



CERTIFICATE OF ANALYSIS

Work Order : **ES2416476**
Client : **ROBERT CARR & ASSOCIATES P/L**
Contact : MS FIONA BROOKER
Address : 92 HILL STREET
CARRINGTON NSW 2294
Telephone : +61 02 4902 9200
Project : 12513e
Order number : ----
C-O-C number : ----
Sampler : Muhammad
Site : ----
Quote number : EN/222
No. of samples received : 9
No. of samples analysed : 9

Page : 1 of 10
Laboratory : Environmental Division Sydney
Contact : Danae Hambly
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 21-May-2024 15:43
Date Analysis Commenced : 21-May-2024
Issue Date : 28-May-2024 15:27



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

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

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP071: Poor duplicate precision for TPH C10-C36 due to sample matrix interferences.
- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1,2,3-cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EP080: ES2416474-4 analysed water layer for Volatile analysis (has more than half oil on the top).
- EP075(SIM): Particular sample required dilution due to matrix interferences. LOR values have been adjusted accordingly. Poor Matrix Spike and surrogate not determined due to matrix interferences.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEXN compounds spiked at 20 ug/L.
- EP071: Particular samples required dilution due to sample matrix . LOR values have been adjusted accordingly.
- EP132: Where reported, Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW1	MW2	MW3	MW4	MW6
Sampling date / time				21-May-2024 00:00	21-May-2024 00:00	21-May-2024 00:00	21-May-2024 00:00	21-May-2024 00:00
Compound	CAS Number	LOR	Unit	ES2416476-001	ES2416476-002	ES2416476-003	ES2416476-004	ES2416476-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.003	0.002	0.003	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L	0.003	<0.001	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L	0.003	0.022	0.007	0.006	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	0.004	----
Zinc	7440-66-6	0.005	mg/L	0.012	0.034	0.014	0.020	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.16	1.76	1.00	1.03	0.85
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.02	0.35	0.06	0.12
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.92	0.02	2.30	0.04	43.7
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.92	0.04	2.65	0.10	43.8
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	----	----	----	14800	----
Acenaphthylene	208-96-8	1.0	µg/L	----	----	----	<4760	----
Acenaphthene	83-32-9	1.0	µg/L	----	----	----	<4760	----
Fluorene	86-73-7	1.0	µg/L	----	----	----	8070	----
Phenanthrene	85-01-8	1.0	µg/L	----	----	----	16800	----
Anthracene	120-12-7	1.0	µg/L	----	----	----	<4760	----
Fluoranthene	206-44-0	1.0	µg/L	----	----	----	<4760	----
Pyrene	129-00-0	1.0	µg/L	----	----	----	<4760	----
Benz(a)anthracene	56-55-3	1.0	µg/L	----	----	----	<4760	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW1	MW2	MW3	MW4	MW6
Sampling date / time					21-May-2024 00:00	21-May-2024 00:00	21-May-2024 00:00	21-May-2024 00:00	21-May-2024 00:00
Compound	CAS Number	LOR	Unit		ES2416476-001	ES2416476-002	ES2416476-003	ES2416476-004	ES2416476-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Chrysene	218-01-9	1.0	µg/L		----	----	----	<4760	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		----	----	----	<4760	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		----	----	----	<4760	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		----	----	----	<4760	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		----	----	----	<4760	----
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L		----	----	----	<4760	----
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L		----	----	----	<4760	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		----	----	----	39700	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		----	----	----	<2380	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	2580	----
C10 - C14 Fraction	----	50	µg/L		90	<50	<50	5800000	----
C15 - C28 Fraction	----	100	µg/L		600	<100	<100	31200000	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	126000	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		690	<50	<50	37100000	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	3860	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	3860	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	16500000	----
>C16 - C34 Fraction	----	100	µg/L		610	<100	<100	19300000	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<14300	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		610	<100	<100	35800000	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	16500000	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	4	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW1	MW2	MW3	MW4	MW6
Sampling date / time				21-May-2024 00:00	21-May-2024 00:00	21-May-2024 00:00	21-May-2024 00:00	21-May-2024 00:00
Compound	CAS Number	LOR	Unit	ES2416476-001	ES2416476-002	ES2416476-003	ES2416476-004	ES2416476-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
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	-----	2	µg/L	<2	<2	<2	<2	----
^ Sum of BTEX	-----	1	µg/L	<1	<1	<1	4	----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	361	----
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	----	----
2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	<0.1	----	----
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	<0.05	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Benzo(g,h,i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Dibenz(a,h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Fluoranthene	206-44-0	0.1	µg/L	<0.1	0.3	0.2	----	----
Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	<0.1	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW1	MW2	MW3	MW4	MW6
Sampling date / time				21-May-2024 00:00	21-May-2024 00:00	21-May-2024 00:00	21-May-2024 00:00	21-May-2024 00:00
Compound	CAS Number	LOR	Unit	ES2416476-001	ES2416476-002	ES2416476-003	ES2416476-004	ES2416476-005
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Phenanthrene	85-01-8	0.1	µg/L	<0.1	0.1	<0.1	----	----
Pyrene	129-00-0	0.1	µg/L	<0.1	0.2	0.1	----	----
^ Sum of PAHs	----	0.05	µg/L	<0.05	----	----	----	----
^ Sum of PAHs	----	0.05	µg/L	----	0.6	0.3	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	<0.05	<0.05	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1.0	%	----	----	----	Not Determined	----
2-Chlorophenol-D4	93951-73-6	1.0	%	----	----	----	Not Determined	----
2,4,6-Tribromophenol	118-79-6	1.0	%	----	----	----	Not Determined	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1.0	%	----	----	----	Not Determined	----
Anthracene-d10	1719-06-8	1.0	%	----	----	----	Not Determined	----
4-Terphenyl-d14	1718-51-0	1.0	%	----	----	----	Not Determined	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	104	102	103	88.2	----
Toluene-D8	2037-26-5	2	%	114	115	112	109	----
4-Bromofluorobenzene	460-00-4	2	%	101	104	102	113	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	82.6	73.0	65.6	----	----
Anthracene-d10	1719-06-8	0.1	%	85.7	75.1	70.5	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	84.1	77.0	75.8	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW10	TRIP BLANK	TRIP SPIKE	QA	----
Sampling date / time				21-May-2024 00:00	17-May-2024 00:00	17-May-2024 00:00	21-May-2024 00:00	----
Compound	CAS Number	LOR	Unit	ES2416476-006	ES2416476-007	ES2416476-008	ES2416476-009	-----
				Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	0.002	----	----	0.003	----
Cadmium	7440-43-9	0.0001	mg/L	0.0002	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	0.003	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	<0.001	----
Nickel	7440-02-0	0.001	mg/L	0.125	----	----	0.022	----
Lead	7439-92-1	0.001	mg/L	0.005	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	0.231	----	----	0.038	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	<0.0001	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.22	----	----	1.68	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	<0.01	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.05	----	----	0.04	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.05	----	----	0.04	----
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 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	----	<20	----	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	<20	----	<20	----
>C10 - C16 Fraction	----	100	µg/L	----	----	----	<100	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW10	TRIP BLANK	TRIP SPIKE	QA	----
Sampling date / time					21-May-2024 00:00	17-May-2024 00:00	17-May-2024 00:00	21-May-2024 00:00	----
Compound	CAS Number	LOR	Unit		ES2416476-006	ES2416476-007	ES2416476-008	ES2416476-009	-----
					Result	Result	Result	Result	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C16 - C34 Fraction	----	100	µg/L		----	----	----	<100	----
>C34 - C40 Fraction	----	100	µg/L		----	----	----	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		----	----	----	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		----	----	----	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		----	<1	20	<1	----
Toluene	108-88-3	2	µg/L		----	<2	18	<2	----
Ethylbenzene	100-41-4	2	µg/L		----	<2	19	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	<2	19	<2	----
ortho-Xylene	95-47-6	2	µg/L		----	<2	20	<2	----
^ Total Xylenes	----	2	µg/L		----	<2	39	<2	----
^ Sum of BTEX	----	1	µg/L		----	<1	96	<1	----
Naphthalene	91-20-3	5	µg/L		----	<5	18	<5	----
EP132B: Polynuclear Aromatic Hydrocarbons									
3-Methylcholanthrene	56-49-5	0.1	µg/L		----	----	----	<0.1	----
2-Methylnaphthalene	91-57-6	0.1	µg/L		----	----	----	<0.1	----
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L		----	----	----	<0.1	----
Acenaphthene	83-32-9	0.1	µg/L		----	----	----	<0.1	----
Acenaphthylene	208-96-8	0.1	µg/L		----	----	----	<0.1	----
Anthracene	120-12-7	0.1	µg/L		----	----	----	<0.1	----
Benz(a)anthracene	56-55-3	0.1	µg/L		----	----	----	<0.1	----
Benzo(a)pyrene	50-32-8	0.05	µg/L		----	----	----	<0.05	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L		----	----	----	<0.1	----
Benzo(e)pyrene	192-97-2	0.1	µg/L		----	----	----	<0.1	----
Benzo(g,h,i)perylene	191-24-2	0.1	µg/L		----	----	----	<0.1	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L		----	----	----	<0.1	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW10	TRIP BLANK	TRIP SPIKE	QA	----
Sampling date / time				21-May-2024 00:00	17-May-2024 00:00	17-May-2024 00:00	21-May-2024 00:00	----
Compound	CAS Number	LOR	Unit	ES2416476-006	ES2416476-007	ES2416476-008	ES2416476-009	-----
				Result	Result	Result	Result	----
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Chrysene	218-01-9	0.1	µg/L	----	----	----	<0.1	----
Coronene	191-07-1	0.1	µg/L	----	----	----	<0.1	----
Dibenz(a,h)anthracene	53-70-3	0.1	µg/L	----	----	----	<0.1	----
Fluoranthene	206-44-0	0.1	µg/L	----	----	----	0.4	----
Fluorene	86-73-7	0.1	µg/L	----	----	----	<0.1	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	----	----	----	<0.1	----
Naphthalene	91-20-3	0.1	µg/L	----	----	----	<0.1	----
Perylene	198-55-0	0.1	µg/L	----	----	----	<0.1	----
Phenanthrene	85-01-8	0.1	µg/L	----	----	----	0.2	----
Pyrene	129-00-0	0.1	µg/L	----	----	----	0.3	----
^ Sum of PAHs	----	0.05	µg/L	----	----	----	0.9	----
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	----	----	----	<0.05	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	----	83.5	98.1	99.6	----
Toluene-D8	2037-26-5	2	%	----	92.8	104	109	----
4-Bromofluorobenzene	460-00-4	2	%	----	82.1	106	99.0	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	----	----	----	76.6	----
Anthracene-d10	1719-06-8	0.1	%	----	----	----	82.8	----
4-Terphenyl-d14	1718-51-0	0.1	%	----	----	----	82.4	----



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	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	43	135
Anthracene-d10	1719-06-8	48	138
4-Terphenyl-d14	1718-51-0	48	144



QUALITY CONTROL REPORT

Work Order	: ES2416476	Page	: 1 of 11
Client	: ROBERT CARR & ASSOCIATES P/L	Laboratory	: Environmental Division Sydney
Contact	: MS FIONA BROOKER	Contact	: Danae Hambly
Address	: 92 HILL STREET CARRINGTON NSW 2294	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 4902 9200	Telephone	: +61-2-8784 8555
Project	: 12513e	Date Samples Received	: 21-May-2024
Order number	: ----	Date Analysis Commenced	: 21-May-2024
C-O-C number	: ----	Issue Date	: 28-May-2024
Sampler	: Muhammad		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 9		
No. of samples analysed	: 9		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

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

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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.

Laboratory Duplicate (DUP) Report

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5808048)									
ES2416357-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0002	<0.0001	87.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	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: Nickel	7440-02-0	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.012	0.013	0.0	No Limit
EW2402355-009	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: Chromium	7440-47-3	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: 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	0.010	0.010	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 5808047)									
EM2408193-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2415927-004	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.1 µg/L	<0.0001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 5808051)									
EW2402371-001	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: 5816080)									

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5816080) - continued									
ES2416639-003	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	8.80	8.69	1.3	0% - 20%
ES2416476-003	MW3	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.00	0.97	3.4	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5806003)									
ES2416476-006	MW10	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2416421-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5816079)									
ES2415927-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.09	0.09	0.0	No Limit
ES2416472-007	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.44	0.42	3.6	0% - 20%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5816081)									
ES2416476-003	MW3	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	2.65	2.70	1.9	0% - 20%
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5806638)									
ES2416476-004	MW4	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5 (4760)*	µg/L	<4760	<4760	0.0	No Limit
		EP075(SIM): Naphthalene	91-20-3	1 (4760)*	µg/L	14800	16700	12.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1 (4760)*	µg/L	<4760	<4760	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1 (4760)*	µg/L	<4760	<4760	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	1 (4760)*	µg/L	8070	8510	5.3	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1 (4760)*	µg/L	16800	23600	33.7	No Limit
		EP075(SIM): Anthracene	120-12-7	1 (4760)*	µg/L	<4760	<4760	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1 (4760)*	µg/L	<4760	<4760	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	1 (4760)*	µg/L	<4760	<4760	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1 (4760)*	µg/L	<4760	<4760	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	1 (4760)*	µg/L	<4760	<4760	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1 (4760)*	µg/L	<4760	<4760	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1 (4760)*	µg/L	<4760	<4760	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1 (4760)*	µg/L	<4760	<4760	0.0	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1 (4760)*	µg/L	<4760	<4760	0.0	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1 (4760)*	µg/L	<4760	<4760	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5806633)									
ES2416476-001	MW1	EP071: C15 - C28 Fraction	----	100	µg/L	600	600	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	90	90	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5806639)									
ES2416476-004	MW4	EP071: C15 - C28 Fraction	----	100 (14300)*	µg/L	31200000	# 20800000	39.8	0% - 20%
		EP071: C10 - C14 Fraction	----	50 (14300)*	µg/L	5800000	# 7310000	23.0	0% - 20%
		EP071: C29 - C36 Fraction	----	50 (14300)*	µg/L	126000	52100	83.4	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5808069)									

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 Work Order : ES2416476
 Client : ROBERT CARR & ASSOCIATES P/L
 Project : 12513e



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5808069) - continued									
ES2416416-018	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2416476-002	MW2	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5806633)									
ES2416476-001	MW1	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	610	610	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5806639)									
ES2416476-004	MW4	EP071: >C10 - C16 Fraction	----	100 (14300)*	µg/L	16500000	15200000	8.7	0% - 20%
		EP071: >C16 - C34 Fraction	----	100 (14300)*	µg/L	19300000	# 13300000	36.6	0% - 20%
		EP071: >C34 - C40 Fraction	----	100 (14300)*	µg/L	<14300	<14300	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5808069)									
ES2416416-018	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2416476-002	MW2	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 5808069)									
ES2416416-018	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	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
ES2416476-002	MW2	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	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
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5806601)									
ES2416476-001	MW1	EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: 7,12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	0.0	No Limit

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 Work Order : ES2416476
 Client : ROBERT CARR & ASSOCIATES P/L
 Project : 12513e



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5806601) - continued									
ES2416476-001	MW1	EP132: Benzo(b+j)fluoranthene	205-99-2	0.1	µg/L	<0.1	<0.1	0.0	No Limit
			205-82-3						
		EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Benzo(g,h,i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Dibenz(a,h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Indeno(1,2,3-cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	0.0	No Limit



Method Blank (MB) and Laboratory Control Sample (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**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			LCS	Low
EG020F: Dissolved Metals by ICP-MS (QCLot: 5808048)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.2	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	90.0	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	88.0	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	87.7	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	88.0	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	87.4	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	90.3	81.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 5808047)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	103	83.0	105
EG035F: Dissolved Mercury by FIMS (QCLot: 5808051)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	99.4	83.0	105
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5816080)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	102	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5806003)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	101	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5816079)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	92.7	91.0	113
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5816081)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	94.2	91.0	113
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5806638)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	75.6	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	77.3	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	74.1	62.2	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	73.3	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	86.8	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	85.9	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	90.2	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	93.6	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	86.3	64.1	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	96.9	62.5	116



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5806638) - continued								
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	5 µg/L	81.0	61.7	119
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	99.5	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	91.2	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	84.5	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	90.6	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	92.3	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5806633)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	65.0	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	65.9	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	92.6	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5806639)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	79.0	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	103	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	99.5	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5808069)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	79.2	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5806633)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	66.7	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	75.1	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	81.1	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5806639)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	69.7	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	102	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	95.1	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5808069)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	78.7	75.0	127
EP080: BTEXN (QCLot: 5808069)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	97.3	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	98.4	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	97.9	73.8	122
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	100	73.0	122
	106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	102	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	93.7	75.5	124



Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
Method: Compound	CAS Number	LOR	Unit	Result				
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 5806601)								
EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	2 µg/L	92.3	60.0	120
EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	2 µg/L	73.9	59.0	123
EP132: 7,12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	2 µg/L	87.9	36.0	144
EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	2 µg/L	76.1	64.0	122
EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	2 µg/L	77.6	64.0	126
EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	2 µg/L	82.8	65.0	127
EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	2 µg/L	87.3	64.0	130
EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	2 µg/L	85.0	64.0	126
EP132: Benzo(b+j)fluoranthene	205-99-2	0.1	µg/L	<0.1	2 µg/L	84.9	62.0	126
	205-82-3							
EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	2 µg/L	85.0	62.0	126
EP132: Benzo(g,h,i)perylene	191-24-2	0.1	µg/L	<0.1	2 µg/L	84.7	56.0	126
EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	2 µg/L	82.8	68.0	130
EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	2 µg/L	84.9	66.0	130
EP132: Coronene	191-07-1	0.1	µg/L	<0.1	2 µg/L	85.3	35.0	133
EP132: Dibenzo(a,h)anthracene	53-70-3	0.1	µg/L	<0.1	2 µg/L	83.3	58.0	128
EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	2 µg/L	85.5	65.0	127
EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	2 µg/L	79.2	64.0	124
EP132: Indeno(1,2,3-cd)pyrene	193-39-5	0.1	µg/L	<0.1	2 µg/L	84.6	57.0	127
EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	2 µg/L	70.2	54.0	128
EP132: Perylene	198-55-0	0.1	µg/L	<0.1	2 µg/L	84.4	66.0	130
EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	2 µg/L	81.1	65.0	129
EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	2 µg/L	82.2	66.0	128

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			
				Spike Concentration	SpikeRecovery(%)	Acceptable Limits (%)	
					MS	Low	High
Laboratory sample ID	Sample ID	Method: Compound	CAS Number				
EG020F: Dissolved Metals by ICP-MS (QCLot: 5808048)							
ES2416357-002	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	106	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	106	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	100	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	102	70.0	130



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 5808048) - continued							
ES2416357-002	Anonymous	EG020A-F: Lead	7439-92-1	1 mg/L	102	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	101	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	104	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5808047)							
EM2408193-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	84.4	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5808051)							
ES2416476-009	QA	EG035F: Mercury	7439-97-6	0.01 mg/L	73.1	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5816080)							
ES2416476-003	MW3	EK055G: Ammonia as N	7664-41-7	1 mg/L	77.3	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5806003)							
ES2416421-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	105	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5816079)							
ES2415927-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	97.9	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5816081)							
ES2416476-003	MW3	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5806638)							
ES2416476-004	MW4	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	# 0.0	70.0	130
		EP075(SIM): Pyrene	129-00-0	20 µg/L	# Not Determined	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5806633)							
ES2416476-001	MW1	EP071: C10 - C14 Fraction	----	200 µg/L	99.3	70.0	130
		EP071: C15 - C28 Fraction	----	250 µg/L	119	71.0	130
		EP071: C29 - C36 Fraction	----	200 µg/L	107	67.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5806639)							
ES2416476-004	MW4	EP071: C10 - C14 Fraction	----	200 µg/L	# Not Determined	70.0	130
		EP071: C15 - C28 Fraction	----	250 µg/L	# Not Determined	71.0	130
		EP071: C29 - C36 Fraction	----	200 µg/L	# Not Determined	67.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5808069)							
ES2416416-018	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	91.6	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5806633)							
ES2416476-001	MW1	EP071: >C10 - C16 Fraction	----	250 µg/L	86.9	70.0	130



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5806633) - continued							
ES2416476-001	MW1	EP071: >C16 - C34 Fraction	----	350 µg/L	100	75.0	130
		EP071: >C34 - C40 Fraction	----	150 µg/L	72.2	67.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5806639)							
ES2416476-004	MW4	EP071: >C10 - C16 Fraction	----	250 µg/L	# Not Determined	70.0	130
		EP071: >C16 - C34 Fraction	----	350 µg/L	# Not Determined	75.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5808069)							
ES2416416-018	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	89.5	70.0	130
EP080: BTEXN (QCLot: 5808069)							
ES2416416-018	Anonymous	EP080: Benzene	71-43-2	25 µg/L	100	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	100	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	104	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	104	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	107	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	113	70.0	130
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 5806601)							
ES2416476-001	MW1	EP132: 3-Methylcholanthrene	56-49-5	2 µg/L	99.1	59.0	115
		EP132: 2-Methylnaphthalene	91-57-6	2 µg/L	78.3	46.0	120
		EP132: 7,12-Dimethylbenz(a)anthracene	57-97-6	2 µg/L	129	21.0	135
		EP132: Acenaphthene	83-32-9	2 µg/L	80.2	62.0	114
		EP132: Acenaphthylene	208-96-8	2 µg/L	83.5	61.0	119
		EP132: Anthracene	120-12-7	2 µg/L	82.0	68.0	116
		EP132: Benz(a)anthracene	56-55-3	2 µg/L	84.8	67.0	122
		EP132: Benzo(a)pyrene	50-32-8	2 µg/L	82.1	72.0	114
		EP132: Benzo(b+j)fluoranthene	205-99-2	2 µg/L	82.3	69.0	119
			205-82-3				
		EP132: Benzo(e)pyrene	192-97-2	2 µg/L	81.2	71.0	119
		EP132: Benzo(g,h,i)perylene	191-24-2	2 µg/L	81.8	49.0	133
		EP132: Benzo(k)fluoranthene	207-08-9	2 µg/L	78.7	71.0	124
		EP132: Chrysene	218-01-9	2 µg/L	82.2	70.0	118
		EP132: Coronene	191-07-1	2 µg/L	94.4	29.0	138
		EP132: Dibenz(a,h)anthracene	53-70-3	2 µg/L	82.0	60.0	122
		EP132: Fluoranthene	206-44-0	2 µg/L	78.2	65.0	121
		EP132: Fluorene	86-73-7	2 µg/L	82.6	63.0	118
		EP132: Indeno(1,2,3.cd)pyrene	193-39-5	2 µg/L	83.1	57.0	123
				EP132: Naphthalene	91-20-3	2 µg/L	74.6



Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 5806601) - continued							
ES2416476-001	MW1	EP132: Perylene	198-55-0	2 µg/L	80.8	71.0	118
		EP132: Phenanthrene	85-01-8	2 µg/L	80.1	67.0	120
		EP132: Pyrene	129-00-0	2 µg/L	77.4	70.0	117



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2416476	Page	: 1 of 8
Client	: ROBERT CARR & ASSOCIATES P/L	Laboratory	: Environmental Division Sydney
Contact	: MS FIONA BROOKER	Telephone	: +61-2-8784 8555
Project	: 12513e	Date Samples Received	: 21-May-2024
Site	: ----	Issue Date	: 28-May-2024
Sampler	: Muhammad	No. of samples received	: 9
Order number	: ----	No. of samples analysed	: 9

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Laboratory Control outliers occur.
- Duplicate outliers exist - please see following pages for full details.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, where applicable to the methodology, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

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



Outliers : Quality Control Samples

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							
EP080/071: Total Petroleum Hydrocarbons	ES2416476--004	MW4	C10 - C14 Fraction	----	23.0 %	0% - 20%	RPD exceeds LOR based limits
EP080/071: Total Petroleum Hydrocarbons	ES2416476--004	MW4	C15 - C28 Fraction	----	39.8 %	0% - 20%	RPD exceeds LOR based limits
EP080/071: Total Recoverable Hydrocarbons - NEPM 2	ES2416476--004	MW4	>C16 - C34 Fraction	----	36.6 %	0% - 20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	ES2416476--003	MW3	Nitrite + Nitrate as N	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	ES2416476--004	MW4	Acenaphthene	83-32-9	0.0 %	70.0-130%	Recovery less than lower data quality objective
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	ES2416476--004	MW4	Pyrene	129-00-0	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080/071: Total Petroleum Hydrocarbons	ES2416476--004	MW4	C10 - C14 Fraction	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080/071: Total Petroleum Hydrocarbons	ES2416476--004	MW4	C15 - C28 Fraction	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080/071: Total Petroleum Hydrocarbons	ES2416476--004	MW4	C29 - C36 Fraction	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080/071: Total Recoverable Hydrocarbons - NEPM 2	ES2416476--004	MW4	>C10 - C16 Fraction	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080/071: Total Recoverable Hydrocarbons - NEPM 2	ES2416476--004	MW4	>C16 - C34 Fraction	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for **VOC in soils** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



Matrix: **WATER** Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) MW1, MW3, MW10, MW2, MW4, QA	21-May-2024	----	----	----	22-May-2024	17-Nov-2024	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) MW1, MW3, MW10, MW2, MW4, QA	21-May-2024	----	----	----	24-May-2024	18-Jun-2024	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) MW1, MW3, MW6, QA MW2, MW4, MW10,	21-May-2024	----	----	----	27-May-2024	18-Jun-2024	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) MW1, MW3, MW6, QA MW2, MW4, MW10,	21-May-2024	----	----	----	21-May-2024	23-May-2024	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) MW1, MW3, MW6, QA MW2, MW4, MW10,	21-May-2024	----	----	----	27-May-2024	18-Jun-2024	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM)) MW4	21-May-2024	23-May-2024	28-May-2024	✓	25-May-2024	02-Jul-2024	✓



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) MW1,	QA	21-May-2024	22-May-2024	28-May-2024	✓	23-May-2024	01-Jul-2024	✓
Amber Glass Bottle - Unpreserved (EP071) MW2,	MW3	21-May-2024	22-May-2024	28-May-2024	✓	25-May-2024	01-Jul-2024	✓
Amber Glass Bottle - Unpreserved (EP071) MW4		21-May-2024	23-May-2024	28-May-2024	✓	28-May-2024	02-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) TRIP BLANK		17-May-2024	23-May-2024	31-May-2024	✓	24-May-2024	31-May-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) MW1, MW3,	MW2, QA	21-May-2024	23-May-2024	04-Jun-2024	✓	24-May-2024	04-Jun-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) MW4		21-May-2024	23-May-2024	04-Jun-2024	✓	27-May-2024	04-Jun-2024	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) MW1,	QA	21-May-2024	22-May-2024	28-May-2024	✓	23-May-2024	01-Jul-2024	✓
Amber Glass Bottle - Unpreserved (EP071) MW2,	MW3	21-May-2024	22-May-2024	28-May-2024	✓	25-May-2024	01-Jul-2024	✓
Amber Glass Bottle - Unpreserved (EP071) MW4		21-May-2024	23-May-2024	28-May-2024	✓	28-May-2024	02-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) TRIP BLANK		17-May-2024	23-May-2024	31-May-2024	✓	24-May-2024	31-May-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) MW1, MW3,	MW2, QA	21-May-2024	23-May-2024	04-Jun-2024	✓	24-May-2024	04-Jun-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) MW4		21-May-2024	23-May-2024	04-Jun-2024	✓	27-May-2024	04-Jun-2024	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) TRIP BLANK		17-May-2024	23-May-2024	31-May-2024	✓	24-May-2024	31-May-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) TRIP SPIKE		17-May-2024	23-May-2024	31-May-2024	✓	27-May-2024	31-May-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) MW1, MW3,	MW2, QA	21-May-2024	23-May-2024	04-Jun-2024	✓	24-May-2024	04-Jun-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) MW4		21-May-2024	23-May-2024	04-Jun-2024	✓	27-May-2024	04-Jun-2024	✓
EP132B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP132) MW1		21-May-2024	22-May-2024	28-May-2024	✓	23-May-2024	01-Jul-2024	✓
Amber Glass Bottle - Unpreserved (EP132) MW2, QA	MW3, QA	21-May-2024	22-May-2024	28-May-2024	✓	24-May-2024	01-Jul-2024	✓



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(were) 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		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	3	25	12.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	3	25	12.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	1	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	4	25.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	5	40.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	5	40.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	5	40.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Matrix Spikes (MS) - Continued							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	5	40.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm 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	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm 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 SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO ₂ - B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Nitrate is reduced to nitrite by way of a chemical reduction 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 Schedule B(3)
Nitrite and Nitrate as N (NO _x) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Combined oxidised Nitrogen (NO ₂ +NO ₃) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 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 the QC requirements of NEPM Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 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 Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 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 the QC requirements of NEPM Schedule B(3)
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	In house: Referenced to USEPA 3640 (GPC Cleanup), 8270 GCMS Capillary column, SIM mode. This method is compliant with NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
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Page : 8 of 8
Work Order : ES2416476
Client : ROBERT CARR & ASSOCIATES P/L
Project : 12513e



Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Sep. Funnel Extraction /Acetylation of Phenolic Compounds	ORG14-AC	WATER	In house: Referenced to USEPA 3510 (Extraction) / In-house (Acetylation): A 1L sample is extracted into dichloromethane and concentrated to 1 mL with exchange into cyclohexane. Phenolic compounds are reacted with acetic anhydride to yield phenyl acetates suitable for ultra-trace analysis. This method is compliant with NEPM Schedule B(3) . 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 purging.



CHAIN OF CUSTODY

ALS Laboratory:
please tick →

ADLAIDE 21 Burma Road Pooraka SA 5095
Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 48 Callomondah Drive Clifton QLD 4850
Ph: 07 7471 5800 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740
Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGE 27 Sydney Road Mudgee NSW 2850
Ph: 02 6372 8735 E: mudgee.mai@alsglobal.com

NEWCASTLE 5/565 Martland Rd Mayfield West NSW 2304
Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
NOWRA 4/13 Geary Place North Nowra NSW 2541
Ph: 024423 2063 E: nowra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6060
Ph: 08 6209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164
Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-15 Desma Court Bohle QLD 4816
Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: perth.mla@alsglobal.com

CLIENT: RCA Australia (ROBCAR)	TURNAROUND REQUIREMENTS : ☐ Standard TAT (List due date): 28-5-24	FOR LABORATORY USE ONLY (Circle)	
OFFICE: 92 Hill Street, Carrington	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	Custody Seal intact? Yes No	Free ice/frozen ice bricks present upon receipt? Yes No
RCA Ref No: 12513e	ALS QUOTE NO.: SYBQ_400_18	Random Sample Temperature on Receipt: °C	Other comment: 6.1
PROJECT MANAGER: Fiona Brooker CONTACT PH: 0408 687 529		COC: 1	RECEIVED BY: WS 21/5/24
SAMPLER: Muhammad	SAMPLER MOBILE: 0401905593	OF: 1	RECEIVED BY: C.C
COC emailed to ALS? (NO)	EDD FORMAT (or default):	DATE/TIME: 21/5/24 1545	DATE/TIME: 21/5 19:47
Email Reports to: administrator@rca.com.au + enviro@rca.com.au			
Email invoice to: as above			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION			ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).							Additional Information
LAB ID	Sample ID	Date / Time	Matrix	Type & Preservative (refer to codes below)	Total Containers	W05 TRH, BTEX, 5 dissolved metals	EP132B UT PAH	PAH	Please report Naphthalene results in BOTH BTEX and PAH suites	EK05SG Ammonia	NT-04 Nitrite + Nitrate	W-18 TRH C6-C9 / BTEX	W-02 8-metals	E-MAILED Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
✓	MW1		Water	2*500mL AG, 2*100mL AG, 2 purple vials, 1 purple plastic, 1 red plastic, 1 500mL green plastic	9	x	x		x	x	x			Double Sample provided for internal QA
✓	MW2		Water	1*500mL AG, 1*100mL AG, 2 purple vials, 1 purple plastic, 1 red plastic, 1 500mL green plastic	7	x	x		x	x	x			
✓	MW3		Water	1*500mL AG, 1*100mL AG, 2 purple vials, 1 purple plastic, 1 red plastic, 1 500mL green plastic	7	x	x		x	x	x			
✓	MW4		Water	1*500mL AG, 1*100mL AG, 2 purple vials, 1 purple plastic, 1 red plastic, 1 500mL green plastic	7	x		x	x	x	x			WATERS CONTAIN HIGH CONCENTRATIONS OF HYDROCARBONS
✓	MW6		Water	1 purple plastic, 1 500mL green plastic	2					x	x			
✓	MW10		Water	1 purple plastic, 1 red plastic, 1 500mL green plastic	3					x	x		x	
✓	TRIP BLANK	17/5	Water	vial	1							x		
✓	TRIP SPIKE	17/5	Water	vial	1							x		
✓	QA		Water		7	x	x		x	x	x			
TOTAL						44	45	45	1	45	6	6	2	

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

Environmental Division
Sydney
Work Order Reference
ES2416476



Telephone : + 61-2-8784 8555



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2416476**

Client : **ROBERT CARR & ASSOCIATES P/L**
Contact : **MS FIONA BROOKER**
Address : **92 HILL STREET
CARRINGTON NSW 2294**

E-mail : **fionab@rca.com.au**
Telephone : **+61 02 4902 9200**
Facsimile : **+61 02 4902 9299**

Project : **12513e**
Order number : **----**
C-O-C number : **----**
Site : **----**
Sampler : **Muhammad**

Laboratory : **Environmental Division Sydney**
Contact : **Danae Hambly**
Address : **277-289 Woodpark Road Smithfield
NSW Australia 2164**

E-mail : **danae.hambly@alsglobal.com**
Telephone : **+61-2-8784 8555**
Facsimile : **+61-2-8784 8500**

Page : **1 of 3**
Quote number : **EN2023ROBCAR0002 (EN/222)**
QC Level : **NEPM 2013 B3 & ALS QC Standard**

Dates

Date Samples Received : **21-May-2024 15:43**
Client Requested Due : **28-May-2024**
Date

Issue Date : **21-May-2024**
Scheduled Reporting Date : **28-May-2024**

Delivery Details

Mode of Delivery : **Undefined**
No. of coolers/boxes : **1**
Receipt Detail :

Security Seal : **Not Available**
Temperature : **6.1°C - Ice present**
No. of samples received / analysed : **9 / 9**

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months $\pm$ 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EP132B(PAH) Ultra Trace Polynuclear Aromatic Compounds	WATER - NT-04 Nitrite and Nitrate	WATER - W-02 8 Metals	WATER - W-05 TRH/BTEXN/8 Metals	WATER - W-18 TRH(C6 - C9)/BTEXN	WATER - W-26 TRH/BTEXN/PAH/8 Metals
ES2416476-001	21-May-2024 00:00	MW1	✓	✓	✓		✓		
ES2416476-002	21-May-2024 00:00	MW2	✓	✓	✓		✓		
ES2416476-003	21-May-2024 00:00	MW3	✓	✓	✓		✓		
ES2416476-004	21-May-2024 00:00	MW4	✓		✓				✓
ES2416476-005	21-May-2024 00:00	MW6	✓		✓				
ES2416476-006	21-May-2024 00:00	MW10	✓		✓	✓			
ES2416476-007	17-May-2024 00:00	TRIP BLANK						✓	
ES2416476-009	21-May-2024 00:00	QA	✓	✓	✓		✓		

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP080 BTEXN
ES2416476-008	17-May-2024 00:00	TRIP SPIKE	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.



Requested Deliverables

ADMINISTRATOR

- *AU Certificate of Analysis - NATA (COA)	Email	administrator@rca.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	administrator@rca.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	administrator@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	administrator@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	administrator@rca.com.au
- Chain of Custody (CoC) (COC)	Email	administrator@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	administrator@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	administrator@rca.com.au
- EDI Format - XTab (XTAB)	Email	administrator@rca.com.au

ALL INVOICES

- A4 - AU Tax Invoice (INV)	Email	administrator@rca.com.au
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ENVIRO

- *AU Certificate of Analysis - NATA (COA)	Email	enviro@rca.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	enviro@rca.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	enviro@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	enviro@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	enviro@rca.com.au
- Chain of Custody (CoC) (COC)	Email	enviro@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	enviro@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	enviro@rca.com.au
- EDI Format - XTab (XTAB)	Email	enviro@rca.com.au

FIONA BROOKER

- *AU Certificate of Analysis - NATA (COA)	Email	fionab@rca.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	fionab@rca.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	fionab@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	fionab@rca.com.au
- Chain of Custody (CoC) (COC)	Email	fionab@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	fionab@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	fionab@rca.com.au
- EDI Format - XTab (XTAB)	Email	fionab@rca.com.au