



Accredited for compliance with ISO/IEC
17025

Accreditation No 2013

Amended Certificate of Analysis



**BUREAU
VERITAS**

Origin Energy Resources Ltd
GPO Box 148
Brisbane QLD 4001

Attention: Matt Kerne

Project 16PEBR0002676
Collected by Lexi Bryant
Client Ref: 16252997

Customer Sample ID	ORN-PW001	ORA-PW087	ORN_PW001
Sample Type	Gas	Gas	Water
Date Sampled	10/05/2016	10/05/2016	10/05/2016
Time Sampled	1355 hr	1055 hr	14:30
Pressure	192 kPa	467 kPa	
Temperature	26°C	35°C	
Cylinder ID	#395	#311	
Description			Post Separator sample
Test/Reference	Unit		
Dräger Tube Test ASTM D4810			
Hydrogen Sulphide (ppm v/v)*	mL/m ³	< 0.10	< 0.10
Hydrogen Sulphide (ppm w/v)*	mg/m ³	< 0.14	< 0.14
Dräger Tube Test			
Mercaptans (ppm v/v)*	mL/m ³	<0.10	<0.10
Carbon Disulphide (ppm v/v)*	mL/m ³	<1.00	<1.00
Arsine (ppm v/v)*	mL/m ³	<0.02	<0.02
Carbonyl Sulphide (ppm v/v)*	mL/m ³	<2.00	<2.00
Radioactive Material OS-03-01			
Radon-222	Bq/m ³	184	-
Radon-222 Uncertainty	Bq/m ³	48	-
Field Analysis			
Field pH*		-	8.65
Field Temperature*	°C	-	30.1
Field Conductivity*	mS/cm	-	3.59
Dissolved Oxygen*	mg/L	-	1.8
GAS ANALYSIS			
Test/Reference	Unit		
Gas Analysis ASTM D 1945-03 (2010)			
Oxygen (mol %)	Mol %	<0.01	<0.01
Nitrogen (mol %)	Mol %	3.25	2.64
Carbon Dioxide (mol %)	Mol %	0.16	0.13
Hydrogen (mol %)	Mol %	< 0.01	< 0.01
Carbon Monoxide (mol %)	Mol %	< 0.01	< 0.01
Methane (mol %)	Mol %	96.59	97.23
Ethane (mol %)	Mol %	< 0.01	< 0.01
Propane (mol %)	Mol %	< 0.01	< 0.01
I-Butane (mol %)	Mol %	< 0.01	< 0.01
N-Butane (mol %)	Mol %	< 0.01	< 0.01
I-Pentane (mol %)	Mol %	< 0.01	< 0.01
N-Pentane (mol %)	Mol %	< 0.01	< 0.01
Hexanes; C-6 (mol %)	Mol %	< 0.01	< 0.01



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Pressure	192 kPa	467 kPa	
Temperature	26°C	35°C	
Cylinder ID	#395	#311	
Description			Post Separator sample

GAS ANALYSIS

<u>Test/Reference</u>	<u>Unit</u>			
Heptanes; C-7 (mol %)	Mol %	< 0.01	< 0.01	-
Octanes and higher hydrocarbons; C-8+	Mol %	< 0.01	< 0.01	-
Total	Mol %	100.00	100.00	-
Gas Parameters ASTM D 1945-03 (2010)				
Average Molecular Weight		16.48	16.40	-
Lower Flammability Limit		5.18	5.14	-
Upper Flammability Limit		15.53	15.43	-
Ratio Of Upper To Lower		3.00	3.00	-
Wobbe Index		48.29	48.73	-
Compressibility Factor (Z)		0.9981	0.9981	-
Ideal Gas Density (Rel to Air = 1)		0.569	0.566	-
Real Gas Density (Rel to Air = 1)		0.570	0.567	-
Ideal Nett Calorific Value	MJ/m ³	32.79	33.01	-
Ideal Gross Calorific Value	MJ/m ³	36.42	36.66	-
Real Nett Calorific Value	MJ/m ³	32.85	33.07	-
Real Gross Calorific Value	MJ/m ³	36.49	36.73	-
Gross Calorific Val Water-Sat Gas	MJ/m ³	35.78	36.02	-
Extended Gas In-house Method GC-04				
Nitrogen	Mol %	3.25	2.64	-
Carbon Dioxide	Mol %	0.16	0.13	-
Methane (mol %)	Mol %	96.59	97.23	-
Ethane (mol %)	Mol %	<0.01	<0.01	-
Propane	Mol %	<0.01	<0.01	-
I-Butane	Mol %	<0.01	<0.01	-
N-Butane	Mol %	<0.01	<0.01	-
I-Pentane	Mol %	<0.01	<0.01	-
N-Pentane	Mol %	<0.01	<0.01	-
Hexanes; C-6	Mol %	< 0.0001	< 0.0001	-
Benzene (mol %)	Mol %	< 0.0001	< 0.0001	-
Cyclohexane (mol %)	Mol %	< 0.0001	< 0.0001	-
Heptanes; C-7	Mol %	< 0.0001	< 0.0001	-
Methylcyclohexane (mol %)	Mol %	< 0.0001	< 0.0001	-
Toluene (mol %)	Mol %	< 0.0001	< 0.0001	-
Octanes; C-8	Mol %	< 0.0001	< 0.0001	-
Ethylbenzene + Xylenes (mol %)	Mol %	< 0.0001	< 0.0001	-
Nonanes; C-9 (mol %)	Mol %	< 0.0001	< 0.0001	-
Decanes; C-10 (mol %)	Mol %	< 0.0001	< 0.0001	-
Undecanes; C-11 (mol %)	Mol %	< 0.0001	< 0.0001	-
Dodecanes; C-12 (mol %)	Mol %	< 0.0001	< 0.0001	-
Tridecanes; C-13 (mol %)	Mol %	< 0.0001	< 0.0001	-
Tetradecanes; C-14+ (mol %)	Mol %	< 0.0001	< 0.0001	-

Sub Contracted



Customer Sample ID	ORN-PW001	ORA-PW087	ORN_PW001
Sample Type	Gas	Gas	Water
Date Sampled	10/05/2016	10/05/2016	10/05/2016
Time Sampled	1355 hr	1055 hr	14:30
Pressure	192 kPa	467 kPa	
Temperature	26°C	35°C	
Cylinder ID	#395	#311	
Description			Post Separator sample

Sub Contracted

Test/Reference	Unit		
Water Chemistry Symbio Alliance*	-	-	Attached

SVOC Analysis

Test/Reference	Unit		
Acenaphthene*	mg/m ³	<0.01	-
Acenaphthylene*	mg/m ³	<0.01	-
Anthracene*	mg/m ³	<0.01	-
Benzo(a)anthracene*	mg/m ³	<0.01	-
Benzo(a)pyrene*	mg/m ³	<0.01	-
Benzo(b,j,k)fluoranthene*	mg/m ³	<0.02	-
Benzo(g,h,i)perylene*	mg/m ³	<0.01	-
Chrysene*	mg/m ³	<0.01	-
Dibenzo(a,h)anthracene*	mg/m ³	<0.01	-
Fluoranthene*	mg/m ³	<0.01	-
Fluorene*	mg/m ³	<0.01	-
Indeno(123-cd)pyrene*	mg/m ³	<0.01	-
Naphthalene*	mg/m ³	<0.01	-
Phenanthrene*	mg/m ³	<0.01	-
Pyrene*	mg/m ³	<0.01	-

Test Description

Gas Parameters

The above results are calculated on an air and water free basis assuming only the measured constituents are present. The following parameters are calculated from the above composition at 15°C and 101.325 kPa (abs) using ISO 6976 and the physical constants from the GPSA SI Engineering Data Handbook 11th Ed. Measured as Radon-222 in the gas phase at 101.3 kPa abs @ 15°C.

Radon-222

Dräger Tube Test

Hydrogen Sulphide results measured at 101.3 kPa abs @ 15°C.

Test Comments

ORN-PW001

SVOC Analysis

Sample filters and XAD sorbent tubes tested by EnviroLab/MPL using method ORG-012/017/033 (Solvent extraction and GCMS analysis)

Authorised By

Lexi Bryant

Chemist

Paul Marty

Technical Manager, Petroleum Services

Michelle Fordham

Chemist

Accreditation No 2013

Laboratory Manager

James Dennett

Operations Manager

Amended Report: Test for VOC by adsorption tube removed.
This report replaces report number 894641.



BUREAU
VERITAS

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Samples will be discarded after 30 days unless otherwise notified.

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The samples were collected by Laboratory staff.

CERTIFICATE NO.: 447873
ISSUE DATE: 18/05/16

Page 1 of 5

REVISION NO: 00
 This certificate supersedes any previous revisions

CLIENT DETAILS: Lexi Bryant
 Bureau Veritas - QLD
 7 Palmer Place
 Murarrie QLD 4172

DATE RECEIVED: 11/05/2016
CLIENT REF. NO: 16PEBR0002676
ORDER NO: 16000078-498

SAMPLE INFORMATION: Water - 16PEBR0002676

CONDITIONS OF SAMPLE: Receipt Temp °C: 16
 Storage Temp °C: 4

TEST DATE: Sample tested between date received and reported

RESULTS OF ANALYSIS:

Test	Method Code	LOR	Unit	447873-1 ORN-PW001 10/05/2016 2:30:00
Inorganics				
pH	EFF006	0.01	unit	8.79
Electrical Conductivity	EFF007	1	uS/cm	3,500
Dissolved Solids	EFF010	2	mg/L	2,200
Turbidity	EFF061	0.1	NTU	10.2
Fluoride	EFF015	0.05	mg/L	2.7
Chloride	EFF011	2	mg/L	470
Sulphur (as Sulphate)#	EWI02	0.3	mg/L	1.3
Calcium (Dissolved)	EWI01	0.1	mg/L	3.1
Magnesium (Dissolved)	EWI01	0.01	mg/L	0.90
Sodium (Dissolved)	EWI01	1	mg/L	820
Sodium Absorption Ratio_S	EFF063	0.01		110
Potassium (Dissolved)	EWI01	0.2	mg/L	4.7
Bromide	EWMB	0.005	mg/L	1.11
Alkalinity Bicarb (CaCO ₃)	EFF031	1	mg/L	1,320
Alkalinity Carbonate (CaCO ₃)	EFF031	1	mg/L	117
Alkalinity Hydroxide(CaCO ₃)	EFF031	1	mg/L	<1
Alkalinity Total (CaCO ₃)	EFF031	1	mg/L	1,440
Alkalinity (Residual) #	EFF031		meq/L	15.43



The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
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 NATA Corporate Accreditation No.: 2455

HPC Holdings Pty Ltd trading as Symbio Laboratories
 ABN 93 621 286 928
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- Rockhampton: Unit 3, 191 Berserker St, Berserker QLD 4701
- Wagga Wagga: Unit 5, 10-12 Koorringal Rd, Wagga Wagga NSW 2650

Test	Method Code	LOR	Unit	447873-1 ORN-PW001 10/05/2016 2:30:00
Ammonia-Nitrogen	EFF044	0.005	mg/L	0.84
Formaldehyde in Water	ENV137	0.05	mg/L	<0.05
Ammonium	EFF044	0.006	mg/L	1.1
Metals				
Arsenic (Total)	EWM02	0.0005	mg/L	0.00072
Arsenic (Dissolved)	EWM01	0.0005	mg/L	<0.0005
Barium (Total)	EWM02	0.0001	mg/L	0.51
Barium (Dissolved)	EWM01	0.0001	mg/L	0.50
Beryllium (Total)	EWM02	0.0001	mg/L	<0.0001
Beryllium (Dissolved)	EWM01	0.0001	mg/L	<0.0001
Boron (Total)	EWM02	0.005	mg/L	0.65
Boron (Dissolved)	EWM01	0.005	mg/L	0.56
Cadmium (Total)	EWM02	0.0001	mg/L	<0.0001
Cadmium (Dissolved)	EWM01	0.0001	mg/L	<0.0001
Chromium (Total)	EWM02	0.0005	mg/L	0.00079
Chromium (Dissolved)	EWM01	0.0005	mg/L	<0.0005
Cobalt (Total)	EWM02	0.0001	mg/L	0.00044
Cobalt (Dissolved)	EWM01	0.0001	mg/L	<0.0001
Copper (Total)	EWM02	0.0005	mg/L	0.0039
Copper (Dissolved)	EWM01	0.0005	mg/L	<0.0005
Iron (Total)	EWM02	0.005	mg/L	1.5
Iron (Dissolved)	EWM01	0.005	mg/L	0.046
Lead (Total)	EWM02	0.0001	mg/L	0.0014
Lead (Dissolved)	EWM01	0.0001	mg/L	<0.0001
Manganese (Total)	EWM02	0.0005	mg/L	0.023
Manganese (Dissolved)	EWM01	0.0005	mg/L	0.0049
Molybdenum (Total)	EWM02	0.0001	mg/L	0.00041
Molybdenum (Dissolved)	EWM01	0.0001	mg/L	0.00026
Nickel (Total)	EWM02	0.0001	mg/L	<0.0001
Nickel (Dissolved)	EWM01	0.0001	mg/L	<0.0001
Selenium (Total)	EWM02	0.0005	mg/L	<0.0005
Selenium (Dissolved)	EWM01	0.0005	mg/L	<0.0005
Silver (Total)	EWM02	0.0001	mg/L	<0.0001
Silver (Dissolved)	EWM01	0.0001	mg/L	<0.0001
Strontium (Total)	EWM02	0.0001	mg/L	1.1
Strontium (Dissolved)	EWM01	0.0001	mg/L	1.1
Tin (Total)	EWM02	0.0005	mg/L	<0.0005
Tin (Dissolved)	EWM01	0.0005	mg/L	<0.0005
Zinc (Total)	EWM02	0.0005	mg/L	0.023



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Test	Method Code	LOR	Unit	447873-1 ORN-PW001 10/05/2016 2:30:00
Zinc (Dissolved)	EWM01	0.0005	mg/L	0.014
Mercury (Total)	EWM02	0.0001	mg/L	<0.0001
Mercury (Dissolved)	EWM01	0.0001	mg/L	<0.0001
Aluminium (Total)	EWM02	0.005	mg/L	1.4
Aluminium (Dissolved)	EWM01	0.005	mg/L	0.053
Silicon (Dissolved)	EWI01	0.1	mg/L	7.3
Silica (from Si) #	EWI01	0.2	mg/L	15.6
Lithium (Dissolved)	EWM01	0.0001	mg/L	0.049
Lithium (Total)	EWM02	0.0001	mg/L	0.11
Uranium (Dissolved)	EWM01	0.0001	mg/L	<0.0001
Uranium (Total)	EWM02	0.0001	mg/L	<0.0001
Vanadium (Dissolved)	EWM01	0.0001	mg/L	0.00012
Vanadium (Total)	EWM02	0.0001	mg/L	0.0026
Organics				
Benzene	ENV105	1	µg/L	<1
Ethylbenzene	ENV105	1	µg/L	<1
Toluene	ENV105	1	µg/L	<1
ortho-Xylenes	ENV105	1	µg/L	<1
meta- & para-Xylenes	ENV105	2	µg/L	<2.0
Xylenes - Total	ENV105	3	µg/L	<3.0
TPH C6-C9 Fraction	ENV105	10	µg/L	<10
TRPH >C10-C16 Fraction	ENV102	50	µg/L	<50
TRPH >C16-C34 Fraction	ENV102	100	µg/L	<100
TRPH >C34-C40 Fraction	ENV102	100	µg/L	<100
Surrogate o-Terphenyl	ENV102		%	100
ENV103 Phenols Water/Effluent				
2,3,4,6-Tetrachlorophenol	ENV103	10	µg/L	<10
2,4,5-Trichlorophenol	ENV103	10	µg/L	<10
2,4,6-Trichlorophenol	ENV103	10	µg/L	<10
2,4-Dichlorophenol	ENV103	10	µg/L	<10
2,4-Dimethylphenol	ENV103	10	µg/L	<10
2,6-Dichlorophenol	ENV103	10	µg/L	<10
2-Chlorophenol	ENV103	10	µg/L	<10
2-Methylphenol	ENV103	10	µg/L	<10
2-Nitrophenol	ENV103	10	µg/L	<10
3 & 4-Methylphenol	ENV103	20	µg/L	<20
4-chloro-3-methylphenol	ENV103	10	µg/L	<10
Pentachlorophenol	ENV103	10	µg/L	<10



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Test	Method Code	LOR	Unit	447873-1 ORN-PW001 10/05/2016 2:30:00
Phenol	ENV103	10	µg/L	<10
Surrogate 2-chlorophenol-d4	ENV103		%	74
Surrogate 2-fluorophenol	ENV103		%	76
Surrogate 246-Tribromophenol	ENV103		%	120
Organics - PAH				
Naphthalene	ENV103	1	µg/L	<1
Acenaphthylene	ENV103	1	µg/L	<1
Acenaphthene	ENV103	1	µg/L	<1
Fluorene	ENV103	1	µg/L	<1
Phenanthrene	ENV103	1	µg/L	<1
Anthracene	ENV103	1	µg/L	<1
Fluoranthene	ENV103	1	µg/L	<1
Pyrene	ENV103	1	µg/L	<1
Benz(a)anthracene	ENV103	1	µg/L	<1
Chrysene	ENV103	1	µg/L	<1
Benzo(b)fluoranthene	ENV103	1	µg/L	<1
Benzo(k)fluoranthene	ENV103	1	µg/L	<1
Benzo(a)pyrene	ENV103	1	µg/L	<1
Indeno(1,2,3-cd)pyrene	ENV103	1	µg/L	<1
Dibenz(a,h)anthracene	ENV103	1	µg/L	<1
Benzo(g,h,i)perylene	ENV103	1	µg/L	<1
Surrogate Nitrobenzene-d5	ENV103		%	115
Surrogate 2-fluorobiphenyl	ENV103		%	110
Surrogate Phenanthrene-d10	ENV103		%	115
Surrog 4-terphenyl-d14	ENV103		%	129
Total Reportable PAH	ENV103	1	µg/L	<1



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DEFINITIONS: < : Less than, > : Greater than, - : Not Tested, DWB : Dry Weight Basis.

* Test not covered by NATA scope of accreditation.

: The result is derived from a calculation. Only results above the LOR are included in the calculation.

Results were reported on an "as received" basis unless otherwise indicated.

Sampling was conducted by the customer and results reported pertain only to the samples submitted.

Responsibility for representative sampling rests with the customer.



Betty Bi, Analyst
(Brisbane)



Jason Roumimper, Chemist
(Brisbane)



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Data Quality Report

Date 19/05/2016

Page 1 of 23



CERTIFICATE No: 447873
ISSUE DATE: 19/05/2016

Page 1 of 23

REVISION NO: 00
This Certificate supersedes any previous revisions

CLIENT DETAILS: Lexi Bryant
Bureau Veritas - QLD
7 Palmer Place
Murarrie QLD 4172
DATE RECEIVED: 11/05/2016
CLIENT REF NO: 16PEBR0002676
ORDER NO: 16000078-498

CONDITIONS OF SAMPLE: Receipt Temperature: 16°C
Storage Temperature: 4°C
TEST DATE: Sample tested between date received and reported

This Data Quality Report contains information relating to:

Method Blank

Refers to the analytical signal derived from chemical reagents and equipment in the absence of a sample matrix. Method blanks provide an indication of potential method bias for the relevant analytes.

Method Blank analyses are conducted at the minimum rate of one per batch or 5% whichever the greater.

Laboratory Control Sample

The Laboratory Control Sample (LCS) comprises of a certified reference material or control matrix spiked with all analytes representative of the analyte class. The LCS recovery data is used to evaluate method performance.

LCS analyses are conducted at the minimum rate of one per batch or 5% whichever the greater.

Laboratory Duplicate

Involves the analyses of a duplicate sample from within the same analytical batch. The variation between duplicate analyses provides an estimation of method precision and sample heterogeneity.

Duplicate analyses are conducted at the minimum rate of one per batch or 5% whichever the greater

Samples selected for duplicate analysis may not be sourced from this registration.

Methods & Procedures

Analytical methodologies and quality control procedures used for environmental analyses are derived from a variety of reference standards and guidelines including but not limited to APHA, USEPA, AS and NEPM. These methods and procedures are designed to comply with NATA requirements for compliance to ISO/IEC 17025.

Data Quality Report

Date 19/05/2016

Page 3 of 23



CERTIFICATE No: 447873

QC BATCH NO:

Method Blank and Laboratory Control Sample Report

Analyte	Units	LOR	Blank Result	LCS Result	LCS Expected Level	Recovery (%)	Acceptable Recovery (%)	
							Low	High
pH	unit	1		8.84	9.00	98	95	105
Method Code EFF007								
Electrical Conductivity	µS/ cm	1	<1	10729	12880	83	80	120
Method Code EFF015								
Fluoride	mg/L	0.05	<0.05	0.52	0.50	104	80	120
Method Code EFF031								
Alkalinity Total (CaCO3)	mg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Alkalinity Bicarb (CaCO3)	mg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Alkalinity Carbonate (CaCO3)	mg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Alkalinity Hydroxide (CaCO3)	mg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Method Code EFF010								
Solids (Dissolved)	mg/L	2	N/A	N/A	N/A	N/A	N/A	N/A
Method Code EFF061								

Data Quality Report

Date 19/05/2016

Page 4 of 23



CERTIFICATE No: 447873

QC BATCH NO:

Method Blank and Laboratory Control Sample Report

Analyte	Units	LOR	Blank Result	LCS Result	LCS Expected Level	Recovery (%)	Acceptable Recovery (%)	
							Low	High
Turbidity	NTU	0.1	<0.1	10.1	10.0	101	98	102
Method Code EWMB								
Bromide	mg/L	0.005	<0.005	0.0092	0.0100	92	80	120
Method Code ENV137								
Formaldehyde	mg/L	0.05	N/A	N/A	N/A	N/A	N/A	N/A
Method Code EW102								
Sulphur (as Sulphate)#	mg/L	0.3	N/A	N/A	N/A	N/A	N/A	N/A
Method Code EW101								
Calcium (Dissolved)	mg/L	0.1	<0.1	9.9	10.0	99	80	120
Magnesium (Dissolved)	mg/L	0.01	<0.01	9.6	10.0	96	80	120
Sodium (Dissolved)	mg/L	1	<1	16.2	15.0	108	80	120
Potassium (Dissolved)	mg/L	0.2	<0.2	19.6	20.0	98	80	120
Silicon (Dissolved)	mg/L	0.1	<0.1	9.8	10.0	98	80	120

Data Quality Report

Date 19/05/2016

Page 5 of 23



CERTIFICATE No: 447873

QC BATCH NO:

Method Blank and Laboratory Control Sample Report

Analyte	Units	LOR	Blank Result	LCS Result	LCS Expected Level	Recovery (%)	Acceptable Recovery (%)	
							Low	High
Silica (from Si) #	mg/L	0.2	N/A	N/A	N/A	N/A	N/A	N/A
Method Code EFF063								
SAR (Sodium Adsorption Ratio)#		0.01	N/A	N/A	N/A	N/A	N/A	N/A
Method Code EFF044								
Ammonia-Nitrogen	mg/L	0.005	<0.005	0.502	0.500	100	80	110
Ammonium	mg/L	0.006	N/A	N/A	N/A	N/A	N/A	N/A
Method Code EFF011								
Chloride	mg/L	2	<2	50.1	50.0	100	80	120
Method Code EWM01								
Aluminium (Dissolved)	mg/L	0.005	<0.005	0.0054	0.0050	108	80	120
Arsenic (Dissolved)	mg/L	0.0005	<0.0005	0.0048	0.0050	96	80	120
Barium (Dissolved)	mg/L	0.0001	<0.0001	0.0048	0.0050	96	80	120
Beryllium (Dissolved)	mg/L	0.0001	<0.0001	0.0050	0.0050	100	80	120

Data Quality Report

Date 19/05/2016

Page 6 of 23



CERTIFICATE No: 447873

QC BATCH NO:

Method Blank and Laboratory Control Sample Report

Analyte	Units	LOR	Blank Result	LCS Result	LCS Expected Level	Recovery (%)	Acceptable Recovery (%)	
							Low	High
Boron (Dissolved)	mg/ L	0.005	<0.005	0.0045	0.0050	90	80	120
Cobalt (Dissolved)	mg/ L	0.0001	<0.0001	0.0047	0.0050	94	80	120
Cadmium (Dissolved)	mg/ L	0.0001	<0.0001	0.0051	0.0050	102	80	120
Chromium (Dissolved)	mg/ L	0.0005	<0.0005	0.0047	0.0050	94	80	120
Copper (Dissolved)	mg/ L	0.0005	<0.0005	0.0044	0.0050	88	80	120
Iron (Dissolved)	mg/ L	0.005	<0.005	0.0046	0.0050	92	80	120
Lead (Dissolved)	mg/ L	0.0001	<0.0001	0.0049	0.0050	98	80	120
Lithium (Dissolved)	mg/ L	0.0001	<0.0001	0.0046	0.0050	92	80	120
Manganese (Dissolved)	mg/ L	0.0005	<0.0005	0.0046	0.0050	92	80	120
Molybdenum (Dissolved)	mg/ L	0.0001	<0.0001	0.0049	0.0050	98	80	120
Mercury (Dissolved)	mg/ L	0.0001	<0.0001	0.0042	0.0050	84	80	120
Nickel (Dissolved)	mg/ L	0.0001	<0.0001	0.0040	0.0050	80	80	120
Selenium (Dissolved)	mg/ L	0.0005	<0.0005	0.0052	0.0050	104	80	120

Data Quality Report

Date 19/05/2016

Page 7 of 23



CERTIFICATE No: 447873

QC BATCH NO:

Method Blank and Laboratory Control Sample Report

Analyte	Units	LOR	Blank Result	LCS Result	LCS Expected Level	Recovery (%)	Acceptable Recovery (%)	
							Low	High
Silver (Dissolved)	mg/L	0.0001	<0.0001	0.0049	0.0050	98	80	120
Strontium (Dissolved)	mg/L	0.0001	<0.0001	0.0049	0.0050	98	80	120
Tin (Dissolved)	mg/L	0.0005	<0.0005	0.0049	0.0050	98	80	120
Uranium (Dissolved)	mg/L	0.0001	<0.0001	0.0048	0.0050	96	80	120
Vanadium (Dissolved)	mg/L	0.0001	<0.0001	0.0048	0.0050	96	80	120
Zinc (Dissolved)	mg/L	0.0005	<0.0005	0.0045	0.0050	90	80	120
Method Code EWM02								
Aluminium (Total)	mg/L	0.005	<0.005	0.0047	0.0050	94	80	120
Arsenic (Total)	mg/L	0.0005	<0.0005	0.0047	0.0050	94	80	120
Barium (Total)	mg/L	0.0001	<0.0001	0.0048	0.0050	96	80	120
Beryllium (Total)	mg/L	0.0001	<0.0001	0.0050	0.0050	100	80	120
Boron (Total)	mg/L	0.005	<0.005	0.0050	0.0050	100	80	120
Cobalt (Total)	mg/L	0.0001	<0.0001	0.0046	0.0050	92	80	120

Data Quality Report

Date 19/05/2016

Page 8 of 23



CERTIFICATE No:

447873

QC BATCH NO:

Method Blank and Laboratory Control Sample Report

Analyte	Units	LOR	Blank Result	LCS Result	LCS Expected Level	Recovery (%)	Acceptable Recovery (%)	
							Low	High
Cadmium (Total)	mg/L	0.0001	<0.0001	0.0050	0.0050	100	80	120
Chromium (Total)	mg/L	0.0005	<0.0005	0.0046	0.0050	92	80	120
Copper (Total)	mg/L	0.0005	<0.0005	0.0044	0.0050	88	80	120
Iron (Total)	mg/L	0.005	<0.005	0.0045	0.0050	90	80	120
Lead (Total)	mg/L	0.0001	<0.0001	0.0049	0.0050	98	80	120
Lithium (Total)	mg/L	0.0001	<0.0001	0.0046	0.0050	92	80	120
Manganese (Total)	mg/L	0.0005	<0.0005	0.0046	0.0050	92	80	120
Molybdenum (Total)	mg/L	0.0001	<0.0001	0.0048	0.0050	96	80	120
Mercury (Total)	mg/L	0.0001	<0.0001	0.0040	0.0050	80	80	120
Nickel (Total)	mg/L	0.0001	<0.0001	0.0040	0.0050	80	80	120
Selenium (Total)	mg/L	0.0005	<0.0005	0.0052	0.0050	104	80	120
Silver (Total)	mg/L	0.0001	<0.0001	0.0049	0.0050	98	80	120
Strontium (Total)	mg/L	0.0001	<0.0001	0.0048	0.0050	96	80	120

Data Quality Report

Date 19/05/2016

Page 9 of 23



CERTIFICATE No: 447873

QC BATCH NO:

Method Blank and Laboratory Control Sample Report

Analyte	Units	LOR	Blank Result	LCS Result	LCS Expected Level	Recovery (%)	Acceptable Recovery (%)	
							Low	High
Tin (Total)	mg/L	0.0005	<0.0005	0.0048	0.0050	96	80	120
Uranium (Total)	mg/L	0.0001	<0.0001	0.0048	0.0050	96	80	120
Vanadium (Total)	mg/L	0.0001	<0.0001	0.0047	0.0050	94	80	120
Zinc (Total)	mg/L	0.0005	<0.0005	0.0046	0.0050	92	80	120
Method Code ENV103								
Naphthalene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Acenaphthylene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Acenaphthene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Fluorene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Phenanthrene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Anthracene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Fluoranthene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Pyrene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A

Data Quality Report

Date 19/05/2016

Page 10 of 23



CERTIFICATE No: 447873

QC BATCH NO:

Method Blank and Laboratory Control Sample Report

Analyte	Units	LOR	Blank Result	LCS Result	LCS Expected Level	Recovery (%)	Acceptable Recovery (%)	
							Low	High
Benz(a)anthracene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Chrysene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(b)fluoranthene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Indeno(1,2,3-cd)pyrene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)anthracene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(g,h,i)perylene	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
PAH Total	µg/L	1	N/A	N/A	N/A	N/A	N/A	N/A
2,3,4,6-Tetrachlorophenol	µg/L	10	N/A	N/A	N/A	N/A	N/A	N/A
2,4,5-Trichlorophenol	µg/L	10	N/A	N/A	N/A	N/A	N/A	N/A
2,4,6-Trichlorophenol	µg/L	10	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dichlorophenol	µg/L	10	N/A	N/A	N/A	N/A	N/A	N/A

Data Quality Report

Date 19/05/2016

Page 11 of 23



CERTIFICATE No: 447873

QC BATCH NO:

Method Blank and Laboratory Control Sample Report

Analyte	Units	LOR	Blank Result	LCS Result	LCS Expected Level	Recovery (%)	Acceptable Recovery (%)	
							Low	High
2,4-Dimethylphenol	µg/L	10	N/A	N/A	N/A	N/A	N/A	N/A
2,6-Dichlorophenol	µg/L	10	N/A	N/A	N/A	N/A	N/A	N/A
2-Chlorophenol	µg/L	10	N/A	N/A	N/A	N/A	N/A	N/A
2-Methylphenol	µg/L	10	N/A	N/A	N/A	N/A	N/A	N/A
2-Nitrophenol	µg/L	10	N/A	N/A	N/A	N/A	N/A	N/A
3 & 4-Methylphenol	µg/L	20	N/A	N/A	N/A	N/A	N/A	N/A
4-chloro-3-methylphenol	µg/L	10	N/A	N/A	N/A	N/A	N/A	N/A
Pentachlorophenol	µg/L	10	N/A	N/A	N/A	N/A	N/A	N/A
Phenol	µg/L	10	N/A	N/A	N/A	N/A	N/A	N/A

Data Quality Report

Date 19/05/2016

Page 12 of 23



CERTIFICATE No:

447873

QC BATCH NO:

Laboratory Duplicate Report

Sample ID	Analyte	Units	LOR	Original Result	Duplicate Result	% RPD	Acceptance Criteria (%)
	Method Code ENV102						
447873-1	TRPH >C10-C16 Fraction	µg/L	50	<50	<50	0	50
447873-1	TRPH >C16-C34 Fraction	µg/L	100	<100	<100	0	50
447873-1	TRPH >C34-C40 Fraction	µg/L	100	<100	<100	0	50
	Method Code ENV105						
447873-1	Benzene	µg/L	1	<1	<1	0	50
447873-1	Ethylbenzene	µg/L	1	<1	<1	0	50
447873-1	Toluene	µg/L	1	<1	<1	0	50
447873-1	Ortho-Xylenes	µg/L	1	<1	<1	0	50
447873-1	meta- & para-Xylenes	µg/L	2	<2	<2	0	50
	Xylenes - Total	µg/L	3	N/A	N/A	N/A	N/A
447873-1	TPH C6-C9 Fraction	µg/L	10	<10	<10	0	50

Data Quality Report

Date 19/05/2016

Page 13 of 23



CERTIFICATE No:

447873

QC BATCH NO:

Laboratory Duplicate Report

Sample ID	Analyte	Units	LOR	Original Result	Duplicate Result	% RPD	Acceptance Criteria (%)
	Method Code EFF006						
448116-1	pH	unit	0.01	7.36	7.36	0	2
	Method Code EFF007						
448116-1	Electrical Conductivity	µS/cm	1	162	163	0.6	10
	Method Code EFF015						
447626-1	Fluoride	mg/L	0.05	0.56	0.56	0	10
	Method Code EFF031						
447731-1	Alkalinity Total (CaCO ₃)	mg/L	1	305.8	316.5	3.4	10
	Alkalinity Bicarb (CaCO ₃)	mg/L	1	N/A	N/A	N/A	N/A
	Alkalinity Carbonate (CaCO ₃)	mg/L	1	N/A	N/A	N/A	N/A
	Alkalinity Hydroxide (CaCO ₃)	mg/L	1	N/A	N/A	N/A	N/A
	Method Code EFF063						

Data Quality Report

Date 19/05/2016

Page 14 of 23



CERTIFICATE No:

447873

QC BATCH NO:

Laboratory Duplicate Report

Sample ID	Analyte	Units	LOR	Original Result	Duplicate Result	% RPD	Acceptance Criteria (%)
	SAR (Sodium Adsorption Ratio)#		0.01	N/A	N/A	N/A	N/A
	Method Code EWMB						
447873-1	Bromide	mg/L	0.005	1.112	1.114	0.2	25
	Method Code ENV137						
	Formaldehyde	mg/L	0.05	N/A	N/A	N/A	N/A
	Method Code EFF011						
448965-1	Chloride	mg/L	2	832	854	2.6	20
	Method Code EW102						
	Sulphur (as Sulphate)#	mg/L	0.3	N/A	N/A	N/A	N/A
	Method Code EW101						
447873-1	Calcium (Dissolved)	mg/L	0.1	3.16	3.14	0.6	15
447873-1	Magnesium (Dissolved)	mg/L	0.05	0.91	0.89	2.2	15

Data Quality Report

Date 19/05/2016

Page 15 of 23



CERTIFICATE No:

447873

QC BATCH NO:

Laboratory Duplicate Report

Sample ID	Analyte	Units	LOR	Original Result	Duplicate Result	% RPD	Acceptance Criteria (%)
447873-1	Sodium (Dissolved)	mg/ L	1	821	819	0.2	15
447873-1	Potassium (Dissolved)	mg/ L	0.2	4.7	4.7	0	15
447873-1	Silicon (Dissolved)	mg/ L	0.1	7.3	7.3	0	15
	Silica (from Si) #	mg/ L	0.2	N/A	N/A	N/A	N/A
	Method Code EFF010						
	Solids (Dissolved)	mg/ L	2	N/A	N/A	N/A	N/A
	Method Code EFF061						
447725-1	Turbidity	NTU	0.1	0.25	0.25	0	25
	Method Code EFF044						
447681-1	Ammonia-Nitrogen	mg/ L	0.005	0.349	0.350	0.3	20
	Ammonium	mg/ L	0.006	N/A	N/A	N/A	N/A
	Method Code EWM01						

Data Quality Report

Date 19/05/2016

Page 16 of 23



CERTIFICATE No:

447873

QC BATCH NO:

Laboratory Duplicate Report

Sample ID	Analyte	Units	LOR	Original Result	Duplicate Result	% RPD	Acceptance Criteria (%)
447873-1	Aluminium (Dissolved)	mg/L	0.005	0.051	0.055	8.5	25
447873-1	Arsenic (Dissolved)	mg/L	0.0005	<0.0005	<0.0005	0	50
447873-1	Barium (Dissolved)	mg/L	0.0001	0.4968	0.5147	3.6	25
447873-1	Beryllium (Dissolved)	mg/L	0.0001	<0.0001	<0.0001	0	50
447873-1	Boron (Dissolved)	mg/L	0.005	0.564	0.595	5.3	25
447873-1	Cobalt (Dissolved)	mg/L	0.0001	<0.0001	<0.0001	0	50
447873-1	Cadmium (Dissolved)	mg/L	0.0001	<0.0001	<0.0001	0	50
447873-1	Chromium (Dissolved)	mg/L	0.0005	<0.0005	<0.0005	0	50
447873-1	Copper (Dissolved)	mg/L	0.0005	<0.0005	<0.0005	0	50
447873-1	Iron (Dissolved)	mg/L	0.005	0.045	0.047	3.4	25
447873-1	Lead (Dissolved)	mg/L	0.0001	<0.0001	<0.0001	0	50
447873-1	Lithium (Dissolved)	mg/L	0.0001	0.0494	0.0494	0	25

Data Quality Report

Date 19/05/2016

Page 17 of 23



CERTIFICATE No:

447873

QC BATCH NO:

Laboratory Duplicate Report

Sample ID	Analyte	Units	LOR	Original Result	Duplicate Result	% RPD	Acceptance Criteria (%)
447873-1	Manganese (Dissolved)	mg/ L	0.0005	0.0048	0.0050	3.5	30
447873-1	Molybdenum (Dissolved)	mg/ L	0.0001	0.00026	0.00026	0	50
447873-1	Mercury (Dissolved)	mg/ L	0.0001	<0.0001	<0.0001	0	50
447873-1	Nickel (Dissolved)	mg/ L	0.0001	<0.0001	<0.0001	0	50
447873-1	Selenium (Dissolved)	mg/ L	0.0005	<0.0005	<0.0005	0	50
447873-1	Silver (Dissolved)	mg/ L	0.0001	<0.0001	<0.0001	0	50
447873-1	Strontium (Dissolved)	mg/ L	0.0001	1.0401	1.0814	3.9	25
447873-1	Tin (Dissolved)	mg/ L	0.0005	<0.0005	<0.0005	0	50
447873-1	Uranium (Dissolved)	mg/ L	0.0001	<0.0001	<0.0001	0	50
447873-1	Vanadium (Dissolved)	mg/ L	0.0001	0.0001	0.0001	0	50
447873-1	Zinc (Dissolved)	mg/ L	0.0005	0.0133	0.0143	7	25
	Method Code EWM02						

Data Quality Report

Date 19/05/2016

Page 18 of 23



CERTIFICATE No:

447873

QC BATCH NO:

Laboratory Duplicate Report

Sample ID	Analyte	Units	LOR	Original Result	Duplicate Result	% RPD	Acceptance Criteria (%)
447873-1	Aluminium (Total)	mg/L	0.005	1.351	1.351	0	25
447873-1	Arsenic (Total)	mg/L	0.0005	0.0007	0.0007	0	30
447873-1	Barium (Total)	mg/L	0.0001	0.4984	0.5125	2.8	25
447873-1	Beryllium (Total)	mg/L	0.0001	<0.0001	<0.0001	0	50
447873-1	Boron (Total)	mg/L	0.005	0.65	0.65	0	25
447873-1	Cobalt (Total)	mg/L	0.0001	0.0005	0.0004	36.6	50
447873-1	Cadmium (Total)	mg/L	0.0001	<0.0001	<0.0001	0	50
447873-1	Chromium (Total)	mg/L	0.0005	0.0009	0.0007	25	30
447873-1	Copper (Total)	mg/L	0.0005	0.0044	0.0034	25.7	30
447873-1	Iron (Total)	mg/L	0.005	1.557	1.426	8.8	25
447873-1	Lead (Total)	mg/L	0.0001	0.0013	0.0015	20.3	30
447873-1	Lithium (Total)	mg/L	0.0001	0.105	0.105	0	25

Data Quality Report

Date 19/05/2016

Page 19 of 23



CERTIFICATE No:

447873

QC BATCH NO:

Laboratory Duplicate Report

Sample ID	Analyte	Units	LOR	Original Result	Duplicate Result	% RPD	Acceptance Criteria (%)
447873-1	Manganese (Total)	mg/L	0.0005	0.0236	0.0233	1.4	25
447873-1	Molybdenum (Total)	mg/L	0.0001	0.00049	0.00032	40.3	50
447873-1	Mercury (Total)	mg/L	0.0001	<0.0001	<0.0001	0	50
447873-1	Nickel (Total)	mg/L	0.0001	<0.0001	<0.0001	0	50
447873-1	Selenium (Total)	mg/L	0.0005	<0.0005	<0.0005	0	50
447873-1	Silver (Total)	mg/L	0.0001	<0.0001	<0.0001	0	50
447873-1	Strontium (Total)	mg/L	0.0001	0.9432	1.0797	13.5	25
447873-1	Tin (Total)	mg/L	0.0005	<0.0005	<0.0005	0	50
447873-1	Uranium (Total)	mg/L	0.0001	<0.0001	<0.0001	0	50
447873-1	Vanadium (Total)	mg/L	0.0001	0.0026	0.0026	0	30
447873-1	Zinc (Total)	mg/L	0.0005	0.0231	0.0231	0	25
	Method Code - ENV103						

Data Quality Report

Date 19/05/2016

Page 20 of 23



CERTIFICATE No:

447873

QC BATCH NO:

Laboratory Duplicate Report

Sample ID	Analyte	Units	LOR	Original Result	Duplicate Result	% RPD	Acceptance Criteria (%)
447873-1	Naphthalene	µg/ L	1	<1	<1	0	20
447873-1	Acenaphthylene	µg/ L	1	<1	<1	0	20
447873-1	Acenaphthene	µg/ L	1	<1	<1	0	20
447873-1	Fluorene	µg/ L	1	<1	<1	0	20
447873-1	Phenanthrene	µg/ L	1	<1	<1	0	20
447873-1	Anthracene	µg/ L	1	<1	<1	0	20
447873-1	Fluoranthene	µg/ L	1	<1	<1	0	20
447873-1	Pyrene	µg/ L	1	<1	<1	0	20
447873-1	Benz(a)anthracene	µg/ L	1	<1	<1	0	20
447873-1	Chrysene	µg/ L	1	<1	<1	0	20
447873-1	Benzo(b)fluoranthene	µg/ L	1	<1	<1	0	20
447873-1	Benzo(k)fluoranthene	µg/ L	1	<1	<1	0	20

Data Quality Report

Date 19/05/2016

Page 21 of 23



CERTIFICATE No:

447873

QC BATCH NO:

Laboratory Duplicate Report

Sample ID	Analyte	Units	LOR	Original Result	Duplicate Result	% RPD	Acceptance Criteria (%)
447873-1	Benzo(a)pyrene	µg/ L	1	<1	<1	0	20
447873-1	Indeno(1,2,3-cd)pyrene	µg/ L	1	<1	<1	0	20
447873-1	Dibenz(a,h)anthracene	µg/ L	1	<1	<1	0	20
447873-1	Benzo(g,h,i)perylene	µg/ L	1	<1	<1	0	20
	PAH Total	µg/ L	16	N/A	N/A	N/A	N/A
447873-1	2,3,4,6-Tetrachlorophenol	µg/ L	10	<10	<10	0	20
447873-1	2,4,5-Trichlorophenol	µg/ L	10	<10	<10	0	20
447873-1	2,4,6-Trichlorophenol	µg/ L	10	<10	<10	0	20
447873-1	2,4-Dichlorophenol	µg/ L	10	<10	<10	0	20
447873-1	2,4-Dimethylphenol	µg/ L	10	<10	<10	0	20
447873-1	2,6-Dichlorophenol	µg/ L	10	<10	<10	0	20
447873-1	2-Chlorophenol	µg/ L	10	<10	<10	0	20

Data Quality Report

Date 19/05/2016

Page 22 of 23



CERTIFICATE No:

447873

QC BATCH NO:

Laboratory Duplicate Report

Sample ID	Analyte	Units	LOR	Original Result	Duplicate Result	% RPD	Acceptance Criteria (%)
447873-1	2-Methylphenol	µg/ L	10	<10	<10	0	20
447873-1	2-Nitrophenol	µg/ L	10	<10	<10	0	20
447873-1	3 & 4-Methylphenol	µg/ L	20	<20	<20	0	20
447873-1	4-chloro-3-methylphenol	µg/ L	10	<10	<10	0	20
	Pentachlorophenol	µg/ L	10	N/A	N/A	N/A	N/A
447873-1	Phenol	µg/ L	10	<10	<10	0	20

Data Quality Report

Date 19/05/2016

Page 23 of 23



CERTIFICATE No: 447873

QC BATCH NO:

Surrogate Control Limit Report

Surrogate	Acceptable Criteria	
	Lower limit	Upper limit
Method Code ENV102		
Surrogate o-Terphenyl	60	130
Method Code ENV103		
<i>Surrogate</i> Nitrobenzene-d5	65	130
<i>Surrogate</i> 2-fluorobiphenyl	65	130
<i>Surrogate</i> Phenanthrene-d10	65	130
<i>Surrogate</i> 4-terphenyl-d14	65	130
<i>Surrogate</i> 2-chlorophenol-d4	60	130
<i>Surrogate</i> 2-fluorophenol	50	100
<i>Surrogate</i> 2,4,6-Tribromophenol	60	130

* - LCS Result obtained is below the LOR owing to low spike concentrations involved.