

AGL Upstream Investments Pty Ltd

Phase 2 Groundwater Investigations

Stage 1 Gas Field Development Area
Gloucester Gas Project

January 2012



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Phase 2 Groundwater Investigations – Stage 1 Gas Field Development Area Gloucester Gas Project

January 2012

AGL Upstream Investments Pty Ltd

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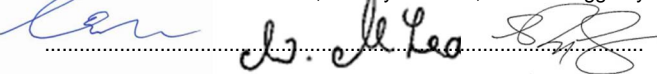
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A+ GRI Rating: Sustainability Report 2009*

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01	Second DRAFT	01/11/2011	JCD/WMC
02	Final DRAFT	19/12/2011	JCD/WMC/SB
03	FINAL	11/01/2012	JCD

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Date:January 2012

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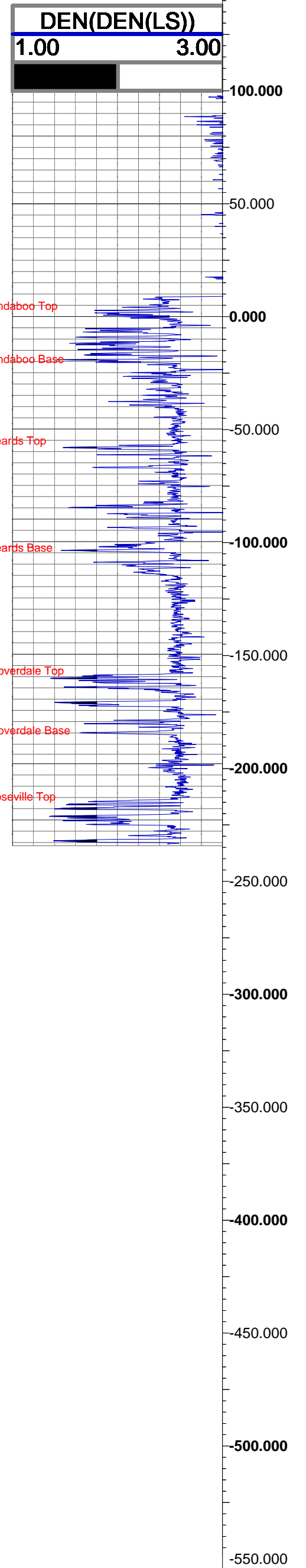
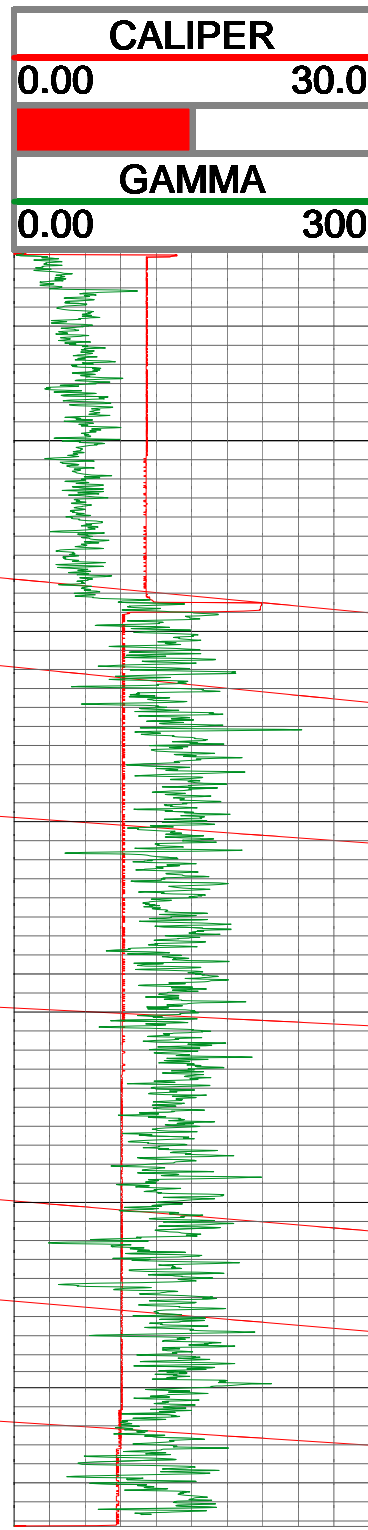
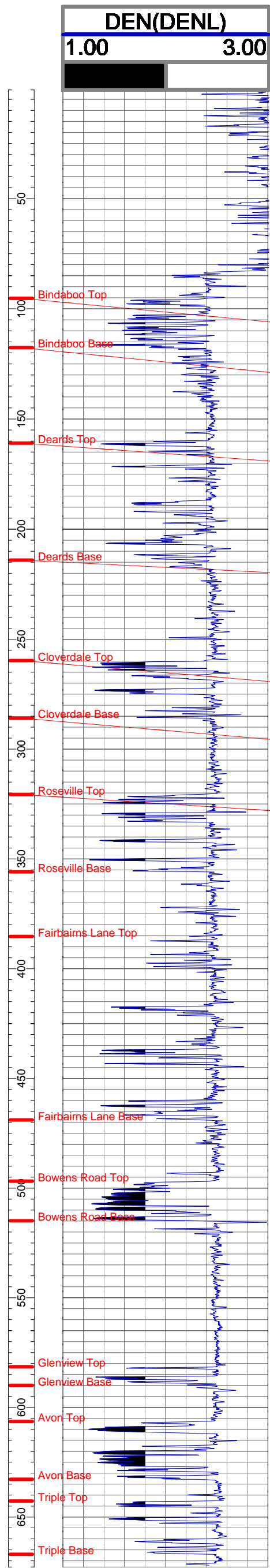
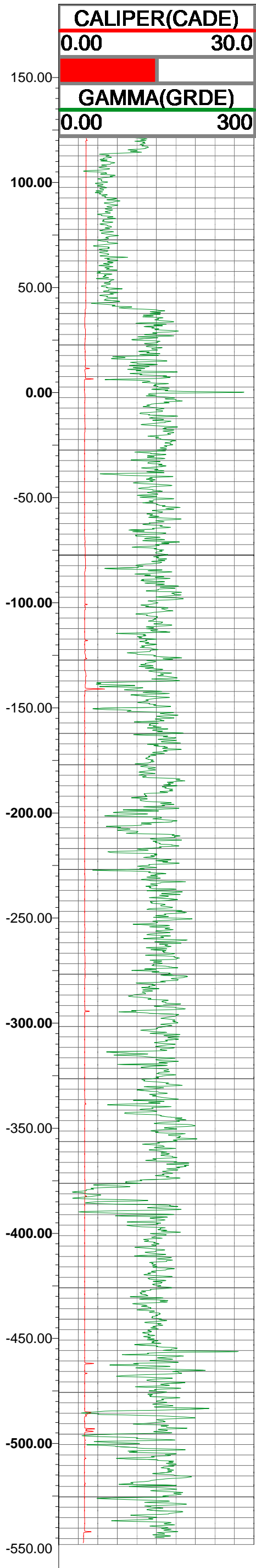
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Appendix E

Geophysical logs



Appendix F

Australian Laboratory Service
analytical results



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1107209	Page	: 1 of 7
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
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Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 06-APR-2011
C-O-C number	: ----	Issue Date	: 14-APR-2011
Sampler	: NPH/SM	No. of samples received	: 3
Site	: ----	No. of samples analysed	: 3
Quote number	: SY/394/09		

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
- Surrogate Control Limits



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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.

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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 insufficient 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

- **EG020: 'Bromine' quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.**
- **EG020: LCS recovery for Cobalt falls outside ALS Dynamic Control Limit. However, it is within the acceptance criteria based on ALS DQO. No further action is required.**
- **EP080: Level of reporting raised for toluene due to ambient background levels in the laboratory.**
- **EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEX compounds spiked at 20 ug/L.**



Analytical Results

Sub-Matrix: WATER

				Client sample ID	S5 MB03	TRIP BLANK	TRIP SPIKE		
				Client sampling date / time	05-APR-2011 15:00	05-APR-2011 15:00	01-APR-2011 15:00	----	----
Compound	CAS Num br	LOR	Unit	ES1107209-001	ES1107209-002	ES1107209-003	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	3770	----	----	----	----	----
EA015: Total Dissolved Solids									
^ Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	2210	----	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	711	----	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	711	----	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	43	----	----	----	----	----
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L	886	----	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	69	----	----	----	----	----
Magnesium	7439-95-4	1	mg/L	56	----	----	----	----	----
Sodium	7440-23-5	1	mg/L	706	----	----	----	----	----
Potassium	7440-09-7	1	mg/L	23	----	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	----	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	0.004	----	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	----	----	----	----	----
Barium	7440-39-3	0.001	mg/L	1.04	----	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	0.0002	----	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	0.001	----	----	----	----	----
Copper	7440-50-8	0.001	mg/L	0.002	----	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	0.137	----	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	0.006	----	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	0.005	----	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----	----
Strontium	7440-24-6	0.001	mg/L	5.20	----	----	----	----	----
Uranium	7440-61-1	0.001	mg/L	0.002	----	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	0.040	----	----	----	----	----
Boron	7440-42-8	0.05	mg/L	0.07	----	----	----	----	----
Iron	7439-89-6	0.05	mg/L	0.18	----	----	----	----	----
Bromine	7726-95-6	0.1	mg/L	1.6	----	----	----	----	----
EG052F: Dissolved Silica by ICPAES									



Analytical Results

Sub-Matrix: WATER

				Client sample ID	S5 MB03	TRIP BLANK	TRIP SPIKE		
				Client sampling date / time	05-APR-2011 15:00	05-APR-2011 15:00	01-APR-2011 15:00	----	----
Compound	CAS Num br	LOR	Unit		ES1107209-001	ES1107209-002	ES1107209-003	----	----
EG052F: Dissolved Silica by ICPAES - Continued									
^ Silica	7631-86-9	0.1	mg/L		21.8	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		1.56	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L		<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
^ Nitrate as N	14797-55-8	0.01	mg/L		<0.01	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.13	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	----	0.01	mg/L		<0.01	----	----	----	----
EN055: Ionic Balance									
^ Total Anions	----	0.01	meq/L		40.1	----	----	----	----
^ Total Cations	----	0.01	meq/L		39.4	----	----	----	----
^ Ionic Balance	----	0.01	%		0.94	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		4	----	----	----	----
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8	10	µg/L		12100	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	----	----	----	----
2,4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	----	----	----	----
2,4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	----	----	----	----
2,6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	----	----	----	----
4-Chloro-3-Methylphenol	59-50-7	1.0	µg/L		<1.0	----	----	----	----
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	----	----	----	----
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	----	----	----	----



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

				S5 MB03	TRIP BLANK	TRIP SPIKE	----	----
				05-APR-2011 15:00	05-APR-2011 15:00	01-APR-2011 15:00	----	----
Compound	CAS Num br	LOR	Unit	ES1107209-001	ES1107209-002	ES1107209-003	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----
EP080: BTEX								
Benzene	71-43-2	1	µg/L	<1	<1	15	----	----
Toluene	108-88-3	2	µg/L	<5	<5	18	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	16	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	16	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	16	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	25.7	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%	62.4	----	----	----	----
2,4,6-Tribromophenol	118-79-6	0.1	%	50.7	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	50.6	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%	69.8	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	92.5	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	117	105	84.0	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				S5 MB03	TRIP BLANK	TRIP SPIKE		
				05-APR-2011 15:00	05-APR-2011 15:00	01-APR-2011 15:00	----	----
<i>Compound</i>	<i>CAS Num br</i>	<i>LOR</i>	<i>Unit</i>	ES1107209-001	ES1107209-002	ES1107209-003	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued								
Toluene-D8	2037-26-5	0.1	%	103	102	96.5	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	97.0	87.6	101	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Num br	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	64.1
2-Chlorophenol-D4	93951-73-6	11.3	122.9
2,4,6-Tribromophenol	118-79-6	11.7	144.0
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	19.9	122.8
Anthracene-d10	1719-06-8	23.3	125.8
4-Terphenyl-d14	1718-51-0	20.3	134.5
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	76.4	133.1
Toluene-D8	2037-26-5	79.6	126.8
4-Bromofluorobenzene	460-00-4	79.1	125.0



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1107209	Page	: 1 of 11
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MR JAMES DUGGLEBY	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jduggleby@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 06-APR-2011
C-O-C number	: ----	Issue Date	: 14-APR-2011
Sampler	: NPH/SM	No. of samples received	: 3
Order number	: ----	No. of samples analysed	: 3
Quote number	: SY/394/09		

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Spectroscopist	Sydney Inorganics
Edwandy Fadjjar	Senior Organic Chemist	Sydney Organics
Sarah Millington	Senior Inorganic Chemist	Sydney 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 insufficient 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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA010P: Conductivity by PC Titrator (QC Lot: 1739331)									
ES1107194-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	1200	1190	0.08	0% - 20%
ES1107209-001	S5 MB03	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	3770	3750	0.5	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1741192)									
ES1107101-001	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	712	726	1.9	0% - 20%
ES1107214-004	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	266	288	7.9	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 1739332)									
ES1107208-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	1420	1420	0.1	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	1420	1420	0.1	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 1739665)									
ES1107200-005	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	46	46	0.0	0% - 20%
ED045G: Chloride Discrete analyser (QC Lot: 1739664)									
ES1107200-005	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	894	883	1.3	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 1739662)									
ES1107200-005	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	13	13	0.0	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	10	11	0.0	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	1040	1100	5.8	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	13	14	7.7	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1740675)									
ES1107068-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0252	0.0254	0.5	0% - 20%
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.118	0.126	6.0	0% - 20%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.047	0.044	5.5	0% - 20%
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.070	0.066	5.4	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.239	0.225	6.1	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.038	0.038	0.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	1.70	1.72	1.1	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.072	0.102	34.6	0% - 20%
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.19	0.25	28.2	0% - 20%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.10	<0.10	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.35	0.36	3.0	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 (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1740675) - continued									
ES1107068-001	Anonymous	EG020A-F: Iron	7439-89-6	0.05	mg/L	6.99	6.32	10.0	0% - 20%
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	58.8	53.3	9.9	0% - 20%
ES1107154-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.023	0.025	7.2	0% - 20%
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	2.44	2.50	2.4	0% - 20%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.019	0.019	0.0	0% - 50%
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.706	0.621	12.8	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.010	0.010	0.0	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.011	0.012	0.0	0% - 50%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.005	0.006	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.06	0.05	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	3.64	3.82	4.8	0% - 20%
EG020A-F: Bromine	7726-95-6	0.1	mg/L	0.4	0.4	0.0	No Limit		
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1740676)									
ES1107068-001	Anonymous	EG020B-F: Strontium	7440-24-6	0.001	mg/L	24.8	24.2	2.3	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	0.011	<0.010	0.0	No Limit
ES1107154-001	Anonymous	EG020B-F: Strontium	7440-24-6	0.001	mg/L	1.15	1.16	1.0	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	0.002	0.002	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1739273)									
ES1107050-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	99.6	100	0.8	0% - 20%
EW1101165-006	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.06	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1739663)									
ES1107200-005	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES1107222-002	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1739272)									
ES1107050-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	1.17	1.01	14.8	0% - 20%
EW1101165-006	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.10	0.10	0.0	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1738943)									
ES1107050-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	19.2	19.0	1.1	0% - 20%
ES1107210-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	8.37	8.67	3.4	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1739661)									
ES1107200-001	Anonymous	EK071G: Reactive Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 1740770)									
ES1107108-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	3	2	40.0	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 (%)
EP005: Total Organic Carbon (TOC) (QC Lot: 1740770) - continued									
ES1107162-012	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	<1	<1	0.0	No Limit
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 1739495)									
EM1103293-001	Anonymous	EP033: Methane	74-82-8	10	µg/L	<10	<10	0.0	No Limit
ES1106898-001	Anonymous	EP033: Methane	74-82-8	10	µg/L	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1740470)									
ES1107205-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES1107205-011	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	520	530	0.0	0% - 20%
EP080: BTEXN (QC Lot: 1740470)									
ES1107205-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
ES1107205-011	Anonymous	EP080: Benzene	71-43-2	1	µg/L	4	3	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	5	5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	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: WATER

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EA010P: Conductivity by PC Titrator (QCLot: 1739331)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	100	86.3	112
EA015: Total Dissolved Solids (QCLot: 1741192)								
EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	<1	293 mg/L	105	77.9	122
ED037P: Alkalinity by PC Titrator (QCLot: 1739332)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	93.4	80.2	108
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1739665)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	10 mg/L	94.2	70	130
ED045G: Chloride Discrete analyser (QCLot: 1739664)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	1000 mg/L	94.0	83.7	124
ED093F: Dissolved Major Cations (QCLot: 1739662)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	95.6	88	110
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	93.5	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	90.6	81	107
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	93.9	89	109
EG020F: Dissolved Metals by ICP-MS (QCLot: 1740675)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	93.2	92	112
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	103	88	110
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	94.3	80	114
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	88.4	85	109
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	91.6	89	107
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	# 87.6	89	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.1	87	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.7	90	110
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	93.6	87	113
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	96.5	84	114
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.0	89	109
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	95.6	79	119
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	105	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	81.9	71	127
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	93.1	84	114
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 1740676)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	93.9	88	112



Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1740676) - continued								
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1739273)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.00 mg/L	98.5	79.6	122
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1739663)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.96 mg/L	108	70	129
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1739272)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.96 mg/L	100	76.9	122
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1738943)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	94.2	64.3	120
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1739661)								
EK071G: Reactive Phosphorus as P	----	0.01	mg/L	<0.01	0.50 mg/L	101	83.8	122
EP005: Total Organic Carbon (TOC) (QCLot: 1740770)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	94.8	86.9	125
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 1739495)								
EP033: Methane	74-82-8	10	µg/L	<10	27.92 µg/L	98.5	91.3	115
EP075(SIM)A: Phenolic Compounds (QCLot: 1738967)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	----	.5 µg/L	48.1	24.5	61.9
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	----	.5 µg/L	81.4	63.8	110
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	----	.5 µg/L	72.9	55.9	112
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	----	1 µg/L	85.0	42.5	114
		2	µg/L	<2.0	----	----	----	----
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	----	.5 µg/L	93.9	62.7	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.2	µg/L	----	.5 µg/L	75.1	59.9	112
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.2	µg/L	----	.5 µg/L	82.2	59.3	122
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.2	µg/L	----	.5 µg/L	73.8	64.3	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	----	.5 µg/L	74.8	63	119
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.2	µg/L	----	.5 µg/L	79.6	58.7	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.2	µg/L	----	.5 µg/L	73.9	51.2	118
		1	µg/L	<1.0	----	----	----	----



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					LCS	Low	High	
EP075(SIM)A: Phenolic Compounds (QCLot: 1738967) - continued								
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	----	1 µg/L	70.0	6.85	95.6
		2	µg/L	<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1738967)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	----	.5 µg/L	77.9	58.6	119
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	----	.5 µg/L	78.5	63.6	114
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	----	.5 µg/L	84.3	62.2	113
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	----	.5 µg/L	89.0	63.9	115
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	----	.5 µg/L	89.9	62.6	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	----	.5 µg/L	90.4	64.3	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	----	.5 µg/L	82.8	63.6	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	----	.5 µg/L	84.1	63.1	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	----	.5 µg/L	93.9	64.1	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	----	.5 µg/L	87.8	62.5	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.2	µg/L	----	.5 µg/L	101	61.7	119
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	----	.5 µg/L	96.3	61.7	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	----	.5 µg/L	101	63.3	117
		0.5	µg/L	<0.5	----	----	----	----
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	----	.5 µg/L	97.0	59.9	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.2	µg/L	----	.5 µg/L	98.1	61.2	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.2	µg/L	----	.5 µg/L	109	59.1	118
		1	µg/L	<1.0	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1738966)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	95.3	58.9	131
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	81.9	73.9	138
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	80.4	62.7	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1740470)								



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1740470) - continued									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	84.4	75	127	
EP080: BTEXN (QCLot: 1740470)									
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	96.1	70	124	
EP080: Toluene	108-88-3	2	µg/L	----	10 µg/L	109	74.4	124	
		5	µg/L	<5	----	----	----	----	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	100	70	120	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	102	69	121	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	103	73	121	



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: **WATER**

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1739665)							
ES1107200-005	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	2.5 mg/L	# Not Determined	70	130
ED045G: Chloride Discrete analyser (QCLot: 1739664)							
ES1107200-005	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	88.2	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 1740675)							
ES1107068-001	Anonymous	EG020A-F: Arsenic	7440-38-2	2 mg/L	105	70	130
		EG020A-F: Beryllium	7440-41-7	2 mg/L	112	70	130
		EG020A-F: Barium	7440-39-3	2 mg/L	110	70	130
		EG020A-F: Cadmium	7440-43-9	0.5 mg/L	100	70	130
		EG020A-F: Cobalt	7440-48-4	2 mg/L	105	70	130
		EG020A-F: Copper	7440-50-8	2 mg/L	93.6	70	130
		EG020A-F: Lead	7439-92-1	2 mg/L	100	70	130
		EG020A-F: Manganese	7439-96-5	2 mg/L	102	70	130
		EG020A-F: Nickel	7440-02-0	2 mg/L	102	70	130
EG020A-F: Zinc	7440-66-6	2 mg/L	98.7	70	130		
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1739273)							
ES1107050-001	Anonymous	EK055G: Ammonia as N	7664-41-7	100 mg/L	93.7	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1739663)							
ES1107200-005	Anonymous	EK057G: Nitrite as N	----	0.60 mg/L	107	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1739272)							
ES1107050-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.60 mg/L	91.5	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1738943)							
ES1107050-001	Anonymous	EK067G: Total Phosphorus as P	----	1.00 mg/L	# Not Determined	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1739661)							
ES1107200-001	Anonymous	EK071G: Reactive Phosphorus as P	----	0.50 mg/L	103	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 1740770)							
ES1107108-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	101	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 1739495)							
EM1103293-002	Anonymous	EP033: Methane	74-82-8	27.92 µg/L	# Not Determined	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1740470)							
ES1107205-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	91.4	70	130
EP080: BTEXN (QCLot: 1740470)							
ES1107205-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	90.5	70	130

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 Work Order : ES1107209
 Client : PARSONS BRINCKERHOFF AUST P/L
 Project : 2162406A



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	Spike Recovery (%)	Recovery Limits (%)	
				Concentration	MS	Low	High
EP080: BTEXN (QCLot: 1740470) - continued							
ES1107205-001	Anonymous	EP080: Toluene	108-88-3	25 µg/L	93.7	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	104	70	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	84.6	70	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	103	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1107209	Page	: 1 of 8
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MR JAMES DUGGLEBY	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jduggleby@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 06-APR-2011
C-O-C number	: ----	Issue Date	: 14-APR-2011
Sampler	: NPH/SM	No. of samples received	: 3
Order number	: ----	No. of samples analysed	: 3
Quote number	: SY/394/09		

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: **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
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural S5 MB03	05-APR-2011	---	03-MAY-2011	----	08-APR-2011	03-MAY-2011	✓
EA015: Total Dissolved Solids							
Clear Plastic Bottle - Natural S5 MB03	05-APR-2011	----	----	----	08-APR-2011	12-APR-2011	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural S5 MB03	05-APR-2011	---	19-APR-2011	----	08-APR-2011	19-APR-2011	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural S5 MB03	05-APR-2011	---	03-MAY-2011	----	07-APR-2011	03-MAY-2011	✓
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural S5 MB03	05-APR-2011	---	03-MAY-2011	----	07-APR-2011	03-MAY-2011	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural S5 MB03	05-APR-2011	---	12-APR-2011	----	07-APR-2011	12-APR-2011	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered S5 MB03	05-APR-2011	---	02-OCT-2011	----	09-APR-2011	02-OCT-2011	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulphuric Acid S5 MB03	05-APR-2011	---	03-MAY-2011	----	07-APR-2011	03-MAY-2011	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural S5 MB03	05-APR-2011	---	07-APR-2011	----	06-APR-2011	07-APR-2011	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulphuric Acid S5 MB03	05-APR-2011	---	03-MAY-2011	----	07-APR-2011	03-MAY-2011	✓



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
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulphuric Acid S5 MB03	05-APR-2011	07-APR-2011	03-MAY-2011	✓	07-APR-2011	03-MAY-2011	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural S5 MB03	05-APR-2011	---	07-APR-2011	----	06-APR-2011	07-APR-2011	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulphuric Acid S5 MB03	05-APR-2011	----	----	----	08-APR-2011	03-MAY-2011	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - H2SO4 for C1 - C4 Gases S5 MB03	05-APR-2011	----	----	----	07-APR-2011	19-APR-2011	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved S5 MB03	05-APR-2011	07-APR-2011	12-APR-2011	✓	11-APR-2011	17-MAY-2011	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved S5 MB03	05-APR-2011	07-APR-2011	12-APR-2011	✓	11-APR-2011	17-MAY-2011	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved S5 MB03	05-APR-2011	07-APR-2011	12-APR-2011	✓	09-APR-2011	17-MAY-2011	✓
Amber VOC Vial - HCl S5 MB03, TRIP BLANK	05-APR-2011	09-APR-2011	19-APR-2011	✓	09-APR-2011	19-APR-2011	✓
EP080: BTEX							
Amber VOC Vial - HCl TRIP SPIKE	01-APR-2011	09-APR-2011	15-APR-2011	✓	09-APR-2011	15-APR-2011	✓
Amber VOC Vial - HCl S5 MB03, TRIP BLANK	05-APR-2011	09-APR-2011	19-APR-2011	✓	09-APR-2011	19-APR-2011	✓



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

Quality Control Sample Type	Analytical Method	Method	Count		Rate (%)			Quality Control Specification
			QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)								
Alkalinity by PC Titrator		ED037-P	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser		EK055G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases		EP033	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	1	2	50.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	1	2	50.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	2	16	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser		EK057G	2	8	25.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser		EK071G	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids		EA015	2	15	13.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon		EP005	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser		EK067G	2	8	25.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX		EP080	2	19	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)								
Alkalinity by PC Titrator		ED037-P	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser		EK055G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases		EP033	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	2	2	100.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	1	2	50.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser		EK057G	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)		EP075(SIM)	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser		EK071G	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids		EA015	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon		EP005	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser		EK067G	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction		EP071	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX		EP080	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)								
Ammonia as N by Discrete analyser		EK055G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases		EP033	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	1	2	50.0	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 <i>Analytical Method</i>	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
Conductivity by PC Titrator	EA010-P	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	2	50.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids	EA015	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.0	5.0	✓	ALS QCS3 requirement
C1 - C4 Gases	EP033	1	20	5.0	5.0	✓	ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	2	50.0	5.0	✓	ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.0	5.0	✓	ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	16	6.3	5.0	✓	ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	8	12.5	5.0	✓	ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.5	5.0	✓	ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	6	16.7	5.0	✓	ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	5.0	5.0	✓	ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	8	12.5	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	19	5.3	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 Method	Method	Matrix	Method Descriptions
Conductivity by PC Titrator	EA010-P	WATER	APHA 21st ed., 2510 B This procedure determines conductivity by automated ISE. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Dissolved Solids	EA015	WATER	APHA 21st ed., 2540C A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Alkalinity by PC Titrator	ED037-P	WATER	APHA 21st ed., 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Major Anions - Dissolved	ED040F	WATER	APHA 21st ed., 3120. The 0.45um filtered samples are determined by ICP/AES for Sulfur and/or Silicon content and reported as Sulfate and/or Silica after conversion by gravimetric factor.
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	APHA 21st ed., 4500-SO4 Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Chloride by Discrete Analyser	ED045G	WATER	APHA 21st ed., 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	APHA 21st ed., 3120; USEPA SW 846 - 6010 The ICPAES technique ionises the 0.45um filtered 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)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Silica (Total Dissolved) by ICPAES	EG052F	WATER	APHA 21st ed., 4500-SiO2. Silica (Total) determined by calculation from Silicon by ICPAES.
Ammonia as N by Discrete analyser	EK055G	WATER	APHA 21st ed., 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrite as N by Discrete Analyser	EK057G	WATER	APHA 21st ed., 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrate as N by Discrete Analyser	EK058G	WATER	APHA 21st ed., 4500-NO3- F. Nitrate is reduced to nitrite by way of a cadmium reduction column followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	APHA 21st ed., 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Cadmium Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)



Analytical Method	Method	Matrix	Method Descriptions
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	APHA 21st ed., 4500-P B&F This procedure involves sulphuric acid digestion of a 100mL sample to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	APHA 21st ed., 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Ionic Balance by PCT DA and ICPAES	EN055 - PG	WATER	APHA 21st Ed. 1030F. The Ionic Balance is calculated based on the major Anions and Cations. The major anions include Alkalinity, Chloride and Sulfate which determined by PCT and DA. The Cations are determined by ICPAES. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Organic Carbon	EP005	WATER	APHA 21st ed., 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TPH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
TPH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

Preparation Method	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	APHA 21st ed., 4500 Norg - D; APHA 21st ed., 4500 P - H. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 500 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2). ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



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: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EG020F: Dissolved Metals by ICP-MS	2047600-003	----	Cobalt	7440-48-4	87.6 %	89-109%	Recovery less than lower control limit
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1107200-005	Anonymous	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EK067G: Total Phosphorus as P by Discrete Analyser	ES1107050-001	Anonymous	Total Phosphorus as P	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP033: C1 - C4 Hydrocarbon Gases	EM1103293-002	Anonymous	Methane	74-82-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

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

- No Analysis Holding Time Outliers exist.

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.



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1107505	Page	: 1 of 7
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: npearsehawkins@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 08-APR-2011
C-O-C number	: ----	Issue Date	: 18-APR-2011
Sampler	: NPH/SM	No. of samples received	: 6
Site	: ----	No. of samples analysed	: 5
Quote number	: SY/394/09		

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
- Surrogate Control 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Raymond Commodor	Instrument Chemist	Sydney Inorganics
Sarah Millington	Senior Inorganic Chemist	Sydney Inorganics

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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 insufficient 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

- **EA015 TDS may bias high for various samples due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.**
- **EG020: Bromine quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.**
- **EG020: LCS recoveries for some elements fall outside ALS Dynamic Control Limit. However, they are within the acceptance criteria based on ALS DQO. No further action is required.**
- **EP080: Level of reporting raised for toluene due to ambient background levels in the laboratory.**



Analytical Results

Sub-Matrix: WATER

				Client sample ID				
				Client sampling date / time				
				AMB02	S-AMB02	S-AMB01	QA2	AMB01
				08-APR-2011 09:00	08-APR-2011 09:30	08-APR-2011 10:00	08-APR-2011 10:00	08-APR-2011 10:30
Compound	CAS Num br	LOR	Unit	ES1107505-001	ES1107505-002	ES1107505-003	ES1107505-004	ES1107505-005
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	417	158	161	417	2340
EA015: Total Dissolved Solids								
^ Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	414	192	199	418	1350
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	102	29	30	102	132
Total Alkalinity as CaCO3	----	1	mg/L	102	29	30	102	132
ED040F: Dissolved Major Anions								
Silicon	7440-21-3	0.05	mg/L	19.0	10.3	10.3	18.7	22.2
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	14	<1	<1	15	34
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	54	24	24	54	696
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	14	5	5	15	102
Magnesium	7439-95-4	1	mg/L	5	3	3	5	56
Sodium	7440-23-5	1	mg/L	61	16	17	63	279
Potassium	7440-09-7	1	mg/L	1	7	7	<1	2
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	0.17	0.66	<0.01	<0.01
Arsenic	7440-38-2	0.001	mg/L	0.003	0.001	0.002	0.002	0.005
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L	0.066	0.045	0.053	0.060	0.580
Cadmium	7440-43-9	0.0001	mg/L	0.0002	0.0002	<0.0001	<0.0001	0.0002
Cobalt	7440-48-4	0.001	mg/L	0.002	0.001	<0.001	0.001	0.027
Copper	7440-50-8	0.001	mg/L	0.002	0.007	0.003	<0.001	0.002
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L	0.170	0.031	0.035	0.163	3.50
Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	0.002	0.003	0.002	<0.001	0.009
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Strontium	7440-24-6	0.001	mg/L	0.235	0.070	0.115	0.240	1.78
Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	0.020	0.031	0.017	0.005	0.036
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: WATER

				Client sample ID				
				Client sampling date / time				
				AMB02	S-AMB02	S-AMB01	QA2	AMB01
				08-APR-2011 09:00	08-APR-2011 09:30	08-APR-2011 10:00	08-APR-2011 10:00	08-APR-2011 10:30
Compound	CAS Num br	LOR	Unit	ES1107505-001	ES1107505-002	ES1107505-003	ES1107505-004	ES1107505-005
EG020F: Dissolved Metals by ICP-MS - Continued								
Iron	7439-89-6	0.05	mg/L	0.90	0.77	1.37	0.86	6.05
Bromine	7726-95-6	0.1	mg/L	0.3	0.2	0.2	0.2	0.9
EG052F: Dissolved Silica by ICPAES								
^ Silica	7631-86-9	0.1	mg/L	40.7	22.1	22.1	40.1	47.6
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.04	0.02	0.05	0.22
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
^ Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	0.02	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.02	<0.01	<0.01
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.10	0.24	0.30	0.14	0.28
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.01	mg/L	<0.01	0.16	0.15	<0.01	<0.01
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	3.87	1.26	1.29	3.88	23.0
^ Total Cations	----	0.01	meq/L	3.81	1.37	1.43	3.92	21.9
^ Ionic Balance	----	0.01	%	0.83	----	----	0.48	2.39
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	4	31	22	3	3
EP033: C1 - C4 Hydrocarbon Gases								
Methane	74-82-8	10	µg/L	<10	----	----	<10	<10
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-Methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

Compound	CAS Num	br	LOR	Unit	AMB02	S-AMB02	S-AMB01	QA2	AMB01
					08-APR-2011 09:00	08-APR-2011 09:30	08-APR-2011 10:00	08-APR-2011 10:00	08-APR-2011 10:30
					ES1107505-001	ES1107505-002	ES1107505-003	ES1107505-004	ES1107505-005
EP075(SIM)A: Phenolic Compounds - Continued									
Pentachlorophenol	87-86-5		2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b)fluoranthene	205-99-2		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8		0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene	53-70-3		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----		20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----		50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----		100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----		50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----		50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft									
C6 - C10 Fraction	----		20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	----		20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----		100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----		100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----		100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----		100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2		1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3		2	µg/L	<5	<5	<5	<5	<5
Ethylbenzene	100-41-4		2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3		2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6		2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7		2	µg/L	<2	<2	<2	<2	<2



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

Compound	CAS Num br	LOR	Unit	AMB02	S-AMB02	S-AMB01	QA2	AMB01
				08-APR-2011 09:00	08-APR-2011 09:30	08-APR-2011 10:00	08-APR-2011 10:00	08-APR-2011 10:30
				ES1107505-001	ES1107505-002	ES1107505-003	ES1107505-004	ES1107505-005
EP080: BTEXN - Continued								
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	22.3	27.8	13.9	28.1	32.5
2-Chlorophenol-D4	93951-73-6	0.1	%	58.8	62.0	40.1	70.4	72.6
2,4,6-Tribromophenol	118-79-6	0.1	%	61.5	64.2	35.5	64.1	72.2
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	54.4	62.1	38.8	63.6	71.8
Anthracene-d10	1719-06-8	0.1	%	59.2	63.1	51.3	67.0	73.1
4-Terphenyl-d14	1718-51-0	0.1	%	71.3	71.2	46.0	77.4	76.7
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	124	124	120	125	125
Toluene-D8	2037-26-5	0.1	%	115	114	109	110	118
4-Bromofluorobenzene	460-00-4	0.1	%	108	108	103	104	107



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Num br	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	64.1
2-Chlorophenol-D4	93951-73-6	11.3	122.9
2,4,6-Tribromophenol	118-79-6	11.7	144.0
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	19.9	122.8
Anthracene-d10	1719-06-8	23.3	125.8
4-Terphenyl-d14	1718-51-0	20.3	134.5
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	76.4	133.1
Toluene-D8	2037-26-5	79.6	126.8
4-Bromofluorobenzene	460-00-4	79.1	125.0



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1107505	Page	: 1 of 13
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: npearsehawkins@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 08-APR-2011
C-O-C number	: ----	Issue Date	: 18-APR-2011
Sampler	: NPH/SM	No. of samples received	: 6
Order number	: ----	No. of samples analysed	: 5
Quote number	: SY/394/09		

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Raymond Commodor	Instrument Chemist	Sydney Inorganics
Sarah Millington	Senior Inorganic Chemist	Sydney 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 insufficient 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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA010P: Conductivity by PC Titrator (QC Lot: 1743226)									
ES1107500-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	1280	1280	0.3	0% - 20%
ES1107521-003	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	3250	3220	1.0	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1748590)									
ES1107307-001	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	123	133	7.8	0% - 20%
ES1107496-001	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	322	322	0.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 1743223)									
ES1107307-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	22	22	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	22	22	0.0	0% - 20%
ES1107500-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	146	150	2.9	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	146	150	2.9	0% - 20%
ED040F: Dissolved Major Anions (QC Lot: 1742567)									
ES1107505-001	AMB02	ED040F: Silicon	7440-21-3	0.05	mg/L	19.0	19.4	2.1	0% - 20%
ES1107521-003	Anonymous	ED040F: Silicon	7440-21-3	0.05	mg/L	13.7	14.6	6.5	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 1742570)									
ES1107505-001	AMB02	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	14	14	0.0	0% - 50%
ES1107521-005	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	38	38	0.0	0% - 20%
ED045G: Chloride Discrete analyser (QC Lot: 1742569)									
ES1107505-001	AMB02	ED045G: Chloride	16887-00-6	1	mg/L	54	55	1.9	0% - 20%
ES1107521-005	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	693	694	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 1742565)									
ES1107500-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	13	13	0.0	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	27	27	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	26	27	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.0	No Limit
ES1107521-003	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	22	22	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	6	6	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	658	665	1.1	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	5	5	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1746679)									
ES1107342-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	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 (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1746679) - continued									
ES1107342-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.002	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.011	0.012	0.0	0% - 50%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.13	0.15	14.9	0% - 50%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.06	0.07	0.0	No Limit
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	<0.1	0.0	No Limit		
ES1107495-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.123	0.122	0.9	0% - 20%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.291	0.297	2.2	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.016	0.017	0.0	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.068	0.069	0.0	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.276	0.279	0.9	0% - 20%
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.12	0.12	0.0	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit		
EG020A-F: Bromine	7726-95-6	0.1	mg/L	5.7	5.9	4.4	0% - 20%		
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1746680)									
ES1107342-001	Anonymous	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.107	0.112	4.5	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1746681)									
ES1107505-004	QA2	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.003	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 (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1746681) - continued									
ES1107505-004	QA2	EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.060	0.063	5.2	0% - 20%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.163	0.168	3.0	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.005	<0.005	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.86	0.87	0.0	0% - 50%
EG020A-F: Bromine	7726-95-6	0.1	mg/L	0.2	0.2	0.0	No Limit		
ES1107521-008	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0002	0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.197	0.186	6.2	0% - 20%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	1.01	1.04	2.8	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.016	0.016	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit		
EG020A-F: Iron	7439-89-6	0.05	mg/L	2.42	2.61	7.6	0% - 20%		
EG020A-F: Bromine	7726-95-6	0.1	mg/L	3.7	3.7	0.0	0% - 20%		
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1742680)									
ES1107505-001	AMB02	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.07	0.0	No Limit
ES1107521-005	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.14	1.14	0.0	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1742566)									
ES1107500-001	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES1107521-002	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1742679)									



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 (%)	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1742679) - continued										
ES1107505-001	AMB02	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit	
ES1107521-005	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1744852)										
ES1107480-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit	
ES1107480-010	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.07	0.09	35.0	No Limit	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1744853)										
EW1101203-004	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.05	0.04	22.2	No Limit	
EW1101204-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	5.98	6.24	4.3	0% - 20%	
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1742568)										
ES1107521-004	Anonymous	EK071G: Reactive Phosphorus as P	----	0.01	mg/L	0.06	0.07	0.0	No Limit	
EP005: Total Organic Carbon (TOC) (QC Lot: 1742972)										
ES1107496-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	21	20	4.9	0% - 20%	
ES1107505-004	QA2	EP005: Total Organic Carbon	----	1	mg/L	3	2	40.0	No Limit	
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 1745128)										
ES1107368-003	Anonymous	EP033: Methane	74-82-8	10	µg/L	9630	9190	4.6	0% - 20%	
ES1107480-014	Anonymous	EP033: Methane	74-82-8	10	µg/L	10	10	0.0	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1749107)										
ES1107491-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit	
ES1107505-001	AMB02	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 1749107)										
ES1107491-001	Anonymous	EP080: C6 - C10 Fraction	----	20	µg/L	<20	<20	0.0	No Limit	
ES1107505-001	AMB02	EP080: C6 - C10 Fraction	----	20	µg/L	<20	<20	0.0	No Limit	
EP080: BTEXN (QC Lot: 1749107)										
ES1107491-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit	
ES1107505-001	AMB02	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit	
			106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit			
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	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: WATER

				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)
Method: Compound	CAS Number	LOR	Unit				LCS	Low
EA010P: Conductivity by PC Titrator (QCLot: 1743226)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	102	86.3	112
EA015: Total Dissolved Solids (QCLot: 1748590)								
EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	<1	293 mg/L	106	77.9	122
ED037P: Alkalinity by PC Titrator (QCLot: 1743223)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	88.2	80.2	108
ED040F: Dissolved Major Anions (QCLot: 1742567)								
ED040F: Silicon	7440-21-3	0.05	mg/L	<0.05	5 mg/L	103	85	121
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1742570)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	10 mg/L	102	70	130
ED045G: Chloride Discrete analyser (QCLot: 1742569)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	1000 mg/L	102	83.7	124
ED093F: Dissolved Major Cations (QCLot: 1742565)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	98.5	88	110
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	99.4	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	97.6	81	107
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	99.8	89	109
EG020F: Dissolved Metals by ICP-MS (QCLot: 1746679)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	# 90.3	92	112
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	94.8	88	110
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	90.4	80	114
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	# 82.5	85	109
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	# 87.3	89	107
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	# 88.2	89	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.4	87	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.6	90	110
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	92.6	87	113
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	96.3	84	114
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	89.2	89	109
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	94.9	79	119
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	# 71.5	91	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.4	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	85.8	71	127
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	97.4	84	114



Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1746679) - continued								
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 1746680)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	# 85.8	88	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 1746681)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	# 88.1	92	112
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	96.2	88	110
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	95.5	80	114
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	89.9	85	109
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	90.7	89	107
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	# 87.1	89	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	88.5	87	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.6	90	110
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	87.2	87	113
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	97.8	84	114
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	89.1	89	109
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	100	79	119
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	# 72.5	91	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.8	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	83.9	71	127
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	96.0	84	114
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1742680)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.00 mg/L	96.9	79.6	122
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1742566)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.96 mg/L	107	70	129
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1742679)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.96 mg/L	111	76.9	122
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1744852)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	84.8	64.3	120
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1744853)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	95.0	64.3	120
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1742568)								
EK071G: Reactive Phosphorus as P	----	0.01	mg/L	<0.01	0.50 mg/L	97.2	83.8	122
EP005: Total Organic Carbon (TOC) (QCLot: 1742972)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	90.8	86.9	125
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 1745128)								



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 1745128) - continued									
EP033: Methane	74-82-8	10	µg/L	<10	27.92 µg/L	# 89.1	91.3	115	
EP075(SIM)A: Phenolic Compounds (QCLot: 1744265)									
EP075(SIM): Phenol	108-95-2	0.2	µg/L	----	.5 µg/L	36.9	24.5	61.9	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	----	.5 µg/L	72.0	63.8	110	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	----	.5 µg/L	71.5	55.9	112	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	----	1 µg/L	74.7	42.5	114	
		2	µg/L	<2.0	----	----	----	----	
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	----	.5 µg/L	75.7	62.7	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.2	µg/L	----	.5 µg/L	66.2	59.9	112	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.2	µg/L	----	.5 µg/L	70.4	59.3	122	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.2	µg/L	----	.5 µg/L	73.8	64.3	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	----	.5 µg/L	77.6	63	119	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.2	µg/L	----	.5 µg/L	86.4	58.7	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.2	µg/L	----	.5 µg/L	71.4	51.2	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	----	1 µg/L	71.6	6.85	95.6	
		2	µg/L	<2.0	----	----	----	----	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1744265)									
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	----	.5 µg/L	68.6	58.6	119	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	----	.5 µg/L	79.0	63.6	114	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	----	.5 µg/L	71.0	62.2	113	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	----	.5 µg/L	78.4	63.9	115	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	----	.5 µg/L	84.1	62.6	116	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	----	.5 µg/L	79.0	64.3	116	
		1	µg/L	<1.0	----	----	----	----	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1744265) - continued									
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	----	.5 µg/L	94.4	63.6	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	----	.5 µg/L	93.9	63.1	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	----	.5 µg/L	82.2	64.1	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	----	.5 µg/L	82.8	62.5	116	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.2	µg/L	----	.5 µg/L	77.5	61.7	119	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	----	.5 µg/L	99.2	61.7	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	----	.5 µg/L	89.4	63.3	117	
		0.5	µg/L	<0.5	----	----	----	----	
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	----	.5 µg/L	86.4	59.9	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.2	µg/L	----	.5 µg/L	85.2	61.2	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.2	µg/L	----	.5 µg/L	85.6	59.1	118	
		1	µg/L	<1.0	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1744264)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	100 µg/L	78.9	58.9	131	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	150 µg/L	93.3	73.9	138	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	100 µg/L	112	62.7	131	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1749107)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	81.5	75	127	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1744264)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	100 µg/L	85.1	58.9	131	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	150 µg/L	127	73.9	138	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	
		50	µg/L	----	100 µg/L	72.4	62.7	131	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1749107)									
EP080: C6 - C10 Fraction	----	20	µg/L	<20	310 µg/L	83.7	75	127	
EP080: BTEXN (QCLot: 1749107)									
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	84.9	70	124	
EP080: Toluene	108-88-3	2	µg/L	----	10 µg/L	85.2	74.4	124	
		5	µg/L	<5	----	----	----	----	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	76.6	70	120	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP080: BTEXN (QCLot: 1749107) - continued									
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	75.2	69	121	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	77.6	73	121	
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	80.9	72.9	127	



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: **WATER**

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	Spike Recovery (%)	Recovery Limits (%)	
				Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1742570)							
ES1107505-001	AMB02	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	2.5 mg/L	# Not Determined	70	130
ED045G: Chloride Discrete analyser (QCLot: 1742569)							
ES1107505-001	AMB02	ED045G: Chloride	16887-00-6	250 mg/L	121	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 1746679)							
ES1107342-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	92.9	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	98.2	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	95.4	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	94.7	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	89.1	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	86.5	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	94.3	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	89.6	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	90.7	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	90.3	70	130
EG020A-F: Zinc	7440-66-6	0.2 mg/L	96.0	70	130		
EG020F: Dissolved Metals by ICP-MS (QCLot: 1746681)							
ES1107505-004	QA2	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	83.8	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	81.0	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	84.2	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	80.8	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	80.6	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	75.2	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	82.0	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	73.2	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	81.5	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	73.9	70	130
EG020A-F: Zinc	7440-66-6	0.2 mg/L	80.3	70	130		
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1742680)							
ES1107505-001	AMB02	EK055G: Ammonia as N	7664-41-7	1.00 mg/L	88.1	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1742566)							
ES1107500-001	Anonymous	EK057G: Nitrite as N	----	0.60 mg/L	98.6	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1742679)							
ES1107505-001	AMB02	EK059G: Nitrite + Nitrate as N	----	0.60 mg/L	108	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1744852)							



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	Spike Recovery (%)	Recovery Limits (%)	
				Concentration	MS	Low	High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1744852) - continued							
ES1107480-001	Anonymous	EK067G: Total Phosphorus as P	----	1.00 mg/L	106	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1744853)							
EW1101203-004	Anonymous	EK067G: Total Phosphorus as P	----	1.00 mg/L	101	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 1742972)							
ES1107496-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	82.8	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 1745128)							
ES1107368-001	Anonymous	EP033: Methane	74-82-8	27.92 µg/L	# Not Determined	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1749107)							
ES1107491-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	76.1	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1749107)							
ES1107491-001	Anonymous	EP080: C6 - C10 Fraction	----	375 µg/L	75.4	70	130
EP080: BTEXN (QCLot: 1749107)							
ES1107491-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	88.3	70	130
		EP080: Toluene	108-88-3	25 µg/L	88.2	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	86.9	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	87.4	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	88.8	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	90.2	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1107505	Page	: 1 of 10
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: npearsehawkins@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 08-APR-2011
Sampler	: NPH/SM	Issue Date	: 18-APR-2011
Order number	: ----		
Quote number	: SY/394/09	No. of samples received	: 6
		No. of samples analysed	: 5

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: **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	
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	---	06-MAY-2011	----	11-APR-2011	06-MAY-2011	✓
EA015: Total Dissolved Solids								
Clear Plastic Bottle - Natural AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	----	----	----	14-APR-2011	15-APR-2011	✓
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	---	22-APR-2011	----	11-APR-2011	22-APR-2011	✓
ED040F: Dissolved Major Anions								
Clear Plastic Bottle - Natural AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	---	06-MAY-2011	----	10-APR-2011	06-MAY-2011	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	---	06-MAY-2011	----	09-APR-2011	06-MAY-2011	✓
ED045G: Chloride Discrete analyser								
Clear Plastic Bottle - Natural AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	---	06-MAY-2011	----	09-APR-2011	06-MAY-2011	✓



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	
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	---	15-APR-2011	----	10-APR-2011	15-APR-2011	✓
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Filtered AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	---	05-OCT-2011	----	14-APR-2011	05-OCT-2011	✓
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	---	06-MAY-2011	----	10-APR-2011	06-MAY-2011	✓
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	---	10-APR-2011	----	09-APR-2011	10-APR-2011	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	---	06-MAY-2011	----	10-APR-2011	06-MAY-2011	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	12-APR-2011	06-MAY-2011	✓	12-APR-2011	06-MAY-2011	✓
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	---	10-APR-2011	----	09-APR-2011	10-APR-2011	✓
EP005: Total Organic Carbon (TOC)								
Amber TOC Vial - Sulfuric Acid AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	----	----	----	11-APR-2011	06-MAY-2011	✓
EP033: C1 - C4 Hydrocarbon Gases								
Amber VOC Vial - H2SO4 for C1 - C4 Gases AMB02, AMB01	QA2,	08-APR-2011	----	----	----	12-APR-2011	22-APR-2011	✓



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	
EP075(SIM)A: Phenolic Compounds								
Amber Glass Bottle - Unpreserved AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	11-APR-2011	15-APR-2011	✓	13-APR-2011	21-MAY-2011	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	11-APR-2011	15-APR-2011	✓	13-APR-2011	21-MAY-2011	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	11-APR-2011	15-APR-2011	✓	13-APR-2011	21-MAY-2011	✓
Amber VOC Vial - HCl AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	16-APR-2011	22-APR-2011	✓	16-APR-2011	22-APR-2011	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
Amber Glass Bottle - Unpreserved AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	11-APR-2011	15-APR-2011	✓	13-APR-2011	21-MAY-2011	✓
Amber VOC Vial - HCl AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	16-APR-2011	22-APR-2011	✓	16-APR-2011	22-APR-2011	✓
EP080: BTEXN								
Amber VOC Vial - HCl AMB02, S-AMB01, AMB01	S-AMB02, QA2,	08-APR-2011	16-APR-2011	22-APR-2011	✓	16-APR-2011	22-APR-2011	✓



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

Quality Control Sample Type	Analytical Method	Method	Count		Rate (%)			Quality Control Specification
			QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)								
Alkalinity by PC Titrator		ED037-P	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser		EK055G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases		EP033	2	14	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	4	39	10.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	1	20	5.0	10.0	*	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved		ED040F	2	5	40.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser		EK057G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser		EK071G	1	20	5.0	10.0	*	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids		EA015	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon		EP005	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser		EK067G	4	30	13.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX		EP080	2	19	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)								
Alkalinity by PC Titrator		ED037-P	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser		EK055G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases		EP033	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	2	39	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved		ED040F	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser		EK057G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)		EP075(SIM)	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser		EK071G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids		EA015	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon		EP005	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser		EK067G	2	30	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction		EP071	1	10	10.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX		EP080	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)								
Ammonia as N by Discrete analyser		EK055G	1	20	5.0	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 <i>Analytical Method</i>	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
C1 - C4 Gases	EP033	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	39	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved	ED040F	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids	EA015	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	2	30	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatle Fraction	EP071	1	10	10.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.0	5.0	✓	ALS QCS3 requirement
C1 - C4 Gases	EP033	1	14	7.1	5.0	✓	ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	20	5.0	5.0	✓	ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	39	5.1	5.0	✓	ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.0	5.0	✓	ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	20	5.0	5.0	✓	ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.0	5.0	✓	ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	5.0	5.0	✓	ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	2	30	6.7	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	19	5.3	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 Method	Method	Matrix	Method Descriptions
Conductivity by PC Titrator	EA010-P	WATER	APHA 21st ed., 2510 B This procedure determines conductivity by automated ISE. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Dissolved Solids	EA015	WATER	APHA 21st ed., 2540C A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Alkalinity by PC Titrator	ED037-P	WATER	APHA 21st ed., 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Major Anions - Dissolved	ED040F	WATER	APHA 21st ed., 3120. The 0.45um filtered samples are determined by ICP/AES for Sulfur and/or Silicon content and reported as Sulfate and/or Silica after conversion by gravimetric factor.
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	APHA 21st ed., 4500-SO4 Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Chloride by Discrete Analyser	ED045G	WATER	APHA 21st ed., 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	APHA 21st ed., 3120; USEPA SW 846 - 6010 The ICPAES technique ionises the 0.45um filtered 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)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Silica (Total Dissolved) by ICPAES	EG052F	WATER	APHA 21st ed., 4500-SiO2. Silica (Total) determined by calculation from Silicon by ICPAES.
Ammonia as N by Discrete analyser	EK055G	WATER	APHA 21st ed., 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrite as N by Discrete Analyser	EK057G	WATER	APHA 21st ed., 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrate as N by Discrete Analyser	EK058G	WATER	APHA 21st ed., 4500-NO3- F. Nitrate is reduced to nitrite by way of a cadmium reduction column followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	APHA 21st ed., 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Cadmium Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)



Analytical Method	Method	Matrix	Method Descriptions
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	APHA 21st ed., 4500-P B&F This procedure involves sulphuric acid digestion of a 100mL sample to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	APHA 21st ed., 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Ionic Balance by PCT DA and ICPAES	EN055 - PG	WATER	APHA 21st Ed. 1030F. The Ionic Balance is calculated based on the major Anions and Cations. The major anions include Alkalinity, Chloride and Sulfate which determined by PCT and DA. The Cations are determined by ICPAES. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Organic Carbon	EP005	WATER	APHA 21st ed., 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TPH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
TPH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

Preparation Method	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	APHA 21st ed., 4500 Norg - D; APHA 21st ed., 4500 P - H. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 500 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2). ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



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: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EG020F: Dissolved Metals by ICP-MS	2055135-003	----	Aluminium	7429-90-5	90.3 %	92-112%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2055135-036	----	Aluminium	7429-90-5	88.1 %	92-112%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2055135-003	----	Barium	7440-39-3	82.5 %	85-109%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2055135-003	----	Cadmium	7440-43-9	87.3 %	89-107%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2055135-003	----	Cobalt	7440-48-4	88.2 %	89-109%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2055135-036	----	Cobalt	7440-48-4	87.1 %	89-109%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2055135-036	----	Vanadium	7440-62-2	72.5 %	91-109%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2055135-003	----	Vanadium	7440-62-2	71.5 %	91-109%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2055135-003	----	Strontium	7440-24-6	85.8 %	88-112%	Recovery less than lower control limit
EP033: C1 - C4 Hydrocarbon Gases	2053264-002	----	Methane	74-82-8	89.1 %	91.3-115%	Recovery less than lower control limit
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1107505-001	AMB02	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP033: C1 - C4 Hydrocarbon Gases	ES1107368-001	Anonymous	Methane	74-82-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

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

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

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

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Method					

Page : 10 of 10
 Work Order : ES1107505
 Client : PARSONS BRINCKERHOFF AUST P/L
 Project : 2162406A



Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Dissolved Metals by ICP-MS - Suite B	1	20	5.0	10.0	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	1	20	5.0	10.0	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1107521	Page	: 1 of 20
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: npearsehawkins@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 09-APR-2011
C-O-C number	: ----	Issue Date	: 18-APR-2011
Sampler	: NPH/SM	No. of samples received	: 16
Site	: ----	No. of samples analysed	: 16
Quote number	: SY/394/09		

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
- Surrogate Control Limits



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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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Spectroscopist	Sydney Inorganics
Edwandy Fadjar	Senior Organic Chemist	Sydney Organics
Raymond Commodor	Instrument Chemist	Sydney Inorganics
Sarah Millington	Senior Inorganic Chemist	Sydney Inorganics
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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 insufficient 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

- **EG020: Bromine quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.**
- **EG020: LCS recoveries for some elements fall outside ALS Dynamic Control Limit. However, they are within the acceptance criteria based on ALS DQO. No further action is required.**
- **EP005: LCS recovery for TOC falls outside ALS dynamic control limits. However, it is within the acceptance criteria based on ALS DQO. No further action is required.**
- **EP080: Level of reporting raised for toluene due to ambient background levels in the laboratory.**



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

Compound	CAS Num br	LOR	Unit	S5MB02	S5MB01	QA1	S4MB01	S4MB02
				05-APR-2011 08:30	05-APR-2011 15:00	06-APR-2011 15:00	06-APR-2011 15:00	06-APR-2011 14:00
				ES1107521-001	ES1107521-002	ES1107521-003	ES1107521-004	ES1107521-005
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	4340	6100	3250	2890	2460
EA015: Total Dissolved Solids								
^ Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	2550	3830	1920	1820	1540
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	806	364	278	307	204
Total Alkalinity as CaCO3	----	1	mg/L	806	364	278	307	204
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	94	790	5	103	38
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	913	1160	898	731	693
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	22	62	22	131	96
Magnesium	7439-95-4	1	mg/L	13	60	6	34	29
Sodium	7440-23-5	1	mg/L	924	1140	658	425	385
Potassium	7440-09-7	1	mg/L	12	88	5	24	6
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.46	1.36	0.34	0.10	<0.01
Arsenic	7440-38-2	0.001	mg/L	0.004	0.018	0.002	0.005	0.002
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L	0.418	0.099	1.48	0.878	1.79
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0003	0.0001	0.881	0.0006
Cobalt	7440-48-4	0.001	mg/L	0.001	0.005	<0.001	0.002	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	0.002	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	0.004	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L	0.108	0.212	0.082	0.320	0.226
Molybdenum	7439-98-7	0.001	mg/L	0.005	0.035	<0.001	0.003	0.003
Nickel	7440-02-0	0.001	mg/L	0.005	0.016	0.002	0.010	0.004
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Strontium	7440-24-6	0.001	mg/L	1.96	8.59	1.76	10.8	7.83
Uranium	7440-61-1	0.001	mg/L	0.005	0.042	<0.001	0.002	0.001
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	0.024	0.046	0.009	0.007	0.007
Boron	7440-42-8	0.05	mg/L	0.08	0.14	<0.05	0.06	<0.05
Iron	7439-89-6	0.05	mg/L	1.15	3.38	0.35	0.54	0.73
Bromine	7726-95-6	0.1	mg/L	2.1	3.3	1.4	1.2	1.0



Analytical Results

Sub-Matrix: WATER

				Client sample ID				
				S5MB02	S5MB01	QA1	S4MB01	S4MB02
				05-APR-2011 08:30	05-APR-2011 15:00	06-APR-2011 15:00	06-APR-2011 15:00	06-APR-2011 14:00
				Client sampling date / time				
Compound	CAS Num br	LOR	Unit	ES1107521-001	ES1107521-002	ES1107521-003	ES1107521-004	ES1107521-005
EG052F: Dissolved Silica by ICPAES								
^ Silica	7631-86-9	0.1	mg/L	21.6	22.9	29.4	38.1	24.8
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	1.45	2.91	1.07	1.17	1.14
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
^ Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.44	0.30	0.14	0.07	0.03
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.01	mg/L	0.06	0.03	0.04	0.06	0.01
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	43.8	56.3	31.0	28.9	24.4
^ Total Cations	----	0.01	meq/L	42.7	59.8	30.4	28.4	24.1
^ Ionic Balance	----	0.01	%	1.28	2.98	1.06	0.82	0.66
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	8	98	6	11	5
EP033: C1 - C4 Hydrocarbon Gases								
Methane	74-82-8	10	µg/L	31800	<10	31300	3720	6830
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	<1.0	1.3	<1.0	<1.0	<1.0
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-Methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

Compound	CAS Num br	LOR	Unit	S5MB02	S5MB01	QA1	S4MB01	S4MB02
				05-APR-2011 08:30	05-APR-2011 15:00	06-APR-2011 15:00	06-APR-2011 15:00	06-APR-2011 14:00
				ES1107521-001	ES1107521-002	ES1107521-003	ES1107521-004	ES1107521-005
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	160	540	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	100	160	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	260	700	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
C6 - C10 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	----	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	200	610	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	120	170	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	320	780	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	3	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	9	<5	<5	<5	<5
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	12	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5

EP075(SIM)S: Phenolic Compound Surrogates



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

Compound	CAS Num br	LOR	Unit	S5MB02	S5MB01	QA1	S4MB01	S4MB02
				05-APR-2011 08:30	05-APR-2011 15:00	06-APR-2011 15:00	06-APR-2011 15:00	06-APR-2011 14:00
				ES1107521-001	ES1107521-002	ES1107521-003	ES1107521-004	ES1107521-005
EP075(SIM)S: Phenolic Compound Surrogates - Continued								
Phenol-d6	13127-88-3	0.1	%	34.1	22.5	20.3	17.7	17.7
2-Chlorophenol-D4	93951-73-6	0.1	%	55.0	36.2	34.8	34.8	25.9
2,4,6-Tribromophenol	118-79-6	0.1	%	55.1	47.8	48.5	51.3	49.2
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	66.2	48.9	56.1	55.6	54.6
Anthracene-d10	1719-06-8	0.1	%	65.8	47.0	59.7	58.3	55.6
4-Terphenyl-d14	1718-51-0	0.1	%	52.9	46.1	50.0	49.6	47.2
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	120	125	119	112	116
Toluene-D8	2037-26-5	0.1	%	122	124	114	116	114
4-Bromofluorobenzene	460-00-4	0.1	%	116	118	118	114	112



Analytical Results

Sub-Matrix: WATER

Client sample ID
 Client sampling date / time

Compound	CAS Num br	LOR	Unit	S4MB03	S-TMB01	TMB01	TMB02	TMB03
				06-APR-2011 12:00	07-APR-2011 15:00	07-APR-2011 16:00	07-APR-2011 17:00	07-APR-2011 04:30
				ES1107521-006	ES1107521-007	ES1107521-008	ES1107521-009	ES1107521-010
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	3200	324	7530	3520	5830
EA015: Total Dissolved Solids								
^ Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	1800	236	4030	1910	3430
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	274	52	472	176	508
Total Alkalinity as CaCO3	----	1	mg/L	274	52	472	176	508
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	5	18	182	40	194
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	911	56	2140	1060	1500
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	22	12	184	106	162
Magnesium	7439-95-4	1	mg/L	6	8	169	70	124
Sodium	7440-23-5	1	mg/L	702	38	1130	533	868
Potassium	7440-09-7	1	mg/L	5	4	3	4	2
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.38	0.02	<0.01	<0.01	<0.01
Arsenic	7440-38-2	0.001	mg/L	0.002	<0.001	0.004	0.003	0.002
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L	1.54	0.044	0.197	0.541	0.189
Cadmium	7440-43-9	0.0001	mg/L	0.0004	0.0006	0.0002	<0.0001	0.0002
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.004	0.003	0.005
Copper	7440-50-8	0.001	mg/L	<0.001	0.003	0.001	0.001	0.002
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L	0.083	0.046	1.01	1.20	1.49
Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.001
Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.004	0.001	0.002
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Strontium	7440-24-6	0.001	mg/L	1.72	0.160	4.81	2.39	4.05
Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.006	<0.001	0.015
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	0.006	0.027	0.016	0.014	0.020
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	7439-89-6	0.05	mg/L	0.41	0.26	2.42	3.78	0.82
Bromine	7726-95-6	0.1	mg/L	1.4	0.2	3.7	2.2	2.7



Analytical Results

Sub-Matrix: WATER

Client sample ID
 Client sampling date / time

Compound	CAS Num br	LOR	Unit	S4MB03	S-TMB01	TMB01	TMB02	TMB03
				06-APR-2011 12:00	07-APR-2011 15:00	07-APR-2011 16:00	07-APR-2011 17:00	07-APR-2011 04:30
				ES1107521-006	ES1107521-007	ES1107521-008	ES1107521-009	ES1107521-010
EG052F: Dissolved Silica by ICPAES								
^ Silica	7631-86-9	0.1	mg/L	34.5	17.8	38.1	35.1	33.0
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.98	0.03	0.12	0.26	0.12
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
^ Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.03	<0.01	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.03	<0.01	<0.01	<0.01
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.11	0.08	0.22	0.11	0.06
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.01	mg/L	0.05	0.06	<0.01	0.05	0.03
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	31.3	2.99	73.8	34.2	56.6
^ Total Cations	----	0.01	meq/L	32.3	3.08	72.4	34.4	56.1
^ Ionic Balance	----	0.01	%	1.55	1.40	0.92	0.31	0.45
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	6	9	5	<1	<1
EP033: C1 - C4 Hydrocarbon Gases								
Methane	74-82-8	10	µg/L	31400	----	<10	19	<10
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-Methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

Compound	CAS Num br	LOR	Unit	S4MB03	S-TMB01	TMB01	TMB02	TMB03
				06-APR-2011 12:00	07-APR-2011 15:00	07-APR-2011 16:00	07-APR-2011 17:00	07-APR-2011 04:30
				ES1107521-006	ES1107521-007	ES1107521-008	ES1107521-009	ES1107521-010
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	160	200
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	110	100
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	270	300
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
C6 - C10 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	----	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	210	260
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	120	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	330	260
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<5	<5	<5	<5	<5
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5

EP075(SIM)S: Phenolic Compound Surrogates



Analytical Results

Sub-Matrix: WATER

Client sample ID
 Client sampling date / time

Compound	CAS Num br	LOR	Unit	S4MB03	S-TMB01	TMB01	TMB02	TMB03
				06-APR-2011 12:00	07-APR-2011 15:00	07-APR-2011 16:00	07-APR-2011 17:00	07-APR-2011 04:30
				ES1107521-006	ES1107521-007	ES1107521-008	ES1107521-009	ES1107521-010
EP075(SIM)S: Phenolic Compound Surrogates - Continued								
Phenol-d6	13127-88-3	0.1	%	19.2	18.4	26.0	19.4	27.5
2-Chlorophenol-D4	93951-73-6	0.1	%	36.4	27.2	40.9	37.4	46.7
2,4,6-Tribromophenol	118-79-6	0.1	%	43.5	41.6	42.4	40.8	46.9
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	51.1	48.4	54.4	56.9	54.2
Anthracene-d10	1719-06-8	0.1	%	53.2	52.1	54.5	58.8	66.4
4-Terphenyl-d14	1718-51-0	0.1	%	45.3	44.6	41.6	45.2	51.7
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	114	119	118	111	115
Toluene-D8	2037-26-5	0.1	%	117	112	111	112	114
4-Bromofluorobenzene	460-00-4	0.1	%	117	107	106	114	113



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

Compound	CAS Num br	LOR	Unit	WMB01	WMB02	WMB03	WMB04	BMB01
				07-APR-2011 01:30	07-APR-2011 12:30	07-APR-2011 13:00	07-APR-2011 12:00	07-APR-2011 09:00
				ES1107521-011	ES1107521-012	ES1107521-013	ES1107521-014	ES1107521-015
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	2450	4960	4490	3690	3870
EA015: Total Dissolved Solids								
^ Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	1560	3180	2740	2310	2120
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	141	420	380	484	431
Total Alkalinity as CaCO3	----	1	mg/L	141	420	380	484	431
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	198	591	436	137	18
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	621	1130	1060	933	1040
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	103	295	259	236	59
Magnesium	7439-95-4	1	mg/L	58	80	68	56	40
Sodium	7440-23-5	1	mg/L	312	670	653	462	733
Potassium	7440-09-7	1	mg/L	5	9	11	8	4
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.02
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.001	0.004	0.003
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L	0.151	0.063	0.089	0.150	0.414
Cadmium	7440-43-9	0.0001	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt	7440-48-4	0.001	mg/L	0.002	<0.001	0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	0.002	0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L	0.422	0.382	0.640	0.140	0.160
Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	0.003	<0.001	0.157	0.001	<0.001
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Strontium	7440-24-6	0.001	mg/L	0.964	4.26	6.01	5.82	2.62
Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.005	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	0.024	0.014	0.015	0.010	<0.005
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	7439-89-6	0.05	mg/L	0.24	3.61	4.99	1.79	0.45
Bromine	7726-95-6	0.1	mg/L	1.2	2.3	2.2	1.5	3.3



Analytical Results

Sub-Matrix: WATER

				Client sample ID				
				WMB01	WMB02	WMB03	WMB04	BMB01
				07-APR-2011 01:30	07-APR-2011 12:30	07-APR-2011 13:00	07-APR-2011 12:00	07-APR-2011 09:00
				Client sampling date / time				
Compound	CAS Num br	LOR	Unit	ES1107521-011	ES1107521-012	ES1107521-013	ES1107521-014	ES1107521-015
EG052F: Dissolved Silica by ICPAES								
^ Silica	7631-86-9	0.1	mg/L	35.1	32.1	32.4	30.8	18.3
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.81	1.44	1.94	0.31
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
^ Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.06	0.06	0.06	0.06	0.04
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.01	mg/L	0.02	0.03	0.02	0.05	0.01
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	24.5	52.6	46.5	38.8	38.2
^ Total Cations	----	0.01	meq/L	23.7	50.7	47.2	36.7	38.2
^ Ionic Balance	----	0.01	%	1.61	1.89	0.71	2.82	0.03
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	3	1	18	1	1
EP033: C1 - C4 Hydrocarbon Gases								
Methane	74-82-8	10	µg/L	<10	49	655	186	190
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-Methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

Compound	CAS Num br	LOR	Unit	WMB01	WMB02	WMB03	WMB04	BMB01
				07-APR-2011 01:30	07-APR-2011 12:30	07-APR-2011 13:00	07-APR-2011 12:00	07-APR-2011 09:00
				ES1107521-011	ES1107521-012	ES1107521-013	ES1107521-014	ES1107521-015
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	80	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	250	220	140	240	200
C29 - C36 Fraction	----	50	µg/L	280	130	100	200	190
^ C10 - C36 Fraction (sum)	----	50	µg/L	530	350	240	440	390
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
C6 - C10 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	----	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	350	300	180	400	280
>C34 - C40 Fraction	----	100	µg/L	360	110	120	170	220
^ >C10 - C40 Fraction (sum)	----	100	µg/L	710	410	300	570	500
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<5	<5	31	<5	<5
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	31	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5

EP075(SIM)S: Phenolic Compound Surrogates



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

Compound	CAS Num br	LOR	Unit	WMB01	WMB02	WMB03	WMB04	BMB01
				07-APR-2011 01:30	07-APR-2011 12:30	07-APR-2011 13:00	07-APR-2011 12:00	07-APR-2011 09:00
				ES1107521-011	ES1107521-012	ES1107521-013	ES1107521-014	ES1107521-015
EP075(SIM)S: Phenolic Compound Surrogates - Continued								
Phenol-d6	13127-88-3	0.1	%	23.9	19.9	26.3	17.1	18.9
2-Chlorophenol-D4	93951-73-6	0.1	%	39.2	41.4	65.6	42.2	48.7
2,4,6-Tribromophenol	118-79-6	0.1	%	38.5	50.4	45.1	42.8	47.0
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	41.9	48.8	40.8	45.8	56.4
Anthracene-d10	1719-06-8	0.1	%	58.0	69.3	57.0	59.2	63.6
4-Terphenyl-d14	1718-51-0	0.1	%	45.2	55.0	45.7	46.4	49.1
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	116	114	120	115	109
Toluene-D8	2037-26-5	0.1	%	111	112	115	111	117
4-Bromofluorobenzene	460-00-4	0.1	%	113	109	112	114	114



Analytical Results

Sub-Matrix: WATER

				Client sample ID				
				BMB02	---	---	---	---
				Client sampling date / time	07-APR-2011 09:30	---	---	---
Compound	CAS Num br	LOR	Unit	ES1107521-016	---	---	---	---
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	---	1	µS/cm	3250	---	---	---	---
EA015: Total Dissolved Solids								
^ Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	1980	---	---	---	---
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	---	---	---	---
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	42	---	---	---	---
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	703	---	---	---	---
Total Alkalinity as CaCO3	---	1	mg/L	745	---	---	---	---
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	129	---	---	---	---
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	570	---	---	---	---
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	6	---	---	---	---
Magnesium	7439-95-4	1	mg/L	2	---	---	---	---
Sodium	7440-23-5	1	mg/L	779	---	---	---	---
Potassium	7440-09-7	1	mg/L	6	---	---	---	---
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.09	---	---	---	---
Arsenic	7440-38-2	0.001	mg/L	0.002	---	---	---	---
Beryllium	7440-41-7	0.001	mg/L	<0.001	---	---	---	---
Barium	7440-39-3	0.001	mg/L	0.341	---	---	---	---
Cadmium	7440-43-9	0.0001	mg/L	0.0002	---	---	---	---
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	0.046	---	---	---	---
Molybdenum	7439-98-7	0.001	mg/L	0.016	---	---	---	---
Nickel	7440-02-0	0.001	mg/L	0.006	---	---	---	---
Selenium	7782-49-2	0.01	mg/L	<0.01	---	---	---	---
Strontium	7440-24-6	0.001	mg/L	0.931	---	---	---	---
Uranium	7440-61-1	0.001	mg/L	0.004	---	---	---	---
Vanadium	7440-62-2	0.01	mg/L	<0.01	---	---	---	---
Zinc	7440-66-6	0.005	mg/L	0.021	---	---	---	---
Boron	7440-42-8	0.05	mg/L	<0.05	---	---	---	---
Iron	7439-89-6	0.05	mg/L	<0.05	---	---	---	---
Bromine	7726-95-6	0.1	mg/L	1.6	---	---	---	---



Analytical Results

Sub-Matrix: **WATER**

			Client sample ID	BMB02	---	---	---	---
			Client sampling date / time	07-APR-2011 09:30	---	---	---	---
Compound	CAS Num br	LOR	Unit	ES1107521-016	---	---	---	---
EG052F: Dissolved Silica by ICPAES								
^ Silica	7631-86-9	0.1	mg/L	16.5	---	---	---	---
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.36	---	---	---	---
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	----	0.01	mg/L	0.04	---	---	---	---
EK058G: Nitrate as N by Discrete Analyser								
^ Nitrate as N	14797-55-8	0.01	mg/L	0.01	---	---	---	---
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.05	---	---	---	---
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.15	---	---	---	---
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.01	mg/L	0.14	---	---	---	---
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	33.6	---	---	---	---
^ Total Cations	----	0.01	meq/L	34.5	---	---	---	---
^ Ionic Balance	----	0.01	%	1.17	---	---	---	---
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	24	---	---	---	---
EP033: C1 - C4 Hydrocarbon Gases								
Methane	74-82-8	10	µg/L	16400	---	---	---	---
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	<1.0	---	---	---	---
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	---	---	---	---
2-Methylphenol	95-48-7	1.0	µg/L	<1.0	---	---	---	---
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	---	---	---	---
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	---	---	---	---
2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	---	---	---	---
2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	---	---	---	---
2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	---	---	---	---
4-Chloro-3-Methylphenol	59-50-7	1.0	µg/L	<1.0	---	---	---	---
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	---	---	---	---
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	---	---	---	---
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	---	---	---	---
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	---	---	---	---



Analytical Results

Sub-Matrix: WATER

				Client sample ID				
				BMB02	---	---	---	---
				Client sampling date / time	07-APR-2011 09:30	---	---	---
Compound	CAS Num br	LOR	Unit	ES1107521-016	---	---	---	---
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	---	---	---	---
Acenaphthene	83-32-9	1.0	µg/L	<1.0	---	---	---	---
Fluorene	86-73-7	1.0	µg/L	<1.0	---	---	---	---
Phenanthrene	85-01-8	1.0	µg/L	<1.0	---	---	---	---
Anthracene	120-12-7	1.0	µg/L	<1.0	---	---	---	---
Fluoranthene	206-44-0	1.0	µg/L	<1.0	---	---	---	---
Pyrene	129-00-0	1.0	µg/L	<1.0	---	---	---	---
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	---	---	---	---
Chrysene	218-01-9	1.0	µg/L	<1.0	---	---	---	---
Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	---	---	---	---
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	---	---	---	---
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	---	---	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	---	---	---	---
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	---	---	---	---
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	---	---	---	---
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	---	20	µg/L	<20	---	---	---	---
C10 - C14 Fraction	---	50	µg/L	<50	---	---	---	---
C15 - C28 Fraction	---	100	µg/L	120	---	---	---	---
C29 - C36 Fraction	---	50	µg/L	70	---	---	---	---
^ C10 - C36 Fraction (sum)	---	50	µg/L	190	---	---	---	---
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
C6 - C10 Fraction	---	20	µg/L	<20	---	---	---	---
^ C6 - C10 Fraction minus BTEX (F1)	---	20	µg/L	<20	---	---	---	---
>C10 - C16 Fraction	---	100	µg/L	<100	---	---	---	---
>C16 - C34 Fraction	---	100	µg/L	170	---	---	---	---
>C34 - C40 Fraction	---	100	µg/L	<100	---	---	---	---
^ >C10 - C40 Fraction (sum)	---	100	µg/L	170	---	---	---	---
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	---	---	---	---
Toluene	108-88-3	2	µg/L	<5	---	---	---	---
Ethylbenzene	100-41-4	2	µg/L	<2	---	---	---	---
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	---	---	---	---
ortho-Xylene	95-47-6	2	µg/L	<2	---	---	---	---
^ Total Xylenes	1330-20-7	2	µg/L	<2	---	---	---	---
^ Sum of BTEX	---	1	µg/L	<1	---	---	---	---
Naphthalene	91-20-3	5	µg/L	<5	---	---	---	---
EP075(SIM)S: Phenolic Compound Surrogates								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

BMB02

Client sampling date / time

07-APR-2011 09:30

Compound	CAS Num br	LOR	Unit	ES1107521-016				
EP075(SIM)S: Phenolic Compound Surrogates - Continued								
Phenol-d6	13127-88-3	0.1	%	19.0	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%	50.8	----	----	----	----
2,4,6-Tribromophenol	118-79-6	0.1	%	46.3	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	51.8	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%	56.8	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	45.1	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	123	----	----	----	----
Toluene-D8	2037-26-5	0.1	%	120	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	116	----	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Num br	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	64.1
2-Chlorophenol-D4	93951-73-6	11.3	122.9
2,4,6-Tribromophenol	118-79-6	11.7	144.0
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	19.9	122.8
Anthracene-d10	1719-06-8	23.3	125.8
4-Terphenyl-d14	1718-51-0	20.3	134.5
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	76.4	133.1
Toluene-D8	2037-26-5	79.6	126.8
4-Bromofluorobenzene	460-00-4	79.1	125.0



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1107521	Page	: 1 of 14
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: npearsehawkins@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 09-APR-2011
C-O-C number	: ----	Issue Date	: 18-APR-2011
Sampler	: NPH/SM	No. of samples received	: 16
Order number	: ----	No. of samples analysed	: 16
Quote number	: SY/394/09		

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Spectroscopist	Sydney Inorganics
Edwandy Fadjjar	Senior Organic Chemist	Sydney Organics
Raymond Commodor	Instrument Chemist	Sydney Inorganics
Sarah Millington	Senior Inorganic Chemist	Sydney Inorganics
Wisam.Marassa	Metals Coordinator	Sydney 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 insufficient 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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA010P: Conductivity by PC Titrator (QC Lot: 1743226)									
ES1107500-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	1280	1280	0.3	0% - 20%
ES1107521-003	QA1	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	3250	3220	1.0	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 1743228)									
ES1107521-012	WMB02	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	4960	4960	0.0	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1742765)									
ES1107162-014	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	95	92	3.2	0% - 20%
ES1107521-001	S5MB02	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	2550	2460	3.4	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1746368)									
ES1107333-001	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	220	202	8.5	0% - 20%
ES1107521-004	S4MB01	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	1820	1830	1.0	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1748272)									
ES1107264-001	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	123	134	8.6	0% - 20%
ES1107264-002	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	146	176	18.6	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1748555)									
ES1107418-011	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	944	960	1.7	0% - 20%
ES1107685-001	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	838	768	8.7	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1748591)									
ES1107521-009	TMB02	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	1910	1990	4.0	0% - 20%
ES1107586-001	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	72	78	8.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 1743223)									
ES1107307-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	22	22	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	22	22	0.0	0% - 20%
ES1107500-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	146	150	2.9	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	146	150	2.9	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 1743227)									
ES1107521-003	QA1	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	278	274	1.2	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	278	274	1.2	0% - 20%
ES1107521-012	WMB02	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit

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 Work Order : ES1107521
 Client : PARSONS BRINCKERHOFF AUST P/L
 Project : 2162406A



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 (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 1743227) - continued									
ES1107521-012	WMB02	ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	420	408	3.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	420	408	3.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 1742570)									
ES1107505-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	14	14	0.0	0% - 50%
ES1107521-005	S4MB02	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	38	38	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 1742576)									
ES1107521-016	BMB02	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	129	126	2.0	0% - 20%
ED045G: Chloride Discrete analyser (QC Lot: 1742569)									
ES1107505-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	54	55	1.9	0% - 20%
ES1107521-005	S4MB02	ED045G: Chloride	16887-00-6	1	mg/L	693	694	0.0	0% - 20%
ED045G: Chloride Discrete analyser (QC Lot: 1742575)									
ES1107521-016	BMB02	ED045G: Chloride	16887-00-6	1	mg/L	570	570	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 1742565)									
ES1107500-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	13	13	0.0	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	27	27	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	26	27	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.0	No Limit
ES1107521-003	QA1	ED093F: Calcium	7440-70-2	1	mg/L	22	22	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	6	6	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	658	665	1.1	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	5	5	0.0	No Limit
ED093F: Dissolved Major Cations (QC Lot: 1742571)									
ES1107521-013	WMB03	ED093F: Calcium	7440-70-2	1	mg/L	259	254	2.2	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	68	66	2.7	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	653	640	2.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	11	10	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1746680)									
ES1107342-001	Anonymous	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.107	0.112	4.5	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1746681)									
ES1107505-004	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.003	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.060	0.063	5.2	0% - 20%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.163	0.168	3.0	0% - 20%



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 (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1746681) - continued									
ES1107505-004	Anonymous	EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.005	<0.005	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.86	0.87	0.0	0% - 50%
ES1107521-008	TMB01	EG020A-F: Bromine	7726-95-6	0.1	mg/L	0.2	0.2	0.0	No Limit
		EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0002	0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.197	0.186	6.2	0% - 20%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	1.01	1.04	2.8	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.016	0.016	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	2.42	2.61	7.6	0% - 20%
EG020A-F: Bromine	7726-95-6	0.1	mg/L	3.7	3.7	0.0	0% - 20%		
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1746682)									
ES1107505-004	Anonymous	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.240	0.241	0.5	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1742680)									
ES1107505-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.07	0.0	No Limit
ES1107521-005	S4MB02	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.14	1.14	0.0	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1742682)									
ES1107521-016	BMB02	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.36	0.37	0.0	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1742566)									
ES1107500-001	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES1107521-002	S5MB01	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1742572)									
ES1107521-013	WMB03	EK057G: Nitrite as N	----	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 (%)	
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1747790)										
ES1107779-001	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1742679)										
ES1107505-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit	
ES1107521-005	S4MB02	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1742681)										
ES1107521-016	BMB02	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.01	0.0	No Limit	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1746335)										
ES1107227-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	1.77	1.64	7.6	0% - 20%	
ES1107521-007	S-TMB01	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.08	0.06	18.4	No Limit	
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1742568)										
ES1107521-004	S4MB01	EK071G: Reactive Phosphorus as P	----	0.01	mg/L	0.06	0.07	0.0	No Limit	
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1742574)										
ES1107521-015	BMB01	EK071G: Reactive Phosphorus as P	----	0.01	mg/L	0.01	0.01	0.0	No Limit	
EP005: Total Organic Carbon (TOC) (QC Lot: 1742972)										
ES1107496-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	21	20	4.9	0% - 20%	
ES1107505-004	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	3	2	40.0	No Limit	
EP005: Total Organic Carbon (TOC) (QC Lot: 1742973)										
ES1107521-009	TMB02	EP005: Total Organic Carbon	----	1	mg/L	<1	<1	0.0	No Limit	
ME1100364-004	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	<1	<1	0.0	No Limit	
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 1744869)										
ES1107521-001	S5MB02	EP033: Methane	74-82-8	10	µg/L	31800	32400	2.1	0% - 20%	
ES1107521-012	WMB02	EP033: Methane	74-82-8	10	µg/L	49	49	0.0	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1749097)										
ES1107521-004	S4MB01	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit	
ES1107521-010	TMB03	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 1749097)										
ES1107521-004	S4MB01	EP080: C6 - C10 Fraction	----	20	µg/L	<20	<20	0.0	No Limit	
ES1107521-010	TMB03	EP080: C6 - C10 Fraction	----	20	µg/L	<20	<20	0.0	No Limit	
EP080: BTEXN (QC Lot: 1749097)										
ES1107521-004	S4MB01	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit	
ES1107521-010	TMB03	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit	

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 Work Order : ES1107521
 Client : PARSONS BRINCKERHOFF AUST P/L
 Project : 2162406A



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 (%)
EP080: BTEXN (QC Lot: 1749097) - continued									
ES1107521-010	TMB03	EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	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: WATER

				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Low			High	
EA010P: Conductivity by PC Titrator (QCLot: 1743226)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	102	86.3	112
EA010P: Conductivity by PC Titrator (QCLot: 1743228)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	102	86.3	112
EA015: Total Dissolved Solids (QCLot: 1742765)								
EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	<1	293 mg/L	117	77.9	122
EA015: Total Dissolved Solids (QCLot: 1746368)								
EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	<1	293 mg/L	111	77.9	122
EA015: Total Dissolved Solids (QCLot: 1748272)								
EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	<1	293 mg/L	104	77.9	122
EA015: Total Dissolved Solids (QCLot: 1748555)								
EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	<1	293 mg/L	112	77.9	122
EA015: Total Dissolved Solids (QCLot: 1748591)								
EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	<1	293 mg/L	96.2	77.9	122
ED037P: Alkalinity by PC Titrator (QCLot: 1743223)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	88.2	80.2	108
ED037P: Alkalinity by PC Titrator (QCLot: 1743227)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	91.6	80.2	108
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1742570)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	10 mg/L	102	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1742576)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	10 mg/L	102	70	130
ED045G: Chloride Discrete analyser (QCLot: 1742569)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	1000 mg/L	102	83.7	124
ED045G: Chloride Discrete analyser (QCLot: 1742575)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	1000 mg/L	103	83.7	124
ED093F: Dissolved Major Cations (QCLot: 1742565)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	98.5	88	110
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	99.4	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	97.6	81	107
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	99.8	89	109
ED093F: Dissolved Major Cations (QCLot: 1742571)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	97.4	88	110



Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
ED093F: Dissolved Major Cations (QCLot: 1742571) - continued								
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.0	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	98.8	81	107
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	101	89	109
EG020F: Dissolved Metals by ICP-MS (QCLot: 1746680)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	# 85.8	88	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 1746681)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	# 88.1	92	112
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	96.2	88	110
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	95.5	80	114
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	89.9	85	109
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	90.7	89	107
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	# 87.1	89	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	88.5	87	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.6	90	110
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	87.2	87	113
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	97.8	84	114
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	89.1	89	109
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	100	79	119
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	# 72.5	91	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.8	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	83.9	71	127
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	96.0	84	114
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 1746682)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	# 87.7	88	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1742680)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.00 mg/L	96.9	79.6	122
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1742682)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.00 mg/L	104	79.6	122
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1742566)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.96 mg/L	107	70	129
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1742572)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.96 mg/L	105	70	129
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1747790)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.96 mg/L	103	70	129
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1742679)								



Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1742679) - continued								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.96 mg/L	111	76.9	122
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1742681)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.96 mg/L	106	76.9	122
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1746335)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	84.0	64.3	120
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1742568)								
EK071G: Reactive Phosphorus as P	----	0.01	mg/L	<0.01	0.50 mg/L	97.2	83.8	122
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1742574)								
EK071G: Reactive Phosphorus as P	----	0.01	mg/L	<0.01	0.50 mg/L	101	83.8	122
EP005: Total Organic Carbon (TOC) (QCLot: 1742972)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	90.8	86.9	125
EP005: Total Organic Carbon (TOC) (QCLot: 1742973)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	# 86.4	86.9	125
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 1744869)								
EP033: Methane	74-82-8	10	µg/L	<10	27.92 µg/L	98.4	91.3	115
EP075(SIM)A: Phenolic Compounds (QCLot: 1742956)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	----	.5 µg/L	41.7	24.5	61.9
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	----	.5 µg/L	81.0	63.8	110
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	----	.5 µg/L	72.9	55.9	112
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	----	1 µg/L	74.7	42.5	114
		2	µg/L	<2.0	----	----	----	----
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	----	.5 µg/L	78.9	62.7	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.2	µg/L	----	.5 µg/L	81.8	59.9	112
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.2	µg/L	----	.5 µg/L	81.6	59.3	122
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.2	µg/L	----	.5 µg/L	82.1	64.3	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	----	.5 µg/L	97.1	63	119
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.2	µg/L	----	.5 µg/L	65.2	58.7	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.2	µg/L	----	.5 µg/L	71.3	51.2	118
		1	µg/L	<1.0	----	----	----	----



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP075(SIM)A: Phenolic Compounds (QCLot: 1742956) - continued									
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	----	1 µg/L	83.6	6.85	95.6	
		2	µg/L	<2.0	----	----	----	----	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1742956)									
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	----	.5 µg/L	81.5	58.6	119	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	----	.5 µg/L	66.0	63.6	114	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	----	.5 µg/L	64.6	62.2	113	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	----	.5 µg/L	67.5	63.9	115	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	----	.5 µg/L	85.6	62.6	116	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	----	.5 µg/L	86.1	64.3	116	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	----	.5 µg/L	102	63.6	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	----	.5 µg/L	101	63.1	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	----	.5 µg/L	77.3	64.1	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	----	.5 µg/L	70.9	62.5	116	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.2	µg/L	----	.5 µg/L	74.5	61.7	119	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	----	.5 µg/L	78.9	61.7	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	----	.5 µg/L	76.4	63.3	117	
		0.5	µg/L	<0.5	----	----	----	----	
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	----	.5 µg/L	71.4	59.9	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.2	µg/L	----	.5 µg/L	71.2	61.2	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.2	µg/L	----	.5 µg/L	73.6	59.1	118	
		1	µg/L	<1.0	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1742955)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	100 µg/L	74.0	58.9	131	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	100 µg/L	110	73.9	138	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	100 µg/L	82.0	62.7	131	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1749097)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1749097) - continued									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	100	75	127	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1742955)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	100 µg/L	78.0	58.9	131	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	150 µg/L	105	73.9	138	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	
		50	µg/L	----	75 µg/L	74.7	62.7	131	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1749097)									
EP080: C6 - C10 Fraction	----	20	µg/L	<20	310 µg/L	81.5	75	127	
EP080: BTEXN (QCLot: 1749097)									
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	102	70	124	
EP080: Toluene	108-88-3	2	µg/L	----	10 µg/L	120	74.4	124	
		5	µg/L	<5	----	----	----	----	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	95.5	70	120	
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	94.6	69	121	
	106-42-3								
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	90.7	73	121	
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	95.7	72.9	127	



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: **WATER**

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1742570)							
ES1107505-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	2.5 mg/L	# Not Determined	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1742576)							
ES1107521-016	BMB02	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	2.5 mg/L	# Not Determined	70	130
ED045G: Chloride Discrete analyser (QCLot: 1742569)							
ES1107505-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	121	70	130
ED045G: Chloride Discrete analyser (QCLot: 1742575)							
ES1107521-016	BMB02	ED045G: Chloride	16887-00-6	250 mg/L	98.2	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 1746681)							
ES1107505-004	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	83.8	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	81.0	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	84.2	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	80.8	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	80.6	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	75.2	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	82.0	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	73.2	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	81.5	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	73.9	70	130
EG020A-F: Zinc	7440-66-6	0.2 mg/L	80.3	70	130		
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1742680)							
ES1107505-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1.00 mg/L	88.1	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1742682)							
ES1107521-016	BMB02	EK055G: Ammonia as N	7664-41-7	1.00 mg/L	87.6	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1742566)							
ES1107500-001	Anonymous	EK057G: Nitrite as N	----	0.60 mg/L	98.6	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1742572)							
ES1107521-013	WMB03	EK057G: Nitrite as N	----	0.60 mg/L	95.1	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1747790)							
ES1107779-001	Anonymous	EK057G: Nitrite as N	----	0.60 mg/L	102	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1742679)							
ES1107505-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.60 mg/L	108	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1742681)							



Sub-Matrix: WATER

				Matrix Spike (MS) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	Spike Recovery (%)	Recovery Limits (%)		
				Concentration	MS	Low	High	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1742681) - continued								
ES1107521-016	BMB02	EK059G: Nitrite + Nitrate as N	----	0.60 mg/L	113	70	130	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1746335)								
ES1107227-003	Anonymous	EK067G: Total Phosphorus as P	----	1.00 mg/L	112	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1742574)								
ES1107521-015	BMB01	EK071G: Reactive Phosphorus as P	----	0.50 mg/L	103	70	130	
EP005: Total Organic Carbon (TOC) (QCLot: 1742972)								
ES1107496-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	82.8	70	130	
EP005: Total Organic Carbon (TOC) (QCLot: 1742973)								
ES1107521-010	TMB03	EP005: Total Organic Carbon	----	100 mg/L	89.8	70	130	
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 1744869)								
ES1107521-002	S5MB01	EP033: Methane	74-82-8	27.92 µg/L	90.2	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1749097)								
ES1107521-004	S4MB01	EP080: C6 - C9 Fraction	----	325 µg/L	93.1	70	130	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1749097)								
ES1107521-004	S4MB01	EP080: C6 - C10 Fraction	----	375 µg/L	87.1	70	130	
EP080: BTEXN (QCLot: 1749097)								
ES1107521-004	S4MB01	EP080: Benzene	71-43-2	25 µg/L	90.7	70	130	
		EP080: Toluene	108-88-3	25 µg/L	110	70	130	
		EP080: Ethylbenzene	100-41-4	25 µg/L	96.1	70	130	
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	93.9	70	130	
			106-42-3					
		EP080: ortho-Xylene	95-47-6	25 µg/L	94.9	70	130	
		EP080: Naphthalene	91-20-3	25 µg/L	91.8	70	130	



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1107521	Page	: 1 of 15
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Contact	: Loren Schiavon
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Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 09-APR-2011
C-O-C number	: ----	Issue Date	: 18-APR-2011
Sampler	: NPH/SM	No. of samples received	: 16
Order number	: ----	No. of samples analysed	: 16
Quote number	: SY/394/09		

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: **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
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural S5MB02, S5MB01	05-APR-2011	---	03-MAY-2011	----	11-APR-2011	03-MAY-2011	✓
Clear Plastic Bottle - Natural QA1, S4MB02, S4MB03	06-APR-2011	---	04-MAY-2011	----	11-APR-2011	04-MAY-2011	✓
Clear Plastic Bottle - Natural S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	---	05-MAY-2011	----	11-APR-2011	05-MAY-2011	✓
EA015: Total Dissolved Solids							
Clear Plastic Bottle - Natural S5MB02, S5MB01	05-APR-2011	----	----	----	11-APR-2011	12-APR-2011	✓
Clear Plastic Bottle - Natural QA1, S4MB02, S4MB03	06-APR-2011	----	----	----	13-APR-2011	13-APR-2011	✓
Clear Plastic Bottle - Natural S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	----	----	----	14-APR-2011	14-APR-2011	✓



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	
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural S5MB02, S5MB01	05-APR-2011	---	19-APR-2011	----	11-APR-2011	19-APR-2011	✓	
Clear Plastic Bottle - Natural QA1, S4MB02, S4MB01, S4MB03	06-APR-2011	---	20-APR-2011	----	11-APR-2011	20-APR-2011	✓	
Clear Plastic Bottle - Natural S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	---	21-APR-2011	----	11-APR-2011	21-APR-2011	✓	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural S5MB02, S5MB01	05-APR-2011	---	03-MAY-2011	----	09-APR-2011	03-MAY-2011	✓	
Clear Plastic Bottle - Natural QA1, S4MB02, S4MB01, S4MB03	06-APR-2011	---	04-MAY-2011	----	09-APR-2011	04-MAY-2011	✓	
Clear Plastic Bottle - Natural S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	---	05-MAY-2011	----	09-APR-2011	05-MAY-2011	✓	
ED045G: Chloride Discrete analyser								
Clear Plastic Bottle - Natural S5MB02, S5MB01	05-APR-2011	---	03-MAY-2011	----	09-APR-2011	03-MAY-2011	✓	
Clear Plastic Bottle - Natural QA1, S4MB02, S4MB01, S4MB03	06-APR-2011	---	04-MAY-2011	----	09-APR-2011	04-MAY-2011	✓	
Clear Plastic Bottle - Natural S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	---	05-MAY-2011	----	09-APR-2011	05-MAY-2011	✓	



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	
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural S5MB02,	S5MB01	05-APR-2011	---	12-APR-2011	----	10-APR-2011	12-APR-2011	✓
Clear Plastic Bottle - Natural QA1, S4MB02,	S4MB01, S4MB03	06-APR-2011	---	13-APR-2011	----	10-APR-2011	13-APR-2011	✓
Clear Plastic Bottle - Natural S-TMB01, TMB02, WMB01, WMB03, BMB01,	TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	---	14-APR-2011	----	10-APR-2011	14-APR-2011	✓
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Filtered S5MB02,	S5MB01	05-APR-2011	---	02-OCT-2011	----	14-APR-2011	02-OCT-2011	✓
Clear Plastic Bottle - Nitric Acid; Filtered QA1, S4MB02,	S4MB01, S4MB03	06-APR-2011	---	03-OCT-2011	----	14-APR-2011	03-OCT-2011	✓
Clear Plastic Bottle - Nitric Acid; Filtered S-TMB01, TMB02, WMB01, WMB03, BMB01,	TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	---	04-OCT-2011	----	14-APR-2011	04-OCT-2011	✓
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid S5MB02,	S5MB01	05-APR-2011	---	03-MAY-2011	----	10-APR-2011	03-MAY-2011	✓
Clear Plastic Bottle - Sulfuric Acid QA1, S4MB02,	S4MB01, S4MB03	06-APR-2011	---	04-MAY-2011	----	10-APR-2011	04-MAY-2011	✓
Clear Plastic Bottle - Sulfuric Acid S-TMB01, TMB02, WMB01, WMB03, BMB01,	TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	---	05-MAY-2011	----	10-APR-2011	05-MAY-2011	✓



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	
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural S5MB02, S5MB01	05-APR-2011	---	07-APR-2011	----	09-APR-2011	07-APR-2011	*	
Clear Plastic Bottle - Natural QA1, S4MB02, S4MB03	06-APR-2011	---	08-APR-2011	----	09-APR-2011	08-APR-2011	*	
Clear Plastic Bottle - Natural S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	---	09-APR-2011	----	09-APR-2011	09-APR-2011	✓	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid S5MB02, S5MB01	05-APR-2011	---	03-MAY-2011	----	10-APR-2011	03-MAY-2011	✓	
Clear Plastic Bottle - Sulfuric Acid QA1, S4MB02, S4MB03	06-APR-2011	---	04-MAY-2011	----	10-APR-2011	04-MAY-2011	✓	
Clear Plastic Bottle - Sulfuric Acid S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	---	05-MAY-2011	----	10-APR-2011	05-MAY-2011	✓	
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid S5MB02, S5MB01	05-APR-2011	13-APR-2011	03-MAY-2011	✓	13-APR-2011	03-MAY-2011	✓	
Clear Plastic Bottle - Sulfuric Acid QA1, S4MB02, S4MB03	06-APR-2011	13-APR-2011	04-MAY-2011	✓	13-APR-2011	04-MAY-2011	✓	
Clear Plastic Bottle - Sulfuric Acid S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	13-APR-2011	05-MAY-2011	✓	13-APR-2011	05-MAY-2011	✓	



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
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural S5MB02, S5MB01	05-APR-2011	---	07-APR-2011	----	09-APR-2011	07-APR-2011	*
Clear Plastic Bottle - Natural QA1, S4MB02, S4MB03	06-APR-2011	---	08-APR-2011	----	09-APR-2011	08-APR-2011	*
Clear Plastic Bottle - Natural S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	---	09-APR-2011	----	09-APR-2011	09-APR-2011	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid S5MB02, S5MB01	05-APR-2011	----	----	----	11-APR-2011	03-MAY-2011	✓
Amber TOC Vial - Sulfuric Acid QA1, S4MB02, S4MB03	06-APR-2011	----	----	----	11-APR-2011	04-MAY-2011	✓
Amber TOC Vial - Sulfuric Acid S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	----	----	----	11-APR-2011	05-MAY-2011	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - H2SO4 for C1 - C4 Gases S5MB02, S5MB01	05-APR-2011	----	----	----	12-APR-2011	19-APR-2011	✓
Amber VOC Vial - H2SO4 for C1 - C4 Gases QA1, S4MB02, S4MB03	06-APR-2011	----	----	----	12-APR-2011	20-APR-2011	✓
Amber VOC Vial - H2SO4 for C1 - C4 Gases TMB01, TMB03, WMB02, WMB04, BMB02, TMB02, WMB01, WMB03, BMB01	07-APR-2011	----	----	----	12-APR-2011	21-APR-2011	✓



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	
EP075(SIM)A: Phenolic Compounds								
Amber Glass Bottle - Unpreserved S5MB02,	S5MB01	05-APR-2011	11-APR-2011	12-APR-2011	✓	12-APR-2011	21-MAY-2011	✓
Amber Glass Bottle - Unpreserved QA1, S4MB02,	S4MB01, S4MB03	06-APR-2011	11-APR-2011	13-APR-2011	✓	12-APR-2011	21-MAY-2011	✓
Amber Glass Bottle - Unpreserved S-TMB01, TMB02, WMB01, WMB03, BMB01,	TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	11-APR-2011	14-APR-2011	✓	12-APR-2011	21-MAY-2011	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved S5MB02,	S5MB01	05-APR-2011	11-APR-2011	12-APR-2011	✓	12-APR-2011	21-MAY-2011	✓
Amber Glass Bottle - Unpreserved QA1, S4MB02,	S4MB01, S4MB03	06-APR-2011	11-APR-2011	13-APR-2011	✓	12-APR-2011	21-MAY-2011	✓
Amber Glass Bottle - Unpreserved S-TMB01, TMB02, WMB01, WMB03, BMB01,	TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	11-APR-2011	14-APR-2011	✓	12-APR-2011	21-MAY-2011	✓



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	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved S5MB02, S5MB01	05-APR-2011	11-APR-2011	12-APR-2011	✓	12-APR-2011	21-MAY-2011	✓	
Amber Glass Bottle - Unpreserved QA1, S4MB02, S4MB03	06-APR-2011	11-APR-2011	13-APR-2011	✓	12-APR-2011	21-MAY-2011	✓	
Amber Glass Bottle - Unpreserved S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	11-APR-2011	14-APR-2011	✓	12-APR-2011	21-MAY-2011	✓	
Amber VOC Vial - HCl S5MB02, S5MB01	05-APR-2011	15-APR-2011	19-APR-2011	✓	15-APR-2011	19-APR-2011	✓	
Amber VOC Vial - HCl QA1, S4MB02, S4MB03	06-APR-2011	15-APR-2011	20-APR-2011	✓	15-APR-2011	20-APR-2011	✓	
Amber VOC Vial - HCl S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	15-APR-2011	21-APR-2011	✓	15-APR-2011	21-APR-2011	✓	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
Amber Glass Bottle - Unpreserved S5MB02, S5MB01	05-APR-2011	11-APR-2011	12-APR-2011	✓	12-APR-2011	21-MAY-2011	✓	
Amber Glass Bottle - Unpreserved QA1, S4MB02, S4MB03	06-APR-2011	11-APR-2011	13-APR-2011	✓	12-APR-2011	21-MAY-2011	✓	
Amber Glass Bottle - Unpreserved S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	11-APR-2011	14-APR-2011	✓	12-APR-2011	21-MAY-2011	✓	
Amber VOC Vial - HCl S5MB02, S5MB01	05-APR-2011	15-APR-2011	19-APR-2011	✓	15-APR-2011	19-APR-2011	✓	
Amber VOC Vial - HCl QA1, S4MB02, S4MB03	06-APR-2011	15-APR-2011	20-APR-2011	✓	15-APR-2011	20-APR-2011	✓	
Amber VOC Vial - HCl S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	15-APR-2011	21-APR-2011	✓	15-APR-2011	21-APR-2011	✓	



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		
EP080: BTEXN									
Amber VOC Vial - HCl S5MB02, S5MB01	05-APR-2011	15-APR-2011	19-APR-2011	✓	15-APR-2011	19-APR-2011	✓		
Amber VOC Vial - HCl QA1, S4MB02, S4MB01, S4MB03	06-APR-2011	15-APR-2011	20-APR-2011	✓	15-APR-2011	20-APR-2011	✓		
Amber VOC Vial - HCl S-TMB01, TMB02, WMB01, WMB03, BMB01, TMB01, TMB03, WMB02, WMB04, BMB02	07-APR-2011	15-APR-2011	21-APR-2011	✓	15-APR-2011	21-APR-2011	✓		



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

Quality Control Sample Type	Analytical Method	Method	Count		Rate (%)			Quality Control Specification
			QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)								
Alkalinity by PC Titrator		ED037-P	4	34	11.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser		EK055G	3	21	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases		EP033	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	3	21	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	3	23	13.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	2	19	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	2	26	7.7	10.0	*	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved		ED040F	2	5	40.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	3	28	10.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	3	21	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser		EK057G	4	25	16.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser		EK071G	2	25	8.0	10.0	*	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	3	21	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids		EA015	10	90	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon		EP005	4	31	12.9	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser		EK067G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX		EP080	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)								
Alkalinity by PC Titrator		ED037-P	2	34	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser		EK055G	2	21	9.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases		EP033	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	4	21	19.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	2	23	8.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	2	26	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved		ED040F	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	2	28	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	2	21	9.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser		EK057G	3	25	12.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)		EP075(SIM)	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser		EK071G	2	25	8.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	2	21	9.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids		EA015	5	90	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon		EP005	2	31	6.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser		EK067G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction		EP071	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX		EP080	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)								
Ammonia as N by Discrete analyser		EK055G	2	21	9.5	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 Method	Method	QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
C1 - C4 Gases	EP033	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	21	9.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	2	23	8.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	2	26	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved	ED040F	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	2	28	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	21	9.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	3	25	12.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	25	8.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	21	9.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids	EA015	5	90	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	31	6.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatle Fraction	EP071	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	2	21	9.5	5.0	✓	ALS QCS3 requirement
C1 - C4 Gases	EP033	1	20	5.0	5.0	✓	ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	21	9.5	5.0	✓	ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	5.3	5.0	✓	ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	21	9.5	5.0	✓	ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	3	25	12.0	5.0	✓	ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	20.0	5.0	✓	ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	21	9.5	5.0	✓	ALS QCS3 requirement
Total Organic Carbon	EP005	2	31	6.5	5.0	✓	ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.0	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	5.0	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 Method	Method	Matrix	Method Descriptions
Conductivity by PC Titrator	EA010-P	WATER	APHA 21st ed., 2510 B This procedure determines conductivity by automated ISE. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Dissolved Solids	EA015	WATER	APHA 21st ed., 2540C A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Alkalinity by PC Titrator	ED037-P	WATER	APHA 21st ed., 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Major Anions - Dissolved	ED040F	WATER	APHA 21st ed., 3120. The 0.45um filtered samples are determined by ICP/AES for Sulfur and/or Silicon content and reported as Sulfate and/or Silica after conversion by gravimetric factor.
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	APHA 21st ed., 4500-SO4 Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Chloride by Discrete Analyser	ED045G	WATER	APHA 21st ed., 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	APHA 21st ed., 3120; USEPA SW 846 - 6010 The ICPAES technique ionises the 0.45um filtered 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)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Silica (Total Dissolved) by ICPAES	EG052F	WATER	APHA 21st ed., 4500-SiO2. Silica (Total) determined by calculation from Silicon by ICPAES.
Ammonia as N by Discrete analyser	EK055G	WATER	APHA 21st ed., 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrite as N by Discrete Analyser	EK057G	WATER	APHA 21st ed., 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrate as N by Discrete Analyser	EK058G	WATER	APHA 21st ed., 4500-NO3- F. Nitrate is reduced to nitrite by way of a cadmium reduction column followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	APHA 21st ed., 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Cadmium Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)



Analytical Method	Method	Matrix	Method Descriptions
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	APHA 21st ed., 4500-P B&F This procedure involves sulphuric acid digestion of a 100mL sample to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	APHA 21st ed., 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Ionic Balance by PCT DA and ICPAES	EN055 - PG	WATER	APHA 21st Ed. 1030F. The Ionic Balance is calculated based on the major Anions and Cations. The major anions include Alkalinity, Chloride and Sulfate which determined by PCT and DA. The Cations are determined by ICPAES. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Organic Carbon	EP005	WATER	APHA 21st ed., 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TPH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
TPH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

Preparation Method	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	APHA 21st ed., 4500 Norg - D; APHA 21st ed., 4500 P - H. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 500 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2). ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



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: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EG020F: Dissolved Metals by ICP-MS	2055135-036	----	Aluminium	7429-90-5	88.1 %	92-112%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2055135-036	----	Cobalt	7440-48-4	87.1 %	89-109%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2055135-036	----	Vanadium	7440-62-2	72.5 %	91-109%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2055135-003	----	Strontium	7440-24-6	85.8 %	88-112%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2055135-036	----	Strontium	7440-24-6	87.7 %	88-112%	Recovery less than lower control limit
EP005: Total Organic Carbon (TOC)	2050526-102	----	Total Organic Carbon	----	86.4 %	86.9-125%	Recovery less than lower control limit
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1107521-016	BMB02	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1107505-001	Anonymous	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

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

Method	Extraction / Preparation			Analysis				
	Container / Client Sample ID(s)	Date extracte d	Due for extraction	Days overdue	Date analyse d	Due for analysis	Days overdue	
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural	S5MB02,	S5MB01	----	----	----	09-APR-2011	07-APR-2011	2
Clear Plastic Bottle - Natural	QA1,	S4MB01,	----	----	----	09-APR-2011	08-APR-2011	1
	S4MB02,	S4MB03						
EK071G: Reactive Phosphorus as P by discrete analyser								



Matrix: **WATER**

Method Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracte d	Due for extraction	Days overdue	Date analyse d	Due for analysis	Days overdue
EK071G: Reactive Phosphorus as P by discrete analyser - Analysis Holding Time Compliance						
Clear Plastic Bottle - Natural S5MB02, S5MB01	----	----	----	09-APR-2011	07-APR-2011	2
Clear Plastic Bottle - Natural QA1, S4MB02, S4MB03	----	----	----	09-APR-2011	08-APR-2011	1

Outliers : Frequency of Quality Control Samples

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

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Dissolved Metals by ICP-MS - Suite B	2	26	7.7	10.0	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	2	25	8.0	10.0	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1108098	Page	: 1 of 7
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MR JAMES DUGGLEBY	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jduggleby@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 15-APR-2011
Sampler	: NPH/SM	Issue Date	: 29-APR-2011
Site	: ----		
Quote number	: SY/394/09	No. of samples received	: 5
		No. of samples analysed	: 5

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
- Surrogate Control 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Spectroscopist	Sydney Inorganics
Edwandy Fadjar	Senior Organic Chemist	Sydney Organics
Hoa Nguyen	Inorganic Chemist	Sydney Inorganics
Phalak Inthaksone	Organics Co-ordinator	Sydney Organics
Sarah Millington	Senior Inorganic Chemist	Sydney Inorganics

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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 insufficient 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

- **EA015 LCS recovery for TDS fall outside ALS dynamic control limits. However, they are within the acceptance criteria based on ALS DQO. No further action is required.**
- **EA015 TDS may bias high for various samples due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.**
- **EA015 TDS result has been confirmed by re-analysis for sample ID "RMB0 and RMB02".**
- **EG020: Bromine & Iodine quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.**
- **EG020: LCS recoveries for some elements fall outside ALS Dynamic Control Limit. However, they are within the acceptance criteria based on ALS DQO. No further action is required.**
- **EP080: Level of reporting raised for toluene due to ambient background levels in the laboratory.**
- **EPO80: Results for TCMB03 and RMB02 have been confirmed.**
- **LCS recovery for potassium falls outside ALS Dynamic Control Limit. However, it is within the acceptance criteria based on ALS DQO. No further action is required.**



Analytical Results

Sub-Matrix: WATER

				Client sample ID				
				TCMB03	TMB04	TMB05	RMB01	RMB02
				14-APR-2011 15:00	13-APR-2011 11:00	13-APR-2011 14:00	12-APR-2011 10:00	12-APR-2011 12:00
				Client sampling date / time				
Compound	CAS Num br	LOR	Unit	ES1108098-001	ES1108098-002	ES1108098-003	ES1108098-004	ES1108098-005
EA005: pH								
pH Value	----	0.01	pH Unit	9.97	6.87	6.41	6.88	7.25
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	3020	8300	8770	11100	8380
EA015: Total Dissolved Solids								
^ Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	1790	4640	5150	6090	----
Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	----	----	----	----	4850
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	359	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	149	365	146	832	1040
Total Alkalinity as CaCO3	----	1	mg/L	508	365	146	832	1040
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2	654	485	5	214
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	801	2430	2830	3420	2440
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	3	132	104	173	77
Magnesium	7439-95-4	1	mg/L	8	239	278	100	56
Sodium	7440-23-5	1	mg/L	672	1250	1330	1990	1780
Potassium	7440-09-7	1	mg/L	8	23	18	13	12
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.10	0.03	<0.01	<0.01	0.02
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.003	0.004	0.001	0.021
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L	0.637	0.107	0.104	17.5	0.760
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0001	<0.0001	0.0002	0.0002
Chromium	7440-47-3	0.001	mg/L	<0.001	0.002	<0.001	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L	<0.001	0.098	0.265	0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	0.002	0.001	0.006	0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L	0.020	10.4	22.2	0.050	0.184
Molybdenum	7439-98-7	0.001	mg/L	0.004	0.001	<0.001	0.003	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	0.041	0.113	0.002	0.005
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Strontium	7440-24-6	0.001	mg/L	1.04	1.14	1.24	16.7	6.58
Uranium	7440-61-1	0.001	mg/L	<0.001	0.005	0.002	<0.001	0.012
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

Compound	CAS Num	br	LOR	Unit	TCMB03	TMB04	TMB05	RMB01	RMB02
					14-APR-2011 15:00	13-APR-2011 11:00	13-APR-2011 14:00	12-APR-2011 10:00	12-APR-2011 12:00
					ES1108098-001	ES1108098-002	ES1108098-003	ES1108098-004	ES1108098-005
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6		0.005	mg/L	0.036	0.029	0.208	0.028	0.007
Boron	7440-42-8		0.05	mg/L	<0.05	<0.05	<0.05	<0.05	0.09
Iron	7439-89-6		0.05	mg/L	0.13	5.52	64.2	1.63	0.07
Bromine	7726-95-6		0.1	mg/L	0.9	3.5	2.2	8.1	4.9
Iodine	7553-56-2		0.1	mg/L	<0.1	<0.1	0.2	0.1	0.2
EG052F: Dissolved Silica by ICPAES									
^ Silica	7631-86-9		0.1	mg/L	11.4	47.8	41.8	17.6	22.9
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7		0.01	mg/L	0.78	0.22	0.21	3.08	1.74
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----		0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
^ Nitrate as N	14797-55-8		0.01	mg/L	0.01	<0.01	0.02	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----		0.01	mg/L	0.01	<0.01	0.02	<0.01	<0.01
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----		0.01	mg/L	0.20	0.57	0.32	0.11	0.11
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	----		0.01	mg/L	0.09	0.01	0.02	0.09	0.05
EN055: Ionic Balance									
^ Total Anions	----		0.01	meq/L	32.8	89.4	92.8	113	94.2
^ Total Cations	----		0.01	meq/L	30.3	81.2	86.4	104	86.2
^ Ionic Balance	----		0.01	%	4.04	4.82	3.59	4.37	4.46
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----		1	mg/L	23	12	32	10	52
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8		10	µg/L	26000	<10	<10	34500	134
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	95-57-8		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7		1.0	µg/L	1.2	<1.0	<1.0	<1.0	<1.0
3- & 4-Methylphenol	1319-77-3		2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
2-Nitrophenol	88-75-5		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	105-67-9		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dichlorophenol	120-83-2		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,6-Dichlorophenol	87-65-0		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

Compound	CAS Num	br	LOR	Unit	TCMB03	TMB04	TMB05	RMB01	RMB02
					14-APR-2011 15:00	13-APR-2011 11:00	13-APR-2011 14:00	12-APR-2011 10:00	12-APR-2011 12:00
					ES1108098-001	ES1108098-002	ES1108098-003	ES1108098-004	ES1108098-005
EP075(SIM)A: Phenolic Compounds - Continued									
4-Chloro-3-Methylphenol	59-50-7		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,6-Trichlorophenol	88-06-2		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,5-Trichlorophenol	95-95-4		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorophenol	87-86-5		2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b)fluoranthene	205-99-2		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8		0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene	53-70-3		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2		1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----		20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----		50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----		100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----		50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----		50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft									
C6 - C10 Fraction	----		20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	----		20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----		100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----		100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----		100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----		100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2		1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3		2	µg/L	5	<5	<5	<5	6
Ethylbenzene	100-41-4		2	µg/L	<2	<2	<2	<2	<2



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

Compound	CAS Num br	LOR	Unit	TCMB03	TMB04	TMB05	RMB01	RMB02
				14-APR-2011 15:00	13-APR-2011 11:00	13-APR-2011 14:00	12-APR-2011 10:00	12-APR-2011 12:00
				ES1108098-001	ES1108098-002	ES1108098-003	ES1108098-004	ES1108098-005
EP080: BTEXN - Continued								
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	5	<1	<1	<1	6
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	17.7	15.4	15.0	34.1	33.2
2-Chlorophenol-D4	93951-73-6	0.1	%	38.5	41.8	43.1	63.1	57.0
2,4,6-Tribromophenol	118-79-6	0.1	%	44.8	51.6	60.5	89.2	72.4
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	53.6	49.7	50.0	63.9	61.3
Anthracene-d10	1719-06-8	0.1	%	46.2	54.3	56.4	86.5	71.2
4-Terphenyl-d14	1718-51-0	0.1	%	48.3	45.4	50.0	80.1	67.1
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	106	123	127	126	106
Toluene-D8	2037-26-5	0.1	%	104	109	111	105	107
4-Bromofluorobenzene	460-00-4	0.1	%	105	115	117	115	104



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Num br	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	64.1
2-Chlorophenol-D4	93951-73-6	11.3	122.9
2,4,6-Tribromophenol	118-79-6	11.7	144.0
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	19.9	122.8
Anthracene-d10	1719-06-8	23.3	125.8
4-Terphenyl-d14	1718-51-0	20.3	134.5
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	76.4	133.1
Toluene-D8	2037-26-5	79.6	126.8
4-Bromofluorobenzene	460-00-4	79.1	125.0



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1108098	Page	: 1 of 16
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MR JAMES DUGGLEBY	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jduggleby@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 15-APR-2011
C-O-C number	: ----	Issue Date	: 29-APR-2011
Sampler	: NPH/SM	No. of samples received	: 5
Order number	: ----	No. of samples analysed	: 5
Quote number	: SY/394/09		

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Spectroscopist	Sydney Inorganics
Edwandy Fadjar	Senior Organic Chemist	Sydney Organics
Hoa Nguyen	Inorganic Chemist	Sydney Inorganics
Phalak Inthaksone	Organics Co-ordinator	Sydney Organics
Sarah Millington	Senior Inorganic Chemist	Sydney 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 insufficient 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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005: pH (QC Lot: 1752571)									
ES1107970-001	Anonymous	EA005: pH Value	----	0.01	pH Unit	7.53	7.52	0.1	0% - 20%
ES1108099-004	Anonymous	EA005: pH Value	----	0.01	pH Unit	11.1	11.1	0.0	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 1755475)									
ES1108059-004	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	975	977	0.2	0% - 20%
ES1108062-009	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	100	99	0.0	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1753483)									
ES1108055-001	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	8070	8380	3.8	0% - 20%
ES1108062-005	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	77	73	5.3	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1753484)									
ES1108098-004	RMB01	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	6090	6160	1.3	0% - 20%
EW1101243-002	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	416	420	1.0	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1755783)									
ES1108139-002	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	218	219	0.4	0% - 20%
ES1108062-007	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	84	90	6.9	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 1755476)									
ES1108098-001	TCMB03	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	359	384	6.6	0% - 20%
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	149	134	10.4	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	508	518	1.9	0% - 20%
ES1108127-005	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	109	106	2.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	109	106	2.3	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 1752531)									
ES1107912-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	314	325	3.6	0% - 20%
ES1107912-010	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	360	357	1.0	0% - 20%
ED045G: Chloride Discrete analyser (QC Lot: 1752530)									
ES1107912-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	3110	3110	0.08	0% - 20%
ES1107912-010	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	376	367	2.4	0% - 20%
ED045G: Chloride Discrete analyser (QC Lot: 1752535)									
ES1108098-005	RMB02	ED045G: Chloride	16887-00-6	1	mg/L	2440	2370	3.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 1752528)									
ES1107912-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	188	185	1.8	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	10	9	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 (%)
ED093F: Dissolved Major Cations (QC Lot: 1752528) - continued									
ES1107912-001	Anonymous	ED093F: Sodium	7440-23-5	1	mg/L	1590	1580	1.1	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	24	24	0.0	0% - 20%
ES1107912-011	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	13	12	0.0	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	9	8	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	1630	1610	1.1	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	9	9	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1754716)									
ES1108043-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	2.01	2.05	1.9	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.004	0.005	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.097	0.107	9.9	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.006	0.007	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.047	0.047	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.27	0.30	12.8	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	2.78	3.06	9.8	0% - 20%
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	0.3	0.3	0.0	No Limit
EG020A-F: Iodine	7553-56-2	0.1	mg/L	<0.1	<0.1	0.0	No Limit		
EW1101306-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0024	0.0021	17.4	0% - 20%
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.012	0.012	0.0	0% - 50%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.007	0.007	0.0	No Limit
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.09	0.10	0.0	0% - 50%

Page : 5 of 16
 Work Order : ES1108098
 Client : PARSONS BRINCKERHOFF AUST P/L
 Project : 2162406A



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 (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1754716) - continued									
EW1101306-002	Anonymous	EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.14	0.13	0.0	No Limit
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG020A-F: Iodine	7553-56-2	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1754717)									
ES1108043-001	Anonymous	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.763	0.766	0.4	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EW1101306-002	Anonymous	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.034	0.033	0.0	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1752636)									
ES1108098-001	TCMB03	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.78	0.79	0.0	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1752529)									
ES1107912-001	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	3.59	3.59	0.0	0% - 20%
ES1107912-010	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1752534)									
ES1108098-005	RMB02	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EW1101306-004	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1752635)									
ES1108062-003	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.07	0.06	0.0	No Limit
ES1108098-001	TCMB03	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.01	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1755318)									
ES1108086-010	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.10	0.02	127	No Limit
ES1108189-004	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.11	0.15	29.4	0% - 50%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1752532)									
ES1108089-001	Anonymous	EK071G: Reactive Phosphorus as P	----	0.01	mg/L	0.32	0.33	0.0	0% - 20%
EW1101305-001	Anonymous	EK071G: Reactive Phosphorus as P	----	0.01	mg/L	0.10	0.11	15.9	0% - 50%
EP005: Total Organic Carbon (TOC) (QC Lot: 1755075)									
ES1108041-008	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	15	11	30.8	0% - 50%
ES1108101-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	11	12	8.7	0% - 50%
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 1755758)									
EB1107382-003	Anonymous	EP033: Methane	74-82-8	10	µg/L	<10	<10	0.0	No Limit
ES1108098-001	TCMB03	EP033: Methane	74-82-8	10	µg/L	26000	26100	0.2	0% - 20%
EP075(SIM)A: Phenolic Compounds (QC Lot: 1752719)									
ES1108109-016	Anonymous	EP075(SIM): Phenol	108-95-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1.0	µg/L	<1.0	<1.0	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 (%)
EP075(SIM)A: Phenolic Compounds (QC Lot: 1752719) - continued									
ES1108109-016	Anonymous	EP075(SIM): 2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	<2.0	0.0	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1752719)									
ES1108109-016	Anonymous	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1752718)									
ES1108109-016	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1760062)									
EM1103927-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES1108098-001	TCMB03	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 1752718)									
ES1108109-016	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 1760062)									
EM1103927-001	Anonymous	EP080: C6 - C10 Fraction	----	20	µg/L	<20	<20	0.0	No Limit

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 Work Order : ES1108098
 Client : PARSONS BRINCKERHOFF AUST P/L
 Project : 2162406A



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 (%)
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 1760062) - continued									
ES1108098-001	TCMB03	EP080: C6 - C10 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 1760062)									
EM1103927-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES1108098-001	TCMB03	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	5	5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	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: WATER

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EA010P: Conductivity by PC Titrator (QCLot: 1755475)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	98.8	86.3	112
EA015: Total Dissolved Solids (QCLot: 1753483)								
EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	<1	293 mg/L	108	77.9	122
EA015: Total Dissolved Solids (QCLot: 1753484)								
EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	<1	293 mg/L	# 128	77.9	122
EA015: Total Dissolved Solids (QCLot: 1755783)								
EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	<1	293 mg/L	118	77.9	122
ED037P: Alkalinity by PC Titrator (QCLot: 1755476)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	95.4	80.2	108
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1752531)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	10 mg/L	103	70	130
ED045G: Chloride Discrete analyser (QCLot: 1752530)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	117	83.7	124
ED045G: Chloride Discrete analyser (QCLot: 1752535)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	118	83.7	124
ED093F: Dissolved Major Cations (QCLot: 1752528)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	91.5	88	110
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	93.3	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	84.9	81	107
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	# 83.2	89	109
EG020F: Dissolved Metals by ICP-MS (QCLot: 1754716)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	# 90.6	92	112
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	88	110
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	87.2	80	114
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	93.7	85	109
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.0	89	107
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	# 84.0	91	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	94.8	89	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	98.0	87	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.6	90	110
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	# 85.3	87	113
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	100	84	114
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.8	89	109



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1754716) - continued								
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	108	79	119
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	# 70.8	91	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	101	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	88.2	71	127
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	84.3	84	114
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020A-F: Iodine	7553-56-2	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 1754717)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	94.3	88	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1752636)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.00 mg/L	96.4	79.6	122
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1752529)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.96 mg/L	105	70	129
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1752534)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.96 mg/L	105	70	129
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1752635)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.96 mg/L	95.4	76.9	122
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1755318)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	90.6	64.3	120
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1752532)								
EK071G: Reactive Phosphorus as P	----	0.01	mg/L	<0.01	0.50 mg/L	103	83.8	122
EP005: Total Organic Carbon (TOC) (QCLot: 1755075)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	99.1	86.9	125
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 1755758)								
EP033: Methane	74-82-8	10	µg/L	<10	27.92 µg/L	96.2	91.3	115
EP075(SIM)A: Phenolic Compounds (QCLot: 1752675)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	----	.5 µg/L	29.4	24.5	61.9
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	----	.5 µg/L	66.7	63.8	110
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	----	.5 µg/L	68.1	55.9	112
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	----	1 µg/L	62.1	42.5	114
		2	µg/L	<2.0	----	----	----	----
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	----	.5 µg/L	63.2	62.7	117
		1	µg/L	<1.0	----	----	----	----



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP075(SIM)A: Phenolic Compounds (QCLot: 1752675) - continued									
EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.2	µg/L	----	.5 µg/L	66.3	59.9	112	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.2	µg/L	----	.5 µg/L	71.2	59.3	122	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.2	µg/L	----	.5 µg/L	72.2	64.3	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	----	.5 µg/L	70.2	63	119	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.2	µg/L	----	.5 µg/L	64.4	58.7	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.2	µg/L	----	.5 µg/L	67.6	51.2	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	----	1 µg/L	34.8	6.85	95.6	
		2	µg/L	<2.0	----	----	----	----	
EP075(SIM)A: Phenolic Compounds (QCLot: 1752719)									
EP075(SIM): Phenol	108-95-2	0.2	µg/L	----	.5 µg/L	36.2	24.5	61.9	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	----	.5 µg/L	74.7	63.8	110	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	----	.5 µg/L	66.1	55.9	112	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	----	1 µg/L	57.4	42.5	114	
		2	µg/L	<2.0	----	----	----	----	
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	----	.5 µg/L	74.6	62.7	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.2	µg/L	----	.5 µg/L	75.3	59.9	112	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.2	µg/L	----	.5 µg/L	62.8	59.3	122	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.2	µg/L	----	.5 µg/L	# 63.0	64.3	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	----	.5 µg/L	64.2	63	119	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.2	µg/L	----	.5 µg/L	90.0	58.7	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.2	µg/L	----	.5 µg/L	89.0	51.2	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	----	1 µg/L	64.7	6.85	95.6	
		2	µg/L	<2.0	----	----	----	----	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1752675)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1752675) - continued								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	----	.5 µg/L	65.8	58.6	119
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	----	.5 µg/L	67.3	63.6	114
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	----	.5 µg/L	65.2	62.2	113
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	----	.5 µg/L	67.4	63.9	115
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	----	.5 µg/L	68.3	62.6	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	----	.5 µg/L	66.8	64.3	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	----	.5 µg/L	# 63.6	63.6	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	----	.5 µg/L	# 62.6	63.1	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	----	.5 µg/L	65.9	64.1	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	----	.5 µg/L	# 60.5	62.5	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.2	µg/L	----	.5 µg/L	76.6	61.7	119
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	----	.5 µg/L	77.0	61.7	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	----	.5 µg/L	65.2	63.3	117
		0.5	µg/L	<0.5	----	----	----	----
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	----	.5 µg/L	65.5	59.9	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.2	µg/L	----	.5 µg/L	65.0	61.2	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.2	µg/L	----	.5 µg/L	69.1	59.1	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1752719)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	----	.5 µg/L	64.8	58.6	119
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	----	.5 µg/L	89.5	63.6	114
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	----	.5 µg/L	86.6	62.2	113
		1	µg/L	<1.0	----	----	----	----



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					LCS	Low	High	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1752719) - continued								
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	----	.5 µg/L	89.9	63.9	115
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	----	.5 µg/L	78.6	62.6	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	----	.5 µg/L	77.1	64.3	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	----	.5 µg/L	73.8	63.6	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	----	.5 µg/L	73.2	63.1	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	----	.5 µg/L	79.0	64.1	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	----	.5 µg/L	76.9	62.5	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.2	µg/L	----	.5 µg/L	81.4	61.7	119
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	----	.5 µg/L	70.8	61.7	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	----	.5 µg/L	79.3	63.3	117
		0.5	µg/L	<0.5	----	----	----	----
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	----	.5 µg/L	83.3	59.9	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.2	µg/L	----	.5 µg/L	82.9	61.2	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.2	µg/L	----	.5 µg/L	86.4	59.1	118
		1	µg/L	<1.0	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1752674)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	70.5	58.9	131
EP071: C15 - C28 Fraction	----	100	µg/L	<100	500 µg/L	89.2	73.9	138
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	111	62.7	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1752718)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	200 µg/L	103	58.9	131
EP071: C15 - C28 Fraction	----	100	µg/L	<100	250 µg/L	134	73.9	138
EP071: C29 - C36 Fraction	----	50	µg/L	<50	200 µg/L	106	62.7	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1760062)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	112	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1752674)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	74.3	58.9	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	82.4	73.9	138



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
					Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)
Method: Compound	CAS Number	LOR	Unit					LCS	Low
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1752674) - continued									
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	----
		50	µg/L	----	300 µg/L	97.1	62.7	131	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1752718)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	250 µg/L	94.1	58.9	131	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	300 µg/L	136	73.9	138	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	----
		50	µg/L	----	150 µg/L	122	62.7	131	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1760062)									
EP080: C6 - C10 Fraction	----	20	µg/L	<20	310 µg/L	112	75	127	
EP080: BTEXN (QCLot: 1760062)									
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	96.2	70	124	
EP080: Toluene	108-88-3	2	µg/L	----	10 µg/L	96.0	74.4	124	
		5	µg/L	<5	----	----	----	----	----
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	94.3	70	120	
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	92.7	69	121	
	106-42-3								
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	92.9	73	121	
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	96.2	72.9	127	



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: **WATER**

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1752531)							
ES1107912-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	2.5 mg/L	# Not Determined	70	130
ED045G: Chloride Discrete analyser (QCLot: 1752530)							
ES1107912-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	70	130
ED045G: Chloride Discrete analyser (QCLot: 1752535)							
ES1108098-005	RMB02	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 1754716)							
ES1108043-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	114	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	89.9	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	# Not Determined	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	88.4	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	77.6	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	95.8	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	86.7	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	83.8	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	86.3	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	91.1	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	89.5	70	130
EG020A-F: Zinc	7440-66-6	0.2 mg/L	96.6	70	130		
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1752636)							
ES1108098-001	TCMB03	EK055G: Ammonia as N	7664-41-7	1.00 mg/L	84.0	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1752529)							
ES1107912-001	Anonymous	EK057G: Nitrite as N	----	0.60 mg/L	# Not Determined	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1752534)							
ES1108098-005	RMB02	EK057G: Nitrite as N	----	0.60 mg/L	80.3	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1752635)							
ES1108062-003	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.60 mg/L	120	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1755318)							
ES1108086-010	Anonymous	EK067G: Total Phosphorus as P	----	1.00 mg/L	84.9	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1752532)							
ES1108089-001	Anonymous	EK071G: Reactive Phosphorus as P	----	0.50 mg/L	98.4	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 1755075)							
ES1108093-001	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	110	70	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			Low	High
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 1755758)							
EB1107382-002	Anonymous	EP033: Methane	74-82-8	27.92 µg/L	88.9	70	130
EP075(SIM)A: Phenolic Compounds (QCLot: 1752675)							
ES1108114-009	Anonymous	EP075(SIM): Phenol	108-95-2	2 µg/L	38.9	20	130
		EP075(SIM): 2-Chlorophenol	95-57-8	2 µg/L	82.1	60	130
		EP075(SIM): 2-Nitrophenol	88-75-5	2 µg/L	84.9	60	130
		EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	2 µg/L	90.0	70	130
		EP075(SIM): Pentachlorophenol	87-86-5	2 µg/L	32.7	20	130
EP075(SIM)A: Phenolic Compounds (QCLot: 1752719)							
ES1108109-017	Anonymous	EP075(SIM): Phenol	108-95-2	2 µg/L	42.7	20	130
		EP075(SIM): 2-Chlorophenol	95-57-8	2 µg/L	81.4	60	130
		EP075(SIM): 2-Nitrophenol	88-75-5	2 µg/L	73.2	60	130
		EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	2 µg/L	81.2	70	130
		EP075(SIM): Pentachlorophenol	87-86-5	2 µg/L	67.3	20	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1752675)							
ES1108114-009	Anonymous	EP075(SIM): Acenaphthene	83-32-9	2 µg/L	87.9	70	130
		EP075(SIM): Pyrene	129-00-0	2 µg/L	103	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1752719)							
ES1108109-017	Anonymous	EP075(SIM): Acenaphthene	83-32-9	2 µg/L	81.4	70	130
		EP075(SIM): Pyrene	129-00-0	2 µg/L	74.5	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1752674)							
ES1108114-009	Anonymous	EP071: C10 - C14 Fraction	----	20 µg/L	128	74	150
		EP071: C15 - C28 Fraction	----	25 µg/L	140	77	153
		EP071: C29 - C36 Fraction	----	20 µg/L	134	67	153
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1752718)							
ES1108109-017	Anonymous	EP071: C10 - C14 Fraction	----	20 µg/L	109	74	150
		EP071: C15 - C28 Fraction	----	25 µg/L	106	77	153
		EP071: C29 - C36 Fraction	----	20 µg/L	115	67	153
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1760062)							
EM1103927-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	128	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1752674)							
ES1108114-009	Anonymous	EP071: >C10 - C16 Fraction	----	25 µg/L	92.5	74	150
		EP071: >C16 - C34 Fraction	----	35 µg/L	126	77	153
		EP071: >C34 - C40 Fraction	----	15 µg/L	152	67	153
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1752718)							
ES1108109-017	Anonymous	EP071: >C10 - C16 Fraction	----	25 µg/L	116	74	150
		EP071: >C16 - C34 Fraction	----	35 µg/L	92.6	77	153
		EP071: >C34 - C40 Fraction	----	15 µg/L	136	67	153



Sub-Matrix: WATER

				Matrix Spike (MS) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	Spike Recovery (%)	Recovery Limits (%)		
				Concentration	MS	Low	High	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1760062)								
EM1103927-001	Anonymous	EP080: C6 - C10 Fraction	----	375 µg/L	124	70	130	
EP080: BTEXN (QCLot: 1760062)								
EM1103927-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	97.0	70	130	
		EP080: Toluene	108-88-3	25 µg/L	104	70	130	
		EP080: Ethylbenzene	100-41-4	25 µg/L	99.6	70	130	
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	96.8	70	130	
			106-42-3					
		EP080: ortho-Xylene	95-47-6	25 µg/L	97.6	70	130	
	EP080: Naphthalene	91-20-3	25 µg/L	101	70	130		



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1108098	Page	: 1 of 11
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MR JAMES DUGGLEBY	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jduggleby@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 15-APR-2011
Sampler	: NPH/SM	Issue Date	: 29-APR-2011
Order number	: ----		
Quote number	: SY/394/09	No. of samples received	: 5
		No. of samples analysed	: 5

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: **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	
EA005: pH								
Clear Plastic Bottle - Natural RMB01, RMB02	12-APR-2011	----	----	----	16-APR-2011	12-APR-2011	✘	
Clear Plastic Bottle - Natural TMB04, TMB05	13-APR-2011	----	----	----	16-APR-2011	13-APR-2011	✘	
Clear Plastic Bottle - Natural TCMB03	14-APR-2011	----	----	----	16-APR-2011	14-APR-2011	✘	
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural RMB01, RMB02	12-APR-2011	---	10-MAY-2011	----	20-APR-2011	10-MAY-2011	✓	
Clear Plastic Bottle - Natural TMB04, TMB05	13-APR-2011	---	11-MAY-2011	----	20-APR-2011	11-MAY-2011	✓	
Clear Plastic Bottle - Natural TCMB03	14-APR-2011	---	12-MAY-2011	----	20-APR-2011	12-MAY-2011	✓	
EA015: Total Dissolved Solids								
Clear Plastic Bottle - Natural RMB01, RMB02	12-APR-2011	----	----	----	18-APR-2011	19-APR-2011	✓	
Clear Plastic Bottle - Natural TMB04, TMB05	13-APR-2011	----	----	----	18-APR-2011	20-APR-2011	✓	
Clear Plastic Bottle - Natural TCMB03	14-APR-2011	----	----	----	18-APR-2011	21-APR-2011	✓	
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural RMB01, RMB02	12-APR-2011	---	26-APR-2011	----	20-APR-2011	26-APR-2011	✓	
Clear Plastic Bottle - Natural TMB04, TMB05	13-APR-2011	---	27-APR-2011	----	20-APR-2011	27-APR-2011	✓	
Clear Plastic Bottle - Natural TCMB03	14-APR-2011	---	28-APR-2011	----	20-APR-2011	28-APR-2011	✓	



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
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural RMB01, RMB02	12-APR-2011	---	10-MAY-2011	----	16-APR-2011	10-MAY-2011	✔
Clear Plastic Bottle - Natural TMB04, TMB05	13-APR-2011	---	11-MAY-2011	----	16-APR-2011	11-MAY-2011	✔
Clear Plastic Bottle - Natural TCMB03	14-APR-2011	---	12-MAY-2011	----	16-APR-2011	12-MAY-2011	✔
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural RMB01, RMB02	12-APR-2011	---	10-MAY-2011	----	16-APR-2011	10-MAY-2011	✔
Clear Plastic Bottle - Natural TMB04, TMB05	13-APR-2011	---	11-MAY-2011	----	16-APR-2011	11-MAY-2011	✔
Clear Plastic Bottle - Natural TCMB03	14-APR-2011	---	12-MAY-2011	----	16-APR-2011	12-MAY-2011	✔
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural RMB01, RMB02	12-APR-2011	---	19-APR-2011	----	16-APR-2011	19-APR-2011	✔
Clear Plastic Bottle - Natural TMB04, TMB05	13-APR-2011	---	20-APR-2011	----	16-APR-2011	20-APR-2011	✔
Clear Plastic Bottle - Natural TCMB03	14-APR-2011	---	21-APR-2011	----	16-APR-2011	21-APR-2011	✔
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered RMB01, RMB02	12-APR-2011	---	09-OCT-2011	----	20-APR-2011	09-OCT-2011	✔
Clear Plastic Bottle - Nitric Acid; Filtered TMB04, TMB05	13-APR-2011	---	10-OCT-2011	----	20-APR-2011	10-OCT-2011	✔
Clear Plastic Bottle - Nitric Acid; Filtered TCMB03	14-APR-2011	---	11-OCT-2011	----	20-APR-2011	11-OCT-2011	✔
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid RMB01, RMB02	12-APR-2011	---	10-MAY-2011	----	17-APR-2011	10-MAY-2011	✔
Clear Plastic Bottle - Sulfuric Acid TMB04, TMB05	13-APR-2011	---	11-MAY-2011	----	17-APR-2011	11-MAY-2011	✔
Clear Plastic Bottle - Sulfuric Acid TCMB03	14-APR-2011	---	12-MAY-2011	----	17-APR-2011	12-MAY-2011	✔
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural RMB01, RMB02	12-APR-2011	---	14-APR-2011	----	15-APR-2011	14-APR-2011	✖
Clear Plastic Bottle - Natural TMB04, TMB05	13-APR-2011	---	15-APR-2011	----	15-APR-2011	15-APR-2011	✔
Clear Plastic Bottle - Natural TCMB03	14-APR-2011	---	16-APR-2011	----	15-APR-2011	16-APR-2011	✔



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
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid RMB01, RMB02	12-APR-2011	---	10-MAY-2011	----	17-APR-2011	10-MAY-2011	✓
Clear Plastic Bottle - Sulfuric Acid TMB04, TMB05	13-APR-2011	---	11-MAY-2011	----	17-APR-2011	11-MAY-2011	✓
Clear Plastic Bottle - Sulfuric Acid TCMB03	14-APR-2011	---	12-MAY-2011	----	17-APR-2011	12-MAY-2011	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid RMB01, RMB02	12-APR-2011	19-APR-2011	10-MAY-2011	✓	19-APR-2011	10-MAY-2011	✓
Clear Plastic Bottle - Sulfuric Acid TMB04, TMB05	13-APR-2011	19-APR-2011	11-MAY-2011	✓	19-APR-2011	11-MAY-2011	✓
Clear Plastic Bottle - Sulfuric Acid TCMB03	14-APR-2011	19-APR-2011	12-MAY-2011	✓	19-APR-2011	12-MAY-2011	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural RMB01, RMB02	12-APR-2011	---	14-APR-2011	----	15-APR-2011	14-APR-2011	*
Clear Plastic Bottle - Natural TMB04, TMB05	13-APR-2011	---	15-APR-2011	----	15-APR-2011	15-APR-2011	✓
Clear Plastic Bottle - Natural TCMB03	14-APR-2011	---	16-APR-2011	----	15-APR-2011	16-APR-2011	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid RMB01, RMB02	12-APR-2011	----	----	----	19-APR-2011	10-MAY-2011	✓
Amber TOC Vial - Sulfuric Acid TMB04, TMB05	13-APR-2011	----	----	----	19-APR-2011	11-MAY-2011	✓
Amber TOC Vial - Sulfuric Acid TCMB03	14-APR-2011	----	----	----	19-APR-2011	12-MAY-2011	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - H2SO4 for C1 - C4 Gases RMB01, RMB02	12-APR-2011	----	----	----	19-APR-2011	26-APR-2011	✓
Amber VOC Vial - H2SO4 for C1 - C4 Gases TMB04, TMB05	13-APR-2011	----	----	----	19-APR-2011	27-APR-2011	✓
Amber VOC Vial - H2SO4 for C1 - C4 Gases TCMB03	14-APR-2011	----	----	----	19-APR-2011	28-APR-2011	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved RMB01, RMB02	12-APR-2011	17-APR-2011	19-APR-2011	✓	19-APR-2011	27-MAY-2011	✓
Amber Glass Bottle - Unpreserved TMB04, TMB05	13-APR-2011	18-APR-2011	20-APR-2011	✓	20-APR-2011	28-MAY-2011	✓
Amber Glass Bottle - Unpreserved TCMB03	14-APR-2011	18-APR-2011	21-APR-2011	✓	20-APR-2011	28-MAY-2011	✓



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	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved RMB01, RMB02	12-APR-2011	17-APR-2011	19-APR-2011	✓	19-APR-2011	27-MAY-2011	✓	
Amber Glass Bottle - Unpreserved TMB04, TMB05	13-APR-2011	18-APR-2011	20-APR-2011	✓	20-APR-2011	28-MAY-2011	✓	
Amber Glass Bottle - Unpreserved TCMB03	14-APR-2011	18-APR-2011	21-APR-2011	✓	20-APR-2011	28-MAY-2011	✓	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved RMB01, RMB02	12-APR-2011	17-APR-2011	19-APR-2011	✓	19-APR-2011	27-MAY-2011	✓	
Amber Glass Bottle - Unpreserved TMB04, TMB05	13-APR-2011	18-APR-2011	20-APR-2011	✓	19-APR-2011	28-MAY-2011	✓	
Amber Glass Bottle - Unpreserved TCMB03	14-APR-2011	18-APR-2011	21-APR-2011	✓	19-APR-2011	28-MAY-2011	✓	
Amber VOC Vial - HCl RMB01, RMB02	12-APR-2011	25-APR-2011	26-APR-2011	✓	25-APR-2011	26-APR-2011	✓	
Amber VOC Vial - HCl TMB04, TMB05	13-APR-2011	25-APR-2011	27-APR-2011	✓	25-APR-2011	27-APR-2011	✓	
Amber VOC Vial - HCl TCMB03	14-APR-2011	25-APR-2011	28-APR-2011	✓	25-APR-2011	28-APR-2011	✓	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
Amber Glass Bottle - Unpreserved RMB01, RMB02	12-APR-2011	17-APR-2011	19-APR-2011	✓	19-APR-2011	27-MAY-2011	✓	
Amber Glass Bottle - Unpreserved TMB04, TMB05	13-APR-2011	18-APR-2011	20-APR-2011	✓	19-APR-2011	28-MAY-2011	✓	
Amber Glass Bottle - Unpreserved TCMB03	14-APR-2011	18-APR-2011	21-APR-2011	✓	19-APR-2011	28-MAY-2011	✓	
Amber VOC Vial - HCl RMB01, RMB02	12-APR-2011	25-APR-2011	26-APR-2011	✓	25-APR-2011	26-APR-2011	✓	
Amber VOC Vial - HCl TMB04, TMB05	13-APR-2011	25-APR-2011	27-APR-2011	✓	25-APR-2011	27-APR-2011	✓	
Amber VOC Vial - HCl TCMB03	14-APR-2011	25-APR-2011	28-APR-2011	✓	25-APR-2011	28-APR-2011	✓	
EP080: BTEXN								
Amber VOC Vial - HCl RMB01, RMB02	12-APR-2011	25-APR-2011	26-APR-2011	✓	25-APR-2011	26-APR-2011	✓	
Amber VOC Vial - HCl TMB04, TMB05	13-APR-2011	25-APR-2011	27-APR-2011	✓	25-APR-2011	27-APR-2011	✓	
Amber VOC Vial - HCl TCMB03	14-APR-2011	25-APR-2011	28-APR-2011	✓	25-APR-2011	28-APR-2011	✓	



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

Quality Control Sample Type	Analytical Method	Method	Count		Rate (%)			Quality Control Specification
			QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)								
Alkalinity by PC Titrator		ED037-P	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser		EK055G	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases		EP033	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	3	28	10.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved		ED040F	2	1	200.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	2	19	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser		EK057G	4	36	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)		EP075(SIM)	1	4	25.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
pH		EA005	2	17	11.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser		EK071G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids		EA015	6	34	17.6	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon		EP005	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser		EK067G	2	17	11.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction		EP071	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX		EP080	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)								
Alkalinity by PC Titrator		ED037-P	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser		EK055G	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases		EP033	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	4	28	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved		ED040F	1	1	100.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser		EK057G	2	36	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)		EP075(SIM)	2	21	9.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser		EK071G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids		EA015	3	34	8.8	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon		EP005	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser		EK067G	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction		EP071	2	23	8.7	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	Metho d	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Laboratory Control Samples (LCS) - Continued							
TPH Volatiles/BTEX	EP080	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	28	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved	ED040F	1	1	100.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	2	36	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	2	21	9.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids	EA015	3	34	8.8	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	2	23	8.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	6	16.7	5.0	✓	ALS QCS3 requirement
C1 - C4 Gases	EP033	1	20	5.0	5.0	✓	ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	28	7.1	5.0	✓	ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	13	7.7	5.0	✓	ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.3	5.0	✓	ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	2	36	5.6	5.0	✓	ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	2	21	9.5	5.0	✓	ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.0	5.0	✓	ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.0	5.0	✓	ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	5.0	5.0	✓	ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	17	5.9	5.0	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	2	23	8.7	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	5.0	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 Method	Method	Matrix	Method Descriptions
pH	EA005	WATER	APHA 21st ed. 4500 H+ B. pH of water samples is determined by ISE either manually or by automated pH meter. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Conductivity by PC Titrator	EA010-P	WATER	APHA 21st ed., 2510 B This procedure determines conductivity by automated ISE. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Dissolved Solids	EA015	WATER	APHA 21st ed., 2540C A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Alkalinity by PC Titrator	ED037-P	WATER	APHA 21st ed., 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrator) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Major Anions - Dissolved	ED040F	WATER	APHA 21st ed., 3120. The 0.45um filtered samples are determined by ICP/AES for Sulfur and/or Silicon content and reported as Sulfate and/or Silica after conversion by gravimetric factor.
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	APHA 21st ed., 4500-SO4 Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Chloride by Discrete Analyser	ED045G	WATER	APHA 21st ed., 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	APHA 21st ed., 3120; USEPA SW 846 - 6010 The ICPAES technique ionises the 0.45um filtered 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)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Silica (Total Dissolved) by ICPAES	EG052F	WATER	APHA 21st ed., 4500-SiO2. Silica (Total) determined by calculation from Silicon by ICPAES.
Ammonia as N by Discrete analyser	EK055G	WATER	APHA 21st ed., 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrite as N by Discrete Analyser	EK057G	WATER	APHA 21st ed., 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrate as N by Discrete Analyser	EK058G	WATER	APHA 21st ed., 4500-NO3- F. Nitrate is reduced to nitrite by way of a cadmium reduction column followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)



Analytical Method	Method	Matrix	Method Descriptions
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	APHA 21st ed., 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Cadmium Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	APHA 21st ed., 4500-P B&F This procedure involves sulphuric acid digestion of a 100mL sample to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	APHA 21st ed., 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Ionic Balance by PCT DA and ICPAES	EN055 - PG	WATER	APHA 21st Ed. 1030F. The Ionic Balance is calculated based on the major Anions and Cations. The major anions include Alkalinity, Chloride and Sulfate which determined by PCT and DA. The Cations are determined by ICPAES. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Organic Carbon	EP005	WATER	APHA 21st ed., 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TPH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
TPH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

Preparation Method	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	APHA 21st ed., 4500 Norg - D; APHA 21st ed., 4500 P - H. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 500 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2). ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



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: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EA015: Total Dissolved Solids	2063362-026	----	Total Dissolved Solids @180°C	GIS-210-010	128 %	77.9-122%	Recovery greater than upper control limit
ED093F: Dissolved Major Cations	2062224-002	----	Potassium	7440-09-7	83.2 %	89-109%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2064982-003	----	Aluminium	7429-90-5	90.6 %	92-112%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2064982-003	----	Chromium	7440-47-3	84.0 %	91-111%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2064982-003	----	Manganese	7439-96-5	85.3 %	87-113%	Recovery less than lower control limit
EG020F: Dissolved Metals by ICP-MS	2064982-003	----	Vanadium	7440-62-2	70.8 %	91-109%	Recovery less than lower control limit
EP075(SIM)A: Phenolic Compounds	2062551-007	----	2,6-Dichlorophenol	87-65-0	63.0 %	64.3-118%	Recovery less than lower control limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	2062475-007	----	Fluoranthene	206-44-0	63.6 %	63.6-118%	Recovery less than lower control limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	2062475-007	----	Pyrene	129-00-0	62.6 %	63.1-118%	Recovery less than lower control limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	2062475-007	----	Chrysene	218-01-9	60.5 %	62.5-116%	Recovery less than lower control limit
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1107912-001	Anonymous	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
ED045G: Chloride Discrete analyser	ES1108098-005	RMB02	Chloride	16887-00-6	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
ED045G: Chloride Discrete analyser	ES1107912-001	Anonymous	Chloride	16887-00-6	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EG020F: Dissolved Metals by ICP-MS	ES1108043-001	Anonymous	Barium	7440-39-3	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EK057G: Nitrite as N by Discrete Analyser	ES1107912-001	Anonymous	Nitrite as N	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

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

Method	Extraction / Preparation			Analysis			
	Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005: pH							
Clear Plastic Bottle - Natural RMB01, RMB02		----	----	----	16-APR-2011	12-APR-2011	4
Clear Plastic Bottle - Natural TMB04, TMB05		----	----	----	16-APR-2011	13-APR-2011	3
Clear Plastic Bottle - Natural TCMB03		----	----	----	16-APR-2011	14-APR-2011	2
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural RMB01, RMB02		----	----	----	15-APR-2011	14-APR-2011	1
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural RMB01, RMB02		----	----	----	15-APR-2011	14-APR-2011	1

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.



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1110071	Page	: 1 of 10
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MS SARAH SCARFF	Contact	: Loren Schiavon
Address	: GPO BOX 5394	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	SYDNEY NSW, AUSTRALIA 2001		
E-mail	: sscarff@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5369	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 13-MAY-2011
Sampler	: NPH/SM	Issue Date	: 24-MAY-2011
Site	: ----		
Quote number	: SY/394/09	No. of samples received	: 6
		No. of samples analysed	: 6

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
- Surrogate Control 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Spectroscopist	Sydney Inorganics
Evie.Sidarta	Inorganic Chemist	Sydney Inorganics
Hoa Nguyen	Inorganic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Sarah Millington	Senior Inorganic Chemist	Sydney Inorganics

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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 insufficient 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

- **EG020: Bromine quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.**
- **EG020: LCS recoveries for some elements fall outside ALS Dynamic control limit, however, they are within the acceptance criteria based on ALS DQO. No further action is required.**
- **EP080: Level of reporting raised for toluene due to ambient background levels in the laboratory.**
- **It has been noted that Reactive P is greater than Total P, however this difference is within the limits of experimental variation.**



Analytical Results

Sub-Matrix: **SOLID**

Client sample ID

Client sampling date / time

Compound	CAS Num	br	LOR	Unit	TCMB04-333	TCMB04-270			
					11-MAY-2011 15:00	11-MAY-2011 15:00	----	----	----
					ES1110071-005	ES1110071-006	----	----	----
EA055: Moisture Content									
^ Moisture Content (dried @ 103°C)	----		1.0	%	3.2	3.0	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2		0.5	mg/kg	<0.5	<0.5	----	----	----
2-Chlorophenol	95-57-8		0.5	mg/kg	<0.5	<0.5	----	----	----
2-Methylphenol	95-48-7		0.5	mg/kg	<0.5	<0.5	----	----	----
3- & 4-Methylphenol	1319-77-3		1.0	mg/kg	<1.0	<1.0	----	----	----
2-Nitrophenol	88-75-5		0.5	mg/kg	<0.5	<0.5	----	----	----
2,4-Dimethylphenol	105-67-9		0.5	mg/kg	<0.5	<0.5	----	----	----
2,4-Dichlorophenol	120-83-2		0.5	mg/kg	<0.5	<0.5	----	----	----
2,6-Dichlorophenol	87-65-0		0.5	mg/kg	<0.5	<0.5	----	----	----
4-Chloro-3-Methylphenol	59-50-7		0.5	mg/kg	<0.5	<0.5	----	----	----
2,4,6-Trichlorophenol	88-06-2		0.5	mg/kg	<0.5	<0.5	----	----	----
2,4,5-Trichlorophenol	95-95-4		0.5	mg/kg	<0.5	<0.5	----	----	----
Pentachlorophenol	87-86-5		2.0	mg/kg	<2.0	<2.0	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3		0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthylene	208-96-8		0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthene	83-32-9		0.5	mg/kg	<0.5	<0.5	----	----	----
Fluorene	86-73-7		0.5	mg/kg	<0.5	<0.5	----	----	----
Phenanthrene	85-01-8		0.5	mg/kg	<0.5	<0.5	----	----	----
Anthracene	120-12-7		0.5	mg/kg	<0.5	<0.5	----	----	----
Fluoranthene	206-44-0		0.5	mg/kg	<0.5	<0.5	----	----	----
Pyrene	129-00-0		0.5	mg/kg	<0.5	<0.5	----	----	----
Benz(a)anthracene	56-55-3		0.5	mg/kg	<0.5	<0.5	----	----	----
Chrysene	218-01-9		0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(b)fluoranthene	205-99-2		0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9		0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(a)pyrene	50-32-8		0.5	mg/kg	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5		0.5	mg/kg	<0.5	<0.5	----	----	----
Dibenz(a,h)anthracene	53-70-3		0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(g,h,i)perylene	191-24-2		0.5	mg/kg	<0.5	<0.5	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----		0.5	mg/kg	<0.5	<0.5	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----		10	mg/kg	<10	<10	----	----	----
C10 - C14 Fraction	----		50	mg/kg	<50	<50	----	----	----
C15 - C28 Fraction	----		100	mg/kg	<100	<100	----	----	----
C29 - C36 Fraction	----		100	mg/kg	<100	<100	----	----	----



Analytical Results

Sub-Matrix: **SOLID**

Client sample ID

Client sampling date / time

				TCMB04-333	TCMB04-270			
				11-MAY-2011 15:00	11-MAY-2011 15:00			
Compound	CAS Num br	LOR	Unit	ES1110071-005	ES1110071-006			
EP080/071: Total Petroleum Hydrocarbons - Continued								
^ C10 - C36 Fraction (sum)		50	mg/kg	<50	<50			
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
C6 - C10 Fraction		10	mg/kg	<10	<10			
^ C6 - C10 Fraction minus BTEX (F1)		10	mg/kg	<10	<10			
>C10 - C16 Fraction		50	mg/kg	<50	<50			
>C16 - C34 Fraction		100	mg/kg	<100	<100			
>C34 - C40 Fraction		100	mg/kg	<100	<100			
^ >C10 - C40 Fraction (sum)		50	mg/kg	<50	<50			
EP080: BTEX								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2			
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5			
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5			
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5			
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5			
EP080: BTEXN								
^ Sum of BTEX		0.2	mg/kg	<0.2	<0.2			
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5			
Naphthalene	91-20-3	1	mg/kg	<1	<1			
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	103	112			
2-Chlorophenol-D4	93951-73-6	0.1	%	108	122			
2,4,6-Tribromophenol	118-79-6	0.1	%	50.8	56.2			
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	106	117			
Anthracene-d10	1719-06-8	0.1	%	106	119			
4-Terphenyl-d14	1718-51-0	0.1	%	124	142			
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	84.4	94.0			
Toluene-D8	2037-26-5	0.1	%	110	76.8			
4-Bromofluorobenzene	460-00-4	0.1	%	103	79.0			



Analytical Results

Sub-Matrix: WATER

				Client sample ID	TCMB02	RMB02	S5MB02	WMB003	----
				Client sampling date / time	13-MAY-2011 12:00	10-MAY-2011 10:00	09-MAY-2011 16:00	11-MAY-2011 10:00	----
Compound	CAS Num br	LOR	Unit		ES1110071-001	ES1110071-002	ES1110071-003	ES1110071-004	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		3200	----	----	----	----
EA015: Total Dissolved Solids									
^ Total Dissolved Solids @180°C	GIS-210-010	1	mg/L		1850	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		309	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		111	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		420	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		31	----	----	----	----
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		743	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		9	----	----	----	----
Magnesium	7439-95-4	1	mg/L		15	----	----	----	----
Sodium	7440-23-5	1	mg/L		672	----	----	----	----
Potassium	7440-09-7	1	mg/L		6	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		0.01	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L		0.007	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	----	----	----	----
Barium	7440-39-3	0.001	mg/L		0.972	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		0.0001	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		0.002	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		<0.001	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		0.010	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		0.004	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
Strontium	7440-24-6	0.001	mg/L		1.59	----	----	----	----
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		0.028	----	----	----	----
Boron	7440-42-8	0.05	mg/L		<0.05	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
Bromine	7726-95-6	0.1	mg/L		0.8	----	----	----	----



Analytical Results

Sub-Matrix: WATER

				Client sample ID	TCMB02	RMB02	S5MB02	WMB003	----
				Client sampling date / time	13-MAY-2011 12:00	10-MAY-2011 10:00	09-MAY-2011 16:00	11-MAY-2011 10:00	----
Compound	CAS Num	br	LOR	Unit	ES1110071-001	ES1110071-002	ES1110071-003	ES1110071-004	----
EG052F: Dissolved Silica by ICPAES									
^ Silica	7631-86-9		0.1	mg/L	24.4	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7		0.01	mg/L	10.3	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----		0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
^ Nitrate as N	14797-55-8		0.01	mg/L	<0.01	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----		0.01	mg/L	<0.01	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----		0.01	mg/L	0.01	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	----		0.01	mg/L	0.04	----	----	----	----
EN055: Ionic Balance									
^ Total Anions	----		0.01	meq/L	30.0	----	----	----	----
^ Total Cations	----		0.01	meq/L	31.0	----	----	----	----
^ Ionic Balance	----		0.01	%	1.66	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----		1	mg/L	89	----	----	----	----
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8		10	µg/L	5180	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2		1.0	µg/L	6.4	----	----	----	----
2-Chlorophenol	95-57-8		1.0	µg/L	<1.0	----	----	----	----
2-Methylphenol	95-48-7		1.0	µg/L	<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3		2.0	µg/L	<2.0	----	----	----	----
2-Nitrophenol	88-75-5		1.0	µg/L	<1.0	----	----	----	----
2,4-Dimethylphenol	105-67-9		1.0	µg/L	<1.0	----	----	----	----
2,4-Dichlorophenol	120-83-2		1.0	µg/L	<1.0	----	----	----	----
2,6-Dichlorophenol	87-65-0		1.0	µg/L	<1.0	----	----	----	----
4-Chloro-3-Methylphenol	59-50-7		1.0	µg/L	<1.0	----	----	----	----
2,4,6-Trichlorophenol	88-06-2		1.0	µg/L	<1.0	----	----	----	----
2,4,5-Trichlorophenol	95-95-4		1.0	µg/L	<1.0	----	----	----	----
Pentachlorophenol	87-86-5		2.0	µg/L	<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3		1.0	µg/L	<1.0	----	----	----	----



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

				TCMB02	RMB02	S5MB02	WMB003	----
				13-MAY-2011 12:00	10-MAY-2011 10:00	09-MAY-2011 16:00	11-MAY-2011 10:00	----
Compound	CAS Num br	LOR	Unit	ES1110071-001	ES1110071-002	ES1110071-003	ES1110071-004	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<1.0	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	20	<20	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L	250	330	<100	220	----
C29 - C36 Fraction	----	50	µg/L	<50	280	<50	80	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	250	610	<50	300	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
C6 - C10 Fraction	----	20	µg/L	<20	<20	20	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	----	20	µg/L	<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L	180	420	<100	220	----
>C34 - C40 Fraction	----	100	µg/L	<100	280	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	180	700	<100	220	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	2	<1	----
Toluene	108-88-3	2	µg/L	9	<5	18	<5	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	----
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L	9	<1	20	<1	----



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

				TCMB02	RMB02	S5MB02	WMB003	----
				13-MAY-2011 12:00	10-MAY-2011 10:00	09-MAY-2011 16:00	11-MAY-2011 10:00	----
Compound	CAS Num br	LOR	Unit	ES1110071-001	ES1110071-002	ES1110071-003	ES1110071-004	----
EP080: BTEXN - Continued								
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	28.0	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%	64.5	----	----	----	----
2,4,6-Tribromophenol	118-79-6	0.1	%	78.2	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	90.6	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%	74.3	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	76.7	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	85.2	81.2	81.4	85.9	----
Toluene-D8	2037-26-5	0.1	%	102	92.6	98.3	104	----
4-Bromofluorobenzene	460-00-4	0.1	%	96.7	89.0	93.3	100	----



Surrogate Control Limits

Sub-Matrix: SOLID		Recovery Limits (%)	
Compound	CAS Num br	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	56.3	133.3
2-Chlorophenol-D4	93951-73-6	53.8	133.8
2,4,6-Tribromophenol	118-79-6	23.1	134.9
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	58.9	132.7
Anthracene-d10	1719-06-8	55.0	137.6
4-Terphenyl-d14	1718-51-0	54.0	147.8
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	72.8	133.2
Toluene-D8	2037-26-5	73.9	132.1
4-Bromofluorobenzene	460-00-4	71.6	130.0

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Num br	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	64.1
2-Chlorophenol-D4	93951-73-6	11.3	122.9
2,4,6-Tribromophenol	118-79-6	11.7	144.0
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	19.9	122.8
Anthracene-d10	1719-06-8	23.3	125.8
4-Terphenyl-d14	1718-51-0	20.3	134.5
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	76.4	133.1
Toluene-D8	2037-26-5	79.6	126.8
4-Bromofluorobenzene	460-00-4	79.1	125.0



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1110071	Page	: 1 of 16
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MS SARAH SCARFF	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: sscarff@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5369	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 13-MAY-2011
C-O-C number	: ----	Issue Date	: 24-MAY-2011
Sampler	: NPH/SM	No. of samples received	: 6
Order number	: ----	No. of samples analysed	: 6
Quote number	: SY/394/09		

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Spectroscopist	Sydney Inorganics
Evie.Sidarta	Inorganic Chemist	Sydney Inorganics
Hoa Nguyen	Inorganic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Sarah Millington	Senior Inorganic Chemist	Sydney 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 insufficient 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 (%)
EA055: Moisture Content (QC Lot: 1798368)									
ES1110071-005	TCMB04-333	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	3.2	1.8	57.1	No Limit
ES1110390-005	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	21.6	19.8	9.0	0% - 50%
EP075(SIM)A: Phenolic Compounds (QC Lot: 1796910)									
ES1110388-004	Anonymous	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1.0	mg/kg	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2.0	mg/kg	<2.0	<2.0	0.0	No Limit
		ES1110388-009	Anonymous	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5
EP075(SIM): 2-Chlorophenol	95-57-8			0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM): 2-Methylphenol	95-48-7			0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM): 2-Nitrophenol	88-75-5			0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM): 2,4-Dimethylphenol	105-67-9			0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM): 2,4-Dichlorophenol	120-83-2			0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM): 2,6-Dichlorophenol	87-65-0			0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7			0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2			0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4			0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM): 3- & 4-Methylphenol	1319-77-3			1.0	mg/kg	<1.0	<1.0	0.0	No Limit
EP075(SIM): Pentachlorophenol	87-86-5			2.0	mg/kg	<2.0	<2.0	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1796910)									
ES1110388-004	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	3.3	3.4	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	1.0	0.9	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	10.2	10.3	1.0	0% - 20%
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	3.5	3.6	3.1	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	19.8	20.8	5.4	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 (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1796910) - continued									
ES1110388-004	Anonymous	EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	17.5	18.9	7.3	0% - 20%
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	10.4	11.8	12.4	0% - 20%
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	10.8	11.7	8.2	0% - 20%
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	12.2	13.4	9.5	0% - 20%
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	7.2	7.0	2.0	0% - 50%
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	9.9	10.6	7.1	0% - 20%
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	6.0	6.5	7.5	0% - 50%
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	2.0	2.0	0.0	No Limit
ES1110388-009	Anonymous	EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	7.4	8.3	11.4	0% - 50%
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	0.8	0.7	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	4.1	3.4	18.3	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	1.0	0.9	18.7	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	7.4	5.8	24.8	0% - 50%
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	7.1	5.5	25.6	0% - 50%
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	3.0	2.2	32.7	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	3.0	2.3	24.2	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	3.4	2.5	30.3	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	1.7	1.6	9.8	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	3.0	2.3	25.6	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	1.9	1.6	21.4	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	2.8	2.3	18.7	No Limit		
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1796858)									
ES1110388-021	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1796909)									
ES1110388-004	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	420	420	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	310	300	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES1110388-009	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	680	740	8.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	710	770	8.6	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 1796858)									
ES1110388-021	Anonymous	EP080: C6 - C10 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 1796909)									
ES1110388-004	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	640	630	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	170	160	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 (%)	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 1796909) - continued										
ES1110388-004	Anonymous	EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit	
ES1110388-009	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	1130	1230	8.2	0% - 50%	
		EP071: >C34 - C40 Fraction	----	100	mg/kg	460	510	11.5	No Limit	
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit	
EP080: BTEXN (QC Lot: 1796858)										
ES1110388-021	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit	
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
	EP080: Naphthalene	91-20-3		1	mg/kg	<1	<1	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 (%)	
EA010P: Conductivity by PC Titrator (QC Lot: 1793124)										
ES1110019-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	43900	43800	0.2	0% - 20%	
ES1110083-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	4640	4700	1.3	0% - 20%	
EA015: Total Dissolved Solids (QC Lot: 1790073)										
ES1109998-001	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	131000	133000	1.6	0% - 20%	
EW1101566-001	Anonymous	EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	82	86	4.8	0% - 20%	
ED037P: Alkalinity by PC Titrator (QC Lot: 1793125)										
ES1110071-001	TCMB02	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit	
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	309	314	1.7	0% - 20%	
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	111	110	0.0	0% - 20%	
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	420	425	1.0	0% - 20%	
ES1110097-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit	
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit	
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	18	13	33.4	0% - 50%	
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	18	13	33.4	0% - 50%	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 1790445)										
ES1110071-001	TCMB02	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	31	31	0.0	0% - 20%	
ES1110108-048	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	224	226	0.8	0% - 20%	
ED045G: Chloride Discrete analyser (QC Lot: 1790444)										
ES1110071-001	TCMB02	ED045G: Chloride	16887-00-6	1	mg/L	743	742	0.2	0% - 20%	
ES1110108-048	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	627	628	0.0	0% - 20%	
ED093F: Dissolved Major Cations (QC Lot: 1790441)										
ES1110071-001	TCMB02	ED093F: Calcium	7440-70-2	1	mg/L	9	8	0.0	No Limit	
		ED093F: Magnesium	7439-95-4	1	mg/L	15	14	0.0	0% - 50%	



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 (%)
ED093F: Dissolved Major Cations (QC Lot: 1790441) - continued									
ES1110071-001	TCMB02	ED093F: Sodium	7440-23-5	1	mg/L	672	660	1.7	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	6	6	0.0	No Limit
ES1110108-049	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	68	67	1.6	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	43	42	2.8	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	372	367	1.3	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	44	44	0.0	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1792596)									
ES1109729-001	Anonymous	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.007	0.007	0.0	No Limit
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
ES1109930-007	Anonymous	EG020B-F: Strontium	7440-24-6	0.001	mg/L	8.75	8.59	1.9	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1792597)									
ES1110049-004	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.021	0.021	0.0	0% - 20%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.020	<0.020	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.024	0.026	9.0	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.050	<0.050	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.10	<0.10	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.10	<0.10	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.10	<0.10	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	3.02	3.13	3.6	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.50	<0.50	0.0	No Limit
EG020A-F: Bromine	7726-95-6	0.1	mg/L	50.3	52.1	3.4	0% - 20%		
ES1110116-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.019	0.019	0.0	0% - 50%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.002	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.006	0.006	0.0	No Limit
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.004	70.3	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 (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1792597) - continued									
ES1110116-003	Anonymous	EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.020	122	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1795476)									
EB1109163-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	0.01	0.0	No Limit
ES1110140-003	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.03	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1790442)									
ES1110071-001	TCMB02	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1795475)									
EB1109163-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES1110140-004	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1791242)									
ES1110020-004	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.14	0.10	37.3	0% - 50%
ES1110123-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.24	0.24	0.0	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1790443)									
ES1110071-001	TCMB02	EK071G: Reactive Phosphorus as P	----	0.01	mg/L	0.04	0.04	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 1794453)									
EP1103012-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	19	19	0.0	0% - 50%
ES1110089-018	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	7	7	0.0	No Limit
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 1798396)									
EM1105029-014	Anonymous	EP033: Methane	74-82-8	10	µg/L	1200	1230	2.5	0% - 20%
EM1105059-001	Anonymous	EP033: Methane	74-82-8	10	µg/L	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1797553)									
ES1110049-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES1110071-004	WMB003	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 1797553)									
ES1110049-001	Anonymous	EP080: C6 - C10 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES1110071-004	WMB003	EP080: C6 - C10 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 1797553)									
ES1110049-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit

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 Work Order : ES1110071
 Client : PARSONS BRINCKERHOFF AUST P/L
 Project : 2162406A



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 (%)	
EP080: BTEXN (QC Lot: 1797553) - continued										
ES1110049-001	Anonymous	EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit	
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit	
ES1110071-004	WMB003	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit	
	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	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: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP075(SIM)A: Phenolic Compounds (QCLot: 1796910)									
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	4 mg/kg	109	73.9	115	
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	4 mg/kg	106	80.2	115	
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	4 mg/kg	108	76.8	114	
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1.0	mg/kg	<1.0	8 mg/kg	# 124	72	119	
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	4 mg/kg	108	60.3	117	
EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	4 mg/kg	110	74.5	119	
EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	4 mg/kg	109	71.6	113	
EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	4 mg/kg	106	74.8	115	
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.5	mg/kg	<0.5	4 mg/kg	108	76.4	114	
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	4 mg/kg	108	62.2	115	
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	4 mg/kg	100	68.9	112	
EP075(SIM): Pentachlorophenol	87-86-5	1.0	mg/kg	<1.0	8 mg/kg	49.4	1.23	91.6	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1796910)									
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	4 mg/kg	107	81.9	113	
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	4 mg/kg	109	79.6	113	
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	4 mg/kg	108	81.5	112	
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	4 mg/kg	104	79.9	112	
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	4 mg/kg	107	79.4	114	
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	4 mg/kg	103	81.1	112	
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	4 mg/kg	83.6	78.8	113	
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	4 mg/kg	108	78.9	113	
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	4 mg/kg	106	77.2	112	
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	4 mg/kg	91.8	79.8	114	
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	4 mg/kg	107	71.8	118	
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	4 mg/kg	95.9	74.2	117	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	4 mg/kg	98.9	76.4	113	
EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	4 mg/kg	77.9	71	113	
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	4 mg/kg	82.1	71.7	113	
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	4 mg/kg	85.2	72.4	114	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1796858)									
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	79.1	68.4	128	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1796909)									
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	115	59	131	
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	134	74	138	



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
Method: Compound	CAS Number	LOR	Unit		Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1796909) - continued									
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	119	63	131	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1796858)									
EP080: C6 - C10 Fraction	----	10	mg/kg	<10	31 mg/kg	78.6	68.4	128	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1796909)									
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	121	59	131	
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	129	74	138	
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----	
		50	mg/kg	----	150 mg/kg	79.7	63	131	
EP080: BTEXN (QCLot: 1796858)									
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	82.6	63	121	
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	84.4	69	122	
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	82.5	61	117	
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	84.7	62	118	
	106-42-3								
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	82.6	63	117	
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	69.0	63	131	

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
Method: Compound	CAS Number	LOR	Unit		Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EA010P: Conductivity by PC Titrator (QCLot: 1793124)									
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	110	86.3	112	
EA015: Total Dissolved Solids (QCLot: 1790073)									
EA015: Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	<1	293 mg/L	104	77.9	122	
ED037P: Alkalinity by PC Titrator (QCLot: 1793125)									
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	90.7	80.2	108	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1790445)									
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	10 mg/L	104	70	130	
ED045G: Chloride Discrete analyser (QCLot: 1790444)									
ED045G: Chloride	16887-00-6	1	mg/L	<1	1000 mg/L	103	83.7	124	
ED093F: Dissolved Major Cations (QCLot: 1790441)									
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	92.6	88	110	
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	92.8	90	110	
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	85.4	81	107	
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	91.3	89	109	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1792596)									
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	105	88	112	
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1792597)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	100	92	112
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	88	110
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	101	80	114
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	97.4	85	109
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.7	89	107
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	100	89	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	102	87	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	102	90	110
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	100	87	113
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	105	84	114
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.8	89	109
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	103	79	119
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	# 83.9	91	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	100	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	92.2	71	127
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	105	84	114
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1795476)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.00 mg/L	101	79.6	122
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1790442)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.96 mg/L	96.6	70	129
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1795475)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.96 mg/L	105	76.9	122
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1791242)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	89.4	64.3	120
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1790443)								
EK071G: Reactive Phosphorus as P	----	0.01	mg/L	<0.01	0.50 mg/L	92.9	83.8	122
EP005: Total Organic Carbon (TOC) (QCLot: 1794453)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	99.9	86.9	125
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 1798396)								
EP033: Methane	74-82-8	10	µg/L	<10	27.92 µg/L	99.3	91.3	115
EP075(SIM)A: Phenolic Compounds (QCLot: 1790969)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	----	.5 µg/L	38.7	24.5	61.9
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	----	.5 µg/L	76.0	63.8	110
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	----	.5 µg/L	65.0	55.9	112
		1	µg/L	<1.0	----	----	----	----



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP075(SIM)A: Phenolic Compounds (QCLot: 1790969) - continued									
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	----	1 µg/L	56.3	42.5	114	
		2	µg/L	<2.0	----	----	----	----	
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	----	.5 µg/L	85.1	62.7	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.2	µg/L	----	.5 µg/L	76.0	59.9	112	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.2	µg/L	----	.5 µg/L	80.4	59.3	122	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.2	µg/L	----	.5 µg/L	80.1	64.3	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	----	.5 µg/L	86.0	63	119	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.2	µg/L	----	.5 µg/L	112	58.7	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.2	µg/L	----	.5 µg/L	97.2	51.2	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	----	1 µg/L	74.3	6.85	95.6	
		2	µg/L	<2.0	----	----	----	----	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1790969)									
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	----	.5 µg/L	67.0	58.6	119	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	----	.5 µg/L	105	63.6	114	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	----	.5 µg/L	83.0	62.2	113	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	----	.5 µg/L	88.0	63.9	115	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	----	.5 µg/L	94.1	62.6	116	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	----	.5 µg/L	91.3	64.3	116	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	----	.5 µg/L	101	63.6	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	----	.5 µg/L	100	63.1	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	----	.5 µg/L	89.7	64.1	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	----	.5 µg/L	81.1	62.5	116	
		1	µg/L	<1.0	----	----	----	----	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1790969) - continued									
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.2	µg/L	----	.5 µg/L	87.9	61.7	119	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	----	.5 µg/L	82.7	61.7	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	----	.5 µg/L	92.8	63.3	117	
		0.5	µg/L	<0.5	----	----	----	----	
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	----	.5 µg/L	88.5	59.9	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.2	µg/L	----	.5 µg/L	89.6	61.2	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.2	µg/L	----	.5 µg/L	93.8	59.1	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	1	µg/L	<1.0	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1790968)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	84.0	58.9	131	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	500 µg/L	94.1	73.9	138	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	97.5	62.7	131	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1797553)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	101	75	127	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1790968)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	72.9	58.9	131	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	98.6	73.9	138	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	
		50	µg/L	----	300 µg/L	104	62.7	131	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1797553)									
EP080: C6 - C10 Fraction	----	20	µg/L	<20	310 µg/L	103	75	127	
EP080: BTEXN (QCLot: 1797553)									
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	89.4	70	124	
EP080: Toluene	108-88-3	2	µg/L	----	10 µg/L	96.8	74.4	124	
		5	µg/L	<5	----	----	----	----	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	92.3	70	120	
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	92.8	69	121	
	106-42-3								
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	93.6	73	121	
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	104	72.9	127	



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				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)		
					MS	Low	High	
EP075(SIM)A: Phenolic Compounds (QCLot: 1796910)								
ES1110388-004	Anonymous	EP075(SIM): Phenol	108-95-2	10 mg/kg	116	70	130	
		EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	112	70	130	
		EP075(SIM): 2-Nitrophenol	88-75-5	10 mg/kg	109	60	130	
		EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	10 mg/kg	117	70	130	
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	82.9	20	130	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1796910)								
ES1110388-004	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	126	70	130	
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	122	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1796858)								
ES1110388-021	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	97.6	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1796909)								
ES1110388-004	Anonymous	EP071: C10 - C14 Fraction	----	640 mg/kg	79.2	73	137	
		EP071: C15 - C28 Fraction	----	3140 mg/kg	85.6	53	131	
		EP071: C29 - C36 Fraction	----	2860 mg/kg	72.8	52	132	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1796858)								
ES1110388-021	Anonymous	EP080: C6 - C10 Fraction	----	37.5 mg/kg	96.4	70	130	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1796909)								
ES1110388-004	Anonymous	EP071: >C10 - C16 Fraction	----	850 mg/kg	117	73	137	
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	110	53	131	
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	85.3	52	132	
EP080: BTEXN (QCLot: 1796858)								
ES1110388-021	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	83.0	70	130	
		EP080: Toluene	108-88-3	2.5 mg/kg	93.8	70	130	
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	101	70	130	
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	103	70	130	
			106-42-3					
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	102	70	130	
		EP080: Naphthalene	91-20-3	2.5 mg/kg	89.4	70	130	

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1790445)							
ES1110071-001	TCMB02	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	2.5 mg/L	# Not Determined	70	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	Spike Recovery (%)	Recovery Limits (%)	
				Concentration	MS	Low	High
ED045G: Chloride Discrete analyser (QCLot: 1790444)							
ES1110071-001	TCMB02	ED045G: Chloride	16887-00-6	250 mg/L	82.1	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 1792597)							
ES1110049-004	Anonymous	EG020A-F: Arsenic	7440-38-2	2 mg/L	118	70	130
		EG020A-F: Beryllium	7440-41-7	2 mg/L	115	70	130
		EG020A-F: Barium	7440-39-3	2 mg/L	119	70	130
		EG020A-F: Cadmium	7440-43-9	0.5 mg/L	109	70	130
		EG020A-F: Cobalt	7440-48-4	2 mg/L	115	70	130
		EG020A-F: Copper	7440-50-8	2 mg/L	112	70	130
		EG020A-F: Lead	7439-92-1	2 mg/L	106	70	130
		EG020A-F: Manganese	7439-96-5	2 mg/L	108	70	130
		EG020A-F: Nickel	7440-02-0	2 mg/L	108	70	130
		EG020A-F: Vanadium	7440-62-2	2 mg/L	115	70	130
		EG020A-F: Zinc	7440-66-6	2 mg/L	116	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1795476)							
EB1109163-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1.00 mg/L	110	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1790442)							
ES1110071-001	TCMB02	EK057G: Nitrite as N	----	0.60 mg/L	89.3	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1795475)							
EB1109163-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.24 mg/L	97.9	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1791242)							
ES1110020-004	Anonymous	EK067G: Total Phosphorus as P	----	1.00 mg/L	117	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1790443)							
ES1110071-001	TCMB02	EK071G: Reactive Phosphorus as P	----	0.50 mg/L	106	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 1794453)							
EP1103012-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	94.1	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 1798396)							
EM1105029-013	Anonymous	EP033: Methane	74-82-8	27.92 µg/L	76.0	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1797553)							
ES1110049-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	126	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1797553)							
ES1110049-001	Anonymous	EP080: C6 - C10 Fraction	----	375 µg/L	117	70	130
EP080: BTEXN (QCLot: 1797553)							
ES1110049-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	82.1	70	130
		EP080: Toluene	108-88-3	25 µg/L	86.9	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	85.8	70	130

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 Work Order : ES1110071
 Client : PARSONS BRINCKERHOFF AUST P/L
 Project : 2162406A



Sub-Matrix: WATER

				<i>Matrix Spike (MS) Report</i>			
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Spike</i>	<i>Spike Recovery (%)</i>	<i>Recovery Limits (%)</i>	
				<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP080: BTEXN (QCLot: 1797553) - continued							
ES1110049-001	Anonymous	EP080: meta- & para-Xylene	108-38-3	25 µg/L	85.9	70	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	84.0	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	86.6	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1110071	Page	: 1 of 13
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MS SARAH SCARFF	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: sscarff@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5369	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 13-MAY-2011
Sampler	: NPH/SM	Issue Date	: 24-MAY-2011
Order number	: ----		
Quote number	: SY/394/09	No. of samples received	: 6
		No. of samples analysed	: 6

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	
EA055: Moisture Content								
Soil Glass Jar - Unpreserved TCMB04-333, TCMB04-270	11-MAY-2011	----	----	----	22-MAY-2011	25-MAY-2011	✓	
EP075(SIM)A: Phenolic Compounds								
Soil Glass Jar - Unpreserved TCMB04-333, TCMB04-270	11-MAY-2011	20-MAY-2011	25-MAY-2011	✓	22-MAY-2011	29-JUN-2011	✓	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved TCMB04-333, TCMB04-270	11-MAY-2011	20-MAY-2011	25-MAY-2011	✓	22-MAY-2011	29-JUN-2011	✓	
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved TCMB04-333, TCMB04-270	11-MAY-2011	20-MAY-2011	25-MAY-2011	✓	21-MAY-2011	25-MAY-2011	✓	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
Soil Glass Jar - Unpreserved TCMB04-333, TCMB04-270	11-MAY-2011	20-MAY-2011	25-MAY-2011	✓	21-MAY-2011	29-JUN-2011	✓	
EP080: BTEX								
Soil Glass Jar - Unpreserved TCMB04-333, TCMB04-270	11-MAY-2011	20-MAY-2011	25-MAY-2011	✓	21-MAY-2011	25-MAY-2011	✓	
EP080: BTEXN								
Soil Glass Jar - Unpreserved TCMB04-333, TCMB04-270	11-MAY-2011	20-MAY-2011	25-MAY-2011	✓	21-MAY-2011	25-MAY-2011	✓	

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	
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural TCMB02	13-MAY-2011	---	10-JUN-2011	----	18-MAY-2011	10-JUN-2011	✓	
EA015: Total Dissolved Solids								
Clear Plastic Bottle - Natural TCMB02	13-MAY-2011	----	----	----	16-MAY-2011	20-MAY-2011	✓	



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
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural TCMB02	13-MAY-2011	---	27-MAY-2011	----	18-MAY-2011	27-MAY-2011	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural TCMB02	13-MAY-2011	---	10-JUN-2011	----	16-MAY-2011	10-JUN-2011	✓
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural TCMB02	13-MAY-2011	---	10-JUN-2011	----	16-MAY-2011	10-JUN-2011	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural TCMB02	13-MAY-2011	---	20-MAY-2011	----	16-MAY-2011	20-MAY-2011	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered TCMB02	13-MAY-2011	---	09-NOV-2011	----	18-MAY-2011	09-NOV-2011	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid TCMB02	13-MAY-2011	---	10-JUN-2011	----	19-MAY-2011	10-JUN-2011	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural TCMB02	13-MAY-2011	---	15-MAY-2011	----	16-MAY-2011	15-MAY-2011	*
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid TCMB02	13-MAY-2011	---	10-JUN-2011	----	19-MAY-2011	10-JUN-2011	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid TCMB02	13-MAY-2011	18-MAY-2011	10-JUN-2011	✓	18-MAY-2011	10-JUN-2011	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural TCMB02	13-MAY-2011	---	15-MAY-2011	----	16-MAY-2011	15-MAY-2011	*
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid TCMB02	13-MAY-2011	----	----	----	19-MAY-2011	10-JUN-2011	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - H2SO4 for C1 - C4 Gases TCMB02	13-MAY-2011	----	----	----	22-MAY-2011	27-MAY-2011	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved TCMB02	13-MAY-2011	17-MAY-2011	20-MAY-2011	✓	18-MAY-2011	26-JUN-2011	✓



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
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved TCMB02	13-MAY-2011	17-MAY-2011	20-MAY-2011	✔	18-MAY-2011	26-JUN-2011	✔
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved S5MB02	09-MAY-2011	17-MAY-2011	16-MAY-2011	✘	17-MAY-2011	26-JUN-2011	✔
Amber Glass Bottle - Unpreserved RMB02	10-MAY-2011	17-MAY-2011	17-MAY-2011	✔	17-MAY-2011	26-JUN-2011	✔
Amber Glass Bottle - Unpreserved WMB003	11-MAY-2011	17-MAY-2011	18-MAY-2011	✔	17-MAY-2011	26-JUN-2011	✔
Amber Glass Bottle - Unpreserved TCMB02	13-MAY-2011	17-MAY-2011	20-MAY-2011	✔	17-MAY-2011	26-JUN-2011	✔
Amber VOC Vial - HCl S5MB02	09-MAY-2011	21-MAY-2011	23-MAY-2011	✔	21-MAY-2011	23-MAY-2011	✔
Amber VOC Vial - HCl RMB02	10-MAY-2011	21-MAY-2011	24-MAY-2011	✔	21-MAY-2011	24-MAY-2011	✔
Amber VOC Vial - HCl WMB003	11-MAY-2011	21-MAY-2011	25-MAY-2011	✔	21-MAY-2011	25-MAY-2011	✔
Amber VOC Vial - HCl TCMB02	13-MAY-2011	21-MAY-2011	27-MAY-2011	✔	21-MAY-2011	27-MAY-2011	✔
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft							
Amber Glass Bottle - Unpreserved S5MB02	09-MAY-2011	17-MAY-2011	16-MAY-2011	✘	17-MAY-2011	26-JUN-2011	✔
Amber Glass Bottle - Unpreserved RMB02	10-MAY-2011	17-MAY-2011	17-MAY-2011	✔	17-MAY-2011	26-JUN-2011	✔
Amber Glass Bottle - Unpreserved WMB003	11-MAY-2011	17-MAY-2011	18-MAY-2011	✔	17-MAY-2011	26-JUN-2011	✔
Amber Glass Bottle - Unpreserved TCMB02	13-MAY-2011	17-MAY-2011	20-MAY-2011	✔	17-MAY-2011	26-JUN-2011	✔
Amber VOC Vial - HCl S5MB02	09-MAY-2011	21-MAY-2011	23-MAY-2011	✔	21-MAY-2011	23-MAY-2011	✔
Amber VOC Vial - HCl RMB02	10-MAY-2011	21-MAY-2011	24-MAY-2011	✔	21-MAY-2011	24-MAY-2011	✔
Amber VOC Vial - HCl WMB003	11-MAY-2011	21-MAY-2011	25-MAY-2011	✔	21-MAY-2011	25-MAY-2011	✔
Amber VOC Vial - HCl TCMB02	13-MAY-2011	21-MAY-2011	27-MAY-2011	✔	21-MAY-2011	27-MAY-2011	✔



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
EP080: BTEXN							
Amber VOC Vial - HCl S5MB02	09-MAY-2011	21-MAY-2011	23-MAY-2011	✓	21-MAY-2011	23-MAY-2011	✓
Amber VOC Vial - HCl RMB02	10-MAY-2011	21-MAY-2011	24-MAY-2011	✓	21-MAY-2011	24-MAY-2011	✓
Amber VOC Vial - HCl WMB003	11-MAY-2011	21-MAY-2011	25-MAY-2011	✓	21-MAY-2011	25-MAY-2011	✓
Amber VOC Vial - HCl TCMB02	13-MAY-2011	21-MAY-2011	27-MAY-2011	✓	21-MAY-2011	27-MAY-2011	✓



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 <i>Analytical Method</i>	Metho d	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	13	7.7	5.0	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	20	5.0	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	8	12.5	5.0	✓	ALS QCS3 requirement

Matrix: **WATER**

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

Quality Control Sample Type <i>Analytical Method</i>	Metho d	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	2	15	13.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved	ED040F	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	5	20.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	33.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids	EA015	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	2	16	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type <i>Analytical Method</i>	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Laboratory Control Samples (LCS) - Continued							
Alkalinity by PC Titrator	ED037-P	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved	ED040F	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	3	33.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	33.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids	EA015	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved	ED040F	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	3	33.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	33.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids	EA015	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.0	5.0	✓	ALS QCS3 requirement
C1 - C4 Gases	EP033	1	20	5.0	5.0	✓	ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	13	7.7	5.0	✓	ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.0	5.0	✓	ALS QCS3 requirement



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Metho d	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Matrix Spikes (MS) - Continued							
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.0	5.0	✔	ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	5	20.0	5.0	✔	ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	33.3	5.0	✔	ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	13	7.7	5.0	✔	ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	5.0	5.0	✔	ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	16	6.3	5.0	✔	ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	5.0	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 Method	Method	Matrix	Method Descriptions
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 (2010 Draft) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (1999) Schedule B(3) (Method 506.1)
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 502 and 507)
TPH Volatiles/BTEX	EP080	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
Conductivity by PC Titrator	EA010-P	WATER	APHA 21st ed., 2510 B This procedure determines conductivity by automated ISE. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Dissolved Solids	EA015	WATER	APHA 21st ed., 2540C A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Alkalinity by PC Titrator	ED037-P	WATER	APHA 21st ed., 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Major Anions - Dissolved	ED040F	WATER	APHA 21st ed., 3120. The 0.45um filtered samples are determined by ICP/AES for Sulfur and/or Silicon content and reported as Sulfate and/or Silica after conversion by gravimetric factor.
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	APHA 21st ed., 4500-SO4 Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Chloride by Discrete Analyser	ED045G	WATER	APHA 21st ed., 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	APHA 21st ed., 3120; USEPA SW 846 - 6010 The ICPAES technique ionises the 0.45um filtered 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)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Silica (Total Dissolved) by ICPAES	EG052F	WATER	APHA 21st ed., 4500-SiO2. Silica (Total) determined by calculation from Silicon by ICPAES.



Analytical Method	Method	Matrix	Method Descriptions
Ammonia as N by Discrete analyser	EK055G	WATER	APHA 21st ed., 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrite as N by Discrete Analyser	EK057G	WATER	APHA 21st ed., 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrate as N by Discrete Analyser	EK058G	WATER	APHA 21st ed., 4500-NO3- F. Nitrate is reduced to nitrite by way of a cadmium reduction column followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	APHA 21st ed., 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Cadmium Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	APHA 21st ed., 4500-P B&F This procedure involves sulphuric acid digestion of a 100mL sample to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	APHA 21st ed., 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Ionic Balance by PCT DA and ICPAES	EN055 - PG	WATER	APHA 21st Ed. 1030F. The Ionic Balance is calculated based on the major Anions and Cations. The major anions include Alkalinity, Chloride and Sulfate which determined by PCT and DA. The Cations are determined by ICPAES. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Organic Carbon	EP005	WATER	APHA 21st ed., 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TPH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
TPH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

Preparation Method	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.
TKN/TP Digestion	EK061/EK067	WATER	APHA 21st ed., 4500 Norg - D; APHA 21st ed., 4500 P - H. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

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Work Order : ES1110071
Client : PARSONS BRINCKERHOFF AUST P/L
Project : 2162406A



<i>Preparation Method</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 500 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2). ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



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
Laboratory Control Spike (LCS) Recoveries							
EP075(SIM)A: Phenolic Compounds	2115133-007	----	3- & 4-Methylphenol	1319-77-3	124 %	72-119%	Recovery greater than upper control limit

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EG020F: Dissolved Metals by ICP-MS	2109813-042	----	Vanadium	7440-62-2	83.9 %	91-109%	Recovery less than lower control limit
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1110071-001	TCMB02	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

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

Method	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EK057G: Nitrite as N by Discrete Analyser						
Clear Plastic Bottle - Natural TCMB02	----	----	----	16-MAY-2011	15-MAY-2011	1
EK071G: Reactive Phosphorus as P by discrete analyser						
Clear Plastic Bottle - Natural TCMB02	----	----	----	16-MAY-2011	15-MAY-2011	1
EP080/071: Total Petroleum Hydrocarbons						
Amber Glass Bottle - Unpreserved S5MB02	17-MAY-2011	16-MAY-2011	1	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft						



Matrix: **WATER**

Method Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracte d	Due for extraction	Days overdue	Date analyse d	Due for analysis	Days overdue
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft - Analysis Holding Time Compliance						
Amber Glass Bottle - Unpreserved S5MB02	17-MAY-2011	16-MAY-2011	1	----	----	----

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.**



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1113626	Page	: 1 of 7
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MS SARAH SCARFF	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: sscarff@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5369	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 27-JUN-2011
C-O-C number	: ----	Issue Date	: 05-JUL-2011
Sampler	: SM	No. of samples received	: 3
Site	: ----	No. of samples analysed	: 3
Quote number	: SY/394/09		

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
- Surrogate Control 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Spectroscopist	Sydney Inorganics
Edwandy Fadjar	Senior Organic Chemist	Sydney Organics
Nancy Wang	Senior Semivolatle Instrument Chemist	Melbourne Organics
Sarah Millington	Senior Inorganic Chemist	Sydney Inorganics
Wisam Marassa	Metals Coordinator	Sydney Inorganics

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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 insufficient 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

- **EG020: Bromine quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.**
- **EP080: Level of reporting raised for toluene due to ambient background levels in the laboratory.**
- **EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEX compounds spiked at 20 ug/L.**



Analytical Results

Sub-Matrix: WATER

				Client sample ID	TCMB04	TRIP BLANK	TRIP SPIKE		
				Client sampling date / time	24-JUN-2011 12:00	22-JUN-2011 15:00	22-JUN-2011 15:00	----	----
Compound	CAS Num br	LOR	Unit	ES1113626-001	ES1113626-002	ES1113626-003	----	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	11.2	----	----	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	3650	----	----	----	----	----
EA015: Total Dissolved Solids									
^ Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	1850	----	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	102	----	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	428	----	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	530	----	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	31	----	----	----	----	----
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L	678	----	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	2	----	----	----	----	----
Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----	----
Sodium	7440-23-5	1	mg/L	734	----	----	----	----	----
Potassium	7440-09-7	1	mg/L	28	----	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	3.87	----	----	----	----	----
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	0.054	----	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	0.0001	----	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	----	----	----	----	----
Copper	7440-50-8	0.001	mg/L	0.004	----	----	----	----	----
Lead	7439-92-1	0.001	mg/L	0.005	----	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	<0.001	----	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	0.005	----	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	0.003	----	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----	----
Strontium	7440-24-6	0.001	mg/L	0.125	----	----	----	----	----
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	0.350	----	----	----	----	----
Boron	7440-42-8	0.05	mg/L	0.06	----	----	----	----	----



Analytical Results

Sub-Matrix: WATER

				Client sample ID	TCMB04	TRIP BLANK	TRIP SPIKE		
				Client sampling date / time	24-JUN-2011 12:00	22-JUN-2011 15:00	22-JUN-2011 15:00	----	----
Compound	CAS Num	br	LOR	Unit	ES1113626-001	ES1113626-002	ES1113626-003	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Iron	7439-89-6		0.05	mg/L	<0.05	----	----	----	----
Bromine	7726-95-6		0.1	mg/L	1.2	----	----	----	----
EG052F: Dissolved Silica by ICPAES									
^ Silica	7631-86-9		0.1	mg/L	25.1	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7		0.01	mg/L	1.24	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----		0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
^ Nitrate as N	14797-55-8		0.01	mg/L	<0.01	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----		0.01	mg/L	<0.01	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----		0.01	mg/L	0.03	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	----		0.01	mg/L	0.02	----	----	----	----
EN055: Ionic Balance									
^ Total Anions	----		0.01	meq/L	30.4	----	----	----	----
^ Total Cations	----		0.01	meq/L	32.7	----	----	----	----
^ Ionic Balance	----		0.01	%	3.74	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----		1	mg/L	32	----	----	----	----
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8		10	µg/L	39500	----	----	----	----
EP070: Total Petroleum Hydrocarbons - Speciation									
Aromatic C10-C14	----		50	µg/L	<50	----	----	----	----
Aromatic C15-C28	----		100	µg/L	<100	----	----	----	----
Aromatic C29-C36	----		50	µg/L	<50	----	----	----	----
Aliphatic C10-C14	----		50	µg/L	<50	----	----	----	----
Aliphatic C15-C28	----		100	µg/L	<100	----	----	----	----
Aliphatic C29-C36	----		50	µg/L	<50	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2		1.0	µg/L	<1.0	----	----	----	----
2-Chlorophenol	95-57-8		1.0	µg/L	<1.0	----	----	----	----
2-Methylphenol	95-48-7		1.0	µg/L	<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3		2.0	µg/L	<2.0	----	----	----	----



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

				TCMB04	TRIP BLANK	TRIP SPIKE	----	----
				24-JUN-2011 12:00	22-JUN-2011 15:00	22-JUN-2011 15:00	----	----
Compound	CAS Num br	LOR	Unit	ES1113626-001	ES1113626-002	ES1113626-003	----	----
EP075(SIM)A: Phenolic Compounds - Continued								
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	----	----	----	----
2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	----	----	----	----
2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	----	----	----	----
2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	----	----	----	----
4-Chloro-3-Methylphenol	59-50-7	1.0	µg/L	<1.0	----	----	----	----
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	----	----	----	----
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.9	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
C6 - C10 Fraction	----	20	µg/L	<20	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	----	20	µg/L	<20	<20	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

				TCMB04	TRIP BLANK	TRIP SPIKE		
				24-JUN-2011 12:00	22-JUN-2011 15:00	22-JUN-2011 15:00	----	----
Compound	CAS Num br	LOR	Unit	ES1113626-001	ES1113626-002	ES1113626-003	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft - Continued								
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	18	----	----
Toluene	108-88-3	2	µg/L	<5	<5	17	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	14	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	14	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	15	----	----
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	29	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	78	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	14	----	----
EP070S:TPH Surrogates - Speciation								
2-Fluorobiphenyl	321-60-8	0.1	%	110	----	----	----	----
2-Bromonaphthalene	580-13-2	0.1	%	106	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	19.5	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%	67.7	----	----	----	----
2,4,6-Tribromophenol	118-79-6	0.1	%	83.8	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	84.2	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%	78.9	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	62.9	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	100	105	104	----	----
Toluene-D8	2037-26-5	0.1	%	90.0	100	105	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	96.9	99.5	108	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Num br	Low	High
EP070S:TPH Surrogates - Speciation			
2-Fluorobiphenyl	321-60-8	52	144
2-Bromonaphthalene	580-13-2	81	135
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	64.1
2-Chlorophenol-D4	93951-73-6	11.3	122.9
2.4.6-Tribromophenol	118-79-6	11.7	144.0
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	19.9	122.8
Anthracene-d10	1719-06-8	23.3	125.8
4-Terphenyl-d14	1718-51-0	20.3	134.5
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	76.4	133.1
Toluene-D8	2037-26-5	79.6	126.8
4-Bromofluorobenzene	460-00-4	79.1	125.0



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1113626	Page	: 1 of 12
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MS SARAH SCARFF	Contact	: Loren Schiavon
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Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 27-JUN-2011
C-O-C number	: ----	Issue Date	: 05-JUL-2011
Sampler	: SM	No. of samples received	: 3
Order number	: ----	No. of samples analysed	: 3
Quote number	: SY/394/09		

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Spectroscopist	Sydney Inorganics
Edwandy Fadjar	Senior Organic Chemist	Sydney Organics
Nancy Wang	Senior Semivolatile Instrument Chemist	Melbourne Organics
Sarah Millington	Senior Inorganic Chemist	Sydney Inorganics
Wisam Marassa	Metals Coordinator	Sydney 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 insufficient 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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005P: pH by PC Titrator (QC Lot: 1849107)									
ES1113513-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.46	7.73	3.6	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 1849106)									
ES1113513-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	649	645	0.6	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1846303)									
ES1113394-002	Anonymous	EA015H: Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	139	164	16.5	0% - 20%
ES1113494-003	Anonymous	EA015H: Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	185000	164000	12.4	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1850352)									
ES1113577-004	Anonymous	EA015H: Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	30800	30800	0.0	0% - 20%
ES1113641-003	Anonymous	EA015H: Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	4490	4620	2.8	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 1849108)									
ES1113593-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	9	11	14.6	0% - 50%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	9	11	14.6	0% - 50%
ES1113626-001	TCMB04	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	102	99	2.9	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	428	438	2.3	0% - 20%
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	530	536	1.3	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 1849311)									
ES1113515-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	9	9	0.0	No Limit
ES1113650-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	83	84	1.4	0% - 20%
ED045G: Chloride Discrete analyser (QC Lot: 1849310)									
ES1113515-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	28	29	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 1849309)									
ES1113515-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	1	1	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	2	2	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	16	16	0.0	0% - 50%
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.0	No Limit
ES1113652-003	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	38	39	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	53	54	2.2	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	36	36	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	5	5	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1850794)									
ES1113626-001	TCMB04	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0001	0.0002	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 (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1850794) - continued									
ES1113626-001	TCMB04	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.054	0.054	0.0	0% - 20%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.350	0.357	2.2	0% - 20%
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	3.87	4.10	5.9	0% - 20%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.06	0.06	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG020A-F: Bromine	7726-95-6	0.1	mg/L	1.2	1.2	0.0	0% - 50%		
ES1113642-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.014	0.014	0.0	0% - 50%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.034	0.034	0.0	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.010	0.011	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	0.34	0.34	0.0	No Limit		
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	<0.1	0.0	No Limit		
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1850795)									
ES1113626-001	TCMB04	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.125	0.129	3.1	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
ES1113687-003	Anonymous	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.007	0.007	0.0	No Limit
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit

EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1852169)



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 (%)	
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1852169) - continued										
ES1113601-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit	
ES1113664-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit	
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1849313)										
ES1113626-001	TCMB04	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit	
EW1101955-002	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1852168)										
ES1113601-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.02	75.0	No Limit	
ES1113664-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.14	0.13	0.0	0% - 50%	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1850166)										
ES1113515-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.01	0.0	No Limit	
ES1113515-010	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.05	<0.01	128	No Limit	
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1849314)										
ES1113626-001	TCMB04	EK071G: Reactive Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.0	No Limit	
EP005: Total Organic Carbon (TOC) (QC Lot: 1849580)										
ES1113626-001	TCMB04	EP005: Total Organic Carbon	----	1	mg/L	32	32	0.0	0% - 20%	
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 1849092)										
EB1112079-001	Anonymous	EP033: Methane	74-82-8	10	µg/L	139	146	5.6	0% - 50%	
EB1112079-012	Anonymous	EP033: Methane	74-82-8	10	µg/L	<10	<10	0.0	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1852379)										
ES1113507-011	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit	
ES1113536-021	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	40	30	0.0	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 1852379)										
ES1113507-011	Anonymous	EP080: C6 - C10 Fraction	----	20	µg/L	<20	<20	0.0	No Limit	
ES1113536-021	Anonymous	EP080: C6 - C10 Fraction	----	20	µg/L	40	30	0.0	No Limit	
EP080: BTEXN (QC Lot: 1852379)										
ES1113507-011	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit	
ES1113536-021	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	7	7	0.0	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	4	4	0.0	No Limit	
			106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	2	2	0.0	No Limit			
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit			

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Work Order : ES1113626
Client : PARSONS BRINCKERHOFF AUST P/L
Project : 2162406A





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: WATER

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EA010P: Conductivity by PC Titrator (QCLot: 1849106)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	107	86.3	112
EA015: Total Dissolved Solids (QCLot: 1850352)								
EA015H: Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	<5	293 mg/L	113	70	130
ED037P: Alkalinity by PC Titrator (QCLot: 1849108)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	89.4	80.2	108
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1849311)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	100	70	130
ED045G: Chloride Discrete analyser (QCLot: 1849310)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	1000 mg/L	93.1	70	130
ED093F: Dissolved Major Cations (QCLot: 1849309)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	101	88	110
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.5	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	92.1	81	107
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	96.3	89	109
EG020F: Dissolved Metals by ICP-MS (QCLot: 1850794)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	93.5	92	112
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.2	88	110
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	90.8	80	114
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	96.9	85	109
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.0	89	107
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	94.8	89	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.2	87	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	99.3	90	110
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	102	87	113
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	96.3	84	114
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.1	89	109
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	101	79	119
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	95.5	91	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.2	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	87.4	71	127
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	96.0	84	114
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 1850795)								



Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			LCS	Low
EG020F: Dissolved Metals by ICP-MS (QCLot: 1850795) - continued								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	96.4	88	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1852169)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.00 mg/L	98.6	79.6	122
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1849313)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.96 mg/L	108	70	129
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1852168)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.96 mg/L	108	76.9	122
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1850166)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	81.8	64.3	120
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1849314)								
EK071G: Reactive Phosphorus as P	----	0.01	mg/L	<0.01	0.50 mg/L	90.4	83.8	122
EP005: Total Organic Carbon (TOC) (QCLot: 1849580)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	107	86.9	125
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 1849092)								
EP033: Methane	74-82-8	10	µg/L	<10	27.92 µg/L	103	91.3	115
EP070: Total Petroleum Hydrocarbons - Speciation (QCLot: 1856032)								
EP070: Aliphatic C10-C14	----	50	µg/L	<50	5400 µg/L	112	53	123
EP070: Aliphatic C15-C28	----	100	µg/L	<100	17280 µg/L	79.1	59	130
EP070: Aliphatic C29-C36	----	50	µg/L	<50	----	----	----	----
EP070: Aromatic C10-C14	----	50	µg/L	<50	2310 µg/L	97.2	56	130
EP070: Aromatic C15-C28	----	100	µg/L	<100	3750 µg/L	106	70	130
EP070: Aromatic C29-C36	----	50	µg/L	<50	----	----	----	----
EP075(SIM)A: Phenolic Compounds (QCLot: 1849255)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	----	.5 µg/L	42.6	24.5	61.9
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	----	.5 µg/L	75.1	63.8	110
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	----	.5 µg/L	67.9	55.9	112
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	----	1 µg/L	66.6	42.5	114
		2	µg/L	<2.0	----	----	----	----
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	----	.5 µg/L	70.0	62.7	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.2	µg/L	----	.5 µg/L	73.7	59.9	112
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.2	µg/L	----	.5 µg/L	73.7	59.3	122
		1	µg/L	<1.0	----	----	----	----



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	High
EP075(SIM)A: Phenolic Compounds (QCLot: 1849255) - continued									
EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.2	µg/L	----	.5 µg/L	79.1	64.3	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	----	.5 µg/L	89.1	63	119	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.2	µg/L	----	.5 µg/L	87.8	58.7	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.2	µg/L	----	.5 µg/L	92.3	51.2	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	----	1 µg/L	94.9	6.85	95.6	
		2	µg/L	<2.0	----	----	----	----	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1849255)									
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	----	.5 µg/L	80.5	58.6	119	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	----	.5 µg/L	96.6	63.6	114	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	----	.5 µg/L	85.3	62.2	113	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	----	.5 µg/L	95.6	63.9	115	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	----	.5 µg/L	104	62.6	116	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	----	.5 µg/L	100	64.3	116	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	----	.5 µg/L	106	63.6	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	----	.5 µg/L	110	63.1	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	----	.5 µg/L	104	64.1	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	----	.5 µg/L	95.5	62.5	116	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.2	µg/L	----	.5 µg/L	106	61.7	119	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	----	.5 µg/L	97.9	61.7	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	----	.5 µg/L	108	63.3	117	
		0.5	µg/L	<0.5	----	----	----	----	
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	----	.5 µg/L	104	59.9	118	
		1	µg/L	<1.0	----	----	----	----	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1849255) - continued								
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.2	µg/L	----	.5 µg/L	105	61.2	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.2	µg/L	----	.5 µg/L	106	59.1	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	1	µg/L	<1.0	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1849254)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	79.2	58.9	131
EP071: C15 - C28 Fraction	----	100	µg/L	<100	500 µg/L	92.5	73.9	138
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	89.4	62.7	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1852379)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	102	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1849254)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	62.7	58.9	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	80.8	73.9	138
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
		50	µg/L	----	300 µg/L	110	62.7	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1852379)								
EP080: C6 - C10 Fraction	----	20	µg/L	<20	310 µg/L	109	75	127
EP080: BTEXN (QCLot: 1852379)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	105	70	124
EP080: Toluene	108-88-3	2	µg/L	----	10 µg/L	120	74.4	124
		5	µg/L	<5	----	----	----	----
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	108	70	120
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	106	69	121
	106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	106	73	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	92.7	72.9	127



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: **WATER**

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1849311)							
ES1113515-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	122	70	130
ED045G: Chloride Discrete analyser (QCLot: 1849310)							
ES1113515-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	112	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 1850794)							
ES1113626-001	TCMB04	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	105	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	88.6	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	103	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	95.8	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	101	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	98.9	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	93.1	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	93.0	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	95.1	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	96.8	70	130
EG020A-F: Zinc	7440-66-6	0.2 mg/L	106	70	130		
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1852169)							
ES1113601-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1.00 mg/L	97.3	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1849313)							
ES1113626-001	TCMB04	EK057G: Nitrite as N	----	0.60 mg/L	91.9	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1852168)							
ES1113601-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.60 mg/L	89.7	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1850166)							
ES1113515-001	Anonymous	EK067G: Total Phosphorus as P	----	1.00 mg/L	83.7	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1849314)							
ES1113626-001	TCMB04	EK071G: Reactive Phosphorus as P	----	0.50 mg/L	103	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 1849580)							
ES1113720-001	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	79.0	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 1849092)							
EB1112079-002	Anonymous	EP033: Methane	74-82-8	27.92 µg/L	# Not Determined	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1852379)							
ES1113507-011	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	106	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1852379)							



Sub-Matrix: WATER

				Matrix Spike (MS) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	Spike Recovery (%)	Recovery Limits (%)		
				Concentration	MS	Low	High	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1852379) - continued								
ES1113507-011	Anonymous	EP080: C6 - C10 Fraction	----	375 µg/L	107	70	130	
EP080: BTEXN (QCLot: 1852379)								
ES1113507-011	Anonymous	EP080: Benzene	71-43-2	25 µg/L	114	70	130	
		EP080: Toluene	108-88-3	25 µg/L	93.0	70	130	
		EP080: Ethylbenzene	100-41-4	25 µg/L	95.9	70	130	
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	90.1	70	130	
			106-42-3					
		EP080: ortho-Xylene	95-47-6	25 µg/L	94.7	70	130	
	EP080: Naphthalene	91-20-3	25 µg/L	104	70	130		



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1113626	Page	: 1 of 10
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MS SARAH SCARFF	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: sscarff@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5369	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 27-JUN-2011
C-O-C number	: ----	Issue Date	: 05-JUL-2011
Sampler	: SM	No. of samples received	: 3
Order number	: ----	No. of samples analysed	: 3
Quote number	: SY/394/09		

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: **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
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural TCMB04	24-JUN-2011	---	24-JUN-2011	----	28-JUN-2011	24-JUN-2011	*
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural TCMB04	24-JUN-2011	---	22-JUL-2011	----	28-JUN-2011	22-JUL-2011	✓
EA015: Total Dissolved Solids							
Clear Plastic Bottle - Natural TCMB04	24-JUN-2011	----	----	----	29-JUN-2011	01-JUL-2011	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural TCMB04	24-JUN-2011	---	08-JUL-2011	----	28-JUN-2011	08-JUL-2011	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural TCMB04	24-JUN-2011	---	22-JUL-2011	----	28-JUN-2011	22-JUL-2011	✓
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural TCMB04	24-JUN-2011	---	22-JUL-2011	----	28-JUN-2011	22-JUL-2011	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural TCMB04	24-JUN-2011	---	01-JUL-2011	----	28-JUN-2011	01-JUL-2011	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered TCMB04	24-JUN-2011	---	21-DEC-2011	----	29-JUN-2011	21-DEC-2011	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid TCMB04	24-JUN-2011	---	22-JUL-2011	----	30-JUN-2011	22-JUL-2011	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural TCMB04	24-JUN-2011	---	26-JUN-2011	----	28-JUN-2011	26-JUN-2011	*



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
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid TCMB04	24-JUN-2011	---	22-JUL-2011	----	30-JUN-2011	22-JUL-2011	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid TCMB04	24-JUN-2011	29-JUN-2011	22-JUL-2011	✓	29-JUN-2011	22-JUL-2011	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural TCMB04	24-JUN-2011	---	26-JUN-2011	----	28-JUN-2011	26-JUN-2011	*
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid TCMB04	24-JUN-2011	----	----	----	28-JUN-2011	22-JUL-2011	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - H2SO4 for C1 - C4 Gases TCMB04	24-JUN-2011	----	----	----	28-JUN-2011	08-JUL-2011	✓
EP070: Total Petroleum Hydrocarbons - Speciation							
Amber Glass Bottle - Unpreserved TCMB04	24-JUN-2011	04-JUL-2011	01-JUL-2011	*	05-JUL-2011	13-AUG-2011	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved TCMB04	24-JUN-2011	28-JUN-2011	01-JUL-2011	✓	29-JUN-2011	07-AUG-2011	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved TCMB04	24-JUN-2011	28-JUN-2011	01-JUL-2011	✓	29-JUN-2011	07-AUG-2011	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved TCMB04	24-JUN-2011	28-JUN-2011	01-JUL-2011	✓	29-JUN-2011	07-AUG-2011	✓
Amber VOC Vial - HCl TRIP BLANK, TRIP SPIKE	22-JUN-2011	01-JUL-2011	06-JUL-2011	✓	01-JUL-2011	06-JUL-2011	✓
Amber VOC Vial - HCl TCMB04	24-JUN-2011	01-JUL-2011	08-JUL-2011	✓	01-JUL-2011	08-JUL-2011	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft							
Amber Glass Bottle - Unpreserved TCMB04	24-JUN-2011	28-JUN-2011	01-JUL-2011	✓	29-JUN-2011	07-AUG-2011	✓
Amber VOC Vial - HCl TRIP BLANK, TRIP SPIKE	22-JUN-2011	01-JUL-2011	06-JUL-2011	✓	01-JUL-2011	06-JUL-2011	✓
Amber VOC Vial - HCl TCMB04	24-JUN-2011	01-JUL-2011	08-JUL-2011	✓	01-JUL-2011	08-JUL-2011	✓

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 Work Order : ES1113626
 Client : PARSONS BRINCKERHOFF AUST P/L
 Project : 2162406A



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
EP080: BTEXN							
Amber VOC Vial - HCl TRIP BLANK, TRIP SPIKE	22-JUN-2011	01-JUL-2011	06-JUL-2011	✓	01-JUL-2011	06-JUL-2011	✓
Amber VOC Vial - HCl TCMB04	24-JUN-2011	01-JUL-2011	08-JUL-2011	✓	01-JUL-2011	08-JUL-2011	✓



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

Quality Control Sample Type	Analytical Metho d	Metho d	Count		Rate (%)			Quality Control Specification
			QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)								
Alkalinity by PC Titrator		ED037-P	2	10	20.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser		EK055G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases		EP033	2	19	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	1	9	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved		ED040F	2	11	18.2	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	2	12	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser		EK057G	2	10	20.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
pH by PC Titrator		EA005-P	1	5	20.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser		EK071G	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	2	16	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)		EA015H	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon		EP005	1	2	50.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser		EK067G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX		EP080	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)								
Alkalinity by PC Titrator		ED037-P	1	10	10.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser		EK055G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases		EP033	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	2	9	22.2	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved		ED040F	1	11	9.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	1	12	8.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser		EK057G	1	10	10.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)		EP075(SIM)	1	1	100.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser		EK071G	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)		EA015H	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon		EP005	1	2	50.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser		EK067G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction		EP071	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Speciation		EP070	1	1	100.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX		EP080	1	18	5.6	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	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	9	11.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved	ED040F	1	11	9.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	12	8.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	10	10.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	1	100.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	2	50.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Speciation	EP070	1	1	100.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.0	5.0	✓	ALS QCS3 requirement
C1 - C4 Gases	EP033	1	19	5.3	5.0	✓	ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	9	11.1	5.0	✓	ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.0	5.0	✓	ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.0	5.0	✓	ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	10	10.0	5.0	✓	ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	6	16.7	5.0	✓	ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	16	6.3	5.0	✓	ALS QCS3 requirement
Total Organic Carbon	EP005	1	2	50.0	5.0	✓	ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.0	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	18	5.6	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 Method	Method	Matrix	Method Descriptions
pH by PC Titrator	EA005-P	WATER	APHA 21st ed. 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Conductivity by PC Titrator	EA010-P	WATER	APHA 21st ed., 2510 B This procedure determines conductivity by automated ISE. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Dissolved Solids (High Level)	EA015H	WATER	APHA 21st ed., 2540C A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Alkalinity by PC Titrator	ED037-P	WATER	APHA 21st ed., 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Major Anions - Dissolved	ED040F	WATER	APHA 21st ed., 3120. The 0.45um filtered samples are determined by ICP/AES for Sulfur and/or Silicon content and reported as Sulfate and/or Silica after conversion by gravimetric factor.
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	APHA 21st ed., 4500-SO4 Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Chloride by Discrete Analyser	ED045G	WATER	APHA 21st ed., 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	APHA 21st ed., 3120; USEPA SW 846 - 6010 The ICPAES technique ionises the 0.45um filtered 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)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Silica (Total Dissolved) by ICPAES	EG052F	WATER	APHA 21st ed., 4500-SiO2. Silica (Total) determined by calculation from Silicon by ICPAES.
Ammonia as N by Discrete analyser	EK055G	WATER	APHA 21st ed., 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrite as N by Discrete Analyser	EK057G	WATER	APHA 21st ed., 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrate as N by Discrete Analyser	EK058G	WATER	APHA 21st ed., 4500-NO3- F. Nitrate is reduced to nitrite by way of a cadmium reduction column followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)



Analytical Method	Method	Matrix	Method Descriptions
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	APHA 21st ed., 4500-NO3- F. Combined oxidised Nitrogen (NO ₂ +NO ₃) is determined by Cadmium Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	APHA 21st ed., 4500-P B&F This procedure involves sulphuric acid digestion of a 100mL sample to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	APHA 21st ed., 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Ionic Balance by PCT DA and ICPAES	EN055 - PG	WATER	APHA 21st Ed. 1030F. The Ionic Balance is calculated based on the major Anions and Cations. The major anions include Alkalinity, Chloride and Sulfate which determined by PCT and DA. The Cations are determined by ICPAES. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Organic Carbon	EP005	WATER	APHA 21st ed., 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TPH - Speciation	EP070	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
TPH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
TPH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

Preparation Method	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	APHA 21st ed., 4500 Norg - D; APHA 21st ed., 4500 P - H. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 500 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2). ALS default excludes sediment which may be resident in the container.
Separatory Funnel Extraction of Liquids	ORG14-HX	WATER	Variation of USEPA SW 846 - 3510B: 500 mL to 0.5L of sample is transferred to a separatory funnel and serially extracted three times using 30mL DCM for each extract. The resultant extracts are combined, dehydrated, and exchanged into 5 mL of hexane for analysis. ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



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: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP033: C1 - C4 Hydrocarbon Gases	EB1112079-002	Anonymous	Methane	74-82-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control 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: **WATER**

Method	Extraction / Preparation			Analysis		
	Date extracte d	Due for extraction	Days overdue	Date analyse d	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural TCMB04	----	----	----	28-JUN-2011	24-JUN-2011	4
EK057G: Nitrite as N by Discrete Analyser						
Clear Plastic Bottle - Natural TCMB04	----	----	----	28-JUN-2011	26-JUN-2011	2
EK071G: Reactive Phosphorus as P by discrete analyser						
Clear Plastic Bottle - Natural TCMB04	----	----	----	28-JUN-2011	26-JUN-2011	2
EP070: Total Petroleum Hydrocarbons - Speciation						
Amber Glass Bottle - Unpreserved TCMB04	04-JUL-2011	01-JUL-2011	3	----	----	----

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.**



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1021779	Page	: 1 of 4
Client	: AGL ENERGY	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN ROSS	Contact	: Charlie Pierce
Address	: P.O BOX 67 MENANGLE MENANGLE NSW 2568	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jross@agl.com.au	E-mail	: sydney.enviro.services@alsglobal.com
Telephone	: 4633 5200	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: GLOUCESTER GAS PROJECT-POND WATER QUALITY ASSESSMENT	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 29-OCT-2010
C-O-C number	: ----	Issue Date	: 04-NOV-2010
Sampler	: TL	No. of samples received	: 5
Site	: ----	No. of samples analysed	: 5
Quote number	: SY/456/10		

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
- Surrogate Control 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Inorganics
Edwandy Fadjar	Senior Organic Chemist	Organics
Wisam.Marassa	Metals Coordinator	Inorganics

Environmental Division Sydney

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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 insufficient 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

- **ED041G: LOR raised for SO4 analysis on sample Id:TiedNth/201010/1/TL due to sample matrix**
- **ED-093F:LCS recovery for Potassium falls outside ALS Dynamic Control Limit. However, they are within the acceptance criteria based on ALS DQO. No further action is required.**
- **EP080:Level of Reporting raised for toluene due to ambient background levels in the laboratory.**



Analytical Results

Sub-Matrix: WATER

Client sample ID
 Client sampling date / time

Compound	CAS Num br	LOR	Unit	TiedNth/201010/1/TL	TiedSth/201010/1/TL	STRAT1/201010/1/TL	STRAT3/201010/1/TL	CRAV6/201010/1/TL
				26-OCT-2010 15:00	26-OCT-2010 15:00	26-OCT-2010 15:00	26-OCT-2010 15:00	26-OCT-2010 15:00
				ES1021779-001	ES1021779-002	ES1021779-003	ES1021779-004	ES1021779-005
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	4280	2790	2160	2300	6440
EA016: Non Marine - Estimated TDS Salinity								
^ Total Dissolved Solids (est.)	----	1	mg/L	2780	1810	1410	1500	4180
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	454	314	212	220	270
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	901	464	393	463	2850
Total Alkalinity as CaCO3	----	1	mg/L	1360	778	605	683	3120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<5	22	21	10	<1
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	569	425	332	338	515
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	3	2	3	10
Magnesium	7439-95-4	1	mg/L	<1	1	<1	1	3
Sodium	7440-23-5	1	mg/L	769	624	504	524	1620
Potassium	7440-09-7	1	mg/L	323	43	12	27	11
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	43.1	28.0	21.9	23.4	76.9
^ Total Cations	----	0.01	meq/L	41.7	28.5	22.4	23.7	71.4
^ Ionic Balance	----	0.01	%	1.70	0.85	1.01	0.62	3.77
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080: BTEX								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<5	<5	<5	<5	<5
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	108	110	91.9	85.2	90.8
Toluene-D8	2037-26-5	0.1	%	106	112	102	96.4	103
4-Bromofluorobenzene	460-00-4	0.1	%	104	106	98.0	95.2	101



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	76.4	133.1
Toluene-D8	2037-26-5	79.6	126.8
4-Bromofluorobenzene	460-00-4	79.1	125.0



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1021779	Page	: 1 of 6
Client	: AGL ENERGY	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN ROSS	Contact	: Charlie Pierce
Address	: P.O BOX 67 MENANGLE MENANGLE NSW 2568	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
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Telephone	: 4633 5200	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: GLOUCESTER GAS PROJECT-POND WATER QUALITY ASSESSMENT	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 29-OCT-2010
C-O-C number	: ----	Issue Date	: 04-NOV-2010
Sampler	: TL	No. of samples received	: 5
Order number	: ----	No. of samples analysed	: 5
Quote number	: SY/456/10		

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Inorganics
Edwandy Fadjar	Senior Organic Chemist	Organics
Wisam.Marassa	Metals Coordinator	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 insufficient 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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA010P: Conductivity by PC Titrator (QC Lot: 1545956)									
ES1021585-003	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	3570	3670	2.8	0% - 20%
ES1021778-003	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	12700	12600	0.4	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 1545957)									
ES1021762-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	3840	3790	1.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	3840	3790	1.3	0% - 20%
ES1021779-005	CRAV6/201010/1/TL	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	297	346	15.2	0% - 20%
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	3170	3140	0.8	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	3460	3490	0.7	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 1541507)									
ES1021757-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	5900	5860	0.7	0% - 20%
ES1021779-004	STRAT3/201010/1/TL	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	10	10	0.0	0% - 50%
ED045G: Chloride Discrete analyser (QC Lot: 1541504)									
ES1021378-018	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	<1	<1	0.0	No Limit
ES1021779-003	STRAT1/201010/1/TL	ED045G: Chloride	16887-00-6	1	mg/L	332	334	0.7	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 1541505)									
ES1021757-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	795	822	3.3	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	158	153	3.3	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	2820	2840	0.6	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	63	62	2.3	0% - 20%
ES1021778-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	43	45	3.2	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	101	101	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	3440	3450	0.2	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	138	138	0.0	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1541922)									
ES1021779-001	TiedNth/201010/1/TL	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES1021781-005	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEX (QC Lot: 1541922)									
ES1021779-001	TiedNth/201010/1/TL	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	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 (%)
EP080: BTEX (QC Lot: 1541922) - continued									
ES1021779-001	TiedNth/201010/1/TL	EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
ES1021781-005	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	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: **WATER**

				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit			LCS	Low	High
EA010P: Conductivity by PC Titrator (QCLot: 1545956)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	105	86.3	112
ED037P: Alkalinity by PC Titrator (QCLot: 1545957)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	95.9	80.2	108
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1541507)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	10 mg/L	103	70	130
ED045G: Chloride Discrete analyser (QCLot: 1541504)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	90.5	83.7	124
ED093F: Dissolved Major Cations (QCLot: 1541505)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	98.9	88	110
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	102	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	84.3	81	107
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	# 87.8	89	109
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1541682)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	100 µg/L	65.7	58.9	131
EP071: C15 - C28 Fraction	----	100	µg/L	<100	100 µg/L	107	73.9	138
EP071: C29 - C36 Fraction	----	50	µg/L	<50	100 µg/L	117	62.7	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1541922)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	88.1	75	127
EP080: BTEX (QCLot: 1541922)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	80.1	70	124
EP080: Toluene	108-88-3	2	µg/L	----	10 µg/L	86.2	74.4	124
		5	µg/L	<5	----	----	----	----
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	87.8	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	85.8	69	121



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: **WATER**

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	Spike Recovery (%)	Recovery Limits (%)	
				Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1541507)							
ES1021757-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	2.5 mg/L	# Not Determined	70	130
ED045G: Chloride Discrete analyser (QCLot: 1541504)							
ES1021378-018	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	102	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1541922)							
ES1021779-001	TiedNth/201010/1/TL	EP080: C6 - C9 Fraction	----	250 µg/L	79.9	70	130
EP080: BTEX (QCLot: 1541922)							
ES1021779-001	TiedNth/201010/1/TL	EP080: Benzene	71-43-2	25 µg/L	76.4	70	130
		EP080: Toluene	108-88-3	25 µg/L	89.8	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	90.4	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	79.3	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	83.6	70	130



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1100539	Page	: 1 of 4
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: JAMES DUGGLEBY	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jduggleby@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 11-JAN-2011
Sampler	: NPH	Issue Date	: 19-JAN-2011
Site	: ----		
Quote number	: EN/008/10	No. of samples received	: 4
		No. of samples analysed	: 4

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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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Inorganics
Celine Conceicao	Spectroscopist	Inorganics
Luke Witham	Senior Inorganic Chemist	Inorganics
Sarah Millington	Senior Inorganic Chemist	Inorganics

Environmental Division Sydney
Part of the **ALS Laboratory Group**

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A Campbell Brothers Limited Company



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 insufficient 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

- **EA015 TDS, result has been confirmed by re-analysis.**
- **ED040F: LCS recovery for sulfate fall outside ALS dynamic control limits. However, they are within the acceptance criteria based on ALS DQO. No further action is required.**
- **EG020: An unpreserved aliquot from the natural bottle was used for analysis.**



Analytical Results

Sub-Matrix: WATER

				Client sample ID				
				N1D	N1S	S1D	S1S	----
				10-JAN-2011 11:35	10-JAN-2011 11:30	10-JAN-2011 12:00	10-JAN-2011 12:00	----
				Client sampling date / time				
Compound	CAS Num br	LOR	Unit	ES1100539-001	ES1100539-002	ES1100539-003	ES1100539-004	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	4180	4240	2610	2650	----
EA015: Total Dissolved Solids								
^ Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	2600	2500	----	1640	----
Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	----	----	1910	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	341	457	231	354	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	989	872	577	395	----
Total Alkalinity as CaCO3	----	1	mg/L	1330	1330	808	748	----
ED040F: Dissolved Major Anions								
Sulfate as SO4 2-	14808-79-8	1	mg/L	14	12	29	23	----
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	634	663	466	489	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	2	1	3	5	----
Magnesium	7439-95-4	1	mg/L	<1	<1	1	2	----
Sodium	7440-23-5	1	mg/L	776	768	602	604	----
Potassium	7440-09-7	1	mg/L	317	320	40	42	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.13	0.48	0.07	0.05	----
Arsenic	7440-38-2	0.001	mg/L	0.008	0.008	0.009	0.007	----
Boron	7440-42-8	0.05	mg/L	0.83	0.79	0.70	0.70	----
Strontium	7440-24-6	0.001	mg/L	0.229	0.157	0.300	0.361	----
Barium	7440-39-3	0.001	mg/L	0.228	0.086	0.241	0.265	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	0.0002	<0.0001	0.0002	0.0003	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.001	0.001	----
Copper	7440-50-8	0.001	mg/L	0.003	0.143	0.002	0.009	----
Manganese	7439-96-5	0.001	mg/L	0.004	0.006	0.005	0.003	----
Molybdenum	7439-98-7	0.001	mg/L	0.024	0.024	0.025	0.024	----
Nickel	7440-02-0	0.001	mg/L	0.004	0.002	0.004	0.004	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----
Vanadium	7440-62-2	0.01	mg/L	0.01	0.01	<0.01	<0.01	----
Zinc	7440-66-6	0.005	mg/L	0.017	0.018	0.026	0.028	----
Iron	7439-89-6	0.05	mg/L	0.11	0.12	0.09	<0.05	----



Analytical Results

Sub-Matrix: WATER

				Client sample ID	N1D	N1S	S1D	S1S	
				Client sampling date / time	10-JAN-2011 11:35	10-JAN-2011 11:30	10-JAN-2011 12:00	10-JAN-2011 12:00	----
Compound	CAS Num br	LOR	Unit		ES1100539-001	ES1100539-002	ES1100539-003	ES1100539-004	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Bromine	7726-95-6	0.1	mg/L		1.9	1.8	0.9	0.9	----
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.10	mg/L		20.8	21.8	15.1	15.7	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		0.19	<0.01	3.60	<0.01	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
^ Nitrate as N	14797-55-8	0.01	mg/L		0.02	<0.01	0.01	0.03	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		0.02	<0.01	0.01	0.03	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		3.61	2.12	3.16	0.46	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	----	0.01	mg/L		<0.01	0.05	0.36	<0.01	----
EN055: Ionic Balance									
^ Total Anions	----	0.01	meq/L		44.8	45.5	29.9	29.2	----
^ Total Cations	----	0.01	meq/L		42.0	41.6	27.5	27.8	----
^ Ionic Balance	----	0.01	%		3.24	4.45	4.26	2.56	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		35	52	120	52	----



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1100539	Page	: 1 of 8
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: JAMES DUGGLEBY	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jduggleby@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 11-JAN-2011
C-O-C number	: ----	Issue Date	: 19-JAN-2011
Sampler	: NPH	No. of samples received	: 4
Order number	: ----	No. of samples analysed	: 4
Quote number	: EN/008/10		

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



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Ankit Joshi	Inorganic Chemist	Inorganics
Celine Conceicao	Spectroscopist	Inorganics
Luke Witham	Senior Inorganic Chemist	Inorganics
Sarah Millington	Senior Inorganic Chemist	Inorganics



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				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA010P: Conductivity by PC Titrator (QC Lot: 1634826)									
ES1100469-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	816	818	0.2	0% - 20%
ES1100539-001	N1D	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	4180	4190	0.3	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1630344)									
EB1100319-001	Anonymous	EA015H: Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	9170	8800	4.1	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1632636)									
EB1100497-002	Anonymous	EA015H: Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	2820	2710	3.8	0% - 20%
ES1100683-002	Anonymous	EA015H: Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	1990	1900	4.8	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 1634830)									
ES1100487-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	165	164	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	165	164	0.0	0% - 20%
ES1100495-005	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	3960	3960	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	3960	3960	0.0	0% - 20%
ED040F: Dissolved Major Anions (QC Lot: 1628988)									
ES1100506-001	Anonymous	ED040F: Sulfate as SO4 2-	14808-79-8	1	mg/L	106	104	1.8	0% - 20%
ES1100539-001	N1D	ED040F: Sulfate as SO4 2-	14808-79-8	1	mg/L	14	15	0.0	0% - 50%
ED040F: Dissolved Major Anions (QC Lot: 1628995)									
ES1100539-004	S1S	ED040F: Sulfate as SO4 2-	14808-79-8	1	mg/L	23	24	0.0	0% - 20%
EW1100092-001	Anonymous	ED040F: Sulfate as SO4 2-	14808-79-8	1	mg/L	12	12	0.0	0% - 50%
ED045G: Chloride Discrete analyser (QC Lot: 1628991)									
ES1100506-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	212	217	2.3	0% - 20%
ES1100506-010	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	<1	<1	0.0	No Limit
ED093F: Dissolved Major Cations (QC Lot: 1628989)									
ES1100506-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	26	28	4.9	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	28	29	4.9	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	265	266	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	28	28	0.0	0% - 20%
ES1100539-001	N1D	ED093F: Calcium	7440-70-2	1	mg/L	2	2	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	<1	1	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	776	778	0.2	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	317	321	1.1	0% - 20%



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 (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1634504)									
ES1100539-001	N1D	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0002	0.0002	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.008	0.007	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.228	0.236	3.5	0% - 20%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.024	0.025	4.3	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.017	0.018	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.13	0.14	0.0	0% - 50%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	0.01	0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.83	0.84	0.0	0% - 50%
EG020A-F: Iron	7439-89-6	0.05	mg/L	0.11	0.10	0.0	No Limit		
EG020A-F: Bromine	7726-95-6	0.1	mg/L	1.9	1.9	0.0	0% - 50%		
ES1100709-004	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0003	0.0003	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.114	0.113	0.0	0% - 20%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.027	0.026	0.0	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.027	0.027	0.0	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.013	0.013	0.0	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.006	0.006	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.028	0.028	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.05	0.05	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.09	0.08	0.0	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	0.05	0.07	29.5	No Limit		
EG020A-F: Bromine	7726-95-6	0.1	mg/L	0.3	0.2	0.0	No Limit		
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1634505)									
ES1100539-001	N1D	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.229	0.234	2.1	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
ES1100709-004	Anonymous	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.107	0.105	2.3	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	0.003	0.003	0.0	No Limit

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 Work Order : ES1100539
 Client : PARSONS BRINCKERHOFF AUST P/L
 Project : 2162406A



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 (%)
EG052G: Silica by Discrete Analyser (QC Lot: 1628994)									
ES1100539-001	N1D	EG052G: Reactive Silica	----	0.10	mg/L	20.8	19.9	4.6	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1629011)									
ES1100506-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES1100506-009	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.10	<0.01	164	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1628990)									
ES1100506-001	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES1100506-009	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1629010)									
ES1100506-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES1100506-009	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.14	# 173	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1631072)									
ES1100527-023	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.04	117	No Limit
ES1100641-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1628993)									
ES1100539-001	N1D	EK071G: Reactive Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 1632384)									
EP1100134-002	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	1910	1640	15.7	0% - 20%
ES1100462-002	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	6	5	18.2	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: WATER

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit			LCS	Low	High	
EA010P: Conductivity by PC Titrator (QCLot: 1634826)									
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	102	86.3	112	
EA015: Total Dissolved Solids (QCLot: 1630344)									
EA015H: Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	<5	293 mg/L	96.2	70	130	
EA015: Total Dissolved Solids (QCLot: 1632636)									
EA015H: Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	<5	293 mg/L	90.8	70	130	
ED037P: Alkalinity by PC Titrator (QCLot: 1634830)									
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	91.1	80.2	108	
ED040F: Dissolved Major Anions (QCLot: 1628988)									
ED040F: Sulfate as SO4 2-	14808-79-8	1	mg/L	<1	150 mg/L	# 116	82.9	114	
ED040F: Dissolved Major Anions (QCLot: 1628995)									
ED040F: Sulfate as SO4 2-	14808-79-8	1	mg/L	<1	150 mg/L	100	82.9	114	
ED045G: Chloride Discrete analyser (QCLot: 1628991)									
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	93.0	83.7	124	
ED093F: Dissolved Major Cations (QCLot: 1628989)									
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	99.1	88	110	
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	100	90	110	
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	90.4	81	107	
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	94.9	89	109	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1634504)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	106	92	112	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	96.0	88	110	
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	97.7	80	114	
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	99.3	85	109	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.8	89	107	
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	102	89	109	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	101	87	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	100	90	110	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	103	87	113	
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	97.9	84	114	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	100	89	109	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	99.6	79	119	
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	103	91	109	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	99.4	85	115	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1634504) - continued									
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	105	71	127	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	101	84	114	
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1634505)									
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	97.5	88	112	
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----	
EG052G: Silica by Discete Analyser (QCLot: 1628994)									
EG052G: Reactive Silica	----	0.1	mg/L	<0.10	21.4 mg/L	99.1	70	130	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1629011)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.00 mg/L	106	79.6	122	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1628990)									
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.96 mg/L	90.4	70	129	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1629010)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.96 mg/L	93.0	76.9	122	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1631072)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	85.3	64.3	120	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1628993)									
EK071G: Reactive Phosphorus as P	----	0.01	mg/L	<0.01	0.50 mg/L	97.4	83.8	122	
EP005: Total Organic Carbon (TOC) (QCLot: 1632384)									
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	87.0	86.9	125	



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: **WATER**

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	Spike Recovery (%)	Recovery Limits (%)	
				Concentration	MS	Low	High
ED045G: Chloride Discrete analyser (QCLot: 1628991)							
ES1100506-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	119	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 1634504)							
ES1100539-001	N1D	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	128	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	117	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	124	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	112	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	127	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	125	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	111	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	115	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	123	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	114	70	130
EG020A-F: Zinc	7440-66-6	0.2 mg/L	124	70	130		
EG052G: Silica by Discrete Analyser (QCLot: 1628994)							
ES1100539-001	N1D	EG052G: Reactive Silica	----	5.0 mg/L	# Not Determined	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1629011)							
ES1100506-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1.00 mg/L	88.1	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1628990)							
ES1100506-001	Anonymous	EK057G: Nitrite as N	----	0.60 mg/L	87.8	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1629010)							
ES1100506-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.60 mg/L	102	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1631072)							
ES1100527-023	Anonymous	EK067G: Total Phosphorus as P	----	1.00 mg/L	101	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1628993)							
ES1100539-001	N1D	EK071G: Reactive Phosphorus as P	----	0.50 mg/L	90.4	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 1632384)							
ES1100453-006	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	87.6	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1100539	Page	: 1 of 8
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: JAMES DUGGLEBY	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
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Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 11-JAN-2011
Sampler	: NPH	Issue Date	: 19-JAN-2011
Order number	: ----		
Quote number	: EN/008/10	No. of samples received	: 4
		No. of samples analysed	: 4

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: **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
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural N1D, S1D, N1S, S1S	10-JAN-2011	---	07-FEB-2011	----	18-JAN-2011	07-FEB-2011	✓
EA015: Total Dissolved Solids							
Clear Plastic Bottle - Natural N1D, S1D, N1S, S1S	10-JAN-2011	----	----	----	13-JAN-2011	17-JAN-2011	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural N1D, S1D, N1S, S1S	10-JAN-2011	---	24-JAN-2011	----	18-JAN-2011	24-JAN-2011	✓
ED040F: Dissolved Major Anions							
Clear Plastic Bottle - Natural N1D, S1D, N1S, S1S	10-JAN-2011	---	07-FEB-2011	----	12-JAN-2011	07-FEB-2011	✓
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural N1D, S1D, N1S, S1S	10-JAN-2011	---	07-FEB-2011	----	12-JAN-2011	07-FEB-2011	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural N1D, S1D, N1S, S1S	10-JAN-2011	---	17-JAN-2011	----	12-JAN-2011	17-JAN-2011	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered N1D, S1D, N1S, S1S	10-JAN-2011	---	09-JUL-2011	----	18-JAN-2011	09-JUL-2011	✓
EG052G: Silica by Discrete Analyser							
Clear Plastic Bottle - Natural N1D, S1D, N1S, S1S	10-JAN-2011	---	07-FEB-2011	----	12-JAN-2011	07-FEB-2011	✓



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
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulphuric Acid N1D, S1D, N1S, S1S	10-JAN-2011	---	07-FEB-2011	----	12-JAN-2011	07-FEB-2011	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural N1D, S1D, N1S, S1S	10-JAN-2011	---	12-JAN-2011	----	12-JAN-2011	12-JAN-2011	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulphuric Acid N1D, S1D, N1S, S1S	10-JAN-2011	---	07-FEB-2011	----	12-JAN-2011	07-FEB-2011	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulphuric Acid N1D, S1D, N1S, S1S	10-JAN-2011	13-JAN-2011	07-FEB-2011	✓	14-JAN-2011	07-FEB-2011	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural N1D, S1D, N1S, S1S	10-JAN-2011	---	12-JAN-2011	----	12-JAN-2011	12-JAN-2011	✓
EP005: Total Organic Carbon (TOC)							
Clear Plastic Bottle - Sulphuric Acid N1D, S1D, N1S, S1S	10-JAN-2011	----	----	----	14-JAN-2011	07-FEB-2011	✓



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

Quality Control Sample Type	Analytical Method	Metho d	Count		Rate (%)			Quality Control Specification
			QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)								
Alkalinity by PC Titrator		ED037-P	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser		EK055G	2	14	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved		ED040F	4	35	11.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	2	14	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser		EK057G	2	17	11.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser		EK071G	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser		EG052G	1	4	25.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Standard Anions		ED009	2	15	13.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)		EA015H	3	19	15.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon		EP005	2	17	11.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser		EK067G	2	12	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)								
Alkalinity by PC Titrator		ED037-P	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser		EK055G	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Dissolved		ED040F	2	35	5.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser		EK057G	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser		EK071G	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser		EG052G	1	4	25.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Standard Anions		ED009	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)		EA015H	2	19	10.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon		EP005	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser		EK067G	1	12	8.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)								
Ammonia as N by Discrete analyser		EK055G	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	1	20	5.0	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	Metho d	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
Major Anions - Dissolved	ED040F	2	35	5.7	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	20	5.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	7.1	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	17	5.9	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.5	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	4	25.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Standard Anions	ED009	1	15	6.7	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	19	10.5	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	17	5.9	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	12	8.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	14	7.1	5.0	✔	ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	20	5.0	5.0	✔	ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.0	5.0	✔	ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	7.1	5.0	✔	ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	17	5.9	5.0	✔	ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.5	5.0	✔	ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	4	25.0	5.0	✔	ALS QCS3 requirement
Standard Anions	ED009	1	15	6.7	5.0	✔	ALS QCS3 requirement
Total Organic Carbon	EP005	1	17	5.9	5.0	✔	ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	12	8.3	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 Method	Method	Matrix	Method Descriptions
Conductivity by PC Titrator	EA010-P	WATER	APHA 21st ed., 2510 B This procedure determines conductivity by automated ISE. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Dissolved Solids (High Level)	EA015H	WATER	APHA 21st ed., 2540C A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Standard Anions	* ED009	WATER	APHA 21st ed., 4110. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Alkalinity by PC Titrator	ED037-P	WATER	APHA 21st ed., 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Major Anions - Dissolved	ED040F	WATER	APHA 21st ed., 3120. The 0.45um filtered samples are determined by ICP/AES for Sulfur and/or Silicon content and reported as Sulfate and/or Silica after conversion by gravimetric factor.
Chloride by Discrete Analyser	ED045G	WATER	APHA 21st ed., 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	APHA 21st ed., 3120; USEPA SW 846 - 6010 The ICPAES technique ionises the 0.45um filtered 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)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Silica (Reactive) by Discrete Analyser	EG052G	WATER	APHA 21st ed. 4500-SiO2 D: Under Acidic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Ammonia as N by Discrete analyser	EK055G	WATER	APHA 21st ed., 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrite as N by Discrete Analyser	EK057G	WATER	APHA 21st ed., 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrate as N by Discrete Analyser	EK058G	WATER	APHA 21st ed., 4500-NO3- F. Nitrate is reduced to nitrite by way of a cadmium reduction column followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	APHA 21st ed., 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Cadmium Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

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 Work Order : ES1100539
 Client : PARSONS BRINCKERHOFF AUST P/L
 Project : 2162406A



<i>Analytical Method</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	APHA 21st ed., 4500-P B&F This procedure involves sulphuric acid digestion of a 100mL sample to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	APHA 21st ed., 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Ionic Balance by PCT DA and ICPAES	EN055 - DA	WATER	APHA 21st Ed. 1030F. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Organic Carbon	EP005	WATER	APHA 21st ed., 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
<i>Preparation Method</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	APHA 21st ed., 4500 Norg - D; APHA 21st ed., 4500 P - H. 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: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	ES1100506-009	Anonymous	Nitrite + Nitrate as N	----	173 %	0-50%	RPD exceeds LOR based limits
Laboratory Control Spike (LCS) Recoveries							
ED040F: Dissolved Major Anions	1912576-002	----	Sulfate as SO4 2-	14808-79-8	116 %	82.9-114%	Recovery greater than upper control limit
Matrix Spike (MS) Recoveries							
EG052G: Silica by Discete Analyser	ES1100539-001	N1D	Reactive Silica	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

- 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.

- No Analysis Holding Time Outliers exist.

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.



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1101497	Page	: 1 of 5
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: JAMES DUGGLEBY	Contact	: Loren Schiavon
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Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
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Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 21-JAN-2011
Sampler	: ----	Issue Date	: 01-FEB-2011
Site	: ----		
Quote number	: EN/008/10	No. of samples received	: 2
		No. of samples analysed	: 2

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
- Surrogate Control 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Edwandy Fadjar	Senior Organic Chemist	Organics



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 insufficient 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

- **EP080: Level of Reporting raised for toluene due to ambient background levels in the laboratory.**



Analytical Results

Sub-Matrix: WATER

Client sample ID
 Client sampling date / time

Compound	CAS Num br	LOR	Unit	NPOND	SPOND			
				20-JAN-2011 14:00	20-JAN-2011 14:30	----	----	----
				ES1101497-001	ES1101497-002	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	----	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	----	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	----	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	----	----	----
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----
EP080: BTEX								
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----
Toluene	108-88-3	2	µg/L	<5	<5	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	39.3	41.7	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%	84.6	77.2	----	----	----
2,4,6-Tribromophenol	118-79-6	0.1	%	78.9	70.1	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	80.8	78.0	----	----	----
Anthracene-d10	1719-06-8	0.1	%	83.9	83.4	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	68.8	66.6	----	----	----
EP080S: TPH(V)/BTEX Surrogates								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				NPOND	SPOND			
				20-JAN-2011 14:00	20-JAN-2011 14:30	----	----	----
Compound	CAS Num br	LOR	Unit	ES1101497-001	ES1101497-002	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	109	111	----	----	----
Toluene-D8	2037-26-5	0.1	%	100	105	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	100	106	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Num br	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	64.1
2-Chlorophenol-D4	93951-73-6	11.3	122.9
2,4,6-Tribromophenol	118-79-6	11.7	144.0
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	19.9	122.8
Anthracene-d10	1719-06-8	23.3	125.8
4-Terphenyl-d14	1718-51-0	20.3	134.5
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	76.4	133.1
Toluene-D8	2037-26-5	79.6	126.8
4-Bromofluorobenzene	460-00-4	79.1	125.0



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1101497	Page	: 1 of 6
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: JAMES DUGGLEBY	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jduggleby@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 21-JAN-2011
C-O-C number	: ----	Issue Date	: 01-FEB-2011
Sampler	: ----	No. of samples received	: 2
Order number	: ----	No. of samples analysed	: 2
Quote number	: EN/008/10		

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
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A Campbell Brothers Limited Company



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 insufficient 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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1645658)									
ES1101485-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES1101603-019	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEX (QC Lot: 1645658)									
ES1101485-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
ES1101603-019	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	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: WATER

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1643303)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	----	.5 µg/L	101	58.6	119
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	----	.5 µg/L	112	63.6	114
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	----	0.5 µg/L	105	62.2	113
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	----	.5 µg/L	113	63.9	115
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	----	.5 µg/L	113	62.6	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	----	.5 µg/L	100	64.3	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	----	.5 µg/L	109	63.6	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	----	.5 µg/L	113	63.1	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	----	.5 µg/L	95.2	64.1	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	----	.5 µg/L	101	62.5	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.2	µg/L	----	.5 µg/L	114	61.7	119
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	----	.5 µg/L	108	61.7	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	----	.5 µg/L	104	63.3	117
		0.5	µg/L	<0.5	----	----	----	----
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	----	.5 µg/L	102	59.9	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.2	µg/L	----	.5 µg/L	98.6	61.2	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.2	µg/L	----	.5 µg/L	108	59.1	118
		1	µg/L	<1.0	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1643302)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	60.0	58.9	131
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	94.0	73.9	138



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1643302) - continued									
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	84.5	62.7	131	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1645658)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	85.2	75	127	
EP080: BTEX (QCLot: 1645658)									
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	77.7	70	124	
EP080: Toluene	108-88-3	2	µg/L	----	10 µg/L	99.8	74.4	124	
		5	µg/L	<5	----	----	----	----	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	87.3	70	120	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	87.6	69	121	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	88.9	73	121	



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: **WATER**

				<i>Matrix Spike (MS) Report</i>			
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Spike</i>	<i>Spike Recovery (%)</i>	<i>Recovery Limits (%)</i>	
				<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1645658)							
ES1101485-001	Anonymous	EP080: C6 - C9 Fraction	----	250 µg/L	91.8	70	130
EP080: BTEX (QCLot: 1645658)							
ES1101485-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	84.3	70	130
		EP080: Toluene	108-88-3	25 µg/L	87.5	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	92.3	70	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	93.8	70	130
		EP080: ortho-Xylene	106-42-3	25 µg/L	91.5	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1101497	Page	: 1 of 5
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: JAMES DUGGLEBY	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jduggleby@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 21-JAN-2011
C-O-C number	: ----	Issue Date	: 01-FEB-2011
Sampler	: ----	No. of samples received	: 2
Order number	: ----	No. of samples analysed	: 2
Quote number	: EN/008/10		

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: **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
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved NPOND, SPOND	20-JAN-2011	24-JAN-2011	27-JAN-2011	✓	25-JAN-2011	05-MAR-2011	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved NPOND, SPOND	20-JAN-2011	24-JAN-2011	27-JAN-2011	✓	25-JAN-2011	05-MAR-2011	✓
Amber VOC Vial - HCl NPOND, SPOND	20-JAN-2011	27-JAN-2011	03-FEB-2011	✓	27-JAN-2011	03-FEB-2011	✓
EP080: BTEX							
Amber VOC Vial - HCl NPOND, SPOND	20-JAN-2011	27-JAN-2011	03-FEB-2011	✓	27-JAN-2011	03-FEB-2011	✓



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

Quality Control Sample Type	Analytical Method	Method	Count		Rate (%)			Quality Control Specification
			QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)								
TPH Volatiles/BTEX		EP080	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)								
PAH/Phenols (GC/MS - SIM)		EP075(SIM)	1	10	10.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction		EP071	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX		EP080	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)								
PAH/Phenols (GC/MS - SIM)		EP075(SIM)	1	10	10.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction		EP071	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX		EP080	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)								
TPH Volatiles/BTEX		EP080	1	20	5.0	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 Method	Method	Matrix	Method Descriptions
TPH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
TPH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Preparation Method	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 500 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2). ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



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

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike 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.

- No Analysis Holding Time Outliers exist.

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.



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 insufficient 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

- **EG020: Bromine quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.**
- **EG020-F: Unpreserved aliquots from natural bottles were used in the analysis of all samples.**
- **EP080: Level of reporting raised for toluene due to ambient background levels in the laboratory.**
- **EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEX compounds spiked at 20 ug/L.**



Analytical Results

Sub-Matrix: WATER

Client sample ID
 Client sampling date / time

Compound	CAS Number	LOR	Unit	S1	S1 (B)	S3	TRIP SPIKE	TRIP BLANK
				04-AUG-2011 15:00	04-AUG-2011 15:00	04-AUG-2011 15:00	04-AUG-2011 15:00	04-AUG-2011 15:00
				ES1116957-001	ES1116957-002	ES1116957-003	ES1116957-004	ES1116957-005
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	1680	1680	2110	----	----
EA015: Total Dissolved Solids								
^ Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	914	972	1170	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	121	125	359	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	297	298	232	----	----
Total Alkalinity as CaCO3	----	1	mg/L	418	424	592	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	8	11	4	----	----
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	249	252	286	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	2	2	2	----	----
Magnesium	7439-95-4	1	mg/L	1	1	1	----	----
Sodium	7440-23-5	1	mg/L	367	372	473	----	----
Potassium	7440-09-7	1	mg/L	8	8	22	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.01	0.02	0.02	----	----
Arsenic	7440-38-2	0.001	mg/L	0.005	0.004	0.003	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Barium	7440-39-3	0.001	mg/L	0.267	0.244	0.426	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.004	----	----
Molybdenum	7439-98-7	0.001	mg/L	0.016	0.016	0.011	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.001	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	----	----
Strontium	7440-24-6	0.001	mg/L	0.290	0.286	0.427	----	----
Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	----	----
Boron	7440-42-8	0.05	mg/L	0.31	0.33	0.59	----	----
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	<0.05	----	----
Bromine	7726-95-6	0.1	mg/L	0.5	0.4	0.6	----	----



Analytical Results

Sub-Matrix: WATER

Client sample ID
 Client sampling date / time

Compound	CAS Number	LOR	Unit	S1	S1 (B)	S3	TRIP SPIKE	TRIP BLANK
				04-AUG-2011 15:00	04-AUG-2011 15:00	04-AUG-2011 15:00	04-AUG-2011 15:00	04-AUG-2011 15:00
				ES1116957-001	ES1116957-002	ES1116957-003	ES1116957-004	ES1116957-005
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.93	0.85	<0.01	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.16	0.18	1.06	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	15.5	15.8	20.0	----	----
^ Total Cations	----	0.01	meq/L	16.4	16.6	21.3	----	----
^ Ionic Balance	----	0.01	%	2.49	2.30	3.20	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	45	44	55	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	<1.0	<1.0	<1.0	----	----
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	<1.0	----	----
2-Methylphenol	95-48-7	1.0	µg/L	<1.0	<1.0	<1.0	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	<2.0	<2.0	----	----
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	<1.0	----	----
2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.0	<1.0	----	----
2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	<1.0	----	----
2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	<1.0	----	----
4-Chloro-3-Methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	<1.0	----	----
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	<1.0	----	----
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	<2.0	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	<1.0	----	----



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S1	S1 (B)	S3	TRIP SPIKE	TRIP BLANK
				04-AUG-2011 15:00	04-AUG-2011 15:00	04-AUG-2011 15:00	04-AUG-2011 15:00	04-AUG-2011 15:00
				ES1116957-001	ES1116957-002	ES1116957-003	ES1116957-004	ES1116957-005
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	<1.0	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
C6 - C10 Fraction	----	20	µg/L	<20	<20	<20	----	<20
^ C6 - C10 Fraction minus BTEX (F1)	----	20	µg/L	<20	<20	<20	----	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	16	<1
Toluene	108-88-3	2	µg/L	<5	<5	<5	17	<5
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	16	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	17	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	18	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	35	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	84	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	18	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	20.2	30.0	27.4	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%	42.3	60.1	51.4	----	----
2,4,6-Tribromophenol	118-79-6	0.1	%	57.8	90.3	61.3	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	63.8	99.5	103	----	----
Anthracene-d10	1719-06-8	0.1	%	76.7	94.6	105	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	87.6	113	99.9	----	----
EP080S: TPH(V)/BTEX Surrogates								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				S1	S1 (B)	S3	TRIP SPIKE	TRIP BLANK
				04-AUG-2011 15:00	04-AUG-2011 15:00	04-AUG-2011 15:00	04-AUG-2011 15:00	04-AUG-2011 15:00
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	ES1116957-001	ES1116957-002	ES1116957-003	ES1116957-004	ES1116957-005
EP080S: TPH(V)/BTEX Surrogates - Continued								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	107	108	110	101	108
Toluene-D8	2037-26-5	0.1	%	97.3	103	101	99.5	100
4-Bromofluorobenzene	460-00-4	0.1	%	90.7	94.4	97.0	92.5	91.4



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	64.1
2-Chlorophenol-D4	93951-73-6	11.3	122.9
2,4,6-Tribromophenol	118-79-6	11.7	144.0
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	19.9	122.8
Anthracene-d10	1719-06-8	23.3	125.8
4-Terphenyl-d14	1718-51-0	20.3	134.5
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	76.4	133.1
Toluene-D8	2037-26-5	79.6	126.8
4-Bromofluorobenzene	460-00-4	79.1	125.0

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: **PARSONS BRINCKERHOFF**

ADDRESS / OFFICE: **Level 27, 660 Adelaide St, Sydney, NSW, 2000**

PROJECT MANAGER (PM): **JAMES SUGGLES**

PROJECT ID: **21522056A**

RESULTS REQUIRED (Date): _____ QUOTE NO.: _____

LABORATORY USE ONLY: _____ COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL: _____

COOLER/STAKE (circle appropriate): _____

AVOID TEMPERATURE: _____

FILTERED: Yes/No

LS ID	SAMPLE ID	MATRIX	DATE	Time	CONTAINER INFORMATION	Type / Code	Total bottles
1	S1	W	4/8/11				
2	S1(B)	W	4/8/11				
3	S3	W	4/8/11				
4	TRIP SPIKE	W					
5	TRIP BLANK	W					

RELINQUISHED BY: _____

NAME: **SEAN MORAN** DATE: **5/8/11**

TIME: **11:30**

DATE: _____

TIME: _____

NAME: _____

DATE: _____

TIME: _____

SAMPLER: **SEAN MORAN**

MOBILE: _____

PHONE: **0423850834**

EMAIL REPORT TO: **jsuggles@pb.com.au**

EMAIL INVOICE TO: (if different to report)

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

Conductivity

Solids-Total Dissolved

Colours Ca, Mg, Na, K

Anions Cl, SO₄, Alkalinity

Dissolved Metals: Fe, Mn, Al, As, B, Be, Bi, Br, Cd, Co, Cu, Pb, Mo, Ni, Se, Sr, U, V, Zn, Hydrocarbons

Nitrogen-Ammonia as N

Phosphorus-Total as P

TRH (C₆-C_{6x}) / BTEX

PAH/Phenols

TOC

Notes: e.g. Highly contaminated samples, Extra volume for QC or trace LORs etc.

Only 1 bottle for TOC
Only 1 bottle for TRH.

RECEIVED BY: _____

NAME: **RONALD** DATE: **5-8-11**

TIME: **1600**

DATE: _____

TIME: _____

NAME: _____

DATE: _____

TIME: _____

ALS CHEMICALS



Environmental Division
Sydney
Work Order
ES1116957



Telephone : + 61-2-8784 8555



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1116957	Page	: 1 of 13
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MR JAMES DUGGLEBY	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jduggleby@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 9272 5100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 05-AUG-2011
C-O-C number	: ----	Issue Date	: 12-AUG-2011
Sampler	: ----	No. of samples received	: 5
Order number	: ----	No. of samples analysed	: 5
Quote number	: EN/008/10		

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Sarah Millington	Senior Inorganic Chemist	Sydney Inorganics
Wisam Marassa	Inorganics Coordinator	Sydney 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 insufficient 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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA010P: Conductivity by PC Titrator (QC Lot: 1903264)									
ES1116758-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	33800	33600	0.6	0% - 20%
ES1116957-003	S3	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	2110	2100	0.4	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 1907335)									
ES1116750-014	Anonymous	EA015H: Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	600	594	1.0	0% - 20%
ES1116829-001	Anonymous	EA015H: Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	304	310	2.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 1903269)									
ES1116957-001	S1	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	121	120	0.0	0% - 20%
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	297	299	0.5	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	418	419	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 1902969)									
ES1116741-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	16	16	0.0	0% - 50%
ES1116741-010	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	14	14	0.0	0% - 50%
ED045G: Chloride Discrete analyser (QC Lot: 1902968)									
ES1116741-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	194	191	1.3	0% - 20%
ES1116741-010	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	107	109	1.3	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 1902965)									
ES1116741-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	4	4	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	11	10	0.0	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	104	102	2.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.0	No Limit
ES1116741-011	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	4	4	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	6	6	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	35	34	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	3	3	0.0	No Limit
ED093F: Dissolved Major Cations (QC Lot: 1902973)									
ES1116957-003	S3	ED093F: Calcium	7440-70-2	1	mg/L	2	2	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	1	1	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	473	477	0.8	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	22	22	0.0	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1904383)									
ES1116751-004	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.010	0.012	17.3	0% - 50%
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	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 (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1904383) - continued									
ES1116751-004	Anonymous	EG020A-F: Barium	7440-39-3	0.001	mg/L	0.111	0.110	0.0	0% - 20%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.227	0.215	5.4	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.013	0.013	0.0	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.007	0.009	16.4	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.19	0.17	7.6	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.14	0.20	36.2	No Limit
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	3.6	3.7	0.0	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1904384)									
ES1116751-004	Anonymous	EG020B-F: Strontium	7440-24-6	0.001	mg/L	6.59	6.23	5.6	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	0.007	0.007	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 1904382)									
ES1116751-006	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1903921)									
EN1101988-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.21	0.21	0.0	0% - 20%
ES1116848-005	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.17	0.18	0.0	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1907747)									
ES1116878-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.82	0.86	4.7	0% - 20%
ES1116992-004	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.37	0.40	7.5	0% - 20%
EP005: Total Organic Carbon (TOC) (QC Lot: 1903698)									
ES1116929-011	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	18	15	18.2	0% - 50%
EP075(SIM)A: Phenolic Compounds (QC Lot: 1904041)									
ES1116924-001	Anonymous	EP075(SIM): Phenol	108-95-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	<2.0	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 (%)
EP075(SIM)A: Phenolic Compounds (QC Lot: 1904041) - continued									
ES1116924-001	Anonymous	EP075(SIM): Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	0.0	No Limit
ES1116924-005	Anonymous	EP075(SIM): Phenol	108-95-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	<2.0	0.0	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	0.0	No Limit
		EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1904041)							
ES1116924-001	Anonymous	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Indeno(1,2,3-cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		ES1116924-005	Anonymous	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5
EP075(SIM): Naphthalene	91-20-3			1.0	µg/L	<1.0	<1.0	0.0	No Limit
EP075(SIM): Acenaphthylene	208-96-8			1.0	µg/L	<1.0	<1.0	0.0	No Limit
EP075(SIM): Acenaphthene	83-32-9			1.0	µg/L	<1.0	<1.0	0.0	No Limit
EP075(SIM): Fluorene	86-73-7			1.0	µg/L	<1.0	<1.0	0.0	No Limit
EP075(SIM): Phenanthrene	85-01-8			1.0	µg/L	<1.0	<1.0	0.0	No Limit
EP075(SIM): Anthracene	120-12-7			1.0	µg/L	<1.0	<1.0	0.0	No Limit
EP075(SIM): Fluoranthene	206-44-0			1.0	µg/L	<1.0	<1.0	0.0	No Limit
EP075(SIM): Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	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 (%)	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1904041) - continued										
ES1116924-005	Anonymous	EP075(SIM): Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit	
		EP075(SIM): Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit	
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit	
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit	
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit	
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit	
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1904040)										
ES1116924-001	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.0	No Limit	
		EP071: C10 - C14 Fraction	----	50	µg/L	160	180	15.2	No Limit	
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit	
ES1116924-005	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.0	No Limit	
		EP071: C10 - C14 Fraction	----	50	µg/L	200	200	0.0	No Limit	
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1909427)										
ES1116924-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	310	310	0.0	0% - 50%	
ES1116930-003	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 1904040)										
ES1116924-001	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	140	170	19.2	No Limit	
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.0	No Limit	
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit	
ES1116924-005	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	170	170	0.0	No Limit	
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.0	No Limit	
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 1909427)										
ES1116924-001	Anonymous	EP080: C6 - C10 Fraction	----	20	µg/L	320	320	0.0	0% - 50%	
ES1116930-003	Anonymous	EP080: C6 - C10 Fraction	----	20	µg/L	<20	<20	0.0	No Limit	
EP080: BTEXN (QC Lot: 1909427)										
ES1116924-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	11	11	0.0	0% - 50%	
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	13	13	0.0	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	62	64	2.7	0% - 20%	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	15	15	0.0	No Limit	
		EP080: Naphthalene	91-20-3	5	µg/L	6	<5	0.0	No Limit	
ES1116930-003	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.0	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit	

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 Work Order : ES1116957
 Client : PARSONS BRINCKERHOFF AUST P/L
 Project : 2162406A



Sub-Matrix: **WATER**

Laboratory Duplicate (DUP) Report

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD (%)</i>	<i>Recovery Limits (%)</i>
EP080: BTEXN (QC Lot: 1909427) - continued									
ES1116930-003	Anonymous	EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	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: WATER

				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)
Method: Compound	CAS Number	LOR	Unit				LCS	Low
EA010P: Conductivity by PC Titrator (QCLot: 1903264)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	106	86.3	112
EA015: Total Dissolved Solids (QCLot: 1907335)								
EA015H: Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	<5	293 mg/L	109	70	130
ED037P: Alkalinity by PC Titrator (QCLot: 1903269)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	90.1	80.2	108
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1902969)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	104	70	130
ED045G: Chloride Discrete analyser (QCLot: 1902968)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	1000 mg/L	99.7	70	130
ED093F: Dissolved Major Cations (QCLot: 1902965)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	99.5	88	110
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.2	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	87.8	81	107
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	93.9	89	109
ED093F: Dissolved Major Cations (QCLot: 1902973)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	99.7	88	110
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	98.3	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	90.7	81	107
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	95.7	89	109
EG020F: Dissolved Metals by ICP-MS (QCLot: 1904383)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	108	92	112
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	104	88	110
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	108	80	114
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	103	85	109
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	103	89	107
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	105	89	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	103	87	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	99.7	90	110
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	97.7	87	113
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	101	84	114
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	108	89	109
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	106	79	119
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	102	91	109



Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
Method: Compound	CAS Number	LOR	Unit		Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1904383) - continued									
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	106	85	115	
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	113	71	127	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	101	84	114	
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1904384)									
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	100	88	112	
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----	
EG035F: Dissolved Mercury by FIMS (QCLot: 1904382)									
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	102	86	116	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1903921)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.00 mg/L	98.8	79.6	122	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1907747)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	82.6	64.3	120	
EP005: Total Organic Carbon (TOC) (QCLot: 1903698)									
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	101	86.9	125	
EP075(SIM)A: Phenolic Compounds (QCLot: 1904041)									
EP075(SIM): Phenol	108-95-2	0.2	µg/L	----	0.5 µg/L	36.8	24.5	61.9	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	----	0.5 µg/L	106	63.8	110	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	----	0.5 µg/L	74.5	55.9	112	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	----	1 µg/L	78.2	42.5	114	
		2	µg/L	<2.0	----	----	----	----	
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	----	0.5 µg/L	84.6	62.7	117	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.2	µg/L	----	0.5 µg/L	78.1	59.9	112	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.2	µg/L	----	0.5 µg/L	95.4	59.3	122	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.2	µg/L	----	0.5 µg/L	92.1	64.3	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	----	0.5 µg/L	92.5	63	119	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.2	µg/L	----	0.5 µg/L	87.7	58.7	118	
		1	µg/L	<1.0	----	----	----	----	
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.2	µg/L	----	0.5 µg/L	90.3	51.2	118	
		1	µg/L	<1.0	----	----	----	----	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP075(SIM)A: Phenolic Compounds (QCLot: 1904041) - continued								
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	----	1 µg/L	95.3	6.85	95.6
		2	µg/L	<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1904041)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	----	0.5 µg/L	87.4	58.6	119
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	----	0.5 µg/L	90.6	63.6	114
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	----	0.5 µg/L	93.4	62.2	113
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	----	0.5 µg/L	101	63.9	115
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	----	0.5 µg/L	112	62.6	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	----	0.5 µg/L	114	64.3	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	----	0.5 µg/L	111	63.6	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	----	0.5 µg/L	99.1	63.1	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	----	0.5 µg/L	96.8	64.1	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	----	0.5 µg/L	94.6	62.5	116
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.2	µg/L	----	0.5 µg/L	84.8	61.7	119
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	----	0.5 µg/L	76.3	61.7	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	----	0.5 µg/L	97.5	63.3	117
		0.5	µg/L	<0.5	----	----	----	----
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	----	0.5 µg/L	101	59.9	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.2	µg/L	----	0.5 µg/L	102	61.2	117
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.2	µg/L	----	0.5 µg/L	112	59.1	118
		1	µg/L	<1.0	----	----	----	----
EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	1	µg/L	<1.0	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1904040)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	76.9	58.9	131
EP071: C15 - C28 Fraction	----	100	µg/L	<100	500 µg/L	104	73.9	138
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	92.0	62.7	131



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1909427)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	82.3	75	127	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1904040)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	71.7	58.9	131	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	102	73.9	138	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	
		50	µg/L	----	300 µg/L	104	62.7	131	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1909427)									
EP080: C6 - C10 Fraction	----	20	µg/L	<20	310 µg/L	79.8	75	127	
EP080: BTEXN (QCLot: 1909427)									
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	93.4	70	124	
EP080: Toluene	108-88-3	2	µg/L	----	10 µg/L	90.6	74.4	124	
		5	µg/L	<5	----	----	----	----	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	79.9	70	120	
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	89.1	69	121	
		106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	89.9	73	121	
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	79.4	72.9	127	



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: **WATER**

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1902969)							
ES1116741-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	109	70	130
ED045G: Chloride Discrete analyser (QCLot: 1902968)							
ES1116741-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	104	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 1904383)							
ES1116751-005	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	106	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	103	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	87.7	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	100	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	103	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	101	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	97.1	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	# Not Determined	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	101	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	104	70	130
EG020A-F: Zinc	7440-66-6	0.2 mg/L	106	70	130		
EG035F: Dissolved Mercury by FIMS (QCLot: 1904382)							
ES1116889-001	Anonymous	EG035F: Mercury	7439-97-6	0.0100 mg/L	88.0	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1903921)							
EN1101988-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1.00 mg/L	111	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1907747)							
ES1116878-001	Anonymous	EK067G: Total Phosphorus as P	----	1.00 mg/L	97.7	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 1903698)							
ES1116929-012	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	109	70	130
EP075(SIM)A: Phenolic Compounds (QCLot: 1904041)							
ES1116924-003	Anonymous	EP075(SIM): Phenol	108-95-2	2 µg/L	33.3	20	130
		EP075(SIM): 2-Chlorophenol	95-57-8	2 µg/L	86.0	60	130
		EP075(SIM): 2-Nitrophenol	88-75-5	2 µg/L	96.1	60	130
		EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	2 µg/L	103	70	130
		EP075(SIM): Pentachlorophenol	87-86-5	2 µg/L	82.5	20	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1904041)							
ES1116924-003	Anonymous	EP075(SIM): Acenaphthene	83-32-9	2 µg/L	90.4	70	130
		EP075(SIM): Pyrene	129-00-0	2 µg/L	90.7	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1904040)							

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 Work Order : ES1116957
 Client : PARSONS BRINCKERHOFF AUST P/L
 Project : 2162406A



Sub-Matrix: WATER

				Matrix Spike (MS) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	Spike Recovery (%)	Recovery Limits (%)		
				Concentration	MS	Low	High	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1904040) - continued								
ES1116924-003	Anonymous	EP071: C10 - C14 Fraction	----	40 µg/L	108	74	150	
		EP071: C15 - C28 Fraction	----	50 µg/L	124	77	153	
		EP071: C29 - C36 Fraction	----	40 µg/L	101	67	153	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1909427)								
ES1116924-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	92.5	70	130	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1904040)								
ES1116924-003	Anonymous	EP071: >C10 - C16 Fraction	----	50 µg/L	84.3	74	150	
		EP071: >C16 - C34 Fraction	----	60 µg/L	130	77	153	
		EP071: >C34 - C40 Fraction	----	30 µg/L	102	67	153	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 1909427)								
ES1116924-001	Anonymous	EP080: C6 - C10 Fraction	----	375 µg/L	88.7	70	130	
EP080: BTEXN (QCLot: 1909427)								
ES1116924-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	93.2	70	130	
		EP080: Toluene	108-88-3	25 µg/L	88.7	70	130	
		EP080: Ethylbenzene	100-41-4	25 µg/L	93.4	70	130	
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	120	70	130	
			106-42-3					
		EP080: ortho-Xylene	95-47-6	25 µg/L	108	70	130	
EP080: Naphthalene	91-20-3	25 µg/L	76.4	70	130			



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1116957	Page	: 1 of 8
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: MR JAMES DUGGLEBY	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jduggleby@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 9272 5100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 2162406A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 05-AUG-2011
C-O-C number	: ----	Issue Date	: 12-AUG-2011
Sampler	: ----	No. of samples received	: 5
Order number	: ----	No. of samples analysed	: 5
Quote number	: EN/008/10		

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: **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	
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural S1, S3	S1 (B),	04-AUG-2011	---	01-SEP-2011	----	07-AUG-2011	01-SEP-2011	✓
EA015: Total Dissolved Solids								
Clear Plastic Bottle - Natural S1, S3	S1 (B),	04-AUG-2011	----	----	----	10-AUG-2011	11-AUG-2011	✓
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural S1, S3	S1 (B),	04-AUG-2011	---	18-AUG-2011	----	07-AUG-2011	18-AUG-2011	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural S1, S3	S1 (B),	04-AUG-2011	---	01-SEP-2011	----	05-AUG-2011	01-SEP-2011	✓
ED045G: Chloride Discrete analyser								
Clear Plastic Bottle - Natural S1, S3	S1 (B),	04-AUG-2011	---	01-SEP-2011	----	05-AUG-2011	01-SEP-2011	✓
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural S1, S3	S1 (B),	04-AUG-2011	---	11-AUG-2011	----	05-AUG-2011	11-AUG-2011	✓
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Filtered S1, S3	S1 (B),	04-AUG-2011	---	31-JAN-2012	----	09-AUG-2011	31-JAN-2012	✓
EG035F: Dissolved Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Filtered S1, S3	S1 (B),	04-AUG-2011	---	01-SEP-2011	----	09-AUG-2011	01-SEP-2011	✓



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	
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid S1, S3	S1 (B),	04-AUG-2011	---	01-SEP-2011	----	08-AUG-2011	01-SEP-2011	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid S1, S3	S1 (B),	04-AUG-2011	10-AUG-2011	01-SEP-2011	✓	10-AUG-2011	01-SEP-2011	✓
EP005: Total Organic Carbon (TOC)								
Amber TOC Vial - Sulfuric Acid S1, S3	S1 (B),	04-AUG-2011	----	----	----	08-AUG-2011	01-SEP-2011	✓
EP075(SIM)A: Phenolic Compounds								
Amber Glass Bottle - Unpreserved S1, S3	S1 (B),	04-AUG-2011	08-AUG-2011	11-AUG-2011	✓	09-AUG-2011	17-SEP-2011	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved S1, S3	S1 (B),	04-AUG-2011	08-AUG-2011	11-AUG-2011	✓	09-AUG-2011	17-SEP-2011	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved S1, S3	S1 (B),	04-AUG-2011	08-AUG-2011	11-AUG-2011	✓	09-AUG-2011	17-SEP-2011	✓
Amber VOC Vial - HCl S1, S3, TRIP BLANK	S1 (B), TRIP SPIKE,	04-AUG-2011	11-AUG-2011	18-AUG-2011	✓	11-AUG-2011	18-AUG-2011	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
Amber Glass Bottle - Unpreserved S1, S3	S1 (B),	04-AUG-2011	08-AUG-2011	11-AUG-2011	✓	09-AUG-2011	17-SEP-2011	✓
Amber VOC Vial - HCl S1, S3, TRIP BLANK	S1 (B), TRIP SPIKE,	04-AUG-2011	11-AUG-2011	18-AUG-2011	✓	11-AUG-2011	18-AUG-2011	✓
EP080: BTEXN								
Amber VOC Vial - HCl S1, S3, TRIP BLANK	S1 (B), TRIP SPIKE,	04-AUG-2011	11-AUG-2011	18-AUG-2011	✓	11-AUG-2011	18-AUG-2011	✓



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

Quality Control Sample Type	Analytical Method	Metho d	Count		Rate (%)			Quality Control Specification
			QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)								
Alkalinity by PC Titrator		ED037-P	1	3	33.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser		EK055G	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	2	5	40.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS		EG035F	1	7	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	1	7	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	3	22	13.6	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)		EP075(SIM)	2	15	13.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	2	19	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)		EA015H	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon		EP005	1	10	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser		EK067G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction		EP071	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX		EP080	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)								
Alkalinity by PC Titrator		ED037-P	1	3	33.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser		EK055G	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS		EG035F	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	2	22	9.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)		EP075(SIM)	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)		EA015H	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon		EP005	1	10	10.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser		EK067G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction		EP071	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX		EP080	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)								
Ammonia as N by Discrete analyser		EK055G	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser		ED045G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator		EA010-P	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS		EG035F	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A		EG020A-F	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B		EG020B-F	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved		ED093F	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	Metho d	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	15	6.7	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	19	5.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	20	5.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	10	10.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	20	5.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	5.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.6	5.0	✔	ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	20	5.0	5.0	✔	ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	7	14.3	5.0	✔	ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	7	14.3	5.0	✔	ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	15	6.7	5.0	✔	ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	19	5.3	5.0	✔	ALS QCS3 requirement
Total Organic Carbon	EP005	1	10	10.0	5.0	✔	ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.0	5.0	✔	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	20	5.0	5.0	✔	ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	5.0	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 Method	Method	Matrix	Method Descriptions
Conductivity by PC Titrator	EA010-P	WATER	APHA 21st ed., 2510 B This procedure determines conductivity by automated ISE. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Dissolved Solids (High Level)	EA015H	WATER	APHA 21st ed., 2540C A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Alkalinity by PC Titrator	ED037-P	WATER	APHA 21st ed., 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	APHA 21st ed., 4500-SO4 Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Chloride by Discrete Analyser	ED045G	WATER	APHA 21st ed., 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	Major Cations is determined based on APHA 21st ed., 3120; USEPA SW 846 - 6010 The ICPAES technique ionises the 0.45um filtered 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) Sodium Absorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2) Total Hardness is calculated based on APHA 21st ed., 2340 B. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. 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.
Dissolved Mercury by FIMS	EG035F	WATER	AS 3550, APHA 21st ed. 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered 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)



Analytical Method	Method	Matrix	Method Descriptions
Ammonia as N by Discrete analyser	EK055G	WATER	APHA 21st ed., 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	APHA 21st ed., 4500-P B&F This procedure involves sulphuric acid digestion of a 100mL sample to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Ionic Balance by PCT DA and ICPAES	EN055 - PG	WATER	APHA 21st Ed. 1030F. The Ionic Balance is calculated based on the major Anions and Cations. The major anions include Alkalinity, Chloride and Sulfate which determined by PCT and DA. The Cations are determined by ICPAES. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Organic Carbon	EP005	WATER	APHA 21st ed., 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
TPH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
TPH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

Preparation Method	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	APHA 21st ed., 4500 Norg - D; APHA 21st ed., 4500 P - H. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 500 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2). ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



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: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG020F: Dissolved Metals by ICP-MS	ES1116751-005	Anonymous	Manganese	7439-96-5	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control 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.

- No Analysis Holding Time Outliers exist.

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.

Appendix G

GNS Stable Isotope Laboratory
analytical results

STABLE ISOTOPE RESULTS



Attention: Wendy McLean
Company: Parsons Brinkerhoff
Earnest & Young Centre level 27
Sydney NSW 2000

SIL Order No.:	6244
Client Ref.:	
Date Received:	13/07/2011
Date Measured:	25/07/2011
Approved By:	A. Phillips
Date Reported:	29/07/2011

National Isotope Centre
30 Gracefield Road
Lower Hutt 5010
PO Box 31 312
Lower Hutt 5040
New Zealand
T +64-4-570 1444
F +64-4-570 4657
www.gns.cri.nz

Sample Type: Water Isotopes for $\delta^{18}\text{O}$ and $\delta^2\text{H}$

SIL ID	External ID	$\delta^{18}\text{O}$ Value	std dev	δD Value	std dev
102875	TCMB04	-5.31		-29.6	0.4

All results are reported with respect to VSMOW, normalized to our internal standards: CM1 with reported values of -17.44‰ for $\delta^{18}\text{O}$, -131.0‰ for $\delta^2\text{H}$, and INS11 with reported values of -0.44‰ for $\delta^{18}\text{O}$, -4.6‰ for $\delta^2\text{H}$. Samples were run in duplicate with the standard deviation provided for each sample. The analytical precision for this instrument is 0.1‰ for $\delta^{18}\text{O}$ and 1.0‰ for $\delta^2\text{H}$.

Samples will be kept for 3 months from the date of the report and discarded unless otherwise notified.

STABLE ISOTOPE RESULTS



Attention: Wendy Mclean
Company: Parsons Brinkerhoff
 Earnest & Young Centre level 27
 Sydney NSW 2000

SIL Order No.:	6077
Client Ref.:	
Date Received:	20/04/2011
Date Measured:	19/05/2011
Approved By:	A. Phillips
Date Reported:	27/05/2011

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 Lower Hutt 5010
 PO Box 31 312
 Lower Hutt 5040
 New Zealand
 T +64-4-570 1444
 F +64-4-570 4657
 www.gns.cri.nz

Sample Type: Water Isotopes for $\delta^{18}\text{O}$ and $\delta^2\text{H}$

SIL ID	External ID	$\delta^{18}\text{O}$ Value	std dev	δD Value	std dev
100449	S5MB01	-3.94		-22.8	0.1
100450	S5MB02	-4.57		-24.9	0.1
100451	BMB01	-3.82		-20.2	0.2
100452	BMB02	-4.40		-25.3	0.5
100453	WMB01	-4.81		-24.4	0.2
100454	WMB02	-4.95		-26.2	0.3
100455	WMB03	-4.89		-25.8	0.2
100456	WMB04	-5.08		-26.6	0.1
100457	S4MB01	-5.04		-27.3	0.1
100458	S4MB02	-5.25		-28.4	0.1
100459	S4MB03	-5.30		-28.4	0.0
100460	AMB01	-3.49		-17.0	0.1
100461	AMB02	-4.90		-26.3	0.2
100462	TCMB03	-4.88		-26.1	0.1
100463	RMB01	-4.78		-25.7	0.1
100464	RMB02	-4.00		-21.7	0.3
100465	TMB01	-4.56		-24.3	0.5
100466	TMB02	-4.68		-25.5	0.3
100467	TMB03	-4.28		-22.7	0.1

All results are reported with respect to VSMOW, normalized to our internal standards: CM1 with reported values of -17.44‰ for $\delta^{18}\text{O}$, -131.0‰ for $\delta^2\text{H}$, and INS11 with reported values of -0.44‰ for $\delta^{18}\text{O}$, -4.6‰ for $\delta^2\text{H}$. Samples were run in duplicate with the standard deviation provided for each sample. The analytical precision for this instrument is 0.1‰ for $\delta^{18}\text{O}$ and 1.0‰ for $\delta^2\text{H}$.

Samples will be kept for 3 months from the date of the report and discarded unless otherwise notified.

STABLE ISOTOPE RESULTS



Attention: Wendy Mclean
Company: Parsons Brinkerhoff
Earnest & Young Centre level 27
Sydney NSW 2000

SIL Order No.:	6133
Client Ref.:	
Date Received:	19/05/2011
Date Measured:	6/06/2011
Approved By:	A. Phillips
Date Reported:	13/06/2011

National Isotope Centre
30 Gracefield Road
Lower Hutt 5010
PO Box 31 312
Lower Hutt 5040
New Zealand
T +64-4-570 1444
F +64-4-570 4657
www.gns.cri.nz

Sample Type: Water Isotopes for $\delta^{18}\text{O}$ and $\delta^2\text{H}$

SIL ID	External ID	$\delta^{18}\text{O}$ Value	std dev	δD Value	std dev
101223	TCMBO2	-4.99		-27.5	0.2
101224	SSMBO3	-4.70		-26.2	0.4

All results are reported with respect to VSMOW, normalized to our internal standards: CM1 with reported values of -17.44‰ for $\delta^{18}\text{O}$, -131.0‰ for $\delta^2\text{H}$, and INS11 with reported values of -0.44‰ for $\delta^{18}\text{O}$, -4.6‰ for $\delta^2\text{H}$. Samples were run in duplicate with the standard deviation provided for each sample. The analytical precision for this instrument is 0.1‰ for $\delta^{18}\text{O}$ and 1.0‰ for $\delta^2\text{H}$.

Samples will be kept for 3 months from the date of the report and discarded unless otherwise notified.

Appendix H

Rafter Radiocarbon Laboratory
analytical results



NZA 36551
R 32718/1
Job No 105834
Measured 16-Jun-11
TW No 2617
Issued 22-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID S5MB01
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** **5004 ± 25 BP** $\delta^{13}\text{C} = -31.8\text{‰}$
** **Per cent modern** = 53.24 ± 0.16 $\delta^{14}\text{C} = -475 \pm 1.6\text{‰}$ $\Delta^{14}\text{C} = -467.6 \pm 1.6\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle, with a layer of grey sediment precipitate at bottom. Treated with phosphoric acid evolution. Carbonate content=104.5mg/kg.
TDIC=8.7mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36552
R 32718/2
Job No 105835
Measured 16-Jun-11
TW No 2617
Issued 22-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID S5MB02
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** **10312 ± 35 BP** $\delta^{13}\text{C} = -14.4\text{‰}$
** **Per cent modern =** 27.5 ± 0.11 $\delta^{14}\text{C} = -719 \pm 1.1\text{‰}$ $\Delta^{14}\text{C} = -725 \pm 1.1\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle, with a layer of brown precipitate at bottom.
Treated with phosphoric acid evolution. Carbonate content=214.1mg/kg. TDIC=17.8mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36553
R 32718/3
Job No 105836
Measured 16-Jun-11
TW No 2617
Issued 22-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID BMB01
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** **7479 ± 25 BP** $\delta^{13}\text{C} = -16.5\text{‰}$
** **Per cent modern** = 39.12 ± 0.13 $\delta^{14}\text{C} = -601.9 \pm 1.3\text{‰}$ $\Delta^{14}\text{C} = -608.8 \pm 1.3\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle, with a layer of brown precipitate at bottom.
Treated with phosphoric acid evolution. Carbonate content=109.3mg/kg. TDIC=9.1mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36554
R 32718/4
Job No 105837
Measured 16-Jun-11
TW No 2617
Issued 22-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID BMB02
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** **9377 ± 30 BP** $\delta^{13}\text{C} = -4.4\text{‰}$
** **Per cent modern** = 30.89 ± 0.12 $\delta^{14}\text{C} = -677.9 \pm 1.2\text{‰}$ $\Delta^{14}\text{C} = -691.1 \pm 1.2\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle, with a layer of grey sediment precipitate at bottom. Treated with phosphoric acid evolution. Carbonate content=185.5mg/kg. TDIC=15.5mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36555
R 32718/5
Job No 105838
Measured 16-Jun-11
TW No 2617
Issued 22-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID WMB01
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** **1111 ± 20 BP** $\delta^{13}\text{C} = -12.4\text{‰}$
** **Per cent modern** = 86.44 ± 0.21 $\delta^{14}\text{C} = -113 \pm 2.1\text{‰}$ $\Delta^{14}\text{C} = -135.6 \pm 2.1\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle, with a layer of grey sediment precipitate at bottom. Treated with phosphoric acid evolution. Carbonate content=57.95mg/kg.
TDIC=4.8mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36556
R 32718/6
Job No 105839
Measured 16-Jun-11
TW No 2617
Issued 22-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID WMB02
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* Radiocarbon Age **7555 ± 30 BP** $\delta^{13}\text{C} = -15\text{‰}$
** Per cent modern = 38.76 ± 0.13 $\delta^{14}\text{C} = -604.5 \pm 1.4\text{‰}$ $\Delta^{14}\text{C} = -612.4 \pm 1.3\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle.. Treated with phosphoric acid evolution.
Carbonate content=135.1mg/kg. TDIC=11.3mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36557
R 32718/7
Job No 105840
Measured 16-Jun-11
TW No 2617
Issued 22-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID WMB03
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** **13161 ± 40 BP** $\delta^{13}\text{C} = -18\text{‰}$
** **Per cent modern =** 19.29 ± 0.1 $\delta^{14}\text{C} = -804.3 \pm 1\text{‰}$ $\Delta^{14}\text{C} = -807.1 \pm 1\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle, with a layer of grey sediment precipitate at bottom. Treated with phosphoric acid evolution. Carbonate content=116.9mg/kg. TDIC=9.7mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36558
R 32718/8
Job No 105841
Measured 16-Jun-11
TW No 2617
Issued 22-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID WMB04
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* Radiocarbon Age **23232 ± 95 BP** $\delta^{13}\text{C} = -13.7\text{‰}$
** Per cent modern = 5.51 ± 0.07 $\delta^{14}\text{C} = -943.7 \pm 0.7\text{‰}$ $\Delta^{14}\text{C} = -944.9 \pm 0.7\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle, with orange stain at bottom. Treated with phosphoric acid evolution. Carbonate content=147.0mg/kg. TDIC=12.3mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36559
R 32718/9
Job No 105842
Measured 16-Jun-11
TW No 2617
Issued 22-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID S4MB01
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** **9193 ± 30 BP** $\delta^{13}\text{C} = -17.5\text{‰}$
** **Per cent modern** = 31.61 ± 0.12 $\delta^{14}\text{C} = -679 \pm 1.2\text{‰}$ $\Delta^{14}\text{C} = -683.9 \pm 1.2\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle, with a layer of brown precipitate at bottom. Treated with phosphoric acid evolution. Carbonate content=86.4mg/kg. TDIC=7.2mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36938
R 32741/2
Job No 106331
Measured 11-Jul-11
TW No 2626
Issued 13-Jul-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID SSMB03
Description Water
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* Radiocarbon Age 9541 ± 30 BP $\delta^{13}\text{C} = -14.8\text{‰}$
** Per cent modern = 30.27 ± 0.11 $\delta^{14}\text{C} = -690.9 \pm 1.1\text{‰}$ $\Delta^{14}\text{C} = -697.3 \pm 1.1\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle. Treated with phosphoric acid evolution.
Carbonate content=170.3mg/kg. TDIC=14.2mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36939
R 32741/1
Job No 106466
Measured 11-Jul-11
TW No 2626
Issued 13-Jul-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID TCMB02
Description Water
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* Radiocarbon Age **25110 ± 110 BP** $\delta^{13}\text{C} = -12.3\text{‰}$
** Per cent modern = 4.36 ± 0.06 $\delta^{14}\text{C} = -955.3 \pm 0.6\text{‰}$ $\Delta^{14}\text{C} = -956.4 \pm 0.6\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Repeat for job # 106330. Water sample was submitted in a full nalgene bottle. Treated with phosphoric acid evolution. Carbonate content=44.2mg/kg. TDIC=3.7mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36573
R 32718/10
Job No 105843
Measured 20-Jun-11
TW No 2618
Issued 24-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID S4MB02
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** **15711 ± 50 BP** $\delta^{13}\text{C} = -18.8\text{‰}$
** **Per cent modern** = 14.04 ± 0.09 $\delta^{14}\text{C} = -857.8 \pm 0.9\text{‰}$ $\Delta^{14}\text{C} = -859.6 \pm 0.9\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle, with a layer of brown precipitate at bottom. Treated with phosphoric acid evolution. Carbonate content=59.4mg/kg. TDIC=4.9mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36574
R 32718/11
Job No 105844
Measured 20-Jun-11
TW No 2618
Issued 24-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID S4MB03
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** **22340 ± 90 BP** $\delta^{13}\text{C} = -14.4\text{‰}$
** **Per cent modern =** 6.15 ± 0.07 $\delta^{14}\text{C} = -937.1 \pm 0.7\text{‰}$ $\Delta^{14}\text{C} = -938.5 \pm 0.7\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a nalgene bottle, with small amount of brown precipitate at bottom. Treated with phosphoric acid evolution. Carbonate content=76.8mg/kg. TDIC=6.4mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36575
R 32718/12
Job No 105845
Measured 20-Jun-11
TW No 2618
Issued 24-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID AMB01
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** **1990 ± 25 BP** $\delta^{13}\text{C} = -15.6\text{‰}$
** **Per cent modern** = 77.48 ± 0.24 $\delta^{14}\text{C} = -210.1 \pm 2.4\text{‰}$ $\Delta^{14}\text{C} = -225.2 \pm 2.4\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle, with a layer of brown precipitate at bottom. Treated with phosphoric acid evolution. Carbonate content=67.96mg/kg. TDIC=5.7mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36577
R 32718/13
Job No 105846
Measured 20-Jun-11
TW No 2618
Issued 24-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID AMB02
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** -232 ± 25 BP $\delta^{13}\text{C} =$ -12.2 ‰
** **Per cent modern** = 102.18 ± 0.29 $\delta^{14}\text{C} =$ 48.7 ± 3 ‰ $\Delta^{14}\text{C} =$ 21.8 ± 2.9 ‰

Comment: Sample is modern i.e. late 20th Century

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a nalgene bottle, with a layer of grey sediment at bottom. Treated with phosphoric acid evolution. Carbonate content=38.3mg/kg. TDIC=3.2mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36586
R 32718/14
Job No 106444
Measured 20-Jun-11
TW No 2618
Issued 24-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID TCMB03
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** **26270 ± 130 BP** $\delta^{13}\text{C} = -12.8\text{‰}$
** **Per cent modern =** 3.77 ± 0.06 $\delta^{14}\text{C} = -961.3 \pm 0.6\text{‰}$ $\Delta^{14}\text{C} = -962.3 \pm 0.6\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI)
corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Repeat for job #105847. Water sample was submitted in a full nalgene bottle with small amount of precipitate at bottom. Treated with phosphoric acid evolution. Carbonate content=92.2mg/kg. TDIC=7.7mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36671
R 32718/15
Job No 105848
Measured 27-Jun-11
TW No 2621
Issued 29-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID RMB01
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** **21894 ± 85 BP** $\delta^{13}\text{C} = -2.9\text{‰}$
** **Per cent modern =** 6.5 ± 0.07 $\delta^{14}\text{C} = -932 \pm 0.7\text{‰}$ $\Delta^{14}\text{C} = -935 \pm 0.7\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle, with small amount of orange precipitate at bottom. Treated with phosphoric acid evolution. Carbonate content=212.1mg/kg.
TDIC=17.7mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36672
R 32718/16
Job No 105849
Measured 27-Jun-11
TW No 2621
Issued 29-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID RMB02
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** **12921 ± 40 BP** $\delta^{13}\text{C} = -1.9\text{‰}$
** **Per cent modern =** 19.87 ± 0.1 $\delta^{14}\text{C} = -791.7 \pm 1.1\text{‰}$ $\Delta^{14}\text{C} = -801.3 \pm 1\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle with small amount of precipitate at bottom. Treated with phosphoric acid evolution. Carbonate content=261.4mg/kg. TDIC=21.8mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36673
R 32718/17
Job No 105850
Measured 27-Jun-11
TW No 2621
Issued 29-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID TMB01
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** 1745 ± 25 BP $\delta^{13}\text{C} = -12.9\text{‰}$
** **Per cent modern** = 79.88 ± 0.27 $\delta^{14}\text{C} = -181.3 \pm 2.8\text{‰}$ $\Delta^{14}\text{C} = -201.2 \pm 2.7\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle, with a thick layer of brown sediment precipitate at bottom. Treated with phosphoric acid evolution. Carbonate content=132.5mg/kg. TDIC=11mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36674
R 32718/18
Job No 105851
Measured 27-Jun-11
TW No 2621
Issued 29-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID TMB02
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* **Radiocarbon Age** **2598 ± 30 BP** $\delta^{13}\text{C} = -14.4\text{‰}$
** **Per cent modern** = 71.84 ± 0.25 $\delta^{14}\text{C} = -266 \pm 2.6\text{‰}$ $\Delta^{14}\text{C} = -281.6 \pm 2.5\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle, with orange stain at bottom. Treated with phosphoric acid evolution. Carbonate content=68.4mg/kg. TDIC=5.7mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 36675
R 32718/19
Job No 105852
Measured 27-Jun-11
TW No 2621
Issued 29-Jun-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID TMB03
Description Groundwater
Fraction Dated groundwater
Submitter Wendy McLean Parsons Brinckerhoff

* Radiocarbon Age **791 ± 25 BP** $\delta^{13}\text{C} = -12.8\text{‰}$
** Per cent modern = 89.96 ± 0.3 $\delta^{14}\text{C} = -77.7 \pm 3.1\text{‰}$ $\Delta^{14}\text{C} = -100.4 \pm 3\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI)
corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample was submitted in a full nalgene bottle. Treated with phosphoric acid evolution.
Carbonate content=139.5mg/kg. TDIC=11.6mmol/kg.

Stored remainder

Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).



NZA 37170
R 32803
Job No 107532
Measured 08-Aug-11
TW No 2636
Issued 11-Aug-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID TCMB04
Description Groundwater
Fraction Dated DIC
Submitter Wendy McLean Parsons Brinckerhoff

* Radiocarbon Age **17060 ± 55 BP** $\delta^{13}\text{C} = -12\text{‰}$
** Per cent modern = 11.87 ± 0.08 $\delta^{14}\text{C} = -878.1 \pm 0.8\text{‰}$ $\Delta^{14}\text{C} = -881.3 \pm 0.8\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

Sample Treatment Details

Water sample submitted in 500ml Nalgene bottle; no headspace and bottle is full and well capped. No odour or discolouration, although some slight deposits in bottom of bottle. Treated with Phosphoric acid evolution. DIC content = 53.9mg/kg as Carbon. TDIC 4.49mmol/kg as CO₂.

Stored none


Comments

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).

Appendix I

ANSTO and GNS Tritium and Water
Dating Laboratory analytical results

 The linked image cannot be displayed. The file may have been moved, renamed, or deleted. Verify that the link points to the correct file and location.


Institute for Environmental Research Analytical Report

Client: **Parsons Brinckerhoff
GPO Box 5394
Sydney
NSW 2001**

Contact: **Wendy McLean**
Tel: **(02) 9272-5234**

Report Number: **2011/0122 – final report**
Batch Description: **tritium activity in water**
Samples Received: **20**
Registration Date: **21-Apr-2011**
Report Date: **14-Jun-2011**
Logged By: **Kellie-Anne Farrawell**
ANSTO Cost Code: **0205V-3-6**
Funds Type: **commercial**
Supervising Analyst: **Robert Chisari**

Signature: _____ Date: 14/06/2011
Robert Chisari

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**Institute for Environmental Research
Analytical Report**

Report Number: 2011/0122

LIMS ID#	Client Identification	Sample Description
2011/0122-1	S5MB01	Groundwater
2011/0122-2	S5MB02	Groundwater
2011/0122-3	S5MB03	Groundwater
2011/0122-4	BMB01	Groundwater
2011/0122-5	BMB02	Groundwater
2011/0122-6	WMB02	Groundwater
2011/0122-7	WMB03	Groundwater
2011/0122-8	WMB04-A (dirty)	Groundwater
2011/0122-9	WMB04-B (clean)	Groundwater
2011/0122-10	S4MB01	Groundwater
2011/0122-11	S4MB02	Groundwater
2011/0122-12	S4MB03	Groundwater
2011/0122-13	AMB01	Groundwater
2011/0122-14	AMB02	Groundwater
2011/0122-15	TCMB03	Groundwater
2011/0122-16	RMB01	Groundwater
2011/0122-17	RMB02	Groundwater
2011/0122-18	TMB01	Groundwater
2011/0122-19	TMB02	Groundwater
2011/0122-20	TMB03	Groundwater

Signature: _____ Date: 14/06/2011
Robert Chisari

Institute for Environmental Research
Analytical Report

Report Number: 2011/0122

Tritium Concentration at Sampling Date

Client Identification	Sample No.	Date Sample Collected	Tritium Ratio	Uncertainty ¹	Quant Limit ²	Tritium Activity	Uncertainty ¹	MDA ²
			TU	TU	TU	Bq/kg	Bq/kg	Bq/kg
S5MB01	1	5/04/2011	0.29	0.04	0.20	0.035	0.005	0.024
S5MB02	2	5/04/2011	0.09 ^	0.04	0.20	0.011 ^	0.005	0.024
S5MB03	3	5/04/2011	0.03 ^	0.03	0.21	0.003 ^	0.004	0.025
BMB01	4	7/04/2011	0.03 ^	0.04	0.20	0.004 ^	0.005	0.024
BMB02	5	7/04/2011	0.18 ^	0.04	0.21	0.022 ^	0.005	0.025
WMB02	6	7/04/2011	0.04 ^	0.04	0.21	0.005 ^	0.005	0.025
WMB03	7	7/04/2011	0.19 ^	0.05	0.21	0.023 ^	0.005	0.025
WMB04-A (dirty)	8	7/04/2011	0.78	0.06	0.22	0.093	0.008	0.026
WMB04-B (clean)	9	7/04/2011	0.06 ^	0.04	0.21	0.007 ^	0.005	0.025
S4MB01	10	6/04/2011	0.05 ^	0.04	0.21	0.006 ^	0.005	0.025
S4MB02	11	6/04/2011	0.04 ^	0.04	0.21	0.001 ^	0.004	0.025
S4MB03	12	6/04/2011	0.01 ^	0.04	0.21	0.001 ^	0.005	0.025
AMB01	13	8/04/2011	0.65	0.05	0.20	0.078	0.006	0.024
AMB02	14	8/04/2011	0.88	0.06	0.20	0.105	0.007	0.024
TCMB03	15	14/04/2011	0.01 ^	0.04	0.19	0.001 ^	0.005	0.023
RMB01	16	12/04/2011	0.03 ^	0.03	0.20	0.004 ^	0.004	0.024
RMB02	17	12/04/2011	0.39	0.05	0.20	0.046	0.005	0.024
TMB01	18	7/04/2011	0.03 ^	0.03	0.20	0.003 ^	0.004	0.024
TMB02	19	7/04/2011	0.16 ^	0.04	0.20	0.019 ^	0.005	0.024
TMB03	20	7/04/2011	0.16 ^	0.04	0.20	0.020 ^	0.005	0.024

Notes on last page

Signature: _____ Date: 14/06/2011

Robert Chisari

**Institute for Environmental Research
Analytical Report**

Report Number: 2011/0122

Notes:

1. Values reported are combined standard uncertainty, calculated to 1 sigma. A Coverage factor, k , of 2 may be used to calculate Expanded Uncertainty to 95% confidence.
 2. The MDA (Minimum Detectable Activity) and Quant Limit (Limit of Quantification) are calculated to 95% confidence.
- ^ This result is below the MDA/Quant Limit and therefore has an unacceptable level of uncertainty. Hence, the data should only be used as an indicator of the true concentration

Signature: _____ Date: 14/06/2011
Robert Chisari



15.8.11

Wendy McLean
Parsons Brinckerhoff
L27 Ernst and Young Centre
680 George St
Sydney NSW 2000
Australia

1 Fairway Drive
Avalon
PO Box 30 368
Lower Hutt
New Zealand
T +64-4-570 1444
F +64-4-570 4600
www.gns.cri.nz

Attention: Wendy McLean

Dear Wendy,

Please find attached your Tritium Result TAUS356

Description: Australia		Tritium Samples	
ID	Collection Date	Description	TR ± sigma
TAUS 356	13.5.11	TCMB02	0.055 ± 0.014

Error is 1 std measurement error.

Regards,

Vanessa Trompetter
Water Dating Laboratory
GNS Science
1 Fairway Dr, Avalon
Lower Hutt

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Appendix J

Quality assurance/quality control

The sampling procedures for chemical and isotopic sampling ensured that cross-contamination did not occur, sample integrity was preserved, and a reliable data set was collected from which to make professional judgements.

The principal laboratory used for the analysis of macro and trace element chemistry was ALS Environmental. The laboratory is certified by the National Association of Testing Authorities (NATA) for all analytes tested. NATA certification also requires the laboratory to use certain prescribed procedures (in-house QA/QC) to ensure accuracy and precision of results.

The isotope testing laboratories, Rafter Radiocarbon Laboratory, GNS Science Stable Isotope Laboratory, GNS Science Tritium and Water Dating Laboratory (all overseas laboratories) and ANSTO are not NATA certified but have been principal isotope laboratories for over three decades. Each laboratory undertakes in house QA/QC procedures to ensure the accuracy and precision of results.

Field quality control

The field investigation sampling procedures conformed to Parsons Brinckerhoff Quality Assurance/Quality Control protocols to prevent cross-contamination and preserve sample integrity. The following QA/QC procedures were applied in the field:

- One in twenty intra-laboratory blind duplicate (two samples)
- trip spike (two samples)
- trip blank sample (two samples)
- Samples were collected in appropriate bottles with appropriate preservation
- Samples were kept chilled (<4°C) at all times
- Samples were delivered to the laboratories within the holding times
- Unstable parameters were analysed in the field.

A summary of the QA/QC procedures for the sampling program is summarised in Table J-1.

Table J-1 Details of QA/QC samples for the sampling program

Sample number	Sample date	Sample type	Primary sample	Analytes
QA1	6/4/2011	Intra-laboratory duplicate - water	S4MB03	Dissolved metals, major ions, nutrients, dissolved gases, TPH/BTEX, phenols and PAHs
QA2	8/4/2011	Intra-laboratory duplicate - water	AMB02	Dissolved metals, major ions, nutrients, dissolved gases, TPH/BTEX, phenols and PAHs
TS	5/4/2011 & 22/6/2011	Trip spike	-	BTEX
TB	5/4/2011 & 22/6/2011	Trip blank	-	BTEX/TPH(C ₆ -C ₉)

In accordance with standard quality control procedures two duplicate samples were collected. Monitoring bores S4MB03 and AMB02 were selected as duplicate sample locations. To assess the performance of the field QC program the Relative Percentage Difference (RPD) was calculated for the primary and duplicate samples (Tables J-2 and J-3). The RPD allows for an assessment of the reproducibility of the analytical data measurements of precision given the adopted field and laboratory methods.

All the RPD for the duplicate samples for BTEX, TPH, nutrients, dissolved gases and the major ions were within the acceptable range (i.e. were less than 50%) or were not calculable because one or both samples had analyte levels below laboratory detection limits. Three exceedences for RPD occurred; for cadmium, cobalt and zinc. These exceedences can be attributed to low concentrations of the analyte present, close to the laboratory limit of reporting (LOR). The elevated RPD results for cadmium, cobalt and zinc are not considered to have compromised the analytical results and the field and laboratory procedures are assessed as adequate throughout this monitoring event.

A trip blank and spike for TPH/BTEX were included in the sample suite for two sampling rounds to assess any hydrocarbon volatiles that may have been introduced or lost during collection and transport of samples to the laboratory. A trip spike and trip blank were provided by ALS and these were included in the sample suite for transfer to the laboratory. The results obtained are included in Table J-4.

Each individual analyte within the BTEX spike was spiked at 20 µg/L. The laboratory results for the BTEX spike ranged between 14 µg/L and 18 µg/L. The RPD calculated for the BTEX trip spike ranged between 0% and 35%, indicating that minor volatile losses during transportation from the laboratory to the field and back to the laboratory occurred.

The water trip blank was analysed for BTEX compounds and the results obtained are presented in Table J-3. Analysis of the trip blanks indicates that no contamination was introduced during transportation to the laboratory as the results for all BTEX/TPH(C₆-C₉) compounds were below the detection limits.

Table J-2 summarises Parsons Brinckerhoff's conformance to specific QA/QC procedures.

Table J-2 Data validation

QA/QC requirement	Conformed	Comments
Samples collected in accordance with Parsons Brinckerhoff standard operating procedures, incorporating appropriate sections of AS 4482.1 – 2005 and AS 4482.2-1999 for sampling of non and semi volatile and volatile components.	Yes	None
Samples delivered to laboratory within sample holding times and with correct preservative	Yes	None
All analyses NATA credited	Yes	None
Required number of sample duplicates analysed	Yes	1/20
Sample duplicates reported RPDs within limits set by AS4482.1	Majority	None
Trip blank samples reported results below detection limits	Yes	None
Water trip spike samples reported spike recoveries within limits set by AS4482.1	Mostly	Minor volatile losses

Laboratory QA/QC results

The NATA registered laboratory (ALS) conducted its own internal quality program. This involved analysis of particular groundwater duplicates for the same parameters for the laboratory to assess the repeatability of the analytical procedures. In addition, standard solutions were analysed by the laboratory for the same parameters as the water samples, to check instrument accuracy.

Based on the laboratory QA/QC results the analytical data presented by ALS is considered to be reliable. No instances of laboratory QA/QC results failing to meet ALS acceptance criteria were reported.

Data quality

Parsons Brinckerhoff considers the sample collection, documentation, handling, storage and transportation procedures utilised in this investigation are of an acceptable standard.

The analytical results provided by the laboratory are deemed reliable and complete based on:

- The results of field and laboratory QA/QC samples demonstrating adequate level of precision and accuracy.
- Laboratory detection limits are less than the adopted assessment criteria.
- Samples were analysed for a range of contaminants with testing undertaken within the recommended holding times.

Based on the review of field observations, measurements, analytical results of field samples and the associated field and laboratory QA/QC results, Parsons Brinckerhoff considers the concentrations of potential contaminants reported are representative of actual conditions.

Table J-3 RPDs for primary and duplicate samples

Analyte		QA1	S4MB03	RPD (%)	QA2	AMB02	RPD (%)
Hydroxide Alkalinity as CaCO ₃	mg/L	<1	<1	nc	<1	<1	nc
Carbonate Alkalinity as CaCO ₃	mg/L	<1	<1	nc	<1	<1	nc
Bicarbonate Alkalinity as CaCO ₃	mg/L	278	274	1.45	102	102	0.00
Total Alkalinity as CaCO ₃	mg/L	278	274	1.45	102	102	0.00
Sulfate as SO ₄ 2-	mg/L	5	5	0.00	15	14	6.90
Chloride	mg/L	898	911	-1.44	54	54	0.00
Calcium	mg/L	22	22	0.00	15	14	6.90
Magnesium	mg/L	6	6	0.00	5	5	0.00
Sodium	mg/L	658	702	-6.47	63	61	3.23
Potassium	mg/L	5	5	0.00	<1	1	nc
Silica	mg/L	29.4	34.5	-15.96	40.1	40.7	-1.49
Dissolved Metals							
Aluminium	mg/L	0.34	0.38	-11.11	<0.01	<0.01	nc

Analyte		QA1	S4MB03	RPD (%)	QA2	AMB02	RPD (%)
Arsenic	mg/L	0.002	0.002	0.00	0.002	0.003	-40.00
Beryllium	mg/L	<0.001	<0.001	nc	<0.001	<0.001	nc
Barium	mg/L	1.48	1.54	-3.97	0.06	0.066	-9.52
Cadmium	mg/L	0.0001	0.0004	-120.00	<0.0001	0.0002	nc
Cobalt	mg/L	<0.001	<0.001	nc	0.001	0.002	-66.67
Copper	mg/L	<0.001	<0.001	nc	<0.001	0.002	nc
Lead	mg/L	<0.001	<0.001	nc	<0.001	<0.001	nc
Manganese	mg/L	0.082	0.083	-1.21	0.163	0.17	-4.20
Molybdenum	mg/L	<0.001	<0.001	nc	<0.001	<0.001	nc
Nickel	mg/L	0.002	0.002	0.00	<0.001	0.002	nc
Selenium	mg/L	<0.01	<0.01	nc	<0.01	<0.01	nc
Strontium	mg/L	1.76	1.72	2.30	0.24	0.235	2.11
Uranium	mg/L	<0.001	<0.001	nc	<0.001	<0.001	nc
Vanadium	mg/L	<0.01	<0.01	nc	<0.01	<0.01	nc
Zinc	mg/L	0.009	0.006	40.00	0.005	0.02	-120.00
Boron	mg/L	<0.05	<0.05	nc	<0.05	<0.05	nc
Iron	mg/L	0.35	0.41	-15.79	0.86	0.9	-4.55
Bromine	mg/L	1.4	1.4	0.00	0.2	0.3	-40.00
Nutrients							
Ammonia as N	mg/L	1.07	0.98	8.78	0.05	0.06	-18.18
Nitrite as N	mg/L	<0.01	<0.01	nc	<0.01	<0.01	nc
Nitrate as N	mg/L	<0.01	<0.01	nc	<0.01	<0.01	nc
Nitrite + Nitrate as N	mg/L	<0.01	<0.01	nc	<0.01	<0.01	nc
Total Phosphorous	mg/L	0.14	0.11	24.00	0.14	0.1	33.33
Reactive Phosphorous	mg/L	0.04	0.05	-22.22	<0.01	<0.01	nc
Total Organic Carbon	mg/L	6	6	0.00	3	4	-28.57
Dissolved Gases							
Methane	µg/L	31300	31400	-0.32	<10	<10	nc
Phenolic compounds							
Phenol	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
2-Chlorophenol	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
2-Methylphenol	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
3-&4-Methylphenol	µg/L	<2.0	<2.0	nc	<2.0	<2.0	nc
2-Nitrophenol	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
2,4-Dimethylphenol	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
2,4-Dichlorophenol	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
2,6-Dichlorophenol	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
4-Chloro-3-Methylphenol	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
2,4,6-Trichlorophenol	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
2,4,5-Trichlorophenol	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Pentachlorophenol	µg/L	<2.0	<2.0	nc	<2.0	<2.0	nc
Polycyclic Aromatic Hydrocarbons							
Naphthalene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc

Analyte		QA1	S4MB03	RPD (%)	QA2	AMB02	RPD (%)
Acenaphthylene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Acenaphthene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Fluorene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Phenanthrene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Anthracene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Fluoranthene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Pyrene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Benz(a)anthracene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Chrysene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Benzo(b)fluoranthene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Benzo(k)fluoranthene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Benzo(a)pyrene	µg/L	<0.5	<0.5	nc	<0.5	<0.5	nc
Indeno(1.2.3.cd)pyrene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Dibenz(a,h)anthracene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Benzo(g,h,i)perylene	µg/L	<1.0	<1.0	nc	<1.0	<1.0	nc
Total petroleum hydrocarbons							
C ₆ -C ₉ Fraction	µg/L	<20	<20	nc	<20	<20	nc
C ₁₀ -C ₁₄ Fraction	µg/L	<50	<50	nc	<50	<50	nc
C ₁₅ -C ₂₈ Fraction	µg/L	<100	<100	nc	<100	<100	nc
C ₂₉ -C ₃₆ Fraction	µg/L	<50	<50	nc	<50	<50	nc
C ₁₀ -C ₃₆ Fraction (sum)	µg/L	<50	<50	nc	<50	<50	nc
Aromatic Hydrocarbons							
Benzene	µg/L	<1	<1	nc	<1	<1	nc
Toluene	µg/L	<5	<5	nc	<5	<5	nc
Ethyl Benzene	µg/L	<2	<2	nc	<2	<2	nc
m&p-Xylenes	µg/L	<2	<2	nc	<2	<2	nc
o-Xylenes	µg/L	<2	<2	nc	<2	<2	nc

Table J-4 Trip blank and trip spike results

Analyte		Trip blank 5/4/2011	Trip spike 5/4/2011	RPD (%)	Trip blank 22/6/2011	Trip spike 22/6/2011	RPD (%)
Total petroleum hydrocarbons							
C ₆ -C ₉ Fraction	µg/L	<20			<20		
C ₁₀ -C ₁₄ Fraction	µg/L						
C ₁₅ -C ₂₈ Fraction	µg/L						
C ₂₉ -C ₃₆ Fraction	µg/L						
C ₁₀ -C ₃₆ Fraction (sum)	µg/L						
Aromatic Hydrocarbons							
Benzene	µg/L	<1	15	29		18	10

Analyte		Trip blank 5/4/2011	Trip spike 5/4/2011	RPD (%)	Trip blank 22/6/2011	Trip spike 22/6/2011	RPD (%)
Toluene	µg/L	<5	18	10		17	16
Ethyl Benzene	µg/L	<2	16	22		14	35
m&p-Xylenes	µg/L	<2	16	22		14	35
o-Xylenes	µg/L	<2	16	22		15	29

Appendix K

Isotech laboratory report – gas
sample analysis

Isotech Satellite Lab Mudgas Data
 TGMB

Company Lab No.	Client ID	Well Name	GC Date	H ₂ ppm	O ₂ + Ar ppm	CO ₂ ppm	N ₂ ppm	CO ppm	C ₁ ppm	C ₂ ppm	C ₂ H ₄ ppm	C ₃ ppm	C ₃ H ₆ ppm	iC ₄ ppm	nC ₄ ppm	iC ₅ ppm	nC ₅ ppm	C ₆ + ppm	MS Date	δ ¹³ C ₁ ‰	δ ¹³ C ₂ ‰	δ ¹³ C ₃ ‰	δ ¹³ iC ₄ ‰	δ ¹³ nC ₄ ‰	δ ¹³ iC ₅ ‰	δ ¹³ nC ₅ ‰	δDC ₁ ‰	δDC ₂ ‰	δDC ₃ ‰	δ ¹³ CO ₂ ‰	Comments			
4219-001	TGMB01	TGMB	5/31/2011	0	217700	560	781700	0	16	0	0	0	0	0	0	0	0	0																
4219-002	TGMB02	TGMB	5/31/2011	0	216600	1200	782100	0	138	0	0	0	0	0	0	0	0	0																

Chemical analysis is in ppm and is normalized to 1000000ppm

Chemical analysis based on standards accurate to within 2%

Hydrogen analysis accurate to within 10%

red = isotopes may be obtained without cryogenic enrichment

Appendix L

ALS Coal analytical reports



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1103839	Page	: 1 of 5
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: JAMES DUGGLEBY	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jduggleby@pb.com.au	E-mail	: loren.schiavon@alsenviro.com
Telephone	: +61 02 9272 5100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 9272 5101	Facsimile	: +61 2 8784 8500
Project	: 216240 6A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 23-FEB-2011
Sampler	: ----	Issue Date	: 02-MAR-2011
Site	: ----		
Quote number	: SY/394/09	No. of samples received	: 1
		No. of samples analysed	: 1

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
- Surrogate Control 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Hoa Nguyen	Inorganic Chemist	Inorganics
Pabi Subba	Senior Organic Chemist	Organics

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A Campbell Brothers Limited Company



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 insufficient 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				TCM B04	---	---	---	---
				22-FEB-2011 15:00	---	---	---	---
Compound	CAS Num	br	LOR	Unit	ES1103839-001	---	---	---
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	---		1.0	%	2.8	---	---	---
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2		0.5	mg/kg	<0.5	---	---	---
2-Chlorophenol	95-57-8		0.5	mg/kg	<0.5	---	---	---
2-Methylphenol	95-48-7		0.5	mg/kg	<0.5	---	---	---
3- & 4-Methylphenol	1319-77-3		1.0	mg/kg	<1.0	---	---	---
2-Nitrophenol	88-75-5		0.5	mg/kg	<0.5	---	---	---
2,4-Dimethylphenol	105-67-9		0.5	mg/kg	<0.5	---	---	---
2,4-Dichlorophenol	120-83-2		0.5	mg/kg	<0.5	---	---	---
2,6-Dichlorophenol	87-65-0		0.5	mg/kg	<0.5	---	---	---
4-Chloro-3-Methylphenol	59-50-7		0.5	mg/kg	<0.5	---	---	---
2,4,6-Trichlorophenol	88-06-2		0.5	mg/kg	<0.5	---	---	---
2,4,5-Trichlorophenol	95-95-4		0.5	mg/kg	<0.5	---	---	---
Pentachlorophenol	87-86-5		2.0	mg/kg	<2.0	---	---	---
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3		0.5	mg/kg	<0.5	---	---	---
Acenaphthylene	208-96-8		0.5	mg/kg	<0.5	---	---	---
Acenaphthene	83-32-9		0.5	mg/kg	<0.5	---	---	---
Fluorene	86-73-7		0.5	mg/kg	<0.5	---	---	---
Phenanthrene	85-01-8		0.5	mg/kg	<0.5	---	---	---
Anthracene	120-12-7		0.5	mg/kg	<0.5	---	---	---
Fluoranthene	206-44-0		0.5	mg/kg	<0.5	---	---	---
Pyrene	129-00-0		0.5	mg/kg	<0.5	---	---	---
Benz(a)anthracene	56-55-3		0.5	mg/kg	<0.5	---	---	---
Chrysene	218-01-9		0.5	mg/kg	<0.5	---	---	---
Benzo(b)fluoranthene	205-99-2		0.5	mg/kg	<0.5	---	---	---
Benzo(k)fluoranthene	207-08-9		0.5	mg/kg	<0.5	---	---	---
Benzo(a)pyrene	50-32-8		0.5	mg/kg	<0.5	---	---	---
Indeno(1.2.3.cd)pyrene	193-39-5		0.5	mg/kg	<0.5	---	---	---
Dibenz(a,h)anthracene	53-70-3		0.5	mg/kg	<0.5	---	---	---
Benzo(g,h,i)perylene	191-24-2		0.5	mg/kg	<0.5	---	---	---
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	---		10	mg/kg	<10	---	---	---
C10 - C14 Fraction	---		50	mg/kg	<50	---	---	---
C15 - C28 Fraction	---		100	mg/kg	<100	---	---	---
C29 - C36 Fraction	---		100	mg/kg	<100	---	---	---
^ C10 - C36 Fraction (sum)	---		50	mg/kg	<50	---	---	---

EP080: BTEX



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

TCM B04

Client sampling date / time

22-FEB-2011 15:00

Compound	CAS Num br	LOR	Unit	ES1103839-001				
EP080: BTEX - Continued								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	56.6	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%	112	----	----	----	----
2,4,6-Tribromophenol	118-79-6	0.1	%	68.4	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	120	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%	111	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	117	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	111	----	----	----	----
Toluene-D8	2037-26-5	0.1	%	118	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	91.5	----	----	----	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Num br	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	56.3	133.3
2-Chlorophenol-D4	93951-73-6	53.8	133.8
2,4,6-Tribromophenol	118-79-6	23.1	134.9
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	58.9	132.7
Anthracene-d10	1719-06-8	55.0	137.6
4-Terphenyl-d14	1718-51-0	54.0	147.8
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	72.8	133.2
Toluene-D8	2037-26-5	73.9	132.1
4-Bromofluorobenzene	460-00-4	71.6	130.0



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1103839	Page	: 1 of 7
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
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Project	: 216240 6A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 23-FEB-2011
C-O-C number	: ----	Issue Date	: 02-MAR-2011
Sampler	: ----	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1
Quote number	: SY/394/09		

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Hoa Nguyen	Inorganic Chemist	Inorganics
Pabi Subba	Senior Organic Chemist	Organics

Environmental Division Sydney

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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 insufficient 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 (%)
EA055: Moisture Content (QC Lot: 1684177)									
ES1103831-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	15.7	18.0	13.7	0% - 50%
ES1103842-003	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	23.0	23.7	2.6	0% - 20%
EP075(SIM)A: Phenolic Compounds (QC Lot: 1686648)									
ES1103719-001	Anonymous	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1.0	mg/kg	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2.0	mg/kg	<2.0	<2.0	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1686648)									
ES1103719-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1683310)							
ES1103719-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES1103845-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	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 (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1686647)									
ES1103719-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	110	120	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	110	120	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES1103839-001	TCM B04	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEX (QC Lot: 1683310)									
ES1103719-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
ES1103845-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	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: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP075(SIM)A: Phenolic Compounds (QCLot: 1686648)									
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	4 mg/kg	103	73.9	115	
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	4 mg/kg	114	80.2	115	
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	4 mg/kg	106	76.8	114	
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1.0	mg/kg	<1.0	8 mg/kg	115	72	119	
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	4 mg/kg	93.4	60.3	117	
EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	4 mg/kg	106	74.5	119	
EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	4 mg/kg	96.1	71.6	113	
EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	4 mg/kg	96.2	74.8	115	
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.5	mg/kg	<0.5	4 mg/kg	108	76.4	114	
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	4 mg/kg	114	62.2	115	
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	4 mg/kg	104	68.9	112	
EP075(SIM): Pentachlorophenol	87-86-5	1.0	mg/kg	<1.0	8 mg/kg	33.6	1.23	91.6	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1686648)									
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	4 mg/kg	111	81.9	113	
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	4 mg/kg	112	79.6	113	
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	4 mg/kg	105	81.5	112	
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	4 mg/kg	# 79.7	79.9	112	
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	4 mg/kg	93.8	79.4	114	
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	4 mg/kg	89.5	81.1	112	
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	4 mg/kg	106	78.8	113	
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	4 mg/kg	99.2	78.9	113	
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	4 mg/kg	90.4	77.2	112	
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	4 mg/kg	111	79.8	114	
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	4 mg/kg	95.2	71.8	118	
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	4 mg/kg	88.4	74.2	117	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	4 mg/kg	106	76.4	113	
EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	4 mg/kg	106	71	113	
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	4 mg/kg	101	71.7	113	
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	4 mg/kg	83.6	72.4	114	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1683310)									
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	111	68.4	128	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1686647)									
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	86.4	75.2	116	
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	200 mg/kg	101	75.3	113	



Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1686647) - continued								
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	99.2	72.6	117
EP080: BTEX (QCLot: 1683310)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	104	63	121
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	101	69	122
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	102	61	117
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	101	62	118
	106-42-3							
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	101	63	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**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)		
					MS	Low	High	
EP075(SIM)A: Phenolic Compounds (QCLot: 1686648)								
ES1103719-001	Anonymous	EP075(SIM): Phenol	108-95-2	10 mg/kg	108	70	130	
		EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	91.2	70	130	
		EP075(SIM): 2-Nitrophenol	88-75-5	10 mg/kg	76.0	60	130	
		EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	10 mg/kg	97.5	70	130	
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	37.5	20	130	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1686648)								
ES1103719-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	124	70	130	
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	# 131	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1683310)								
ES1103845-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	74.5	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1686647)								
ES1103719-001	Anonymous	EP071: C10 - C14 Fraction	----	640 mg/kg	115	70	130	
		EP071: C15 - C28 Fraction	----	3140 mg/kg	108	70	130	
		EP071: C29 - C36 Fraction	----	2860 mg/kg	111	70	130	
EP080: BTEX (QCLot: 1683310)								
ES1103845-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	84.1	70	130	
		EP080: Toluene	108-88-3	2.5 mg/kg	88.1	70	130	
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	90.6	70	130	
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	88.9	70	130	
			106-42-3					
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	88.1	70	130	



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1103839	Page	: 1 of 5
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: JAMES DUGGLEBY	Contact	: Loren Schiavon
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Project	: 216240 6A	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 23-FEB-2011
C-O-C number	: ----	Issue Date	: 02-MAR-2011
Sampler	: ----	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1
Quote number	: SY/394/09		

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
EA055: Moisture Content							
Soil Glass Jar - Unpreserved TCM B04	22-FEB-2011	----	----	----	25-FEB-2011	08-MAR-2011	✓
EP075(SIM)A: Phenolic Compounds							
Soil Glass Jar - Unpreserved TCM B04	22-FEB-2011	28-FEB-2011	08-MAR-2011	✓	28-FEB-2011	09-APR-2011	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved TCM B04	22-FEB-2011	28-FEB-2011	08-MAR-2011	✓	28-FEB-2011	09-APR-2011	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved TCM B04	22-FEB-2011	24-FEB-2011	08-MAR-2011	✓	27-FEB-2011	08-MAR-2011	✓
Soil Glass Jar - Unpreserved TCM B04	22-FEB-2011	28-FEB-2011	08-MAR-2011	✓	28-FEB-2011	09-APR-2011	✓
EP080: BTEX							
Soil Glass Jar - Unpreserved TCM B04	22-FEB-2011	24-FEB-2011	08-MAR-2011	✓	27-FEB-2011	08-MAR-2011	✓



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	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	19	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	7	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	2	15	13.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	7	14.3	5.0	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	15	6.7	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	5.0	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.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
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 (2010 Draft) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (1999) Schedule B(3) (Method 506.1)
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 502 and 507)
TPH Volatiles/BTEX	EP080	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.



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
Laboratory Control Spike (LCS) Recoveries							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	1981382-007	----	Fluorene	86-73-7	79.7 %	79.9-112%	Recovery less than lower control limit
Matrix Spike (MS) Recoveries							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	ES1103719-001	Anonymous	Pyrene	129-00-0	131 %	70-130%	Recovery greater than upper data quality objective

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

- No Analysis Holding Time Outliers exist.

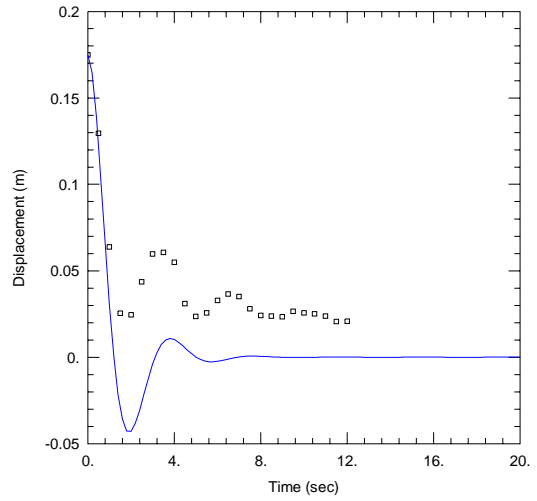
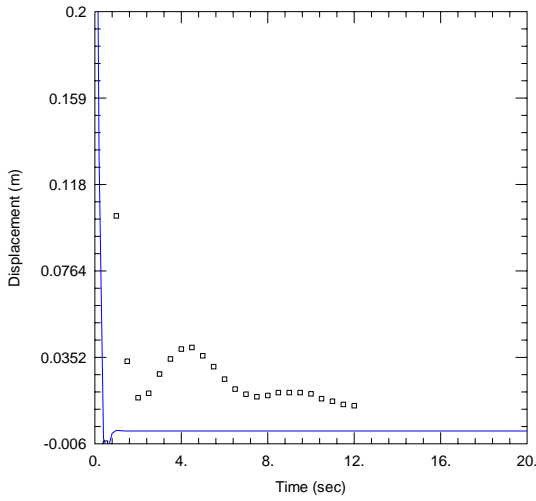
Outliers : Frequency of Quality Control Samples

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

- No Quality Control Sample Frequency Outliers exist.

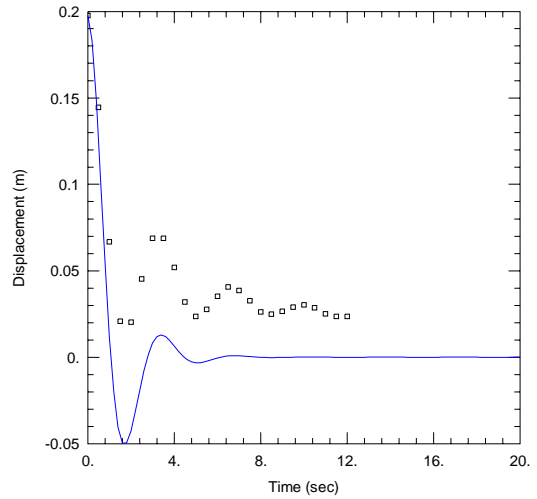
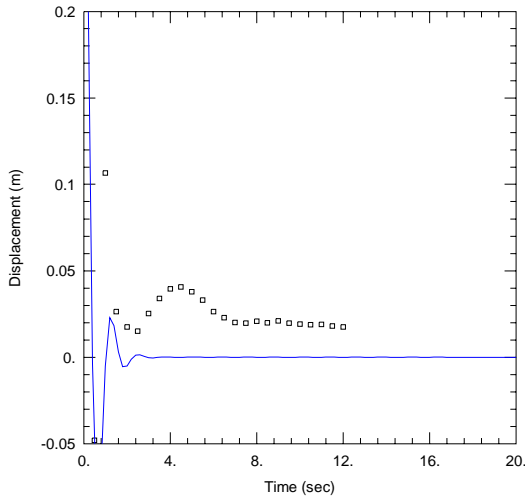
Appendix M

Hydraulic conductivity testing figures



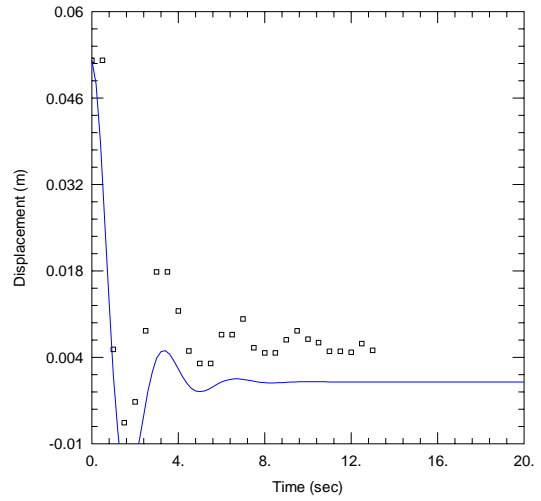
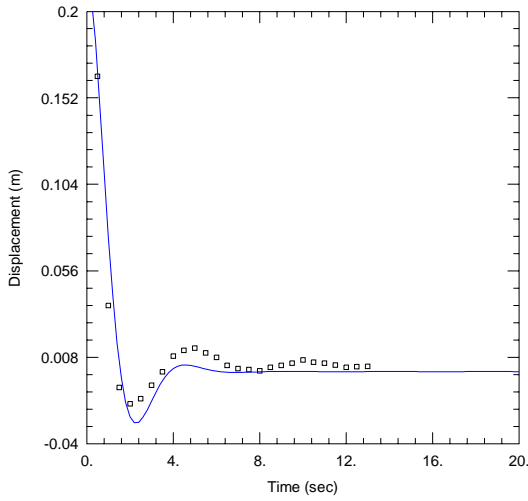
WELL TEST ANALYSIS	
Data Set: __AMB01(a)_FallingHead1_Butler.aqt	Time: 16:38:53
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: AMB01	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 3. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (AMB01)	
Initial Displacement: 0.3944 m	Static Water Column Height: 3.85 m
Total Well Penetration Depth: 3. m	Screen Length: 2. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 452.5 m/day	Le = 0.11 m

WELL TEST ANALYSIS	
Data Set: __AMB01(b)_RisingHead1_Butler.aqt	Time: 16:42:41
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: AMB01	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 3. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (AMB01)	
Initial Displacement: 0.1749 m	Static Water Column Height: 3.85 m
Total Well Penetration Depth: 3. m	Screen Length: 2. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 157. m/day	Le = 3.02 m



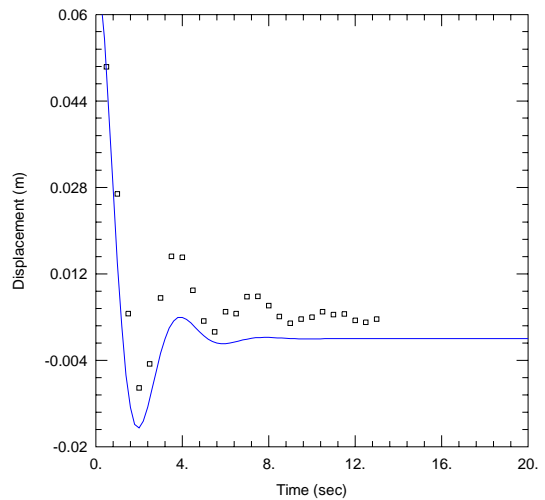
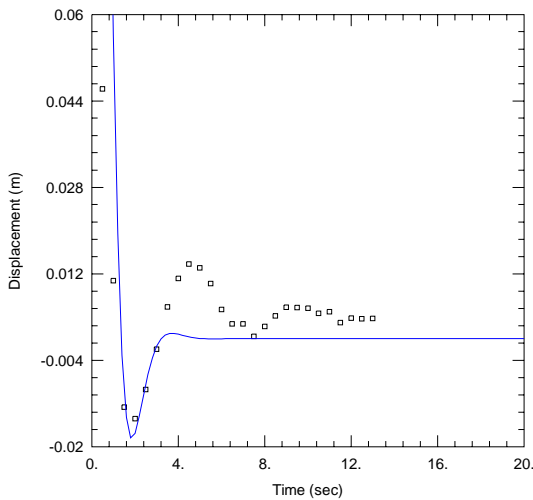
WELL TEST ANALYSIS	
Data Set: __AMB01(c)_FallingHead2_Butler.aqt	Time: 16:44:29
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: AMB01	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 3. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (AMB01)	
Initial Displacement: 0.3623 m	Static Water Column Height: 3.85 m
Total Well Penetration Depth: 3. m	Screen Length: 2. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 493. m/day	Le = 0.3296 m

WELL TEST ANALYSIS	
Data Set: __AMB01(d)_RisingHead2_Butler.aqt	Time: 16:46:25
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: AMB01	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 3. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (AMB01)	
Initial Displacement: 0.1976 m	Static Water Column Height: 3.85 m
Total Well Penetration Depth: 3. m	Screen Length: 2. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 179.6 m/day	Le = 2.399 m



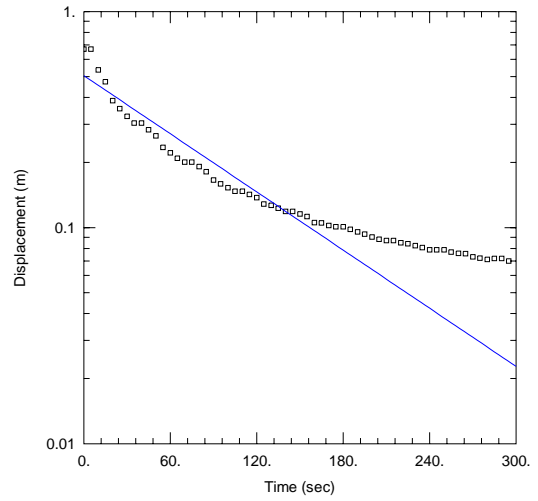
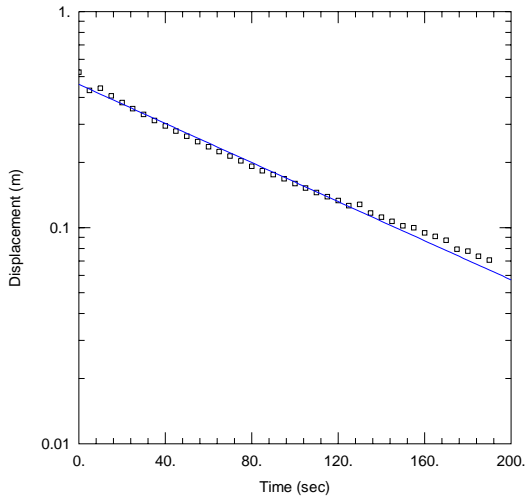
WELL TEST ANALYSIS	
Data Set: __AMB02(a)_FallingHead1_Butler.aqt	Time: 17:02:16
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: AMB02	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 6. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (AMB02)	
Initial Displacement: 0.2202 m	Static Water Column Height: 7.16 m
Total Well Penetration Depth: 6. m	Screen Length: 4.5 m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 54.75 m/day	Le = 3.631 m

WELL TEST ANALYSIS	
Data Set: __AMB02(b)_RisingHead1_Butler.aqt	Time: 17:05:00
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: AMB02	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 6. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (AMB02)	
Initial Displacement: 0.0521 m	Static Water Column Height: 7.16 m
Total Well Penetration Depth: 6. m	Screen Length: 4.5 m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 105.7 m/day	Le = 2.43 m



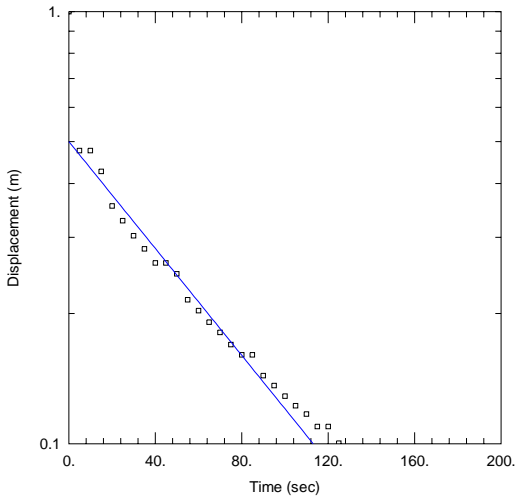
WELL TEST ANALYSIS	
Data Set: __AMB02(c)_FallingHead2_Butler.aqt	Time: 17:10:13
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: AMB02	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 6. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (AMB02)	
Initial Displacement: 0.3441 m	Static Water Column Height: 7.16 m
Total Well Penetration Depth: 6. m	Screen Length: 4.5 m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 61.88 m/day	Le = 1.82 m

WELL TEST ANALYSIS	
Data Set: __AMB02(d)_RisingHead2_Butler.aqt	Time: 17:14:54
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: AMB02	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 6. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (AMB02)	
Initial Displacement: 0.0692 m	Static Water Column Height: 7.16 m
Total Well Penetration Depth: 6. m	Screen Length: 4.5 m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 77.44 m/day	Le = 3.16 m

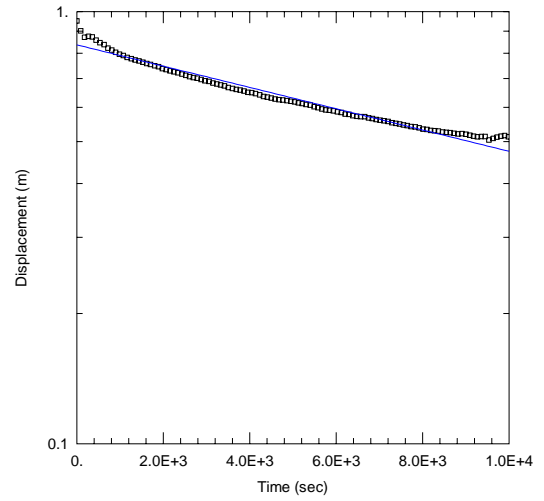
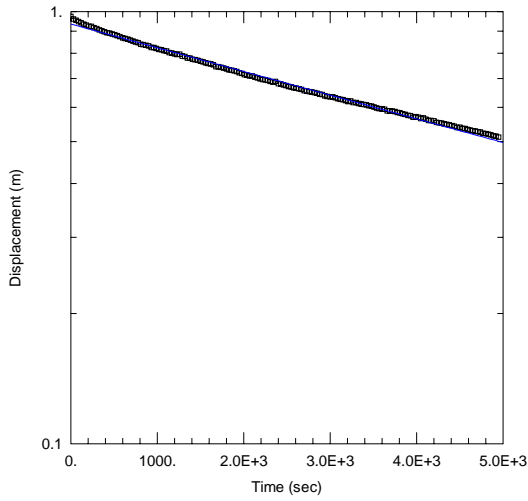


WELL TEST ANALYSIS	
Data Set: _\BMB01(a)_FallingHead1_BouwerRice.aqt	Time: 10:12:14
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: BMB01	
Test Date: 16/03/2011	
AQUIFER DATA	
Saturated Thickness: 14. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (BMB01)	
Initial Displacement: 0.524 m	Static Water Column Height: 130.2 m
Total Well Penetration Depth: 14. m	Screen Length: 12. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.1229 m/day	y0 = 0.46 m

WELL TEST ANALYSIS	
Data Set: _\BMB01(b)_RisingHead1_BouwerRice.aqt	Time: 10:16:50
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: BMB01	
Test Date: 16/03/2011	
AQUIFER DATA	
Saturated Thickness: 14. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (BMB01)	
Initial Displacement: 0.67 m	Static Water Column Height: 130.2 m
Total Well Penetration Depth: 14. m	Screen Length: 12. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.1219 m/day	y0 = 0.5052 m



WELL TEST ANALYSIS	
Data Set: _\BMB01(c)_FallingHead2_BouwerRice.aqt	Time: 10:19:13
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: BMB01	
Test Date: 16/03/2011	
AQUIFER DATA	
Saturated Thickness: 14. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (BMB01)	
Initial Displacement: 1. m	Static Water Column Height: 130.2 m
Total Well Penetration Depth: 14. m	Screen Length: 12. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.1681 m/day	y0 = 0.5003 m



WELL TEST ANALYSIS

Data Set: _\BMB02(a)_FallingHead1_BouwerRice.aqt
 Date: 03/31/11 Time: 10:25:04

PROJECT INFORMATION

Company: Parsons Brinckerhoff
 Client: AGL Limited
 Project: 2123229A
 Location: Gloucester
 Test Well: BMB02
 Test Date: 14/03/2011

AQUIFER DATA

Saturated Thickness: 14. m Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (BMB02)

Initial Displacement: 0.9738 m Static Water Column Height: 130.2 m
 Total Well Penetration Depth: 14. m Screen Length: 12. m
 Casing Radius: 0.025 m Well Radius: 0.07 m

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice
 K = 0.00149 m/day $y_0 = 0.9352$ m

WELL TEST ANALYSIS

Data Set: _\BMB02(c)_FallingHead2_BouwerRice.aqt
 Date: 03/31/11 Time: 10:26:19

PROJECT INFORMATION

Company: Parsons Brinckerhoff
 Client: AGL Limited
 Project: 2123229A
 Location: Gloucester
 Test Well: BMB02
 Test Date: 14/03/2011

AQUIFER DATA

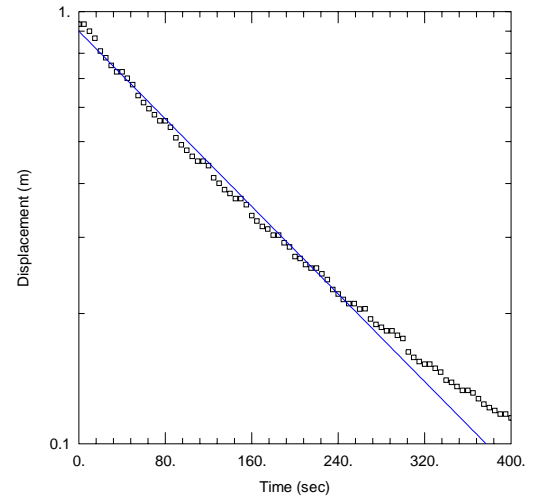
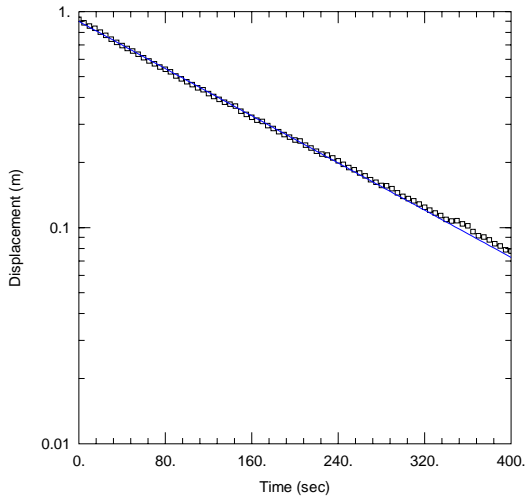
Saturated Thickness: 14. m Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (BMB02)

Initial Displacement: 0.9511 m Static Water Column Height: 130.2 m
 Total Well Penetration Depth: 14. m Screen Length: 12. m
 Casing Radius: 0.025 m Well Radius: 0.07 m

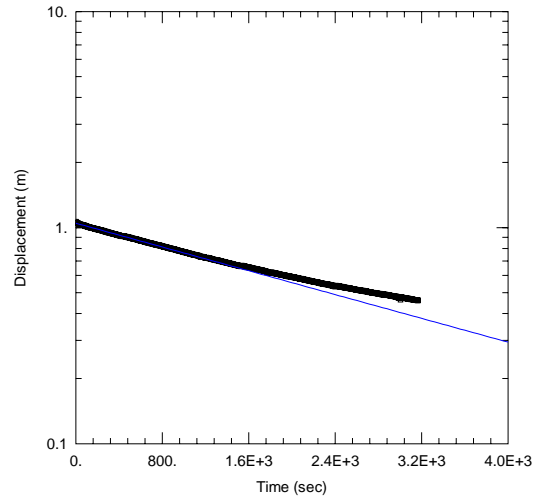
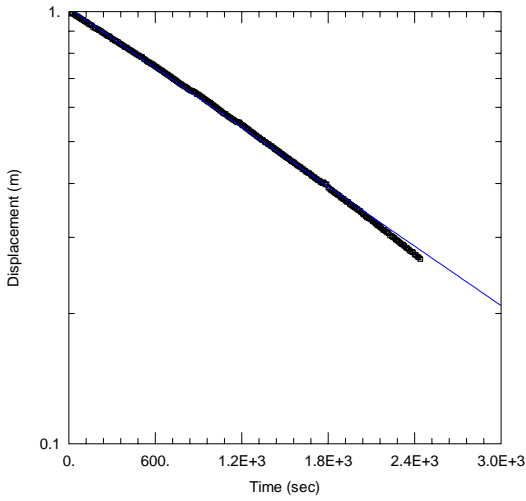
SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice
 K = 0.0006696 m/day $y_0 = 0.8372$ m



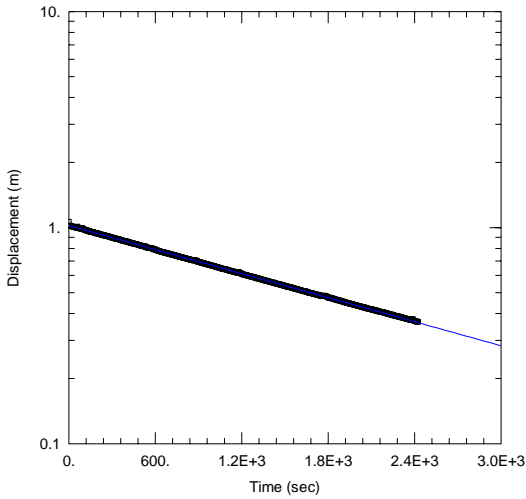
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Data Set: _\RMB01(a)_FallingHead1_BouwerRice.agt	Time: 14:29:42
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: RMB01	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 7. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (RMB01)	
Initial Displacement: 0.92 m	Static Water Column Height: 88.88 m
Total Well Penetration Depth: 7. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.1278 m/day	y0 = 0.8999 m

WELL TEST ANALYSIS	
Data Set: _\RMB01(c)_FallingHead2_BouwerRice.agt	Time: 14:32:42
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: RMB01	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 7. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (RMB01)	
Initial Displacement: 0.935 m	Static Water Column Height: 88.88 m
Total Well Penetration Depth: 7. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.1186 m/day	y0 = 0.9003 m

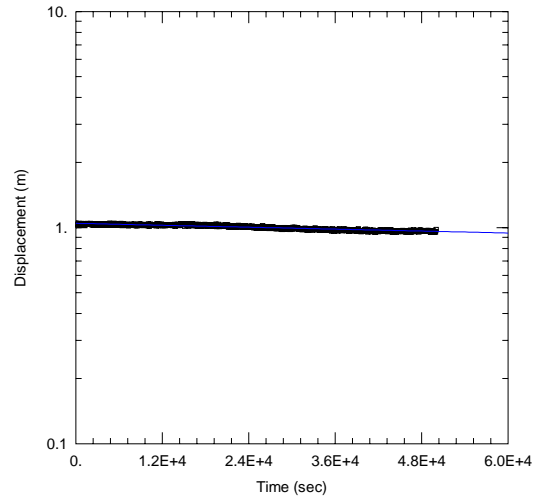
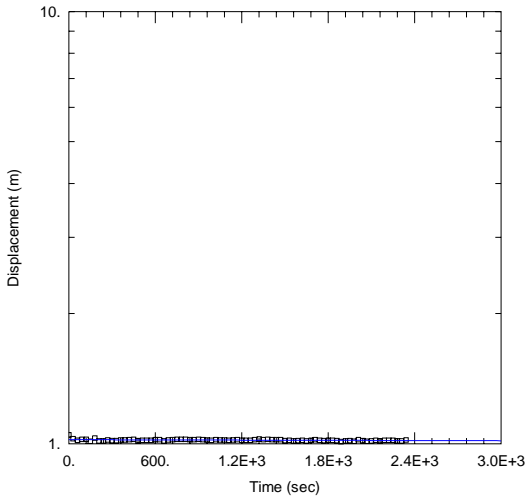


WELL TEST ANALYSIS	
Data Set: __RMB02(a)_FallingHead1_BouwerRice.agt	Time: 16:20:58
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: RMB02	
Test Date: 7/03/2011	
AQUIFER DATA	
Saturated Thickness: 7. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (RMB02)	
Initial Displacement: 1.065 m	Static Water Column Height: 88.88 m
Total Well Penetration Depth: 7. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.01073 m/day	y0 = 1.017 m

WELL TEST ANALYSIS	
Data Set: __RMB02(b)_RisingHead1_BouwerRice.agt	Time: 16:23:34
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: RMB02	
Test Date: 7/03/2011	
AQUIFER DATA	
Saturated Thickness: 7. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (RMB02)	
Initial Displacement: 1.065 m	Static Water Column Height: 88.88 m
Total Well Penetration Depth: 7. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.006444 m/day	y0 = 1.048 m

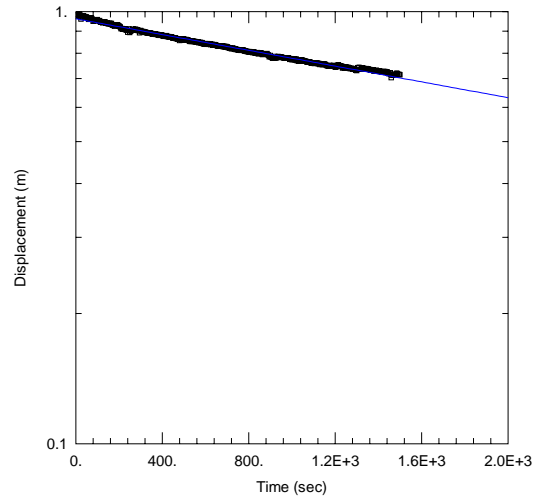
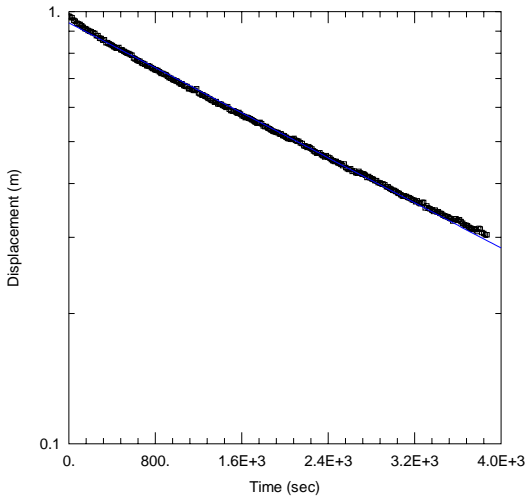


WELL TEST ANALYSIS	
Data Set: __RMB02(c)_FallingHead2_BouwerRice.agt	Time: 16:24:36
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: RMB02	
Test Date: 7/03/2011	
AQUIFER DATA	
Saturated Thickness: 7. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (RMB02)	
Initial Displacement: 1.065 m	Static Water Column Height: 88.88 m
Total Well Penetration Depth: 7. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.00868 m/day	y0 = 1.022 m



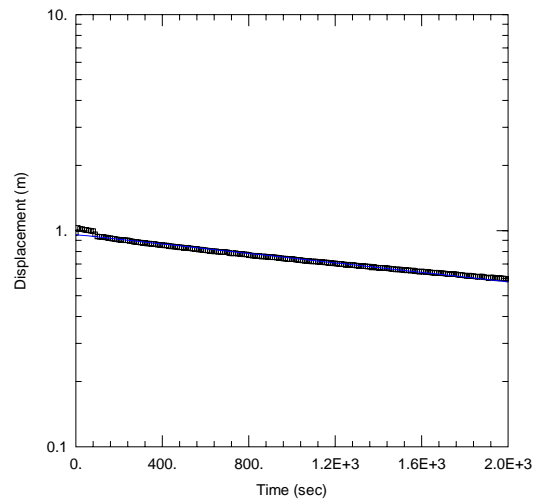
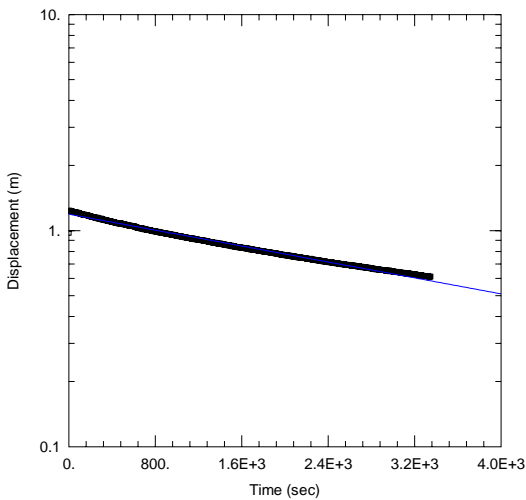
WELL TEST ANALYSIS	
Data Set: _\S4MB01(a)_FallingHead1_BouwerRice.aqt	Time: 15:58:23
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: S4MB01	
Test Date: 18/10/2010	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (S4MB01)	
Initial Displacement: 1.048 m	Static Water Column Height: 57.68 m
Total Well Penetration Depth: 8. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 3.964E-5 m/day	y0 = 1.021 m

WELL TEST ANALYSIS	
Data Set: _\S4MB01(c)_FallingHead2_BouwerRice.aqt	Time: 16:00:33
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: S4MB01	
Test Date: 18/10/2010	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (S4MB01)	
Initial Displacement: 1.048 m	Static Water Column Height: 57.68 m
Total Well Penetration Depth: 8. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 3.563E-5 m/day	y0 = 1.046 m



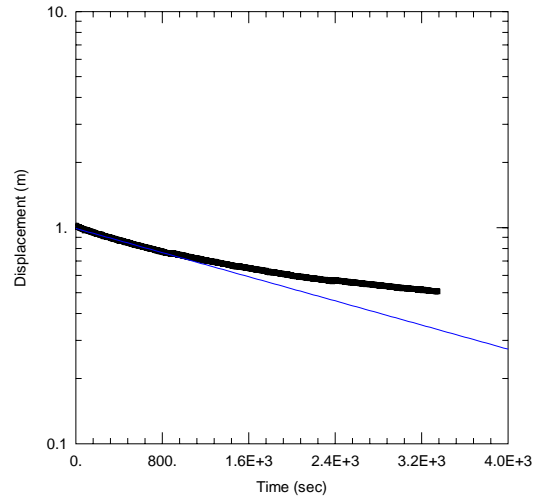
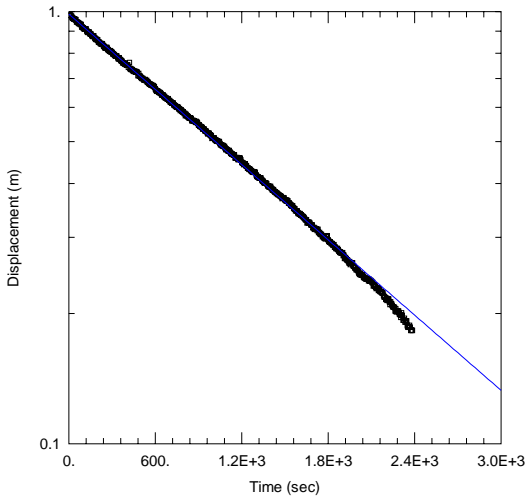
WELL TEST ANALYSIS	
Data Set: _\S4MBO2(a)_FallingHead1_BouwerRice.agt	Time: 16:03:04
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: S4MB02	
Test Date: 7/03/2011	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (S4MB02)	
Initial Displacement: 0.9751 m	Static Water Column Height: 91.42 m
Total Well Penetration Depth: 8. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.00622 m/day	y0 = 0.942 m

WELL TEST ANALYSIS	
Data Set: _\S4MBO2(b)_RisingHead1_BouwerRice.agt	Time: 16:10:48
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: S4MB02	
Test Date: 7/03/2011	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (S4MB02)	
Initial Displacement: 0.9751 m	Static Water Column Height: 91.42 m
Total Well Penetration Depth: 8. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.004357 m/day	y0 = 0.9617 m



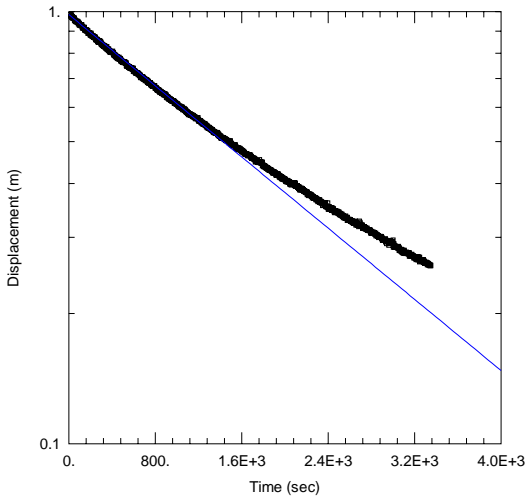
WELL TEST ANALYSIS	
Data Set: _\S4MBO2(c)_FallingHead2_BouwerRice.agt	Time: 16:09:39
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: S4MB02	
Test Date: 7/03/2011	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (S4MB02)	
Initial Displacement: 0.9751 m	Static Water Column Height: 91.42 m
Total Well Penetration Depth: 8. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.004401 m/day	y0 = 1.191 m

WELL TEST ANALYSIS	
Data Set: _\S4MBO2(d)_RisingHead2_BouwerRice.agt	Time: 16:08:02
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: S4MB02	
Test Date: 7/03/2011	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (S4MB02)	
Initial Displacement: 0.9751 m	Static Water Column Height: 91.42 m
Total Well Penetration Depth: 8. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.005219 m/day	y0 = 0.9582 m

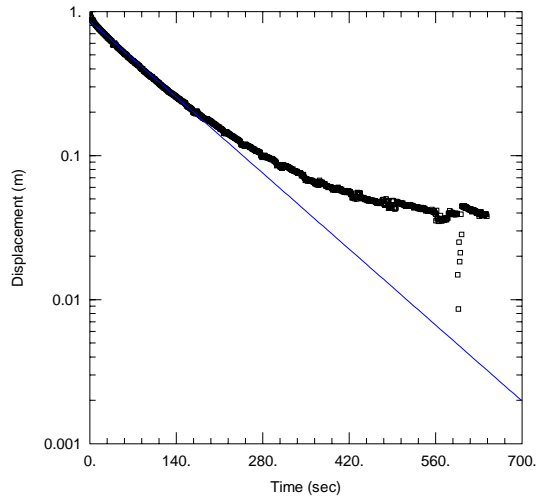
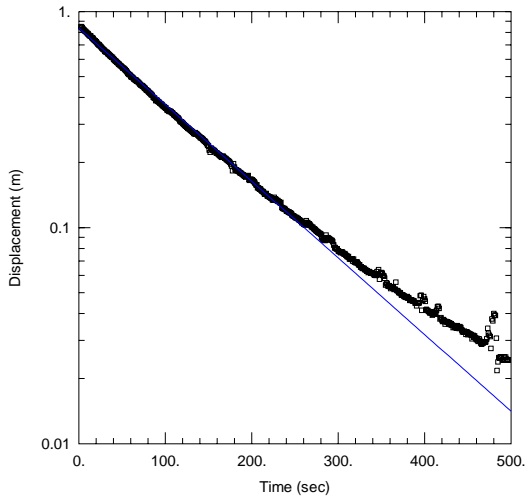


WELL TEST ANALYSIS	
Data Set: _\S4MBO3(a)_FallingHead1_BouwerRice.agt	Time: 16:16:21
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: S4MB03	
Test Date: 7/03/2011	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (S4MB03)	
Initial Displacement: 1.021 m	Static Water Column Height: 163.9 m
Total Well Penetration Depth: 8. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.01386 m/day	y0 = 0.9864 m

WELL TEST ANALYSIS	
Data Set: _\S4MBO3(b)_RisingHead1_BouwerRice.agt	Time: 16:15:28
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: S4MB03	
Test Date: 7/03/2011	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (S4MB03)	
Initial Displacement: 1.021 m	Static Water Column Height: 163.9 m
Total Well Penetration Depth: 8. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.006671 m/day	y0 = 0.9908 m

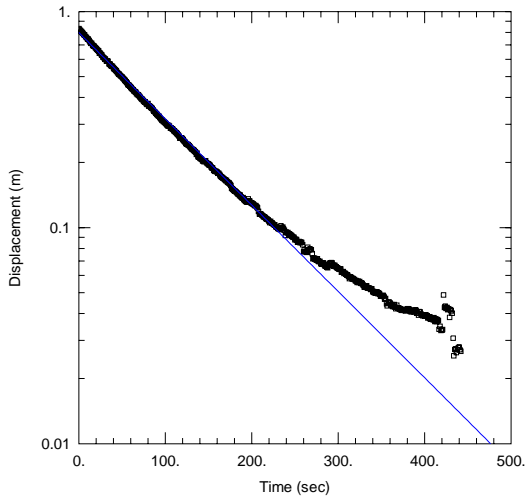


WELL TEST ANALYSIS	
Data Set: _\S4MBO3(c)_FallingHead2_BouwerRice.agt	Time: 16:17:56
Date: 03/30/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: S4MB03	
Test Date: 7/03/2011	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (S4MB03)	
Initial Displacement: 1.021 m	Static Water Column Height: 163.9 m
Total Well Penetration Depth: 8. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.009834 m/day	y0 = 0.9836 m

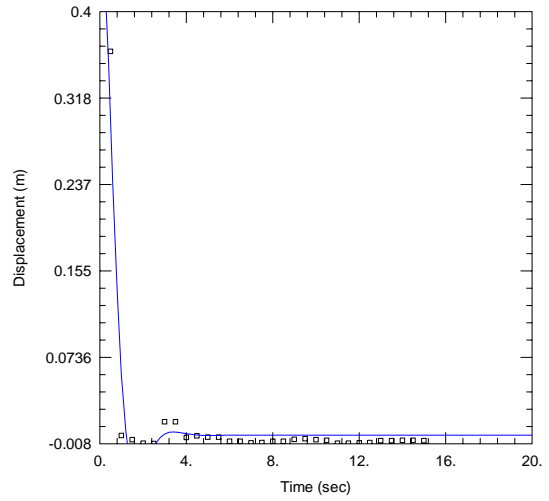
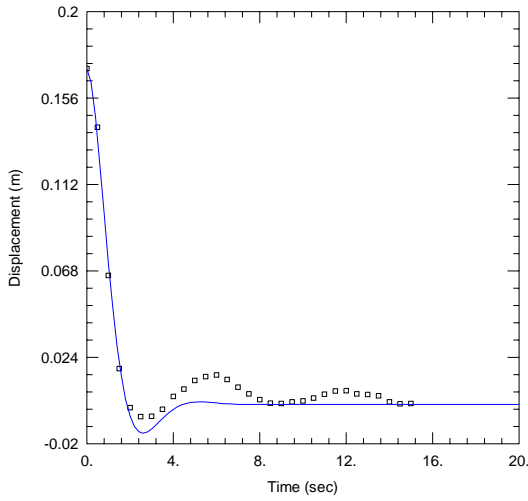


WELL TEST ANALYSIS	
Data Set: __TMB01(a)_FallingHead1_BouwerRice.agt	Time: 10:39:52
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: TMB01	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 5.25 m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TMB01)	
Initial Displacement: 1.069 m	Static Water Column Height: 5.25 m
Total Well Penetration Depth: 5.25 m	Screen Length: 3. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Unconfined	Solution Method: Bouwer-Rice
K = 0.3054 m/day	y0 = 0.8399 m

WELL TEST ANALYSIS	
Data Set: __TMB01(b)_RisingHead1_BouwerRice.agt	Time: 10:41:18
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: TMB01	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 5.25 m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TMB01)	
Initial Displacement: 0.9833 m	Static Water Column Height: 5.25 m
Total Well Penetration Depth: 5.25 m	Screen Length: 3. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Unconfined	Solution Method: Bouwer-Rice
K = 0.3242 m/day	y0 = 0.8567 m

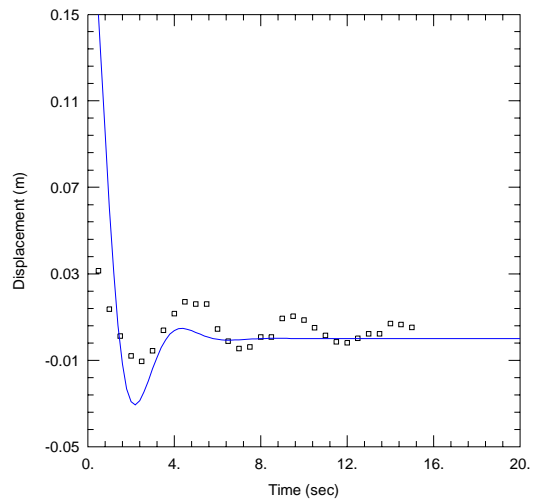
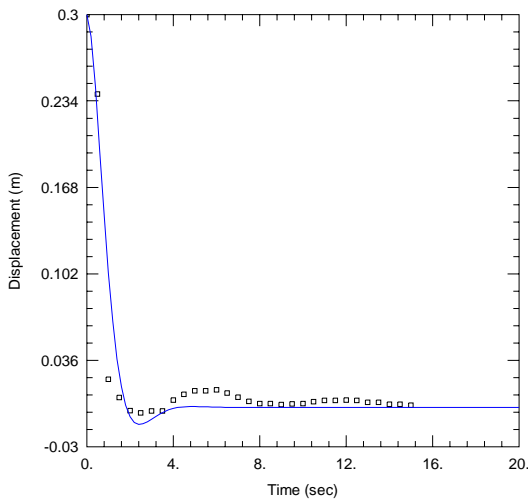


WELL TEST ANALYSIS	
Data Set: __TMB01(c)_FallingHead1_BouwerRice.agt	Time: 10:42:28
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: TMB01	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 5.25 m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TMB01)	
Initial Displacement: 0.8325 m	Static Water Column Height: 5.25 m
Total Well Penetration Depth: 5.25 m	Screen Length: 3. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Unconfined	Solution Method: Bouwer-Rice
K = 0.3437 m/day	y0 = 0.7988 m



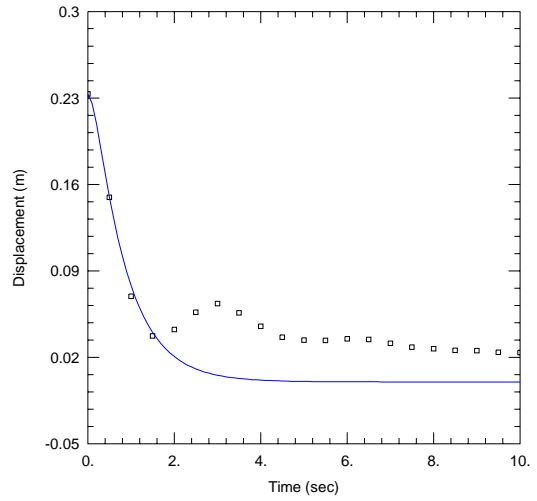
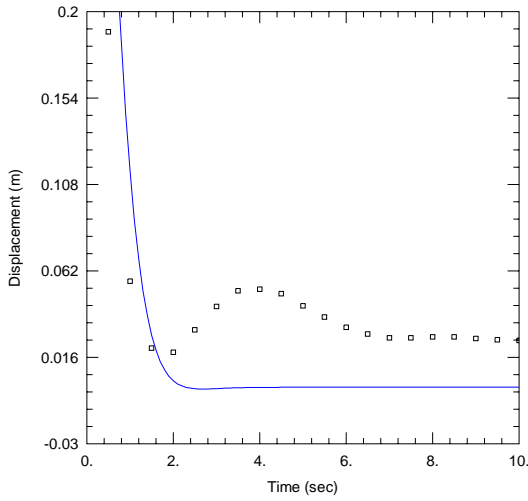
WELL TEST ANALYSIS	
Data Set: _\TMB02(a)_FallingHead1_Butler.aqt	Time: 11:01:46
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: TMB02	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 6. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TMB02)	
Initial Displacement: 0.1709 m	Static Water Column Height: 7.386 m
Total Well Penetration Depth: 6. m	Screen Length: 3. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 63.29 m/day	Le = 4.169 m

WELL TEST ANALYSIS	
Data Set: _\TMB02(b)_RisingHead1_Butler.aqt	Time: 11:02:52
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: TMB02	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 6. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TMB02)	
Initial Displacement: 0.5 m	Static Water Column Height: 7.386 m
Total Well Penetration Depth: 6. m	Screen Length: 3. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 96.27 m/day	Le = 1.741 m



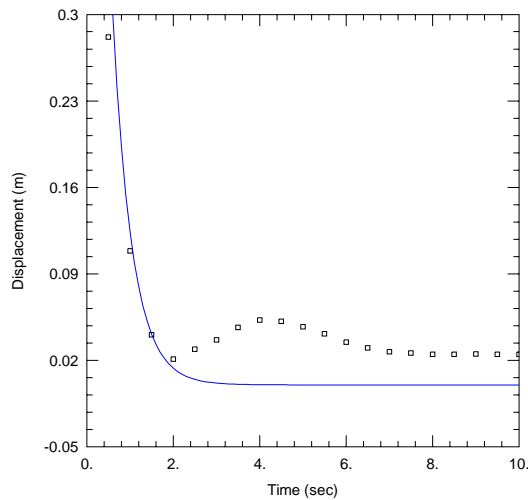
WELL TEST ANALYSIS	
Data Set: _\TMB02(c)_FallingHead2_Butler.aqt	Time: 11:08:12
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: TMB02	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 6. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TMB02)	
Initial Displacement: 0.3 m	Static Water Column Height: 7.386 m
Total Well Penetration Depth: 6. m	Screen Length: 3. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 65.5 m/day	Le = 2.967 m

WELL TEST ANALYSIS	
Data Set: _\TMB02(d)_RisingHead2_Butler.aqt	Time: 11:25:42
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: TMB02	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 6. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TMB02)	
Initial Displacement: 0.2 m	Static Water Column Height: 7.386 m
Total Well Penetration Depth: 6. m	Screen Length: 3. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 83.7 m/day	Le = 3.467 m

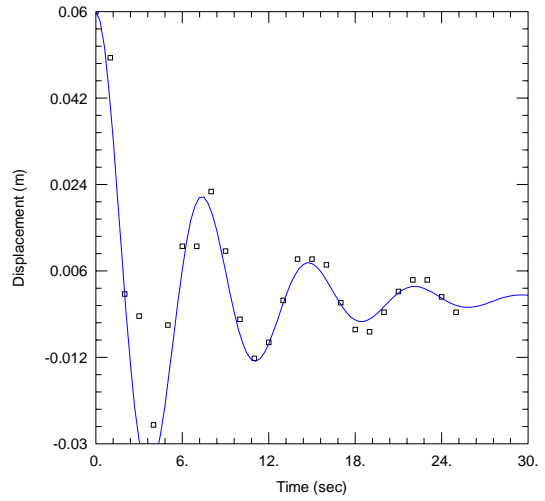
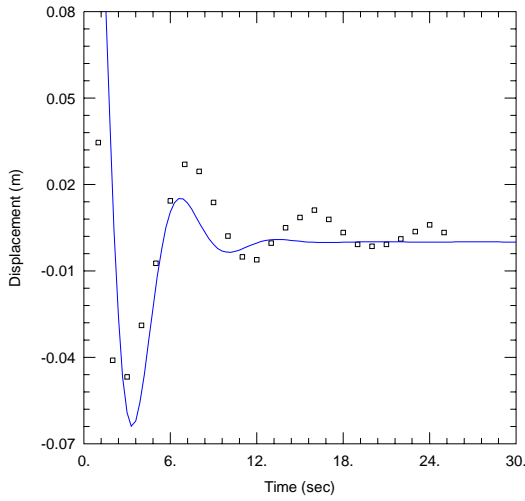


WELL TEST ANALYSIS	
Data Set: _\TMB03(a)_FallingHead1_Butler.aqt	Time: 11:29:24
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: TMB03	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TMB03)	
Initial Displacement: 0.5552 m	Static Water Column Height: 7.772 m
Total Well Penetration Depth: 7. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 37.57 m/day	Le = 1.38 m

WELL TEST ANALYSIS	
Data Set: _\TMB03(b)_RisingHead1_Butler.aqt	Time: 11:34:15
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: TMB03	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TMB03)	
Initial Displacement: 0.2332 m	Static Water Column Height: 7.772 m
Total Well Penetration Depth: 7. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 27.75 m/day	Le = 1.202 m

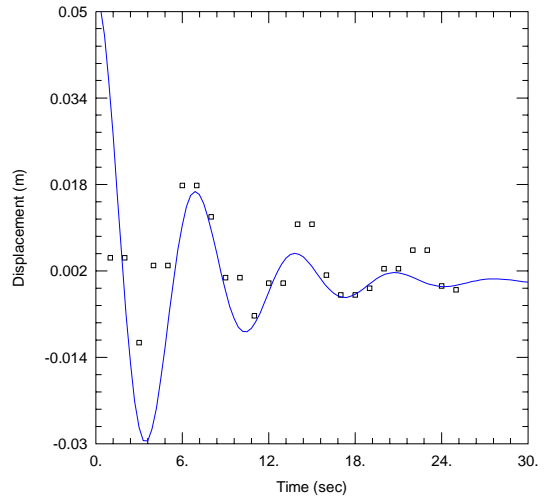
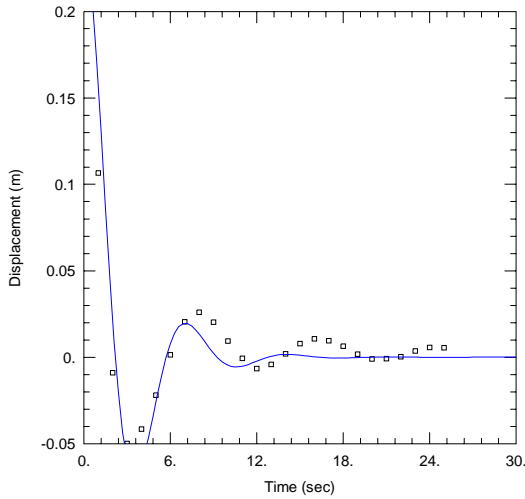


WELL TEST ANALYSIS	
Data Set: _\TMB03(c)_FallingHead2_Butler.aqt	Time: 11:37:04
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: TMB03	
Test Date: 14/03/2011	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TMB03)	
Initial Displacement: 0.9194 m	Static Water Column Height: 7.772 m
Total Well Penetration Depth: 7. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 47.14 m/day	Le = 0.3802 m



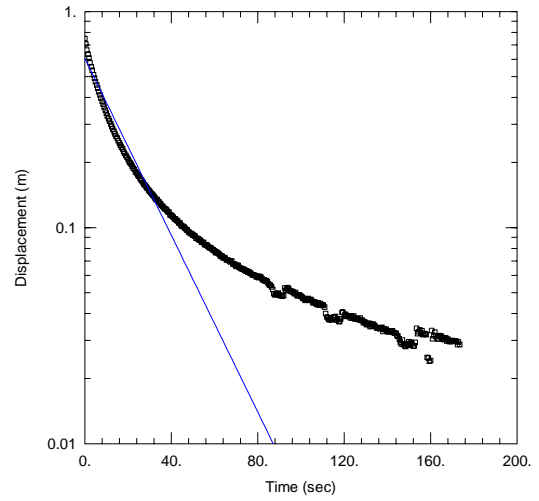
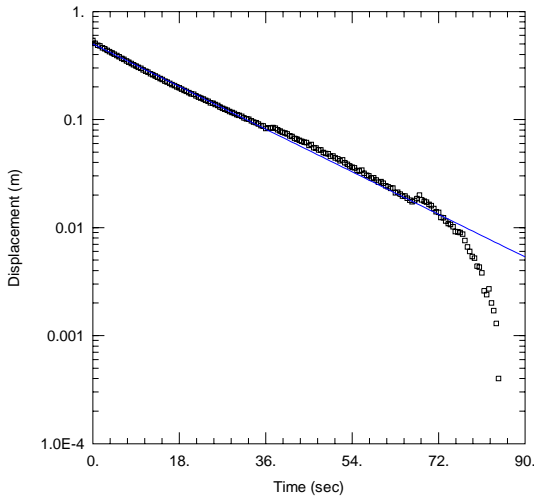
WELL TEST ANALYSIS	
Data Set: _\WMB01(a)_FallingHead1_BouwerRice.agt	Time: 11:51:42
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: WMB01	
Test Date: 15/03/2011	
AQUIFER DATA	
Saturated Thickness: 3. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (WMB01)	
Initial Displacement: 0.27 m	Static Water Column Height: 4.772 m
Total Well Penetration Depth: 3. m	Screen Length: 3. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 59.14 m/day	Le = 9.259 m

WELL TEST ANALYSIS	
Data Set: _\WMB01(b)_RisingHead1_BouwerRice.agt	Time: 11:55:18
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: WMB01	
Test Date: 15/03/2011	
AQUIFER DATA	
Saturated Thickness: 3. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (WMB01)	
Initial Displacement: 0.06 m	Static Water Column Height: 4.772 m
Total Well Penetration Depth: 3. m	Screen Length: 3. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 128.4 m/day	Le = 13.17 m



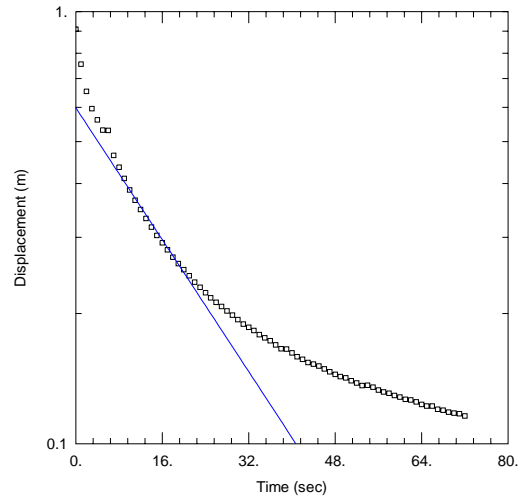
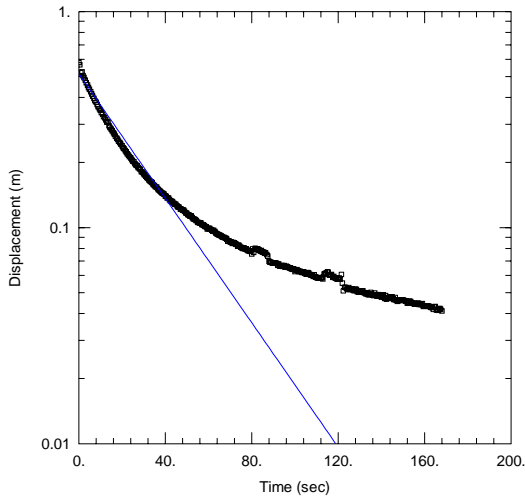
WELL TEST ANALYSIS	
Data Set: _\WMB01(c)_FallingHead2_BouwerRice.agt	Time: 11:57:22
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: WMB01	
Test Date: 15/03/2011	
AQUIFER DATA	
Saturated Thickness: 3. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (WMB01)	
Initial Displacement: 0.24 m	Static Water Column Height: 4.772 m
Total Well Penetration Depth: 3. m	Screen Length: 3. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 61.99 m/day	Le = 10.68 m

WELL TEST ANALYSIS	
Data Set: _\WMB01(d)_RisingHead2_BouwerRice.agt	Time: 12:00:10
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: WMB01	
Test Date: 15/03/2011	
AQUIFER DATA	
Saturated Thickness: 3. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (WMB01)	
Initial Displacement: 0.053 m	Static Water Column Height: 4.772 m
Total Well Penetration Depth: 3. m	Screen Length: 3. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 122.6 m/day	Le = 11.48 m



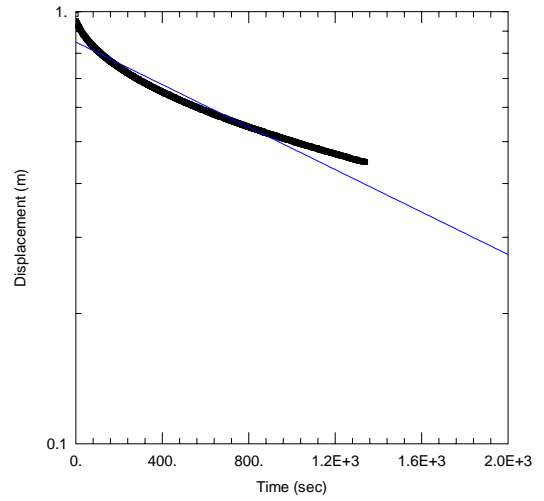
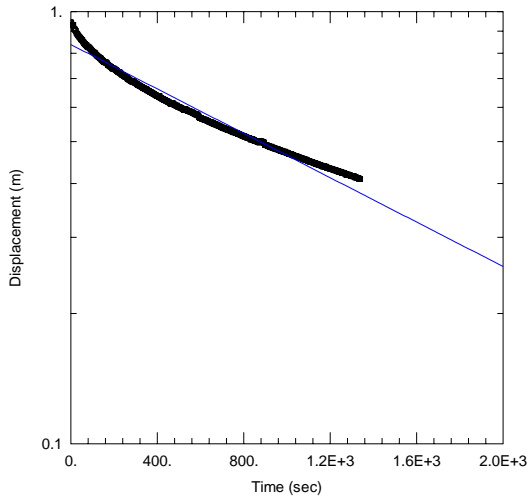
WELL TEST ANALYSIS	
Data Set: _\WMB02(a)_FallingHead1_BouwerRice.agt	Time: 12:05:49
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: WMB02	
Test Date: 15/03/2011	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (WMB02)	
Initial Displacement: 0.54 m	Static Water Column Height: 16.09 m
Total Well Penetration Depth: 8. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 1.046 m/day	y0 = 0.5015 m

WELL TEST ANALYSIS	
Data Set: _\WMB02(b)_RisingHead1_BouwerRice.agt	Time: 12:16:21
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: WMB02	
Test Date: 15/03/2011	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (WMB02)	
Initial Displacement: 0.75 m	Static Water Column Height: 16.09 m
Total Well Penetration Depth: 8. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.9767 m/day	y0 = 0.6074 m



WELL TEST ANALYSIS	
Data Set: _\WMB02(c)_FallingHead2_BouwerRice.agt	Time: 12:15:06
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: WMB02	
Test Date: 15/03/2011	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (WMB02)	
Initial Displacement: 0.58 m	Static Water Column Height: 16.09 m
Total Well Penetration Depth: 8. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.6877 m/day	y0 = 0.5152 m

WELL TEST ANALYSIS	
Data Set: _\WMB02(d)_RisingHead2_BouwerRice.agt	Time: 12:18:20
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: WMB02	
Test Date: 15/03/2011	
AQUIFER DATA	
Saturated Thickness: 8. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (WMB02)	
Initial Displacement: 0.91 m	Static Water Column Height: 16.09 m
Total Well Penetration Depth: 8. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.9111 m/day	y0 = 0.5988 m



WELL TEST ANALYSIS

Data Set: _\WMB03(a)_FallingHead1_BouwerRice.agt
 Date: 03/31/11 Time: 12:23:34

PROJECT INFORMATION

Company: Parsons Brinckerhoff
 Client: AGL Limited
 Project: 2123229A
 Location: Gloucester
 Test Well: WMB03
 Test Date: 15/03/2011

AQUIFER DATA

Saturated Thickness: 3. m Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (WMB03)

Initial Displacement: 0.946 m Static Water Column Height: 28.89 m
 Total Well Penetration Depth: 3. m Screen Length: 2. m
 Casing Radius: 0.025 m Well Radius: 0.07 m

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice
 K = 0.02972 m/day $y_0 = 0.8385$ m

WELL TEST ANALYSIS

Data Set: _\WMB03(c)_FallingHead2_BouwerRice.agt
 Date: 03/31/11 Time: 12:28:52

PROJECT INFORMATION

Company: Parsons Brinckerhoff
 Client: AGL Limited
 Project: 2123229A
 Location: Gloucester
 Test Well: WMB03
 Test Date: 15/03/2011

AQUIFER DATA

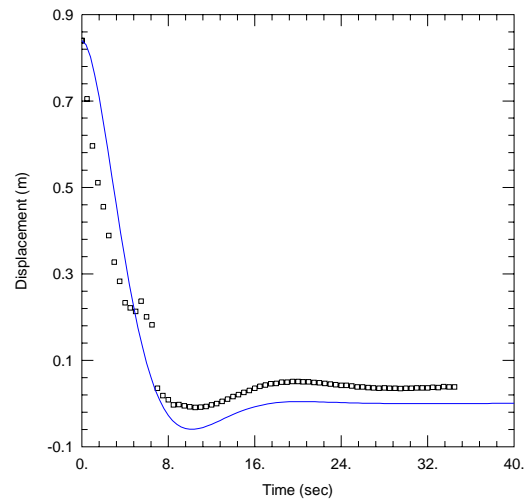
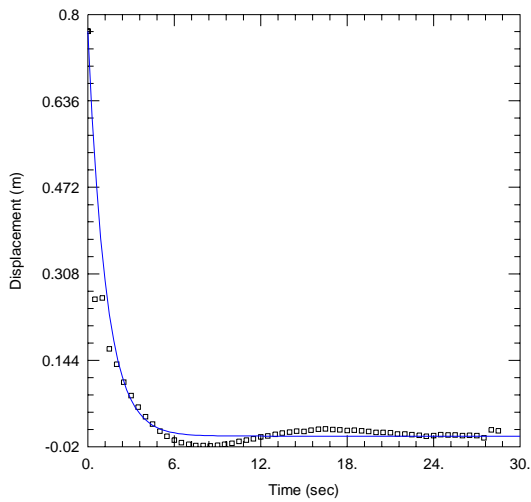
Saturated Thickness: 3. m Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (WMB03)

Initial Displacement: 0.9857 m Static Water Column Height: 28.89 m
 Total Well Penetration Depth: 3. m Screen Length: 2. m
 Casing Radius: 0.025 m Well Radius: 0.07 m

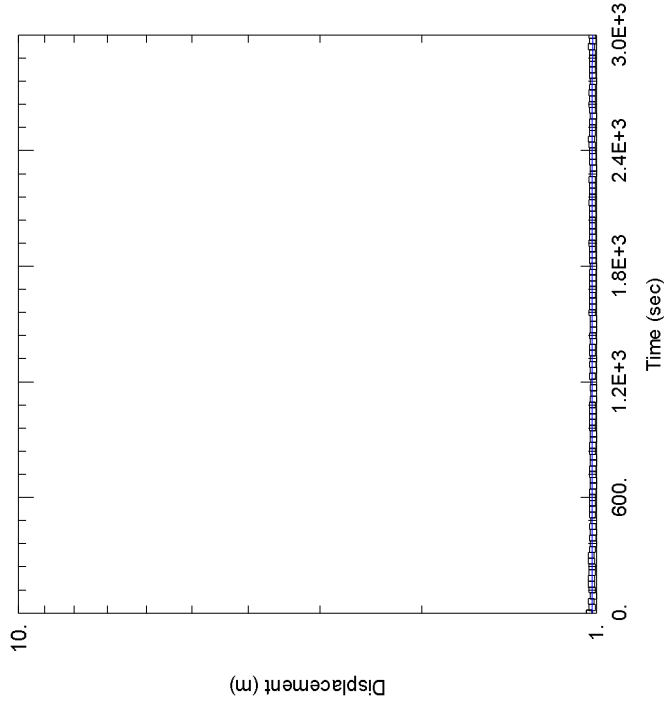
SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice
 K = 0.02844 m/day $y_0 = 0.8495$ m

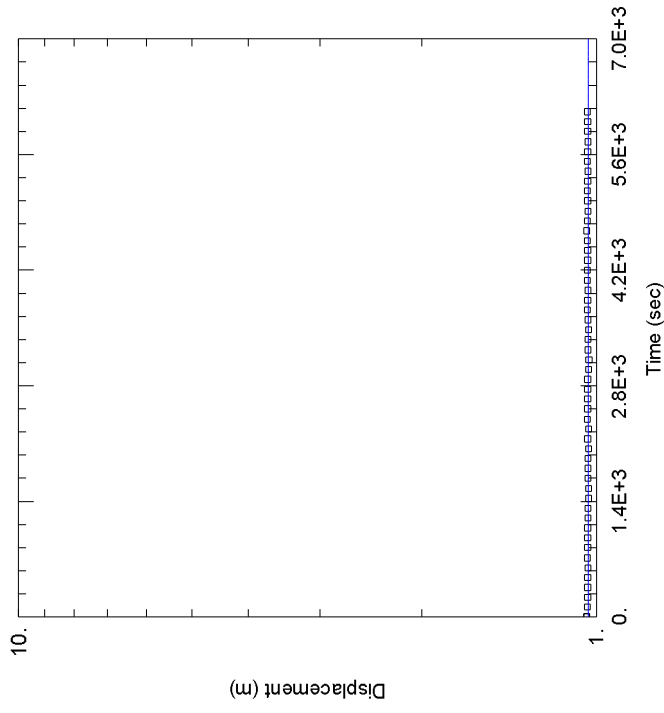


WELL TEST ANALYSIS	
Data Set: _\WMB04(c)_FallingHead2_Butler.aqt	Time: 13:19:04
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: WMB04	
Test Date: 15/03/2011	
AQUIFER DATA	
Saturated Thickness: 14. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (WMB04)	
Initial Displacement: 0.768 m	Static Water Column Height: 74. m
Total Well Penetration Depth: 14. m	Screen Length: 12. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 13.64 m/day	Le = 0.1 m

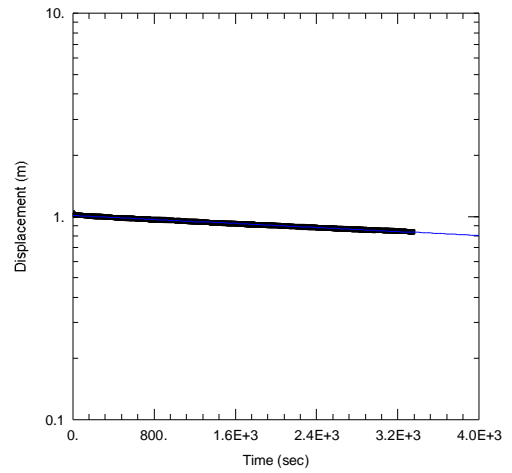
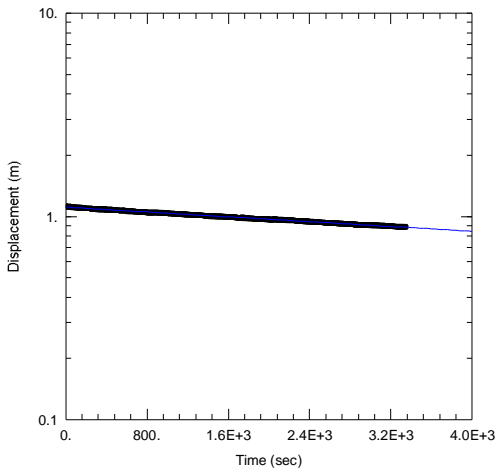
WELL TEST ANALYSIS	
Data Set: _\WMB04(d)_RisingHead2_Butler.aqt	Time: 13:12:50
Date: 03/31/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: WMB04	
Test Date: 15/03/2011	
AQUIFER DATA	
Saturated Thickness: 14. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (WMB04)	
Initial Displacement: 0.8399 m	Static Water Column Height: 74. m
Total Well Penetration Depth: 14. m	Screen Length: 12. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Butler
K = 5.084 m/day	Le = 60.26 m



<p>WELL TEST ANALYSIS</p> <p>Data Set: <u>...S5MB01(a)_FallingHead1_BouwerRice.adt</u> Date: <u>08/18/11</u> Time: <u>10:55:58</u></p>	
<p>PROJECT INFORMATION</p> <p>Company: <u>Parsons Brinckerhoff</u> Client: <u>AGL Limited</u> Project: <u>2123229A</u> Location: <u>Gloucester</u> Test Well: <u>S5MB01</u> Test Date: <u>9/03/11</u></p>	
<p>AQUIFER DATA</p> <p>Saturated Thickness: <u>8</u> m Anisotropy Ratio (Kz/Kt): <u>0.1</u></p>	
<p>WELL DATA (S5MB01)</p> <p>Initial Displacement: <u>1.027</u> m Static Water Column Height: <u>43.5</u> m Total Well Penetration Depth: <u>58</u> m Screen Length: <u>6</u> m Casing Radius: <u>0.025</u> m Well Radius: <u>0.07</u> m</p>	
<p>SOLUTION</p> <p>Aquifer Model: <u>Confined</u> Solution Method: <u>Bouwer-Rice</u> K = <u>3.658E-6</u> m/day y0 = <u>1.014</u> m</p>	

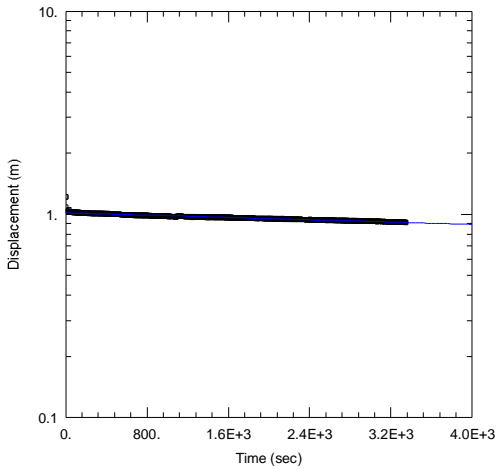


<p>WELL TEST ANALYSIS</p> <p>Data Set: <u>...S5MB01(b)_RisingHead1_BouwerRice.adt</u> Date: <u>08/18/11</u> Time: <u>10:56:39</u></p>	
<p>PROJECT INFORMATION</p> <p>Company: <u>Parsons Brinckerhoff</u> Client: <u>AGL Limited</u> Project: <u>2123229A</u> Location: <u>Gloucester</u> Test Well: <u>S5MB01</u> Test Date: <u>9/03/11</u></p>	
<p>AQUIFER DATA</p> <p>Saturated Thickness: <u>8</u> m Anisotropy Ratio (Kz/Kt): <u>0.1</u></p>	
<p>WELL DATA (S5MB01)</p> <p>Initial Displacement: <u>1.037</u> m Static Water Column Height: <u>43.5</u> m Total Well Penetration Depth: <u>58</u> m Screen Length: <u>6</u> m Casing Radius: <u>0.025</u> m Well Radius: <u>0.07</u> m</p>	
<p>SOLUTION</p> <p>Aquifer Model: <u>Confined</u> Solution Method: <u>Bouwer-Rice</u> K = <u>3.624E-8</u> m/day y0 = <u>1.033</u> m</p>	

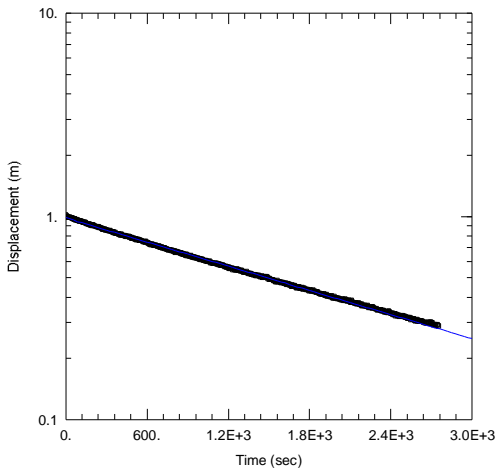


WELL TEST ANALYSIS	
Data Set: \.\S5MBO2(a)_FallingHead1_BouwerRice.aqt	Time: 10:21:19
Date: 07/29/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: S5MB02	
Test Date: 9/03/11	
AQUIFER DATA	
Saturated Thickness: 14. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (S5MB02)	
Initial Displacement: 1.12 m	Static Water Column Height: 102. m
Total Well Penetration Depth: 112. m	Screen Length: 12. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.001029 m/day	y0 = 1.108 m

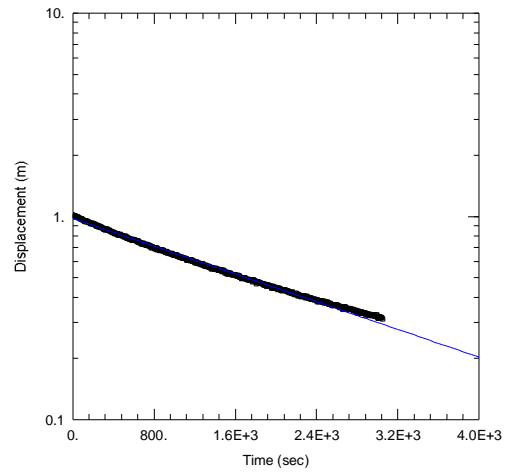
WELL TEST ANALYSIS	
Data Set: \.\S5MBO2(c)_FallingHead2_BouwerRice.aqt	Time: 10:22:41
Date: 07/29/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: S5MB02	
Test Date: 9/03/11	
AQUIFER DATA	
Saturated Thickness: 14. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (S5MB02)	
Initial Displacement: 1.039 m	Static Water Column Height: 102. m
Total Well Penetration Depth: 112. m	Screen Length: 12. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.0008565 m/day	y0 = 1.01 m



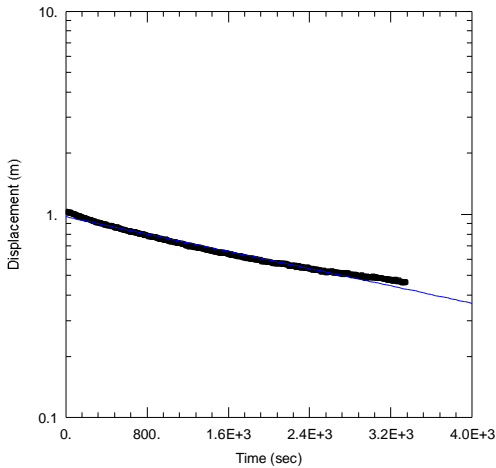
WELL TEST ANALYSIS	
Data Set: \.\S5MBO2(b)_risingHead1_BouwerRice.aqt	Time: 10:22:14
Date: 07/29/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Limited	
Project: 2123229A	
Location: Gloucester	
Test Well: S5MB02	
Test Date: 9/03/11	
AQUIFER DATA	
Saturated Thickness: 14. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (S5MB02)	
Initial Displacement: 1.223 m	Static Water Column Height: 102. m
Total Well Penetration Depth: 112. m	Screen Length: 12. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.0004968 m/day	y0 = 1.018 m



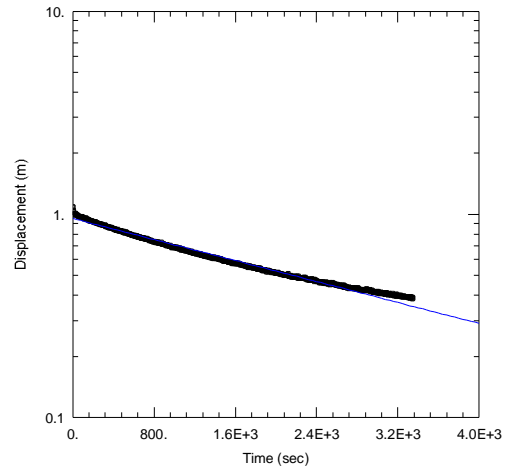
WELL TEST ANALYSIS	
Data Set: <u>\\.\S5MBO3(a)_FallingHead1_BouwerRice.aqt</u>	Time: <u>10:23:01</u>
Date: <u>07/29/11</u>	
PROJECT INFORMATION	
Company: <u>Parsons Brinckerhoff</u>	
Client: <u>AGL Limited</u>	
Project: <u>2123229A</u>	
Location: <u>Gloucester</u>	
Test Well: <u>S5MB03</u>	
Test Date: <u>9/03/11</u>	
AQUIFER DATA	
Saturated Thickness: <u>8. m</u>	Anisotropy Ratio (Kz/Kr): <u>0.1</u>
WELL DATA (S5MB03)	
Initial Displacement: <u>1.015 m</u>	Static Water Column Height: <u>146.2 m</u>
Total Well Penetration Depth: <u>162. m</u>	Screen Length: <u>6. m</u>
Casing Radius: <u>0.025 m</u>	Well Radius: <u>0.07 m</u>
SOLUTION	
Aquifer Model: <u>Confined</u>	Solution Method: <u>Bouwer-Rice</u>
K = <u>0.01337 m/day</u>	y0 = <u>0.9833 m</u>



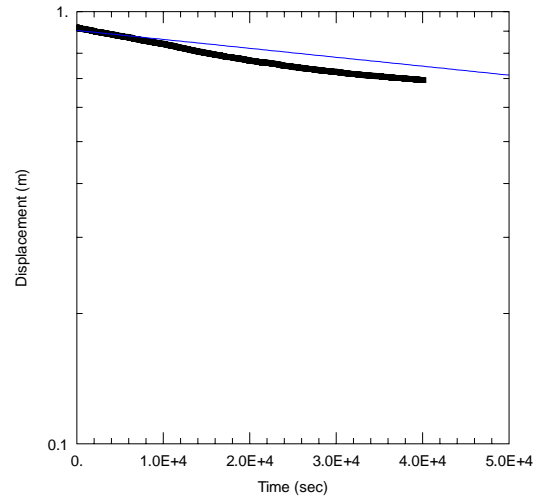
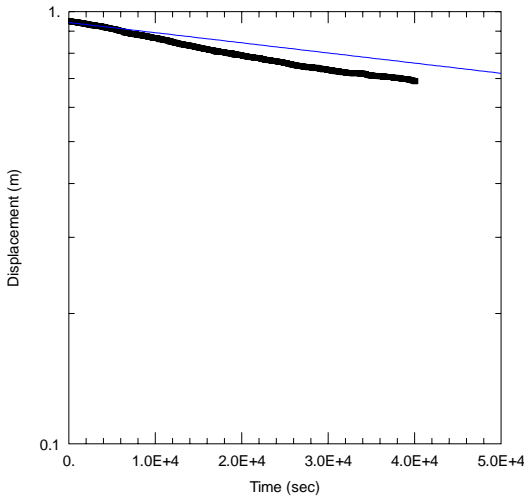
WELL TEST ANALYSIS	
Data Set: <u>\\.\S5MBO3(c)_FallingHead2_BouwerRice.aqt</u>	Time: <u>10:23:39</u>
Date: <u>07/29/11</u>	
PROJECT INFORMATION	
Company: <u>Parsons Brinckerhoff</u>	
Client: <u>AGL Limited</u>	
Project: <u>2123229A</u>	
Location: <u>Gloucester</u>	
Test Well: <u>S5MB03</u>	
Test Date: <u>9/03/11</u>	
AQUIFER DATA	
Saturated Thickness: <u>8. m</u>	Anisotropy Ratio (Kz/Kr): <u>0.1</u>
WELL DATA (S5MB03)	
Initial Displacement: <u>1.014 m</u>	Static Water Column Height: <u>146.2 m</u>
Total Well Penetration Depth: <u>162. m</u>	Screen Length: <u>6. m</u>
Casing Radius: <u>0.025 m</u>	Well Radius: <u>0.07 m</u>
SOLUTION	
Aquifer Model: <u>Confined</u>	Solution Method: <u>Bouwer-Rice</u>
K = <u>0.0115 m/day</u>	y0 = <u>0.9769 m</u>



WELL TEST ANALYSIS	
Data Set: <u>\\.\S5MBO3(b)_RisingHead1_BouwerRice.aqt</u>	Time: <u>10:23:20</u>
Date: <u>07/29/11</u>	
PROJECT INFORMATION	
Company: <u>Parsons Brinckerhoff</u>	
Client: <u>AGL Limited</u>	
Project: <u>2123229A</u>	
Location: <u>Gloucester</u>	
Test Well: <u>S5MB03</u>	
Test Date: <u>9/03/11</u>	
AQUIFER DATA	
Saturated Thickness: <u>8. m</u>	Anisotropy Ratio (Kz/Kr): <u>0.1</u>
WELL DATA (S5MB03)	
Initial Displacement: <u>1.036 m</u>	Static Water Column Height: <u>146.2 m</u>
Total Well Penetration Depth: <u>162. m</u>	Screen Length: <u>6. m</u>
Casing Radius: <u>0.025 m</u>	Well Radius: <u>0.07 m</u>
SOLUTION	
Aquifer Model: <u>Confined</u>	Solution Method: <u>Bouwer-Rice</u>
K = <u>0.007171 m/day</u>	y0 = <u>0.9741 m</u>

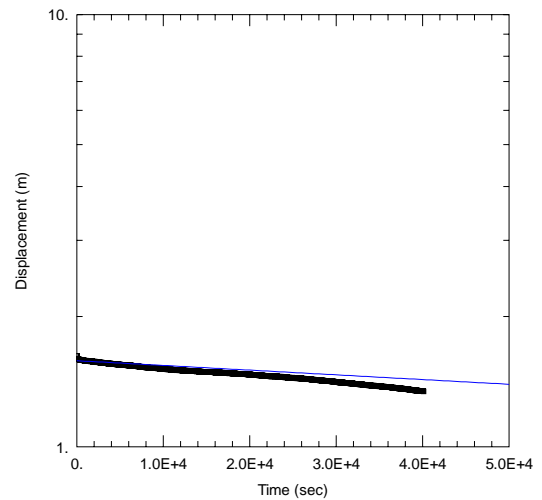
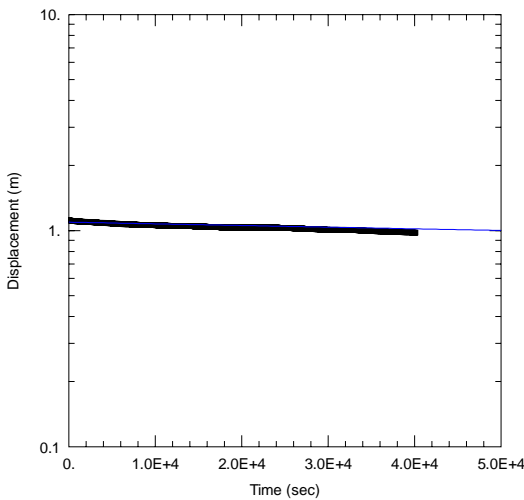


WELL TEST ANALYSIS	
Data Set: <u>\\.\S5MBO3(d)_RisingHead2_BouwerRice.aqt</u>	Time: <u>10:23:56</u>
Date: <u>07/29/11</u>	
PROJECT INFORMATION	
Company: <u>Parsons Brinckerhoff</u>	
Client: <u>AGL Limited</u>	
Project: <u>2123229A</u>	
Location: <u>Gloucester</u>	
Test Well: <u>S5MB03</u>	
Test Date: <u>9/03/11</u>	
AQUIFER DATA	
Saturated Thickness: <u>8. m</u>	Anisotropy Ratio (Kz/Kr): <u>0.1</u>
WELL DATA (S5MB03)	
Initial Displacement: <u>1.089 m</u>	Static Water Column Height: <u>146.2 m</u>
Total Well Penetration Depth: <u>162. m</u>	Screen Length: <u>6. m</u>
Casing Radius: <u>0.025 m</u>	Well Radius: <u>0.07 m</u>
SOLUTION	
Aquifer Model: <u>Confined</u>	Solution Method: <u>Bouwer-Rice</u>
K = <u>0.008697 m/day</u>	y0 = <u>0.9538 m</u>



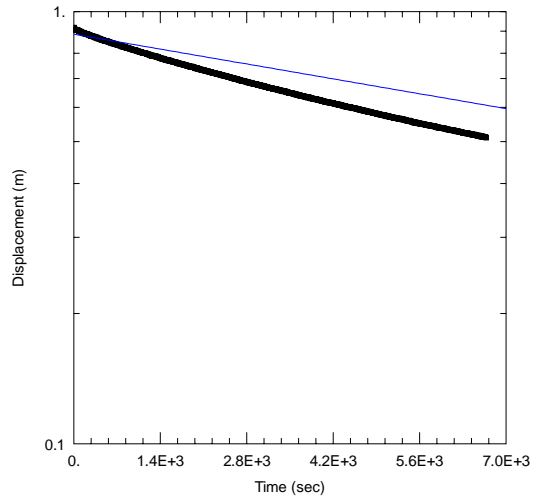
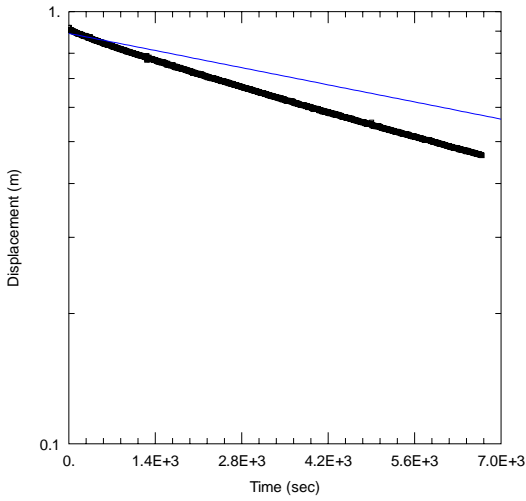
WELL TEST ANALYSIS	
Data Set: __TCMB02(a).aqt	Time: 10:43:12
Date: 11/29/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Energy Limited	
Project: 2114305A	
Location: Gloucester	
Test Well: TCMB02	
Test Date: 6/4/11	
AQUIFER DATA	
Saturated Thickness: 12. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TCMB02)	
Initial Displacement: 0.9505 m	Static Water Column Height: 173. m
Total Well Penetration Depth: 171. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.000159 m/day	y0 = 0.9428 m

WELL TEST ANALYSIS	
Data Set: __TCMB02(c).aqt	Time: 10:47:38
Date: 11/29/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Energy Limited	
Project: 2114305A	
Location: Gloucester	
Test Well: TCMB02	
Test Date: 6/4/11	
AQUIFER DATA	
Saturated Thickness: 12. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TCMB02)	
Initial Displacement: 0.9184 m	Static Water Column Height: 173. m
Total Well Penetration Depth: 171. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.0001399 m/day	y0 = 0.9038 m



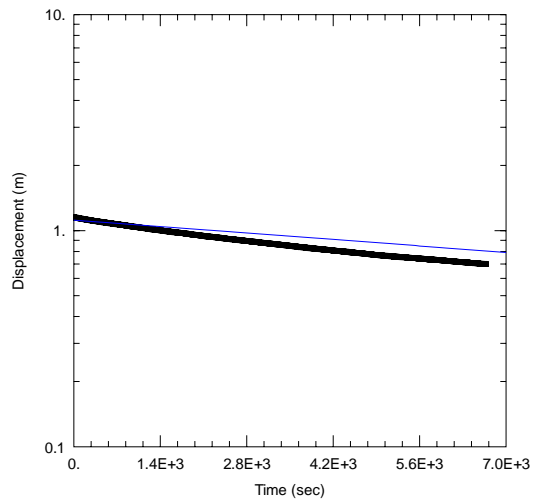
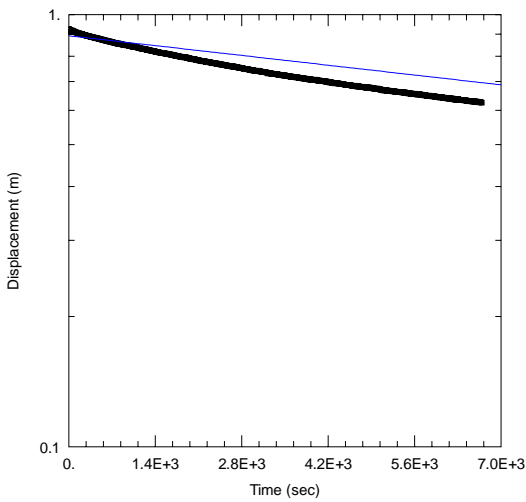
WELL TEST ANALYSIS	
Data Set: __TCMB02(b).aqt	Time: 10:45:40
Date: 11/29/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Energy Limited	
Project: 2114305A	
Location: Gloucester	
Test Well: TCMB02	
Test Date: 6/4/11	
AQUIFER DATA	
Saturated Thickness: 12. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TCMB02)	
Initial Displacement: 1.12 m	Static Water Column Height: 173. m
Total Well Penetration Depth: 171. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 5.162E-5 m/day	y0 = 1.093 m

WELL TEST ANALYSIS	
Data Set: __TCMB02(d).aqt	Time: 10:48:14
Date: 11/29/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Energy Limited	
Project: 2114305A	
Location: Gloucester	
Test Well: TCMB02	
Test Date: 6/4/11	
AQUIFER DATA	
Saturated Thickness: 12. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TCMB02)	
Initial Displacement: 1.623 m	Static Water Column Height: 173. m
Total Well Penetration Depth: 171. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 7.387E-5 m/day	y0 = 1.581 m



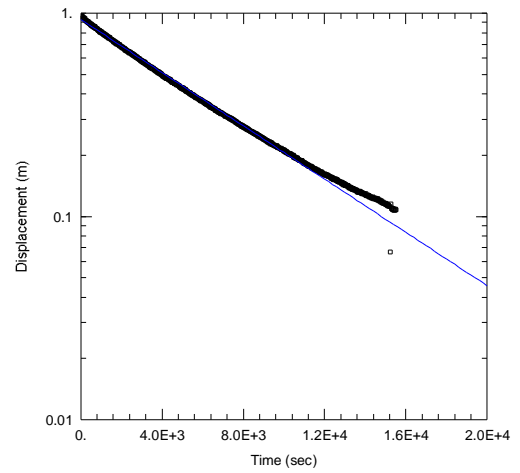
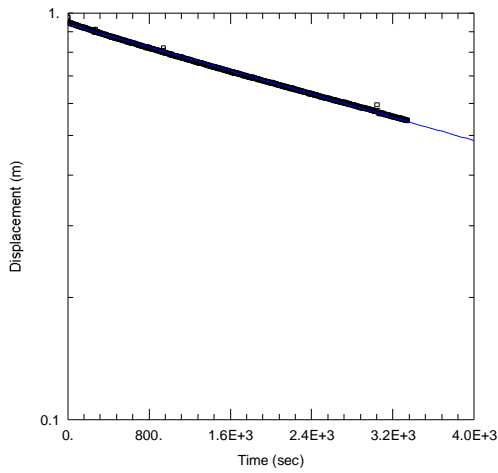
WELL TEST ANALYSIS	
Data Set: __TCMB03(a).aqt	Time: 10:48:48
Date: 11/29/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Energy Limited	
Project: 2114305A	
Location: Gloucester	
Test Well: TCMB03	
Test Date: 05/04/11	
AQUIFER DATA	
Saturated Thickness: 7. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TCMB03)	
Initial Displacement: 0.9173 m	Static Water Column Height: 256. m
Total Well Penetration Depth: 255. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.001986 m/day	y0 = 0.8899 m

WELL TEST ANALYSIS	
Data Set: __TCMB03(c).aqt	Time: 10:49:37
Date: 11/29/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Energy Limited	
Project: 2114305A	
Location: Gloucester	
Test Well: TCMB03	
Test Date: 05/04/11	
AQUIFER DATA	
Saturated Thickness: 7. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TCMB03)	
Initial Displacement: 0.9173 m	Static Water Column Height: 256. m
Total Well Penetration Depth: 255. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.001725 m/day	y0 = 0.886 m



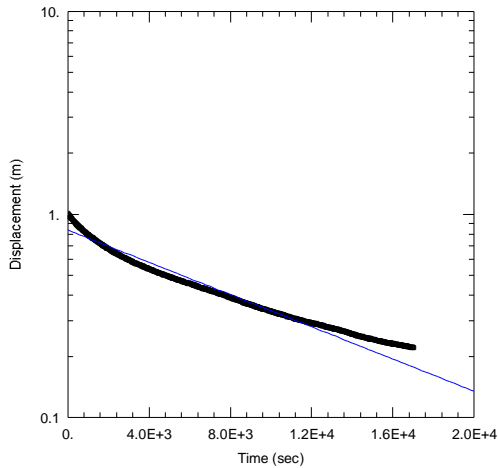
WELL TEST ANALYSIS	
Data Set: __TCMB03(b).aqt	Time: 10:49:12
Date: 11/29/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Energy Limited	
Project: 2114305A	
Location: Gloucester	
Test Well: TCMB03	
Test Date: 05/04/11	
AQUIFER DATA	
Saturated Thickness: 7. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TCMB03)	
Initial Displacement: 0.9241 m	Static Water Column Height: 256. m
Total Well Penetration Depth: 255. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.001136 m/day	y0 = 0.8926 m

WELL TEST ANALYSIS	
Data Set: __TCMB03(d).aqt	Time: 10:50:03
Date: 11/29/11	
PROJECT INFORMATION	
Company: Parsons Brinckerhoff	
Client: AGL Energy Limited	
Project: 2114305A	
Location: Gloucester	
Test Well: TCMB03	
Test Date: 05/04/11	
AQUIFER DATA	
Saturated Thickness: 7. m	Anisotropy Ratio (Kz/Kr): 0.1
WELL DATA (TCMB03)	
Initial Displacement: 1.152 m	Static Water Column Height: 256. m
Total Well Penetration Depth: 255. m	Screen Length: 6. m
Casing Radius: 0.025 m	Well Radius: 0.07 m
SOLUTION	
Aquifer Model: Confined	Solution Method: Bouwer-Rice
K = 0.0015 m/day	y0 = 1.119 m



WELL TEST ANALYSIS	
Data Set: <u>\\.\TCMB04(a)_Falling.aqt</u>	Time: <u>10:57:08</u>
Date: <u>07/25/11</u>	
PROJECT INFORMATION	
Company: <u>Parsons Brinckerhoff</u>	
Client: <u>AGL</u>	
Project: <u>2162406A</u>	
Location: <u>Gloucester</u>	
Test Well: <u>TCMB04</u>	
Test Date: <u>14/04/2011</u>	
AQUIFER DATA	
Saturated Thickness: <u>322.5</u> m	Anisotropy Ratio (Kz/Kr): <u>0.1</u>
WELL DATA (TCMB04)	
Initial Displacement: <u>0.9777</u> m	Static Water Column Height: <u>322.2</u> m
Total Well Penetration Depth: <u>320.5</u> m	Screen Length: <u>6</u> m
Casing Radius: <u>0.025</u> m	Well Radius: <u>0.48</u> m
SOLUTION	
Aquifer Model: <u>Confined</u>	Solution Method: <u>Bouwer-Rice</u>
K = <u>0.003068</u> m/day	y0 = <u>0.9398</u> m

WELL TEST ANALYSIS	
Data Set: <u>\\.\TCMB04(b)_Falling.aqt</u>	Time: <u>10:55:02</u>
Date: <u>07/25/11</u>	
PROJECT INFORMATION	
Company: <u>Parsons Brinckerhoff</u>	
Client: <u>AGL</u>	
Project: <u>2162406A</u>	
Location: <u>Gloucester</u>	
Test Well: <u>TCMB04</u>	
Test Date: <u>14/04/2011</u>	
AQUIFER DATA	
Saturated Thickness: <u>322.5</u> m	Anisotropy Ratio (Kz/Kr): <u>0.1</u>
WELL DATA (TCMB04)	
Initial Displacement: <u>0.9777</u> m	Static Water Column Height: <u>322.2</u> m
Total Well Penetration Depth: <u>320.5</u> m	Screen Length: <u>6</u> m
Casing Radius: <u>0.025</u> m	Well Radius: <u>0.48</u> m
SOLUTION	
Aquifer Model: <u>Confined</u>	Solution Method: <u>Bouwer-Rice</u>
K = <u>0.002803</u> m/day	y0 = <u>0.9321</u> m

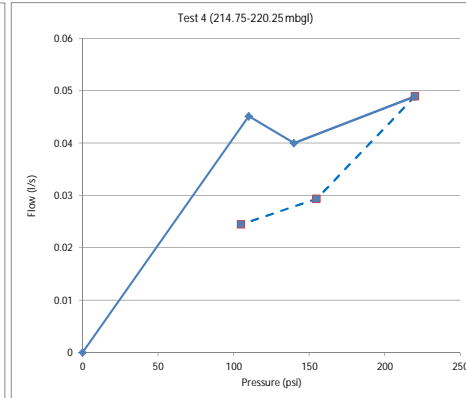
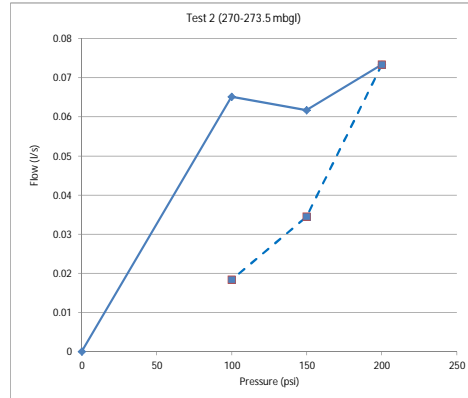
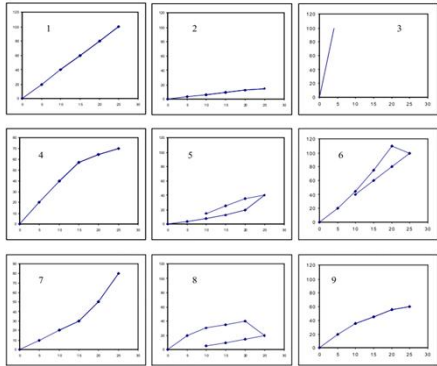


WELL TEST ANALYSIS	
Data Set: <u>\\.\TCMB04(b)_Rising.aqt</u>	Time: <u>10:59:09</u>
Date: <u>07/25/11</u>	
PROJECT INFORMATION	
Company: <u>Parsons Brinckerhoff</u>	
Client: <u>AGL</u>	
Project: <u>2162406A</u>	
Location: <u>Gloucester</u>	
Test Well: <u>TCMB04</u>	
Test Date: <u>14/04/2011</u>	
AQUIFER DATA	
Saturated Thickness: <u>322.5</u> m	Anisotropy Ratio (Kz/Kr): <u>0.1</u>
WELL DATA (TCMB04)	
Initial Displacement: <u>0.9777</u> m	Static Water Column Height: <u>322.2</u> m
Total Well Penetration Depth: <u>320.5</u> m	Screen Length: <u>6</u> m
Casing Radius: <u>0.025</u> m	Well Radius: <u>0.48</u> m
SOLUTION	
Aquifer Model: <u>Confined</u>	Solution Method: <u>Bouwer-Rice</u>
K = <u>0.001698</u> m/day	y0 = <u>0.8374</u> m

Appendix N

Packer test charts

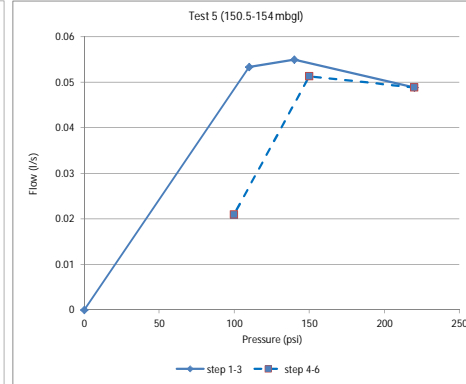
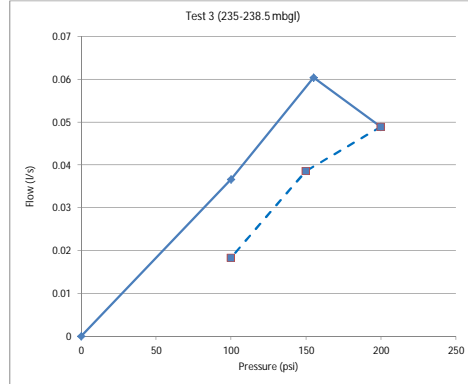
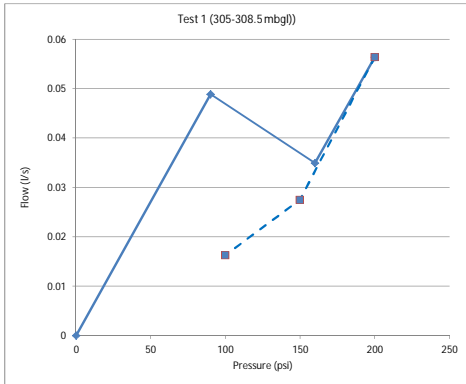
Typical flow vs pressure curves



5.1.3 Data Interpretation

The graphs in Figure 2 illustrate a selection of type curves, which are commonly observed. The following describes each curve. (Note that the recovery curve -reducing pressure curve- is indicated by a dashed line in the plots, otherwise the recovery curve is seen to mimic the ascending pressure curve).

1. Ideal result where flow is laminar, probably on clean fractures, discharge proportional to pressure head.
2. Tight fractures, impermeable material
3. Highly permeable, large open fractures. Water acceptance exceeds capacity of the test system and pressure recorded is due to friction in supply system.
4. Fairly high permeability with a decrease in flow with time due partially to a change from laminar to turbulent flow, as well as partial clogging of fractures with time.
5. Low permeability, but washing out of gouge material from the fractures, increasing the permeability.
6. Laminar flow, moderate permeability but with an increase in flow with pressure. Increasing packer pressure brings the flow back to a linear relationship with pressure, indicating increased flow was previous leakage past the packer.
7. Increase in permeability with increased pressure and the recovery curve follows the same path. This indicates that fractures have been opened up due to excess pressure (hydrofracturing).
8. Progressive decrease in permeability with pressure (and time) indicating incomplete blocking of the fractures by transported material.
9. Moderate permeability and flow rate is not linear. The down turned curve and similar recovery curve indicate that turbulent flow conditions exist beyond 15 bars.



— step 1-3 - - - step 4-6

Appendix O

Groundwater monitoring bore
hydrographs

Figure AO-1 Groundwater levels and rainfall TMB01

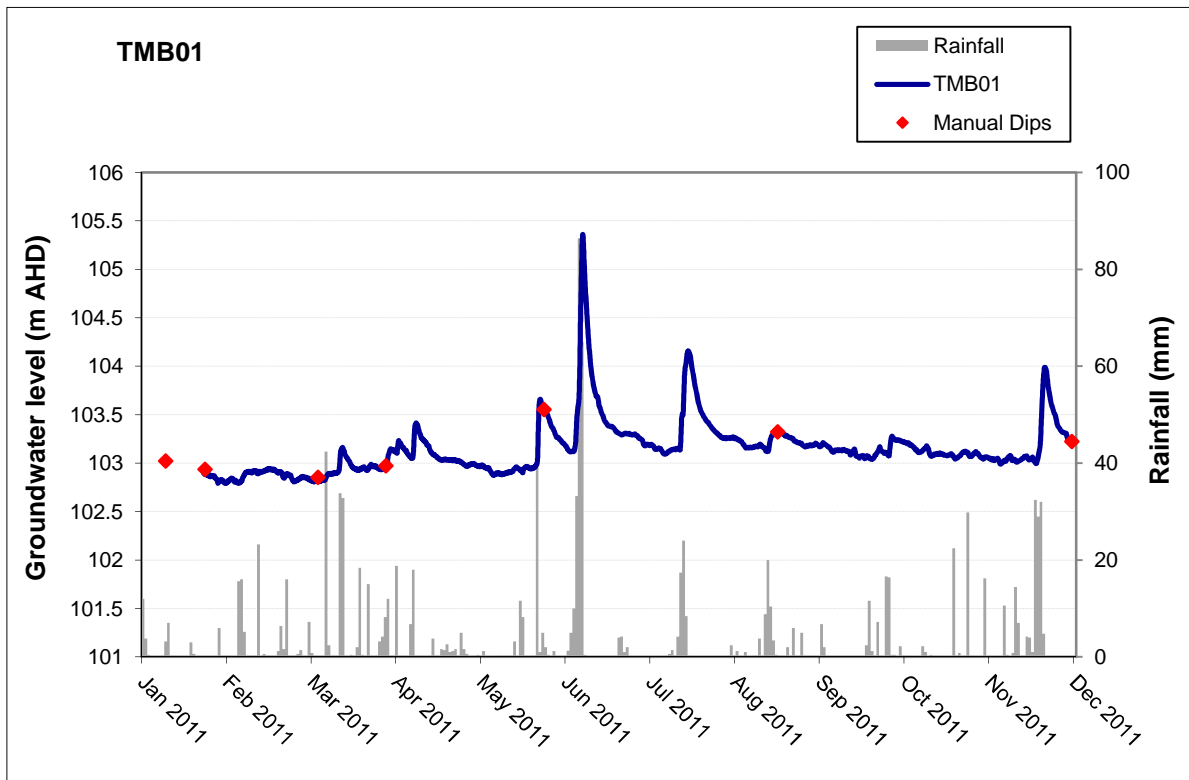


Figure AO-2 Groundwater levels and rainfall at TMB02



Figure AO-3 Groundwater levels and rainfall at TMB03

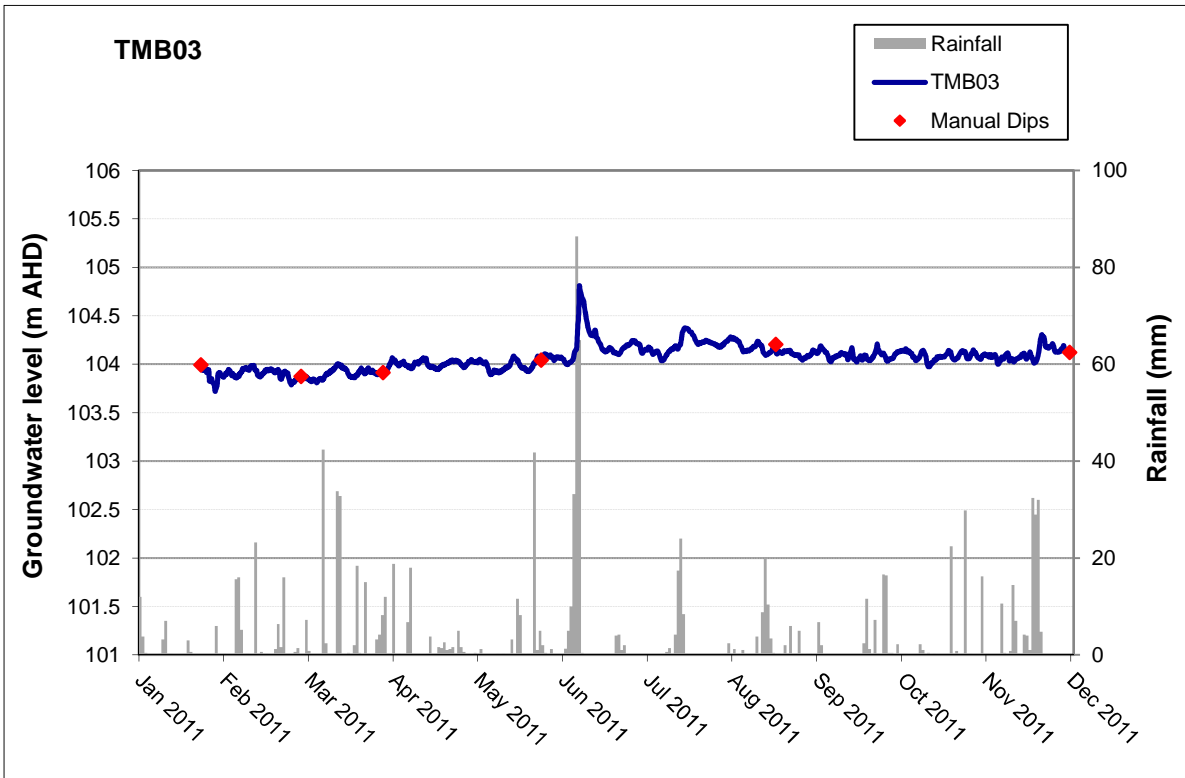


Figure AO-4 Groundwater levels and rainfall at AMB01

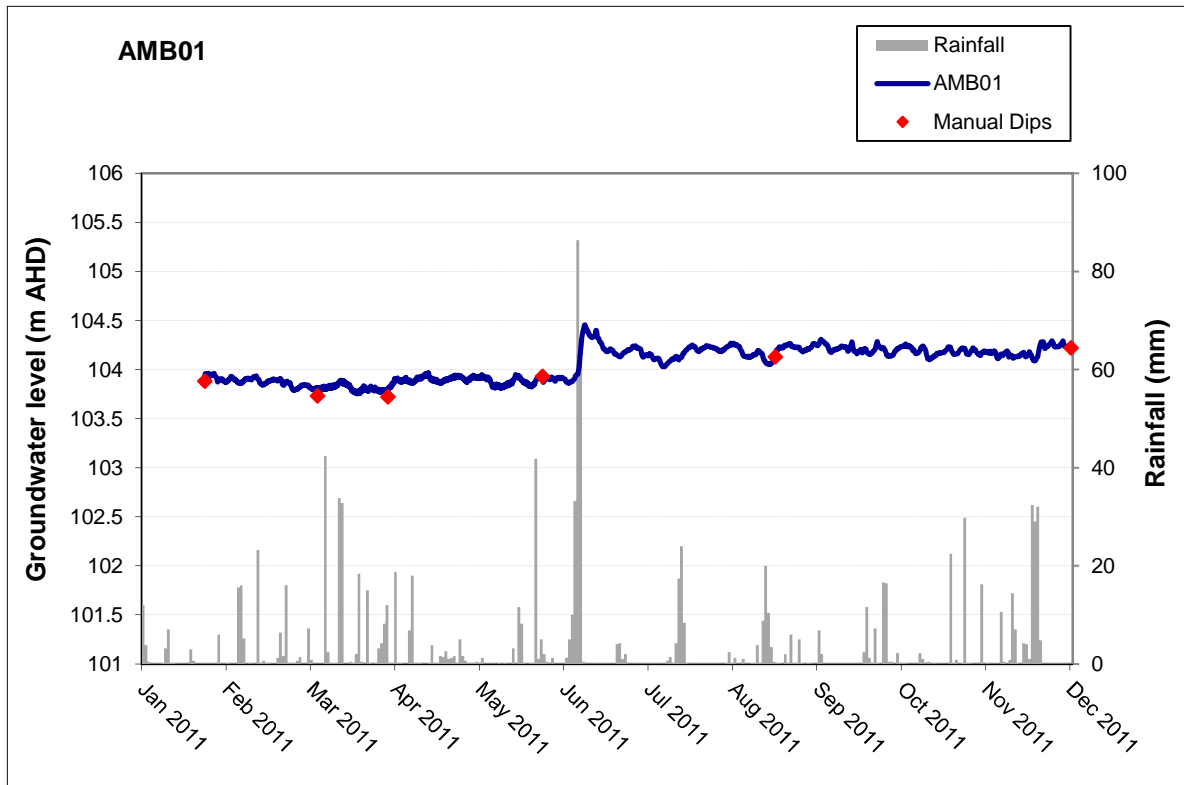


Figure AO-5 Groundwater levels and rainfall at AMB02

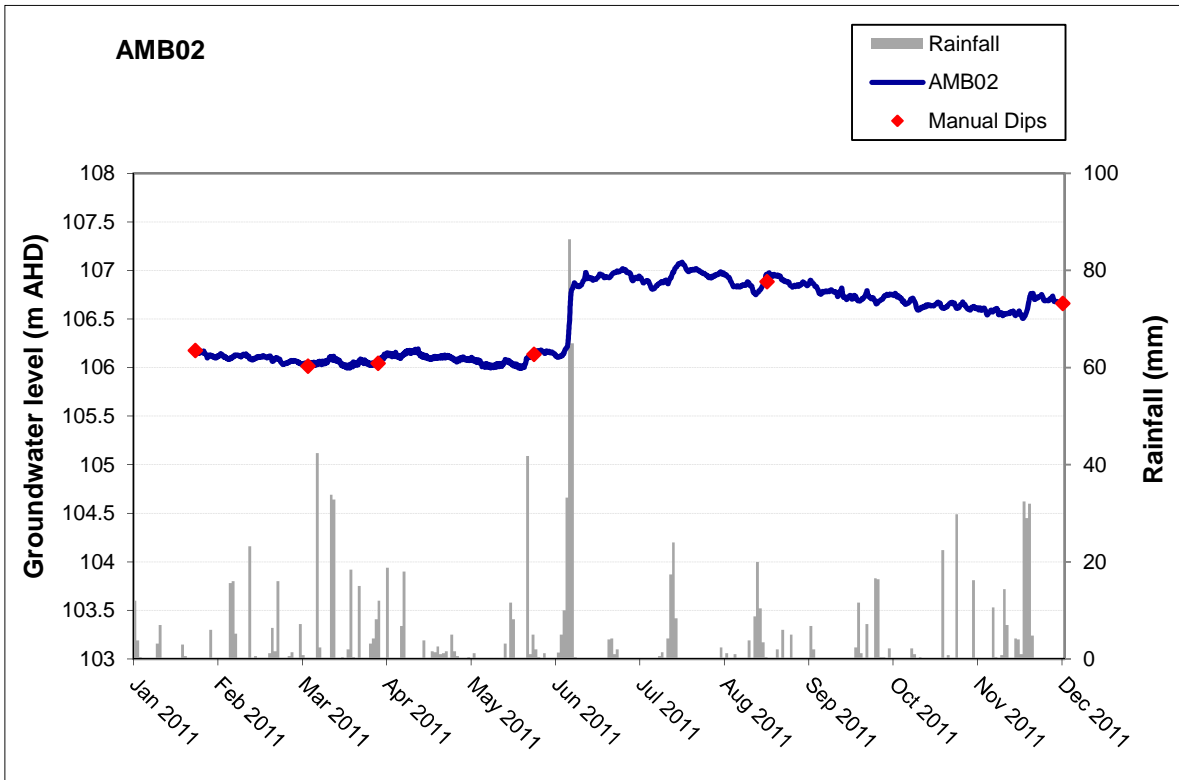


Figure AO-6 Groundwater levels and rainfall at S4MB01

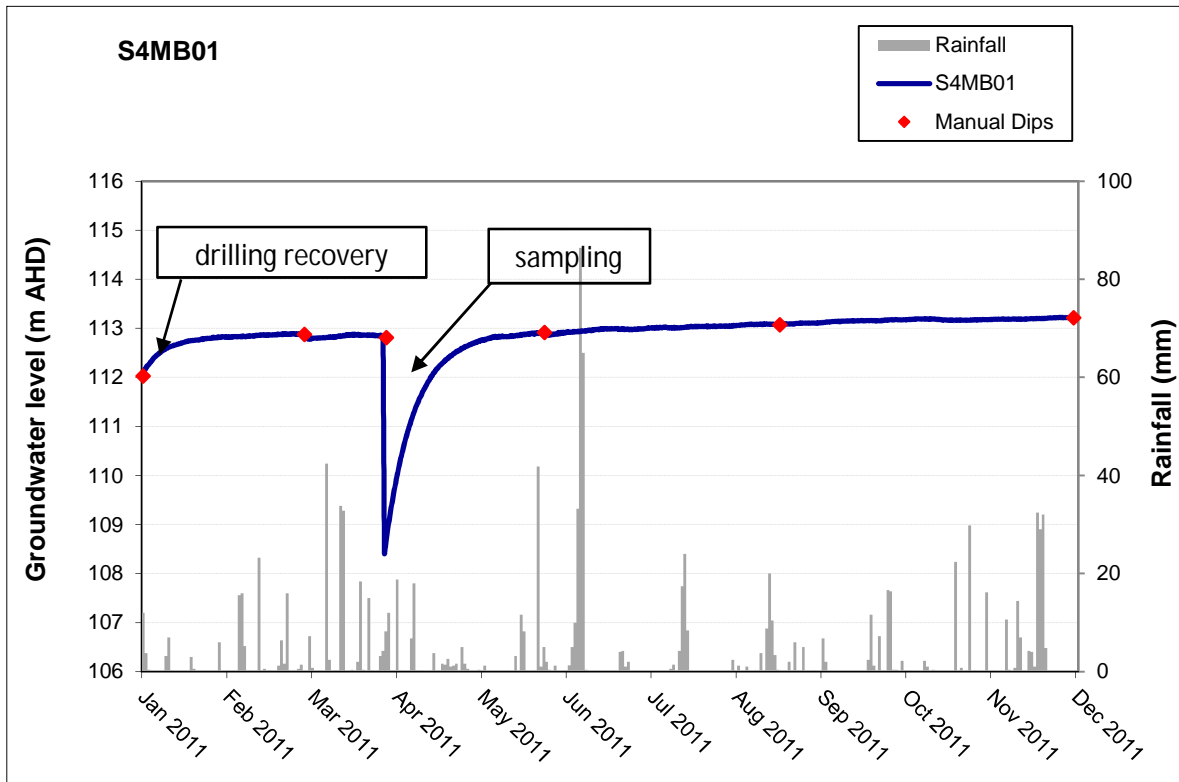


Figure AO-7 Groundwater levels and rainfall at S4MB02

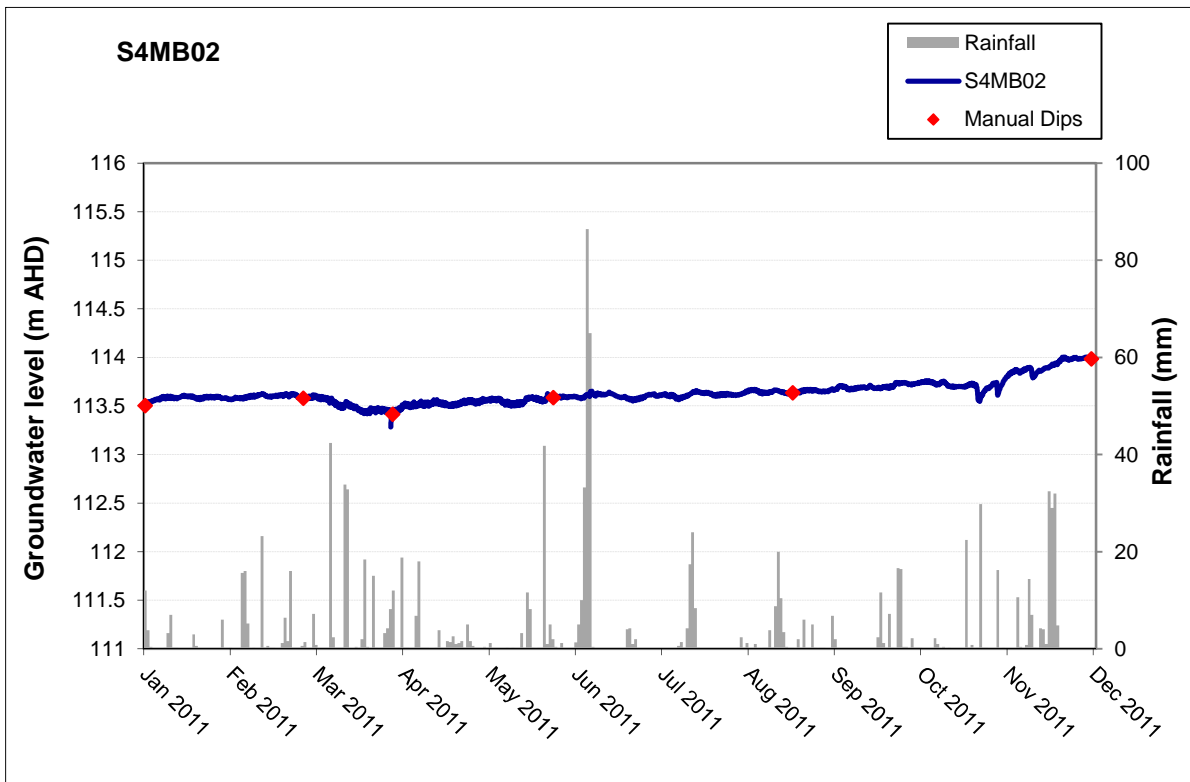


Figure AO-8 Groundwater levels and rainfall at S4MB03

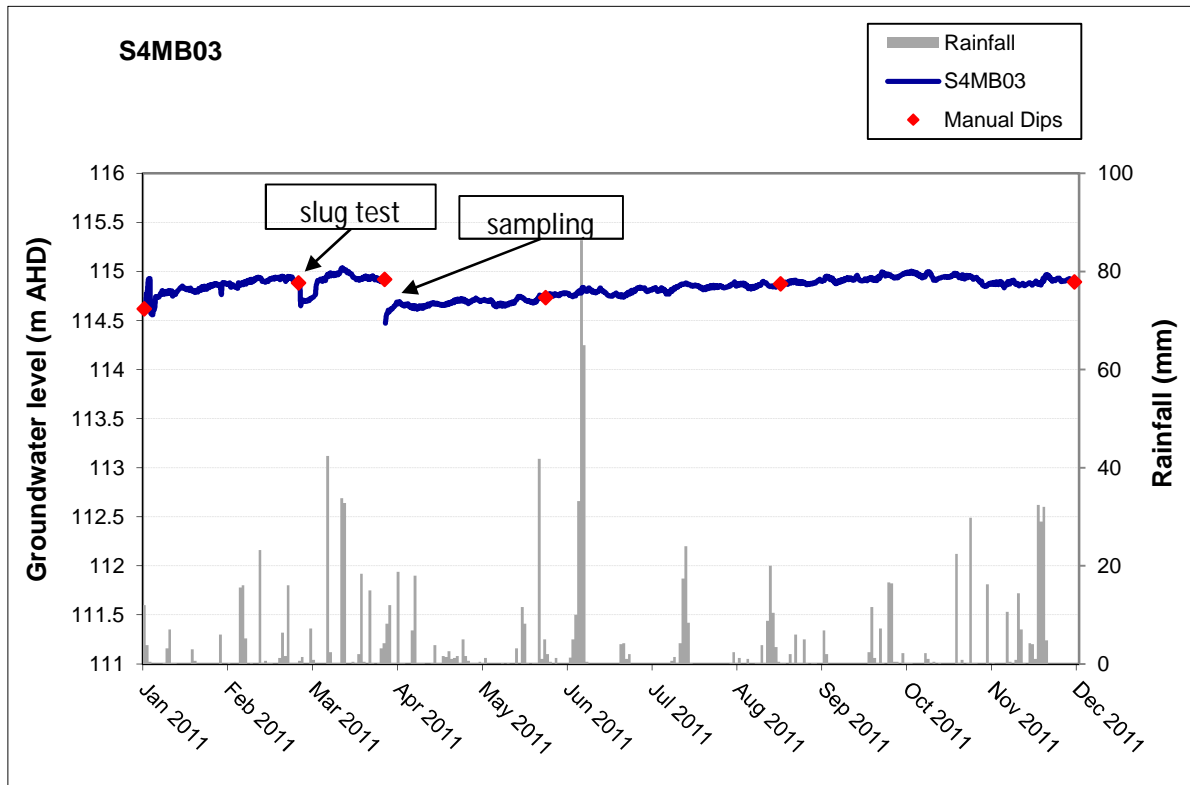


Figure AO-9 Groundwater levels and rainfall at S5MB01

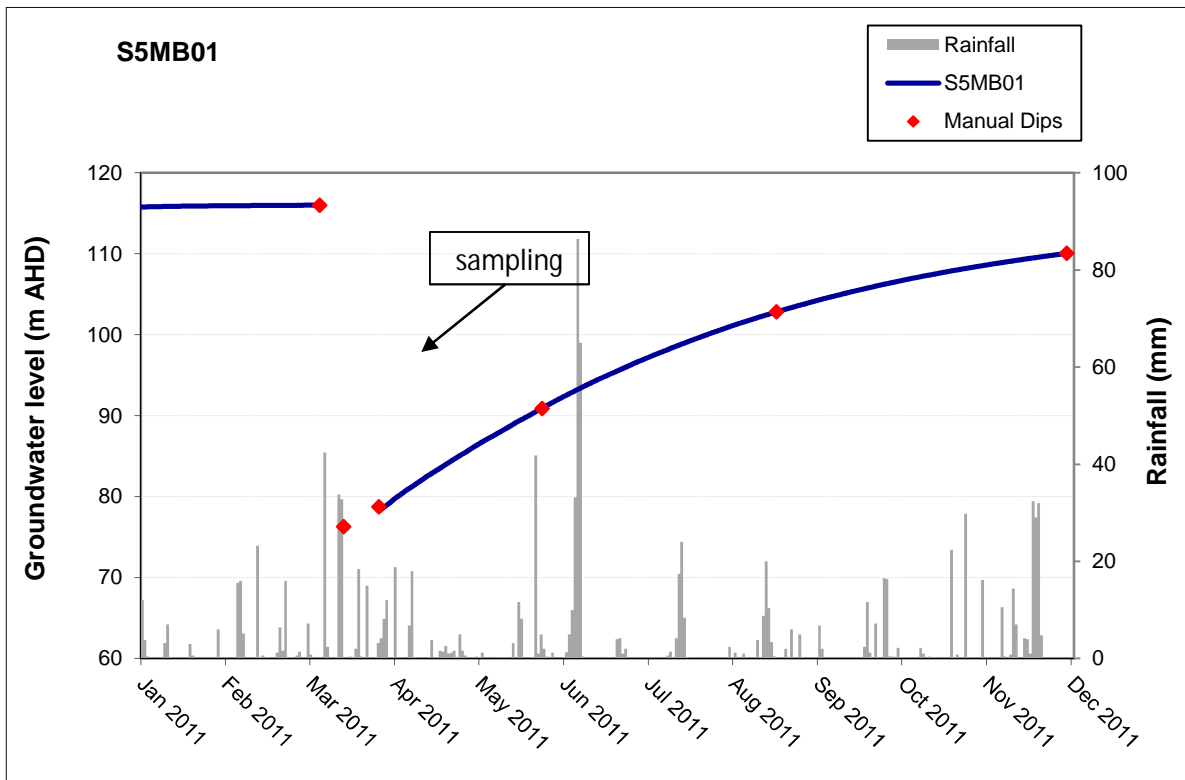


Figure AO-10 Groundwater levels and rainfall at S5MB02

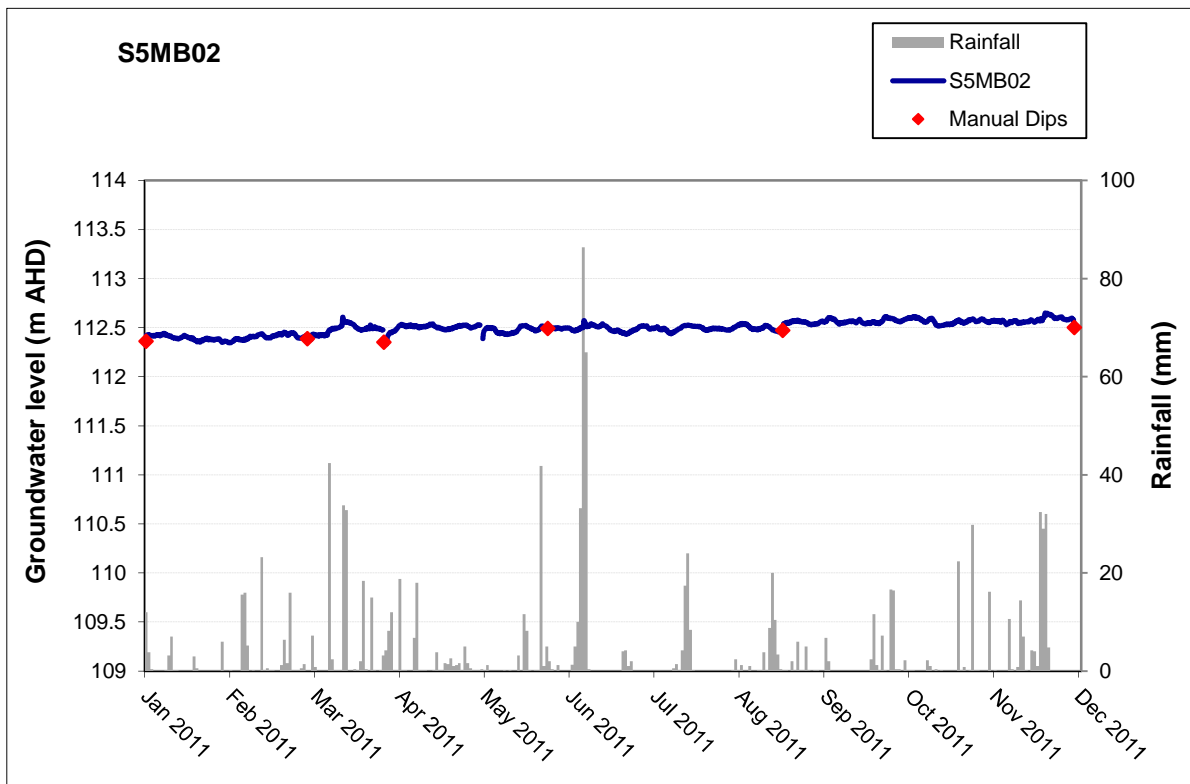


Figure AO-11 Groundwater levels and rainfall at S5MB03

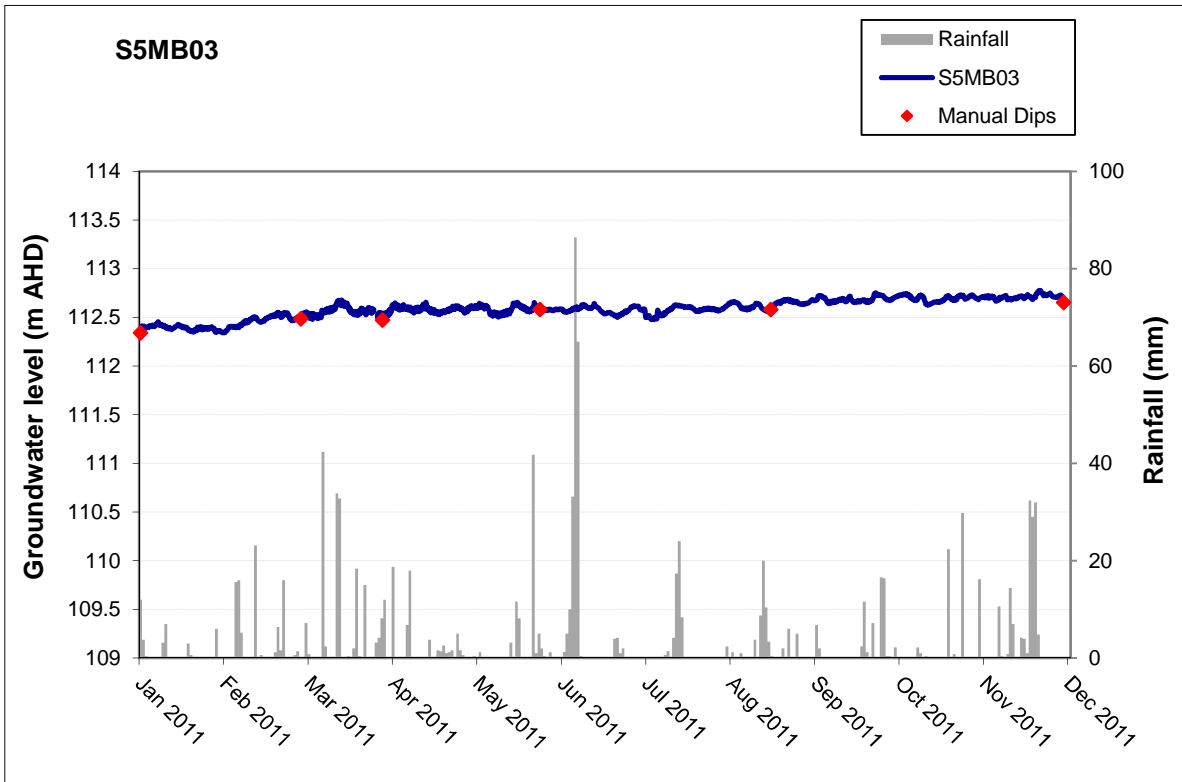


Figure AO-12 Groundwater levels and rainfall at WMB01

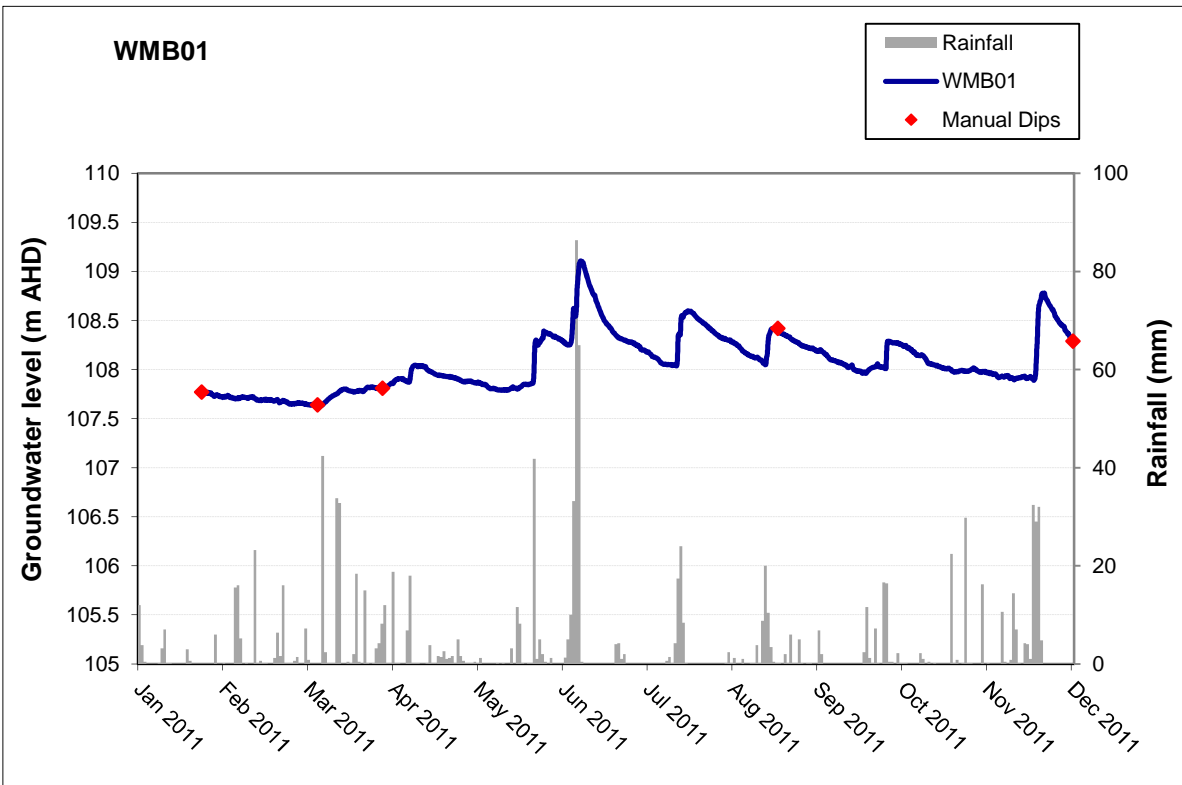


Figure AO-13 Groundwater levels and rainfall at WMB02

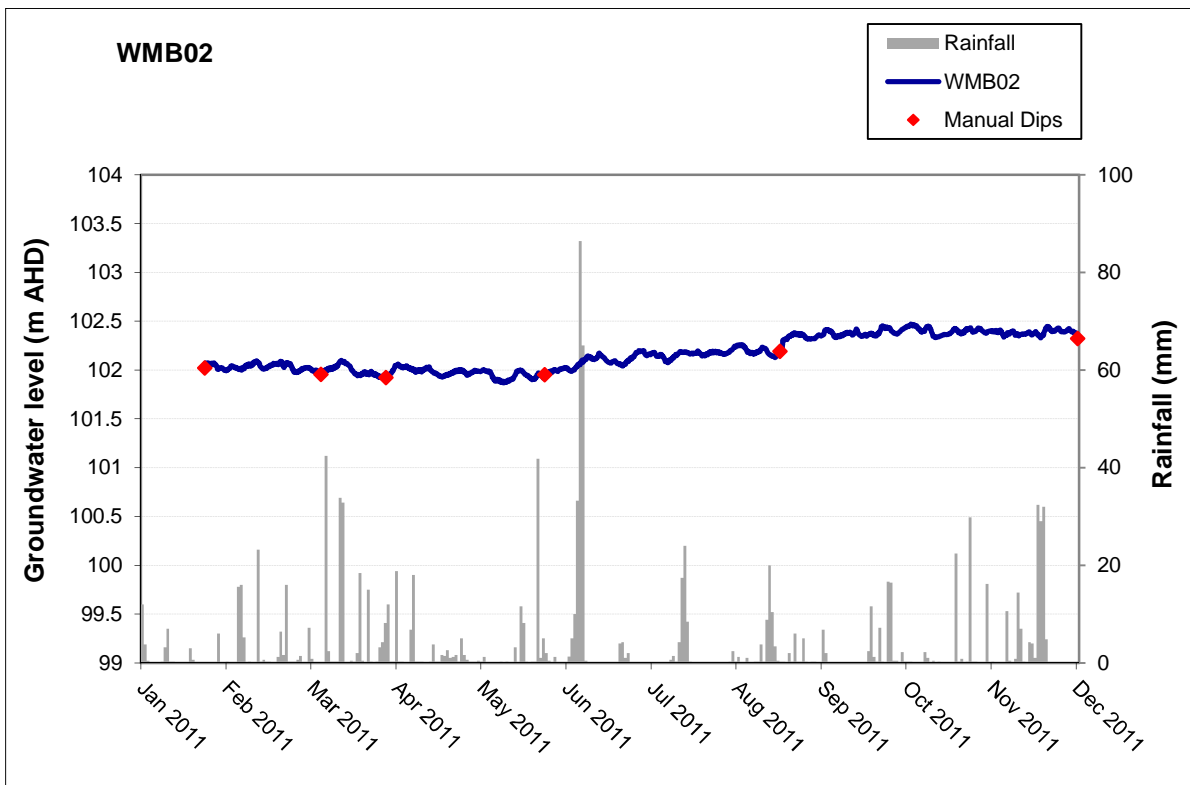


Figure AO-14 Groundwater levels and rainfall at WMB03

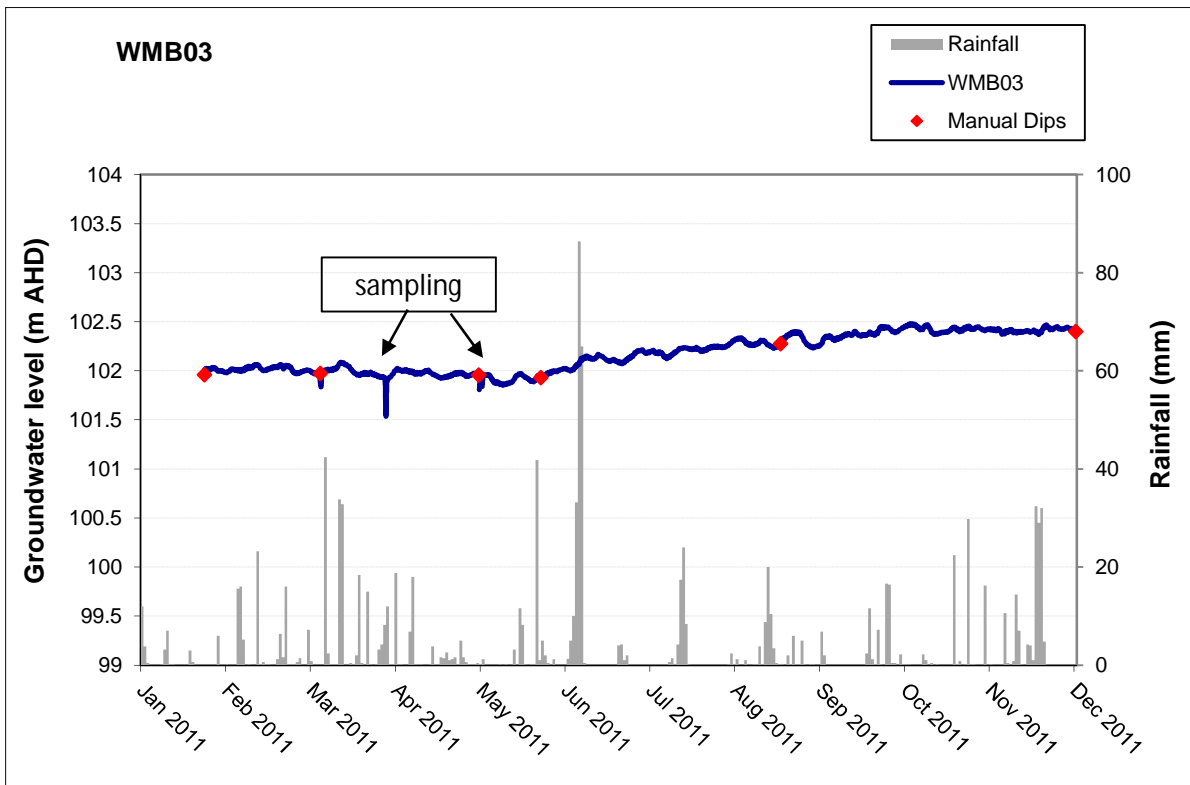


Figure AO-15 Groundwater levels and rainfall at WMB04

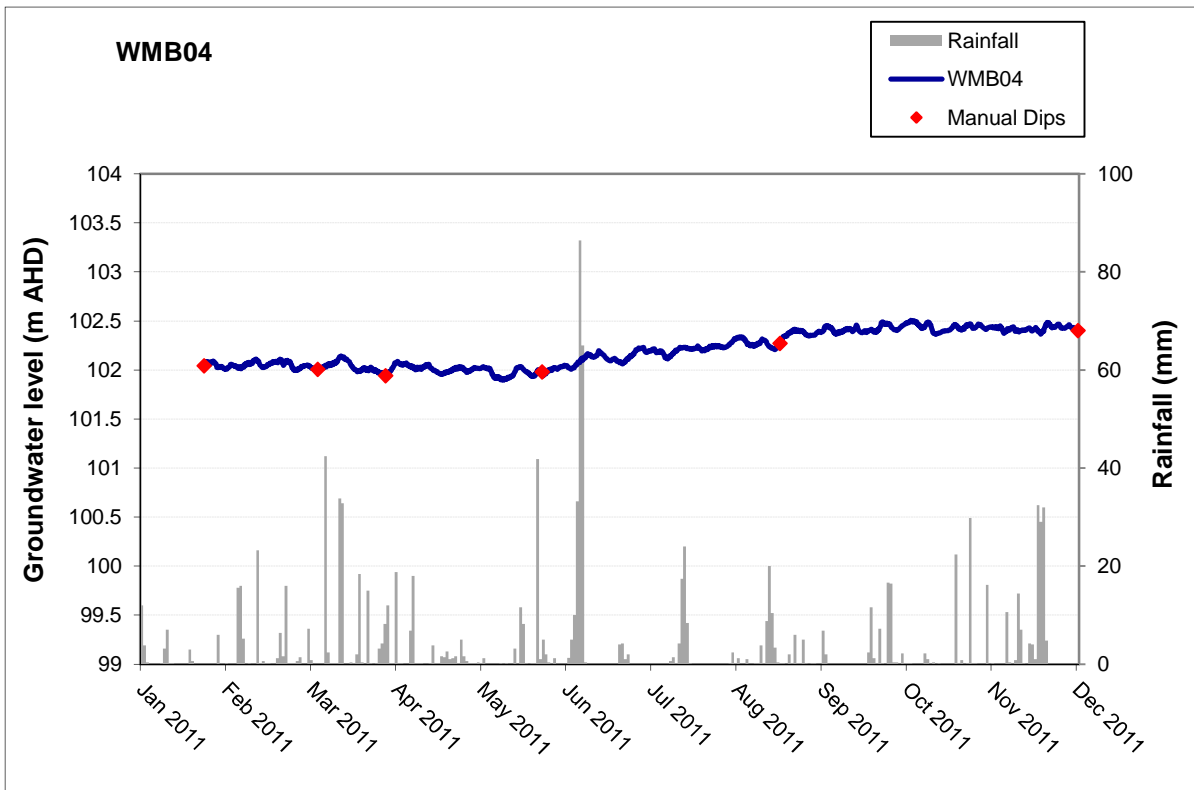


Figure AO-16 Groundwater levels and rainfall at RMB01

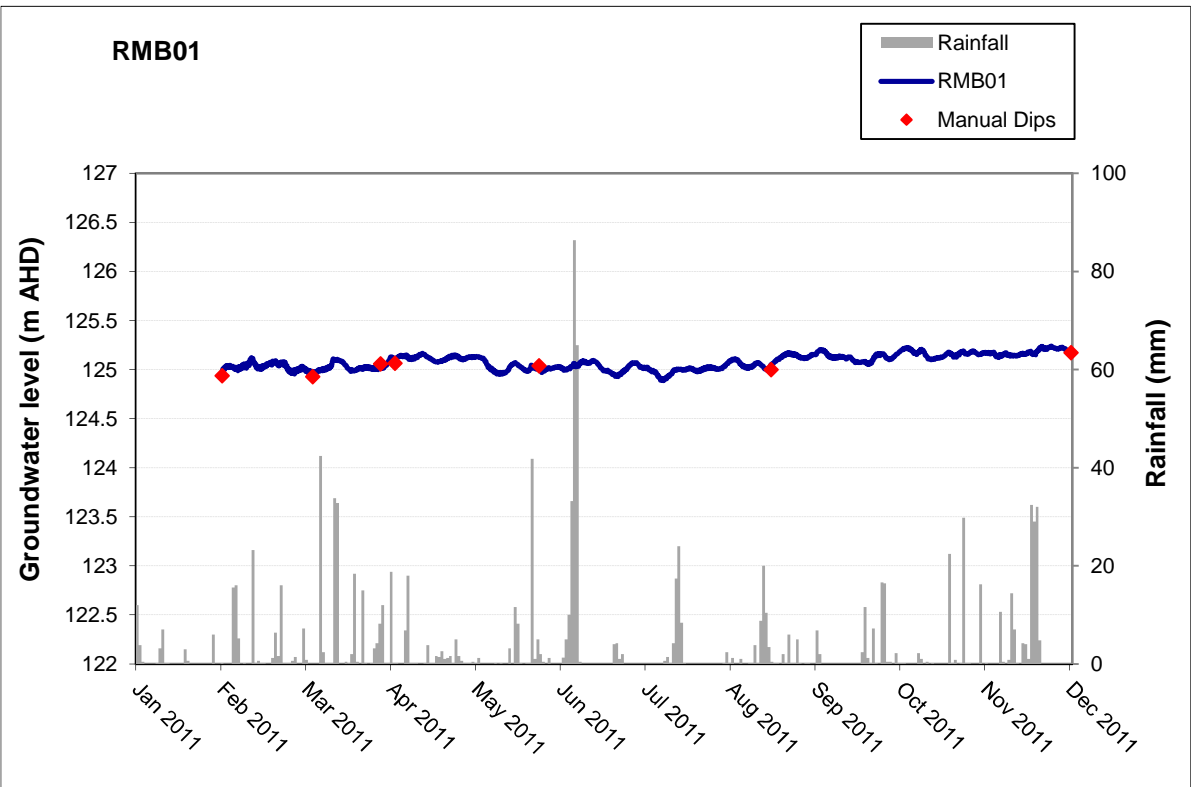


Figure AO-17 Groundwater levels and rainfall at RMB02

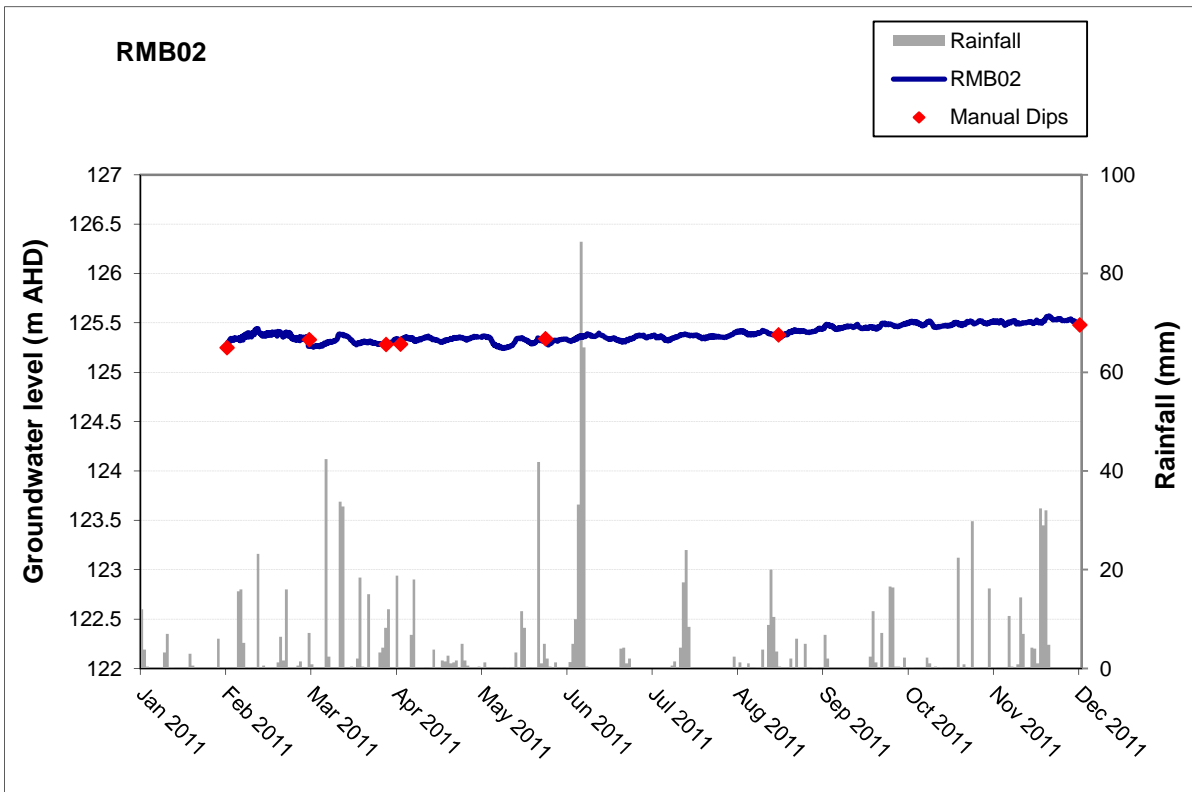


Figure AO-18 Groundwater levels and rainfall at BMB01

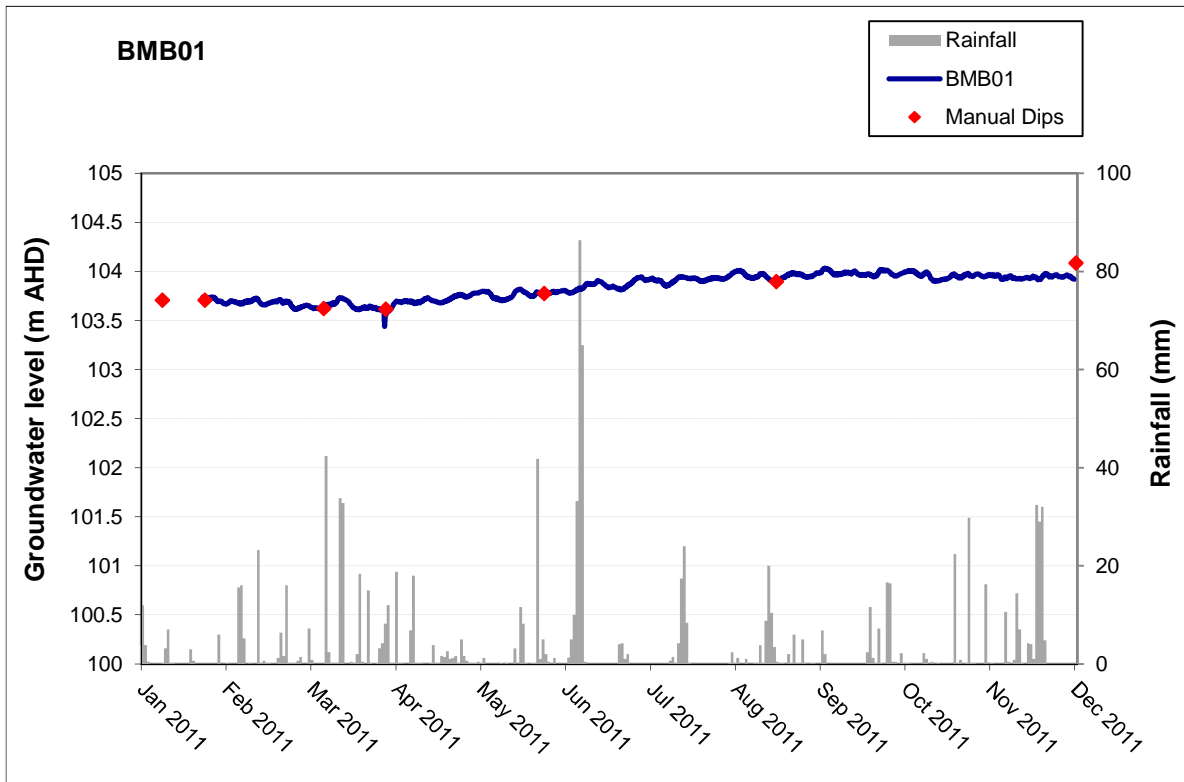


Figure AO-19 Groundwater levels and rainfall at BMB02

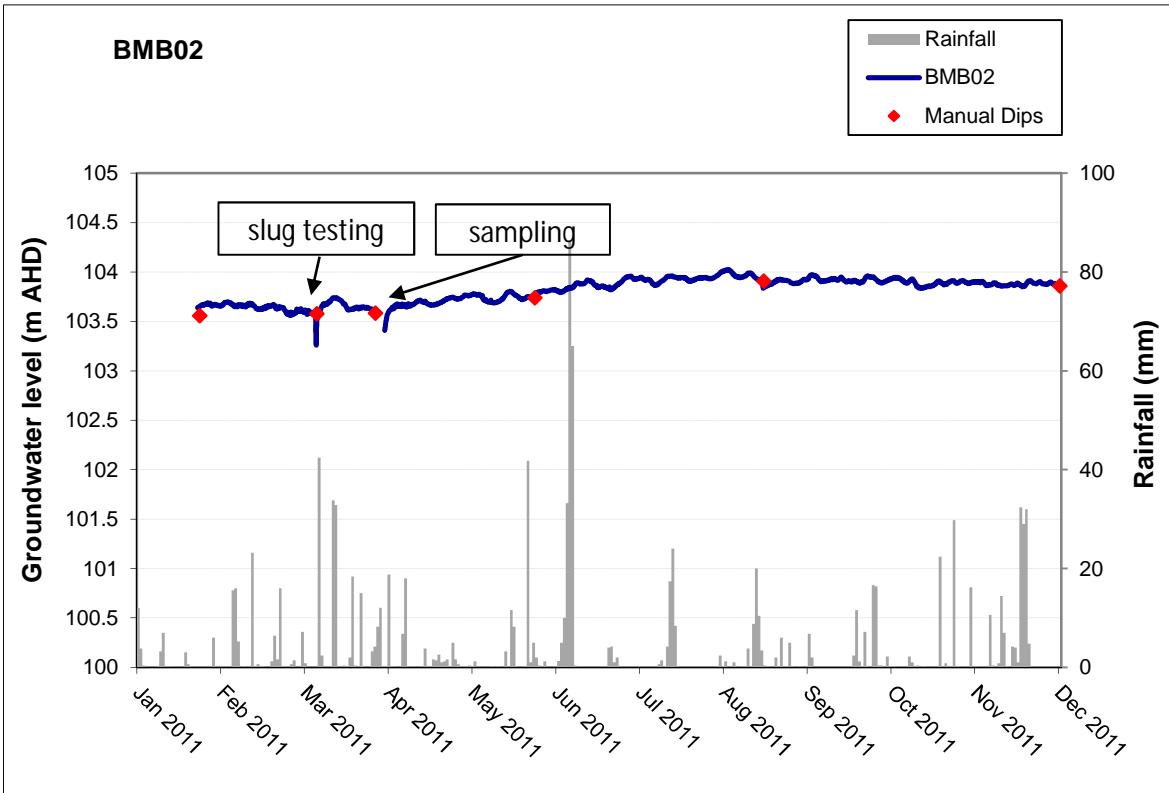


Figure AO-20 Groundwater levels and rainfall at TCMB02

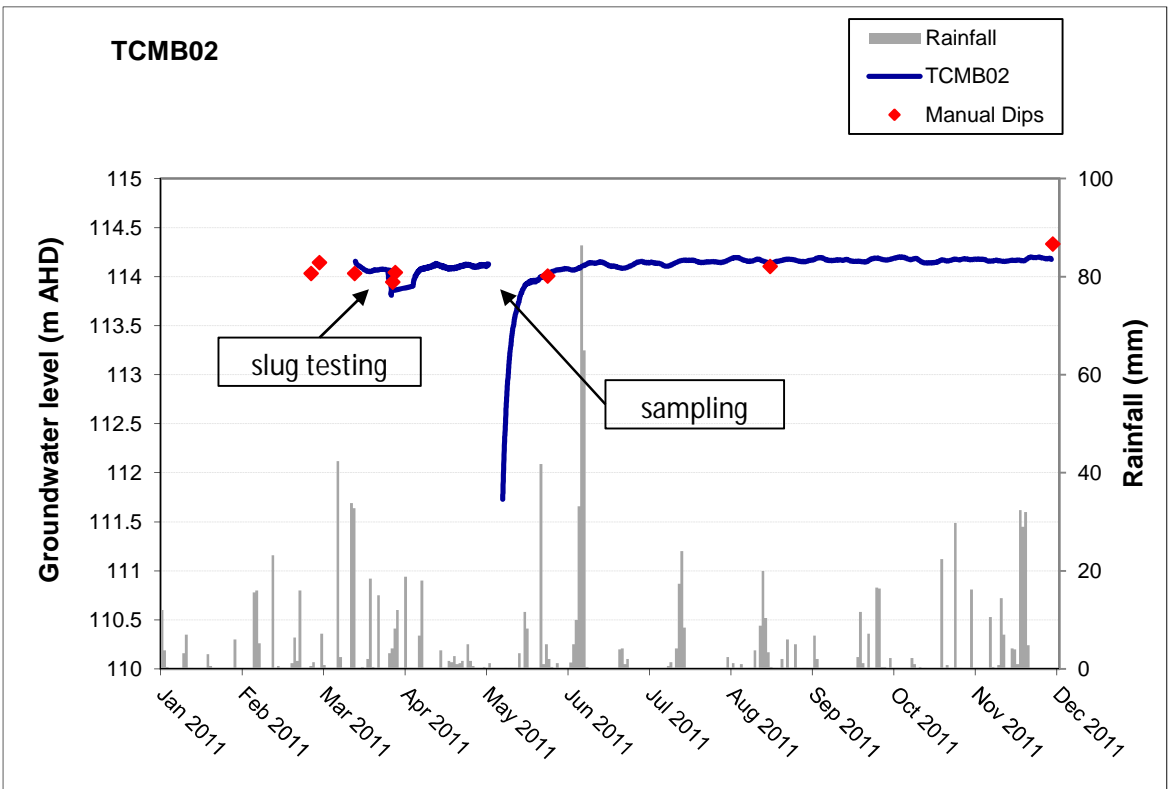


Figure A-21 Groundwater levels and rainfall at TCMB03

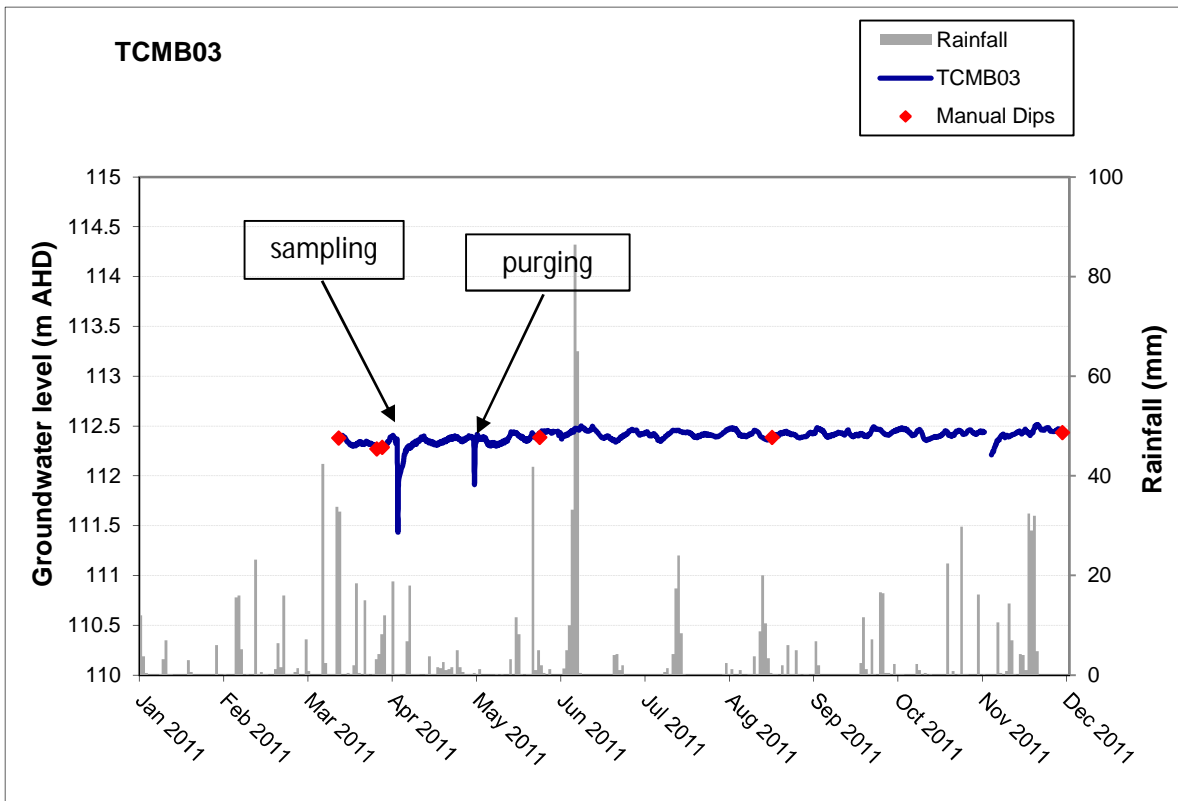
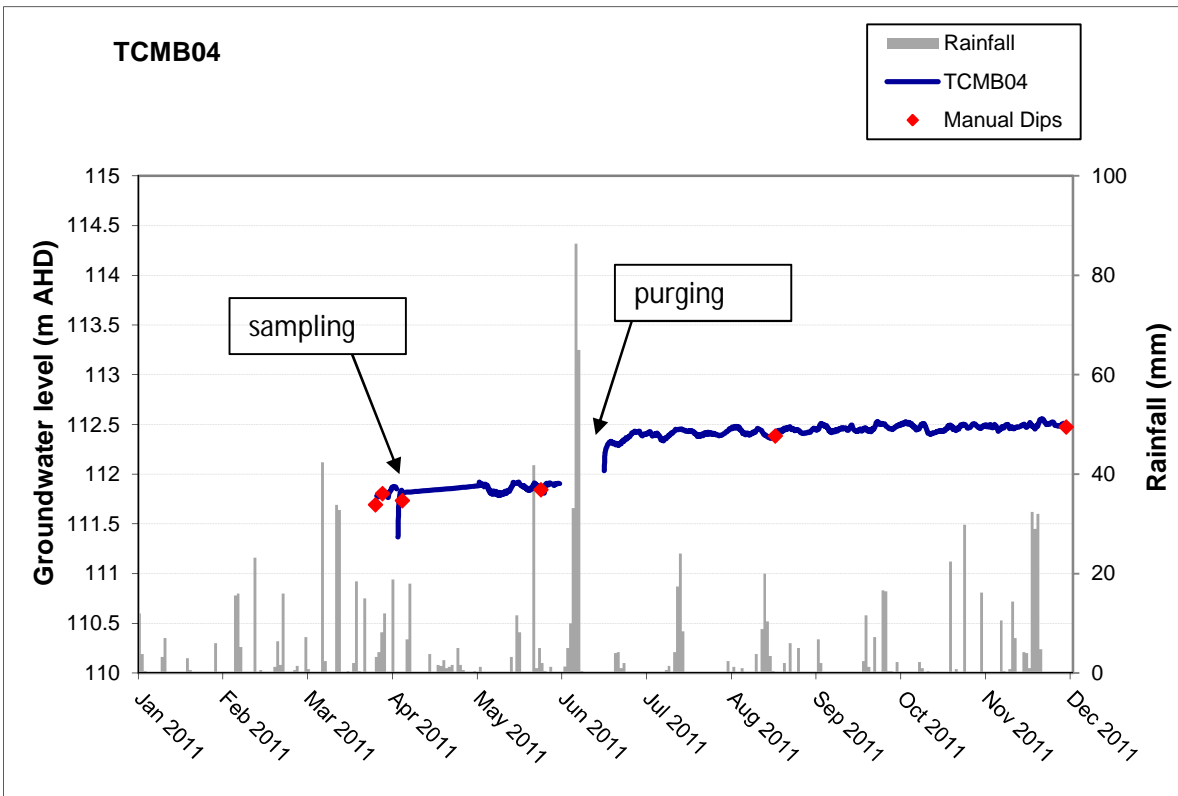
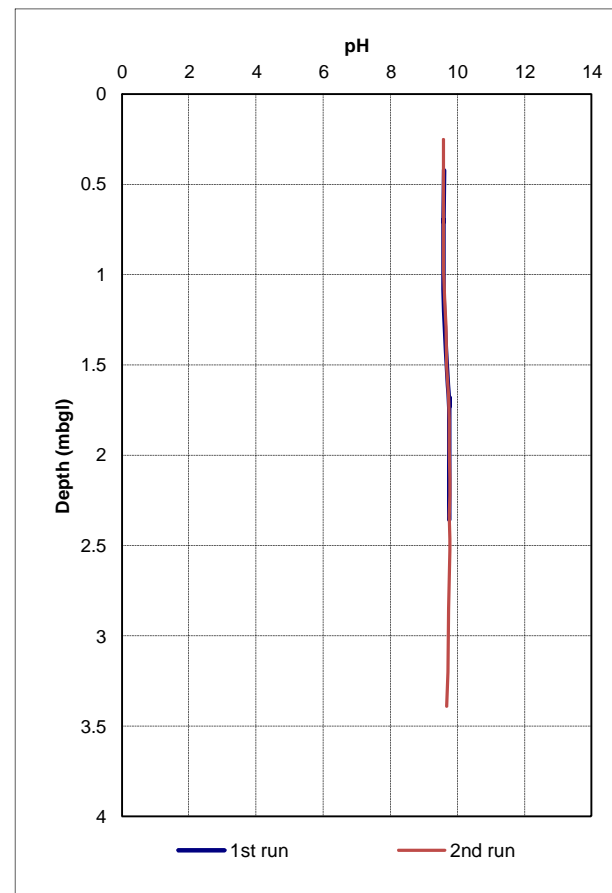
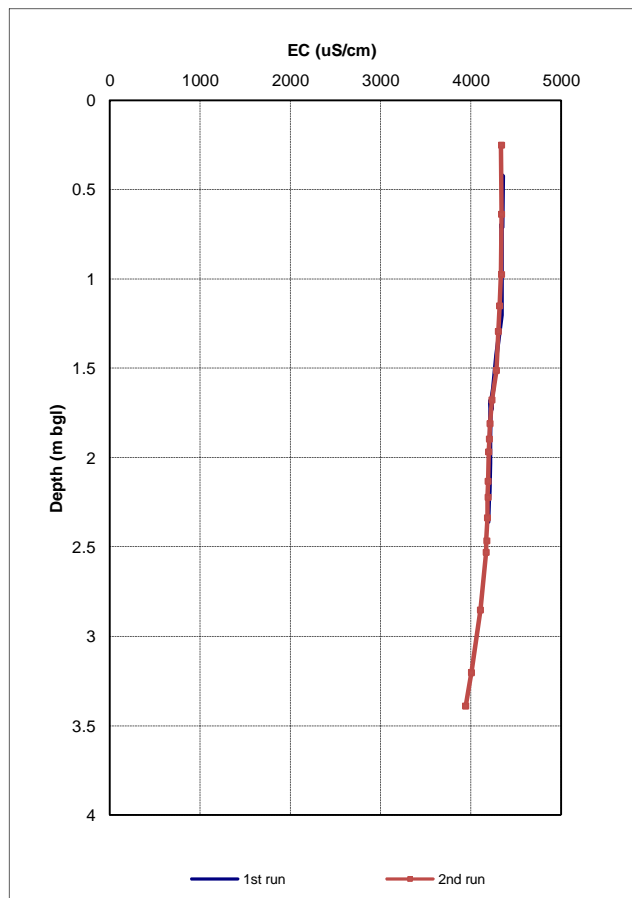


Figure AO-22 Groundwater levels and rainfall at TCMB04



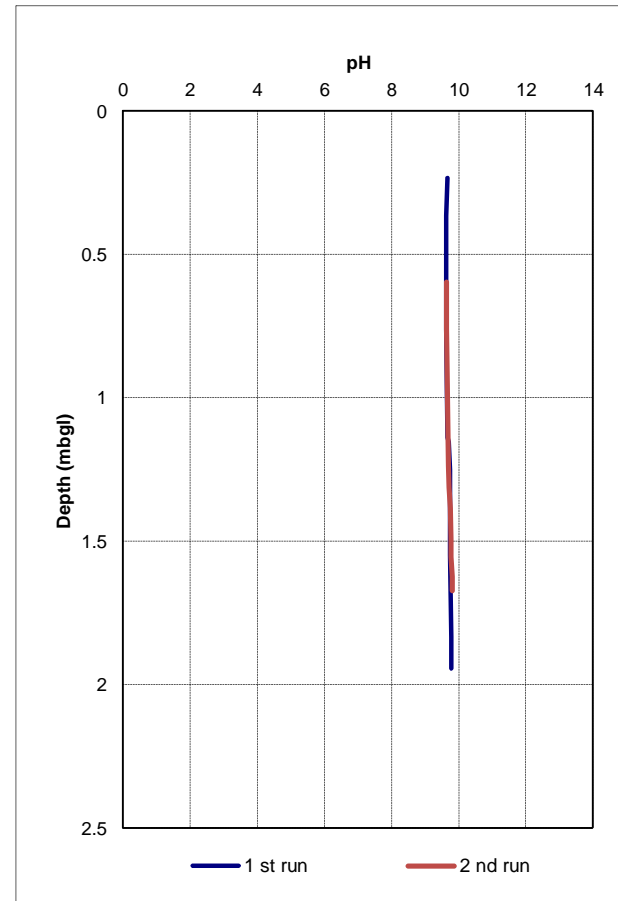
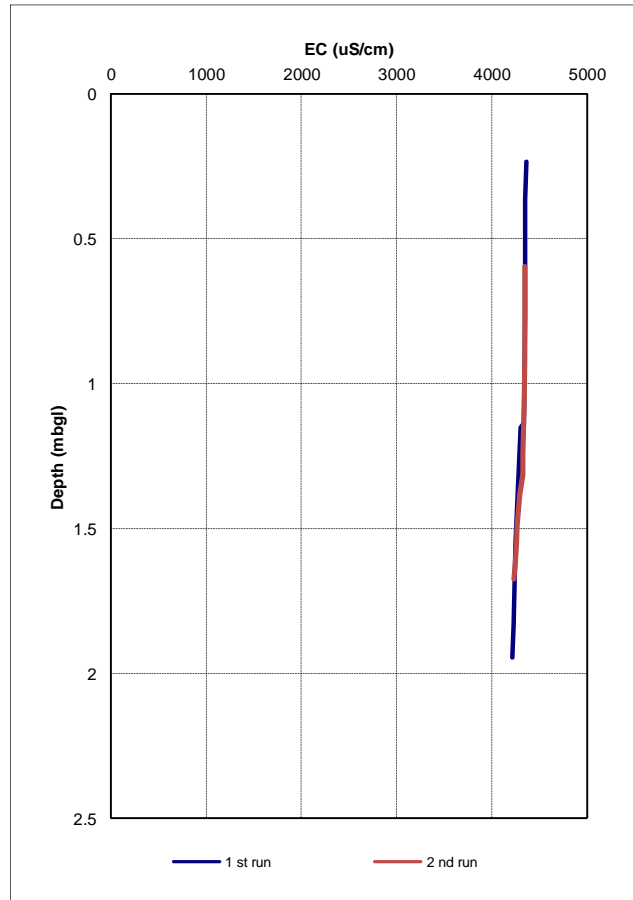
Appendix P

Tiedman Dam profiling figures



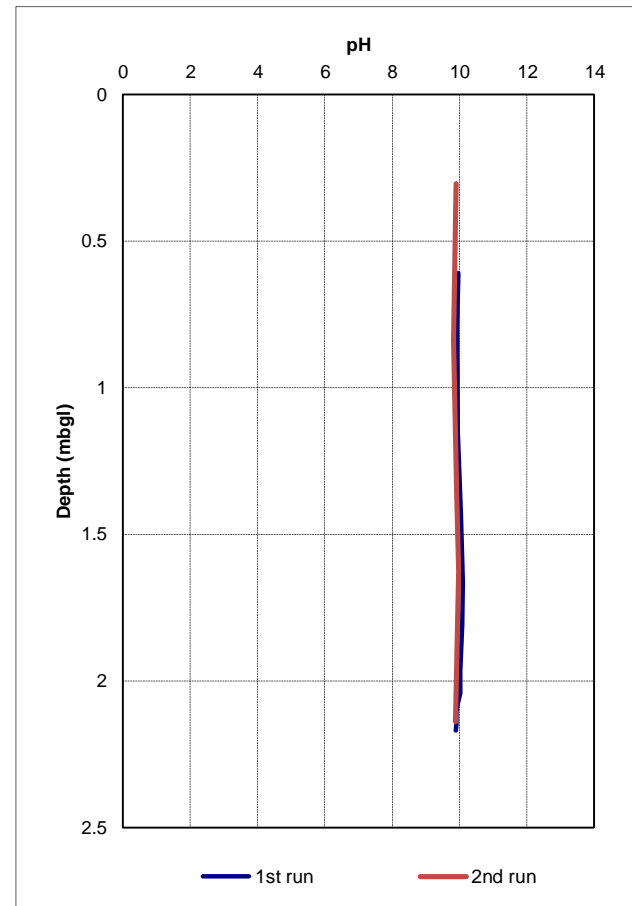
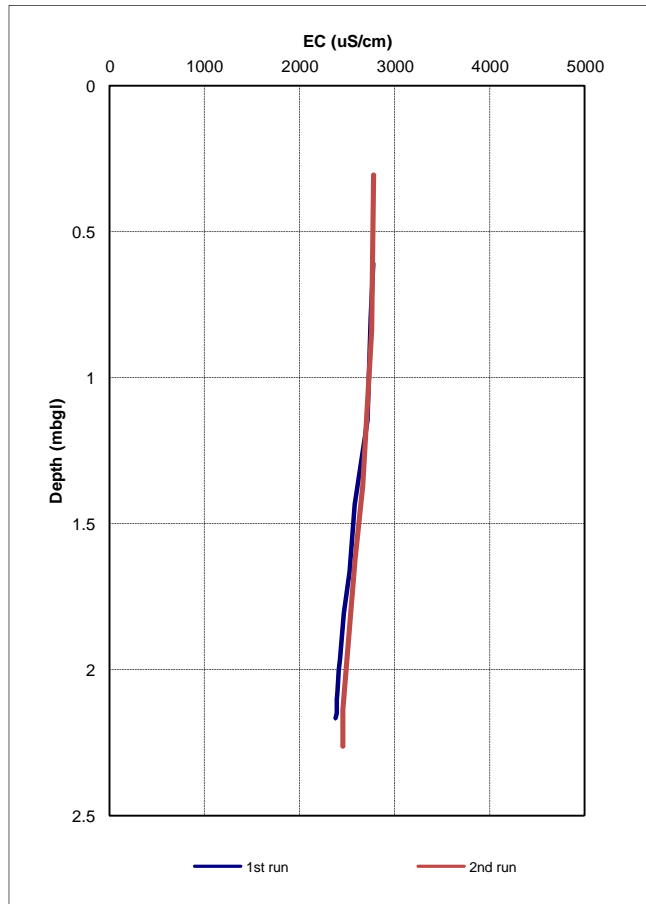
Client: AGL Energy Ltd
Project: Gloucester groundwater investigations
Location: Gloucester

Tiedman North dam (centre)
10-Jan-11
Project No: 2162406A



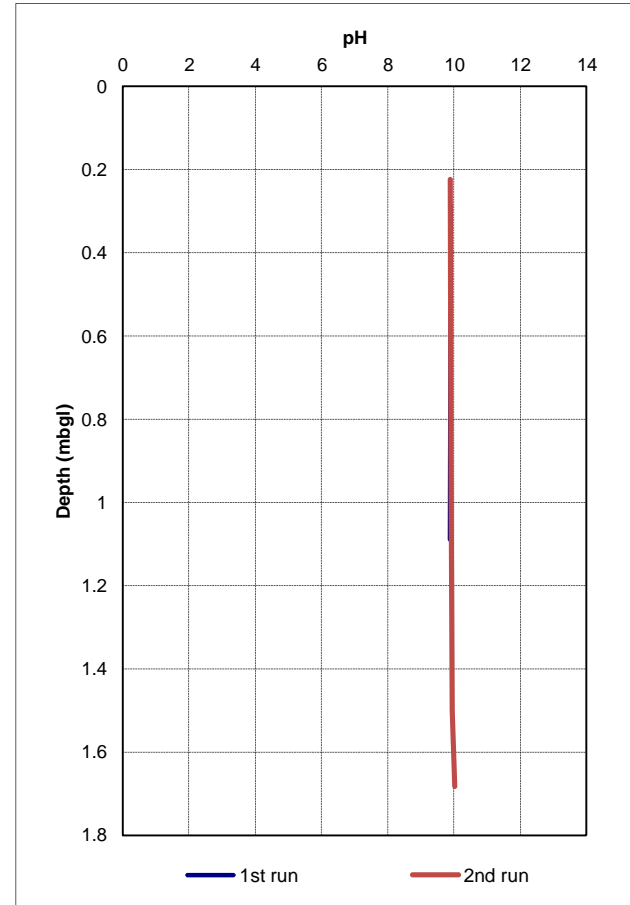
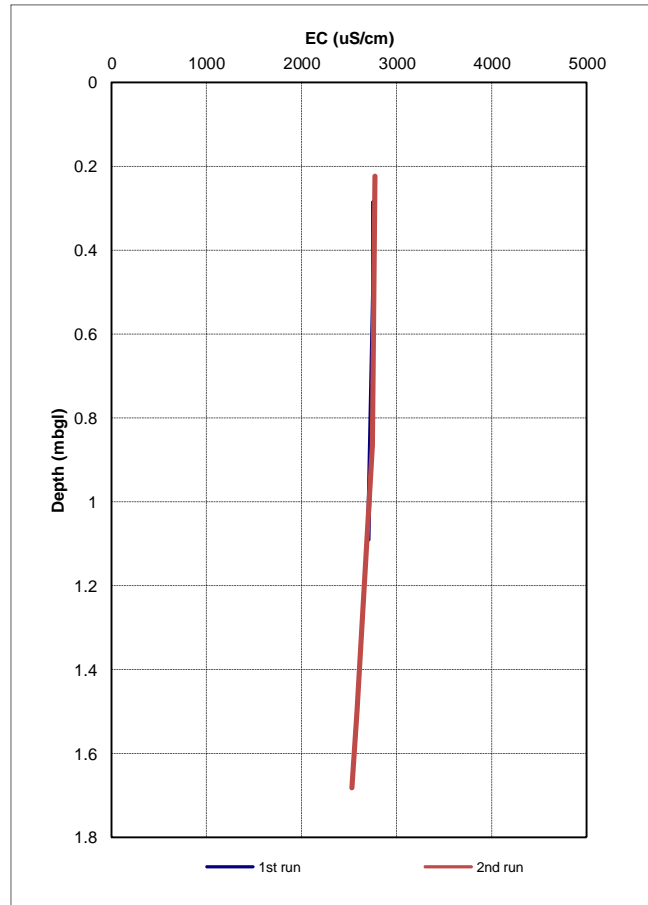
Client: AGL energy Ltd
Project: Gloucester groundwater investigations
Location: Gloucester

Tiedman North dam (north east corner)
10-Jan-11
Project No: 2162406A



Client: AGL Energy Ltd
Project: Gloucester groundwater investigations
Location: Gloucester

Tiedman South dam (centre)
10-Jan-11
Project No: 2162406A



Client: AGL Energy Ltd
Project: Gloucester groundwater investigations
Location: Gloucester

Tiedman South dam (north east corner)
10-Jan-11
Project No: 2162406A

