G2 | Acid Sulfate Soils

Santos | PETRONAS

Report

GLNG Dredge Material Placement Facility, Acid Sulfate Soils Investigation

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Prepared for

Santos

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Abbreviations

Acronym	Description
AASS	Actual Acid Sulfate Soils
AHD	Australian Height Datum
ALS	Australian Laboratory Services Pty Ltd
ANZECC	Australian and New Zealand Environment and Conservation Council
ANC	Acid Neutralising Capacity
As	Arsenic
ASS	Acid Sulfate Soil
$CaCO_3$	Calcium Carbonate
CG	Coordinator General
CRC	Cooperative Research Centre
CSG	Coal Seam Gas
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DERM	Department of Environmental Resources and Management
DMPF	Dredge Material Placement Facility
EIL	Environmental Investigation Level
EIS	Environmental Impact Statement
GPC	Gladstone Ports Corporation
GPS	Global Positioning system
HIL	Health Investigation Level
IL	Investigation Level
ISQG	Interim Sediment Quality Guidelines
KCL	Potassium Chloride
kg	Kilogram
km	Kilometre
L	Litre
LOR	Limit of Reporting
LNG	Liquefied Natural Gasgg
m	Metre
Mbgl	Metres below ground level
mg	Milligram
MIPEC	Marine Industrial Port Engineering and Contracting Pty Ltd
NATA	National Association of Testing Authorities
NEPC	National Environmental Protection Council
NEPM	National Environmental Protection Measure
NO_x	Nitrate/nitrite
PASS	Potential Acid Sulfate Soils
pH	potential of Hydrogen (measures acidity)

Acronym	Description
pH_F	Field pH
pH_{FOX}	Oxidised Field pH
QASSIT	Queensland Acid Sulfate Soils Investigation Team
QA/QC	Quality Assurance/ Quality Control
QEPA	Queensland Environmental Protection Agency
RPD	Relative Mean Difference
S	Sulphur
sCr	Chromium Reducible Sulphur
s-TAA	Sulfidic Titratable Actual Acidity
SAP	Sampling and Analysis Plan
TAA	Titratable Actual Acidity
TKN	Total Kjeldahl Nitrogen
TN	Total Nitrogen
TP	Total Phosphorus
TPA	Titratable Peroxide Acidity
TSS	Total Suspended Solids
µg	Microgram

Executive Summary

URS Australia Pty Ltd (URS) was commissioned by Santos Ltd (Santos) to undertake Acid Sulfate Soils Assessment at the proposed Dredge Management Placement Facility (DMPF) to be located in the tidal flats south of Laird Point as part of the Environmental Impact Statement (EIS) supplement being prepared for the Gladstone Liquefied Natural Gas (GLNG) Project.

Specifically URS undertook an additional acid sulfate soils (ASS) study to complement the preliminary work already undertaken (GeoCoastal 2008), in order to provide a more complete ASS assessment of the DMPF in conjunction with geotechnical investigations planned for the site. Additionally this investigation aims to establish baseline data for metals, nutrients and leachable metals within the DMPF for subsequent comparative assessment (if required).

Upon collection of the ASS data a review of the data pursuant to the geotechnical design of the DMPF was undertaken, to establish any data gaps and to provide recommendations for additional ASS investigations (if required) targeting any identified data gaps in the areas of planned disturbance.

A total of 22 test pits were excavated in August 2009. Test pit locations were selected to allow for geotechnical assessment to be undertaken with opportunistic ASS and environmental sampling.

Tidal Flats

The geological profiles encountered in the tidal flats generally comprised marine clays *(Holocene aged estuarine alluvial)* at depths from 0.0 to 3.5 mbgl (deepest point of test pitting). Marine clays varied from grey high plasticity clays through to brown low plasticity clays, with the surface lithology occasionally containing shell fragments.

The marine clay within the tidal flat contains moderate to very high levels of potential acidity with minimal actual acidity. As such the material is considered to comprise moderate to very high levels of PASS. No obvious trend in PASS presence with depth or spatial distribution was observed within the tidal flat. There is insufficient Acid Neutralising Capacity (ANC) to buffer the PASS naturally.

Disturbance of material from the tidal flat will require ASS management, which may comprise avoidance, minimisation, oxidation minimisation or neutralisation; however no disturbance other than filling is planned for the main tidal flat area (except the main embankment), which has been indentified as being PASS.

Surrounding Areas

The areas surrounding the tidal flat comprised residual material of low through to high plasticity clays (0.5 to 4.0 mbgl) underlying occasional silts (0.0 to 1.0 mbgl).

The area surrounding the tidal flat contains minimal potential acidity with occasional low level actual acidity. As such, the material is not considered to comprise PASS or AASS but does contain some low level actual (existing) acidity. No obvious trends in spatial distribution or vertical occurrence in actual (existing) acidity was noted. No ANC was noted in this material.

Filling activity is proposed for these areas. No excavation activities are planned.

DMPF Filling Activities

The DMPF will be filled with dredging spoils from Port Curtis as part of a capital dredging program and subsequent maintenance dredging. The filling activities associated with capital dredging works will

cover the tidal flats and the surrounding hills with an estimated 6.8 million cubic metres of spoil, to an estimated depth of between 15 m and 20 m, overlying the tidal flat.

The outcomes of this report have shown that whilst there is some minimal actual acidity present in the tidal flat, the material is not considered AASS.

The filling activities will not involve excavation or dewatering activities (except for the main embankment as outlined below) and as such the PASS identified in that area should not be exposed to oxidising conditions (except for the material excavated to construct the main embankment).

As such, URS considers there is adequate data available to address issues associated with ASS for the proposed filling activities associated with the DMPF.

Main Embankment Construction

The DMPF bund system comprises several bunds, dams and embankments; however only one of these involves excavation of material, namely the western-most main embankment along the tidal flat. The construction of this main embankment will involve excavation of marine clay in the tidal flats with some additional excavation extending off the tidal flat into the surrounding areas at each end, within the footprint of the embankment. The total dimensions of this embankment excavation are proposed to be 560 m long and between 70 m and 75 m wide. However, of the total dimensions, the proposed excavation specifically on the tidal flat (marine clay PASS) is estimated to be 440 m long, between 70 m and 75 m wide (giving a maximum area of tidal flat excavation of approximately 3.3 ha) and 4 m deep. The estimated *in situ* volume of marine clay PASS material within the tidal flat proposed for excavation as per the design calculations is 145,500 m^3.

At the time of report preparation, there were five investigation locations to a maximum depth of 3.5 mbgl within the footprint of the main embankment excavation (three by GeoCoastal to a depth of 1.0 mbgl).

As per the Queensland Acid Sulfate Soils Investigation Team's (QASSIT's) guidelines, additional locations would be required to a depth of 5 mbgl as this area has been shown to be a "hot spot" and will undergo intensive disturbance.

Main Embankment Construction - Potential ASS Management Options

Excavation activities associated with construction of the main embankment will require the adoption of specific ASS management measures, which may include a combination of avoidance, minimisation, oxidation minimisation and/or neutralisation. Further investigations will be undertaken after completion of detailed design (and prior to commencement of construction) to allow a detailed ASS management plan to be finalised and implemented.

Based on DMPF design details developed to date the following options are being considered:

Neutralisation

Application of lime to the estimated 145,500 m^3 of excavated marine clay PASS, material at the current assumed conservative liming rate for that material (in the absence of additional analytical data) of 253 kg $CaCO_3$/tonne excluding ANC, would potentially be economically and environmentally onerous. One such issue is the storage of thousands of tonnes of loose agricultural lime and the associated risk of highly alkaline leachate reaching Port Curtis.

Executive Summary

Oxidation Minimisation

Minimisation of oxidation of this material could potentially be achieved by capping with non PASS and/or non ASS material. This would require additional specific management considerations, including:

- The construction of an impermeable layer to prevent leachate infiltration into the underlying lithology and groundwater;
- The application of a basal layer of lime as per the SPP 2/02 calculation for basal lime rates with a 1.5 safety factor included to neutralise leachate at the base of the stockpile;
- Construction of sumps or leachate collection points (low points) and the associated treatment of leachate; and
- Staging construction to alternate between excavation activities, backfilling of the excavation with the desired material and capping of the excavated marine clay so as to prevent extended exposure of any excavated PASS material to oxidising conditions (atmosphere).

Recommendations

Based on the sampling and analyses completed to date, 145,500 m^3 (i*n situ*) of PASS are likely to be disturbed in the construction of the western embankment. A conservative lining rate of 253 kg $CaCO_3$/tonne has been derived. Given such a high rate poses unacceptable risks, more detailed sampling and analyses will be undertaken prior to construction, to refine the ASS management strategy further.

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Introduction

URS Australia Pty Ltd (URS) was commissioned by Santos Ltd (Santos) to undertake an Environmental Impact Statement (EIS) supplement for the proposed development of an LNG facility on the southern end of Curtis Island, including the Laird Point dredge material placement facility (DMPF).

The broad objectives of this investigation were to:

- Identify and characterise any Actual Acid Sulfate Soils (AASS) or Potential Acid Sulfate Soils (PASS) present in the tidal flats and adjoining areas at Laird Point; and
- Establish baseline data regarding major ions, nutrients and metals, and the ability of these metals to mobilise due to change in pH (metals are more soluble in acidic conditions).

The results of this investigation and the baseline conditions identified herein, along with the results of the ASS investigations conducted on the marine sediment material to be dredged, will be used to manage any acid sulfate soil risk identified, and allow for the development of any ASS management strategies or plans as part of the Dredge Management Plan (DMP) and/or Environmental Management Plan (EMP). Appendix F details the Acid Sulfate Soil studies completed to date, including methods of study, information collected and management plans.

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Scope and Objectives

2.1 Dredge Material Placement Facility Project Description

The proposed DMPF will cover an area of approximately 120 ha, and have a capacity of 10.1 million m^3 of consolidated dredged material. The DMPF will also provide some capacity for ongoing maintenance dredging.

External embankments will be constructed to a height of 22 m AHD (in four stages) which, combined with the natural contours of the land, will contain the dredge material. The dredge material will be pumped from the dredger combined with transport water, in the form of seawater, into the DMPF. The dredge material will be separated from the seawater through a series of settling ponds separated by internal bunds with adjustable weirs to allow the seawater to flow from one pond to the next. The dredged material will pass slowly through these structures, allowing the solid material (sand, silt etc) to settle out of the seawater. Following a period of controlled settlement and monitoring, the seawater will be discharged back into the marine environment.

The DMPF will be designed and managed to ensure that the quality of discharge water complies with the relevant environmental authority approval conditions. A more detailed description of the DMPF is included in Attachments G4 and G6.

2.2 Scope and Objective

A preliminary ASS assessment of the DMPF was conducted and submitted as part of the EIS by GeoCoastal Pty Ltd (Geocoastal) (refer to Appendix L4 of the GLNG EIS). That assessment comprised shallow depth sampling of the DMPF tidal flat (by hand auger to approximately 1 metre) and analyses of samples collected; sample locations were shown in Figure 1-2 of Appendix L4 of the EIS. At the time of this preliminary work (mid 2008) no design details were available for the proposed DMPF.

URS undertook this additional ASS study to complement the preliminary work already undertaken, and to provide a more complete ASS assessment of the DMPF. The work has been undertaken in locations guided by the concept design layout of the DMPF. As such, the samples are indicative of the materials expected to be encountered during final construction.

Accordingly the objective of this investigation was to establish the ASS condition on the tidal flat, in the general vicinity of the main embankment and the surrounding areas, to identify occurring lithologies and the ASS risks and possible management approaches associated with those lithologies.

URS developed a staged approach for this study comprising:

- Stage 1: ASS investigation and baseline data collection for nutrients, metals and leachable metals undertaken in conjunction with DMPF geotechnical investigations, for comparative assessment; and
- Stage 2: Review of the complete ASS data set for the DMPF pursuant to the geotechnical design, allowing for a data gap analysis and provision of recommendations for additional ASS investigations (if required following detailed foundation design and prior to construction) targeting any identified data gaps in the areas of planned disturbance.

The results of this investigation and the baseline conditions identified will assist in the assessment of appropriate proposed methods and locations for the disposal of dredge spoils. The results of this DMPF ASS investigation, along with the results of the ASS investigation conducted on the marine

2 Scope and Objectives

sediment material to be dredged and disposed of at the DMPF (EIS Appendix R3), will be used to subsequently develop management strategies to mitigate any identified acid sulfate soil risk.

The attached Figure 1 (included in Appendix A) shows the URS investigation locations, the GeoCoastal investigation locations and the proposed location of the DMPF western construction bund.

3

Background

3.1 Regional Geology

The proposed site is underlain by the Wandilla Formation, with structural deformation having produced steeply dipping and vertical foliations ("Geological Series 1:100,000 Map for Gladstone (Sheet 9150), Department of Mines (1998)"). The unit consists mainly of mudstone and arenite, with subordinate chert and minor limestone. The mudstone is characteristically dark grey and is commonly indurated. Interbedded with the mudstones are thick, massive beds of weakly foliated grey to greenish grey arenites, with minor greywackes and quartz arenites.

The tectonic activities are recognised in the mineralisation of the Wandilla Formation, which contains minor gold, silver, turquoise, and manganese mineralisation on the islands in Port Curtis and on the mainland around Gladstone.

The Laird Point site is underlain by coastal tidal flats, mangrove flats, supratidal flats and grasslands, which comprise mud, sandy mud, muddy sand, and minor gravel. The Holocene sediments comprising tidal flats and surficial alluvial material occur on the western margin of the site and colluvial deposits, comprising silt, sand, and gravel, overlie the Wandilla Formation units. The overburden is between 0.5 and 1.5 m thick on the high-lying ridges and 3 to 5 m thick on the flat areas. Thicker alluvium has been deposited along the drainages lines draining the island. Mud, sand, and gravel estuarine deposits flank the shores in many places. The lithology logged during drilling in the Wandilla Formation included mudstone, sand, gravel and weathered greywacke. The sediments within the alluvium and estuarine deposits comprise clay, sandy clay, sand and gravel.

3.2 Acid Sulfate Soils Background

ASS is a common name for naturally occurring clays, muds and sands rich in iron sulfides (pyrite). ASS typically occurs in coastal and estuarine sediments. When such sediments are exposed to the air by excavation, dredging, placement of fill or by lowering the local ground water table, the iron sulfides react with oxygen to form sulfuric acid according to the following overall reaction:

$$FeS_2 + \frac{15}{4} O_2 + \frac{7}{2} H_2O \text{ ---> } Fe(OH)_3 + 2\ SO_4^{2-} + 2\ H_2^{+}$$

The decrease in pH also causes iron, aluminum and other metals to become soluble. The flushing or leaching of disturbed ASS potentially enables mobilization of the dissolved metals and acidic leach waters. This can cause significant impact to the environment, engineered structures and human health in the receiving areas.

In their natural (usually anaerobic) environments, the iron sulfides in the soil are relatively stable. These stable ASS are called Potential Acid Sulfate Soils (PASS) because they have the potential to produce acidity when exposed to oxygen, but have not yet done so. PASS materials have a pH close to neutral (pH 6.5 – 7.5) when undisturbed. Disturbed PASS materials that have been subjected to oxidation are referred to as Actual Acid Sulfate Soils (AASS). AASS are acidic and have a pH of less than 4.

3.2.1 ASS Investigation Triggers

The *State Planning Policy 2/02 Guideline – Acid Sulfate Soils* (SPP 2/02), the *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland 1988* (Ahern *et al*. 1998) and the *Soil Management Guidelines – Queensland Acid Sulfate Soils Technical Manual* (Moore *et al*. 2002), outline the requirements for investigation, treatment and management of ASS. Additionally the *Acid*

3 Background

Sulfate Soils Laboratory Methods Guidelines (Ahern *et al*., 2004) outline the analytical methods for ASS laboratories, as well as having determinations for establishing neutralisation targets (where required).

The SPP2/02 outlines the criteria for the volume, elevation and type of soil disturbance, which trigger the requirements for ASS investigation, as follows:

Where surface elevation ≤5 m AHD:

- Filling ≥500 m^3 with average depth ≥0.5 m; and
- Excavations ≥100 m^3.

Where surface elevation >5 m AHD and <20 m AHD:

- If excavations include ≥100 m^3 of material from <5 m AHD.

3.2.2 Regional Acid Sulfate Soils

Acid Sulfate Soils (ASS) risk maps have been generated and published by the former Queensland Department of Natural Resources and Water (DNRW), now renamed the Department of Environment and Resource Management (DERM). At the time of this investigation, several previous ASS studies had been commissioned by DERM in the area around Gladstone (Tannum Sands and The Narrows) as well as numerous industry commissioned ASS surveys; however, no ASS Risk Map had been published for the Gladstone area by the DNRW.

Given the presence of Holocene tidal flats and muds (particularly in existing mangrove swamps or areas where mangrove swamps have been drained and reclaimed); there is a likelihood that “organic clays” may be either acidic or potentially acidic.

4

Previous Environmental Studies

4.1 GeoCoastal (2008) – Santos GLNG Dredge Area

Santos commissioned GeoCoastal to carry out a preliminary assessment of AASS on additional tidal flat areas that may be suitable for receiving dredge spoil, as a preliminary study to be used in conjunction with the subsequent URS marine sediment investigation, (URS 2008 Appendix R3 of the EIS).

The location of the GeoCoastal boreholes are shown in Figure 1 (Appendix A) and named as GC/GLNG (cores #70 to #84). GeoCoastal drilled 15 shallow (1 metre) boreholes at the tidal flat south of Laird Point.

The analytical parameters tested as part of the GeoCoastal investigation included 101 samples submitted for Acid Sulfate Soils indicative field tests (pH_{Field} and pH_{Fox}) and 31 samples submitted for Chromium Suite analysis. The analytical results from the GeoCoastal (2008) investigation have been incorporated into the URS DMPF ASS investigation, into the analytical results tables within this report (Appendix C).

Summary of Results

The upper sedimentary sequence immediately underlying the tidal flat cap is characterised by very highly organic (mangrove), very dark grey, very soft moist weakly cohered clayey silts. The Tidal flat cap comprises of a contiguous, thin (~ 20 cm) capping layer of light olive brown silt/clay and brown sandy silty/clay.

The report concluded that very high level PASS occurs throughout the top one metre of sediment within this mangrove fringed bay, with the majority of sites having AASS above the action limit of 0.03 % S (Sulphur). Six of the 15 locations sampled had actual ASS as Titratable Actual Acidity (TAA) at levels ≥ 0.1 %S. The depths of AASS varied but were present in many locations at 1mbgl.

All cores contained PASS at variable levels. Chromium reducible (S_{Cr}) values ranged to very high (5.22 %S) with lower amounts in some surface samples but overall Net Acidities ranged between 0.08 to 5.4 %S. ANC was variable and widely spread in the site ranging from 0.11 to 0.61 %S. These concentrations would classify the sediments as being low level actual ASS and very high level PASS (Net Acidity >1.5 %S) (GeoCoastal 2008).

5

Investigation Methodology

5.1 Fieldwork Programme and Personnel

URS supervised a field investigation at the DMPF undertaken between the 11th and 17th of August 2009. A total of 20 test pits for environmental sampling were excavated during this period using a sub contractor (Rayment Excavation). A 22.5 tonne Daewoo 225 LCV crawler excavator was used to undertake the excavation work.

5.2 Test Pit Location and Description

Test pits were located by URS to allow for ASS, geotechnical field investigations and design assessment work to be carried out concurrently. Additionally, sampling and analytical requirements were also guided by the results of previous preliminary marine sediment studies historically carried out in the tidal flats south of Laird Point (GeoCoastal, 2008).

The test pits were generally targeted to a depth of five metres below ground level (mbgl); however, this was not achieved in some test pits either due to maximum excavator reach or collapse of the test pit. The actual test pit identification and depth details are given in the following Table 5-1.

Table 5-1 Actual depths and locations of the test pits

Location of the Test pit	Name of the Test pit	Depth (mbgl)	Easting	Northing
Tidal Flats	TP_CPT-1	3	315189	7371662
	TP_ CPT-2	3.5	315068	7371603
	TP_ CPT-4	4	314868	7371761
	TP_ CPT-4b	4	315112	7371767
	TP_ CPT5	3	314932	7371873
	TP_ CTP5a	4.5	314786	7371863
	TP_ CTP6	3.2	314998	7371880
	TP_CTP11	Push tube samples	315358	7371818
	TP_ CTP12	5	315147	7371898
	TP_ CTP13	2.5	315382	7371816
Areas Surrounding the tidal flats	TP-2	5	315711	7371396
	New TP2	5	315148	7371596
	TP-3	5	315837	7371947
	TP-4	5	315975	7372145
	TP-5	5	315505	7372332
	TP-6	5	315017	7372444
	TP-8	5	315559	7372423
	TP-9	3.5	315018	7372445
	TP-10	4	315065	7372326
	TP-11	5	315239	7372255

5.3 Sampling Strategy

The proposed soil sampling strategy was as follows:

- Soil samples were collected as composites for each 0.5 m depth for the top 2 m; and

- From 2 mbgl to test pit termination (maximum soil depth) samples were collected every change of lithology or every one metre (whichever was the greater).

However, the confirmation of consistent soil classifications throughout the profile across the tidal flat, enabled a reduction in the sampling frequency for areas proposed for filling activities.

All samples were collected using fresh disposable nitrile gloves to prevent cross contamination.

Samples were collected in laboratory provided ASS sample bags for ASS analysis and Teflon lid glass jars for all other analytical parameters. Samples were stored in water tight eskies, chilled with ice and transported to the laboratory as soon as possible, weather and courier operations permitting.

Where sub-samples were taken for quality control purposes, selected composite samples were homogenised as much as practical, prior to splitting, to ensure representative split samples.

5.4 Sampling and Analysis

In total, 55 soil samples were taken at various depths at 20 different locations. This included one duplicate and one triplicate sample. All the soil samples collected were analysed for the following analytical suites as per the requirements of the QASSIT (2004):

- ASS: indicative field test (ph_{Field} and pH_{Fox}) and the full chromium suite analyses.

Of these 55 samples, 38 samples (including duplicate and triplicate samples) were also analysed to establish conditions for the following additional analytes:

- Nutrients: Total Nitrogen (TN), total Kjeldahl nitrogen (TKN), NO_X (nitrate and nitrite) and total phosphorus (TP);
- Anions and Cations: calcium, magnesium, sodium, potassium, chloride, sulfate and alkalinity;
- Metals/Trace Elements/ Metaloids: aluminium, antimony, arsenic, barium, beryllium, boron, cadmium, cobolt, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, titanium, tungsten, uranium, vanadium and zinc; and
- Deionised Water Leach Preparation. The leach water was then analysed for:
  - Leachable Metals/Trace Elements/ Metaloids including aluminium, antimony, arsenic, barium, beryllium, boron, cadmium, cobolt, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, titanium, tungsten, uranium, vanadium and zinc.

The primary samples, duplicate sample and the field quality sample were sent to Australian Laboratories Services Pty Ltd (ALS). The triplicate sample was sent to Labmark Laboratories, and was analysed for all the above except Total Alkalinity, Total Phosphorus, Total Nitrogen and some metals (titanium, tungsten and uranium).

Both analytical laboratories are NATA accredited for the requested analyses.

5.4.1 Field Quality Control

To check the sample variations and repeatability of methods used between laboratories, one set of duplicate and triplicate split sample was collected; “blind” labelled and submitted for analysis to two different laboratories. Relative Percentage Differences (RPDs) were calculated between primary, duplicate and triplicate samples. The application of the 50 % criteria has been assumed as per the requirements of AS4482.1-2005, to permit for data validation to be more broadly applicable.

The sample collection method involved test pitting and grab sampling from the excavator bucket using fresh disposable nitrile gloves for each sample. Material was sampled from the within the bucket which was observed to not have come into contact with the bucket itself. As such no sampling equipment which came into contact with the samples was re-used and accordingly no decontamination was required.

As no volatile organic compounds were being analysed, no trip blanks samples were analysed during this investigation.

5.5 Analytical Investigation Criteria

5.5.1 Acid Sulfate Soils

In Queensland, action criteria defined in SPP2/02 indicate when ASS disturbed at a site will need to be managed. Action criteria are based on the sum of actual (existing) plus potential acidity and are shown in Table 5-2. The action criteria are differentiated on the basis of soil textural characteristics depending on the scale of the project.

Given the scale of the proposed works and the texture within the marine sediments, the most conservative trigger value was assumed of 0.03 %S Equivalent Sulphur (existing + potential acidity).

Table 5-2 Action Criteria Based on ASS Analysis for Three Broad Texture Categories

Type of Material		Action Criteria if 1 to 1000 tonnes		Action Criteria if more than 1000 tonnes	
		Existing + Potential Acidity		Existing + Potential Acidity	
Texture Range	**Approximate clay content**	**Equivalent Sulphur**	**Equivalent Acidity (oven-dry basis)**	**Equivalent Sulphur (oven-dry**	**Equivalent Acidity (oven-dry basis)**
Coarse Texture Sands to loamy sand	≤5 (%)	0.03 (%S)	18 (mol H^+/tonne)	0.03 (%S)	18 (mol H^+/tonne)
Medium texture Sandy loams to light clays	5-40 (%)	0.06 (%S)	36 (mol H^+/tonne)	0.03 (%S)	18 (mol H^+/tonne)
Fine texture (Medium to heavy clays and silty clays)	≥40 (%)	0.1 (%S)	62 (mol H^+/tonne)	0.03 (%S)	18 (mol H^+/tonne)

Indicative ASS Testing

Field pH (pH_F) and oxidised field pH (pH_{FOX}) are indicative tests and involve the addition of water and hydrogen peroxide (to simulate full oxidation) respectively, to soil samples. These tests are used to indicate the likelihood of a soil becoming AASS or PASS, according to the following:

- pH_F value of less than four may indicate that AASS is present;
- pH_{FOX} value of less than three may indicate that PASS is present;
- pH_{FOX} values 1 pH unit below the associated pH_F value may indicate PASS, with larger reductions in pH_{FOX} generally providing a stronger indication of PASS; and
- A strong reaction to peroxide in the pH_{FOX} test in may also indicate PASS. The oxidation of organic matter may also result in strong reaction rates.

5 Investigation Methodology

5.5.2 Metals, Nutrients and Leachate

The scope of this investigation with regard to metals, nutrients and leachate was to establish baseline conditions, for subsequent comparative use and assessment against future monitoring data and with results from other investigations associated with the DMPF (i.e. groundwater).

As such, the adoption of guideline values for this data set is for reference purposes only.

Selection of relevant guidelines and the associated investigation levels (ILs) within those guidelines should consider the following:

- The nature and source of the material being tested;
- Potential sources of contamination and thus any specific chemicals of potential concern; and
- The end location or use of the material and therefore, the associated potential human or environmental receptors of any environmental impact.

Given that the selection of guidelines is for reference purposes, a broad range of guidelines were included for comparative purposes for both soil and leachate, as outlined below.

Soil

- Environmental Investigation Level (EILs) from the "QLD EPA Draft Guidelines for Assessment and Management of Contaminated Lands in Queensland 1998" (QEPA EILs);
- Health Investigation Levels (HILs) from Table 5-A of the National Environmental Protection Measure, 1999 (NEPM) from the National Environmental Protection Council (NEPC). The HIL exposure setting 'E' which applies to "Parks, recreational open space and playing fields" land use was selected (NEPM HILs);
- Health Investigation Levels (HILs) from Table 5-A of the National Environmental Protection Measure, 1999 (NEPM) from the National Environmental Protection Council (NEPC). The HIL exposure setting 'F' which applies to "commercial/industrial" land use was selected (NEPM HILs); and
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) - Volume 2 – Chapter 8 – Sediment Quality Guidelines. Comparison with both Low and High Trigger Values.

Leachate

- ANZECC 2000 Trigger Levels for Typical Slightly to Moderately Disturbed Freshwater Ecosystems, Chapter 3- Aquatic Ecosystems, ANZECC 2000;
- ANZECC 2000 Trigger Levels for Typical Slightly to Moderately Disturbed Marine water Ecosystems, Chapter 3- Aquatic Ecosystems, ANZECC 2000;
- Irrigation use - Long-term Trigger Value, Chapter 4- Primary Industries, ANZECC 2000;
- Irrigation use - Short-term Trigger Value, Chapter 4- Primary Industries, ANZECC 2000;
- Trigger values for sheep and beef cattle watering, Chapter 4- Primary Industries, ANZECC 2000; and
- Drinking water guideline values for physical and chemical characteristics, ADWG, 2004.

6

Geology and Lithology

The soil lithology observed across the tidal flats and the surrounding hills is described in the following sub-sections. Borehole drilling logs and a drilling summary have been included in Appendix B, it should be noted that these logs provide data for both the DMPF ASS study and geotechnical study undertaken by URS as part of the EIS supplement "*GLNG DMPF Geotechnical Assessment*". Accordingly, the logs include results for various geotechnical parameters; however, only the soil lithology and geology of the site is discussed in this report.

Lithological cross sections have been generated for two configurations; running south-east to north-west and south-west to north-east of the DMPF tidal flats. These cross sections A-A' and B-B' have also been included in Appendix B.

It was apparent that two main lithologies were intersected during this investigation, described as marine clay and residual material, which is consistent with the published geology for the area, as discussed in Section 3.1.

The geological profiles were generally uniform in thickness with apparent or distinct transitions in the tidal flats.

6.1 Tidal Flats

The observed lithologies within the DMPF tidal flat were marine clays, noted as being within the tidal flat alluvium and were the dominant lithology. The marine clays ranged from soft greyish to brownish-grey clays with high plasticity, to organic silty clays of low to medium plasticity with some sub angular gravel and occasional shell fragments.

As such the tidal flat is described as being marine clay to the maximum depths of 5 mbgl (maximum depth of test pit) in TPCPT12 which was in the central area of the tidal flat; shell and some gravel was noted in some locations from approximately 3.5 mbgl.

Residual material (Clays and silts) was noted at 2.5 mbgl in TP11. This was the only noted instance of material other than marine clay being intercepted in the tidal flat. The location of TP11 was in close proximity to the southern edge of the tidal flat, adjacent to the vegetated areas, where residual material was visible forming the hill on the southern side of the tidal flat. Elsewhere in the tidal flat the transition from marine clay to underlying residual material was not observed at the maximum depth of the test pits (5 mbgl). As such it was assumed that the transition was shallower towards the edges of the tidal flat.

6.2 Surrounding Area

Soils in the areas surrounding the tidal flats, which are described as being vegetated hills to the north, east and south of the tidal flat, were classified as residual clays and silts at various locations and depths.

The observed silt material included inorganic silts, silty or clayey fine sands, and clayey silts with slight plasticity, noted as being from light grey to reddish brown. Silt was observed only in the areas surrounding the tidal flats at depths no deeper than 1.0 mbgl.

The residual clay in the surrounding area was widely distributed throughout the area at depths ranging between 0.5 to 5.0 mbgl. These comprised greyish to reddish brown, inorganic, low to medium plastic clays along with some sub angular gravels, occasional yellowish grey to reddish brown stiff, high plasticity gravelly clays were noted.

7

Analytical Results and Discussion

7.1 Acid Sulfate Soils

The results of indicative field testing and chromium suite analyses from both the GeoCoastal and the URS investigation (a total of 156 samples submitted for indicative field testing and 86 samples submitted for the chromium suite) are provided as a combined table in Appendix C, Table 1.

ASS analytical results varied depending on the lithology. As noted in Section 5.5, the ASS action criteria are dependent on the soil texture (clay content); additionally, as identified in Section 6, different primary lithologies are apparent for the tidal area and the surrounding areas. The ASS analytical results obtained during the URS investigation have been discussed accordingly in the following sections.

GeoCoastal (2008) results are summarised in Section 4.

7.1.1 Tidal Flat Marine Clay

Indicative field ASS results (pH_F and pH_{FOX})

- The pH_{Field} results ranged from pH 5.6 to pH 8.6, indicating that samples collected from these locations are unlikely to contain existing or actual acidity.
- The pH_{Fox} values were equal to or less than pH 3 for 23 out of 30 samples tested and ranged from pH 2.9 to pH 1.1 indicative of residual or potential acidity in these samples. No apparent vertical or spatial trend was noted for the six samples with $pH_{Fox} \geq 3$, which is indicative of anomalous lithological characteristics in those samples, such as shell fragment.
- A general trend was noted between the reductions in pH from pH_F to pH_{Fox}.and the reaction rates. Samples with more vigorous reaction rates were noted as having greater pH reductions from pH_{Field} to pH_{Fox}. This is indicative of the presence of levels of sulphides related with potential acidity in samples with minimal existing acidity. The oxidation of organic matter may also result in strong reaction rates.

Actual / Existing Acidity

- pH potassium chloride (pH KCl) results indicated minimal actual acidity in the tidal flat marine clays. The pH KCl values ranged from pH 4.0 to pH 8.1.
- sulfidic - Titratable Actual Acidity (sTAA) results were noted as less than the LOR (<0.02 %S) for the majority of the samples analysed at the above locations.
- Ten samples out of 30 returned positive sTAA values from locations TP_CPT 1, TP_CPT2, TP_CPT5, TP_CPT5a and TP_CPT12 at depths varying from 0.0 to 2.5 mbgl; values ranged from 0.02 -0.16 %S, indicating presence of some minimal actual acidity at these locations. No apparent vertical or spatial trend was noted for these samples which is indicative of anomalous lithological characteristics in those samples, where some potential sulphidic acidity may have oxidised, or there may be some organic acidity present.

Retained Acidity

- Sample location TP_CPT5 at sample depths 0.5-1.0 mbgl and 1.0-1.5 mbgl returned pH KCl values less than 4.5, indicating potential presence of retained acidity.
  - These samples also returned HCl extractable sulphur S_{HCl} values of 0.59 and 0.63 %S respectively, potentially indicating the presence of insoluble sulfate compounds including

jarosite, along with adsorbed and soluble sulfate including gypsum. It should be noted no jarosite was observed; however, vegetation was noted from 0.0 to 3.0 mbgl.

- The KCl extractable sulphur (S_{KCl}) results for these samples were 0.64 and 0.68 %S respectively, potentially indicating that the actual acidity for this location may be due to presence of adsorbed and soluble sulfate including gypsum.
- The retained acidity as reported by the laboratory (S_{NAS}) was less than the LOR for both samples.

Potential Acidity (S_{Cr}):

- Of the 30 samples submitted for analyses, 26 returned S_{Cr} results above the LOR, in the range of 0.54 to 5.54 %S indicating moderate to very high presence of inorganic potential acidity in these samples.
- The positive potential acidity was found in marine clays at depths ranging from 0.0 -3.5 mbgl throughout the tidal flats area.
- Four samples, TP_CPT 4 0.0-1.0 mbgl, TP_CPT 4b 3.0-4.0 mbgl, TO_CPT 11 1.5 mbgl and TP_CPT 13 1.0 mbgl, did not return any potential acidity, however samples above and below these depths at the same locations returned S_{Cr} values above the LOR indicating potential acidity.

Excess Acid Neutralising Capacity (ANC):

ANC is indicative of buffering capacity inherent in soils; however the availability of ANC *in situ* can be overestimated during laboratory analysis. Under natural conditions shell fragments are usually coarse with minimal surface area. Under laboratory conditions shell fragments are ground, increasing the surface area/volume ratio for reaction (neutralisation). Additionally, large shell fragments may often be coated in reaction by-products such as gypsum, rendering the bulk of the $CaCO_3$ of the shell unavailable for neutralisation. ANC can also be present in the microscopic range (such as foraminiferal content) and provide larger reactive surface area ratios.

- Low to moderate amounts of ANC were noted in 11 samples, ranging in value from 0.05 %S to 0.48 %S. These samples were at depths from 0.0 to 4.0 mbgl with no obvious trend in either depth or location. Additionally samples above and below some of these noted ANC samples did no contain any ANC whilst the lithology remained the same. No consistent visual observation of shell fragments was noted in these samples. As such the noted ANC in considered anomalous and represents occasional lithological characteristics in those samples, where ANC is present, potential as small shell fragment or foraminiferal content.

Net acidity:

- Net Acidity is a derived value from the sum of actual, retained and potential acidity less any available natural buffering in the soil (ANC). As per Section 5.5 the action criteria for this investigation is 0.03 %S net acidity.
  - The net acidity for the tidal flat marine clays (excluding ANC) is in excess of 0.03 %S for all samples, with a range from 0.04 %S to 5.59 %S.
  - Inclusion of ANC in the calculations reduces the net acidity to less than the 0.03 %S for six samples. These samples are located at TP_CPT 1, 2, 4, 4b, 11 and 13 at depths ranging from 0.0-3.5 mbgl.

7 Analytical Results and Discussion

Tidal Flat Marine Clay ASS Summary and Liming Rates

The marine clay within the tidal flat contains moderate to very high levels of potential acidity with minimal actual acidity. As such the material is considered to comprise moderate to very high levels of PASS. No obvious trend in PASS presence with depth or spatial distribution was observed within the tidal flat. The ANC present in the soil is insufficient to buffer the PASS naturally.

Liming rate is a derived value calculated from the Net Acidity and can be calculated excluding or including ANC.

- The overall liming rate (excluding ANC) comprising of samples analysed within the tidal flat marine clay soils, ranged from 2 to 262 kg $CaCO_3$/tonne.
- The inclusion of ANC does not affect any significant reduction to the liming rate, with adjusted rates ranging from 2 to 261 kg $CaCO_3$/tonne; except for the six samples with net acidity was less than LOR as a result of ANC, where the liming rate is calculated as being <1 kg $CaCO_3$/tonne. However, these samples appear to be anomalous, and do not appear to represent bands of non acid material.

7.1.2 Surrounding Area Residual Clays and Silts

Indicative field ASS results (pH_F and pH_{FOX})

- The pH_{Field} results ranged from pH 4.9 to pH 7.7, indicating that samples collected from these locations are unlikely to contain existing or actual acidity.
- The pH_{Fox} values were equal to or less than pH 3, for 6 out of 25 samples tested and ranged from pH 2.3 to pH 2.9 indicating some minimal presence of potential acidity, at depths shallower than 1.0 mbgl, However no obvious spatial trend was observed of these locations (TP5, New TP2, TP6, TP10 and TP11.
- All other pH_{Fox} results were above pH 3, ranging from pH 3 to pH 5.5, indicating a minimal likelihood of potential acidity.
- Reaction rates were between 1 and 3 with stronger reactions noted for larger drops in pH between pH_{Field} and pH_{Fox} (the largest drop in pH was recorded as 3.5 for TP5 0.5m).

Actual Acidity

- The samples collected from this area returned pH KCl values ranging from pH 3.9 to pH 6.0, which indicates presence of some minimal actual acidity at these locations.
- These results were supported by sulfidic - Titratable Actual Acidity (sTAA) values, which returned values ranging from 0.02 to 0.14 %S for all the samples analysed in this area of the site.
- The maximum sTAA of 0.14 %S was from sample TP2 at 0.3 m. This material was noted as having some organic (vegetation) present which may result in organic acidity, potentially increasing the actual acidity results. As such the next highest result is 00.11 %S from sample TP8 at 3.5 m.
- Three samples had sTAA values less than LOR (<0.02 %S), located at TP4, TP5 and TP6 at depths of 3.5, 0.5 and 2.5 mbgl respectively. This indicates absence of any actual acidity at these locations and depths.

7 Analytical Results and Discussion

Retained Acidity

- KCl values less than pH 4.5 were noted in seven samples, TP2 at 0.3mbgl, TP3 at 1.5 and 3 mbgl, TP6 at 0.5 mbgl and TP8 at 0.3, 1.0 and 3.5 mbgl, indicating potential presence of retained acidity.
  - The HCl extractable sulphur (S_{HCl}) results were below the LOR except for TP2 at 0.3 mbgl (0.02 %S), TP8 at 1.0 mbgl (0.03 %S) and TP3 at 0.3 mbgl (0.02 %S)) which were approaching or at the LOR (0.02 %S).
  - The KCl extractable sulphur (S_{KCl}) results were less than the LOR (0.02 %S) for all seven samples, potentially indicating a lack of adsorbed and soluble sulfate including gypsum.
  - The retained acidity as reported by the laboratory (S_{NAS}) was less than the LOR for all samples except TP8 at 0.3 and 1.0 mbgl with S_{Nas} of 0.02 and 0.03 %S respectively.
  - Accordingly the retained acidity in these samples (and the area surrounding the tidal flat) is considered negligible.

Potential Acidity (S_{Cr})

- S_{Cr} was less than LOR (0.02 %S) for all the samples from the test pits located in the area surrounding the tidal flat except for the following which returned samples at or 0.01 %S above the LOR: TP9 0.3 mbgl (0.02 %S), TP10 0.3 mbgl (0.03 %S) and TP10 2.5 mbgl (0.02 %S). This indicates an absence of potential acidity in these locations.

Excess Acid Neutralising Capacity (ANC)

- ANC was not recorded in any of samples from the test pits situated in the areas surrounding the tidal flats. This may be as a result of lack of marine inundation over this material and an associated lack of shell fragment.

Net acidity

- The net acidity for the areas surrounding the tidal flat (excluding ANC) is in excess of the action criteria 0.03 %S for all 25 samples, with a range from 0.04 %S to 0.19 %S.
- Inclusion of ANC in the calculations reduces the net acidity to less than the 0.03 %S for six samples from four locations, TP4 2.5 and 3.5 mbgl, TP5 0.5 and 3.0 mbgl, TP6 2.5 mbgl and Net_TP2 3.5 mbgl.

Surrounding Area Clay and Silt ASS Summary and Liming Rates

The area surrounding the tidal flat contains minimal potential acidity with occasional low level actual acidity. As such, the material is not considered to comprise PASS but does contain some low level actual (existing) acidity.

No obvious trends in spatial distribution or vertical occurrence in actual (existing) acidity was noted. No ANC was noted in this material.

- The overall liming rate comprising the residual material of all samples analysed within the material surrounding the tidal flat residual clayey soils, ranged from 1 to 8 kg $CaCO_3$/tonne.
- Excluding the sample from TP2 at 0.3 m which contained organic material the overall liming rate ranges from 1 to 5 kg $CaCO_3$/tonne.

7.2 Metals

A total of 36 primary samples from 14 locations situated in the tidal flats and the areas around the tidal flats were analysed for metals. A summary of analytical results is given in Appendix C, Table 2.

- Aluminium and iron were noted in both the tidal material and the surrounding area ranging from 3,410 mg/kg to 16,800 mg/kg for aluminium and 2,760 mg/kg to 59,600 mg/kg for iron. Screening levels and ILs (investigation levels) have not been established for aluminium or iron under the reference guidelines. It is considered these concentrations are naturally occurring.
- Antimony, beryllium, cadmium, mercury, selenium and tungsten returned results approaching or below the respective LOR for all samples from both the tidal flats and the surrounding areas.
- Arsenic was detected in most samples analysed and exceeded the QEPA EILS screening level of 20 mg/kg in six samples, which were located in the tidal flat area; TP_CPT1 0.0-1.5 mbgl (24 mg/kg), TP_CPT2 1.0-2.0 mbgl (26 mg/kg), TP_CPT2 3.0-3.5 mbgl (27 mg/kg), TP_CPT4 1.0-2.0 mbgl (24 mg/kg), New TP2 1.5 mbgl (26 mg/kg) and TP8 0.3 mbgl (28 mg/kg).
- Barium was detected in the range of 10 mg/kg to 580 mg/kg; no ILs have been established for barium under the reference guidelines. It was noted that in general higher concentrations were recorded for test pits located outside the tidal flats. Barium, titanium, uranium, and vanadium, were detected at varying concentrations in both the tidal flat and surrounding area; however, no ILs have been established under the reference guidelines.
- Boron, cobalt, lead, nickel, zinc were detected at varying concentrations in both the tidal flat and the surrounding area. No ILs was exceeded for any of these metals.
- Chromium exceeded QEPA EIL (50 mg/kg) screening level in one sample located at TP_CPT2 at 3.0-3.5 mbgl (54 mg/kg) and was detected at concentrations from 4 to 32 mg/kg in all other samples except TP8 1.0 mbgl (<0.02 mg/kg).
- Copper was detected in all samples with concentrations generally observed as being higher in samples collected from the tidal flats. Sample NEW_TP2 at 3.0-3.5 mbgl (141 mg/kg) exceeded QEPA EILs screening level (60 mg/kg). All other concentrations ranged from 7 to 37 mg/kg.
- Manganese was also noted to generally be present in higher concentrations within the tidal flat than the surrounding areas. This is in agreement with the findings for manganese in the URS Marine Sediment Report (URS 2008 Appendix R3 of the EIS), which concluded high levels of manganese detected in the marine sediment were naturally occurring. Values exceeding the QEPA EIL (500 mg/kg) were noted in three samples, TP_CPT4 0.0-1.0mbgl (661 mg/kg), CPT11 at 1.5mbgl (1,360 mg/kg) and TP3 0.3 mbgl (1,690 mg/kg); all other values ranged from 5 to 396 mg/kg except fro samples TP8 0.3 mbgl, TP8 1.0 mbgl and NEW_TP2 3.5mbgl in which manganese was not detected.

It is likely that the presence of metals is naturally occurring; given that metals were consistently present within both the residual material (from the surrounding area) and the overlying marine clay (in the tidal area) with little spatial trend. Additionally the presence of metals did not appear to decrease with depth as would be expected if the source were from previous surface activities in the area.

High metals concentrations were also reported in EIS studies for Curtis Island (LNG facility onshore study area) soils and groundwater. These results have been discussed in those respective individual reports and summarised in the relevant EIS chapters (Section 8.3 and Section 8.6 of the EIS).

Exceedances were only apparent when compared against the QEPA EILs, which have been included as a reference guideline only. All other reference guidelines were not exceeded. Metals were

generally noted at higher concentrations in the marine clay material of the tidal flat; however, given the consistent lithology through the soil profile within the tidal flat, no immediate trend was noted with metals concentrations with depth.

7.3 Nutrients and Major Ions

Samples from the tidal flats and the surrounding area were analysed for a range of nutrients and for major cations and anions. The analytical results are provided in Appendix C, Table 2 and are discussed below:

- Nitrate and nitrite were recorded in all the samples except one location at CPT11 1.5 mbgl. The range of nitrate/nitrite (NO_X) varied from 0.1 to 162 mg/kg, with the maximum concentration was recorded for a sample classified as silty CLAY from NEW_TP2 3.5 mbgl.
- TKN was recorded in all the samples analysed ranging from 110 to 4,730 mg/kg. The maximum concentration of TKN was noted for a tidal flat marine clay sample TP_CPT5 0.0-0.5mbgl. In general, the tidal flat marine clays contained higher concentrations of TKN than the residual clay materials comprising the surrounding areas. This is likely due to an increased organic content within the surface sediment on the tidal flats.
- TN and TP were also recorded for all samples analysed in the range of 110 to 4,730 mg/kg and 58 to 680 mg/kg respectively. The sample collected from TP_CPT5 0.0-0.5 mbgl recorded the maximum concentrations for both TN and TP. TN was present in higher concentrations within the tidal flat material than the surrounding areas; however, this trend was not as apparent for TP.
- Bicarbonate alkalinity was <LOR for all samples at all locations TP_CPT 4 at 0.0-1.0, 1.0-2.0 and 2.0-3.0 mbgl and TP_CPT 4b at 1.0-2.0 mbgl. It should be noted that surrounding locations did not record any alkalinity and no description of shell fragments was made during test pitting at these locations.
- Total alkalinity as calcium carbonate ($CaCO_3$) was recorded in all the samples ranging from 22 mg/kg to 3,350 mg/kg. A strong trend was noted with higher values being detected in the tidal flats than the surrounding areas.
- All ions, chloride, sulfate, calcium, magnesium, potassium and sodium showed a very strong trend of higher concentrations in the tidal flat marine clay than the surrounding areas, with calcium, magnesium and potassium below the limit of detention in most of the samples taken in the surrounding are (off of the tidal flat). The maximum concentrations of all ions were as follows:
  - Chloride 73,400 mg/kg TP_CPT5 0.5-1.0 mbgl;
  - Sulfate 8,200 mg/kg TP CPT11 0.5 mbgl;
  - Calcium 500 mg/kg TP_CPT5 0.5-1.0 mbgl;
  - Magnesium 3,800 mg/kg TP_CPT11 0.5 mbgl;
  - Potassium 1,840 mg/kg TP_CPT11 0.5 mbgl; and
  - Sodium 34,200 mg/kg TP_CPT11 0.5mbgl.

7.4 Leachable Metals

Selected soil samples from the DMPF tidal flats and from the area surrounding the tidal flat were leached with deionised water to give an indicative assessment of the potential for metals to leach out and enter ground water. The dredge spoil will be placed as a saturated material with water potentially infiltrating the tidal flats and the surrounding area.

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A total of 38 samples (including a set of duplicate and triplicate samples) were extracted with deionised water and the filtrate was analysed for a complete suite of 21 metals. The analytical data for these tests is provided in Appendix C, Table 3.

The data was compared against a broad range of referenced guidelines as discussed in Section 5.5. These are reference guidelines only and highlighted values refer to the most conservative guideline for a parameter where there is more than one guideline value exceeded. Also it is noted that ANZECC 2000 Fresh-water (95 %) and ADWG (2004) guidelines had values for certain metals less than the laboratory LOR.

For all the samples analysed, the final pH of the extracted leach filtrate solution ranged from pH 2.1 to pH 8.4. Out of the 38 samples, 22 samples returned a final pH <5 and 16 samples returned a final pH >5. Concentration of metals were detected in the leachate samples with final pH of <5.0 at higher concentrations than those samples where the finishing pH was >5, indicative of metals increasing solubility with an increase in acidity.

The analytical results for leachable metals as compared to the guidelines for reference purposes are summarised as:

- Of 38 samples, 18 samples returned with positive detections for aluminium in the range from 0.15 to 10.9 mg/L and all these samples exceeded the ANZECC 2000 Fresh water 95 % criteria of 0.055 mg/L;
- Arsenic was only detected in three samples at TP_CPT5 and 5a at 2.0-3.0, 1-2 and 3-3.5 mbgl respectively and all these values exceed the ADWG guideline value of 0.007 mg/L;
- Barium was detected in all the samples in the range from 0.1 - 2.6 mg/L. Of 38 samples, 10 samples exceeded the ADWG guideline criteria of 0.7 mg/L;
- Boron was reported ranging from 0.1 to 3.0 mg/L and exceeded the ANZECC 2000 Fresh water 95 % (0.37 mg/L) in 21 samples collected from both the tidal flat and the surrounding area;
- Chromium was detected in five samples ranging from 0.01 to 0.03 mg/L and exceeded the ANZECC Marine waters (95 %) criteria of 0.0044 mg/L;
- Cobalt was only detected in three samples at TP_CPT1, TP_CPT5 and TP_CPT6 at 0-1.5, 0-0.5 and 1.0-3.0 mbgl and all these values exceeded the ANZECC Marine waters (95 %) criteria of 0.001 mg/L;
- Copper exceeded the ANZECC 2000 Marine water (95 %) criteria of in 11 samples and was detected in the range from 0.01 – 0.16 mg/L;
- 23 samples returned positive detections for Iron ranging from 0.05 – 22.3 mg/L; and of these 12 samples exceeded the ANZECC 2000 Irrigation LTU guideline criteria value of 0.2 mg/L;
- Lead was reported ranging from 0.01 to 0.02 mg/L and exceeded the ANZECC 2000 Fresh water (95 %) criteria of 0.0034 for four samples;
- Manganese was reported above the ANZECC 2000 Irrigation LTU guidelines value of 0.2 mg/L in only three samples at TP_CPT11, TP_CPT13 and TP3 at 1.5, 1.0 and 0.3 mbgl respectively;
- Nickel was detected in seven samples ranging from 0.01 – 0.11 mg/L and exceeded the ANZECC 2000 Fresh water (95 %) guidelines criteria of 0.011 mg/L;
- Selenium exceeded the Australian Drinking water guideline (ADWG) value of 0.01 mg/L at the test pit location TP9 (0.02 mg/L) at a depth of 0.3 mbgl;
- Vanadium was detected in the range from 0.02 to 0.17 mg/L in 20 samples and of these, eight samples exceeded the ANZECC marine waters (95 %) value of 0.1 mg/L; and

7 Analytical Results and Discussion

- Zinc exceeded the ANZECC 2000 Fresh waters 95 % (0.008 mg/L) criteria in 35 samples and returned concentrations in the range of 0.01 - 4.26 mg/L.

The Metals which were less than LOR for all the samples analysed include Beryllium, Cadmium, Mercury and Tungsten. This data correlates with the availability of these metals in the soil samples (Appendix C Table 2), as these metals were not recorded in the soil samples as well.

Other metals which were detected in these samples but did not exceed any of the selected ILs include Titanium and Uranium. It should be noted that screening levels and ILs have not been established for Titanium and Tungsten under the guidelines adopted for this investigation.

These results should be compared with the baseline groundwater metal concentrations provided as part of the results of the "*Dredge Management Placement Facility – Hydrogeological Study*" undertaken as a specific EIS Supplement study. A comparison of these two data sets would provide an indicative assessment of what the background naturally occurring metals concentration is in groundwater beneath the northern part of Curtis Island and what metals concentrations may enter that groundwater from potential leaching of the materials beneath the DMPF (tidal flat and surrounding areas) once saturated soils are placed as overlying material.

8

Data Validation

8.1.1 Relative Percentage Difference

The Relative Percent Difference (RPD) is a calculation of the percentage difference between sets of primary, duplicate and triplicate samples. The sample ID CPT5_5-2.0-3m from test pit TP_CPT5 at a depth of 2.0-3.0 m was split in the field, each sample homogenised, and sent to the testing laboratory with blind labelling (i.e. no indication that these are duplicate or triplicate samples) for testing.

The RPD was calculated as follows:

$$RPD = \frac{|Co - Cs|}{(Co + Cs)/2} \times 100$$

Where: Co = concentration of original sample

Cs = concentration of duplicate sample

Australian Standard AS4482.1-2005 indicates that RPDs less than 50 % are acceptable for quality assurance purposes but higher variations (and hence RPDs) can be expected for organic analyses and for low concentrations of analytes, although acceptable RPD limits have not been specified for these instances. As such, the following criteria have been applied:

- Pass: RPD <50 %;
- Pass 1: RPD >50 % and the highest analyte concentration in the sample set is between 5xLOR and 10xLOR; and
- Fail: RPD >50 % and one or both of the analyte concentrations in the sample set exceed 10xLOR.

RPD calculations are presented in Appendix E. It is noted that RPD s were not calculated for sample pairs where results for both samples were less than laboratory limit of reporting (LOR).

Out of 70 RPD values calculated, there were four RPD failures which include two primary/triplicate sets and two duplicate/triplicate pair analyses. These results highlight sample heterogeneity and analyte concentration variability within the soil matrix. Additionally, split sampling for duplicate and triplicate QA/QC requires homogenising composite samples to obtain adequate volumes for splitting.

Fully homogenising composite samples may not be possible where:

- The material is not malleable, soft or loose;
- The lithology is of varying types within the intended composite sample; and
- When analysis is for volatile compounds and any excess handling or aeration may volatilise target compounds, resulting in inaccurate analytical results.

As such, the overall results of the RPD calculations between primary, duplicate and triplicate samples indicate that the analytical data is suitable for interpretive use.

8.1.2 Laboratory Quality Control

Laboratory quality assurance procedures included analysis of matrix spike/matrix spike duplicate (MS/MSD) results, surrogates spike results, laboratory blanks, laboratory control samples and laboratory duplicates. A summary of the assessment of the laboratory quality control performance is provided in the Laboratory Quality Control reports in Appendix D.

Overall the analytical results are considered suitable to enable valid assessment of the site. Anomalies identified are discussed below:

8 Data Validation

- Select laboratory duplicate RPDs, Laboratory Control spike and Matrix spike recoveries were outside quality control limits due to matrix interference and sample heterogeneity. As other laboratory control samples (e.g., method blanks, duplicates) were within QC limits the data are considered acceptable.
- Select samples have analysis holding time non compliance for some analytes including pH(field/fox), Actual Acidity, Potential Acidity, Retained Acidity, Acid Neutralising Capacity, Acid base accounting (all included in the Chromium suite for ASS testing), Moisture Content, Alkalinity and Soluble major anions and cations. As the samples were stored in eskies with ice following collection close to freezing temperatures, were properly stored for transport and promptly submitted to the laboratory, the data are not considered to be adversely affected.

9

Conclusions, Data Gaps and Recommendations

9.1 Geology and Lithology

Two main geological profiles were intersected during this investigation, which is comparable to the published geology for the area, as per the "Geological Series 1:100,000 Map for Gladstone (Sheet 9150), Department of Mines (1998)".

The geological profiles encountered in the tidal flats generally comprised marine clays *(Holocene aged estuarine alluvial)* at depths from 0.0 to 3.5 mbgl (deepest point of test pitting). The marine clays varied from grey high plasticity clays through to brown low plasticity clays, with the surface lithology occasional containing shell fragments.

The surrounding areas around the tidal flat comprised residual material of low through to high plasticity clays (0.5-4.0 mbgl) underlying occasional silts (0.0-1 mbgl).

9.2 Acid Sulfate Soils

Additional conclusions relating to the ASS issues pursuant to the specific scope of DMPF construction and operation are presented in Section 9.6.

Tidal Flat

Preliminary ASS investigations carried out by GeoCoastal (2008) in the tidal flat area had previously identified the area of tidal flats south of Laird Point as being a PASS risk. The report concluded that very high level PASS occurs throughout the top one metre of sediment within this mangrove fringed bay, with the majority of sites having AASS above the action limit of 0.03 %S (GeoCoastal, 2008). The GeoCoastal findings are in general agreement with the findings of this investigation. The marine clay within the tidal flat contains moderate to very high levels of potential acidity with minimal actual acidity. As such the material is considered to comprise moderate to very high levels of PASS.

No obvious trend in PASS presence with depth or spatial distribution was observed within the tidal flat. There is insufficient ANC to buffer the PASS naturally.

Disturbance of material from the tidal flat will require ASS management, which may comprise several methods of avoidance, minimisation, oxidation minimisation or neutralisation; however no disturbance other than filling is planned for the main tidal flat area.

Surrounding Areas

The area surrounding the tidal flat contains minimal potential acidity with occasional low level actual acidity. As such, the material is not considered to comprise PASS or AASS but does contain some low level actual (existing) acidity.

No obvious trends in spatial distribution or vertical occurrence in actual (existing) acidity was noted. No ANC was noted in this material.

URS understands that filling activity is proposed for these areas, however, no excavation activities are planned.

Neutralisation requirements have been determined in the range of 1 to 5 kg $CaCO_3$/tonne, some samples (in similarly described material) returned liming rates <1 kg $CaCO_3$/tonne; however, this is potentially a result of the conclusion that no consistent AASS was detected in these areas, and the

and actual acidity was found at occasional low levels and were unlikely to be the result of oxidised PASS (which was not detected in any of these areas).

9.3 Metals

Reference guideline exceedances for arsenic, barium, chromium, copper and manganese were recorded. Metals concentrations were generally higher in the tidal flat marine clay than the surrounding residual material.

It is the opinion of URS that the presence of these metals is naturally occurring. It is noted that high metals concentrations were also reported in the EIS study "LNG facility onshore study area" for soils and groundwater. These results have been discussed in those respective reports and summarised in the relevant EIS chapter.

9.4 Nutrients and Ions

TN was present in higher concentrations within the tidal flat material than the surrounding areas; however, this trend was not as apparent for TP. In general, the tidal flat marine clays also contained higher concentrations of TKN than the residual clay materials comprising the surrounding areas. This is likely due to an increased organic content within the surface sediment on the tidal flats.

All ions, chloride, sulfate, calcium, magnesium, potassium and sodium showed a very strong trend of higher concentrations in the tidal flat marine clay than the surrounding areas, with calcium, magnesium and potassium below the limit of detention in most of the samples taken in the surrounding area (off of the tidal flat).

Total alkalinity as calcium carbonate ($CaCO_3$) was generally noted at higher concentrations in the tidal flats than the surrounding areas.

9.5 Leachable Metals

Leachable metals were reported in all locations at all depths with results generally relating to the trends in the metals content of the material leached.

Selected metals concentrations in the leachate increased substantially when the final pH of filtrate solution was less than pH 5.0, indicating increased metals solubility in acidic conditions. Such changes in pH can occur when PASS is disturbed and generates acid through sulphide oxidation.

9.6 DMPF Project Specific ASS Conclusions

Santos is proposing for the DMPF to be filled with dredge material from Port Curtis. The filling activities will cover the tidal flats and the surrounding hills with an estimated 8-10 million m^3 of dredge spoil to an estimated depth of between 15 m and 20 m, overlying the tidal flat. This requires an assessment of existing ASS on the proposed DMPF site.

The outputs of investigation undertaken and presented in this report have shown that whilst there is some minimal actual acidity present in the tidal flat the material is not considered AASS.

It is understood that the filling activities will not involve excavation or residual material dewatering activities (except for the western-most bund) and as such the PASS identified in that area should not come into contact with oxidising conditions (except for the material excavated to construct the bund).

9 Conclusions, Data Gaps and Recommendations

Much of the surrounding area around the tidal flat which will also be filled is above 5mAHD; however as a conservative measure, this ASS investigation undertook sampling in the surrounding areas which indicated that whilst there was some minimal actual acidity the material is not considered AASS or PASS.

9.6.1 Embankment Design

The DMPF bund system comprises several bunds, dams and embankments; however only one of these involves excavation of material, namely the western most main embankment along the coast of the tidal flat.

The construction of this main embankment, the location of which is shown in Figure 1 (Appendix A), will involve excavation of marine clay in the tidal flats with some additional excavation extending off the tidal flat into the surrounding areas at each end, within the footprint of the embankment.

The total dimensions of this embankment excavation are proposed to be 560 m long and between 70 m and 75 m wide. However, of the total dimensions, the proposed excavation specifically on the tidal flat (marine clay PASS) is estimated to be 440m long, between 70 m and 75 m wide (giving a maximum area of tidal flat excavation of approximately 3.3 ha) and 4 m deep. The estimated *in situ* volume of marine clay PASS material within the tidal flat proposed for excavation as per the design calculations is 145,500 m^3.

9.6.2 Data Gap Analysis

Guideline Sampling Requirements

According to SPP 2/02 and related QASSIT guidelines:

- The sampling intensity for areas greater than four hectares is two boreholes/locations per hectare;
- The recommended depth of the borehole/test pits is one metre below the depth of the proposed disturbance; and
- Additional samples may be required in areas of more intensive disturbance or in potential “hot spots”. In this areas grid sampling may be required (50-75m grid); however reduced sampling frequencies can be justified in lower risk areas with demonstrated confirmatory sampling.

Where the elevation is ≥5 m AHD and the proposed activity is filling, the SPP 2/02 does not require an investigation. As shown in Figure 1, Appendix A (note the 5 m AHD contour) the majority of the surrounding area proposed for filling is above 5 m AHD.

Filling Activities

With regard to the proposed filling activities associated with the DMPF, URS considers the data available demonstrates the following:

- Consistency of lithology within tidal flats to a depth of 3.5 m;
- The presence of occasional low level actual acidity but the absence of confirmed AASS within the tidal flat and the presence of consistent high levels of PASS within the tidal flat;
- Moderate consistency of lithology in the surrounding hill areas to a depth of 5 m; and
- The presence of some occasional low level actual acidity but the absence of confirmed AASS within the surrounding hill areas.

As such URS considers there is adequate data available to address issues associated with ASS for the proposed filling activities associated with the DMPF.

Main Embankment Construction

At the time of report preparation, there were five investigation locations to a maximum depth of 3.5 mbgl within the footprint of the embankment excavation. Of these locations three were undertaken by GeoCoastal to a depth of 1.0 mbgl.

As per Section 9.2, additional locations would be required to a depth of 5 mbgl as this area has been shown to be a “hot spot” and will undergo intensive disturbance.

9.6.3 Main Embankment Construction Potential ASS Management Options

Disturbance of material from the tidal flat being excavated for the main embankment will require ASS management, which may include a combination of avoidance, minimisation, oxidation minimisation and/or neutralisation.

The manual application of lime to the 145,500 m^3 of excavated tidal flat marine clay PASS from the main embankment, at the current assumed conservative liming rate for that material (in the absence of additional analytical data) of 253 kg $CaCO_3$/tonne excluding ANC, would potentially be economically and environmentally onerous and would create additional environmental issues. One such issue is the storage of thousands of tonnes of loose agricultural lime and the associated risk of highly alkaline leachate reaching Port Curtis.

Another option for management of the tidal flat marine clay PASS excavated as part of the main embankment is the minimisation of oxidation of this material by capping with non PASS non ASS material. This would require additional specific management considerations, including:

- The construction of an impermeable layer to prevent leachate infiltration into the underlying lithology and groundwater;
- The application of a basal layer of lime as per the SPP 2/02 calculation for basal lime rates with a 1.5 safety factor to neutralise leachate at the base of the stockpile;
- Construction of sumps or leachate collection points (low points) and the associated treatment of leachate; and
- Staging construction to alternate between excavation, backfilling of the excavation with the desired material and capping of the excavated marine clay so as to prevent extended exposure of any excavated PASS or PASS in the excavation walls to oxidising conditions (atmosphere).

9.6.4 Recommendations

Based on the sampling and analyses completed to date, 145,500 m^3 (i*n situ*) of PASS are likely to be disturbed in the construction of the western embankment. A conservative lining rate of 253 kg $CaCO_3$/tonne has been derived. Given such a high rate poses unacceptable risks, more detailed sampling and analyses will be undertaken prior to construction, to refine the ASS management strategy further.

References

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Imray, P, Moore, MR, Callan, PW & Lock, W (1998). Aluminium. Report of an International Meeting, 20-21 April 1995, Brisbane, National Environmental Health Forum Monographs Metal Series No. 1

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11

Limitations

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in Section 2 of this report and as per the GLNG EIS Supplement Proposal, dated 15th July 2009.

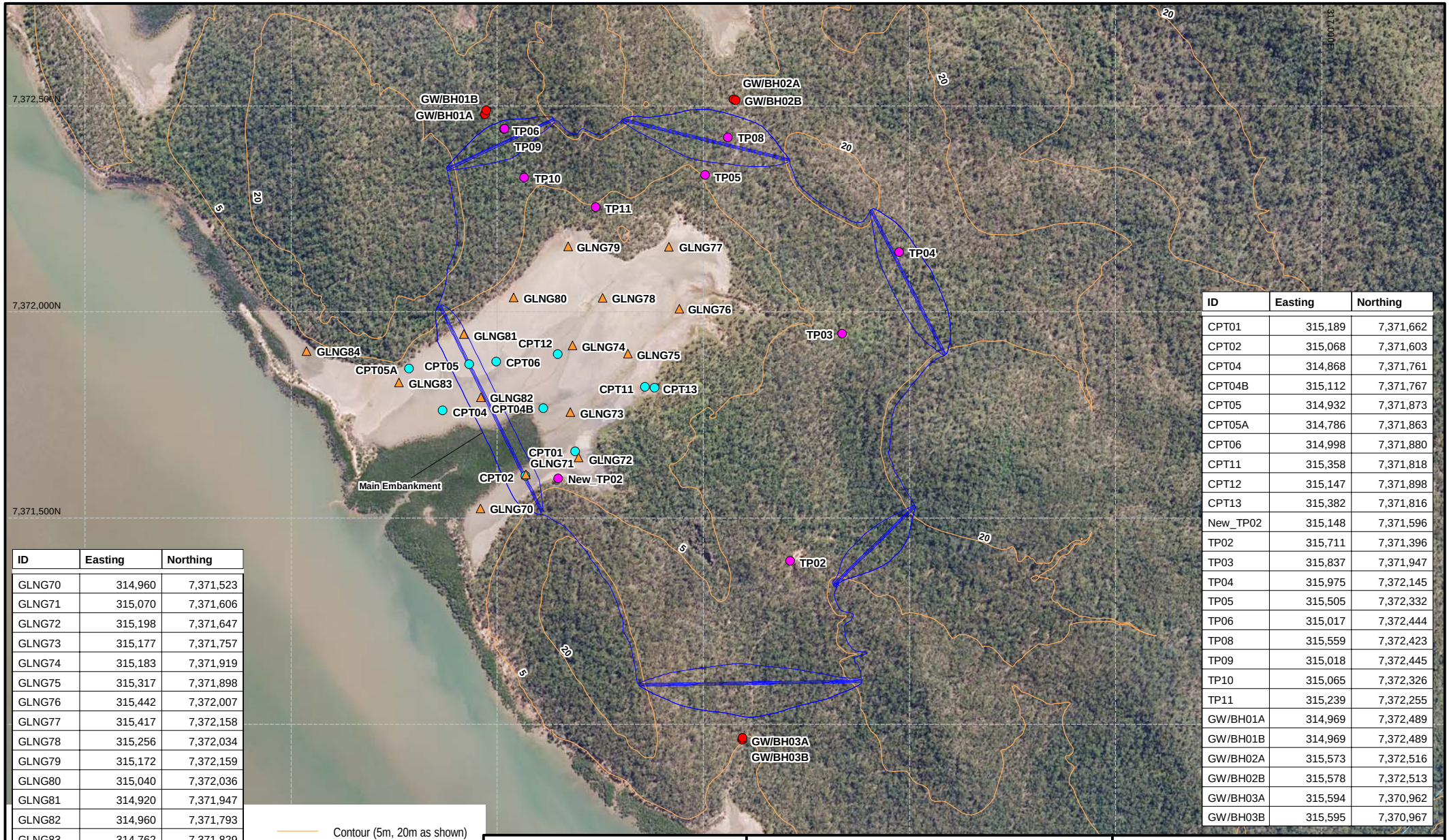
The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

This report was prepared between 11th August 2009 and 19th October 2009 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

A

Appendix A Figure



ID	Easting	Northing
GLNG70	314,960	7,371,523
GLNG71	315,070	7,371,606
GLNG72	315,198	7,371,647
GLNG73	315,177	7,371,757
GLNG74	315,183	7,371,919
GLNG75	315,317	7,371,898
GLNG76	315,442	7,372,007
GLNG77	315,417	7,372,158
GLNG78	315,256	7,372,034
GLNG79	315,172	7,372,159
GLNG80	315,040	7,372,036
GLNG81	314,920	7,371,947
GLNG82	314,960	7,371,793
GLNG83	314,762	7,371,829
GLNG84	314,538	7,371,905

ID	Easting	Northing
CPT01	315,189	7,371,662
CPT02	315,068	7,371,603
CPT04	314,868	7,371,761
CPT04B	315,112	7,371,767
CPT05	314,932	7,371,873
CPT05A	314,786	7,371,863
CPT06	314,998	7,371,880
CPT11	315,358	7,371,818
CPT12	315,147	7,371,898
CPT13	315,382	7,371,816
New_TP02	315,148	7,371,596
TP02	315,711	7,371,396
TP03	315,837	7,371,947
TP04	315,975	7,372,145
TP05	315,505	7,372,332
TP06	315,017	7,372,444
TP08	315,559	7,372,423
TP09	315,018	7,372,445
TP10	315,065	7,372,326
TP11	315,239	7,372,255
GW/BH01A	314,969	7,372,489
GW/BH01B	314,969	7,372,489
GW/BH02A	315,573	7,372,516
GW/BH02B	315,578	7,372,513
GW/BH03A	315,594	7,370,962
GW/BH03B	315,595	7,370,967

N
W E
S

0 200 400m

Scale: 1:12,500 (A3)
Projection: MGA Zone 56 (GDA94)

Contour (5m, 20m as shown)
CPT/Sample Test Pit
Test Pit
Groundwater Monitoring Bore
Geocoastal Core Location

Source: Client Supplied Data; Post Corrected GPS Field Recorded Data.

Client

LNG

URS

Project
GLNG SUPPLEMENTARY EIS -
DMPF ACID SULPHATE INVESTIGATION

Title
DMPF ASS
FIELD INVESTIGATION LOCATIONS

Drawn: RG	Approved: JB	Date: 30-10-2009
Job No: **42626440/**6220	File No: 42626440-g-2141.wor	

Figure: **1**

Rev:B
A4

B

Appendix B Borehole Logs and Cross Sections

URS Australia Pty Ltd

TEST PIT LOG New-TP02

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **17-8-09**
Date Finished: **17-8-09**

Relative Level: **2.14 mAHD**
Coordinates: **7371596 mN**
315148 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
2	Topsoil, brown, moist, roots.		0					
	SILT (ML); low plasticity, grey, with some vegetation and gravel, subangular gravel, moist, stiff, (residual soil).							BS 0.5m
1	CLAY (CH); medium plasticity, greyish brown, with some gravel, subangular gravel, moist, very stiff, (residual soil).		1					
	MC:21.1%, LL:56%, PL:22%, PI:34%, LS:12.0*+%, EC:6, MDD:1.74t/m³, OMC:19%				>4.5			BS 1.5m
0	CLAY (CH); high plasticity, greyish brown, with some gravel, subangular gravel, moist, very stiff, (residual soil).		2					
-1			3					
	MC:15.7%				>4.5			BS 3.5m
-2			4					
-3	Test pit terminated at 5.0m due to target depth reached.		5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	X
Refusal	
Flooding	
Caving/collapse	

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred
+: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability
FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-02

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

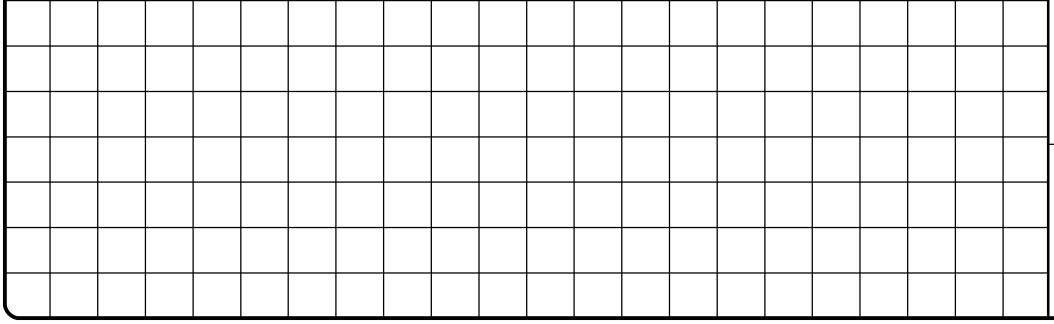
Logged By: **WWD**
Checked By: **TWA**
Date Started: **16-8-09**
Date Finished: **16-8-09**

Relative Level: **11.281 mAHD**
Coordinates: **7371396 mN**
315711 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
11	Topsoil, brown, moist, roots.		0					
	SILT (ML); low plasticity, red brown, with a trace of vegetation, moist, very stiff, (residual soil).							
	CLAY (CH); high plasticity, light yellow grey, with some gravel, subangular gravel, dry, hard				>4.5			BS 0.3m
10	C=19kPa, FA=25.8°		1					
			2					
9					>4.5			BS 2.5m
			3					
8								
			4					
7								
			5					
6	Test pit terminated at 5.0m due to target depth reached.							

TEST PIT SECTION



TEST PIT TERMINATED AT:

Target Depth	X
Refusal	
Flooding	
Caving/collapse	

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred +: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-03

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **16-8-09**
Date Finished: **16-8-09**

Relative Level: **6.662 mAHD**
Coordinates: **7371947 mN**
315837 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
	Topsoil, brown, moist, roots.		0					
	SILT (ML): low plasticity, grey, some vegetation and gravel, subangular gravel, dry, firm, (residual soil).							
6	CLAY (CL): medium plasticity, red brown, with some gravel, subangular gravel, moist, very stiff, (residual soil).		1					BS 0.3m
5					>4.5			BS 1.5m
			2					
4								
	CLAY (CH): high plasticity, grey with mottled brown, with some gravel, subangular gravel, moist, hard, (residual soil). MC:15.6%, LL:58%, PL:21%, PI:37%, LS:16.5+%		3		>4.5			BS 3m
3								
			4					
2								
	Test pit terminated at 5.0m due to target depth reached.		5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	X
Refusal	
Flooding	
Caving/collapse	

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred
+: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability
FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-04

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **16-8-09**
Date Finished: **16-8-09**

Relative Level: **10.915 mAHD**
Coordinates: **7372145 mN**
315975 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
	Topsoil, brown, moist, roots.		0					
	SILT (ML): low plasticity, grey, with some vegetation and gravel, subangular gravel, dry, firm, (residual soil). MC:4.2%							BS 0.3m
10	CLAY (CI): medium plasticity, grey with mottled white, with a trace of gravel, subangular gravel, moist, stiff, (residual soil).		1					
9			2					
					>4.5			BS 2.5m
8	CLAY (CI): medium plasticity, brownish white, with some gravel, subangular gravel, moist, stiff, (residual soil).		3					
7	MC:8.3%, LL:38%, PL:20%, PI:18%, LS:8%		4		>4.5			BS 4m
6								
	Test pit terminated at 5.0m due to target depth reached.		5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	X
Refusal	
Flooding	
Caving/collapse	

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred
+: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability
FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-05

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **16-8-09**
Date Finished: **16-8-09**

Relative Level: **5.413 mAHD**
Coordinates: **7372332 mN**
315505 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
	Topsoil, brown, moist, roots.		0					
5	CLAY (CL): low plasticity, grey, with some vegetation and gravel, subangular gravel, dry, firm, (residual soil).							BS 0.5m
	CLAY (CI): medium plasticity, yellowish brown, with some gravel, subangular gravel, moist, stiff, (residual soil).		1					
4			2					
3			3		>4.5			BS 3m
2			4					
1			5					
0	Test pit terminated at 5.0m due to target depth reached.							

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	X
Refusal	
Flooding	
Caving/collapse	

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred
+: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability
FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-06

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **17-8-09**
Date Finished: **17-8-09**

Relative Level: **4.634 mAHD**
Coordinates: **7371691 mN**
315449 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
	Topsoil, brown, moist, roots.		0					
	SILT (ML); low plasticity, light grey, with some vegetation and gravel, subangular gravel, moist, firm, (residual soil).				>4.5			BS 0.5m
4			1					
	CLAY (CI); medium plasticity, reddish brown, with some gravel, subangular gravel, moist, stiff, (residual soil).							
3			2					
					>4.5			BS 2.5m
2			3					
1			4					
0								
	Test pit terminated at 5.0m due to target depth reached.		5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	X
Refusal	
Flooding	
Caving/collapse	

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred
+: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability
FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-06a

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **17-8-09**
Date Finished: **17-8-09**

Relative Level: **1.9 mAHD**
Coordinates: **7371743 mN**
315246 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
1	CLAY (CH): high plasticity, dark grey, with some vegetation and gravel, subangular gravel, wet, soft, (Marine Clay). MC:41.6%, LL:54%, PL:22%, PI:32%, LS:14.5+%		0 1					BS 0.5m
0	CLAY (CL): low plasticity, brown, with some gravel, subangular gravel, moist, stiff, (Marine Clay). MC:12.6%		2 3					BS 2m
-1								
-2	Test pit terminated at 3.5m due to excavator becoming unstable.		4					
-3			5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	☐
Refusal	☐
Flooding	☐
Caving/collapse	☒

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred +: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-08

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **16-8-09**
Date Finished: **16-8-09**

Relative Level: **8.633 mAHD**
Coordinates: **7372423 mN**
315559 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
	Topsoil, brown, moist, roots.		0					
8	CLAY (CH); high plasticity, light grey, with some vegetation and gravel, subangular gravel, moist, firm, (residual soil). LL:82%, PL:22%, PI:60%, LS:20.0+%							BS 0.5m
	CLAY (CI); medium plasticity, dark grey, with some gravel, subangular gravel, moist, very stiff, (residual soil).		1					
7	MC:16.4%, EC:2, MDD:1.69t/m3, OMC:19%				>4.5			BS 1.5m
	CLAY (CI); medium plasticity, reddish brown, with some gravel, subangular gravel, moist, very stiff, (residual soil).		2					
6								
			3					
5	MC:12.3%, LL:41%, PL:25%, PI:16%, LS:7%				>4.5			BS 3.5m
			4					
4								
	Test pit terminated at 5.0m due to target depth reached.		5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	X
Refusal	
Flooding	
Caving/collapse	

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred
+: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability
FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-09

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **16-8-09**
Date Finished: **16-8-09**

Relative Level: **12.314 mAHD**
Coordinates: **7372445 mN**
315018 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
12	Topsoil, brown, moist, roots.		0					
	CLAY (CL): low plasticity, grey, with some vegetation and gravel, moist, firm, (residual soil).				>4.5			BS 0.3m
	CLAY (CI): medium plasticity, reddish brown, with some gravel, moist, hard, (residual soil).		1					
11								
	MC:7.6%, EC:5, MDD:1.93t/m3, OMC:12.4%		2		>4.5			BS 2m
10								
			3					
9								
	Testpit terminated at 3.5m due to excavator refusal.							
			4					
8								
			5					
7								

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	☐
Refusal	☒
Flooding	☐
Caving/collapse	☐

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred
+: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability
FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-10

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **16-8-09**
Date Finished: **16-8-09**

Relative Level: **6.393 mAHD**
Coordinates: **7372326 mN**
315065 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
6	Topsoil, moist, brown, roots.		0					
	SILT(ML): low plasticity, light grey, with some vegetation and gravel, subangular gravel, dry, firm, (residual soil).							BS 0.5m
	CLAY (CH): high plasticity, reddish brown, with some gravel, subangular gravel, moist, hard, (residual soil).		1					
5								
			2					
4	MC:10.2%				>4.5			BS 2.5m
			3					
3								
	Test pit terminated at 4.0m due to excavator refusal.		4					
2								
			5					
1								

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	☐
Refusal	☒
Flooding	☐
Caving/collapse	☐

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred +: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-11

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

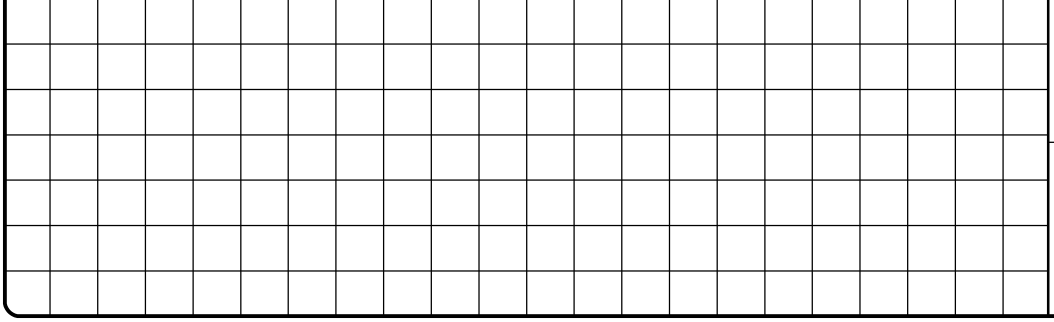
Logged By: **WWD**
Checked By: **TWA**
Date Started: **16-8-09**
Date Finished: **16-8-09**

Relative Level: **4.523 mAHD**
Coordinates: **7372255 mN**
315239 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
	Topsoil, brown, moist, roots.		0					
	SILT (ML): low plasticity, light grey, with some vegetation and gravel, subangular gravel, moist, firm, (residual soil).				>4.5			BS 0.3m
4	CLAY (CL): low plasticity, reddish brown, with some gravel, with some sand, moist, stiff, (residual soil).		1					
	MC:5.4%				>4.5			BS 1m
3			2					
2	CLAY (CH): high plasticity, dark brown, with some gravel, subangular gravel, moist, very stiff, (residual soil).		3					
1			4		>4.5			BS 3.5m
0								
	Testpit terminated at 5.0m due to target depth reached.		5					

TEST PIT SECTION



TEST PIT TERMINATED AT:

Target Depth	X
Refusal	
Flooding	
Caving/collapse	

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred
+: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability
FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-BH3

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **16-8-09**
Date Finished: **16-8-09**

Relative Level: **10.384 mAHD**
Coordinates: **7372359 mN**
315118 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
10	Topsoil, brown, moist, roots.		0					
	SILT (ML); medium plasticity, grey, with some gravel, subangular gravel, moist, firm, (residual soil).				>4.5			BS 0.5m
9	CLAY (CL); low plasticity, light brownish grey, with some gravel, subangular gravel, moist, stiff, (residual soil).		1					
			2		>4.5			BS 2m
8			3					
7	CLAY (CL): low plasticity, reddish brown, with some gravel, subangular gravel, moist, stiff, (residual soil).							
	LL:28%, PL:15%, PI:13%, LS:4.5*+%, EC:5, MDD:2.13t/m³ OMC:8.4%		4					
6					>4.5			BS 4.5m
			5					
5	Test pit terminated at 5.0m due to target depth reached.							

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	X
Refusal	
Flooding	
Caving/collapse	

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred +: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-CPT01

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **15-8-09**
Date Finished: **15-8-09**

Relative Level: **1.912 mAHD**
Coordinates: **7371661 mN**
315189 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
1	CLAY (CL): low plasticity, dark grey, with some vegetation and gravel, subangular gravel, moist, soft, (marine clay).		0					
	MC:34.5%, LL:30%, PL:16%, PI:14%, LS:4.5*+%		1					BS 1m
0	CLAY (CL): low plasticity, reddish brown, with some gravel, subangular gravel, moist, stiff, (marine clay).		2					BS 2m
-1			3					
-2	Test pit terminated at 3.0m due to excavator refusal.		4					
-3			5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	☐
Refusal	☒
Flooding	☐
Caving/collapse	☐

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred +: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-CPT02

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **15-8-09**
Date Finished: **15-8-09**

Relative Level: **1.349 mAHD**
Coordinates: **7371603 mN**
315068 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
1	CLAY (CL): low plasticity, dark grey, with some vegetation, wet, soft, (marine clay).		0					
0	C'=1.1kPa, phi'=28.5º		1					BS 1.5m
-1	CLAY (CH): high plasticity, reddish brown, with some gravel, subangular gravel, moist, very stiff, (marine clay).		2					
-2	MC:20.9%, LL:60%, PL:24%, PI:36%, LS:14.5+%		3					BS 3.2m
-3	Test pit terminated at 3.5m due to excavator refusal.		4					
-4			5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	☐
Refusal	☒
Flooding	☐
Caving/collapse	☐

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred +: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-CPT04

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **14-8-09**
Date Finished: **14-8-09**

Relative Level: **1.9 mAHD**
Coordinates: **7371761 mN**
314868 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
1	CLAY (CI): medium plasticity, brownish grey, with some vegetation, moist, soft, (marine clay).		0					BS 0.5m
0	CLAY (CI): medium plasticity, dark grey, with some vegetation, with a trace of gravel, subangular gravel, wet, soft, (marine clay).		1					
-1			2					BS 2m
-2			3					
-3	Test pit terminated at 4.0m due to test pit collapse.		4					
			5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	☐
Refusal	☐
Flooding	☐
Caving/collapse	☒

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred +: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-CPT04b

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **15-8-09**
Date Finished: **15-8-09**

Relative Level: **1.9 mAHD**
Coordinates: **7371770 mN**
315105 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
1	CLAY (CH); high plasticity, dark grey, with some vegetation, wet, soft, (marine clay).		0					
	MC:57.2%, LL:63%, PL:26%, PI:37%, LS:17.5*+% EC:2		1					BS 1m
0			2					
-1	CLAY (CL); low plasticity, yellowish grey, with some gravel, subangular gravel, moist, firm, (marine clay).		3					BS 3.5m
-2			4					
	Test pit terminated at 4.0m due to test pit collapse.							
-3			5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	☐
Refusal	☐
Flooding	☐
Caving/collapse	☒

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred +: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-CPT05

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **13-8-09**
Date Finished: **13-8-09**

Relative Level: **1.9 mAHD**
Coordinates: **7371873 mN**
314932 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
1 0 -1	CLAY (CL): low plasticity, grey with mottled brown, with some vegetation, wet, soft, (marine clay).		0 1 2 3					
-2 -3	Test pit terminated at 3.0m due to test pit collapse.		4 5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	☐
Refusal	☐
Flooding	☐
Caving/collapse	☒

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred
+: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability
FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-CPT05a

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **13-8-09**
Date Finished: **13-8-09**

Relative Level: **1.9 mAHD**
Coordinates: **7371863 mN**
314786 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
1	CLAY (CH): high plasticity, brownish grey, with some vegetation, wet, soft, (marine clay)		0					
	LL:70%, PL:27%, PI:43%, LS:10%		1					
0	MC:73.4%, LL:94%, PL:30%, PI:64%, LS:21.5%, C'=4.1kPa, phi'=15.5°, Cc=1.09, Cr=0.16		2					
-1			3					
-2	CLAY (CL): low plasticity, dark grey, with some gravel and shells, sub-angular gravel, wet, firm, (marine clay). C'=20.4kPa, phi'=12.6°, Cc=0.81, Cr=0.14		4					
-3	Test pit terminated at 4.5m due to test pit collapse.		5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	☐
Refusal	☐
Flooding	☐
Caving/collapse	☒

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred +: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-CPT06

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **13-8-09**
Date Finished: **13-8-09**

Relative Level: **1.9 mAHD**
Coordinates: **7371880 mN**
314998 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
1	CLAY (CL); low plasticity, grey, with some vegetation, wet, very soft, (marine clay).		0					
0			1					
-1			2					
-2	Test pit terminated at 3.2m due to test pit collapse.		3					
-3			4					
			5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	☐
Refusal	☐
Flooding	☐
Caving/collapse	☒

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred +: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-CPT12

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **12-8-09**
Date Finished: **12-8-09**

Relative Level: **1.9 mAHD**
Coordinates: **7371898 mN**
315147 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
1	CLAY (CH): high plasticity, grey, with some vegetation, moist, very soft, (marine clay). MC:91%, LL:90%, PL:28%, PI:62%, LS:19.0+%, C'=0kPa, phi'=17°, Cc=1.07, Cr=0.08 MC:67.9%, LL:84%, PL:27%, PI:57%, LS:18.0+%, C'=1.4kPa, phi'=18°, Cc=1.14, Cr=0.13		0 1					
0	CLAY (CH): high plasticity, grey, with some vegetation, wet, very soft, (marine clay). MC:94.9%, LL:100%, PL:34%, PI:66%, LS:16%, C'=1.1kPa, phi'=28.5°, Cc=1.54, Cr=0.21		2					
-1	CLAY, high plasticity, poorly graded, greenish grey, with some poorly graded sub angular fine sand , moist, medium dense, (marine clay). MC:87.8%, LL:100%, PL:41%, PI:59%, LS:16.5%, C'=0kPa, phi'=23.5°, Cc= 1.57, Cr= 0.20		3					
-2			4					
-3	Test pit terminated at 5.0m due to test pit collapse.		5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	☐
Refusal	☐
Flooding	☐
Caving/collapse	☒

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred +: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-CPT13

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **11-8-09**
Date Finished: **11-8-09**

Relative Level: **2.236 mAHD**
Coordinates: **7371816 mN**
315382 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
2	CLAY (CL); low plasticity, brownish grey, with a trace of gravel, subangular gravel, moist, soft, (marine clay).		0					
1	CLAY (CL); Low plasticity, brown with light green, with some gravel, subangular gravel, moist, stiff, (marine clay).		1					
0	CLAY (CL); low plasticity, grey green, with some gravel, subangular gravel, moist, stiff, (marine clay).		2					
-1	Test pit terminated at 2.5m due to excavator refusal.		3					
-2			4					
-3			5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	☐
Refusal	☒
Flooding	☐
Caving/collapse	☐

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred
+: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability
FA: Peak Friction Angle C: Cohesion

URS Australia Pty Ltd

TEST PIT LOG TP-CPT14

URS Australia Pty. Ltd.
Phone: (07) 3243 2111
Fax: (07) 3243 2199

Project No.: **42626445**

Project Reference: **GLNG DMPF Geotech Assessment**

Excavator Contractor **Rayment Excavation**

Excavator Type: **Daewoo 225LCV**

Logged By: **WWD**
Checked By: **TWA**
Date Started: **16-8-09**
Date Finished: **16-8-09**

Relative Level: **1.9 mAHD**
Coordinates: **7371747 mN**
315247 mE
Permit No:

Client: **Santos Ltd**

REDUCED LEVEL (m RL)	DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	SHEAR VANE STRENGTH (kPa)	POCKET PENETROMETER (KG/CM²)	DCPT (Blows/100mm)	SAMPLING AND OTHER TESTING	COMMENTS
1	CLAY (CL); low plasticity, dark grey, with some vegetation, wet, soft, (marine clay).		0					
0	CLAY (CL); low plasticity, yellowish green, with some gravel, subangular gravel, moist, stiff, (marine clay).		1					BS 1.5m
-1	Test pit terminated at 2.5m due to excavator refusal.		2					BS 2.2m
-2			3					
-3			4					
			5					

TEST PIT SECTION

TEST PIT TERMINATED AT:

Target Depth	☐
Refusal	☒
Flooding	☐
Caving/collapse	☐

SAMPLE TYPE:

Bulk Sample	BS
Tube Sample	TS
Disturbed Sample	DS

NOTES: Soil classification via AS1726-1993

ABBREVIATIONS: MC: Moisture Content LL: Liquid Limit PL:Plastic Limit PI: Plasticity Index LS: Linear Shrinkage *: Crumbling occurred
+: Curling occurred EC: Emerson Class MDD: Maximum Dry Density OMC: Optimum Moisture Content k: Laboratory Permeability
FA: Peak Friction Angle C: Cohesion

C

Appendix C Analytical Results Tables

Table 2: Soil Analytical Results for Metals and Nutrients
GLNG DMPF ASS Assessment

Location								TP_CPT1		TP_CPT2		TP_CPT4			TP_CPT4b	
Depth (mbg)								0-1.5m	1.5-2.5m	1.0m-2.0m	3.0m-3.5m	0m-1m	1m-2m	2m-3m	1.0m-2.0m	3m-4m
Sample ID								CPT1 1-0-1.5m	CPT1 2-1.5-2.5m	CPT2 1-1.0m-2.0m	CPT2 2-3.0m-3.5m	CPT4 1-0m-1m	CPT4 2-1m-2m	CPT4 3-2m-3m	CPT4b 1-1.0m-2.0m	CPT4b 2-3m-4m
Date Sampled								15/08/2009	15/08/2009	15/08/2009	15/08/2009	14/08/2009	14/08/2009	14/08/2009	15/08/2009	15/08/2009
Sample Type								Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample
Primary Sample ID								CPT1 1-0-1.5m	CPT1 2-1.5-2.5m	CPT2 1-1.0m-2.0m	CPT2 2-3.0m-3.5m	CPT4 1-0m-1m	CPT4 2-1m-2m	CPT4 3-2m-3m	CPT4b 1-1.0m-2.0m	CPT4b 2-3m-4m
Laboratory								ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS
Batch No.								EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED
Analyte	LOR	Units	QEPA - EILs	NEPM - HBILs 'E'	NEPM - HBILs 'F'	ANZECC Sediment Guidelines - Low (Trigger Values)	ANZECC Sediment Guidelines - High (Trigger Values)									
Moisture Content																
Moisture Content	1	%	ne	ne	ne	ne	ne	**36.7**	**12.6**	**47.4**	**16.4**	**23.6**	**41.1**	**34.3**	**35.6**	**16.7**
Natural Attenuation Parameters																
Nitrate and Nitrite (as N)	0.1	mg/kg	ne	ne	ne	ne	ne	**35.6**	**123**	**59.2**	**26.4**	**48.3**	**159**	**39.4**	**83.2**	**30.5**
Total Kjeldahl Nitrogen as N	20	mg/kg	ne	ne	ne	ne	ne	**350**	**130**	**640**	**150**	**490**	**420**	**480**	**290**	**160**
Total Nitrogen as N	20	mg/kg	ne	ne	ne	ne	ne	**390**	**260**	**700**	**170**	**540**	**580**	**520**	**370**	**190**
Total Phosphorus as P	2	mg/kg	ne	ne	ne	ne	ne	**61**	**126**	**148**	**324**	**394**	**169**	**147**	**110**	**126**
Bicarbonate Alkalinity as CaCO3	1	mg/kg	ne	ne	ne	ne	ne	**475**	**642**	**837**	**782**	**2900**	**1710**	**1640**	**1370**	**1600**
Carbonate Alkalinity as CaCO3	1	mg/kg	ne	ne	ne	ne	ne	<1	<1	<1	<1	**450**	**112**	**313**	**670**	<1
Total Alkalinity	1	mg/kg	ne	ne	ne	ne	ne	**475**	**642**	**837**	**782**	**3350**	**1810**	**1950**	**2040**	**1600**
Major Ions																
Chloride	10	mg/kg	ne	ne	ne	ne	ne	**32800**	**5140**	**42500**	**7440**	**24100**	**34800**	**29100**	**27500**	**8300**
Sulphate	10	mg/kg	ne	ne	ne	ne	ne	**5090**	**820**	**6790**	**1230**	**4130**	**5660**	**5170**	**4580**	**1360**
Calcium	10	mg/kg	ne	ne	ne	ne	ne	**360**	**30**	**390**	**40**	**350**	**290**	**220**	**250**	**50**
Magnesium	10	mg/kg	ne	ne	ne	ne	ne	**2080**	**100**	**2330**	**210**	**1300**	**1580**	**1280**	**1260**	**180**
Potassium	10	mg/kg	ne	ne	ne	ne	ne	**1130**	**250**	**1570**	**300**	**840**	**1520**	**1410**	**1320**	**310**
Sodium	10	mg/kg	ne	ne	ne	ne	ne	**19700**	**3600**	**24900**	**4770**	**14600**	**21100**	**19700**	**17800**	**5610**
Metals (Total)																
Aluminium	50	mg/kg	ne	ne	ne	ne	ne	**5140**	**3410**	**13400**	**5020**	**11800**	**12200**	**11700**	**11900**	**8980**
Antimony	5	mg/kg	20	ne	ne	2	25	<5	<5	<5	<5	<5	<5	<5	<5	<5
Arsenic	5	mg/kg	20	200	500	20	70	**24**	**12**	**26**	**27**	**20**	**24**	**11**	**20**	<5
Barium	10	mg/kg	ne	ne	ne	ne	ne	<10	<10	<10	<10	**10**	**10**	**10**	**10**	**30**
Beryllium	1	mg/kg	ne	40	100	ne	ne	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
Boron	50	mg/kg	ne	6000	15000	ne	ne	<50	<50	**50**	<50	**80**	<50	<50	<50	<50
Cadmium	1	mg/kg	3	40	100	1.5	10	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	2	mg/kg	50	200	500	80	370	**20**	**26**	**24**	**54**	**24**	**22**	**18**	**21**	**18**
Cobalt	2	mg/kg	ne	200	500	ne	ne	**19**	<2	**16**	<2	**13**	**48**	**13**	**17**	**14**
Copper	5	mg/kg	60	2000	5000	65	270	**15**	**13**	**30**	**19**	**23**	**29**	**31**	**29**	**35**
Iron	50	mg/kg	ne	ne	ne	ne	ne	**35600**	**24500**	**42500**	**59600**	**27700**	**27700**	**24900**	**22400**	**18900**
Lead	5	mg/kg	300	600	1500	50	220	**8**	<5	**6**	<5	**7**	**5**	**5**	**6**	**8**
Manganese	5	mg/kg	500	3000	7500	ne	ne	**127**	**20**	**314**	**12**	**661**	**196**	**192**	**152**	**120**
Mercury	0.1	mg/kg	1	30	75	0.15	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	2	mg/kg	60	600	3000	21	52	**11**	<2	**14**	<2	**14**	**20**	**11**	**16**	**9**
Selenium	5	mg/kg	ne	ne	ne	ne	ne	<5	<5	<5	<5	<5	<5	<5	<5	<5
Titanium	10	mg/kg	ne	ne	ne	ne	ne	-	-	-	-	**110**	**140**	**120**	**120**	**60**
Tungsten	0.01	mg/kg	ne	ne	ne	ne	ne	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Uranium	1	mg/kg	ne	ne	ne	ne	ne	**2**	**0.5**	**7.3**	**1.7**	**1**	**4.4**	**2.4**	**6.3**	**0.6**
Vanadium	5	mg/kg	ne	ne	ne	ne	ne	**43**	**71**	**55**	**108**	**71**	**110**	**56**	**55**	**47**
Zinc	5	mg/kg	200	14000	35000	200	410	**24**	<5	**42**	<5	**40**	**40**	**34**	**36**	**14**

Legend:

Exceeds the Queensland Environmental Protection Agency, 1998, Environmental Investigation Levels

Exceeds the National Environment Protection Council, 1999, Health-based Investigation Levels - Parks, recreational open space and playing fields;

Exceeds the National Environment Protection Council, 1999, Health-based Investigation Levels - Commercial/Industrial

Exceeds the ANZECC and ARMCANZ, 2000, ANZECC Sediment Guidelines ISQG - Low (Trigger Values)

Exceeds the ANZECC and ARMCANZ, 2000, ANZECC Sediment Guidelines ISQG - High (Trigger Values)

- Not Analysed

* LOR Exceeds Guideline Trigger Value

Table 2: Soil Analytical Results for Metals and Nutrients
GLNG DMPF ASS Assessment

Location								TP_CPT5							TP_CPT5a			TP_CPT6		CPT11	
Depth (mbg)								0m-0.5m	0.5m-1m	1.0m-1.5m	1.5m-2m	2.0m-3m	2.0m-3m	2.0m-3m	0m-1m	1m-2m	3m-3.5m	0m-1.0m	1.0m-3.0m	0.5m	1.5m
Sample ID								CPT5_1-0m-0.5m	CPT5_2-0.5m-1m	CPT5_3-1.0m-1.5m	CPT5_4-1.5m-2m	CPT5_5-2.0m-3m	QC01	QC02__13/08/2009	CPT5a_1-0m-1m	CPT5a_2-1m-2m	CPT5a_3-3m-3.5m	CPT6_1-0m-1.0m	CPT6_2-1.0m-3.0m	CPT11_2-0.5m	CPT11_4-1.5m
Date Sampled								13/08/2009	13/08/2009	13/08/2009	13/08/2009	13/08/2009	13/08/2009	13/08/2009	13/08/2009	13/08/2009	13/08/2009	13/08/2009	13/08/2009	12/08/2009	12/08/2009
Sample Type								Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Duplicate Sample	Triplicate Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample
Primary Sample ID								CPT5_1-0m-0.5m	CPT5_2-0.5m-1m	CPT5_3-1.0m-1.5m	CPT5_4-1.5m-2m	CPT5_5-2.0m-3m	CPT5_5-2.0m-3m	CPT5_5-2.0m-3m	CPT5a_1-0m-1m	CPT5a_2-1m-2m	CPT5a_3-3m-3.5m	CPT6_1-0m-1.0m	CPT6_2-1.0m-3.0m	CPT11_2-0.5m	CPT11_4-1.5m
Laboratory								ALS	ALS	ALS	ALS	ALS	ALS	Labmark	ALS	ALS	ALS	ALS	ALS	ALS	ALS
Batch No.								EB0912892_MRED	EB0912892_MRED	EB0912892_MRED	EB0912892_MRED	EB0912892_MRED	EB0912892_MRED	E044152_URS	EB0912892_MRED	EB0912892_MRED	EB0912892_MRED	EB0912892_MRED	EB0912892_MRED	EB0912892_MRED	EB0912892_MRED
Analyte	LOR	Units	QEPA - EILs	NEPM - HBILs 'E'	NEPM - HBILs 'F'	ANZECC Sediment Guidelines - Low (Trigger Values)	ANZECC Sediment Guidelines - High (Trigger Values)														
Moisture Content																					
Moisture Content	1	%	ne	ne	ne	ne	ne	**44.8**	**49.4**	**36.4**	**36.6**	**35**	**35.5**	**26**	**48.1**	**42.5**	**42.3**	**38.8**	**41.8**	**49**	**12.6**
Natural Attenuation Parameters																					
Nitrate and Nitrite (as N)	0.1	mg/kg	ne	ne	ne	ne	ne	**1.1**	**0.9**	**1**	**0.1**	**0.4**	**0.2**	-	**1.1**	**0.3**	**0.2**	**0.8**	**0.4**	**0.3**	<0.1
Total Kjeldahl Nitrogen as N	20	mg/kg	ne	ne	ne	ne	ne	**4730**	**820**	**460**	**510**	**380**	**360**	-	**540**	**530**	**510**	**520**	**560**	**520**	**110**
Total Nitrogen as N	20	mg/kg	ne	ne	ne	ne	ne	**4730**	**820**	**470**	**510**	**380**	**360**	-	**540**	**530**	**510**	**520**	**560**	**520**	**110**
Total Phosphorus as P	2	mg/kg	ne	ne	ne	ne	ne	**680**	**176**	**206**	**199**	**206**	**202**	-	**191**	**223**	**172**	**195**	**189**	**134**	**92**
Bicarbonate Alkalinity as CaCO3	1	mg/kg	ne	ne	ne	ne	ne	**77**	**669**	**837**	**1050**	**821**	**893**	-	**698**	**931**	**980**	**1760**	**2430**	**380**	**1120**
Carbonate Alkalinity as CaCO3	1	mg/kg	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity	1	mg/kg	ne	ne	ne	ne	ne	**77**	**669**	**837**	**1050**	**821**	**893**	-	**698**	**931**	**980**	**1760**	**2420**	**380**	**1120**
Major Ions																					
Chloride	10	mg/kg	ne	ne	ne	ne	ne	**51600**	**73400**	**54700**	**41100**	**40800**	**40700**	-	**64900**	**56500**	**49100**	**42100**	**39200**	**68200**	**11600**
Sulphate	10	mg/kg	ne	ne	ne	ne	ne	**4700**	**7600**	**5200**	**4980**	**5140**	**6020**	-	**7000**	**6070**	**5110**	**4830**	**5300**	**8200**	**1530**
Calcium	10	mg/kg	ne	ne	ne	ne	ne	**350**	**500**	**320**	**250**	**240**	**270**	-	**390**	**300**	**250**	**320**	**270**	**480**	**50**
Magnesium	10	mg/kg	ne	ne	ne	ne	ne	**2210**	**3440**	**2290**	**1960**	**1930**	**2180**	-	**2960**	**2420**	**1990**	**1980**	**1820**	**3800**	**350**
Potassium	10	mg/kg	ne	ne	ne	ne	ne	**1210**	**1750**	**1380**	**1380**	**1370**	**1470**	-	**1810**	**1540**	**1370**	**1330**	**1530**	**1840**	**360**
Sodium	10	mg/kg	ne	ne	ne	ne	ne	**24100**	**33300**	**24700**	**23100**	**23300**	**25100**	-	**31200**	**26300**	**22900**	**22300**	**23900**	**34200**	**6920**
Metals (Total)																					
Aluminium	50	mg/kg	ne	ne	ne	ne	ne	**14200**	**13600**	**13500**	**13700**	**13600**	**13400**	**16800**	**12600**	**13100**	**12800**	**14200**	**16300**	**14000**	**5840**
Antimony	5	mg/kg	20	ne	ne	2	25	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5
Arsenic	5	mg/kg	20	200	500	20	70	<5	**17**	**10**	**14**	**7**	**10**	**12**	**16**	**15**	**12**	<5	**10**	**11**	**6**
Barium	10	mg/kg	ne	ne	ne	ne	ne	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	<10	**10**	**20**	**50**
Beryllium	1	mg/kg	ne	40	100	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**1**	<1	**1**
Boron	50	mg/kg	ne	6000	15000	ne	ne	<50	<50	<50	<50	<50	<50	**24**	<50	<50	<50	<50	<50	<50	<50
Cadmium	1	mg/kg	3	40	100	1.5	10	<1	<1	<1	<1	<1	<1	<0.1	<1	<1	<1	<1	<1	<1	<1
Chromium	2	mg/kg	50	200	500	80	370	**24**	**22**	**22**	**21**	**20**	**20**	**22**	**20**	**20**	**20**	**20**	**24**	**22**	**22**
Cobalt	2	mg/kg	ne	200	500	ne	ne	**4**	**12**	**6**	**8**	**6**	**8**	**21**	**10**	**12**	**8**	**4**	**10**	**11**	**17**
Copper	5	mg/kg	60	2000	5000	65	270	**25**	**22**	**26**	**26**	**25**	**27**	**23**	**25**	**29**	**31**	**32**	**33**	**28**	**20**
Iron	50	mg/kg	ne	ne	ne	ne	ne	**15800**	**28500**	**19400**	**21800**	**17400**	**18900**	**22000**	**28300**	**29800**	**21600**	**16500**	**24800**	**26400**	**25900**
Lead	5	mg/kg	300	600	1500	50	220	<5	**6**	**6**	**6**	**6**	**7**	**8**	<5	**5**	**6**	**6**	**6**	**10**	**6**
Manganese	5	mg/kg	500	3000	7500	ne	ne	**96**	**223**	**130**	**129**	**116**	**102**	**124**	**244**	**175**	**147**	**159**	**160**	**190**	**1360**
Mercury	0.1	mg/kg	1	30	75	0.15	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	2	mg/kg	60	600	3000	21	52	**7**	**12**	**10**	**10**	**9**	**9**	**13**	**11**	**11**	**10**	**9**	**12**	**12**	**8**
Selenium	5	mg/kg	ne	ne	ne	ne	ne	<5	<5	<5	<5	<5	<5	<2	<5	<5	<5	<5	<5	<5	<5
Titanium	10	mg/kg	ne	ne	ne	ne	ne	**150**	**180**	**150**	**160**	**150**	**160**	**81**	**160**	**160**	**140**	**140**	**160**	**210**	**40**
Tungsten	0.01	mg/kg	ne	ne	ne	ne	ne	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Uranium	1	mg/kg	ne	ne	ne	ne	ne	**3.5**	**3.7**	**3.7**	**3.8**	**3**	**3.3**	**-**	**3.6**	**4**	**3.8**	**3.4**	**4.5**	**3.2**	**0.4**
Vanadium	5	mg/kg	ne	ne	ne	ne	ne	**35**	**45**	**50**	**49**	**50**	**54**	**80**	**50**	**53**	**54**	**46**	**60**	**61**	**60**
Zinc	5	mg/kg	200	14000	35000	200	410	**24**	**36**	**36**	**34**	**34**	**35**	**40**	**35**	**36**	**35**	**35**	**40**	**30**	**10**

Legend:

Exceeds the Queensland Environmental Protection Agency, 1998, Environmental Investigation Levels

Exceeds the National Environment Protection Council, 1999, Health-based Investigation Levels - Parks, recreational open space and playing fields;

Exceeds the National Environment Protection Council, 1999, Health-based Investigation Levels - Commercial/Industrial

Exceeds the ANZECC and ARMCANZ, 2000, ANZECC Sediment Guidelines ISQG - Low (Trigger Values)

Exceeds the ANZECC and ARMCANZ, 2000, ANZECC Sediment Guidelines ISQG - High (Trigger Values)

- Not Analysed

* LOR Exceeds Guideline Trigger Value

Table 2: Soil Analytical Results for Metals and Nutrients
GLNG DMPF ASS Assessment

Location								TP_CPT13		NEW_TP2			TP3			TP6		TP8			TP9	
Depth (mbg)								1.0m	1.5m	0.5m	1.5m	3.5m	1.5m	3m	0.3m	0.5m	2.5m	0.3m	1m	3.5m	0.3m	2m
Sample ID								CPT13_1-1.0m	CPT13_3-1.5m	NEW_TP2-1-0.5m	NEW_TP2-2-1.5m	NEW_TP2-3-3.5m	TP3 2-1.5m	TP3 3-3mm	TP3-1-0.3m	TP6 1-0.5m	TP6 2-2.5m	TP8 1-0.3m	TP8 2-1m	TP8 3-3.5m	TP9 1-0.3m	TP9 2-2m
Date Sampled								11/08/2009	11/08/2009	17/08/2009	17/08/2009	17/08/2009	11/08/2009	16/08/2009	16/08/2009	17/08/2009	17/08/2009	16/08/2009	16/08/2009	16/08/2009	16/08/2009	16/08/2009
Sample Type								Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample
Primary Sample ID								CPT13_1-1.0m	CPT13_3-1.5m	NEW_TP2-1-0.5m	NEW_TP2-2-1.5m	NEW_TP2-3-3.5m	TP3 2-1.5m	TP3 3-3mm	TP3-1-0.3m	TP6 1-0.5m	TP6 2-2.5m	TP8 1-0.3m	TP8 2-1m	TP8 3-3.5m	TP9 1-0.3m	TP9 2-2m
Laboratory								ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS
Batch No.								EB0912892_MRED	EB0912892_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED	EB0913021_MRED
Analyte	**LOR**	**Units**	**QEPA - EILs**	**NEPM - HBILs 'E'**	**NEPM - HBILs 'F'**	**ANZECC Sediment Guidelines - Low (Trigger Values)**	**ANZECC Sediment Guidelines - High (Trigger Values)**															
Moisture Content																						
Moisture Content	1	%	ne	ne	ne	ne	ne	**16.8**	**14.5**	**8.2**	**15.8**	**30.8**	**7.3**	**19.4**	**5.8**	**22.2**	**21.3**	**32.9**	**23.8**	**15**	**21**	**8.6**
Natural Attenuation Parameters																						
Nitrate and Nitrite (as N)	0.1	mg/kg	ne	ne	ne	ne	ne	**0.3**	**0.2**	**66.6**	**1.2**	**162**	**23.3**	**150**	**46.7**	**42.4**	**106**	**73.8**	**30.6**	**7.7**	**31.2**	**132**
Total Kjeldahl Nitrogen as N	20	mg/kg	ne	ne	ne	ne	ne	**120**	**150**	**300**	**210**	**160**	**130**	**110**	**780**	**320**	**110**	**500**	**120**	**370**	**290**	**160**
Total Nitrogen as N	20	mg/kg	ne	ne	ne	ne	ne	**120**	**150**	**370**	**210**	**320**	**160**	**260**	**820**	**360**	**220**	**570**	**160**	**380**	**320**	**290**
Total Phosphorus as P	2	mg/kg	ne	ne	ne	ne	ne	**58**	**86**	**102**	**397**	**430**	**105**	**58**	**194**	**76**	**144**	**98**	**100**	**175**	**182**	**214**
Bicarbonate Alkalinity as CaCO3	1	mg/kg	ne	ne	ne	ne	ne	**698**	**670**	**22**	**56**	**128**	**73**	**470**	**56**	**84**	**162**	**56**	**39**	**22**	**67**	**84**
Carbonate Alkalinity as CaCO3	1	mg/kg	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity	1	mg/kg	ne	ne	ne	ne	ne	**698**	**670**	**22**	**56**	**128**	**73**	**470**	**56**	**84**	**162**	**56**	**39**	**22**	**67**	**84**
Major Ions																						
Chloride	10	mg/kg	ne	ne	ne	ne	ne	**15500**	**12700**	**1740**	**3220**	**1550**	**280**	**1220**	**180**	**250**	**890**	**630**	**1270**	**1080**	**130**	**50**
Sulphate	10	mg/kg	ne	ne	ne	ne	ne	**2010**	**1710**	**270**	**580**	**420**	**20**	<10	**20**	**40**	**160**	**320**	**390**	**150**	**20**	<10
Calcium	10	mg/kg	ne	ne	ne	ne	ne	**90**	**50**	**30**	**40**	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Magnesium	10	mg/kg	ne	ne	ne	ne	ne	**740**	**360**	**90**	**110**	**20**	<10	<10	<10	<10	<10	<10	**10**	<10	<10	<10
Potassium	10	mg/kg	ne	ne	ne	ne	ne	**420**	**400**	**60**	**110**	**70**	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Sodium	10	mg/kg	ne	ne	ne	ne	ne	**8630**	**7500**	**990**	**2080**	**1230**	**10**	**30**	**20**	**20**	**560**	**490**	**960**	**730**	**40**	<10
Metals (Total)																						
Aluminium	50	mg/kg	ne	ne	ne	ne	ne	**6070**	**3930**	**3960**	**4500**	**4610**	**3640**	**5230**	**4980**	**7530**	**4560**	**7260**	**4360**	**6340**	**5420**	**5800**
Antimony	5	mg/kg	20	ne	ne	2	25	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Arsenic	5	mg/kg	20	200	500	20	70	**10**	**8**	**6**	**26**	**17**	**9**	<5	**7**	**5**	**10**	**28**	<5	**13**	**7**	**10**
Barium	10	mg/kg	ne	ne	ne	ne	ne	**200**	**60**	<10	**30**	**10**	**40**	<10	**230**	**70**	**180**	**580**	**500**	**20**	**30**	**20**
Beryllium	1	mg/kg	ne	40	100	ne	ne	<1	<1	<1	<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	<1
Boron	50	mg/kg	ne	6000	15000	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	1	mg/kg	3	40	100	1.5	10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	2	mg/kg	50	200	500	80	370	**32**	**20**	**11**	**31**	**28**	**30**	**14**	**25**	**12**	**19**	**4**	<2	**6**	**25**	**22**
Cobalt	2	mg/kg	ne	200	500	ne	ne	**9**	**2**	<2	<2	<2	**7**	**13**	**25**	**4**	**4**	<2	<2	<2	**9**	<2
Copper	5	mg/kg	60	2000	5000	65	270	**20**	**12**	**17**	**37**	**141**	**13**	**17**	**14**	**26**	**20**	**10**	**7**	**18**	**10**	**17**
Iron	50	mg/kg	ne	ne	ne	ne	ne	**23700**	**21700**	**5800**	**40800**	**47200**	**26600**	**10500**	**24800**	**20900**	**26700**	**12100**	**2760**	**29400**	**17100**	**32600**
Lead	5	mg/kg	300	600	1500	50	220	**8**	**7**	<5	<5	<5	**6**	<5	**13**	**8**	**6**	**5**	<5	<5	**7**	<5
Manganese	5	mg/kg	500	3000	7500	ne	ne	**280**	**72**	**13**	**7**	<5	**165**	**5**	**1690**	**81**	**61**	<5	<5	**74**	**396**	**29**
Mercury	0.1	mg/kg	1	30	75	0.15	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	2	mg/kg	60	600	3000	21	52	**7**	**3**	<2	<2	<2	**3**	**6**	**5**	**4**	**3**	<2	<2	**3**	**2**	<2
Selenium	5	mg/kg	ne	ne	ne	ne	ne	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Titanium	10	mg/kg	ne	ne	ne	ne	ne	**80**	**40**	**40**	**80**	**30**	**20**	**20**	**20**	**20**	**30**	<10	<10	**20**	**70**	**20**
Tungsten	0.01	mg/kg	ne	ne	ne	ne	ne	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Uranium	1	mg/kg	ne	ne	ne	ne	ne	**1.6**	**0.4**	**5.4**	**4.5**	**4.8**	**0.9**	**0.6**	**0.6**	**1.3**	**0.4**	**0.4**	**0.2**	**0.4**	**1.9**	**2.3**
Vanadium	5	mg/kg	ne	ne	ne	ne	ne	**85**	**50**	**27**	**135**	**149**	**92**	**38**	**64**	**52**	**72**	**39**	**8**	**16**	**47**	**74**
Zinc	5	mg/kg	200	14000	35000	200	410	**8**	**12**	**7**	<5	<5	**6**	**16**	**10**	**16**	**11**	<5	<5	**26**	<5	<5

Legend:

Exceeds the Queensland Environmental Protection Agency, 1998, Environmental Investigation Levels

Exceeds the National Environment Protection Council, 1999, Health-based Investigation Levels - Parks, recreational open space and playing fields;

Exceeds the National Environment Protection Council, 1999, Health-based Investigation Levels - Commercial/Industrial

Exceeds the ANZECC and ARMCANZ, 2000, ANZECC Sediment Guidelines ISQG - Low (Trigger Values)

Exceeds the ANZECC and ARMCANZ, 2000, ANZECC Sediment Guidelines ISQG - High (Trigger Values)

- Not Analysed

* LOR Exceeds Guideline Trigger Value

Table 1: URS and GeoCoastal ASS Soil Analytical Results

Sample Location	Sample Depth (m)	Sample ID	Sample Description	Sample Date	pH_F value	pH_{FOX} value	Δ pH	pH_{FOX} Reaction Rate[1]	pH KCl	TAA (Titratable Actual Acidity)	S KCL (KCl Extractable Sulfur)	S_{CR} (Chromium Reducible Sulfur)	S_{NAS} (Net Acid Soluble Sulfur)	S_{HCL} (HCL Extractable Sulfur)	ANC_E (Excess ANC)	Net Acidity[2] (includes ANC)	Net Acidity[3] (excludes ANC)	Liming Rate[4] (includes ANC)	Liming Rate[4] (excludes ANC)
									Method Code: 23A	Method Code: 23F	Method Code: 23C	Method Code: 22B	Method Code: 20J	Method Code: 20B	Method Code: 23Q				
									pH Units	% S	% S	% S	% S	% S	% S	% S	% S	(kg Aglime /tonne)	(kg Aglime /tonne)
TP_CPT1 (URS)	0-1.5m	CPT1 1-0-1.5m	CLAY (CL): low plasticity, dark grey, vegetation, subangular gravel, moist,(marine clay).	15/08/2009	7.4	1.4	6	4	4.9	0.05	-	5.54	-	-	-	5.59	5.59	261	262
	1.5-2.5m	CPT1 2-1.5-2.5m	CLAY (CL): low plasticity, reddish brown, subangular gravel, moist, stiff, (marine clay).	15/08/2009	8.5	3.1	5.4	2	6.5	<0.02	-	0.07	-	-	0.1	<0.02	0.09	<1	4
TP_CPT2 (URS)	1.0m-2.0m	CPT2 1-1.0m-2.0m	CLAY (CL): low plasticity, dark grey, with some vegetation, wet, soft, (marine clay).	15/08/2009	7.3	1.5	5.8	4	5.5	0.02	-	4.04	-	-	-	4.07	4.06	190	190
	3.0m-3.5m	CPT2 2-3.0m-3.5m	CLAY (CH): high plasticity, reddish brown, subangular gravel, moist, very stiff, (marine clay).	15/08/2009	8.3	4.7	3.6	1	6.5	<0.02	-	0.03	-	-	0.08	<0.02	0.05	<1	2
TP_CPT4 (URS)	0m-1m	CPT4 1-0m-1m	CLAY (CI): medium plasticity, brownish grey, with some vegetation, moist, soft, (marine clay).	14/08/2009	8.6	7.5	1.1	4	7.9	<0.02	-	<0.02	-	-	0.48	<0.02	0.04	<1	2
	1m-2m	CPT4 2-1m-2m	CLAY (CI): medium plasticity, dark grey, gravel, wet soft, (marine clay).	14/08/2009	8.4	1.8	6.6	4	6.7	<0.02	-	2.17	-	-	0.25	2	2.19	94	102
	2m-3m	CPT4 3-2m-3m	CLAY (CI): medium plasticity, dark grey, with a trace of gravel, wet, soft, (marine clay).	14/08/2009	8.4	1.7	6.7	4	6	<0.02	-	1.99	-	-	-	2	2.01	94	94
TP_CPT4b (URS)	1.0m-2.0m	CPT4b 1-1.0m-2.0m	CLAY (CH); high plasticity, dark grey, with some vegetation, wet, soft, (marine clay).	15/08/2009	8.6	1.8	6.8	4	6.6	<0.02	-	1.7	-	-	0.27	1.52	1.72	71	80
	3m-4m	CPT4b 2-3m-4m	CLAY (CL); low plasticity, yellowish grey, subangular gravel, moist, firm, (marine clay).	15/08/2009	8.4	6.2	2.2	2	6.7	<0.02	-	<0.02	-	-	0.2	<0.02	0.04	<1	2
TP_CPT5 (URS)	0m-0.5m	CPT5_1-0m-0.5m	CLAY (CL): low plasticity, grey with mottled brown, vegetation, wet, soft, (marine clay).	13/08/2009	5.6	2.9	2.7	4	4.5	0.08	-	0.54	-	-	-	0.63	0.62	29	29
	0.5m-1m	CPT5_2-0.5m-1m	CLAY (CL): low plasticity, grey with mottled brown, wet, soft, (marine clay).	13/08/2009	5.9	1.3	4.6	4	4.1	0.16	0.64	2.54	<0.02	0.59	-	2.66	3.95	125	185
	1.0m-1.5m	CPT5_3-1.0m-1.5m	CLAY (CL): low plasticity, grey with mottled brown, wet, soft, (marine clay).	13/08/2009	7.9	1.1	6.8	2	4	0.14	0.68	2.68	<0.02	0.63	-	2.77	4.15	130	194
	1.5m-2m	CPT5_4-1.5m-2m	CLAY (CL): low plasticity, grey with mottled brown, wet, soft, (marine clay).	13/08/2009	8.4	1.5	6.9	4	6.3	<0.02	-	0.64	-	-	-	0.65	0.66	30	31
	2.0m-3m	CPT5_5-2.0m-3m	CLAY (CL): low plasticity, grey with mottled brown, wet, soft, (marine clay).	13/08/2009	8.5	1.4	7.1	4	6.2	<0.02	-	0.94	-	-	-	0.96	0.96	45	45
	2.0m-3m	QC01	Duplicate of CPT5_5-2.0m-3m	13/08/2009	8.6	1.7	6.9	4	6.3	<0.02	-	0.95	-	-	-	0.96	0.97	45	45
	2.0m-3m	QC02	Duplicate of CPT5_5-2.0m-3m	13/08/2009	-	-	-	-	7.05	<0.02	-	0.765	-	-	0.25	0.6	0.785	28	37
TP_CPT5a (URS)	0m-1m	CPT5a_1-0m-1m	CLAY (CH): high plasticity, brownish grey, with some vegetation, wet, soft, (marine clay)	13/08/2009	8	1.5	6.5	4	4.7	0.07	-	2	-	-	-	2.07	2.07	97	97
	1m-2m	CPT5a_2-1m-2m	CLAY (CH): high plasticity, brownish grey, with some vegetation, wet, soft, (marine clay)	13/08/2009	8.3	1.4	6.9	4	5.2	0.04	-	2.07	-	-	-	2.11	2.11	99	99
	3m-3.5m	CPT5a_3-3m-3.5m	'CLAY (CL): low plasticity, dark grey, gravel and shells, wet, firm, (marine clay).	13/08/2009	8.2	1.5	6.7	4	6.2	<0.02	-	1.46	-	-	-	1.47	1.48	69	69
TP_CPT6 (URS)	0m-1.0m	CPT6_1-0m-1.0m	CLAY (CL); low plasticity, grey, with some vegetation, wet, very soft, (marine clay).	13/08/2009	8.6	1.5	7.1	4	7	<0.02	-	1.85	-	-	0.21	1.7	1.87	80	88
	1.0m-3.0m	CPT6_2-1.0m-3.0m	CLAY (CL); low plasticity, grey, with some vegetation, wet, very soft, (marine clay).	13/08/2009	8.4	1.4	7	4	6.7	<0.02	-	1.78	-	-	0.22	1.63	1.8	76	84
CPT11 (URS)	0.5m	CPT11_1-0.5m	Marine Clay (samples taken from push tube)	12/08/2009	7.9	1.8	6.1	2	6.2	<0.02	-	0.86	-	-	-	0.87	0.88	41	41
	1.5m	CPT11_3-1.5m	Marine Clay (samples taken from push tube)	12/08/2009	8.4	5.4	3	2	6.6	<0.02	-	<0.02	-	-	0.05	<0.02	0.04	<1	2
TP_CPT12 (URS)	1m	CPT12_1-1m	CLAY (CH): high plasticity, grey, with some vegetation, moist, very soft, (marine clay).	12/08/2009	7.9	1.3	6.6	4	4.9	0.07	-	3.32	-	-	-	3.39	3.39	159	159
	1.5m	CPT12_2-1.5m	CLAY (CH): high plasticity, grey, with some vegetation, wet, very soft, (marine clay).	12/08/2009	8	1.8	6.2	2	5.5	0.04	-	3.18	-	-	-	3.23	3.22	151	151
	2m	CPT12_3-2m	'CLAY, high plasticity, greenish grey, fine sand , moist, medium dense, (marine clay).	12/08/2009	8.2	1.5	6.7	4	6.1	<0.02	-	3.09	-	-	-	3.11	3.11	146	146
	2.5m	CPT12_4-2.5m	'CLAY, high plasticity, greenish grey, fine sand , moist, medium dense, (marine clay).	12/08/2009	8.1	1.5	6.6	4	5.9	0.03	-	3.42	-	-	-	3.45	3.45	161	161
	3m	CPT12_5-3m	'CLAY, high plasticity, greenish grey, fine sand , moist, medium dense, (marine clay).	12/08/2009	8.4	2.3	6.1	2	8.1	<0.02	-	0.62	-	-	0.38	0.36	0.64	17	30
TP_CPT13 (URS)	1.0m	CPT13_2-1.0m	trace of gravel, subangular gravel, moist, soft, (marine clay).	11/08/2009	6.6	3.4	3.2	2	6.1	<0.02	-	<0.02	-	-	-	<0.02	0.04	<1	2
	1.5m	CPT13_4-1.5m	CLAY (CL); Low plasticity, brown with light green, gravel, moist, very stiff, (marine clay).	11/08/2009	5.9	3	2.9	2	6.1	<0.02	-	0.02	-	-	-	0.04	0.04	2	2

Table 1: URS and GeoCoastal ASS Soil Analytical Results

Sample Location	Sample Depth (m)	Sample ID	Sample Description	Sample Date	pH_F value	pH_{FOX} value	Δ pH	pH_{FOX} Reaction Rate[1]	pH KCl	TAA (Titratable Actual Acidity)	S KCL (KCl Extractable Sulfur)	S_{CR} (Chromium Reducible Sulfur)	S_{NAS} (Net Acid Soluble Sulfur)	S_{HCL} (HCL Extractable Sulfur)	ANC_E (Excess ANC)	Net Acidity[2] (includes ANC)	Net Acidity[3] (excludes ANC)	Liming Rate[4] (includes ANC)	Liming Rate[4] (excludes ANC)
									Method Code: 23A	Method Code: 23F	Method Code: 23C	Method Code: 22B	Method Code: 20J	Method Code: 20B	Method Code: 23Q				
									pH Units	% S	% S	% S	% S	% S	% S	% S	% S	(kg Aglime /tonne)	(kg Aglime /tonne)
TP2 (URS)	0.3m	TP2-1-0.3m	SILT (ML); low plasticity, red brown, with a trace of vegetation, moist, very stiff, (residual soil).	16/08/2009	**5.2**	**3.3**	**1.9**	**2**	**4.1**	**0.14**	<0.02	**0.03**	<0.02	**0.02**	-	**0.17**	**0.17**	**8**	8
	2.5m	TP2-2-2.5m	CLAY (CH); high plasticity, light yellow grey, with some gravel, subangular gravel, dry, hard	16/08/2009	**5.6**	**3.5**	**2.1**	**2**	**4.5**	**0.06**	-	**0.02**	-	-	-	**0.08**	**0.08**	**4**	4
NEW TP2 (URS)	0.5m	NEW_TP2-1-0.5m	SILT (ML); low plasticity, grey, subangular gravel, moist, stiff, (residual soil).	17/08/2009	**5**	**2.7**	**2.3**	**2**	**5**	**0.03**	-	<0.02	-	-	-	**0.03**	**0.05**	**1**	2
	1.5m	NEW_TP2-2-1.5m	CLAY (CH); medium plasticity, greyish brown, moist, very stiff, (residual soil).	17/08/2009	**6.2**	**3.8**	**2.4**	**2**	**5.3**	**0.03**	-	<0.02	-	-	-	**0.03**	**0.05**	**1**	2
	3.5m	NEW_TP2-3-3.5m	CLAY (CH); high plasticity, greyish brown, gravel, moist, very stiff, (residual soil).	17/08/2009	**6.3**	**4.1**	**2.2**	**2**	**5.4**	**0.02**	-	<0.02	-	-	-	**0.02**	**0.04**	<1	2
TP3 (URS)	0.3m	TP3-1-0.3m	SILT (ML): low plasticity, grey, gravel, dry, firm, (residual soil).	16/08/2009	**5.8**	**3**	**2.8**	**2**	**5**	**0.04**	-	<0.02	-	-	-	**0.04**	**0.06**	**2**	3
	1.5m	TP3 2-1.5m	gravel, subangular gravel, moist, very stiff, (residual soil).	11/08/2009	**5.7**	**3.7**	**2**	**3**	**4.3**	**0.08**	<0.02	<0.02	<0.02	<0.02	-	**0.08**	**0.16**	**4**	7
	3mm	TP3 3-3mm	CLAY (CH): high plasticity, grey with mottled brown, gravel, moist, hard, (residual soil).	16/08/2009	**5**	**3.8**	**1.2**	**2**	**4.3**	**0.05**	<0.02	<0.02	<0.02	<0.02	-	**0.05**	**0.13**	**2**	6
TP4 (URS)	0.3m	TP4 1-0.3m	SILT (ML): low plasticity, grey, subangular gravel, dry, firm, (residual soil).	16/08/2009	**6.2**	**3.5**	**2.7**	**2**	**4.7**	**0.04**	-	<0.02	-	-	-	**0.04**	**0.06**	**2**	3
	2.5m	TP4 2-2.5m	CLAY (CI): medium plasticity, grey with mottled white,trace gravel, moist, stiff, (residual soil).	16/08/2009	**6.6**	**4.6**	**2**	**1**	**4.8**	**0.02**	-	<0.02	-	-	-	**0.02**	**0.04**	**1**	2
	3.5m	TP4 3-3.5m	CLAY (CI): medium plasticity, brownish white, gravel, moist, stiff, (residual soil).	16/08/2009	**6**	**4**	**2**	**1**	**5**	<0.02	-	<0.02	-	-	-	<0.02	**0.04**	<1	2
TP5 (URS)	0.5m	TP5 1-0.5m	CLAY (CL): low plasticity, grey, gravel, dry, firm, (residual soil).	16/08/2009	**5.8**	**2.3**	**3.5**	**3**	**5.1**	<0.02	-	<0.02	-	-	-	<0.02	**0.04**	<1	2
	3m	TP5 2-3m	some gravel, subangular gravel, moist, stiff, (residual soil).	16/08/2009	**5.5**	**4.3**	**1.2**	**1**	**4.7**	**0.02**	-	<0.02	-	-	-	**0.02**	**0.04**	<1	2
TP6 (URS)	0.5m	TP6 1-0.5m	SILT (ML); low plasticity, light grey, gravel, moist, firm, (residual soil).	17/08/2009	**5.8**	**2.7**	**3.1**	**2**	**4.3**	**0.08**	<0.02	<0.02	<0.02	<0.02	-	**0.08**	**0.16**	**4**	7
	2.5m	TP6 2-2.5m	CLAY (CI); medium plasticity, reddish brown, gravel moist, stiff, (residual soil).	17/08/2009	**7.7**	**5.5**	**2.2**	**1**	**6**	<0.02	-	<0.02	-	-	-	<0.02	**0.04**	<1	2
TP8 (URS)	0.3m	TP8 1-0.3m	CLAY (CH); high plasticity, light grey, gravel, moist, firm, (residual soil).	16/08/2009	**5**	**3.4**	**1.6**	**2**	**4.4**	**0.08**	<0.02	<0.02	**0.02**	**0.02**	-	**0.12**	**0.16**	**5**	7
	1m	TP8 2-1m	CLAY (CH); high plasticity, light grey, gravel, moist, firm, (residual soil).	16/08/2009	**4.9**	**3.5**	**1.4**	**2**	**4.2**	**0.08**	<0.02	<0.02	**0.03**	**0.03**	-	**0.1**	**0.18**	**5**	8
	3.5m	TP8 3-3.5m	CLAY (CI); medium plasticity, reddish brown, gravel moist, very stiff, (residual soil).	16/08/2009	**5.1**	**3.8**	**1.3**	**1**	**3.9**	**0.11**	<0.02	<0.02	<0.02	<0.02	-	**0.11**	**0.19**	**5**	9
TP9 (URS)	0.3m	TP9 1-0.3m	CLAY (CL): low plasticity, grey, gravel, moist, firm, (residual soil).	16/08/2009	**6.1**	**3.6**	**2.5**	**2**	**4.9**	**0.04**	-	**0.02**	-	-	-	**0.06**	**0.06**	**3**	3
	2m	TP9 2-2m	CLAY (CI): medium plasticity, reddish brown, with some gravel, moist, har, (residual soil).	16/08/2009	**6.1**	**4.2**	**1.9**	**1**	**5.2**	**0.03**	-	<0.02	-	-	-	**0.03**	**0.05**	**1**	2
TP10 (URS)	0.5m	TP10 1-0.5m	SILT(ML): low plasticity, light grey, gravel, dry, firm, (residual soil).	16/08/2009	**6.3**	**2.8**	**3.5**	**3**	**5**	**0.03**	-	<0.02	-	-	-	**0.03**	**0.05**	**1**	2
	2.5m	TP10 2-2.5m	some gravel, subangular gravel, moist, hard, (residual soil).	16/08/2009	**4.9**	**3**	**1.9**	**2**	**4.5**	**0.05**	-	<0.02	-	-	-	**0.05**	**0.07**	**2**	3
TP11 (URS)	0.3m	TP11 1-0.3m	SILT (ML): low plasticity, light grey, gravel, moist, firm, (residual soil).	16/08/2009	**6**	**2.8**	**3.2**	**3**	**4.8**	**0.04**	-	<0.02	-	-	-	**0.04**	**0.06**	**2**	3
	1m	TP11 2-1m	CLAY (CL): low plasticity, reddish brown, gravel, sand, moist, stiff, (residual soil).	16/08/2009	**5**	**2.9**	**2.1**	**2**	**4.6**	**0.04**	-	<0.02	-	-	-	**0.06**	**0.06**	**3**	3
	3.5m	TP11 3-3.5m	CLAY (CH): high plasticity, dark brown,gravel, moist, very stiff, (residual soil).	16/08/2009	**5**	**3.4**	**1.6**	**2**	**4.7**	**0.05**	-	<0.02	-	-	-	**0.05**	**0.07**	**2**	3

Table 1: URS and GeoCoastal ASS Soil Analytical Results

Sample Location	Sample Depth (m)	Sample ID	Sample Description	Sample Date	pH_F value	pH_{FOX} value	Δ pH	pH_{FOX} Reaction Rate[1]	pH KCl	TAA (Titratable Actual Acidity)	S KCL (KCl Extractable Sulfur)	S_{CR} (Chromium Reducible Sulfur)	S_{NAS} (Net Acid Soluble Sulfur)	S_{HCL} (HCL Extractable Sulfur)	ANC_E (Excess ANC)	Net Acidity[2] (includes ANC)	Net Acidity[3] (excludes ANC)	Liming Rate[4] (includes ANC)	Liming Rate[4] (excludes ANC)
									Method Code: 23A	Method Code: 23F	Method Code: 23C	Method Code: 22B	Method Code: 20J	Method Code: 20B	Method Code: 23Q				
									pH Units	% S	% S	% S	% S	% S	% S	% S	% S	(kg Aglime /tonne)	(kg Aglime /tonne)
BH70 (GC)	0.1	BH70 0.1	na	2/09/2008	7.9	8.01	-0.11	4	-	-	-	-	-	-	-	-	-	-	-
	0.25	BH70 0.25	na	2/09/2008	7.33	0.98	6.35	4s	-	-	-	-	-	-	-	-	-	-	-
	0.5	BH70 0.5	na	2/09/2008	6.93	0.99	5.94	4s	-	-	-	-	-	-	-	-	-	-	-
	0.75	BH70 0.75	na	2/09/2008	6.87	1.08	5.79	4s	-	-	-	-	-	-	-	-	-	-	-
	1	BH70 1.0	na	2/09/2008	6.97	1.31	5.66	4s	-	-	-	-	-	-	-	-	-	-	-
	0.3-0.5	GLNG#70 0.3-0.5m	na	2/09/2008	-	-	-	-	3.7	0.14	-	1.92	0.01	-	-	2.06	2.07	97	97
	0.8-1.0	GLNG#70 0.8-1.0m	na	2/09/2008	-	-	-	-	3.8	0.14	-	3.32	0.01	-	-	3.46	3.47	162	162
BH71 (GC)	0.3-0.5	GLNG#71 0.3-0.5m	na	2/09/2008	-	-	-	-	3.5	0.18	-	5.22	0.01	-	-	5.4	5.41	253	253
	0.8-1.0	GLNG#71 0.8-1.0m	na	2/09/2008	-	-	-	-	3.4	0.18	-	3.2	0.01	-	-	3.38	3.39	158	159
BH 72 (GC)	0.1	BH72 0.1	na	2/09/2008	7.88	6.08	1.8	2	-	-	-	-	-	-	-	-	-	-	-
	0.25	BH72 0.25	na	2/09/2008	6.87	2.73	4.14	2	-	-	-	-	-	-	-	-	-	-	-
	0.5	BH72 0.5	na	2/09/2008	6.29	0.8	5.49	4s	-	-	-	-	-	-	-	-	-	-	-
	0.65	BH72 0.65	na	2/09/2008	6.13	0.98	5.15	4s	-	-	-	-	-	-	-	-	-	-	-
	0.3-0.5	GLNG#72 0.3-0.5m	na	2/09/2008	-	-	-	-	4.6	0.04	-	1.3	-	-	-	1.34	1.34	63	63
	0.8-1.0	GLNG#72 0.8-1.0m	na	2/09/2008	-	-	-	-	5.6	0.01	-	1.3	-	-	-	1.31	1.31	61	61
BH73 (GC)	0.1	BH73 0.1	na	2/09/2008	7.29	6.98	0.31	4	-	-	-	-	-	-	-	-	-	-	-
	0.25	BH73 0.25	na	2/09/2008	6.57	1.48	5.09	3s	-	-	-	-	-	-	-	-	-	-	-
	0.5	BH73 0.5	na	2/09/2008	6.77	1.36	5.41	4s	-	-	-	-	-	-	-	-	-	-	-
	0.75	BH73 0.75	na	2/09/2008	6.57	1.27	5.3	4s	-	-	-	-	-	-	-	-	-	-	-
	1	BH73 1.0	na	2/09/2008	7.07	1.23	5.84	4s	-	-	-	-	-	-	-	-	-	-	-
	0-0.1	GLNG#73 0.0-0.1m	na	2/09/2008	-	-	-	-	7.8	0.01	-	0.05	-	-	0.24	0.01	0.06	<1	3
	0.3-0.5	GLNG#73 0.3-0.5m	na	2/09/2008	-	-	-	-	6	0.01	-	0.58	-	-	-	0.58	0.59	27	28
	0.8-1.0	GLNG#73 0.8-1.0m	na	2/09/2008	-	-	-	-	4.3	0.06	-	1.44	0.01	-	-	1.5	1.51	70	71
BH74 (GC)	0.1	BH74 0.1	na	2/09/2008	8.04	6.55	1.49	2	-	-	-	-	-	-	-	-	-	-	-
	0.25	BH74 0.25	na	2/09/2008	5.77	1.03	4.74	3s	-	-	-	-	-	-	-	-	-	-	-
	0.5	BH74 0.5	na	2/09/2008	6.26	1.07	5.19	4s	-	-	-	-	-	-	-	-	-	-	-
	0.75	BH74 0.75	na	2/09/2008	6.46	1.02	5.44	4s	-	-	-	-	-	-	-	-	-	-	-
	1	BH74 1.0	na	2/09/2008	6.95	0.75	6.2	4s	-	-	-	-	-	-	-	-	-	-	-
	0.3-0.5	GLNG#74 0.3-0.5m	na	2/09/2008	-	-	-	-	4.2	0.06	-	1.59	0.01	-	-	1.66	1.66	77	78
	0.8-1.0	GLNG#74 0.8-1.0m	na	2/09/2008	-	-	-	-	4.1	0.07	-	2.48	0.01	-	-	2.56	2.56	120	120
BH75 (GC)	0.1	BH75 0.1	na	2/09/2008	7.54	5.89	1.65	4s	-	-	-	-	-	-	-	-	-	-	-
	0.25	BH75 0.25	na	2/09/2008	5.14	0.79	4.35	2	-	-	-	-	-	-	-	-	-	-	-
	0.5	BH75 0.5	na	2/09/2008	4.56	0.94	3.62	3s	-	-	-	-	-	-	-	-	-	-	-
	0.3-0.5	GLNG#75 0.3-0.5m	na	2/09/2008	-	-	-	-	4.2	0.08	-	3.18	0.01	-	-	3.26	3.27	152	153
BH76 (GC)	0.1	BH76 0.1	na	2/09/2008	8.04	7.62	0.42	4s	-	-	-	-	-	-	-	-	-	-	-
	0.25	BH76 0.25	na	2/09/2008	4.44	3.35	1.09	1	-	-	-	-	-	-	-	-	-	-	-
	0.5	BH76 0.5	na	2/09/2008	5.53	1.04	4.49	3s	-	-	-	-	-	-	-	-	-	-	-
	0.3-0.5	GLNG#76 0.3-0.5m	na	2/09/2008	-	-	-	-	4.7	0.01	-	0.7	-	-	-	0.71	0.71	33	33
BH77 (GC)	0.1	BH77 0.1	na	2/09/2008	7.93	6.39	1.54	2	-	-	-	-	-	-	-	-	-	-	-
	0.25	BH77 0.25	na	2/09/2008	4.15	4.14	0.01	3s	-	-	-	-	-	-	-	-	-	-	-
	0.5	BH77 0.5	na	2/09/2008	4.35	0.83	3.52	4s	-	-	-	-	-	-	-	-	-	-	-
	0.75	BH77 0.75	na	2/09/2008	5.04	1.02	4.02	4s	-	-	-	-	-	-	-	-	-	-	-
	1	BH77 1.0	na	2/09/2008	6.31	0.79	5.52	4s	-	-	-	-	-	-	-	-	-	-	-
	0.3-0.5	GLNG#77 0.3-0.5m	na	2/09/2008	-	-	-	-	3.9	0.12	-	2.56	0.01	-	-	2.68	2.69	125	126
	0.8-1.0	GLNG#77 0.8-1.0m	na	2/09/2008	-	-	-	-	4.3	0.07	-	1.44	0.01	-	-	1.5	1.52	70	71

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Sample Location	Sample Depth (m)	Sample ID	Sample Description	Sample Date	pH_F value	pH_{FOX} value	Δ pH	pH_{FOX} Reaction Rate[1]	pH KCl	TAA (Titratable Actual Acidity)	S KCL (KCl Extractable Sulfur)	S_{CR} (Chromium Reducible Sulfur)	S_{NAS} (Net Acid Soluble Sulfur)	S_{HCL} (HCL Extractable Sulfur)	ANC_E (Excess ANC)	Net Acidity[2] (includes ANC)	Net Acidity[3] (excludes ANC)	Liming Rate[4] (includes ANC)	Liming Rate[4] (excludes ANC)
									Method Code: 23A	Method Code: 23F	Method Code: 23C	Method Code: 22B	Method Code: 20J	Method Code: 20B	Method Code: 23Q				
									pH Units	% S	% S	% S	% S	% S	% S	% S	% S	(kg Aglime /tonne)	(kg Aglime /tonne)
BH78 (GC)	0.1	BH78 0.1	na	2/09/2008	**8.24**	**6.48**	**1.76**	**2**	-	-	-	-	-	-	-	-	-	-	-
	0.25	BH78 0.25	na	2/09/2008	**6.23**	**5.12**	**1.11**	**1**	-	-	-	-	-	-	-	-	-	-	-
	0.5	BH78 0.5	na	2/09/2008	**7.47**	**2.23**	**5.24**	**2**	-	-	-	-	-	-	-	-	-	-	-
	0.75	BH78 0.75	na	2/09/2008	**8.15**	**0.99**	**7.16**	**3**	-	-	-	-	-	-	-	-	-	-	-
	1	BH78 1.0	na	2/09/2008	**7.82**	**0.89**	**6.93**	**2**	-	-	-	-	-	-	-	-	-	-	-
	0-0.1	GLNG#78 0.0-0.1m	na	2/09/2008	-	-	-	-	**7.4**	**0.01**	-	**0.04**	-	-	**0.44**	**0.01**	**0.05**	**<1**	**2**
	0.3-0.5	GLNG#78 0.3-0.5m	na	2/09/2008	-	-	-	-	**5.6**	**0.01**	-	**0.58**	-	-	-	**0.59**	**0.59**	**28**	**28**
	0.8-1.0	GLNG#78 0.8-1.0m	na	2/09/2008	-	-	-	-	**6.5**	**0.01**	-	**0.78**	-	-	**0.11**	**0.7**	**0.79**	**33**	**37**
BH79 (GC)	0.1	BH79 0.1	na	2/09/2008	**8.08**	**6.25**	**1.83**	**2**	-	-	-	-	-	-	-	-	-	-	-
	0.25	BH79 0.25	na	2/09/2008	**5.27**	**4.43**	**0.84**	**1**	-	-	-	-	-	-	-	-	-	-	-
	0.5	BH79 0.5	na	2/09/2008	**4.28**	**1.5**	**2.78**	**1**	-	-	-	-	-	-	-	-	-	-	-
	0.75	BH79 0.75	na	2/09/2008	**5.84**	**0.97**	**4.87**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	1	BH79 1.0	na	2/09/2008	**7.31**	**4.81**	**2.5**	**2**	-	-	-	-	-	-	-	-	-	-	-
	0.3-0.5	GLNG#79 0.3-0.5m	na	2/09/2008	-	-	-	-	**4.5**	**0.04**	-	**0.62**	-	-	-	**0.67**	**0.66**	**31**	**31**
	0.8-1.0	GLNG#79 0.8-1.0m	na	2/09/2008	-	-	-	-	**5.3**	**0.01**	-	**1.51**	-	-	-	**1.53**	**1.52**	**72**	**71**
BH80 (GC)	0.1	BH80 0.1	na	2/09/2008	**7.73**	**6.24**	**1.49**	**2s**	-	-	-	-	-	-	-	-	-	-	-
	0.25	BH80 0.25	na	2/09/2008	**4.83**	**4.06**	**0.77**	**1**	-	-	-	-	-	-	-	-	-	-	-
	0.5	BH80 0.5	na	2/09/2008	**5.13**	**1.43**	**3.7**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	0.75	BH80 0.75	na	2/09/2008	**6.85**	**1.32**	**5.53**	**2**	-	-	-	-	-	-	-	-	-	-	-
	1	BH80 1.0	na	2/09/2008	**7.34**	**1.42**	**5.92**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	0.3-0.5	GLNG#80 0.3-0.5m	na	2/09/2008	-	-	-	-	**5**	**0.02**	-	**0.58**	-	-	-	**0.6**	**0.6**	**28**	**28**
	0.8-1.0	GLNG#80 0.8-1.0m	na	2/09/2008	-	-	-	-	**6.3**	**0.01**	-	**0.54**	-	-	-	**0.54**	**0.55**	**26**	**26**
BH81 (GC)	0.1	BH81 0.1	na	2/09/2008	**8.09**	**6.76**	**1.33**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	0.25	BH81 0.25	na	2/09/2008	**5.3**	**4.17**	**1.13**	**1**	-	-	-	-	-	-	-	-	-	-	-
	0.5	BH81 0.5	na	2/09/2008	**6.01**	**1.49**	**4.52**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	0.75	BH81 0.75	na	2/09/2008	**7.36**	**1.35**	**6.01**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	1	BH81 1.0	na	2/09/2008	**7.58**	**1.19**	**6.39**	**2**	-	-	-	-	-	-	-	-	-	-	-
	0.3-0.5	GLNG#81 0.3-0.5m	na	2/09/2008	-	-	-	-	**5.4**	**0.01**	-	**0.81**	-	-	-	**0.83**	**0.82**	**39**	**38**
	0.8-1.0	GLNG#81 0.8-1.0m	na	2/09/2008	-	-	-	-	**6.7**	**0.01**	-	**0.7**	-	-	**0.21**	**0.56**	**0.71**	**26**	**33**
BH82 (GC)	0.1	BH82 0.1	na	2/09/2008	**8.16**	**7.82**	**0.34**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	0.25	BH82 0.25	na	2/09/2008	**7.36**	**1.16**	**6.2**	**2**	-	-	-	-	-	-	-	-	-	-	-
	0.5	BH82 0.5	na	2/09/2008	**7.52**	**1.58**	**5.94**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	0.75	BH82 0.75	na	2/09/2008	**7.57**	**1.54**	**6.03**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	1	BH82 1.0	na	2/09/2008	**7.48**	**1.18**	**6.3**	**2**	-	-	-	-	-	-	-	-	-	-	-
	0.3-0.5	GLNG#82 0.3-0.5m	na	2/09/2008	-	-	-	-	**6.5**	**0.01**	-	**1.47**	-	-	**0.25**	**1.31**	**1.48**	**61**	**69**
	0.8-1.0	GLNG#82 0.8-1.0m	na	2/09/2008	-	-	-	-	**6.6**	**0.01**	-	**1.07**	-	-	**0.26**	**0.89**	**1.08**	**42**	**51**
BH83 (GC)	0.1	BH83 0.1	na	2/09/2008	**8.13**	**7.01**	**1.12**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	0.25	BH83 0.25	na	2/09/2008	**5.01**	**0.9**	**4.11**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	0.5	BH83 0.5	na	2/09/2008	**6.66**	**1.24**	**5.42**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	0.75	BH83 0.75	na	2/09/2008	**6.9**	**1.04**	**5.86**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	1	BH83 1.0	na	2/09/2008	**7.13**	**1.06**	**6.07**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	0-0.1	GLNG#83 0.0-0.1m	na	2/09/2008	-	-	-	-	**3.8**	**0.11**	-	**3.41**	**0.01**	-	-	**3.52**	**3.53**	**165**	**165**
	0.3-0.5	GLNG#83 0.3-0.5m	na	2/09/2008	-	-	-	-	**6.7**	**0.01**	-	**0.49**	-	-	**0.61**	**0.08**	**0.5**	**4**	**23**
	0.8-1.0	GLNG#83 0.8-1.0m	na	2/09/2008	-	-	-	-	**4.4**	**0.07**	-	**1.71**	**0.01**	-	-	**1.77**	**1.79**	**83**	**84**
BH84 (GC)	0.1	BH84 0.1	na	2/09/2008	**8.1**	**6.88**	**1.22**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	0.25	BH84 0.25	na	2/09/2008	**7.47**	**0.95**	**6.52**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	0.5	BH84 0.5	na	2/09/2008	**7.03**	**0.94**	**6.09**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	0.75	BH84 0.75	na	2/09/2008	**6.78**	**0.98**	**5.8**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	1	BH84 1.0	na	2/09/2008	**6.96**	**1.18**	**5.78**	**4s**	-	-	-	-	-	-	-	-	-	-	-
	0.3-0.5	GLNG#84 0.3-0.5m	na	2/09/2008	-	-	-	-	**4.1**	**0.06**	-	**1.82**	**0.01**	-	-	**1.88**	**1.89**	**88**	**88**
	0.8-1.0	GLNG#84 0.8-1.0m	na	2/09/2008	-	-	-	-	**3.9**	**0.1**	-	**2.87**	**0.01**	-	-	**2.98**	**2.98**	**139**	**139**

Notes:

1. pH_{FOX} Reaction Rate: 1 - slight, 2 - Moderate, 3 - Vigorous, 4 - Very vigorous, s - evolution of sulphide gas
2. net acidity including ANC = (sTAA)+(S_{CR})+(sS_{NAS})-(ANC/Fineness Factor) or (sTAA)+(S_{POS})+(sS_{NAS})-(ANC/Fineness Factor)
3. net acidity excluding ANC = s-TAA + S_{CR} + s-S_{NAS} or s-TAA + S_{POS}+s-S_{NAS}
4. Liming rate = %S x 30.59 x 1.02 x 1.5 where 30.59 converts to H_2SO_4, 1.02 converts to $CaCO_3$ and 1.5 is the safety factor

Table 3: Analysis Results for Leachable Metals
GLNG DMPF ASS Assessment

Location										TP_CPT1		TP_CPT2		TP_CPT4		
Depth (mbg)										0-1.5m	1.5-2.5m	1.0m-2.0m	3.0m-3.5m	0m-1m	1m-2m	2m-3m
Sample ID										CPT1 1-0-1.5m	CPT1 2-1.5-2.5m	CPT2 1-1.0m-2.0m	CPT2 2-3.0m-3.5m	CPT4 1-0m-1m	CPT4 2-1m-2m	CPT4 3-2m-3m
Date Sampled										15/08/2009	15/08/2009	15/08/2009	15/08/2009	14/08/2009	14/08/2009	14/08/2009
Sample Type										Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample
Primary Sample ID										CPT1 1-0-1.5m	CPT1 2-1.5-2.5m	CPT2 1-1.0m-2.0m	CPT2 2-3.0m-3.5m	CPT4 1-0m-1m	CPT4 2-1m-2m	CPT4 3-2m-3m
Laboratory										ALS	ALS	ALS	ALS	ALS	ALS	ALS
Batch No.										EB0913021	EB0913021	EB0913021	EB0913021	EB0913021	EB0913021	EB0913021
Analyte	**LOR**	**Units**	**ANZECC 2000 - Freshwater - 95%**	**ANZECC 2000 - Marine Water - 95%**	**ANZECC 2000 - Irrigation - LTU**	**ANZECC 2000 - Irrigation - STU**	**ANZECC 2000 - Livestock - Beef**	**ANZECC 2000 - Livestock (sheep drinking water)**	**ADWG 2004 - Health**							
Physico-Chemical Parameters																
Initial pH	0.1	ph units	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
Final pH	0.1	ph unit	ne	ne	ne	ne	ne	ne	ne	**2.5**	**2.8**	**3.2**	**3**	**3.2**	**2.2**	**2.5**
Metals (Leachable)																
Aluminium	0.1	mg/L	0.055	ne	5	20	5.6	5.1	0.2	**0.3**	**3.33**	<0.1*	**0.15**	**0.27**	**0.37**	**0.48**
Antimony	0.01	mg/L	ne	ne	ne	ne	ne	ne	0.003	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Arsenic	0.01	mg/L	0.013	ne	0.1	2	0.5	0.5	0.007	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Barium	0.1	mg/L	ne	ne	ne	ne	ne	ne	0.7	**0.6**	**0.9**	**0.3**	**0.3**	**0.5**	**0.2**	**0.2**
Beryllium	0.01	mg/L	0.00013	ne	0.1	0.5	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	0.1	mg/L	0.37	ne	0.5	15	7	6.2	4	**1**	**1.6**	**0.5**	**0.2**	**1.3**	**0.2**	**0.2**
Cadmium	0.005	mg/L	0.0002	0.0055	0.01	0.05	0.01	0.01	0.002	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*
Chromium	0.01	mg/L	0.001	0.0044	0.1	1	1	1	0.05	<0.01*	**0.01**	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Cobalt	0.01	mg/L	0.09	0.001	0.05	0.1	1	1	ne	**0.1**	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Copper	0.01	mg/L	0.0014	0.0013	0.2	5	1	0.4	2	<0.01*	**0.03**	<0.01*	<0.01*	<0.01*	<0.01*	**0.02**
Iron	0.05	mg/L	0.3	ne	0.2	10	ne	ne	0.3	**0.12**	**4.08**	<0.05	**0.09**	**0.18**	**0.17**	**0.22**
Lead	0.01	mg/L	0.0034	0.0044	2	5	0.1	0.1	0.01	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Manganese	0.01	mg/L	1.9	ne	0.2	10	ne	ne	0.5	<0.01	**0.03**	**0.01**	<0.01	**0.01**	**0.02**	<0.01
Mercury	0.0001	mg/L	0.0006	0.0004	0.002	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.01	mg/L	0.011	0.07	0.2	2	1	1	0.02	**0.03**	**0.02**	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	0.01	mg/L	0.011	ne	0.02	0.05	0.02	0.02	0.01	<0.01	**0.01**	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	<0.01	**0.03**	<0.01	<0.01	**0.01**	**0.01**	**0.02**
Tungsten	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.01	0.1	0.2	0.2	0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	0.01	mg/L	ne	0.1	0.1	0.5	ne	ne	ne	**0.07**	**0.02**	**0.02**	<0.01	<0.01	**0.08**	**0.07**
Zinc	0.01	mg/L	0.008	0.015	2	5	20	20	3	**1.54**	**2.44**	**0.68**	**0.54**	**0.84**	**0.11**	**0.12**

Legend:

Exceeds the ANZECC/ARMCANZ, 2000, Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ, 2000, Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ, 2000, Irrigation Trigger Values - Long Term Use

Exceeds the ANZECC/ARMCANZ, 2000, Irrigation Trigger Values - Short Term Use

Exceeds the ANZECC/ARMCANZ, 2000, Livestock Watering - Beef Cattle

Exceeds the ANZECC and ARMCANZ, 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand

Exceeds the National Health and Medical Research Council (NHMR, 2004, Australian Drinking Water Guidelines 6, 2004 (Health).

- Not Analysed

* LOR Exceeds Guideline Trigger Value

Table 3: Analysis Results for Leachable Metals
GLNG DMPF ASS Assessment

Location										TP_CPT4b		TP_CPT5							
Depth (mbg)										1.0m-2.0m	3m-4m	0m-0.5m	0.5m-1m	1.0m-1.5m	1.5m-2m	2.0m-3m	2.0m-3m	2.0m-3m	
Sample ID										CPT4b 1-1.0m-2.0m	CPT4b 2-3m-4m	CPT5_1-0m-0.5m	CPT5_2-0.5m-1m	CPT5_3-1.0m-1.5m	CPT5_4-1.5m-2m	CPT5_5-2.0m-3m	QC01	QC02	
Date Sampled										15/08/2009	15/08/2009	13/08/2009	13/08/2009	13/08/2009	13/08/2009	13/08/2009	13/08/2009	13/08/2009	
Sample Type										Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Duplicate Sample	Triplicate Sample	
Primary Sample ID										CPT4b 1-1.0m-2.0m	CPT4b 2-3m-4m	CPT5_1-0m-0.5m	CPT5_2-0.5m-1m	CPT5_3-1.0m-1.5m	CPT5_4-1.5m-2m	CPT5_5-2.0m-3m	CPT5_5-2.0m-3m	CPT5_5-2.0m-3m	
Laboratory										ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS	Labmark	
Batch No.										EB0913021	EB0913021	EB0912892	EB0912892	EB0912892	EB0912892	EB0912892	EB0912892	E044152	
Analyte	**LOR**	**Units**	**ANZECC 2000 - Freshwater - 95%**	**ANZECC 2000 - Marine Water - 95%**	**ANZECC 2000 - Irrigation - LTU**	**ANZECC 2000 - Irrigation - STU**	**ANZECC 2000 - Livestock - Beef**	**ANZECC 2000 - Livestock (sheep drinking water)**	**ADWG 2004 - Health**										
Physico-Chemical Parameters																			
Initial pH	0.1	ph units	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	**6.8**	
Final pH	0.1	ph unit	ne	ne	ne	ne	ne	ne	ne	**2.5**	**2.6**	**6.4**	**7.4**	**7.8**	**8**	**8.4**	**8.3**	**8**	
Metals (Leachable)																			
Aluminium	0.1	mg/L	0.055	ne	5	20	5.6	5.1	0.2	**0.6**	**0.34**	<0.1*	<0.1*	<0.1*	<0.1*	<0.1*	<0.1*	<0.02*	
Antimony	0.01	mg/L	ne	ne	ne	ne	ne	ne	0.003	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	-	
Arsenic	0.01	mg/L	0.013	ne	0.1	2	0.5	0.5	0.007	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	**0.008**	
Barium	0.1	mg/L	ne	ne	ne	ne	ne	ne	0.7	**0.2**	**0.6**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.12**	
Beryllium	0.01	mg/L	0.00013	ne	0.1	0.5	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	
Boron	0.1	mg/L	0.37	ne	0.5	15	7	6.2	4	**0.2**	**1.5**	**0.2**	**0.4**	**0.4**	**0.4**	**0.3**	**0.3**	**0.47**	
Cadmium	0.005	mg/L	0.0002	0.0055	0.01	0.05	0.01	0.01	0.002	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*	
Chromium	0.01	mg/L	0.001	0.0044	0.1	1	1	1	0.05	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	
Cobalt	0.01	mg/L	0.09	0.001	0.05	0.1	1	1	ne	<0.01*	<0.01*	**0.02**	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	
Copper	0.01	mg/L	0.0014	0.0013	0.2	5	1	0.4	2	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	
Iron	0.05	mg/L	0.3	ne	0.2	10	ne	ne	0.3	**0.26**	**0.06**	<0.05	<0.05	**0.08**	<0.05	**0.15**	<0.05	<0.5	
Lead	0.01	mg/L	0.0034	0.0044	2	5	0.1	0.1	0.01	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.005*	
Manganese	0.01	mg/L	1.9	ne	0.2	10	ne	ne	0.5	**0.02**	**0.02**	**0.03**	**0.07**	<0.01	<0.01	<0.01	<0.01	<0.01	
Mercury	0.0001	mg/L	0.0006	0.0004	0.002	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	
Nickel	0.01	mg/L	0.011	0.07	0.2	2	1	1	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	
Selenium	0.01	mg/L	0.011	ne	0.02	0.05	0.02	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	
Titanium	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	**0.02**	<0.01	<0.01	<0.01	<0.01	<0.01	**0.02**	<0.01	-	
Tungsten	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	
Uranium	0.001	mg/L	ne	ne	0.01	0.1	0.2	0.2	0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	
Vanadium	0.01	mg/L	ne	0.1	0.1	0.5	ne	ne	ne	**0.16**	<0.01	<0.01	<0.01	**0.12**	**0.11**	**0.12**	**0.12**	**0.17**	
Zinc	0.01	mg/L	0.008	0.015	2	5	20	20	3	**0.2**	**2.36**	**0.09**	**0.07**	**0.01**	**0.02**	**0.01**	<0.01*	<0.01*	

Legend:

Exceeds the ANZECC/ARMCANZ, 2000, Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ, 2000, Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ, 2000, Irrigation Trigger Values - Long Term Use

Exceeds the ANZECC/ARMCANZ, 2000, Irrigation Trigger Values - Short Term Use

Exceeds the ANZECC/ARMCANZ, 2000, Livestock Watering - Beef Cattle

Exceeds the ANZECC and ARMCANZ, 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand

Exceeds the National Health and Medical Research Council (NHMR, 2004, Australian Drinking Water Guidelines 6, 2004 (Health).

- Not Analysed

* LOR Exceeds Guideline Trigger Value

Table 3: Analysis Results for Leachable Metals
GLNG DMPF ASS Assessment

Location										TP_CPT5a			TP_CPT6		TP_CPT11		TP_CPT13	
Depth (mbg)										0m-1m	1m-2m	3m-3.5m	0m-1.0m	1.0m-3.0m	0.5m	1.5m	1.0m	1.5m
Sample ID										CPT5a_1-0m-1m	CPT5a_2-1m-2m	CPT5a_3-3m-3.5m	CPT6_1-0m-1.0m	CPT6_2-1.0m-3.0m	CPT11_2-0.5m	CPT11_4-1.5m	CPT13_1-1.0m	CPT13_3-1.5m
Date Sampled										13/08/2009	13/08/2009	13/08/2009	13/08/2009	13/08/2009	12/08/2009	12/08/2009	11/08/2009	11/08/2009
Sample Type										Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample
Primary Sample ID										CPT5a_1-0m-1m	CPT5a_2-1m-2m	CPT5a_3-3m-3.5m	CPT6_1-0m-1.0m	CPT6_2-1.0m-3.0m	CPT11_2-0.5m	CPT11_4-1.5m	CPT13_1-1.0m	CPT13_3-1.5m
Laboratory										ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS
Batch No.										EB0912892	EB0912892	EB0912892	EB0912892	EB0912892	EB0912892	EB0912892	EB0912892	EB0912892
Analyte	**LOR**	**Units**	**ANZECC 2000 - Freshwater - 95%**	**ANZECC 2000 - Marine Water - 95%**	**ANZECC 2000 - Irrigation - LTU**	**ANZECC 2000 - Irrigation - STU**	**ANZECC 2000 - Livestock - Beef**	**ANZECC 2000 - Livestock (sheep drinking water)**	**ADWG 2004 - Health**									
Physico-Chemical Parameters																		
Initial pH	0.1	ph units	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
Final pH	0.1	ph unit	ne	ne	ne	ne	ne	ne	ne	**6.8**	**7.6**	**8**	**8**	**7.7**	**6.2**	**7.5**	**5.6**	**7.1**
Metals (Leachable)																		
Aluminium	0.1	mg/L	0.055	ne	5	20	5.6	5.1	0.2	<0.1*	<0.1*	<0.1*	<0.1*	<0.1*	<0.1*	<0.1*	<0.1*	<0.1*
Antimony	0.01	mg/L	ne	ne	ne	ne	ne	ne	0.003	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Arsenic	0.01	mg/L	0.013	ne	0.1	2	0.5	0.5	0.007	<0.01*	**0.01**	**0.01**	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Barium	0.1	mg/L	ne	ne	ne	ne	ne	ne	0.7	**0.3**	**0.2**	**0.2**	**0.2**	**0.1**	**0.2**	**0.3**	**0.3**	**0.3**
Beryllium	0.01	mg/L	0.00013	ne	0.1	0.5	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	0.1	mg/L	0.37	ne	0.5	15	7	6.2	4	<0.1	**0.2**	**0.2**	**0.4**	**0.4**	**0.2**	**0.2**	**0.2**	<0.1
Cadmium	0.005	mg/L	0.0002	0.0055	0.01	0.05	0.01	0.01	0.002	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*
Chromium	0.01	mg/L	0.001	0.0044	0.1	1	1	1	0.05	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Cobalt	0.01	mg/L	0.09	0.001	0.05	0.1	1	1	ne	<0.01*	<0.01*	<0.01*	<0.01*	**0.04**	<0.01*	<0.01*	<0.01*	<0.01*
Copper	0.01	mg/L	0.0014	0.0013	0.2	5	1	0.4	2	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Iron	0.05	mg/L	0.3	ne	0.2	10	ne	ne	0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.08**
Lead	0.01	mg/L	0.0034	0.0044	2	5	0.1	0.1	0.01	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Manganese	0.01	mg/L	1.9	ne	0.2	10	ne	ne	0.5	<0.01	**0.02**	**0.01**	<0.01	<0.01	**0.08**	**0.34**	**0.56**	<0.01
Mercury	0.0001	mg/L	0.0006	0.0004	0.002	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.01	mg/L	0.011	0.07	0.2	2	1	1	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	**0.03**	<0.01	<0.01	<0.01
Selenium	0.01	mg/L	0.011	ne	0.02	0.05	0.02	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.01**	<0.01
Titanium	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tungsten	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.01	0.1	0.2	0.2	0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	0.01	mg/L	ne	0.1	0.1	0.5	ne	ne	ne	**0.04**	**0.09**	**0.12**	**0.17**	**0.09**	**0.05**	<0.01	<0.01	<0.01
Zinc	0.01	mg/L	0.008	0.015	2	5	20	20	3	**0.14**	**0.02**	**0.02**	<0.01*	**0.02**	**0.11**	**0.03**	**0.17**	**0.05**

Legend:

Exceeds the ANZECC/ARMCANZ, 2000, Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ, 2000, Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ, 2000, Irrigation Trigger Values - Long Term Use

Exceeds the ANZECC/ARMCANZ, 2000, Irrigation Trigger Values - Short Term Use

Exceeds the ANZECC/ARMCANZ, 2000, Livestock Watering - Beef Cattle

Exceeds the ANZECC and ARMCANZ, 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand

Exceeds the National Health and Medical Research Council (NHMR, 2004, Australian Drinking Water Guidelines 6, 2004 (Health).

- Not Analysed

* LOR Exceeds Guideline Trigger Value

Table 3: Analysis Results for Leachable Metals
GLNG DMPF ASS Assessment

Location	NEW_TP2			TP3			TP6	
Depth (mbg)	0.5m	1.5m	3.5m	1.5m	3m	0.3m	0.5m	2.5m
Sample ID	NEW_TP2-1-0.5m	NEW_TP2-2-1.5m	NEW_TP2-3-3.5m	TP3 2-1.5m	TP3 3-3mm	TP3-1-0.3m	TP6 1-0.5m	TP6 2-2.5m
Date Sampled	17/08/2009	17/08/2009	17/08/2009	11/08/2009	16/08/2009	16/08/2009	17/08/2009	17/08/2009
Sample Type	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample
Primary Sample ID	NEW_TP2-1-0.5m	NEW_TP2-2-1.5m	NEW_TP2-3-3.5m	TP3 2-1.5m	TP3 3-3mm	TP3-1-0.3m	TP6 1-0.5m	TP6 2-2.5m
Laboratory	ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS
Batch No.	EB0913021	EB0913021	EB0913021	EB0913021	EB0913021	EB0913021	EB0913021	EB0913021

Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ANZECC 2000 - Irrigation - LTU	ANZECC 2000 - Irrigation - STU	ANZECC 2000 - Livestock - Beef	ANZECC 2000 - Livestock (sheep drinking water)	ADWG 2004 - Health								
Physico-Chemical Parameters																	
Initial pH	0.1	ph units	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Final pH	0.1	ph unit	ne	ne	ne	ne	ne	ne	ne	**2.5**	**4.5**	**2.6**	**2.6**	**2.3**	**2.5**	**2.9**	**2.2**
Metals (Leachable)																	
Aluminium	0.1	mg/L	0.055	ne	5	20	5.6	5.1	0.2	**4.2**	<0.1*	<0.1*	**10.9**	**2.61**	**0.23**	**3.47**	**5.2**
Antimony	0.01	mg/L	ne	ne	ne	ne	ne	ne	0.003	<0.01*	**0.02**	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Arsenic	0.01	mg/L	0.013	ne	0.1	2	0.5	0.5	0.007	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Barium	0.1	mg/L	ne	ne	ne	ne	ne	ne	0.7	**1.2**	**0.3**	**0.6**	**2.6**	**1.2**	**0.9**	**1.1**	**1.9**
Beryllium	0.01	mg/L	0.00013	ne	0.1	0.5	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	0.1	mg/L	0.37	ne	0.5	15	7	6.2	4	**1.7**	<0.1	**0.1**	**2.3**	**1.7**	<0.1	**0.9**	**2**
Cadmium	0.005	mg/L	0.0002	0.0055	0.01	0.05	0.01	0.01	0.002	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*
Chromium	0.01	mg/L	0.001	0.0044	0.1	1	1	1	0.05	**0.01**	<0.01*	<0.01*	**0.03**	**0.01**	<0.01*	<0.01*	**0.02**
Cobalt	0.01	mg/L	0.09	0.001	0.05	0.1	1	1	ne	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Copper	0.01	mg/L	0.0014	0.0013	0.2	5	1	0.4	2	**0.04**	<0.01*	<0.01*	**0.04**	**0.01**	<0.01*	**0.04**	**0.05**
Iron	0.05	mg/L	0.3	ne	0.2	10	ne	ne	0.3	**4.6**	**0.08**	**0.05**	**22.3**	**2.83**	**0.15**	**2.96**	**8.76**
Lead	0.01	mg/L	0.0034	0.0044	2	5	0.1	0.1	0.01	<0.01*	<0.01*	**0.01**	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Manganese	0.01	mg/L	1.9	ne	0.2	10	ne	ne	0.5	**0.01**	<0.01	<0.01	**0.03**	<0.01	**0.22**	**0.01**	**0.03**
Mercury	0.0001	mg/L	0.0006	0.0004	0.002	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.01	mg/L	0.011	0.07	0.2	2	1	1	0.02	<0.01	<0.01	<0.01	**0.02**	<0.01	<0.01	**0.01**	**0.02**
Selenium	0.01	mg/L	0.011	ne	0.02	0.05	0.02	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	**0.07**	<0.01	<0.01	**0.08**	**0.04**	<0.01	**0.03**	**0.03**
Tungsten	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.01	0.1	0.2	0.2	0.02	**0.003**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	0.01	mg/L	ne	0.1	0.1	0.5	ne	ne	ne	**0.02**	<0.01	<0.01	**0.04**	<0.01	<0.01	<0.01	**0.02**
Zinc	0.01	mg/L	0.008	0.015	2	5	20	20	3	**2.86**	**0.14**	**0.56**	**3.18**	**1.74**	**0.25**	**1.44**	**3.14**

Legend:

Exceeds the ANZECC/ARMCANZ, 2000, Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ, 2000, Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ, 2000, Irrigation Trigger Values - Long Term Use

Exceeds the ANZECC/ARMCANZ, 2000, Irrigation Trigger Values - Short Term Use

Exceeds the ANZECC/ARMCANZ, 2000, Livestock Watering - Beef Cattle

Exceeds the ANZECC and ARMCANZ, 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand

Exceeds the National Health and Medical Research Council (NHMR, 2004, Australian Drinking Water Guidelines 6, 2004 (Health).

- Not Analysed

* LOR Exceeds Guideline Trigger Value

Table 3: Analysis Results for Leachable Metals
GLNG DMPF ASS Assessment

Location	TP8			TP9	
Depth (mbg)	0.3m	1m	3.5m	0.3m	2m
Sample ID	TP8 1-0.3m	TP8 2-1m	TP8 3-3.5m	TP9 1-0.3m	TP9 2-2m
Date Sampled	16/08/2009	16/08/2009	16/08/2009	16/08/2009	16/08/2009
Sample Type	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample
Primary Sample ID	TP8 1-0.3m	TP8 2-1m	TP8 3-3.5m	TP9 1-0.3m	TP9 2-2m
Laboratory	ALS	ALS	ALS	ALS	ALS
Batch No.	EB0913021	EB0913021	EB0913021	EB0913021	EB0913021

Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ANZECC 2000 - Irrigation - LTU	ANZECC 2000 - Irrigation - STU	ANZECC 2000 - Livestock - Beef	ANZECC 2000 - Livestock (sheep drinking water)	ADWG 2004 - Health					
Physico-Chemical Parameters														
Initial pH	0.1	ph units	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-
Final pH	0.1	ph unit	ne	ne	ne	ne	ne	ne	ne	**2.5**	**2.1**	**2.6**	**3.6**	**2.1**
Metals (Leachable)														
Aluminium	0.1	mg/L	0.055	ne	5	20	5.6	5.1	0.2	**1.18**	**1.19**	**1.28**	**0.6**	<0.1*
Antimony	0.01	mg/L	ne	ne	ne	ne	ne	ne	0.003	<0.01*	<0.01*	<0.01*	**0.05**	**0.02**
Arsenic	0.01	mg/L	0.013	ne	0.1	2	0.5	0.5	0.007	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Barium	0.1	mg/L	ne	ne	ne	ne	ne	ne	0.7	**1.1**	**1.4**	**0.8**	**0.7**	**0.6**
Beryllium	0.01	mg/L	0.00013	ne	0.1	0.5	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	0.1	mg/L	0.37	ne	0.5	15	7	6.2	4	**2.1**	**3**	**2.1**	<0.1	<0.1
Cadmium	0.005	mg/L	0.0002	0.0055	0.01	0.05	0.01	0.01	0.002	<0.005*	<0.005*	<0.005*	<0.005*	<0.005*
Chromium	0.01	mg/L	0.001	0.0044	0.1	1	1	1	0.05	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Cobalt	0.01	mg/L	0.09	0.001	0.05	0.1	1	1	ne	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
Copper	0.01	mg/L	0.0014	0.0013	0.2	5	1	0.4	2	**0.02**	**0.07**	**0.16**	**0.03**	<0.01*
Iron	0.05	mg/L	0.3	ne	0.2	10	ne	ne	0.3	**0.55**	**0.46**	**1.11**	**0.44**	<0.05
Lead	0.01	mg/L	0.0034	0.0044	2	5	0.1	0.1	0.01	<0.01*	**0.01**	**0.02**	**0.01**	<0.01*
Manganese	0.01	mg/L	1.9	ne	0.2	10	ne	ne	0.5	<0.01	**0.04**	**0.09**	**0.02**	<0.01
Mercury	0.0001	mg/L	0.0006	0.0004	0.002	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.01	mg/L	0.011	0.07	0.2	2	1	1	0.02	<0.01	**0.11**	**0.3**	**0.02**	<0.01
Selenium	0.01	mg/L	0.011	ne	0.02	0.05	0.02	0.02	0.01	<0.01	<0.01	<0.01	**0.02**	<0.01
Titanium	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	**0.01**	<0.01	**0.01**	**0.02**	<0.01
Tungsten	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.01	0.1	0.2	0.2	0.02	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	0.01	mg/L	ne	0.1	0.1	0.5	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	0.01	mg/L	0.008	0.015	2	5	20	20	3	**2.96**	**4.26**	**3.07**	**0.43**	**0.28**

Legend:

Exceeds the ANZECC/ARMCANZ, 2000, Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ, 2000, Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ, 2000, Irrigation Trigger Values - Long Term Use

Exceeds the ANZECC/ARMCANZ, 2000, Irrigation Trigger Values - Short Term Use

Exceeds the ANZECC/ARMCANZ, 2000, Livestock Watering - Beef Cattle

Exceeds the ANZECC and ARMCANZ, 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand

Exceeds the National Health and Medical Research Council (NHMR, 2004, Australian Drinking Water Guidelines 6, 2004 (Health).

- Not Analysed

* LOR Exceeds Guideline Trigger Value

D

Appendix D Lab Reports

CHAIN OF CUSTODY DOCUMENTATION

24/8/09 MG.

134254

CLIENT:	URS
ADDRESS / OFFICE:	16/240 Queen St, Brisbane 4000
PROJECT MANAGER (PM):	Julian Dobos
PROJECT ID:	42626447
SITE:	Curtis Island Gladstone
P.O. NO.:	BN/356/09
RESULTS REQUIRED (Date):	
QUOTE NO.:	~~BN/356/09~~

SAMPLER:	Jerry Wang
MOBILE:	0417 382 975
PHONE	
EMAIL REPORT TO:	julian-dobos@urscorp.com
EMAIL INVOICE TO: (if different to report)	Santos

ALS Laboratory Group

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

Additional Metals = Al, B, Fe, Sb, Se, Ti, U, W

Leachable Metals = S-3 Suite and Al, B, Fe, Sb, Se, Ti, U, W

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.

17.8

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		PH Field + PH Fox EA003	Full Chromium Suite, EA033		Total metals S-3	Additional metals EG005T	DI leach preparation	Leachable metals EG005C + EG003C	Cations, NT-1	Anions, NT-2	Nutrients, NT-11			
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles													
1	CPT13 1-1.0m	S	11/8/09	1:20pm	250 Jar					✓	✓	✓	✓	✓	✓	✓			
2	CPT13 2-1.0m	S	11/8/09	1:20pm	Ass bag		✓	✓											
3	CPT13 3-1.5m	S	"	1:25pm	250 Jar					✓	✓	✓	✓	✓	✓	✓			
4	CPT13 4-1.5m	S	"	1:25pm	Ass bag		✓	✓											
5	CPT11 1-0.5m	S	12/8/09	11:45am	Ass bag		✓	✓											
6	CPT11 2-0.5m	S	"	11:45am	250 Jar					✓	✓	✓	✓	✓	✓	✓			
7	CPT11 3-1.5m	S	"	11:55am	Ass bag		✓	✓											
8	CPT11 4-1.5m	S	"	11:55am	250 Jar					✓	✓	✓	✓	✓	✓	✓			
9	CPT12 1-1m	S	"	2:45pm	Ass bag		✓	✓											
10	CPT12 2-1.5m	S	"	2:50pm	Ass bag		✓	✓											
11	CPT12 3-2m	S	"	2:55pm	Ass bag		✓	✓											
12	CPT12 4-2.5m	S		3:00pm	Ass bag		✓	✓											

Environmental Division
Brisbane
Work Order
EB0912892

Telephone : +61-7-3243 7222

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Jerry Wang	Date: 14/8/09	Name: NIKKI	Date: 15/8/09	Con' Note No:
Of:	Time: 6:55am	Of: ALS	Time: 0800	
Name: UPS Australia	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserveed Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY DOCUMENTATION

134255

ALS Laboratory Group

CLIENT: UDS	SAMPLER: Jerry Wang
ADDRESS / OFFICE: 16/240 Queen Street, Brisbane 4000	MOBILE: 0417 382 975
PROJECT MANAGER (PM): Julian Dobos	PHONE
PROJECT ID: 42626447	EMAIL REPORT TO: julian_dobos@uds corp. com
SITE: Curtis Is, Gladstone P.O. NO.: BN/356/09	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.: ~~BN/356/09~~	**ANALYSIS REQUIRED including SUITES** (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:
Additional Metals = Al, B, Fe, Sb, Se, Ti, U, W
Leachable Metals = S-3 Suite and Al, B, Fe, Sb, Se, Ti, U, W

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected".
Extra volume for QC or trace LORs etc.

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	PH Field + PH Fox EA003	Full Chromium Suite EA033		Total Metals S-3	Additional Metals EG005T	DI Leach prep.	Leachable Metals EG005C+EG033C	Cations, NT-1	Anions, NT-2	Nutrients, NT-11			
13	CPT12 5-3m	S	12/8/09	3:40	Ass bag		✓	✓											
14	CPT6 1-0m-1.0m	S	13/8/09	11:45am	Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
15	CPT6 2-1.0m-3.0m	S	13/8/09	11:25am	Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
16	CPT5 1-0m-0.5m	S	13/8/09		Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
17	CPT5 2-0.5m-1m	S	13/8/09		Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
18	CPT5 3-1.0m-1.5m	S	13/8/09		Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
19	CPT5 4-1.5m-2m	S	13/8/09		Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
20	CPT5 5-2.0m-3m	S	13/8/09		Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
21	QC01	S	13/8/09		Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
22	CPT5a 1-0m-1m	S	13/8/09		Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
23	CPT5a 2-1m-2m	S	13/8/09		Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
24	CPT5a 3-3m-3.5m	S	13/8/09		Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: Jerry Wang	Date: 14/8/09		Name: N.K Kelly	Date: 18/8/09		Con' Note No:
Of: UDS Australia	Time: 6:53 am		Of: ALS	Time: 0800		
Name:	Date:		Name:	Date:		Transport Co:
Of:	Time:		Of:	Time:		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserveed Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order : **EB0912892**

Client	: **SANTOS LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JULIAN DOBOS	Contact	: Tim Kilmister
Address	: GPO BOX 302 BRISBANE QLD, AUSTRALIA 4000	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: julian_dobos@urscorp.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32432111	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 42626447	Page	: 1 of 5
Order number	: BN/356/09		
C-O-C number	: 134254 - 134255	Quote number	: EB2009SANTOS0305 (BN/356/09)
Site	: Curtis Island, Gladstone		
Sampler	: Jenny Wang	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received	: 15-AUG-2009	Issue Date	: 18-AUG-2009 13:16
Client Requested Due Date	: 24-AUG-2009	Scheduled Reporting Date	: **24-AUG-2009**

Delivery Details

Mode of Delivery	: Carrier	Temperature	: 7.2 C - Ice bricks present
No. of coolers/boxes	: 2 MEDIUM	No. of samples received	: 24
Sercurity Seal	: Intact.	No. of samples analysed	: 24

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **Sample(s) have been received within recommended holding times.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Maggie Kahi.
- Analytical work for this work order will be conducted at ALS Brisbane.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process neccessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: **SOIL**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	SOIL - EA003 pH field/fox	SOIL - EA033 Chromium Suite for Acid Sulphate Soils	SOIL - ED037 Alkalinity in Soil	SOIL - ED040S Soluble Major Anions	SOIL - ED045S Chloride Soluble	SOIL - ED093S Cations - Soluble	SOIL - EG005T (solids) Total Metals by ICP-AES	SOIL - EG005W Water Leachable Metals by ICPAES
EB0912892-001	11-AUG-2009 10:00	CPT13 1-1.0m								✓
	11-AUG-2009 13:20	CPT13 1-1.0m			✓	✓	✓	✓	✓	
EB0912892-002	11-AUG-2009 13:20	CPT13 2-1.0m	✓	✓						
EB0912892-003	11-AUG-2009 10:00	CPT13 3-1.5m								✓
	11-AUG-2009 13:25	CPT13 3-1.5m			✓	✓	✓	✓	✓	
EB0912892-004	11-AUG-2009 13:25	CPT13 4-1.5m	✓	✓						
EB0912892-005	12-AUG-2009 11:45	CPT11 1-0.5m	✓	✓						
EB0912892-006	12-AUG-2009 10:00	CPT11 2-0.5m								✓
	12-AUG-2009 11:45	CPT11 2-0.5m			✓	✓	✓	✓	✓	
EB0912892-007	12-AUG-2009 11:55	CPT11 3-1.5m	✓	✓						
EB0912892-008	12-AUG-2009 10:00	CPT11 4-1.5m								✓
	12-AUG-2009 11:55	CPT11 4-1.5m			✓	✓	✓	✓	✓	
EB0912892-009	12-AUG-2009 14:45	CPT12 1-1m	✓	✓						
EB0912892-010	12-AUG-2009 14:50	CPT12 2-1.5m	✓	✓						
EB0912892-011	12-AUG-2009 14:55	CPT12 3-2m	✓	✓						
EB0912892-012	12-AUG-2009 15:05	CPT12 4-2.5m	✓	✓						
EB0912892-013	12-AUG-2009 15:10	CPT12 5-3m	✓	✓						
EB0912892-014	13-AUG-2009 10:00	CPT6 1-0m-1.0m								✓
	13-AUG-2009 11:25	CPT6 1-0m-1.0m	✓	✓	✓	✓	✓	✓	✓	
EB0912892-015	13-AUG-2009 10:00	CPT6 2-1.0m-3.0m								✓
	13-AUG-2009 11:25	CPT6 2-1.0m-3.0m	✓	✓	✓	✓	✓	✓	✓	
EB0912892-016	13-AUG-2009 10:00	CPT5 1-0m-0.5m								✓
	13-AUG-2009 15:00	CPT5 1-0m-0.5m	✓	✓	✓	✓	✓	✓	✓	
EB0912892-017	13-AUG-2009 10:00	CPT5 2-0.5m-1m								✓
	13-AUG-2009 15:00	CPT5 2-0.5m-1m	✓	✓	✓	✓	✓	✓	✓	
EB0912892-018	13-AUG-2009 10:00	CPT5 3-1.0m-1.5m								✓
	13-AUG-2009 15:00	CPT5 3-1.0m-1.5m	✓	✓	✓	✓	✓	✓	✓	
EB0912892-019	13-AUG-2009 10:00	CPT5 4-1.5m-2m								✓
	13-AUG-2009 15:00	CPT5 4-1.5m-2m	✓	✓	✓	✓	✓	✓	✓	
EB0912892-020	13-AUG-2009 10:00	CPT5 5-2.0m-3m								✓
	13-AUG-2009 15:00	CPT5 5-2.0m-3m	✓	✓	✓	✓	✓	✓	✓	
EB0912892-021	13-AUG-2009 10:00	QC01								✓
	13-AUG-2009 15:00	QC01	✓	✓	✓	✓	✓	✓	✓	
EB0912892-022	13-AUG-2009 10:00	CPT5a 1-0m-1m								✓
	13-AUG-2009 15:00	CPT5a 1-0m-1m	✓	✓	✓	✓	✓	✓	✓	

			SOIL - EA003 pH field/fox	SOIL - EA033 Chromium Suite for Acid Sulphate Soils	SOIL - ED037 Alkalinity in Soil	SOIL - ED040S Soluble Major Anions	SOIL - ED045S Chloride Soluble	SOIL - ED093S Cations - Soluble	SOIL - EG005T (solids) Total Metals by ICP-AES	SOIL - EG005W Water Leachable Metals by ICPAES
EB0912892-023	13-AUG-2009 10:00	CPT5a 2-1m-2m								✓
	13-AUG-2009 15:00	CPT5a 2-1m-2m	✓	✓	✓	✓	✓	✓	✓	
EB0912892-024	13-AUG-2009 10:00	CPT5a 3-3m-3.5m								✓
	13-AUG-2009 15:00	CPT5a 3-3m-3.5m	✓	✓	✓	✓	✓	✓	✓	

Matrix: **SOIL**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	SOIL - EG020B-W Water Leachable Metals by ICP-MS - Suite B	SOIL - EG020E-T Total Metals by ICPMS - Suite E	SOIL - EG020V-T Total Metals by ICPMS - Suite V	SOIL - EG020X-T Total Metals by ICPMS - Suite X	SOIL - EG035W Water Leachable Mercury by FIMS	SOIL - EK062G (Solids) Total Nitrogen as N (TKN + NOx) By Discrete Analyser	SOIL - EK067G (Solids) Total Phosphorus as P by Discrete Analyser	SOIL - EN60-DI Suite Deionised Water Leach
EB0912892-001	11-AUG-2009 10:00	CPT13 1-1.0m	✓	✓			✓			
	11-AUG-2009 13:20	CPT13 1-1.0m			✓	✓		✓	✓	✓
EB0912892-003	11-AUG-2009 10:00	CPT13 3-1.5m	✓	✓			✓			
	11-AUG-2009 13:25	CPT13 3-1.5m			✓	✓		✓	✓	✓
EB0912892-006	12-AUG-2009 10:00	CPT11 2-0.5m	✓	✓			✓			
	12-AUG-2009 11:45	CPT11 2-0.5m			✓	✓		✓	✓	✓
EB0912892-008	12-AUG-2009 10:00	CPT11 4-1.5m	✓	✓			✓			
	12-AUG-2009 11:55	CPT11 4-1.5m			✓	✓		✓	✓	✓
EB0912892-014	13-AUG-2009 10:00	CPT6 1-0m-1.0m	✓	✓			✓			
	13-AUG-2009 11:25	CPT6 1-0m-1.0m			✓	✓		✓	✓	✓
EB0912892-015	13-AUG-2009 10:00	CPT6 2-1.0m-3.0m	✓	✓			✓			
	13-AUG-2009 11:25	CPT6 2-1.0m-3.0m			✓	✓		✓	✓	✓
EB0912892-016	13-AUG-2009 10:00	CPT5 1-0m-0.5m	✓	✓			✓			
	13-AUG-2009 15:00	CPT5 1-0m-0.5m			✓	✓		✓	✓	✓
EB0912892-017	13-AUG-2009 10:00	CPT5 2-0.5m-1m	✓	✓			✓			
	13-AUG-2009 15:00	CPT5 2-0.5m-1m			✓	✓		✓	✓	✓
EB0912892-018	13-AUG-2009 10:00	CPT5 3-1.0m-1.5m	✓	✓			✓			
	13-AUG-2009 15:00	CPT5 3-1.0m-1.5m			✓	✓		✓	✓	✓
EB0912892-019	13-AUG-2009 10:00	CPT5 4-1.5m-2m	✓	✓			✓			
	13-AUG-2009 15:00	CPT5 4-1.5m-2m			✓	✓		✓	✓	✓
EB0912892-020	13-AUG-2009 10:00	CPT5 5-2.0m-3m	✓	✓			✓			
	13-AUG-2009 15:00	CPT5 5-2.0m-3m			✓	✓		✓	✓	✓
EB0912892-021	13-AUG-2009 10:00	QC01	✓	✓			✓			
	13-AUG-2009 15:00	QC01			✓	✓		✓	✓	✓
EB0912892-022	13-AUG-2009 10:00	CPT5a 1-0m-1m	✓	✓			✓			
	13-AUG-2009 15:00	CPT5a 1-0m-1m			✓	✓		✓	✓	✓

			SOIL - EG020B-W Water Leachable Metals by ICP-MS - Suite B	SOIL - EG020E-T Total Metals by ICPMS - Suite E	SOIL - EG020V-T Total Metals by ICPMS - Suite V	SOIL - EG020X-T Total Metals by ICPMS - Suite X	SOIL - EG035W Water Leachable Mercury by FIMS	SOIL - EK062G (Solids) Total Nitrogen as N (TKN + NOx) By Discrete Analyser	SOIL - EK067G (Solids) Total Phosphorus as P by Discrete Analyser	SOIL - EN60-DI Suite Deionised Water Leach
EB0912892-023	13-AUG-2009 10:00	CPT5a 2-1m-2m	✓	✓			✓			
	13-AUG-2009 15:00	CPT5a 2-1m-2m			✓	✓		✓	✓	✓
EB0912892-024	13-AUG-2009 10:00	CPT5a 3-3m-3.5m	✓	✓			✓			
	13-AUG-2009 15:00	CPT5a 3-3m-3.5m			✓	✓		✓	✓	✓

Matrix: **SOIL**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	SOIL - S-03 13 Metals (NEPM Suite - incl. Digestion)
EB0912892-001	11-AUG-2009 13:20	CPT13 1-1.0m	✓
EB0912892-003	11-AUG-2009 13:25	CPT13 3-1.5m	✓
EB0912892-006	12-AUG-2009 11:45	CPT11 2-0.5m	✓
EB0912892-008	12-AUG-2009 11:55	CPT11 4-1.5m	✓
EB0912892-014	13-AUG-2009 11:25	CPT6 1-0m-1.0m	✓
EB0912892-015	13-AUG-2009 11:25	CPT6 2-1.0m-3.0m	✓
EB0912892-016	13-AUG-2009 15:00	CPT5 1-0m-0.5m	✓
EB0912892-017	13-AUG-2009 15:00	CPT5 2-0.5m-1m	✓
EB0912892-018	13-AUG-2009 15:00	CPT5 3-1.0m-1.5m	✓
EB0912892-019	13-AUG-2009 15:00	CPT5 4-1.5m-2m	✓
EB0912892-020	13-AUG-2009 15:00	CPT5 5-2.0m-3m	✓
EB0912892-021	13-AUG-2009 15:00	QC01	✓
EB0912892-022	13-AUG-2009 15:00	CPT5a 1-0m-1m	✓
EB0912892-023	13-AUG-2009 15:00	CPT5a 2-1m-2m	✓
EB0912892-024	13-AUG-2009 15:00	CPT5a 3-3m-3.5m	✓

Requested Deliverables

MR JULIAN DOBOS

- *AU Certificate of Analysis - NATA (COA)	Email	julian_dobos@urscorp.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	julian_dobos@urscorp.com
- AU Interpretive QC Report (Anon QCI Not Rep) (QCI_NoAnon)	Email	julian_dobos@urscorp.com
- AU QC Report (Anon QC Not Rep) - NATA (QC_NoAnon)	Email	julian_dobos@urscorp.com
- Default - Chain of Custody (COC)	Email	julian_dobos@urscorp.com
- EDI Format - MRED (MRED)	Email	julian_dobos@urscorp.com

RESULTS ADDRESS

- *AU Certificate of Analysis - NATA (COA)	Email	brisbane@urscorp.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	brisbane@urscorp.com
- AU Interpretive QC Report (Anon QCI Not Rep) (QCI_NoAnon)	Email	brisbane@urscorp.com
- AU QC Report (Anon QC Not Rep) - NATA (QC_NoAnon)	Email	brisbane@urscorp.com
- Default - Chain of Custody (COC)	Email	brisbane@urscorp.com
- EDI Format - MRED (MRED)	Email	brisbane@urscorp.com

THE ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV)	Email	accounts.payable@santos.com

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EB0912892**	Page	: 1 of 15
Client	: **SANTOS LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JULIAN DOBOS	Contact	: Tim Kilmister
Address	: GPO BOX 302 BRISBANE QLD, AUSTRALIA 4000	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: julian_dobos@urscorp.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32432111	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 42626447	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: BN/356/09		
C-O-C number	: 134254 - 134255	Date Samples Received	: 15-AUG-2009
Sampler	: Jenny Wang	Issue Date	: 26-AUG-2009
Site	: Curtis Island, Gladstone		
		No. of samples received	: 24
Quote number	: BN/356/09	No. of samples analysed	: 24

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics
Kim McCabe	Senior Inorganic Chemist	Inorganics
Stephen Hislop	Senior Inorganic Chemist	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **EG005T (Total Metals): LCS recoveries fall outside Dynamic Control Limits. They are however within ALS Static Control Limits and hence deemed acceptable.**
- **EG005T (Total Metals): Sample EB0912892-001 (CPT13/1-1.0m) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.**
- **EG005T (Total Metals): Sample EB0912892-003 (CPT13/3-1.5m) shows poor matrix spike recovery due to matrix interference. Confirmed by visual inspection.**
- **EG005T (Total Metals): Sample EB0912892-022 (CPT5a/1-0m-1m) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.**
- **EG005W (Water Leachable Metals): LCS recoveries fall outside Dynamic Control Limits. They are however within ALS Static Control Limits and hence deemed acceptable.**
- **EG020X-T (Total Metals) Sample EB091892-022(1-0m-1m) shows poor duplicate results for Uranium due to sample heterogeneity. Confirmed by visual inspection.**
- **Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m3'.**
- **pH FOX Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Vigorous; 4 - Very Vigorous**

Analytical Results

Sub-Matrix: **DI WATER LEACHATE**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT13 1-1.0m	CPT13 3-1.5m	CPT11 2-0.5m	CPT11 4-1.5m	CPT6 1-0m-1.0m
			Client sampling date / time	25-AUG-2009 14:00	25-AUG-2009 14:00	25-AUG-2009 14:00	25-AUG-2009 14:00	25-AUG-2009 14:00
				EB0912892-001	EB0912892-003	EB0912892-006	EB0912892-008	EB0912892-014
EG005W: Water Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Antimony	7440-36-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	7440-38-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium	7440-39-3	0.1	mg/L	**0.3**	**0.3**	**0.2**	**0.3**	**0.2**
Beryllium	7440-41-7	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	7440-42-8	0.1	mg/L	**0.2**	<0.1	**0.2**	**0.2**	**0.4**
Cadmium	7440-43-9	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	7440-47-3	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	7440-48-4	0.01	mg/L	<0.01	<0.01	**0.04**	<0.01	<0.01
Copper	7440-50-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L	<0.05	**0.08**	<0.05	<0.05	<0.05
Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese	7439-96-5	0.01	mg/L	**0.56**	<0.01	**0.08**	**0.34**	<0.01
Nickel	7440-02-0	0.01	mg/L	<0.01	<0.01	**0.03**	<0.01	<0.01
Selenium	7782-49-2	0.01	mg/L	**0.01**	<0.01	<0.01	<0.01	<0.01
Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	**0.05**	<0.01	**0.17**
Zinc	7440-66-6	0.01	mg/L	**0.17**	**0.05**	**0.11**	**0.03**	<0.01
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG020W: Water Leachable Metals by ICP-MS								
Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG035W: Water Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: **DI WATER LEACHATE**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT6 2-1.0m-3.0m	CPT5 1-0m-0.5m	CPT5 2-0.5m-1m	CPT5 3-1.0m-1.5m	CPT5 4-1.5m-2m
				Client sampling date / time: 25-AUG-2009 14:00	25-AUG-2009 14:00	25-AUG-2009 14:00	25-AUG-2009 14:00	25-AUG-2009 14:00
				EB0912892-015	EB0912892-016	EB0912892-017	EB0912892-018	EB0912892-019
EG005W: Water Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Antimony	7440-36-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	7440-38-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium	7440-39-3	0.1	mg/L	**0.1**	**0.2**	**0.2**	**0.2**	**0.2**
Beryllium	7440-41-7	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	7440-42-8	0.1	mg/L	**0.4**	**0.2**	**0.4**	**0.4**	**0.4**
Cadmium	7440-43-9	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	7440-47-3	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	7440-48-4	0.01	mg/L	<0.01	**0.02**	<0.01	<0.01	<0.01
Copper	7440-50-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	<0.05	**0.08**	<0.05
Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese	7439-96-5	0.01	mg/L	<0.01	**0.03**	**0.07**	<0.01	<0.01
Nickel	7440-02-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	7440-62-2	0.01	mg/L	**0.09**	<0.01	<0.01	**0.12**	**0.11**
Zinc	7440-66-6	0.01	mg/L	**0.02**	**0.09**	**0.07**	**0.01**	**0.02**
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG020W: Water Leachable Metals by ICP-MS								
Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG035W: Water Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: **DI WATER LEACHATE**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT5 5-2.0m-3m	QC01	CPT5a 1-0m-1m	CPT5a 2-1m-2m	CPT5a 3-3m-3.5m
				Client sampling date / time: 25-AUG-2009 14:00	25-AUG-2009 14:00	20-AUG-2009 14:00	20-AUG-2009 14:00	20-AUG-2009 14:00
				EB0912892-020	EB0912892-021	EB0912892-022	EB0912892-023	EB0912892-024
EG005W: Water Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Antimony	7440-36-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	7440-38-2	0.01	mg/L	<0.01	<0.01	<0.01	**0.01**	**0.01**
Barium	7440-39-3	0.1	mg/L	**0.2**	**0.2**	**0.3**	**0.2**	**0.2**
Beryllium	7440-41-7	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	7440-42-8	0.1	mg/L	**0.3**	**0.3**	<0.1	**0.2**	**0.2**
Cadmium	7440-43-9	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	7440-47-3	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	7440-48-4	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	7440-50-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L	**0.15**	<0.05	<0.05	<0.05	<0.05
Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese	7439-96-5	0.01	mg/L	<0.01	<0.01	<0.01	**0.02**	**0.01**
Nickel	7440-02-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium	7440-32-6	0.01	mg/L	**0.02**	<0.01	<0.01	<0.01	<0.01
Vanadium	7440-62-2	0.01	mg/L	**0.12**	**0.12**	**0.04**	**0.09**	**0.12**
Zinc	7440-66-6	0.01	mg/L	**0.01**	<0.01	**0.14**	**0.02**	**0.02**
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG020W: Water Leachable Metals by ICP-MS								
Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG035W: Water Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT13 1-1.0m Client sampling date / time: 11-AUG-2009 13:20 EB0912892-001	CPT13 2-1.0m 11-AUG-2009 13:20 EB0912892-002	CPT13 3-1.5m 11-AUG-2009 13:25 EB0912892-003	CPT13 4-1.5m 11-AUG-2009 13:25 EB0912892-004	CPT11 1-0.5m 12-AUG-2009 11:45 EB0912892-005
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	----	**6.6**	----	**5.9**	**7.9**
pH (Fox)	----	0.1	pH Unit	----	**3.4**	----	**3.0**	**1.8**
Reaction Rate	----	1	Reaction Uni	----	**2**	----	**2**	**2**
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	**6.1**	----	**6.1**	**6.2**
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	**10**	----	**10**	**6**
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	<0.02	----	<0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	----	<0.02	----	**0.02**	**0.86**
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	<10	----	**15**	**536**
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	**1.5**	----	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	----	<0.02	----	**0.04**	**0.87**
Net Acidity (acidity units)	----	10	mole H+ / t	----	<10	----	**24**	**542**
Liming Rate	----	1	kg CaCO3/t	----	<1	----	**2**	**41**
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**16.8**	----	**14.5**	----	----
ED037: Alkalinity								
Total Alkalinity as CaCO3	----	1	mg/kg	**698**	----	**670**	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	**698**	----	**670**	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	<1	----	<1	----	----
ED040S: Soluble Major Anions								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	**2010**	----	**1710**	----	----
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	**15500**	----	**12700**	----	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	**90**	----	**50**	----	----
Magnesium	7439-95-4	10	mg/kg	**740**	----	**360**	----	----
Sodium	7440-23-5	10	mg/kg	**8630**	----	**7500**	----	----
Potassium	7440-09-7	10	mg/kg	**420**	----	**400**	----	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	**6070**	----	**3930**	----	----
Antimony	7440-36-0	5	mg/kg	<5	----	<5	----	----
Arsenic	7440-38-2	5	mg/kg	**10**	----	**8**	----	----
Barium	7440-39-3	10	mg/kg	**200**	----	**60**	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT13 1-1.0m	CPT13 2-1.0m	CPT13 3-1.5m	CPT13 4-1.5m	CPT11 1-0.5m
Client sampling date / time				11-AUG-2009 13:20	11-AUG-2009 13:20	11-AUG-2009 13:25	11-AUG-2009 13:25	12-AUG-2009 11:45
				EB0912892-001	EB0912892-002	EB0912892-003	EB0912892-004	EB0912892-005
EG005T: Total Metals by ICP-AES - Continued								
Beryllium	7440-41-7	1	mg/kg	<1	----	<1	----	----
Boron	7440-42-8	50	mg/kg	<50	----	<50	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	<1	----	----
Chromium	7440-47-3	2	mg/kg	**32**	----	**20**	----	----
Cobalt	7440-48-4	2	mg/kg	**9**	----	**2**	----	----
Copper	7440-50-8	5	mg/kg	**20**	----	**12**	----	----
Iron	7439-89-6	50	mg/kg	**23700**	----	**21700**	----	----
Lead	7439-92-1	5	mg/kg	**8**	----	**7**	----	----
Manganese	7439-96-5	5	mg/kg	**280**	----	**72**	----	----
Nickel	7440-02-0	2	mg/kg	**7**	----	**3**	----	----
Selenium	7782-49-2	5	mg/kg	<5	----	<5	----	----
Vanadium	7440-62-2	5	mg/kg	**85**	----	**50**	----	----
Zinc	7440-66-6	5	mg/kg	**8**	----	**12**	----	----
Titanium	7440-32-6	10	mg/kg	**80**	----	**40**	----	----
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.01	mg/kg	<0.05	----	<0.05	----	----
Uranium	7440-61-1	0.1	mg/kg	**1.6**	----	**0.4**	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	<0.1	----	----
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	**0.3**	----	**0.2**	----	----
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	**120**	----	**150**	----	----
EK062: Total Nitrogen as N								
^ Total Nitrogen as N	----	20	mg/kg	**120**	----	**150**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	**58**	----	**86**	----	----
EN60-DI: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	**5.6**	----	**7.1**	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT11 2-0.5m	CPT11 3-1.5m	CPT11 4-1.5m	CPT12 1-1m	CPT12 2-1.5m
				Client sampling date / time: 12-AUG-2009 11:45	12-AUG-2009 11:55	12-AUG-2009 11:55	12-AUG-2009 14:45	12-AUG-2009 14:50
				EB0912892-006	EB0912892-007	EB0912892-008	EB0912892-009	EB0912892-010
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	----	8.4	----	7.9	8.0
pH (Fox)	----	0.1	pH Unit	----	5.4	----	1.3	1.8
Reaction Rate	----	1	Reaction Uni	----	2	----	4	2
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	6.6	----	4.9	5.5
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	<2	----	44	25
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	<0.02	----	0.07	0.04
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	----	<0.02	----	3.32	3.18
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	<10	----	2070	1990
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	----	0.16	----	----	----
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	----	32	----	----	----
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	----	0.05	----	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	1.5	----	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	----	<0.02	----	3.39	3.23
Net Acidity (acidity units)	----	10	mole H+ / t	----	<10	----	2120	2010
Liming Rate	----	1	kg CaCO3/t	----	<1	----	159	151
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	49.0	----	12.6	----	----
ED037: Alkalinity								
Total Alkalinity as CaCO3	----	1	mg/kg	380	----	1120	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	380	----	1120	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	<1	----	<1	----	----
ED040S: Soluble Major Anions								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	8200	----	1530	----	----
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	68200	----	11600	----	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	480	----	50	----	----
Magnesium	7439-95-4	10	mg/kg	3800	----	350	----	----
Sodium	7440-23-5	10	mg/kg	34200	----	6920	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID	CPT11 2-0.5m	CPT11 3-1.5m	CPT11 4-1.5m	CPT12 1-1m	CPT12 2-1.5m
				Client sampling date / time	12-AUG-2009 11:45	12-AUG-2009 11:55	12-AUG-2009 11:55	12-AUG-2009 14:45	12-AUG-2009 14:50
					EB0912892-006	EB0912892-007	EB0912892-008	EB0912892-009	EB0912892-010
ED093S: Soluble Major Cations - Continued									
Potassium	7440-09-7	10	mg/kg		1840	----	360	----	----
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		14000	----	5840	----	----
Antimony	7440-36-0	5	mg/kg		<5	----	<5	----	----
Arsenic	7440-38-2	5	mg/kg		11	----	6	----	----
Barium	7440-39-3	10	mg/kg		20	----	50	----	----
Beryllium	7440-41-7	1	mg/kg		<1	----	1	----	----
Boron	7440-42-8	50	mg/kg		<50	----	<50	----	----
Cadmium	7440-43-9	1	mg/kg		<1	----	<1	----	----
Chromium	7440-47-3	2	mg/kg		22	----	22	----	----
Cobalt	7440-48-4	2	mg/kg		11	----	17	----	----
Copper	7440-50-8	5	mg/kg		28	----	20	----	----
Iron	7439-89-6	50	mg/kg		26400	----	25900	----	----
Lead	7439-92-1	5	mg/kg		10	----	6	----	----
Manganese	7439-96-5	5	mg/kg		190	----	1360	----	----
Nickel	7440-02-0	2	mg/kg		12	----	8	----	----
Selenium	7782-49-2	5	mg/kg		<5	----	<5	----	----
Vanadium	7440-62-2	5	mg/kg		61	----	60	----	----
Zinc	7440-66-6	5	mg/kg		30	----	10	----	----
Titanium	7440-32-6	10	mg/kg		210	----	40	----	----
EG020T: Total Metals by ICP-MS									
Tungsten	7440-33-7	0.01	mg/kg		<0.05	----	<0.04	----	----
Uranium	7440-61-1	0.1	mg/kg		3.2	----	0.4	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	<0.1	----	----
EK059G: NOX as N by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		0.3	----	<0.1	----	----
EK061G: Total Kjeldahl Nitrogen as N									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		520	----	110	----	----
EK062: Total Nitrogen as N									
^ Total Nitrogen as N	----	20	mg/kg		520	----	110	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	2	mg/kg		134	----	92	----	----
EN60-DI: Bottle Leaching Procedure									
Final pH	----	0.1	pH Unit		6.2	----	7.5	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID	CPT12 3-2m	CPT12 4-2.5m	CPT12 5-3m	CPT6 1-0m-1.0m	CPT6 2-1.0m-3.0m
				Client sampling date / time	12-AUG-2009 14:55	12-AUG-2009 15:05	12-AUG-2009 15:10	13-AUG-2009 11:25	13-AUG-2009 11:25
					EB0912892-011	EB0912892-012	EB0912892-013	EB0912892-014	EB0912892-015
EA003 :pH (field/fox)									
pH (F)	----	0.1	pH Unit		8.2	8.1	8.4	8.6	8.4
pH (Fox)	----	0.1	pH Unit		1.5	1.5	2.3	1.5	1.4
Reaction Rate	----	1	Reaction Uni		4	4	2	4	4
EA033-A: Actual Acidity									
pH KCl (23A)	----	0.1	pH Unit		6.1	5.9	8.1	7.0	6.7
Titratable Actual Acidity (23F)	----	2	mole H+ / t		12	19	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S		<0.02	0.03	<0.02	<0.02	<0.02
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.02	% S		3.09	3.42	0.62	1.85	1.78
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t		1930	2130	384	1150	1110
EA033-C: Acid Neutralising Capacity									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3		----	----	1.18	0.67	0.70
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t		----	----	235	134	139
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S		----	----	0.38	0.21	0.22
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S		3.11	3.45	0.36	1.70	1.63
Net Acidity (acidity units)	----	10	mole H+ / t		1940	2150	227	1060	1020
Liming Rate	----	1	kg CaCO3/t		146	161	17	80	76
EA055: Moisture Content									
^ Moisture Content (dried @ 103°C)	----	1.0	%		----	----	----	38.8	41.8
ED037: Alkalinity									
Total Alkalinity as CaCO3	----	1	mg/kg		----	----	----	1760	2420
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg		----	----	----	1760	2430
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg		----	----	----	<1	<1
ED040S: Soluble Major Anions									
Sulfate as SO4 2-	14808-79-8	10	mg/kg		----	----	----	4830	5300
ED045: Chloride									
Chloride	16887-00-6	10	mg/kg		----	----	----	42100	39200
ED093S: Soluble Major Cations									
Calcium	7440-70-2	10	mg/kg		----	----	----	320	270
Magnesium	7439-95-4	10	mg/kg		----	----	----	1980	1820
Sodium	7440-23-5	10	mg/kg		----	----	----	22300	23900

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT12 3-2m	CPT12 4-2.5m	CPT12 5-3m	CPT6 1-0m-1.0m	CPT6 2-1.0m-3.0m
Client sampling date / time				12-AUG-2009 14:55	12-AUG-2009 15:05	12-AUG-2009 15:10	13-AUG-2009 11:25	13-AUG-2009 11:25
				EB0912892-011	EB0912892-012	EB0912892-013	EB0912892-014	EB0912892-015
ED093S: Soluble Major Cations - Continued								
Potassium	7440-09-7	10	mg/kg	----	----	----	**1330**	**1530**
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	----	----	----	**14200**	**16300**
Antimony	7440-36-0	5	mg/kg	----	----	----	<5	<5
Arsenic	7440-38-2	5	mg/kg	----	----	----	<5	**10**
Barium	7440-39-3	10	mg/kg	----	----	----	<10	**10**
Beryllium	7440-41-7	1	mg/kg	----	----	----	<1	**1**
Boron	7440-42-8	50	mg/kg	----	----	----	<50	<50
Cadmium	7440-43-9	1	mg/kg	----	----	----	<1	<1
Chromium	7440-47-3	2	mg/kg	----	----	----	**20**	**24**
Cobalt	7440-48-4	2	mg/kg	----	----	----	**4**	**10**
Copper	7440-50-8	5	mg/kg	----	----	----	**32**	**33**
Iron	7439-89-6	50	mg/kg	----	----	----	**16500**	**24800**
Lead	7439-92-1	5	mg/kg	----	----	----	**6**	**6**
Manganese	7439-96-5	5	mg/kg	----	----	----	**159**	**160**
Nickel	7440-02-0	2	mg/kg	----	----	----	**9**	**12**
Selenium	7782-49-2	5	mg/kg	----	----	----	<5	<5
Vanadium	7440-62-2	5	mg/kg	----	----	----	**46**	**60**
Zinc	7440-66-6	5	mg/kg	----	----	----	**35**	**40**
Titanium	7440-32-6	10	mg/kg	----	----	----	**140**	**160**
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.01	mg/kg	----	----	----	<0.05	<0.05
Uranium	7440-61-1	0.1	mg/kg	----	----	----	**3.4**	**4.5**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	<0.1	<0.1
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	----	----	----	**0.8**	**0.4**
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	----	----	**520**	**560**
EK062: Total Nitrogen as N								
^ Total Nitrogen as N	----	20	mg/kg	----	----	----	**520**	**560**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	----	----	----	**195**	**189**
EN60-DI: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	----	----	----	**8.0**	**7.7**

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT5 1-0m-0.5m	CPT5 2-0.5m-1m	CPT5 3-1.0m-1.5m	CPT5 4-1.5m-2m	CPT5 5-2.0m-3m
			Client sampling date / time	13-AUG-2009 15:00	13-AUG-2009 15:00	13-AUG-2009 15:00	13-AUG-2009 15:00	13-AUG-2009 15:00
				EB0912892-016	EB0912892-017	EB0912892-018	EB0912892-019	EB0912892-020
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	5.6	5.9	7.9	8.4	8.5
pH (Fox)	----	0.1	pH Unit	2.9	1.3	1.1	1.5	1.4
Reaction Rate	----	1	Reaction Uni	4	4	2	4	4
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	4.5	4.1	4.0	6.3	6.2
Titratable Actual Acidity (23F)	----	2	mole H+ / t	51	101	88	7	8
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.08	0.16	0.14	<0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	0.54	2.54	2.68	0.64	0.94
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	340	1580	1670	397	588
EA033-D: Retained Acidity								
Net Acid Soluble Sulfur (20Je)	----	0.02	% S	----	<0.02	<0.02	----	----
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	----	<10	<10	----	----
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	----	<0.02	<0.02	----	----
KCl Extractable Sulfur (23Ce)	----	0.02	% S	----	0.64	0.68	----	----
HCl Extractable Sulfur (20Be)	----	0.02	% S	----	0.59	0.63	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	0.63	2.66	2.77	0.65	0.96
Net Acidity (acidity units)	----	10	mole H+ / t	391	1660	1730	403	596
Liming Rate	----	1	kg CaCO3/t	29	125	130	30	45
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	44.8	49.4	36.4	36.6	35.0
ED037: Alkalinity								
Total Alkalinity as CaCO3	----	1	mg/kg	77	669	837	1050	821
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	77	669	837	1050	821
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	<1	<1	<1	<1	<1
ED040S: Soluble Major Anions								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	4700	7600	5200	4980	5140
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	51600	73400	54700	41100	40800
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	350	500	320	250	240
Magnesium	7439-95-4	10	mg/kg	2210	3440	2290	1960	1930
Sodium	7440-23-5	10	mg/kg	24100	33300	24700	23100	23300

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT5 1-0m-0.5m	CPT5 2-0.5m-1m	CPT5 3-1.0m-1.5m	CPT5 4-1.5m-2m	CPT5 5-2.0m-3m
				Client sampling date / time: 13-AUG-2009 15:00	13-AUG-2009 15:00	13-AUG-2009 15:00	13-AUG-2009 15:00	13-AUG-2009 15:00
				EB0912892-016	EB0912892-017	EB0912892-018	EB0912892-019	EB0912892-020
ED093S: Soluble Major Cations - Continued								
Potassium	7440-09-7	10	mg/kg	1210	1750	1380	1380	1370
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	14200	13600	13500	13700	13600
Antimony	7440-36-0	5	mg/kg	<5	<5	<5	<5	<5
Arsenic	7440-38-2	5	mg/kg	<5	17	10	14	7
Barium	7440-39-3	10	mg/kg	10	10	10	10	10
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	24	22	22	21	20
Cobalt	7440-48-4	2	mg/kg	4	12	6	8	6
Copper	7440-50-8	5	mg/kg	25	22	26	26	25
Iron	7439-89-6	50	mg/kg	15800	28500	19400	21800	17400
Lead	7439-92-1	5	mg/kg	<5	6	6	6	6
Manganese	7439-96-5	5	mg/kg	96	223	130	129	116
Nickel	7440-02-0	2	mg/kg	7	12	10	10	9
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadium	7440-62-2	5	mg/kg	35	45	50	49	50
Zinc	7440-66-6	5	mg/kg	24	36	36	34	34
Titanium	7440-32-6	10	mg/kg	150	180	150	160	150
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.01	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Uranium	7440-61-1	0.1	mg/kg	3.5	3.7	3.7	3.8	3.0
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	1.1	0.9	1.0	0.1	0.4
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	4730	820	460	510	380
EK062: Total Nitrogen as N								
^ Total Nitrogen as N	----	20	mg/kg	4730	820	470	510	380
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	680	176	206	199	206
EN60-DI: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	6.4	7.4	7.8	8.0	8.4

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID	QC01	CPT5a 1-0m-1m	CPT5a 2-1m-2m	CPT5a 3-3m-3.5m	----
				Client sampling date / time	13-AUG-2009 15:00	13-AUG-2009 15:00	13-AUG-2009 15:00	13-AUG-2009 15:00	----
					EB0912892-021	EB0912892-022	EB0912892-023	EB0912892-024	----
EA003 :pH (field/fox)									
pH (F)	----	0.1	pH Unit		8.6	8.0	8.3	8.2	----
pH (Fox)	----	0.1	pH Unit		1.7	1.5	1.4	1.5	----
Reaction Rate	----	1	Reaction Uni		4	4	4	4	----
EA033-A: Actual Acidity									
pH KCl (23A)	----	0.1	pH Unit		6.3	4.7	5.2	6.2	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t		7	42	25	8	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S		<0.02	0.07	0.04	<0.02	----
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.02	% S		0.95	2.00	2.07	1.46	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t		595	1250	1290	910	----
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		1.5	1.5	1.5	1.5	----
Net Acidity (sulfur units)	----	0.02	% S		0.96	2.07	2.11	1.47	----
Net Acidity (acidity units)	----	10	mole H+ / t		602	1290	1320	918	----
Liming Rate	----	1	kg CaCO3/t		45	97	99	69	----
EA055: Moisture Content									
^ Moisture Content (dried @ 103°C)	----	1.0	%		35.5	48.1	42.5	42.3	----
ED037: Alkalinity									
Total Alkalinity as CaCO3	----	1	mg/kg		893	698	931	980	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg		893	698	931	980	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg		<1	<1	<1	<1	----
ED040S: Soluble Major Anions									
Sulfate as SO4 2-	14808-79-8	10	mg/kg		6020	7000	6070	5110	----
ED045: Chloride									
Chloride	16887-00-6	10	mg/kg		40700	64900	56500	49100	----
ED093S: Soluble Major Cations									
Calcium	7440-70-2	10	mg/kg		270	390	300	250	----
Magnesium	7439-95-4	10	mg/kg		2180	2960	2420	1990	----
Sodium	7440-23-5	10	mg/kg		25100	31200	26300	22900	----
Potassium	7440-09-7	10	mg/kg		1470	1810	1540	1370	----
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		13400	12600	13100	12800	----
Antimony	7440-36-0	5	mg/kg		<5	<5	<5	<5	----
Arsenic	7440-38-2	5	mg/kg		10	16	15	12	----
Barium	7440-39-3	10	mg/kg		10	10	10	10	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: QC01	CPT5a 1-0m-1m	CPT5a 2-1m-2m	CPT5a 3-3m-3.5m	----
Client sampling date / time				13-AUG-2009 15:00	13-AUG-2009 15:00	13-AUG-2009 15:00	13-AUG-2009 15:00	----
				EB0912892-021	EB0912892-022	EB0912892-023	EB0912892-024	----
EG005T: Total Metals by ICP-AES - Continued								
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	----
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	20	20	20	20	----
Cobalt	7440-48-4	2	mg/kg	8	10	12	8	----
Copper	7440-50-8	5	mg/kg	27	25	29	31	----
Iron	7439-89-6	50	mg/kg	18900	28300	29800	21600	----
Lead	7439-92-1	5	mg/kg	7	<5	5	6	----
Manganese	7439-96-5	5	mg/kg	102	244	175	147	----
Nickel	7440-02-0	2	mg/kg	9	11	11	10	----
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	----
Vanadium	7440-62-2	5	mg/kg	54	50	53	54	----
Zinc	7440-66-6	5	mg/kg	35	35	36	35	----
Titanium	7440-32-6	10	mg/kg	160	160	160	140	----
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.01	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Uranium	7440-61-1	0.1	mg/kg	3.3	3.6	4.0	3.8	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.2	1.1	0.3	0.2	----
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	360	540	530	510	----
EK062: Total Nitrogen as N								
^ Total Nitrogen as N	----	20	mg/kg	360	540	530	510	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	202	191	223	172	----
EN60-DI: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	8.3	6.8	7.6	8.0	----

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EB0912892**	Page	: 1 of 17
Client	: **SANTOS LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JULIAN DOBOS	Contact	: Tim Kilmister
Address	: GPO BOX 302 BRISBANE QLD, AUSTRALIA 4000	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: julian_dobos@urscorp.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32432111	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 42626447	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Curtis Island, Gladstone		
C-O-C number	: 134254 - 134255	Date Samples Received	: 15-AUG-2009
Sampler	: Jenny Wang	Issue Date	: 26-AUG-2009
Order number	: BN/356/09		
		No. of samples received	: 24
Quote number	: BN/356/09	No. of samples analysed	: 24

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA
WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics
Kim McCabe	Senior Inorganic Chemist	Inorganics
Stephen Hislop	Senior Inorganic Chemist	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA003 :pH (field/fox) (QC Lot: 1072193)									
EB0912892-002	CPT13 2-1.0m	EA003: Reaction Rate	----	1	--	2	2	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	6.6	6.6	0.0	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	3.4	3.3	3.0	0% - 20%
EB0912892-014	CPT6 1-0m-1.0m	EA003: Reaction Rate	----	1	--	4	4	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	8.6	8.4	2.4	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	1.5	1.4	6.9	0% - 50%
EA033-A: Actual Acidity (QC Lot: 1072184)									
EB0912892-002	CPT13 2-1.0m	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	10	9	0.0	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	6.1	6.2	1.6	0% - 20%
EB0912892-015	CPT6 2-1.0m-3.0m	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	6.7	6.5	3.0	0% - 20%
EA033-B: Potential Acidity (QC Lot: 1072184)									
EB0912892-002	CPT13 2-1.0m	EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EB0912892-015	CPT6 2-1.0m-3.0m	EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	1.78	1.79	0.0	0% - 20%
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	1110	1120	0.5	0% - 20%
EA033-C: Acid Neutralising Capacity (QC Lot: 1072184)									
EB0912892-015	CPT6 2-1.0m-3.0m	EA033: Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	0.70	0.64	8.0	0% - 20%
		EA033: sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	0.22	0.20	8.0	0% - 20%
		EA033: acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	139	128	8.0	0% - 50%
EA055: Moisture Content (QC Lot: 1073170)									
EB0912949-004	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	Anonymous	Anonymous	Anonymous	Anonymous
EA055: Moisture Content (QC Lot: 1073258)									
EB0912936-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	Anonymous	Anonymous	Anonymous	Anonymous
EB0912936-006	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	Anonymous	Anonymous	Anonymous	Anonymous
EA055: Moisture Content (QC Lot: 1075659)									
EB0912892-017	CPT5 2-0.5m-1m	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	49.4	49.0	0.8	0% - 20%
EB0912892-024	CPT5a 3-3m-3.5m	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	42.3	42.4	0.4	0% - 20%
ED037: Alkalinity (QC Lot: 1073746)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED037: Alkalinity (QC Lot: 1073746) - continued									
EB0912892-023	CPT5a 2-1m-2m	ED037: Total Alkalinity as CaCO3	----	1	meq/kg	931	931	0.0	0% - 20%
ED037: Alkalinity (QC Lot: 1074924)									
EB0912892-015	CPT6 2-1.0m-3.0m	ED037: Total Alkalinity as CaCO3	----	1	meq/kg	2420	2430	0.3	0% - 20%
ED037: Alkalinity (QC Lot: 1075726)									
EB0912892-003	CPT13 3-1.5m	ED037: Total Alkalinity as CaCO3	----	1	meq/kg	670	670	0.0	0% - 20%
ED040S: Soluble Major Anions (QC Lot: 1073743)									
EB0912892-023	CPT5a 2-1m-2m	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	6070	5710	6.0	0% - 20%
ED040S: Soluble Major Anions (QC Lot: 1074922)									
EB0912892-015	CPT6 2-1.0m-3.0m	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	5300	5380	1.5	0% - 20%
ED040S: Soluble Major Anions (QC Lot: 1075724)									
EB0912892-003	CPT13 3-1.5m	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	1710	1720	0.0	0% - 20%
ED045: Chloride (QC Lot: 1073744)									
EB0912892-023	CPT5a 2-1m-2m	EDO45S: Chloride	16887-00-6	10	mg/kg	56500	56500	0.0	0% - 20%
ED045: Chloride (QC Lot: 1075723)									
EB0912892-003	CPT13 3-1.5m	EDO45S: Chloride	16887-00-6	10	mg/kg	12700	12400	2.1	0% - 20%
ED093S: Soluble Major Cations (QC Lot: 1073745)									
EB0912892-023	CPT5a 2-1m-2m	ED093S: Calcium	7440-70-2	10	mg/kg	300	300	0.0	0% - 20%
		ED093S: Magnesium	7439-95-4	10	mg/kg	2420	2330	3.4	0% - 20%
		ED093S: Sodium	7440-23-5	10	mg/kg	26300	25300	3.8	0% - 20%
		ED093S: Potassium	7440-09-7	10	mg/kg	1540	1510	1.9	0% - 20%
ED093S: Soluble Major Cations (QC Lot: 1074923)									
EB0912892-015	CPT6 2-1.0m-3.0m	ED093S: Calcium	7440-70-2	10	mg/kg	270	270	0.0	0% - 20%
		ED093S: Magnesium	7439-95-4	10	mg/kg	1820	1840	0.8	0% - 20%
		ED093S: Sodium	7440-23-5	10	mg/kg	23900	24300	1.6	0% - 20%
		ED093S: Potassium	7440-09-7	10	mg/kg	1530	1540	0.0	0% - 20%
ED093S: Soluble Major Cations (QC Lot: 1075725)									
EB0912892-003	CPT13 3-1.5m	ED093S: Calcium	7440-70-2	10	mg/kg	50	50	0.0	No Limit
		ED093S: Magnesium	7439-95-4	10	mg/kg	360	370	0.0	0% - 20%
		ED093S: Sodium	7440-23-5	10	mg/kg	7500	7450	0.6	0% - 20%
		ED093S: Potassium	7440-09-7	10	mg/kg	400	420	5.0	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 1075664)									
EB0912892-022	CPT5a 1-0m-1m	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	10	10	0.0	No Limit
		EG005T: Titanium	7440-32-6	10	mg/kg	160	150	8.6	0% - 50%
		EG005T: Chromium	7440-47-3	2	mg/kg	20	21	0.0	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	10	9	16.5	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	11	10	0.0	No Limit
		EG005T: Antimony	7440-36-0	5	mg/kg	<5	<5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005T: Total Metals by ICP-AES (QC Lot: 1075664) - continued									
EB0912892-022	CPT5a 1-0m-1m	EG005T: Arsenic	7440-38-2	5	mg/kg	16	13	15.8	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	25	24	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	5	0.0	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	244	165	# 39.0	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	50	43	14.5	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	35	34	0.0	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	12600	13000	3.2	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	28300	24000	16.6	0% - 20%
EB0912892-024	CPT5a 3-3m-3.5m	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	10	10	0.0	No Limit
		EG005T: Titanium	7440-32-6	10	mg/kg	140	150	0.0	0% - 50%
		EG005T: Chromium	7440-47-3	2	mg/kg	20	19	0.0	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	8	9	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	10	10	0.0	No Limit
		EG005T: Antimony	7440-36-0	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	12	12	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	31	28	10.4	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	6	<5	0.0	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	147	142	3.3	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	54	52	4.8	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	35	35	0.0	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	12800	13100	1.8	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	21600	23400	7.5	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 1075729)									
EB0912892-001	CPT13 1-1.0m	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	200	120	# 50.1	0% - 50%
		EG005T: Titanium	7440-32-6	10	mg/kg	80	70	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	32	28	12.3	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	9	12	30.3	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	7	8	0.0	No Limit
		EG005T: Antimony	7440-36-0	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	10	9	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	20	22	7.8	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	8	8	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005T: Total Metals by ICP-AES (QC Lot: 1075729) - continued									
EB0912892-001	CPT13 1-1.0m	EG005T: Manganese	7439-96-5	5	mg/kg	280	478	# 52.4	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	85	73	15.7	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	8	9	18.0	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	6070	6570	8.0	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	23700	23100	2.8	0% - 20%
EB0913095-019	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Cadmium	7440-43-9	1	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Barium	7440-39-3	10	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Titanium	7440-32-6	10	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Chromium	7440-47-3	2	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Cobalt	7440-48-4	2	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Nickel	7440-02-0	2	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Antimony	7440-36-0	5	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Arsenic	7440-38-2	5	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Copper	7440-50-8	5	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Lead	7439-92-1	5	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Manganese	7439-96-5	5	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Selenium	7782-49-2	5	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Vanadium	7440-62-2	5	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Zinc	7440-66-6	5	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Aluminium	7429-90-5	50	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Boron	7440-42-8	50	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
		EG005T: Iron	7439-89-6	50	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
EG020T: Total Metals by ICP-MS (QC Lot: 1075666)									
EB0912892-022	CPT5a 1-0m-1m	EG020X-T: Uranium	7440-61-1	0.1	mg/kg	3.6	4.5	# 21.3	0% - 20%
EB0912892-024	CPT5a 3-3m-3.5m	EG020X-T: Uranium	7440-61-1	0.1	mg/kg	3.8	4.2	9.9	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 1075667)									
EB0912892-024	CPT5a 3-3m-3.5m	EG020V-T: Tungsten	7440-33-7	0.01	mg/kg	<0.05	<0.05	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1075731)									
EB0912892-001	CPT13 1-1.0m	EG020X-T: Uranium	7440-61-1	0.1	mg/kg	1.6	1.2	30.3	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1075665)									
EB0912892-022	CPT5a 1-0m-1m	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EB0912892-024	CPT5a 3-3m-3.5m	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1075730)									
EB0912892-001	CPT13 1-1.0m	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EB0913095-019	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
EK059G: NOX as N by Discrete Analyser (QC Lot: 1073747)									
EB0912892-023	CPT5a 2-1m-2m	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.3	0.3	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK059G: NOX as N by Discrete Analyser (QC Lot: 1074925)									
EB0912892-015	CPT6 2-1.0m-3.0m	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.4	0.3	0.0	No Limit
EK059G: NOX as N by Discrete Analyser (QC Lot: 1075727)									
EB0912892-003	CPT13 3-1.5m	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.2	<0.1	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen as N (QC Lot: 1075660)									
EB0912892-022	CPT5a 1-0m-1m	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	540	560	3.0	0% - 20%
EB0912892-024	CPT5a 3-3m-3.5m	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	510	490	3.8	0% - 20%
EK061G: Total Kjeldahl Nitrogen as N (QC Lot: 1075721)									
EB0912892-001	CPT13 1-1.0m	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	120	120	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1075661)									
EB0912892-022	CPT5a 1-0m-1m	EK067G: Total Phosphorus as P	----	2	mg/kg	191	219	13.7	0% - 20%
EB0912892-024	CPT5a 3-3m-3.5m	EK067G: Total Phosphorus as P	----	2	mg/kg	172	181	4.9	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1075722)									
EB0912892-001	CPT13 1-1.0m	EK067G: Total Phosphorus as P	----	2	mg/kg	58	57	1.9	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005W: Water Leachable Metals by ICPAES (QC Lot: 1075533)									
EB0912892-022	CPT5a 1-0m-1m	EG005W: Cadmium	7440-43-9	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG005W: Antimony	7440-36-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Arsenic	7440-38-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Beryllium	7440-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Chromium	7440-47-3	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Cobalt	7440-48-4	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Copper	7440-50-8	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Manganese	7439-96-5	0.01	mg/L	<0.01	0.02	0.0	No Limit
		EG005W: Nickel	7440-02-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Vanadium	7440-62-2	0.01	mg/L	0.04	0.04	0.0	No Limit
		EG005W: Zinc	7440-66-6	0.01	mg/L	0.14	0.14	0.0	0% - 50%
		EG005W: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG005W: Barium	7440-39-3	0.1	mg/L	0.3	0.3	0.0	No Limit
		EG005W: Boron	7440-42-8	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005W: Aluminium	7429-90-5	0.10	mg/L	<0.10	<0.10	0.0	No Limit
EG005W: Water Leachable Metals by ICPAES (QC Lot: 1078806)									
EB0912892-001	CPT13 1-1.0m	EG005W: Cadmium	7440-43-9	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG005W: Antimony	7440-36-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Arsenic	7440-38-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Beryllium	7440-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005W: Water Leachable Metals by ICPAES (QC Lot: 1078806) - continued									
EB0912892-001	CPT13 1-1.0m	EG005W: Chromium	7440-47-3	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Cobalt	7440-48-4	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Copper	7440-50-8	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Manganese	7439-96-5	0.01	mg/L	0.56	0.55	0.0	0% - 20%
		EG005W: Nickel	7440-02-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Selenium	7782-49-2	0.01	mg/L	0.01	<0.01	0.0	No Limit
		EG005W: Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Zinc	7440-66-6	0.01	mg/L	0.17	0.17	0.0	0% - 50%
		EG005W: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG005W: Barium	7440-39-3	0.1	mg/L	0.3	0.3	0.0	No Limit
		EG005W: Boron	7440-42-8	0.1	mg/L	0.2	0.2	0.0	No Limit
		EG005W: Aluminium	7429-90-5	0.10	mg/L	<0.10	<0.10	0.0	No Limit
EB0912892-019	CPT5 4-1.5m-2m	EG005W: Cadmium	7440-43-9	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG005W: Antimony	7440-36-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Arsenic	7440-38-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Beryllium	7440-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Chromium	7440-47-3	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Cobalt	7440-48-4	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Copper	7440-50-8	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Manganese	7439-96-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Nickel	7440-02-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Vanadium	7440-62-2	0.01	mg/L	0.11	0.11	0.0	0% - 50%
		EG005W: Zinc	7440-66-6	0.01	mg/L	0.02	0.02	0.0	No Limit
		EG005W: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG005W: Barium	7440-39-3	0.1	mg/L	0.2	0.2	0.0	No Limit
		EG005W: Boron	7440-42-8	0.1	mg/L	0.4	0.4	0.0	No Limit
		EG005W: Aluminium	7429-90-5	0.10	mg/L	<0.10	<0.10	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1075535)									
EB0912892-022	CPT5a 1-0m-1m	EG020E-W: Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1078808)									
EB0912892-001	CPT13 1-1.0m	EG020E-W: Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EB0912892-019	CPT5 4-1.5m-2m	EG020E-W: Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG020W: Water Leachable Metals by ICP-MS (QC Lot: 1075534)									
EB0912892-022	CPT5a 1-0m-1m	EG020B-W: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG020W: Water Leachable Metals by ICP-MS (QC Lot: 1078807)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020W: Water Leachable Metals by ICP-MS (QC Lot: 1078807) - continued									
EB0912892-001	CPT13 1-1.0m	EG020B-W: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EB0912892-019	CPT5 4-1.5m-2m	EG020B-W: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG035W: Water Leachable Mercury by FIMS (QC Lot: 1075521)									
EB0912892-022	CPT5a 1-0m-1m	EG035W: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035W: Water Leachable Mercury by FIMS (QC Lot: 1078812)									
EB0912892-001	CPT13 1-1.0m	EG035W: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EB0912892-020	CPT5 5-2.0m-3m	EG035W: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA033-A: Actual Acidity (QCLot: 1072184)								
EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-B: Potential Acidity (QCLot: 1072184)								
EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	----	----	----	----
EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----
EA033-C: Acid Neutralising Capacity (QCLot: 1072184)								
EA033: Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	<0.01	----	----	----	----
EA033: acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	<10	----	----	----	----
EA033: sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	<0.01	----	----	----	----
EA033-D: Retained Acidity (QCLot: 1072184)								
EA033: Net Acid Soluble Sulfur (20Je)	----	0.02	% S	<0.02	----	----	----	----
EA033: acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	<10	----	----	----	----
EA033: sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----
EA033: HCl Extractable Sulfur (20Be)	----	0.02	% S	<0.02	----	----	----	----
ED037: Alkalinity (QCLot: 1073746)								
ED037: Total Alkalinity as CaCO3	----	1	meq/kg	<1	500 meq/kg	94.4	84	108
ED037: Alkalinity (QCLot: 1074924)								
ED037: Total Alkalinity as CaCO3	----	1	meq/kg	<1	500 meq/kg	94.4	84	108
ED037: Alkalinity (QCLot: 1075726)								
ED037: Total Alkalinity as CaCO3	----	1	meq/kg	<1	500 meq/kg	94.4	84	108
ED040S: Soluble Major Anions (QCLot: 1073743)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	238 mg/kg	77.4	70	130
ED040S: Soluble Major Anions (QCLot: 1074922)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	238 mg/kg	97.0	70	130
ED040S: Soluble Major Anions (QCLot: 1075724)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	238 mg/kg	96.3	70	130
ED045: Chloride (QCLot: 1073744)								
EDO45S: Chloride	16887-00-6	10	mg/kg	<10	400 mg/kg	92.5	86	114
ED045: Chloride (QCLot: 1074921)								
EDO45S: Chloride	16887-00-6	10	mg/kg	<10	400 mg/kg	104	86	114
ED045: Chloride (QCLot: 1075723)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
ED045: Chloride (QCLot: 1075723) - continued								
EDO45S: Chloride	16887-00-6	10	mg/kg	<10	400 mg/kg	104	86	114
ED093S: Soluble Major Cations (QCLot: 1073745)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	----	----	----	----
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	----	----	----	----
ED093S: Sodium	7440-23-5	10	mg/kg	<10	----	----	----	----
ED093S: Potassium	7440-09-7	10	mg/kg	<10	----	----	----	----
ED093S: Soluble Major Cations (QCLot: 1074923)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	----	----	----	----
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	----	----	----	----
ED093S: Sodium	7440-23-5	10	mg/kg	<10	----	----	----	----
ED093S: Potassium	7440-09-7	10	mg/kg	<10	----	----	----	----
ED093S: Soluble Major Cations (QCLot: 1075725)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	----	----	----	----
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	----	----	----	----
ED093S: Sodium	7440-23-5	10	mg/kg	<10	----	----	----	----
ED093S: Potassium	7440-09-7	10	mg/kg	<10	----	----	----	----
EG005T: Total Metals by ICP-AES (QCLot: 1075664)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005T: Antimony	7440-36-0	5	mg/kg	<5	----	----	----	----
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	13.8 mg/kg	88.6	78	124
EG005T: Barium	7440-39-3	10	mg/kg	<10	143 mg/kg	92.4	84	120
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	----	----	----	----
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	2.82 mg/kg	79.0	77	117
EG005T: Chromium	7440-47-3	2	mg/kg	<2	61.6 mg/kg	84.7	83	119
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	----	----	----	----
EG005T: Copper	7440-50-8	5	mg/kg	<5	54.7 mg/kg	85.1	82	122
EG005T: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG005T: Lead	7439-92-1	5	mg/kg	<5	55.5 mg/kg	# 78.8	83	117
EG005T: Manganese	7439-96-5	5	mg/kg	<5	----	----	----	----
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.1 mg/kg	# 78.7	83	121
EG005T: Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	----	----	----	----
EG005T: Zinc	7440-66-6	5	mg/kg	<5	105 mg/kg	83.5	82	120
EG005T: Titanium	7440-32-6	10	mg/kg	<10	----	----	----	----
EG005T: Total Metals by ICP-AES (QCLot: 1075729)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005T: Antimony	7440-36-0	5	mg/kg	<5	----	----	----	----

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1075729) - continued								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	13.8 mg/kg	102	78	124
EG005T: Barium	7440-39-3	10	mg/kg	<10	143 mg/kg	109	84	120
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	----	----	----	----
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	2.82 mg/kg	90.3	77	117
EG005T: Chromium	7440-47-3	2	mg/kg	<2	61.6 mg/kg	98.6	83	119
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	----	----	----	----
EG005T: Copper	7440-50-8	5	mg/kg	<5	54.7 mg/kg	95.4	82	122
EG005T: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG005T: Lead	7439-92-1	5	mg/kg	<5	55.5 mg/kg	88.4	83	117
EG005T: Manganese	7439-96-5	5	mg/kg	<5	----	----	----	----
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.1 mg/kg	92.2	83	121
EG005T: Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	----	----	----	----
EG005T: Zinc	7440-66-6	5	mg/kg	<5	105 mg/kg	93.0	82	120
EG005T: Titanium	7440-32-6	10	mg/kg	<10	----	----	----	----
EG020T: Total Metals by ICP-MS (QCLot: 1075666)								
EG020X-T: Uranium	7440-61-1	0.1	mg/kg	<0.1	----	----	----	----
EG020T: Total Metals by ICP-MS (QCLot: 1075667)								
EG020V-T: Tungsten	7440-33-7	0.01	mg/kg	<0.05	----	----	----	----
EG020T: Total Metals by ICP-MS (QCLot: 1075731)								
EG020X-T: Uranium	7440-61-1	0.1	mg/kg	<0.1	----	----	----	----
EG020T: Total Metals by ICP-MS (QCLot: 1075732)								
EG020V-T: Tungsten	7440-33-7	0.01	mg/kg	<0.05	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1075665)								
EG035T: Mercury	7439-97-6	0.10	mg/kg	<0.1	1.34 mg/kg	99.6	73	119
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1075730)								
EG035T: Mercury	7439-97-6	0.10	mg/kg	<0.1	1.34 mg/kg	100	73	119
EK059G: NOX as N by Discrete Analyser (QCLot: 1073747)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.86 mg/kg	106	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1074925)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.86 mg/kg	113	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1075727)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.86 mg/kg	99.8	70	130
EK061G: Total Kjeldahl Nitrogen as N (QCLot: 1075660)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	373 mg/kg	110	70	130
EK061G: Total Kjeldahl Nitrogen as N (QCLot: 1075721)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EK061G: Total Kjeldahl Nitrogen as N (QCLot: 1075721) - continued								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	373 mg/kg	109	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1075661)								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	75 mg/kg	86.4	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1075722)								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	75 mg/kg	95.2	70	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005W: Water Leachable Metals by ICPAES (QCLot: 1075533)								
EG005W: Aluminium	7429-90-5	0.1	mg/L	<0.10	----	----	----	----
EG005W: Antimony	7440-36-0	0.01	mg/L	<0.01	----	----	----	----
EG005W: Arsenic	7440-38-2	0.01	mg/L	<0.01	0.100 mg/L	111	79	121
EG005W: Barium	7440-39-3	0.1	mg/L	<0.1	0.5 mg/L	104	70	117
EG005W: Beryllium	7440-41-7	0.01	mg/L	<0.01	----	----	----	----
EG005W: Boron	7440-42-8	0.1	mg/L	<0.1	----	----	----	----
EG005W: Cadmium	7440-43-9	0.005	mg/L	<0.005	0.100 mg/L	100	83	111
EG005W: Chromium	7440-47-3	0.01	mg/L	<0.01	0.100 mg/L	96.8	81	111
EG005W: Cobalt	7440-48-4	0.01	mg/L	<0.01	0.100 mg/L	89.9	84.3	114
EG005W: Copper	7440-50-8	0.01	mg/L	<0.01	0.200 mg/L	97.3	82	112
EG005W: Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----
EG005W: Lead	7439-92-1	0.01	mg/L	<0.01	0.100 mg/L	87.6	77	111
EG005W: Manganese	7439-96-5	0.01	mg/L	<0.01	0.100 mg/L	88.9	76	121
EG005W: Nickel	7440-02-0	0.01	mg/L	<0.01	0.100 mg/L	81.3	76	110
EG005W: Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
EG005W: Titanium	7440-32-6	0.01	mg/L	<0.01	----	----	----	----
EG005W: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.100 mg/L	102	82	110
EG005W: Zinc	7440-66-6	0.01	mg/L	<0.01	0.200 mg/L	102	72	122
EG005W: Water Leachable Metals by ICPAES (QCLot: 1078806)								
EG005W: Aluminium	7429-90-5	0.1	mg/L	<0.10	----	----	----	----
EG005W: Antimony	7440-36-0	0.01	mg/L	<0.01	----	----	----	----
EG005W: Arsenic	7440-38-2	0.01	mg/L	<0.01	0.100 mg/L	101	79	121
EG005W: Barium	7440-39-3	0.1	mg/L	<0.1	0.5 mg/L	103	70	117
EG005W: Beryllium	7440-41-7	0.01	mg/L	<0.01	----	----	----	----
EG005W: Boron	7440-42-8	0.1	mg/L	<0.1	----	----	----	----
EG005W: Cadmium	7440-43-9	0.005	mg/L	<0.005	0.100 mg/L	97.2	83	111
EG005W: Chromium	7440-47-3	0.01	mg/L	<0.01	0.100 mg/L	94.5	81	111
EG005W: Cobalt	7440-48-4	0.01	mg/L	<0.01	0.100 mg/L	# 81.7	84.3	114
EG005W: Copper	7440-50-8	0.01	mg/L	<0.01	0.200 mg/L	# 77.0	82	112

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG005W: Water Leachable Metals by ICPAES (QCLot: 1078806) - continued								
EG005W: Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----
EG005W: Lead	7439-92-1	0.01	mg/L	<0.01	0.100 mg/L	90.0	77	111
EG005W: Manganese	7439-96-5	0.01	mg/L	<0.01	0.100 mg/L	84.7	76	121
EG005W: Nickel	7440-02-0	0.01	mg/L	<0.01	0.100 mg/L	87.4	76	110
EG005W: Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
EG005W: Titanium	7440-32-6	0.01	mg/L	<0.01	----	----	----	----
EG005W: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.100 mg/L	96.3	82	110
EG005W: Zinc	7440-66-6	0.01	mg/L	<0.01	0.200 mg/L	98.7	72	122
EG020T: Total Metals by ICP-MS (QCLot: 1075535)								
EG020E-W: Tungsten	7440-33-7	0.001	mg/L	<0.001	----	----	----	----
EG020T: Total Metals by ICP-MS (QCLot: 1078808)								
EG020E-W: Tungsten	7440-33-7	0.001	mg/L	<0.001	----	----	----	----
EG020W: Water Leachable Metals by ICP-MS (QCLot: 1075534)								
EG020B-W: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG020W: Water Leachable Metals by ICP-MS (QCLot: 1078807)								
EG020B-W: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG035W: Water Leachable Mercury by FIMS (QCLot: 1075521)								
EG035W: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	104	81	117
EG035W: Water Leachable Mercury by FIMS (QCLot: 1078812)								
EG035W: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	101	81	117

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045: Chloride (QCLot: 1073744)							
EB0912892-022	CPT5a 1-0m-1m	EDO45S: Chloride	16887-00-6	10000 mg/kg	96.8	70	130
ED045: Chloride (QCLot: 1074921)							
EB0912892-015	CPT6 2-1.0m-3.0m	EDO45S: Chloride	16887-00-6	10000 mg/kg	94.4	70	130
ED045: Chloride (QCLot: 1075723)							
EB0912892-001	CPT13 1-1.0m	EDO45S: Chloride	16887-00-6	10000 mg/kg	94.5	70	130
EG005T: Total Metals by ICP-AES (QCLot: 1075664)							
EB0912892-023	CPT5a 2-1m-2m	EG005T: Arsenic	7440-38-2	50 mg/kg	89.0	70	130
		EG005T: Barium	7440-39-3	50 mg/kg	95.1	70	130
		EG005T: Beryllium	7440-41-7	5 mg/kg	117	70	130
		EG005T: Cadmium	7440-43-9	25 mg/kg	87.5	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	90.9	70	130
		EG005T: Cobalt	7440-48-4	50 mg/kg	90.2	70	130
		EG005T: Copper	7440-50-8	50 mg/kg	87.2	70	130
		EG005T: Lead	7439-92-1	50 mg/kg	86.4	70	130
		EG005T: Manganese	7439-96-5	50 mg/kg	83.4	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	85.9	70	130
		EG005T: Vanadium	7440-62-2	50 mg/kg	95.0	70	130
		EG005T: Zinc	7440-66-6	50 mg/kg	85.3	70	130
EG005T: Total Metals by ICP-AES (QCLot: 1075729)							
EB0912892-003	CPT13 3-1.5m	EG005T: Arsenic	7440-38-2	50 mg/kg	86.8	70	130
		EG005T: Barium	7440-39-3	50 mg/kg	# 348	70	130
		EG005T: Beryllium	7440-41-7	5 mg/kg	105	70	130
		EG005T: Cadmium	7440-43-9	25 mg/kg	93.2	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	85.5	70	130
		EG005T: Cobalt	7440-48-4	50 mg/kg	92.3	70	130
		EG005T: Copper	7440-50-8	50 mg/kg	87.1	70	130
		EG005T: Lead	7439-92-1	50 mg/kg	88.8	70	130
		EG005T: Manganese	7439-96-5	50 mg/kg	# 61.2	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	90.7	70	130
		EG005T: Vanadium	7440-62-2	50 mg/kg	# 54.3	70	130
		EG005T: Zinc	7440-66-6	50 mg/kg	89.8	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1075665)							
EB0912892-023	CPT5a 2-1m-2m	EG035T: Mercury	7439-97-6	5.0 mg/kg	101	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1075730)							

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Spike Recovery (%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1075730) - continued							
EB0912892-003	CPT13 3-1.5m	EG035T: Mercury	7439-97-6	5.0 mg/kg	101	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1073747)							
EB0912892-022	CPT5a 1-0m-1m	EK059G: Nitrite + Nitrate as N (Sol.)	----	4.0 mg/kg	105	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1075727)							
EB0912892-001	CPT13 1-1.0m	EK059G: Nitrite + Nitrate as N (Sol.)	----	2.0 mg/kg	119	70	130
EK061G: Total Kjeldahl Nitrogen as N (QCLot: 1075660)							
EB0912892-023	CPT5a 2-1m-2m	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	109	70	130
EK061G: Total Kjeldahl Nitrogen as N (QCLot: 1075721)							
EB0912892-003	CPT13 3-1.5m	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	95.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1075661)							
EB0912892-023	CPT5a 2-1m-2m	EK067G: Total Phosphorus as P	----	100 mg/kg	79.6	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1075722)							
EB0912892-003	CPT13 3-1.5m	EK067G: Total Phosphorus as P	----	100 mg/kg	71.2	70	130

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Spike Recovery (%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005W: Water Leachable Metals by ICPAES (QCLot: 1075533)							
EB0912892-023	CPT5a 2-1m-2m	EG005W: Arsenic	7440-38-2	1.0 mg/L	107	70	130
		EG005W: Barium	7440-39-3	1.0 mg/L	104	70	130
		EG005W: Cadmium	7440-43-9	0.50 mg/L	102	70	130
		EG005W: Chromium	7440-47-3	1.0 mg/L	104	70	130
		EG005W: Cobalt	7440-48-4	1.0 mg/L	102	70	130
		EG005W: Copper	7440-50-8	1.0 mg/L	104	70	130
		EG005W: Lead	7439-92-1	1.0 mg/L	99.8	70	130
		EG005W: Manganese	7439-96-5	1.0 mg/L	99.5	70	130
		EG005W: Nickel	7440-02-0	1.0 mg/L	98.8	70	130
		EG005W: Vanadium	7440-62-2	1.0 mg/L	102	70	130
		EG005W: Zinc	7440-66-6	1.0 mg/L	103	70	130
EG005W: Water Leachable Metals by ICPAES (QCLot: 1078806)							
EB0912892-003	CPT13 3-1.5m	EG005W: Arsenic	7440-38-2	1.0 mg/L	104	70	130
		EG005W: Barium	7440-39-3	1.0 mg/L	108	70	130
		EG005W: Cadmium	7440-43-9	0.50 mg/L	101	70	130
		EG005W: Chromium	7440-47-3	1.0 mg/L	105	70	130
		EG005W: Cobalt	7440-48-4	1.0 mg/L	101	70	130
		EG005W: Copper	7440-50-8	1.0 mg/L	101	70	130
		EG005W: Lead	7439-92-1	1.0 mg/L	99.5	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005W: Water Leachable Metals by ICPAES (QCLot: 1078806) - continued							
EB0912892-003	CPT13 3-1.5m	EG005W: Manganese	7439-96-5	1.0 mg/L	100	70	130
		EG005W: Nickel	7440-02-0	1.0 mg/L	98.9	70	130
		EG005W: Vanadium	7440-62-2	1.0 mg/L	101	70	130
		EG005W: Zinc	7440-66-6	1.0 mg/L	101	70	130
EG035W: Water Leachable Mercury by FIMS (QCLot: 1075521)							
EB0912892-023	CPT5a 2-1m-2m	EG035W: Mercury	7439-97-6	0.010 mg/L	104	70	130
EG035W: Water Leachable Mercury by FIMS (QCLot: 1078812)							
EB0912892-003	CPT13 3-1.5m	EG035W: Mercury	7439-97-6	0.010 mg/L	97.8	70	130

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EB0912892**	Page	: 1 of 17
Client	: SANTOS LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR JULIAN DOBOS	Contact	: Tim Kilmister
Address	: GPO BOX 302 BRISBANE QLD, AUSTRALIA 4000	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: julian_dobos@urscorp.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32432111	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 42626447	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Curtis Island, Gladstone		
C-O-C number	: 134254 - 134255	Date Samples Received	: 15-AUG-2009
Sampler	: Jenny Wang	Issue Date	: 26-AUG-2009
Order number	: BN/356/09		
		No. of samples received	: 24
Quote number	: BN/356/09	No. of samples analysed	: 24

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non -volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA003 :pH (field/fox)							
Snap Lock Bag CPT13 - 2-1.0m, CPT13 - 4-1.5m	**11-AUG-2009**	**----**	----	----	**18-AUG-2009**	12-AUG-2009	✗
Snap Lock Bag CPT11 - 1-0.5m, CPT11 - 3-1.5m, CPT12 - 1-1m, CPT12 - 2-1.5m, CPT12 - 3-2m, CPT12 - 4-2.5m, CPT12 - 5-3m	**12-AUG-2009**	**----**	----	----	**18-AUG-2009**	13-AUG-2009	✗
Snap Lock Bag CPT6 - 1-0m-1.0m, CPT6 - 2-1.0m-3.0m, CPT5 - 1-0m-0.5m, CPT5 - 2-0.5m-1m, CPT5 - 3-1.0m-1.5m, CPT5 - 4-1.5m-2m, CPT5 - 5-2.0m-3m, QC01, CPT5a - 1-0m-1m, CPT5a - 2-1m-2m, CPT5a - 3-3m-3.5m	**13-AUG-2009**	**----**	----	----	**18-AUG-2009**	14-AUG-2009	✗
EA033-A: Actual Acidity							
Snap Lock Bag CPT13 - 2-1.0m, CPT13 - 4-1.5m	**11-AUG-2009**	**15-AUG-2009**	12-AUG-2009	✗	**21-AUG-2009**	16-NOV-2009	✓
Snap Lock Bag CPT11 - 1-0.5m, CPT11 - 3-1.5m, CPT12 - 1-1m, CPT12 - 2-1.5m, CPT12 - 3-2m, CPT12 - 4-2.5m, CPT12 - 5-3m	**12-AUG-2009**	**15-AUG-2009**	13-AUG-2009	✗	**21-AUG-2009**	16-NOV-2009	✓
Snap Lock Bag CPT6 - 1-0m-1.0m, CPT6 - 2-1.0m-3.0m, CPT5 - 1-0m-0.5m, CPT5 - 2-0.5m-1m, CPT5 - 3-1.0m-1.5m, CPT5 - 4-1.5m-2m, CPT5 - 5-2.0m-3m, QC01, CPT5a - 1-0m-1m, CPT5a - 2-1m-2m, CPT5a - 3-3m-3.5m	**13-AUG-2009**	**15-AUG-2009**	---	----	**21-AUG-2009**	16-NOV-2009	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-B: Potential Acidity							
Snap Lock Bag CPT13 - 2-1.0m, CPT13 - 4-1.5m	**11-AUG-2009**	**15-AUG-2009**	12-AUG-2009	×	**21-AUG-2009**	16-NOV-2009	✓
Snap Lock Bag CPT11 - 1-0.5m, CPT11 - 3-1.5m, CPT12 - 1-1m, CPT12 - 2-1.5m, CPT12 - 3-2m, CPT12 - 4-2.5m, CPT12 - 5-3m	**12-AUG-2009**	**15-AUG-2009**	13-AUG-2009	×	**21-AUG-2009**	16-NOV-2009	✓
Snap Lock Bag CPT6 - 1-0m-1.0m, CPT6 - 2-1.0m-3.0m, CPT5 - 1-0m-0.5m, CPT5 - 2-0.5m-1m, CPT5 - 3-1.0m-1.5m, CPT5 - 4-1.5m-2m, CPT5 - 5-2.0m-3m, QC01, CPT5a - 1-0m-1m, CPT5a - 2-1m-2m, CPT5a - 3-3m-3.5m	**13-AUG-2009**	**15-AUG-2009**	---	----	**21-AUG-2009**	16-NOV-2009	✓
EA033-C: Acid Neutralising Capacity							
Snap Lock Bag CPT13 - 2-1.0m, CPT13 - 4-1.5m	**11-AUG-2009**	**15-AUG-2009**	12-AUG-2009	×	**21-AUG-2009**	16-NOV-2009	✓
Snap Lock Bag CPT11 - 1-0.5m, CPT11 - 3-1.5m, CPT12 - 1-1m, CPT12 - 2-1.5m, CPT12 - 3-2m, CPT12 - 4-2.5m, CPT12 - 5-3m	**12-AUG-2009**	**15-AUG-2009**	13-AUG-2009	×	**21-AUG-2009**	16-NOV-2009	✓
Snap Lock Bag CPT6 - 1-0m-1.0m, CPT6 - 2-1.0m-3.0m, CPT5 - 1-0m-0.5m, CPT5 - 2-0.5m-1m, CPT5 - 3-1.0m-1.5m, CPT5 - 4-1.5m-2m, CPT5 - 5-2.0m-3m, QC01, CPT5a - 1-0m-1m, CPT5a - 2-1m-2m, CPT5a - 3-3m-3.5m	**13-AUG-2009**	**15-AUG-2009**	---	----	**21-AUG-2009**	16-NOV-2009	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-D: Retained Acidity							
Snap Lock Bag							
CPT13 - 2-1.0m, CPT13 - 4-1.5m	**11-AUG-2009**	**15-AUG-2009**	12-AUG-2009	×	**21-AUG-2009**	16-NOV-2009	✓
Snap Lock Bag							
CPT11 - 1-0.5m, CPT11 - 3-1.5m, CPT12 - 1-1m, CPT12 - 2-1.5m, CPT12 - 3-2m, CPT12 - 4-2.5m, CPT12 - 5-3m	**12-AUG-2009**	**15-AUG-2009**	13-AUG-2009	×	**21-AUG-2009**	16-NOV-2009	✓
Snap Lock Bag							
CPT6 - 1-0m-1.0m, CPT6 - 2-1.0m-3.0m, CPT5 - 1-0m-0.5m, CPT5 - 2-0.5m-1m, CPT5 - 3-1.0m-1.5m, CPT5 - 4-1.5m-2m, CPT5 - 5-2.0m-3m, QC01, CPT5a - 1-0m-1m, CPT5a - 2-1m-2m, CPT5a - 3-3m-3.5m	**13-AUG-2009**	**15-AUG-2009**	---	----	**21-AUG-2009**	16-NOV-2009	✓
EA033-E: Acid Base Accounting							
Snap Lock Bag							
CPT13 - 2-1.0m, CPT13 - 4-1.5m	**11-AUG-2009**	**15-AUG-2009**	12-AUG-2009	×	**21-AUG-2009**	16-NOV-2009	✓
Snap Lock Bag							
CPT11 - 1-0.5m, CPT11 - 3-1.5m, CPT12 - 1-1m, CPT12 - 2-1.5m, CPT12 - 3-2m, CPT12 - 4-2.5m, CPT12 - 5-3m	**12-AUG-2009**	**15-AUG-2009**	13-AUG-2009	×	**21-AUG-2009**	16-NOV-2009	✓
Snap Lock Bag							
CPT6 - 1-0m-1.0m, CPT6 - 2-1.0m-3.0m, CPT5 - 1-0m-0.5m, CPT5 - 2-0.5m-1m, CPT5 - 3-1.0m-1.5m, CPT5 - 4-1.5m-2m, CPT5 - 5-2.0m-3m, QC01, CPT5a - 1-0m-1m, CPT5a - 2-1m-2m, CPT5a - 3-3m-3.5m	**13-AUG-2009**	**15-AUG-2009**	---	----	**21-AUG-2009**	16-NOV-2009	✓
EA055: Moisture Content							
Soil Glass Jar - Unpreserved							
CPT13 - 1-1.0m, CPT13 - 3-1.5m	**11-AUG-2009**	**----**	----	----	**19-AUG-2009**	18-AUG-2009	×
Soil Glass Jar - Unpreserved							
CPT11 - 2-0.5m, CPT11 - 4-1.5m	**12-AUG-2009**	**----**	----	----	**19-AUG-2009**	19-AUG-2009	✓
Soil Glass Jar - Unpreserved							
CPT6 - 1-0m-1.0m, CPT6 - 2-1.0m-3.0m, CPT5 - 1-0m-0.5m, CPT5 - 2-0.5m-1m, CPT5 - 3-1.0m-1.5m, CPT5 - 4-1.5m-2m, CPT5 - 5-2.0m-3m, QC01, CPT5a - 1-0m-1m, CPT5a - 2-1m-2m, CPT5a - 3-3m-3.5m	**13-AUG-2009**	**----**	----	----	**21-AUG-2009**	20-AUG-2009	×

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037: Alkalinity								
Soil Glass Jar - Unpreserved								
CPT13 - 1-1.0m,	CPT13 - 3-1.5m	**11-AUG-2009**	**21-AUG-2009**	18-AUG-2009	×	**24-AUG-2009**	07-FEB-2010	✓
Soil Glass Jar - Unpreserved								
CPT11 - 2-0.5m,	CPT11 - 4-1.5m	**12-AUG-2009**	**21-AUG-2009**	19-AUG-2009	×	**24-AUG-2009**	08-FEB-2010	✓
Soil Glass Jar - Unpreserved								
CPT6 - 1-0m-1.0m,	CPT5 - 1-0m-0.5m,	**13-AUG-2009**	**20-AUG-2009**	20-AUG-2009	✓	**20-AUG-2009**	09-FEB-2010	✓
CPT5 - 2-0.5m-1m,	CPT5 - 3-1.0m-1.5m,							
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,							
CPT5a - 3-3m-3.5m								
Soil Glass Jar - Unpreserved								
CPT6 - 2-1.0m-3.0m,	CPT5 - 4-1.5m-2m,	**13-AUG-2009**	**21-AUG-2009**	20-AUG-2009	×	**24-AUG-2009**	09-FEB-2010	✓
CPT5 - 5-2.0m-3m,	QC01							
ED040S: Soluble Major Anions								
Soil Glass Jar - Unpreserved								
CPT13 - 1-1.0m,	CPT13 - 3-1.5m	**11-AUG-2009**	**21-AUG-2009**	18-AUG-2009	×	**24-AUG-2009**	18-SEP-2009	✓
Soil Glass Jar - Unpreserved								
CPT11 - 2-0.5m,	CPT11 - 4-1.5m	**12-AUG-2009**	**21-AUG-2009**	19-AUG-2009	×	**24-AUG-2009**	18-SEP-2009	✓
Soil Glass Jar - Unpreserved								
CPT6 - 1-0m-1.0m,	CPT5 - 1-0m-0.5m,	**13-AUG-2009**	**20-AUG-2009**	20-AUG-2009	✓	**20-AUG-2009**	17-SEP-2009	✓
CPT5 - 2-0.5m-1m,	CPT5 - 3-1.0m-1.5m,							
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,							
CPT5a - 3-3m-3.5m								
Soil Glass Jar - Unpreserved								
CPT6 - 2-1.0m-3.0m,	CPT5 - 4-1.5m-2m,	**13-AUG-2009**	**21-AUG-2009**	20-AUG-2009	×	**24-AUG-2009**	18-SEP-2009	✓
CPT5 - 5-2.0m-3m,	QC01							
ED045: Chloride								
Soil Glass Jar - Unpreserved								
CPT13 - 1-1.0m,	CPT13 - 3-1.5m	**11-AUG-2009**	**21-AUG-2009**	18-AUG-2009	×	**24-AUG-2009**	18-SEP-2009	✓
Soil Glass Jar - Unpreserved								
CPT11 - 2-0.5m,	CPT11 - 4-1.5m	**12-AUG-2009**	**21-AUG-2009**	19-AUG-2009	×	**24-AUG-2009**	18-SEP-2009	✓
Soil Glass Jar - Unpreserved								
CPT6 - 1-0m-1.0m,	CPT5 - 1-0m-0.5m,	**13-AUG-2009**	**20-AUG-2009**	20-AUG-2009	✓	**20-AUG-2009**	17-SEP-2009	✓
CPT5 - 2-0.5m-1m,	CPT5 - 3-1.0m-1.5m,							
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,							
CPT5a - 3-3m-3.5m								
Soil Glass Jar - Unpreserved								
CPT6 - 2-1.0m-3.0m,	CPT5 - 4-1.5m-2m,	**13-AUG-2009**	**21-AUG-2009**	20-AUG-2009	×	**24-AUG-2009**	18-SEP-2009	✓
CPT5 - 5-2.0m-3m,	QC01							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED093S: Soluble Major Cations								
Soil Glass Jar - Unpreserved								
CPT13 - 1-1.0m,	CPT13 - 3-1.5m	**11-AUG-2009**	**21-AUG-2009**	18-AUG-2009	×	**24-AUG-2009**	07-FEB-2010	✓
Soil Glass Jar - Unpreserved								
CPT11 - 2-0.5m,	CPT11 - 4-1.5m	**12-AUG-2009**	**21-AUG-2009**	19-AUG-2009	×	**24-AUG-2009**	08-FEB-2010	✓
Soil Glass Jar - Unpreserved								
CPT6 - 1-0m-1.0m,	CPT5 - 1-0m-0.5m,	**13-AUG-2009**	**20-AUG-2009**	20-AUG-2009	✓	**20-AUG-2009**	09-FEB-2010	✓
CPT5 - 2-0.5m-1m,	CPT5 - 3-1.0m-1.5m,							
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,							
CPT5a - 3-3m-3.5m								
Soil Glass Jar - Unpreserved								
CPT6 - 2-1.0m-3.0m,	CPT5 - 4-1.5m-2m,	**13-AUG-2009**	**21-AUG-2009**	20-AUG-2009	×	**24-AUG-2009**	09-FEB-2010	✓
CPT5 - 5-2.0m-3m,	QC01							
EG005T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved								
CPT13 - 1-1.0m,	CPT13 - 3-1.5m	**11-AUG-2009**	**21-AUG-2009**	08-SEP-2009	✓	**24-AUG-2009**	07-FEB-2010	✓
Soil Glass Jar - Unpreserved								
CPT11 - 2-0.5m,	CPT11 - 4-1.5m	**12-AUG-2009**	**21-AUG-2009**	09-SEP-2009	✓	**24-AUG-2009**	08-FEB-2010	✓
Soil Glass Jar - Unpreserved								
CPT6 - 1-0m-1.0m,	CPT6 - 2-1.0m-3.0m,	**13-AUG-2009**	**21-AUG-2009**	10-SEP-2009	✓	**21-AUG-2009**	09-FEB-2010	✓
CPT5 - 1-0m-0.5m,	CPT5 - 2-0.5m-1m,							
CPT5 - 3-1.0m-1.5m,	CPT5 - 4-1.5m-2m,							
CPT5 - 5-2.0m-3m,	QC01,							
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,							
CPT5a - 3-3m-3.5m								
EG005W: Water Leachable Metals by ICPAES								
Clear Plastic Bottle - Nitric Acid; Unfiltered								
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,	**20-AUG-2009**	**21-AUG-2009**	16-FEB-2010	✓	**21-AUG-2009**	16-FEB-2010	✓
CPT5a - 3-3m-3.5m								
Clear Plastic Bottle - Nitric Acid; Unfiltered								
CPT13 - 1-1.0m,	CPT13 - 3-1.5m,	**25-AUG-2009**	**25-AUG-2009**	21-FEB-2010	✓	**25-AUG-2009**	21-FEB-2010	✓
CPT11 - 2-0.5m,	CPT11 - 4-1.5m,							
CPT6 - 1-0m-1.0m,	CPT6 - 2-1.0m-3.0m,							
CPT5 - 1-0m-0.5m,	CPT5 - 2-0.5m-1m,							
CPT5 - 3-1.0m-1.5m,	CPT5 - 4-1.5m-2m,							
CPT5 - 5-2.0m-3m,	QC01							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered								
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,	**20-AUG-2009**	**21-AUG-2009**	16-FEB-2010	✓	**21-AUG-2009**	16-FEB-2010	✓
CPT5a - 3-3m-3.5m								
Clear Plastic Bottle - Nitric Acid; Unfiltered								
CPT13 - 1-1.0m,	CPT13 - 3-1.5m,	**25-AUG-2009**	**25-AUG-2009**	21-FEB-2010	✓	**25-AUG-2009**	21-FEB-2010	✓
CPT11 - 2-0.5m,	CPT11 - 4-1.5m,							
CPT6 - 1-0m-1.0m,	CPT6 - 2-1.0m-3.0m,							
CPT5 - 1-0m-0.5m,	CPT5 - 2-0.5m-1m,							
CPT5 - 3-1.0m-1.5m,	CPT5 - 4-1.5m-2m,							
CPT5 - 5-2.0m-3m,	QC01							
Soil Glass Jar - Unpreserved								
CPT13 - 1-1.0m,	CPT13 - 3-1.5m	**11-AUG-2009**	**21-AUG-2009**	08-SEP-2009	✓	**24-AUG-2009**	07-FEB-2010	✓
Soil Glass Jar - Unpreserved								
CPT11 - 2-0.5m,	CPT11 - 4-1.5m	**12-AUG-2009**	**21-AUG-2009**	09-SEP-2009	✓	**24-AUG-2009**	08-FEB-2010	✓
Soil Glass Jar - Unpreserved								
CPT6 - 1-0m-1.0m,	CPT6 - 2-1.0m-3.0m,	**13-AUG-2009**	**21-AUG-2009**	10-SEP-2009	✓	**21-AUG-2009**	09-FEB-2010	✓
CPT5 - 1-0m-0.5m,	CPT5 - 2-0.5m-1m,							
CPT5 - 3-1.0m-1.5m,	CPT5 - 4-1.5m-2m,							
CPT5 - 5-2.0m-3m,	QC01,							
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,							
CPT5a - 3-3m-3.5m								
EG020W: Water Leachable Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered								
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,	**20-AUG-2009**	**21-AUG-2009**	16-FEB-2010	✓	**21-AUG-2009**	16-FEB-2010	✓
CPT5a - 3-3m-3.5m								
Clear Plastic Bottle - Nitric Acid; Unfiltered								
CPT13 - 1-1.0m,	CPT13 - 3-1.5m,	**25-AUG-2009**	**25-AUG-2009**	21-FEB-2010	✓	**25-AUG-2009**	21-FEB-2010	✓
CPT11 - 2-0.5m,	CPT11 - 4-1.5m,							
CPT6 - 1-0m-1.0m,	CPT6 - 2-1.0m-3.0m,							
CPT5 - 1-0m-0.5m,	CPT5 - 2-0.5m-1m,							
CPT5 - 3-1.0m-1.5m,	CPT5 - 4-1.5m-2m,							
CPT5 - 5-2.0m-3m,	QC01							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved								
CPT13 - 1-1.0m,	CPT13 - 3-1.5m	**11-AUG-2009**	**21-AUG-2009**	08-SEP-2009	✓	**24-AUG-2009**	08-SEP-2009	✓
Soil Glass Jar - Unpreserved								
CPT11 - 2-0.5m,	CPT11 - 4-1.5m	**12-AUG-2009**	**21-AUG-2009**	09-SEP-2009	✓	**24-AUG-2009**	09-SEP-2009	✓
Soil Glass Jar - Unpreserved								
CPT6 - 1-0m-1.0m,	CPT6 - 2-1.0m-3.0m,	**13-AUG-2009**	**21-AUG-2009**	10-SEP-2009	✓	**24-AUG-2009**	10-SEP-2009	✓
CPT5 - 1-0m-0.5m,	CPT5 - 2-0.5m-1m,							
CPT5 - 3-1.0m-1.5m,	CPT5 - 4-1.5m-2m,							
CPT5 - 5-2.0m-3m,	QC01,							
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,							
CPT5a - 3-3m-3.5m								
EG035W: Water Leachable Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Unfiltered								
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,	**20-AUG-2009**	**----**	----	----	**21-AUG-2009**	17-SEP-2009	✓
CPT5a - 3-3m-3.5m								
Clear Plastic Bottle - Nitric Acid; Unfiltered								
CPT13 - 1-1.0m,	CPT13 - 3-1.5m,	**25-AUG-2009**	**----**	----	----	**25-AUG-2009**	22-SEP-2009	✓
CPT11 - 2-0.5m,	CPT11 - 4-1.5m,							
CPT6 - 1-0m-1.0m,	CPT6 - 2-1.0m-3.0m,							
CPT5 - 1-0m-0.5m,	CPT5 - 2-0.5m-1m,							
CPT5 - 3-1.0m-1.5m,	CPT5 - 4-1.5m-2m,							
CPT5 - 5-2.0m-3m,	QC01							
EK059G: NOX as N by Discrete Analyser								
Soil Glass Jar - Unpreserved								
CPT13 - 1-1.0m,	CPT13 - 3-1.5m	**11-AUG-2009**	**21-AUG-2009**	18-AUG-2009	×	**21-AUG-2009**	07-FEB-2010	✓
Soil Glass Jar - Unpreserved								
CPT11 - 2-0.5m,	CPT11 - 4-1.5m	**12-AUG-2009**	**21-AUG-2009**	19-AUG-2009	×	**21-AUG-2009**	08-FEB-2010	✓
Soil Glass Jar - Unpreserved								
CPT6 - 1-0m-1.0m,	CPT5 - 1-0m-0.5m,	**13-AUG-2009**	**20-AUG-2009**	20-AUG-2009	✓	**20-AUG-2009**	09-FEB-2010	✓
CPT5 - 2-0.5m-1m,	CPT5 - 3-1.0m-1.5m,							
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,							
CPT5a - 3-3m-3.5m								
Soil Glass Jar - Unpreserved								
CPT6 - 2-1.0m-3.0m,	CPT5 - 4-1.5m-2m,	**13-AUG-2009**	**21-AUG-2009**	20-AUG-2009	×	**21-AUG-2009**	09-FEB-2010	✓
CPT5 - 5-2.0m-3m,	QC01							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK061G: Total Kjeldahl Nitrogen as N								
Soil Glass Jar - Unpreserved								
CPT13 - 1-1.0m,	CPT13 - 3-1.5m	**11-AUG-2009**	**21-AUG-2009**	07-FEB-2010	✓	**22-AUG-2009**	07-FEB-2010	✓
Soil Glass Jar - Unpreserved								
CPT11 - 2-0.5m,	CPT11 - 4-1.5m	**12-AUG-2009**	**21-AUG-2009**	08-FEB-2010	✓	**22-AUG-2009**	08-FEB-2010	✓
Soil Glass Jar - Unpreserved								
CPT6 - 1-0m-1.0m,	CPT6 - 2-1.0m-3.0m,	**13-AUG-2009**	**21-AUG-2009**	09-FEB-2010	✓	**22-AUG-2009**	09-FEB-2010	✓
CPT5 - 1-0m-0.5m,	CPT5 - 2-0.5m-1m,							
CPT5 - 3-1.0m-1.5m,	CPT5 - 4-1.5m-2m,							
CPT5 - 5-2.0m-3m,	QC01,							
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,							
CPT5a - 3-3m-3.5m								
EK067G: Total Phosphorus as P by Discrete Analyser								
Soil Glass Jar - Unpreserved								
CPT13 - 1-1.0m,	CPT13 - 3-1.5m	**11-AUG-2009**	**21-AUG-2009**	07-FEB-2010	✓	**22-AUG-2009**	07-FEB-2010	✓
Soil Glass Jar - Unpreserved								
CPT11 - 2-0.5m,	CPT11 - 4-1.5m	**12-AUG-2009**	**21-AUG-2009**	08-FEB-2010	✓	**22-AUG-2009**	08-FEB-2010	✓
Soil Glass Jar - Unpreserved								
CPT6 - 1-0m-1.0m,	CPT6 - 2-1.0m-3.0m,	**13-AUG-2009**	**21-AUG-2009**	09-FEB-2010	✓	**22-AUG-2009**	09-FEB-2010	✓
CPT5 - 1-0m-0.5m,	CPT5 - 2-0.5m-1m,							
CPT5 - 3-1.0m-1.5m,	CPT5 - 4-1.5m-2m,							
CPT5 - 5-2.0m-3m,	QC01,							
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,							
CPT5a - 3-3m-3.5m								
EN60-DI: Bottle Leaching Procedure								
Lab Split : Leach for Hg, Cr(VI) and other metal								
CPT13 - 1-1.0m		**11-AUG-2009**	**---**	---	----	**24-AUG-2009**	08-SEP-2009	✓
Lab Split : Leach for Hg, Cr(VI) and other metal								
CPT13 - 3-1.5m		**11-AUG-2009**	**---**	---	----	**25-AUG-2009**	08-SEP-2009	✓
Lab Split : Leach for Hg, Cr(VI) and other metal								
CPT11 - 2-0.5m,	CPT11 - 4-1.5m	**12-AUG-2009**	**---**	---	----	**25-AUG-2009**	09-SEP-2009	✓
Lab Split : Leach for Hg, Cr(VI) and other metal								
CPT5a - 1-0m-1m		**13-AUG-2009**	**---**	---	----	**19-AUG-2009**	10-SEP-2009	✓
Lab Split : Leach for Hg, Cr(VI) and other metal								
CPT5a - 2-1m-2m,	CPT5a - 3-3m-3.5m	**13-AUG-2009**	**---**	---	----	**20-AUG-2009**	10-SEP-2009	✓
Lab Split : Leach for Hg, Cr(VI) and other metal								
CPT6 - 1-0m-1.0m,	CPT6 - 2-1.0m-3.0m,	**13-AUG-2009**	**---**	---	----	**25-AUG-2009**	10-SEP-2009	✓
CPT5 - 1-0m-0.5m,	CPT5 - 2-0.5m-1m,							
CPT5 - 3-1.0m-1.5m,	CPT5 - 4-1.5m-2m,							
CPT5 - 5-2.0m-3m,	QC01							

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity in Soil	ED037	3	15	**20.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	3	15	**20.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	2	14	**14.3**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chromium Suite for Acid Sulphate Soils	EA033	2	20	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	3	16	**18.8**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	5	39	**12.8**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	3	15	**20.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
pH field/fox	EA003	2	20	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	3	15	**20.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	4	31	**12.9**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	4	31	**12.9**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite V	EG020V-T	1	11	**9.1**	**10.0**	×	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite X	EG020X-T	3	15	**20.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosporus By Discrete Analyser	EK067G	3	15	**20.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity in Soil	ED037	3	15	**20.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	3	15	**20.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	3	16	**18.8**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	3	15	**20.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	15	**13.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	31	**6.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	31	**6.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite X	EG020X-T	1	11	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosporus By Discrete Analyser	EK067G	2	15	**13.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Alkalinity in Soil	ED037	3	15	**20.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	3	15	**20.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	3	15	**20.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chromium Suite for Acid Sulphate Soils	EA033	1	20	**5.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	3	16	**18.8**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	3	15	**20.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	15	**13.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Total Mercury by FIMS	EG035T	2	31	**6.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	31	**6.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite V	EG020V-T	2	15	**13.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite X	EG020X-T	2	15	**13.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosporus By Discrete Analyser	EK067G	2	15	**13.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride - Soluble	EDO45S	3	15	**20.0**	**5.0**	✓	ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	14	**14.3**	**5.0**	✓	ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	15	**13.3**	**5.0**	✓	ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	31	**6.5**	**5.0**	✓	ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	31	**6.5**	**5.0**	✓	ALS QCS3 requirement
Total Metals by ICP-MS - Suite X	EG020X-T	1	11	**9.1**	**5.0**	✓	ALS QCS3 requirement
Total Phosporus By Discrete Analyser	EK067G	2	15	**13.3**	**5.0**	✓	ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Water Leachable Mercury by FIMS	EG035W	3	15	**20.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICPAES	EG005W	3	15	**20.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICP-MS - Suite B	EG020B-W	3	15	**20.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICP-MS - Suite E	EG020E-W	3	15	**20.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Water Leachable Mercury by FIMS	EG035W	2	15	**13.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICPAES	EG005W	2	15	**13.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICP-MS - Suite B	EG020B-W	2	15	**13.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Water Leachable Mercury by FIMS	EG035W	2	15	**13.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICPAES	EG005W	2	15	**13.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICP-MS - Suite B	EG020B-W	2	15	**13.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICP-MS - Suite E	EG020E-W	2	15	**13.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Water Leachable Mercury by FIMS	EG035W	2	15	**13.3**	**5.0**	✓	ALS QCS3 requirement
Water Leachable Metals by ICPAES	EG005W	2	15	**13.3**	**5.0**	✓	ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH field/fox	EA003	SOIL	Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide.
Chromium Suite for Acid Sulphate Soils	EA033	SOIL	Ahern et al 2004. This method covers the determination of Chromium Reducible Sulfur (SCR); pHKCl; titratable actual acidity (TAA); acid neutralising capacity by back titration (ANC); and net acid soluble sulfur (SNAS) which incorporates peroxide sulfur. It applies to soils and sediments (including sands) derived from coastal regions. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Alkalinity in Soil	ED037	SOIL	APHA 21st ed., 2320 B Alkalinity is determined and reported on a 1:5 soil/water leach.
Major Anions - Soluble	ED040S	SOIL	In-house. Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Cations - soluble by ICP-AES	ED093S	SOIL	APHA 21st ed., 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Chloride - Soluble	EDO45S	SOIL	APHA 21st ed., 4500Cl- Soluble Chloride is determined titremetrically on soil samples following a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 401)
Total Metals by ICP-AES	EG005T	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Water Leachable Metals by ICPAES	EG005W	SOIL	APHA 21st ed., 3120; USEPA SW 846 - 6010 The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Water Leachable Metals by ICP-MS - Suite B	EG020B-W	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Water Leachable Metals by ICP-MS - Suite E	EG020E-W	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite V	EG020V-T	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Metals in solids are determined following an appropriate acid digestion. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Total Metals by ICP-MS - Suite X	EG020X-T	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Mercury by FIMS	EG035T	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
Water Leachable Mercury by FIMS	EG035W	SOIL	AS 3550, APHA 21st ed. 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the TCLP solution. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	SOIL	APHA 21st ed., 4500 NO3- F. Combined oxidised Nitrogen (NO2+NO3) in a water extract is determined by Cadmium Reduction, and direct colourimetry by Discrete Analyser.
TKN as N By Discrete Analyser	EK061G	SOIL	APHA 21st ed., 4500-Norg-D Soil samples are digested using Kjeldahl digestion followed by determination by Discrete Analyser.
Total Nitrogen as N (TKN + NOx) By Discrete Analyser	EK062G	SOIL	APHA 21st ed., 4500 Norg/NO3- Total Nitrogen is determined as the sum of TKN and Oxidised Nitrrogen, each determined seperately as N.
Total Phosporus By Discrete Analyser	EK067G	SOIL	APHA 21st ed., 4500 P-B&F This procedure involves sulfuric acid digestion and quantification using Discrete Analyser.

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	SOIL	APHA 21st ed., 4500 Norg- D; APHA 21st ed., 4500 P - H. Macro Kjeldahl digestion.
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
Digestion for Total Recoverable Metals	EN25	SOIL	USEPA SW846-3005 Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Digestion for Total Recoverable Metals in DI Water Leachate	EN25W	SOIL	USEPA SW846-3005 Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Deionised Water Leach	EN60-DIa	SOIL	AS4439.3 Preparation of Leachates
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG005T: Total Metals by ICP-AES	EB0912892-001	CPT13 1-1.0m	**Barium**	7440-39-3	50.1 %	0-50%	**RPD exceeds LOR based limits**
EG005T: Total Metals by ICP-AES	EB0912892-001	CPT13 1-1.0m	**Manganese**	7439-96-5	52.4 %	0-20%	**RPD exceeds LOR based limits**
EG005T: Total Metals by ICP-AES	EB0912892-022	CPT5a 1-0m-1m	**Manganese**	7439-96-5	39.0 %	0-20%	**RPD exceeds LOR based limits**
EG020T: Total Metals by ICP-MS	EB0912892-022	CPT5a 1-0m-1m	**Uranium**	7440-61-1	21.3 %	0-20%	**RPD exceeds LOR based limits**
Laboratory Control Spike (LCS) Recoveries							
EG005T: Total Metals by ICP-AES	1237686-003	----	**Lead**	7439-92-1	78.8 %	83-117%	**Recovery less than lower control limit**
EG005T: Total Metals by ICP-AES	1237686-003	----	**Nickel**	7440-02-0	78.7 %	83-121%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
EG005T: Total Metals by ICP-AES	EB0912892-003	CPT13 3-1.5m	**Barium**	7440-39-3	348 %	70-130%	**Recovery greater than upper data quality objective**
EG005T: Total Metals by ICP-AES	EB0912892-003	CPT13 3-1.5m	**Manganese**	7439-96-5	61.2 %	70-130%	**Recovery less than lower data quality objective**
EG005T: Total Metals by ICP-AES	EB0912892-003	CPT13 3-1.5m	**Vanadium**	7440-62-2	54.3 %	70-130%	**Recovery less than lower data quality objective**

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EG005W: Water Leachable Metals by ICPAES	1241394-002	----	**Cobalt**	7440-48-4	81.7 %	84.3-114%	**Recovery less than lower control limit**
EG005W: Water Leachable Metals by ICPAES	1241394-002	----	**Copper**	7440-50-8	77.0 %	82-112%	**Recovery less than lower control limit**

- **For all matrices, no Method Blank value outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **SOIL**

Method	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA003 :pH (field/fox)						

Matrix: **SOIL**

Method / Container / Client Sample ID(s)		Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA003 :pH (field/fox) - Analysis Holding Time Compliance							
Snap Lock Bag							
CPT13 - 2-1.0m,	CPT13 - 4-1.5m	----	----	----	18-AUG-2009	12-AUG-2009	**6**
Snap Lock Bag							
CPT11 - 1-0.5m,	CPT11 - 3-1.5m,	----	----	----	18-AUG-2009	13-AUG-2009	**5**
CPT12 - 1-1m,	CPT12 - 2-1.5m,						
CPT12 - 3-2m,	CPT12 - 4-2.5m,						
CPT12 - 5-3m							
Snap Lock Bag							
CPT6 - 1-0m-1.0m,	CPT6 - 2-1.0m-3.0m,	----	----	----	18-AUG-2009	14-AUG-2009	**4**
CPT5 - 1-0m-0.5m,	CPT5 - 2-0.5m-1m,						
CPT5 - 3-1.0m-1.5m,	CPT5 - 4-1.5m-2m,						
CPT5 - 5-2.0m-3m,	QC01,						
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,						
CPT5a - 3-3m-3.5m							
EA033-A: Actual Acidity							
Snap Lock Bag							
CPT13 - 2-1.0m,	CPT13 - 4-1.5m	15-AUG-2009	12-AUG-2009	**3**	----	----	----
Snap Lock Bag							
CPT11 - 1-0.5m,	CPT11 - 3-1.5m,	15-AUG-2009	13-AUG-2009	**2**	----	----	----
CPT12 - 1-1m,	CPT12 - 2-1.5m,						
CPT12 - 3-2m,	CPT12 - 4-2.5m,						
CPT12 - 5-3m							
EA033-B: Potential Acidity							
Snap Lock Bag							
CPT13 - 2-1.0m,	CPT13 - 4-1.5m	15-AUG-2009	12-AUG-2009	**3**	----	----	----
Snap Lock Bag							
CPT11 - 1-0.5m,	CPT11 - 3-1.5m,	15-AUG-2009	13-AUG-2009	**2**	----	----	----
CPT12 - 1-1m,	CPT12 - 2-1.5m,						
CPT12 - 3-2m,	CPT12 - 4-2.5m,						
CPT12 - 5-3m							
EA033-C: Acid Neutralising Capacity							
Snap Lock Bag							
CPT13 - 2-1.0m,	CPT13 - 4-1.5m	15-AUG-2009	12-AUG-2009	**3**	----	----	----
Snap Lock Bag							
CPT11 - 1-0.5m,	CPT11 - 3-1.5m,	15-AUG-2009	13-AUG-2009	**2**	----	----	----
CPT12 - 1-1m,	CPT12 - 2-1.5m,						
CPT12 - 3-2m,	CPT12 - 4-2.5m,						
CPT12 - 5-3m							
EA033-D: Retained Acidity							

Matrix: **SOIL**

Method / Container / Client Sample ID(s)		Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA033-D: Retained Acidity - Analysis Holding Time Compliance							
Snap Lock Bag							
CPT13 - 2-1.0m,	CPT13 - 4-1.5m	15-AUG-2009	12-AUG-2009	3	----	----	----
Snap Lock Bag							
CPT11 - 1-0.5m,	CPT11 - 3-1.5m,	15-AUG-2009	13-AUG-2009	2	----	----	----
CPT12 - 1-1m,	CPT12 - 2-1.5m,						
CPT12 - 3-2m,	CPT12 - 4-2.5m,						
CPT12 - 5-3m							
EA033-E: Acid Base Accounting							
Snap Lock Bag							
CPT13 - 2-1.0m,	CPT13 - 4-1.5m	15-AUG-2009	12-AUG-2009	3	----	----	----
Snap Lock Bag							
CPT11 - 1-0.5m,	CPT11 - 3-1.5m,	15-AUG-2009	13-AUG-2009	2	----	----	----
CPT12 - 1-1m,	CPT12 - 2-1.5m,						
CPT12 - 3-2m,	CPT12 - 4-2.5m,						
CPT12 - 5-3m							
EA055: Moisture Content							
Soil Glass Jar - Unpreserved							
CPT13 - 1-1.0m,	CPT13 - 3-1.5m	----	----	----	19-AUG-2009	18-AUG-2009	1
Soil Glass Jar - Unpreserved							
CPT6 - 1-0m-1.0m,	CPT6 - 2-1.0m-3.0m,	----	----	----	21-AUG-2009	20-AUG-2009	1
CPT5 - 1-0m-0.5m,	CPT5 - 2-0.5m-1m,						
CPT5 - 3-1.0m-1.5m,	CPT5 - 4-1.5m-2m,						
CPT5 - 5-2.0m-3m,	QC01,						
CPT5a - 1-0m-1m,	CPT5a - 2-1m-2m,						
CPT5a - 3-3m-3.5m							
ED037: Alkalinity							
Soil Glass Jar - Unpreserved							
CPT13 - 1-1.0m,	CPT13 - 3-1.5m	21-AUG-2009	18-AUG-2009	3	----	----	----
Soil Glass Jar - Unpreserved							
CPT11 - 2-0.5m,	CPT11 - 4-1.5m	21-AUG-2009	19-AUG-2009	2	----	----	----
Soil Glass Jar - Unpreserved							
CPT6 - 2-1.0m-3.0m,	CPT5 - 4-1.5m-2m,	21-AUG-2009	20-AUG-2009	1	----	----	----
CPT5 - 5-2.0m-3m,	QC01						
ED040S: Soluble Major Anions							
Soil Glass Jar - Unpreserved							
CPT13 - 1-1.0m,	CPT13 - 3-1.5m	21-AUG-2009	18-AUG-2009	3	----	----	----
Soil Glass Jar - Unpreserved							
CPT11 - 2-0.5m,	CPT11 - 4-1.5m	21-AUG-2009	19-AUG-2009	2	----	----	----

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
ED040S: Soluble Major Anions - Analysis Holding Time Compliance						
Soil Glass Jar - Unpreserved						
CPT6 - 2-1.0m-3.0m, CPT5 - 4-1.5m-2m, CPT5 - 5-2.0m-3m, QC01	21-AUG-2009	20-AUG-2009	1	----	----	----
ED045: Chloride						
Soil Glass Jar - Unpreserved						
CPT13 - 1-1.0m, CPT13 - 3-1.5m	21-AUG-2009	18-AUG-2009	3	----	----	----
Soil Glass Jar - Unpreserved						
CPT11 - 2-0.5m, CPT11 - 4-1.5m	21-AUG-2009	19-AUG-2009	2	----	----	----
Soil Glass Jar - Unpreserved						
CPT6 - 2-1.0m-3.0m, CPT5 - 4-1.5m-2m, CPT5 - 5-2.0m-3m, QC01	21-AUG-2009	20-AUG-2009	1	----	----	----
ED093S: Soluble Major Cations						
Soil Glass Jar - Unpreserved						
CPT13 - 1-1.0m, CPT13 - 3-1.5m	21-AUG-2009	18-AUG-2009	3	----	----	----
Soil Glass Jar - Unpreserved						
CPT11 - 2-0.5m, CPT11 - 4-1.5m	21-AUG-2009	19-AUG-2009	2	----	----	----
Soil Glass Jar - Unpreserved						
CPT6 - 2-1.0m-3.0m, CPT5 - 4-1.5m-2m, CPT5 - 5-2.0m-3m, QC01	21-AUG-2009	20-AUG-2009	1	----	----	----
EK059G: NOX as N by Discrete Analyser						
Soil Glass Jar - Unpreserved						
CPT13 - 1-1.0m, CPT13 - 3-1.5m	21-AUG-2009	18-AUG-2009	3	----	----	----
Soil Glass Jar - Unpreserved						
CPT11 - 2-0.5m, CPT11 - 4-1.5m	21-AUG-2009	19-AUG-2009	2	----	----	----
Soil Glass Jar - Unpreserved						
CPT6 - 2-1.0m-3.0m, CPT5 - 4-1.5m-2m, CPT5 - 5-2.0m-3m, QC01	21-AUG-2009	20-AUG-2009	1	----	----	----

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

Matrix: **SOIL**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Total Metals by ICP-MS - Suite V	1	11	9.1	10.0	NEPM 1999 Schedule B(3) and ALS QCS3 requirement

CHAIN OF CUSTODY DOCUMENTATION

134256

ALS Laboratory Group

CLIENT: UPS	SAMPLER: Jerry Wang
ADDRESS / OFFICE: 16/240 Queen Street, Brisbane	MOBILE: 0417 382 975
PROJECT MANAGER (PM): Julian Dobos	PHONE
PROJECT ID: 4202 6447	EMAIL REPORT TO: julian_dobos@upscorp.com
SITE: Curtis Is Gladstone P.O. NO.: BN/356/09	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.: E	**ANALYSIS REQUIRED including SUITES** (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate):
Intact: Yes No N/A
SAMPLE TEMPERATURE:
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:
Additional Metals = Al, B, Fe, Sb, Se, Ti, U, W
Leachable Metals = S-3 suite and Al, B, Fe, Sb, Se, Ti, U, W

Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.

Environmental Division Brisbane
Work Order
EB0913021
Telephone : +61-7-3243 7222

ALS ID	SAMPLE ID	MATRIX	DATE	Time	CONTAINER INFORMATION Type / Code	Total bottles	pH Field + pH for EA003	Full Chromium suite EA033		Total metals S-3	Additional metals EG005T	Dr Leach prep.	Leachable metals EG005C + EG035C	Cations NT-1	Anions, NT-2	Nutrients, NT-4		
1	CPT4 1-0m-1m	S	14/8/09	1:45pm	Ass bag / 250 Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓		
2	CPT4 2-1m-2m	S	14/8/09	1:58pm	Ass bag / 250 Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓		
3	CPT4 3-2m-3m	S	14/8/09	2:13pm	Ass bag / 250 Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓		
4	CPT4b 1-1m-2m	S	15/8/09	8:25am	Ass bag / 250 Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓		
5	CPT4b 2-3m-4m	S	15/8/09	8:35am	Ass bag / 250 Jar		✓	✓			✓	✓	✓	✓	✓	✓		
6	CPT2 1-1.0m-2m	S	15/8/09	11:15am	Ass bag / 250 Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓		
7	CPT2 2-3.0m-3.5m	S	15/8/09	11:58am	Ass bag / 250 Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓		
8	CPT1 1-0-1.5m	S	15/8/09	2:15pm	Ass bag / 250 Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓		
9	CPT1 2-1.5-2.5m	S	15/8/09	2:45pm	Ass bag / 250 Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓		
10	TP2 -1-0.2m	S	16/8/09	9:25am	ASS		✓	✓										
11	TP2 -2-2.5m	S	16/8/09	9:35am	ASS		✓	✓										
12	TP3 -1-0.2m	S	16/8/09	10:05am	ASS / 250 Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓		

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Newdong Wang Jerry	Date:	Name: N-KIM	Date: 19/8/09	Con' Note No:
Of: UPS	Time:	Of: ALS	Time: 0830	
Name: 18/8/09. 7:20am	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserveed Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Laboratory Group

WHITE - LAB COPY
YELLOW - CUSTOMER COPY
PINK - BOOK COPY

CHAIN OF CUSTODY DOCUMENTATION

134257

ALS Laboratory Group

CLIENT: UPS
ADDRESS / OFFICE: 16/240 Queen Street, Brisbane 4000
PROJECT MANAGER (PM): Julian Dobos
PROJECT ID:
SITE: Curtis Is, Gladstone P.O. NO.: BN/356/09
RESULTS REQUIRED (Date): QUOTE NO.:

SAMPLER: Jerry Wang
MOBILE: 0417 382 975
PHONE
EMAIL REPORT TO: julian_dobos@upscorp.com
EMAIL INVOICE TO: (if different to report)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:
Additional Metals = Al, B, Fe, Sb, Se, Ti, U, W
Leachable Metals = S-3 suite and Al, B, Fe, Sb, Se, Ti, U, W

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected".
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		pH Field + PH Fox EA003	Full Chromium Suite EA033		Total metals S-3	Additional metals EG005T	DI leach prep	Leachable metals EG005C + EG025C	Cations, NT-1	Anions, NT-2	Nutrients, NT-11				Notes
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles														
130	TP3 2-1.5m	S	16/8/09	10:00am	Ass bag/250 Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓				
140	TP3 3-3m	S	16/8/09	10:09am	Ass bag/250 Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓				
150	TP4 1-0.7m	S	16/8/09	11:00am	Ass bag		✓	✓												
160	TP4 2-2.5m	S	16/8/09	11:02am	Ass bag		✓	✓												
170	TP4 3-3.5m	S	16/8/09	11:05am	Ass bag		✓	✓												
180	TP5 1-0.5m	S	16/8/09	11:45am	Ass bag		✓	✓												
190	TP5-2-3m	S	16/8/09	11:48am	Ass bag		✓	✓												
200	TP8 1-0.3m	S	16/8/09	12pm	Ass/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓				
210	TP8 2-1m	S	16/8/09	12:03pm	Ass/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓				
220	TP8 3-3.5m	S	16/8/09	12:10pm	Ass/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓				
230	TP11-0.3m	S	16/8/09	1pm	Ass		✓	✓												
240	TP11 2-1m	S	16/8/09	1:03pm	Ass		✓	✓												

RELINQUISHED BY:

Name:	Jerry Wang	Date:	
Of:	UPS	Time:	
Name:	18/8/09. 7:00am	Date:	
Of:		Time:	

RECEIVED BY

Name:	N. King	Date:	19/8/09
Of:	ALS	Time:	0830
Name:		Date:	
Of:		Time:	

METHOD OF SHIPMENT

Con' Note No:

Transport Co:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserveed Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

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CHAIN OF CUSTODY DOCUMENTATION

134258

ALS Laboratory Group

CLIENT: URS
ADDRESS / OFFICE: 16/240 Queen St, Brisbane 4000
PROJECT MANAGER (PM): Julian Dobos
PROJECT ID:
SITE: Curtis Is. Gladstone P.O. NO.: BN/356/09
RESULTS REQUIRED (Date): QUOTE NO.:

SAMPLER: Jerry Wang
MOBILE: 0417 382 975
PHONE
EMAIL REPORT TO: julian_dobos@URSCorp.com
EMAIL INVOICE TO: (if different to report)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:
Additional metals = Al, B, Fe, Sb, Se, Ti, U, W
Leachable Metals = S-3 Suite and Al, B, Fe, Sb, Se, Ti, U, W

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected".
Extra volume for QC or trace LORs etc.

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	PH Field + Pri Fox EA003	Full Chromium Suite EA033		Total metals S-3	Additional metals EG005T	DI Leach Prep	Leachable metals EG005C+EG003C	(Cations, NT-1)	Anions, NT-2	Nutrients, NT-11			
25	TP11 3-3.5m	S	16/8/09	1:05pm	Ass bag		✓	✓											
26	TP10 1-0.5m	S	16/8/09	1:25pm	Ass bag		✓	✓											
27	TP10 2-2.5m	S	16/8/09	1:30pm	Ass bag		✓	✓											
28	TP9 1-0.3m	S	16/8/09	3:03pm	Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
29	TP9 2-2m	S	16/8/09	3:05pm	Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
30	TP6 1-0.5m	S	17/8/09	8:22am	Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
31	TP6 2-2.5m	S	17/8/09	8:25am	Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
32	New_TP2_0.5m	S	17/8/09	3:55pm	Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
33	New_TP2_2-1.5m	S	17/8/09	4pm	Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
34	New_TP2_3-3.1m	S	17/8/09	4:05pm	Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			
35	* RINSATE WATER	W	"	"															
* Extra Sample																			

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Jerry Wang	Date:	Name: N-Kirk	Date: 19/8/09	Con' Note No:
Of: URS	Time:	Of: ALS	Time: 0930	
Name: 18/8/09, 7:20pm	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserveed Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

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SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: **EB0913021**		
Amendment	: **1**		
Client	: **SANTOS LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JULIAN DOBOS	Contact	: Tim Kilmister
Address	: GPO BOX 302 BRISBANE QLD, AUSTRALIA 4000	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: julian_dobos@urscorp.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32432111	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 4262 6447	Page	: 1 of 5
Order number	: A2280		
C-O-C number	: 134256-58	Quote number	: EB2009SANTOS0305 (BN/356/09)
Site	: Curtis Is Gladstone		
Sampler	: Jerry Wang	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received	: 19-AUG-2009	Issue Date	: 07-OCT-2009 14:58
Client Requested Due Date	: 26-AUG-2009	Scheduled Reporting Date	: **26-AUG-2009**

Delivery Details

Mode of Delivery	: Carrier	Temperature	: 5.7 ,6.4 C - Ice present
No. of coolers/boxes	: 2 MEDIUM	No. of samples received	: 35
Sercurity Seal	: Intact.	No. of samples analysed	: 35

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Requested Deliverables
- **Sample containers do not comply to pretreatment / preservation standards (AS, APHA, USEPA). Please refer to the Sample Container(s)/Preservation Non-Compliance Log at the end of this report for details.**
- **Sample(s) have been received within recommended holding times.**
- **As per telephone confirmation with Julian Dobos the extra sample id Rinsate Water will be logged for W-3 Total Metals and extra metals as per COC. @19/8/9 @ 16:54**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Maggie Kahi.
- Analytical work for this work order will be conducted at ALS Brisbane.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

Method / Client sample ID	Sample Container Received	Preferred Sample Container for Analysis
EG020A-T : Total Metals by ICP-MS - Suite A		
RINSATE WATER	- Soil Glass Jar - Unpreserved	- Clear Plastic Bottle - Nitric Acid; Unfiltered
EG020B-T : Total Metals by ICP-MS - Suite B		
RINSATE WATER	- Soil Glass Jar - Unpreserved	- Clear Plastic Bottle - Nitric Acid; Unfiltered
EG020E-T : Total Metals by ICP-MS - Suite E		
RINSATE WATER	- Soil Glass Jar - Unpreserved	- Clear Plastic Bottle - Nitric Acid; Unfiltered
EG035T : Total Mercury by FIMS		
RINSATE WATER	- Soil Glass Jar - Unpreserved	- Clear Plastic Bottle - Nitric Acid; Unfiltered

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process neccessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA003 pH field/fox	SOIL - EA033 Chromium Suite for Acid Sulphate Soils	SOIL - ED037 Alkalinity in Soil	SOIL - EG005T (solids) Total Metals by ICP-AES	SOIL - EG005W Water Leachable Metals by ICPAES	SOIL - EG020B-W Water Leachable Metals by ICP-MS - Suite B	SOIL - EG020E-W Water Leachable Metals by ICPMS-Suite E	SOIL - EG020V-T Total Metals by ICPMS - Suite V
EB0913021-001	14-AUG-2009 13:25	CPT4 1-0m-1m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	CPT4 1-0m-1m					✓	✓	✓	
EB0913021-002	14-AUG-2009 13:28	CPT4 2-1m-2m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	CPT4 2-1m-2m					✓	✓	✓	
EB0913021-003	14-AUG-2009 13:30	CPT4 3-2m-3m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	CPT4 3-2m-3m					✓	✓	✓	
EB0913021-004	15-AUG-2009 08:50	CPT4b 1-1.0m-2.0m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	CPT4b 1-1.0m-2.0m					✓	✓	✓	
EB0913021-005	15-AUG-2009 08:55	CPT4b 2-3m-4m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	CPT4b 2-3m-4m					✓	✓	✓	
EB0913021-006	15-AUG-2009 13:55	CPT2 1-1.0m-2.0m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	CPT2 1-1.0m-2.0m					✓	✓	✓	
EB0913021-007	15-AUG-2009 11:58	CPT2 2-3.0m-3.5m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	CPT2 2-3.0m-3.5m					✓	✓	✓	
EB0913021-008	15-AUG-2009 14:15	CPT1 1-0-1.5m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	CPT1 1-0-1.5m					✓	✓	✓	
EB0913021-009	15-AUG-2009 14:28	CPT1 2-1.5-2.5m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	CPT1 2-1.5-2.5m					✓	✓	✓	
EB0913021-010	16-AUG-2009 09:25	TP2-1-0.3m	✓	✓						
EB0913021-011	16-AUG-2009 09:30	TP2-2-2.5m	✓	✓						
EB0913021-012	16-AUG-2009 10:05	TP3-1-0.3m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	TP3-1-0.3m					✓	✓	✓	
EB0913021-013	16-AUG-2009 10:07	TP3 2-1.5m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	TP3 2-1.5m					✓	✓	✓	
EB0913021-014	16-AUG-2009 10:10	TP3 3-3mm	✓	✓	✓	✓				✓

			SOIL - EA003 pH field/fox	SOIL - EA033 Chromium Suite for Acid Sulphate Soils	SOIL - ED037 Alkalinity in Soil	SOIL - EG005T (solids) Total Metals by ICP-AES	SOIL - EG005W Water Leachable Metals by ICPAES	SOIL - EG020B-W Water Leachable Metals by ICP-MS - Suite B	SOIL - EG020E-W Water Leachable Metals by ICPMS-Suite E	SOIL - EG020V-T Total Metals by ICPMS - Suite V
EB0913021-014	21-AUG-2009 12:00	TP3 3-3mm					✓	✓	✓	
EB0913021-015	16-AUG-2009 11:00	TP4 1-0.3m	✓	✓						
EB0913021-016	16-AUG-2009 11:02	TP4 2-2.5m	✓	✓						
EB0913021-017	16-AUG-2009 11:05	TP4 3-3.5m	✓	✓						
EB0913021-018	16-AUG-2009 11:45	TP5 1-0.5m	✓	✓						
EB0913021-019	16-AUG-2009 11:48	TP5 2-3m	✓	✓						
EB0913021-020	16-AUG-2009 12:00	TP8 1-0.3m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	TP8 1-0.3m					✓	✓	✓	
EB0913021-021	16-AUG-2009 12:02	TP8 2-1m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	TP8 2-1m					✓	✓	✓	
EB0913021-022	16-AUG-2009 12:10	TP8 3-3.5m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	TP8 3-3.5m					✓	✓	✓	
EB0913021-023	16-AUG-2009 13:00	TP11 1-0.3m	✓	✓						
EB0913021-024	16-AUG-2009 13:02	TP11 2-1m	✓	✓						
EB0913021-025	16-AUG-2009 13:05	TP11 3-3.5m	✓	✓						
EB0913021-026	16-AUG-2009 11:25	TP10 1-0.5m	✓	✓						
EB0913021-027	16-AUG-2009 13:30	TP10 2-2.5m	✓	✓						
EB0913021-028	16-AUG-2009 15:03	TP9 1-0.3m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	TP9 1-0.3m					✓	✓	✓	
EB0913021-029	16-AUG-2009 15:05	TP9 2-2m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	TP9 2-2m					✓	✓	✓	
EB0913021-030	17-AUG-2009 08:22	TP6 1-0.5m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	TP6 1-0.5m					✓	✓	✓	
EB0913021-031	17-AUG-2009 08:25	TP6 2-2.5m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	TP6 2-2.5m					✓	✓	✓	
EB0913021-032	17-AUG-2009 15:55	NEW_TP2-1-0.5m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	NEW_TP2-1-0.5m					✓	✓	✓	
EB0913021-033	17-AUG-2009 16:00	NEW_TP2-2-1.5m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	NEW_TP2-2-1.5m					✓	✓	✓	
EB0913021-034	17-AUG-2009 16:05	NEW_TP2-3-3.5m	✓	✓	✓	✓				✓
	21-AUG-2009 12:00	NEW_TP2-3-3.5m					✓	✓	✓	

Matrix: **SOIL**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	SOIL - EG020X-T Total Metals by ICPMS - Suite X	SOIL - EG035W Water Leachable Mercury by FIMS	SOIL - EN60-DI Suite Deionised Water Leach	SOIL - Major Anions Cl, SO4 only	SOIL - NT-11S Total N + Total P	SOIL - NT-1S Major Cations (Ca, Mg, Na, K)	SOIL - S-03 13 Metals (NEPM Suite - incl. Digestion)
EB0913021-001	14-AUG-2009 13:25	CPT4 1-0m-1m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	CPT4 1-0m-1m		✓					
EB0913021-002	14-AUG-2009 13:28	CPT4 2-1m-2m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	CPT4 2-1m-2m		✓					
EB0913021-003	14-AUG-2009 13:30	CPT4 3-2m-3m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	CPT4 3-2m-3m		✓					
EB0913021-004	15-AUG-2009 08:50	CPT4b 1-1.0m-2.0m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	CPT4b 1-1.0m-2.0m		✓					
EB0913021-005	15-AUG-2009 08:55	CPT4b 2-3m-4m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	CPT4b 2-3m-4m		✓					
EB0913021-006	15-AUG-2009 13:55	CPT2 1-1.0m-2.0m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	CPT2 1-1.0m-2.0m		✓					
EB0913021-007	15-AUG-2009 11:58	CPT2 2-3.0m-3.5m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	CPT2 2-3.0m-3.5m		✓					
EB0913021-008	15-AUG-2009 14:15	CPT1 1-0-1.5m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	CPT1 1-0-1.5m		✓					
EB0913021-009	15-AUG-2009 14:28	CPT1 2-1.5-2.5m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	CPT1 2-1.5-2.5m		✓					
EB0913021-012	16-AUG-2009 10:05	TP3-1-0.3m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	TP3-1-0.3m		✓					
EB0913021-013	16-AUG-2009 10:07	TP3 2-1.5m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	TP3 2-1.5m		✓					
EB0913021-014	16-AUG-2009 10:10	TP3 3-3mm	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	TP3 3-3mm		✓					
EB0913021-020	16-AUG-2009 12:00	TP8 1-0.3m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	TP8 1-0.3m		✓					
EB0913021-021	16-AUG-2009 12:02	TP8 2-1m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	TP8 2-1m		✓					
EB0913021-022	16-AUG-2009 12:10	TP8 3-3.5m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	TP8 3-3.5m		✓					
EB0913021-028	16-AUG-2009 15:03	TP9 1-0.3m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	TP9 1-0.3m		✓					
EB0913021-029	16-AUG-2009 15:05	TP9 2-2m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	TP9 2-2m		✓					
EB0913021-030	17-AUG-2009 08:22	TP6 1-0.5m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	TP6 1-0.5m		✓					
EB0913021-031	17-AUG-2009 08:25	TP6 2-2.5m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	TP6 2-2.5m		✓					
EB0913021-032	17-AUG-2009 15:55	NEW_TP2-1-0.5m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	NEW_TP2-1-0.5m		✓					
EB0913021-033	17-AUG-2009 16:00	NEW_TP2-2-1.5m	✓		✓	✓	✓	✓	✓

			SOIL - EG020X-T Total Metals by ICPMS - Suite X	SOIL - EG035W Water Leachable Mercury by FIMS	SOIL - EN60-DI Suite Deionised Water Leach	SOIL - Major Anions Cl, SO4 only	SOIL - NT-11S Total N + Total P	SOIL - NT-1S Major Cations (Ca, Mg, Na, K)	SOIL - S-03 13 Metals (NEPM Suite - incl. Digestion)
EB0913021-033	21-AUG-2009 12:00	NEW_TP2-2-1.5m		✓					
EB0913021-034	17-AUG-2009 16:05	NEW_TP2-3-3.5m	✓		✓	✓	✓	✓	✓
	21-AUG-2009 12:00	NEW_TP2-3-3.5m		✓					

Matrix: **WATER**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	WATER - EG020A-T Total Metals by ICPMS - Suite A	WATER - EG020B-T Total Metals by ICPMS - Suite B	WATER - EG020E-T Total Metals by ICPMS - Suite E	WATER - W-03T 13 Metals (Total) (NEPM)
EB0913021-035	17-AUG-2009 15:00	RINSATE WATER	✓	✓	✓	✓

Requested Deliverables

MR JULIAN DOBOS

- *AU Certificate of Analysis - NATA (COA)	Email	julian_dobos@urscorp.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	julian_dobos@urscorp.com
- AU Interpretive QC Report (Anon QCI Not Rep) (QCI_NoAnon)	Email	julian_dobos@urscorp.com
- AU QC Report (Anon QC Not Rep) - NATA (QC_NoAnon)	Email	julian_dobos@urscorp.com
- Default - Chain of Custody (COC)	Email	julian_dobos@urscorp.com
- EDI Format - MRED (MRED)	Email	julian_dobos@urscorp.com

RESULTS ADDRESS

- *AU Certificate of Analysis - NATA (COA)	Email	brisbane@urscorp.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	brisbane@urscorp.com
- AU Interpretive QC Report (Anon QCI Not Rep) (QCI_NoAnon)	Email	brisbane@urscorp.com
- AU QC Report (Anon QC Not Rep) - NATA (QC_NoAnon)	Email	brisbane@urscorp.com
- Default - Chain of Custody (COC)	Email	brisbane@urscorp.com

THE ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV)	Email	accounts.payable@santos.com

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EB0913021**	Page	: 1 of 24
Amendment	: **2**		
Client	: **SANTOS LTD**	Laboratory	: Environmental Division Brisbane
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Project	: 4262 6447	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: A2280		
C-O-C number	: 134256-58	Date Samples Received	: 19-AUG-2009
Sampler	: Jerry Wang	Issue Date	: 12-OCT-2009
Site	: Curtis Is Gladstone		
		No. of samples received	: 35
Quote number	: BN/356/09	No. of samples analysed	: 35

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics
Kim McCabe	Senior Inorganic Chemist	Inorganics
Stephen Hislop	Senior Inorganic Chemist	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **EG005T (Total Metals): Sample EB0913021-002, 034 (CPT4 2-1m-2m, NEW_TP2-3-3.5m) shows poor matrix spike recovery due to matrix interference. Confirmed by visual inspection.**
- **EG005T (Total Metals): Sample EB0913021-012 (TP3-1-0.3m) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.**
- **EG005W (Water Leachable Metals): LCS recoveries fall outside Dynamic Control Limits. They are however within ALS Static Control Limits and hence deemed acceptable.**
- **EK061G (Total Kjeldahl Nitrogen): Sample EB0913223-009 shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.**
- **EK067G (Total Phosphorus): Sample EB0913021-013 (TP3 2-1.5m) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.**
- **EK067G (Total Phosphorus): Sample EB0913021-034 (NEW_TP2-3-3.5m) shows poor spike recovery due to sample heterogeneity. Confirmed by visual inspection.**
- **Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m3'.**
- **pH FOX Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Vigorous; 4 - Very Vigorous**
- **This report has been amended following changes to the analytical data reported. The quality system is being utilised to resolve this issue. The specific data affected includes sample 1 (CPT4 1-0m-1m) Alkalinity results.**

Analytical Results

Sub-Matrix: **DI WATER LEACHATE**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT4 1-0m-1m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-001	Client sample ID: CPT4 2-1m-2m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-002	Client sample ID: CPT4 3-2m-3m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-003	Client sample ID: CPT4b 1-1.0m-2.0m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-004	Client sample ID: CPT4b 2-3m-4m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-005
EG005W: Water Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.10	mg/L	**0.27**	**0.37**	**0.48**	**0.60**	**0.34**
Antimony	7440-36-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	7440-38-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium	7440-39-3	0.1	mg/L	**0.5**	**0.2**	**0.2**	**0.2**	**0.6**
Beryllium	7440-41-7	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	7440-42-8	0.1	mg/L	**1.3**	**0.2**	**0.2**	**0.2**	**1.5**
Cadmium	7440-43-9	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	7440-47-3	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	7440-48-4	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	7440-50-8	0.01	mg/L	<0.01	<0.01	**0.02**	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L	**0.18**	**0.17**	**0.22**	**0.26**	**0.06**
Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese	7439-96-5	0.01	mg/L	**0.01**	**0.02**	<0.01	**0.02**	**0.02**
Nickel	7440-02-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium	7440-32-6	0.01	mg/L	**0.01**	**0.01**	**0.02**	**0.02**	<0.01
Vanadium	7440-62-2	0.01	mg/L	<0.01	**0.08**	**0.07**	**0.16**	<0.01
Zinc	7440-66-6	0.01	mg/L	**0.84**	**0.11**	**0.12**	**0.20**	**2.36**
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG020W: Water Leachable Metals by ICP-MS								
Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG035W: Water Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: **DI WATER LEACHATE**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT2 1-1.0m-2.0m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-006	Client sample ID: CPT2 2-3.0m-3.5m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-007	Client sample ID: CPT1 1-0-1.5m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-008	Client sample ID: CPT1 2-1.5-2.5m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-009	Client sample ID: TP3-1-0.3m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-012
EG005W: Water Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.10	mg/L	<0.10	**0.15**	**0.30**	**3.33**	**0.23**
Antimony	7440-36-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	7440-38-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium	7440-39-3	0.1	mg/L	**0.3**	**0.3**	**0.6**	**0.9**	**0.9**
Beryllium	7440-41-7	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	7440-42-8	0.1	mg/L	**0.5**	**0.2**	**1.0**	**1.6**	<0.1
Cadmium	7440-43-9	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	7440-47-3	0.01	mg/L	<0.01	<0.01	<0.01	**0.01**	<0.01
Cobalt	7440-48-4	0.01	mg/L	<0.01	<0.01	**0.10**	<0.01	<0.01
Copper	7440-50-8	0.01	mg/L	<0.01	<0.01	<0.01	**0.03**	<0.01
Iron	7439-89-6	0.05	mg/L	<0.05	**0.09**	**0.12**	**4.08**	**0.15**
Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese	7439-96-5	0.01	mg/L	**0.01**	<0.01	<0.01	**0.03**	**0.22**
Nickel	7440-02-0	0.01	mg/L	<0.01	<0.01	**0.03**	**0.02**	<0.01
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	**0.01**	<0.01
Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	<0.01	**0.03**	<0.01
Vanadium	7440-62-2	0.01	mg/L	**0.02**	<0.01	**0.07**	**0.02**	<0.01
Zinc	7440-66-6	0.01	mg/L	**0.68**	**0.54**	**1.54**	**2.44**	**0.25**
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG020W: Water Leachable Metals by ICP-MS								
Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG035W: Water Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: **DI WATER LEACHATE**

Compound	CAS Number	LOR	Unit	Client sample ID: TP3 2-1.5m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-013	Client sample ID: TP3 3-3mm Client sampling date / time: 21-AUG-2009 12:00 EB0913021-014	Client sample ID: TP8 1-0.3m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-020	Client sample ID: TP8 2-1m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-021	Client sample ID: TP8 3-3.5m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-022
EG005W: Water Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.10	mg/L	**10.9**	**2.61**	**1.18**	**1.19**	**1.28**
Antimony	7440-36-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	7440-38-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium	7440-39-3	0.1	mg/L	**2.6**	**1.2**	**1.1**	**1.4**	**0.8**
Beryllium	7440-41-7	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	7440-42-8	0.1	mg/L	**2.3**	**1.7**	**2.1**	**3.0**	**2.1**
Cadmium	7440-43-9	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	7440-47-3	0.01	mg/L	**0.03**	**0.01**	<0.01	<0.01	<0.01
Cobalt	7440-48-4	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	7440-50-8	0.01	mg/L	**0.04**	**0.01**	**0.02**	**0.07**	**0.16**
Iron	7439-89-6	0.05	mg/L	**22.3**	**2.83**	**0.55**	**0.46**	**1.11**
Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	<0.01	**0.01**	**0.02**
Manganese	7439-96-5	0.01	mg/L	**0.03**	<0.01	<0.01	**0.04**	**0.09**
Nickel	7440-02-0	0.01	mg/L	**0.02**	<0.01	<0.01	**0.11**	**0.30**
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium	7440-32-6	0.01	mg/L	**0.08**	**0.04**	**0.01**	<0.01	**0.01**
Vanadium	7440-62-2	0.01	mg/L	**0.04**	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.01	mg/L	**3.18**	**1.74**	**2.96**	**4.26**	**3.07**
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG020W: Water Leachable Metals by ICP-MS								
Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG035W: Water Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: **DI WATER LEACHATE**

Compound	CAS Number	LOR	Unit	Client sample ID: TP9 1-0.3m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-028	TP9 2-2m 21-AUG-2009 12:00 EB0913021-029	TP6 1-0.5m 21-AUG-2009 12:00 EB0913021-030	TP6 2-2.5m 21-AUG-2009 12:00 EB0913021-031	NEW_TP2-1-0.5m 21-AUG-2009 12:00 EB0913021-032
EG005W: Water Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.10	mg/L	**0.60**	<0.10	**3.47**	**5.20**	**4.20**
Antimony	7440-36-0	0.01	mg/L	**0.05**	**0.02**	<0.01	<0.01	<0.01
Arsenic	7440-38-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium	7440-39-3	0.1	mg/L	**0.7**	**0.6**	**1.1**	**1.9**	**1.2**
Beryllium	7440-41-7	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	7440-42-8	0.1	mg/L	<0.1	<0.1	**0.9**	**2.0**	**1.7**
Cadmium	7440-43-9	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	7440-47-3	0.01	mg/L	<0.01	<0.01	<0.01	**0.02**	**0.01**
Cobalt	7440-48-4	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	7440-50-8	0.01	mg/L	**0.03**	<0.01	**0.04**	**0.05**	**0.04**
Iron	7439-89-6	0.05	mg/L	**0.44**	<0.05	**2.96**	**8.76**	**4.60**
Lead	7439-92-1	0.01	mg/L	**0.01**	<0.01	<0.01	<0.01	<0.01
Manganese	7439-96-5	0.01	mg/L	**0.02**	<0.01	**0.01**	**0.03**	**0.01**
Nickel	7440-02-0	0.01	mg/L	**0.02**	<0.01	**0.01**	**0.02**	<0.01
Selenium	7782-49-2	0.01	mg/L	**0.02**	<0.01	<0.01	<0.01	<0.01
Titanium	7440-32-6	0.01	mg/L	**0.02**	<0.01	**0.03**	**0.03**	**0.07**
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	**0.02**	**0.02**
Zinc	7440-66-6	0.01	mg/L	**0.43**	**0.28**	**1.44**	**3.14**	**2.86**
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG020W: Water Leachable Metals by ICP-MS								
Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	**0.003**
EG035W: Water Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: **DI WATER LEACHATE**

Compound	CAS Number	LOR	Unit	Client sample ID: NEW_TP2-2-1.5m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-033	Client sample ID: NEW_TP2-3-3.5m Client sampling date / time: 21-AUG-2009 12:00 EB0913021-034	----	----	----
EG005W: Water Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.10	mg/L	<0.10	<0.10	----	----	----
Antimony	7440-36-0	0.01	mg/L	**0.02**	<0.01	----	----	----
Arsenic	7440-38-2	0.01	mg/L	<0.01	<0.01	----	----	----
Barium	7440-39-3	0.1	mg/L	**0.3**	**0.6**	----	----	----
Beryllium	7440-41-7	0.01	mg/L	<0.01	<0.01	----	----	----
Boron	7440-42-8	0.1	mg/L	<0.1	**0.1**	----	----	----
Cadmium	7440-43-9	0.005	mg/L	<0.005	<0.005	----	----	----
Chromium	7440-47-3	0.01	mg/L	<0.01	<0.01	----	----	----
Cobalt	7440-48-4	0.01	mg/L	<0.01	<0.01	----	----	----
Copper	7440-50-8	0.01	mg/L	<0.01	<0.01	----	----	----
Iron	7439-89-6	0.05	mg/L	**0.08**	**0.05**	----	----	----
Lead	7439-92-1	0.01	mg/L	<0.01	**0.01**	----	----	----
Manganese	7439-96-5	0.01	mg/L	<0.01	<0.01	----	----	----
Nickel	7440-02-0	0.01	mg/L	<0.01	<0.01	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----
Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.01	mg/L	**0.14**	**0.56**	----	----	----
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	----	----	----
EG020W: Water Leachable Metals by ICP-MS								
Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	----	----	----
EG035W: Water Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT4 1-0m-1m Client sampling date / time: 14-AUG-2009 13:25 EB0913021-001	CPT4 2-1m-2m 14-AUG-2009 13:28 EB0913021-002	CPT4 3-2m-3m 14-AUG-2009 13:30 EB0913021-003	CPT4b 1-1.0m-2.0m 15-AUG-2009 08:50 EB0913021-004	CPT4b 2-3m-4m 15-AUG-2009 08:55 EB0913021-005
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	8.6	8.4	8.4	8.6	8.4
pH (Fox)	----	0.1	pH Unit	7.5	1.8	1.7	1.8	6.2
Reaction Rate	----	1	Reaction Uni	4	4	4	4	2
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	7.9	6.7	6.0	6.6	6.7
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	6	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	2.17	1.99	1.70	<0.02
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	12	1350	1240	1060	<10
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	1.50	0.78	----	0.83	0.62
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	301	156	----	166	124
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	0.48	0.25	----	0.27	0.20
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	<0.02	2.00	2.00	1.52	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	1250	1250	949	<10
Liming Rate	----	1	kg CaCO3/t	<1	94	94	71	<1
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	23.6	41.1	34.3	35.6	16.7
ED037: Alkalinity								
Total Alkalinity as CaCO3	----	1	mg/kg	3350	1810	1950	2040	1600
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	2900	1710	1640	1370	1600
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	450	112	313	670	<1
ED040S: Soluble Major Anions								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	4130	5660	5170	4580	1360
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	24100	34800	29100	27500	8300
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	350	290	220	250	50
Magnesium	7439-95-4	10	mg/kg	1300	1580	1280	1260	180
Sodium	7440-23-5	10	mg/kg	14600	21100	19700	17800	5610
Potassium	7440-09-7	10	mg/kg	840	1520	1410	1320	310

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT4 1-0m-1m	CPT4 2-1m-2m	CPT4 3-2m-3m	CPT4b 1-1.0m-2.0m	CPT4b 2-3m-4m
				Client sampling date / time: 14-AUG-2009 13:25	14-AUG-2009 13:28	14-AUG-2009 13:30	15-AUG-2009 08:50	15-AUG-2009 08:55
				EB0913021-001	EB0913021-002	EB0913021-003	EB0913021-004	EB0913021-005
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	11800	12200	11700	11900	8980
Antimony	7440-36-0	5	mg/kg	<5	<5	<5	<5	<5
Arsenic	7440-38-2	5	mg/kg	20	24	11	20	<5
Barium	7440-39-3	10	mg/kg	10	10	10	10	30
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	1
Boron	7440-42-8	50	mg/kg	80	<50	<50	<50	<50
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	24	22	18	21	18
Cobalt	7440-48-4	2	mg/kg	13	48	13	17	14
Copper	7440-50-8	5	mg/kg	23	29	31	29	35
Iron	7439-89-6	50	mg/kg	27700	27700	24900	22400	18900
Lead	7439-92-1	5	mg/kg	7	5	5	6	8
Manganese	7439-96-5	5	mg/kg	661	196	192	152	120
Nickel	7440-02-0	2	mg/kg	14	20	11	16	9
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadium	7440-62-2	5	mg/kg	71	110	56	55	47
Zinc	7440-66-6	5	mg/kg	40	40	34	36	14
Titanium	7440-32-6	10	mg/kg	110	140	120	120	60
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.01	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Uranium	7440-61-1	0.1	mg/kg	1.0	4.4	2.4	6.3	0.6
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	48.3	159	39.4	83.2	30.5
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	490	420	480	290	160
EK062: Total Nitrogen as N								
^ Total Nitrogen as N	----	20	mg/kg	540	580	520	370	190
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	394	169	147	110	126
EN60-DI: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	3.2	2.2	2.5	2.5	2.6

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT2 1-1.0m-2.0m Client sampling date / time: 15-AUG-2009 13:55 EB0913021-006	CPT2 2-3.0m-3.5m 15-AUG-2009 11:58 EB0913021-007	CPT1 1-0-1.5m 15-AUG-2009 14:15 EB0913021-008	CPT1 2-1.5-2.5m 15-AUG-2009 14:28 EB0913021-009	TP2-1-0.3m 16-AUG-2009 09:25 EB0913021-010
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	7.3	8.3	7.4	8.5	5.2
pH (Fox)	----	0.1	pH Unit	1.5	4.7	1.4	3.1	3.3
Reaction Rate	----	1	Reaction Uni	4	1	4	2	2
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	5.5	6.5	4.9	6.5	4.1
Titratable Actual Acidity (23F)	----	2	mole H+ / t	16	<2	29	<2	85
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.02	<0.02	0.05	<0.02	0.14
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	4.04	0.03	5.54	0.07	0.03
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	2520	20	3460	43	17
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	----	0.26	----	0.31	----
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	----	52	----	62	----
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	----	0.08	----	0.10	----
EA033-D: Retained Acidity								
Net Acid Soluble Sulfur (20Je)	----	0.02	% S	----	----	----	----	<0.02
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	----	----	----	----	<10
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	----	----	----	----	<0.02
KCl Extractable Sulfur (23Ce)	----	0.02	% S	----	----	----	----	<0.02
HCl Extractable Sulfur (20Be)	----	0.02	% S	----	----	----	----	0.02
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	4.07	<0.02	5.59	<0.02	0.17
Net Acidity (acidity units)	----	10	mole H+ / t	2540	<10	3480	<10	106
Liming Rate	----	1	kg CaCO3/t	190	<1	261	<1	8
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	47.4	16.4	36.7	12.6	----
ED037: Alkalinity								
Total Alkalinity as CaCO3	----	1	mg/kg	837	782	475	642	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	837	782	475	642	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	<1	<1	<1	<1	----
ED040S: Soluble Major Anions								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	6790	1230	5090	820	----
ED045: Chloride								

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: CPT2 1-1.0m-2.0m	CPT2 2-3.0m-3.5m	CPT1 1-0-1.5m	CPT1 2-1.5-2.5m	TP2-1-0.3m
				Client sampling date / time: 15-AUG-2009 13:55	15-AUG-2009 11:58	15-AUG-2009 14:15	15-AUG-2009 14:28	16-AUG-2009 09:25
				EB0913021-006	EB0913021-007	EB0913021-008	EB0913021-009	EB0913021-010
ED045: Chloride - Continued								
Chloride	16887-00-6	10	mg/kg	42500	7440	32800	5140	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	390	40	360	30	----
Magnesium	7439-95-4	10	mg/kg	2330	210	2080	100	----
Sodium	7440-23-5	10	mg/kg	24900	4770	19700	3600	----
Potassium	7440-09-7	10	mg/kg	1570	300	1130	250	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	13400	5020	5140	3410	----
Antimony	7440-36-0	5	mg/kg	<5	<5	<5	<5	----
Arsenic	7440-38-2	5	mg/kg	26	27	24	12	----
Barium	7440-39-3	10	mg/kg	<10	<10	<10	<10	----
Beryllium	7440-41-7	1	mg/kg	1	<1	<1	<1	----
Boron	7440-42-8	50	mg/kg	50	<50	<50	<50	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	24	54	20	26	----
Cobalt	7440-48-4	2	mg/kg	16	<2	19	<2	----
Copper	7440-50-8	5	mg/kg	30	19	15	13	----
Iron	7439-89-6	50	mg/kg	42500	59600	35600	24500	----
Lead	7439-92-1	5	mg/kg	6	<5	8	<5	----
Manganese	7439-96-5	5	mg/kg	314	12	127	20	----
Nickel	7440-02-0	2	mg/kg	14	<2	11	<2	----
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	----
Vanadium	7440-62-2	5	mg/kg	55	108	43	71	----
Zinc	7440-66-6	5	mg/kg	42	<5	24	<5	----
Titanium	7440-32-6	10	mg/kg	160	120	60	30	----
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.01	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Uranium	7440-61-1	0.1	mg/kg	7.3	1.7	2.0	0.5	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	59.2	26.4	35.6	123	----
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	640	150	350	130	----
EK062: Total Nitrogen as N								
^ Total Nitrogen as N	----	20	mg/kg	700	170	390	260	----
EK067G: Total Phosphorus as P by Discrete Analyser								

Analytical Results

Sub-Matrix: SOIL				Client sample ID	CPT2 1-1.0m-2.0m	CPT2 2-3.0m-3.5m	CPT1 1-0-1.5m	CPT1 2-1.5-2.5m	TP2-1-0.3m
				Client sampling date / time	15-AUG-2009 13:55	15-AUG-2009 11:58	15-AUG-2009 14:15	15-AUG-2009 14:28	16-AUG-2009 09:25
Compound	CAS Number	LOR	Unit		EB0913021-006	EB0913021-007	EB0913021-008	EB0913021-009	EB0913021-010
EK067G: Total Phosphorus as P by Discrete Analyser - Continued									
Total Phosphorus as P	----	2	mg/kg		148	324	61	126	----
EN60-DI: Bottle Leaching Procedure									
Final pH	----	0.1	pH Unit		3.2	3.0	2.5	2.8	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP2-2-2.5m Client sampling date / time: 16-AUG-2009 09:30 EB0913021-011	TP3-1-0.3m 16-AUG-2009 10:05 EB0913021-012	TP3 2-1.5m 16-AUG-2009 10:07 EB0913021-013	TP3 3-3mm 16-AUG-2009 10:10 EB0913021-014	TP4 1-0.3m 16-AUG-2009 11:00 EB0913021-015
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	5.6	5.8	5.7	5.0	6.2
pH (Fox)	----	0.1	pH Unit	3.5	3.0	3.7	3.8	3.5
Reaction Rate	----	1	Reaction Uni	2	3	2	2	2
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	4.5	5.0	4.3	4.3	4.7
Titratable Actual Acidity (23F)	----	2	mole H+ / t	37	24	47	33	23
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.06	0.04	0.08	0.05	0.04
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	0.02	<0.02	<0.02	<0.02	<0.02
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	14	<10	<10	<10	<10
EA033-D: Retained Acidity								
Net Acid Soluble Sulfur (20Je)	----	0.02	% S	----	----	<0.02	<0.02	----
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	----	----	<10	<10	----
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	----	----	<0.02	<0.02	----
KCl Extractable Sulfur (23Ce)	----	0.02	% S	----	----	<0.02	<0.02	----
HCl Extractable Sulfur (20Be)	----	0.02	% S	----	----	<0.02	<0.02	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	0.08	0.04	0.08	0.05	0.04
Net Acidity (acidity units)	----	10	mole H+ / t	52	24	47	33	23
Liming Rate	----	1	kg CaCO3/t	4	2	4	2	2
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	----	5.8	7.3	19.4	----
ED037: Alkalinity								
Total Alkalinity as CaCO3	----	1	mg/kg	----	56	73	470	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	----	56	73	470	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	----	<1	<1	<1	----
ED040S: Soluble Major Anions								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	----	20	20	<10	----
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	----	180	280	1220	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	----	<10	<10	<10	----
Magnesium	7439-95-4	10	mg/kg	----	<10	<10	<10	----
Sodium	7440-23-5	10	mg/kg	----	20	10	30	----
Potassium	7440-09-7	10	mg/kg	----	<10	<10	<10	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP2-2-2.5m Client sampling date / time: 16-AUG-2009 09:30 EB0913021-011	TP3-1-0.3m 16-AUG-2009 10:05 EB0913021-012	TP3 2-1.5m 16-AUG-2009 10:07 EB0913021-013	TP3 3-3mm 16-AUG-2009 10:10 EB0913021-014	TP4 1-0.3m 16-AUG-2009 11:00 EB0913021-015
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	----	**4980**	**3640**	**5230**	----
Antimony	7440-36-0	5	mg/kg	----	<5	<5	<5	----
Arsenic	7440-38-2	5	mg/kg	----	**7**	**9**	<5	----
Barium	7440-39-3	10	mg/kg	----	**230**	**40**	<10	----
Beryllium	7440-41-7	1	mg/kg	----	**1**	<1	<1	----
Boron	7440-42-8	50	mg/kg	----	<50	<50	<50	----
Cadmium	7440-43-9	1	mg/kg	----	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	----	**25**	**30**	**14**	----
Cobalt	7440-48-4	2	mg/kg	----	**25**	**7**	**13**	----
Copper	7440-50-8	5	mg/kg	----	**14**	**13**	**17**	----
Iron	7439-89-6	50	mg/kg	----	**24800**	**26600**	**10500**	----
Lead	7439-92-1	5	mg/kg	----	**13**	**6**	<5	----
Manganese	7439-96-5	5	mg/kg	----	**1690**	**165**	**5**	----
Nickel	7440-02-0	2	mg/kg	----	**5**	**3**	**6**	----
Selenium	7782-49-2	5	mg/kg	----	<5	<5	<5	----
Vanadium	7440-62-2	5	mg/kg	----	**64**	**92**	**38**	----
Zinc	7440-66-6	5	mg/kg	----	**10**	**6**	**16**	----
Titanium	7440-32-6	10	mg/kg	----	**20**	**20**	**20**	----
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.01	mg/kg	----	<0.05	<0.05	<0.05	----
Uranium	7440-61-1	0.1	mg/kg	----	**0.9**	**0.6**	**0.6**	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	<0.1	<0.1	<0.1	----
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	----	**46.7**	**23.3**	**150**	----
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	**780**	**130**	**110**	----
EK062: Total Nitrogen as N								
^ Total Nitrogen as N	----	20	mg/kg	----	**820**	**160**	**260**	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	----	**194**	**105**	**58**	----
EN60-DI: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	----	**2.5**	**2.6**	**2.3**	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP4 2-2.5m Client sampling date / time: 16-AUG-2009 11:02 EB0913021-016	TP4 3-3.5m 16-AUG-2009 11:05 EB0913021-017	TP5 1-0.5m 16-AUG-2009 11:45 EB0913021-018	TP5 2-3m 16-AUG-2009 11:48 EB0913021-019	TP8 1-0.3m 16-AUG-2009 12:00 EB0913021-020
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**6.6**	**6.0**	**5.8**	**5.5**	**5.0**
pH (Fox)	----	0.1	pH Unit	**4.6**	**4.0**	**2.3**	**4.3**	**3.4**
Reaction Rate	----	1	Reaction Uni	**1**	**1**	**3**	**1**	**2**
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	**4.8**	**5.0**	**5.1**	**4.7**	**4.4**
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**15**	**11**	**9**	**13**	**51**
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	**0.02**	<0.02	<0.02	**0.02**	**0.08**
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	<10	<10	**12**
EA033-D: Retained Acidity								
Net Acid Soluble Sulfur (20Je)	----	0.02	% S	----	----	----	----	**0.02**
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	----	----	----	----	**10**
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	----	----	----	----	<0.02
KCl Extractable Sulfur (23Ce)	----	0.02	% S	----	----	----	----	<0.02
HCl Extractable Sulfur (20Be)	----	0.02	% S	----	----	----	----	**0.02**
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	**0.02**	<0.02	<0.02	**0.02**	**0.12**
Net Acidity (acidity units)	----	10	mole H+ / t	**15**	**11**	<10	**13**	**73**
Liming Rate	----	1	kg CaCO3/t	**1**	<1	<1	<1	**5**
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	----	----	----	----	**32.9**
ED037: Alkalinity								
Total Alkalinity as CaCO3	----	1	mg/kg	----	----	----	----	**56**
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	----	----	----	----	**56**
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	----	----	----	----	<1
ED040S: Soluble Major Anions								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	----	----	----	----	**320**
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	----	----	----	----	**630**
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	----	----	----	----	<10
Magnesium	7439-95-4	10	mg/kg	----	----	----	----	<10
Sodium	7440-23-5	10	mg/kg	----	----	----	----	**490**
Potassium	7440-09-7	10	mg/kg	----	----	----	----	<10

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP4 2-2.5m Client sampling date / time: 16-AUG-2009 11:02 EB0913021-016	Client sample ID: TP4 3-3.5m Client sampling date / time: 16-AUG-2009 11:05 EB0913021-017	Client sample ID: TP5 1-0.5m Client sampling date / time: 16-AUG-2009 11:45 EB0913021-018	Client sample ID: TP5 2-3m Client sampling date / time: 16-AUG-2009 11:48 EB0913021-019	Client sample ID: TP8 1-0.3m Client sampling date / time: 16-AUG-2009 12:00 EB0913021-020
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	----	----	----	----	**7260**
Antimony	7440-36-0	5	mg/kg	----	----	----	----	<5
Arsenic	7440-38-2	5	mg/kg	----	----	----	----	**28**
Barium	7440-39-3	10	mg/kg	----	----	----	----	**580**
Beryllium	7440-41-7	1	mg/kg	----	----	----	----	<1
Boron	7440-42-8	50	mg/kg	----	----	----	----	<50
Cadmium	7440-43-9	1	mg/kg	----	----	----	----	<1
Chromium	7440-47-3	2	mg/kg	----	----	----	----	**4**
Cobalt	7440-48-4	2	mg/kg	----	----	----	----	<2
Copper	7440-50-8	5	mg/kg	----	----	----	----	**10**
Iron	7439-89-6	50	mg/kg	----	----	----	----	**12100**
Lead	7439-92-1	5	mg/kg	----	----	----	----	**5**
Manganese	7439-96-5	5	mg/kg	----	----	----	----	<5
Nickel	7440-02-0	2	mg/kg	----	----	----	----	<2
Selenium	7782-49-2	5	mg/kg	----	----	----	----	<5
Vanadium	7440-62-2	5	mg/kg	----	----	----	----	**39**
Zinc	7440-66-6	5	mg/kg	----	----	----	----	<5
Titanium	7440-32-6	10	mg/kg	----	----	----	----	<10
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.01	mg/kg	----	----	----	----	<0.05
Uranium	7440-61-1	0.1	mg/kg	----	----	----	----	**0.4**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	----	<0.1
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	----	----	----	----	**73.8**
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	----	----	----	**500**
EK062: Total Nitrogen as N								
^ Total Nitrogen as N	----	20	mg/kg	----	----	----	----	**570**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	----	----	----	----	**98**
EN60-DI: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	----	----	----	----	**2.5**

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP8 2-1m Client sampling date / time: 16-AUG-2009 12:02 EB0913021-021	TP8 3-3.5m 16-AUG-2009 12:10 EB0913021-022	TP11 1-0.3m 16-AUG-2009 13:00 EB0913021-023	TP11 2-1m 16-AUG-2009 13:02 EB0913021-024	TP11 3-3.5m 16-AUG-2009 13:05 EB0913021-025
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	4.9	5.1	6.0	5.0	5.0
pH (Fox)	----	0.1	pH Unit	3.5	3.8	2.8	2.9	3.4
Reaction Rate	----	1	Reaction Uni	2	1	3	2	2
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	4.2	3.9	4.8	4.6	4.7
Titratable Actual Acidity (23F)	----	2	mole H+ / t	52	70	24	26	32
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.08	0.11	0.04	0.04	0.05
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	<10	12	<10
EA033-D: Retained Acidity								
Net Acid Soluble Sulfur (20Je)	----	0.02	% S	0.03	<0.02	----	----	----
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	12	<10	----	----	----
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	<0.02	<0.02	----	----	----
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	----	----	----
HCl Extractable Sulfur (20Be)	----	0.02	% S	0.03	<0.02	----	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	0.10	0.11	0.04	0.06	0.05
Net Acidity (acidity units)	----	10	mole H+ / t	65	70	24	37	32
Liming Rate	----	1	kg CaCO3/t	5	5	2	3	2
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	23.8	15.0	----	----	----
ED037: Alkalinity								
Total Alkalinity as CaCO3	----	1	mg/kg	39	22	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	39	22	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	<1	<1	----	----	----
ED040S: Soluble Major Anions								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	390	150	----	----	----
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	1270	1080	----	----	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	----	----	----
Magnesium	7439-95-4	10	mg/kg	10	<10	----	----	----
Sodium	7440-23-5	10	mg/kg	960	730	----	----	----
Potassium	7440-09-7	10	mg/kg	<10	<10	----	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP8 2-1m Client sampling date / time: 16-AUG-2009 12:02 EB0913021-021	TP8 3-3.5m 16-AUG-2009 12:10 EB0913021-022	TP11 1-0.3m 16-AUG-2009 13:00 EB0913021-023	TP11 2-1m 16-AUG-2009 13:02 EB0913021-024	TP11 3-3.5m 16-AUG-2009 13:05 EB0913021-025
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	**4360**	**6340**	----	----	----
Antimony	7440-36-0	5	mg/kg	<5	<5	----	----	----
Arsenic	7440-38-2	5	mg/kg	<5	**13**	----	----	----
Barium	7440-39-3	10	mg/kg	**500**	**20**	----	----	----
Beryllium	7440-41-7	1	mg/kg	<1	<1	----	----	----
Boron	7440-42-8	50	mg/kg	<50	<50	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	----	----	----
Chromium	7440-47-3	2	mg/kg	<2	**6**	----	----	----
Cobalt	7440-48-4	2	mg/kg	<2	<2	----	----	----
Copper	7440-50-8	5	mg/kg	**7**	**18**	----	----	----
Iron	7439-89-6	50	mg/kg	**2760**	**29400**	----	----	----
Lead	7439-92-1	5	mg/kg	<5	<5	----	----	----
Manganese	7439-96-5	5	mg/kg	<5	**74**	----	----	----
Nickel	7440-02-0	2	mg/kg	<2	**3**	----	----	----
Selenium	7782-49-2	5	mg/kg	<5	<5	----	----	----
Vanadium	7440-62-2	5	mg/kg	**8**	**16**	----	----	----
Zinc	7440-66-6	5	mg/kg	<5	**26**	----	----	----
Titanium	7440-32-6	10	mg/kg	<10	**20**	----	----	----
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.01	mg/kg	<0.05	<0.05	----	----	----
Uranium	7440-61-1	0.1	mg/kg	**0.2**	**0.4**	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	----	----	----
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	**30.6**	**7.7**	----	----	----
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	**120**	**370**	----	----	----
EK062: Total Nitrogen as N								
^ Total Nitrogen as N	----	20	mg/kg	**160**	**380**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	**100**	**175**	----	----	----
EN60-DI: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	**2.1**	**2.6**	----	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP10 1-0.5m Client sampling date / time: 16-AUG-2009 11:25 EB0913021-026	TP10 2-2.5m 16-AUG-2009 13:30 EB0913021-027	TP9 1-0.3m 16-AUG-2009 15:03 EB0913021-028	TP9 2-2m 16-AUG-2009 15:05 EB0913021-029	TP6 1-0.5m 17-AUG-2009 08:22 EB0913021-030
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**6.3**	**4.9**	**6.1**	**6.1**	**5.8**
pH (Fox)	----	0.1	pH Unit	**2.8**	**3.0**	**3.6**	**4.2**	**2.7**
Reaction Rate	----	1	Reaction Uni	**3**	**2**	**2**	**1**	**2**
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	**5.0**	**4.5**	**4.9**	**5.2**	**4.3**
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**19**	**33**	**22**	**17**	**51**
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	**0.03**	**0.05**	**0.04**	**0.03**	**0.08**
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	<0.02	**0.02**	<0.02	<0.02
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	**14**	<10	<10
EA033-D: Retained Acidity								
Net Acid Soluble Sulfur (20Je)	----	0.02	% S	----	----	----	----	<0.02
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	----	----	----	----	<10
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	----	----	----	----	<0.02
KCl Extractable Sulfur (23Ce)	----	0.02	% S	----	----	----	----	<0.02
HCl Extractable Sulfur (20Be)	----	0.02	% S	----	----	----	----	<0.02
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	**0.03**	**0.05**	**0.06**	**0.03**	**0.08**
Net Acidity (acidity units)	----	10	mole H+ / t	**19**	**33**	**37**	**17**	**51**
Liming Rate	----	1	kg CaCO3/t	**1**	**2**	**3**	**1**	**4**
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	----	----	**21.0**	**8.6**	**22.2**
ED037: Alkalinity								
Total Alkalinity as CaCO3	----	1	mg/kg	----	----	**67**	**84**	**84**
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	----	----	**67**	**84**	**84**
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	----	----	<1	<1	<1
ED040S: Soluble Major Anions								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	----	----	**20**	<10	**40**
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	----	----	**130**	**50**	**250**
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	----	----	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	----	----	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	----	----	**40**	<10	**20**
Potassium	7440-09-7	10	mg/kg	----	----	<10	<10	<10

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP10 1-0.5m Client sampling date / time: 16-AUG-2009 11:25 EB0913021-026	Client sample ID: TP10 2-2.5m Client sampling date / time: 16-AUG-2009 13:30 EB0913021-027	Client sample ID: TP9 1-0.3m Client sampling date / time: 16-AUG-2009 15:03 EB0913021-028	Client sample ID: TP9 2-2m Client sampling date / time: 16-AUG-2009 15:05 EB0913021-029	Client sample ID: TP6 1-0.5m Client sampling date / time: 17-AUG-2009 08:22 EB0913021-030
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	----	----	**5420**	**5800**	**7530**
Antimony	7440-36-0	5	mg/kg	----	----	<5	<5	<5
Arsenic	7440-38-2	5	mg/kg	----	----	**7**	**10**	**5**
Barium	7440-39-3	10	mg/kg	----	----	**30**	**20**	**70**
Beryllium	7440-41-7	1	mg/kg	----	----	<1	<1	<1
Boron	7440-42-8	50	mg/kg	----	----	<50	<50	<50
Cadmium	7440-43-9	1	mg/kg	----	----	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	----	----	**25**	**22**	**12**
Cobalt	7440-48-4	2	mg/kg	----	----	**9**	<2	**4**
Copper	7440-50-8	5	mg/kg	----	----	**10**	**17**	**26**
Iron	7439-89-6	50	mg/kg	----	----	**17100**	**32600**	**20900**
Lead	7439-92-1	5	mg/kg	----	----	**7**	<5	**8**
Manganese	7439-96-5	5	mg/kg	----	----	**396**	**29**	**81**
Nickel	7440-02-0	2	mg/kg	----	----	**2**	<2	**4**
Selenium	7782-49-2	5	mg/kg	----	----	<5	<5	<5
Vanadium	7440-62-2	5	mg/kg	----	----	**47**	**74**	**52**
Zinc	7440-66-6	5	mg/kg	----	----	<5	<5	**16**
Titanium	7440-32-6	10	mg/kg	----	----	**50**	**70**	**20**
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.01	mg/kg	----	----	<0.05	<0.05	<0.05
Uranium	7440-61-1	0.1	mg/kg	----	----	**1.9**	**2.3**	**1.3**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	<0.1	<0.1	<0.1
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	----	----	**31.2**	**132**	**42.4**
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	----	**290**	**160**	**320**
EK062: Total Nitrogen as N								
^ Total Nitrogen as N	----	20	mg/kg	----	----	**320**	**290**	**360**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	----	----	**182**	**214**	**76**
EN60-DI: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	----	----	**3.6**	**2.1**	**2.9**

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP6 2-2.5m Client sampling date / time: 17-AUG-2009 08:25 EB0913021-031	Client sample ID: NEW_TP2-1-0.5m Client sampling date / time: 17-AUG-2009 15:55 EB0913021-032	Client sample ID: NEW_TP2-2-1.5m Client sampling date / time: 17-AUG-2009 16:00 EB0913021-033	Client sample ID: NEW_TP2-3-3.5m Client sampling date / time: 17-AUG-2009 16:05 EB0913021-034	Client sample ID: ---- Client sampling date / time: ---- ----
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**7.7**	**5.0**	**6.2**	**6.3**	----
pH (Fox)	----	0.1	pH Unit	**5.5**	**2.7**	**3.8**	**4.1**	----
Reaction Rate	----	1	Reaction Uni	**1**	**2**	**2**	**2**	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	**6.0**	**5.0**	**5.3**	**5.4**	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**4**	**16**	**18**	**13**	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	**0.03**	**0.03**	**0.02**	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	<10	<10	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	**1.5**	----
Net Acidity (sulfur units)	----	0.02	% S	<0.02	**0.03**	**0.03**	**0.02**	----
Net Acidity (acidity units)	----	10	mole H+ / t	<10	**16**	**18**	**13**	----
Liming Rate	----	1	kg CaCO3/t	<1	**1**	**1**	<1	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**21.3**	**8.2**	**15.8**	**30.8**	----
ED037: Alkalinity								
Total Alkalinity as CaCO3	----	1	mg/kg	**162**	**22**	**56**	**128**	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	**162**	**22**	**56**	**128**	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	<1	<1	<1	<1	----
ED040S: Soluble Major Anions								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	**160**	**270**	**580**	**420**	----
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	**890**	**1740**	**3220**	**1550**	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	**30**	**40**	<10	----
Magnesium	7439-95-4	10	mg/kg	<10	**90**	**110**	**20**	----
Sodium	7440-23-5	10	mg/kg	**560**	**990**	**2080**	**1230**	----
Potassium	7440-09-7	10	mg/kg	<10	**60**	**110**	**70**	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	**4560**	**3960**	**4500**	**4610**	----
Antimony	7440-36-0	5	mg/kg	<5	<5	<5	<5	----
Arsenic	7440-38-2	5	mg/kg	**10**	**6**	**26**	**17**	----
Barium	7440-39-3	10	mg/kg	**180**	<10	**30**	**10**	----
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP6 2-2.5m Client sampling date / time: 17-AUG-2009 08:25 EB0913021-031	Client sample ID: NEW_TP2-1-0.5m Client sampling date / time: 17-AUG-2009 15:55 EB0913021-032	Client sample ID: NEW_TP2-2-1.5m Client sampling date / time: 17-AUG-2009 16:00 EB0913021-033	Client sample ID: NEW_TP2-3-3.5m Client sampling date / time: 17-AUG-2009 16:05 EB0913021-034	Client sample ID: ---- Client sampling date / time: ---- ----
EG005T: Total Metals by ICP-AES - Continued								
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	**19**	**11**	**31**	**28**	----
Cobalt	7440-48-4	2	mg/kg	**4**	<2	<2	<2	----
Copper	7440-50-8	5	mg/kg	**20**	**17**	**37**	**141**	----
Iron	7439-89-6	50	mg/kg	**26700**	**5800**	**40800**	**47200**	----
Lead	7439-92-1	5	mg/kg	**6**	<5	<5	<5	----
Manganese	7439-96-5	5	mg/kg	**61**	**13**	**7**	<5	----
Nickel	7440-02-0	2	mg/kg	**3**	<2	<2	<2	----
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	----
Vanadium	7440-62-2	5	mg/kg	**72**	**27**	**135**	**149**	----
Zinc	7440-66-6	5	mg/kg	**11**	**7**	<5	<5	----
Titanium	7440-32-6	10	mg/kg	**30**	**40**	**80**	**30**	----
EG020T: Total Metals by ICP-MS								
Tungsten	7440-33-7	0.01	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Uranium	7440-61-1	0.1	mg/kg	**0.4**	**5.4**	**4.5**	**4.8**	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	**106**	**66.6**	**1.2**	**162**	----
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	**110**	**300**	**210**	**160**	----
EK062: Total Nitrogen as N								
^ Total Nitrogen as N	----	20	mg/kg	**220**	**370**	**210**	**320**	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	**144**	**102**	**397**	**430**	----
EN60-DI: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	**2.2**	**2.5**	**4.5**	**2.6**	----

Analytical Results

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Client sample ID: RINSATE WATER	----	----	----	----
				Client sampling date / time: 17-AUG-2009 15:00	----	----	----	----
				EB0913021-035	**----**	**----**	**----**	**----**
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.22**	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	----	----	----	----
Barium	7440-39-3	0.001	mg/L	**0.001**	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.004**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Titanium	7440-32-6	0.01	mg/L	<0.01	----	----	----	----
Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
Boron	7440-42-8	0.05	mg/L	<0.05	----	----	----	----
Iron	7439-89-6	0.05	mg/L	**0.45**	----	----	----	----
Tungsten	7440-33-7	0.001	mg/L	<0.001	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EB0913021**	Page	: 1 of 18
Amendment	: **2**		
Client	: **SANTOS LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JULIAN DOBOS	Contact	: Tim Kilmister
Address	: GPO BOX 302 BRISBANE QLD, AUSTRALIA 4000	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: julian_dobos@urscorp.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32432111	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 4262 6447	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Curtis Is Gladstone		
C-O-C number	: 134256-58	Date Samples Received	: 19-AUG-2009
Sampler	: Jerry Wang	Issue Date	: 12-OCT-2009
Order number	: A2280		
		No. of samples received	: 35
Quote number	: BN/356/09	No. of samples analysed	: 35

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics
Kim McCabe	Senior Inorganic Chemist	Inorganics
Stephen Hislop	Senior Inorganic Chemist	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA003 :pH (field/fox) (QC Lot: 1074495)									
EB0913021-001	CPT4 1-0m-1m	EA003: Reaction Rate	----	1	--	4	4	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	8.6	8.5	1.2	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	7.5	7.5	0.0	0% - 20%
EB0913021-010	TP2-1-0.3m	EA003: Reaction Rate	----	1	--	2	2	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	5.2	5.1	1.9	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	3.3	3.4	3.0	0% - 20%
EA003 :pH (field/fox) (QC Lot: 1074496)									
EB0913021-021	TP8 2-1m	EA003: Reaction Rate	----	1	--	2	2	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	4.9	4.9	0.0	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	3.5	3.5	0.0	0% - 20%
EB0913021-030	TP6 1-0.5m	EA003: Reaction Rate	----	1	--	2	2	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	5.8	5.8	0.0	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	2.7	2.7	0.0	0% - 20%
EA033-A: Actual Acidity (QC Lot: 1077729)									
EB0913021-001	CPT4 1-0m-1m	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	7.9	7.9	0.0	0% - 20%
EB0913021-011	TP2-2-2.5m	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.06	0.06	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	37	38	0.0	0% - 50%
		EA033: pH KCl (23A)	----	0.1	pH Unit	4.5	4.5	0.0	0% - 20%
EA033-A: Actual Acidity (QC Lot: 1077730)									
EB0913021-021	TP8 2-1m	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.08	0.10	13.4	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	52	60	13.4	0% - 20%
		EA033: pH KCl (23A)	----	0.1	pH Unit	4.2	4.2	0.0	0% - 20%
EB0913021-031	TP6 2-2.5m	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	4	4	0.0	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	6.0	6.0	0.0	0% - 20%
EA033-B: Potential Acidity (QC Lot: 1077729)									
EB0913021-001	CPT4 1-0m-1m	EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	12	<10	14.1	No Limit
EB0913021-011	TP2-2-2.5m	EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	0.02	0.02	0.0	No Limit
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	14	14	0.0	No Limit
EA033-B: Potential Acidity (QC Lot: 1077730)									
EB0913021-021	TP8 2-1m	EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	<0.02	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA033-B: Potential Acidity (QC Lot: 1077730) - continued									
EB0913021-021	TP8 2-1m	EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EB0913021-031	TP6 2-2.5m	EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA033-C: Acid Neutralising Capacity (QC Lot: 1077729)									
EB0913021-001	CPT4 1-0m-1m	EA033: Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	1.50	1.45	3.5	0% - 20%
		EA033: sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	0.48	0.46	3.5	0% - 20%
		EA033: acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	301	290	3.5	0% - 20%
EA033-D: Retained Acidity (QC Lot: 1077730)									
EB0913021-021	TP8 2-1m	EA033: sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA033: Net Acid Soluble Sulfur (20Je)	----	0.02	% S	0.03	0.03	0.0	No Limit
		EA033: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA033: HCl Extractable Sulfur (20Be)	----	0.02	% S	0.03	0.03	0.0	No Limit
		EA033: acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	12	12	0.0	No Limit
EA055: Moisture Content (QC Lot: 1074546)									
EB0913021-004	CPT4b 1-1.0m-2.0m	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	35.6	35.9	1.0	0% - 20%
EB0913021-013	TP3 2-1.5m	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	7.3	7.1	3.9	No Limit
ED037: Alkalinity (QC Lot: 1074538)									
EB0913021-002	CPT4 2-1m-2m	ED037: Total Alkalinity as CaCO3	----	1	meq/kg	1810	1770	2.4	0% - 20%
EB0913021-012	TP3-1-0.3m	ED037: Total Alkalinity as CaCO3	----	1	meq/kg	56	56	0.0	0% - 20%
ED037: Alkalinity (QC Lot: 1074543)									
EB0913021-034	NEW_TP2-3-3.5m	ED037: Total Alkalinity as CaCO3	----	1	meq/kg	128	134	4.6	0% - 20%
ED040S: Soluble Major Anions (QC Lot: 1074536)									
EB0913021-002	CPT4 2-1m-2m	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	5660	5170	8.9	0% - 20%
EB0913021-012	TP3-1-0.3m	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	20	10	0.0	No Limit
ED040S: Soluble Major Anions (QC Lot: 1074541)									
EB0913021-034	NEW_TP2-3-3.5m	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	420	380	11.0	0% - 20%
ED045: Chloride (QC Lot: 1074535)									
EB0913021-002	CPT4 2-1m-2m	EDO45S: Chloride	16887-00-6	10	mg/kg	34800	34400	1.1	0% - 20%
EB0913021-012	TP3-1-0.3m	EDO45S: Chloride	16887-00-6	10	mg/kg	180	180	0.0	0% - 50%
ED045: Chloride (QC Lot: 1074540)									
EB0913021-034	NEW_TP2-3-3.5m	EDO45S: Chloride	16887-00-6	10	mg/kg	1550	1540	0.9	0% - 20%
ED093S: Soluble Major Cations (QC Lot: 1074537)									
EB0913021-002	CPT4 2-1m-2m	ED093S: Calcium	7440-70-2	10	mg/kg	290	260	8.2	0% - 20%
		ED093S: Magnesium	7439-95-4	10	mg/kg	1580	1460	8.1	0% - 20%
		ED093S: Sodium	7440-23-5	10	mg/kg	21100	20400	3.3	0% - 20%

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED093S: Soluble Major Cations (QC Lot: 1074537) - continued									
EB0913021-002	CPT4 2-1m-2m	ED093S: Potassium	7440-09-7	10	mg/kg	1520	1460	3.3	0% - 20%
EB0913021-012	TP3-1-0.3m	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.0	No Limit
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	No Limit
		ED093S: Sodium	7440-23-5	10	mg/kg	20	<10	72.9	No Limit
		ED093S: Potassium	7440-09-7	10	mg/kg	<10	<10	0.0	No Limit
ED093S: Soluble Major Cations (QC Lot: 1074542)									
EB0913021-034	NEW_TP2-3-3.5m	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.0	No Limit
		ED093S: Magnesium	7439-95-4	10	mg/kg	20	10	0.0	No Limit
		ED093S: Sodium	7440-23-5	10	mg/kg	1230	1090	12.0	0% - 20%
		ED093S: Potassium	7440-09-7	10	mg/kg	70	60	0.0	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 1077448)									
EB0913021-001	CPT4 1-0m-1m	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	10	10	0.0	No Limit
		EG005T: Titanium	7440-32-6	10	mg/kg	110	110	0.0	0% - 50%
		EG005T: Chromium	7440-47-3	2	mg/kg	24	26	7.0	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	13	13	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	14	15	0.0	No Limit
		EG005T: Antimony	7440-36-0	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	20	20	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	23	24	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	7	7	0.0	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	661	630	4.9	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	71	74	4.8	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	40	42	4.5	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	11800	12900	9.0	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	80	80	0.0	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	27700	29600	6.4	0% - 20%
EB0913021-012	TP3-1-0.3m	EG005T: Beryllium	7440-41-7	1	mg/kg	1	1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	230	100	# 81.1	0% - 50%
		EG005T: Titanium	7440-32-6	10	mg/kg	20	20	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	25	20	22.7	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	25	21	19.3	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	5	5	0.0	No Limit
		EG005T: Antimony	7440-36-0	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	7	6	21.8	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	14	13	9.4	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	13	8	49.6	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005T: Total Metals by ICP-AES (QC Lot: 1077448) - continued									
EB0913021-012	TP3-1-0.3m	EG005T: Manganese	7439-96-5	5	mg/kg	1690	1070	# 45.3	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	64	46	33.7	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	10	8	21.1	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	4980	4520	9.6	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	24800	15600	# 45.3	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 1077452)									
EB0913021-033	NEW_TP2-2-1.5m	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	30	50	42.3	No Limit
		EG005T: Titanium	7440-32-6	10	mg/kg	80	80	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	31	30	0.0	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	2	0.0	No Limit
		EG005T: Antimony	7440-36-0	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	26	25	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	37	41	10.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	7	5	23.6	No Limit
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	135	143	5.7	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	4500	4900	8.4	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	40800	42900	4.9	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 1077450)									
EB0913021-001	CPT4 1-0m-1m	EG020X-T: Uranium	7440-61-1	0.1	mg/kg	1.0	1.2	10.8	0% - 50%
EB0913021-012	TP3-1-0.3m	EG020X-T: Uranium	7440-61-1	0.1	mg/kg	0.9	0.9	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1077451)									
EB0913021-012	TP3-1-0.3m	EG020V-T: Tungsten	7440-33-7	0.01	mg/kg	<0.05	<0.05	0.0	No Limit
EB0913021-032	NEW_TP2-1-0.5m	EG020V-T: Tungsten	7440-33-7	0.01	mg/kg	<0.05	<0.05	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1077454)									
EB0913021-033	NEW_TP2-2-1.5m	EG020X-T: Uranium	7440-61-1	0.1	mg/kg	4.5	5.1	12.4	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1077449)									
EB0913021-001	CPT4 1-0m-1m	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EB0913021-012	TP3-1-0.3m	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1077453)									
EB0913021-033	NEW_TP2-2-1.5m	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EK059G: NOX as N by Discrete Analyser (QC Lot: 1074539)									

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK059G: NOX as N by Discrete Analyser (QC Lot: 1074539) - continued									
EB0913021-002	CPT4 2-1m-2m	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	159	174	8.9	0% - 20%
EB0913021-012	TP3-1-0.3m	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	46.7	31.6	38.6	0% - 20%
EK059G: NOX as N by Discrete Analyser (QC Lot: 1074544)									
EB0913021-034	NEW_TP2-3-3.5m	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	162	172	6.1	0% - 20%
EK061G: Total Kjeldahl Nitrogen as N (QC Lot: 1077803)									
EB0913021-001	CPT4 1-0m-1m	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	490	470	3.9	0% - 20%
EB0913021-013	TP3 2-1.5m	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	130	190	35.2	No Limit
EK061G: Total Kjeldahl Nitrogen as N (QC Lot: 1077805)									
EB0913021-033	NEW_TP2-2-1.5m	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	210	240	16.3	0% - 50%
EB0913223-009	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	Anonymous	Anonymous	Anonymous	Anonymous
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1077804)									
EB0913021-001	CPT4 1-0m-1m	EK067G: Total Phosphorus as P	----	2	mg/kg	394	340	14.8	0% - 20%
EB0913021-013	TP3 2-1.5m	EK067G: Total Phosphorus as P	----	2	mg/kg	105	71	# 38.4	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1077806)									
EB0913021-033	NEW_TP2-2-1.5m	EK067G: Total Phosphorus as P	----	2	mg/kg	397	431	8.3	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005W: Water Leachable Metals by ICPAES (QC Lot: 1077064)									
EB0913021-001	CPT4 1-0m-1m	EG005W: Cadmium	7440-43-9	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG005W: Antimony	7440-36-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Arsenic	7440-38-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Beryllium	7440-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Chromium	7440-47-3	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Cobalt	7440-48-4	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Copper	7440-50-8	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Manganese	7439-96-5	0.01	mg/L	0.01	<0.01	0.0	No Limit
		EG005W: Nickel	7440-02-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Titanium	7440-32-6	0.01	mg/L	0.01	0.01	0.0	No Limit
		EG005W: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Zinc	7440-66-6	0.01	mg/L	0.84	0.87	3.3	0% - 20%
		EG005W: Iron	7439-89-6	0.05	mg/L	0.18	0.17	0.0	No Limit
		EG005W: Barium	7440-39-3	0.1	mg/L	0.5	0.5	0.0	No Limit
		EG005W: Boron	7440-42-8	0.1	mg/L	1.3	1.3	0.0	0% - 50%
		EG005W: Aluminium	7429-90-5	0.10	mg/L	0.27	0.27	0.0	No Limit
EB0913021-013	TP3 2-1.5m	EG005W: Cadmium	7440-43-9	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG005W: Antimony	7440-36-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Arsenic	7440-38-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005W: Water Leachable Metals by ICPAES (QC Lot: 1077064) - continued									
EB0913021-013	TP3 2-1.5m	EG005W: Beryllium	7440-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Chromium	7440-47-3	0.01	mg/L	0.03	0.03	0.0	No Limit
		EG005W: Cobalt	7440-48-4	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Copper	7440-50-8	0.01	mg/L	0.04	0.04	0.0	No Limit
		EG005W: Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Manganese	7439-96-5	0.01	mg/L	0.03	0.02	0.0	No Limit
		EG005W: Nickel	7440-02-0	0.01	mg/L	0.02	0.02	0.0	No Limit
		EG005W: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Titanium	7440-32-6	0.01	mg/L	0.08	0.06	34.4	No Limit
		EG005W: Vanadium	7440-62-2	0.01	mg/L	0.04	0.04	0.0	No Limit
		EG005W: Zinc	7440-66-6	0.01	mg/L	3.18	3.19	0.4	0% - 20%
		EG005W: Iron	7439-89-6	0.05	mg/L	22.3	19.8	12.0	0% - 20%
		EG005W: Barium	7440-39-3	0.1	mg/L	2.6	2.6	0.0	0% - 20%
		EG005W: Boron	7440-42-8	0.1	mg/L	2.3	2.4	0.0	0% - 20%
		EG005W: Aluminium	7429-90-5	0.10	mg/L	10.9	9.83	10.0	0% - 20%
EG005W: Water Leachable Metals by ICPAES (QC Lot: 1077067)									
EB0913021-033	NEW_TP2-2-1.5m	EG005W: Cadmium	7440-43-9	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG005W: Antimony	7440-36-0	0.01	mg/L	0.02	<0.01	76.9	No Limit
		EG005W: Arsenic	7440-38-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Beryllium	7440-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Chromium	7440-47-3	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Cobalt	7440-48-4	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Copper	7440-50-8	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Manganese	7439-96-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Nickel	7440-02-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG005W: Zinc	7440-66-6	0.01	mg/L	0.14	0.12	9.2	0% - 50%
		EG005W: Iron	7439-89-6	0.05	mg/L	0.08	<0.05	51.9	No Limit
		EG005W: Barium	7440-39-3	0.1	mg/L	0.3	0.3	0.0	No Limit
		EG005W: Boron	7440-42-8	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005W: Aluminium	7429-90-5	0.10	mg/L	<0.10	<0.10	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1077066)									
EB0913021-001	CPT4 1-0m-1m	EG020E-W: Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EB0913021-013	TP3 2-1.5m	EG020E-W: Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1077069)									
EB0913021-033	NEW_TP2-2-1.5m	EG020E-W: Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1077101)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 1077101) - continued									
EB0912792-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Antimony	7440-36-0	0.001	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Beryllium	7440-41-7	0.001	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Barium	7440-39-3	0.001	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Copper	7440-50-8	0.001	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Lead	7439-92-1	0.001	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Boron	7440-42-8	0.05	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Iron	7439-89-6	0.05	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
EG020T: Total Metals by ICP-MS (QC Lot: 1077102)									
EB0912792-001	Anonymous	EG020B-T: Uranium	7440-61-1	0.001	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
		EG020B-T: Titanium	7440-32-6	0.01	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
EG020T: Total Metals by ICP-MS (QC Lot: 1077104)									
EB0913021-035	RINSATE WATER	EG020E-T: Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG020W: Water Leachable Metals by ICP-MS (QC Lot: 1077065)									
EB0913021-001	CPT4 1-0m-1m	EG020B-W: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EB0913021-013	TP3 2-1.5m	EG020B-W: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG020W: Water Leachable Metals by ICP-MS (QC Lot: 1077068)									
EB0913021-033	NEW_TP2-2-1.5m	EG020B-W: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1077583)									
EB0913021-035	RINSATE WATER	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EB0913122-003	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	Anonymous	Anonymous	Anonymous	Anonymous
EG035W: Water Leachable Mercury by FIMS (QC Lot: 1077060)									
EB0913021-001	CPT4 1-0m-1m	EG035W: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EB0913021-013	TP3 2-1.5m	EG035W: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035W: Water Leachable Mercury by FIMS (QC Lot: 1077061)									
EB0913021-033	NEW_TP2-2-1.5m	EG035W: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA033-A: Actual Acidity (QCLot: 1077729)								
EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-A: Actual Acidity (QCLot: 1077730)								
EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-B: Potential Acidity (QCLot: 1077729)								
EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	----	----	----	----
EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----
EA033-B: Potential Acidity (QCLot: 1077730)								
EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	----	----	----	----
EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----
EA033-C: Acid Neutralising Capacity (QCLot: 1077729)								
EA033: Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	<0.01	----	----	----	----
EA033: acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	<10	----	----	----	----
EA033: sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	<0.01	----	----	----	----
EA033-D: Retained Acidity (QCLot: 1077729)								
EA033: Net Acid Soluble Sulfur (20Je)	----	0.02	% S	<0.02	----	----	----	----
EA033: acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	<10	----	----	----	----
EA033: sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----
EA033: HCl Extractable Sulfur (20Be)	----	0.02	% S	<0.02	----	----	----	----
EA033-D: Retained Acidity (QCLot: 1077730)								
EA033: Net Acid Soluble Sulfur (20Je)	----	0.02	% S	<0.02	----	----	----	----
EA033: acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	<10	----	----	----	----
EA033: sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----
EA033: HCl Extractable Sulfur (20Be)	----	0.02	% S	<0.02	----	----	----	----
ED037: Alkalinity (QCLot: 1074538)								
ED037: Total Alkalinity as CaCO3	----	1	meq/kg	<1	500 meq/kg	94.4	84	108
ED037: Alkalinity (QCLot: 1074543)								
ED037: Total Alkalinity as CaCO3	----	1	meq/kg	<1	500. meq/kg	94.4	84	108
ED040S: Soluble Major Anions (QCLot: 1074536)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	238 mg/kg	106	70	130

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
ED040S: Soluble Major Anions (QCLot: 1074541)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	238 mg/kg	109	70	130
ED045: Chloride (QCLot: 1074535)								
EDO45S: Chloride	16887-00-6	10	mg/kg	<10	400 mg/kg	110	86	114
ED045: Chloride (QCLot: 1074540)								
EDO45S: Chloride	16887-00-6	10	mg/kg	<10	400 mg/kg	110	86	114
ED093S: Soluble Major Cations (QCLot: 1074537)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	----	----	----	----
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	----	----	----	----
ED093S: Sodium	7440-23-5	10	mg/kg	<10	----	----	----	----
ED093S: Potassium	7440-09-7	10	mg/kg	<10	----	----	----	----
ED093S: Soluble Major Cations (QCLot: 1074542)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	----	----	----	----
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	----	----	----	----
ED093S: Sodium	7440-23-5	10	mg/kg	<10	----	----	----	----
ED093S: Potassium	7440-09-7	10	mg/kg	<10	----	----	----	----
EG005T: Total Metals by ICP-AES (QCLot: 1077448)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005T: Antimony	7440-36-0	5	mg/kg	<5	----	----	----	----
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	13.8 mg/kg	104	78	124
EG005T: Barium	7440-39-3	10	mg/kg	<10	143 mg/kg	111	84	120
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	----	----	----	----
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	2.82 mg/kg	99.5	77	117
EG005T: Chromium	7440-47-3	2	mg/kg	<2	61.6 mg/kg	103	83	119
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	----	----	----	----
EG005T: Copper	7440-50-8	5	mg/kg	<5	54.7 mg/kg	102	82	122
EG005T: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG005T: Lead	7439-92-1	5	mg/kg	<5	55.5 mg/kg	96.3	83	117
EG005T: Manganese	7439-96-5	5	mg/kg	<5	----	----	----	----
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.1 mg/kg	97.3	83	121
EG005T: Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	----	----	----	----
EG005T: Zinc	7440-66-6	5	mg/kg	<5	105 mg/kg	100	82	120
EG005T: Titanium	7440-32-6	10	mg/kg	<10	----	----	----	----
EG005T: Total Metals by ICP-AES (QCLot: 1077452)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005T: Antimony	7440-36-0	5	mg/kg	<5	----	----	----	----
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	13.8 mg/kg	109	78	124

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1077452) - continued								
EG005T: Barium	7440-39-3	10	mg/kg	<10	143 mg/kg	118	84	120
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	----	----	----	----
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	2.82 mg/kg	106	77	117
EG005T: Chromium	7440-47-3	2	mg/kg	<2	61.6 mg/kg	110	83	119
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	----	----	----	----
EG005T: Copper	7440-50-8	5	mg/kg	<5	54.7 mg/kg	109	82	122
EG005T: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG005T: Lead	7439-92-1	5	mg/kg	<5	55.5 mg/kg	101	83	117
EG005T: Manganese	7439-96-5	5	mg/kg	<5	----	----	----	----
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.1 mg/kg	105	83	121
EG005T: Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	----	----	----	----
EG005T: Zinc	7440-66-6	5	mg/kg	<5	105 mg/kg	107	82	120
EG005T: Titanium	7440-32-6	10	mg/kg	<10	----	----	----	----
EG020T: Total Metals by ICP-MS (QCLot: 1077450)								
EG020X-T: Uranium	7440-61-1	0.1	mg/kg	<0.1	----	----	----	----
EG020T: Total Metals by ICP-MS (QCLot: 1077451)								
EG020V-T: Tungsten	7440-33-7	0.01	mg/kg	<0.05	----	----	----	----
EG020T: Total Metals by ICP-MS (QCLot: 1077454)								
EG020X-T: Uranium	7440-61-1	0.1	mg/kg	<0.1	----	----	----	----
EG020T: Total Metals by ICP-MS (QCLot: 1077455)								
EG020V-T: Tungsten	7440-33-7	0.01	mg/kg	<0.05	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1077449)								
EG035T: Mercury	7439-97-6	0.10	mg/kg	<0.1	1.34 mg/kg	108	73	119
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1077453)								
EG035T: Mercury	7439-97-6	0.10	mg/kg	<0.1	1.34 mg/kg	113	73	119
EK059G: NOX as N by Discrete Analyser (QCLot: 1074539)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.86 mg/kg	70.1	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1074544)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.86 mg/kg	70.1	70	130
EK061G: Total Kjeldahl Nitrogen as N (QCLot: 1077803)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	373 mg/kg	119	70	130
EK061G: Total Kjeldahl Nitrogen as N (QCLot: 1077805)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	373 mg/kg	118	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1077804)								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	75 mg/kg	114	70	130

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1077806)								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	75 mg/kg	99.9	70	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005W: Water Leachable Metals by ICPAES (QCLot: 1077064)								
EG005W: Aluminium	7429-90-5	0.1	mg/L	<0.10	----	----	----	----
EG005W: Antimony	7440-36-0	0.01	mg/L	<0.01	----	----	----	----
EG005W: Arsenic	7440-38-2	0.01	mg/L	<0.01	0.100 mg/L	120	79	121
EG005W: Barium	7440-39-3	0.1	mg/L	<0.1	0.5 mg/L	108	70	117
EG005W: Beryllium	7440-41-7	0.01	mg/L	<0.01	----	----	----	----
EG005W: Boron	7440-42-8	0.1	mg/L	<0.1	----	----	----	----
EG005W: Cadmium	7440-43-9	0.005	mg/L	<0.005	0.100 mg/L	102	83	111
EG005W: Chromium	7440-47-3	0.01	mg/L	<0.01	0.100 mg/L	104	81	111
EG005W: Cobalt	7440-48-4	0.01	mg/L	<0.01	0.100 mg/L	98.1	84.3	114
EG005W: Copper	7440-50-8	0.01	mg/L	<0.01	0.200 mg/L	99.0	82	112
EG005W: Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----
EG005W: Lead	7439-92-1	0.01	mg/L	<0.01	0.100 mg/L	98.4	77	111
EG005W: Manganese	7439-96-5	0.01	mg/L	<0.01	0.100 mg/L	93.5	76	121
EG005W: Nickel	7440-02-0	0.01	mg/L	<0.01	0.100 mg/L	97.3	76	110
EG005W: Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
EG005W: Titanium	7440-32-6	0.01	mg/L	<0.01	----	----	----	----
EG005W: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.100 mg/L	101	82	110
EG005W: Zinc	7440-66-6	0.01	mg/L	<0.01	0.200 mg/L	103	72	122
EG005W: Water Leachable Metals by ICPAES (QCLot: 1077067)								
EG005W: Aluminium	7429-90-5	0.1	mg/L	<0.10	----	----	----	----
EG005W: Antimony	7440-36-0	0.01	mg/L	<0.01	----	----	----	----
EG005W: Arsenic	7440-38-2	0.01	mg/L	<0.01	0.100 mg/L	# 129	79	121
EG005W: Barium	7440-39-3	0.1	mg/L	<0.1	0.5 mg/L	110	70	117
EG005W: Beryllium	7440-41-7	0.01	mg/L	<0.01	----	----	----	----
EG005W: Boron	7440-42-8	0.1	mg/L	<0.1	----	----	----	----
EG005W: Cadmium	7440-43-9	0.005	mg/L	<0.005	0.100 mg/L	105	83	111
EG005W: Chromium	7440-47-3	0.01	mg/L	<0.01	0.100 mg/L	108	81	111
EG005W: Cobalt	7440-48-4	0.01	mg/L	<0.01	0.100 mg/L	87.9	84.3	114
EG005W: Copper	7440-50-8	0.01	mg/L	<0.01	0.200 mg/L	102	82	112
EG005W: Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----
EG005W: Lead	7439-92-1	0.01	mg/L	<0.01	0.100 mg/L	99.4	77	111
EG005W: Manganese	7439-96-5	0.01	mg/L	<0.01	0.100 mg/L	116	76	121
EG005W: Nickel	7440-02-0	0.01	mg/L	<0.01	0.100 mg/L	97.3	76	110
EG005W: Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG005W: Water Leachable Metals by ICPAES (QCLot: 1077067) - continued								
EG005W: Titanium	7440-32-6	0.01	mg/L	<0.01	----	----	----	----
EG005W: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.100 mg/L	102	82	110
EG005W: Zinc	7440-66-6	0.01	mg/L	<0.01	0.200 mg/L	109	72	122
EG020T: Total Metals by ICP-MS (QCLot: 1077066)								
EG020E-W: Tungsten	7440-33-7	0.001	mg/L	<0.001	----	----	----	----
EG020T: Total Metals by ICP-MS (QCLot: 1077069)								
EG020E-W: Tungsten	7440-33-7	0.001	mg/L	<0.001	----	----	----	----
EG020T: Total Metals by ICP-MS (QCLot: 1077101)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.500 mg/L	111	70	128
EG020A-T: Antimony	7440-36-0	0.001	mg/L	<0.001	0.100 mg/L	102	84	114
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.100 mg/L	102	76	120
EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.100 mg/L	119	79	130
EG020A-T: Barium	7440-39-3	0.001	mg/L	<0.001	----	----	----	----
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.100 mg/L	105	84	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.100 mg/L	110	82	124
EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.100 mg/L	112	82	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.200 mg/L	108	82	116
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.100 mg/L	106	85	113
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.100 mg/L	116	79	121
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.100 mg/L	110	81	117
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.100 mg/L	110	73	117
EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.100 mg/L	107	76	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.200 mg/L	107	81	123
EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	0.500 mg/L	124	70	129
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.500 mg/L	129	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1077102)								
EG020B-T: Titanium	7440-32-6	0.01	mg/L	<0.01	0.100 mg/L	113	72	124
EG020B-T: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG020T: Total Metals by ICP-MS (QCLot: 1077104)								
EG020E-T: Tungsten	7440-33-7	0.001	mg/L	<0.001	----	----	----	----
EG020W: Water Leachable Metals by ICP-MS (QCLot: 1077065)								
EG020B-W: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG020W: Water Leachable Metals by ICP-MS (QCLot: 1077068)								
EG020B-W: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1077583)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.0100 mg/L	103	80	116
EG035W: Water Leachable Mercury by FIMS (QCLot: 1077060)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG035W: Water Leachable Mercury by FIMS (QCLot: 1077060) - continued								
EG035W: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	102	81	117
EG035W: Water Leachable Mercury by FIMS (QCLot: 1077061)								
EG035W: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	103	81	117

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045: Chloride (QCLot: 1074535)							
EB0913021-001	CPT4 1-0m-1m	EDO45S: Chloride	16887-00-6	20000 mg/kg	95.6	70	130
ED045: Chloride (QCLot: 1074540)							
EB0913021-033	NEW_TP2-2-1.5m	EDO45S: Chloride	16887-00-6	1000 mg/kg	120	70	130
EG005T: Total Metals by ICP-AES (QCLot: 1077448)							
EB0913021-002	CPT4 2-1m-2m	EG005T: Arsenic	7440-38-2	50 mg/kg	85.2	70	130
		EG005T: Barium	7440-39-3	50 mg/kg	108	70	130
		EG005T: Beryllium	7440-41-7	5 mg/kg	109	70	130
		EG005T: Cadmium	7440-43-9	25 mg/kg	99.1	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	100	70	130
		EG005T: Cobalt	7440-48-4	50 mg/kg	# 61.3	70	130
		EG005T: Copper	7440-50-8	50 mg/kg	98.0	70	130
		EG005T: Lead	7439-92-1	50 mg/kg	98.4	70	130
		EG005T: Manganese	7439-96-5	50 mg/kg	# 58.0	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	88.6	70	130
		EG005T: Vanadium	7440-62-2	50 mg/kg	# 31.1	70	130
		EG005T: Zinc	7440-66-6	50 mg/kg	93.4	70	130
EG005T: Total Metals by ICP-AES (QCLot: 1077452)							
EB0913021-034	NEW_TP2-3-3.5m	EG005T: Arsenic	7440-38-2	50 mg/kg	89.9	70	130
		EG005T: Barium	7440-39-3	50 mg/kg	116	70	130
		EG005T: Beryllium	7440-41-7	5 mg/kg	114	70	130
		EG005T: Cadmium	7440-43-9	25 mg/kg	103	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	95.1	70	130
		EG005T: Cobalt	7440-48-4	50 mg/kg	103	70	130
		EG005T: Copper	7440-50-8	50 mg/kg	82.2	70	130
		EG005T: Lead	7439-92-1	50 mg/kg	103	70	130
		EG005T: Manganese	7439-96-5	50 mg/kg	99.8	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	101	70	130
		EG005T: Vanadium	7440-62-2	50 mg/kg	# 37.6	70	130
		EG005T: Zinc	7440-66-6	50 mg/kg	102	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1077449)							
EB0913021-002	CPT4 2-1m-2m	EG035T: Mercury	7439-97-6	5.0 mg/kg	104	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1077453)							
EB0913021-034	NEW_TP2-3-3.5m	EG035T: Mercury	7439-97-6	5.0 mg/kg	103	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1074539)							

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Spike Recovery (%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EK059G: NOX as N by Discrete Analyser (QCLot: 1074539) - continued							
EB0913021-001	CPT4 1-0m-1m	EK059G: Nitrite + Nitrate as N (Sol.)	----	50.0 mg/kg	74.0	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1074544)							
EB0913021-033	NEW_TP2-2-1.5m	EK059G: Nitrite + Nitrate as N (Sol.)	----	2.0 mg/kg	88.8	70	130
EK061G: Total Kjeldahl Nitrogen as N (QCLot: 1077803)							
EB0913021-002	CPT4 2-1m-2m	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	91.6	70	130
EK061G: Total Kjeldahl Nitrogen as N (QCLot: 1077805)							
EB0913021-034	NEW_TP2-3-3.5m	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	81.5	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1077804)							
EB0913021-002	CPT4 2-1m-2m	EK067G: Total Phosphorus as P	----	100 mg/kg	73.2	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1077806)							
EB0913021-034	NEW_TP2-3-3.5m	EK067G: Total Phosphorus as P	----	100 mg/kg	# 46.4	70	130

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Spike Recovery (%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005W: Water Leachable Metals by ICPAES (QCLot: 1077064)							
EB0913021-002	CPT4 2-1m-2m	EG005W: Arsenic	7440-38-2	1.0 mg/L	113	70	130
		EG005W: Barium	7440-39-3	1.0 mg/L	105	70	130
		EG005W: Cadmium	7440-43-9	0.50 mg/L	103	70	130
		EG005W: Chromium	7440-47-3	1.0 mg/L	109	70	130
		EG005W: Cobalt	7440-48-4	1.0 mg/L	101	70	130
		EG005W: Copper	7440-50-8	1.0 mg/L	102	70	130
		EG005W: Lead	7439-92-1	1.0 mg/L	101	70	130
		EG005W: Manganese	7439-96-5	1.0 mg/L	99.9	70	130
		EG005W: Nickel	7440-02-0	1.0 mg/L	101	70	130
		EG005W: Vanadium	7440-62-2	1.0 mg/L	100	70	130
		EG005W: Zinc	7440-66-6	1.0 mg/L	104	70	130
EG005W: Water Leachable Metals by ICPAES (QCLot: 1077067)							
EB0913021-034	NEW_TP2-3-3.5m	EG005W: Arsenic	7440-38-2	1.0 mg/L	107	70	130
		EG005W: Barium	7440-39-3	1.0 mg/L	104	70	130
		EG005W: Cadmium	7440-43-9	0.50 mg/L	99.8	70	130
		EG005W: Chromium	7440-47-3	1.0 mg/L	105	70	130
		EG005W: Cobalt	7440-48-4	1.0 mg/L	98.9	70	130
		EG005W: Copper	7440-50-8	1.0 mg/L	97.8	70	130
		EG005W: Lead	7439-92-1	1.0 mg/L	98.2	70	130
		EG005W: Manganese	7439-96-5	1.0 mg/L	99.1	70	130
		EG005W: Nickel	7440-02-0	1.0 mg/L	98.5	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005W: Water Leachable Metals by ICPAES (QCLot: 1077067) - continued							
EB0913021-034	NEW_TP2-3-3.5m	EG005W: Vanadium	7440-62-2	1.0 mg/L	94.2	70	130
		EG005W: Zinc	7440-66-6	1.0 mg/L	101	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1077101)							
EB0912792-002	Anonymous	EG020A-T: Arsenic	7440-38-2	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Beryllium	7440-41-7	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Barium	7440-39-3	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Cadmium	7440-43-9	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Chromium	7440-47-3	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Cobalt	7440-48-4	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Copper	7440-50-8	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Lead	7439-92-1	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Manganese	7439-96-5	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Nickel	7440-02-0	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Vanadium	7440-62-2	Anonymous	Anonymous	Anonymous	Anonymous
		EG020A-T: Zinc	7440-66-6	Anonymous	Anonymous	Anonymous	Anonymous
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1077583)							
EB0913041-011	Anonymous	EG035T: Mercury	7439-97-6	Anonymous	Anonymous	Anonymous	Anonymous
EG035W: Water Leachable Mercury by FIMS (QCLot: 1077060)							
EB0913021-002	CPT4 2-1m-2m	EG035W: Mercury	7439-97-6	0.010 mg/L	103	70	130
EG035W: Water Leachable Mercury by FIMS (QCLot: 1077061)							
EB0913021-034	NEW_TP2-3-3.5m	EG035W: Mercury	7439-97-6	0.010 mg/L	102	70	130

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EB0913021**	Page	: 1 of 23
Amendment	: **2**		
Client	: SANTOS LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR JULIAN DOBOS	Contact	: Tim Kilmister
Address	: GPO BOX 302 BRISBANE QLD, AUSTRALIA 4000	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: julian_dobos@urscorp.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32432111	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 4262 6447	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Curtis Is Gladstone		
C-O-C number	: 134256-58	Date Samples Received	: 19-AUG-2009
Sampler	: Jerry Wang	Issue Date	: 12-OCT-2009
Order number	: A2280		
		No. of samples received	: 35
Quote number	: BN/356/09	No. of samples analysed	: 35

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non -volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA003 :pH (field/fox)								
Snap Lock Bag - frozen								
CPT4 1-0m-1m,	CPT4 2-1m-2m,	**14-AUG-2009**	**----**	----	----	**20-AUG-2009**	14-AUG-2010	✓
CPT4 3-2m-3m								
Snap Lock Bag - frozen								
CPT4b 1-1.0m-2.0m,	CPT4b 2-3m-4m,	**15-AUG-2009**	**----**	----	----	**20-AUG-2009**	15-AUG-2010	✓
CPT2 1-1.0m-2.0m,	CPT2 2-3.0m-3.5m,							
CPT1 1-0-1.5m,	CPT1 2-1.5-2.5m							
Snap Lock Bag - frozen								
TP2-1-0.3m,	TP2-2-2.5m,	**16-AUG-2009**	**----**	----	----	**20-AUG-2009**	16-AUG-2010	✓
TP3-1-0.3m,	TP3 2-1.5m,							
TP3 3-3mm,	TP4 1-0.3m,							
TP4 2-2.5m,	TP4 3-3.5m,							
TP5 1-0.5m,	TP5 2-3m,							
TP8 1-0.3m,	TP8 2-1m,							
TP8 3-3.5m,	TP11 1-0.3m,							
TP11 2-1m,	TP11 3-3.5m,							
TP10 1-0.5m,	TP10 2-2.5m,							
TP9 1-0.3m,	TP9 2-2m							
Snap Lock Bag - frozen								
TP6 1-0.5m,	TP6 2-2.5m,	**17-AUG-2009**	**----**	----	----	**20-AUG-2009**	17-AUG-2010	✓
NEW_TP2-1-0.5m,	NEW_TP2-2-1.5m,							
NEW_TP2-3-3.5m								

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-A: Actual Acidity							
Snap Lock Bag - frozen							
CPT4 1-0m-1m, CPT4 2-1m-2m, CPT4 3-2m-3m	**14-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
Snap Lock Bag - frozen							
CPT4b 1-1.0m-2.0m, CPT4b 2-3m-4m, CPT2 1-1.0m-2.0m, CPT2 2-3.0m-3.5m, CPT1 1-0-1.5m, CPT1 2-1.5-2.5m	**15-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
Snap Lock Bag - frozen							
TP2-1-0.3m, TP2-2-2.5m, TP3-1-0.3m, TP3 2-1.5m, TP3 3-3mm, TP4 1-0.3m, TP4 2-2.5m, TP4 3-3.5m, TP5 1-0.5m, TP5 2-3m, TP8 1-0.3m, TP8 2-1m, TP8 3-3.5m, TP11 1-0.3m, TP11 2-1m, TP11 3-3.5m, TP10 1-0.5m, TP10 2-2.5m, TP9 1-0.3m, TP9 2-2m	**16-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
Snap Lock Bag - frozen							
TP6 1-0.5m, TP6 2-2.5m, NEW_TP2-1-0.5m, NEW_TP2-2-1.5m, NEW_TP2-3-3.5m	**17-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-B: Potential Acidity								
Snap Lock Bag - frozen								
CPT4 1-0m-1m,	CPT4 2-1m-2m,	**14-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
CPT4 3-2m-3m								
Snap Lock Bag - frozen								
CPT4b 1-1.0m-2.0m,	CPT4b 2-3m-4m,	**15-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
CPT2 1-1.0m-2.0m,	CPT2 2-3.0m-3.5m,							
CPT1 1-0-1.5m,	CPT1 2-1.5-2.5m							
Snap Lock Bag - frozen								
TP2-1-0.3m,	TP2-2-2.5m,	**16-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
TP3-1-0.3m,	TP3 2-1.5m,							
TP3 3-3mm,	TP4 1-0.3m,							
TP4 2-2.5m,	TP4 3-3.5m,							
TP5 1-0.5m,	TP5 2-3m,							
TP8 1-0.3m,	TP8 2-1m,							
TP8 3-3.5m,	TP11 1-0.3m,							
TP11 2-1m,	TP11 3-3.5m,							
TP10 1-0.5m,	TP10 2-2.5m,							
TP9 1-0.3m,	TP9 2-2m							
Snap Lock Bag - frozen								
TP6 1-0.5m,	TP6 2-2.5m,	**17-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
NEW_TP2-1-0.5m,	NEW_TP2-2-1.5m,							
NEW_TP2-3-3.5m								

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-C: Acid Neutralising Capacity								
Snap Lock Bag - frozen								
CPT4 1-0m-1m,	CPT4 2-1m-2m,	**14-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
CPT4 3-2m-3m								
Snap Lock Bag - frozen								
CPT4b 1-1.0m-2.0m,	CPT4b 2-3m-4m,	**15-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
CPT2 1-1.0m-2.0m,	CPT2 2-3.0m-3.5m,							
CPT1 1-0-1.5m,	CPT1 2-1.5-2.5m							
Snap Lock Bag - frozen								
TP2-1-0.3m,	TP2-2-2.5m,	**16-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
TP3-1-0.3m,	TP3 2-1.5m,							
TP3 3-3mm,	TP4 1-0.3m,							
TP4 2-2.5m,	TP4 3-3.5m,							
TP5 1-0.5m,	TP5 2-3m,							
TP8 1-0.3m,	TP8 2-1m,							
TP8 3-3.5m,	TP11 1-0.3m,							
TP11 2-1m,	TP11 3-3.5m,							
TP10 1-0.5m,	TP10 2-2.5m,							
TP9 1-0.3m,	TP9 2-2m							
Snap Lock Bag - frozen								
TP6 1-0.5m,	TP6 2-2.5m,	**17-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
NEW_TP2-1-0.5m,	NEW_TP2-2-1.5m,							
NEW_TP2-3-3.5m								

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-D: Retained Acidity							
Snap Lock Bag - frozen							
CPT4 1-0m-1m, CPT4 2-1m-2m, CPT4 3-2m-3m	**14-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
Snap Lock Bag - frozen							
CPT4b 1-1.0m-2.0m, CPT4b 2-3m-4m, CPT2 1-1.0m-2.0m, CPT2 2-3.0m-3.5m, CPT1 1-0-1.5m, CPT1 2-1.5-2.5m	**15-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
Snap Lock Bag - frozen							
TP2-1-0.3m, TP2-2-2.5m, TP3-1-0.3m, TP3 2-1.5m, TP3 3-3mm, TP4 1-0.3m, TP4 2-2.5m, TP4 3-3.5m, TP5 1-0.5m, TP5 2-3m, TP8 1-0.3m, TP8 2-1m, TP8 3-3.5m, TP11 1-0.3m, TP11 2-1m, TP11 3-3.5m, TP10 1-0.5m, TP10 2-2.5m, TP9 1-0.3m, TP9 2-2m	**16-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
Snap Lock Bag - frozen							
TP6 1-0.5m, TP6 2-2.5m, NEW_TP2-1-0.5m, NEW_TP2-2-1.5m, NEW_TP2-3-3.5m	**17-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-E: Acid Base Accounting								
Snap Lock Bag - frozen								
CPT4 1-0m-1m,	CPT4 2-1m-2m,	**14-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
CPT4 3-2m-3m								
Snap Lock Bag - frozen								
CPT4b 1-1.0m-2.0m,	CPT4b 2-3m-4m,	**15-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
CPT2 1-1.0m-2.0m,	CPT2 2-3.0m-3.5m,							
CPT1 1-0-1.5m,	CPT1 2-1.5-2.5m							
Snap Lock Bag - frozen								
TP2-1-0.3m,	TP2-2-2.5m,	**16-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
TP3-1-0.3m,	TP3 2-1.5m,							
TP3 3-3mm,	TP4 1-0.3m,							
TP4 2-2.5m,	TP4 3-3.5m,							
TP5 1-0.5m,	TP5 2-3m,							
TP8 1-0.3m,	TP8 2-1m,							
TP8 3-3.5m,	TP11 1-0.3m,							
TP11 2-1m,	TP11 3-3.5m,							
TP10 1-0.5m,	TP10 2-2.5m,							
TP9 1-0.3m,	TP9 2-2m							
Snap Lock Bag - frozen								
TP6 1-0.5m,	TP6 2-2.5m,	**17-AUG-2009**	**19-AUG-2009**	---	----	**25-AUG-2009**	22-NOV-2009	✓
NEW_TP2-1-0.5m,	NEW_TP2-2-1.5m,							
NEW_TP2-3-3.5m								
EA055: Moisture Content								
Soil Glass Jar - Unpreserved								
CPT4 1-0m-1m,	CPT4 2-1m-2m,	**14-AUG-2009**	**----**	----	----	**20-AUG-2009**	21-AUG-2009	✓
CPT4 3-2m-3m								
Soil Glass Jar - Unpreserved								
CPT4b 1-1.0m-2.0m,	CPT4b 2-3m-4m,	**15-AUG-2009**	**----**	----	----	**20-AUG-2009**	22-AUG-2009	✓
CPT2 1-1.0m-2.0m,	CPT2 2-3.0m-3.5m,							
CPT1 1-0-1.5m,	CPT1 2-1.5-2.5m							
Soil Glass Jar - Unpreserved								
TP3-1-0.3m,	TP3 2-1.5m,	**16-AUG-2009**	**----**	----	----	**20-AUG-2009**	23-AUG-2009	✓
TP3 3-3mm,	TP8 1-0.3m,							
TP8 2-1m,	TP8 3-3.5m,							
TP9 1-0.3m,	TP9 2-2m							
Soil Glass Jar - Unpreserved								
TP6 1-0.5m,	TP6 2-2.5m,	**17-AUG-2009**	**----**	----	----	**20-AUG-2009**	24-AUG-2009	✓
NEW_TP2-1-0.5m,	NEW_TP2-2-1.5m,							
NEW_TP2-3-3.5m								

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037: Alkalinity							
Soil Glass Jar - Unpreserved							
CPT4 1-0m-1m, CPT4 2-1m-2m, CPT4 3-2m-3m	**14-AUG-2009**	**20-AUG-2009**	21-AUG-2009	✓	**21-AUG-2009**	10-FEB-2010	✓
Soil Glass Jar - Unpreserved							
CPT4b 1-1.0m-2.0m, CPT4b 2-3m-4m, CPT2 1-1.0m-2.0m, CPT2 2-3.0m-3.5m, CPT1 1-0-1.5m, CPT1 2-1.5-2.5m	**15-AUG-2009**	**20-AUG-2009**	22-AUG-2009	✓	**21-AUG-2009**	11-FEB-2010	✓
Soil Glass Jar - Unpreserved							
TP3-1-0.3m, TP3 2-1.5m, TP3 3-3mm, TP8 1-0.3m, TP8 2-1m, TP8 3-3.5m, TP9 1-0.3m, TP9 2-2m	**16-AUG-2009**	**20-AUG-2009**	23-AUG-2009	✓	**21-AUG-2009**	12-FEB-2010	✓
Soil Glass Jar - Unpreserved							
TP6 1-0.5m, TP6 2-2.5m, NEW_TP2-1-0.5m, NEW_TP2-2-1.5m, NEW_TP2-3-3.5m	**17-AUG-2009**	**20-AUG-2009**	24-AUG-2009	✓	**21-AUG-2009**	13-FEB-2010	✓
ED040S: Soluble Major Anions							
Soil Glass Jar - Unpreserved							
CPT4 1-0m-1m, CPT4 2-1m-2m, CPT4 3-2m-3m	**14-AUG-2009**	**20-AUG-2009**	21-AUG-2009	✓	**21-AUG-2009**	17-SEP-2009	✓
Soil Glass Jar - Unpreserved							
CPT4b 1-1.0m-2.0m, CPT4b 2-3m-4m, CPT2 1-1.0m-2.0m, CPT2 2-3.0m-3.5m, CPT1 1-0-1.5m, CPT1 2-1.5-2.5m	**15-AUG-2009**	**20-AUG-2009**	22-AUG-2009	✓	**21-AUG-2009**	17-SEP-2009	✓
Soil Glass Jar - Unpreserved							
TP3-1-0.3m, TP3 2-1.5m, TP3 3-3mm, TP8 1-0.3m, TP8 2-1m, TP8 3-3.5m, TP9 1-0.3m, TP9 2-2m	**16-AUG-2009**	**20-AUG-2009**	23-AUG-2009	✓	**21-AUG-2009**	17-SEP-2009	✓
Soil Glass Jar - Unpreserved							
TP6 1-0.5m, TP6 2-2.5m, NEW_TP2-1-0.5m, NEW_TP2-2-1.5m, NEW_TP2-3-3.5m	**17-AUG-2009**	**20-AUG-2009**	24-AUG-2009	✓	**21-AUG-2009**	17-SEP-2009	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED045: Chloride							
Soil Glass Jar - Unpreserved							
CPT4 1-0m-1m, CPT4 2-1m-2m, CPT4 3-2m-3m	**14-AUG-2009**	**20-AUG-2009**	21-AUG-2009	✓	**21-AUG-2009**	17-SEP-2009	✓
Soil Glass Jar - Unpreserved							
CPT4b 1-1.0m-2.0m, CPT4b 2-3m-4m, CPT2 1-1.0m-2.0m, CPT2 2-3.0m-3.5m, CPT1 1-0-1.5m, CPT1 2-1.5-2.5m	**15-AUG-2009**	**20-AUG-2009**	22-AUG-2009	✓	**21-AUG-2009**	17-SEP-2009	✓
Soil Glass Jar - Unpreserved							
TP3-1-0.3m, TP3 2-1.5m, TP3 3-3mm, TP8 1-0.3m, TP8 2-1m, TP8 3-3.5m, TP9 1-0.3m, TP9 2-2m	**16-AUG-2009**	**20-AUG-2009**	23-AUG-2009	✓	**21-AUG-2009**	17-SEP-2009	✓
Soil Glass Jar - Unpreserved							
TP6 1-0.5m, TP6 2-2.5m, NEW_TP2-1-0.5m, NEW_TP2-2-1.5m, NEW_TP2-3-3.5m	**17-AUG-2009**	**20-AUG-2009**	24-AUG-2009	✓	**21-AUG-2009**	17-SEP-2009	✓
ED093S: Soluble Major Cations							
Soil Glass Jar - Unpreserved							
CPT4 1-0m-1m, CPT4 2-1m-2m, CPT4 3-2m-3m	**14-AUG-2009**	**20-AUG-2009**	21-AUG-2009	✓	**21-AUG-2009**	10-FEB-2010	✓
Soil Glass Jar - Unpreserved							
CPT4b 1-1.0m-2.0m, CPT4b 2-3m-4m, CPT2 1-1.0m-2.0m, CPT2 2-3.0m-3.5m, CPT1 1-0-1.5m, CPT1 2-1.5-2.5m	**15-AUG-2009**	**20-AUG-2009**	22-AUG-2009	✓	**21-AUG-2009**	11-FEB-2010	✓
Soil Glass Jar - Unpreserved							
TP3-1-0.3m, TP3 2-1.5m, TP3 3-3mm, TP8 1-0.3m, TP8 2-1m, TP8 3-3.5m, TP9 1-0.3m, TP9 2-2m	**16-AUG-2009**	**20-AUG-2009**	23-AUG-2009	✓	**21-AUG-2009**	12-FEB-2010	✓
Soil Glass Jar - Unpreserved							
TP6 1-0.5m, TP6 2-2.5m, NEW_TP2-1-0.5m, NEW_TP2-2-1.5m, NEW_TP2-3-3.5m	**17-AUG-2009**	**20-AUG-2009**	24-AUG-2009	✓	**21-AUG-2009**	13-FEB-2010	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved								
CPT4 1-0m-1m,	CPT4 2-1m-2m,	**14-AUG-2009**	**25-AUG-2009**	11-SEP-2009	✓	**26-AUG-2009**	10-FEB-2010	✓
CPT4 3-2m-3m								
Soil Glass Jar - Unpreserved								
CPT4b 1-1.0m-2.0m,	CPT4b 2-3m-4m,	**15-AUG-2009**	**25-AUG-2009**	12-SEP-2009	✓	**26-AUG-2009**	11-FEB-2010	✓
CPT2 1-1.0m-2.0m,	CPT2 2-3.0m-3.5m,							
CPT1 1-0-1.5m,	CPT1 2-1.5-2.5m							
Soil Glass Jar - Unpreserved								
TP3-1-0.3m,	TP3 2-1.5m,	**16-AUG-2009**	**25-AUG-2009**	13-SEP-2009	✓	**26-AUG-2009**	12-FEB-2010	✓
TP3 3-3mm,	TP8 1-0.3m,							
TP8 2-1m,	TP8 3-3.5m,							
TP9 1-0.3m,	TP9 2-2m							
Soil Glass Jar - Unpreserved								
TP6 1-0.5m,	TP6 2-2.5m,	**17-AUG-2009**	**25-AUG-2009**	14-SEP-2009	✓	**26-AUG-2009**	13-FEB-2010	✓
NEW_TP2-1-0.5m,	NEW_TP2-2-1.5m,							
NEW_TP2-3-3.5m								
EG005W: Water Leachable Metals by ICPAES								
Clear Plastic Bottle - Nitric Acid; Unfiltered								
CPT4 1-0m-1m,	CPT4 2-1m-2m,	**21-AUG-2009**	**24-AUG-2009**	17-FEB-2010	✓	**24-AUG-2009**	17-FEB-2010	✓
CPT4 3-2m-3m,	CPT4b 1-1.0m-2.0m,							
CPT4b 2-3m-4m,	CPT2 1-1.0m-2.0m,							
CPT2 2-3.0m-3.5m,	CPT1 1-0-1.5m,							
CPT1 2-1.5-2.5m,	TP3-1-0.3m,							
TP3 2-1.5m,	TP3 3-3mm,							
TP8 1-0.3m,	TP8 2-1m,							
TP8 3-3.5m,	TP9 1-0.3m,							
TP9 2-2m,	TP6 1-0.5m,							
TP6 2-2.5m,	NEW_TP2-1-0.5m,							
NEW_TP2-2-1.5m,	NEW_TP2-3-3.5m							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered								
CPT4 1-0m-1m,	CPT4 2-1m-2m,	**21-AUG-2009**	**24-AUG-2009**	17-FEB-2010	✓	**24-AUG-2009**	17-FEB-2010	✓
CPT4 3-2m-3m,	CPT4b 1-1.0m-2.0m,							
CPT4b 2-3m-4m,	CPT2 1-1.0m-2.0m,							
CPT2 2-3.0m-3.5m,	CPT1 1-0-1.5m,							
CPT1 2-1.5-2.5m,	TP3-1-0.3m,							
TP3 2-1.5m,	TP3 3-3mm,							
TP8 1-0.3m,	TP8 2-1m,							
TP8 3-3.5m,	TP9 1-0.3m,							
TP9 2-2m,	TP6 1-0.5m,							
TP6 2-2.5m,	NEW_TP2-1-0.5m,							
NEW_TP2-2-1.5m,	NEW_TP2-3-3.5m							
Soil Glass Jar - Unpreserved								
CPT4 1-0m-1m,	CPT4 2-1m-2m,	**14-AUG-2009**	**25-AUG-2009**	11-SEP-2009	✓	**25-AUG-2009**	10-FEB-2010	✓
CPT4 3-2m-3m								
Soil Glass Jar - Unpreserved								
CPT4b 1-1.0m-2.0m,	CPT4b 2-3m-4m,	**15-AUG-2009**	**25-AUG-2009**	12-SEP-2009	✓	**25-AUG-2009**	11-FEB-2010	✓
CPT2 1-1.0m-2.0m,	CPT2 2-3.0m-3.5m,							
CPT1 1-0-1.5m,	CPT1 2-1.5-2.5m							
Soil Glass Jar - Unpreserved								
TP3-1-0.3m,	TP3 2-1.5m,	**16-AUG-2009**	**25-AUG-2009**	13-SEP-2009	✓	**25-AUG-2009**	12-FEB-2010	✓
TP3 3-3mm,	TP8 1-0.3m,							
TP8 2-1m,	TP8 3-3.5m,							
TP9 1-0.3m,	TP9 2-2m							
Soil Glass Jar - Unpreserved								
TP6 1-0.5m,	TP6 2-2.5m,	**17-AUG-2009**	**25-AUG-2009**	14-SEP-2009	✓	**25-AUG-2009**	13-FEB-2010	✓
NEW_TP2-1-0.5m,	NEW_TP2-2-1.5m,							
NEW_TP2-3-3.5m								
EG020W: Water Leachable Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered								
CPT4 1-0m-1m,	CPT4 2-1m-2m,	**21-AUG-2009**	**24-AUG-2009**	17-FEB-2010	✓	**24-AUG-2009**	17-FEB-2010	✓
CPT4 3-2m-3m,	CPT4b 1-1.0m-2.0m,							
CPT4b 2-3m-4m,	CPT2 1-1.0m-2.0m,							
CPT2 2-3.0m-3.5m,	CPT1 1-0-1.5m,							
CPT1 2-1.5-2.5m,	TP3-1-0.3m,							
TP3 2-1.5m,	TP3 3-3mm,							
TP8 1-0.3m,	TP8 2-1m,							
TP8 3-3.5m,	TP9 1-0.3m,							
TP9 2-2m,	TP6 1-0.5m,							
TP6 2-2.5m,	NEW_TP2-1-0.5m,							
NEW_TP2-2-1.5m,	NEW_TP2-3-3.5m							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved								
CPT4 1-0m-1m,	CPT4 2-1m-2m,	**14-AUG-2009**	**25-AUG-2009**	11-SEP-2009	✓	**26-AUG-2009**	11-SEP-2009	✓
CPT4 3-2m-3m								
Soil Glass Jar - Unpreserved								
CPT4b 1-1.0m-2.0m,	CPT4b 2-3m-4m,	**15-AUG-2009**	**25-AUG-2009**	12-SEP-2009	✓	**26-AUG-2009**	12-SEP-2009	✓
CPT2 1-1.0m-2.0m,	CPT2 2-3.0m-3.5m,							
CPT1 1-0-1.5m,	CPT1 2-1.5-2.5m							
Soil Glass Jar - Unpreserved								
TP3-1-0.3m,	TP3 2-1.5m,	**16-AUG-2009**	**25-AUG-2009**	13-SEP-2009	✓	**26-AUG-2009**	13-SEP-2009	✓
TP3 3-3mm,	TP8 1-0.3m,							
TP8 2-1m,	TP8 3-3.5m,							
TP9 1-0.3m,	TP9 2-2m							
Soil Glass Jar - Unpreserved								
TP6 1-0.5m,	TP6 2-2.5m,	**17-AUG-2009**	**25-AUG-2009**	14-SEP-2009	✓	**26-AUG-2009**	14-SEP-2009	✓
NEW_TP2-1-0.5m,	NEW_TP2-2-1.5m,							
NEW_TP2-3-3.5m								
EG035W: Water Leachable Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Unfiltered								
CPT4 1-0m-1m,	CPT4 2-1m-2m,	**21-AUG-2009**	**----**	----	----	**24-AUG-2009**	18-SEP-2009	✓
CPT4 3-2m-3m,	CPT4b 1-1.0m-2.0m,							
CPT4b 2-3m-4m,	CPT2 1-1.0m-2.0m,							
CPT2 2-3.0m-3.5m,	CPT1 1-0-1.5m,							
CPT1 2-1.5-2.5m,	TP3-1-0.3m,							
TP3 2-1.5m,	TP3 3-3mm,							
TP8 1-0.3m,	TP8 2-1m,							
TP8 3-3.5m,	TP9 1-0.3m,							
TP9 2-2m,	TP6 1-0.5m,							
TP6 2-2.5m,	NEW_TP2-1-0.5m,							
NEW_TP2-2-1.5m,	NEW_TP2-3-3.5m							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK059G: NOX as N by Discrete Analyser							
Soil Glass Jar - Unpreserved							
CPT4 1-0m-1m, CPT4 2-1m-2m, CPT4 3-2m-3m	**14-AUG-2009**	**20-AUG-2009**	21-AUG-2009	✓	**21-AUG-2009**	10-FEB-2010	✓
Soil Glass Jar - Unpreserved							
CPT4b 1-1.0m-2.0m, CPT4b 2-3m-4m, CPT2 1-1.0m-2.0m, CPT2 2-3.0m-3.5m, CPT1 1-0-1.5m, CPT1 2-1.5-2.5m	**15-AUG-2009**	**20-AUG-2009**	22-AUG-2009	✓	**21-AUG-2009**	11-FEB-2010	✓
Soil Glass Jar - Unpreserved							
TP3-1-0.3m, TP3 2-1.5m, TP3 3-3mm, TP8 1-0.3m, TP8 2-1m, TP8 3-3.5m, TP9 1-0.3m, TP9 2-2m	**16-AUG-2009**	**20-AUG-2009**	23-AUG-2009	✓	**21-AUG-2009**	12-FEB-2010	✓
Soil Glass Jar - Unpreserved							
TP6 1-0.5m, TP6 2-2.5m, NEW_TP2-1-0.5m, NEW_TP2-2-1.5m, NEW_TP2-3-3.5m	**17-AUG-2009**	**20-AUG-2009**	24-AUG-2009	✓	**21-AUG-2009**	13-FEB-2010	✓
EK061G: Total Kjeldahl Nitrogen as N							
Soil Glass Jar - Unpreserved							
CPT4 1-0m-1m, CPT4 2-1m-2m, CPT4 3-2m-3m	**14-AUG-2009**	**26-AUG-2009**	10-FEB-2010	✓	**27-AUG-2009**	10-FEB-2010	✓
Soil Glass Jar - Unpreserved							
CPT4b 1-1.0m-2.0m, CPT4b 2-3m-4m, CPT2 1-1.0m-2.0m, CPT2 2-3.0m-3.5m, CPT1 1-0-1.5m, CPT1 2-1.5-2.5m	**15-AUG-2009**	**26-AUG-2009**	11-FEB-2010	✓	**27-AUG-2009**	11-FEB-2010	✓
Soil Glass Jar - Unpreserved							
TP3-1-0.3m, TP3 2-1.5m, TP3 3-3mm, TP8 1-0.3m, TP8 2-1m, TP8 3-3.5m, TP9 1-0.3m, TP9 2-2m	**16-AUG-2009**	**26-AUG-2009**	12-FEB-2010	✓	**27-AUG-2009**	12-FEB-2010	✓
Soil Glass Jar - Unpreserved							
TP6 1-0.5m, TP6 2-2.5m, NEW_TP2-1-0.5m, NEW_TP2-2-1.5m, NEW_TP2-3-3.5m	**17-AUG-2009**	**26-AUG-2009**	13-FEB-2010	✓	**27-AUG-2009**	13-FEB-2010	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK067G: Total Phosphorus as P by Discrete Analyser							
Soil Glass Jar - Unpreserved							
CPT4 1-0m-1m, CPT4 2-1m-2m, CPT4 3-2m-3m	**14-AUG-2009**	**26-AUG-2009**	10-FEB-2010	✓	**27-AUG-2009**	10-FEB-2010	✓
Soil Glass Jar - Unpreserved							
CPT4b 1-1.0m-2.0m, CPT4b 2-3m-4m, CPT2 1-1.0m-2.0m, CPT2 2-3.0m-3.5m, CPT1 1-0-1.5m, CPT1 2-1.5-2.5m	**15-AUG-2009**	**26-AUG-2009**	11-FEB-2010	✓	**27-AUG-2009**	11-FEB-2010	✓
Soil Glass Jar - Unpreserved							
TP3-1-0.3m, TP3 2-1.5m, TP3 3-3mm, TP8 1-0.3m, TP8 2-1m, TP8 3-3.5m, TP9 1-0.3m, TP9 2-2m	**16-AUG-2009**	**26-AUG-2009**	12-FEB-2010	✓	**27-AUG-2009**	12-FEB-2010	✓
Soil Glass Jar - Unpreserved							
TP6 1-0.5m, TP6 2-2.5m, NEW_TP2-1-0.5m, NEW_TP2-2-1.5m, NEW_TP2-3-3.5m	**17-AUG-2009**	**26-AUG-2009**	13-FEB-2010	✓	**27-AUG-2009**	13-FEB-2010	✓
EN60-DI: Bottle Leaching Procedure							
Lab Split : Leach for Hg, Cr(VI) and other metal							
CPT4 1-0m-1m, CPT4 2-1m-2m, CPT4 3-2m-3m	**14-AUG-2009**	**---**	---	----	**21-AUG-2009**	11-SEP-2009	✓
Lab Split : Leach for Hg, Cr(VI) and other metal							
CPT4b 1-1.0m-2.0m, CPT4b 2-3m-4m, CPT2 1-1.0m-2.0m, CPT2 2-3.0m-3.5m, CPT1 1-0-1.5m, CPT1 2-1.5-2.5m	**15-AUG-2009**	**---**	---	----	**21-AUG-2009**	12-SEP-2009	✓
Lab Split : Leach for Hg, Cr(VI) and other metal							
TP3-1-0.3m, TP3 2-1.5m, TP3 3-3mm, TP8 1-0.3m, TP8 2-1m, TP8 3-3.5m, TP9 1-0.3m, TP9 2-2m	**16-AUG-2009**	**---**	---	----	**21-AUG-2009**	13-SEP-2009	✓
Lab Split : Leach for Hg, Cr(VI) and other metal							
TP6 1-0.5m, TP6 2-2.5m, NEW_TP2-1-0.5m, NEW_TP2-2-1.5m, NEW_TP2-3-3.5m	**17-AUG-2009**	**---**	---	----	**21-AUG-2009**	14-SEP-2009	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS							
Soil Glass Jar - Unpreserved							
RINSATE WATER	**17-AUG-2009**	**24-AUG-2009**	13-FEB-2010	✓	**24-AUG-2009**	13-FEB-2010	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved							
RINSATE WATER	**17-AUG-2009**	**----**	----	----	**24-AUG-2009**	31-AUG-2009	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity in Soil	ED037	3	22	**13.6**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	3	22	**13.6**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	3	22	**13.6**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chromium Suite for Acid Sulphate Soils	EA033	4	34	**11.8**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	3	22	**13.6**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	2	20	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	3	22	**13.6**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
pH field/fox	EA003	4	34	**11.8**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	4	35	**11.4**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	3	22	**13.6**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	3	22	**13.6**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite V	EG020V-T	2	20	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite X	EG020X-T	3	22	**13.6**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosporus By Discrete Analyser	EK067G	3	30	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity in Soil	ED037	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	35	**5.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite X	EG020X-T	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosporus By Discrete Analyser	EK067G	2	30	**6.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Alkalinity in Soil	ED037	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chromium Suite for Acid Sulphate Soils	EA033	2	34	**5.9**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	35	**5.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
Total Mercury by FIMS	EG035T	2	22	9.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	22	9.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite V	EG020V-T	2	22	9.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite X	EG020X-T	2	22	9.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosporus By Discrete Analyser	EK067G	2	30	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride - Soluble	EDO45S	2	22	9.1	5.0	✓	ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	22	9.1	5.0	✓	ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	35	5.7	5.0	✓	ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	22	9.1	5.0	✓	ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	22	9.1	5.0	✓	ALS QCS3 requirement
Total Metals by ICP-MS - Suite X	EG020X-T	2	22	9.1	5.0	✓	ALS QCS3 requirement
Total Phosporus By Discrete Analyser	EK067G	2	30	6.7	5.0	✓	ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Total Mercury by FIMS	EG035T	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite B	EG020B-T	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite E	EG020E-T	1	1	100.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Mercury by FIMS	EG035W	3	22	13.6	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICPAES	EG005W	3	22	13.6	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICP-MS - Suite B	EG020B-W	3	22	13.6	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICP-MS - Suite E	EG020E-W	3	22	13.6	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Total Mercury by FIMS	EG035T	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite B	EG020B-T	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Mercury by FIMS	EG035W	2	22	9.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICPAES	EG005W	2	22	9.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICP-MS - Suite B	EG020B-W	2	22	9.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Total Mercury by FIMS	EG035T	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite B	EG020B-T	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite E	EG020E-T	1	1	100.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Mercury by FIMS	EG035W	2	22	9.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Water Leachable Metals by ICPAES	EG005W	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICP-MS - Suite B	EG020B-W	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Water Leachable Metals by ICP-MS - Suite E	EG020E-W	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Total Mercury by FIMS	EG035T	1	20	**5.0**	**5.0**	✓	ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	6	**16.7**	**5.0**	✓	ALS QCS3 requirement
Water Leachable Mercury by FIMS	EG035W	2	22	**9.1**	**5.0**	✓	ALS QCS3 requirement
Water Leachable Metals by ICPAES	EG005W	2	22	**9.1**	**5.0**	✓	ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH field/fox	EA003	SOIL	Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide.
Chromium Suite for Acid Sulphate Soils	EA033	SOIL	Ahern et al 2004. This method covers the determination of Chromium Reducible Sulfur (SCR); pHKCl; titratable actual acidity (TAA); acid neutralising capacity by back titration (ANC); and net acid soluble sulfur (SNAS) which incorporates peroxide sulfur. It applies to soils and sediments (including sands) derived from coastal regions. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Alkalinity in Soil	ED037	SOIL	APHA 21st ed., 2320 B Alkalinity is determined and reported on a 1:5 soil/water leach.
Major Anions - Soluble	ED040S	SOIL	In-house. Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Cations - soluble by ICP-AES	ED093S	SOIL	APHA 21st ed., 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Chloride - Soluble	EDO45S	SOIL	APHA 21st ed., 4500Cl- Soluble Chloride is determined titremetrically on soil samples following a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 401)
Total Metals by ICP-AES	EG005T	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Water Leachable Metals by ICPAES	EG005W	SOIL	APHA 21st ed., 3120; USEPA SW 846 - 6010 The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Water Leachable Metals by ICP-MS - Suite B	EG020B-W	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Water Leachable Metals by ICP-MS - Suite E	EG020E-W	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite V	EG020V-T	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Metals in solids are determined following an appropriate acid digestion. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Total Metals by ICP-MS - Suite X	EG020X-T	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Mercury by FIMS	EG035T	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
Water Leachable Mercury by FIMS	EG035W	SOIL	AS 3550, APHA 21st ed. 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the TCLP solution. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	SOIL	APHA 21st ed., 4500 NO3- F. Combined oxidised Nitrogen (NO2+NO3) in a water extract is determined by Cadmium Reduction, and direct colourimetry by Discrete Analyser.
TKN as N By Discrete Analyser	EK061G	SOIL	APHA 21st ed., 4500-Norg-D Soil samples are digested using Kjeldahl digestion followed by determination by Discrete Analyser.
Total Nitrogen as N (TKN + NOx) By Discrete Analyser	EK062G	SOIL	APHA 21st ed., 4500 Norg/NO3- Total Nitrogen is determined as the sum of TKN and Oxidised Nitrrogen, each determined seperately as N.
Total Phosporus By Discrete Analyser	EK067G	SOIL	APHA 21st ed., 4500 P-B&F This procedure involves sulfuric acid digestion and quantification using Discrete Analyser.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite B	EG020B-T	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite E	EG020E-T	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Mercury by FIMS	EG035T	WATER	AS 3550, APHA 21st ed. 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

Preparation Methods	Method	Matrix	Method Descriptions

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	SOIL	APHA 21st ed., 4500 Norg- D; APHA 21st ed., 4500 P - H. Macro Kjeldahl digestion.
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
Digestion for Total Recoverable Metals in DI Water Leachate	EN25W	SOIL	USEPA SW846-3005 Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Deionised Water Leach	EN60-Dla	SOIL	AS4439.3 Preparation of Leachates
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)
Digestion for Total Recoverable Metals	EN25	WATER	USEPA SW846-3005 Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG005T: Total Metals by ICP-AES	EB0913021-012	TP3-1-0.3m	**Barium**	7440-39-3	81.1 %	0-20%	**RPD exceeds LOR based limits**
EG005T: Total Metals by ICP-AES	EB0913021-012	TP3-1-0.3m	**Iron**	7439-89-6	45.3 %	0-20%	**RPD exceeds LOR based limits**
EG005T: Total Metals by ICP-AES	EB0913021-012	TP3-1-0.3m	**Manganese**	7439-96-5	45.3 %	0-20%	**RPD exceeds LOR based limits**
EK067G: Total Phosphorus as P by Discrete Analyser	EB0913021-013	TP3 2-1.5m	**Total Phosphorus as P**	----	38.4 %	0-20%	**RPD exceeds LOR based limits**
Matrix Spike (MS) Recoveries							
EG005T: Total Metals by ICP-AES	EB0913021-002	CPT4 2-1m-2m	**Cobalt**	7440-48-4	61.3 %	70-130%	**Recovery less than lower data quality objective**
EG005T: Total Metals by ICP-AES	EB0913021-002	CPT4 2-1m-2m	**Manganese**	7439-96-5	58.0 %	70-130%	**Recovery less than lower data quality objective**
EG005T: Total Metals by ICP-AES	EB0913021-002	CPT4 2-1m-2m	**Vanadium**	7440-62-2	31.1 %	70-130%	**Recovery less than lower data quality objective**
EG005T: Total Metals by ICP-AES	EB0913021-034	NEW_TP2-3-3.5m	**Vanadium**	7440-62-2	37.6 %	70-130%	**Recovery less than lower data quality objective**
EK067G: Total Phosphorus as P by Discrete Analyser	EB0913021-034	NEW_TP2-3-3.5m	**Total Phosphorus as P**	----	46.4 %	70-130%	**Recovery less than lower data quality objective**

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EG005W: Water Leachable Metals by ICPAES	1239373-039	----	**Arsenic**	7440-38-2	129 %	79-121%	**Recovery greater than upper control limit**

- **For all matrices, no Method Blank value outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **SOIL**

Method	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA055: Moisture Content						

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA055: Moisture Content - Analysis Holding Time Compliance						
Soil Glass Jar - Unpreserved						
TP3 2-1.5m	----	----	----	20-AUG-2009	18-AUG-2009	**2**
ED037: Alkalinity						
Soil Glass Jar - Unpreserved						
TP3 2-1.5m	20-AUG-2009	18-AUG-2009	**2**	----	----	----
ED040S: Soluble Major Anions						
Soil Glass Jar - Unpreserved						
TP3 2-1.5m	20-AUG-2009	18-AUG-2009	**2**	----	----	----
ED045: Chloride						
Soil Glass Jar - Unpreserved						
TP3 2-1.5m	20-AUG-2009	18-AUG-2009	**2**	----	----	----
ED093S: Soluble Major Cations						
Soil Glass Jar - Unpreserved						
TP3 2-1.5m	20-AUG-2009	18-AUG-2009	**2**	----	----	----
EK059G: NOX as N by Discrete Analyser						
Soil Glass Jar - Unpreserved						
TP3 2-1.5m	20-AUG-2009	18-AUG-2009	**2**	----	----	----

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

CHAIN OF CUSTODY DOCUMENTATION

134253

ALS Laboratory Group

CLIENT: URS	SAMPLER: Jerry Wang
ADDRESS / OFFICE: 16/240 Queen St Brisbane 4000	MOBILE: 0417 382 975
PROJECT MANAGER (PM): Julian Dobos	PHONE
PROJECT ID: 4262 6447	EMAIL REPORT TO: julian_dobos@urscorp.com
SITE: Curtis Is GLNG P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (**Date**): QUOTE NO.:	**ANALYSIS REQUIRED including SUITES** (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:
Additional metals = Al, B, Fe, Sb, Se, Ti, U, W
leachable Metals = S-3 Suite and Al, B, Fe, Sb, Se, Ti, U, W

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected".
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		pH Field + pH Flex EA003	Chromium Suite - Complete EA033		Total metals S-3	Additional metals EG005T	DI Leach preparation	Leachable Metals EG005C+EG003C	Cations (Ca, Mg, Na, K) NT-1	Cl, SO4 bot. Alk. Anions NT-2	TP, TN Nutrients NT-11			
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles													
222053	QC 02	S	13/8/09	1:15Pm	Ass bag/Jar		✓	✓		✓	✓	✓	✓	✓	✓	✓			

EQ44152

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: Jerry Wang	Date: 14/8/09		Name: JANE WALKER	Date: 17/8/09		Con' Note No:
Of:	Time: 6.53am		Of: LABMARK SYDNEY	Time: 1330		
Name: UPS Australia	Date:		Name:	Date:		Transport Co:
Of:	Time:		Of:	Time:		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserveed Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Laboratory Group

WHITE - LAB COPY
YELLOW - CUSTOMER COPY
PINK - BOOK COPY

COC Page ___ of ___

LabMark
ENVIRONMENTAL LABORATORIES

Report Date : 18/08/2009
Report Time : 2:22:34PM

Sample **Receipt** Notice (SRN) for **E044152**

Quality, Service, Support

Client Details		Laboratory Reference Information	
Client Name:	URS Australia Pty Ltd (QLD)	**Please have this information ready when contacting Labmark.**	
Client Phone:	07 3243 2111		
Client Fax:	07 3243 2199	**Laboratory Report:**	**E044152**
Contact Name:	Julian Dobos	**Quotation Number:**	- Not provided, standard prices apply
Contact Email:	julian_dobos@urscorp.com	**Laboratory Address:**	Unit 1, 8 Leighton Pl. Asquith NSW 2077
Client Address:	PO Box 302 Brisbane QLD 4001	**Phone:**	61 2 9476 6533
		Fax:	61 2 9476 8219
Project Name:	Curtis Island GLNG	**Sample Receipt Contact:**	Ros Schacht
Project Number:	4262 6447	**Email:**	Ros.Schacht@labmark.com.au
CoC Serial Number:	134253	**Reporting Contact:**	Leanne Boag
Purchase Order:	- Not provided -	**Email:**	leanne.boag@labmark.com.au
Surcharge:	No surcharge applied (results by 6:30pm on due date)		
Sample Matrix:	SOIL		

Date Sampled (earliest date):	13/08/2009	**NATA Accreditation:**	13542
Date Samples Received:	17/08/2009	**TGA GMP License:**	185-336 (Sydney)
Date Sample Receipt Notice issued:	18/08/2009	**APVMA License:**	6105 (Sydney)
Date Preliminary Report Due:	24/08/2009	**AQIS Approval:**	NO356 (Sydney)
Client TAT Request Date:	24/08/2009	**AQIS Entry Permit:**	200521534 (Sydney)

Reporting Requirements: Electronic Data Download required:Yes

Invoice Number: 09EA5411

Sample Condition: COC received with samples. Report number and lab ID's defined on COC.
Samples received in good order .
Samples received with cooling media: No cooling media .
Samples received ambient.
Security seals not required. Direct Labmark's custody taken .
Sample container & chemical preservation suitable .

Comments: LabMark Sydney unable to analyse Soil Leachate for Total Alkilinity, Total Phosporous and Total Nitrogen. Metals analysis does not include Tungsten

Holding Times: Date received allows for sufficient time to meet Technical Holding Times.

Preservation: Chemical preservation of samples satisfactory for requested analytes.

Important Notes:

LabMark shall responsibly dispose of spent customer soil and water samples which includes the disintegration of the sample label. A sample disposal fee of $1.00 is applicable on all samples received by the laboratory regardless of whether they have undergone analytical testing. Sample disposal of environmental samples shall be 31 days (water) and 3 months (soil, HN03 preserved samples) after laboratory receipt, unless otherwise requested in writing by the client. Samples requested to be held in non-refrigerated storage shall incur $5.00/ sample/ 3 months. Additional refrigerated storage shall incur $30/ sample/ 3 months. Combination prices apply only if requested. Transfer of report ownership from LabMark to the client shall occur once full and final payment has been settled and verified. All report copies may be retracted where full payment does not occur within the agreed settlement period.

Analysis comments:

Subcontracted Analyses:

Reported by EAL,

Thank you for choosing Labmark to analyse your project samples.

Additional information on www.labmark.com.au

LabMark
ENVIRONMENTAL LABORATORIES

Report Date : 18/08/2009
Report Time : 2:22:34PM

Sample **Receipt** Notice (SRN) for **E044152**

Quality, Service, Support

The table below represents LabMark's understanding and interpretation of the customer supplied sample COC request (refer to SRN comments section on first page for external subcontracting method details). Please confirm that your COC request has been entered correctly. Due to THT and TAT requirements, testing shall commence immediately as per this table, unless the customer intervenes with a correction prior to testing.

GRID REVIEW TABLE

No.	Date	Depth	Client Sample ID	Requested Analysis: Major cations	Acid extractable metals - mercury	TCLP Mercury (DW)	Acid extractable metals	Acid extractable metals	TCLP Metals (DIW)	Moisture	PREP Not Reported	PREP Not Reported	TCLP (DIW)	TCLP (DIW) Chloride in leachate	TCLP (DIW) Sulphate in leachate	TCLP Preparation (DW)	External Acid Sulphate Soil Analysis by EAL						
222053	13/08		QC02	●	●	●	●	●	●	●	●	●	●	●	●	●	●						
			Totals:	1	1	1	1	1	1	1	1	1	1	1	1	1	1						

'PREP Not Reported' refers to an internal laboratory instruction - client confirmation of this parameter is not required.

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Additional information on www.labmark.com.au

LabMark
ENVIRONMENTAL LABORATORIES

Report Date : 18/08/2009
Report Time : 2:22:34PM

Sample **Receipt** Notice (SRN) for **E044152**

Quality, Service, Support

No.	Date	Depth	Client Sample ID	Requested Analysis																			
				M9 - MET-T_S	M9 - MET-TCLD_W	MET-AAS_S Iron	MET-T_S Aluminium	MET-T_S Antimony	MET-T_S Barium	MET-T_S Beryllium	MET-T_S Boron	MET-T_S Manganese	MET-T_S Selenium	MET-T_S Titanium	MET-T_S Uranium	MET-T_S Vanadium	MET-TCLD_W Aluminium	MET-TCLD_W Antimony	MET-TCLD_W Barium	MET-TCLD_W Beryllium	MET-TCLD_W Boron	MET-TCLD_W Manganese	MET-TCLD_W Selenium
222053	13/08		QC02	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			Totals:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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Report Date : 18/08/2009
Report Time : 2:22:34PM

Sample **Receipt** Notice (SRN) for **E044152**

Quality, Service, Support

No.	Date	Depth	Client Sample ID	MET-TCLD_W Titanium	MET-TCLD_W Vanadium	TCLD-AAS_W Iron																
				Requested Analysis																		
222053	13/08		QC02	●	●	●																
			Totals:	1	1	1																

Thank you for choosing Labmark to analyse your project samples.
Additional information on www.labmark.com.au

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ilac-MRA NATA Accreditation No. 13542

Accredited for compliance with ISO/IEC 17025. The results of tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the APLAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

AQIS
AUSTRALIAN QUARANTINE AND INSPECTION SERVICE

SYDNEY License No. N0356.

Quarantine Approved Premises criteria 5.1 for quarantine containment level 1 (QCI) facilities. Class five criteria cover premises utilised for research, analysis and testing of biological material, soil, animal, plant and human products.

CUSTOMER CENTRIC - ANALYTICAL CHEMISTS

FINAL CERTIFICATE OF ANALYSIS - ENVIRONMENTAL DIVISION

Laboratory Report No:	E044152	Cover Page 1 of 4 plus Sample Results
Client Name:	URS Australia Pty Ltd (QLD)	
Client Reference:	Curtis Island GLNG	
Contact Name:	Julian Dobos	
Chain of Custody No:	134253	Date Received: 17/08/2009
Sample Matrix:	SOIL	Date Reported: 24/08/2009

This Final Certificate of Analysis consists of sample results, DQI's, method descriptions, laboratory definitions, and internationally recognised NATA accreditation and endorsement. The DQO compliance relates specifically to QA/QC results as performed as part of the sample analysis, and may provide an indication of sample result quality. Transfer of report ownership from Labmark to the client shall only occur once full & final payment has been settled and verified. All report copies may be retracted where full payment has not occured within the agreed settlement period.

QUALITY ASSURANCE CRITERIA

Accuracy:	matrix spike:	1 in first 5-20, then 1 every 20 samples
	lcs, crm, method:	1 per analytical batch
	surrogate spike:	addition per target organic method
Precision:	laboratory duplicate:	1 in first 5-10, then 1 every 10 samples
	laboratory triplicate:	re-extracted & reported when duplicate RPD values exceed acceptance criteria
Holding Times:	soils, waters:	Refer to LabMark Preservation & THT table VOC's 14 days water / soil VAC's 7 days water or 14 days acidified VAC's 14 days soil SVOC's 7 days water, 14 days soil Pesticides 7 days water, 14 days soil Metals 6 months general elements Mercury 28 days
Confirmation:	target organic analysis:	GC/MS, or confirmatory column
Sensitivity:	EQL:	Typically 2-5 x Method Detection Limit (MDL)

QUALITY CONTROL GLOBAL ACCEPTANCE CRITERIA (GAC)

Accuracy:	spike, lcs, crm surrogate:	general analytes 70% - 130% recovery phenol analytes 50% - 130% recovery organophosphorous pesticide analytes 60% - 130% recovery phenoxy acid herbicides, organotin 50% - 130% recovery
	anion/cation bal:	+/- 10% (0-3 meq/l), +/- 5% (>3 meq/l)
Precision:	method blank:	not detected >95% of the reported EQL
	duplicate lab RPD (metals):	0-30% (>10xEQL), 0-75% (5-10xEQL) 0-100% (<5xEQL)
	duplicate lab RPD:	0-50% (>10xEQL), 0-75% (5-10xEQL) 0-100% (<5xEQL)

QUALITY CONTROL ANALYTE SPECIFIC ACCEPTANCE CRITERIA (ASAC)

Accuracy:	spike, lcs, crm surrogate:	analyte specific recovery data <3xsd of historical mean
Uncertainty:	spike, lcs:	measurement calculated from historical analyte specific control charts

RESULT ANNOTATION

Data Quality Objective	s:	matrix spike recovery	p:	pending	bcs: batch specific lcs
Data Quality Indicator	d:	laboratory duplicate	lcs:	laboratory control sample	bmb: batch specific mb
Estimated Quantitation Limit	t:	laboratory triplicate	crm:	certified reference material	
not applicable	r:	RPD relative % difference	mb:	method blank	

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Environmental Laboratory Industry Group
Foundation Member

Laboratory Report: E044152

NEPC GUIDELINE COMPLIANCE - DQO

1. GENERAL

A. Results relate specifically to samples as received. Sample results are not corrected for matrix spike, lcs, or surrogate recovery data.

B. EQL's are matrix dependant and may be increased due to sample dilution or matrix interference.

C. Laboratory QA/QC samples are specific to this project.

D. Inter-laboratory proficiency results are available upon request. NATA accreditation details available at www.nata.asn.au.

E. VOC spikes & surrogates added to samples during extraction, SVOC spikes & surrogates added prior to extraction.

F. Recovery data outside GAC limits shall be investigated and compared to ASAC (historical mean +/- 3sd). If recovery data <20%, then the relevant results for that compound are considered not reliable.

G. Recovery data (ms, surrogate, crm, lcs) outside ASAC limits shall initiate an investigative action. Anomolous QC data is examined in conjunction with other QC samples and a final decision whether to accept or reject results is provided by the professional judgement of the senior analyst. The USEPA-CLP National Functional Guidelines are referred to for specific recommendations.

H. Extraction (preparation) date refers to the date that sample preparation was initiated. Note that certain methods not requiring sample preparation (eg. VOCs in water, etc) may report a common extraction and analysis date.

I. LabMark shall maintain an official copy of this Certificate of Analysis for all tracable reference purposes.

2. CHAIN OF CUSTODY (COC) & SAMPLE RECEIPT NOTICE (SRN) REQUIREMENTS

A. SRN issued to client upon sample receipt & login verification.

B. Preservation & sampling date details specified on COC and SRN, unless noted.

C. Sample Integrity & Validated Time of Sample Receipt (VTSR) Holding Times verified (preservation may extend holding time, refer to preservation chart).

3. NATA ACCREDITED METHODS

A. NATA accreditation held for each in-house method and sample matrix type reported, unless noted below (Refer to subcontracted test reports for NATA accreditation status).

B. NATA accredited in-house laboratory methods are referenced from NEPC, ASTM, modified USEPA / APHA documents. Corporate Accreditation No. 13542.

C. Subcontracted analyses: Refer to Sample Receipt Notice and additional DQO comments.

Reported by EAL,

4. QA/QC FREQUENCY COMPLIANCE TABLE SPECIFIC TO THIS REPORT

Matrix: **SOIL**

Page:	Method:	Totals:	#d	%d-ratio	#t	#s	%s-ratio
2	Acid extractable metals - mercury	1	0	0%	0	0	0%
3	Acid extractable metals	1	0	0%	0	0	0%
6	Acid extractable metals	1	0	0%	0	0	0%
10	Major cations	1	0	0%	0	0	0%
11	Moisture	1	--	--	--	--	--

Matrix: **SOIL-LEACHATE**

Page:	Method:	Totals:	#d	%d-ratio	#t	#s	%s-ratio
1	TCLP Preparation (DW)	1	0	0%	0	0	0%
4	TCLP Metals (DIW)	1	0	0%	0	0	0%
5	TCLP Mercury (DW)	1	0	0%	0	0	0%
7	TCLP (DIW) Sulphate in leachate	1	0	0%	0	0	0%
8	TCLP (DIW) Chloride in leachate	1	0	0%	0	0	0%
9	TCLP (DIW)	1	0	0%	0	0	0%

GLOSSARY:

#d	number of discrete duplicate extractions/analyses performed.
%d-ratio	NEPC guideline for laboratory duplicates is 1 in 10 samples (min 10%).
#t	number of triplicate extractions/analyses performed.
#s	number of spiked samples analysed.
%s-ratio	USEPA guideline for laboratory matrix spikes is 1 in 20 samples (min 5%).

Laboratory Report: E044152

5. ADDITIONAL COMMENTS SPECIFIC TO THIS REPORT

A. All tests were conducted by LabMark Environmental Sydney, NATA accreditation No. 13542, unless indicated below.
B. Please note Titanium[Soil] was analysed from acid digest. This is not covered by NATA accreditation.
C. The following test was conducted by EAL, :- SPOCAS

Laboratory QA/QC data shall relate specifically to this report, and may provide an indication of site specific sample result quality. LabMark DOES NOT report NON-RELEVANT BATCH QA/QC data. Acceptance of this self assessment certificate does not preclude any requirement for a QA/QC review by a accredited contaminated site EPA auditor, when and wherever necessary. Laboratory QA/QC self assessment references available upon request.

LabMark
ENVIRONMENTAL LABORATORIES

Laboratory Report No: E044152
Client Name: URS Australia Pty Ltd (QLD)
Contact Name: Julian Dobos
Client Reference: Curtis Island GLNG 4262 6447

plus cover page
Date: 24/08/09
This report supercedes reports issued on: N/A

Final
Certificate
of Analysis

Laboratory Identification		**222053**									
Sample Identification		QC02									
Depth (m)		--									
Sampling Date recorded on COC		13/8/09									
Laboratory Extraction (Preparation) Date		18/8/09									
Laboratory Analysis Date		18/8/09									
Method : E019.2											
TCLP Preparation (DW)	**EQL**										
Initial pH (pH units)	--	6.8									
Final pH (pH units)	--	8.0									

Results expressed in pH units unless otherwise specified

Comments:

E019.2: Soil leached with distilled water for 18 hours. Refer to relevant water method for results. TCLP preparation is equivalent to AS4439.3 (also known as ASLP).

Laboratory Identification		**222053**	**crm**	**lcs**	**mb**						
Sample Identification		QC02	QC	QC	QC						
Depth (m)		--	--	--	--						
Sampling Date recorded on COC		13/8/09	--	--	--						
Laboratory Extraction (Preparation) Date		18/8/09	18/8/09	18/8/09	18/8/09						
Laboratory Analysis Date		19/8/09	19/8/09	19/8/09	19/8/09						
Method : E026.2											
Acid extractable metals - mercury	**EQL**										
Mercury	0.05	<0.05	100%	109%	<0.05						

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E026.2: 0.5g digested with nitric/hydrochloric acid. Analysis by CV-ICP-MS or FIMS.

Laboratory Identification		**222053**	**crm**	**lcs**	**mb**						
Sample Identification		QC02	QC	QC	QC						
Depth (m)		--	--	--	--						
Sampling Date recorded on COC		13/8/09	--	--	--						
Laboratory Extraction (Preparation) Date		18/8/09	18/8/09	18/8/09	18/8/09						
Laboratory Analysis Date		19/8/09	18/8/09	18/8/09	18/8/09						
Method : E022.2											
Acid extractable metals	**EQL**										
Aluminium	100	16800	--	#	<100						
Antimony	1	<1	129%	93%	<1						
Arsenic	1	12	100%	96%	<1						
Barium	5	10	101%	102%	<5						
Beryllium	1	<1	91%	97%	<1						
Boron	5	24	73%	91%	<5						
Cadmium	0.1	<0.1	103%	102%	<0.1						
Chromium	1	22	80%	85%	<1						
Cobalt	1	21	80%	83%	<1						
Copper	2	23	97%	96%	<2						
Lead	2	8	93%	95%	<2						
Manganese	5	124	90%	84%	<5						
Nickel	1	13	90%	94%	<1						
Selenium	2	<2	78%	96%	<2						
Titanium	5	81	--	--	<5						
Uranium	1	2	93%	97%	<1						
Vanadium	5	80	70%	77%	<5						
Zinc	5	40	96%	99%	<5						

Results expressed in mg/kg dry weight unless otherwise specified

Comments: - # Percent recovery not available due to significant background levels of analyte in sample.

E022.2: 0.5g digested in nitric/hydrochloric acid. Analysis by ICP-MS.

Laboratory Identification		**222053**	**lcs**	**mb**							
Sample Identification		QC02	QC	QC							
Depth (m)		--	--	--							
Sampling Date recorded on COC		13/8/09	--	--							
Laboratory Extraction (Preparation) Date		19/8/09	19/8/09	19/8/09							
Laboratory Analysis Date		19/8/09	19/8/09	19/8/09							
Method : E022.1											
TCLP Metals (DIW)	**EQL**										
Aluminium	20	<20	82%	<20							
Arsenic	5	8	91%	<5							
Barium	10	120	89%	<10							
Beryllium	1	<1	93%	<1							
Boron	50	470	96%	<50							
Antimony	10	<10	96%	<10							
Cadmium	0.5	<0.5	92%	<0.5							
Chromium	10	<10	92%	<10							
Cobalt	5	<5	88%	<5							
Copper	10	<10	86%	<10							
Lead	5	<5	92%	<5							
Manganese	10	<10	91%	<10							
Nickel	5	<5	85%	<5							
Selenium	5	<5	92%	<5							
Vanadium	10	170	92%	<10							
Zinc	10	<10	87%	<10							

Results expressed in ug/l unless otherwise specified

Comments:

E022.1: DIW used as leaching fluid. Filtered TCLP leachate acidifed with nitric/hydrochloric acid. Analysis by ICP-MS. Results are expressed as in the leachate.

Laboratory Identification		**222053**	**lcs**	**mb**							
Sample Identification		QC02	QC	QC							
Depth (m)		--	--	--							
Sampling Date recorded on COC		13/8/09	--	--							
Laboratory Extraction (Preparation) Date		19/8/09	19/8/09	19/8/09							
Laboratory Analysis Date		19/8/09	19/8/09	19/8/09							
Method : E026.1											
TCLP Mercury (DW)	**EQL**										
Mercury	0.2	<0.2	107%	<0.2							

Results expressed in ug/l unless otherwise specified

Comments:

E026.1: DIW used as leaching fluid. Filtered TCLP leachate acidifed with nitric/hydrochloric acid. Analysis by CV-ICP/MS or FIMS. Results are expressed as in the leachate.

Laboratory Identification		**222053**	**lcs**	**mb**							
Sample Identification		QC02	QC	QC							
Depth (m)		--	--	--							
Sampling Date recorded on COC		13/8/09	--	--							
Laboratory Extraction (Preparation) Date		18/8/09	18/8/09	18/8/09							
Laboratory Analysis Date		20/8/09	20/8/09	20/8/09							
Method : E020.2/E030.2											
Acid extractable metals	**EQL**										
Iron	10	22000	107%	<10							

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E020.2/E030.2: 0.5g digested with nitric/hydrochloric acid . Analysis by AAS and/or ICP-OES.

Laboratory Identification		**222053**	**lcs**	**mb**							
Sample Identification		QC02	QC	QC							
Depth (m)		--	--	--							
Sampling Date recorded on COC		13/8/09	--	--							
Laboratory Extraction (Preparation) Date		19/8/09	19/8/09	19/8/09							
Laboratory Analysis Date		20/8/09	20/8/09	20/8/09							
Method : E042.1/E045.1/E056.1											
TCLP (DIW) Sulphate in leachate	**EQL**										
Sulphate	5	165	103%	<5							

Results expressed in mg/l unless otherwise specified

Comments:

E042.1/E045.1/E056.1: Determination by colour/Ion Chromatography. Results expressed as per the leachate. DIW used as leaching fluid.

Laboratory Identification		**222053**	**lcs**	**mb**							
Sample Identification		QC02	QC	QC							
Depth (m)		--	--	--							
Sampling Date recorded on COC		13/8/09	--	--							
Laboratory Extraction (Preparation) Date		19/8/09	19/8/09	19/8/09							
Laboratory Analysis Date		20/8/09	20/8/09	20/8/09							
Method : E033.1/E045.1/E047.1 **TCLP (DIW) Chloride in leachate**	**EQL**										
Chloride	5	1520	105%	<5							

Results expressed in mg/l unless otherwise specified

Comments:

E033.1/E045.1/E047.1: Determination by colour and/or Ion Chromatography. Results expressed as per the leachate. DIW used as leaching fluid.

Laboratory Identification		**222053**	**lcs**	**mb**							
Sample Identification		QC02	QC	QC							
Depth (m)		--	--	--							
Sampling Date recorded on COC		13/8/09	--	--							
Laboratory Extraction (Preparation) Date		19/8/09	19/8/09	19/8/09							
Laboratory Analysis Date		20/8/09	20/8/09	20/8/09							
Method : E042.1											
TCLP (DIW)	**EQL**										
Iron	0.5	<0.5	96%	<0.5							

Results expressed in mg/l unless otherwise specified

Comments:

E042.1: Determination by ICP-OES and/or AAS. Results expressed as per the leachate. DIW used as leaching fluid.

Laboratory Identification		**222053**	**lcs**	**mb**							
Sample Identification		QC02	QC	QC							
Depth (m)		--	--	--							
Sampling Date recorded on COC		13/8/09	--	--							
Laboratory Extraction (Preparation) Date		19/8/09	19/8/09	19/8/09							
Laboratory Analysis Date		20/8/09	20/8/09	20/8/09							
Method : E020.1/E030.1											
Major cations	**EQL**										
Calcium	0.1	6.4	97%	<0.1							
Magnesium	0.1	47.8	93%	<0.1							
Sodium	0.1	848	99%	<0.1							
Potassium	0.1	55.7	95%	<0.1							

Results expressed in mg/l unless otherwise specified

Comments:

E020.1/E030.1: Sample directly analysed by Flame AAS and/or ICP-OES.

Laboratory Identification		**222053**									
Sample Identification		QC02									
Depth (m)		--									
Sampling Date recorded on COC		13/8/09									
Laboratory Extraction (Preparation) Date		18/8/09									
Laboratory Analysis Date		19/8/09									
Method : E005.2											
Moisture	**EQL**										
Moisture	--	26									

Results expressed in % w/w unless otherwise specified

Comments:

E005.2: Moisture by gravimetric analysis. Results are in % w/w.

RESULTS OF ACID SULFATE SOIL ANALYSIS

1 sample supplied by Labmark on 20th August, 2009 - Lab. Job No. A4928

Analysis requested by Leanne Boag - **Your Ref: E044152**

(required if pH_{kcl}>6.5)

Sample Site	EAL lab code	Texture (note 6)	Moisture Content (% moisture of total wet weight)	Moisture Content (g moisture / g of oven dry soil)	TAA pH_{kcl}	Titratable Actual Acidity (TAA) mole H^+/tonne (to pH 6.5)	Reduced Inorganic Sulfur (% chromium reducible S) (%Scr) (note 2)	Reduced Inorganic Sulfur (Scr) mole H^+/tonne	% ANC_{BT} $\%CaCO_3$	a-ANC_{BT} mole H^+/tonne	NET ACIDITY Chromium Suite mole H^+/tonne (based on %Scrs)	LIME CALCULATION Chromium Suite kg $CaCO_3$/tonne DW (includes 1.5 safety Factor)
Method No.					*23A*	*23F*	*22B*	*a- 22B*	*19A2*	*a-19A2*	*note 5*	*note 4 and 6*
QC02	*A4928/1*	Fine	33.0	0.49	7.05	0	0.765	477	0.78	156	373	28

NOTE:

1 - All analysis is Dry Weight (DW) - samples dried and ground immediately upon arrival (unless supplied dried and ground)

2 - Samples analysed by SPOCAS method 23 (ie Suspension Peroxide Oxidation Combined Acidity & sulfate) and 'Chromium Reducible Sulfur' technique (Scr - Method 22B)

3 - Methods from Ahern, CR, McElnea AE , Sullivan LA (2004). ***Acid Sulfate Soils Laboratory Methods Guidelines.*** QLD DNRME.

4 - Bulk Density is required for liming rate calculations per soil volume. Lab. Bulk Density is no longer applicable - field bulk density rings can be used and dried/ weighed in the laboratory.

5 - **ABA Equation: Net Acidity = Potential Sulfidic Acidity (ie. Scrs or Sox) + Actual Acidity + Retained Acidity - measured ANC/FF (with FF currently defaulted to 1.5)**

6 - The neutralising requirement, lime calculation, includes a 1.5 safety margin for acid neutralisation (an increased safety factor may be required in some cases)

7 - For Texture: coarse = sands to loamy sands; medium = sandy loams to light clays; fine = medium to heavy clays and silty clays

8 - .. denotes not requested or required

9 - SCREENING, CRS, TAA and ANC are NATA accredited but other SPOCAS segments are currently not NATA accredited

10- Results at or below detection limits are replaced with '0' for calculation purposes.

11 - Projects that disturb >1000 tonnes of soil, the ≥0.03% S classification guideline would apply (refer to acid sulfate management guidelines).

NATA
Lab.Accred.No.:14960
This Document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IES 17025

(Classification of potential acid sulfate material if: coarse Scr≥0.03%S or 19mole H+/t; medium Scr≥0.06%S or 37mole H+/t; fine Scr≥0.1%S or 62mole H+/t) - as per QUASSIT Laboratory Methods Guidelines

Environmental Analysis Laboratory, Southern Cross University,
Tel. 02 6620 3678, website: scu.edu.au/eal

checked: .....

E

Appendix E Quality Control Data

RPD Calculations
GLNG DMPF ASS Assessment

Location	CPT5	CPT5	CPT5
Sample ID	CPT5_5-2.0m-3m	QC01	QC02__13/08/2009
Date Sampled	13/08/2009	13/08/2009	13/08/2009
Sample Type	Primary Sample	Duplicate Sample	Triplicate Sample
Primary Sample ID	CPT5_5-2.0m-3m	CPT5_5-2.0m-3m	CPT5_5-2.0m-3m
Laboratory	ALS	ALS	Labmark
Batch No.	EB0912892_MRED	EB0912892_MRED	E044152_URS

Pass RPD <= 50%
Pass-1 RPD > 50%, Analyis result < 10 times LOR

Analyte	LOR1	LOR2	LOR3	Units				Primary vs. Duplicate	Primary vs. Triplicate	Duplicate vs. Triplicate	Category1	Category2	Category3
Moisture Content	1	1		%	**35**	**35.5**	**26**	1.42%	29.51%	30.89%	Pass	Pass	Pass
Nitrate and Nitrite (as N)	0.1	0.1		mg/kg	**0.4**	**0.2**	-	66.67%	-	-	Pass-1	-	-
Total Kjeldahl Nitrogen as N	20	20		mg/kg	**380**	**360**	-	5.41%	-	-	Pass	-	-
Total Nitrogen as N	20	20		mg/kg	**380**	**360**	-	5.41%	-	-	Pass	-	-
Total Phosphorus as P	2	2		mg/kg	**206**	**202**	-	1.96%	-	-	Pass	-	-
Total Alkalinity as CaCO3	1	1		mg/kg	**821**	**893**	-	8.40%	-	-	Pass	-	-
Bicarbonate Alkalinity as CaCO3	1	1		mg/kg	**821**	**893**	-	8.40%	-	-	Pass	-	-
Calcium	10	10		mg/kg	**240**	**270**	-	11.76%	-	-	Pass	-	-
Magnesium	10	10		mg/kg	**1930**	**2180**	-	12.17%	-	-	Pass	-	-
Potassium	10	10		mg/kg	**1370**	**1470**	-	7.04%	-	-	Pass	-	-
Sodium	10	10		mg/kg	**23300**	**25100**	-	7.44%	-	-	Pass	-	-
Chloride	10	10		mg/kg	**40800**	**40700**	-	0.25%	-	-	Pass	-	-
Sulphate	10	10		mg/kg	**5140**	**6020**	-	15.77%	-	-	Pass	-	-
Aluminium	50	50		mg/kg	**13600**	**13400**	**16800**	1.48%	21.05%	22.52%	Pass	Pass	Pass
Arsenic	5	5		mg/kg	**7**	**10**	**12**	35.29%	52.63%	18.18%	Pass	Pass-1	Pass
Barium	10	10		mg/kg	**10**	**10**	**10**	0.00%	0.00%	0.00%	Pass	Pass	Pass
Boron	50	50		mg/kg	<50	<50	**24**	-	70.27%	70.27%	-	Pass-1	Pass-1
Chromium	2	2		mg/kg	**20**	**20**	**22**	0.00%	9.52%	9.52%	Pass	Pass	Pass
Cobalt	2	2		mg/kg	**6**	**8**	**21**	28.57%	111.11%	89.66%	Pass	Pass-1	Pass-1
Copper	2	2		mg/kg	**25**	**27**	**23**	7.69%	8.33%	16.00%	Pass	Pass	Pass
Iron	50	50		mg/kg	**17400**	**18900**	**22000**	8.26%	23.35%	15.16%	Pass	Pass	Pass
Lead	5	5		mg/kg	**6**	**7**	**8**	15.38%	28.57%	13.33%	Pass	Pass	Pass
Manganese	5	5		mg/kg	**116**	**102**	**124**	12.84%	6.67%	19.47%	Pass	Pass	Pass
Nickel	2	2		mg/kg	**9**	**9**	**13**	0.00%	36.36%	36.36%	Pass	Pass	Pass
Titanium	10	10		mg/kg	**150**	**160**	**81**	6.45%	**59.74%**	**65.56%**	Pass	Fail	Fail
Vanadium	5	5		mg/kg	**50**	**54**	**80**	7.69%	46.15%	38.81%	Pass	Pass	Pass
Zinc	5	5		mg/kg	**34**	**35**	**40**	2.90%	16.22%	13.33%	Pass	Pass	Pass
pH KCl (23A)	0.1	0.1	0.1	ph unit	**6.2**	**6.3**	**7.05**	1.60%	12.83%	11.24%	Pass	Pass	Pass
Chromium Reducible Sulfur (22B)	0.02	0.02	0.02	% s	**0.94**	**0.95**	**0.765**	1.06%	20.53%	21.57%	Pass	Pass	Pass
Acid Neutralising Capacity (19A2)	0.01	0.01	0.01	% caco3	<0.01	<0.01	**0.78**	-	**194.94%**	**194.94%**	-	Fail	Fail
Net Acidity (sulfur units)	0.02	0.02	0.02	% s	**0.96**	**0.96**	**0.6**	0.00%	46.15%	46.15%	Pass	Pass	Pass
Liming Rate	1	1	1	kg caco3/t	**45**	**45**	**28**	0.00%	46.58%	46.58%	Pass	Pass	Pass

F

Appendix F ASS Assessment Table

Project Component		EIS or Supplement Study	EIS or Supplement Section	Consultant and Investigation	ASS Intrusive Investigations		Approach Rationale	ASS Characterisation Data Gaps	ASS Management Plan (ASSMP)
Name	Description				Field Screening (pHField and pHFox)	Analytical Tests (SPOCAS or Chromium Suite)			
LNG facility.	Relates to LNG facility on Curtis Island, inland from China Bay, and north of Hamilton Point.	Completed as part of EIS.	EIS Section 8.3 and EIS Appendix L4	GEOCOASTAL (ASS INVESTIGATION) Terrain Soils and Land Capability LNG facility 12 February 2009.	Yes - Limited spatial coverage (≤5 mAHD only).	Yes - Limited spatial coverage (≤5 mAHD only).	GeoCoastal were engaged to undertake an ASS assessment of the proposed LNG facility location to address the TOR regarding ASS in areas at or below 5 mAHD.	Sample locations were selected along the coastal area of the LNG facility to target areas ≤5 mAHD. Specific analysis will also be required when the final construction method is known.	Specific management strategies based on the extent, location and method of disturbance will be prepared, based on the characterisation completed to date, and specific construction details. These details will be submitted as part of any application for authorities to undertake work.
Dredge Area Marine Sediments.	Relates to the marine sediment within the area proposed for dredging in Port Curtis, including both the swing basin and approach channel.	Completed as part of EIS.	EIS Section 8.3 and EIS Appendix L4	GEOCOASTAL (ASS INVESTIGATION) Terrain Soils and Land Capability LNG facility 12 February 2009.	Yes - Limited spatial coverage.	Yes - Limited spatial coverage.	The GeoCoastal investigation was undertaken as part of on and off-shore ASS investigations; however, the marine sediment data was limited (as an initial study) and additional samples were required for a more spatial representative assessment. The GeoCoastal data was used to develop a more targeted second round of sampling which was undertaken by URS for analytical samples (excluding field screen testing), and was also included in the URS report to provide a more complete spatial ASS assessment of the area. In addition to ASS, URS requested analyses and reported results on metals, nutrients, radionuclide and organic compounds.	The ASS data available should be sufficient for assessment and characterisation of any ASS in the marine sediment within the dredge area, and provide adequate data for the development of any management strategies for any identified ASS material, disturbed within the dredge area.	The management of any ASS identified within the marine sediment proposed for dredging will depend on the method of dredging and the handling of dredge spoils. This is because different dredge methods and spoil placement approaches can affect the way in which sediments settle or separate (which will also affect the distribution of shell fragment and thereby the distribution of one form of natural acid neutralisation), homogenise, dewater or break apart. As such, any management plan for ASS (if required) should be developed in parallel or as part of the final dredge management plan (DMP); this would relate the results of the investigation to the methods of dredging, and the placement and handling of spoils and dredge waters.
		Completed as part of EIS.	EIS Section 8.3 and EIS Appendix R3	URS (ASS INVESTIGATION) Marine Sediment Investigation - Environmental Investigations of Proposed Dredging at China Bay and Pipeline Crossing at The Narrows, Gladstone 28 January 2009.	No - used GeoCoastal data.	Yes.			
		Completed as part of EIS Supplement.	Supplement Attachment G5.	URS (MARINE SEDIMENT LEACHABLE CONTAMINANTS INVESTIGATION).	NA.	NA.	A data gap was identified by URS regarding leachable metals from the dredged spoils (i.e. how readily and in what concentrations metals can mobilise into water from the dredged marine sediment). URS undertook an investigation to close the data gap. Mobilisation of metals is more likely to occur in acidic conditions.		
DMPF.	Relates to the tidal flat area and surrounding hills on the western side of Curtis Island just south of Laird Point; identified as a possible location for placement of dredging spoils.	Completed as part of EIS.	EIS Section 8.17 and EIS Appendix L4.	GEOCOASTAL (ASS INVESTIGATION) Terrain Soils and Land Capability LNG facility 12 February 2009 - Subsection D Preliminary assessment of adjacent South Curtis Island tidal flat areas for Actual Acid Sulfate Soil.	Yes - Limited investigation depth.	Yes - Limited investigation depth.	GeoCoastal undertook sampling to approximately 1m. URS identified a data gap regarding the need for deeper sampling, as a result of possible excavation during bund construction and the extent of proposed spoil filling, and accordingly undertook additional sampling. Additionally, URS undertook metals and leachable metals sampling in the tidal flat and surrounding hills, to provide an indicative assessment of the likelihood of metals mobilising from the tidal flat lithology and surrounding hills into the groundwater, which may occur in the event that infiltration into the tidal flat of	The ASS data available should be sufficient for assessment and characterisation of any ASS filling activities associated with the DMPF. However there is insufficient data to characterise the area beneath the proposed western embankment where excavation to 5mbgl over an area approximately 100m x 600m, is proposed. The data available in that specific area provides a general ASS assessment and will be used to develop a more targeted approach to additional sampling pursuant to	Specific management strategies based on the extent, location and method of disturbance will be prepared, based on the characterisation completed to date, and specific construction details. These details will be submitted as part of any application for authorities to undertake work. The management of any ASS in the DMPF tidal flat should also factor in the method of spoil placement and dredge waters (should be detailed in the final DMP for the dredge area).

Project Component		EIS or Supplement Study	EIS or Supplement Section	Consultant and Investigation	ASS Intrusive Investigations		Approach Rationale	ASS Characterisation Data Gaps	ASS Management Plan (ASSMP)
Name	Description				Field Screening (pHField and pHFox)	Analytical Tests (SPOCAS or Chromium Suite)			
		Completed as part of EIS Supplement.	Supplement Attachment G6	URS (GEOTECHNICAL ASSESSMENT OF DMPF).	NA.	NA.	acidic leachate from the dredge spoil occurs. This represents a worst case scenario as the spoil will be managed under an ASSMP if required, to minimise acid production.	specific proposed design of the embankment excavation.	
		Completed as part of EIS Supplement.	Supplement Attachment G2	URS (ASS INVESTIGATION) GLNG Dredge Placement Material facility Curtis Island: Acid Sulfate Soils Investigation, October 2009.	Yes.	Yes.			
Bridge and Marine Pipeline Trench.	Relates to the span of water between Friend Point on the mainland and Laird Point on Curtis Island. Proposed method of pipeline trenching is dredging.	Completed as part of EIS.	EIS Section 7.3 and EIS Appendix L4.	GHD (PIPELINE FEED GEOTECH).	Yes.	No.	GHD had been engaged to undertake a geotechnical assessment along the off-shore section, at which time additional ASS samples were collected. The results of this work were assessed and presented in the EIS.	There is sufficient data to broadly characterise the ASS condition for various lithologies and their occurrences; if the final route is closely aligned with the sample locations.	Management of ASS that may have been identified within the marine sediment, across which a pipeline trench is proposed, will depend on the method of dredging and the handling of dredge spoils. This is because various dredge methods and spoil placement approaches can affect the way in which sediments settle or separate (which will also affect the distribution of shell fragment and thereby the distribution of one form of natural acid neutralisation), homogenise, dewater or break apart. Specific management strategies based on the extent, location and method of disturbance will be prepared, based on the characterisation completed to date, and specific construction details. These details will be submitted as part of any application for authorities to undertake work This would relate the results of the investigation to the methods of dredging, and the placement and handling of spoils and dredge waters.
		Completed as part of EIS.	EIS Section 8.3 and EIS Appendix R3.	URS (ASS INVESTIGATION) Marine Sediment Investigation - Environmental Investigations of Proposed Dredging at China Bay and Pipeline Crossing at The Narrows, Gladstone 28 January 2009.	Yes.	Yes.	As part of the EIS, URS undertook ASS, metals, nutrients, radionuclide and organic compounds sampling along 2 proposed bridge and trench alignments, with 3 sample locations along each.		
Pipeline (EIS Assessed Route), road construction and bridge abutment piling.	Relates to the gas transmission pipeline mainland EIS base case. The base case proposed route approaches the GSDA from the south-east, veering slightly north to run roughly parallel with the mainland coast (offset between 100 m and 500 m inland from the coastline) for approximately 2500m, where it reaches Friend Point. Additionally considers the ASS aspect of road and bridge abutment construction.	Completed as part of EIS.	EIS Section 7.3 and EIS Appendix L4.	GEOCOASTAL (ASS INVESTIGATION) Terrain Soils and Land Capability LNG facility 12 February 2009.	Yes.	Yes.	GeoCoastal undertook sampling along the mainland coastline at 23 locations, starting in the south from approximately 1000m north of Fisherman's Landing Wharf up to Friend Point in the north. Of the 23 locations, 13 were located along the general alignment of the mainland EIS base case pipeline route, allowing for an ASS assessment along this particular general alignment.	The ASS data available should be sufficient for assessment and characterisation of any ASS along the mainland EIS base case pipeline alignment, and provide adequate data for the development of any management strategies for any identified ASS material, disturbed during construction along the mainland EIS base case pipeline alignment.	The management of any ASS identified along the mainland EIS base case, should be developed in parallel with the CEMP and any EMP for the proposed works. To develop an ASSMP which mitigates the site and project specific environmental issues associated with ASS disturbance, the extent and method of disturbance and construction must be known to allow volumes of disturbed ASS to be estimated and details such as the locations of stockpile locations and sumps (if required) to be established. Whether the excavated material is intended for backfill will also affect the type of management strategies implemented. Additionally, any CEMP or EMP will comprise monitoring aspects which would otherwise be required for ASSMP impact monitoring.
		Completed as part of EIS Supplement.	Supplement Attachment E5.	GHD (PIPELINE FEED GEOTECH).	Yes.	Yes.	GHD had been engaged to undertake pre FEED geotechnical assessment of the mainland EIS base case pipeline route. During intrusive sampling, ASS samples were also collected and submitted for analyses, to ensure that any ASS data gap was closed and analytical data was available along the precise alignment of the pipeline, to be used in conjunction with the GeoCoastal data.		

Project Component		EIS or Supplement Study	EIS or Supplement Section	Consultant and Investigation	ASS Intrusive Investigations		Approach Rationale	ASS Characterisation Data Gaps	ASS Management Plan (ASSMP)
Name	Description				Field Screening (pHField and pHFox)	Analytical Tests (SPOCAS or Chromium Suite)			
Pipeline (Curtis Island), road construction and bridge abutment piling.	Relates to the route of the gas transmission pipeline on Curtis Island from Laird Point heading inland in an easterly direction, along which a road is also proposed. Additionally considers the ASS aspect of road and bridge abutment construction.	Completed as part of EIS.	EIS Section 7.3 and EIS Appendix L4.	GEOCOASTAL (ASS INVESTIGATION) Terrain Soils and Land Capability LNG facility 12 February 2009.	Yes - Limited lineal coverage (≤5 mAHD only).	Yes - Limited lineal coverage (≤5 mAHD only).	GeoCoastal undertook sampling at 7 locations on Curtis Island, starting from Laird Point and heading in an easterly direction. GeoCoastal's report outlined the proposed activities along this sampling run as being for roadway and bridge abutment construction; however, the proposed alignment of the pipeline also follows the route sampled by GeoCoastal. Geocoastal focused on low lying areas and areas they considered as requiring ASS assessment along the route. Geocoastal sampled to depths of approximately 1m on the assumption that roadway construction would be mostly filling activities.	The suitability of ASS data obtained for the Curtis Island pipeline route cannot be confirmed until the alignment of this section of pipeline and the method of construction is finalised, to compare the investigation locations against the final alignment route and the depth to which soils will be disturbed. Also, sample locations were selected to target areas ≤5 mAHD; if the soil disturbance criteria for ASS investigation are triggered for areas >5mAHD and ≤20 mAHD, additional data in those areas may be required.	Specific management strategies based on the extent, location and method of disturbance will be prepared, based on the characterisation completed to date, and specific construction details. These details will be submitted as part of any application for authorities to undertake work.
Pipeline CPIC Route	Relates to the CPIC Route which runs direct to Friend Point in an easterly direction originating inland and which continues without deviation across Port Curtis.	Completed as part of EIS Supplement.	Supplement Attachment E5.	GHD (PIPELINE FEED GEOTECH).	Yes - Limited spatial coverage (no lineal representation).	No - SPOCAS sample locations outside of alignment.	The GHD data will permit a more targeted investigation (target specific depth profiles which are now known to comprise ASS in the area). However, as no laboratory data is available in the proposed northern alignment, additional ASS investigations will be carried out post EIS once final alignment is confirmed, to ensure the conditions are known along the final alignment.	The data provides an ASS assessment of the general area and will be used to develop a more targeted approach to additional sampling once the exact route is finalised as the ASS condition for general area has been established.	Specific management strategies based on the extent, location and method of disturbance will be prepared, based on the characterisation completed to date, and specific construction details. These details will be submitted as part of any application for authorities to undertake work.
		Completed as part of EIS Supplement.	Supplement Attachment G6.	GLNG EIS Supplement. Common Pipeline Infrastructure Corridor - Acid Sulfate Soils assessment of additional field data.	NA.	NA.	URS undertook a review of the GHD data and produced a report assessing the ASS condition in the general area of the northern alignment.		

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