ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2234911**	Page	: 1 of 4
Client	: **PF FORMATION**	Laboratory	: Environmental Division Sydney
Contact	: Josh Graham	Contact	: Customer Services ES
Address	: 1 Patrica Fay Drive MAROOTA 2756	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: ----	Date Samples Received	: 29-Sep-2022 14:50
Order number	: ----	Date Analysis Commenced	: 01-Oct-2022
C-O-C number	: ----	Issue Date	: 07-Oct-2022 17:33
Sampler	: Melissa Mass		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

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
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, 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.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EA010-P LCS recovery for Conductivity falls outside ALS Dynamic Control Limit . However, it is within the acceptance criteria based on ALS DQO. No further action is required.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	LOT 198	PIT 5	PIT 4	MAROOTA LODGE DAM 1	MAROOTA LODGE DAM 2
				Sampling date / time	29-Sep-2022 08:15	29-Sep-2022 10:00	29-Sep-2022 10:35	29-Sep-2022 11:00	29-Sep-2022 11:05
					ES2234911-001	ES2234911-002	ES2234911-003	ES2234911-004	ES2234911-005
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		7.27	6.55	7.34	6.95	7.18
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		220	64	251	106	247
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		8	28	18	15	18
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		10	5	29	14	39
Total Alkalinity as CaCO3	----	1	mg/L		10	5	29	14	39
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		34	6	27	15	42
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		38	13	34	16	19
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		7	1	14	6	19
Magnesium	7439-95-4	1	mg/L		7	1	7	2	6
Sodium	7440-23-5	1	mg/L		21	10	18	12	17
Potassium	7440-09-7	1	mg/L		4	2	8	2	9
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		----	----	----	<0.01	2.30
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		----	----	----	0.2	3.9
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		----	----	----	0.2	6.2
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		----	----	----	0.01	1.12
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		1.98	0.59	2.10	1.04	2.19
ø Total Cations	----	0.01	meq/L		1.94	0.62	2.26	1.04	2.41
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L		<5	<5	<5	<5	<5