	0.8	-	-	-
177464_R01_124.35-124.62	Other	Fresh	Siltstone; sandstone bands; minor calcite		-	-	-	-	-	0.8	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-	0.8	-	-	-
177464_R01_138-138.26	Other	Fresh	Carbonaceous Mudstone; sparse disseminated in part		-	-	-	-	-	-	-	-	-	-	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_140.7-141	Other	Fresh	Coaly Shale; minor coaly claystone bands [VL]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Geochemical abundance index (GAI) was calculated from the average element abundance in soil in the earth's crust (AusIMM 2011; Bowen 1979). Refer to report body for further explanation. " - " = GAI <1

Table B3. Geochemical Abundance Indices (GAI) of Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
			Avg. abundance in soil (units shown)	%	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
				0.5	20	80	0.08	35	150	0.0004	0.07	1	16	0.4	4	370	2	0.01	12	0.56	0.6	2.4	160	1.5	40	90	400
177520_17.25-17.5	Other	Weathered	Siltstone; oxidised sandstone laminae bands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	-	-	-	-	-	-	-	-	-
177520_25.5-25.75	Other	Fresh	Sandstone, very fine; common siltstone laminae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	-	-	-	-	-	-	-	-	-
177520_31.71-32	Other	Fresh	Siltstone; carbonaceous; minor coaly bands	-	-	-	-	-	-	-	0.6	-	-	-	-	-	-	2.8	-	-	-	-	-	-	-	-	-
177520_37-37.25	Other	Fresh	Siltstone; common sandstone laminae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	-	-	-	-	-	-	-	-	-
177520_51.28-51.56	Other	Fresh	Siltstone; common sandstone laminae throughout	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	-	-	-	-	-	-	-	-	-
177520_59.73-60	Other	Fresh	Carbonaceous Siltstone; carbonaceous throughout	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.7	-	-	-	-	-	-	-	-	-
177520_61.5-61.78	Other	Fresh	Tuff [YT]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	-	-	0.5	-	-	-	-	-
177464_R01_1.2-1.5	Other	Weathered	Soil; clayey in part oxidised	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	-	-	-	-	-	-	-	-	-
177464_R01_7-7.3	Other	Weathered	Claystone; oxidised	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	-	-	-	-	-	-	-	-	-
177464_R01_17.5-17.8	Other	Weathered	Siltstone; oxidised sandstone bands in part	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-	-	-	-	-	-	-
177464_R01_29.5-29.76	Other	Weathered	Sandstone, medium; ox. siltst. bands; calcite fractures	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3	-	-	-	-	-	-	-	-	-
177464_R01_35.64-35.9	Other	Weathered	Sandstone, fine-medium; carb. wisps; calcite fractures	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	1.6	-	-	-	-	-	-	-	-	-
177464_R01_44.5-44.75	Other	Fresh	Sandstone, fine-medium; calcite sporadic infill fractures	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9	-	-	-	-	-	-	-	-	-
177464_R01_54.5-54.8	Other	Fresh	Sandstone, fine-medium; common carbonaceous wisps	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	-	-	-	-	-	-	-	-	-
177464_R01_61.67-61.96	Other	Fresh	Carbonaceous Mudstone; siltstone in part	-	-	-	-	-	-	-	-	-	-	1.1	-	-	-	3.2	0.9	-	-	0.8	-	0.8	-	-	-
177464_R01_62.85-63.18	Other	Fresh	Coal, 10-40% bright; calcite on bedding surfaces [L2]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_76-76.3	Other	Fresh	Carbonaceous Siltstone; minor coal; minor calcite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3	-	-	-	-	-	-	-	-	-
177464_R01_83.37-83.66	Other	Fresh	Sandstone, coarse to v. coarse; carb. wisps; minor calcite	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_91-91.3	Other	Fresh	Sandstone, fine; carb. wisps; calcite in fractures	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-	-	-	-	-	-	-
177464_R01_100.5-100.8	Other	Fresh	Coal, 10-40% bright; calcite common infill fractures [V1]	-	-	-	-	-	-	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177464_R01_102.7-103	Other	Fresh	Siltstone; sandstone in part	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	-	-	-	-	-	-	-	-	-
177464_R01_111.24-111.5	Other	Fresh	Sandstone, fine; siltstone in part; calcite infill fractures	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	-	-	-	-	-	-	-	-	-
177464_R01_115.88-116.16	Other	Fresh	Sandstone, very fine; siltstone; carb. laminae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-	-	-	-	-	-	-	-	-
177464_R01_124.35-124.62	Other	Fresh	Siltstone; sandstone bands; minor calcite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-	-	-	-	-	-	-	-	-
177464_R01_138-138.26	Other	Fresh	Carbonaceous Mudstone; sparse disseminated in part	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9	-	-	-	-	-	-	-	-	-
177464_R01_140.7-141	Other	Fresh	Coaly Shale; minor coaly claystone bands [VL]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	-	-	-	-	-	-	-	-	-

Geochemical abundance index (GAI) was calculated from the average element abundance in soil in the earth's crust (AusIMM 2011; Bowen 1979). Refer to report body for further explanation. " - " = GAI <1

Table B4. Quantitative X-Ray Diffraction (QXRD) Results for Pandora Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Pyrite	Marcasite	Jarosite	Calcite	Ankerite	Siderite	Illite-smectite	Illite-muscovite	Kaolinite	Montmorillonite	Quartz
				Sulfide	Sulfide	Sulfate	Carb.	Carb.	Carb.	Clay	Clay	Clay	Clay	Quartz
				wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%
177204_6.7-6.9	Pandora	Weathered	Sandstone, fine-medium; ferruginous	0.5	0.4	0.2	7.1	0.2	<0.1	1.3		34.8	0.7	39.0
177204_21.1-21.3	Pandora	Weathered	Siltstone; sandstone mudstone bands	0.2	0.2	<0.1	0.1	0.1	9.9	3.6		50.7	0.9	27.3
177204_24.7-24.9	Pandora	Fresh	Claystone [L1]	1.7	0.7	<0.1	0.1	<0.1	0.8	0.1	<0.1	40.0	22.5	27.6
177204_37-37.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands	0.4	0.3	0.3	0.4	0.2	5.1	4.3		20.4	18.5	35.6
177204_54-54.2	Pandora	Fresh	Sandstone, fine; siltstone laminae throughout	0.7	0.2	0.2	0.6	4.4	2.8	10.6		23.9	2.1	30.6
177204_59-59.2	Pandora	Fresh	Carbonaceous Mudstone; mudstone near top of unit	0.7	0.3	<0.1	0.2	0.2	0.5	11.5		27.8	4.6	26.1
177212_8-8.2	Pandora	Weathered	Siltstone; sub angular in part	0.6	0.6	0.2	1.8	0.3	0.6	8.5		46.5	13.1	26.2
177212_28.8-29	Pandora	Fresh	Coal, 40-60% bright [L12]	3.6	0.1	<0.1	<0.1	<0.1	0.1	2.8		18.9	0.5	21.1
177212_38-38.2	Pandora	Fresh	Sandstone, fine; siltstone bands throughout	0.4	0.3	0.3	0.4	1.5	7.1	14.3		18.4	8.5	38.6
177212_51.8-52	Pandora	Fresh	Sandstone, medium; sideritic nodules	0.3	0.1	0.4	0.4	16.7	5.2	9.2		13.8	15.4	30.2
177212_60.3-60.38	Pandora	Fresh	Carbonaceous Mudstone; clayey in part [YT]	0.6	0.3	<0.1	0.2	0.3	0.4	12.2		18.4	7.5	31.2

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Albite	Microcline	Muscovite	Chlorite	Orthoclase	Goethite	Anatase	Rutile	Apatite	Amorphous /coal
				Feldspar	Feldspar	Silicate	Silicate	Silicate	Ox./OH	Oxide	Oxide	Phos.	non-crystalline
				wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%
177204_6.7-6.9	Pandora	Weathered	Sandstone, fine-medium; ferruginous	1	0.9	<0.1	11.3		1.2	0.5		0.8	<0.1
177204_21.1-21.3	Pandora	Weathered	Siltstone; sandstone mudstone bands	<0.1	1	2.3	3.2		<0.1	0.6		<0.1	<0.1
177204_24.7-24.9	Pandora	Fresh	Claystone [L1]	1.7			<0.1	<0.1		0.9	0.3		3.6
177204_37-37.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands	2.6	0.7	3.4	5.8		0.6	0.4		<0.1	<0.1
177204_54-54.2	Pandora	Fresh	Sandstone, fine; siltstone laminae throughout	12.7	1.3	3.2	5.6		<0.1	0.2		0.9	<0.1
177204_59-59.2	Pandora	Fresh	Carbonaceous Mudstone; mudstone near top of unit	0.6	0.6	0.1	3.5		<0.1	0.6		<0.1	22.7
177212_8-8.2	Pandora	Weathered	Siltstone; sub angular in part	<0.1	0.4	0.2	<0.1		<0.1	1		<0.1	0.2
177212_28.8-29	Pandora	Fresh	Coal, 40-60% bright [L12]	<0.1	0.1	<0.1	<0.1		<0.1	0.2		<0.1	52.5
177212_38-38.2	Pandora	Fresh	Sandstone, fine; siltstone bands throughout	<0.1	<0.1	3.4	5.8		0.6	0.4		<0.1	<0.1
177212_51.8-52	Pandora	Fresh	Sandstone, medium; sideritic nodules	5.9	0.4	1.3	<0.1		<0.1	0.5		0.2	<0.1
177212_60.3-60.38	Pandora	Fresh	Carbonaceous Mudstone; clayey in part [YT]	0.9	0.9	<0.1	<0.1		<0.1	0.3		<0.1	26.8

Table B5. Soluble Major Ions, pH, Electrical Conductivity (EC), Metal and Metalloid Concentrations in Fresh Water Extracts from Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH 1:5	EC 1:5	Total Alk.	HCO_3	CO_3	OH	Acidity	SO_4	Cl	F	Ca	Mg	Na	K	Ag	Al	As	B	Ba	Be	Bi	Cd	Co
					µS/cm	mg CaCO3/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
177204_2.5-2.7	Pandora	Weathered	Clayey Sand	8.4	145	6880	6720	170		<1	10	2		19	3	8	2		0.01	<0.001	<0.05	0.126	<0.001	<0.001	<0.0001	<0.001
177204_6.7-6.9	Pandora	Weathered	Sandstone, fine-medium; ferruginous	8.7	178	9100	8920	170		<1	4	16		10	5	21	<1		0.04	<0.001	<0.05	0.015	<0.001	<0.001	<0.0001	<0.001
177204_8.4-8.6	Pandora	Weathered	Mudstone; clayey throughout	8.4	419	10120	9940	170		<1	11	91		14	10	62	1		<0.01	<0.001	0.06	0.169	<0.001	<0.001	<0.0001	<0.001
177204_11-11.2	Pandora	Weathered	Sandstone, fine; siltstone bands throughout	8.4	408	6800	6640	170		<1	17	82		13	10	62	2		0.01	<0.001	<0.05	0.039	<0.001	<0.001	<0.0001	<0.001
177204_14-14.3	Pandora	Weathered	Sandstone, very fine; abundant siltstone throughout	8.4	414	4600	4420	170		<1	16	75		9	9	69	3		0.01	<0.001	<0.05	0.002	<0.001	<0.001	<0.0001	<0.001
177204_17.4-17.6	Pandora	Weathered	Sandstone, fine; siltstone bands throughout	8.4	300	980	980	<1		<1	9	39		6	5	55	2		0.02	0.001	<0.05	0.002	<0.001	<0.001	<0.0001	<0.001
177204_21.1-21.3	Pandora	Weathered	Siltstone; sandstone mudstone bands	8.2	128	228	228	<1		<1	16	16		<1	<1	29	2		0.07	0.09	<0.05	<0.001	<0.001	<0.001	<0.0001	<0.001
177204_23-23.2	Pandora	Weathered	Carbonaceous Mudstone	7.9	196	218	218	<1		8.8	17	36		<1	<1	36	1		0.2	0.258	<0.05	<0.001	<0.001	<0.001	<0.0001	<0.001
177204_23.41-23.54	Pandora	Weathered	Coal, weathered; heat affected [L1]	7.4	96	87.6	87.6	<1		1.6	12	13		3	2	16	<1		<0.01	0.005	<0.05	0.07	<0.001	<0.001	<0.0001	<0.001
177204_24.7-24.9	Pandora	Fresh	Claystone [L1]	7.1	546	140	140	<1		51.2	174	76		10	11	95	1		<0.01	<0.001	<0.05	0.004	<0.001	<0.001	<0.0001	0.028
177204_26.33-26.6	Pandora	Fresh	Coal, <10% bright [L1]	6.9	70	35	35	<1		6.4	16	14		2	2	14	<1		<0.01	<0.001	<0.05	0.004	<0.001	<0.001	<0.0001	<0.001
177204_28.26-28.5	Pandora	Fresh	Carbonaceous Mudstone	8.2	187	148.8	148.8	<1		<1	40	22		<1	<1	38	2		0.06	0.187	<0.05	0.033	<0.001	<0.001	<0.0001	<0.001
177204_29.4-29.6	Pandora	Fresh	Mudstone	8.2	225	175	175	<1		<1	45	30		<1	<1	42	2		0.04	0.188	<0.05	0.002	<0.001	<0.001	<0.0001	<0.001
177204_33-33.2	Pandora	Fresh	Mudstone; siltstone in part; clayey in part	8.2	317	472	456	17.6		<1	69	34		4	4	55	6		0.02	0.025	<0.05	0.014	<0.001	<0.001	<0.0001	<0.001
177204_37-37.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands	9.1	280	1252	1234	17.6		<1	53	16		4	4	50	6		0.05	0.127	<0.05	0.007	<0.001	<0.001	<0.0001	<0.001
177204_41.2-41.4	Pandora	Fresh	Sandstone, fine-medium	9.1	248	1296	1278	17.6		<1	21	15		2	2	49	6		0.07	0.342	<0.05	0.009	<0.001	<0.001	<0.0001	<0.001
177204_47.5-47.7	Pandora	Fresh	Sandstone, fine-medium; siltstone bands; calcite cement	9.2	254	578	524	52.4		<1	20	24		<1	<1	55	4		0.08	0.335	<0.05	<0.001	<0.001	<0.001	<0.0001	<0.001
177204_50.9-51.1	Pandora	Fresh	Sandstone, fine; siltstone throughout	9.2	254	498	482	17.6		<1	24	24		1	<1	56	4		0.09	0.132	<0.05	0.007	<0.001	<0.001	<0.0001	<0.001
177204_54-54.2	Pandora	Fresh	Sandstone, fine; siltstone laminae throughout	9.2	267	918	848	70		<1	20	26		1	1	58	4		0.09	0.491	<0.05	<0.001	<0.001	<0.001	<0.0001	<0.001
177204_57.6-57.8	Pandora	Fresh	Sandstone, fine; siltstone throughout; calcite cement	9.1	312	4020	4000	17.6		<1	23	34		3	2	62	5		0.08	0.54	<0.05	0.002	<0.001	<0.001	<0.0001	<0.001
177204_59-59.2	Pandora	Fresh	Carbonaceous Mudstone; mudstone near top of unit	7.9	544	244	244	<1		<1	154	68		10	10	102	4		<0.01	0.033	<0.05	0.005	<0.001	<0.001	<0.0001	0.002
177204_59.9-60.2	Pandora	Fresh	Coal, 10-40% bright	9.0	139	384	368	17.6		<1	33	23		8	4	27	2		0.02	0.008	<0.05	0.01	<0.001	<0.001	<0.0001	<0.001
177204_64.32-64.64	Pandora	Fresh	Coal, dull <1-10% bright [V1]	8.9	95	96.2	78.8	17.6		<1	8	7		2	<1	24	<1		0.07	<0.001	<0.05	0.001	<0.001	<0.001	<0.0001	<0.001
177204_65.74-65.87	Pandora	Fresh	Mudstone	9.0	347	1504	1470	35		<1	38	39		2	1	83	2		0.06	0.01	0.05	0.004	<0.001	<0.001	<0.0001	<0.001
177204_66.36-66.64	Pandora	Fresh	Mudstone; carbonaceous bands throughout	8.5	323	350	316	35		<1	63	53		<1	<1	70	1		0.07	0.022	0.09	0.002	<0.001	<0.001	<0.0001	<0.001
177212_2-2.2	Pandora	Weathered	Sandstone, fine-medium; soft clayey	8.4	338	79600	79400	175		<1	3	46		10	3	55	1		0.02	<0.001	0.1	0.012	<0.001	<0.001	<0.0001	<0.001
177212_5.8-6	Pandora	Weathered	Siltstone; rare sub angular bands near top of unit	8.0	263	3420	3420	<1		13.6	4	60		<1	<1	56	<1		0.31	<0.001	0.14	<0.001	<0.001	<0.001	<0.0001	<0.001
177212_8-8.2	Pandora	Weathered	Siltstone; sub angular in part	8.6	512	25600	25400	175		<1	8	87		6	4	87	1		0.03	0.002	<0.05	<0.001	<0.001	<0.001	<0.0001	<0.001
177212_13-13.2	Pandora	Weathered	Siltstone; occasional sandstone bands	8.2	582	5160	5160	<1		3.2	11	128		11	8	90	5		0.02	<0.001	<0.05	0.007	<0.001	<0.001	<0.0001	<0.001
177212_18.3-18.5	Pandora	Weathered	Carbonaceous Mudstone	7.7	254	4980	4980	<1		44.8	8	59		<1	<1	47	<1		0.05	<0.001	0.1	<0.001	<0.001	<0.001	<0.0001	<0.001
177212_21.28-21.48	Pandora	Weathered	Siltstone	7.9	253	3320	3320	<1		24	15	48		<1	<1	45	3		0.02	0.013	<0.05	<0.001	<0.001	<0.001	<0.0001	<0.001
177212_24.09-24.21	Pandora	Weathered	Clay	8.2	315	27600	27600	<1		15.2	9	16		12	6	51	3		0.02	0.006	<0.05	0.006	<0.001	<0.001	<0.0001	<0.001
177212_24.75-24.95	Pandora	Fresh	Coal, 10-40% bright [L12]	7.1	167	700	700	<1		28.8	58	26		14	7	23	<1		<0.01	<0.001	<0.05	0.008	<0.001	<0.001	<0.0001	0.097
177212_26-26.2	Pandora	Fresh	Coal, 10-40% bright [L12]	5.2	140	6.8	6.8	<1		73.6	89	8		8	7	20	1		0.08	<0.001	<0.05	0.015	0.001	<0.001	0.0001	1.37
177212_28.8-29	Pandora	Fresh	Coal, 40-60% bright [L12]	4.9	324	3.4	3.4	<1		96	135	31		14	14	35	4		0.23	<0.001	<0.05	0.02	0.002	<0.001	0.0007	1.39
177212_29.02-29.18	Pandora	Fresh	Mudstone	7.7	363	170.8	170.8	<1		47.2	57	78		1	2	68	4		0.01	0.007	<0.05	<0.001	<0.001	<0.001	<0.0001	<0.001
177212_32.14-32.43	Pandora	Fresh	Mudstone	8.3	465	228	228	<1		6.4	28	126		1	2	81	6		0.03	0.085	<0.05	<0.001	<0.001	<0.001	<0.0001	<0.001
177212_35-35.2	Pandora	Fresh	Siltstone; mudstone throughout	7.9	690	166.2	166.2	<1		16	129	117		6	8	102	10		<0.01	0.029	<0.05	0.004	<0.001	<0.001	<0.0001	0.005
177212_38-38.2	Pandora	Fresh	Sandstone, fine; siltstone bands throughout	8.8	408	306	306	<1		<1	29	80		1	1	79	5		0.04	0.924	<0.05	<0.001	<0.001	<0.001	<0.0001	<0.001
177212_43.1-43.3	Pandora	Fresh	Sandstone, medium; sideritic nodules	9.2	384	7880	7860	17.6		<1	15	38		3	2	80	8		0.06	0.085	<0.05	0.001	<0.001	<0.001	<0.0001	<0.001
177212_45.6-45.8	Pandora	Fresh	Sandstone, fine; siltstone bands; siderite lenses	9.1	434	612	612	<1		<1	17	66		2	2	84	7		0.05	0.154	<0.05	<0.001	<0.001	<0.001	<0.0001	<0.001
177212_49-49.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands	9.1	445	1138	1138	<1		<1	27	81		2	2	93	6		0.05	0.99	<0.05	0.001	<0.001	<0.001	<0.0001	<0.001
177212_51.8-52	Pandora	Fresh	Sandstone, medium; sideritic nodules	8.8	493	6480	6460	17.6		<1	20	73		6	5	92	13		0.05	0.145	<0.05	0.015	<0.001	<0.001	<0.0001	<0.001
177212_54-54.2	Pandora	Fresh	Siltstone; sandstone laminae near base of unit	8.5	453	316	316	<1		11.2	20	123		1	1	89	7		0.06	0.144	<0.05	<0.001	<0.001	<0.001	<0.0001	<0.001
177212_55.18-55.42	Pandora	Fresh	Mudstone	8.5	475	306	306	<1		4.8	25	126		<1	<1	90	6		0.05	0.098	<0.05	0.006	<0.001	<0.001	<0.0001	<0.001
177212_55.66-55.86	Pandora	Fresh	Coal, inferior; mudstone	7.6	582	105	105	<1		32.8	141	77		4	5	103	5		<0.01	0.097	0.06	0.004	<0.001	<0.001	0.0002	0.023

Table B5. Soluble Major Ions, pH, Electrical Conductivity (EC), Metal and Metalloid Concentrations in Fresh Water Extracts from Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Cr	Cu	Fe	Hg	Mn	Mo	Ni	P	Pb	Sb	Se	Sn	Sr	Th	Ti	Tl	U	V	W	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	mg/l	mg/l	mg/l	mg/l	mg/l
177204_2.5-2.7	Pandora	Weathered	Clayey Sand	0.002	<0.001	<0.05	<0.0001	<0.001	0.002	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.207	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_6.7-6.9	Pandora	Weathered	Sandstone, fine-medium; ferruginous	<0.001	<0.001	<0.05	<0.0001	0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.01	0.001	0.136	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_8.4-8.6	Pandora	Weathered	Mudstone; clayey throughout	<0.001	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.01	0.001	0.307	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_11-11.2	Pandora	Weathered	Sandstone, fine; siltstone bands throughout	<0.001	<0.001	<0.05	<0.0001	0.001	0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.282	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_14-14.3	Pandora	Weathered	Sandstone, very fine; abundant siltstone throughout	<0.001	<0.001	<0.05	<0.0001	0.008	0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.232	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_17.4-17.6	Pandora	Weathered	Sandstone, fine; siltstone bands throughout	<0.001	<0.001	<0.05	<0.0001	0.009	0.004	0.014	<1	<0.001	<0.001	<0.01	<0.001	0.155	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_21.1-21.3	Pandora	Weathered	Siltstone; sandstone mudstone bands	<0.001	<0.001	<0.05	<0.0001	0.008	0.006	<0.001	<1	<0.001	0.002	0.01	<0.001	0.014	<0.001	<0.01		<0.001	0.01	<0.001	<0.005	<0.005
177204_23-23.2	Pandora	Weathered	Carbonaceous Mudstone	<0.001	0.004	<0.05	<0.0001	<0.001	0.045	0.002	<1	<0.001	0.007	0.04	<0.001	0.008	<0.001	0.02		<0.001	0.02	<0.001	<0.005	<0.005
177204_23.41-23.54	Pandora	Weathered	Coal, weathered; heat affected [L1]	<0.001	<0.001	<0.05	<0.0001	0.009	0.006	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.136	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_24.7-24.9	Pandora	Fresh	Claystone [L1]	<0.001	0.004	<0.05	<0.0001	0.018	0.002	0.069	<1	<0.001	<0.001	0.02	<0.001	0.544	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_26.33-26.6	Pandora	Fresh	Coal, <10% bright [L1]	<0.001	<0.001	<0.05	<0.0001	0.006	0.002	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.088	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_28.26-28.5	Pandora	Fresh	Carbonaceous Mudstone	<0.001	<0.001	<0.05	<0.0001	<0.001	0.039	<0.001	<1	<0.001	0.002	0.01	<0.001	0.029	<0.001	<0.01		<0.001	0.02	<0.001	<0.005	<0.005
177204_29.4-29.6	Pandora	Fresh	Mudstone	<0.001	<0.001	<0.05	<0.0001	<0.001	0.024	<0.001	<1	<0.001	0.004	0.03	<0.001	0.026	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_33-33.2	Pandora	Fresh	Mudstone; siltstone in part; clayey in part	<0.001	<0.001	<0.05	<0.0001	0.004	0.116	<0.001	<1	<0.001	0.004	0.01	<0.001	0.213	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_37-37.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands	<0.001	<0.001	<0.05	<0.0001	0.002	0.017	<0.001	<1	<0.001	0.004	<0.01	<0.001	0.193	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_41.2-41.4	Pandora	Fresh	Sandstone, fine-medium	<0.001	<0.001	<0.05	<0.0001	<0.001	0.018	<0.001	<1	<0.001	0.004	<0.01	<0.001	0.109	<0.001	<0.01		<0.001	0.01	<0.001	<0.005	<0.005
177204_47.5-47.7	Pandora	Fresh	Sandstone, fine-medium; siltstone bands; calcite cement	<0.001	<0.001	<0.05	<0.0001	<0.001	0.026	<0.001	<1	<0.001	0.004	0.02	<0.001	0.058	<0.001	<0.01		<0.001	0.01	<0.001	<0.005	<0.005
177204_50.9-51.1	Pandora	Fresh	Sandstone, fine; siltstone throughout	<0.001	<0.001	<0.05	<0.0001	<0.001	0.019	<0.001	<1	<0.001	0.002	0.02	<0.001	0.072	<0.001	<0.01		<0.001	0.01	<0.001	<0.005	<0.005
177204_54-54.2	Pandora	Fresh	Sandstone, fine; siltstone laminae throughout	<0.001	<0.001	<0.05	<0.0001	<0.001	0.019	<0.001	<1	<0.001	0.003	0.01	<0.001	0.083	<0.001	<0.01		<0.001	0.01	<0.001	<0.005	<0.005
177204_57.6-57.8	Pandora	Fresh	Sandstone, fine; siltstone throughout; calcite cement	<0.001	<0.001	<0.05	<0.0001	0.001	0.03	<0.001	<1	<0.001	0.003	0.02	<0.001	0.198	<0.001	<0.01		<0.001	0.01	<0.001	<0.005	<0.005
177204_59-59.2	Pandora	Fresh	Carbonaceous Mudstone; mudstone near top of unit	<0.001	<0.001	<0.05	<0.0001	0.001	0.222	0.002	<1	<0.001	0.021	0.07	<0.001	0.711	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_59.9-60.2	Pandora	Fresh	Coal, 10-40% bright	<0.001	<0.001	<0.05	<0.0001	0.002	0.008	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.36	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_64.32-64.64	Pandora	Fresh	Coal, dull <1-10% bright [V1]	<0.001	<0.001	<0.05	<0.0001	<0.001	0.006	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.11	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_65.74-65.87	Pandora	Fresh	Mudstone	<0.001	<0.001	<0.05	<0.0001	<0.001	0.068	<0.001	<1	<0.001	0.002	0.01	<0.001	0.145	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177204_66.36-66.64	Pandora	Fresh	Mudstone; carbonaceous bands throughout	<0.001	<0.001	<0.05	<0.0001	<0.001	0.092	<0.001	<1	<0.001	0.006	0.03	<0.001	0.042	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177212_2-2.2	Pandora	Weathered	Sandstone, fine-medium; soft clayey	<0.001	<0.001	<0.05	<0.0001	<0.001	0.002	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.155	<0.001	<0.01		<0.001	<0.01	0.001	<0.005	<0.005
177212_5.8-6	Pandora	Weathered	Siltstone; rare sub angular bands near top of unit	<0.001	<0.001	0.1	<0.0001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.015	<0.001	0.07		<0.001	<0.01	<0.001	<0.005	<0.005
177212_8-8.2	Pandora	Weathered	Siltstone; sub angular in part	<0.001	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.114	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177212_13-13.2	Pandora	Weathered	Siltstone; occasional sandstone bands	<0.001	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.211	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177212_18.3-18.5	Pandora	Weathered	Carbonaceous Mudstone	<0.001	<0.001	<0.05	<0.0001	<0.001	0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.006	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177212_21.28-21.48	Pandora	Weathered	Siltstone	<0.001	<0.001	<0.05	<0.0001	0.01	0.004	<0.001	<1	<0.001	0.002	<0.01	<0.001	0.019	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177212_24.09-24.21	Pandora	Weathered	Clay	<0.001	0.004	<0.05	<0.0001	0.028	0.008	<0.001	1	<0.001	0.008	<0.01	<0.001	0.211	<0.001	<0.01		0.001	<0.01	0.029	<0.005	<0.005
177212_24.75-24.95	Pandora	Fresh	Coal, 10-40% bright [L12]	<0.001	0.001	<0.05	<0.0001	0.134	0.019	0.107	<1	<0.001	0.005	<0.01	<0.001	0.261	<0.001	<0.01		<0.001	<0.01	0.001	<0.005	<0.005
177212_26-26.2	Pandora	Fresh	Coal, 10-40% bright [L12]	<0.001	0.084	<0.05	<0.0001	0.098	<0.001	2.5	<1	<0.001	<0.001	<0.01	<0.001	0.334	<0.001	<0.01		<0.001	<0.01	<0.001	0.264	<0.005
177212_28.8-29	Pandora	Fresh	Coal, 40-60% bright [L12]	<0.001	0.025	0.21	<0.0001	0.128	<0.001	0.997	<1	<0.001	<0.001	<0.01	<0.001	0.584	<0.001	<0.01		<0.001	<0.01	<0.001	0.518	<0.005
177212_29.02-29.18	Pandora	Fresh	Mudstone	<0.001	0.008	<0.05	<0.0001	<0.001	0.023	0.004	<1	<0.001	0.003	<0.01	<0.001	0.06	<0.001	<0.01		<0.001	0.04	<0.001	<0.005	<0.005
177212_32.14-32.43	Pandora	Fresh	Mudstone	<0.001	<0.001	0.13	<0.0001	0.002	0.012	<0.001	<1	<0.001	0.003	0.02	<0.001	0.073	<0.001	<0.01		<0.001	0.02	<0.001	<0.005	<0.005
177212_35-35.2	Pandora	Fresh	Siltstone; mudstone throughout	<0.001	<0.001	<0.05	<0.0001	0.002	0.147	0.01	<1	<0.001	0.013	0.02	<0.001	0.348	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177212_38-38.2	Pandora	Fresh	Sandstone, fine; siltstone bands throughout	<0.001	<0.001	<0.05	<0.0001	<0.001	0.06	<0.001	<1	<0.001	0.016	0.02	<0.001	0.067	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177212_43.1-43.3	Pandora	Fresh	Sandstone, medium; sideritic nodules	<0.001	<0.001	<0.05	<0.0001	0.001	0.018	<0.001	<1	<0.001	0.003	<0.01	<0.001	0.137	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177212_45.6-45.8	Pandora	Fresh	Sandstone, fine; siltstone bands; siderite lenses	<0.001	<0.001	<0.05	<0.0001	<0.001	0.036	<0.001	<1	<0.001	0.003	<0.01	<0.001	0.097	<0.001	<0.01		<0.001	0.01	<0.001	<0.005	<0.005
177212_49-49.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands	<0.001	<0.001	<0.05	<0.0001	<0.001	0.04	<0.001	<1	<0.001	0.007	0.01	<0.001	0.139	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177212_51.8-52	Pandora	Fresh	Sandstone, medium; sideritic nodules	<0.001	<0.001	<0.05	<0.0001	0.003	0.018	<0.001	<1	<0.001	0.003	<0.01	<0.001	0.323	<0.001	<0.01		<0.001	<0.01	<0.001	<0.005	<0.005
177212_54-54.2	Pandora	Fresh	Siltstone; sandstone laminae near base of unit	<0.001	<0.001	<0.05	<0.0001	<0.001	0.023	<0.001	<1	<0.001	0.004	0.02	<0.001	0.088	<0.001	<0.01		<0.001	0.04	<0.001	<0.005	<0.005
177212_55.18-55.42	Pandora	Fresh	Mudstone	<0.001	<0.001	<0.05	<0.0001	<0.001	0.03	<0.001	<1	<0.001	0.002	0.03	<0.001	0.066	<0.001	<0.01		<0.001	0.09	<0.001	<0.005	<0.005
177212_55.66-55.86	Pandora	Fresh	Coal, inferior; mudstone	<0.001	<0.001	<0.05	<0.0001	0.001	0.614	0.027	<1	<0.001	0.092	0.08	<0.001	0.321	<0.001	<0.01		<0.001	0.02	<0.001	<0.005	<0.005

Table B5. Soluble Major Ions, pH, Electrical Conductivity (EC), Metal and Metalloid Concentrations in Fresh Water Extracts from Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH 1:5	EC 1:5	Total Alk.	HCO_3	CO_3	OH	Acidity	SO_4	Cl	F	Ca	Mg	Na	K	Ag	Al	As	B	Ba	Be	Bi	Cd	Co
					µS/cm	mg CaCO3/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
177212_56.85-57.03	Pandora	Fresh	Coal, <10% bright [V1]	7.6	59	175	175	<1		12.8	9	29		2	3	22	<1		<0.01	<0.001	<0.05	0.005	<0.001	<0.001	<0.0001	<0.001
177212_59.89-60.07	Pandora	Fresh	Coal, dull <1-10% bright; minor tuff & carb. siltst. [V1]	8.3	205	43.8	43.8	<1		13.6	14	46		<1	<1	44	<1		0.03	0.008	<0.05	<0.001	<0.001	<0.001	<0.0001	<0.001
177212_60.3-60.38	Pandora	Fresh	Carbonaceous Mudstone; clayey in part [YT]	8.7	329	175	175	<1		<1	17	72		<1	<1	62	2		0.05	0.004	<0.05	<0.001	<0.001	<0.001	<0.0001	<0.001
177212_62.5-62.7	Pandora	Fresh	Carbonaceous Mudstone; coaly lenses throughout	9.3	315	131.2	113.8	17.6		<1	19	63		<1	<1	62	2		0.08	0.038	<0.05	<0.001	<0.001	<0.001	<0.0001	<0.001
177496_1.2-1.5	Other	Weathered	Sand; clayey in part common clasts oxidised	8.6	834	80	80	<1	<1	1	39	185	1.9	9	5	142	3	<0.001	<0.01	<0.001	0.3	0.036	<0.001	<0.001	<0.0001	<0.001
177496_7.7-8	Other	Weathered	Sandstone, fine-medium; oxidised siltstone in part	9.2	310	77	72	5	<1	<1	5	38	1.3	4	2	59	2	<0.001	0.1	<0.001	<0.1	0.004	<0.001	<0.001	<0.0001	<0.001
177496_15.5-15.8	Other	Weathered	Sandstone, very fine; oxidised siltstone in part	8.9	506	72	72	<1	<1	<1	8	97	1.3	3	3	91	3	<0.001	0.02	0.001	<0.1	0.007	<0.001	<0.001	<0.0001	<0.001
177496_23.5-23.8	Other	Weathered	Sandstone, fine-medium; oxidised; minor calcite	9.1	332	88	86	2	<1	<1	5	40	0.8	<1	<1	63	2	<0.001	0.04	0.002	<0.1	0.003	<0.001	<0.001	<0.0001	<0.001
177496_27.5-27.82	Other	Fresh	Sandstone, fine; calcite sporadic infill fractures	9.1	250	70	65	5	<1	<1	8	20	0.5	3	2	43	11	<0.001	0.14	0.008	<0.1	0.007	<0.001	<0.001	<0.0001	<0.001
177496_40.5-40.77	Other	Fresh	Sandstone, very fine	9.4	228	68	68	<1	<1	<1	14	13	0.4	<1	<1	45	3	<0.001	0.08	0.322	<0.1	0.002	<0.001	<0.001	<0.0001	<0.001
177496_55-55.25	Other	Fresh	Sandstone, fine-medium; calcite infill fractures	9.3	234	79	76	2	<1	<1	18	7	0.3	2	<1	43	10	<0.001	0.22	0.15	<0.1	0.009	<0.001	<0.001	<0.0001	<0.001
177496_60-60.3	Other	Fresh	Coal, <10% bright; calcite sporadic infill fractures [L2]	7.8	306	58	58	<1	<1	1	111	4	<0.1	53	7	8	<1	<0.001	0.09	0.002	<0.1	0.022	<0.001	<0.001	<0.0001	<0.001
177496_62-62.3	Other	Fresh	Coal, 10-40% bright; calcite infill fractures [L3]	4.6	158	<1	<1	<1	<1	7	57	<1	<0.1	10	4	7	<1	<0.001	0.29	<0.001	<0.1	0.1	0.002	<0.001	0.0002	0.002
177496_63.53-63.76	Other	Fresh	Carbonaceous Sandstone	9.1	97	11	11	<1	<1	2	17	4	0.7	<1	<1	16	<1	<0.001	0.12	0.015	<0.1	<0.001	<0.001	<0.001	<0.0001	<0.001
177496_82-82.25	Other	Fresh	Sandstone, medium; carbonaceous wisps	9.9	346	136	90	46	<1	<1	11	3	0.4	<1	<1	67	4	<0.001	0.33	0.149	<0.1	0.006	<0.001	<0.001	<0.0001	<0.001
177496_94.13-94.41	Other	Fresh	Sandstone, fine; carb. siltstone laminae	9.8	363	143	97	46	<1	<1	14	4	0.4	<1	<1	68	4	<0.001	0.51	0.405	<0.1	0.009	<0.001	<0.001	<0.0001	<0.001
177496_98.5-98.85	Other	Fresh	Coal, 40-60% bright [V1]	8.0	12	23	23	<1	<1	2	3	2	<0.1	4	1	11	2	<0.001	0.05	0.003	<0.1	0.034	<0.001	<0.001	<0.0001	<0.001
177496_105.47-105.68	Other	Fresh	Sandstone, medium; carbonaceous laminae	10.0	411	144	105	39	<1	<1	16	3	0.4	<1	<1	79	3	<0.001	0.16	0.26	<0.1	0.009	<0.001	<0.001	<0.0001	<0.001
177496_115.5-115.75	Other	Fresh	Sandstone, medium; carbonaceous clasts; minor calcite	10.0	375	143	101	42	<1	<1	10	4	0.4	<1	<1	79	3	<0.001	0.5	0.182	<0.1	0.014	<0.001	<0.001	<0.0001	<0.001
177496_125.52-125.8	Other	Fresh	Sandstone, medium-coarse; carb. laminae; minor calcite	9.9	423	134	93	41	<1	<1	36	7	0.7	<1	<1	83	2	<0.001	0.15	0.276	<0.1	0.007	<0.001	<0.001	0.0001	<0.001
177496_135.5-136.75	Other	Fresh	Carbonaceous Sandstone; minor coal; minor calcite	10.0	435	150	103	47	<1	<1	28	6	0.6	<1	<1	90	3	<0.001	0.31	0.785	<0.1	0.014	<0.001	<0.001	<0.0001	<0.001
177518_3-3.25	Pandora	Weathered	Clayey Sand; oxidised carb. fragments; gravelly	8.5	534	52	52	<1	<1	2	11	126	2.2	3	2	106	1	<0.001	0.13	0.001	0.7	0.405	<0.001	<0.001	<0.0001	<0.001
177518_8.5-8.75	Pandora	Weathered	Sandy Clay; oxidised sandy bands	9.2	428	83	66	16	<1	<1	6	85	2.1	<1	<1	98	1	<0.001	0.1	0.001	0.3	0.616	<0.001	<0.001	<0.0001	<0.001
177518_17.1-17.35	Pandora	Weathered	Sandstone, very fine; oxidised	8.4	237	17	17	<1	<1	1	8	63	1.6	<1	<1	56	<1	<0.001	<0.01	<0.001	0.4	0.205	<0.001	<0.001	<0.0001	<0.001
177518_29.9-30.2	Pandora	Weathered	Sandstone, fine; siltstone laminae finer near base of unit	9.2	298	78	64	14	<1	<1	9	50	0.6	<1	<1	62	<1	<0.001	<0.01	0.001	0.2	0.431	<0.001	<0.001	<0.0001	<0.001
177518_42.2-42.45	Pandora	Weathered	Siltstone; common sandstone bands	9.3	185	54	42	12	<1	<1	4	17	0.3	<1	<1	36	<1	<0.001	0.04	<0.001	0.1	0.055	<0.001	<0.001	<0.0001	<0.001
177518_48-48.25	Pandora	Fresh	Sandstone, very fine; common siltstone laminae bands	9.4	242	60	40	20	<1	<1	5	21	0.3	<1	<1	48	<1	<0.001	0.03	0.01	0.2	0.153	<0.001	<0.001	<0.0001	<0.001
177518_62-62.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite fragments	9.4	213	48	34	14	<1	<1	4	17	0.2	<1	<1	38	<1	<0.001	0.02	0.006	0.1	0.114	<0.001	<0.001	<0.0001	<0.001
177518_76.11-76.35	Pandora	Fresh	Sandstone, fine; carb. laminae; calcite fragments	9.6	232	82	39	44	<1	<1	4	10	0.2	<1	<1	50	<1	<0.001	0.07	0.044	0.1	0.164	<0.001	<0.001	<0.0001	<0.001
177518_90.1-90.35	Pandora	Fresh	Sandstone, fine; occasional carbonaceous laminae bands	9.3	230	70	40	30	<1	<1	10	14	0.3	<1	<1	48	1	<0.001	0.04	0.045	0.1	0.272	<0.001	<0.001	<0.0001	<0.001
177518_104-104.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite common	9.2	235	55	38	18	<1	<1	14	16	0.4	<1	<1	47	1	<0.001	0.02	0.186	0.1	0.296	<0.001	<0.001	<0.0001	<0.001
177518_112-112.4	Pandora	Fresh	Coal, 10-60% bright [L3/2]	7.6	62	12	12	<1	<1	1	10	11	0.3	<1	<1	18	<1	<0.001	<0.01	0.001	<0.1	0.446	<0.001	<0.001	<0.0001	<0.001
177518_118-118.25	Pandora	Fresh	Sandstone, very fine; minor coaly bands; minor calcite	9.5	256	62	38	25	<1	<1	17	18	0.4	<1	<1	54	<1	<0.001	<0.01	0.563	0.2	0.142	<0.001	<0.001	<0.0001	<0.001
177518_129-129.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; minor calcite	9.6	284	95	44	51	<1	<1	10	7	0.2	<1	<1	54	<1	<0.001	0.05	0.434	0.1	0.237	<0.001	<0.001	<0.0001	<0.001
177518_132.5-133	Pandora	Fresh	Coal, 40-60% bright; claystone in cleats [V1]	7.9	33	23	23	<1	<1	1	6	8	0.2	1	<1	16	<1	<0.001	<0.01	0.002	<0.1	0.433	<0.001	<0.001	<0.0001	<0.001
177518_136.75-137	Pandora	Fresh	Tuff [YT]	8.9	143	38	32	6	<1	<1	5	23	0.5	<1	<1	32	<1	<0.001	0.07	0.008	0.5	0.056	<0.001	<0.001	<0.0001	<0.001
177519_2.7-3	Other	Weathered	Clay; common sandstone siltstone fragments	7.3	1460	13	13	<1	<1	2	1	519	0.9	4	8	289	3	<0.001	<0.01	<0.001	0.5	1.06	<0.001	<0.001	<0.0001	<0.001
177519_11.92-12.2	Other	Weathered	Sandstone, very fine; minor siltstone & mudstone bands	8.2	416	16	16	<1	<1	2	<1	132	0.7	<1	<1	88	<1	<0.001	<0.01	<0.001	0.2	0.426	<0.001	<0.001	<0.0001	<0.001
177519_21.5-21.76	Other	Weathered	Sandstone, very fine; siltstone & mudst. bands; coal rare	9.1	533	92	78	14	<1	<1	5	116	1	<1	<1	112	<1	<0.001	<0.01	<0.001	0.2	0.392	<0.001	<0.001	<0.0001	<0.001
177519_35.5-35.76	Other	Fresh	Sandstone, very fine; minor siltst. bands; minor calcite	9.4	245	78	49	28	<1	<1	4	18	0.5	<1	<1	50	<1	<0.001	0.08	0.01	0.1	0.121	<0.001	<0.001	<0.0001	<0.001
177519_50-50.26	Other	Fresh	Sandstone, very fine; calcite sporadic fragments	9.5	239	90	53	37	<1	<1	4	13	0.3	<1	<1	50	<1	<0.001	0.24	0.096	0.1	0.081	<0.001	<0.001	<0.0001	<0.001
177519_63.2-63.5	Other	Fresh	Sandstone, fine; calcite on bedding surfaces	9.6	216	96	52	44	<1	<1	4	9	0.2	<1	<1	47	<1	<0.001	0.2	0.093	0.1	0.169	<0.001	<0.001	<0.0001	<0.001
177519_78.5-78.75	Other	Fresh	Sandstone, very fine; carb. laminae; minor calcite	9.6	249	119	75	44	<1	<1	4	7	0.3	<1	<1	57	1	<0.001	0.24	0.112	<0.1	0.198	<0.001	<0.001	<0.0001	<0.001
177519_92.45-92.7	Other	Fresh	Carbonaceous Sandstone; carb. siltstone; minor calcite	9.0	143	45	36	9	<1	<1	6	8	0.7	<1	<1	27	<1	<0.001	0.08	0.016	0.1	0.059	<0.001	<0.001	<0.0001	<0.001
177519_95.5-96	Other	Fresh	Coal, 60-90% bright [L2/3]	8.7	24	36	36	<1	<1	1	2	10	0.2	6	<1	14	<1	<0.001	0.02	<0.001	<0.1	0.424	<0.001	<0.001	<0.0001	<0.001
177519_99.5-99.75	Other	Fresh	Carbonaceous Sandstone; occasional minor coaly bands	9.1	58	34	25	8	<1	<1	5	14	0.4	<1	<1	23	<1	<0.001	0.07	0.25	<0.1	0.017	<0.001	<0.001	<0.0001	<0.001

Table B5. Soluble Major Ions, pH, Electrical Conductivity (EC), Metal and Metalloid Concentrations in Fresh Water Extracts from Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Cr	Cu	Fe	Hg	Mn	Mo	Ni	P	Pb	Sb	Se	Sn	Sr	Th	Ti	Tl	U	V	W	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	mg/l	mg/l	mg/l	mg/l	mg/l
177212_56.85-57.03	Pandora	Fresh	Coal, <10% bright [V1]	<0.001	<0.001	<0.05	<0.0001	0.002	0.021	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.188	<0.001	<0.01		<0.001	0.02	<0.001	<0.005	<0.005
177212_59.89-60.07	Pandora	Fresh	Coal, dull <1-10% bright; minor tuff & carb. siltst. [V1]	<0.001	0.002	<0.05	<0.0001	<0.001	0.06	<0.001	<1	<0.001	0.007	0.01	<0.001	0.012	<0.001	<0.01		<0.001	0.14	<0.001	<0.005	<0.005
177212_60.3-60.38	Pandora	Fresh	Carbonaceous Mudstone; clayey in part [YT]	<0.001	<0.001	<0.05	<0.0001	<0.001	0.067	<0.001	<1	<0.001	0.002	0.02	<0.001	0.017	<0.001	<0.01		<0.001	0.28	<0.001	<0.005	<0.005
177212_62.5-62.7	Pandora	Fresh	Carbonaceous Mudstone; coaly lenses throughout	<0.001	<0.001	<0.05	<0.0001	<0.001	0.041	<0.001	<1	<0.001	0.002	0.02	<0.001	0.038	<0.001	<0.01		<0.001	0.03	0.001	<0.005	<0.005
177496_1.2-1.5	Other	Weathered	Sand; clayey in part common clasts oxidised	0.02	0.002	<0.05	<0.0001	0.002	0.004	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.199	0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177496_7.7-8	Other	Weathered	Sandstone, fine-medium; oxidised siltstone in part	<0.001	<0.001	<0.05	<0.0001	<0.001	0.002	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.041	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177496_15.5-15.8	Other	Weathered	Sandstone, very fine; oxidised siltstone in part	<0.001	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.069	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177496_23.5-23.8	Other	Weathered	Sandstone, fine-medium; oxidised; minor calcite	0.003	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.025	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177496_27.5-27.82	Other	Fresh	Sandstone, fine; calcite sporadic infill fractures	<0.001	<0.001	<0.05	<0.0001	0.002	0.003	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.063	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177496_40.5-40.77	Other	Fresh	Sandstone, very fine	<0.001	<0.001	<0.05	<0.0001	<0.001	0.001	0.001	<1	<0.001	0.002	<0.01	<0.001	0.014	<0.001	<0.01	<0.001	<0.001	0.02	<0.001	<0.005	<0.005
177496_55-55.25	Other	Fresh	Sandstone, fine-medium; calcite infill fractures	<0.001	<0.001	<0.05	<0.0001	<0.001	0.004	<0.001	<1	<0.001	0.001	<0.01	<0.001	0.09	<0.001	<0.01	<0.001	<0.001	0.04	<0.001	<0.005	<0.005
177496_60-60.3	Other	Fresh	Coal, <10% bright; calcite sporadic infill fractures [L2]	<0.001	<0.001	<0.05	<0.0001	0.071	0.065	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.503	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177496_62-62.3	Other	Fresh	Coal, 10-40% bright; calcite infill fractures [L3]	<0.001	0.156	0.77	<0.0001	0.201	0.001	0.004	<1	<0.001	<0.001	<0.01	<0.001	0.456	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.053	<0.005
177496_63.53-63.76	Other	Fresh	Carbonaceous Sandstone	<0.001	0.003	<0.05	<0.0001	<0.001	0.023	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.002	<0.001	<0.01	<0.001	<0.001	0.04	<0.001	<0.005	<0.005
177496_82-82.25	Other	Fresh	Sandstone, medium; carbonaceous wisps	<0.001	<0.001	<0.05	<0.0001	<0.001	0.023	<0.001	<1	<0.001	0.004	<0.01	<0.001	0.036	<0.001	<0.01	<0.001	<0.001	0.05	<0.001	<0.005	<0.005
177496_94.13-94.41	Other	Fresh	Sandstone, fine; carb. siltstone laminae	<0.001	<0.001	<0.05	<0.0001	<0.001	0.042	<0.001	<1	<0.001	0.004	<0.01	<0.001	0.032	<0.001	0.01	<0.001	<0.001	0.06	<0.001	<0.005	<0.005
177496_98.5-98.85	Other	Fresh	Coal, 40-60% bright [V1]	<0.001	<0.001	<0.05	<0.0001	0.008	0.002	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.316	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177496_105.47-105.68	Other	Fresh	Sandstone, medium; carbonaceous laminae	0.001	<0.001	<0.05	<0.0001	<0.001	0.021	<0.001	<1	<0.001	0.009	<0.01	<0.001	0.017	<0.001	<0.01	<0.001	<0.001	0.04	<0.001	<0.005	<0.005
177496_115.5-115.75	Other	Fresh	Sandstone, medium; carbonaceous clasts; minor calcite	0.002	0.001	<0.05	<0.0001	<0.001	0.018	<0.001	<1	<0.001	0.003	<0.01	<0.001	0.045	<0.001	<0.01	<0.001	<0.001	0.06	<0.001	<0.005	<0.005
177496_125.52-125.8	Other	Fresh	Sandstone, medium-coarse; carb. laminae; minor calcite	<0.001	<0.001	<0.05	<0.0001	<0.001	0.361	<0.001	<1	<0.001	0.03	0.01	<0.001	0.028	<0.001	<0.01	<0.001	<0.001	0.06	<0.001	<0.005	<0.005
177496_135.5-136.75	Other	Fresh	Carbonaceous Sandstone; minor coal; minor calcite	<0.001	<0.001	<0.05	<0.0001	<0.001	0.156	<0.001	<1	<0.001	0.016	0.03	<0.001	0.039	<0.001	0.03	<0.001	<0.001	0.07	<0.001	<0.005	<0.005
177518_3-3.25	Pandora	Weathered	Clayey Sand; oxidised carb. fragments; gravelly	<0.001	0.001	<0.05	<0.0001	0.006	0.003	<0.001	<1	0.006	<0.001	<0.01	0.002	0.067	<0.001	<0.01	<0.001	<0.001	<0.01	0.002	0.048	<0.005
177518_8.5-8.75	Pandora	Weathered	Sandy Clay; oxidised sandy bands	<0.001	<0.001	<0.05	<0.0001	0.003	<0.001	<0.001	<1	0.001	<0.001	<0.01	0.001	0.027	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.028	<0.005
177518_17.1-17.35	Pandora	Weathered	Sandstone, very fine; oxidised	<0.001	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.01	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177518_29.9-30.2	Pandora	Weathered	Sandstone, fine; siltstone laminae finer near base of unit	0.005	<0.001	<0.05	<0.0001	<0.001	0.005	0.021	<1	<0.001	<0.001	<0.01	0.001	0.016	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177518_42.2-42.45	Pandora	Weathered	Siltstone; common sandstone bands	<0.001	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.005	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177518_48-48.25	Pandora	Fresh	Sandstone, very fine; common siltstone laminae bands	<0.001	0.005	<0.05	<0.0001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.007	<0.001	<0.01	<0.001	<0.001	0.01	<0.001	0.007	<0.005
177518_62-62.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite fragments	<0.001	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.006	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177518_76.11-76.35	Pandora	Fresh	Sandstone, fine; carb. laminae; calcite fragments	<0.001	<0.001	0.07	<0.0001	<0.001	0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.01	<0.001	<0.01	<0.001	<0.001	0.01	<0.001	<0.005	<0.005
177518_90.1-90.35	Pandora	Fresh	Sandstone, fine; occasional carbonaceous laminae bands	<0.001	<0.001	<0.05	<0.0001	<0.001	0.002	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.015	<0.001	<0.01	<0.001	<0.001	0.02	<0.001	<0.005	<0.005
177518_104-104.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite common	<0.001	<0.001	0.06	<0.0001	<0.001	0.007	<0.001	<1	<0.001	0.001	<0.01	<0.001	0.021	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177518_112-112.4	Pandora	Fresh	Coal, 10-60% bright [L3/2]	<0.001	<0.001	<0.05	<0.0001	0.001	0.003	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.049	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.011	<0.005
177518_118-118.25	Pandora	Fresh	Sandstone, very fine; minor coaly bands; minor calcite	0.002	<0.001	<0.05	<0.0001	<0.001	0.08	<0.001	<1	<0.001	0.006	0.02	<0.001	0.01	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177518_129-129.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; minor calcite	0.001	<0.001	<0.05	<0.0001	<0.001	0.011	0.004	<1	<0.001	0.004	<0.01	<0.001	0.02	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177518_132.5-133	Pandora	Fresh	Coal, 40-60% bright; claystone in cleats [V1]	<0.001	<0.001	<0.05	<0.0001	0.004	0.004	0.001	<1	<0.001	<0.001	<0.01	<0.001	0.098	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.021	<0.005
177518_136.75-137	Pandora	Fresh	Tuff [YT]	0.001	0.001	0.08	<0.0001	<0.001	0.06	0.002	<1	<0.001	<0.001	0.01	0.003	0.011	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.032	<0.005
177519_2.7-3	Other	Weathered	Clay; common sandstone siltstone fragments	<0.001	<0.001	0.06	<0.0001	0.013	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.142	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.042	<0.005
177519_11.92-12.2	Other	Weathered	Sandstone, very fine; minor siltstone & mudstone bands	<0.001	<0.001	0.06	<0.0001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.019	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177519_21.5-21.76	Other	Weathered	Sandstone, very fine; siltstone & mudst. bands; coal rare	<0.001	<0.001	<0.05	<0.0001	<0.001	0.002	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.039	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177519_35.5-35.76	Other	Fresh	Sandstone, very fine; minor siltst. bands; minor calcite	<0.001	<0.001	<0.05	<0.0001	<0.001	0.002	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.006	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177519_50-50.26	Other	Fresh	Sandstone, very fine; calcite sporadic fragments	<0.001	<0.001	0.07	<0.0001	<0.001	0.006	<0.001	<1	<0.001	0.003	<0.01	<0.001	0.007	<0.001	<0.01	<0.001	<0.001	0.01	<0.001	<0.005	<0.005
177519_63.2-63.5	Other	Fresh	Sandstone, fine; calcite on bedding surfaces	<0.001	<0.001	<0.05	<0.0001	<0.001	0.002	<0.001	<1	<0.001	0.003	<0.01	<0.001	0.01	<0.001	<0.01	<0.001	<0.001	0.02	<0.001	<0.005	<0.005
177519_78.5-78.75	Other	Fresh	Sandstone, very fine; carb. laminae; minor calcite	<0.001	<0.001	<0.05	<0.0001	<0.001	0.024	<0.001	<1	<0.001	0.006	<0.01	<0.001	0.015	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177519_92.45-92.7	Other	Fresh	Carbonaceous Sandstone; carb. siltstone; minor calcite	<0.001	<0.001	<0.05	<0.0001	<0.001	0.004	<0.001	<1	<0.001	0.002	0.01	<0.001	0.004	<0.001	<0.01	<0.001	<0.001	0.01	<0.001	<0.005	<0.005
177519_95.5-96	Other	Fresh	Coal, 60-90% bright [L2/3]	<0.001	<0.001	<0.05	<0.0001	<0.001	0.025	<0.001	<1	<0.001	0.001	<0.01	<0.001	0.199	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.007	<0.005
177519_99.5-99.75	Other	Fresh	Carbonaceous Sandstone; occasional minor coaly bands	<0.001	<0.001	<0.05	<0.0001	<0.001	0.026	<0.001	<1	<0.001	0.004	0.01	<0.001	0.003	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005

Table B5. Soluble Major Ions, pH, Electrical Conductivity (EC), Metal and Metalloid Concentrations in Fresh Water Extracts from Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH 1:5	EC 1:5	Total Alk.	HCO_3	CO_3	OH	Acidity	SO_4	Cl	F	Ca	Mg	Na	K	Ag	Al	As	B	Ba	Be	Bi	Cd	Co
					µS/cm	mg CaCO3/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
177519_104.25-104.5	Other	Fresh	Sandstone, fine; carb. siltst. laminae; calcite fragments	9.3	130	71	53	18	<1	<1	10	9	0.3	<1	<1	40	<1	<0.001	0.05	0.759	0.1	0.064	<0.001	<0.001	<0.0001	<0.001
177519_123.5-123.75	Other	Fresh	Sandstone, very fine; carb. siltst. laminae; minor calcite	9.7	294	131	82	49	<1	<1	7	10	0.2	<1	<1	66	1	<0.001	0.11	0.057	0.1	0.178	<0.001	<0.001	<0.0001	<0.001
177519_139-139.25	Other	Fresh	Sandstone, very fine; carbonaceous laminae	9.7	194	76	45	31	<1	<1	12	10	0.3	<1	<1	45	<1	<0.001	0.05	0.091	0.2	0.069	<0.001	<0.001	<0.0001	<0.001
177519_140.7-140.99	Other	Fresh	Coal, 10-40% bright [V23]	9.6	160	124	76	48	<1	<1	2	7	0.4	<1	<1	55	4	<0.001	0.1	0.002	<0.1	0.388	<0.001	<0.001	<0.0001	<0.001
177519_142-142.25	Other	Fresh	Tuff; occasional carb. clasts; calcite fragments [YT]	9.7	391	113	81	31	<1	<1	4	15	0.5	<1	<1	60	<1	<0.001	0.11	0.005	0.4	0.047	<0.001	<0.001	<0.0001	<0.001
177520_1.5-1.75	Other	Weathered	Sandy Clay; sandy in part	5.8	850	5	5	<1	<1	2	16	296	0.1	1	1	150	1	<0.001	<0.01	<0.001	0.4	0.565	<0.001	<0.001	<0.0001	<0.001
177520_11.5-11.75	Other	Weathered	Sandstone, fine-medium; oxidised; carbonaceous wisps	9.0	364	63	63	<1	<1	<1	7	77	1.2	1	<1	79	<1	<0.001	<0.01	<0.001	0.1	0.488	<0.001	<0.001	<0.0001	<0.001
177520_17.25-17.5	Other	Weathered	Siltstone; oxidised sandstone laminae bands	8.8	283	56	56	<1	<1	1	12	46	1	<1	<1	48	<1	<0.001	<0.01	<0.001	0.3	0.185	<0.001	<0.001	<0.0001	<0.001
177520_25.5-25.75	Other	Fresh	Sandstone, very fine; common siltstone laminae	8.7	203	50	50	<1	<1	2	28	9	1.7	4	2	35	1	<0.001	<0.01	0.754	0.2	0.21	<0.001	<0.001	<0.0001	<0.001
177520_31.71-32	Other	Fresh	Siltstone; carbonaceous; minor coaly bands	8.4	95	20	20	<1	<1	2	21	9	1.5	<1	<1	25	<1	<0.001	<0.01	0.028	<0.1	0.056	<0.001	<0.001	<0.0001	<0.001
177520_37-37.25	Other	Fresh	Siltstone; common sandstone laminae	9.1	257	57	57	<1	<1	<1	25	27	0.6	1	<1	52	2	<0.001	<0.01	0.059	0.2	0.276	<0.001	<0.001	<0.0001	<0.001
177520_51.28-51.56	Other	Fresh	Siltstone; common sandstone laminae throughout	9.3	222	57	57	<1	<1	<1	15	14	0.2	<1	<1	42	1	<0.001	<0.01	0.189	0.1	0.252	<0.001	<0.001	<0.0001	<0.001
177520_59.73-60	Other	Fresh	Carbonaceous Siltstone; carbonaceous throughout	9.2	232	63	54	8	<1	<1	20	21	0.2	<1	<1	45	1	<0.001	0.05	0.068	0.2	0.029	<0.001	<0.001	<0.0001	<0.001
177520_61.5-61.78	Other	Fresh	Tuff [YT]	9.2	92	27	27	<1	<1	<1	4	10	0.2	<1	<1	27	<1	<0.001	0.14	0.002	0.3	0.239	<0.001	<0.001	<0.0001	<0.001
177464_R01_1.2-1.5	Other	Weathered	Soil; clayey in part oxidised	8.0	452	133	133	<1	<1	1	32	12	0.6	58	8	30	8	<0.001	<0.01	0.002	2	3.25	<0.001	<0.001	0.0002	<0.001
177464_R01_7-7.3	Other	Weathered	Claystone; oxidised	6.4	858	34	34	<1	<1	3	69	242	0.7	6	5	184	2	<0.001	<0.01	<0.001	2.1	2.69	<0.001	<0.001	0.0001	<0.001
177464_R01_17.5-17.8	Other	Weathered	Siltstone; oxidised sandstone bands in part	8.2	484	45	45	<1	<1	2	11	114	1.9	3	2	101	2	<0.001	<0.01	0.002	2	2.56	<0.001	<0.001	<0.0001	<0.001
177464_R01_29.5-29.76	Other	Weathered	Sandstone, medium; ox. siltst. bands; calcite fractures	9.2	261	82	82	<1	<1	<1	9	20	0.8	4	1	56	5	<0.001	<0.01	0.077	1.9	2.54	<0.001	<0.001	<0.0001	<0.001
177464_R01_35.64-35.9	Other	Weathered	Sandstone, fine-medium; carb. wisps; calcite fractures	8.8	217	75	75	<1	<1	<1	6	23	0.9	6	2	47	1	<0.001	<0.01	0.007	1.9	2.77	<0.001	<0.001	<0.0001	<0.001
177464_R01_44.5-44.75	Other	Fresh	Sandstone, fine-medium; calcite sporadic infill fractures	9.1	252	82	74	8	<1	1	19	21	0.8	2	<1	55	4	<0.001	0.01	0.115	0.6	0.373	<0.001	<0.001	<0.0001	<0.001
177464_R01_54.5-54.8	Other	Fresh	Sandstone, fine-medium; common carbonaceous wisps	9.0	186	80	80	<1	<1	<1	10	9	1.1	4	2	34	7	<0.001	<0.01	0.065	1.4	2.04	<0.001	<0.001	<0.0001	<0.001
177464_R01_61.67-61.96	Other	Fresh	Carbonaceous Mudstone; siltstone in part	7.4	175	12	12	<1	<1	<1	50	12	2.4	2	<1	43	2	<0.001	<0.01	0.048	1.9	1.51	<0.001	<0.001	<0.0001	<0.001
177464_R01_62.85-63.18	Other	Fresh	Coal, 10-40% bright; calcite on bedding surfaces [L2]	6.2	48	4	4	<1	<1	2	34	5	0.3	4	2	16	<1	<0.001	<0.01	<0.001	0.9	1.42	<0.001	<0.001	<0.0001	0.008
177464_R01_76-76.3	Other	Fresh	Carbonaceous Siltstone; minor coal; minor calcite	9.4	240	101	91	10	<1	<1	29	9	0.9	1	<1	62	4	<0.001	0.08	0.083	1.8	0.327	<0.001	<0.001	<0.0001	<0.001
177464_R01_83.37-83.66	Other	Fresh	Sandstone, coarse to v. coarse; carb. wisps; minor calcite	9.6	263	115	97	19	<1	<1	20	6	1.1	4	1	71	3	<0.001	0.02	0.331	5.4	2.32	<0.001	<0.001	<0.0001	<0.001
177464_R01_91-91.3	Other	Fresh	Sandstone, fine; carb. wisps; calcite in fractures	9.5	240	107	102	5	<1	<1	22	3	1.2	3	<1	70	3	<0.001	0.04	0.48	4.1	1.9	<0.001	<0.001	0.0001	<0.001
177464_R01_100.5-100.8	Other	Fresh	Coal, 10-40% bright; calcite common infill fractures [V1]	8.0	147	79	79	<1	<1	2	55	6	0.2	37	3	10	<1	<0.001	<0.01	<0.001	0.8	1.45	<0.001	<0.001	<0.0001	<0.001
177464_R01_102.7-103	Other	Fresh	Siltstone; sandstone in part	9.3	236	79	79	<1	<1	<1	45	6	1.4	2	<1	68	2	<0.001	0.06	0.056	4.3	1.19	<0.001	<0.001	<0.0001	<0.001
177464_R01_111.24-111.5	Other	Fresh	Sandstone, fine; siltstone in part; calcite infill fractures	9.6	350	136	110	26	<1	<1	18	9	1.1	2	<1	79	3	<0.001	0.03	0.366	2.1	0.773	<0.001	<0.001	<0.0001	<0.001
177464_R01_115.88-116.16	Other	Fresh	Sandstone, very fine; siltstone; carb. laminae	9.6	241	129	113	16	<1	<1	16	4	<10.0	<1	<1	57	2	<0.001	0.89	0.176	1.6	0.044	<0.001	<0.001	<0.0001	<0.001
177464_R01_124.35-124.62	Other	Fresh	Siltstone; sandstone bands; minor calcite	9.6	340	117	104	14	<1	<1	29	7	1.5	2	<1	76	2	<0.001	0.07	0.111	4	1.04	<0.001	<0.001	<0.0001	<0.001
177464_R01_138-138.26	Other	Fresh	Carbonaceous Mudstone; sparse disseminated in part	9.7	295	135	101	34	<1	1	12	5	0.8	<1	<1	64	3	<0.001	0.28	0.244	3.4	0.082	<0.001	<0.001	<0.0001	<0.001
177464_R01_140.7-141	Other	Fresh	Coaly Shale; minor coaly claystone bands [VL]	9.5	177	98	81	17	<1	<1	7	4	1	<1	<1	52	3	<0.001	0.33	0.046	3.4	0.223	<0.001	<0.001	<0.0001	<0.001

Water extract tests undertaken as 1:5 (w:v). Refer to report body for further explanation of data.

Table B5. Soluble Major Ions, pH, Electrical Conductivity (EC), Metal and Metalloid Concentrations in Fresh Water Extracts from Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	Cr	Cu	Fe	Hg	Mn	Mo	Ni	P	Pb	Sb	Se	Sn	Sr	Th	Ti	Tl	U	V	W	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	mg/l	mg/l	mg/l	mg/l	mg/l
177519_104.25-104.5	Other	Fresh	Sandstone, fine; carb. siltst. laminae; calcite fragments	0.001	<0.001	0.05	<0.0001	<0.001	0.041	<0.001	<1	<0.001	0.007	0.01	<0.001	0.011	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177519_123.5-123.75	Other	Fresh	Sandstone, very fine; carb. siltst. laminae; minor calcite	<0.001	<0.001	<0.05	<0.0001	<0.001	0.054	<0.001	<1	<0.001	0.006	0.01	<0.001	0.022	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177519_139-139.25	Other	Fresh	Sandstone, very fine; carbonaceous laminae	<0.001	<0.001	<0.05	<0.0001	<0.001	0.064	<0.001	<1	<0.001	0.014	0.02	<0.001	0.009	<0.001	<0.01	<0.001	<0.001	0.01	<0.001	0.01	<0.005
177519_140.7-140.99	Other	Fresh	Coal, 10-40% bright [V23]	<0.001	<0.001	<0.05	<0.0001	<0.001	0.016	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.121	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177519_142-142.25	Other	Fresh	Tuff; occasional carb. clasts; calcite fragments [YT]	0.001	<0.001	<0.05	<0.0001	<0.001	0.008	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.018	<0.001	<0.01	<0.001	0.004	<0.01	<0.001	0.017	<0.005
177520_1.5-1.75	Other	Weathered	Sandy Clay; sandy in part	<0.001	<0.001	<0.05	<0.0001	<0.005	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.029	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.076	<0.005
177520_11.5-11.75	Other	Weathered	Sandstone, fine-medium; oxidised; carbonaceous wisps	<0.001	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.024	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177520_17.25-17.5	Other	Weathered	Siltstone; oxidised sandstone laminae bands	<0.001	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.011	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177520_25.5-25.75	Other	Fresh	Sandstone, very fine; common siltstone laminae	0.001	<0.001	<0.05	<0.0001	0.002	0.032	0.004	<1	<0.001	0.012	0.03	<0.001	0.043	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177520_31.71-32	Other	Fresh	Siltstone; carbonaceous; minor coaly bands	<0.001	<0.001	<0.05	<0.0001	<0.001	0.112	<0.001	<1	<0.001	0.002	<0.01	<0.001	0.003	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.005	<0.005
177520_37-37.25	Other	Fresh	Siltstone; common sandstone laminae	<0.001	<0.001	<0.05	<0.0001	<0.001	0.081	<0.001	<1	<0.001	0.005	0.03	<0.001	0.038	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177520_51.28-51.56	Other	Fresh	Siltstone; common sandstone laminae throughout	<0.001	<0.001	<0.05	<0.0001	<0.001	0.085	<0.001	<1	<0.001	0.004	0.02	<0.001	0.016	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177520_59.73-60	Other	Fresh	Carbonaceous Siltstone; carbonaceous throughout	<0.001	<0.001	0.07	<0.0001	<0.001	0.105	<0.001	<1	<0.001	0.007	0.05	<0.001	0.016	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177520_61.5-61.78	Other	Fresh	Tuff [YT]	0.003	<0.001	<0.05	<0.0001	0.002	0.055	0.001	<1	<0.001	<0.001	<0.01	<0.001	0.016	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	<0.005	<0.005
177464_R01_1.2-1.5	Other	Weathered	Soil; clayey in part oxidised	0.002	0.016	<0.05	<0.0001	0.032	0.004	0.007	<1	<0.001	<0.001	<0.01	<0.001	0.385	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.425	<0.005
177464_R01_7-7.3	Other	Weathered	Claystone; oxidised	0.001	0.002	<0.05	<0.0001	0.085	<0.001	0.002	<1	<0.001	<0.001	<0.01	<0.001	0.111	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.297	<0.005
177464_R01_17.5-17.8	Other	Weathered	Siltstone; oxidised sandstone bands in part	0.002	0.001	<0.05	<0.0001	0.002	<0.001	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.048	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.041	<0.005
177464_R01_29.5-29.76	Other	Weathered	Sandstone, medium; ox. siltst. bands; calcite fractures	<0.001	0.001	<0.05	<0.0001	0.002	0.002	<0.001	<1	<0.001	0.002	<0.01	<0.001	0.046	<0.001	<0.01	<0.001	<0.001	0.02	0.002	0.016	<0.005
177464_R01_35.64-35.9	Other	Weathered	Sandstone, fine-medium; carb. wisps; calcite fractures	0.002	0.002	<0.05	<0.0001	0.002	0.003	0.001	<1	<0.001	<0.001	<0.01	<0.001	0.073	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.03	<0.005
177464_R01_44.5-44.75	Other	Fresh	Sandstone, fine-medium; calcite sporadic infill fractures	0.001	0.002	<0.05	<0.0001	<0.001	0.003	<0.001	<1	<0.001	0.001	<0.01	<0.001	0.046	<0.001	<0.01	<0.001	<0.001	0.02	<0.001	<0.005	<0.005
177464_R01_54.5-54.8	Other	Fresh	Sandstone, fine-medium; common carbonaceous wisps	0.004	0.001	<0.05	<0.0001	0.001	0.003	<0.001	<1	<0.001	0.001	<0.01	<0.001	0.065	<0.001	<0.01	<0.001	<0.001	0.02	<0.001	0.011	<0.005
177464_R01_61.67-61.96	Other	Fresh	Carbonaceous Mudstone; siltstone in part	0.003	0.002	<0.05	<0.0001	0.001	0.014	<0.001	<1	<0.001	0.005	0.05	<0.001	0.023	<0.001	<0.01	<0.001	<0.001	0.02	<0.001	0.036	<0.005
177464_R01_62.85-63.18	Other	Fresh	Coal, 10-40% bright; calcite on bedding surfaces [L2]	0.002	0.002	<0.05	<0.0001	0.01	0.008	0.007	<1	<0.001	<0.001	<0.01	<0.001	0.116	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.042	<0.005
177464_R01_76-76.3	Other	Fresh	Carbonaceous Siltstone; minor coal; minor calcite	0.002	0.001	<0.05	<0.0001	<0.001	0.013	<0.001	<1	<0.001	<0.001	<0.01	<0.001	0.085	<0.001	<0.01	<0.001	<0.001	0.03	<0.001	<0.005	<0.005
177464_R01_83.37-83.66	Other	Fresh	Sandstone, coarse to v. coarse; carb. wisps; minor calcite	0.001	<0.001	<0.05	<0.0001	<0.001	0.023	<0.001	<1	<0.001	0.012	<0.01	<0.001	0.239	<0.001	<0.01	<0.001	<0.001	0.04	<0.001	0.011	<0.005
177464_R01_91-91.3	Other	Fresh	Sandstone, fine; carb. wisps; calcite in fractures	<0.001	<0.001	<0.05	<0.0001	0.002	0.19	<0.001	<1	<0.001	0.011	0.02	<0.001	0.183	<0.001	<0.01	<0.001	<0.001	0.03	<0.001	0.012	<0.005
177464_R01_100.5-100.8	Other	Fresh	Coal, 10-40% bright; calcite common infill fractures [V1]	0.004	0.001	<0.05	<0.0001	0.175	<0.001	0.001	<1	<0.001	<0.001	<0.01	<0.001	0.468	<0.001	<0.01	<0.001	<0.001	<0.01	<0.001	0.192	<0.005
177464_R01_102.7-103	Other	Fresh	Siltstone; sandstone in part	<0.001	<0.001	<0.05	<0.0001	<0.001	0.196	<0.001	<1	<0.001	0.01	0.04	<0.001	0.232	<0.001	<0.01	<0.001	<0.001	0.03	<0.001	0.012	<0.005
177464_R01_111.24-111.5	Other	Fresh	Sandstone, fine; siltstone in part; calcite infill fractures	0.003	0.003	<0.05	<0.0001	0.006	0.123	<0.001	<1	<0.001	0.016	<0.01	<0.001	0.084	<0.001	<0.01	<0.001	<0.001	0.03	<0.001	0.009	<0.005
177464_R01_115.88-116.16	Other	Fresh	Sandstone, very fine; siltstone; carb. laminae	0.02	<0.001	0.14	<0.0001	0.001	0.052	<0.001	<1	<0.001	0.003	0.01	<0.001	0.061	<0.001	0.02	<0.001	<0.001	0.03	<0.001	0.007	<0.005
177464_R01_124.35-124.62	Other	Fresh	Siltstone; sandstone bands; minor calcite	0.002	0.001	<0.05	<0.0001	<0.001	0.225	<0.001	<1	<0.001	0.008	0.02	<0.001	0.207	<0.001	<0.01	<0.001	<0.001	0.03	<0.001	0.013	<0.005
177464_R01_138-138.26	Other	Fresh	Carbonaceous Mudstone; sparse disseminated in part	0.003	<0.001	<0.05	<0.0001	<0.001	0.075	<0.001	<1	<0.001	0.004	0.02	<0.001	0.089	<0.001	<0.01	<0.001	<0.001	0.03	<0.001	0.008	<0.005
177464_R01_140.7-141	Other	Fresh	Coaly Shale; minor coaly claystone bands [VL]	0.002	0.005	0.05	<0.0001	<0.001	0.086	<0.001	<1	<0.001	0.004	0.01	<0.001	0.13	<0.001	0.01	<0.001	<0.001	0.04	<0.001	0.013	<0.005

Water extract tests undertaken as 1:5 (w:v). Refer to report body for further explanation of data.

Table B6. Exchangeable Cations and Emerson Class Test Results in Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH 1:5	EC 1:5	Exch. Ca	Exch. Mg	Exch. K	Exch. Na	CEC	ESP	Sodicity Rating	Emerson Class No. & Description	
					µS/cm	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	%			
48100_1-3	Other	Distinctly	Sandstone, fine-medium			34.2	12.4	0.48	3.09	50.2	6.2	sodic		
48100_10.612-13	Other	Slightly	Sandstone, medium; minor claystone			28.2	11.2	1.03	1.74	42.2	4.1	non-sodic		
48100_13-20	Other	Fresh	Sandstone, fine-medium; with siltstone			22.2	11	1.09	2.03	36.4	5.6	non-sodic		
48100_23.337-26.556	Other	Fresh	Claystone			20.2	8	1.34	2.35	31.8	7.4	sodic		
48100_26-29	Other	Fresh	Claystone; with coal			20.8	8.3	1.47	2.36	32.9	7.2	sodic		
48100_29-36	Other	Fresh	Sandstone, fine; with siltstone			21.2	7.3	1.4	2.47	32.3	7.6	sodic		
48101_1-4	Other	Extremely	Siltstone			26.7	18.6	1	8.34	54.6	15.3	strongly sodic		
48101_6-20	Other	Distinctly	Siltstone			18	12.6	1.22	4.92	36.8	13.4	sodic		
48101_33-43	Other	Fresh	Sandstone, fine-medium			22.6	4.8	1.98	2.03	31.5	6.4	sodic		
48101_44.717-53.783	Other	Fresh	Siltstone			22.6	4.3	1.9	2.25	31	7.3	sodic		
48101_54-63	Other	Fresh	Sandstone, fine-medium			22.9	3.1	1.34	1.75	29.1	6.0	sodic		
48101_62.498-67.182	Other	Fresh	Siltstone			10.1	5	1.25	2.63	19	13.8	sodic		
48101_71.628-75.801	Other	Fresh	Claystone			20.6	3.6	1.49	5.38	31	17.4	strongly sodic		
48101_89-98	Other	Fresh	Siltstone			23.5	3	0.99	4.27	31.8	13.4	sodic		
48101_102.372-103.551	Other	Fresh	Siltstone			22.3	3.2	2.31	4.7	32.5	14.5	strongly sodic		
48101_108-114	Other	Fresh	Siltstone; with coal			12.6	2.7	1.97	5.58	22.9	24.4	strongly sodic		
48101_119.114-123.074	Other	Fresh	Siltstone			15.7	2.3	1.65	6.98	26.6	26.2	strongly sodic		
48102_7.242-15.137	Pandora	Distinctly	Claystone			19.8	8.1	0.9	4.93	33.8	14.6	strongly sodic		
48102_27.431-36.855	Pandora	Slightly	Siltstone; sandstone abundant			14.7	6.9	0.82	2.94	25.9	11.4	sodic		
48102_57.68-72.748	Pandora	Fresh	Siltstone			17.7	3.3	1.4	3.48	25.9	13.4	sodic		
48102_97.023-109.772	Pandora	Fresh	Sandstone, medium-coarse			21.8	3	0.79	2.49	28.1	8.9	sodic		
48102_122-126	Pandora	Fresh	Siltstone; with coal			19.7	4.3	0.78	3.59	28.4	12.6	sodic		
48102_129-138	Pandora	Fresh	Siltstone; sandstone common			21.2	6.8	1.03	4.32	33.4	12.9	sodic		
48102_148.925-165.375	Pandora	Fresh	Sandstone, medium-coarse			18.6	3.7	0.78	3.11	26.1	11.9	sodic		
48103_17.125-21.962	Pandora	Distinctly	Siltstone			21.6	7.9	0.94	5.32	35.8	14.9	strongly sodic		
48103_32-41	Pandora	Fresh	Siltstone; with sandstone			18.7	4.9	1.17	3.24	28	11.6	sodic		
48103_60.091-68.597	Pandora	Fresh	Sandstone, fine-medium			23.7	3.1	1	2.48	30.3	8.2	sodic		
48103_92.641-95.306	Pandora	Fresh	Siltstone			12.3	5.5	0.91	3.72	22.5	16.5	strongly sodic		
48103_95-97	Pandora	Fresh	Claystone; with tuff			4.7	5.1	0.64	3.08	13.5	22.8	strongly sodic		
48103_104.157-109.028	Pandora	Fresh	Sandstone, medium-coarse			18.2	6.6	0.92	3.84	29.5	13.0	sodic		
48103_111-123	Pandora	Fresh	Sandstone, medium			24.8	6.5	1.09	3.66	36	10.2	sodic		
48103_123.333-125.264	Pandora	Fresh	Claystone			9.6	6.8	1.21	4.8	22.4	21.4	strongly sodic		
48104_3.108-6.261	Pandora	Extremely	Sandstone, fine-medium			25.3	7.2	1.07	1.5	35.1	4.3	non-sodic		
48104_8-14	Pandora	Distinctly	Siltstone; clayey abundant			18.5	9	0.7	2.53	30.8	8.2	sodic		
48104_17-20	Pandora	Slightly	Siltstone; sandstone abundant			20.4	6.2	0.86	1.67	29.2	5.7	non-sodic		
48104_19.635-21.795	Pandora	Fresh	Sandstone, medium-coarse; siltstone; minor gravel			8.6	6.5	0.88	1.31	17.3	7.6	sodic		
48104_28-31	Pandora	Fresh	Siltstone; clayey abundant			4.7	6.9	1.16	1.89	14.7	12.9	sodic		
48104_34-41	Pandora	Fresh	Sandstone, fine; clayey abundant cement			22.6	8.4	1.5	2.03	34.5	5.9	non-sodic		
48104_51-58	Pandora	Fresh	Siltstone; clayey abundant			14.1	7.7	1.63	2.72	26.2	10.4	sodic		
48104_60.514-61.186	Pandora	Fresh	Tuff; coal common [YT]			10.1	10.9	1.35	4.09	26.4	15.5	strongly sodic		
48105_2-4	Pandora	Extremely	Siltstone			7.2	8.5	0.69	4.57	20.9	21.9	strongly sodic		
48105_5-8.705	Pandora	Distinctly	Siltstone; sandstone abundant			26.6	5.5	0.41	2.84	35.3	8.0	sodic		
48105_8.705-9.869	Pandora	Distinctly	Sandstone, medium			25.2	2.8	0.28	1.54	29.9	5.2	non-sodic		
48105_14.116-15.055	Pandora	Distinctly	Sandstone, fine; siltstone abundant			20.7	4.3	0.36	1.86	27.2	6.8	sodic		
48105_16.536-18.19	Pandora	Slightly	Carbonaceous Claystone; claystone; minor siltstone			16.2	2.8	0.25	1.26	20.5	6.1	sodic		
48105_17-22	Pandora	Fresh	Carbonaceous Claystone; tuff, minor coal			10.8	2.3	0.38	1.34	14.8	9.1	sodic		
48105_24-31	Pandora	Fresh	Sandstone, medium-coarse; coal fragments rare			22.3	5	0.82	2.63	30.7	8.6	sodic		
48105_35-46	Pandora	Fresh	Siltstone; sandstone common coal rare			20.4	3.6	0.77	3.53	28.4	12.4	sodic		
48105_51-52	Pandora	Fresh	Tuff; coal [YT]			21.4	3	1.45	6.66	32.5	20.5	strongly sodic		
48106_1-3	Other	Extremely	Siltstone			15.7	14.6	0.8	5.68	36.8	15.4	strongly sodic		
48106_4-10.001	Other	Distinctly	Siltstone			27	10		3.9	42	9.3	sodic		
48106_10.001-13.97	Other	Distinctly	Sandstone, fine-medium			22.3	6.9	0.72	2.8	32.6	8.6	sodic		
48106_32-42.714	Other	Fresh	Siltstone; sandstone abundant			20.6	5	1.29	1.97	28.9	6.8	sodic		
48106_42-53	Other	Fresh	Sandstone, fine; siltstone common			22.1	2.8	0.7	1.54	27.1	5.7	non-sodic		
48106_75-81	Other	Fresh	Sandstone, fine-medium			22.7	2.3	0.62	1.42	27.1	5.2	non-sodic		
48106_83-84	Other	Fresh	Carbonaceous Claystone; coal abundant			5.5	1.1	0.21	0.83	7.6	10.9	sodic		
48106_100.5-108	Other	Fresh	Siltstone			27.3	3.2	1.24	3.29	35.1	9.4	sodic		
48106_108-110.048	Other	Fresh	Sandstone, medium; siltstone abundant			28.9	3.8	1.14	2.73	36.6	7.5	sodic		
48106_115-116	Other	Fresh	Claystone; carbonaceous common			9.3	2.5	1.31	4.66	17.8	26.2	strongly sodic		
48106_116-117	Other	Fresh	Claystone; tuffaceous common sandstone rare			15.9	4	1.82	6.27	28	22.4	strongly sodic		
48107_1.931-3.873	Other	Distinctly	Siltstone; sandstone common			34.8	6.7	0.29	0.83	42.7	1.9	non-sodic		
48107_11.638-15.52	Other	Distinctly	Siltstone			23.4	7	0.41	1.88	32.7	5.7	non-sodic		
48107_21.344-23.285	Other	Distinctly	Siltstone; sandstone abundant			19.3	5.7	0.62	1.85	27.4	6.8	sodic		
48107_33.181-41.722	Other	Fresh	Sandstone, fine-medium			21.2	3	0.42	1.02	25.6	4.0	non-sodic		
48107_41.722-43.467	Other	Fresh	Siltstone			16	5.7	0.59	1.9	24.1	7.9	sodic		
48107_44-52	Other	Fresh	Claystone; with sandstone			6.3	5.4	0.53	2.32	14.6	15.9	strongly sodic		
48107_59.631-65.501	Other	Fresh	Siltstone; tuffaceous minor			7.2	8.1	0.86	3.37	19.6	17.2	strongly sodic		
48107_67.459-79.894	Other	Fresh	Sandstone, fine-medium; tuffaceous minor			18.9	7.3	0.7	2.68	29.6	9.1	sodic		
48107_79.894-81.465	Other	Fresh	Siltstone			10.7	7.4	0.76	3.23	22	14.7	strongly sodic		
48107_86.564-91.267	Other	Fresh	Siltstone; tuffaceous rare			9.1	7.4	0.98	4.32	21.8	19.8	strongly sodic		
48108_3.15-7.2	Other	Distinctly	Sandstone, fine-medium			28.1	4	1.15	2.59	35.9	7.2	sodic		
48108_7.2-13.1	Other	Distinctly	Claystone; sandstone abundant			27.5	4.5	1.3	2.92	36.2	8.1	sodic		
48108_13.1-14.7	Other	Distinctly	Coal, weathered [L13]			37.7	22.9	1.43	14	76	18.4	strongly sodic		
48108_14.7-16.11	Other	Distinctly	Claystone			8.8	7.6	2.32	3.57	22.3	16.0	strongly sodic		
48108_16.11-16.51	Other	Distinctly	Coal, weathered [L4]			28.9	22.4	1.65	10.2	63.2	16.1	strongly sodic		
48108_17-23	Other	Distinctly	Claystone			24.5	7.8	2.35	2.62	37.3	7.0	sodic		
48108_27.661-28.24	Other	Fresh	Carbonaceous Claystone; claystone abundant			7.6	8.5	2.01	2.91	21.1	13.8	sodic		
48108_32-35	Other	Fresh	Claystone; siltstone			11.8	8.7	1.58	3.01	25	12.0	sodic		
48109_1-4.5	Other	Extremely	Basalt			6.7	11.4	1.1	6.55	25.8	25.4	strongly sodic		
48109_9-12	Other	Distinctly	Siltstone; sandstone abundant			24	7.2	0.64	3.25	35.1	9.3	sodic		
48109_12-14	Other	Distinctly	Claystone			12.2	9.2	0.94	3.57	26	13.7	sodic		
48109_20-24	Other	Distinctly	Siltstone			20.6	8.3	1.08	2.55	32.5	7.8	sodic		
48109_43-54	Other	Fresh	Sandstone, fine-medium			23.1	3	0.76	0.97	27.8	3.5	non-sodic		
48109_80-83	Other	Fresh	Claystone; with tuff			6.6	4.6	0.93	1.52	13.6	11.2	sodic		
48109_90-93	Other	Fresh	Claystone; carbonaceous minor			17.8	4.9	0.89	2.78	26.3	10.6	sodic		
48109_106-114	Other	Fresh	Sandstone, medium-coarse			24.7	4.8	1.12	2.25	32.9	6.8	sodic		
48109_114-115	Other	Fresh	Carbonaceous Claystone			15.1	4.4	1.08	2.78	23.3	11.9	sodic		
48109_118-12	Other	Fresh	Siltstone; sandstone minor			16.2	3.3	1.48	2.9	23.9	12.1	sodic		
48109_123-125	Other	Fresh	Carbonaceous Claystone; coal minor [YT]			13.8	2.8	1.28	3.55	21.4	16.6	strongly sodic		
48109_125-131	Other	Fresh	Siltstone			9	3	1.6	4.6	18	25.6	strongly sodic		
48110_1.6-3.2	Other	Distinctly	Siltstone			22.8	3.5	0.74	2.67	29.8	9.0	sodic		
48110_18.47-19.24	Other	Distinctly	Claystone			26	7.6	1.33	3.82	38.7	9.9	sodic		
48110_19.24-25.7	Other	Distinctly	Sandstone, fine-medium; clayey abundant cement			24.4	6.6	1.39	2.8	35.1	8.0	sodic		
48110_31-34	Other	Slightly	Sandstone, fine-medium; siltstone abundant			21.8	6.5	1.6	2.24	32.1	7.0	sodic		
48110_37-43	Other	Fresh	Siltstone			13.7	5.5	1.87	3.22	24.3	13.3	sodic		
48110_43-46	Other	Fresh	Sandstone, fine			21.2	5.4	2.47	3.19	32.2	9.9	sodic		
48110_53.02-58.412	Other	Fresh	Sandstone, fine-medium			23.2	3.6	1.96	3.15	32	9.8	sodic		
48110_69-73	Other	Fresh	Claystone; carbonaceous rare coal			20.6	3.1	2.61	4.39	30.7	14.3	strongly sodic		

Table B6. Exchangeable Cations and Emerson Class Test Results in Drill-hole Samples

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH 1:5	EC 1:5	Exch. Ca	Exch. Mg	Exch. K	Exch. Na	CEC	ESP	Sodicity Rating	Emerson Class No. & Description	
					µS/cm	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	%			
48110_75.817-77.211	Other	Fresh	Siltstone			19.1	2.7	2.92	4.69	29.4	16.0	strongly sodic		
48111_1.007-5.033	Other	Extremely	Sandstone, coarse to very coarse			30.3	7.7	0.56	2.25	40.8	5.5	non-sodic		
48111_16.106-18.119	Other	Distinctly	Siltstone			19.1	13.4	1.76	3.44	37.7	9.1	sodic		
48111_18.119-21.139	Other	Distinctly	Sandstone, fine-medium			25.5	9.8	1.43	2.29	39	5.9	non-sodic		
48111_27.18-30.779	Other	Slightly	Sandstone, fine-medium			19.6	9.4	1.78	1.6	32.5	4.9	non-sodic		
48111_30.78-32.21	Other	Fresh	Siltstone			10.9	10.1	1.95	1.86	24.8	7.5	sodic		
48111_35-45	Other	Fresh	Siltstone			11.8	6.8	1.22	3	22.8	13.2	sodic		
48111_45.339-51.448	Other	Fresh	Sandstone, fine; siltstone abundant			19.3	5.1	1.56	3.52	29.5	11.9	sodic		
48111_52-55	Other	Fresh	Claystone; with coal			15.6	4.4	0.43	4.86	25.2	19.3	strongly sodic		
48111_59.291-62.411	Other	Fresh	Siltstone			13.1	3.8	1.77	4.6	23.2	19.8	strongly sodic		
48111_63-67	Other	Fresh	Siltstone; carbonaceous claystone			22	2.8	1.51	4.84	31.2	15.5	strongly sodic		
48112_1.03-3.1	Other	Extremely	Siltstone			11.5	14.9	0.52	5.52	32.4	17.0	strongly sodic		
48112_11.38-13.45	Other	Distinctly	Siltstone			21.1	10.4	0.67	2.39	34.5	6.9	sodic		
48112_28.97-41.38	Other	Fresh	Siltstone			19.8	5.2	0.86	1.43	27.3	5.2	non-sodic		
48112_59-70	Other	Fresh	Sandstone, fine-medium; with claystone			24.6	2.2	1	1.26	29.1	4.3	non-sodic		
48112_66.22-73.041	Other	Fresh	Claystone			19.2	3.4	0.9	2.33	25.8	9.0	sodic		
48112_73.05-73.63	Other	Fresh	Tuff; coal common			22.8	2.2	0.35	1.93	27.2	7.1	sodic		
48112_79-81	Other	Fresh	Carbonaceous Claystone; with coal			9.7	2.2	1.28	2.89	16.1	18.0	strongly sodic		
48112_86-91	Other	Fresh	Siltstone			12.6	4.2	1.08	4.06	22	18.5	strongly sodic		
48112_93.4-94.54	Other	Fresh	Siltstone			20.9	3.3	1.91	3.9	30	13.0	sodic		
48112_97-99	Other	Fresh	Claystone; coal common carbonaceous			5.6	3	1.64	3.81	14	27.2	strongly sodic		
48112_99-105	Other	Fresh	Claystone; coal minor			8.1	2.9	1.25	4.99	17.2	29.0	strongly sodic		
48112_105.18-109.21	Other	Fresh	Sandstone, coarse; siltstone common coal minor			29	4.8	5.64	3.45	42.9	8.0	sodic		
48112_109.21-111.22	Other	Fresh	Sandstone, coarse; coal abundant			22.3	2.1	0.82	3.11	28.3	11.0	sodic		
48112_115-116	Other	Fresh	Sandstone, coarse; coal abundant			21.6	2.5	0.82	4.09	29	14.1	strongly sodic		
48112_120.885-121.85	Other	Fresh	Siltstone; coal abundant			21.1	2.9	1.49	4.38	29.9	14.6	strongly sodic		
48113_1.97-3.94	Other	Extremely	Siltstone			2.8	12.4	0.96	3.49	19.6	17.8	strongly sodic		
48113_19.957-24.421	Other	Distinctly	Sandstone, medium; clayey abundant cement			23.2	5.7	0.52	1.79	31.3	5.7	non-sodic		
48113_34.524-36.544	Other	Fresh	Siltstone			17.5	5.8	1.59	1.72	26.7	6.4	sodic		
48113_37-48	Other	Fresh	Siltstone			24.3	4.3	1.9	1.4	31.9	4.4	non-sodic		
48113_59-64	Other	Fresh	Sandstone, fine-medium; siltstone abundant			19	3	0.7	1	25	4.0	non-sodic		
48113_64-66	Other	Fresh	Siltstone			13.5	4.9	1.35	1.64	21.4	7.7	sodic		
48113_72.23-72.82	Other	Fresh	Carbonaceous Claystone; carbonaceous abundant coal			16.6	4.3	2.64	1.94	25.6	7.6	sodic		
48113_73.462-80.653	Other	Fresh	Siltstone			7.8	5.6	1.84	2.53	17.8	14.2	strongly sodic		
48113_88-92	Other	Fresh	Siltstone			21	4.5	1.31	3.5	30.4	11.5	sodic		
48113_98-102	Other	Fresh	Siltstone			18.1	4.4	1.16	3.74	27.4	13.6	sodic		
48113_101.423-102.693	Other	Fresh	Claystone; carbonaceous abundant			13.4	4.2	3.15	3.5	24.2	14.5	strongly sodic		
48113_102.91-106.185	Other	Fresh	Siltstone			8.4	4.6	1.67	4.88	19.6	24.9	strongly sodic		
48114_2.17-3.81	Other	Distinctly	Claystone; carbonaceous abundant			27.7	8.1	0.99	1.71	38.5	4.4	non-sodic		
48114_7-9	Other	Distinctly	Claystone; carbonaceous abundant			4.5	10.2	2.5	3.54	20.7	17.1	strongly sodic		
48114_10.276-18.008	Other	Distinctly	Sandstone, medium-coarse			27.8	6.5	2.12	2.04	38.5	5.3	non-sodic		
48114_24.68-26.18	Other	Fresh	Sandstone, medium			17	11.2	2.72	1.47	32.4	4.5	non-sodic		
48114_26-27	Other	Fresh	Siltstone; with sandstone			20.2	7.2	3.48	1.43	32.4	4.4	non-sodic		
48114_26.81-27.41	Other	Fresh	Claystone; coal abundant			22.5	6.2	2.43	1.38	32.5	4.2	non-sodic		
48114_30-40	Other	Fresh	Siltstone			15.7	7.8	4.05	1.76	29.3	6.0	sodic		
48114_42-43	Other	Fresh	Tuff; coal abundant [YT]			13.7	6.6	2.22	2.25	24.7	9.1	sodic		
48115_7.291-14.581	Other	Distinctly	Sandstone, medium-coarse; minor siltstone			23.3	5.8	0.29	1.8	31.1	5.8	non-sodic		
48115_19.902-22.804	Other	Distinctly	Siltstone; sandstone common			17.1	12.7	0.99	2.15	33	6.5	sodic		
48115_31-43	Other	Fresh	Sandstone, medium-coarse; siltstone			23.5	6.3	1.05	1.07	32	3.3	non-sodic		
48115_73-85	Other	Fresh	Siltstone; sandstone common; micaceous			21.8	5.7	1.08	0.98	29.6	3.3	non-sodic		
48115_92-98	Other	Fresh	Claystone; siltstone abundant			11.1	7.3	1.39	1.88	21.8	8.6	sodic		
48115_98-100	Other	Fresh	Sandstone, fine-medium; minor siltstone			15.5	7.4	1.28	1.71	25.9	6.6	sodic		
48115_102-103	Other	Fresh	Siltstone; claystone			12.9	8	1.92	2.03	24.9	8.2	sodic		
48115_106-112	Other	Fresh	Siltstone			22.7	5.1	0.85	3.77	32.4	11.6	sodic		
48115_112-120	Other	Fresh	Claystone; cabonaceous claystone			20.9	5.1	1.32	4.02	31.4	12.8	sodic		
48115_122-130	Other	Fresh	Claystone; siltstone; tuffaceous			11.9	4.8	1.08	5.04	22.9	22.0	strongly sodic		
48116_3-6	Other	Distinctly	Siltstone; sandstone abundant			20.6	8.3	0.68	7.29	36.9	19.8	strongly sodic		
48116_10-14	Other	Distinctly	Sandstone, fine-medium; siltstone common			28.3	4.8	0.52	3.17	36.8	8.6	sodic		
48116_19-20	Other	Distinctly	Siltstone; sandstone abundant			30.3	4.3	0.5	1.67	36.8	4.5	non-sodic		
48116_23-31	Other	Fresh	Siltstone			22.4	5.6	0.92	1.55	30.5	5.1	non-sodic		
48116_38-39	Other	Fresh	Claystone			11.9	6.4	1.36	2.1	21.7	9.7	sodic		
48116_42-44	Other	Fresh	Sandstone, fine; siltstone abundant near top of unit			9.5	7.7	0.96	2.26	20.4	11.1	sodic		
48116_53-58	Other	Fresh	Siltstone; sandstone abundant			20	6.8	1.31	2.5	30.6	8.2	sodic		
48116_63-64	Other	Fresh	Siltstone			6.8	6.4	1.94	4.06	19.2	21.1	strongly sodic		
48116_66-67	Other	Fresh	Tuff; carbonaceous abundant [YT]			12.6	8	2.05	4.56	27.2	16.8	strongly sodic		
48116_68-72	Other	Fresh	Claystone; siltstone common			13.4	5.2	1.92	5.11	25.7	19.9	strongly sodic		
48117_1.001-3.004	Other	Extremely	Siltstone; sandstone rare			6.4	12.2	0.12	6.17	25	24.7	strongly sodic		
48117_11.016-14.02	Other	Distinctly	Siltstone			11.5	9.1	0.21	3.64	24.5	14.9	strongly sodic		
48117_26.038-28.041	Other	Fresh	Siltstone; sandstone minor near base of unit			7.4	8.2	0.36	2.34	18.3	12.8	sodic		
48117_30-42	Other	Fresh	Siltstone; sandstone rare			11	4	<1	2	19	10.5	sodic		
48117_52.89-60.219	Other	Fresh	Sandstone, medium			13.2	1.5	0.14	1.05	15.8	6.6	sodic		
48117_70.94-83.569	Other	Fresh	Sandstone, medium; siltstone minor			12.6	1.3	0.19	1.64	15.7	10.4	sodic		
48117_84-87	Other	Fresh	Claystone			8.2	2.1	0.33	2.8	13.5	20.7	strongly sodic		
48117_93.403-99.65	Other	Fresh	Siltstone; clayey common			6.1	4	0.32	2.57	13	19.8	strongly sodic		
48117_106-120	Other	Fresh	Sandstone, medium-coarse			10.4	2.8	0.25	2.82	16.3	17.3	strongly sodic		
48117_137-145	Other	Fresh	Siltstone; clayey abundant			8.9	2.1	0.49	5.89	17.4	33.9	strongly sodic		
48117_159-162	Other	Fresh	Claystone; carbonaceous abundant			5.7	1.8	0.51	6.85	14.8	46.3	strongly sodic		
48122_1.5-4	Other	Extremely	Sandstone, medium; siltstone common			20.9	8.1	1.27	5.8	36.1	16.1	strongly sodic		
48122_6-13	Other	Distinctly	Siltstone; sandstone abundant near top of unit			11.7	10.3	0.9	6.67	29.6	22.5	strongly sodic		
48122_14-27	Other	Distinctly	Claystone; siltstone common			9.1	10	0.46	5.94	25.5	23.3	strongly sodic		
48122_38-41	Other	Slightly	Claystone; siltstone common			10.8	5.9	1.08	3.38	21.1	16.0	strongly sodic		
48122_58.437-61.398	Other	Fresh	Sandstone, fine; claystone			19	3	0.92	2.18	25.1	8.7	sodic		
48122_73.641-81.052	Other	Fresh	Siltstone; clayey abundant			19.6	3.5	1.29	2.82	27.2	10.4	sodic		
48122_109-118	Other	Fresh	Siltstone; clayey; tuffaceous; calcite			22	2.4	1.16	2.84	28.3	10.0	sodic		
48122_127-134	Other	Fresh	Claystone; calcite minor			19	1.9	1.08	2.55	24.5	10.4	sodic		
48122_135-140	Other	Fresh	Claystone; coal			20.2	0.7	0.32	1.55	22.8	6.8	sodic		
48122_151-154	Other	Fresh	Sandstone, fine-medium; siltstone			13.6	3.2	1.57	3.73	22.1	16.9	strongly sodic		
48122_160-162	Other	Fresh	Siltstone; claystone minor coal			12.3	2.8	1.4	3.02	19.6	15.4	strongly sodic		
48122_164-178	Other	Fresh	Claystone; siltstone common; minor coal			21.8	2.8	2.53	4.35	31.4	13.9	sodic		
48122_185-190	Other	Fresh	Claystone; carbonaceous; minor coal; minor tuff			14.9	2.8	2.79	6.23	26.7	23.3	strongly sodic		
48123_1.5-3	Other	Extremely	Sandstone, medium			22	6.6	1.09	4.09	33.8	12.1	sodic		
48123_15-21	Other	Distinctly	Claystone; siltstone common			25.5	7.6	1.22	2.36	36.7	6.4	sodic		
48123_33-44	Other	Slightly	Claystone; siltstone common sandstone minor			19.6	4.6	0.93	1.21	26.4	4.6	non-sodic		
48123_51-58	Other	Fresh	Claystone			16.1	6.4	1.73	2.28	26.5	8.6	sodic		
48123_64-74	Other	Fresh	Sandstone, medium			17.5	5	1.51	2.3	26.4	8.7	sodic		
48123_74-79	Other	Fresh	Claystone			18.9	4.9	2.22	2.72	28.8	9.4	sodic		
48123_83-85	Other	Fresh	Claystone			10	5.6	2.95	3.83	22.4	17.1	strongly sodic		
48123_89-92	Other	Fresh	Sandstone, medium; siltstone			11.7	4.1	2.48	3.98	22.3	17.8	strongly sodic		

Table B6. Exchangeable Cations and Emerson Class Test Results in Drill-hole Samples

TERRENUS EARTH SCIENCES

Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH 1:5	EC 1:5	Exch. Ca	Exch. Mg	Exch. K	Exch. Na	CEC	ESP	Sodicity Rating	Emerson Class No. & Description	
					µS/cm	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	%			
175028_2-6	Other	Extremely	Sand	8.5	120	23	2.2	0.22	0.65	27	2.4	non-sodic		
175028_9-13	Other	Extremely	Claystone; minor sandstone bands throughout	8.6	510	19	8.2	0.31	3.2	31	10.3	sodic	2	Some dispersion
175028_15-18	Other	Fresh	Sandstone, fine-medium; coarser bands throughout	8.8	380	14	8	0.49	2.5	25	10.0	sodic	2	Some dispersion
175028_18-21	Other	Fresh	Sandstone, fine; coarser bands throughout	8.8	310	14	6.2	0.46	1.8	23	7.8	sodic	2	Some dispersion
175028_21-24	Other	Fresh	Siltstone; carbonaceous near base of unit	8.6	260	9	4.4	0.36	1.5	15	10.0	sodic	2	Some dispersion
175028_30-31	Other	Fresh	Carbonaceous Siltstone; minor sandstone	3.1	1000	3	0.98	0.04	0.23	5.1	4.5	non-sodic	8	No slaking; no swelling
175028_32-33	Other	Fresh	Sandstone, fine; finer bands throughout	8.2	400	4.7	3.9	0.43	1.8	11	16.4	strongly sodic	2	Some dispersion
175028_33-38	Other	Fresh	Sandstone, fine-medium	8.8	340	8.5	5.4	0.49	1.8	16	11.3	sodic	2	Some dispersion
175028_42-48	Other	Fresh	Sandstone, fine-medium; finer bands near base of unit	9.1	240	14	5.2	0.49	1.8	22	8.2	sodic	2	Some dispersion
175028_48.24-50.24	Other	Fresh	Sandstone, very fine; minor siltstone bands	9.2	240	12	5.2	0.49	2	20	10.0	sodic	2	Some dispersion
175028_50-51	Other	Fresh	Carbonaceous Siltstone; coaly bands	9	340	16	5.1	0.56	2.4	24	10.0	sodic		
175028_54-55	Other	Fresh	Carbonaceous Siltstone	9.4	280	7.5	4	0.64	3.1	15	20.7	strongly sodic		
175028_55.24-59.24	Other	Fresh	Sandstone, very fine; carbonaceous	9.3	310	15	4.4	0.69	3.3	24	13.8	sodic		
175028_59.24-61.24	Other	Fresh	Sandstone, fine	9.4	310	18	4.3	0.66	3	26	11.5	sodic		
175028_61.24-62.15	Other	Fresh	Carbonaceous Siltstone; minor sandstone bands	9.5	320	11	3.8	0.87	4.2	20	21.0	strongly sodic		
175028_65-66	Other	Fresh	Carbonaceous Siltstone; coaly	9.5	420	8	3.4	0.77	5.2	17	30.6	strongly sodic		
175028_66.24-68.24	Other	Fresh	Sandstone, very fine; carbonaceous	9.6	440	10	3.2	0.87	5.2	19	27.4	strongly sodic		
175310_0-1	Other	Extremely	Soil	7.7	210	28	2.2	0.74	0.22	31	<1	strongly sodic	3	Dispersion
175310_1-9	Other	Extremely	Sandstone, fine-medium; coarser bands throughout	8.4	180	23	2.3	0.23	0.96	26	3.7	non-sodic	3	Dispersion
175310_9-11	Other	Extremely	Siltstone; sandstone bands throughout	8.7	280	20	3.6	0.18	1.6	25	6.4	sodic	2	Some dispersion
175310_11-15	Other	Distinctly	Siltstone; sandstone bands throughout	8.6	260	19	5.3	0.23	1.8	26	6.9	sodic	2	Some dispersion
175310_15-16	Other	Slightly	Siltstone; occasional carbonaceous bands	8.6	220	13	4.6	0.25	1.4	19	7.4	sodic	2	Some dispersion
175310_16-18	Other	Slightly	Coal, weath.; carb. bands near top of unit [L13/L12]	8.4	180	7	2.1	0.13	0.78	10	7.8	sodic	8	No slaking; no swelling
175310_21-23	Other	Fresh	Carbonaceous Siltstone; coaly wisps	7.8	180	3.3	3.2	0.28	1.3	8.1	16.0	strongly sodic	8	No slaking; no swelling
175310_24.001-26	Other	Fresh	Siltstone; occasional sandstone bands	8.7	400	9.5	5.8	0.61	2.4	18	13.3	sodic	2	Some dispersion
175310_26-34	Other	Fresh	Siltstone; sandstone bands	8.9	290	15	6.8	0.61	1.9	25	7.6	sodic	2	Some dispersion
175310_34-35	Other	Fresh	Siltstone; sandstone bands	9	330	16	6.1	0.51	2.2	25	8.8	sodic	2	Some dispersion
175310_35-36	Other	Fresh	Siltstone	8.2	590	11	6.1	0.46	2.2	20	11.0	sodic	2	Some dispersion
175310_38-41	Other	Fresh	Siltstone; occasional carbonaceous bands	8.7	380	6.5	6.9	0.72	2.9	17	17.1	strongly sodic	2	Some dispersion
175310_41-49	Other	Fresh	Siltstone; sandstone bands throughout	9.2	280	15	6.5	0.69	2.7	25	10.8	sodic	2	Some dispersion
175310_49-52	Other	Fresh	Sandstone, medium; siltstone bands throughout	9.4	230	18	5	0.56	2.4	26	9.2	sodic	2	Some dispersion
175310_52-54	Other	Fresh	Tuff [YT]	9.3	250	11	6	0.77	3.1	21	14.8	strongly sodic	2	Some dispersion
175310_53.999-55.998	Other	Fresh	Sandstone, medium	9.3	290	17	5.7	0.69	3	26	11.5	sodic	2	Some dispersion
175310_55.998-64	Other	Fresh	Siltstone; occasional carbonaceous bands sandstone	9.2	320	12	5.4	0.79	3.4	22	15.5	strongly sodic	8	No slaking; no swelling
175310_64-72	Other	Fresh	Sandstone, medium	9.4	240	18	2.5	0.46	2.1	23	9.1	sodic		
175310_72-75	Other	Fresh	Siltstone; sandstone bands near base of unit	9.3	380	15	4.7	0.84	3.9	24	16.3	strongly sodic	2	Some dispersion
175310_75-78	Other	Fresh	Siltstone; coaly with carbonaceous bands	9.4	300	18	3.7	0.92	3.9	27	14.4	strongly sodic	2	Some dispersion
175310_80-80.998	Other	Fresh	Siltstone; carbonaceous bands near top of unit	9.5	330	17	3.4	0.87	3.9	26	15.0	strongly sodic	2	Some dispersion
175310_80.998-90	Other	Fresh	Sandstone, medium; siltstone bands near top of unit	9.4	360	18	2.7	0.66	3.1	25	12.4	sodic	2	Some dispersion
175387_0-3	Other	Extremely	Soil; clayey near base of unit	8.3	380	36	11	0.79	1.9	51	3.7	non-sodic		
175387_3-5	Other	Extremely	Clay; sandy bands throughout	8.8	810	26	12	0.43	4.8	44	10.9	sodic		
175387_5-9	Other	Extremely	Claystone; occasional sandstone bands throughout	8.5	820	23	12	0.38	4.3	40	10.8	sodic		
175387_9-11	Other	Extremely	Sandstone, fine; claystone bands; minor siltstone	8.5	740	17	11	0.36	3.5	31	11.3	sodic		
175387_11-11.961	Other	Extremely	Siltstone; carbonaceous bands near base of unit	8.5	680	15	9.8	0.36	3.2	29	11.0	sodic		
175387_12-15	Other	Extremely	Carbonaceous Siltstone; coaly bands throughout	7.3	920	20	20	0.49	6.1	47	13.0	sodic		
175387_15-16	Other	Extremely	Coal, weathered; siltstone [L4]	6.9	110	27	31	0.66	8.3	68	12.2	sodic		
175387_16-18	Other	Distinctly	Siltstone; sandstone bands throughout	7.7	970	10	18	0.66	4.8	34	14.1	strongly sodic		
175387_18-26	Other	Slightly	Siltstone; occasional sandstone bands	8.6	640	14	13	0.64	3.1	31	10.0	sodic		
175387_26-28.771	Other	Fresh	Sandstone, medium; siltstone bands throughout	9.2	350	18	11	0.61	2	32	6.3	sodic		
175387_28-29	Other	Fresh	Sandstone, medium; siltstone bands throughout	9.1	370	16	11	0.64	2.2	30	7.3	sodic		
175401_0-2	Other	Extremely	Soil	8.3	730	26	11	0.74	4.8	43	11.2	sodic	2	Some dispersion
175401_2-4	Other	Extremely	Clay	7.1	1400	12	11	0.61	6.1	30	20.3	strongly sodic	3	Dispersion
175401_4-6	Other	Extremely	Claystone	6.4	1200	7	9	0.61	5.6	22	25.5	strongly sodic	3	Dispersion
175401_6-8	Other	Extremely	Sandstone, fine	8.6	750	20	7.5	0.51	4.3	33	13.0	sodic	2	Some dispersion
175401_8-12	Other	Extremely	Siltstone	8.7	670	18	8.2	0.56	4.3	32	13.4	sodic	8	No slaking; no swelling
175401_11.575-15.101	Other	Extremely	Sandstone, fine-medium	8.8	540	21	6.8	0.41	3.5	32	10.9	sodic	3	Dispersion
175401_15-16	Other	Slightly	Coal, weathered; sandstone [V1]	8.2	540	12	5.7	0.31	3	22	13.6	sodic	8	No slaking; no swelling
175401_16-17	Other	Slightly	Coal, weathered; carbonaceous siltstone [V1]	8.6	340	6	4.7	0.31	2.3	13	17.7	strongly sodic	8	No slaking; no swelling
175401_17-18	Other	Slightly	Carbonaceous Siltstone	8.5	530	5.5	7.4	0.59	3.3	17	19.4	strongly sodic	8	No slaking; no swelling
175401_18-25	Other	Fresh	Siltstone; sandstone	9	450	13	7.6	0.66	3.3	25	13.2	sodic	8	No slaking; no swelling
175401_25.001-26.023	Other	Fresh	Sandstone, medium	9.2	340	17	7.5	0.56	2.8	28	10.0	sodic	2	Some dispersion
175401_26.023-27.846	Other	Fresh	Siltstone	9.2	350	14	7.3	0.61	2.9	25	11.6	sodic	2	Some dispersion
175401_27.846-33.492	Other	Fresh	Sandstone, medium	9.4	270	17	6.2	0.51	2.5	26	9.6	sodic	2	Some dispersion
175401_33.492-36.503	Other	Fresh	Siltstone	9.3	310	11	7	0.72	3.1	22	14.1	strongly sodic	2	Some dispersion
175401_36-39	Other	Fresh	Sandstone, medium	9.4	250	19	5.3	0.49	2.4	27	8.9	sodic	2	Some dispersion
175401_39-47	Other	Fresh	Siltstone	9.2	310	12	6.6	0.72	3.3	23	14.3	strongly sodic	2	Some dispersion
175401_46.418-54.495	Other	Fresh	Sandstone, medium	9.5	220	19	3.1	0.41	2	25	8.0	sodic	2	Some dispersion
175401_54-63	Other	Fresh	Siltstone	9.4	280	25	8.2	1.6	6.5	41	15.9	strongly sodic	2	Some dispersion
175401_63-64	Other	Fresh	Carbonaceous Siltstone [V23]	9.4	270	14	3.6	0.69	3.3	22	15.0	strongly sodic	2	Some dispersion
175401_66-78	Other	Fresh	Sandstone, medium	9.6	230	17	2	0.46	2.5	22	11.4	sodic	2	Some dispersion
177204_2.5-2.7	Pandora	Weathered	Clayey Sand	8.4	145	8.5	1.9	<0.2	<0.2	10.5	<0.2	non-sodic	3	Dispersion
177204_6.7-6.9	Pandora	Weathered	Sandstone, fine-medium; ferruginous	8.7	178	2.8	1.7	<0.2	0.4	4.8	8.8	sodic	3	Dispersion
177204_8.4-8.6	Pandora	Weathered	Mudstone; clayey throughout	8.4	419	5.4	6.2	<0.2	1.2	12.7	9.1	sodic	3	Dispersion
177204_11-11.2	Pandora	Weathered	Sandstone, fine; siltstone bands throughout	8.4	408	5.5	6	<0.2	1.2	12.7	9.8	sodic	3	Dispersion
177204_14-14.3	Pandora	Weathered	Sandstone, very fine; abundant siltstone throughout	8.4	414	7.7	8.5	<0.2	1.8	18.2	10.1	sodic	3	Dispersion
177204_17.4-17.6	Pandora	Weathered	Sandstone, fine; siltstone bands throughout	8.4	300	6	7.7	<0.2	1.6	15.3	10.2	sodic	3	Dispersion
177204_21.1-21.3	Pandora	Weathered	Siltstone; sandstone mudstone bands	8.2	128	2.6	3.8	<0.2	0.9	7.5	12.4	sodic	3	Dispersion
177204_23-23.2	Pandora	Weathered	Carbonaceous Mudstone	7.9	196	3.7	5.7	0.3	1.8	11.5	15.4	strongly sodic	3	Dispersion
177204_28.26-28.5	Pandora	Fresh	Carbonaceous Mudstone	8.2	187	2.4	3.2	0.2	1.2	7.1	17.2	strongly sodic	3	Dispersion
177204_29.4-29.6	Pandora	Fresh	Mudstone	8.2	225	3.9	5.6	0.3	1.7	11.5	14.9	strongly sodic	2	Some dispersion
177204_33-33.2	Pandora	Fresh	Mudstone; siltstone in part; clayey in part	8.2	317	2.8	3.8	<0.2	1	7.8	13.2	sodic	3	Dispersion
177204_37-37.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands	9.1	280	3.7	5.1	<0.2	1.2	10.3	12.2	sodic	3	Dispersion
177204_41.2-41.4	Pandora	Fresh	Sandstone, fine-medium	9.1	248	4.4	6	0.2	1.7	12.2	13.6	sodic	3	Dispersion
177204_47.5-47.7	Pandora	Fresh	Sandstone, fine-medium; siltstone bands; calcite cement	9.2	254	5.5	7.5	0.4	2.4	15.8	15.4	strongly sodic	3	Dispersion
177204_50.9-51.1	Pandora	Fresh	Sandstone, fine; siltstone throughout	9.2	254	4.5	6.2	0.3	2.1	13.1	15.8	strongly sodic	3	Dispersion
177204_54-54.2	Pandora	Fresh	Sandstone, fine; siltstone laminae throughout	9.2	267	4.7	6.8	0.3	2.2	13.9	15.4	strongly sodic	3	Dispersion
177204_57.6-57.8	Pandora	Fresh	Sandstone, fine; siltstone throughout; calcite cement	9.1	312	4.3	5.8	0.3	2	12.4	15.8	strongly sodic	3	Dispersion
177204_59-59.2	Pandora	Fresh	Carbonaceous Mudstone; mudstone near top of unit	7.9	544	4.9	7.2	0.3	2.5	14.9	16.9	strongly sodic	3	Dispersion
177204_66.36-66.64	Pandora	Fresh	Mudstone; carbonaceous bands throughout	8.5	323	10.9	13.2	0.4	6.2	30.8	20.2	strongly sodic	2	Some dispersion
177212_2-2.2	Pandora	Weathered	Sandstone, fine-medium; soft clayey	8.4	338	4.2	2.4	1	<0.2	7.6	13.5	sodic	2	Some dispersion
177212_5.8-6	Pandora	Weathered	Siltstone; rare sub angular bands near top of unit	8	263	3.2	4.8	1.8	<0.2	9.8	18.5	strongly sodic	2	Some dispersion
177212_8-8.2	Pandora	Weathered	Siltstone; sub angular in part	8.6	512	2.6	4.6	1.5	<0.2	8.7	17.2	strongly sodic	2	Some dispersion
177212_13-13.2	Pandora	Weathered	Siltstone; occasional sandstone bands	8.2	582	1.1	3.3	1.1	<0.2	5.7	20	strongly sodic	2	Some dispersion
177212_18.3-18.5	Pandora	Weathered	Carbonaceous Mudstone	7.7	254	1.8	3.9	1.5	<0.2	7.1	20.8	strongly sodic	2	Some dispersion
177212_21.28-21.48	Pandora	Weathered	Siltstone	7.9	253	0.8	3.3	1.1	<0.2	5.3	20.2	strongly sodic	2	Some dispersion
177212_24.09-24.21	Pandora	Weathered	Clay	8.2	315	4.1	4.2	1	<0.2	9.5	11.1	sodic	2	Some dispersion
177212_29.02-29.18	Pandora	Fresh	Mudstone	7.7	363	0.7	3.3	1	<0.2	5.2	19.2	strongly sodic	2	Some dispersion
177212_32.14-32.43	Pandora	Fresh	Mudstone	8.3	465	1.9	5.3	1.3	0.3	8.8	15.1	strongly sodic	2	Some dispersion

Table B6. Exchangeable Cations and Emerson Class Test Results in Drill-hole Samples

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Drill-hole ID & Sample Interval (m)	Location	Weath.	Description	pH 1:5	EC 1:5	Exch. Ca	Exch. Mg	Exch. K	Exch. Na	CEC	ESP	Sodicity Rating	Emerson Class No. & Description	
					µS/cm	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	%			
177212_35-35.2	Pandora	Fresh	Siltstone; mudstone throughout	7.9	690	2.4	6.5	1.8	0.4	11.1	16.6	strongly sodic	2	Some dispersion
177212_38-38.2	Pandora	Fresh	Sandstone, fine; siltstone bands throughout	8.8	408	2.5	6.2	2.1	0.3	11.3	19	strongly sodic	2	Some dispersion
177212_43.1-43.3	Pandora	Fresh	Sandstone, medium; sideritic nodules	9.2	384	0.6	2.7	1	<0.2	4.5	22.5	strongly sodic	2	Some dispersion
177212_45.6-45.8	Pandora	Fresh	Sandstone, fine; siltstone bands; siderite lenses	9.1	434	3.2	7.2	3	0.5	13.9	21.3	strongly sodic	2	Some dispersion
177212_49-49.2	Pandora	Fresh	Sandstone, fine-medium; carbonaceous bands	9.1	445	3.5	7	2.8	0.4	13.7	20.7	strongly sodic	2	Some dispersion
177212_51.8-52	Pandora	Fresh	Sandstone, medium; sideritic nodules	8.8	493	2.6	5.8	2.5	0.3	11.2	22	strongly sodic	2	Some dispersion
177212_54-54.2	Pandora	Fresh	Siltstone; sandstone laminae near base of unit	8.5	453	2.5	5.5	2.3	0.4	10.7	21.7	strongly sodic	2	Some dispersion
177212_55.18-55.42	Pandora	Fresh	Mudstone	8.5	475	2.4	5.6	2.2	0.4	10.6	20.8	strongly sodic	2	Some dispersion
177212_60.3-60.38	Pandora	Fresh	Carbonaceous Mudstone; clayey in part [YT]	8.7	329	2.6	6.4	3	0.3	12.3	24.5	strongly sodic	2	Some dispersion
177212_62.5-62.7	Pandora	Fresh	Carbonaceous Mudstone; coaly lenses throughout	9.3	315	1.9	4.3	2.3	0.4	8.9	26	strongly sodic	2	Some dispersion
177496_1.2-1.5	Other	Weathered	Sand; clayey in part common clasts oxidised	8.6	886	8.2	8.7	0.2	4.2	21.4	19.7	strongly sodic	2	Some dispersion
177496_7.7-8	Other	Weathered	Sandstone, fine-medium; oxidised siltstone in part	9.2	306	2	3.1	<0.2	1.8	6.9	26.6	strongly sodic	7	No slaking; swelling
177496_15.5-15.8	Other	Weathered	Sandstone, very fine; oxidised siltstone in part	9	515	4.4	9.2	<0.2	3.1	16.9	18.3	strongly sodic	2	Some dispersion
177496_23.5-23.8	Other	Weathered	Sandstone, fine-medium; oxidised; minor calcite	9.2	304	3.6	7.8	0.2	3	14.7	20.5	strongly sodic	7	No slaking; swelling
177496_27.5-27.82	Other	Fresh	Sandstone, fine; calcite sporadic infill fractures	9.2	250	1.1	3.3	0.2	1.2	5.8	20.1	strongly sodic	7	No slaking; swelling
177496_40.5-40.77	Other	Fresh	Sandstone, very fine	9.4	236	3.8	5.5	0.4	2.7	12.3	21.9	strongly sodic	7	No slaking; swelling
177496_55-55.25	Other	Fresh	Sandstone, fine-medium; calcite infill fractures	9.4	231	1.8	1.5	<0.2	1.3	4.7	27.1	strongly sodic	8	No slaking; no swelling
177496_63.53-63.76	Other	Fresh	Carbonaceous Sandstone	9.1	99	3.5	1.6	0.4	4.2	9.6	43.5	strongly sodic	7	No slaking; swelling
177496_82-82.25	Other	Fresh	Sandstone, medium; carbonaceous wisps	9.9	338	3.7	1.3	0.3	4.1	9.4	43.6	strongly sodic	7	No slaking; swelling
177496_94.13-94.41	Other	Fresh	Sandstone, fine; carb. siltstone laminae	9.8	377	5.2	1.4	0.4	6.1	13.1	46.4	strongly sodic	8	No slaking; no swelling
177496_105.47-105.68	Other	Fresh	Sandstone, medium; carbonaceous laminae	10	422	5.8	1.5	0.5	7.6	15.4	49.6	strongly sodic	2	Some dispersion
177496_115.5-115.75	Other	Fresh	Sandstone, medium; carbonaceous clasts; minor calcite	10	386	3.4	0.8	0.3	5	9.5	52.6	strongly sodic	7	No slaking; swelling
177496_125.52-125.8	Other	Fresh	Sandstone, medium-coarse; carb. laminae; minor calcite	9.9	432	5.4	1.3	0.5	7.9	15	52.4	strongly sodic	7	No slaking; swelling
177496_135.5-136.75	Other	Fresh	Carbonaceous Sandstone; minor coal; minor calcite	10	448	4.8	1.2	0.5	7.9	14.6	54.5	strongly sodic	7	No slaking; swelling
177518_3-3.25	Pandora	Weathered	Clayey Sand; oxidised carb. fragments; gravelly	8.5	550	5.4	5.6	<0.2	1.8	13	13.8	sodic	2	Some dispersion
177518_8.5-8.75	Pandora	Weathered	Sandy Clay; oxidised sandy bands	9.1	455	4	5.7	<0.2	2.2	11.9	18.5	strongly sodic	2	Some dispersion
177518_17.1-17.35	Pandora	Weathered	Sandstone, very fine; oxidised	8.3	246	4.1	6.6	<0.2	2.7	13.4	20.2	strongly sodic	2	Some dispersion
177518_29.9-30.2	Pandora	Weathered	Sandstone, fine; siltstone laminae finer near base of unit	9.2	329	3.6	4.5	<0.2	1.9	10	18.8	strongly sodic	2	Some dispersion
177518_42.2-42.45	Pandora	Weathered	Siltstone; common sandstone bands	9.3	200	3.5	4.1	0.2	2	9.8	20.7	strongly sodic	7	No slaking; swelling
177518_48-48.25	Pandora	Fresh	Sandstone, very fine; common siltstone laminae bands	9.4	256	8.2	6.2	0.5	2.5	17.4	14.2	strongly sodic	7	No slaking; swelling
177518_62-62.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite fragments	9.4	223	4.5	3	0.2	2.2	10	22.1	strongly sodic	7	No slaking; swelling
177518_76.11-76.35	Pandora	Fresh	Sandstone, fine; carb. laminae; calcite fragments	9.6	245	4.3	2.1	0.2	2	8.6	22.9	strongly sodic	8	No slaking; no swelling
177518_90.1-90.35	Pandora	Fresh	Sandstone, fine; occasional carbonaceous laminae bands	9.4	231	3.2	1.9	<0.2	1.2	6.5	19.1	strongly sodic	8	No slaking; no swelling
177518_104-104.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; calcite common	9.3	235	2.3	1.9	<0.2	1	5.2	18.2	strongly sodic	8	No slaking; no swelling
177518_118-118.25	Pandora	Fresh	Sandstone, very fine; minor coaly bands; minor calcite	9.5	273	3.5	3.2	0.2	2.2	9.2	24.3	strongly sodic	7	No slaking; swelling
177518_129-129.25	Pandora	Fresh	Sandstone, very fine; carb. laminae; minor calcite	9.6	306	2.6	1.9	<0.2	1.4	6	23.6	strongly sodic	8	No slaking; no swelling
177518_136.75-137	Pandora	Fresh	Tuff [YT]	9	165	7.3	5.1	0.4	4.8	17.6	27.2	strongly sodic	2	Some dispersion
177519_2.7-3	Other	Weathered	Clay; common sandstone siltstone fragments	7.6	1470	3.7	7.5	0.5	3.5	15.2	23.1	strongly sodic	2	Some dispersion
177519_11.92-12.2	Other	Weathered	Sandstone, very fine; minor siltstone & mudstone bands	8.2	429	3	5.9	<0.2	3.5	12.6	28.2	strongly sodic	2	Some dispersion
177519_21.5-21.76	Other	Weathered	Sandstone, very fine; siltstone & mudst. bands; coal rare	9.2	533	4.3	6.2	<0.2	3.4	13.9	24.2	strongly sodic	2	Some dispersion
177519_35.5-35.76	Other	Fresh	Sandstone, very fine; minor siltst. bands; minor calcite	9.6	263	2.9	3.2	0.2	2	8.2	23.9	strongly sodic	8	No slaking; no swelling
177519_50-50.26	Other	Fresh	Sandstone, very fine; calcite sporadic fragments	9.6	250	3.3	1.8	0.2	1.8	7.1	25.3	strongly sodic	8	No slaking; no swelling
177519_63.2-63.5	Other	Fresh	Sandstone, fine; calcite on bedding surfaces	9.6	227	3	0.8	<0.2	1.3	5.2	25.2	strongly sodic	8	No slaking; no swelling
177519_78.5-78.75	Other	Fresh	Sandstone, very fine; carb. laminae; minor calcite	9.6	260	4.5	1	0.2	2.1	7.8	27	strongly sodic	8	No slaking; no swelling
177519_92.45-92.7	Other	Fresh	Carbonaceous Sandstone; carb. siltstone; minor calcite	9.2	155	3.8	0.5	<0.2	1.9	6.4	29.6	strongly sodic	8	No slaking; no swelling
177519_99.5-99.75	Other	Fresh	Carbonaceous Sandstone; occasional minor coaly bands	9.4	102	3.4	0.8	<0.2	2.4	6.8	34.9	strongly sodic	8	No slaking; no swelling
177519_104.25-104.5	Other	Fresh	Sandstone, fine; carb. siltst. laminae; calcite fragments	9.5	179	5.2	1.3	0.2	3.3	10.1	32.9	strongly sodic	8	No slaking; no swelling
177519_123.5-123.75	Other	Fresh	Sandstone, very fine; carb. siltst. laminae; minor calcite	9.8	315	3.5	1.1	0.2	2.9	7.8	37.9	strongly sodic	8	No slaking; no swelling
177519_139-139.25	Other	Fresh	Sandstone, very fine; carbonaceous laminae	9.9	222	4.7	1.3	0.4	4.8	11.1	42.8	strongly sodic	8	No slaking; no swelling
177519_142-142.25	Other	Fresh	Tuff; occasional carb. clasts; calcite fragments [YT]	9.8	414	4.7	1.3	0.3	5.5	11.8	46.7	strongly sodic	2	Some dispersion
177520_1.5-1.75	Other	Weathered	Sandy Clay; sandy in part	5.2	876	2.2	3	0.4	1.4	7.4	19.7	strongly sodic	2	Some dispersion
177520_11.5-11.75	Other	Weathered	Sandstone, fine-medium; oxidised; carbonaceous wisps	9.4	377	2	0.9	<0.2	0.6	3.5	17	strongly sodic	4	No dispersion; calcite or gypsum present
177520_17.25-17.5	Other	Weathered	Siltstone; oxidised sandstone laminae bands	9.2	172	2.9	2.6	0.2	0.6	6.2	9.8	sodic	2	Some dispersion
177520_25.5-25.75	Other	Fresh	Sandstone, very fine; common siltstone laminae	9	171	1.5	0.7	<0.2	<0.2	2.4	<0.2	non-sodic	4	No dispersion; calcite or gypsum present
177520_31.71-32	Other	Fresh	Siltstone; carbonaceous; minor coaly bands	8.4	118	2.3	1.7	0.5	0.4	5	8.4	sodic	2	Some dispersion
177520_37-37.25	Other	Fresh	Siltstone; common sandstone laminae	9.5	248	3.6	3.8	0.8	0.7	9	7.7	sodic	2	Some dispersion
177520_51.28-51.56	Other	Fresh	Siltstone; common sandstone laminae throughout	9.5	199	1.9	2.8	0.5	0.5	5.8	9.1	sodic	2	Some dispersion
177520_59.73-60	Other	Fresh	Carbonaceous Siltstone; carbonaceous throughout	9.7	239	2.7	5.3	2.4	1.7	12	13.8	sodic	2	Some dispersion
177520_61.5-61.78	Other	Fresh	Tuff [YT]	9.6	97	4.8	6.2	1.8	2.5	15.4	16.5	strongly sodic	2	Some dispersion
177464_R01_1.2-1.5	Other	Weathered	Soil; clayey in part oxidised	8.1	437	12.6	2.1	0.6	<0.2	15.3	<0.2	non-sodic	4	No dispersion; calcite or gypsum present
177464_R01_7-7.3	Other	Weathered	Claystone; oxidised	6.5	872	6.8	10.3	<0.1	3.8	21	18.1	strongly sodic	2	Some dispersion
177464_R01_17.5-17.8	Other	Weathered	Siltstone; oxidised sandstone bands in part	8.3	472	6.4	5.4	<0.2	2.8	14.6	19.2	strongly sodic	2	Some dispersion
177464_R01_29.5-29.76	Other	Weathered	Sandstone, medium; ox. siltst. bands; calcite fractures	9.4	254	3.3	3.4	<0.2	1.3	7.9	15.9	strongly sodic	7	No slaking; swelling
177464_R01_35.64-35.9	Other	Weathered	Sandstone, fine-medium; carb. wisps; calcite fractures	9	209	3.4	3.4	<0.2	1.1	7.9	13.9	sodic	7	No slaking; swelling
177464_R01_44.5-44.75	Other	Fresh	Sandstone, fine-medium; calcite sporadic infill fractures	9.2	249	4.2	5.7	0.3	1.5	11.7	12.5	sodic	7	No slaking; swelling
177464_R01_54.5-54.8	Other	Fresh	Sandstone, fine-medium; common carbonaceous wisps	9.2	179	2.4	2.4	<0.2	0.7	5.7	12.8	sodic	2	Some dispersion
177464_R01_61.67-61.96	Other	Fresh	Carbonaceous Mudstone; siltstone in part	7.5	178	3.7	3.6	0.3	1.7	9.3	18.4	strongly sodic	7	No slaking; swelling
177464_R01_76-76.3	Other	Fresh	Carbonaceous Siltstone; minor coal; minor calcite	9.6	232	3.8	3.2	0.2	1.9	9.2	21.2	strongly sodic	7	No slaking; swelling
177464_R01_83.37-83.66	Other	Fresh	Sandstone, coarse to v. coarse; carb. wisps; minor calcite	9.7	258	5.9	4.5	0.3	2.7	13.5	20.2	strongly sodic	7	No slaking; swelling
177464_R01_91-91.3	Other	Fresh	Sandstone, fine; carb. wisps; calcite in fractures	9.6	242	7.2	4.2	0.5	3.7	15.6	23.6	strongly sodic	7	No slaking; swelling
177464_R01_102.7-103	Other	Fresh	Siltstone; sandstone in part	9.4	238	6.2	2.1	0.3	4.3	13	33.4	strongly sodic	7	No slaking; swelling
177464_R01_111.24-111.5	Other	Fresh	Sandstone, fine; siltstone in part; calcite infill fractures	9.7	345	5.4	2	0.3	3.7	11.5	32.2	strongly sodic	7	No slaking; swelling
177464_R01_115.88-116.16	Other	Fresh	Sandstone, very fine; siltstone; carb. laminae	9.7	231	6.7	1.7	0.4	4.8	13.7	34.8	strongly sodic	7	No slaking; swelling
177464_R01_124.35-124.62	Other	Fresh	Siltstone; sandstone bands; minor calcite	9.7	326	10.2	3.2	0.4	7.2	21.1	34.3	strongly sodic	3	Dispersion
177464_R01_138-138.26	Other	Fresh	Carbonaceous Mudstone; sparse disseminated in part	9.8	283	5.1	1.3	0.5	4	11	36.6	strongly sodic	7	No slaking; swelling
177464_R01_140.7-141	Other	Fresh	Coaly Shale; minor coaly claystone bands [VL]	9.7	172	4.4	1.2	0.4	3.9	9.9	39.3	strongly sodic	7	No slaking; swelling

pH and EC on 1:5 (w:v) water extracts; CEC = cation exchange capacity; ESP = exchangeable sodium percentage. Refer to report body for further explanation of data and data sources.

Appendix C

AMD Hazard Scoring Table for the OOPD

Table C1. AMD hazard scoring for source materials and likelihood for AMD generation from the proposed OOPD final landform

Out-of-Pit Dump (OOPD): Landform components	Estimated material proportion within landform	% of samples classified as PAF	% of material in landform estimated to be PAF	Comment	AMD propensity rating	AMD capacity rating	AMD quantity rating	AMD hazard score	Landform AMD hazard score	Likelihood for AMD generation from Out-of-Pit Dump (OOPD) landform
Non-carbonaceous spoil Distributed throughout landform	90%	1.2%	1.0%	Total S is very low (75th percentile = 0.03%), of which all except two samples are NAF. The 'PAF' samples have a 75th percentile total S value of 0.76% (and AMD capacity is based on this number). Based on sample numbers (n=173), 1.2% of non-carbonaceous spoil is conservatively classified as 'PAF' of some type. 75th percentile EC(1:5) of non-carbonaceous spoil = 381 µS/cm. Non-carbonaceous spoil from Pandora Pit is estimated to comprise approximately 90% of mineral waste in the out-of-pit dump (OOPD). AMD quantity conservatively assumes proportion of PAF non-carbonaceous spoil samples approximates the proportion of non-carbonaceous spoil that is PAF.	**1** Low	**5** Moderate	**1** Low	**4** Low	**1.5** Low	The out-of-pit dump (OOPD) is expected to be comprised almost entirely of spoil (approximately 99% of the landform). Waste coal is conservatively assumed to comprise 1% of the landform. General spoil is overwhelmingly NAF with very low sulfur, excess neutralising capacity and low soluble metals concentration. What very little 'PAF' material exists will be well mixed throughout bulk NAF spoil. Approximately 73% of coal from Pandora Pit is conservatively classified as 'PAF', however coal (as waste coal) is assumed to comprise a very low proportion of the landform (up to 1%) and is broadly mixed amongst spoil. Overall, approximately 3.2 % of the landform is conservatively estimated to be either PAF, PAF-LC, UC(PAF) material - which is associated with both spoil and waste coal. Bulk spoil is regarded as posing a low AMD source hazard and is expected to comprise about 99% of the landform. Waste coal is regarded as posing a low-moderate AMD source hazard and is conservatively expected to comprise about 1% of the landform. The 75th percentile EC(1:5) of the OOPD (based on the EC(1:5) of the source materials proportionally represented) is estimated at 368 µS/cm. The hazard for AMD generation from the OOPD at the Project is considered to be **LOW**. The likelihood for AMD generation from the OOPD at the Project is rated **HIGHLY UNLIKELY**. This AMD hazard rating is consistent with the AMD hazard rating of spoil emplacements containing waste coal at nearby mining operations (mining the same overburden/interburden and seams, and processing the same ROM coal).
Carbonaceous spoil Distributed throughout landform	9%	16%	1.4%	Total S is low (75th percentile = 0.17%), of which 84% of samples are NAF. The 'PAF' samples have a low 75th percentile total S value of 0.28% (and AMD capacity is based on this number). Based on sample numbers (n=25), 16% of carbonaceous spoil is conservatively classified as 'PAF' of some type. 75th percentile EC(1:5) of carbonaceous spoil = 262 µS/cm. Carbonaceous spoil from Pandora Pit is estimated to comprise approximately 9% of mineral waste in the out-of-pit dump (OOPD). AMD quantity conservatively assumes proportion of PAF carbonaceous spoil samples approximates the proportion of carbonaceous spoil that is PAF.	**5** Plausible	**5** Moderate	**1** Low	**8** Low-Moderate		
Waste coal Distributed throughout landform	1%	73%	0.7%	Approximately 73% of coal samples from Pandora Pit have been conservatively classified as PAF, PAF-LC or UC(PAF). Of these 'PAF' samples, about two-thirds were conservatively classified as PAF-LC or UC(PAF), with the remaining one-third (approximately) conservatively classified as PAF. Total S is generally low (75th percentile = 0.46%). NAF samples have a 75th percentile S value of 0.26% and 'PAF' samples have a low 75th percentile S value of 0.50% (and AMD capacity is based on this number). 75th percentile EC(1:5) of coal = 167 µS/cm. Coal from Pandora Pit (as waste coal) is assumed to conservatively comprise about 1% of all mineral waste in the OOPD. AMD quantity conservatively assumes proportion of PAF coal samples approximates the proportion of coal that is PAF.	**7** Moderate	**5** Moderate	**1** Low	**10** Low-Moderate		
Coal rejects No rejects disposed into landform	0%	0%	0%	No rejects located within the out-of-pit dump.	**n/a**	**n/a**	**n/a**	**n/a**		

Data used to undertake the AMD hazard scoring assessment was from Pandora drillholes only.

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