## Appendix A

Groundwater SSTLs









## C.1 Field water quality SSTLs

The SSTLs that are applied to field water quality parameters are outlined in Table C.1.

Table C.1 Field parameter water quality SSTLs

Water Quality	Shep	parton Forn	nation	Loxton	Parilla Sands	Aquifer	Lower Re	nmark Grou	ıp Aquifer
Parameter	Green	Yellow	Red	Green	Yellow	Red	Green	Yellow	Red
pH Upper	<8.78	<8.78	>9	<8.78	≥8.78	>9	≤8.24	>8.24	>9
pH Lower	>5.60	>5.60	<4	>5.73	≤5.73	<4	≥6.11	<6.11	<4
EC (mS/cm)	<99.191	<99.191	>112.717	<113.808	≥113.808	>129.328	<14.948	≥14.948	>16.986
Total Iron	<9.422	<9.422	>10.706	<10.588	≥10.588	>12.031	<3.670	≥3.670	>4.170

## C.2 Laboratory water quality SSTLs

The SSTLs that are applied to the results of laboratory analysed water quality samples are shown in Table C.2.

Table C.2 Laboratory water quality SSTLs

Water Quality	Sheppart	on Formation	on	Loxton Pa	ırilla Sands A	Aquifer	Lower Re	nmark Grou	p Aquifer
Parameter	Green	Yellow	Red	Green	Yellow	Red	Green	Yellow	Red
Indirect - Adverse I	Risk to Bene	eficial Users							
Total Alkalinity (mg/L CaCO3)	<628	≥628	>754	<727	≥727	>823	<639	≥639	>767
Calcium (mg/L)	<1,112	≥1,112	>1,335	<1,220	≥1,220	>1,464	<101	≥101	>121
Magnesium (mg/L	<3,219	≥3,219	>3,863	<3,324	≥3,324	>3,989	<130	≥130	>156
Sodium (mg/L)	<23586	≥23586	>28303	<24381	≥24381	>29258	<2880	≥2880	>3456
Potassium (mg/L)	<141	≥141	>169	<105	≥105	>126	<47	≥47	>56
Sulphate (mg/L)	<8254	≥8254	>9905	<9642	≥9642	>11570	<4	≥4	>5
Chloride (mg/L)	<42672	≥42672	>51206	<41875	≥41875	>50250	<4556	≥4556	>5468
Direct – Adverse Ris	k to Benefic	ial Users							
pH Upper	<8.78	≥8.78	>9	<8.78	≥8.78	>9	≤8.24	>8.24	>9
pH Lower	>5.60	≤5.60	<4	>5.73	≤5.73	<4	≥6.11	<6.11	<4
Total Alkalinity (mg/L CaCO3)	<628	≥628	>754	<727	≥727	>873	<639	≥639	>767
Total Dissolved Solids	<64474	≥64474	>73266	<73975	≥73975	>84063	<9716	≥9716	>11041
Al (mg/L)	<0.129	≥0.129	5	<0.129	≥0.129	5	<0.283	≥0.283	5
Ag (mg/L)	<0.01	≥001	>0.05	<0.01	≥0.01	>0.05	<0.01	≥0.01	>0.05
As (mg/L)	<0.026	≥0.026	>0.1	<0.020	≥0.02	>0.1	LOR	LOR	>0.1
B (mg/L)	<0.5	≥0.5	>1.0	<0.5	≥0.5	≥1.0	<0.5	≥0.5	>1.0

S190512 | RP 1 | v2 A.1

Table C.2 Laboratory water quality SSTLs

Water Quality	Sheppart	ton Formati	on	Loxton Pa	ırilla Sands /	Aquifer	Lower Re	nmark Grou	ıp Aquifer
Parameter	Green	Yellow	Red	Green	Yellow	Red	Green	Yellow	Red
Be (mg/L)	<0.1	≥0.1	>0.5	<0.1	≥0.1	>0.5	<0.1	≥0.1	>0.5
Bi (mg/L)	<0.01	≥0.01	>0.05	<0.01	≥0.01	>0.05	<0.01	≥0.01	>0.05
Cd (mg/L)	<0.01	≥0.01	>0.05	<0.01	≥0.01	>0.05	<0.01	≥0.01	>0.05
Co (mg/L)	<0.05	≥0.05	>0.1	<0.05	≥0.05	>0.1	<0.05	≥0.05	>0.1
Cr (mg/L)	<0.1	≥0.1	>1.0	<0.1	≥0.1	>1.0	<0.1	≥0.1	>1.0
Cu (mg/L)	<0.042	≥0.042	>0.2	<0.018	≥0.018	>0.2	<0.004	≥0.004	>0.2
F (mg/L)	<1.0	≥1.0	>2.0	<1.0	≥1.0	>2.0	<1.0	≥1.0	>2.0
Fe (mg/L	<9.422	≥9.422	>10.706	<10.588	≥10.588	>12.031	<3.670	≥3.670	>4.170
Li (mg/L)	<0.233	≥0.233	>2.5	<0.283	≥0.283	>2.5	<0.122	≥0.122	>2.5
Mn (mg/L)	<1.472	≥1.472	>1.673	<1.342	≥1.342	>1.525	<0.0822	≥0.082	>0.093
Mo (mg/L)	<0.024	≥0.024	>0.028	<0.007	≥0.007	>0.01	LOR	≥LOR	>0.01
Ni (mg/L)	<0.038	≥0.038	>0.2	<0.009	≥0.009	>0.2	LOR	≥LOR	>0.2
Pb (mg/L)	<2.0	≥2.0	>5.0	<2.0	≥2.0	>5.0	<2.0	≥2.0	>5.0
Sb (mg/L)	<0.01	≥0.01	>0.05	<0.01	≥0.01	>0.05	<0.01	≥0.01	>0.05
Se (mg/L)	<0.02	≥0.02	>0.05	<0.02	≥0.02	>0.05	<0.02	≥0.02	>0.05
Sr (mg/L)	<29.964	≥26.964	>30.641	<29.821	≥29.821	>33.888	<3.755	≥3.755	>4.267
Th (mg/L)	<0.01	≥0.01	>0.1	<0.01	≥0.01	>0.1	<0.01	≥0.01	>0.1
U (mg/L)	<0.065	≥0.065	>0.073	<0.013	≥0.013	>0.015	<0.001	>LOR	>0.01
V (mg/L)	<0.1	≥0.1	>0.5	<0.1	≥0.1	>0.5	<0.1	≥0.1	>0.5
Zn (mg/L)	<0.166	≥0.166	>2	<0.199	≥0.199	>2	LOR	>LOR	>2
Gross alpha (Bq/L)	<1.5	1.5	3.0	<1.5	1.5	3.0*		N/A	
Gross beta (Bq/L)	<1.5	1.5	3.0	<1.5	1.5	3.0*		N/A	
Ra-226 (Bq/L)	N	I/A	≥5	N	/A	≥5	N	/A	>5
Ra-228 (Bq/L)	N	I/A	≥2	N	/A	≥2	N	/A	≥2
N- Species	<5	≥5	>25	>5	≥5	>25	>5	≥5	>25
Total Recoverable Hydrocarbons (TPH)	N	I/A	≥0.3	N	/A	≥0.3	N	/A	≥0.3

Note: \*Gross alpha/Gross beta site-specific trigger of 3 Bq/L represents approximately a 2x increase in the maximum radioactivity measured in 2017

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## Appendix B

Groundwater quality results









CHAIN OF CUSTODY

ALS Laboratory: please tick >

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UNELDOURNE 2-4 Westaf Road Springwife VIC 317\* Prv. 03 8549 9600 E. samales methormes@alagicisal con UMUDGEE 179 Swiney Road Muggee NSW 2850 Ph. 02 6372 6735 E. mudgee, mail@alcqicbal.com LISIAGKAY 28 Harbour Road Mackey OLD 4746 Ph. 07 4944 (1177 f.; medvay@aleglobal com

LINEWCASTLE 5/593 Mailtind Road Mayfield West NSW 230/8 Phr 02 4014 2500 E. samples.news/self@alsglobel.com CINOVYRA 413 Geary Place North Nowra NSW 2541 Ph. 02 4423 2663 E. nowra@alsohbal.com OPERTH 10 Hod Way Malaga, WA 6090 Phr 08 9209 7655 Et samples perfeliglalsglobal com

CIVYOLLONGONG 99 Kenny Street Welongang NSW 2500 Ph: 02 4225 3125 E: wolfongong@aksjabal nom OTOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Phr 07 4796 0600 E: towneswile environmental (abbiglobat.com LISYDNEY 277-289 Woodcak, Road Smithled NSW 216. Ptv 02 8784 8555 E: samples.aydnev@steplobal.com

200 RECEIVED BY: Ř N/A DATE/TIME: 12 ž ટ Yes Yes FOR LABORATORY USE ONLY (Circle) Random Sample Temperature on Receipt. Free ice / frozen ice bricks present upon receipt? Sustody Seal Intact? RELINQUISHED BY: Other comment: DATE/TIME: COC SEQUENCE NUMBER (Circle) m RECEIVED BY DATE/TIME: <u>-</u> OF: ☐ Non Standard or urgent TAT (List due date): DATE/TIME: 24/4/20 ☐ Standard TAT (List due date): RELINQUISHED BY: (Standard TAT may be longer for some tests e.g., Ultra Trace Organics) TURNAROUND REQUIREMENTS: COUNTRY OF ORIGIN: **SAMPLER MOBILE: 0401 881 447** 23 ALS QUOTE NO.: CONTACT PH: 02 9493 9500 EDD FORMAT (or default): PROJECT NO.: PURCHASE ORDER NO.: OFFICE: Ground floor, 20 Chandos Street, St Leonards, NSW 2065 COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Email Reports to: pgibbons@emmconsulting.com.au Email invoice to: pgibbons@emmconsulting.com.au SAMPLER: Kaltlyn Brodie / Henry Noakes PROJECT MANAGER: Paul Gibbons COC Emailed to ALS? (YES / NO) CLIENT: EMM Consulting PROJECT: \$190512 ORDER NUMBER:

		SAMDIE DETAILS				ANALYSI	REQUIRE	) including	SUITES (NB.	Suite Codes must be lis	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suits and co.)	
ALS USE ONLY		MATRIX: Solid(S) Water(W)		CONTAINER INFORMATION		Where	letals are require	bd, specify Total (	unfiltered bottle n	Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (fiold filtated bottle required)	filtered bottle required).	Additional Information
LABID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL	esines d'anns + ionic balance NT-1 & NT-2 (Green)	ED040F (Yellow) Sulphide	Dissolved metals (Field flitered) EG020F (Red)	(bərətlifi blə i'ə) nori suorre GDS) (Maroon)	d&s azorð, GSS19SS mulbe) (neer8 & Green) rSSA:		Comments on likely confaminant levels, dilutions, or samples requiring specific QC analysis etc.
	BH-M16d	23/4/20 10:15	*		1	_	-				— Environme Melbourne	Environmental Division — Melbourne
2	BH- M165	23/4/20 10:40	W		4	_	_	-	-	3	Mon.	<u>~</u>
$\sim$	BH-MI94	22/4/20 10:00	М		t	_	-		-	80	Ι l	
حو.	BH-111195	22/4/20 08:45	٨		14	_		_	_	3		
5	BH-M204	22/4/20 07:30	W		Th	_		_	-	23		
و	BH-M205	21/4/20 15:45	W		4	_	-	,	-	3		
14	BH-1M220	23/4/20 07:00	W		14	_	-		-	3	Telephone	Telephone: + 61-3-8549 9600
ဆ	BH-M1225	22/4/20 15:00	W		14		-		-	57	-	
8	BH-M23d	22/4/20 12:50	*	-	13	_	-	-	-	8		
0)	BH-M235	22/4/20 13:00	W		14	-	-	-	-	3		
-1	BH-M249	23/4/20 08:40	м		7	_	-	-	-	3		
15	BH-M245	23/4/20 08:45	*		4	1		_	_	2		
				TOTAL	84	17	12	12	12 3	36		
Water Container Codes:	Water Container Codes: P = Unpreserved Plastic: N = Nitric Preserved Plastic: ORC = Nitric Preserved ORC: SH = Sodium Hydroxida/Cd Preserved	erved Plastic: ORC = Nitric Preserved	10RC: SH =	Sodium Hydroxide/Cd Preserved: S = Sodium Hy	odroxida Prose	Proserved Plactic: AG = Amb	G = Amhor C	academi l cool	Alafan	The Proposition of the		

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DITOFWCASTI F.5585 Mailtand Road Mayfield West NSW 2304. Prt. 02 4014 2500 E. someles, newcastle@atgicba.com DNOWRA 413 Goary Pere horn hows NSW 2541 Phr 02 4423 2063 E. nowe@elsolobal com

DVJOL: ONGONG 99 kenny Street Workingong NSW 2500 Ph. 02 4225 3125 E. verlongeng Balegobalcom J\*\*ON/NSVILLE 14-15 Dagma Court Boths CLD 4819 Ph; 07 4705 0600 E: tomerate environmental@saspicbal cort

LIPERTY 10 Med Way Malega, WA 6090 Ph; 08 3209 7655 E. samples perty @alega

372 N/A MA RECEIVED BY: 2 PATE/TIME: Yes 768 FOR LABORATORY USE ONLY (Circle) Random Sample Temperature on Receipt Free ice / frozen ice bricks present upon recelpt? Custody Seal Intact? RELINQUISHED BY: Other comment: DATE/TIME: COC SEQUENCE NUMBER (Circle) 9 2 m RECEIVED BY: DATE/TIME: 0F: 1 COC Non Standard or urgent TAT (List due date): Standard TAT (List due date): 24/4/20 RELINQUISHED BY: DATE/TIME: (Standard TAT may be longer for some tests e.g., Ultra Trace Organics) TURNAROUND REQUIREMENTS: COUNTRY OF ORIGIN: **SAMPLER MOBILE: 0401 881 447** 23 ALS QUOTE NO .: CONTACT PH: 02 9493 9500 EDD FORMAT (or default): PROJECT NO .: PURCHASE ORDER NO .: OFFICE: Ground floor, 20 Chandos Street, St Leonards, NSW 2065 COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Email Reports to: pgibbons@emmconsulting.com.au Email Invoice to: pgibbons@emmconsulting.com.au SAMPLER: Kaitlyn Brodie / Henry Noakes COC Emailed to ALS? (YES / NO) PROJECT MANAGER: Paul Gibbons CLIENT: EMM Consulting PROJECT: \$190512 ORDER NUMBER:

Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc. Additional 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). Radium 226/228, Gross a&b EA251 (Red & Green) 3 3 3 M EG051 (Maroon) Ferrous iron (Field filtered) FG020F (Red) Dissolved metals (Field ED040E (Kellow) Major ions + Ionic balance NT-1 & NT-2 (Green) TOTAL 4 4 4 4 CONTAINER INFORMATION TYPE & PRESERVATIVE (refer to codes below) MATRIX 3 3 ₹ 3 3 15:40 3/4/20 15:00 21/4/20 09:45 21/4/20 12:30 DATE / TIME 23/4/20 SAMPLE DETAILS MATRIX: Solid(S) Water(W) SAMPLE ID UGM-MIS UGM-MID BH-M255 BH-M25d 多 ALS USE ONLY LABID 7 9

TOTAL 269
Water Container Codes: P = Unpreserved Plastic: N = Witch Preserved Plastic: ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved Amber Glass: H = HC1 preserved Plastic; AG = Amber Glass Unpreserved Plastic; AG = Amber Glass Unpreserved Plastic; AG = Amber Glass: H = HC1 preserved Plastic; AC = Amber Glass: H = HC1 preserved Plastic; AC = Amber Glass: H = HC1 preserved Plastic; AC = Amber Glass: H = HC1 preserved Plastic; AC = Amber Glass: H = HC1 preserved Plastic; AC = Amber Glass: H = HC1 preserved Plastic; AC = Amber Glass: H = HC1 preserved Plastic; F = FDTA Preserved Plastic; F = FDTA Preserved Bottles; ST = Sterile Bottles, ASS = Plastic Bag for Acid Sulphain Solis; B = Unpreserved Bottles; ST = Sterile Bottles.

3 3 3 3 3

## **COC Melbourne**

From: ,

ALS Enviro Melbourne

Sent:

Friday, 24 April 2020 8:57 AM

To:

COC Melbourne

Subject:

FW: [EXTERNAL] - Sample bottles required

From: Kaitlyn Brodie [mailto:kbrodie@emmconsulting.com.au]

Sent: Thursday, 23 April 2020 7:42 PM

To: ALS Enviro Melbourne <ALSEnviroMelbourne@ALSGlobal.com>

Cc: Henry Noakes <a href="mailto:knoakes@emmconsulting.com.au">hnoakes@emmconsulting.com.au</a> Subject: FW: [EXTERNAL] - Sample bottles required

Hi ALS Melbourne,

There should be 8 eskys delivered tomorrow morning (24/04/2020) to Springvale (includes COC's). In case the COC isn't clear please refer to the below email chain. Shane Ellis should also be able to answer any questions.

Thanks for your help

Kaitlyn

## **Kaitlyn Brodie**

Hydrogeologist

M 0401 881 447

www.emmconsulting.com.au

From: Shane Ellis <shane.ellis@ALSGlobal.com>

Sent: Thursday, 9 April 2020 10:00 AM

To: Kaitlyn Brodie <kbrodie@emmconsulting.com.au>

Cc: Brenda Hong < Brenda.Hong@alsglobal.com >; Henry Noakes < hnoakes@emmconsulting.com.au >

Subject: RE: [EXTERNAL] - Sample bottles required

Morning Kaitlyn,

Thank you for clarifying, if sulphide is require we will need to add one more bottle type in the mix for this. Please see the updated bottle summary below for all analysis including additional alpha/beta.

Label Colour	Bottle Type and Preservative	Analysis
Yellow	1 x 125mL plastic (Zn(OAC)2 and NaOH)	Sulphide
Green	1 x 250mL plastic	Major ions, Alkalinity, Ionic Balance, Chloride, Sulphate, Magnesium, Sulphur
Red	1 x 60mL plastic (HNO3 acid)	Dissolved metals (Field Filtered)
Maroon	1 x 60mL plastic (HCl acid)	Ferrous Iron (Field Filtered)
Red & Green	3 x 1,000mL plastic	Radium 226/228, Gross a&b

I will have this organise for delivery by Wednesday to your St Leonards office, please let me know if you require anything else.

Regards,

### Shane Ellis

Client Services Officer, Environmental



<u>T</u> +61 2 8784 8555 <u>F</u> +61 2 8784 8500 <u>D</u> +61 2 8784 8509

shane.ellis@alsglobal.com 277-289 Woodpark Road Smithfield NSW 2164 AUSTRALIA

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From: Kaitlyn Brodie [mailto:kbrodie@emmconsulting.com.au]

Sent: Thursday, 9 April 2020 9:26 AM

To: Shane Ellis <shane.ellis@ALSGlobal.com>

Cc: Brenda Hong < Brenda.Hong@alsglobal.com>; Henry Noakes < hnoakes@emmconsulting.com.au>

Subject: RE: [EXTERNAL] - Sample bottles required

Hey Shane,

I've just been advised we need to add this bottle. Is that achievable?

Gross Alpha and Gross Beta Gross alpha, Gross beta with K40 correction in clean matrices (TDS < 400 mg/L (EC ~600 μS/cm)). Samples with TDS 400-2000 mg/L (EC~3,000 μS/cm) will have LORs raised to 0.25 or 0.5 Bg/L (E)

EA250 ASTM D7283-06

Alpha = 0.05 Bq/L Beta = 0.1 Bg/L

114.75

## Kaitlyn Brodie

Hydrogeologis

M 0401 881 447

www.emmconsulting.com.au

From: Kaitlyn Brodie

Sent: Thursday, 9 April 2020 8:53 AM

To: Shane Ellis <shane.ellis@ALSGlobal.com>

Cc: Brenda Hong < Brenda. Hong@alsglobal.com >; Henry Noakes < hnoakes@emmconsulting.com.au >

Subject: RE: [EXTERNAL] - Sample bottles required

Hi Shane.

Apologies there was a typo. SO2- is meant to be S2-. Does this fall under an existing bottle category?

We will arrange to get samples to the lab within the 7 day holding period thanks for clarifying.

Could I please order 50 of each bottle, delivered to the EMM office in St Leonards - preferably by next Wednesday 15 April.

Thank you for your help.

Kaitlyn

## Kaitlyn Brodie

Hydrogeologist



02 9493 9500

M 0401 881 447

in Connect with us

SYDNEY | Ground floor, 20 Chandos Street, St Leonards NSW 2065



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From: Shane Ellis <shane.ellis@ALSGlobal.com>

Sent: Wednesday, 8 April 2020 4:18 PM

To: Kaitlyn Brodie < kbrodie@emmconsulting.com.au> Cc: Brenda Hong < Brenda. Hong@alsglobal.com> Subject: RE: [EXTERNAL] - Sample bottles required

Hi Kaitlyn,

Not a problem, I will try to assist with the updated info. Uranium and Thorium are both captured in our standard metals scan, so no new containers needed for that. There are two analytes in particular that will be affected by storing for 2 weeks prior to analysis, these being ferrous iron (holding time 7 days) and alkalinity (holding time 14 days). The most efficient method codes/packages for this are as follows.

MATRIX	TEST PARAMETER	
WATER	Cations & Anions: Major (Ca, Mg, Na, K, Cl, SO₄, Alkalinity) + Ionic Balance	
WATER	Sulfur	E

WATER	ICP/MS: Al, Fe, Th, U
WATER	Irpn - Ferrous
WATER	Radium 226 & 228 by Scintillation Emanometry
	TOTAL PROJECT COST FOR WATER SAMPLES – STD TAT (EX GST):

Unfortunately I do not believe we have a method setup for SO2-, is this a requirement for the project?

Regards,

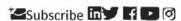
### **Shane Ellis**

Client Services Officer, Environmental



<u>T</u>+61 2 8784 8555 <u>F</u>+61 2 8784 8500 <u>D</u>+61 2 8784 8509

shane.ellis@alsglobal.com 277-289 Woodpark Road Smithfield NSW 2164 AUSTRALIA



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From: Kaitlyn Brodie [mailto:kbrodie@emmconsulting.com.au]

Sent: Wednesday, 8 April 2020 10:25 AM

To: Shane Ellis <shane.ellis@ALSGlobal.com>
Cc: Brenda Hong <Brenda.Hong@alsglobal.com>
Subject: RE: [EXTERNAL] - Sample bottles required

Hi Brenda and Shane,

I would just like to clarify a few things before placing an order.

The analysis I requested was (mildly) wrong – sorry. The correct suite is attached.

We only need to test for dissolved metals.

Uranium and thorium do not require speciation.

We have fridges to keep samples cold for approximately 2 weeks (expected length of time before we can get samples to the lab), and eskys for transport. Are there any suites/analytes that cannot tolerate this holding time?

I was also trying to organise a COC that we can easily complete in the field and I'm finding it difficult to find sampling suites that include all analytes. Have I missed something or will this sampling suite involve a complicated COC?

Thank you and apologies for all the questions.

Kaitlyn

### Kaitlyn Brodie

Mydrogaetologist

M 0401 881 447

www.emmconsulting.com.au

From: Shane Ellis <shane.ellis@ALSGlobal.com>

Sent: Monday, 6 April 2020 1:28 PM

To: Kaitlyn Brodie < <a href="mailto:kbrodie@emmconsulting.com.au">kbrodie@emmconsulting.com.au</a> <a href="mailto:Cc:">Cc: Brenda Hong <a href="mailto:Brenda.Hong@alsglobal.com">Brenda.Hong@alsglobal.com</a> <a href="mailto:Subject: RE">Subject: RE: [EXTERNAL] - Sample bottles required</a>

Hi Kaitlyn,

Can certainly help out with this one, please see below:

### 1 x 250mL Unpreserved HDPE Bottle (ALS Green Label)

Major ions, Alkalinity, Ionic Balance, Chloride, Sulphate, Magnesium, Sulphur

### 1 x 60mL Nitric Acid HDPE Bottle (ALS Red Label)

Total Iron, Aluminium & Uranium

## 1 x 60mL HCL HDPE Bottle (ALS Maroon Label)

Ferrous Iron

## 1 x 1L Unpreserved HDPE Bottle (ALS Red/Green Label)

Radium 226, 228

Please note if uranium speciation is required, a separate unpreserved 60mL HDPE bottle is required. If you require any of these containers to be sent out, I would be happy to organise this for you.

Regards,

## Shane Ellis

Client Services Officer, Environmental



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From: Kaitlyn Brodie < kbrodie@emmconsulting.com.au >

Sent: Monday, 6 April 2020 12:54 PM

To: Brenda Hong < Brenda. Hong@alsglobal.com > Subject: [EXTERNAL] - Sample bottles required

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Hi Brenda,

Hope your staying safe. I was hoping you could help me with which sample bottles I would require for the following sampling suite.

Major ions (Calcium, Chloride, Magnesium, Potassium, Sodium, Sulphate)
Total Anions, Total Cations, Charge Balance Error (%).

Alkalinity (hydroxide, carbonate, bicarbonate and total as CaCO3)

Leading indicators (aluminium, magnesium, sulphur, chloride, sulphate, ferrous and total iron)

Radionucleotides (Uranium, Radium 226, Radium 228)

Thank you

Kaitlyn

Kaitlyn Brodie



r 02 9493 9500

M 0401 881 447

n Connect with u

SYDNEY | Ground floor, 20 Chandos Street, St Leonards NSW 2065



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# CERTIFICATE OF ANALYSIS

: 1 of 6 Laboratory **EMM CONSULTING PTY LTD** EM2006908 **Work Order** 

: 4 Westall Rd Springvale VIC Australia 3171 Shane Colley Contact Address Ground Floor Suite 1 20 Chandos Street PAUL GIBBONS

**Environmental Division Melbourne** 

24-Apr-2020 08:25 +61-3-8549 9600 28-Apr-2020 Date Analysis Commenced Date Samples Received Telephone St Leonards NSW NSW 2065 S190512

Order number

Sampler

Telephone

Project

Contact Address

Client

: 19-May-2020 08:56 Issue Date

EN/222 KB/HN 16 No. of samples analysed No. of samples received C-O-C number Quote number

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. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

General Comments

Analytical Results

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

## Signatories

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.

Accreditation Category

Melbourne Inorganics, Springvale, VIC	Radionuclides, Fyshwick, ACT
Senior Inorganic Chemist	Metals Teamleader
Dilani Fernando	Titus Vimalasiri



## General Comments

In house developed procedures 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. 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

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

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. Key:

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.

EG020F : EM2006908 #1-16 dissolved metal required dilution prior analysis due to sample matrix. LOR's have been adjusted accordingly.

EG051G: EM2006908 #1 Sample has been confirmed for Ferrous Iron by re-extraction and re-analysis.

lonic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.

LOR for Gross Alpha and Gross Beta raised due to high solid content.

ED045G: The presence of thiocyanate can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

EK085: EM2006908-015 Poor matrix spike recovery for sulphide due to sample matrix. Confirmed by re-extraction and re-analysis.

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.



Page Work Order

: 3 of 6 : EM2006908 : EMM CONSULTING PTY LTD : \$190512 Project Client

Sub-Matrix: WATER (Matrix: WATER)		Clie	Client sample ID	BH-M16d	BH-M16s	BH-M19d	BH-M19s	BH-M20d
	Clie	nt samplin	Client sampling date / time	23-Apr-2020 10:15	23-Apr-2020 10:40	22-Apr-2020 10:00	22-Apr-2020 08:45	22-Apr-2020 07:30
Compound	CAS Number	LOR	Unit	EM2006908-001	EM2006908-002	EM2006908-003	EM2006908-004	EM2006908-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	۲>
Carbonate Alkalinity as CaCO3	3812-32-6	_	mg/L	<1	<1	<1	<1	\ \
Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	433	351	462	332	418
Total Alkalinity as CaCO3		-	mg/L	433	351	462	332	418
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	3660	3940	3350	4830	3560
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	-	mg/L	18200	18400	17200	23200	18600
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	-	mg/L	557	989	542	602	531
Magnesium	7439-95-4	-	mg/L	1570	1560	1520	1720	1600
Sodium	7440-23-5	-	mg/L	11000	11300	10600	13700	11300
Potassium	7440-09-7	_	mg/L	45	44	46	28	47
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.02	0.04	<0.02	<0.02
Thorium	7440-29-1	0.001	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	7440-61-1	0.001	mg/L	<0.002	0.029	0.008	0.122	<0.002
Iron	7439-89-6	0.05	mg/L	2.37	<0.10	<0.10	<0.10	7.10
EG051G: Ferrous Iron by Discrete Analyser	er							
Ferrous Iron		0.05	mg/L	3.88	<0.05	<0.05	<0.05	6.17
EK085M: Sulfide as S2-								
Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	<0.1	0.1	<0.1	<0.1
EN055: Ionic Balance								
Ø Total Anions	-	0.01	med/L	598	809	564	762	607
Ø Total Cations		0.01	med/L	637	655	614	768	651
ø lonic Balance		0.01	%	3.11	3.73	4.26	0.43	3.48
EA250CA: Gross Alpha and Beta Activity								
Gross alpha		0.05	Bq/L	0.37	1.47	2.45	4.95	<1.12
Gross beta activity - 40K		0.10	Bq/L	1.12	<1.87	<1.89	3.19	<2.23
EA251CA: Radium 226 and Radium 228 Activity	ctivity							
Radium 226	13982-63-3	0.01	Bq/L	0.10	0.14	0.48	0.30	0.08
Radium 228	7440-14-4	80.0	Bq/L	0.14	0.29	0.39	0:20	<0.08



Client Project

EMM CONSULTING PTY LTD S190512

EM2006908

Work Order

22-Apr-2020 13:00 EM2006908-010 <0.002 25600 15300 <0.05 2030 0.061 2.18 0.16 ٥.1 م 842 871 1.68 3.27 280 V ۲ 38 22-Apr-2020 12:10 EM2006908-009 BH-M23d Result <0.002 17400 1510 10500 <0.02 0.003 <2.05 1.51 436 436 3580 809 2.90 1.32 ٥ 0.1 574 1.7 0.41 V V 46 22-Apr-2020 15:00 EM2006908-008 BH-M22s Result <0.002 12000 0.020 19700 1520 11.5 2.33 0.14 10.5 4050 646 677 1.01 V V 307 307 32 23-Apr-2020 07:00 EM2006908-007 BH-M22d Result <0.002 <0.002 10800 18200 <1.01 <2.02 1550 2.11 416 416 1.67 1.13 626 0.18 ٥.1 د V 47 21-Apr-2020 15:45 EM2006908-006 BH-M20s Result <0.002 17800 12400 0.005 <0.10 <0.05 4100 1660 8.16 <1.88 0.12 846 0.94 693 46 0.7 588 28 49 7 Client sample ID Client sampling date / time meq/L med/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Bq/L Bq/L Bq/L % LOR 0.001 0.001 0.05 0.02 0.05 0.10 0.01 0.01 0.01 0.01 0.1 7429-90-5 7439-89-6 13982-63-3 14808-79-8 16887-00-6 7440-61-1 l 18496-25-8 7440-70-2 7439-95-4 7440-23-5 | CAS Number DMO-210-001 3812-32-6 71-52-3 7440-09-7 7440-29-1 ED041G: Sulfate (Turbidimetric) as SO4 2- by DA EA251CA: Radium 226 and Radium 228 Activity EG051G: Ferrous Iron by Discrete Analyser EA250CA: Gross Alpha and Beta Activity ED045G: Chloride by Discrete Analyser EG020F: Dissolved Metals by ICP-MS **ED093F: Dissolved Major Cations** ED037P: Alkalinity by PC Titrator Bicarbonate Alkalinity as CaCO3 Hydroxide Alkalinity as CaCO3 Carbonate Alkalinity as CaCO3 Sulfate as SO4 - Turbidimetric Total Alkalinity as CaCO3 Gross beta activity - 40K EK085M: Sulfide as S2-**EN055: Ionic Balance** Sub-Matrix: WATER (Matrix: WATER) Ø Total Cations Ø Ionic Balance Sulfide as S2-Ø Total Anions Ferrous Iron Gross alpha Radium 226 Magnesium Potassium Aluminium Compound Thorium Chloride Calcium Uranium Sodium ron

0.43

0.44

0.30

0.28

0.10

Bq/L

0.08

7440-14-4

Radium 228



Project Client

: 5 of 6 : EM2006908 : EMM CONSULTING PTY LTD : \$190512

Page Work Order

Sub-Matrix: WATER (Matrix: WATER)		Clie	Client sample ID	BH-M24d	BH-M24s	BH-M25d	BH-M25s	UGM-MID	
	Clie	ent samplir	Client sampling date / time	23-Apr-2020 08:40	23-Apr-2020 08:45	21-Apr-2020 12:30	21-Apr-2020 09:45	23-Apr-2020 15:00	
Compound	CAS Number	TOR	Unit	EM2006908-011	EM2006908-012	EM2006908-013	EM2006908-014	EM2006908-015	
				Result	Result	Result	Result	Result	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	\ \	1>	<b>\&gt;</b>	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	₹	7	\	7	<b>\</b>	
Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	436	376	428	302	387	
Total Alkalinity as CaCO3	1	-	mg/L	436	376	428	302	387	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	3710	3850	3750	4940	3690	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	-	mg/L	18500	19500	17000	23700	18000	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	-	mg/L	574	571	568	909	622	
Magnesium	7439-95-4	-	mg/L	1640	1480	1540	1680	1600	
Sodium	7440-23-5	-	mg/L	11400	12400	10200	13800	11100	
Potassium	7440-09-7	-	mg/L	48	30	47	31	48	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.02	<0.02	<0.02	<0.02	0.02	
Thorium	7440-29-1	0.001	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	
Uranium	7440-61-1	0.001	mg/L	<0.002	0.014	<0.002	0.064	<0.002	
Iron	7439-89-6	0.05	mg/L	0.70	12.1	1.40	<0.10	1.87	
EG051G: Ferrous Iron by Discrete Analyser	i.								
Ferrous Iron		0.05	mg/L	0.26	11.4	90:0	<0.05	1.87	
EK085M: Sulfide as S2-									
Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	<0.1	<0.1	0.1	<0.1	
EN055: Ionic Balance									
Ø Total Anions		0.01	med/L	809	638	266	777	592	
Ø Total Cations		0.01	med/L	661	069	009	770	647	
Ø Ionic Balance		0.01	%	4.17	3.97	2.90	0.51	4.39	
EA250CA: Gross Alpha and Beta Activity									
Gross alpha		0.05	Bq/L	<1.21	2.49	2.97	2.45	<1.11	
Gross beta activity - 40K		0.10	Bq/L	<2.42	1.94	<1.98	<1.78	<2.22	
EA251CA: Radium 226 and Radium 228 Activity	tivity								
Radium 226	13982-63-3	0.01	Bq/L	0.10	0.35	0.17	0.10	0.05	
Radium 228	7440-14-4	0.08	Bq/L	80.0	0.57	0.42	<0.08	<0.08	



: 6 of 6 : EM2006908 : EMM CONSULTING PTY LTD : \$190512 Project

Page Work Order Client

Sub-Matrix: WATER (Matrix: WATER)		Clie	Client sample ID	UGM-MIS	-		I	
	Cli	ent samplin	Client sampling date / time	23-Apr-2020 15:40		-		
Compound	CAS Number	TOR	Unit	EM2006908-016				
				Result				
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1				
Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	<1				
Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	132				
Total Alkalinity as CaCO3		-	mg/L	132				
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	4970				
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	-	mg/L	24100			-	
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	1170				
Magnesium	7439-95-4	-	mg/L	1490				
Sodium	7440-23-5	1	mg/L	14600				
Potassium	7440-09-7	1	mg/L	41		-		
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.03				
Thorium	7440-29-1	0.001	mg/L	<0.002				
Uranium	7440-61-1	0.001	mg/L	0.016		-	1	
Iron	7439-89-6	0.05	mg/L	0.48		-	1	
EG051G: Ferrous Iron by Discrete Analyser	ser							
Ferrous Iron		0.05	mg/L	0.41		-		
EK085M: Sulfide as S2-								
Sulfide as S2-	18496-25-8	0.1	mg/L	0.5		-	1	-
EN055: Ionic Balance								
Ø Total Anions		0.01	med/L	786		-		
Ø Total Cations	-	0.01	med/L	817		-		
Ø Ionic Balance		0.01	%	1.94				
EA250CA: Gross Alpha and Beta Activity								
Gross alpha		0.05	Bq/L	<0.94				
Gross beta activity - 40K		0.10	Bq/L	<1.87				
EA251CA: Radium 226 and Radium 228 Activity	Activity							
Radium 226	13982-63-3	0.01	Bq/L	0.04				
Radium 228	7440-14-4	80.0	Bq/L	0.31	•			



# QUALITY CONTROL REPORT

: 4 Westall Rd Springvale VIC Australia 3171 Environmental Division Melbourne Shane Colley : 1 of 6 Laboratory Contact Address Ground Floor Suite 1 20 Chandos Street **EMM CONSULTING PTY LTD** PAUL GIBBONS EM2006908 **Work Order** Contact Address

+61-3-8549 9600 19-May-2020 24-Apr-2020 28-Apr-2020 Date Analysis Commenced Date Samples Received Telephone Issue Date St Leonards NSW NSW 2065 S190512 KB/HN

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. 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

EN/222

Quote number

C-O-C number

Sampler

Order number

Telephone

Client

Project

16

No. of samples analysed No. of samples received

- 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.

Accreditation Category	Melbourne Inorganics, Springvale, VIC	Radionuclides, Fyshwick, ACT
Position	Senior Inorganic Chemist	Metals Teamleader
Signatories	Dilani Fernando	Titus Vimalasiri



 Page
 : 2 of 6

 Work Order
 : EM2006908

 Client
 : EMM CONSULTING PTY LTD

 Project
 : S190512

General Comments

In house developed procedures 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. 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 primary

Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot 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

RPD = Relative Percentage Difference

# = Indicates failed QC

## Laboratory Duplicate (DUP) Report

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

Sub-Matrix: WATER						Laboratory D	Laboratory Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA250CA: Gross Alp	EA250CA: Gross Alpha and Beta Activity (QC Lot: 3014761)	ot: 3014761)							
CA2003105-001	Anonymous	EA250: Gross alpha	-	0.05	Bq/L	<0.05	<0.05	0.00	No Limit
		EA250: Gross beta activity - 40K	1	0.1	Bq/L	<0.10	<0.10	0.00	No Limit
EM2006908-005	BH-M20d	EA250: Gross alpha	-	0.05	Bq/L	<1.12	<0.94	17.0	No Limit
		EA250: Gross beta activity - 40K	-	0.1	Bq/L	<2.23	<1.88	17.0	No Limit
EA250CA: Gross Alp	EA250CA: Gross Alpha and Beta Activity (QC Lot: 3014762)	ot: 3014762)							
EM2006908-015	UGM-MID	EA250: Gross alpha	-	0.05	Bq/L	<1.11	<0.94	17.1	No Limit
		EA250: Gross beta activity - 40K	-	0.1	Bq/L	<2.22	<1.87	17.1	No Limit
ED037P: Alkalinity by	ED037P: Alkalinity by PC Titrator (QC Lot: 2992190)	190)							
EM2006908-002	BH-M16s	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	\ \	7	00.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	<u>^</u>	₹	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	351	351	0.00	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	1	-	mg/L	351	351	0.00	0% - 20%
EM2006908-012	BH-M24s	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	^	<b>^</b>	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	_	mg/L		₹	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	376	377	0.330	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	-	-	mg/L	376	377	0.330	0% - 20%
ED041G: Sulfate (Tur	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 2989681)	A (QC Lot: 2989681)							
EM2006894-006	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	98	66	1.07	0% - 20%
EM2006908-006	BH-M20s	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	4100	4520	9.74	0% - 20%
ED045G: Chloride by	ED045G: Chloride by Discrete Analyser (QC Lot: 2989682)	t: 2989682)							
EM2006894-006	Anonymous	ED045G: Chloride	16887-00-6	-	mg/L	707	718	1.60	0% - 20%
EM2006908-006	BH-M20s	ED045G: Chloride	16887-00-6	-	mg/L	17800	17800	0.527	0% - 20%
ED093F: Dissolved M	ED093F: Dissolved Major Cations (QC Lot: 2990153)	1153)							
EM2006894-002	Anonymous	ED093F: Calcium	7440-70-2	-	mg/L	38	36	4.05	0% - 20%



EMM CONSULTING PTY LTD

S190512

Client Project

EM2006908

Work Order

Recovery Limits (%) 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 3% - 20% %09 - %0 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% No Limit RPD (%) 0.700 2.15 2.02 2.04 0.00 3.84 0.00 0.00 4.38 4.48 0.00 0.00 0.00 0.00 0.00 0.00 1.98 0.00 3.70 4.56 4.51 0.00 0.00 0.00 0.00 6.48 1.97 0.00 0.00 0.00 0.00 Laboratory Duplicate (DUP) Report Original Result Duplicate Result <0.002 <0.002 <0.002 14000 13900 <0.02 1750 1120 <0.05 <0.10 0.060 1.37 15.2 <0.05 5.79 1.83 1150 615 132 0.22 0.1 20 29 39 188 21 4 <0.002 <0.002 13700 <0.002 14600 <0.05 <0.02 <0.10 <0.02 1720 1170 1490 <0.01 0.061 <0.05 <0.05 1200 15.1 6.17 1.40 602 0.22 1.87 ٥.1 م 138 28 187 2 4 21 79 4 mg/L Unit mg/L mg/L 0.001 0.05 0.001 0.001 0.001 0.05 0.05 0.05 0.05 LOR 0.01 0.05 0.01 0.01 0.05 0.1 \_ \_ \_ \_ \_ \_ 7429-90-5 -18496-25-8 CAS Number 7439-95-4 7440-23-5 7440-23-5 7440-09-7 7440-70-2 7439-95-4 7440-23-5 7440-70-2 7440-23-5 7440-09-7 7429-90-5 7439-89-6 7429-90-5 7439-89-6 7440-29-1 7440-61-1 7429-90-5 7439-89-6 7439-89-6 7440-09-7 7440-70-2 7439-95-4 7440-09-7 7439-95-4 7440-61-1 7440-29-1 EG020A-F: Aluminium EG051G: Ferrous Iron EG051G: Ferrous Iron EG020A-F: Aluminium EG051G: Ferrous Iron EG020A-F: Aluminium EG020A-F: Aluminium EG051G: Ferrous Iron EK085: Sulfide as S2-ED093F: Magnesium ED093F: Magnesium ED093F: Magnesium ED093F: Magnesium EG020B-F: Thorium EG020B-F: Uranium EG020B-F: Uranium ED093F: Potassium ED093F: Potassium EG020B-F: Thorium ED093F: Potassium ED093F: Potassium ED093F: Sodium ED093F: Calcium ED093F: Sodium ED093F: Calcium ED093F: Calcium ED093F: Sodium ED093F: Sodium ED093F: Dissolved Major Cations (QC Lot: 2990153) - continued EG020A-F: Iron EG020A-F: Iron EG020A-F: Iron EG020A-F: Iron EG051G: Ferrous Iron by Discrete Analyser (QC Lot: 2989675) EG051G: Ferrous Iron by Discrete Analyser (QC Lot: 2992283) EG020F: Dissolved Metals by ICP-MS (QC Lot: 2990152) EG020F: Dissolved Metals by ICP-MS (QC Lot: 2990154) EG020F: Dissolved Metals by ICP-MS (QC Lot: 2990155) ED093F: Dissolved Major Cations (QC Lot: 2990156) EK085M: Sulfide as S2- (QC Lot: 2990865) Client sample ID Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous UGM-MIS **UGM-MID** BH-M16d BH-M25d BH-M20d BH-M19s BH-M16s BH-M23s Laboratory sample ID Sub-Matrix: WATER EM2006908-016 EM2006832-004 EM2006832-013 EM2006832-007 EM2006832-004 EM2006908-015 EM2006894-002 EM2006942-005 EM2006908-002 EM2006908-001 EM2006908-010 EM2006908-013 EM2006942-004 EM2006908-005 EM2006908-004



: 4 of 6 : EM2006908 : EMM CONSULTING PTY LTD : S190512 Client Project

Page Work Order

Sub-Matrix: WATER						Laboratory D	aboratory Duplicate (DUP) Report		
Laboratory sample ID Client sample ID	Client sample ID	Method: Compound	CAS Number LOR	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Original Result Duplicate Result RPD (%) Recovery Limits (%)
EK085M: Sulfide as	EK085M: Sulfide as S2- (QC Lot: 2990865) - continued	tinued							
EM2006908-003	BH-M19d	EK085: Sulfide as S2-	18496-25-8 0.1	0.1	mg/L	0.1	0.2	0.00	No Limit
EK085M: Sulfide as	EK085M: Sulfide as S2- (QC Lot: 2990867)								
EM2006908-014	BH-M25s	EK085: Sulfide as S2-	18496-25-8 0.1	0.1	mg/L	0.1	0.1	00:00	No Limit



Client Project

: 5 of 6 : EM2006908 : EMM CONSULTING PTY LTD : S190512

Page Work Order

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

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	iision and accurac	sy independent of sai	npie matrix. Dynamic	Recovery Limits are based  Method Blank (MB)	on statistical evaluation of	r processed LCS.  Laboratory Control Spike (LCS) Report	SS) Report	
				Report	Spike	Spike Recovery (%)	Recovery Limits (%)	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SO7	Low	High
EA250CA: Gross Alpha and Beta Activity (QCLot: 3014761)								
EA250: Gross alpha	-	0.05	Bq/L	<0.05	1751 Bq/L	# 102	98.0	100
EA250: Gross beta activity - 40K	-	0.1	Bq/L	<0.10	-	-	-	
EA250CA: Gross Alpha and Beta Activity (QCLot: 3014762)								
EA250: Gross alpha	-	0.05	Bq/L	<0.05	1751 Bq/L	100	98.0	100
EA250: Gross beta activity - 40K	-	0.1	Bq/L	<0.10	1		-	
EA251CA: Radium 226 and Radium 228 Activity (QCLot: 3001678)	01678)							
EA251: Radium 226	13982-63-3	0.01	Bq/L	<0.01	2.5 Bq/L	98.9	89.9	110
EA251: Radium 228	7440-14-4	0.08	Bq/L	<0.08	2.5 Bq/L	98.0	85.6	112
ED037P: Alkalinity by PC Titrator (QCLot: 2992190)								
ED037-P: Total Alkalinity as CaCO3	-		mg/L		200 mg/L	105	88.0	112
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 2989681)	989681)							
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	_	mg/L	٧	25 mg/L	96.2	85.8	117
				V	100 mg/L	96.2	85.8	117
ED045G: Chloride by Discrete Analyser (QCLot: 2989682)								
ED045G: Chloride	16887-00-6	_	mg/L	₹	10 mg/L	97.0	85.0	122
				۲	1000 mg/L	99.3	85.0	122
ED093F: Dissolved Major Cations (QCLot: 2990153)								
ED093F: Calcium	7440-70-2	1	mg/L	<b>\</b>	5 mg/L	111	88.2	117
ED093F: Magnesium	7439-95-4	1	mg/L	₹	5 mg/L	107	85.6	114
ED093F: Sodium	7440-23-5	1	mg/L	₹	50 mg/L	106	0.06	114
ED093F: Potassium	7440-09-7	1	mg/L	₹	50 mg/L	89.9	86.7	111
ED093F: Dissolved Major Cations (QCLot: 2990156)								
ED093F: Calcium	7440-70-2	1	mg/L	۲	5 mg/L	108	88.2	117
ED093F: Magnesium	7439-95-4	_	mg/L	₹	5 mg/L	106	85.6	114
ED093F: Sodium	7440-23-5	1	mg/L	<u>۲</u>	50 mg/L	104	0.06	114
ED093F: Potassium	7440-09-7	_	mg/L	₹	50 mg/L	89.1	86.7	111
EG020F: Dissolved Metals by ICP-MS (QCLot: 2990152)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	105	90.4	107
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	106	91.8	109
EG020F: Dissolved Metals by ICP-MS (QCLot: 2990154)								
EG020B-F: Thorium	7440-29-1	0.001	mg/L	<0.001	0.1 mg/L	104	90.2	114
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	0.1 mg/L	99.4	85.2	110
EG020F: Dissolved Metals by ICP-MS (QCLot: 2990155)								



 Page
 : 6 of 6

 Work Order
 : EM2006908

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LCS) Report	S) Report	
				Report	Spike	Spike Recovery (%)	Recovery Limits (%)	Limits (%)
Method: Compound (	CAS Number	LOR	Unit	Result	Concentration	7CS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 2990155) - continued	ntinued							
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	94.7	90.4	107
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	104	91.8	109
EG051G: Ferrous Iron by Discrete Analyser (QCLot: 2989675)	<u> </u>							
EG051G: Ferrous Iron	-	0.05	mg/L	<0.05	2 mg/L	92.5	75.8	112
EG051G: Ferrous Iron by Discrete Analyser (QCLot: 2992283)	<b>≅</b>							
EG051G: Ferrous Iron		0.05	mg/L	<0.05	2 mg/L	95.2	75.8	112
EK085M: Sulfide as S2- (QCLot: 2990865)								
EK085: Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	0.5 mg/L	102	81.9	116
EK085M: Sulfide as S2- (QCLot: 2990867)								
EK085: Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	0.5 mg/L	9.06	81.9	116

## 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.

Matrix Spike (MS) Report

Sub-Matrix: WATER

				Spike	SpikeRecovery(%)	Recovery Limits (%)	mits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (1	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 2989681)						
EM2006905-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.0	130
ED045G: Chloride	ED045G: Chloride by Discrete Analyser (QCLot: 2989682)						
EM2006905-001	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	# Not Determined	70.0	130
EG051G: Ferrous	EG051G: Ferrous Iron by Discrete Analyser (QCLot: 2989675)						
EM2006832-008	Anonymous	EG051G: Ferrous Iron	-	2 mg/L	80.7	70.0	130
EG051G: Ferrous	EG051G: Ferrous Iron by Discrete Analyser (QCLot: 2992283)						
EM2006832-010	Anonymous	EG051G: Ferrous Iron	1	2 mg/L	92.5	70.0	130
EK085M: Sulfide a	EK085M: Sulfide as S2- (QCLot: 2990865)						
EM2006832-010	Anonymous	EK085: Sulfide as S2-	18496-25-8	0.33 mg/L	97.8	70.0	130
EK085M: Sulfide a	EK085M: Sulfide as S2- (QCLot: 2990867)						
EM2006908-015	UGM-MID	EK085: Sulfide as S2-	18496-25-8	0.33 mg/L	# 63.9	70.0	130



# QA/QC Compliance Assessment to assist with Quality Review

: 1 of 9	ory : Environmental Division Melbourne	les Received	ate : 19-May-2020	No. of samples received : 16	No. of samples analysed : 16
Page	Laboratory	Date Si	Issue Date	No. of	No. of §
: EM2006908	EMM CONSULTING PTY LTD	: S190512	1.	: KB/HN	:
Work Order	Client	Project	Site	Sampler	Order number

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 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 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 Duplicate outliers occur.
- Laboratory Control 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, NO surrogate recovery outliers occur.

# Outliers: Analysis Holding Time Compliance

NO Analysis Holding Time Outliers exist.

# Outliers: Frequency of Quality Control Samples

Quality Control Sample Frequency Outliers exist - please see following pages for full details.



EMM CONSULTING PTY LTD : 2 of 9 : EM2006908 S190512 Work Order Project Client

Outliers: Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: WATER

Compound Group Name	Laboratory Sample ID   Client Sample ID	Client Sample ID	Analyte	CAS Number Data	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EA250CA: Gross Alpha and Beta Activity	QC-3014761-002		Gross alpha	1	102 %	98.0-100%	98.0-100% Recovery greater than upper control limit
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EM2006905001 Anonymous	Anonymous	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined		MS recovery not determined, background level greater than or equal to 4x spike level.
ED045G: Chloride by Discrete Analyser	EM2006905001	Anonymous	Chloride	16887-00-6 Not	Not Determined	1	MS recovery not determined, background level greater than or equal to 4x spike level.
EK085M: Sulfide as S2-	EM2006908015	UGM-MID	Sulfide as S2-	18496-25-8	63.9 %	70.0-130%	Recovery less than lower data quality objective

## Outliers: Frequency of Quality Control Samples

Matrix: WATER

Quality Control Sample Type	Count	nt	Rate	Rate (%)	Quality Control Specification
Method	ac	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Radium 226 and Radium 228 Activity	0	18	0.00	10.00	10.00 NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)					
Gross Alpha and Beta Activity	2	23	8.70	10.00	10.00 NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Dissolved Metals by ICP-MS - Suite A	0	26	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

# 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.

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 time for leachate methods (e.g. TCLP) vary according to the analytes reported.

Holding times for <u>VOC in soils</u> 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

Matrix: WATER				Evaluation:	= Holding time	breach;	in holding time.
Method	Sample Date	Ext	raction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



: 3 of 9 : EM2006908 : EMM CONSULTING PTY LTD : \$190512 Page Work Order Client Project

Matrix: WATER					Evaluation	: x = Holding time	Evaluation: $\mathbf{x} = Holding$ time breach; $\checkmark = Within$ holding time.	holding time.
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA250CA: Gross Alpha and Beta Activity								
Clear Plastic Bottle - Unfiltered; Lab-acidified (EA250) BH-M20s, BH-M25s	ВН-М25d,	21-Apr-2020	I	ļ		12-May-2020	18-Oct-2020	>
Clear Plastic Bottle - Unfiltered; Lab-acidified (EA250) BH-M19d, BH-M20d, BH-M23d,	BH-M19s, BH-M22s, BH-M23s	22-Apr-2020	1	-		12-May-2020	19-Oct-2020	>
Clear Plastic Bottle - Unfiltered; Lab-acidified (EA250) BH-M16d, BH-M22d, BH-M24s, UGM-MIS	BH-M16s, BH-M24d, UGM-MID,	23-Apr-2020			1	12-May-2020	20-Oct-2020	>
EA251CA: Radium 226 and Radium 228 Activity								
Clear Plastic Bottle - Unfiltered; Lab-acidified (EA251) BH-M20s, BH-M25s	BH-M25d,	21-Apr-2020	-	-	-	05-May-2020	18-Oct-2020	>
Clear Plastic Bottle - Unfiltered; Lab-acidified (EA251) BH-M19d, BH-M20d, BH-M23d,	BH-M19s, BH-M22s, BH-M23s	22-Apr-2020	l		1	05-May-2020	19-Oct-2020	>
Clear Plastic Bottle - Unfiltered; Lab-acidified (EA251) BH-M16d, BH-M22d, BH-M24s, UGM-MIS	BH-M16s, BH-M24d, UGM-MID,	23-Apr-2020				05-May-2020	20-Oct-2020	>
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P) BH-M20s, BH-M25s	BH-M25d,	21-Apr-2020			-	29-Apr-2020	05-May-2020	>
Clear Plastic Bottle - Natural (ED037-P) BH-M19d, BH-M20d, BH-M23d,	BH-M19s, BH-M22s, BH-M23s	22-Apr-2020	l	-	1	29-Apr-2020	06-May-2020	>
Clear Plastic Bottle - Natural (ED037-P) BH-M16d, BH-M22d, BH-M24s, UGM-MIS	BH-M16s, BH-M24d, UGM-MID,	23-Apr-2020	l			29-Apr-2020	07-May-2020	>



 Page
 : 4 of 9

 Work Order
 : EM2006908

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Matrix - WATER					Evaluation	x = Holding time	Evaluation: $\mathbf{x} = \text{Holding time breach} \cdot \mathbf{v} = \text{Within holding time}$	holding time
		Control Order	Ţ	a citora a Coro			Analysis	
Method		Sample Date	EXI	Extraction / Preparation			Anaiysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Bottle - Natural (ED041G)								
BH-M20s,	BH-M25d,	21-Apr-2020	1	-	-	28-Apr-2020	19-May-2020	>
BH-M25s								
Clear Plastic Bottle - Natural (ED041G)								
BH-M19d, B	BH-M19s,	22-Apr-2020	1	-	-	28-Apr-2020	20-May-2020	>
BH-M20d, B	BH-M22s,							
BH-M23d, B	BH-M23s							
Clear Plastic Bottle - Natural (ED041G)								
	BH-M16s.	23-Apr-2020	1	1	-	28-Apr-2020	21-May-2020	>
	BH-M24d.							
	, CIM-MID							
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)								
BH-M20s, B	BH-M25d,	21-Apr-2020	i	1	1	28-Apr-2020	19-May-2020	>
Clear Plastic Bottle - Natural (FD045G)								
	BH-M19s	22-Apr-2020	1	1	-	28-Apr-2020	20-Mav-2020	_
	DH M325	-						•
	11-14/12/25,							
	BH-M23s							
Bottle - Natural (ED045G)								
BH-M16d, B	BH-M16s,	23-Apr-2020	1	1		28-Apr-2020	21-May-2020	>
BH-M22d, B	BH-M24d,							
BH-M24s, U	JGM-MID,							
UGM-MIS								
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
BH-M20s, B	BH-M25d,	21-Apr-2020	1	-	-	28-Apr-2020	19-May-2020	>
BH-M25s								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
BH-M19d, B	BH-M19s,	22-Apr-2020	1	-	-	28-Apr-2020	20-May-2020	>
BH-M20d, B	BH-M22s,							
BH-M23d, B	BH-M23s							
Bottle - Nitric Acid; Filtered (ED093F)								
	BH-M16s,	23-Apr-2020	1	1		28-Apr-2020	21-May-2020	>
BH-M22d, B	BH-M24d,							
	UGM-MID,							



: 5 of 9 : EM2006908 : EMM CONSULTING PTY LTD : \$190512 Page Work Order Client Project

					:	:		:
Matrix: WATER					Evaluation	: x = Holding time	Evaluation: * = Holding time breach; < = Within holding time.	holding time.
Method		Sample Date	Ext	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 (EG020B-F) BH-M20s.	BH-M25d.	21-Apr-2020	I	-	-	28-Apr-2020	18-Oct-2020	>
BH-M25s						,		•
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)								
BH-M19d,	BH-M19s,	22-Apr-2020	-	-	-	28-Apr-2020	19-Oct-2020	>
BH-M20d,	BH-M22s,							
BH-M23d,	BH-M23s							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)								
BH-M16d,	BH-M16s,	23-Apr-2020	1	-	1	28-Apr-2020	20-Oct-2020	>
BH-M22d,	BH-M24d,							
BH-M24s,	UGM-MID,							
UGM-MIS								
EG051G: Ferrous Iron by Discrete Analyser								
Clear Plastic Bottle - HCl - Filtered (EG051G)								
BH-M20s,	BH-M25d.	21-Apr-2020	1	1		28-Apr-2020	28-Apr-2020	>
BH-M25s								•
Clear Plastic Bottle - HCI - Filtered (EG051G)								
BH-M19d,	BH-M19s,	22-Apr-2020	1	-	-	28-Apr-2020	29-Apr-2020	>
BH-M20d,	BH-M22s,							
BH-M23d,	BH-M23s							
Clear Plastic Bottle - HCI - Filtered (EG051G)								
BH-M16d,	BH-M16s,	23-Apr-2020	1	-	-	29-Apr-2020	30-Apr-2020	>
BH-M22d,	BH-M24d,							
BH-M24s,	UGM-MID,							
UGM-MIS								
EK085M: Sulfide as S2-								
Clear Plastic Bottle - Zinc Acetate/NaOH (EK085)								
BH-M20s,	BH-M25d,	21-Apr-2020	ļ		-	28-Apr-2020	28-Apr-2020	>
BH-M25s								
Clear Plastic Bottle - Zinc Acetate/NaOH (EK085)								
BH-M19d,	BH-M19s,	22-Apr-2020	1	1		28-Apr-2020	29-Apr-2020	>
BH-M20d,	BH-M22s,							
BH-M23d,	BH-M23s							
Clear Plastic Bottle - Zinc Acetate/NaOH (EK085)								
BH-M16d,	BH-M16s,	23-Apr-2020	I	1	-	28-Apr-2020	30-Apr-2020	>
BH-M22d,	BH-M24d,							
BH-M24s,	UGM-MID,							
UGM-MIS								



Page : 6 of 9
Work Order : EM2006908
Client : EMM CONSULTING PTY LTD
Project : S190512

# 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.

Motor: WATED

Matrix: WATER				Evaluation	ı: 🗴 = Quality Con	rol frequency n	Evaluation: * = Quality Control frequency not within specification; < = Quality Control frequency within specification.
Quality Control Sample Type		ပိ	Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	20	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	19	10.53	10.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	26	15.38	10.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	2	16	12.50	10.00	>	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	4	35	11.43	10.00	>	NEPM 2013 B3 & ALS QC Standard
Gross Alpha and Beta Activity	EA250	က	23	13.04	10.00	>	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	4	40	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Radium 226 and Radium 228 Activity	EA251	0	18	00.0	10.00	×	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	3	23	13.04	10.00	^	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	-	20	5.00	5.00	>	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	19	10.53	10.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	26	69.7	5.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	_	16	6.25	2.00	>	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	2	35	5.71	5.00	>	NEPM 2013 B3 & ALS QC Standard
Gross Alpha and Beta Activity	EA250	2	23	8.70	10.00	×	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	40	2.00	5.00	>	NEPM 2013 B3 & ALS QC Standard
Radium 226 and Radium 228 Activity	EA251	_	18	5.56	5.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	2	23	8.70	2.00	>	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	_	19	5.26	2.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	26	69.7	5.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	~	16	6.25	5.00	>	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	2	35	5.71	2.00	>	B3
Gross Alpha and Beta Activity	EA250	2	23	8.70	5.00	>	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	40	2.00	5.00	>	NEPM 2013 B3 & ALS QC Standard
Radium 226 and Radium 228 Activity	EA251	_	18	5.56	5.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	_	20	5.00	5.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	2	23	8.70	2.00	>	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	_	19	5.26	5.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	0	26	0.00	2.00	×	& ALS QC
Ferrous Iron by Discrete Analyser	EG051G	2	35	5.71	2.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	_	20	2.00	2.00	>	NEPM 2013 B3 & ALS QC Standard



Page Work Order Client Project

: 7 of 9 : EM2006908 : EMM CONSULTING PTY LTD : \$190512

Matrix: WATER		d		Evaluation	: x = Quality Co	ntrol frequency r	Evaluation: x = Quality Control frequency not within specification; \( \sigma = \text{Quality Control frequency within specification.} \)
duality Collinol Salliple Type		Count	1Ur		Kare (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Matrix Spikes (MS) - Continued							
Sulfide as S2-	EK085	2	23	8.70	5.00	>	NEPM 2013 B3 & ALS QC Standard



 Page
 : 8 of 9

 Work Order
 : EM2006908

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

## **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
Gross Alpha and Beta Activity	EA250	WATER	ASTM D7283-06: Determination of gross alpha and gross beta radioactivity in water samples by Liquid Scintillation Counting (LSC).
Radium 226 and Radium 228 Activity	EA251	WATER	In-house: Determination of radium 226 and radium 226 radioactivity in water samples by Liquid Scintillation Counting (LSC).
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3)  Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method  QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3)  Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013)  Schedule B(3)
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 Metals by ICP-MS - Suite B	EG020B-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.
Ferrous Iron by Discrete Analyser	EG051G	WATER	In house: Referenced to APHA 3500 Fe-B. A colorimetric determination based on the reaction between phenanthroline and ferrous iron at pH 3.2-3.3 to form an orange-red complex that is measured against a five-point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)



: 9 of 9 : EM2006908 : EMM CONSULTING PTY LTD : \$190512 Page Work Order Client Project

Analytical Methods Sulfide as S2- EK085  Onic Balance by PCT DA and Turbi SO4 * EN055 - PG	WATER WATER WATER	Method Descriptions In house: Referenced to APHA 4500-S2- D. Sulfide species present in water samples are immediately precipitated when collected in pretreated caustic/zinc acetate preserved sample containers. The sulphides are coloured using methylene blue indicator. Non-detects may be screened by comparison against a standard at half-LOR, otherwise samples are measured using UV-VIS detection at 664nm. This method is compliant with NEPM (2013) Schedule B(3) In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
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CHAIN OF CUSTODY

ALS Laboratory: please tick >>

Yes Yes FOR LABORATORY USE ONLY (Circle) indom Sample Temperature on Receipt ree ice / frozen ice bricks present upon eceipt? ustody Seal Intact? 1 (Circle) S COC SEQUENCE NUMBER m 7

Non Standard or urgent TAT (List due date):

Standard TAT (List due date):

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(Standard TAT may be longer for some tests TURNAROUND REQUIREMENTS:

COUNTRY OF ORIGIN:

PURCHASE ORDER NO.

PROJECT NO.: S1905/23 ALS QUOTE NO.:

OFFICE: Ground floor, 20 Chandos Street, St Leonards, NSW 2065

PROJECT: \$190512

ORDER NUMBER:

CLIENT: EMM Consulting

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RELINQUISHED BY: DATE/TIME

DATE/TIME:

RECEIVED BY:

0:17

30/4/20

Poma Consu Hinos Comaca

Email Reports to: pgibbons@emmconsulting.com.au , hona hea

SAMPLER: Kaitlyn Brodie / Henry Noakes

PROJECT MANAGER: Paul Gibbons

COC Emailed to ALS? (YES / NO)

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

Email Invoice to: pgibbons@emmconsulting.com.au

CONTAINER INFORMATION

SAMPLE DETAILS MATRIX: Solid(S) Water(W)

ALS USE ONLY

H. NOAKES

RELINQUISHED BY:

**SAMPLER MOBILE: 0401 881 447** 

EDD FORMAT (or default):

CONTACT PH: 02 9493 9500

Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc. Additional Information ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Matals are required, specify Total (unfiltered bottle required) or Dissolvod (field filtered bottle required).

0+ 573 Browner Please Radium 226/228, Gross EA251 (Red & Green)

EG050F (Red)

ED040E (Aellow)

Dissolved metals (Field

Major ions + ionic balance NT-1 & NT-2 (Green)

TOTAL

TYPE & PRESERVATIVE (refer to codes below)

MATRIX

DATE / TIME

SAMPLE ID

LAB ID

Ferrous iron (Field filtered) EG051 (Maroon)

X

50 000 +

3

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11:30

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11:10

Lrm-MLD

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Lab / Analysis:

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16m-m125

16.m-m20

9 5

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27/4

BH-M21D

Telephone: +61-2-8784 6555

= VOA VIAI HCI Preserved, VB = VOA VIAI Sodium Bisuiphato Preserved, VS = VOA VIAI Sulfuric Preserved. AV = Arifreight Unpreserved Vial SG = Sulfuric Preserved Manager. B = Lupreserved Manager. B = Lupreserved Bottles. ST = Sterile Sodium Thiosulfate Preserved Bottles. ST = Sterile Sodium Thiosulfate Preserved Bottles. ST = Sterile Sodium Thiosulfate Preserved Bottles.

Water Container Codes: P = Unpreserved Plastic: ORC = Nitric Preserved ORC: SH = Sodium Hydroxide/Gd Preserved: S = Sodium Hydroxide Preserved Plastic: AC = Amber Glass Unpreserved: AP - Airfright Unpreserved Plastic

Sait

400

BL

Shane

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renj, rudiogan

CLIENT: EMM Consulting

PROJECT: \$190512 ORDER NUMBER:

CHAIN OF CUSTODY

ALS Laboratory: please tick >>

Catemoridali Drive Claton OLD 4680 distribue 3 altabolisticem

JTOWNSHILE 14:15 Desma Court Bank CLD 48:18
Ph. 67 4756 0600 E. tourentwis enuronmental ((alignmental

XX N/A

ŝ å RECEIVED BY: Yes Yes FOR LABORATORY USE ONLY (Circle) Random Sample Temperature on Receipt: Free ice / frozen ice bricks present upon receipt? Custody Seal Intact? RELINQUISHED BY: Other comment: 1 (Circle) 9 2 COC SEQUENCE NUMBER 3 OF: 1 2 coc: 1 (2) RECEIVED BY: Non Standard or urgent TAT (List due date): ☐ Standard TAT (List due date): RELINQUISHED BY: (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) TURNAROUND REQUIREMENTS: COUNTRY OF ORIGIN: **SAMPLER MOBILE: 0401 881 447** PROJECT NO .: SIGN TITES ALS QUOTE NO .: CONTACT PH: 02 9493 9500 EDD FORMAT (or default): PURCHASE ORDER NO .: OFFICE: Ground floor, 20 Chandos Street, St Leonards, NSW 2065

DATE/TIME: 10.30 2/4/2 DATE/TIME: DATE/TIME: DATE SS 20/C roman.

hoor bes @ como coose Hine

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

Email Reports to: pgibbons@emmconsulting.com.au

SAMPLER: Kaitlyn Brodie / Henry Noakes COC Emailed to ALS? (YES / NO)

PROJECT MANAGER: Paul Gibbons

Email Invoice to: pgibbons@emmconsulting.com.au

DATE/TIME

Additional Information	Comments on likely contaminant levels, ditutions, or samples requiring specific QC analysis etc.						To be submitted for					*		
ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unitered bottle required) or Dissolved (feld filesed bottle required).	(170H	The state of the s										2.3		
odes must be lis or Dissolved (fek	Picase formard +0 813						×							
(NB. Suite Co	Radium 226/228, Gross a&b EA251 (Red & Green)	X	X	X	X	X		X	X	X	×	X		
ing SUITES	Ferrous iron (Field filtered) EG051 (Maroon)	X	X	Χ	X	X		X	X	X	Χ	X		
RED includi	Dissolved metals (Field filtered)	X	X	X	X	X		X	Χ	X	X	X	anie.	
SIS REQUIF	Sulphide Sulphide	X	Χ	X	Χ	X		X	Χ	X	X	>		
ANALY	Major ions + ionic balance M1-1 & NT-2 (Green)	X	Χ	×	X	X		Χ	X	X	¥	X		
	TOTAL	7	7	4	1	7	7	14	7	H	7	4		
CONTAINER INFORMATION	TYPE & PRESERVATIVE (refer to codes below)													
	MATRIX	8	м	8	х	Α	W	м	W	м	W	W	8	
SAMPLE DETAILS MATRIX: Solid(S) Water(W)	DATE / TIME	25/4 10:15	24/4 15:50	24/4 16:00	24/4 8:00	24/4	24/4	24/4 11:00	24/4 10:45	07/4 9:10	27/4 8:00	28/4		
SAMI MATRIX:	SAMPLEID	U600-1080	BH-MIZD.	BH-M175	LPS PBOY	QC100	Q C200	ULM-MISS	UCM-MISD	46m-m185	W.GM-MIRD	RB 100	)	
ALS USE ONLY	LABID	21	13	74	ا ك	91	ſ	7	81	61	2	12		

Water Container Codes: P = Unpreserved Plastic: N = Nitric Preserved Plastic: ORC = Nitric Preserved Plastic: AP = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide/Cd Preserved; Plastic: AP = HCI preserved; AP = Aldreight Unpreserved; VS = VOA Vial Sulfuric Preserved; VS = VOA Vial Sulfuric Preserved; AV = Aidreight Unpreserved Vial SG = Sulfuric Preserved Plastic: AP = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic: F = FDTA Preserved Plastic: ASS = Plastic Bag for Acid Sulphate Solis; B = Unpreserved Bottles; ST = Sterile Bottles.

TOTAL



### CERTIFICATE OF ANALYSIS

**Environmental Division Sydney** Customer Services ES : 1 of 7 Laboratory Contact EUU CONSGLTINP DTY LTI PAUL GIBBONS ESM206986 **Work Order** Contact

277-289 Woodpark Road Smithfield NSW Australia 2164 Address Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065

30-Apr-2020 10:20 +61-2-8784 8555 30-Apr-2020 Date Analysis Commenced Date Samples Received Telephone S190512

Order number

Sampler

Telephone

Project

Address

Client

: 14-May-2020 08:45 Issue Date

HENRY NOAKES, KAITLYN BRODIE EN/222 7 No. of samples analysed No. of samples received C-O-C number Quote number

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. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

General Comments

Analytical Results

rse monfrobtac wehlrine influspeanw. ygliftn, Coarrof Rehorni y Awy. Cophiftla Qe. Awwewwpean no Iwwitwn btns ta Additioal f tamprolitoa heritaean no istwirehorn bill ue mogad yglftn, Re. teb I ad SI p hfe ReCethnNortrfCl rtoa^

### 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.

Accreditation Category	Sydney Inorganics, Smithfield, NSW	Sydney Inorganics, Smithfield, NSW	Sydney Inorganics, Smithfield, NSW	Padioniclidae Evehwick ACT
osition Accredita	norganic Chemist Sydney	senior Spectroscopist Sydney	Analyst Sydney	Aptale Teamleader Badion
Signatories	Ankit Joshi Ino	Celine Conceicao Ser	Ivan Taylor Ana	Titus Vimalasiri



EMM CONSULTING PTY LTD 2 of 7 ES2014654 S190512 Work Order Project Client

General Comments

In house developed procedures 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. 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

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

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. Key:

LOR = Limit of reporting

B = 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.

EG020: LOR's have been raised due to matrix interference. (High Total Dissolved Solids)

LOR for Gross Alpha and Gross Beta raised for some samples due to high solid content.

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.



Client Project

EMM CONSULTING PTY LTD S190512

3 of 7 ES2014654

Work Order

27-Apr-2020 11:40 ESM2069861228 H- 1UMDi Result 00922 M69 07722 0672 M69 607 V √ 27-Apr-2020 00:00 ESN2069861226 y C020 Result 0M122 29 M M6722 0652 29 M 6562 678 V ∀ 27-Apr-2020 12:45 ESN2069861225 GP U1U MOS Result M5022 0Mk22 6582 67x 0692 587 587 ∀ √ 26-Apr-2020 11:30 ESN206986122M GPU1U9S Result **W**5422 05222 08x2 6692 585 585 899 V V 26-Apr-2020 11:10 ESN2069861220 GP U 1U9i Result 07NP2 02922 0592 5762 609 828 828 V V Client sample ID Client sampling date / time mg/L mg/L mg/L mg/L mg/L Unit mg/L mg/L mg/L mg/L LOR 14808-79-8 16887-00-6 7440-70-2 7439-95-4 7440-23-5 3812-32-6 CAS Number DMO-210-001 71-52-3 Ei 260P: Sgfrhre (Tgrutdtp enrt0) I wSO6 MIu, i A Ei 268P: Csfortde u, i tworene Aalf, wer Ei 2x5F: i twwof. ed Ul jor Cl rtoaw Ei 254D: Afkl ftatı, u, DC Ttırl ror Htcl ruoal re Afkl ftatr, I wCl CO5 CI ruoal re Afkl ftatr, I wCI CO5 Sgfrhre I wSO6 1Tgrutdtp enrtQ - , dro3tde Afkl ftatn, I wCI CO5 Torl f Afkl ftatry I wCI CO5 Sub-Matrix: WATER (Matrix: WATER) Ulcaewtgp Compound Csfortde CI fatgp Sodtgp

Dorl wwtgp	7440-09-7	-	mg/L	52	50	MM	WD	5M
EP 2NZF: i twoof. ed Uent fwu, ICD1US								
Afgp tatgp	7429-90-5	0.01	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Tsortgp	7440-29-1	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Grl atgp	7440-61-1	0.001	mg/L	<0.010	2/209	2.2MB	2.2NB	<0.010
Iroa	7439-89-6	0.05	mg/L	<0.10	<0.10	2.68	2.6x	x′94
EP 280P: Ferrogwiroa u, i tworene Aalf, wer								
Ferrogwiroa		0.05	mg/L	2.00	<0.05	2.28	<0.05	8,00
EK278U: Sgfrtde I wSMI								
Sgfrtde I wSMI	18496-25-8	0.1	mg/L	M/8	<0.1	<0.1	<0.1	<0.1
EN288: loatQHI fl a Ce								
Ø Torl f Aatoaw		0.01	med/L	925	497	447	4x4	×06
Ø Torl fCl rtoaw	-	0.01	med/L	8x6	4MB	429	9x8	296
Ø loatQHI fl a Ce		0.01	%	2.46	MP7	672	646	ANIN
EAMB2CA: ProwwAffis! I ad Hen AQt. tr)								
Prowwl fhs1	-	0.05	Bq/L	06.0>	6%0	M72	2×,0	<0.81
Prowwuerl I Qt. tr, 162K		0.10	Bq/L	<1.81	<2.10	<2.09	<2.06	<1.62
EAMBOCA: RIdtgp MABIad Ridtgp MAF AQt. tn	ë:							
Ridtgp MM9	13982-63-3	0.01	Bq/L	2.25	2.0x	2.0x	2.04	2.26
RIdtgp MM	7440-14-4	80.0	Bq/L	80.0>	2/82	2/99	2.92	<0.08



Client Project

EMM CONSULTING PTY LTD S190512

ES2014654

Work Order

4 of 7

25-Apr-2020 15:20 ESN2069861202 GP U 1U M <0.010 <0.010 07 IN 22 00022 <0.08 2.25 67 M 2/05 ٥ 0.1 9M6 0.67 √ 929 V 20 25-Apr-2020 15:40 ESM206986122x GP U 1U MS Result <0.010 0842 0MM22 2.205 <0.05 <2.03 6x02 52M ٥.1 م 0×6 874 211/6 444 2/77 ∀ V ₹ 26-Apr-2020 09:00 ESIN2069861227 GP U 1U 6i Result <0.010 <0.010 <0.10 02522 <0.90 5x72 04422 0552 2.25 2/27 870 27x 2/MB ٥.1 م 8x0 V V 667 667 ž 28-Apr-2020 09:00 ESN2069861224 GP U 1U 0NB Result <0.010 <0.10 06922 M4N22 2/272 <2.32 <0.08 0982 672 664 3262 2.00 4x4 2/28 ٥.1 د 747 MX7 V 2 27-Apr-2020 15:30 ESM2069861229 GP U 1U 0M Result <0.010 <0.010 <0.10 09922 5052 0072 x8M2 <1.27 2.02 2.06 28x 2.09 0.58 869 852 2.97 869 š 866 V ĭ Client sample ID Client sampling date / time meq/L med/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Bq/L Bq/L Bq/L Bq/L % LOR 0.001 0.001 0.05 0.02 0.05 0.10 0.01 0.08 0.01 0.01 0.01 0.1 7429-90-5 7439-89-6 13982-63-3 7440-14-4 14808-79-8 16887-00-6 7440-61-1 l 18496-25-8 7440-70-2 7439-95-4 7440-23-5 | CAS Number DMO-210-001 3812-32-6 71-52-3 7440-09-7 7440-29-1 Ei 260P: Sgfrhre (Tgrutdtp errtQ) I wSO6 MIu, i A EAMBOCA: RIdtgp MM9 I ad RIdtgp MM7 AQt. tn EP280P: Ferrogwiroa u, i tworene Aalf, wer EAMB2CA: ProwwAfths! I ad Herl AQrt. try Ei 268P: Csfortde u, i tworene Aalf, wer EP2MPF: i twoof. ed Uerl fwu, ICD1US Ei 2x5F: i twoof. ed Uljor Cl rtoaw Ei 254D: Afkl ftatn, u, DC Ttrrl ror Htcl ruoal re Afkl ftatr, I wCl CO5 CI ruoal re Afkl ftatr, I wCI CO5 - , dro3tde Afkl ftatn, I wCI CO5 Sgffhre I wSO6 1Tgrutdtp errtQ Torl f Afkl ftatr, I wCI CO5 EK278U: Sgfttde I wSMI Prowwuer I Qrt. tr, 162K EN288: loatQHI fl a Ce Sub-Matrix: WATER (Matrix: WATER) Sgfrtde I wSMI Ø loatQHI fl a Qe Ferrogwiroa RIdtgp MM9 RIdtgp MW Prowwl fhsi Ulcaewtgp Afgp tatgp Dorl wwtgp Compound Csfortde Sodtgp Grl atgp Tsortgp CI fctgp Iroa



Project Client

: 5 of 7 : ES2014654 : EMM CONSULTING PTY LTD : \$190512

Page Work Order

Sub-Matrix: WATER		Clie	Client sample ID	GPU1U7S	GPU1U7i	H- 1U 04i	H- 1U04S	LDSDH26
	Clie	ent samplin	Client sampling date / time	25-Apr-2020 12:00	25-Apr-2020 10:15	24-Apr-2020 15:50	24-Apr-2020 16:00	24-Apr-2020 08:00
Compound	CAS Number	TOR	Unit	ESM2069861200	ESM206986120M	ESM2069861205	ESM2069861206	ESN2069861208
				Result	Result	Result	Result	Result
Ei 254D: Afkl ftatn, u, DC Ttrrl ror								
- , dro3tde Afkl ftatr) I wCI CO5	DMO-210-001	1	mg/L	<1	<1	۲۷	<1	۲>
CI ruoal ne Afkl ftatry I w CI CO5	3812-32-6	-	mg/L	<1	<b>\</b>	<b>1</b> >	<1	۲>
HtQ ruoal re Afkl ftatr, I wCl CO5	71-52-3	-	mg/L	M#8	672	602	6M5	689
Torl f Afkl ftatr, I wCI CO5	1	-	mg/L	N#8	672	602	6N6	689
Ei 260P: Sgfrhre (Tgrutdtp enrtQ) I wSO6 MI u,	Miu, i A							
Sgfrhre I wSO6 1 Tgrutdtp enrtQ	14808-79-8	-	mg/L	6752	5xN2	5792	6002	6562
Ei 268P: Csfortde u, i tworere Aal f, wer								
Csfortde	16887-00-6	-	mg/L	M8422	07722	04522	07822	0x222
Ei 2x5F: i twof. ed UI jor CI rtoaw								
CI fCtgp	7440-70-2	-	mg/L	286	662	627	644	×69
Ulcaewtgp	7439-95-4	-	mg/L	04x2	05x2	0592	0Mk2	0662
Sodtgp	7440-23-5	-	mg/L	05622	02722	02822	02x22	02722
Dorl wwtgp	7440-09-7	-	mg/L	52	5M	50	М	59
EP 2NZF: i twof. ed Uen fwu, ICD1US								
Afgp tatgp	7429-90-5	0.01	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Tsortgp	7440-29-1	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Grl atgp	7440-61-1	0.001	mg/L	2.200	<0.010	<0.010	2.205	<0.010
Iroa	7439-89-6	0.05	mg/L	<0.10	2.5M	84M	2.94	2.08
EP280P: Ferrogwiroa u, i tworene Aalf, wer	wer							
Ferrogwiroa		0.05	mg/L	<0.05	2/82	949	2.75	2.1/15
EK278U: Sgfrtde I wSMI								
Sgfrtde I wSMI	18496-25-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
EN288: loatQHI fl a Ce								
Ø Torl f Aatoaw		0.01	med/L	750	9MM	849	606	958
Ø Torl fCl rtoaw		0.01	med/L	496	924	8x2	928	902
Ø loatQHI fl a Qe		0.01	%	6-1MI	0.0x	0.05	2%0	0.75
EAMB2CA: ProwwAffis! I ad Herl AQt. tr)								
Prowwl fins!		0.05	Bq/L	0.87	<0.93	2%7	M20	0.22
Prowwuerl IQt. tr, 162K		0.10	Bq/L	<2.15	<1.86	<1.83	<1.82	<1.86
EAMBOCA: RIdtgp MABIad RIdtgp MAFAQ1.tn	AQrt. tr)							
Ridtgp MM9	13982-63-3	0.01	Bq/L	2 M2	2/25	2.00	2.07	2.06
RIdtgp MM	7440-14-4	0.08	Bq/L	2.42	<0.08	2.0x	2.4x	2/52



Client Project

EMM CONSULTING PTY LTD S190512

ES2014654

Work Order

6 of 7

27-Apr-2020 08:00 ESN20698612N2 GP U 1U 07i <0.010 <0.010 05x2 02x22 02/9 <1.81 2.06 2.1VG **2**M ٥ 0.1 8x5 902 0.68 605 605 ĕ V Ÿ 27-Apr-2020 09:10 ESM206986120x GP U 1U 07S Result <0.010 0542 0N622 2.260 52M 2.×M 6/W 6 2.56 8.20 ٥ 0.1 947 5.9x M29 V V 584 584 9 ¥ 6 24-Apr-2020 10:45 ESIN2069861207 GP U 1U 08i Result <0.010 <0.010 00422 07722 0662 574 <0.94 <1.87 2/24 2.06 6448 M54 685 X06 х96 685 2⊠ V V 24-Apr-2020 11:00 ESN2069861204 **GPU 1U08S** Result <0.010 <0.10 06422 **WB022** 08x2 <0.05 <2.34 2/MM 72M M46 8272 5.66 2.9x 9 ٥.1 د 764 V 9 24-Apr-2020 00:00 ESM2069861209 y C022 Result <0.010 <0.010 0x022 00022 <1.86 6072 0672 2.06 2.05 2.59 604 2116 ٥.1 م **₩**6 2.57 604 29 926 V Client sample ID Client sampling date / time meq/L med/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Bq/L Bq/L Bq/L Bq/L % LOR 0.001 0.001 0.05 0.02 0.05 0.10 0.01 0.08 0.01 0.01 0.01 0.1 7429-90-5 7439-89-6 13982-63-3 7440-14-4 14808-79-8 16887-00-6 7440-61-1 l 18496-25-8 7440-70-2 7439-95-4 7440-23-5 | CAS Number DMO-210-001 3812-32-6 71-52-3 7440-09-7 7440-29-1 Ei 260P: Sgfrhre (Tgrutdtp errtQ) I wSO6 MIu, i A EAMBOCA: RIdtgp MM9 I ad RIdtgp MM7 AQt. tn EP280P: Ferrogwiroa u, i tworene Aalf, wer EAMB2CA: ProwwAfths! I ad Herl AQrt. try Ei 268P: Csfortde u, i tworene Aalf, wer EP2MPF: i twoof. ed Uerl fwu, ICD1US Ei 2x5F: i twoof. ed Uljor Cl rtoaw Ei 254D: Afkl ftatn, u, DC Ttrrl ror Htcl ruoal re Afkl ftatr, I wCl CO5 CI ruoal re Afkl ftatr, I wCI CO5 - , dro3tde Afkl ftatn, I wCI CO5 Sgffhre I wSO6 1Tgrutdtp errtQ Torl f Afkl ftatr, I wCI CO5 EK278U: Sgfrtde I wSMI Prowwuer I Qrt. tr, 162K EN288: loatQHI fl a Ce Sub-Matrix: WATER (Matrix: WATER) Sgfrtde I wSMI Ø loatQHI fl a Ce Ferrogwiroa RIdtgp MM9 RIdtgp MW Prowwl fhsi Ulcaewtgp Afgp tatgp Dorl wwtgp Compound Csfortde Sodtgp Grl atgp Tsortgp CI fctgp Iroa



Project Client

: 7 of 7 : ES2014654 : EMM CONSULTING PTY LTD : S190512

Page Work Order

Sub-Matrix: WATER (Matrix: WATER)		Clier	Client sample ID	RH022	11H	###	##	1111
	Clie	ent samplin	Client sampling date / time	28-Apr-2020 00:00				
Compound	CAS Number	LOR	Unit	ESM20698612M0	11111111	11111111	11111111	11111111
				Result				
Ei 254D: Afkl ftatı, u, DC Ttırıl ror								
- , dro3tde Afkl ftatr, I wCI CO5	DMO-210-001	1	mg/L	<1	1111	1111	1111	1111
CI ruoal ne Afkliftatnj I w CI CO 5	3812-32-6	-	mg/L	<1	Т	1111	1111	1111
Htcl ruoal re Afkl ftatr, I wCl CO5	71-52-3	<b>-</b>	mg/L	1	Щ	т.	44	44
Tori f Afki ftatrı I wCI CO5		-	mg/L	<1	Щ	тт	1111	ти
Ei 260P: Sgfrhre (Tgrutdtp enrtQ) I wSO6 Milu, i A	¶u, i A							
Sgfrhre I wSO6 1Tgrutdtp errtQ	14808-79-8	1	mg/L	۲,	1111	1111	1111	414
Ei 268P: Csfortde u, i tw Grene Aalf, wer								
Csfortde	16887-00-6	1	mg/L	<1	1111	1111	1111	414
Ei 2x5F: i twwof. ed UI jor CI rtoaw								
CI fctgp	7440-70-2	1	mg/L	<1	1111	1111	1111	1111
UIcaewtgp	7439-95-4	_	mg/L	<b>\</b>	т	1111	1111	414
Sodtgp	7440-23-5	-	mg/L	<1	ти	1111	1111	1111
Dorl wwtgp	7440-09-7	-	mg/L	<1	Т	1111	1111	414
EP 2NZF: i twof. ed Uen fwu, ICD1US								
Afgp tatgp	7429-90-5	0.01	mg/L	<0.01	т	1111	1111	414
Tsortgp	7440-29-1	0.001	mg/L	<0.001	Т	1111	1111	414
Grl atgp	7440-61-1	0.001	mg/L	<0.001	Т	1111	1111	1111
Iroa	7439-89-6	0.05	mg/L	<0.05	ти	1111	1111	1111
EP 280P: Ferrogwiroa u, i tworeme Aalf, wer	er							
Ferrogwiroa		0.05	mg/L	<0.05	1111	1111	1111	414
EK278U: Sgfrtde I wSMI								
Sgfrtde I wSMI	18496-25-8	0.1	mg/L	<0.1	1111	1111	1111	414
EN288: loatQHI fl a Ce								
Ø Torl f Aatoaw		0.01	med/L	<0.01	Т	1111	1111	1111
Ø Torl fCl rtoaw		0.01	med/L	<0.01	Т	1111	1111	1111
EAMB2CA: ProwwAffis1 I ad Hen AQt. tr)								
Prowwl fhs1		0.05	Bq/L	<0.05	Щ	Ш	1111	414
Prowwuerl I Qt. tr, 162K		0.10	Bq/L	<0.10	1111	1111	1111	414
EAMBOCA: RIdtgp MABIad RIdtgp MAF AQt. tn	Ort. tr)							
Ridtgp MA9	13982-63-3	0.01	Bq/L	<0.01	Т	1111	1111	1111
Ridtgp MW7	7440-14-4	0.08	Bq/L	<0.08	Щ	Щ	1111	ти



## QUALITY CONTROL REPORT

**Environmental Division Sydney** Customer Services ES : 1 of 7 Laboratory Contact **EGG CONMULTIND PTY LT5** PAUL GIBBONS **EM20698S9 Work Order** Contact 277-289 Woodpark Road Smithfield NSW Australia 2164 +61-2-8784 8555 30-Apr-2020 Date Samples Received Telephone Address Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065 S190512

30-Apr-2020

Date Analysis Commenced

Order number

Sampler

Telephone

Project

Address

Client

14-May-2020 Issue Date HENRY NOAKES, KAITLYN BRODIE EN/222 2 No. of samples analysed No. of samples received C-O-C number Quote number

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. 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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Titus Vimalasiri	Metals Teamleader	Radionuclides, Fyshwick, ACT



General Comments

In house developed procedures 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. 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 primary

Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot 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

RPD = Relative Percentage Difference

# = Indicates failed QC

### Laboratory Duplicate (DUP) Report

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

Sub-Matrix: WATER						Laboratory D	Laboratory Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA2S0CA: Dross Alp	EA2S0CA: Dross Alpha and Beta Activity (QC Lot: 23333164	ot: 23333164							
EB2011392-001	Anonymous	EA250: Gross alpha	-	0.05	Bq/L	<0.05	<0.05	0.00	No Limit
		EA250: Gross beta activity - 40K	1	0.1	Bq/L	<0.10	<0.10	0.00	No Limit
EP2004202-006	Anonymous	EA250: Gross alpha	1	0.05	Bq/L	0.08	0.15	56.0	No Limit
		EA250: Gross beta activity - 40K	1	0.1	Bq/L	0.14	0.21	40.4	No Limit
EA2S0CA: Dross Alp	EA2S0CA: Dross Alpha and Beta Activity (QC Lot: 23333124	ot: 23333124							
ES2014654-009	UGM-M2S	EA250: Gross alpha	-	0.05	Bq/L	1.72	1.94	12.6	No Limit
		EA250: Gross beta activity - 40K	1	0.1	Bq/L	<2.03	<2.03	0.00	No Limit
ES2014654-019	UGM-M18S	EA250: Gross alpha	1	0.05	Bq/L	3.02	3.36	10.7	No Limit
		EA250: Gross beta activity - 40K	1	0.1	Bq/L	2.06	<2.00	3.19	No Limit
E5071P: Alkalinity)	E5071P: Alkalinity) y PC Titrator (QC Lot: 233S8264	8264							
ES2014654-003	UGM-M21S	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	~	mg/L	۲	^	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	_	mg/L	۲	^	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	_	mg/L	358	350	2.30	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	1	_	mg/L	358	350	2.30	0% - 20%
ES2014638-007	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	۲	^	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	_	mg/L	۲	^	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	_	mg/L	325	354	8.62	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	-	_	mg/L	325	354	8.62	0% - 20%
E5071P: Alkalinity)	E5071P: Alkalinity) y PC Titrator (QC Lot: 233S8274	8274							
ES2014654-014	BH-M17S	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	٧	^	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	~	mg/L	۲	^	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	_	mg/L	424	417	1.50	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	-	_	mg/L	424	417	1.50	0% - 20%
ES2014672-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	۲	^	0.00	No Limit



EMM CONSULTING PTY LTD

S190512

Client Project

ES2014654

Work Order

3 of 7

Recovery Limits (%) 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% No Limit No Limit 0% - 50% No Limit RPD (%) 0.740 3.39 26.6 3.10 9.94 1.07 0.00 0.00 1.10 0.00 7.67 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 3.39 0.00 3.26 10.1 7.53 0.00 0.00 0.00 Laboratory Duplicate (DUP) Report Duplicate Result <0.10 <0.010 10600 12100 5140 27000 <0.10 <0.10 <0.10 409 1620 610 3700 637 637 37 34 30 28 12 V 7 7 Ÿ 7 V 4 ~ Original Result <0.10 <0.010 0090 26100 13400 <0.10 <0.10 <0.10 5080 1790 1360 3820 659 659 416 658 30 V 38 39 34 2 30 Ÿ ۲ Ÿ 12 4 2 mg/L Unit 0.001 0.05 LOR 0.05 0.01 0.01 \_ ~ \_ \_ <del>-</del> \_ \_ Ψ ~ ~ \_ \_ \_ \_ \_ \_ ~ 7429-90-5 7440-29-1 14808-79-8 16887-00-6 9-00-2889 7429-90-5 CAS Number 3812-32-6 71-52-3 14808-79-8 14808-79-8 14808-79-8 16887-00-6 7440-70-2 7440-23-5 7440-09-7 7440-70-2 7440-23-5 7440-70-2 7440-23-5 7440-09-7 7440-70-2 7440-23-5 7439-89-6 7439-89-6 7439-95-4 7439-95-4 7440-09-7 7439-95-4 7439-95-4 7440-09-7 ED037-P: Bicarbonate Alkalinity as CaCO3 ED037-P: Carbonate Alkalinity as CaCO3 ED041G: Sulfate as SO4 - Turbidimetric ED037-P: Total Alkalinity as CaCO3 EG020A-F: Aluminium EG020A-F: Aluminium E5096D: Mulfate (Tur) idimetric4as MO9 2b) y 5A (QC Lot: 233SS-74 ED093F: Magnesium ED093F: Magnesium ED093F: Magnesium ED093F: Magnesium E5 096D: Mulfate (Tur) idimetric4as MO9 2b) y 5 A (QC Lot: 233SS-34 ED093F: Potassium ED093F: Potassium EG020B-F: Thorium ED093F: Potassium ED093F: Potassium ED045G: Chloride ED045G: Chloride ED045G: Chloride ED093F: Calcium ED093F: Calcium ED093F: Calcium ED093F: Calcium ED093F: Sodium ED093F: Sodium ED093F: Sodium ED093F: Sodium E5071P: Alkalinity)y PC Titrator(QC Lot: 233S8274 bcontinued EG020A-F: Iron EG020A-F: Iron E509SD: Chloride ) y 5 iscrete Analyser (QC Lot: 233SS--4 E509SD: Chloride ) y 5 iscrete Analyser (QC Lot: 233SS304 ED020F: 5 issolved Getals ) y ICPtGM (QC Lot: 23382- S4 ED020F: 5 issolved Getals ) y ICPtGM (QC Lot: 23382-84 E5037F: 5 issolved Gajor Cations (QC Lot: 23382-14 E5037F: 5 issolved Gajor Cations (QC Lot: 23382-94 Client sample ID Anonymous UGM-M15D UGM-M15S UGM-M15S Anonymous Anonymous Anonymous Anonymous Anonymous UGM-M6D UGM-M6D UGM-M6D UGM-M8S **UGM-M8S** RB100 Laboratory sample ID Sub-Matrix: WATER ES2014654-018 ES2014654-021 EW2002098-004 ES2014672-002 ES2014654-017 ES2014654-001 ES2014635-001 ES2014629-001 ES2014654-017 ES2014654-001 ES2014654-011 ES2014629-001 ES2014635-001 ES2014654-011 ES2014654-001



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S190512

Client Project

ES2014654

Work Order

4 of 7

Recovery Limits (%) No Limit No Limit 0% - 20% No Limit 0% - 20% No Limit RPD (%) 0.159 0.00 0.00 0.00 0.00 0.00 15.4 0.00 0.00 36.5 0.00 0.00 0.00 0.00 0.00 2.01 0.00 Laboratory Duplicate (DUP) Report Original Result Duplicate Result <0.010 <0.001 <0.001 < 0.010 <0.05 <0.001 0.011 <0.01 <0.01 0.14 < 0.001 0.08 <0.05 20.1 23.4 40° 0.1 ٥.1 م <0.010 <0.001 <0.001 <0.05 <0.010 <0.05 <0.001 0.011 <0.01 <0.01 <0.001 23.3 0.12 0.11 19.7 40 1.0 ٥.1 م **0.** mg/L Unit 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.05 0.02 0.05 0.05 0.05 LOR 0.01 0.1 0.1 0.01 0.1 7429-90-5 7439-89-6 7439-89-6 18496-25-8 18496-25-8 CAS Number 7440-61-1 7440-29-1 7440-61-1 7429-90-5 7440-61-1 7440-29-1 7440-61-1 -18496-25-8 7440-29-1 EG020A-F: Aluminium EG020A-F: Aluminium EG051G: Ferrous Iron EG051G: Ferrous Iron EG051G: Ferrous Iron EG051G: Ferrous Iron EK085: Sulfide as S2-EK085: Sulfide as S2-EK085: Sulfide as S2-ED020F: 5 issolved Getals)y ICPtGM (QC Lot: 23382- 84 bcontinued EG020B-F: Uranium EG020B-F: Uranium EG020B-F: Thorium EG020B-F: Thorium EG020B-F: Uranium EG020B-F: Thorium EG020B-F: Uranium EG020A-F: Iron EG020A-F: Iron ED0S6D: Ferrous Iron ) y 5 iscrete Analyser (QC Lot: 2331S664 ED0S6D: Ferrous Iron ) y 5 iscrete Analyser (QC Lot: 233-0964 ED020F: 5 issolved Getals ) y ICPtGM (QC Lot: 23382-34 ED020F: 5 issolved Getals ) y ICPtGM (QC Lot: 23382--4 EK0-SG: Mulfide as M2b (QC Lot: 233810S4 EK0-SG: Mulfide as M2b (QC Lot: 233-3694 Client sample ID Anonymous Anonymous Anonymous Anonymous Anonymous UGM-M6D UGM-M6S UGM-M6D UGM-M8S UGM-M8S LPSPB04 RB100 RB100 Laboratory sample ID Sub-Matrix: WATER EW2002098-004 EW2002098-004 ES2014654-001 ES2014586-001 ES2014651-013 ES2014654-002 ES2014654-015 ES2014654-021 ES2014654-011 ES2014459-001 ES2014654-001 ES2014654-011 ES2014654-021



: 5 of 7 : ES2014654 : EMM CONSULTING PTY LTD : S190512 Page Work Order Project Client

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

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target

Method: Compound FA2SDCA: Dross Alpha and Beta Activity (OCI of: 23333464				Method Blank (MB)		Laboratory Control Spike (LCS) Report	co) report	
Method: Compound  EA2SDCA: Dross Alpha and Beta Activity (OCI of: 233				Report	Spike	Spike Recovery (%)	Recovery	Recovery Limits (%)
EA2S0CA: Dross Alpha and Beta Activity (QCI of: 233	CAS Number	LOR	Unit	Result	Concentration	SOT	Low	High
	33164							
EA250: Gross alpha	1	0.05	Bq/L	<0.05	1751 Bq/L	# 102	98.0	100
EA250: Gross beta activity - 40K	1	0.1	Bq/L	<0.10		-	-	-
EA2S0CA: Dross Alpha and Beta Activity (QCLot: 23333124	33124							
EA250: Gross alpha	1	0.05	Bq/L	<0.05	1751 Bq/L	100	98.0	100
EA250: Gross beta activity - 40K	-	0.1	Bq/L	<0.10	-	-	-	-
EA2S6CA: Radium 228 and Radium 22- Activity (QCLot: 70032864	pt: 70032864							
EA251: Radium 226	13982-63-3	0.01	Bq/L	<0.01	2.5 Bq/L	96.5	89.9	110
EA251: Radium 228	7440-14-4	0.08	Bq/L	<0.08	2.5 Bq/L	94.8	85.6	112
E5071P: Alkalinity) y PC Titrator (QCLot: 233S8264								
ED037-P: Total Alkalinity as CaCO3			mg/L		200 mg/L	99.1	81.0	111
`				-	50 mg/L	118	70.0	130
E5071P: Alkalinity ) v PC Titrator (QCLot: 233S8274								
ED037-P: Total Alkalinity as CaCO3		1	mg/L		200 mg/L	100	81.0	111
`					50 mg/L	122	70.0	130
E5096D: Mulfate (Tur) idimetric4as MO9 2b) y 5 A (QCLot: 233SS-74	ot: 233SS-74							
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	~	mg/L	₹	25 mg/L	111	82.0	122
					500 mg/L	101	82.0	122
E5096D: Mulfate (Tur) idimetric4as MO9 2b) y 5A (QCLot: 233SS-34	ot: 233SS-34							
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	_	mg/L	<b>\</b>	25 mg/L	115	82.0	122
				^	500 mg/L	103	82.0	122
E5 09SD: Chloride) y 5 iscrete Analyser (QCLot: 233SS4	54							
ED045G: Chloride	16887-00-6	_	mg/L	^	10 mg/L	110	80.9	127
				V	1000 mg/L	105	80.9	127
E509SD: Chloride) y 5 iscrete Analyser (QCLot: 233SS304								
ED045G: Chloride	16887-00-6	~	mg/L	<u>`</u>	10 mg/L	112	80.9	127
				<b>\</b>	1000 mg/L	108	80.9	127
E5037F: 5issolved Gajor Cations (QCLot: 23382-94								
ED093F: Calcium	7440-70-2	_	mg/L	<u>\</u>	50 mg/L	98.2	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	1>	50 mg/L	96.4	90.0	116
ED093F: Sodium	7440-23-5	_	mg/L	۲>	50 mg/L	95.7	82.0	120
ED093F: Potassium	7440-09-7	_	mg/L	<b>\</b>	50 mg/L	95.1	85.0	113
E5037F: 5 issolved Gajor Cations (QCLot: 23382-14								
ED093F: Calcium	7440-70-2	-	mg/L	₹	50 mg/L	99.3	80.0	114



 Page
 : 6 of 7

 Work Order
 : ES2014654

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LCS) Report	S) Report	
				Report	Spike	Spike Recovery (%)	Recovery Limits (%)	imits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SOT	Low	High
E5037F: 5 issolved Gajor Cations (QCLot: 23382-14 bcontinued	ntinued							
ED093F: Magnesium	7439-95-4	_	mg/L		50 mg/L	95.2	0.06	116
ED093F: Sodium	7440-23-5	_	mg/L	₹	50 mg/L	101	82.0	120
ED093F: Potassium	7440-09-7	_	mg/L	۲	50 mg/L	99.1	85.0	113
ED020F: 5 issolved Getals ) y ICPtGM (QCLot: 23382- S4								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	91.4	80.0	116
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	92.5	82.0	112
ED020F: 5 issolved Getals ) y ICPkGM (QCLot: 23382-84								
EG020B-F: Thorium	7440-29-1	0.001	mg/L	<0.001	0.1 mg/L	103	85.0	115
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	0.1 mg/L	87.7	85.0	115
ED020F: 5 issolved Getals ) y ICPkGM (QCLot: 233824								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	86.9	80.0	116
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	89.9	82.0	112
ED020F: 5 issolved Getals ) y ICPtGM (QCLot: 23382-34								
EG020B-F: Thorium	7440-29-1	0.001	mg/L	<0.001	0.1 mg/L	94.1	85.0	115
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	0.1 mg/L	85.1	85.0	115
ED0S6D: Ferrous Iron ) y 5 iscrete Analyser (QCLot: 2331S664	S664							
EG051G: Ferrous Iron		0.05	mg/L	<0.05	2 mg/L	97.1	89.0	117
ED0S6D: Ferrous Iron ) y 5 iscrete Analyser (QCLot: 233- 0964	0964							
EG051G: Ferrous Iron		0.05	mg/L	<0.05	2 mg/L	97.0	89.0	117
EK0-SG: Mulfide as Mzb (QCLot: 233810S4								
EK085: Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	0.5 mg/L	98.0	76.0	116
EK0-SG: Mulfide as M2b (QCLot: 233-3694								
EK085: Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	0.5 mg/L	96.0	76.0	116

### 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.

Matrix Spike (MS) Report

Sub-Matrix: WATER

			Spike	SpikeRecovery(%)	Recovery Limits (%)	imits (%)
Laboratory sample ID Client sample ID	Method: Compound	CAS Number	CAS Number Concentration	MS	Low	High
E5096D: Mulfate (Tur) idimetric4as MO9 2b) y 5A (QCLot: 233SS-74						
ES2014629-001 Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	50 mg/L	96.8	70.0	130
E5096D: Mulfate (Tur) idimetric4as MO9 2b) y 5A (QCLot: 233SS-34						
ES2014654-017 UGM-M15S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
E5 09SD: Chloride ) y 5 iscrete Analyser (QCLot: 233SS - 4						



 Page
 : 7 of 7

 Work Order
 : ES2014654

 Client
 : EMIM CONSULTING PTY LTD

 Project
 : \$190512

Sub-Matrix: WATER			Mé	Matrix Spike (MS) Report		
			Spike	SpikeRecovery(%)	Recovery Limits (%)	mits (%)
Laboratory sample ID Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
E5 09SD: Chloride ) y 5 iscrete Analyser (QCLot: 233SS 4 bcontinued						
ES2014629-001 Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	118	70.0	130
E509SD: Chloride ) y 5 iscrete Analyser (QCLot: 233SS304						
ES2014654-017 UGM-M15S	ED045G: Chloride	16887-00-6	250 mg/L	# Not	70.0	130
				Determined		
ED056D: Ferrous Iron ) y 5 iscrete Analyser (QCLot: 2331S664						
ES2014654-001 UGM-M6D	EG051G: Ferrous Iron	-	1 mg/L	103	70.0	130
ED056D: Ferrous Iron ) y 5 iscrete Analyser (QCLot: 233-0964						
ES2014586-001 Anonymous	EG051G: Ferrous Iron		10 mg/L	83.0	70.0	130
EK0-SG: Mulfide as M2b (QCLot: 233810S4						
ES2014654-002 UGM-M6S	EK085: Sulfide as S2-	18496-25-8	0.33 mg/L	106	70.0	130
EK0-SG: Mulfide as M2b (QCLot: 233-3694						
ES2014459-001 Anonymous	EK085: Sulfide as S2-	18496-25-8	0.33 mg/L	97.0	70.0	130



# QA/QC Compliance Assessment to assist with Quality Review

: 1 of 11	ratort : n i Broi v ei taOnIBDoi stM et spoie : h+16 63835 3444	@DRecelEeM	: 156K at 6.2-2	No(of Dav S@DrecelEeM :-1	No( of Dav S@Dai a@DeM :-1
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reportinb hibhlibhts any non, con. ormancesx. a cilitates . aster and more accurate data validation and is desibned to assist internal eBpert and eBternal Auditor review-S any components o. this I his report is automatically benerated f y the ATMTS Mthroubh interpretation o. the ATM Quality Control Report and several Quality Assurance parameters measured fy ATM-I his automated report contrif ute to the overall gQO assessment and reportinb .or buideline compliance-

Brief v etpoMDuv v arleDai Mreferei ceDare a Co Sro EMeMto a DDDoil tracea Lict

### Summary of Outliers

### Outliers : Quality Control Samples

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- UO Sethod Flank value outliers occur-
- UO guplicate outliers occur-
- Taf oratory Control outliers eBist, please see .ollowinb pabes .or .ull details-
- SatriBMpike outliers eBist, please see .ollowinb pabes .or .ull details-
- Hor all rebular sample matricesxUO surrobate recovery outliers occur-

## Outliers: Analysis Holding Time Compliance

UO Analysis qoldinb I ime Outliers eBist-

# Outliers: Frequency of Quality Control Samples

Quality Control Mample Hre( uency Outliers eBist, please see .ollowinb pabes .or .ull details-



nKK y ONSU9TING PTH 9Tm ns-215+45 s 1j 241-Y orx OrMer Procecb v Oeib

Outliers: Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Kabil?: WAI ER

y ov Soui MGrouS Nav e	9aLorabort sav S@ Im y Deibsav S@ Im	y Oeibsav Soelm	Analyte	y As Nuv Ler maba	maba	9lv ItD Comment	Comment
Taf oratory Control Mpike )TCM4Recoveries							
n A- 42y A: GroDDA©pa ai MBeta Acti⊟ti	) y6jjjj81@2-	9999	Pross alpha	9999	12- %	j 3(26122%	j 3(26/22% Recovery breater than upper control
							limit
Satrib Mpike JS MA Recoveries							
nm251G: su@abe WinrLIMv ebickaDsO5-6Lt mA	ns-215+456218	UGK 6K 14s	Mul.ate as MO9,	15323æj æ	qoN	9999	S Mrecovery not determinedx
			l urf idimetric		meberv li eM		f ackbround level breater than or
							e( ual to 9Bspike level-
nm254G: y p@rlMe Lt mlDcrebe Ai a@Der	ns-215+4566218	UGK 6K 14s	Chloride	1+3386226+	Nob	9999	S Mrecovery not determinedx
					meberv li eM		f ackbround level breater than or
							e( ual to 9Bspike level-

### Outliers: Frequency of Quality Control Samples

Kabil7: WAI ER

Wall: WA EN					
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9aLorabrt muScealeDWNUPk					
RaMuv+ai MRaMuv3 Acb⊟ti	2	p -	2(22	12(22	Nn PK - 21d Bd & A9s ) y shai MarM
9aLorabort yoi broGs av S@DNAys k					
GroDDA©pa ai MBeba Actibilit		pp	+(2+	12(22	NnPK -21d Bd & A9s ) y shai MarM
RaMuv+ai MRaMuv3 AcbBta	_	p -	5(d4	4(22	Nn PK - 21d Bd & A9s ) y stai MarM
K etpoMB@i xD\M Bk					
RaMuv+ai MRaMuv3 Acb⊟ti	1	p -	5(d4	4(22	Nn PK - 21d Bd & A9s ) y stail MarM
Kabri7s SxeDWrsk					
mlDoceMKebaOLt Iy P6Ks 6sulbe A	2	52	2(22	4(22	NnPK -21d Bd & A9s ) y stai MarM

### Analysis Holding Time Compliance

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



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Method		Sample Date	Ex	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA2N0CA: Pross Alpha and Feta Activity								
Clear Ylastic Fottle, Ln.ilteredj Taf, acidi.ied )EA2N04								
B/ 6K18mQ	B/ 6K18sQ	29,Apr,2020	****	999	9999	09,S ay,2020	- 160 ct6-2-2	>
9Ps PB25Q	) y 122Q							
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Clear Ylastic Fottle, Ln.ilteredj Taf, acidi.ied )EA2N04								
UGK 6K-SQ	UGK 6K - mQ	2N, Apr, 2020	****	999	9999	09,S ay,2020	60cl6-2-2	>
UGK 6K 3s Q	UGK 6K 3m							
Clear Ylastic Fottle, Ln.ilteredj Taf, acidi. ied )EA2N04								
UGK &K +mQ	UGK & +sQ	28,Apr,2020	1111	9999	9999	09,S ay,2020	-d60c16-2-2	>
UGK 6K 5m								
Clear Ylastic Fottle, Ln.ilteredj Taf, acidi.ied )EA2N04								
UGK 6K-15Q	) y 121Q	25,Apr,2020	*****	9999	9999	09,S ay,2020	- 560 clfs 2-2	>
B/ 6K-1mQ	UGK 6K 1-mQ							
UGK 6K 13s Q	UGK 6K 13m							
Clear Ylastic Fottle, Ln.ilteredj Taf, acidi. ied )EA2N04								
UGK K 1- s Q	RB122	2; ,Apr,2020	*****	9999	9999	09,S ay,2020	- 460cb6-2-2	>
EA2N6CA: Radium 228 and Radium 22; Activity								
Clear Ylastic Fottle, Ln.ilteredj Taf, acidi.ied )EA2N64								
B/ 6K 18mQ	B/ 6K18sQ	29,Apr,2020	****	9999	9999	0; ,S ay,2020	- 160 ct6-2-2	>
9Ps PB25Q	) y 122Q							
UGK 6K 14s Q	UGK 6K 14m							
Clear Ylastic Fottle, Ln.ilteredj Taf, acidi.ied )EA2N64								
UGK 6K-SQ	UGK & - mQ	2N, Apr, 2020	****	9999	9999	0; ,S ay,2020	60cl6-2-2	>
UGK 6K 3s Q	UGK 6K 3m							
Clear Ylastic Fottle, Ln.ilteredj Taf, acidi.ied )EA2N64								
UGK 6K +mQ	UGK 6K +sQ	28,Apr,2020	3333	9999	9999	0; ,S ay,2020	- d60 ct6-2-2	>
UGK 6K 5m								
Clear Ylastic Fottle, Ln.ilteredj Taf, acidi.ied )EA2N64								
UGK 6K - 1s Q	) y 121Q	25,Apr,2020	****	9999	9999	0; ,S ay,2020	- 560 ct6-2-2	>
B/ 6K-1mQ	UGK &K 1-mQ							
UGK ØK 13s Q	UGK ØK 13m							
Clear Ylastic Fottle , Ln.ilteredj Taf ,acidi.ied )EA2N64	00100	2. Anr 2020		<b>#</b>	#	0. S av 2020	- 480 chs. 2- 2	`
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Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
Eg015Y: Alkalinity f y YC I itrator								
Clear Ylastic F ottle,Uatural )Eg015,Y4 B/ 6≺18mQ	B/ <del>0</del> K18sQ	29,Apr,2020	666	9999	9999	10,Apr,2020	236K at 6 2-2	>
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Clear Ylastic Fottle , Uatural )Eg015,Y4								
UGK & +mQ	UGK 6K +SQ	28,Apr,2020		9999	9999	10,Apr,2020	126Kat 6 2-2	>
UGK & 5m								
Clear Ylastic Fottle , Uatural )Eg015,Y4								
UGK K-1sQ	) y 121Q	25,Apr,2020	1111	9999	9999	10,Apr,2020	116Kat 6 2-2	>
B/ 6K-1mQ	UGK & 1-mQ							
UGK KK 13s Q	UGK 6K 13m							
Clear Ylastic Fottle, Uatural )Eg015,Y4								
UGK & 1-sQ	RB122	2; ,Apr,2020	1111	9999	9999	10,Apr,2020	1-6Kat 6 2-2	>
Eg096P: Mul.ate )I urf idimetric4as MO9 2, f y gA								
Clear Ylastic Fottle, Uatural) Eg096P4								
B/ 6K18mQ	B/ 0K18sQ	29,Apr,2020	****	9999	9999	10,Apr,2020	6Kat 6 2-2	>
9Ps PB25Q	) y 122Q							
UGK fK 14s Q	UGK 6K 14m							
Clear Ylastic Fottle, Uatural )Eg096P4								
UGK 6K-sQ	UGK & - m	2N, Apr, 2020	****	9999	9999	10,Apr,2020	- d6Kat 6 2-2	>
UGK 6K 3s Q	UGK &K 3m							
Clear Ylastic Fottle , Uatural )Eg096P4								
UGK 6K +mQ	UGK fK +sQ	28,Apr,2020	****	9999	9999	10,Apr,2020	- 56Kat 6 2-2	>
UGK 6K 5m								
Clear Ylastic Fottle , Uatural )Eg096P4								
UGK K-1sQ	) y 121Q	25,Apr,2020	1111	9999	9999	10,Apr,2020	- 46Kat 6 2-2	>
B/ 6K-1mQ	UGK &K 1- mQ							
UGK KK 13s Q	UGK 6K 13m							
Clear Ylastic Fottle, Uatural )Eg096P4				•			0	,
UGK fK 1- s Q	RB122	2; ,Apr,2020	1111	9999	9999	10,Apr,2020	- +6K at 6 2-2	>



: 4 of 11 : ns-215+45 : nKK yONsU9TING PTH 9Tm : s1j 241-

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Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
Eg09NP: Chloride f y giscrete Analyser								
Clear Ylastic F ottle , Uatural )Eg 09NP4								
B/ 6K 18mQ	B/ 6K18sQ	29,Apr,2020	1111	9999	9999	10,Apr,2020	6Kat 6 2-2	>
9Ps PB25Q	) y 122Q							
UGK ØK 14s Q	UGK 6K 14m							
Clear Ylastic Fottle , Uatural )Eg09NP4								
UGK K-sQ	UGK 6K - mQ	2N, Apr, 2020	****	9999	9999	10,Apr,2020	- d6Kat 6 2-2	>
UGK KK 3s Q	UGK & 3m							
Clear Ylastic Fottle , Uatural )Eg09NP4								
UGK &K +mQ	UGK fK +sQ	28,Apr,2020	2222	9999	9999	10,Apr,2020	- 56K at 6 2-2	>
UGK &K 5m								
Clear Ylastic Fottle . Uatural )Eq09NP4								
UGK 6K-18Q	) y 121Q	25,Apr,2020	****	9999	9999	10,Apr,2020	- 46Kat 6 2- 2	>
B/ 6K-1mQ	UGK K1-mQ							
UGK ØK 13s Q	UGK 6K 13m							
Clear Ylastic Fottle, Uatural )Eq09NP4								
UGK & 1-sQ	RB122	2; ,Apr,2020	1111	9999	9999	10,Apr,2020	- +6Kat 6 2-2	>
Eg031H: gissolved Sarbr Cations								
Clear Ylastic Fottle , Uitric Acidj Hiltered )Eg031H4								
B/ 6K 18mQ	B/ 6K18sQ	29,Apr,2020	*****	9999	9999	10,Apr,2020	6Kat 6 2-2	>
9Ps PB25Q	) y 122Q							
UGK &K 14s Q	UGK & 14m							
Clear Ylastic Fottle, Uitric Acidj Hiltered ) Eg 031H4								
UGK K-sQ	UGK 6K - mQ	2N, Apr, 2020	1111	9999	9999	10,Apr,2020	- d6Kat 6 2-2	>
UGK fK 3s Q	UGK & 3m							
Clear Ylastic Fottle , Uitric Acidj Hiltered )Eg031H4								
UGK 6K +mQ	UGK KK +sQ	28,Apr,2020	1111	9999	9999	10,Apr,2020	- 56K at 6 2-2	>
UGK &K 5m								
Clear Ylastic Fottle , Uitric Acidj Hiltered )Eg031H4								
UGK 6K-1sQ	) y 121Q	25,Apr,2020	9999	9999	9999	10,Apr,2020	- 46K at 6 2- 2	>
B/ 6K-1mQ	UGK 6K 1- mQ							
UGK ØK 13s Q	UGK 6K 13m							
Clear Ylastic Fottle , Uitric Acidj Hiltered )Eg031H4								
UGK 6K 1- sQ	RB122	2; ,Apr,2020	1111	9999	9999	10,Apr,2020	- +6Kat 6 2-2	>



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Method		Sample Date	Exi	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP 020H: gissolved Setals f y GY,SM								•
Clear Ylastic Fottle, Uitric Acidj Hiltered )EP020F, H4								
B/ 6K 18mQ	B/ 6K18sQ	29,Apr,2020	****	9999	9999	10,Apr,2020	- 160 cb6-2-2	>
9Ps PB25Q	) y 122Q							
UGK ØK 14s Q	UGK 6K 14m							
Clear Ylastic Fottle, Uitric Acidj Hiltered) EP020F, H4								
UGK &K - s Q	UGK & - m2	2N, Apr, 2020	****	9999	9999	10,Apr,2020	60cl6-2-2	>
UGK 6K 3s Q	UGK fK 3m							
Clear Ylastic Fottle, Uitric Acidi Hiltered )EP020F, H4								
UGK 6K +mQ	UGK 6K +sQ	28,Apr,2020	****	9999	9999	10,Apr,2020	- d60cb6-2-2	>
UGK &K 5m								
Clear Ylastic Fottle . Uitric Acidi Hiltered )EP020F.H4								
UGK 6K - 1s O	) v 1210	25.Apr.2020	:	9999	9999	10.Apr.2020	- 560cl6-2-2	`
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UGK 6K 13s Q	UGK &K 13m							
Clear Ylastic Fottle, Uitric Acidj Hiltered )EP020F,H4								
UGK & 1-sQ	RB122	2; ,Apr,2020	1111	9999	9999	10,Apr,2020	- 460cts 2-2	>
EP 0N6P: Herrous Gon f y giscrete Analyser								
Clear Ylastic Fottle, q CI, Hiltered )EP 0N6P4								
B/ 6K 18mQ	B/ 6K18sQ	29,Apr,2020	****	9999	9999	06,S ay,2020	216Kat 6 2-2	>
9Ps PB25Q	) y 122Q							
UGK 6K 14s Q	UGK & 14m							
Clear Ylastic Fottle, q CI, Hiltered )EP 0N6P4								
UGK &K - s Q	UGK 6K - mQ	2N, Apr, 2020	1111	9999	9999	06,S ay,2020	2-6Kat 6 2-2	>
UGK KK 3s Q	UGK & 3m							
Clear Ylastic Fottle, qCl, Hiltered )EP 0N6P4								
UGK 6K +mQ	UGK 6K +sQ	28,Apr,2020	1111	9999	9999	06,S ay,2020	2d6Kat 6 2-2	>
UGK &K 5m								
Clear Ylastic Fottle, q CI, Hiltered )EP 0N6P4								
UGK &K-1sQ	) y 121Q	25,Apr,2020	****	9999	9999	06,S ay,2020	256K at 6 2-2	>
B/ 6K-1mQ	UGK & 1-mQ							
UGK 6K 13s Q	UGK &K 13m							
Clear Ylastic Fottle, qCI, Hiltered )EP 0N6P4								
UGK 6K 1- s.Q	RB122	2; ,Apr,2020	:	9999	9999	06,S ay, 2020	246K at 6 2-2	>



: 8 of 11 : ns-215+45 : nKK y ONsU9TING PTH 9Tm : s 1j 241-

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Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK0; NS: Mul.ide as M2,								
Clear Ylastic Fottle, Zinc Acetate/UaOq )EK0; N4								
B/ 6K18mQ	B/ 6K18sQ	29,Apr,2020	****	9999	9999	06,S ay,2020	216Kat 6 2-2	>
9Ps PB25Q	) y 122Q							
UGK 6K 14s Q	UGK &K 14m							
Clear Ylastic Fottle, Zinc Acetate/UaOq) EK0; N4								
UGK &K - s Q	UGK 6K - mQ	2N, Apr, 2020	3333	9999	9999	06,S ay,2020	2-6Kat 6 2-2	>
UGK KK 3s Q	UGK & 3m							
Clear Ylastic Fottle, Zinc Acetate/UaOq) EK0; N4								
UGK & +mQ	UGK fK +sQ	28,Apr,2020	****	9999	9999	06,S ay,2020	2d6Kat 6 2-2	>
UGK &K 5m								
Clear Ylastic Fottle, Zinc Acetate/UaOq) EK0; N4								
UGK 6K - 1s Q	) y 121Q	25,Apr,2020	****	9999	9999	09,S ay,2020	256K at 6 2-2	>
B/ 6K-1mQ	UGK & 1-mQ							
UGK ØK 13s Q	UGK &K 13m							
Clear Ylastic Fottle, Zinc Acetate/UaOq )EK0; N4								
UGK K 1- s Q	RB122	2; ,Apr,2020	1111	9999	9999	09,S ay,2020	246Kat 6 2-2	>



 Page
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Quality Control Parameter Frequency Compliance

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) ua@thy oi bro Csav S@ TtSe		CO	Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
9aLorabort muSCcateDVMUPk							
A Gad It Lt Py Tibator	n m2d8&	5	52	00-09	00-09	>	Nn PK - 21d Bd & A9s ) y stai MarM
yp@rlMe Lt mlDcrebe Ai a@Der	nm254G	р	Ţ	60-19	00-09	>	Nn PK - 21d Bd & A9s ) y stai MarM
mDo CEMK eta OLt Iy PGKs 6sulta A	nG2-2AF	2	52	00-09	00-09	>	Nn PK - 21d Bd & A9s ) y shai MarM
midbo Gemik eta OLt iy Poks 6sulta B	nG2-2B6F	2	-1	63-0N	00-09	>	Nn PK - 21d Bd & A9s ) y stai MarM
FerrouDIroi Lt mlDcrebe Ai a@Der	nG241G	2	Θ	60-28	00-09	>	Nn PK - 21d Bd & A9s ) y stai MarM
GroDDA Spa ai MBeta Acti Bit	nA- 42	2	pp	62-62	00-09	>	Nn PK - 21d Bd & A9s ) y shai MarM
Kaon yaboi D6mlDDo EeM	nm2j dF	2	52	00-09	00-09	>	Nn PK - 21d Bd & A9s ) y stai MarM
RaMuv+ ai MRaMuv3 AcbBtt	nA-41	7	p-	00-0	00-09	×	Nn PK - 21d Bd & A9s ) y stai MarM
su Chabe War LIMvebrick a Ds O5-6Ltml Careba Aia Cher	nm251G	2	d3	W-09	00-09	>	Nn PK - 21d Bd & A9s ) y shai MarM
su@Me aDs-6	n. 234	р	-	61-89	00-09	>	Nn PK - 21d Bd & A9s ) y stai MarM
9aLorabort voitroGs av S@DMVvs k							
AGa@ lbt Lt Py Tibrator	n m2d8@	2	52	00-09	00-09	>	Nn PK - 21d Bd & A9s ) y stai MarM
yp@rlNe Lt mlDcrebe Ai a@Der	nm254G	2	Ţ	61-53	00-09	>	Nn PK - 21d Bd & A9s ) y stai MarM
mIDDOEEMK eta@Lt Iy PGKs 6sulte A	nG2-2AF	1	52	N-00	N-00	>	Nn PK - 21d Bd & A9s ) y stai MarM
mIDDOGEMK eta@Lt Iy PGKs 6sulte B	nG2-2B6F	1	-	3-12	N-00	>	Nn PK - 21d Bd & A9s ) y stai MarM
FerrouDIroi Lt mlDcrebe Ai a@Der	nG241G	1	ίρ	N-61	00N	>	Nn PK - 21d Bd & A9s ) y stai MarM
GroDDA©pa ai MBeba Actb⊟tt	nA- 42	1	pp	8-08	00-09	×	Nn PK -21d Bd & A9s ) y shai MarM
Ka@r yatboi D6mlDDoŒeM	nm2j dF	ı	52	N-00	00N	>	Nn PK -21d Bd & A9s ) y shai MarM
RaMuv+ai MRaMuv3 AcbBtb	nA-41	_	p-	9-1N	00N	×	Nn PK - 21d Bd & A9s ) y stai MarM
su ©abe WarLlMvebrickaDsO5-6LtmlDcrebe Aia © Der	nm251G	5	d3	₩-09	00-09	>	Nn PK -21d Bd & A9s ) y shai MarM
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KetpoMB@ixDWKBk							
yp@rlMe Lt mlDcrebe Aia@Der	nm254G	ı	Ţ	8-30	00N	>	Nn PK -21d Bd & A9s ) y shai MarM
midbo Gemik eta OLt iy Poks 6s ulbe A	nG2-2A€	1	52	N-00	00N	>	Nn PK -21d Bd & A9s ) y shai MarM
mLDoGEMKeta@Lt Iy PGKs 6sulbe B	nG2-2BF	1	1-1	3-N2	00N	>	Nn PK -21d Bd & A9s ) y shai MarM
FerrouDIroi Lt mlDcrebe Ai a@Der	nG241G	ı	σj	N-61	N-00	>	Nn PK -21d Bd & A9s ) y shai MarM
GroDDA©pa ai MBeba Actb⊟ta	nA- 42	1	pp	8-08	00N	>	Nn PK -21d Bd & A9s ) y shai MarM
Ka@r yatoi D6mlDb@eM	nm2j dF	1	52	N-00	00N	>	Nn PK -21d Bd & A9s ) y shai MarM
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suctabe WintLIMvebrickaDsO5-6LtmlDcrebe Aia Cher	nm251G	1	d3	N-28	N-00	>	Nn PK - 21d Bd & A9s ) y shai MarM
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K abri7 s SixeD\M s k							
yp@rlMe Lt mlDcrebe Ai a@Der	nm254G	1	Ţ	8-30	00N	>	Nn PK - 21d Bd & A9s ) y stai MarM
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Kabri7s SxeDVMsk6y oibli ueM							
su@Ne aDs-6	n. 234	1	:	3-03	00N	>	Nn PK - 21d Bd & A9s ) y stai NarM



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**Brief Method Summaries** 

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Analytical Methods	Method	Matrix	Method Descriptions
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RaMuv+ai MRaMuv3 Acb⊟ti	nA-41	YATnR	liqhouDe:meberv liabloi ofraMuv+aiMraMuv+raMoacbi⊟bt li qaber Dav So∂DLt 9I,ulMsclibkOabloi youibig Wosyk(
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s uđabe WurLIMv ebickaDs 05 - 6Lt mlDrebe Ai ađDer	n m251G	YATnR	li pouDe: Referei ceMbo AP/ A 5422& O5( mIDDOŒEMDU®te IDNeterv li eMli a 2(54uv fl@ereMDav S@( su@abe loi Dare coi EerbeMbo a Larluv Du®abe DuDSei Doi li ai acebic aclMv eMuv qlip Larluv cp@rlNe(9lgpb aLDorLai ce of tipe Bas O5 DuDSei Doi IDv eaDreMLt a Spotov eter ai Mipe s O56 coi cei brathoi IDNeterv li eM Lt cov SarlDoi of tipe reaMi g qlip a Dai NarMcurEe(TplDv etpoMIDcov S@i bqlip Nn PK W21dks cpeMu® BWkk
y pontine Lt mitcrete Ai acter	n m254G	Y ATnR	li pouDe: Referei ceMb AP/ A 5422 y &G(Tpe tploct ai abe loi IDQLerateMfrov v ercurlc tploct ai abe tprougp De, ueDratioi of v ercurt Lt tpe cp@rlNe loi to forv i oi doi IDeMv ercurlc cp@rlNe(li tpe SreDei ce of ferrlc loi D tpe QLrateMtploct i abe forv DplgpQcoQureMferrlc tploct i abe q plcp IDv eaDureMab532 i v AP/ A - 1DbeMtboi DeaOv etpoM- 2186169 aSrIC 22d
Ka@r y aboi D6mlDb@eM	nm2j dF	YATnR	li pouDe: Referei ceMbo AP/ A d1-2 ai Md1-4; Us nPA s Y 35+6+212 ai M+2-2; y aboi Dare Meberv li eMLt elbper ly PGAns or ly PGK s becpi I, ueD(TpIDv etpoMIDcov SCai bq ltp Nn PK W21dk s cpeMuG BWMk s oMuv AMDrStboi Rabo IDcaGuGabeMfrov y aCKg ai MNa qplcp Meberv li eMLt A9s li pouDe v etpoM) > Y IGNNWIND   Y IGNNWIND   Y IGNNWIND   A TpIDv etpoMIDcov SCai bq Itp Nn PK W21dk s cpeMuG BWMk   arM eDDSarav eberDare caGuGabeMLaDeMoi AP/ A - d52 B(TpIDv etpoMIDcov SCai bq Itp Nn PK W21dk s cpeMuG BWMk
mDbGeMKebaのLt Iy PoKs 6s ulbe A	nG2-2A∉	YATnR	li pouDe: Referei ceMbo AP/A d1-4; Us nPAsY35+6+2-2QA9s) Y 16η Nwo G2-2(sav SocDare 2(54μν flobereM Shorbo ai aCDQ Tpe ly PKs becpil, ue ublQzeDa plgpC efficlei bargoi SocDva booloi Ize DeGocbeMeGeveibC loi D are bpei SaDDeMlibo a plgp Eacuuv va DDSecbroveberQq plcp DeSarabeDppe ai aCbeDLaDeMoi ppelr MDbicb vaDbo cparge rabboDShorbo bpelr veaDureveibLt a MDcrebo MioNeloi Mebecbor(
MDDEMK etaOLt Iy PCKs 6s ulte B	nG2-2B&	Y ATnR	li pouDe: Referei ceMbo AP/A d1-4; Us nPAsY35+6+2-2CA9s) γ ION Now G2-2(sav SoeDare 2(54μν 1100ereM Srlor bo ai aCDC Tpe Iy PKs becpi I, ue ublCzeDa plgpC efficlei bargoi SADν a bo loi Ize DeOschae (ei bC loi D are opei SaDDeMii bo a plgp Eacuuv v aDD DSectrov eberCq plcp DeSarabeDope ai aCbeDLaDeMoi opeir Michi cb v aDDob cparge raboDSrlor bo opeir v eaDurev ei bLt a Mocrebo Mi o Nove loi Nebecbor(
FerrouDIroi Lt mlDcrebe Aia CDer	nG241G	YATnR	li pouDe: Referei ceMbo AP/ A d422 Fe®( A co@ntvebric Mebervili abtoi LaDeMoi tipe reactboi Lebajeei Spei ai tiprottie ai MferrouDtroi abS/d-68(d borforvai orai ge&reMcov S&7 tipablDveaDureMagali Dba filEe®oli bcatLratboi curEe(TplDvetpoMIDcovStaibqlip, NnPK W21dkscpeMu@BWMk



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Analytical Methods s u@Ne aDs - 6	Method n. 234	<i>Matrix</i> Y ATnR	Method Descriptions Ii pouDe: Referei ceMb AP/ A 542268-6m( su@Ne DSecleDSreDei bli qater Dav S@Dare Iv v eMater© SreciSlateMqpei co@cteMii SretreateMcauDtowii c acetate SreDerEeMDav S@ coi tali erD( Tpe DuSpINeDare co@ureMuDi g v etpt @i e L@e Ii Mcator( Noi @NetectDv at Le Dcreei eMLt cov SarlDvi agali Da Dai MarMab pa@BOROptoperqIDe Dav S@Dare v eaDureMuDi g UV@vls Metectdoi ab++5i v (TpIDv etpoMIDcov S@ai bq Itp
loi Ic Ba@i ce Lt Py T mA ai MTurLl s O5 mA	* nN244 6PG	YATnR	Nn PK W21dkscpeMuGe BWork li pouDe: RefereiceMbor AP/A 12d2F(TpIDvebpoMIDcovSCaibqlopNn PK W21dkscpeMuGe BWork

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J. JELBOURNE 24 "Fetel Bond Spinguele VIC 3171 Ph. 03 8549 0000 E. samels melbonine@atgibbel.com JI UDGEE 1.29 Swiney Road I indige MSIV 2850 Phy 02 8372 5735 Emudoes mol & Jenistral com

JNOVYRA 1/13 Geery Physe North North USW 2511 Ph. 02 1122 2063 E. norther Alexandroph JPERTH 10 Hod Wav Nakoga W4 6090 Ph. 05 ng09 7655 E. campho, perth & stryhbat oom

JWOLLONGONG 89 Kenny Steat Wofongong NSW: 2500 Ph. 02 4225 3125 E. wellongong@aleglabal.com DTOWNSVILLE 14-15 Dooms Court Bobto OLD 4618

N/A MA

6/20 30 RECEIVED BY: DATE/TIME: Yes Yes FOR LABORATORY USE ONLY (Circle) Random Sample Temperature on Receipt: ree ice / frozen ice bricks present upon Sustody Seal Infact? RELINQUISHED BY: Other comment: DATE/TIME: (Circle) न्य द्रा COC SEQUENCE NUMBER 2/h/or 0 DATE/TIME: 8 RECEIVED BY: 0 COC: Non Standard or urgent TAT (List due date): OF: 0.0 Standard TAT (List due date): H. NOAKES 30/4/20 RELINQUISHED BY: D (Standard TAT may be longer for some tests TURNAROUND REQUIREMENTS: Email Reports to: pgibbons@emmconsulting.com.au 。 hのの なと、の e たの Cansa Hiのらいらの.com.ac COUNTRY OF ORIGIN: **SAMPLER MOBILE: 0401 881 447** PROJECT NO :: 5/4 05/23 ALS QUOTE NO .: CONTACT PH: 02 9493 9500 EDD FORMAT (or default): PURCHASE ORDER NO.: OFFICE: Ground floor, 20 Chandos Street, St Leonards, NSW 2065

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

Email Invoice to: pgibbons@emmconsulting.com.au

SAMPLER: Kaitlyn Brodie / Henry Noakes

PROJECT MANAGER: Paul Gibbons

CLIENT: EMM Consulting

PROJECT: \$190512

ORDER NUMBER:

COC Emailed to ALS? ( YES / NO)

be scionifical Comments on likely contaminant levels, dilutions, or samples requiring specific QC 12 Ashley St Chatswood NSW 2067 Ph: (02) 9910 6200 Enviroles Services Additional Information Sydney Work Order Reference ES2014654 Date Received: 30 4/20 Environmental Division Security: ditact/Broken/None 2367 Time Received: (5) 35 Tempifcool/Ambient **llcepack** Received by: O. S. Job No: Coolin 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). 0+ 573 Please Bonward EA251 (Red & Green) X Radium 226/228, Gross a&b EG021 (Waroon) Ferrous iron (Field filtered) Dissolved metals (Field filtered) EG020F (Red) X X X Sulphide Sulphide X X Major ions + ionic balance MT-1 & MT-2 (Green) × X X X X TOTAL 4 5 5 5 Th 4 17 CONTAINER INFORMATION 400 suite rendination Internal Sheet Attached By PO TYPE & PRESERVATIVE (refer to codes below) ON OW Connote Course Relinquished By Dut a/ klishA \ 0200 + Subcon ds OST THEN MATRIX 3 ≥ 3 ≥ ≥ 3 3 3 3 3 3 17:00 15:20 37/4 11:40 12.50 9:00 27/4 17:45 5.30 26/4 11:30 9:00 26/4 11:10 (BCS DATE / TIME SAMPLE DETAILS MATRIX: Solid(S) Water(W) 26/4 25/4 25/4 28/4 125/4 chanel 4/15 U (-M-M2D UGM-MAD 14M-10120 16M-m40 SAMPLE ID BH-m210 U601-0135 U6M-M2S UGM-M8 WEM-mes 5H- m215 ACIOI Qr 201 ALS USE ONLY 1 M LAB ID 2 7 9 00 0 a

HICH Preserved, WB = VOA Vial Sodium Bisuiphate Preserved; VS = VOA Vial Sulfuric Preserved; VS = VOA Vial Sulfuric Preserved; WS = VOA Vial Sulfuric Preserved Wilding Preserved Bag; LI = Lugols lodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bag; LI = Sterile Sodium Thiosulfate Preserved Bottles. sserved ORC: SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic Valen Container Codes: P = Unpreserved Plastic; N=Nitric Preserved Plastic; ORC = Nitric

Telephone: +61-2-8784 8656

CHAIN OF CUSTODY ALS Laboratory: please tick >>

JGLADSTONE 45 Cafemandah Dina Chiton OLD 4500 Ph. 07 7471 5600 E. abalaceno Szispilabal com TRRISBANG 2 Bkin Sprei Stafford OLD 2053 Phr. (7 2010 7227 E. sameles brekens gialachhal.com JADFLAIDE DI Buma Rosa Proveta SA 5009 Ph. 12 8750 0900 E. postude Galejabel com

LIGEL BOURNE 2-4 Westell Road Spirigrals VIC 3174 Ph. 03 8546 9500 E. cample, melbourne @skoplobal.com JANUDGEE 1/20 Sydney Road Lludgee NSW 2350 Ptv 02 6372 6725 Er mudgesunah@alsylobal.com J. GCKAY 8 Harbour Road Mackay (JLD).
Ply 07 1944 0177 E, mockay@alcolcom

DIVEWCASTLE 5/585Mettand Road Marked West NSW Ptr. 02:401.4,2507.E. samples neverable desisolate con DNOWS 4.13 Seary Place North Novra NSW 2511 Ph. 02.423 2083 E. novra Zatsclobal com

LIWOLLONGONG 99 Kenny Steat Weitonpond NSW 2500 Ph. 02 J225 3135 €. wolongong 過ぎ合かす el ou n JSVDMEY 277-239 Woodpan Pood Smithfield NSW 2) Ph. 02 878-1 8555 E. ramples sydnsy@alsplobal.com DTOWNSVILLE 14-15 Desma Coun Bottle QLD J818 Phr 07-1796 0800 E. tomecyte environmental@stadebni

N/A MA

2

Yes Yes

> Random Sample Temperature on Receipt: Free ice / frozen ice bricks present upon receipt?

> > 1

Custody Seal Intact?

Non Standard or urgent TAT (List due date):

(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) TURNAROUND REQUIREMENTS:

OFFICE: Ground floor, 20 Chandos Street, St Leonards, NSW 2065

PROJECT: \$190512

ORDER NUMBER:

CLIENT: EMM Consulting

COUNTRY OF ORIGIN:

PURCHASE ORDER NO.:

PROJECT NO.: S19051,223 ALS QUOTE NO.:

☐ Standard TAT (List due date):

DPERTH 10 Hod Way Malage WA 8000 Ph. ng q280 7655 Er remples ocnh@alagloba

FOR LABORATORY USE ONLY (Circle)

(Circle) 9 10:20 S COC SEQUENCE NUMBER ~ @ @ RECEIVED BY: 30/4/2 DATE/TIME: -COC OF:

RELINQUISHED BY:

SAMPLER MOBILE: 0401 881 447

EDD FORMAT (or default):

CONTACT PH: 02 9493 9500

Loon bes O como local Hine coman

Email Reports to: pgibbons@emmconsulting.com.au

SAMPLER: Kaitlyn Brodie / Henry Noakes

COC Emailed to ALS? (YES / NO)

PROJECT MANAGER: Paul Gibbons

Email Invoice to: pgibbons@emmconsulting.com.au

RELINQUISHED BY: Other comment DATE/TIME:

DATE/TIME: と言 H. NOGKESS 20/1/20

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RECEIVED BY:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

Additional Information ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) CONTAINER INFORMATION

Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc. Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). Jornard Radium 226/228, Gross a&b EA251 (Red & Green) Ferrous iron (Field filtered) EG051 (Maroon) SAMPLE DETAILS MATRIX: Solid(S) Water(W) ALS USE ONLY

EDO40E (Kellow) Major ions + Ionic balance NT-1 & NT-2 (Green) TOTAL TYPE & PRESERVATIVE (refer to codes below)

MATRIX

DATE / TIME

SAMPLE ID

LABID

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BH-MIZD

LPS PBOY RH-MIZS

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filtered) EG020F (Red) Dissolved metals (Field

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To be submitted for non similar

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Water Container Codes: P = Unpreserved Plastic; N= Serial Districtor Preserved DRC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide/Cd Preserved Plastic; AS = Minis Preserved Plastic; N= Shifter Dreserved; AV = Minis Preserved; AV = Aidreight Unpreserved; AV = Aidreight Unpreserved Vial SG = Sulfuric Preserved Plastic; H= HCI preserved Plastic; H= HCI preserved Plastic; H= HCI preserved Plastic; B= Sulfuric Preserved Plastic; F = Formaldehyde Preserved Bottles; ST = Sterile Bottles; ST = Sterile Bottles; ASS = Plastic Bag for Acid Sulphate Solis; B = Unpreserved Bottles; ST = Sterile Bottles; B= EDTA Preserved Bottles; ST = Sterile Bottles; B= Unpreserved Bottl

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9:10 8:00

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NOM-MIRD

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**Envirolab Services Pty Ltd** 

ABN 37 112 535 645 12 Ashley St Chatswood NSW 2067 ph 02 9910 6200 fax 02 9910 6201 customerservice@envirolab.com.au www.envirolab.com.au

### **CERTIFICATE OF ANALYSIS 241966**

Client Details	
Client	EMM Consulting Pty Ltd
Attention	Paul Gibbons
Address	188 Normanby Rd, SOUTHBANK, VIC, 3006

Sample Details	
Your Reference	<u>\$190512</u>
Number of Samples	2 Water
Date samples received	30/04/2020
Date completed instructions received	01/05/2020

### **Analysis Details**

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details					
Date results requested by	08/05/2020				
Date of Issue	18/06/2020				
NATA Accreditation Number 2901. This document shall not be reproduced except in full.					
Accredited for compliance with ISC	/IEC 17025 - Testing. Tests not covered by NATA are denoted with *				

**Results Approved By** 

Hannah Nguyen, Senior Chemist Ken Nguyen, Reporting Supervisor Priya Samarawickrama, Senior Chemist **Authorised By** 

Nancy Zhang, Laboratory Manager



Ion Balance			
Our Reference		241966-1	241966-2
Your Reference	UNITS	QC201	QC200
Date Sampled		27/04/2020	24/04/2020
Type of sample		Water	Water
Date prepared	-	07/05/2020	07/05/2020
Date analysed	-	07/05/2020	07/05/2020
Calcium - Dissolved	mg/L	560	550
Potassium - Dissolved	mg/L	27	45
Sodium - Dissolved	mg/L	14,000	12,000
Magnesium - Dissolved	mg/L	1,500	1,500
Hydroxide Alkalinity (OH⁻) as CaCO₃	mg/L	<5	<5
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	330	420
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	<5	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	330	420
Sulphate, SO4	mg/L	4,200	4,000
Chloride, Cl	mg/L	22,000	20,000
Ionic Balance	%	3.0	2.0

HM in water - dissolved			
Our Reference		241966-1	241966-2
Your Reference	UNITS	QC201	QC200
Date Sampled		27/04/2020	24/04/2020
Type of sample		Water	Water
Date prepared	-	04/05/2020	04/05/2020
Date analysed	-	04/05/2020	04/05/2020
Arsenic-Dissolved	μg/L	1	1
Cadmium-Dissolved	μg/L	<0.1	<0.1
Chromium-Dissolved	μg/L	<1	<1
Copper-Dissolved	μg/L	14	20
Lead-Dissolved	μg/L	<1	1
Mercury-Dissolved	μg/L	<0.05	<0.05
Nickel-Dissolved	μg/L	21	20
Zinc-Dissolved	μg/L	35	77

Envirolab Reference: 241966 Revision No: R00

Page | 3 of 12

Miscellaneous Inorganics			
Our Reference		241966-1	241966-2
Your Reference	UNITS	QC201	QC200
Date Sampled		27/04/2020	24/04/2020
Type of sample		Water	Water
Date prepared	-	01/05/2020	01/05/2020
Date analysed	-	01/05/2020	01/05/2020
Ferrous Iron	mg/L	<0.05	<0.05
Sulphide	mg/L	<0.5	<0.5

Radioactivity Analysis report			
Our Reference		241966-1	241966-2
Your Reference	UNITS	QC201	QC200
Date Sampled		27/04/2020	24/04/2020
Type of sample		Water	Water
Date prepared	-	05/05/2020	05/05/2020
Date analysed	-	17/06/2020	17/06/2020
Radium-226	Bq/L	#	#
Radium-228	Bq/L	#	#

Method ID	Methodology Summary
Ext-041	Analysed by Australian Government - Australian Radiation Protection and Nuclear Safety Agnency. VIC. Radium 226 is determined by liquid scintiallation counting. Radium 228 is measured by high resolution gamma-ray spectrometry.
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 10% ie total anions = total cations +/-10%.
Inorg-051	Sulphide determined titrimetrically based on APHA latest edition 4500 S2- F. Note, the Sulphide is termed as Total Sulphide given any Sulphide contained in any sediment present is also included in the determination.
Inorg-076	Ferrous Iron is determined colourimetrically by discrete analyser. Waters samples are filtered on receipt prior to analysis.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis.  Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.

Envirolab Reference: 241966

Revision No: R00

QUALI	TY CONTRO	L: Ion Ba	lance			Du		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			07/05/2020	[NT]		[NT]	[NT]	07/05/2020	
Date analysed	-			07/05/2020	[NT]		[NT]	[NT]	07/05/2020	
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	102	
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	89	
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	107	
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	104	
Hydroxide Alkalinity (OH-) as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Carbonate Alkalinity as CaCO₃	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	102	
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]		[NT]	[NT]	99	
Chloride, Cl	mg/L	1	Inorg-081	<1	[NT]		[NT]	[NT]	94	

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			04/05/2020	[NT]		[NT]	[NT]	04/05/2020	
Date analysed	-			04/05/2020	[NT]		[NT]	[NT]	04/05/2020	
Arsenic-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	88	
Cadmium-Dissolved	μg/L	0.1	Metals-022	<0.1	[NT]		[NT]	[NT]	101	
Chromium-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	88	
Copper-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	92	
Lead-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	98	
Mercury-Dissolved	μg/L	0.05	Metals-021	<0.05	[NT]		[NT]	[NT]	105	
Nickel-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	92	
Zinc-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	89	

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]	
Date prepared	-			01/05/2020	[NT]		[NT]	[NT]	01/05/2020		
Date analysed	-			01/05/2020	[NT]		[NT]	[NT]	01/05/2020		
Ferrous Iron	mg/L	0.05	Inorg-076	<0.05	[NT]		[NT]	[NT]	99		
Sulphide	mg/L	0.5	Inorg-051	<0.5	[NT]		[NT]	[NT]	101		

### Client Reference: S190512

Result Definiti	ons
NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Envirolab Reference: 241966 Revision No: R00 Client Reference: S190512

<b>Quality Contro</b>	ol Definitions
Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

### **Laboratory Acceptance Criteria**

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Page | 11 of 12

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Reference: 241966
Revision No: R00

Client Reference: S190512

### Report Comments

Radioactivity analysed by SGS. Report no. ME314791 #View attached external report

Envirolab Reference: 241966
Revision No: R00

Page | 12 of 12



NSW 2067

### **ANALYTICAL REPORT**





LABORATORY DETAILS CLIENT DETAILS

Results Adam Atkinson Contact Manager Envirolab Services SGS Melbourne EH&S Client Laboratory 12 Ashley St 10/585 Blackburn Road Address Address Chatswood

Notting Hill Victoria 3168

Telephone 02 9910 6200 Telephone +61395743200 02 8594 0499 +61395743399 Facsimile Facsimile

Results@envirolab.com.au Au.SampleReceipt.Melbourne@sgs.com Email Email

241966 Project SGS Reference ME314791 R0 241966 Order Number Date Received 5/5/2020 2 17/6/2020 Samples Date Reported

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(22793).

SIGNATORIES

S. Ruthowshi

Stephen RUTKOWSKI Senior Health Physicist

> SGS Australia Pty Ltd ABN 44 000 964 278



### **ANALYTICAL RESULTS**

ME314791 R0

Gross alpha and beta in liquids [ARS-SOP-AS302/AS504] Tested: 7/5/2020

			241966-1	241966-2
			WATER	WATER
			27/4/2020	24/4/2020
PARAMETER	UOM	LOR	ME314791.001	ME314791.002
Gross alpha	Bq/L	-	2.01 ±0.37	0.86 ±0.17
Gross beta (excluding K-40)	Bq/L	-	1.53 ±0.22	0.569 ±0.090

17/06/2020 Page 2 of 4



### **ANALYTICAL RESULTS**

ME314791 R0

### Radionuclides by Gamma Ray Spectrometry in liquids [ARS-SOP-AS301/AS406] Tested: 17/6/2020

			241966-1	241966-2
			WATER	WATER
			27/4/2020	24/4/2020
PARAMETER	UOM	LOR	ME314791.001	ME314791.002
Radium-226	Bq/L	-	0.207 ±0.026	0.188 ±0.031
Radium-228	Bq/L	-	1.14 ±0.11	0.386 ±0.063

17/06/2020 Page 3 of 4



### **METHOD SUMMARY**

ME314791 R0

METHOD -

METHODOLOGY SUMMARY -

ARS-SOP-AS301/AS406

Analysis of radionuclides in liquids by high resolution gamma ray spectrometry after radiochemical preparation .

Radiochemical preparation involves total sample evaporation, sample

co-precipitation using stable elemental carriers, or a combination thereof. In some cases, preparation may involve merely transferring liquid to a standard geometry container such

as a Marinelli beaker

ARS-SOP-AS302/AS504

Gross alpha and beta in liquids after radiochemical preparation. Radiochemical preparation involves total sample evaporation, sample co-precipitation using stable elemental carriers, or a combination thereof.

FOOTNOTES -

\* NATA accreditation does not cover the performance of this service.

\*\* Indicative data, theoretical holding time exceeded.

Not analysed.NVL Not validated.

IS Insufficient sample for analysis.

LNR Sample listed, but not received.

UOM Unit of Measure.

LOR Limit of Reporting.

↑↓ Raised/lowered Limit of

Reporting.

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received. Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the "Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.

Note that in terms of units of radioactivity:

- a. 1 Bq is equivalent to 27 pCi
- b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: <a href="https://www.sgs.com.au/en-qb/environment-health-and-safety">www.sgs.com.au/en-qb/environment-health-and-safety</a>.

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Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

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This report must not be reproduced, except in full.

17/06/2020 Page 4 of 4

						) Pu369 GW	LAB ID	ALS USE	COMMENTS/SPEC	Email Invoice to do	Email Reports to d	COC emailed to AL	SAMPLER: Dan Condon	PROJECT MANAGER: Paul Gibbons	ORDER NUMBER: S190512	PROJECT: \$190512	OFFICE: Melbourne	CLIENT: EMM C	Elevisie compressive and
4 4 3 5 7						W	SAMPLEID	SAMPLE DETAILS MATRIX: SOLID (9) WATER (W)	COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:	Email Invoice to dcondon@emmconsulting.com.au	Email Reports to dcondon@emmconsulting.com.au	COC emailed to ALS? ( YES / NO) YES	indon	ER: Paul Gibbons	\$190512	2	ne	EMM Consulting Pty Ltd	CHAIN OF CUSTODY  ALS Laboratory: please fick →
						27/07/2020	DATE / TIME	ALLS WATER (W)	POSAL:			EDD FORMAT (or default):	SAMPLER	CONTACT PH: 0477 702 413					
23							MATRIX					AT (or def	NOBILE: (	H: 0477		ALS QU	(Standard	TURNA	21 Burms Ro 0890 E: adela 32 Shand St 7222 E: samp NE 46 Callem 5500 E: glads
				8		Plastic non ALS bottle - no preservatives	TYPE & PRESERVATIVE codes below)	CONTAINER INFORMATION				ault):	SAMPLER MOBILE: 0439 885 614	702 413		ALS QUOTE NO.:	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	TURNAROUND REQUIREMENTS:	□ADELAIDE 21 Burms Road Pooraka SA 5095 Prv. 08 8359 0880 E. adeloide@alegichat.com □BRISBANE 32 Shand Street Stafford QLD 4053 Prt. 07 3243 7222 E. samples.treishane@alegichat.com □GLADSTONE 46 Callement ah Dirve Clinton QLD 4680 Prt. 07 7371 5500 E. gladstone@alegichat.com
TOTAL				-00	_	servatives	(refer to	ORMATION		27/7/2020 1500	DATE/TIME:	Daniel Condon	RELINQUISHED BY:						LIMACKAY 78 Herbour Road Mackay QLD 4740 PN: 07 4944 0177 E: maxkny@alegbool.com DMELBOURNIE 24 Westall Road Springuale VIC 3171 Ph: 03 5649 9800 E: samples melbourne@alegbool.com DMIDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 03 6372 6735 E: mudgee mail@aleglobal.com
-				٠		4	TOTAL CONTAINERS					on	IED BY:	13			Non Standard or urgent TAT	d TAT (List	mackay@ali mackay@ali 4 Wesiali Roa samples me samples me mudgee.mai
_						-	Sulphate Reducing Bacteria (MM669)	ANALY: Where Me										Standard TAT (List due date):	ckay OLD 4740 sgłobal.com d Springvale VIC slbourne@alsglob slgee NSW 2850 sl@alsglobal.com
-					1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	1	Iron Reducing Bacteria (M673)	SIS REQUIF			DAT		REC	OF:	coc:		(List due date):		3171 sel.com
-				<i>y</i> /55		1	Slime Producing Bacteria (M683)	tED including			DATE/TIME:		RECEIVED BY:	1 2	1 2	COC SEQUI	*		DNEWCA Ph: 02 40 QNOWRJ Ph: 02442 Ph: 02681H
٠					131	+	Algae - Total Count	SUITES (NB. Suite rotal (unfiltered bo required).	1 7	アプゴ	<u>}</u>	100 C	Ś	3 4	3	COC SEQUENCE NUMBER (Circle)			STLE 5/585 Ma 1/4/2500 E: sam 1/4/13 Geery Pii 3/2063 E: nowr 10 Hod Way M
-						٠	Total Cyanobacteria	Suite Codes ned bottle required).	4.1	7	Ć	7		5 6	5	ER (Circle)			UNEWCASTLE 5585 Mailland Rd Mayfield Weat NS Ph. 02 4014 2500 E. sambéa. newcastle@ataplobal.co. UNOWRA 413 Geary Place North Nowin NSW 2541 Ph. 024473 2685 E. nover@ailsabol.com  UPERTH 10 Hod Way Nalsga WA 6690 Ph. 08 9209 7655 E. sambéas perh@ailsgbool.com
	Telephone .				Melbourne	Enviror		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).	ָב, בי		DATE/TIME:		RELINQUISHED BY:	7 Other comment:	7 Random Sample Temperature on Receipt:	Free ice / frozen ice bricks present upon receipt?	Custody Seal Intact?	FOR LABORATORY USE ONLY (Circle)	W 2304
	Telephone 61-8-6549 9800		10000	MOR Order Heference	Ime	Environmental Division	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.	Additional Information	S.H. Lander C.H.		DATE/TIME:		RECEIVED BY:		e on Receipt: *C	resent upon Yes No N/A	Yes No NA	E ONLY (Circle)	OSYDNEY 277-260 Woodpark Road Smithfield NSW 2164 Phr. 02 8794 8555 E. sampres sydney@ alsgobol.com "TOWNSYNLE 14-15 Dasma Court Bohe OLD 4818 Phr. 07 4796 9600 E. twonsyldia chromomatic@esgobola.com "DWOLLONGONG 98 Kenny Street Wollongarg NSW 2500 Phr. 02 4225 8125 E. pontwembla@etsglobal.com



### CERTIFICATE OF ANALYSIS

Laboratory Contact **EMM CONSULTING PTY LTD** PAUL GIBBONS EM2013003 **Work Order** Contact

Address 187 Coventry Street Melbourne 3205

: 4 Westall Rd Springvale VIC Australia 3171

**Environmental Division Melbourne** 

: 1 of 2

Shane Colley

27-Jul-2020 16:15 +61-3-8549 9600 28-Jul-2020 Date Analysis Commenced Date Samples Received Telephone S190512 S190512

: 10-Aug-2020 12:53 Issue Date

Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing EN/112/18 - Primary work only DC

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

This Certificate of Analysis contains the following information:

General Comments

No. of samples analysed No. of samples received

Quote number

C-O-C number

Sampler

Order number

Telephone

Project

Address

Client

Analytical Results

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

Accreditation Category	WRG Subcontracting, Springvale, VIC
Position	Laboratory Coordinator
Signatories	Samantha Smith



General Comments

In house developed procedures 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. 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

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

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

Key:

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.

SRB (MM669) is conducted by ALS Scoresby NATA accreditation no. 992, site no. 989. NATA accreditation does not cover performance of this method.

Iron Reducing Bacteria (MM673) is conducted by ALS Scoresby NATA accreditation no. 992, site no. 989. NATA accreditation does not cover performance of this method.

NR - Reported in separate COA

Algal Count (BM010) has been performed by ALS Water Resources Group, NATA Accreditation no. 992, Site no. 989.

Blue Green Algae (MB010) has been performed by ALS Water Resources Group, NATA Accreditation no. 992, Site no. 989.

### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Clie	Client sample ID	Pu369 GW	1	1		1
	Cli	ent samplir	Client sampling date / time	27-Jul-2020 00:00			-	
Compound	CAS Number	TOR	Unit	EM2013003-001	1			!
			•	Result				
BM010: Algal Count								
Algal Count		-	-	NR			-	-
BM014: Blue Green Algae Count								
Blue Green Algae Count			-	NR	-		-	1
MM669: Sulphate Reducing Bacteria								
Sulphate Reducing Bacteria Population Estimate	-	-	pac/mL	120000				
Aggressivity		-	-	Aggressive			-	
MM673: Iron Related Bacteria using Biological Activity Reaction Test (BART)	ogical Activity Re	eaction Te	est (BART)					
Ø Aggressivity	-			Aggressive	1	1	-	1
Ø Iron Related Bacteria Population Estimate		25	pac/mL	140000				-
MM683: Slime Producing Bacteria (BART)	-							
Slime Producing Bacteria		-	pac/mL	<20				-
Aggressivity				Not Aggressive			-	-



### QUALITY CONTROL REPORT

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

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### General Comments

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### Laboratory Duplicate (DUP) Report

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No Laboratory Duplicate (DUP) Results are required to be reported.



Page : f 1of 8 1rQl r2er : nD604f00f yl@ib : nDD yl BCc 7TIBA PTz 7Tm Pr1t⊌Sb : 0430546

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

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No Method Blank (MB) or Laboratory Control Spike (LCS) Results are required to be reported.

### Matrix Spike (MS) Report

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No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.



# QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EM2013003	Page	:10f4
Client	: EMM CONSULTING PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: PAUL GIBBONS	Telephone	: +61-3-8549 9600
Project	: S190512	Date Samples Received	: 27-Jul-2020
Site	:	Issue Date	: 10-Aug-2020
Sampler	: DC	No. of samples received	<u> </u>
Order number	: S190512	No. of samples analysed	<u></u>

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 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 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.

- Mo Method Blank value outliers occur.
- NO Duplicate outliers occur.
- NO Laboratory Control outliers occur.
- NO Matrix Spike outliers occur.
- For all regular sample matrices, 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.



 Page
 : 2 of 4

 Work Order
 : EM2013003

 Client
 : EMM CONSULTING PTY LTD

 Project
 : S190512

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 <u>Voc. in soils</u> 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. Evaluation: x = Holding time breach;  $\sqrt{\ } = \text{Within holding time}$ .

Matrix: WATER

Method	Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Ciient Sample ID(s)		Date extracted	Date extracted         Due for extraction         Evaluation         Date analysed         Due for analysis	Evaluation	Date analysed	Due for analysis	Evaluation
MM669: Sulphate Reducing Bacteria							
Miscellaneous Plastic Container (MM669) Pu369 GW	27-Jul-2020				28-Jul-2020	28-Jul-2020	>
MM673: Iron Related Bacteria using Biological Activity Reaction Test (BART)							
Miscellaneous Plastic Container (MM673) Pu369 GW	27-Jul-2020				28-Jul-2020	28-Jul-2020	>
MM683: Slime Producing Bacteria (BART)							
Miscellaneous Plastic Container (MM683) Pu369 GW	27-Jul-2020		I		28-Jul-2020		



Quality Control Parameter Frequency Compliance

: 3 of 4 : EM2013003 : EMM CONSULTING PTY LTD : S190512

Page Work Order Client Project No Quality Control data available for this section.



 Page
 : 4 of 4

 Work Order
 : EM2013003

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

### **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
Algal Count	BM010	WATER	Specialist microbiological analysis subcontracted to ALS Scoresby (NATA Accredited Laboratory No. 992).
Blue Green Algae Count	MB010	WATER	Specialist microbiological analysis subcontracted to ALS Scoresby (NATA Accredited Laboratory No. 992).
Sulphate Reducing Bacteria (BART)	MM669	WATER	Specialist microbiological analysis subcontracted to ALS Scoresby (NATA accreditation does not cover this
			service).
Iron Related Bacteria (BART)	* MM673	WATER	Specialist microbiological analysis subcontracted to ALS Scoresby (NATA accreditation does not cover this
			service).
Slime Producing Bacteria (BART)	MM683	WATER	Specialist microbiological analysis subcontracted to ALS Scoresby (NATA accreditation does not cover this
			Service).

<b>A</b>
(ALS)

CHAIN OF CUSTODY ALS Laboratory: please tick >

TIADELAICE 21 Burma Read Poortha SA 5005 Phr 06 6359 0860 E. wdelaide@ottgiobel.com JERISSANE > Byth Street Stafford QLD 4053 Ph. 07 3243 7222 F. namples brittener@alsglobal.co JUEL BOURNE 24 Weetst Klad Springste 19, 317-Ph 03 5540 9000 E samples inebnime@attgetat cou UMUDGE 1799 Syring, kast Madge NSW 8556 Ph 00 6372 6755E middee midlookstrusion

Philips CASTLE Gots Martine Rose Mayield West N Ph. 02 4014 2500 E sameles resecuting application JNOWRA 4 13 Geary Place North Norma 1-5W 2541 Ph. 02 4473 2000 E normal@akgishal.com JPERTH 10 Hod Way Malaga WA 6090 Ph. 08 9208 7656 Et samples pernigulações com

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CLIENT: EMM CONSULTING		1	TOXABLOOMS RECOMMENDED	O Standard TAT (List due 646):							Custody Seal Intact?	Yes	No	NA
DEFICE: 29 Chandos Street, St Leonards			(Standard TAT may be longer for some tests e.g., Ultra Trace Organist) ALS QUOTE NO	Non Standard or ungent YAT (List due date):		COC SEG	JENGE NU	MBER	(Circle)		Free toe / frozen ice brioke present upon receipt	? Yes	No	N/A
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PROJECT MANAGER: Paul Gibbons		CONTACT PH: 64		RELINQUISHED BY:	RECEIV	ED BY:				RELIN	QUISHED BY:	RECEIVED BY:	1.	
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Email Reports to: pglibbons@emmoonsulting.com.au; doondon@emmeonsulting.	.com.au; kbrodle(	Benimoonwilling.	gem.au	DATE/TIME:	DATE					1				
Constitution to accounts@emoconsulting.com.au.pglobors@emoconsulting.com.au				2409/2020	Ш-		_	_						_

FINTSISPECIAL HANDLING/STORAGE OR DISPOSAL: ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to advact suits price) Additional Information Where Metals are required, specify Total (unlitered bottle required) or Dissolved (field filtered bottle required) MATRIX CONTAINER INFORMATION SAMPLE DETAILS Solid(S) Water(W) ALS USE ONLY mmerts on likely contaminant levels, dilutions, or mples requiring specific OC protytis etc. TOTAL BOTTLES W 2 w 3 1 1 1 4 1 4 w w 8 1 w 1 1 1 1 Ø 1 1 (1 w 12 w 13 14 w 15 1 1 16 1 17 4 w 18 w 19 20 1 4 4 1 1 1 Melbourne 22 Work Order Reference 1 1 1 6 EM2014666 23 1 w 24

**Environmental Division** 



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### Niki Papastergiou

From:

Kaitlyn Brodie < kbrodie@emmconsulting.com.au>

Sent:

Monday, 24 August 2020 6:38 PM

To:

Shane Colley

Cc:

Paul Gibbons; Dan Condon; Henry Noakes; Joel Georgiou RE: [EXTERNAL] - COC for S190512 - posted 24/08/2020

Subject: Attachments:

COC S190512 20200824.xlsx

Hi Shane,

Can we please amend the COC sent this morning (as outlined in below message chain) with the attached. Changes are as follows:

- TS and TB to be analysed for TRH and BTEXN;
- QA305 was not included with this sample set.

Apologies.

Regards,

Kaitlyn

### **Kaitlyn Brodie**

Hydrogeologist

M 0401 881 447

www.emmconsulting.com.au

From: Shane Colley <shane.colley@ALSGlobal.com>

Sent: Monday, 24 August 2020 8:50 AM

To: Kaitlyn Brodie <kbrodie@emmconsulting.com.au>

Cc: Paul Gibbons <pgibbons@emmconsulting.com.au>; Dan Condon <dcondon@emmconsulting.com.au>; Henry

Noakes < hnoakes@emmconsulting.com.au>

Subject: RE: [EXTERNAL] - COC for S190512 - posted 24/08/2020

CAUTION: This email originated outside of the Organisation.

Good morning Kaitlyn,

Thanks for this, I have forwarded on to the team.

Regards,

### **Shane Colley**

Client Services Officer - Springvale Environmental



<u>T</u> +61 3 8549 9600 <u>D</u> +61 3 8549 9613 shane.colley@alsglobal.com 2-4 Westall Rd Springvale VIC 3171 AUSTRALIA EnviroMail™ 125 - ALS Now Provides Testing capabilities for TOF EnviroMail™ 126 - TOF for Compliance with Guideline ERA 60 EnviroMail™ 00 - All EnviroMails™ in one convenient library.



From: Kaitlyn Brodie < kbrodie@emmconsulting.com.au>

Sent: Monday, 24 August 2020 7:32 AM

To: ALS Enviro Melbourne < ALSEnviro Melbourne @ALSGlobal.com >; Shane Colley < shane.colley @ALSGlobal.com > Cc: Paul Gibbons cc: Paul Gibbons com.au; Dan Condon <dcondon@emmconsulting.com.au</pre>; Henry

Noakes < hnoakes@emmconsulting.com.au >

Subject: [EXTERNAL] - COC for S190512 - posted 24/08/2020

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Good morning,

Attached is the COC for job number \$190512.

8 eskys posted today (24/08/2020). Con note 980125371584.

Let me know if you have any questions.

Thanks

Kaitlyn

### **Kaitlyn Brodie**

Hydrogeologist



M 0401 881 447

in Connect with us

SYDNEY | Ground floor, 20 Chandos Street, St Leonards NSW 2065



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### Niki Papastergiou

From:

COC Melbourne

Subject:

FW: [EXTERNAL] - COC for S190512 - posted 24/08/2020

Attachments:

RE: [EXTERNAL] - COC for S190512 - posted 24/08/2020

From: Shane Colley <shane.colley@ALSGlobal.com>

Sent: Tuesday, 25 August 2020 8:44 AM

To: COC Melbourne < COC. Melbourne@alsglobal.com>

Subject: FW: [EXTERNAL] - COC for \$190512 - posted 24/08/2020

Good morning

Please see attached. The client has sent through an updated COC for this one.

Regards,

### **Shane Colley**

Client Services Officer - Springvale Environmental



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2-4 Westall Rd
Springvale VIC 3171
AUSTRALIA

EnviroMail™ 124 - PFOS Analysis to Freshwater Species Protection Lvl 99%

EnviroMail™ 125 – ALS Now Provides Testing capabilities for TOF

EnviroMail™ 126 – TOF for Compliance with Guideline ERA 60

EnviroMail™ 00 - All EnviroMails™ in one convenient library.





### CERTIFICATE OF ANALYSIS

**Environmental Division Melbourne** Shane Colley : 1 of 13 Laboratory Contact **EMM CONSULTING PTY LTD** PAUL GIBBONS EM2014666 **Work Order** 

: 4 Westall Rd Springvale VIC Australia 3171 Address Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065

07-Sep-2020 10:48 25-Aug-2020 12:10 +61-3-8549 9600 25-Aug-2020 Date Analysis Commenced Date Samples Received Issue Date Telephone S190512 C-O-C number Order number

HN / KB

Sampler

Telephone

Project

Contact Address

Client

EN/222

Quote number

4

No. of samples analysed No. of samples received

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. 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.

## 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

Signatories	Position	Accreditation Category
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Titus Vimalasiri	Metals Teamleader	Radionuclides, Fyshwick, ACT



. 2 01 13
. Work Order : EM2014666
Client : EMM CONSULTING PTY LTD
Project : S190512

General Comments

In house developed procedures 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. 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

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

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. Key:

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.

EK085: EM2014666: Sample 1, 14, & 24 required dilution prior to analysis due to matrix interferences. LOR has been raised accordingly.

EG020-F: EM2014666 #1-33 dissolved metal required dilution prior analysis due to sample matrix. LORs have been adjusted accordingly.

EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR

It is recognised that dissolved iron less than ferrous iron for EM2014666 #13. However, the difference is within experimental variation of the methods

EP080: Samples EM2014666\_34, 41 TRIP SPIKE and TRIP SPIKE CONTROL contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory.

EG020-T: EM2014666 #2, #4, #7, #10, #12-14, #16-18, #20, #22, #24, #25, #29, #36 total metal required dilution prior analysis due to sample matrix. LORs have been adjusted accordingly.

lonic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.

LOR for Gross Alpha and Gross Beta raised due to high solid content.

ED045G: The presence of thiocyanate can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly

EK085: EM2014666-002 Poor matrix spike recovery for sulphide due to sample matrix. Confirmed by re-extraction and re-analysis.

EK085: EM2014666-022 Poor matrix spike recovery for sulphide due to sample matrix. Confirmed by re-extraction and re-analysis.

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.



Client Project

EMM CONSULTING PTY LTD S190512

3 of 13 EM2014666

Work Order

23-Aug-2020 09:00 EM2014666-005 UGM-M4D Result 22000 1550 11100 3990 370 370 268 ₹ V 19-Aug-2020 14:20 EM2014666-004 UGM-M2S Result 12100 21600 1680 4820 257 257 ∀ V 19-Aug-2020 15:20 EM2014666-003 **UGM-M2D** Result 20200 11300 3840 1580 383 298 383 ∀ V 23-Aug-2020 08:00 EM2014666-002 UGM-M1S Result 25400 14600 1080 1550 206 4690 V 23-Aug-2020 07:40 EM2014666-001 **UGM-M1D** Result 19000 10500 3540 1430 443 637 V V 443 Client sample ID Client sampling date / time mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L mg/L mg/L LOR 14808-79-8 16887-00-6 7440-70-2 7439-95-4 7440-23-5 CAS Number DMO-210-001 3812-32-6 71-52-3 ED041G: Sulfate (Turbidimetric) as SO4 2- by DA ED045G: Chloride by Discrete Analyser **ED093F: Dissolved Major Cations** ED037P: Alkalinity by PC Titrator Bicarbonate Alkalinity as CaCO3 Carbonate Alkalinity as CaCO3 Hydroxide Alkalinity as CaCO3 Sulfate as SO4 - Turbidimetric Total Alkalinity as CaCO3 Sub-Matrix: WATER (Matrix: WATER) Magnesium Compound Chloride Calcium Sodium

EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	-	0.49		<0.02	
Thorium	7440-29-1	0.001	mg/L	-	<0.002	-	<0.002	
Uranium	7440-61-1	0.001	mg/L		0.031		0.016	
Iron	7439-89-6	0.05	mg/L		0.94	-	<0.10	
EG051G: Ferrous Iron by Discrete Analyser								
Ferrous Iron		0.05	mg/L	0.05	0.61	4.54	<0.05	1.83
EK085M: Sulfide as S2-								
Sulfide as S2-	18496-25-8	0.1	mg/L	5.8	<0.1	<0.1	<0.1	<0.1
EN055: Ionic Balance								
Ø Total Anions		0.01	med/L	618	818	657	715	711
Ø Total Cations		0.01	med/L	809	818	653	700	640
Ø Ionic Balance		0.01	%	0.88	0.03	0.35	1.02	5.25

<0.002

<0.002

<0.002

<0.002

<0.002

mg/L mg/L

0.001

7440-61-1

7440-29-1

7439-89-6 0.05

mg/L

7429-90-5

EG020F: Dissolved Metals by ICP-MS

Potassium

Aluminium

Uranium

Iron

Thorium

0.026

69.0

<0.10

4.69

<0.02

0.012

<0.02

22

46

25

49

62

mg/L

7440-09-7

1.87



Project Client

: 4 of 13 : EM2014666 : EMM CONSULTING PTY LTD : \$190512

Page Work Order

Sub-Matrix: WATER (Matrix: WATER)		Clie	Client sample ID	UGM-M8D	UGM-M8S	UGM-M12D	UGM-M12S	UGM-M15S
	Cli	ent samplii	Client sampling date / time	22-Aug-2020 08:45	22-Aug-2020 08:00	19-Aug-2020 09:20	19-Aug-2020 09:40	22-Aug-2020 12:00
Compound	CAS Number	TOR	Unit	EM2014666-006	EM2014666-007	EM2014666-008	EM2014666-009	EM2014666-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	<b>\</b>	<b>\</b>	₹	₹	₹
Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	>	>		₹	7
Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	396	238	389	317	251
Total Alkalinity as CaCO3	1	-	mg/L	396	238	389	317	251
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	3140	4090	3770	4660	5510
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	-	mg/L	20800	23500	21500	25500	25800
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	-	mg/L	552	798	545	592	757
Magnesium	7439-95-4	_	mg/L	1580	1900	1650	1780	1730
Sodium	7440-23-5	-	mg/L	11200	13000	12000	14400	14800
Potassium	7440-09-7	-	mg/L	55	20	28	36	40
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Thorium	7440-29-1	0.001	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	7440-61-1	0.001	mg/L	<0.002	0.012	<0.002	0.088	0.065
Iron	7439-89-6	0.05	mg/L	2.83	<0.10	1.56	<0.10	<0.10
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L		0.04			0.46
Thorium	7440-29-1	0.001	mg/L		<0.002		:	<0.002
Uranium	7440-61-1	0.001	mg/L		0.015			0.070
Iron	7439-89-6	0.05	mg/L		<0.10		1	0.57
EG051G: Ferrous Iron by Discrete Analyser	er							
Ferrous Iron	-	0.05	mg/L	2.80	<0.05	1.51	<0.05	<0.05
EK085M: Sulfide as S2-								
Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
EN055: Ionic Balance								
Ø Total Anions		0.01	med/L	099	753	693	823	848
Ø Total Cations		0.01	med/L	646	763	989	803	825
ø lonic Balance		0.01	%	1.06	0.67	0.46	1.19	1.35
EA250CA: Gross Alpha and Beta Activity								
Gross alpha	-	0.05	Bq/L	<0.93	2.11			3.02
Gross beta activity - 40K		0.10	Bq/L	<1.86	<2.08		:	2.59



Project Client

: 5 of 13 : EM2014666 : EMM CONSULTING PTY LTD : \$190512

Page Work Order

Sub-Matrix: WATER		Clie	Client sample ID	BH-M16D	BH-M16S	BH-M17D	BH-M17S	BH-M18D
	Cli	ent samplin	Client sampling date / time	22-Aug-2020 15:30	22-Aug-2020 15:00	20-Aug-2020 13:00	20-Aug-2020 13:15	20-Aug-2020 14:00
Compound	CAS Number	LOR	Unit	EM2014666-011	EM2014666-012	EM2014666-013	EM2014666-014	EM2014666-015
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	7	<b>\</b>	₹	₹	7
Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	٧	<b>\</b>	₹	₹	7
Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	418	338	418	380	424
Total Alkalinity as CaCO3		-	mg/L	418	338	418	380	424
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	3910	2060	3650	3470	3850
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	-	mg/L	20600	22700	19300	20800	19600
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	-	mg/L	555	748	512	601	518
Magnesium	7439-95-4	-	mg/L	1560	1680	1490	1500	1480
Sodium	7440-23-5	-	mg/L	11100	12300	10800	11300	10700
Potassium	7440-09-7	7	mg/L	56	52	56	47	54
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.02	<0.02	0.03	<0.02	<0.02
Thorium	7440-29-1	0.001	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	7440-61-1	0.001	mg/L	<0.002	0:030	0.002	0.013	<0.002
Iron	7439-89-6	0.05	mg/L	2.18	<0.10	4.02	1.81	5.80
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L		10.1	0.14	14.4	
Thorium	7440-29-1	0.001	mg/L		0.003	<0.002	0.002	
Uranium	7440-61-1	0.001	mg/L		0.040	0.003	0.017	
Iron	7439-89-6	0.05	mg/L	-	3.86	4.30	5.22	-
EG051G: Ferrous Iron by Discrete Analyser	er							
Ferrous Iron		0.05	mg/L	2.12	<0.05	4.06	1.67	5.22
EK085M: Sulfide as S2-								
Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	<0.1	0.2	<0.2	0.3
EN055: Ionic Balance								
Ø Total Anions		0.01	med/L	671	752	629	999	642
Ø Total Cations		0.01	med/L	640	712	619	646	614
Ø lonic Balance		0.01	%	2.33	2.76	0.75	1.56	2.15
EA250CA: Gross Alpha and Beta Activity								
Gross alpha		0.05	Bq/L	-		<0.88	1.60	<0.88
Gross beta activity - 40K		0.10	Bq/L			<1.76	2.68	<1.76



Client Project

EMM CONSULTING PTY LTD S190512

EM2014666

Work Order

22-Aug-2020 13:00 EM2014666-020 BH-M20S <0.002 <0.002 13500 0.030 <2.15 1460 0.025 4790 1.08 1.48 0.1 0.50 184 184 753 V Ÿ 46 761 21-Aug-2020 13:00 EM2014666-019 BH-M20D Result <0.002 <0.002 21200 11000 <0.02 <0.96 <1.91 1520 5.03 630 4.23 V V 392 392 54 1 l **6**0.1 989 21-Aug-2020 09:30 EM2014666-018 BH-M19S Result <0.002 <0.002 0.111 <0.10 13800 0.126 26300 313 773 5.03 4.90 855 2.24 313 V V 33 0.2 21-Aug-2020 10:06 EM2014666-017 **BH-M19D** Result <0.002 <0.002 9000 19300 10700 0.005 8.44 1480 2.06 1.79 428 428 3620 615 1.06 0.2 628 V 3 20-Aug-2020 14:35 EM2014666-016 **BH-M18S** Result <0.002 13200 <0.002 23300 0.049 0.055 4610 1590 1.64 6.70 3.23 <2.11 655 3.27 332 1.29 332 38 0.1 760 739 1.41 V Client sample ID Client sampling date / time meq/L med/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L Bq/L Bq/L mg/L mg/L % 0.001 LOR 0.001 0.001 0.05 0.001 0.05 0.05 0.05 0.10 0.01 0.1 0.01 0.01 0.01 7439-89-6 7429-90-5 Ī 14808-79-8 16887-00-6 7439-89-6 18496-25-8 7440-70-2 7439-95-4 7440-23-5 7440-61-1 7429-90-5 7440-29-1 7440-61-1 I I CAS Number DMO-210-001 3812-32-6 71-52-3 7440-09-7 7440-29-1 ED041G: Sulfate (Turbidimetric) as SO4 2- by DA EG051G: Ferrous Iron by Discrete Analyser EA250CA: Gross Alpha and Beta Activity ED045G: Chloride by Discrete Analyser EG020F: Dissolved Metals by ICP-MS **ED093F: Dissolved Major Cations** ED037P: Alkalinity by PC Titrator EG020T: Total Metals by ICP-MS Bicarbonate Alkalinity as CaCO3 Hydroxide Alkalinity as CaCO3 Carbonate Alkalinity as CaCO3 Sulfate as SO4 - Turbidimetric Total Alkalinity as CaCO3 Gross beta activity - 40K EK085M: Sulfide as S2-**EN055: Ionic Balance** Sub-Matrix: WATER (Matrix: WATER) Sulfide as S2-Ø Total Cations Ø Ionic Balance Ferrous Iron Gross alpha Magnesium Aluminium Potassium Aluminium Uranium Compound Chloride Calcium Thorium Uranium Thorium Sodium Iron Iron



Project Client

: 7 of 13 : EM2014666 : EMM CONSULTING PTY LTD : S190512 Page Work Order

Sub-Matrix: WATER (Matrix: WATER)		Clie	Client sample ID	BH-M21D	BH-M21S	BH-M22d	BH-M22s	BH-M23d
	Clie	ent samplir	Client sampling date / time	19-Aug-2020 13:30	19-Aug-2020 10:30	21-Aug-2020 11:56	21-Aug-2020 12:20	23-Aug-2020 13:15
Compound	CAS Number	LOR	Unit	EM2014666-021	EM2014666-022	EM2014666-023	EM2014666-024	EM2014666-025
			-	Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	۲>	^	<b>\</b>	۲۷	۲
Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	1		<b>\</b>	7	
Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	397	313	432	292	411
Total Alkalinity as CaCO3		-	mg/L	397	313	432	292	411
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	3560	4140	4750	4290	3730
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	-	mg/L	21500	25500	19400	24500	20000
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	-	mg/L	516	618	527	899	526
Magnesium	7439-95-4	-	mg/L	1590	1630	1510	1720	1550
Sodium	7440-23-5	-	mg/L	11600	13100	10900	13600	11100
Potassium	7440-09-7	-	mg/L	55	37	28	43	58
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.02	<0.02	<0.02	<0.02	<0.02
Thorium	7440-29-1	0.001	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	7440-61-1	0.001	mg/L	<0.002	0.033	<0.002	0.022	<0.002
Iron	7439-89-6	0.05	mg/L	3.05	0.14	3.20	8.92	2.01
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L		0.05		16.7	0.72
Thorium	7440-29-1	0.001	mg/L		<0.002		0.005	<0.002
Uranium	7440-61-1	0.001	mg/L		0.039		0.024	<0.002
Iron	7439-89-6	0.05	mg/L		0.25		17.8	2.59
EG051G: Ferrous Iron by Discrete Analyser	er							
Ferrous Iron	-	0.05	mg/L	2.97	<0.05	2.90	7.65	1.99
EK085M: Sulfide as S2-								
Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	<0.1	<0.1	0.3	<0.1
EN055: Ionic Balance								
Ø Total Anions		0.01	med/L	889	812	655	786	650
Ø Total Cations	-	0.01	med/L	662	736	626	768	638
Ø lonic Balance	-	0.01	%	1.92	4.91	2.23	1.20	0.92
EA250CA: Gross Alpha and Beta Activity								
Gross alpha	-	0.05	Bq/L			0.95	2.45	
Gross beta activity - 40K	-	0.10	Bq/L	-		<1.82	<2.15	:



Client Project

EMM CONSULTING PTY LTD S190512

EM2014666

Work Order

22-Aug-2020 00:00 EM2014666-030 <0.002 <0.002 11200 1570 3760 3.03 0.1 3.39 398 398 645 l l V Ÿ 26 l 1 69 23-Aug-2020 11:15 EM2014666-029 LPSPB04 Result <0.002 <0.002 <0.002 <0.002 21400 11000 <0.02 <0.92 4210 1590 1.66 2.24 639 419 419 1.43 0.1 4.55 V V 62 21-Aug-2020 10:45 EM2014666-028 BH-M25s Result <0.002 14000 0.054 25600 1720 0.39 322 4820 782 V V 322 35 l 1 1 l 6.7 829 l l 21-Aug-2020 11:10 EM2014666-027 BH-M25d Result <0.002 <0.002 10400 19000 2.11 1520 1.23 401 404 1.91 ٥.1 د 622 607 V 9 İ l 23-Aug-2020 14:20 EM2014666-026 BH-M23s Result <0.002 27500 15300 <0.10 0909 2000 0.057 <0.05 745 268 898 268 47 l 0.1 907 l l V Client sample ID Client sampling date / time meq/L meq/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L Bq/L Bq/L mg/L % 0.001 LOR 0.001 0.001 0.05 0.001 0.05 0.05 0.05 0.10 0.01 0.1 0.01 0.01 0.01 7439-89-6 7429-90-5 Ī 14808-79-8 16887-00-6 7439-89-6 18496-25-8 7440-70-2 7439-95-4 7440-23-5 7440-61-1 7429-90-5 7440-29-1 7440-61-1 I CAS Number DMO-210-001 3812-32-6 71-52-3 7440-09-7 7440-29-1 ED041G: Sulfate (Turbidimetric) as SO4 2- by DA EG051G: Ferrous Iron by Discrete Analyser EA250CA: Gross Alpha and Beta Activity ED045G: Chloride by Discrete Analyser EG020F: Dissolved Metals by ICP-MS **ED093F: Dissolved Major Cations** ED037P: Alkalinity by PC Titrator EG020T: Total Metals by ICP-MS Bicarbonate Alkalinity as CaCO3 Hydroxide Alkalinity as CaCO3 Carbonate Alkalinity as CaCO3 Sulfate as SO4 - Turbidimetric Total Alkalinity as CaCO3 Gross beta activity - 40K EK085M: Sulfide as S2-**EN055: Ionic Balance** Sub-Matrix: WATER (Matrix: WATER) Sulfide as S2-Ø Total Cations Ø Ionic Balance Ferrous Iron Gross alpha Magnesium Aluminium Potassium Aluminium Uranium Compound Chloride Calcium Thorium Uranium Thorium Sodium Iron Iron



Project Client

: 9 of 13 : EM2014666 : EMM CONSULTING PTY LTD : \$190512

Page Work Order

Sub-Matrix: WATER		Clier	Client sample ID	QA200	QA101	QA201	TS	<b>TB</b>
(Matrix: WATER)								
	Clie	nt samplin	Client sampling date / time	22-Aug-2020 00:00	23-Aug-2020 00:00	23-Aug-2020 00:00	31-Jul-2020 00:00	29-Jul-2020 00:00
Compound	CAS Number	TOR	Unit	EM2014666-031	EM2014666-032	EM2014666-033	EM2014666-034	EM2014666-035
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	7	mg/L	<b>\^</b>	۲>		-	
Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	<1	<1	\ \		
Bicarbonate Alkalinity as CaCO3	71-52-3	<b>-</b>	mg/L	400	268	268		
Total Alkalinity as CaCO3		-	mg/L	400	268	268		
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	3920	5940	5930	i	
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	-	mg/L	21600	28300	27900	:	
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	<b>-</b>	mg/L	545	755	770	:	1
Magnesium	7439-95-4	-	mg/L	1580	1990	2020		
Sodium	7440-23-5	-	mg/L	11300	15300	15500		
Potassium	7440-09-7	-	mg/L	56	46	46		
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.02	<0.02	<0.02	-	
Thorium	7440-29-1	0.001	mg/L	<0.002	<0.002	<0.002		
Uranium	7440-61-1	0.001	mg/L	<0.002	0.058	0.059		
Iron	7439-89-6	0.05	mg/L	2.99	<0.10	<0.10	-	
EG051G: Ferrous Iron by Discrete Analyser	er							
Ferrous Iron		0.05	mg/L	2.81	<0.05	<0.05		
EK085M: Sulfide as S2-								
Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	<0.1	<0.1		
EN055: Ionic Balance								
Ø Total Anions		0.01	med/L	669	927	916	-	
Ø Total Cations		0.01	med/L	650	898	880		
Ø Ionic Balance	-	0.01	%	3.61	3.30	1.99	-	
EP080/071: Total Petroleum Hydrocarbons	0							
C6 - C9 Fraction	-	20	hg/L	:		1	170	<20
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions	ons - NEPM 2013	Fraction	s					
C6 - C10 Fraction	C6_C10	20	hg/L	-		-	210	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	hg/L	1	1	1	110	<20
EP080: BTEXN								
Benzene	71-43-2	-	hg/L		:		17	٧



Client Project

EMM CONSULTING PTY LTD S190512

10 of 13 EM2014666

Page Work Order

29-Jul-2020 00:00 EM2014666-035 Result 95.2 102 122 7 7 7 ۲ ۲ 7 ^ გ 31-Jul-2020 00:00 EM2014666-034 Result Z 98.4 105 16 32 **98** 5 104 23-Aug-2020 00:00 EM2014666-033 QA201 Result 1 l I 1 l l 23-Aug-2020 00:00 EM2014666-032 QA101 Result 1 | | | | | | | | | 22-Aug-2020 00:00 EM2014666-031 QA200 Result i l i İ Client sample ID Client sampling date / time Unit hg/L hg/L hg/L hg/L hg/L hg/L % % % LOR 7 2 7 7 7 7 N N 95-47-6 460-00-4 91-20-3 17060-07-0 100-41-4 108-38-3 106-42-3 2037-26-5 CAS Number 108-88-3 EP080S: TPH(V)/BTEX Surrogates **EP080: BTEXN - Continued** 4-Bromofluorobenzene 1.2-Dichloroethane-D4 meta- & para-Xylene Sub-Matrix: WATER (Matrix: WATER) Ethylbenzene ^ Total Xylenes A Sum of BTEX ortho-Xylene Naphthalene Toluene-D8 Compound Toluene



Project Client

: 11 of 13 : EM2014666 : EMM CONSULTING PTY LTD : S190512

Page Work Order

Sub-Matrix: WATER		Clien	Client sample ID	QA300	QA301	QA302	QA303	QA304
(Matrix: WAIER)	Clie	nt sampling	Client sampling date / time	19-Aug-2020 00:00	20-Aug-2020 00:00	21-Aug-2020 00:00	22-Aug-2020 00:00	23-Aug-2020 00:00
Compound	CAS Number LOR	LOR	Unit	EM2014666-036	EM2014666-037	EM2014666-038	EM2014666-039	EM2014666-040
				Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5 0.01	0.01	mg/L	<0.02	<0.01	<0.01	<0.01	<0.01
Thorium	7440-29-1	0.001	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001
Iron	7439-89-6 0.05	0.05	mg/L	<0.10	<0.05	<0.05	<0.05	<0.05



Project Client

: 12 of 13 : EM2014666 : EMM CONSULTING PTY LTD : S190512

Page Work Order

Sub-Matrix: WATER (Matrix: WATER)		Clie	Client sample ID	Trip Spike Control		1		1
	Clie	ent samplir	Client sampling date / time	31-Jul-2020 00:00		-		
Compound	CAS Number	LOR	Unit	EM2014666-041	1		-	!
				Result				
EP080/071: Total Petroleum Hydrocarbons	pons							
C6 - C9 Fraction		20	hg/L	190			-	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions	arbons - NEPM 2013	3 Fraction	SI					
C6 - C10 Fraction	C6_C10	20	hg/L	230	-	-	-	:
^ C6 - C10 Fraction minus BTEX	C6_C10-BTEX	20	hg/L	120	-	-	-	1
(F1)								
EP080: BTEXN								
Benzene	71-43-2	-	hg/L	19	-	1	1	
Toluene	108-88-3	2	hg/L	17		-	-	-
Ethylbenzene	100-41-4	2	hg/L	18				
meta- & para-Xylene	108-38-3 106-42-3	2	hg/L	36				
ortho-Xylene	92-47-6	2	hg/L	19			-	-
^ Total Xylenes		2	hg/L	55				
^ Sum of BTEX		-	hg/L	109	-	-	-	:
Naphthalene	91-20-3	2	hg/L	<5				
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	105		-		-
Toluene-D8	2037-26-5	2	%	93.3		-	-	-
4-Bromofluorobenzene	460-00-4	2	%	102	-	1		



: 13 of 13 : EM2014666 : EMM CONSULTING PTY LTD : S190512 Surrogate Control Limits Sub-Matrix: WATER Project

Page Work Order

Client

SUD-Matrix: WAIEK		Recovery Limits (%)	Imits (%)
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	129
Toluene-D8	2037-26-5	20	125
4-Bromofluorobenzene	460-00-4	71	129



### QUALITY CONTROL REPORT

: 4 Westall Rd Springvale VIC Australia 3171 Environmental Division Melbourne +61-3-8549 9600 Shane Colley 25-Aug-2020 25-Aug-2020 07-Sep-2020 : 1 of 9 Date Analysis Commenced Date Samples Received Telephone Laboratory Issue Date Contact Address Ground Floor Suite 1 20 Chandos Street **EMM CONSULTING PTY LTD** St Leonards NSW NSW 2065 PAUL GIBBONS EM2014666 S190512 HN / KB EN/222 C-O-C number Quote number Order number **Work Order** Telephone Sampler Contact Address Project Client

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

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

This Quality Control Report contains the following information:

4

No. of samples received No. of samples analysed 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
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Titus Vimalasiri	Metals Teamleader	Radionuclides, Fyshwick, ACT



 Page
 : 2 of 9

 Work Order
 : EM2014666

 Client
 : EMM CONSULTING PTY LTD

 Project
 : S190512

### General Comments

In house developed procedures 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. 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 primary

Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot 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

RPD = Relative Percentage Difference

# = Indicates failed QC

### Laboratory Duplicate (DUP) Report

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

Sub-Matrix: WATER						Laboratory D	Laboratory Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA250CA: Gross Alp	EA250CA: Gross Alpha and Beta Activity (QC Lot: 3241420)	.ot: 3241420)							
CA2005680-001	Anonymous	EA250: Gross alpha	-	0.05	Bq/L	<0.05	<0.05	0.00	No Limit
		EA250: Gross beta activity - 40K	1	0.1	Bq/L	<0.10	<0.10	0.00	No Limit
EM2014666-010	UGM-M15S	EA250: Gross alpha	1	0.05	Bq/L	3.02	3.02	0.00	No Limit
		EA250: Gross beta activity - 40K	-	0.1	Bq/L	2.59	<2.33	10.7	No Limit
EA250CA: Gross Alp	EA250CA: Gross Alpha and Beta Activity (QC Lot: 3241421)	.ot: 3241421)						=	
EM2014666-024	BH-M22s	EA250: Gross alpha	-	0.05	Bq/L	2.45	1.42	53.3	No Limit
		EA250: Gross beta activity - 40K	-	0.1	Bq/L	<2.15	2.27	5.55	No Limit
ED037P: Alkalinity by	ED037P: Alkalinity by PC Titrator (QC Lot: 3226070)	(070)							
EM2014666-008	UGM-M12D	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	^	^	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	^	^	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	389	391	0.441	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	-	-	mg/L	389	391	0.441	0% - 20%
EM2014555-018	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	۲۷	^	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	_	mg/L	۲	^	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	^	^	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	1	-	mg/L	1>	۲>	0.00	No Limit
ED037P: Alkalinity by	ED037P: Alkalinity by PC Titrator (QC Lot: 3226072)	(072)							
EM2014666-018	BH-M19S	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	^	^	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	^	^	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	313	311	0.640	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	1	-	mg/L	313	311	0.640	0% - 20%
EM2014666-028	BH-M25s	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	₹	<u>^</u>	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	_	mg/L	۲۷	^	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	322	326	1.31	0% - 20%



S190512

Client Project

EM2014666

Work Order

Recovery Limits (%) 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 50% No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.420 0.536 0.158 0.354 0.883 0.943 0.839 3.18 1.45 0.00 3.28 0.00 0.00 10.1 4.75 0.831 1.79 2.25 0.00 2.56 4 0.00 0.00 3.29 2.36 0.00 0.00 1.31 Laboratory Duplicate (DUP) Report Duplicate Result 20800 21900 14400 14900 12700 <0.10 <0.02 <0.10 2140 5250 3990 26400 1070 11300 1540 1740 1580 1250 756 1590 543 326 265 3880 49 36 4 26 Original Result 21200 14600 13100 <0.02 25800 21400 14800 1200 <0.10 <0.10 2370 5510 3860 1240 1730 3760 1080 1550 1630 1570 49 538 322 40 37 26 mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L LOR 0.01 0.05 0.01 0.05 \_ \_ \_ \_ \_ \_ \_ \_ ~ \_ \_ ~ \_ \_ -14808-79-8 14808-79-8 16887-00-6 7429-90-5 7429-90-5 CAS Number 14808-79-8 14808-79-8 14808-79-8 16887-00-6 16887-00-6 16887-00-6 7440-70-2 7440-23-5 7440-70-2 7439-95-4 7440-23-5 7440-70-2 7440-23-5 7440-70-2 7439-95-4 7440-23-5 7440-09-7 7439-89-6 7439-89-6 7439-95-4 7440-09-7 7440-09-7 7439-95-4 7440-09-7 ED041G: Sulfate as SO4 - Turbidimetric ED041G: Sulfate as SO4 - Turbidimetric ED041G: Sulfate as SO4 - Turbidimetric ED041G: Sulfate as SO4 - Turbidimetric ED041G: Sulfate as SO4 - Turbidimetric ED037-P: Total Alkalinity as CaCO3 EG020A-F: Aluminium EG020A-F: Aluminium ED093F: Magnesium ED093F: Magnesium ED093F: Magnesium ED093F: Magnesium ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3219766) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3219763) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3219768) ED093F: Potassium ED093F: Potassium ED093F: Potassium ED093F: Potassium ED045G: Chloride ED045G: Chloride ED045G: Chloride ED045G: Chloride ED093F: Calcium ED093F: Calcium ED093F: Sodium ED093F: Calcium ED093F: Calcium ED093F: Sodium ED093F: Sodium ED093F: Sodium ED037P: Alkalinity by PC Titrator(QC Lot: 3226072)- continued EG020A-F: Iron EG020A-F: Iron ED045G: Chloride by Discrete Analyser (QC Lot: 3219765) ED045G: Chloride by Discrete Analyser (QC Lot: 3219767) EG020F: Dissolved Metals by ICP-MS (QC Lot: 3220394) ED093F: Dissolved Major Cations (QC Lot: 3220393) ED093F: Dissolved Major Cations (QC Lot: 3220396) Client sample ID UGM-M15S Anonymous Anonymous UGM-M15S Anonymous UGM-M15S UGM-M15S UGM-M1D UGM-M1S BH-M20D BH-M21S BH-M20D BH-M25s QA100 QA100 QA100 Laboratory sample ID Sub-Matrix: WATER EM2014666-019 EM2014666-010 EM2014666-019 EM2014666-030 EM2014666-010 EM2014666-002 EM2014666-022 EM2014666-028 EM2014637-001 EM2014658-001 EM2014666-030 EM2014666-010 EM2014666-030 EM2014666-001 EM2014666-010 EM2014658-001



S190512

Client Project

EM2014666

Work Order

Recovery Limits (%) 0% - 20% 0% - 20% %09 - %0 0% - 20% 0% - 20% 0% - 20% No Limit No Limit No Limit No Limit 0% - 20% No Limit No Limit No Limit 0% - 20% 0% - 20% %09 - %0 No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.00 0.00 0.00 4.54 0.00 0.00 2.17 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 15.8 1.72 0.00 0.00 0.00 0.00 0.00 0.00 0.00 1.01 4.31 5.48 8.89 0.00 Laboratory Duplicate (DUP) Report Duplicate Result <0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.05 0.062 2.98 <0.02 <0.05 <0.01 <0.05 0.031 0.002 0.115 <0.01 <0.05 2.92 2.78 <0.01 7.87 **6**0.1 2.87 5.00 5.8 Original Result <0.002 <0.002 <0.002 <0.002 <0.002 <0.002 0.065 <0.002 <0.002 <0.05 0.031 3.05 <0.02 3.03 <0.01 <0.05 0.126 <0.05 7.52 <0.05 0.05 0.02 4.26 2.97 2.81 <0.1 5.8 mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L mg/L mg/L mg/L mg/L mg/L 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.05 0.001 0.05 0.05 0.05 0.05 0.05 0.05 0.001 0.001 LOR 0.01 0.01 0.01 0.01 0.05 0.1 0.01 0.01 0.1 7429-90-5 7429-90-5 7439-89-6 7429-90-5 7429-90-5 18496-25-8 18496-25-8 CAS Number 7440-61-1 7440-29-1 7440-61-1 7439-89-6 7429-90-5 7439-89-6 7440-29-1 7440-29-1 7439-89-6 7429-90-5 7440-61-1 7440-29-1 7440-61-1 7439-89-6 7439-89-6 7440-29-1 7440-61-1 7440-61-1 7440-29-1 EG020A-F: Aluminium EG020A-T: Aluminium EG020A-T: Aluminium EG020A-T: Aluminium EG051G: Ferrous Iron EG051G: Ferrous Iron EG051G: Ferrous Iron EG020A-F: Aluminium EG020A-T: Aluminium EK085: Sulfide as S2-EK085: Sulfide as S2-EG051G: Ferrous Iron EG020B-F: Uranium EG020B-F: Uranium EG020B-F: Uranium EG020B-T: Thorium EG020B-T: Uranium EG020B-F: Thorium EG020B-F: Uranium EG020B-F: Thorium EG020B-F: Thorium EG020B-F: Thorium EG020B-T: Uranium EG020B-T: Thorium EG020A-T: Iron EG020A-T: Iron EG020A-F: Iron EG020A-F: Iron EG020A-T: Iron EG020A-T: Iron EG051G: Ferrous Iron by Discrete Analyser (QC Lot: 3219612) EG051G: Ferrous Iron by Discrete Analyser (QC Lot: 3219613) EG020F: Dissolved Metals by ICP-MS (QC Lot: 3220395) EG020F: Dissolved Metals by ICP-MS (QC Lot: 3220397) EG020F: Dissolved Metals by ICP-MS (QC Lot: 3220398) EG020T: Total Metals by ICP-MS (QC Lot: 3219740) EG020T: Total Metals by ICP-MS (QC Lot: 3219736) EG020T: Total Metals by ICP-MS (QC Lot: 3219739) EK085M: Sulfide as S2- (QC Lot: 3221186) Client sample ID Anonymous UGM-M15S UGM-M15S UGM-M15S Anonymous UGM-M1D UGM-M1D UGM-M1S UGM-M1D BH-M19S BH-M21D BH-M21D BH-M21D BH-M19S QA303 QA100 QA100 QA100 Laboratory sample ID Sub-Matrix: WATER EM2014666-039 EM2014666-001 EM2014666-010 EM2014666-021 EM2014666-021 EM2014596-030 EM2014666-002 EM2014666-018 EM2014666-018 EM2014666-010 EM2014666-021 EM2014666-030 EM2014666-001 EM2014666-010 EM2014666-030 EM2014666-030 EM2014665-003 EM2014666-001



S190512

Client Project

EM2014666

Work Order

5 of 9

Recovery Limits (%) 0% - 20% %09 - %0 0% - 20% 0% - 20% No Limit No Limit No Limit 0% - 20% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.920 0.00 0.00 0.901 0.00 0.00 0.00 0.00 0.00 0.00 2.80 0.00 0.00 0.00 0.00 Laboratory Duplicate (DUP) Report Original Result Duplicate Result <20 1150 <20 1190 **6**0.1 40° 833 7 7 7 \$ 5 13 76 157 37 V 1160 <20 1200 <0.1 0.1 <20 84 13 76 157 V 7 7 2 33 mg/L mg/L hg/L hg/L hg/L hg/L hg/L hg/L hg/L hg/L Unit hg/L hg/L hg/L hg/L hg/L hg/L LOR 0.1 8 8 8 8 N 2 7 2 2 2 N N C6\_C10 91-20-3 71-43-2 C6\_C10 CAS Number 18496-25-8 18496-25-8 71-43-2 108-88-3 100-41-4 108-38-3 106-42-3 95-47-6 91-20-3 108-88-3 108-38-3 106-42-3 100-41-4 EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3219780) EP080: meta- & para-Xylene EP080: meta- & para-Xylene EP080: C6 - C10 Fraction EP080: C6 - C10 Fraction EP080: C6 - C9 Fraction EP080: C6 - C9 Fraction EK085: Sulfide as S2-EK085: Sulfide as S2-EP080: Ethylbenzene EP080: Ethylbenzene EP080: ortho-Xylene EP080: ortho-Xylene EP080: Naphthalene EP080: Naphthalene EP080: Benzene EP080: Benzene EP080: Toluene EP080: Toluene EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3219780) EK085M: Sulfide as S2- (QC Lot: 3221187) Client sample ID EP080: BTEXN (QC Lot: 3219780) Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous BH-M21D QA100 Laboratory sample ID Sub-Matrix: WATER EM2014666-021 EM2014670-006 EM2014670-006 EM2014666-030 EM2014670-001 EM2014670-006 EM2014670-001 EM2014670-001



: 6 of 9 : EM2014666 : EMM CONSULTING PTY LTD : S190512 Work Order Project Client

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

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (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.	ion and accuracy	independent of sam	ıple matrix. Dynamic I	Recovery Limits are based	on statistical evaluation of	processed LCS.		
Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LCS) Report	.CS) Report	
				Report	Spike	Spike Recovery (%)	Recovery	Recovery Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SO7	TOW	High
EA250CA: Gross Alpha and Beta Activity (QCLot: 3241420)								
EA250: Gross alpha	-	0.05	Bq/L	<0.05	1751 Bq/L	101	95.2	105
EA250: Gross beta activity - 40K	-	0.1	Bq/L	<0.10	-	-	-	-
EA250CA: Gross Alpha and Beta Activity (QCLot: 3241421)								
EA250: Gross alpha	-	0.05	Bq/L	<0.05	1751 Bq/L	8.66	95.2	105
EA250: Gross beta activity - 40K		0.1	Bq/L	<0.10	-			-
ED037P: Alkalinity by PC Titrator (QCLot: 3226070)								
ED037-P: Total Alkalinity as CaCO3		-	mg/L		200 mg/L	92.7	88.0	112
ED037P: Alkalinity by PC Titrator (QCLot: 3226072)								
ED037-P: Total Alkalinity as CaCO3		-	mg/L		200 mg/L	99.2	88.0	112
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3219763)	19763)							
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	_	mg/L	7	25 mg/L	113	85.8	117
				₹	100 mg/L	94.9	85.8	117
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3219766)	19766)							
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	_	mg/L	۲>	25 mg/L	86.2	85.8	117
				<b>&gt;</b>	100 mg/L	95.5	85.8	117
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3219768)	19768)							
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	_	mg/L	₹	25 mg/L	102	85.8	117
				<b>&gt;</b>	100 mg/L	95.9	85.8	117
ED045G: Chloride by Discrete Analyser (QCLot: 3219765)								
	16887-00-6	_	mg/L	>	10 mg/L	102	85.0	122
				<b>^</b>	1000 mg/L	101	85.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 3219767)								
	16887-00-6	-	mg/L	₹	10 mg/L	108	85.0	122
				₹	1000 mg/L	101	85.0	122
ED093F: Dissolved Major Cations (QCLot: 3220393)								
ED093F: Calcium	7440-70-2	1	mg/L	1>	5 mg/L	107	88.2	117
ED093F: Magnesium	7439-95-4	_	mg/L	1>	5 mg/L	99.1	85.6	114
ED093F: Sodium	7440-23-5	_	mg/L	7	50 mg/L	103	90.0	114
ED093F: Potassium	7440-09-7	1	mg/L	<b>-</b>	50 mg/L	104	86.7	111
ED093F: Dissolved Major Cations (QCLot: 3220396)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	5 mg/L	102	88.2	117
ED093F: Magnesium	7439-95-4	1	mg/L	۲>	5 mg/L	96.2	85.6	114
ED093F: Sodium	7440-23-5	_	mg/L	۲>	50 mg/L	100	90.0	114



S190512

Client Project

EM2014666

Work Order

High 11 109 110 107 110 115 116 117 114 115 116 112 112 116 116 129 107 126 124 Recovery Limits (%) 91.8 85.2 91.8 92.8 87.5 92.8 81.9 81.9 65.5 90.2 75.8 86.7 90.4 90.4 90.2 85.2 90.8 89.1 90.8 75.8 64.3 69.8 TOW Laboratory Control Spike (LCS) Report Spike Recovery (%) 90.2 87.4 9.96 95.8 102 90.6 89.2 112 111 92.6 92.5 92.5 110 SO7 105 105 110 102 109 102 101 108 Concentration 0.5 mg/L 0.5 mg/L 0.1 mg/L 0.1 mg/L 0.5 mg/L 0.1 mg/L 360 µg/L 450 µg/L 0.1 mg/L 20 µg/L 50 mg/L 0.1 mg/L 0.5 mg/L 0.5 mg/L 2 mg/L 2 mg/L 0.5 mg/L 0.5 mg/L 0.1 mg/L 0.5 mg/L 0.5 mg/L 0.5 mg/L Method Blank (MB) Result <0.05 <0.001 <0.001 <0.001 <0.01 <0.05 <0.001 <0.001 <0.05 <0.001 <0.05 <0.05 <0.05 Report <0.01 <0.01 <0.01 ٥ 0.1 ٥.1 م <20 <20 ₹ Ÿ mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L <u>Unit</u> mg/L mg/L mg/L hg/L hg/L hg/L EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions(QCLot: 3219780) 0.05 0.001 0.01 0.001 0.05 0.001 0.001 0.05 0.05 0.05 0.001 LOR 0.01 0.01 0.01 0.1 0.1 20 20 7429-90-5 7439-89-6 7429-90-5 7439-89-6 7440-29-1 7440-61-1 CAS Number 7440-29-1 7439-89-6 18496-25-8 | C6\_C10 7440-09-7 7429-90-5 7439-89-6 7440-61-1 7440-61-1 7429-90-5 18496-25-8 71-43-2 7440-29-1 ED093F: Dissolved Major Cations (QCLot: 3220396) - continued EG051G: Ferrous Iron by Discrete Analyser (QCLot: 3219612) EG051G: Ferrous Iron by Discrete Analyser (QCLot: 3219613) EP080/071: Total Petroleum Hydrocarbons (QCLot: 3219780) EG020F: Dissolved Metals by ICP-MS (QCLot: 3220395) EG020F: Dissolved Metals by ICP-MS (QCLot: 3220397) EG020F: Dissolved Metals by ICP-MS (QCLot: 3220394) EG020F: Dissolved Metals by ICP-MS (QCLot: 3220398) EG020T: Total Metals by ICP-MS (QCLot: 3219740) EG020T: Total Metals by ICP-MS (QCLot: 3219736) EG020T: Total Metals by ICP-MS (QCLot: 3219739) EK085M: Sulfide as S2- (QCLot: 3221186) EK085M: Sulfide as S2- (QCLot: 3221187) EP080: BTEXN (QCLot: 3219780) EP080: C6 - C10 Fraction EP080: C6 - C9 Fraction EG020A-F: Aluminium EG020A-F: Aluminium EG020A-T: Aluminium EG020A-T: Aluminium EG051G: Ferrous Iron EG051G: Ferrous Iron EK085: Sulfide as S2-EK085: Sulfide as S2-EG020B-F: Thorium EG020B-T: Thorium EG020B-F: Uranium EG020B-F: Thorium EG020B-F: Uranium EG020B-T: Uranium Sub-Matrix: WATER ED093F: Potassium Method: Compound EP080: Benzene EG020A-F: Iron EG020A-F: Iron EG020A-T: Iron EG020A-T: Iron



 Page
 : 8 of 9

 Work Order
 : EM2014666

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LCS) Report	S) Report	
				Report	Spike	Spike Recovery (%)	Recovery Limits (%)	imits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SO7	Low	High
EP080: BTEXN (QCLot: 3219780) - continued								
EP080: Toluene	108-88-3	2	hg/L	<2	20 µg/L	103	73.6	126
EP080: Ethylbenzene	100-41-4	2	hg/L	<2	20 µg/L	110	72.0	126
EP080: meta- & para-Xylene	108-38-3	2	hg/L	<2	40 µg/L	110	71.5	132
	106-42-3							
EP080: ortho-Xylene	92-47-6	2	hg/L	<2	20 µg/L	105	76.5	132
EP080: Naphthalene	91-20-3	2	hg/L	<5	5 µg/L	97.0	70.5	127

### Matrix Spike (MS) Report

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

Matrix Spike (MS) Report

Sub-Matrix: WATER

				Spike	SpikeRecovery(%)	Recovery Limits (%)	nits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (1	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3219763)						
EM2014658-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	120	70.0	130
ED041G: Sulfate (1	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3219766)						
EM2014666-019	BH-M20D	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not	70.0	130
					Determined		
ED041G: Sulfate (1	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3219768)						
EM2014666-031	QA200	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not	70.0	130
					Determined		
ED045G: Chloride	ED045G: Chloride by Discrete Analyser (QCLot: 3219765)						
EM2014658-002	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	# Not	70.0	130
					Determined		
ED045G: Chloride	ED045G: Chloride by Discrete Analyser (QCLot: 3219767)						
EM2014666-019	BH-M20D	ED045G: Chloride	16887-00-6	400 mg/L	# Not	70.0	130
					Determined		
EG051G: Ferrous	EG051G: Ferrous Iron by Discrete Analyser (QCLot: 3219612)						
EM2014666-002	UGM-M1S	EG051G: Ferrous Iron	-	2 mg/L	92.3	70.0	130
EG051G: Ferrous	EG051G: Ferrous Iron by Discrete Analyser (QCLot: 3219613)						
EM2014666-022	BH-M21S	EG051G: Ferrous Iron		2 mg/L	84.1	70.0	130
EK085M: Sulfide a	EK085M: Sulfide as S2- (QCLot: 3221186)						
EM2014666-002	UGM-M1S	EK085: Sulfide as S2-	18496-25-8	0.33 mg/L	# 69.2	70.0	130
EK085M: Sulfide a	EK085M: Sulfide as S2- (QCLot: 3221187)						
EM2014666-022	BH-M21S	EK085: Sulfide as S2-	18496-25-8	0.33 mg/L	# 21.4	70.0	130



 Page
 : 9 of 9

 Work Order
 : EM2014666

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Sub-Matrix: WATER				M	Matrix Spike (MS) Report		
				Spike	SpikeRecovery(%)	Recovery Limits (%)	mits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total P	EP080/071: Total Petroleum Hydrocarbons (QCLot: 3219780)						
EM2014670-002	Anonymous	EP080: C6 - C9 Fraction	-	280 µg/L	# Not Determined	43.0	125
EP080/071: Total R	EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3219780)	ot: 3219780)					
EM2014670-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	# Not Determined	44.0	122
EP080: BTEXN (QCLot: 3219780)	CLot: 3219780)						
EM2014670-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	# Not Determined	68.0	130
		EP080: Toluene	108-88-3	20 µg/L	95.3	72.0	132



# QA/QC Compliance Assessment to assist with Quality Review

: 1 of 14	atory : Environmental Division Melbourne :+61-3-8549 9600	les Received	Date : 07-Sep-2020	No. of samples received : 41	No. of samples analysed : 41
Page	Laboratory	Date S	Issue Date	No. of	No. of
: EM2014666	EMM CONSULTING PTY LTD  PAUL GIBBONS	: \$190512	:	: HN / KB	:
Work Order	Client	Project	Site	Sampler	Order number

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 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 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.

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

# Outliers: Analysis Holding Time Compliance

Analysis Holding Time Outliers exist - please see following pages for full details.

# Outliers: Frequency of Quality Control Samples

Quality Control Sample Frequency Outliers exist - please see following pages for full details.



: 2 of 14 : EM2014666 : EMM CONSULTING PTY LTD : S190512 Page Work Order Project Client

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
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EM2014666031	QA200	Sulfate as SO4 -	14808-79-8	Not	l	MS recovery not determined,
			Turbidimetric	_	Determined		background level greater than or
							equal to 4x spike level.
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EM2014666019	BH-M20D	Sulfate as SO4 -	14808-79-8	Not	1	MS recovery not determined,
			Turbidimetric	_	Determined		background level greater than or
							equal to 4x spike level.
ED045G: Chloride by Discrete Analyser	EM2014658002	Anonymons	Chloride	16887-00-6	Not	1	MS recovery not determined,
				_	Determined		background level greater than or
							equal to 4x spike level.
ED045G: Chloride by Discrete Analyser	EM2014666019	BH-M20D	Chloride	16887-00-6	Not	ŀ	MS recovery not determined,
				_	Determined		background level greater than or
							equal to 4x spike level.
EK085M: Sulfide as S2-	EM2014666002	UGM-M1S	Sulfide as S2-	18496-25-8	69.2 %	70.0-130%	Recovery less than lower data quality
							objective
EK085M: Sulfide as S2-	EM2014666022	BH-M21S	Sulfide as S2-	18496-25-8	21.4 %	70.0-130%	Recovery less than lower data quality
							objective
EP080/071: Total Petroleum Hydrocarbons	EM2014670002	Anonymons	C6 - C9 Fraction		Not		MS recovery not determined,
				_	Determined		background level greater than or
							equal to 4x spike level.
EP080/071: Total Recoverable Hydrocarbons - NEPM 2 EM2014670002	2 EM2014670002	Anonymons	C6 - C10 Fraction	C6_C10	Not		MS recovery not determined,
				_	Determined		background level greater than or
							equal to 4x spike level.
EP080: BTEXN	EM2014670002	Anonymons	Benzene	71-43-2	Not		MS recovery not determined,
				_	Determined		background level greater than or
							equal to 4x spike level.

## Outliers: Analysis Holding Time Compliance

Matrix: WATER

Method		Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Date extracted Due vor extraction	Days	Date analysed	Due vor analysis	Days
				overdue			overdue
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid							
TB		26-Aug-2020	12-Aug-2020	41	26-Aug-2020	26-Aug-2020 12-Aug-2020	4
Amber VOC Vial - Sulfuric Acid							
TS,	Trip Spike Control	26-Aug-2020	14-Aug-2020	12	26-Aug-2020	14-Aug-2020	12
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions	M 2013 Fractions						
Amber VOC Vial - Sulfuric Acid							
TB		26-Aug-2020	12-Aug-2020	14	26-Aug-2020	26-Aug-2020 12-Aug-2020	14



 Page
 : 3 of 14

 Work Order
 : EM2014666

 Client
 : EMM CONSULTING PTY LTD

 Project
 : S190512

Matrix: WATER

Method	Ext	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)	Date extracted	Date extracted Due to extraction	Days	Date analysed	Due vor analysis	Days	
			overdue			overdue	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Analysis Holding Time							

14-Aug-2020 12-Aug-2020 14-Aug-2020 26-Aug-2020 26-Aug-2020 26-Aug-2020 12 4 12 14-Aug-2020 14-Aug-2020 12-Aug-2020 26-Aug-2020 26-Aug-2020 26-Aug-2020 Trip Spike Control Trip Spike Control Amber VOC Vial - Sulfuric Acid Amber VOC Vial - Sulfuric Acid Amber VOC Vial - Sulfuric Acid **EP080: BTEXN** TS,

12

12

4

**Outliers: Frequency of Quality Control Samples** 

Matrix: WATER

Quality Control Sample Type	Co	Count	Rate (%)	(%)	Quality Control Specification
Method	ac	Regular	Actual	Actual Expected	
Laboratory Control Samples (LCS)					
Gross Alpha and Beta Activity	2	29	06.90	10.00	10.00 NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Dissolved Metals by ICP-MS - Suite A	0	33	00.00	5.00	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	0	25	00.00	5.00	NEPM 2013 B3 & ALS QC Standard

## 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.

organics

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: 14 days, mercuny 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 tille	Dicacii, V - VVIIIII	noiding time.
Method	Sample Date	Extu	action / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due wor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation



 Page
 : 4 of 14

 Work Order
 : EM2014666

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Matrix: WATER					Evaluation	x = Holding time	Evaluation: $\mathbf{x} = \text{Holding time breach}$ ; $\mathbf{v} = \text{Within holding time}$ .	n holding time.
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
EA250CA: Gross Alpha and Beta Activity								
Clear Plastic Bottle - Natural (EA250)								
BH-M17D,	BH-M17S,	20-Aug-2020	1	-	-	07-Sep-2020	16-Feb-2021	>
BH-M18D,	BH-M18S							
Clear Plastic Bottle - Natural (EA250)								
BH-M19D,	BH-M19S,	21-Aug-2020	1			07-Sep-2020	17-Feb-2021	>
BH-M20D,	BH-M22d,							
BH-M22s								
Clear Plastic Bottle - Natural (EA250)								
UGM-M8D,	UGM-M8S,	22-Aug-2020	!	-	-	07-Sep-2020	18-Feb-2021	>
UGM-M15S,	BH-M20S							
Clear Plastic Bottle - Natural (EA250)								
LPSPB04		23-Aug-2020	1	-	-	07-Sep-2020	19-Feb-2021	>
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
UGM-M2D,	UGM-M2S,	19-Aug-2020	!	-	-	28-Aug-2020	02-Sep-2020	>
UGM-M12D,	UGM-M12S,							
BH-M21D,	BH-M21S							
Clear Plastic Bottle - Natural (ED037-P)								
BH-M17D,	BH-M17S,	20-Aug-2020	1	-	-	28-Aug-2020	03-Sep-2020	>
BH-M18D,	BH-M18S							
Clear Plastic Bottle - Natural (ED037-P)								
BH-M19D,	BH-M19S,	21-Aug-2020	!	1		28-Aug-2020	04-Sep-2020	>
BH-M20D,	BH-M22d,							
BH-M22s,	BH-M25d,							
BH-M25s								
Clear Plastic Bottle - Natural (ED037-P)								
UGM-M8D,	UGM-M8S,	22-Aug-2020	!	1		28-Aug-2020	05-Sep-2020	>
UGM-M15S,	BH-M16D,							
BH-M16S,	BH-M20S,							
QA100,	QA200							
Clear Plastic Bottle - Natural (ED037-P)								
UGM-M1D,	UGM-M1S,	23-Aug-2020	!	-	-	28-Aug-2020	06-Sep-2020	>
UGM-M4D,	BH-M23d,							
BH-M23s,	LPSPB04,							
QA101,	QA201							



 Page
 : 5 of 14

 Work Order
 : EM2014666

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Matrix: WATER					Evaluation	: x = Holding time	Evaluation: $x = \text{Holding time breach}$ ; $V = \text{Within holding time}$ .	n holding time.
Method		Sample Date	Ex	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)								
UGM-M2D,	UGM-M2S,	19-Aug-2020	1	-	-	26-Aug-2020	16-Sep-2020	>
UGM-M12D,	UGM-M12S,							
BH-M21D,	BH-M21S							
Clear Plastic Bottle - Natural (ED041G)								
BH-M17D,	BH-M17S,	20-Aug-2020	1			26-Aug-2020	17-Sep-2020	>
BH-M18D,	BH-M18S							
Clear Plastic Bottle - Natural (ED041G)								
BH-M19D,	BH-M19S,	21-Aug-2020	1			26-Aug-2020	18-Sep-2020	>
BH-M20D,	BH-M22d,							
BH-M22s,	BH-M25d,							
BH-M25s								
Clear Plastic Bottle - Natural (ED041G)								
UGM-M8D,	UGM-M8S,	22-Aug-2020	1	-	-	26-Aug-2020	19-Sep-2020	>
UGM-M15S,	BH-M16D,							
BH-M16S,	BH-M20S,							
QA100,	QA200							
Clear Plastic Bottle - Natural (ED041G)								
UGM-M1D,	UGM-M1S,	23-Aug-2020	1	-	-	26-Aug-2020	20-Sep-2020	>
UGM-M4D,	BH-M23d,							
BH-M23s,	LPSPB04,							
QA101,	QA201							



 Page
 : 6 of 14

 Work Order
 : EM2014666

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Matrix: WATER					Evaluation	= Holding time	Evaluation: $x = \text{Holding time breach}$ ; $\sqrt{\ } = \text{Within holding time}$ .	holding time.
Method		Sample Date	E	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)								
UGM-M2D,	UGM-M2S,	19-Aug-2020	1	-	-	26-Aug-2020	16-Sep-2020	>
UGM-M12D,	UGM-M12S,							
BH-M21D,	BH-M21S							
Clear Plastic Bottle - Natural (ED045G)								
BH-M17D,	BH-M17S,	20-Aug-2020	1	1	-	26-Aug-2020	17-Sep-2020	>
BH-M18D,	BH-M18S							
Clear Plastic Bottle - Natural (ED045G)								
BH-M19D,	BH-M19S,	21-Aug-2020	1	-	-	26-Aug-2020	18-Sep-2020	>
BH-M20D,	BH-M22d,							
BH-M22s,	BH-M25d,							
BH-M25s								
Clear Plastic Bottle - Natural (ED045G)								
UGM-M8D,	UGM-M8S,	22-Aug-2020	1	1	-	26-Aug-2020	19-Sep-2020	>
UGM-M15S,	BH-M16D,							
BH-M16S,	BH-M20S,							
QA100,	QA200							
Clear Plastic Bottle - Natural (ED045G)								
UGM-M1D,	UGM-M1S,	23-Aug-2020	1	1	-	26-Aug-2020	20-Sep-2020	>
UGM-M4D,	BH-M23d,							
BH-M23s,	LPSPB04,							
QA101,	QA201							



 Page
 : 7 of 14

 Work Order
 : EM2014666

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Matrix: WATER					Evaluation	= Holding time	Evaluation: $\mathbf{x} = \text{Holding time breach}$ ; $\checkmark = \text{Within holding time}$ .	holding time.
Method		Sample Date	Ex	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
UGM-M2D,	UGM-M2S,	19-Aug-2020	1	1	-	26-Aug-2020	16-Sep-2020	>
UGM-M12D,	UGM-M12S,							
BH-M21D,	BH-M21S							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
BH-M17D,	BH-M17S,	20-Aug-2020	1	-	-	26-Aug-2020	17-Sep-2020	>
BH-M18D,	BH-M18S							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
BH-M19D,	BH-M19S,	21-Aug-2020	1	-	-	26-Aug-2020	18-Sep-2020	>
BH-M20D,	BH-M22d,							
BH-M22s,	BH-M25d,							
BH-M25s								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
UGM-M8D,	UGM-M8S,	22-Aug-2020	1	-	-	26-Aug-2020	19-Sep-2020	>
UGM-M15S,	BH-M16D,							
BH-M16S,	BH-M20S,							
QA100,	QA200							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
UGM-M1D,	UGM-M1S,	23-Aug-2020	1	-	-	26-Aug-2020	20-Sep-2020	>
UGM-M4D,	BH-M23d,							
BH-M23s,	LPSPB04,							
QA101,	QA201							



 Page
 : 8 of 14

 Work Order
 : EM2014666

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Matrix: WATER					Evaluation	: x = Holding time	Evaluation: $\mathbf{x}=Holding$ time breach ; $\checkmark=Within$ holding time	holding time
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)	85 22 23 24 25	19-Aug-2020	ļ	-		26-Aug-2020	15-Feb-2021	,
UGM-M12D,	UGM-M12S,							•
BH-M21D,	BH-M21S							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)							T	,
BH-M17D,	BH-M17S,	20-Aug-2020	ł			26-Aug-2020	16-Feb-2021	>
BH-M18D,	BH-M18S							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)		0000				0000	77 7	`
BH-M19D,	BH-M19S,	71-Aug-2020	!	!		26-Aug-2020	17-Feb-2021	>
BH-IMZUD,	BH-WZZd,							
BH-M25s,	BH-W250,							
Clear Plastic Bottle - Nitric Acid: Filtered (EG020B-F)								
UGM-M8D,	UGM-M8S,	22-Aug-2020	1	-	1	26-Aug-2020	18-Feb-2021	>
UGM-M15S,	BH-M16D,							
BH-M16S,	BH-M20S,							
QA100,	QA200							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)								
UGM-M1D,	UGM-M1S,	23-Aug-2020	1	-	-	26-Aug-2020	19-Feb-2021	>
UGM-M4D,	BH-M23d,							
BH-M23s,	LPSPB04,							
QA101,	QA201							
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020B-T)		0000		г г г с с	,	000	т Г С	,
OGIN-WZS, QA300	BH-IM2 13,	0707-5n4-61	0707-Bny-07	202-00-10	>	0707-6nW-07	1202-02 1-01	>
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020B-T)								
BH-M17D,	BH-M17S,	20-Aug-2020	26-Aug-2020	16-Feb-2021	>	26-Aug-2020	16-Feb-2021	>
BH-M18S,	QA301							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020B-T)				71	`	4	7 L	,
BH-M19D,	BH-M19S,	71-Aug-2020	70-Aug-2020	17-LED-2021	>	20-Aug-2020	17-L-CD-7071	>
BH-IMZZS,	QA302							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020B-1)		22-Aug-2020	26-Aug-2020	18-Feb-2021	`	26-Aug-2020	18-Feb-2021	,
BH-M16S.	BH-M20S.	I	I		İ	I		•
QA303								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020B-T)								
UGM-M1S,	BH-M23d,	23-Aug-2020	26-Aug-2020	19-Feb-2021	>	26-Aug-2020	19-Feb-2021	>
LPSPB04,	QA304							



PTY LTD : 9 of 14 : EM2014666 Page Work Order Client Project

EMM CONSULTING P	: S190512
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Matrix: WATER					Evaluation:	= Holding time	Evaluation: $\star$ = Holding time breach; $\checkmark$ = Within holding time.	holding time.
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
EG051G: Ferrous Iron by Discrete Analyser								
Clear Plastic Bottle - HCI - Filtered (EG051G)								
UGM-M2D,	UGM-M2S,	19-Aug-2020	-	-		25-Aug-2020	26-Aug-2020	>
UGM-M12D,	UGM-M12S,							
BH-M21D,	BH-M21S							
Clear Plastic Bottle - HCI - Filtered (EG051G)								
BH-M17D,	BH-M17S,	20-Aug-2020	-	-		25-Aug-2020	27-Aug-2020	>
BH-M18D,	BH-M18S							
Clear Plastic Bottle - HCI - Filtered (EG051G)								
BH-M19D,	BH-M19S,	21-Aug-2020	-	-	-	25-Aug-2020	28-Aug-2020	>
BH-M20D,	BH-M22d,							
BH-M22s,	BH-M25d,							
BH-M25s								
Clear Plastic Bottle - HCI - Filtered (EG051G)								
UGM-M8D,	UGM-M8S,	22-Aug-2020	1	-	-	25-Aug-2020	29-Aug-2020	>
UGM-M15S,	BH-M16D,							
BH-M16S,	BH-M20S,							
QA100,	QA200							
Clear Plastic Bottle - HCI - Filtered (EG051G)								
UGM-M1D,	UGM-M1S,	23-Aug-2020	-	-	-	25-Aug-2020	30-Aug-2020	>
UGM-M4D,	BH-M23d,							
BH-M23s,	LPSPB04,							
QA101,	QA201							



 Page
 : 10 of 14

 Work Order
 : EM2014666

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Matrix: WATER					Evaluation	: x = Holding time	Evaluation: $x = \text{Holding time breach}$ ; $\checkmark = \text{Within holding time}$ .	holding time.
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
EK085M: Sulfide as S2-								
Clear Plastic Bottle - Zinc Acetate/NaOH (EK085)							0000	,
UGM-MZD,	UGM-M2S,	19-Aug-2020	1	1		26-Aug-2020	Zo-Aug-Zuzu	>
UGM-M12D,	UGM-M12S,							
BH-M21D,	BH-M21S							
Clear Plastic Bottle - Zinc Acetate/NaOH (EK085)								
BH-M17D,	BH-M17S,	20-Aug-2020	1	-	-	26-Aug-2020	27-Aug-2020	>
BH-M18D,	BH-M18S							
Clear Plastic Bottle - Zinc Acetate/NaOH (EK085)								
BH-M19D,	BH-M19S,	21-Aug-2020	1	-		26-Aug-2020	28-Aug-2020	>
BH-M20D,	BH-M22d,							
BH-M22s,	BH-M25d,							
BH-M25s								
Clear Plastic Bottle - Zinc Acetate/NaOH (EK085)								
UGM-M8D,	UGM-M8S,	22-Aug-2020	1	1	1	26-Aug-2020	29-Aug-2020	>
UGM-M15S,	BH-M16D,							
BH-M16S,	BH-M20S,							
QA100,	QA200							
Clear Plastic Bottle - Zinc Acetate/NaOH (EK085)								
UGM-M1D,	UGM-M1S,	23-Aug-2020	1	-	-	26-Aug-2020	30-Aug-2020	>
UGM-M4D,	BH-M23d,							
BH-M23s,	LPSPB04,							
QA101,	QA201							
EP080/071: Total Petroleum Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP080)								
TB		29-Jul-2020	26-Aug-2020	12-Aug-2020	¥	26-Aug-2020	12-Aug-2020	×
Amber VOC Vial - Sulfuric Acid (EP080)								
TS,	Trip Spike Control	31-Jul-2020	26-Aug-2020	14-Aug-2020	¥	26-Aug-2020	14-Aug-2020	×
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions	Fractions							
Amber VOC Vial - Sulfuric Acid (EP080) TB		29-Jul-2020	26-Aug-2020	12-Aug-2020	я	26-Aug-2020	12-Aug-2020	×
Amber VOC Vial - Sulfuric Acid (EP080)		-		0000			0000	
TS,	Trip Spike Control	31-Jul-2020	26-Aug-2020	14-Aug-2020	×	26-Aug-2020	14-Aug-2020	×
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)							•	
18		29-Jul-2020	26-Aug-2020	12-Aug-2020	¥	26-Aug-2020	12-Aug-2020	×
Amber VOC Vial - Sulfuric Acid (EP080) ⊤c	Tion Control	34. 1.11.2020	26-4119-2020	14-A119-2020	1	26-Aug-2020	14-Aug-2020	1
10,	Trip oplike Correct	01-041-100-10	77.77.67-07	2101 gpt 1	×	~4~4-KnU-04	2101 gp. 1	×



: 11 of 14 : EM2014666 : EMM CONSULTING PTY LTD : \$190512 Page Work Order Project Client

# 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							
Quality Control Sample Type		S	Count		Rate (%)		Quality Control Specivication
Analytical Methods	Method	OC	Reaular	Actual	Expected	Ef aluation	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	4	40	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	36	11.11	10.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	33	12.12	10.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	4	33	12.12	10.00	>	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	4	33	12.12	10.00	>	NEPM 2013 B3 & ALS QC Standard
Gross Alpha and Beta Activity	EA250	က	29	10.34	10.00	>	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	4	33	12.12	10.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	വ	44	11.36	10.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	4	33	12.12	10.00	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	4	25	16.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	2	20	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	15	13.33	10.00	>	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	2	40	5.00	5.00	>	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	36	11.11	10.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	33	90.9	2.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	2	33	90.9	5.00	>	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	2	33	90'9	5.00	`	NEPM 2013 B3 & ALS QC Standard
Gross Alpha and Beta Activity	EA250	2	29	06.9	10.00	×	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	33	90.9	5.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	9	44	13.64	10.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	2	33	90.9	2.00	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	25	8.00	2.00	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	_	20	5.00	2.00	>	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	_	15	6.67	5.00	>	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	2	36	5.56	5.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	33	90.9	5.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	2	33	90.9	2.00	>	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	2	33	90.9	5.00	>	NEPM 2013 B3 & ALS QC Standard
Gross Alpha and Beta Activity	EA250	2	29	06.9	5.00	>	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	33	90.9	2.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	3	44	6.82	5.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	2	33	90.9	5.00	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	25	8.00	2.00	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	-	20	2.00	2.00	>	NEPM 2013 B3 & ALS QC Standard



: 12 of 14 : EM2014666 : EMM CONSULTING PTY LTD : S190512 Page Work Order Client

Project

Matrix: WATER				Evaluation	ı: 🗴 = Quality Coı	ntrol frequency r	Evaluation: x = Quality Control frequency not within specification; $\vee$ = Quality Control frequency within specification.
Quality Control Sample Type		CO	Count		Rate (%)		Quality Control Specivication
Analytical Methods	Method	OC	Reaular	Actual	Expected	Ef aluation	
Method Blanks (MB) - Continued							
TRH Volatiles/BTEX	EP080	-	15	6.67	2.00	<b>\</b>	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	2	36	5.56	2.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	0	33	0.00	5.00	×	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	2	33	90.9	2.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	က	44	6.82	2.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	2	33	90.9	5.00	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	0	25	0.00	2.00	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	_	15	6.67	5.00	>	NEPM 2013 B3 & ALS QC Standard



: 13 of 14 : EM2014666 : EMM CONSULTING PTY LTD : \$190512 Work Order Project Client

**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.

A : - 1. 45 1. 44 - 41 1.	A 4 - 411	11-1-4	11-11-11
Analytical Methods	Mernod	Matrix	Wetnod Descriptions
Gross Alpha and Beta Activity	EA250	WATER	ASTM D7283-06: Determination of gross alpha and gross beta radioactivity in water samples by Liquid Scintillation Counting (LSC).
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ins are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 CI - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA seal method 2 017-1-L
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
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.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals by ICP-MS - Suite B	EG020B-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.
Total Metals by ICP-MS - Suite B	EG020B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ferrous Iron by Discrete Analyser	EG051G	WATER	In house: Referenced to APHA 3500 Fe-B. A colorimetric determination based on the reaction between phenanthroline and ferrous iron at pH 3.2-3.3 to form an orange-red complex that is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3).



 Page
 : 14 of 14

 Work Order
 : EM2014666

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Analytical Methods	Method	Matrix	Method Descriptions
Sulfide as S2-	EK085	WATER	In house: Referenced to APHA 4500-S2- D. Sulfide species present in water samples are immediately precipitated when collected in pretreated caustic/zinc acetate preserved sample containers. The sulphides are coloured using methylene blue indicator. Non-detects may be screened by comparison against a standard at half-LOR, otherwise samples are measured using UV-VIS detection at 664nm. This method is compliant with NEPM Schedule B(3)
lonic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. 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)
Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



DMACKAY 78 Harbour Road Mackay OLD 4740 Pls 07 4944 0177 €: mackay@stoglobal com DGLADSTONE 46 Callemendeh Drive Clinton QLD 4630 Ph. 67 7471 5600 E. gaddstone@alagibbal.com OBRISSANE 2 BAN Street Stafford ULD 4653 PN 07 3243 7222 E. semples histome@ateglobal.com

> ALS Laboratory: please tick >> CHAIN OF CUSTODY

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DNETWCASTILE BISSE Melitand Road Nayfado West NSW 2004 Ph. D2 4014 S200 E: semplex newsollegislanjudek.com CNG-PR-A 419 Geay Place Nath Naves NSW 2541 Ph. D2 473 2008 E: nowas@inspices.com DPERTH 10 Hod Way Malaga WA 6090 Ph. 08 9209 7650 Et complex parth@alsglobd com

DWOLLONGONG 1/19-21 Rainn Black Dr. Nach Wollorgong NSW 2500 Ph. 02 4225 3125 E. wallongong@aisglobal.com DTOWNSVILLE 14-15 Desma Court Bolne OLD 4418 Prr 07 4796 0600 El rownessille enurcemental@slegobal.com

A THE CAME AND THE		TURNAROUND REQUIREMENTS:	Standard TAT (List due date):		FOR LABORATORY USE ONLY (CIrcle)			(1)
CELENT: ERM CONTOURNED		(Standard TAT may be longer for some tests e.g	Non Standard or urgent TAT (List due data):		Custody Seal Intact?	Yes	Q.	₹)
	PROJECT NO.: \$190512	ALS QUOTE NO		COC SEQUENCE NUMBER (Girele)	Free ice / flozen ice bricks present upon receipt?	Yes	S.	Š.
PURCHASE ORDER:		COUNTRY OF ORIGIN:		coc: (i) 2 3 4 5 6 7	Random Sample Temperature on Receipt:	~	, D	
	CONTACT PH: 0477702413	477702413	12	OF: ③ 2 3 4 5 6 7	6 7 Other comment:			
PROJECT MANAGER: Paul Gibbons				,	SOUND HAND BY:	RECEIVED BY:		
SAMPLER: Henry Noakes / Kaitiyn Brodie	SAMPLER MOB	SAMPLER MOBILE: 0401881447	RELINQUISHED BY:					
COC Emailed to ALS? ( YES )	EDD FORMAT (or default):	or default):	Kaitlyn Brodle	です。ナスクリ				
Email Reports to: pglbbons@emmeonsulting.com.au; dcondon@emmconsulting.com.au; kbrodia@emmconsulting.com.au	ng.com.au; kbrodla@emmconsulting	.com.au	DATE/TIME:	_	DATE/TIME: DA	DATE/TIME:		
Fmail Invoice to: accounts@emmconsulting.com.au, pgibbons@emmconsulting.com.au	m.au		26/08/2020	26181631760				
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COMMENTS/SPECIAL HAND	SISPECIAL HANDLING/STORAGE OR DISPOSAL:			
			(ex) the critical policy of property of the community of	
			ANALYSIS REQUIRED Including suit ES (NE. Suite Codes fillus de listed de suite proc)	Additional Information
ALS USE ONLY	. SAMPLE DETAILS	CONTAINER INFORMATION	Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).	
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	Additional Information	Comments on likely contaminant levels, dilutions, o	ES2030077					
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		1	MATRIX	OM oqu	רַנוּ	).	<b>∑</b>	),
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	SAMPLE DETAILS MATRIX: Solid(S) Water(W)		DATE / TIME	00.00	Z4108Z0Z0 10.30	24/08/2020 9:50	24/08/2020 10:50	
	SAMPLE MATRIX: Sol		•		a		~	
			SAMPLEID		USM-M12D	UGM-M128	CHARLE	DISPLACIO
	ALS USE ONLY		CABID	-	3		<i>(</i> 1	Ď.

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Water Container Codes: P = Unpreserved Pleatic; NR = Nitric Preserved CRC; SH = Sodium Hydroxide Preserved Pleatic; AC = Aniber Glass: Unpreserved Pleatic; NP = Nitric Preserved Pleatic; OR = Nitric Preserved CRC; SH = Sodium Hydroxide Preserved Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Nitric Preserved Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Sodium Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic; NP = Hydroxide Pleatic

Form Page 1 of 1



## CERTIFICATE OF ANALYSIS

**Environmental Division Sydney** Customer Services ES : 1 of 8 Laboratory Contact **EMM CONSULTING PTY LTD** PAUL GIBBONS ES2030077 **Work Order** Contact

277-289 Woodpark Road Smithfield NSW Australia 2164 Address Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065

26-Aug-2020 19:00 +61-2-8784 8555 28-Aug-2020 Date Analysis Commenced Date Samples Received Telephone S190512 Balranald T3 Ancillary

C-O-C number

Sampler

Order number

Telephone

Project

Address

Client

: 10-Sep-2020 17:05 Issue Date

Henry Noakes / Kaitlyn Brodie EN/112/18 - Primary work only No. of samples analysed No. of samples received Quote number

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. 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.

ignatories nkit Joshi shesh Patel celine Conceicao dwandy Fadjar	Position Inorganic Chemist Senior Chemist Senior Spectroscopist Organic Coordinator	Accreditation Category Sydney Inorganics, Smithfield, NSW Sydney Inorganics, Smithfield, NSW Sydney Inorganics, Smithfield, NSW Sydney Organics, Smithfield, NSW
	Metals Teamleader	Radionuclides, Fyshwick, ACT



General Comments

In house developed procedures 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. 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

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

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. Key:

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.

EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.

EG020/ED093: LOR's have been raised due to matrix interference. (High Total Dissolved Solids)

EG035: Poor matrix spike recovery was obtained for Mercury on sample ES2030077 # 2. Confirmed by re-analysis.

EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory.

LOR for Gross Alpha and Gross Beta raised due to high solid content.

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.



Project Client

: 3 of 8 : ES2030077 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

Page Work Order

Sub-Matrix: WATER		Clie	Client sample ID	UGM-M12D	UGM-M12S	BH-M21D	BH-M21S	BH-M24D
	Clie	ent samplin	Client sampling date / time	24-Aug-2020 10:30	24-Aug-2020 09:50	24-Aug-2020 10:50	24-Aug-2020 11:10	24-Aug-2020 12:15
Compound	CAS Number	LOR	Unit	ES2030077-001	ES2030077-002	ES2030077-003	ES2030077-004	ES2030077-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L		7	\	<b>\</b>	
Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L		7	1>	<b>\</b>	
Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	403	325	416	354	426
Total Alkalinity as CaCO3		7-	mg/L	403	325	416	354	426
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	y DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3560	4600	3630	4360	3840
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	-	mg/L	20200	25500	20300	23700	20300
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	-	mg/L	503	602	522	639	260
Magnesium	7439-95-4	-	mg/L	1340	1540	1440	1470	1360
Sodium	7440-23-5	-	mg/L	10600	14000	11400	13000	10800
Potassium	7440-09-7	-	mg/L	38	26	40	26	40
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	<0.010	0.012	<0.010
Copper	7440-50-8	0.001	mg/L	<0.010	0.011	<0.010	<0.010	0.467
Nickel	7440-02-0	0.001	mg/L	<0.010	0.018	<0.010	0.018	<0.010
Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Zinc	7440-66-6	0.005	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L				<0.010	<0.010
Cadmium	7440-43-9	0.0001	mg/L				<0.0010	<0.0010
Chromium	7440-47-3	0.001	mg/L				0.014	<0.010
Copper	7440-50-8	0.001	mg/L				<0.010	0.657
Nickel	7440-02-0	0.001	mg/L				0.020	<0.010
Lead	7439-92-1	0.001	mg/L				<0.010	<0.010
Zinc	7440-66-6	0.005	mg/L				<0.052	<0.052
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS	S							
Mercury	7439-97-6	0.0001	mg/L				<0.0001	<0.0001
EG051G: Ferrous Iron by Discrete Analyser								



Client Project

EMM CONSULTING PTY LTD S190512 Balranald T3 Ancillary

: 4 of 8 : ES2030077

Work Order

24-Aug-2020 12:15 ES2030077-005 BH-M24D Result ٥.1 م 24-Aug-2020 11:10 ES2030077-004 **BH-M21S** Result <0.05 <0.1 24-Aug-2020 10:50 ES2030077-003 BH-M21D Result 3.08 ۸ 1.0 24-Aug-2020 09:50 ES2030077-002 UGM-M12S Result <0.05 . 0. 24-Aug-2020 10:30 ES2030077-001 UGM-M12D Result 1.62 5. Client sample ID Client sampling date / time mg/L mg/L Unit LOR 0.05 0.1 18496-25-8 CAS Number EG051G: Ferrous Iron by Discrete Analyser - Continued EK085M: Sulfide as S2-Sub-Matrix: WATER (Matrix: WATER) Sulfide as S2-Ferrous Iron Compound

661 611 3.96

719

99/

656 641 1.16

822 766 3.47

597

med/L

%

0.01

med/L

0.01

1 1 1

EN055: Ionic Balance Ø Total Anions

Ø Total Cations Ø Ionic Balance

652

2.42

<0.96

1 1

Bq/L

Bq/L

0.05

EA250CA: Gross Alpha and Beta Activity

Gross beta activity - 40K

Gross alpha



Project Client

: 5 of 8 : ES2030077 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

Page Work Order

Sub-Matrix: WATER		Clier	Client sample ID	BH-M24S	TS	<b>TB</b>	QA305	TS
	Cli	ent samplin	Client sampling date / time	24-Aug-2020 11:10	31-Jul-2020 00:00	29-Jul-2020 00:00	24-Aug-2020 00:00	03-Aug-2020 00:00
Compound	CAS Number	LOR	Unit	ES2030077-006	ES2030077-007	ES2030077-008	ES2030077-009	ES2030077-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	۲>				
Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	-1>		-		
Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	346				
Total Alkalinity as CaCO3	-	-	mg/L	346				
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	Ψ							
Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	4120				
ED045G: Chloride by Discrete Analyser								
	16887-00-6	-	mg/L	22400				
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	-	mg/L	298				
Magnesium	7439-95-4	-	mg/L	1350				
Sodium	7440-23-5	-	mg/L	12600				-
Potassium	7440-09-7	-	mg/L	26		-		
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.010				-
Cadmium	7440-43-9	0.0001	mg/L	<0.0010				
Chromium	7440-47-3	0.001	mg/L	<0.010				
Copper	7440-50-8	0.001	mg/L	<0.010				-
Nickel	7440-02-0	0.001	mg/L	<0.010				
Lead	7439-92-1	0.001	mg/L	<0.010				
Zinc	7440-66-6	0.005	mg/L	<0.050				-
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L				<0.001	
Cadmium	7440-43-9	0.0001	mg/L				<0.0001	-
Chromium	7440-47-3	0.001	mg/L				<0.001	
Copper	7440-50-8	0.001	mg/L				<0.001	-
Nickel	7440-02-0	0.001	mg/L			-	<0.001	
Lead	7439-92-1	0.001	mg/L				<0.001	
Zinc	7440-66-6	0.005	mg/L			-	<0.005	
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001				
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L		-		<0.0001	
EG051G: Ferrous Iron by Discrete Analyser								



EMM CONSULTING PTY LTD S190512 Balranald T3 Ancillary

6 of 8 ES2030077

Work Order

Client Project

03-Aug-2020 00:00 ES2030077-010 Result 99.9 112 106 l I l 1 l I l l 24-Aug-2020 00:00 ES2030077-009 QA305 Result l -1 | 1 | | | 1 -1 | 1 29-Jul-2020 00:00 ES2030077-008 Result 13 122 l l 1 l V 7 7 7 ۲ 7 V **%** 31-Jul-2020 00:00 ES2030077-007 Result 2 96.4 84.8 l l 1 ı 24-Aug-2020 11:10 ES2030077-006 BH-M24S Result 23.2 724 2.47 0.2 i i l l l Client sample ID Client sampling date / time med/L med/L mg/L mg/L Unit hg/L hg/L hg/L hg/L hg/L hg/L hg/L % % % % LOR 0.05 0.01 0.01 0.1 0.01 2 7 N 7 N 2 N 0 91-20-3 108-88-3 100-41-4 2037-26-5 460-00-4 18496-25-8 17060-07-0 CAS Number 71-43-2 108-38-3 106-42-3 95-47-6 EG051G: Ferrous Iron by Discrete Analyser - Continued EP080S: TPH(V)/BTEX Surrogates EK085M: Sulfide as S2-4-Bromofluorobenzene 1.2-Dichloroethane-D4 EN055: Ionic Balance meta- & para-Xylene Sub-Matrix: WATER (Matrix: WATER) **EP080: BTEXN** Sulfide as S2-Ø Total Cations Ø Ionic Balance Ethylbenzene ^ Total Xylenes A Sum of BTEX Ø Total Anions ortho-Xylene Naphthalene Ferrous Iron Toluene-D8 Compound Benzene Toluene



Client Project

EMM CONSULTING PTY LTD S190512 Balranald T3 Ancillary

: 7 of 8 : ES2030077

Page Work Order

1 I 1 ŀ | | | İ | | | | l İ l l | | | İ 1 1 1 l 30-Jul-2020 00:00 ES2030077-011 Result 82.9 4 t 4 t ς, 7 7 7 7 V \$ Client sample ID Client sampling date / time Unit hg/L hg/L hg/L hg/L hg/L µg/L µg/L % % % LOR 7 7 2 7 0 N 2 0 95-47-6 91-20-3 17060-07-0 71-43-2 2037-26-5 460-00-4 CAS Number 108-88-3 100-41-4 108-38-3 106-42-3 EP080S: TPH(V)/BTEX Surrogates 1.2-Dichloroethane-D4 4-Bromofluorobenzene meta- & para-Xylene Sub-Matrix: WATER (Matrix: WATER) **EP080: BTEXN** Ethylbenzene ^ Total Xylenes ortho-Xylene A Sum of BTEX Naphthalene Toluene-D8 Compound Benzene Toluene



: 8 of 8 : ES2030077 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary Project

Page Work Order

Client

Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	Limits (%)
Compound	CAS Number	Том	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	7.1	137
Toluene-D8	2037-26-5	62	131
4-Bromofluorobenzene	460-00-4	70	128



## QUALITY CONTROL REPORT

**Environmental Division Sydney** Customer Services ES : 1 of 7 Laboratory Contact **EMM CONSULTING PTY LTD** PAUL GIBBONS ES2030077 **Work Order** Contact 277-289 Woodpark Road Smithfield NSW Australia 2164 Address Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065

Address

Client

+61-2-8784 8555 28-Aug-2020 10-Sep-2020 26-Aug-2020 Date Analysis Commenced Date Samples Received Telephone Issue Date S190512 Balranald T3 Ancillary : Henry Noakes / Kaitlyn Brodie EN/112/18 - Primary work only No. of samples analysed No. of samples received C-O-C number Quote number Order number Telephone Sampler Project

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full. This Quality Control Report contains the following information:

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

- 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.

Accreditation Category	Sydney Inorganics, Smithfield, NSW	Sydney Inorganics, Smithfield, NSW	Sydney Inorganics, Smithfield, NSW	Sydney Organics, Smithfield, NSW	Radionuclides, Fyshwick, ACT
Position	Inorganic Chemist	Senior Chemist	Senior Spectroscopist	Organic Coordinator	Metals Teamleader
Signatories	Ankit Joshi	Ashesh Patel	Celine Conceicao	Edwandy Fadjar	Titus Vimalasiri



 Page
 : 2 of 7

 Work Order
 : ES2030077

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512 Balranald T3 Ancillary

### General Comments

In house developed procedures 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. 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 primary

Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot 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

RPD = Relative Percentage Difference

# = Indicates failed QC

### Laboratory Duplicate (DUP) Report

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

Sub-Matrix: WATER						Laboratory I	Laboratory Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA250CA: Gross Alp	EA250CA: Gross Alpha and Beta Activity (QC Lot: 3241421)	ot: 3241421)						-	
EM2014666-024	Anonymous	EA250: Gross alpha		0.05	Bq/L	2.45	1.42	53.3	No Limit
		EA250: Gross beta activity - 40K	-	0.1	Bq/L	<2.15	2.27	5.55	No Limit
ED037P: Alkalinity b	ED037P: Alkalinity by PC Titrator (QC Lot: 3230444)	9444)							
ES2030077-004	BH-M21S	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	۲	Ÿ	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	_	mg/L	٧	V	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	354	349	1.57	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	-	-	mg/L	354	349	1.57	0% - 20%
ES2029950-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	٧	<u>\</u>	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	٧	V	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	_	mg/L	969	694	0.289	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	1	-	mg/L	969	694	0.289	0% - 20%
ED041G: Sulfate (Tu	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3228751)	A (QC Lot: 3228751)							
ES2030109-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	_	mg/L	148	142	3.88	0% - 20%
ES2030077-001	UGM-M12D	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	_	mg/L	3560	3540	0.598	0% - 20%
ED045G: Chloride by	ED045G: Chloride by Discrete Analyser (QC Lot: 3228746)	t: 3228746)							
ES2030077-001	UGM-M12D	ED045G: Chloride	16887-00-6	-	mg/L	20200	21500	5.84	0% - 20%
ES2029935-001	Anonymous	ED045G: Chloride	16887-00-6	_	mg/L	2	2	0.00	No Limit
ED093F: Dissolved N	ED093F: Dissolved Major Cations (QC Lot: 3241128)	1128)						=	
ES2030077-001	UGM-M12D	ED093F: Calcium	7440-70-2	_	mg/L	503	525	4.25	0% - 20%
		ED093F: Magnesium	7439-95-4	-	mg/L	1340	1380	2.87	0% - 20%
		ED093F: Sodium	7440-23-5	-	mg/L	10600	11100	4.44	0% - 20%
		ED093F: Potassium	7440-09-7	-	mg/L	38	40	5.01	0% - 20%
ES2031164-005	Anonymous	ED093F: Calcium	7440-70-2	-	mg/L	2	2	0.00	No Limit
		ED093F: Magnesium	7439-95-4	_	mg/L	10	10	0.00	No Limit



EMM CONSULTING PTY LTD S190512 Balranald T3 Ancillary

ES2030077

Work Order

Client Project

3 of 7

Recovery Limits (%) 0% - 20% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.00 33.0 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Laboratory Duplicate (DUP) Report Original Result Duplicate Result <0.010 <0.010 <0.010 <0.010 <0.010 <0.050 <0.0001 <0.001 <0.001 <0.005 <0.0010 <0.010 <0.010 <0.010 <0.0001 <0.001 <0.0001 <0.0001 <0.0010 <0.052 <0.001 <0.005 <0.001 <0.001 0.014 <0.001 <0.001 0.014 <0.001 <0.0001 <0.0001 0.001 48 2 <0.0001 <0.0010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.0001 <0.0010 <0.010 <0.010 <0.0001 <0.0001 <0.050 <0.001 <0.001 <0.001 <0.005 <0.052 <0.001 <0.001 0.014 <0.001 <0.001 <0.005 <0.0001 <0.0001 <0.001 0.001 0.020 <0.001 47 2 mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit 0.0001 0.0001 0.0001 0.001 0.001 0.001 0.005 0.001 0.001 0.001 0.005 0.001 0.001 0.005 0.001 0.001 0.0001 0.0001 0.0001 0.001 0.001 0.001 0.0001 0.001 0.001 0.001 0.005 0.001 0.001 0.001 0.0001 LOR \_ <del>-</del> 7439-97-6 7439-97-6 7439-97-6 7440-43-9 7440-66-6 7439-97-6 7440-43-9 7440-02-0 7440-66-6 7440-43-9 7440-43-9 CAS Number 7440-23-5 7440-09-7 7440-38-2 7440-47-3 7440-50-8 7440-66-6 7440-38-2 7440-47-3 7440-50-8 7439-92-1 7440-02-0 7440-47-3 7440-50-8 7440-02-0 7440-38-2 7440-47-3 7440-50-8 7439-92-1 7440-02-0 7440-66-6 7439-92-1 7439-92-1 EG020A-F: Chromium EG020A-F: Chromium EG020A-T: Chromium EG020A-T: Cadmium EG020A-T: Chromium EG020A-F: Cadmium EG020A-F: Cadmium EG020A-T: Cadmium ED093F: Potassium EG020A-F: Arsenic EG020A-F: Arsenic EG020A-T: Arsenic EG020A-T: Arsenic EG020A-F: Copper EG020A-F: Copper EG020A-T: Copper EG020A-T: Copper EG020A-F: Nickel EG020A-F: Nickel EG020A-T: Nickel EG020A-T: Nickel EG035F: Mercury EG035T: Mercury EG035T: Mercury ED093F: Sodium EG035F: Mercury ED093F: Dissolved Major Cations (QC Lot: 3241128) - continued EG020A-F: Lead EG020A-F: Lead EG020A-F: Zinc EG020A-F: Zinc EG020A-T: Lead EG020A-T: Zinc EG020A-T: Lead EG020A-T: Zinc EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3243391) EG051G: Ferrous Iron by Discrete Analyser (QC Lot: 3229847) EG020F: Dissolved Metals by ICP-MS (QC Lot: 3241130) EG035F: Dissolved Mercury by FIMS (QC Lot: 3241129) EG020T: Total Metals by ICP-MS (QC Lot: 3243386) Client sample ID Anonymous Anonymous UGM-M12D Anonymous Anonymous Anonymous BH-M21D **BH-M21S** QA305 Laboratory sample ID Sub-Matrix: WATER ES2031164-005 ES2031055-008 ES2030077-001 ES2030077-003 ES2030909-004 ES2030077-009 ES2031118-001 ES2031164-001 ES2030077-004



EMM CONSULTING PTY LTD S190512 Balranald T3 Ancillary

ES2030077

Work Order

Client Project

: 4 of 7

Recovery Limits (%) 0% - 20% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.889 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Laboratory Duplicate (DUP) Report Original Result Duplicate Result <0.05 3.11 <0.1 40.1 √ ° 7 7 27 5 ž 7 2 7 \$ 5 <0.05 3.08 **0**.7 40.1 7 \$ V 7  $^{\circ}_{V}$ ĭ 7 7 7 7 ^5 mg/L mg/L mg/L hg/L hg/L hg/L hg/L hg/L mg/L hg/L hg/L hg/L hg/L Unit 0.05 LOR 0.1 0.1 0 \_ 7 2 2 0 0 0 2 7 N 95-47-6 100-41-4 91-20-3 71-43-2 108-38-3 91-20-3 CAS Number 18496-25-8 18496-25-8 71-43-2 108-88-3 108-38-3 106-42-3 95-47-6 108-88-3 100-41-4 106-42-3 EG051G: Ferrous Iron by Discrete Analyser (QC Lot: 3229847) - continued EP080: meta- & para-Xylene EP080: meta- & para-Xylene EG051G: Ferrous Iron EG051G: Ferrous Iron EP080: Ethylbenzene EK085: Sulfide as S2-EK085: Sulfide as S2-EP080: Ethylbenzene EP080: ortho-Xylene EP080: ortho-Xylene EP080: Naphthalene EP080: Naphthalene EP080: Benzene EP080: Benzene EP080: Toluene EP080: Toluene EK085M: Sulfide as S2- (QC Lot: 3226065) Client sample ID EP080: BTEXN (QC Lot: 3224246) Anonymous Anonymous Anonymous Anonymous BH-M21D BH-M24D Laboratory sample ID Sub-Matrix: WATER ES2029982-001 ES2030077-003 ES2030077-005 ES2030176-005 ES2029568-001 ES2030176-001



: 5 of 7 : ES2030077 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary Page Work Order Client Project

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

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of thi	with	
nrpose	spiked	
The p	matrix	
aration	e free	
e prep	ference	
sampl	n inter	LCS.
andard	know	sessed LCS.
in st	ora	of proc
th all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC	oratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with targe	nic Recovery Limits are based on statistical evaluation of pr
ortions	euce	stical ev
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Blank refers to an analyte free matrix to wh	y contamination	to monitor meth
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ctivity (QCLot: 3241421) (QCLot: 3230444) SO4 2- by DA (QCLot: 322	CAS Number			Donoug	: (		-	
Method: Compound  EA250CA: Gross Alpha and Beta Activity (QCLot: 3241421)  EA250: Gross alpha EA250: Gross beta activity - 40K  ED037P: Alkalinity by PC Titrator (QCLot: 3230444)  ED037-P: Total Alkalinity as CaCO3  ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3228	AS Number			кероп	Spike	Spike Recovery (%)	Recovery	Recovery Limits (%)
EA250CA: Gross Alpha and Beta Activity (QCLot: 3241421) EA250: Gross alpha EA250: Gross beta activity - 40K ED037P: Alkalinity by PC Titrator (QCLot: 3230444) ED037-P: Total Alkalinity as CaCO3 ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3228		LOR	Unit	Result	Concentration	SOT	Low	High
EA250: Gross alpha EA250: Gross beta activity - 40K ED037P: Alkalinity by PC Titrator (QCLot: 3230444) ED037-P: Total Alkalinity as CaCO3 ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3228								
EA250: Gross beta activity - 40K ED037P: Alkalinity by PC Titrator (QCLot: 3230444) ED037-P: Total Alkalinity as CaCO3 ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3228)	-	0.05	Bq/L	<0.05	1751 Bq/L	8.66	95.2	105
ED037P: Alkalinity by PC Titrator (QCLot: 3230444) ED037-P: Total Alkalinity as CaCO3 ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3228	-	0.1	Bq/L	<0.10	-	1	-	-
ED037-P: Total Alkalinity as CaCO3 ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3228								
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3228	-	-	mg/L		200 mg/L	94.2	81.0	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3228				-	50 mg/L	108	70.0	130
	3751)							
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	_	mg/L	7	25 mg/L	102	82.0	122
				7	500 mg/L	108	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 3228746)								
	16887-00-6	_	mg/L	7	10 mg/L	113	80.9	127
				7	1000 mg/L	109	80.9	127
ED093F: Dissolved Major Cations (QCLot: 3241128)								
	7440-70-2	1	mg/L	7	50 mg/L	93.5	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	^	50 mg/L	96.2	0.06	116
ED093F: Sodium 7	7440-23-5	_	mg/L	7	50 mg/L	97.2	82.0	120
ED093F: Potassium 7-	7440-09-7	1	mg/L	7	50 mg/L	95.4	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 3241130)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	94.6	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	92.1	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	88.4	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.4	81.0	111
EG020A-F: Lead 7-	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	91.5	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.8	82.0	112
EG020A-F: Zinc 7-	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	94.4	81.0	117
EG020T: Total Metals by ICP-MS (QCLot: 3243386)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	0.86	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	0.86	84.0	112
EG020A-T: Chromium 7	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	101	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	96.1	83.0	118
EG020A-T: Lead 7	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	6.96	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	93.3	84.0	116
EG020A-T: Zinc 7	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	95.3	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 3241129)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	7.76	83.0	105



: 6 of 7 : ES2030077 : EMM CONSULTING PTY LTD Page Work Order Client

S190512 Balranald T3 Ancillary Project

Slib-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LCS) Report	S) Report	
				Report	Spike	Spike Recovery (%)	Recovery Limits (%)	imits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	S27	Low	High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3243391)	3391)							
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	95.0	77.0	111
EG051G: Ferrous Iron by Discrete Analyser (QCLot: 3229847)	347)							
EG051G: Ferrous Iron	-	0.05	mg/L	<0.05	2 mg/L	103	89.0	117
EK085M: Sulfide as S2- (QCLot: 3226065)								
EK085: Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	0.5 mg/L	102	76.0	116
EP080: BTEXN (QCLot: 3224246)								
EP080: Benzene	71-43-2	_	hg/L	<b>\</b>	10 µg/L	93.3	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	105	0.69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	108	70.0	120
EP080: meta- & para-Xylene	108-38-3	2	hg/L	<2	10 µg/L	107	0.69	121
	106-42-3							
EP080: ortho-Xylene	92-47-6	2	hg/L	<2	10 µg/L	107	72.0	122
EP080: Naphthalene	91-20-3	S	µg/L	<5	10 µg/L	99.3	70.0	120

### 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.

Recovery Limits (%)

Matrix Spike (MS) Report SpikeRecovery(%)

Spike

Sub-Matrix: WATER

Laboratory sample ID Clien	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbid	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3228751)						
ES2030077-001 UGM-	UGM-M12D	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Dis	ED045G: Chloride by Discrete Analyser (QCLot: 3228746)						
ES2029952-001 Anony	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	118	70.0	130
EG020F: Dissolved Meta	EG020F: Dissolved Metals by ICP-MS (QCLot: 3241130)						
ES2030077-004 BH-M21S	A21S	EG020A-F: Arsenic	7440-38-2	10 mg/L	102	70.0	130
		EG020A-F: Cadmium	7440-43-9	2.5 mg/L	98.4	70.0	130
		EG020A-F: Chromium	7440-47-3	10 mg/L	98.6	70.0	130
		EG020A-F: Copper	7440-50-8	10 mg/L	0.66	70.0	130
		EG020A-F: Lead	7439-92-1	10 mg/L	97.8	70.0	130
		EG020A-F: Nickel	7440-02-0	10 mg/L	101	70.0	130
		EG020A-F: Zinc	7440-66-6	10 mg/L	101	70.0	130
EG020T: Total Metals by	EG020T: Total Metals by ICP-MS (QCLot: 3243386)						
ES2030077-005 BH-M24D	/24D	EG020A-T: Arsenic	7440-38-2	1 mg/L	103	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	98.4	70.0	130



: 7 of 7 : ES2030077 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary Page Work Order

Client Project

Sub-Matrix: WATER				Me	Matrix Spike (MS) Report		
				Spike	SpikeRecovery(%)	Recovery Limits (%)	nits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Me	EG020T: Total Metals by ICP-MS (QCLot: 3243386) - continued						
ES2030077-005	BH-M24D	EG020A-T: Chromium	7440-47-3	1 mg/L	98.0	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	6.66	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	94.7	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	104	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	104	70.0	130
EG035F: Dissolve	EG035F: Dissolved Mercury by FIMS (QCLot: 3241129)						
ES2030077-002	UGM-M12S	EG035F: Mercury	7439-97-6	0.01 mg/L	# 49.8	70.0	130
EG035T: Total Re	EG035T: Total Recoverable Mercury by FIMS (QCLot: 3243391)						
ES2031055-001	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	90.1	70.0	130
EG051G: Ferrous	EG051G: Ferrous Iron by Discrete Analyser (QCLot: 3229847)						
ES2029982-001	Anonymous	EG051G: Ferrous Iron		1 mg/L	101	70.0	130
EK085M: Sulfide a	EK085M: Sulfide as S2- (QCLot: 3226065)						
ES2029568-001	Anonymous	EK085: Sulfide as S2-	18496-25-8	0.33 mg/L	100	70.0	130
EP080: BTEXN (QCLot: 3224246)	2CLot: 3224246)						
ES2030176-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	82.8	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	98.0	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	104	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	97.4	70.0	130



# QA/QC Compliance Assessment to assist with Quality Review

**Environmental Division Sydney** +61-2-8784 8555 26-Aug-2020 10-Sep-2020 : 1 of 8 No. of samples analysed Date Samples Received No. of samples received Issue Date Laboratory Telephone S190512 Balranald T3 Ancillary Henry Noakes / Kaitlyn Brodie **EMM CONSULTING PTY LTD** PAUL GIBBONS ES2030077 Order number **Work Order** Contact Sampler Project Client Site

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 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 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 Duplicate outliers occur.
- NO Laboratory Control outliers occur.
- Matrix Spike outliers exist please see following pages for full details.
- For all regular sample matrices, NO surrogate recovery outliers occur.

# Outliers: Analysis Holding Time Compliance

Analysis Holding Time Outliers exist - please see following pages for full details.

# **Outliers: Frequency of Quality Control Samples**

NO Quality Control Sample Frequency Outliers exist.



EMM CONSULTING PTY LTD ES2030077 Work Order Project Client

S190512 Balranald T3 Ancillary

Outliers: Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: WATER

Compound Group Name	Laboratory Sample ID   Client Sample ID	Client Sample ID	Analyte	CAS Number Data	Data	Limits Comment	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2030077001 UGM-M12D	UGM-M12D	Sulfate as SO4 -	14808-79-8 Not	Not	i	MS recovery not determined,
			Turbidimetric		Determined		background level greater than or
							equal to 4x spike level.
EG035F: Dissolved Mercury by FIMS	ES2030077002	UGM-M12S	Mercury	7439-97-6 49.8 %	49.8 %	70.0-130%	Recovery less than lower data quality
							objective

### Outliers: Analysis Holding Time Compliance

Matrix WATED

Malik: WAIER						
Method	Extra	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)	Date extracted Due vor extraction	Due wr extraction	Days overdue	Date analysed	Due vor analysis	Days overdue
EP080: BTEXN						
Amber VOC Vial - Sulfuric Acid						
ТВ	02-Sep-2020 12-Aug-2020	12-Aug-2020	21	02-Sep-2020 12-Aug-2020	12-Aug-2020	21
Amber VOC Vial - Sulfuric Acid						
ТВ	02-Sep-2020 13-Aug-2020	13-Aug-2020	20	02-Sep-2020 13-Aug-2020	13-Aug-2020	20

## 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.

organics 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: 14 days, mercuny 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	: x = Holding time	Evaluation: * = Holding time breach; < = Within holding time.	n holding tim
Method		Sample Date	Ē	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Date extracted Due vor extraction Efaluation Date analysed Due vor analysis Efaluation	Efaluation	Date analysed	Due vor analysis	Efaluation
EA250CA: Gross Alpha and Beta Activity								
Clear Plastic Bottle - Natural (EA250) BH-M21D,	BH-M21S	24-Aug-2020	ŀ	-	-	07-Sep-2020	20-Feb-2021	>
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
UGM-M12D,	UGM-M12S,	24-Aug-2020	1	1	1	31-Aug-2020	07-Sep-2020	>
BH-M21D,	BH-M21S,							
BH-M24D	BH-M24S							



 Page
 : 3 of 8

 Work Order
 : ES2030077

 Client
 : EMM CONSULTING PTY LTD

 Project
 : S190512 Balranald T3 Ancillary

Matrix: WATER					Evaluation	x = Holding time	Evaluation: $\mathbf{x} = \text{Holding time breach}$ : $\checkmark = \text{Within holding time}$ .	n holding time.
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G) UGM-M12D,	UGM-M12S,	24-Aug-2020	1	1	1	31-Aug-2020	21-Sep-2020	>
BH-M21D, BH-M24D,	BH-M21S, BH-M24S							
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)	1.5M.M120	24-4119-2020	i	-		31-4119-2020	21-Sen-2020	`
BH-M21D,	BH-M21S,						)   	>
BH-M24D,	BH-M24S							
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)	O PAN ANOLI	24 Aug 2020				07 800 3030	21-Sep-2020	,
OGM-WIZD, BH-M21D,	OGIN-MIZS, BH-M21S,	0707-504-47				0707-090-10	0202-020-12	>
BH-M24D,	BH-M24S							
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)		0000					T	,
UGM-M12D,	UGM-M12S,	24-Aug-2020	!	-		07-2eb-70	ZU-Feb-ZUZ1	>
BH-M21D, BH-M24D,	BH-M24S							
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)	!			F 000	,		T	,
BH-M21S,	BH-M24D,	24-Aug-2020	08-Sep-2020	Z0-F-eb-Z0Z1	>	08-Sep-2020	ZU-Feb-ZUZ1	>
CONTRACT TO THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF TH								
Clear Plactic Rottle - Nitric Acid: Filtered (FG035F)								
UGM-M12D,	UGM-M12S,	24-Aug-2020	I		-	08-Sep-2020	21-Sep-2020	>
BH-M21D,	BH-M21S,							
BH-M24D,	BH-M24S							
EG035T: Total Recoverable Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)	( ) ( )	0000				0000	0000	,
DA 305	BT-IN/24D,	4-Aug-2020	! ! !			000-00-00	21-365-220	>
000470								
EG051G: Ferrous Iron by Discrete Analyser								
Clear Plastic Bottle - HCI - Filtered (EG051G)						0000	0000	,
UGM-M12D,	UGM-M12S,	24-Aug-2020	!			31-Aug-2020	31-Aug-2020	>
BH-M21D,	BH-M21S,							
BH-M24D,	BH-M24S							



 Page
 : 4 of 8

 Work Order
 : ES2030077

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512 Balranald T3 Ancillary

Matrix: WATER					Evaluation	= Holding time	Evaluation: $x = \text{Holding time breach}$ ; $\checkmark = \text{Within holding time}$ .	holding time.
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Date extracted Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
EK085M: Sulfide as S2-								
Clear Plastic Bottle - Zinc Acetate/NaOH (EK085)								
UGM-M12D,	UGM-M12S,	24-Aug-2020	1	-	-	28-Aug-2020	31-Aug-2020	>
BH-M21D,	BH-M21S,							
BH-M24D,	BH-M24S							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
TB		29-Jul-2020	02-Sep-2020	12-Aug-2020	¥	02-Sep-2020	12-Aug-2020	×
Amber VOC Vial - Sulfuric Acid (EP080)								
TB		30-Jul-2020	02-Sep-2020	13-Aug-2020	×	02-Sep-2020	13-Aug-2020	×



: 5 of 8 : ES2030077 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary Work Order Project Client

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				7	. A I Kuality Co	illol i cyclicy	
Quality Control Sample Type			Count		Rate (%)	ì	Quality Control Specivication
Analytical Methods	Method	OC	Reaular	Actual	Expected	Et aluation	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	7	20	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	7	20	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	7	19	10.53	10.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	41	14.29	10.00	>	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	7	20	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Gross Alpha and Beta Activity	EA250	~	0	11.11	10.00	>	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	7	20	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	7	15	13.33	10.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	2	19	10.53	10.00	>	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	19	10.53	10.00	>	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	7	20	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	_	19	5.26	5.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	_	41	7.14	5.00	>	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	_	20	5.00	5.00	>	NEPM 2013 B3 & ALS QC Standard
Gross Alpha and Beta Activity	EA250	_	6	11.11	10.00	>	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	_	20	5.00	5.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	7	15	13.33	10.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	_	19	5.26	5.00	>	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	_	20	5.00	5.00	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	-	20	5.00	5.00	>	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	_	19	5.26	5.00	>	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	-	20	5.00	2.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	_	19	5.26	5.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	_	41	7.14	5.00	>	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	_	20	5.00	5.00	>	NEPM 2013 B3 & ALS QC Standard
Gross Alpha and Beta Activity	EA250	_	6	11.11	5.00	>	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	_	20	5.00	2.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	_	15	6.67	5.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	1	19	5.26	5.00	>	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	-	20	5.00	2.00	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	_	20	2.00	5.00	>	NEPM 2013 B3 & ALS QC Standard



 Page
 : 6 of 8

 Work Order
 : ES2030077

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512 Balranald T3 Ancillary

Matrix: WATER				Evaluation	n: x = Quality Co	ntrol frequency n	Evaluation: x = Quality Control frequency not within specification; < = Quality Control frequency within specification.
Quality Control Sample Type		S	Count		Rate (%)		Quality Control Specivication
Analytical Methods	Method	OC	Reaular	Actual	Expected	Ef aluation	
Method Blanks (MB) - Continued							
TRH Volatiles/BTEX	EP080	-	19	5.26	2.00	>	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	-	20	5.00	2.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	~	19	5.26	2.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	~	41	7.14	5.00	>	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	-	20	5.00	2.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	~	15	6.67	2.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	~	19	5.26	2.00	>	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	_	20	5.00	5.00	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	-	20	5.00	2.00	>	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	-	19	5.26	2.00	>	NEPM 2013 B3 & ALS QC Standard



 Page
 : 7 of 8

 Work Order
 : ES2030077

 Client
 : EMIM CONSULTING PTY LTD

 Project
 : S190512 Balranald T3 Ancillary

**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
Gross Alpha and Beta Activity	EA250	WATER	ASTM D7283-06: Determination of gross alpha and gross beta radioactivity in water samples by Liquid Scintillation Counting (LSC).
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA seal method 2 017-1-L
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
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.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(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 SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).



: 8 of 8 : ES2030077 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary Page Work Order Client Project

Analytical Methods	Method	Matrix	Method Descriptions
Ferrous Iron by Discrete Analyser	EG051G	WATER	In house: Referenced to APHA 3500 Fe-B. A colorimetric determination based on the reaction between phenanthroline and ferrous iron at pH 3.2-3.3 to form an orange-red complex that is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3).
Sulfide as S2-	EK085	WATER	In house: Referenced to APHA 4500-S2- D. Sulfide species present in water samples are immediately precipitated when collected in pretreated caustic/zinc acetate preserved sample containers. The sulphides are coloured using methylene blue indicator. Non-detects may be screened by comparison against a standard at half-LOR, otherwise samples are measured using UV-VIS detection at 664nm. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. 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)
Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

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tee / teebricks / NA



### Scott Huett

From:

Shane Colley

Sent:

Thursday, 17 September 2020 3:25 PM

To:

Samples Melbourne

Subject:

FW: [EXTERNAL] - Please help

**Attachments:** 

EM2014666\_COC.pdf

Follow Up Flag:

Follow up

Flag Status:

Flagged

**Categories:** 

Client amendment

Hi guys

Can you check if we still have any of the bottles for EM2014666 – 32 + 33? Green, yellow sulphide, ferrous iron, metals and metals filtered (MG1818-20+25, MM184-86, MR 440-42). If so, can they be forwarded to Eurofins to be analysed at per the attached COC? Let me know.

Regards,

### **Shane Colley**

Client Services Officer - Springvale Environmental



T +61 3 8549 9600 D +61 3 8549 9613 shane.colley@alsglobal.com
2-4 Westall Rd
Springvale VIC 3171
AUSTRALIA





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From: Kaitlyn Brodie <kbrodie@emmconsulting.com.au>

Sent: Thursday, 17 September 2020 3:18 PM
To: Shane Colley <shane.colley@ALSGlobal.com>
Cc: Dan Condon <dcondon@emmconsulting.com.au>

Subject: [EXTERNAL] - Please help

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Reling by Milla 17/09



Just to clarify my earlier request...

In August I forgot to request samples QA101 and QA201 from 23/08/2020 to be forwarded to Enviro Lab for a full suite analysis. If the samples are still available could you please forward them to Enviro Lab now for a full analysis (COC attached). If there isn't enough sample to do a full suite, just the metals is fine.

Secondly, I have been sampling PSD\_01 and PSD\_02 for Particle Sizing in Water by Laser Diffraction (EA154) since 11/09/2020 and will continue to sample daily until approximately 11/10/2020. Is it possible to keep the results of PSD\_01 and PSD\_02 on a separate report?

Thanks for your help, let me know if you need any more details.

Kaitlyn

### Kaitlyn Brodie

Hydrogeologist



T 02 9493 9500

M 0401 881 447

in Connect with us

SYDNEY | Ground floor, 20 Chandos Street, St Leonards NSW 2065



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Reling by Miliha 17/09



**Envirolab Services Pty Ltd** 

ABN 37 112 535 645 - 002 25 Research Drive Croydon South VIC 3136 ph 03 9763 2500 fax 03 9763 2633 melbourne@envirolab.com.au www.envirolab.com.au

### **CERTIFICATE OF ANALYSIS 22545**

Client Details	
Client	EMM
Attention	Paul Gibbons
Address	187 Coventry Street, South Melbourne, VIC, 3205

Sample Details	
Your Reference	<u>\$190512</u>
Number of Samples	2 WATER
Date samples received	17/09/2020
Date completed instructions received	17/09/2020

### **Analysis Details**

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details				
Date results requested by	24/09/2020			
Date of Issue	24/09/2020			
NATA Accreditation Number 2901. This document shall not be reproduced except in full.				
Accredited for compliance with ISO/IEO	C 17025 - Testing. Tests not covered by NATA are denoted with *			

**Results Approved By** 

Chris De Luca, Operations Manager

**Authorised By** 

Pamela Adams, Laboratory Manager



HM in water - dissolved			
Our Reference		22545-1	22545-2
Your Reference	UNITS	QA101	QA201
Date Sampled		23/08/2020	23/08/2020
Type of sample		WATER	WATER
Date prepared	-	21/09/2020	21/09/2020
Date analysed	-	21/09/2020	21/09/2020
Arsenic-Dissolved	μg/L	<1	<1
Cadmium-Dissolved	μg/L	<0.2	<0.2
Chromium-Dissolved	μg/L	3	3
Copper-Dissolved	μg/L	130	120
Lead-Dissolved	μg/L	<1	<1
Nickel-Dissolved	μg/L	9	8
Zinc-Dissolved	μg/L	35	32
Mercury-Dissolved	μg/L	<0.05	<0.05

Miscellaneous Inorganics			
Our Reference		22545-1	22545-2
Your Reference	UNITS	QA101	QA201
Date Sampled		23/08/2020	23/08/2020
Type of sample		WATER	WATER
Date prepared	-	23/09/2020	23/09/2020
Date analysed	-	23/09/2020	23/09/2020
Sulphide	mg/L	<0.5	<0.5
Ferrous Iron	mg/L	<0.05	<0.05

Ion Balance			
Our Reference		22545-1	22545-2
Your Reference	UNITS	QA101	QA201
Date Sampled		23/08/2020	23/08/2020
Type of sample		WATER	WATER
Date prepared	-	21/09/2020	21/09/2020
Date analysed	-	21/09/2020	21/09/2020
Calcium - Dissolved	mg/L	650	620
Potassium - Dissolved	mg/L	34	34
Sodium - Dissolved	mg/L	13,000	13,000
Magnesium - Dissolved	mg/L	1,700	1,600
Hydroxide Alkalinity (OH-) as CaCO <sub>3</sub>	mg/L	<5	<5
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	270	270
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	<5	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	270	270
Sulphate, SO4	mg/L	5,100	4,900
Chloride, Cl	mg/L	25,000	25,000
Hardness	mgCaCO3/L	8,700	8,200
Ionic Balance	%	-4.1	-4.6

Method ID	Methodology Summary
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 10% ie total anions = total cations +/-10%.
Inorg-051	Sulphide determined titrimetrically based on APHA latest edition 4500 S2- F. Note, the Sulphide is termed as Total Sulphide given any Sulphide contained in any sediment present may also included in the determination.
Inorg-076	A sample is determined colourimetrically by discrete analyser as referenced in APHA 3500 Fe-B (phenanthroline method). Water samples are filtered on receipt prior to analysis.
Inorg-087	Chloride by colourimetry using Discrete Analyser
Inorg-115	Sulphate by turbidity using Discrete Analyser
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.

QUALITY CO		Du	Spike Recovery %							
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			21/09/2020	[NT]		[NT]	[NT]	21/09/2020	
Date analysed	-			21/09/2020	[NT]		[NT]	[NT]	21/09/2020	
Arsenic-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	[NT]		[NT]	[NT]	109	
Cadmium-Dissolved	μg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]		[NT]	[NT]	109	
Chromium-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	[NT]		[NT]	[NT]	106	
Copper-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	[NT]		[NT]	[NT]	107	
Lead-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	[NT]		[NT]	[NT]	107	
Nickel-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	[NT]		[NT]	[NT]	110	
Zinc-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	[NT]		[NT]	[NT]	110	
Mercury-Dissolved	μg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]		[NT]	[NT]	100	

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			23/09/2020	[NT]		[NT]	[NT]	23/09/2020	
Date analysed	-			23/09/2020	[NT]		[NT]	[NT]	23/09/2020	
Sulphide	mg/L	0.5	Inorg-051	<0.5	[NT]		[NT]	[NT]	82	
Ferrous Iron	mg/L	0.05	Inorg-076	<0.05	[NT]		[NT]	[NT]	112	

QUALI	QUALITY CONTROL: Ion Balance								Spike Red	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			21/09/2020	[NT]		[NT]	[NT]	21/09/2020	
Date analysed	-			21/09/2020	[NT]		[NT]	[NT]	21/09/2020	
Calcium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	89	
Potassium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	92	
Sodium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	85	
Magnesium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	88	
Hydroxide Alkalinity (OH-) as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	107	
Carbonate Alkalinity as CaCO₃	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	107	
Sulphate, SO4	mg/L	1	Inorg-115	<1	[NT]		[NT]	[NT]	100	
Chloride, Cl	mg/L	1	Inorg-087	<1	[NT]		[NT]	[NT]	111	

Result Definiti	ons
NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

<b>Quality Contro</b>	ol Definitions
Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

### **Laboratory Acceptance Criteria**

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Reference: 22545

Revision No: R00

Page | 10 of 11

### **Report Comments**

Sulphide analysed by Envirolab Sydney, report number 251656.

Sulphide, Ferrous Iron, Alkalinity have exceeded the recommended technical holding times, Envirolab Group Form 347 "Recommended Preservation and Holding Times" can be provided on request (available on the Envirolab website)

METALS: The PQL has been raised for Cadmium due to the sample matrix requiring dilution.

Envirolab Reference: 22545
Revision No: R00
Page | 11 of 11

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**Environmental Division** Melbourne

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T +61 3 8549 9600 D +61 3 8549 9613 <u>shane.colley@alsglobal.com</u> 2-4 Westall Rd Springvale VIC 3171 AUSTRALIA



ALS Compass - Webinars running 9-11 September | Register now Right Solutions - Right Partner www.alsglobal.com

From: Kaitlyn Brodie < kbrodie@emmconsulting.com.au>

Sent: Sunday, 13 September 2020 3:22 PM

To: ALS Enviro Melbourne <<u>ALSEnviroMelbourne@ALSGlobal.com</u>>; Shane Colley <<u>shane.colley@ALSGlobal.com</u>> Cc: Dan Condon <<u>dcondon@emmconsulting.com.au</u>>; Bill Bull <<u>bull@emmconsulting.com.au</u>>; Joel Georgiou

<jgeorgiou@emmconsulting.com.au>; Paul Gibbons <pgibbons@emmconsulting.com.au>

Subject: [EXTERNAL] - COC for 4 eskys - S190512

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Good afternoon,

Attached is the COC for job number \$190512.

4 eskys will be posted tomorrow (14/09/2020) and should arrive by Tuesday at the latest.

Let me know if you have any questions.

Thanks

Kaitlyn

### Kaitlyn Brodie



T 02 9493 9500

M 0401 881 447

in Connect with us

SYDNEY | Ground floor, 20 Chandos Street, St Leonards NSW 2065



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### **Gemma Smeaton**

-						
-	r	o	r	*	٠	•
		v		ш	в	•

Kaitlyn Brodie <kbrodie@emmconsulting.com.au>

Sent:

Monday, 14 September 2020 5:52 PM

To:

ALS Enviro Melbourne; Shane Colley

Cc:

Dan Condon; Bill Bull; Joel Georgiou; Paul Gibbons

Subject:

[EXTERNAL] - RE: COC for 4 eskys - S190512

Attachments:

COC S190512 20200914.xlsx; RE: [EXTERNAL] - FW: Particle Size Distribution Testing

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Hi Shane and team,

Attached is an updated COC. PSD\_01 and PSD\_02 samples need to be analysed for laser particle sizing.

Could you please advise the code number?

Thank you sorry for the last minute change

Kaitlyn

### Kaitlyn Brodie

Hydrogeologist

M 0401 881 447

www.emmconsulting.com.au

From: Kaitlyn Brodie

Sent: Sunday, 13 September 2020 3:22 PM

To: alsenviro.melbourne@alsglobal.com; Shane Colley <shane.colley@ALSGlobal.com>

Cc: Dan Condon <dcondon@emmconsulting.com.au>; Bill Bull <bbull@emmconsulting.com.au>; Joel Georgiou

<jgeorgiou@emmconsulting.com.au>; Paul Gibbons <pgibbons@emmconsulting.com.au>

Subject: COC for 4 eskys - \$190512

Good afternoon,

Attached is the COC for job number \$190512.

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Let me know if you have any questions.

Thanks

Kaitlyn

### Kaitlyn Brodie

Hydrogeologist



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## CERTIFICATE OF ANALYSIS

**Environmental Division Melbourne** 

: 1 of 12

 Work Order
 : E2 037NBNBLAA
 Page

 Client
 : E2 2 CONSGLTINP DTY LTi
 Laboratory

 Contact
 : PAUL GIBBONS
 Contact

: 4 Westall Rd Springvale VIC Australia 3171 Shane Colley Address Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065

: 16-Sep-2020 10:15 +61-3-8549 9600 : 17-Sep-2020 Date Analysis Commenced Date Samples Received Telephone S190512

lssue Date : 28-Sep-2020 16:35

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

Accredited for compliance with ISO/IEC 17025 - Testing

This Certificate of Analysis contains the following information:

EN/112/18 - Primary work only

24

No. of samples received No. of samples analysed

Quote number

BB, KB

C-O-C number

Sampler

Order number

Telephone

Project

Address

General Comments

Analytical Results

Surrogate Control Limits

Additional famoriplition heritaean no ristworehorm bitff ue nogad ta rise noffobtac wehline InfOspeanway infiting Coarnof Rehord y Awy C Cophital De Awwewingean no Iwwithin bitris y giftn, Re. teb I ad Siphfe ReCethnNortntCl rtoa^

### 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
Arenie Vijayaratnam	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Titus Vimalasiri	Metals Teamleader	Radionuclides, Fyshwick, ACT



### General Comments

In house developed procedures 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. 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

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

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

Key:

B = 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.

■ EK085: EM2016060-017 required dilution prior to analysis due to matrix interferences. LOR has been raised accordingly.

EP080: Samples EM2016060 018,029 TRIP SPIKE and TRIP SPIKE CONTROL contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory

EG020-T: EM2016060 #2, #4, #7, #13, #14 total metal required dilution prior analysis due to sample matrix. LORs have been adjusted accordingly.

EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR

EG020-T: EM2016060 #19-23 results for total metal have been confirmed by re-digestion and re-analysis.

EG020-F: EM2016060 #1-17 dissolved metal required dilution prior analysis due to sample matrix. LORs have been adjusted accordingly.

EG035T: EM2016060 #4 Poor matrix spike recovery for total mercury due to sample matrix. Confirmed by re-extraction and re-analysis.

lonic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.

LOR for Gross Alpha and Gross Beta raised due to high solid content.

ED045G: The presence of thiocyanate can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly

EK085: EM2016060-002 Poor matrix spike recovery for sulphide due to sample matrix. Confirmed by re-extraction and re-analysis.

EG035T: EM2016060 #7 sample results for total mercury confirmed by re-extraction and re-analysis.

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.



Client Project Sub-Matrix: WATER

Client sample ID

: 3 of 12 : EM2016060-AA : EMM CONSULTING PTY LTD : \$190512

Page Work Order

Sub-Matrix: WATER H/Atrix: WATER-		Clier	Client sample ID	GP 2 L2 7 i	GP 2 L2 7S	GP 2 L2 0i	GP 2 U 0S	GP 2 L2 70i
	Clie	nt samplin	Client sampling date / time	11-Sep-2020 15:00	11-Sep-2020 14:20	12-Sep-2020 15:20	12-Sep-2020 15:00	11-Sep-2020 12:20
Compound	CAS Number	LOR	Unit	E2 037MBMBL337	E2 037NBNBLB30	E2 037MBMBLB3(	E2 037 MBMBLB31	E2 037 NB NB L334
				Result	Result	Result	Result	Result
Ei 3() D: Afkl ftatn, u, DC Ttml ror								
5, droxtde Afkl ftatr, I wCI CO(	DMO-210-001	-	mg/L	7		₹	<b>\</b>	₹
Ciruoal re Afki ftatr, I wCi CO(	3812-32-6	-	mg/L	7	٧	٧	<b>&gt;</b>	٧
6 tG ruoal re Afkl ftatr, I wCl CO(	71-52-3	-	mg/L	0()	(44	(84	OMB	(83
Torl f Afkl ftatr, I wCI CO(	1	-	mg/L	0()	(44	(84	OMB	(83
Ei 317P: Sgfrhre Hgrutdtp errtQ- I wSO1 0Uu, i A	A i							
Sgfrhre I wSO1 UTgrutdtp errtQ	14808-79-8	-	mg/L	(133	1) 33	( MI3	1( NB	(103
Ei 314P: Csfortde u, i tw. Prene Aalf, wer								
Csfortde	16887-00-6	-	mg/L	78(33	0()33	79(33	07033	03433
Ei 39( F: i twof. ed 2 l jor Cl rtoaw								
CIfCigp	7440-70-2	-	mg/L	MOM	803	4) 9	) 10	409
2 I caewtgp	7439-95-4	-	mg/L	7403	7NB3	7473	7MB3	74MB
Sodtgp	7440-23-5	-	mg/L	73833	71333	73) 33	70333	77133
Dorl wwtgp	7440-09-7	-	mg/L	44	1(	40	JW	41
EP 303F: i twoof. ed 2 en fwu, ICDU2 S								
ArweatQ	7440-38-2	0.001	mg/L	<0.002	3.83)	3,830	3.830	<0.002
CI dp tgp	7440-43-9	0.0001	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Csrop tgp	7440-47-3	0.001	mg/L	<0.002	<0.002	<0.002	3.834	<0.002
Cohher	7440-50-8	0.001	mg/L	<0.002	<0.002	<0.002	3.83(	<0.002
NtOkef	7440-02-0	0.001	mg/L	3.830	3.83(	3.830	3.977	<0.002
Leld	7439-92-1	0.001	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
ZtaQ	7440-66-6	0.005	mg/L	<0.010	<0.010	3/31(	<0.010	<0.010
EP 303T: Tonf 2 en fwu, ICDL S								
ArweatQ	7440-38-2	0.001	mg/L	nin	3/339		3.83(	<b>m</b>
CI dp tgp	7440-43-9	0.0001	mg/L	<b>MIN</b>	<0.0002		<0.0002	m
Csrop tgp	7440-47-3	0.001	mg/L	<b>MIN</b>	<0.002		3.873	m
Cohher	7440-50-8	0.001	mg/L		3/330		3.839	m
NtCkef	7440-02-0	0.001	mg/L	<b>MIN</b>	3/334	<b>MM</b>	3.803	m
Peld	7439-92-1	0.001	mg/L	<b>MIN</b>	<0.002	<b>MIN</b>	<0.002	m
ZtaQ	7440-66-6	0.005	mg/L	MIN.	<0.010		<0.010	m
EP3(4F: itwoof.ed 2 erQgr, u, FI2 S								
2 erûgr,	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EP3(4T: TorlfReOp.erlufe 2 erOgr, u, FI2 S	S							
2 erQgr,	7439-97-6	0.0001	mg/L	(III)	<0.0001	<b>TIII</b>	<0.0001	m
EP347P: Ferrogwiroa u, i tworeme Aalf, wer								



Project Client

EMM CONSULTING PTY LTD S190512

: 4 of 12 : EM2016060-AA

Page Work Order

GP 2 L2 7S GP 2 L2 7i Client sample ID

11-Sep-2020 12:20 E2 037 NBNBU34 GP 2 L2 70i Result 3/(8 ₩0 섫 ₹ 12-Sep-2020 15:00 E2 037 MBMBL\$31 GP 2 L2 0S Result <0.05 <0.1 31(7 MB8 **M9** 12-Sep-2020 15:20 E2 037MBMBUB3( GP 2 L2 0i Result 1,00 37MI 34 11-Sep-2020 14:20 E2 037MBMBU330 Result ۸ 1.0 3.01 ) ( ( 11-Sep-2020 15:00 E2 037NBNBU337 Result MQ, O **6**0.1 **W** 0 17 491 Client sampling date / time med/L med/L mg/L mg/L Unit % LOR 0.05 0.01 0.01 0.01 0.1 CAS Number 18496-25-8 | EP347P: Ferrogwlroa u, i tworene Aal f, wer UCoartaged EK3842 : Sgfrtde I wS0U EN344: loatQ61 fl aQe & Torl f Aatoaw Sub-Matrix: WATER HMatrix: WATER-Sgfrtde I wS0U Ø Torl fCl rtoaw Ø loatQ6I fl a Qe Ferrogwiroa Compound



Project Client

: 5 of 12 : EM2016060-AA : EMM CONSULTING PTY LTD : \$190512

Page Work Order

Sub-Matrix: WATER H/latrix: WATER-		Clier	Client sample ID	GP 2 L2 70S	GP 2 L 74S	65 L2 7M	6 5 L2 7 NS	65 L2 07i
	Clie	ent samplin	Client sampling date / time	11-Sep-2020 12:40	12-Sep-2020 08:15	11-Sep-2020 09:45	11-Sep-2020 10:30	11-Sep-2020 13:15
Compound	CAS Number	LOR	Unit	E2 037MBMBL33M	E2 037MBMBU33)	E2 037MBMBLB38	E2 037 NBNBU39	E2 037 NB NB LB 73
				Result	Result	Result	Result	Result
Ei 3() D: Afkl ftatn, u, DC Ttrrl ror								
5, droxtde Afkl ftatn, I wCI CO(	DMO-210-001	-	mg/L	>	۲	₹		7
CI ruoal re Afkl ftatry I wCl CO(	3812-32-6	-	mg/L	<b>\</b>	٧	۲	₹	₹
6 tQ ruoal re Afkl ftatr, I wCl CO(	71-52-3	-	mg/L	(73	080	17)	(13	130
Tori f Afki ftatr, I wCI CO(		-	mg/L	(73	080	17)	(13	130
Ei 317P: Sgfrhre Hgrutdtp enrt Alw SO1 0Uu, i A	7, i A							
Sgfrhre I wSO1 UTgrutdtp enrtQ	14808-79-8	-	mg/L	1) 03	4343	8W6 )	1( 03	( ) NB
Ei 314P: Csfortde u, it Mcrene Aalf, wer								
Csfortde	16887-00-6	1	mg/L	0NB33	0 MI 33	79333	00(33	03033
Ei 39(F:i twwof.ed 2 I jor CI rtoaw								
CIfCigp	7440-70-2	-	mg/L	M(3	)1(	4 N#	8)(	431
2 I caewtgp	7439-95-4	-	mg/L	7))3	7) 33	7403	7493	74) 3
Sodtgp	7440-23-5	-	mg/L	71133	71133	73833	77) 33	77433
Dorl wwtgp	7440-09-7	-	mg/L	()	13	40	43	41
EP303F: i twwof. ed 2 en fwu, ICDU2 S								
ArweatQ	7440-38-2	0.001	mg/L	<0.002	3.830	<0.002	<0.002	<0.002
CI dp tgp	7440-43-9	0.0001	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Csrop tgp	7440-47-3	0.001	mg/L	<0.002	3/877	<0.002	<0.002	<0.002
Cohher	7440-50-8	0.001	mg/L	3-830	3/789	3.83M	<0.002	<0.002
NtCkef	7440-02-0	0.001	mg/L	3-33M	3/803	3.8M4	3.8(7	<0.002
Leld	7439-92-1	0.001	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
ZtaQ	7440-66-6	0.005	mg/L	<0.010	<0.010	3.0(1	3.30)	<0.010
EP303T: Tonf 2 en fwu, ICDL S								
ArweatQ	7440-38-2	0.001	mg/L	nin i	3.834			<b>m</b>
CI dp tgp	7440-43-9	0.0001	mg/L	(III)	<0.0002		<b>MIN</b>	TIII)
Csrop tgp	7440-47-3	0.001	mg/L	(III)	3.843		<b>MIN</b>	THIN .
Cohher	7440-50-8	0.001	mg/L		347(			m
NtCkef	7440-02-0	0.001	mg/L	<b>MIN</b>	3/813	<b>MIN</b>	m	m
Leld	7439-92-1	0.001	mg/L	O O	<0.002	<b>AIII</b>	<b>MIN</b>	TIME I
ZtaQ	7440-66-6	0.005	mg/L	) III	<0.010		<b>MIN</b>	TII)
EP3(4F:itwwof.ed 2 er Cgr, u, Fl2 S								
2 erQgr,	7439-97-6	0.0001	mg/L	<0.0001	3/3330	<0.0001	<0.0001	<0.0001
EP3(4T: TorlfReOp. erlufe 2 erOgr, u, Fl2 S	S							
2 erQgr,	7439-97-6	0.0001	mg/L	ON O	3/3330	<b>TIII</b>	<b>III</b>	TIME I
EP347P: Ferrogwlroa u, i twQrene Aal f, wer								



Project Client

: 6 of 12 : EM2016060-AA : EMM CONSULTING PTY LTD : S190512

Page Work Order

Sub-Matrix: WATER H/Matrix: WATER-		Clier	Client sample ID	GP 2 U 70S	GP 2 U 74S	65 LP 7 M	65 LZ 7 NG	65 <b>L</b> 07i
	Clie	ent samplin	Client sampling date / time	11-Sep-2020 12:40	12-Sep-2020 08:15	11-Sep-2020 09:45	11-Sep-2020 10:30	11-Sep-2020 13:15
Compound	CAS Number	LOR	Unit	E2 037MBNBU33M	E2 037MBMB(\$3)	E2 037NBNBLB38	E2 037 NBNBL339	E2 037 NBNBL\$73
				Result	Result	Result	Result	Result
EP347P: Ferrogwiroa u, i tworene Aalf, wer Ucoartaged	oartaged							
Ferrogwiroa	-	0.05	mg/L	<0.05	<0.05	M4∕0	<0.05	1.07
EK3842: Sgfrtde I wS0U								
Sgfrtde I wS0U	18496-25-8	0.1	mg/L	<0.1	<0.1	<0.1	3.7	<0.1
EN344: loatQ61 fl a Qe								
Ø Torl f Aatoaw	1	0.01	med/L	8(8	844	MD)	M0 (	M#M
Ø Torl fCl rtoaw	1	0.01	med/L	831	831	MD1	M) 8	M#M
Ø loatQ6 I fl a Qe	-	0.01	%	0.81	88,)	3/79	۲۳)	3/87
EA043CA: ProwvAfinsl I ad 6en AQt. tn								
Prowwl flust	-	0.05	Bq/L		0.84		m	m
Prowwuerl IQt. tr) U13K	-	0.10	Bq/L		<2.29		<b>IIII</b>	AIII)



PTY LTD : S190512

: / or 12	: EM2016060-AA	: EMM CONSULTING	C400E40
age	Vork Order	Slient	Project

•								
Sub-Matrix: WATER H/Jatrix: WATER-		Clier	Client sample ID	65U 07S	65 L 00i	6 5 L2 00S	65 L 0( i	65U2 O(S
	Clie	ent samplin	Client sampling date / time	11-Sep-2020 13:20	12-Sep-2020 12:00	12-Sep-2020 11:20	12-Sep-2020 09:00	12-Sep-2020 09:40
Compound	CAS Number	LOR	Unit	E2 037NBNBU\$77	E2 037MBMBL\$70	E2 037MBMBUB7(	E2 037NBNBU\$71	E2 037 NBNBL\$74
				Result	Result	Result	Result	Result
Ei 3() D: Afkl ftatr, u, DC Ttrrl ror								
5, droxtde Afkl ftatr, I wCI CO(	DMO-210-001	-	mg/L	₹	₹	₹	₹	<b>∨</b>
CI ruoal re Afkl ftatr, I wCI CO(	3812-32-6	-	mg/L	7	Ý	<b>\</b>	7	₹
6 tQ ruoal re Afkl ftatr, I wCl CO(	71-52-3	-	mg/L	80)	108	(33	177	0) 3
Tori f Afki ftatr, I wCI CO(	1	-	mg/L	80)	108	( 33	177	0) 3
Ei 317P: Sgfrhre Hgrutdtp enrto-IwSO1 0Uu, i	4 -							
	14808-79-8	-	mg/L	1413	( ( NB	1(43	(373	4433
Ei 314P: Csfortde u, i tw Qrene Aalf, wer								
	16887-00-6	-	mg/L	01NB3	78133	0()33	79333	OMI 33
Ei 39(F:i twwof. ed 2 I jor CI rtoaw								
CIfClgp	7440-70-2	-	mg/L	MIO	440	IMM	410	)((
2 I caewtgp	7439-95-4	-	mg/L	7MB3	7403	7 M 3	7183	79) 3
Sodtgp	7440-23-5	-	mg/L	7( MB3	73933	7( 733	73MB3	74033
Dorl wwtgp	7440-09-7	-	mg/L	8)	4M	17	41	1M
EP303F: i twoof. ed 2 en fwu, ICDU2 S								
ArweatQ	7440-38-2	0.001	mg/L	<0.002	<0.002	<0.002	3.831	<0.002
CI dp tgp	7440-43-9	0.0001	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Csrop tgp	7440-47-3	0.001	mg/L	<0.002	<0.002	<0.002	<0.002	3.831
Cohher	7440-50-8	0.001	mg/L	3/330	<0.002	<0.002	3.831	3.73)
NtCkef	7440-02-0	0.001	mg/L	3/33M	3,83(	3/871	3.830	3.838
Lei d	7439-92-1	0.001	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
ZtaQ	7440-66-6	0.005	mg/L	<0.010	<0.010	3.87)	3.309	3/3/41
EP303T: Tonf2 enfwu, ICDL2 S								
ArveatQ	7440-38-2	0.001	mg/L	AIII)	<b></b>	3.830	3.834	m
CI dp tgp	7440-43-9	0.0001	mg/L	AIII)	<b>III</b>	<0.0002	<0.0002	<b>MIN</b>
Csrop tgp	7440-47-3	0.001	mg/L	AIII)	<b>III</b>	3/33/1	3.831	
Cohher	7440-50-8	0.001	mg/L	<b>1</b>		3/34M	3.470	
NtCkef	7440-02-0	0.001	mg/L	AM .	m	3.878	3.831	m
Leid	7439-92-1	0.001	mg/L	m		<0.002	3.83(	<b>MIN</b>
ZtaQ	7440-66-6	0.005	mg/L	TIME I		3/30)	3.8()	
EP3(4F: i twwof. ed 2 erQgr, u, FI2 S								
2 erQgr,	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EP3(4T: Torlf ReCo. erl ufe 2 er Cgr, u, FI2 S								
2 erQgr,	7439-97-6	0.0001	mg/L	nm	AIII	<0.0001	<0.0001	<b>III</b>
EP347P: Ferrogwiroa u, i tworene Aalf, wer								



: 8 of 12 : EM2016060-AA : EMM CONSULTING PTY LTD : S190512

Page Work Order

Client Project

Sub-Matrix: WATER H/Matrix: WATER-		Clier	Client sample ID	6512 078	65 L 00i	65 L 00S	65120(i	65 <b>0</b> 0(S
	Clie	ent samplin	Client sampling date / time	11-Sep-2020 13:20	12-Sep-2020 12:00	12-Sep-2020 11:20	12-Sep-2020 09:00	12-Sep-2020 09:40
Compound	CAS Number	LOR	Unit	E2 037MBNBU377	E2 037MBMBL\$70	E2 037MBMBLB7(	E2 037 NBINBL\$71	E2 037 NBNBL\$74
				Result	Result	Result	Result	Result
EP347P: Ferrogwiroa u, i tworene Aalf, wer Ucoartaged	Soartaged							
Ferrogwiroa	-	0.05	mg/L	<0.05	( '83	) 24	۱۳۱ (	<0.05
EK3842 : Sgfrtde I wS0U								
Sgfrtde I wS0U	18496-25-8	0.1	mg/L	<0.1	3.4	3.7	3.0	<0.1
EN344: loatQ61 fl aQb								
	1	0.01	med/L	) 94	498	) NA	IVB)	8M4
Ø Torl fCl rtoaw	1	0.01	med/L	) M(	MD8	8)(	NP.7	8M(
Ø loatQ6 I fl a Qe		0.01	%	0.3M	0.43	7/19	3.()	3/89
EA043CA: ProwwAffis! I ad 6 ent AQ1. tr)								
Prownl fhs1		0.05	Bq/L		<1.07	<0.92	AIII)	m
Prowwuerl IQt. trj U13K		0.10	Bq/L		<2.14	<1.83	<b>IIII</b>	AIII)



: 9 of 12 : EM2016060-AA : EMM CONSULTING PTY LTD : \$190512 Analytical Results Project

Page Work Order

Client

Sub-Matrix: WATER M/atrix: WATER-		Clie	Client sample ID	65 L2 01i	65 LP 01S	TS	Т6733	T6 033
	Ö	ent samplir	Client sampling date / time	11-Sep-2020 08:00	11-Sep-2020 08:45	11-Sep-2020 00:00	13-Sep-2020 12:30	13-Sep-2020 12:30
Compound	CAS Number	LOR	Unit	E2 037NBNBU37M	E2 037MBMBU37)	E2 037MBMBLB78	E2 037NBNBL\$79	E2 037NBNBU303
				Result	Result	Result	Result	Result
Ei 3() D: Afkl ftath, u, DC Ttrrl ror								
5, droxtde Afkl ftatn, I wCI CO(	DMO-210-001	1	mg/L	<1	1>			
CI ruoal re Afkl flatry I wCI CO(	3812-32-6	-	mg/L	<b>\</b>	7			
6 tQ ruoal re Afkl ftatr, I wCl CO(	71-52-3	-	mg/L	17M	( NB			
Torl f Afkl ftatr, I wCI CO(	1	-	mg/L	17M	( NB		m	m
Ei 317P: Sgfrhre Hgrutdtp entQ I wSO1 0Uu, i A	<b>4</b> -							
Sgfrhre I wSO1 UTgrutdtp errtQ	14808-79-8	-	mg/L	((43	1393			m
Ei 314P: Csfortde u, i twQrene Aalf, wer								
Csfortde	16887-00-6	1	mg/L	78833	00933	3		
Ei 39(F: i twwof. ed 2 I jor CI rtoaw								
CI fCtgp	7440-70-2	_	mg/L	48M	MP(			
2 I caewtgp	7439-95-4	-	mg/L	74) 3	7403	3		
Sodtgp	7440-23-5	-	mg/L	77033	70833			
Dorl wwtgp	7440-09-7	_	mg/L	4M	M)			
EP 303F: i twoof. ed 2 en fwu, ICDL2 S								
ArweatQ	7440-38-2	0.001	mg/L	<0.002	3.830			<b>m</b>
CI dp tgp	7440-43-9	0.0001	mg/L	<0.0002	<0.0002			
Csrop tgp	7440-47-3	0.001	mg/L	<0.002	<0.002			
Cohher	7440-50-8	0.001	mg/L	3731	<0.002		m	m
NtCkef	7440-02-0	0.001	mg/L	3/33(	3.83M			
Leld	7439-92-1	0.001	mg/L	<0.002	<0.002			
ZtaQ	7440-66-6	0.005	mg/L	3/309	<0.010			<b>m</b>
EP303T: Tonff2 enfwu, ICDL S								
ArweatQ	7440-38-2	0.001	mg/L	m			<0.001	<0.001
CI dp tgp	7440-43-9	0.0001	mg/L	AMD.	m		<0.0001	<0.0001
Csrop tgp	7440-47-3	0.001	mg/L				<0.001	<0.001
Cohher	7440-50-8	0.001	mg/L	<b>1</b>		3	<0.001	<0.001
NtCkef	7440-02-0	0.001	mg/L	<b>3</b>			<0.001	<0.001
Leld	7439-92-1	0.001	mg/L	<b>3</b>			<0.001	<0.001
ZtaQ	7440-66-6	0.005	mg/L				3.83M	3.83M
EP3(4F: i twoof. ed 2 erQgr, u, FI2 S								
2 erQgr,	7439-97-6	0.0001	mg/L	<0.0001	<0.0001		m	m
EP3(4T: Torlf ReOp. erl ufe 2 er Ogr, u, FI2 S								
2 erQgr,	7439-97-6	0.0001	mg/L	OIII)	<b>III</b> I	<b>TIII</b>	<0.0001	<0.0001
EP347P: Ferrogwiroa u, i tworere Aalf, wer								



: 10 of 12 : EM2016060-AA : EMM CONSULTING PTY LTD : S190512

Page Work Order Client Project

•								
Sub-Matrix: WATER H/latrix: WATER-		Clie	Client sample ID	65 L 01i	65 LP 01S	TS	T6733	T6033
	Clie	ent samplir	Client sampling date / time	11-Sep-2020 08:00	11-Sep-2020 08:45	11-Sep-2020 00:00	13-Sep-2020 12:30	13-Sep-2020 12:30
Compound	CAS Number	LOR	Unit	E2 037NBNBLB7M	E2 037NBNB(\$7)	E2 037MBMBUB78	E2 037 NBNBL\$79	E2 037 NB NB U\$ 03
				Result	Result	Result	Result	Result
EP347P: Ferrogwlroa u, i tworene Aal f, wer UCoartaged	r UCoartaged							
Ferrogwiroa		0.05	mg/L	7 44 1	03.⁴	<b>TII</b> II	m	<b>IIII</b>
EK3842 : Sgfrtde I wS0U								
Sgfrtde I wS0U	18496-25-8	0.1	mg/L	3.7	34		m	
EN344: loatQ61fl aQe								
Ø Torl f Aatoaw		0.01	med/L	MB8	8)(			3
Ø Torl fCl rtoaw		0.01	med/L	(MI)	)7(		m	
Ø loatQ6 i fla Qe		0.01	%	88, )	7.7 (		m	m
ED383\(\mathbb{3}\)) 7: Torl f Derrofegp 5, drod ruoaw								
CMUC9 Frl Ottoa		20	hg/L	(III)	TIM)	773	m	
ED38338) 7: Torl f ReCo. erl ufe 5, drocl ruoaw UNED2 037(Frl Otoaw	aw UNED2 037(	Fri Ortos	WE					
CMUC73 Frl Ottoa	C6_C10	20	hg/L			743		3
C73 Frl Ottoa p tagw6TEX	C6_C10-BTEX	20	hg/L	<b>III</b>		83	<b>m</b>	∄
<b>F</b> 7-								
ED383: 6 TEXN								
6 eazeae	71-43-2	_	hg/L	(III)		77	m	■
Тобреае	108-88-3	2	hg/L	(III)		70	m	m
Ers, fueazeae	100-41-4	2	hg/L	(III)	<b>TIE</b>	77	m	<b>MIN</b>
p erl U& hI rl UX, feae 108-	108-38-3 106-42-3	2	hg/L			)0	m	
orrsoUX, feae	92-47-6	2	hg/L	<b>MIN</b>	AMD.	71	m	
△ Torl f X, feaew		2	hg/L	ON THE	<b>MIN</b>	()	m	m
^ Sgp on6TEX		-	hg/L			7 (	<b>m</b>	
NI hsrsl feae	91-20-3	5	hg/L	<b>III</b>	<b>IIII</b>	•	m	m
ED383S: TD5 W-16 TEX Sgrrocl rew								
7.0U tOsforoersI aeU 1	17060-07-0	2	%	(III)		737	<b>m</b>	TIM
TofgeaeU 8	2037-26-5	2	%			8, /8	m	
116 rop orfgoroueazeae	460-00-4	2	%	ON THE	<b>MIN</b>	8) /M	m	TIM



EMM CONSULTING PTY LTD S190512

11 of 12 EM2016060-AA

Work Order

Client Project

 3 3 3 3|3|3|3|3|3|3|3 3 3 3 ₿ 11-Sep-2020 00:00 E2 037 NB NB LB 09 TS Coarrof 8( 7 7(3 ₿ 783 7 Σ  $\stackrel{+}{\sim}$ 80  $\simeq$ 6 12-Sep-2020 10:00 E2 037NBNBUB0( R6 033 Result <0.0001 3.83M <0.001 <0.0001 <0.001 3/1/#3 3%(1 3.4MB  $\blacksquare$ 11-Sep-2020 09:15 E2 037NBNBU300 Result <0.0001 <0.001 <0.001 <0.001 <0.001 <0.0001 3,83( 3.838 3|3|3|3|3|3|3|3 13-Sep-2020 12:30 E2 037NBNBU307 T6(33 Result <0.0001 <0.001 <0.001 <0.0001 <0.001 <0.001 <0.001 3,33) Client sample ID Client sampling date / time mg/L mg/L mg/L mg/L Unit mg/L mg/L hg/L mg/L mg/L hg/L hg/L hg/L hg/L hg/L hg/L hg/L hg/L hg/L hg/L % % % ED383ಚಿ) 7: Torl f Re🕰. erl ufe 5, droQ ruoaw UNED2 037( Frl Qtoaw 0.0001 0.005 7439-97-6 0.0001 0.001 LOR 0.001 0.001 0.001 0.001 20 20 N N 2 N N 2 2 2 7 7440-66-6 7440-38-2 7440-02-0 C6\_C10 7440-43-9 7439-92-1 I 95-47-6 91-20-3 0-20-0902 7440-47-3 7440-50-8 CAS Number C6\_C10-BTEX 71-43-2 108-88-3 100-41-4 108-38-3 106-42-3 2037-26-5 460-00-4 EP 3 (4T: Torlf ReOb. erlufe 2 er Ogr, u, FI2 ED383⁄8) 7: Torl f Derrofegp 5, droQ ruoaw ED383S: TD5 W-16 TEX Sgrrocl rew EP303T: Tonf2 en fwu, ICDL2 S CMUC73 FrI Ortoa p tagw6TEX 116 rop onfgoroueazeae 7.00 tOsforoens a aeU 1 p en U& hl rl UX, feae Sub-Matrix: WATER HMatrix: WATER-CMUC73 Frl Qtoa CMUC9 Frl Ottoa **ED383: 6 TEXN** ^ Torl fX, feaew Ers, fueazeae ^ Sgp on6 TEX orrsoUK, feae NI hsrs feae TofgeaeU 8 **Csrop tgp** CI dp tgp 6 eazeae Compound ArweatQ Tofgeae Cohher 2 erQgr, NtCkef Leld ZtaQ



: 12 of 12 : EM2016060-AA : EMM CONSULTING PTY LTD : S190512 Project Client

Page Work Order

Surrogate Control Limits

Sub-Matrix: WATER  Compound	CAS Number	Recovery Limits (%) Low	J
700 tGforoersl aeU 1 TofgeaeU 8	17060-07-0	73	
116 rop orfgoroueazeae	460-00-4	71	



## CERTIFICATE OF ANALYSIS

Laboratory **EMM CONSULTING PTY LTD** EM2016060-AB **Work Order** Client

: 4 Westall Rd Springvale VIC Australia 3171 Shane Colley Contact Address Ground Floor Suite 1 20 Chandos Street PAUL GIBBONS

**Environmental Division Melbourne** 

: 1 of 2

: 16-Sep-2020 10:15 +61-3-8549 9600 : 18-Sep-2020 Date Analysis Commenced Date Samples Received Telephone St Leonards NSW NSW 2065 S190512

28-Sep-2020 16:35 Issue Date

Accreditation No. 825 Accredited for compliance with ISO/IEC 17025 - Testing EN/112/18 - Primary work only BB, KB

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

This Certificate of Analysis contains the following information:

General Comments

No. of samples analysed No. of samples received

Quote number

C-O-C number

Sampler

Order number

Telephone

Project

Contact Address Analytical Results

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

Newcastle - Inorganics, Mayfield West, NSW Accreditation Category Laboratory Technician Aleksandar Vujkovic



. 2 01 2

Work Order : EM2016060-AB

Client : EMM CONSULTING PTY LTD

Project : \$190512

General Comments

In house developed procedures 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.

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

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.

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

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

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

Key:

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.

EK085: EM2016060-017 required dilution prior to analysis due to matrix interferences. LOR has been raised accordingly.

EP080: Samples EM2016060 018,029 TRIP SPIKE and TRIP SPIKE CONTROL contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory

EG020-T: EM2016060 #2, #4, #7, #13, #14 total metal required dilution prior analysis due to sample matrix. LORs have been adjusted accordingly.

EA154: ALS does not hold NATA accreditation for Laser Particle Sizing.

EG020-T: EM2016060 #19-23 results for total metal have been confirmed by re-digestion and re-analysis.

EG020-F: EM2016060 #1-17 dissolved metal required dilution prior analysis due to sample matrix. LORs have been adjusted accordingly.

EG035T: EM2016060 #4 Poor matrix spike recovery for total mercury due to sample matrix. Confirmed by re-extraction and re-analysis.

lonic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.

LOR for Gross Alpha and Gross Beta raised due to high solid content.

ED045G: The presence of thiocyanate can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

EK085: EM2016060-002 Poor matrix spike recovery for sulphide due to sample matrix. Confirmed by re-extraction and re-analysis.

EG035T: EM2016060 #7 sample results for total mercury confirmed by re-extraction and re-analysis.

### Analytical Results

12-Sep-2020 07:15 EM2016060-028 See Attached **PSD 02** 12-Sep-2020 07:10 EM2016060-027 See Attached **PSD 02** 11-Sep-2020 15:50 EM2016060-026 See Attached **PSD 02** 13-Sep-2020 07:10 EM2016060-025 See Attached **PSD 01** 12-Sep-2020 07:08 EM2016060-024 See Attached **PSD 01** Client sample ID Client sampling date / time Chit % LOR LOR CAS Number EA150: Particle Sizing Sub-Matrix: WATER (Matrix: WATER) Compound ø +75µm



## QUALITY CONTROL REPORT

: 4 Westall Rd Springvale VIC Australia 3171 Environmental Division Melbourne +61-3-8549 9600 Shane Colley 16-Sep-2020 17-Sep-2020 28-Sep-2020 : 1 of 9 Date Analysis Commenced Date Samples Received Telephone Laboratory Issue Date Contact Address Ground Floor Suite 1 20 Chandos Street EN/112/18 - Primary work only **EMM CONSULTING PTY LTD** St Leonards NSW NSW 2065 EM20140406AA PAUL GIBBONS S190512 BB, KB 24 No. of samples received C-O-C number Quote number Order number **Work Order** Telephone Contact Sampler Address Project Client

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full. This Quality Control Report contains the following information:

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

Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits

No. of samples analysed

- 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.

Accreditation Category	Melbourne Inorganics, Springvale, VIC	Melbourne Inorganics, Springvale, VIC	Melbourne Inorganics, Springvale, VIC	Melbourne Organics, Springvale, VIC	Radionuclides, Fyshwick, ACT
Position	Non-Metals Team Leader	Senior Inorganic Chemist	Metals Team Leader	2IC Organic Chemist	Metals Teamleader
Signatories	Arenie Vijayaratnam	Dilani Fernando	Eric Chau	Nancy Wang	Titus Vimalasiri



 Page
 : 2 of 9

 Work Order
 : EM2016060-AA

 Client
 : EMM CONSULTING PTY LTD

 Project
 : S190512

General Comments

In house developed procedures 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. 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 primary

Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot 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

RPD = Relative Percentage Difference

# = Indicates failed QC

## Laboratory Duplicate (DUP) Report

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

Sub-Matrix: WATER						Laboratory L	Laboratory Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED05sP: AlkplhalnBt	ED05sP: AlkplhamBtBPCThmpnor QCLon 524is02v	i s02v						-	
EM2016055-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	۲	٧	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	Ý	٧	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	5	-	131	No Limit
		ED037-P: Total Alkalinity as CaCO3	-	-	mg/L	2	_	131	No Limit
EM2016055-006	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	<u>^</u>	٧	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	~	mg/L	<u>^</u>	۲	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	~	mg/L	15	15	0.00	0% - 50%
		ED037-P: Total Alkalinity as CaCO3		~	mg/L	15	15	0.00	%05 - %0
ED05sP: AlkplhalnBt	ED05sP: AlkpliamBt BPC Timpror QC Lon 524i s0i v	i s0i v						=	
EM2016060-011	BH-M21S	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	٧	٧	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	<u>^</u>	۲	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	328	330	0.900	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	1	-	mg/L	328	330	0.900	0% - 20%
EM2016091-004	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	<u>^</u>	۲	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	<u>^</u>	۲	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	13	12	8.60	0% - 50%
		ED037-P: Total Alkalinity as CaCO3		_	mg/L	13	12	8.60	%05 - %0
ED0i 1G: Syl(pre cTyl	ED0i 1G: Syl(pre cfyrt falf8 enri) vp7 SOi 26t BDA cQC Lon 52451b-v	0A QC Lon 52451b- ν							
EM2015644-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	~	mg/L	1310	1340	2.27	0% - 20%
EM2016060-001	UGM-M1D	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	~	mg/L	3400	3630	09.9	0% - 20%
ED0i 1G: Syl(pre cTyl	ED0i 1G: Syl(pre cTyrt Idi8 erri) vp7 SOi 26t BDA QC Lon 52451bsv	0A QC Lon 52451bsv							
EM2016060-012	BH-M22D	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	~	mg/L	3360	3670	8.92	0% - 20%
EM2016112-003	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	~	mg/L	29	58	13.6	0% - 20%
ED0i - G: Culoride t E	ED0i - G: Culorble t BDP) rene AarolB7er co.C Lon 52451b4v	br 52451b4v							



S190512

Client Project

EM2016060-AA

Work Order

Recovery Limits (%) 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% %09 - %0 No Limit 3% - 20% 0% - 20% 0% - 20% 0% - 20% %09 - %C 0% - 20% 0% - 20% 0% - 20% 0% - 50% No Limit No Limit No Limit 0% - 20% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.463 0.437 4.49 3.04 0.00 0.979 1.10 0.00 0.00 0.00 0.00 1.24 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 69.6 0.00 0.00 0.00 2.63 3.30 0.00 0.00 15.4 Laboratory Duplicate (DUP) Report Original Result Duplicate Result <0.0002 <0.002 <0.002 <0.002 <0.0001 <0.001 0.110 <0.002 <0.001 <0.001 <0.001 10300 19100 <0.001 13400 0.001 0.008 0.020 19000 0.034 0.031 1110 1660 852 225 89 9 38 2 က 4 ž 111 µg/L <1 µg/L <1 µg/L <0.0002 <0.0001 20 µg/L <0.002 <0.002 <0.002 <0.001 <0.001 10100 18300 13600 1 µg/L <0.002 <0.001 18400 8 µg/L 0.031 0.027 1100 1680 826 642 224 38 83 9 2 က 42 V mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit 0.001 0.005 0.0001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.005 0.0001 0.001 0.001 0.001 LOR \_ \_ \_ \_ \_ Ψ ~ \_ \_ \_ 7440-43-9 7440-38-2 7440-50-8 16887-00-6 7440-43-9 7440-02-0 7440-66-6 7440-02-0 7440-66-6 7440-47-3 CAS Number 16887-00-6 16887-00-6 16887-00-6 7440-70-2 7439-95-4 7440-23-5 7440-23-5 7440-09-7 7440-70-2 7439-95-4 7440-23-5 7440-09-7 7440-38-2 7440-47-3 7440-50-8 7440-43-9 7440-38-2 7440-47-3 7440-50-8 7439-92-1 7440-09-7 7440-70-2 7439-95-4 7439-92-1 ED0i - G: Culoride t BDir) rene Aapl Brer QC Lon 52451b4v 6) oanhayed EG020A-F: Chromium EG020A-F: Chromium EG020A-T: Chromium ED093F: Magnesium ED093F: Magnesium EG020A-F: Cadmium EG020A-F: Cadmium EG020A-T: Cadmium ED093F: Magnesium ED093F: Potassium ED093F: Potassium ED093F: Potassium EG020A-T: Arsenic EG020A-F: Arsenic EG020A-T: Copper EG020A-F: Copper EG020A-F: Arsenic EG020A-F: Copper ED045G: Chloride ED045G: Chloride ED045G: Chloride ED045G: Chloride ED093F: Calcium ED093F: Sodium ED093F: Calcium ED093F: Sodium ED093F: Calcium ED093F: Sodium EG020A-F: Nickel EG020A-F: Nickel EG020A-F: Lead EG020A-F: Lead EG020A-F: Zinc EG020A-F: Zinc ED0i - G: Culoride t BDir) rere Aapl Frer QC Lon 52451 bf v EG020m DI77019ed Merpl7 t BICP6MS QC Lon 524104-v ED0b5m Dlf7ol9ed Mp&r Cprtoa7 QC Lon 5241045v ED0b5m Dif7ol9ed Mp&r Cprtoa7 QC Lon 524104sv EG020T: Torpl Merpl7 t BICPGMS QC Lon 5241s-4v Client sample ID Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous UGM-M1D **BH-M21S** BH-M22D BH-M16S Laboratory sample ID Sub-Matrix: WATER EM2016055-004 EM2015836-005 EM2015644-001 EM2016060-001 EM2016060-012 EM2016112-003 EM2015983-004 EM2016055-003 EM2016060-009 EM2016060-011



S190512

Client Project

EM2016060-AA

Work Order

Recovery Limits (%) No Limit No Limit % - <del>2</del>0% No Limit 0% - 20% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit % - 20% % - 20% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Laboratory Duplicate (DUP) Report Duplicate Result <0.005 <0.0001 <0.0001 <0.0001 <0.0001 <0.0001 <0.0001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 900.0 <0.001 < 0.001 900.0 0.013 <0.0001 <0.0001 <0.05 <0.05 0.002 0.092 0.001 0.001 0.002 0.025 0.042 **1.0** ٥.1 م Original Result <0.1 µg/L <0.0001 <0.0001 <0.0001 <0.0001 <0.0001 <0.0001 <0.001 <0.005 0.001 <0.001 <0.001 <0.001 <0.001 0.012 <0.0001 <0.001 <0.001 900.0 <0.001 0.002 <0.001 900.0 0.002 0.002 <0.05 <0.05 0.094 0.024 0.041 **1.0** ٥.1 م mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L mg/L mg/L 0.0001 0.005 0.0001 0.001 0.001 0.0001 0.001 0.005 0.0001 0.0001 0.0001 0.001 0.001 0.001 0.005 0.001 0.001 0.001 0.001 0.001 0.001 0.005 0.0001 0.0001 0.001 0.001 0.001 0.001 0.001 0.05 0.05 LOR 0.1 0.1 7439-97-6 7439-97-6 7439-97-6 7439-97-6 7439-97-6 18496-25-8 7440-02-0 7440-38-2 7440-50-8 7440-02-0 7440-43-9 7440-02-0 18496-25-8 CAS Number 7440-66-6 7440-43-9 7440-47-3 7439-92-1 7440-66-6 7440-38-2 7440-47-3 7440-50-8 7440-66-6 7440-43-9 7440-38-2 7440-47-3 7440-50-8 7440-02-0 7440-66-6 7439-92-1 7439-92-1 7439-92-1 EG051G: Ferrous Iron EG020A-T: Chromium EG051G: Ferrous Iron EK085: Sulfide as S2-EK085: Sulfide as S2-EG020A-T: Chromium EG020A-T: Chromium EG020A-T: Cadmium EG020A-T: Cadmium EG020A-T: Cadmium EG020A-T: Arsenic EG020A-T: Arsenic EG020A-T: Arsenic EG020A-T: Copper EG020A-T: Copper EG020A-T: Copper EG020A-T: Nickel EG020A-T: Nickel EG020A-T: Nickel EG020A-T: Nickel EG035F: Mercury EG035F: Mercury EG035F: Mercury EG035T: Mercury EG035T: Mercury QC Lon 5245-11v EG020A-T: Lead EG020A-T: Lead EG020A-T: Lead EG020A-T: Lead EG020A-T: Zinc EG020A-T: Zinc EG020A-T: Zinc EG020A-T: Zinc EG020T: Torpl Merpl7 t BICP6MS QC Lon 5241s-4v 6) oarhayed EG0-1G: merroy7 Iroa t BDIF) rere AapIB7er QC Lon 5240i b4v EG05- m Di77ol9ed Mer) yrBt BmiMS QC Lon 5241041v EG05- m Dif7ol9ed Mer) yrBt BmMS QC Lon 5241044v EG020T: Torpl Merpl7 t BICP6MS QC Lon 5241s-sv EG05-T: Torpl Re) o9erpt le Mer) yrBt BmlMS EF 0f - M: Syl(Ide p7 S26 QC Lon 5242- 1bv Client sample ID Anonymous UGM-M15S Anonymous Anonymous Anonymous Anonymous Anonymous UGM-M1S UGM-M1D BH-M21D BH-M16S **RB200** TB100 Laboratory sample ID Sub-Matrix: WATER EM2016060-019 EM2016060-009 EM2016060-010 EM2015836-005 EM2016022-004 EM2016088-003 EM2016055-002 EM2015968-049 EM2016060-002 EM2016060-023 EM2015832-001 EM2016060-001 EM2016060-007



S190512

Project Client

EM2016060-AA

Work Order

5 of 9

Recovery Limits (%) 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 8.76 8.03 9.91 12.5 9.70 Laboratory Duplicate (DUP) Report Original Result Duplicate Result 17500 <20 6260 <20 6470 1620 1320 1190 2040 987 V 7 2 2 7 5 <20 6510 <20 6700 1220 1080 1480 1800 896 7 **2** V 7 7 hg/L hg/L hg/L hg/L µg/L hg/L hg/L hg/L hg/L hg/L Unit hg/L hg/L hg/L hg/L hg/L LOR 8 8 8 8 2 \_ 2 \_ 7 2 2 0 7 N C6\_C10 95-47-6 C6\_C10 108-38-3 106-42-3 71-43-2 108-88-3 108-38-3 91-20-3 CAS Number 71-43-2 108-88-3 100-41-4 95-47-6 91-20-3 100-41-4 106-42-3 EP0f 0j0s1: Torpl Re) o9erpt le KBdro) prt oa7 6NEPM 2015 mp) rroa7 QC Lon 524050i v EP080: meta- & para-Xylene EP080: meta- & para-Xylene EP080: C6 - C10 Fraction EP080: C6 - C10 Fraction EP080: C6 - C9 Fraction EP080: C6 - C9 Fraction EP080: Ethylbenzene EP080: Ethylbenzene EP080: ortho-Xylene EP080: Naphthalene EP080: Naphthalene EP080: ortho-Xylene EP080: Benzene EP080: Benzene EP080: Toluene EP080: Toluene EP0f 0j0s1: Torpl Perroley3 KBdro) prt oa7 QC Lon 524050i v Client sample ID EP0f0: / TEHN QC Lon 524050i v Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous Laboratory sample ID Sub-Matrix: WATER EM2016021-016 EM2016021-016 EM2016021-016 EM2016016-001 EM2016016-001 EM2016016-001

0.422

17400

2



EMM CONSULTING PTY LTD EM2016060-AA S190512 Work Order Project Client

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

The purpose of this QC 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.

parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target High 105 112 112 117 117 114 114 114 105 901 122 122 11 114 111 108 Recovery Limits (%) 85.6 90.0 85.6 90.0 83.5 83.2 88.0 85.8 85.8 85.8 85.8 85.0 85.0 85.0 85.0 86.7 95.2 88.0 88.2 86.7 Low 83.1 Laboratory Control Spike (LCS) Report Spike Recovery (%) 97.0 96.5 97.1 94.0 99.3 99.6 97.2 93.2 SOT 99.5 98.8 98.4 90.7 105 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. 100 106 100 91.1 104 108 Concentration 1000 mg/L 10 mg/L 1000 mg/L 25 mg/L 100 mg/L 100 mg/L 0.1 mg/L 25 mg/L 0.1 mg/L 0.1 mg/L 200 mg/L 1751 Bq/l 10 mg/L 5 mg/L 50 mg/L 50 mg/L 5 mg/L 50 mg/L 50 mg/L 0.1 mg/L 200 mg/l 5 mg/L 5 mg/L Method Blank (MB) Result Report <0.001 <0.0001 <0.001 <0.001 <0.05 <0.10 ۲ <u>v</u> v <u>v</u> v √ √ <u>v</u> v Ÿ Ÿ ₹ ₹ V V mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Bq/L Bq/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit 0.0001 0.001 0.001 0.001 LOR 0.05 0.7 CAS Number 7440-70-2 7440-23-5 7440-70-2 7440-23-5 7440-09-7 7440-38-2 7440-43-9 7440-47-3 16887-00-6 16887-00-6 7439-95-4 7440-09-7 7439-95-4 7440-50-8 14808-79-8 14808-79-8 ED0i 1G: Syl(pre cTyrt rdi8 errt) vp7 SOi 26t BDA QCLon 52451b-v ED0i 1G: Syl(pre cTyrt ldf8 errl) vp7 SOi 26t BDA QCLon 52451bsv EA2-0CA: Gro77 AIXup pad / erp A) r191nB QCLon 52s1f4fv ED0i - G: Culorhde t BDh?) rene AaplB7er . CLon 52451bf v ED0i-G: Culorhde t BDh?) rene Aaplb7er cΩCLon 52451b4v EG020m DI77019ed Merp17 t BICPGMS ACCLON 524104-v ED0b5m Dlf7ol9ed Mp&r Cprtoa7 QCLon 524104sv ED05sP: AlkplanBt BPC Thrpnor QCLon 524i s0i v ED05sP: AlkplhahmBtBPCThmpnor oQCLon 524is02v ED041G: Sulfate as SO4 - Turbidimetric ED041G: Sulfate as SO4 - Turbidimetric ED037-P: Total Alkalinity as CaCO3 ED037-P: Total Alkalinity as CaCO3 EA250: Gross beta activity - 40K EG020A-F: Chromium EG020A-F: Cadmium ED093F: Magnesium ED093F: Magnesium EA250: Gross alpha Sub-Matrix: WATER ED093F: Potassium ED093F: Potassium EG020A-F: Arsenic EG020A-F: Copper Method: Compound ED045G: Chloride ED045G: Chloride ED093F: Calcium ED093F: Calcium ED093F: Sodium ED093F: Sodium



S190512

Client Project

EM2016060-AA

Work Order

High 107 110 110 111 114 112 110 109 111 114 112 112 115 112 116 126 7 601 110 129 126 124 126 Recovery Limits (%) 84.3 86.9 86.9 86.9 86.9 81.9 73.6 72.0 84.6 86.4 88.3 87.9 88.3 87.9 86.3 86.7 86.4 86.7 72.6 75.8 65.5 64.3 TOW 71.1 71.1 Laboratory Control Spike (LCS) Report Spike Recovery (%) 8.66 98.6 96.4 103 8.66 102 108 105 95.7 98.8 95.2 98.5 107 SO7 96.2 106 100 105 110 109 104 99.1 104 100 103 Concentration 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.01 mg/L 0.01 mg/L 0.01 mg/L 0.1 mg/L 0.1 mg/L 360 µg/L 450 µg/L 20 µg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 2 mg/L 20 µg/L 20 µg/L 0.1 mg/L 0.1 mg/L 0.5 mg/L 0.1 mg/l Method Blank (MB) Result <0.005 <0.0001 <0.001 <0.005 < 0.0001 <0.001 <0.001 <0.001 <0.001 < 0.0001 <0.001 <0.001 <0.001 <0.001 <0.005 < 0.0001 <0.0001 <0.001 <0.001 <0.05 Report ٥ -<20 <20 **₹** ₩ ₩ mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L <u>Unit</u> mg/L mg/L mg/L mg/L mg/L mg/L hg/L Hg/L Hg/L hg/L 0.0001 0.0001 0.0001 0.005 0.001 0.0001 0.001 0.005 0.001 0.001 0.0001 0.001 0.001 0.005 EP0f 0j0s1: Torpl Re) o9erpt le KBdro) prt oa7 6NEPM 2015 nrp) rtoa7 🕰CLon 524050 0.001 0.001 0.001 0.001 0.05 0.001 0.001 LOR 0.1 20 20 0 0 C6\_C10 CAS Number 7439-97-6 7439-97-6 7439-97-6 108-88-3 7440-66-6 7440-38-2 7440-43-9 7440-47-3 7440-50-8 7440-02-0 7440-66-6 7440-38-2 7440-43-9 7440-50-8 7440-02-0 7440-66-6 18496-25-8 71-43-2 100-41-4 7440-02-0 7439-92-1 7440-47-3 7439-92-1 7439-92-1 EG020m Di77ol9ed Merpl7 t BICP6MS QCLon 524104-v 6) oarhayed :G05-T: Torpl Re) o9erpt le Mer) yrBt BmMS QCLon 5245-11v EG05- m DI77ol9ed Mer) yrBt BmiMS QCLon 5241044v :G020T: Torpl Merp17 t BICPGMS QCLon 5241s-sv EG020T: Torpl Merpl7 t BICPGMS QCLon 5241s-4v EF 0f - M: Syl(rde p7 S26 QCL on 5242- 1bv EP0f0: / TEHN QCLon 524050i v EP080: C6 - C10 Fraction EP080: C6 - C9 Fraction EG020A-T: Chromium EG051G: Ferrous Iron EG020A-T: Chromium EP080: Ethylbenzene EG020A-T: Cadmium EK085: Sulfide as S2-EG020A-T: Cadmium Sub-Matrix: WATER EG020A-T: Arsenic EG020A-T: Arsenic EG020A-T: Copper EG020A-T: Copper Method: Compound EG020A-T: Nickel EG020A-F: Nickel EG020A-T: Nickel G035T: Mercury EG020A-T: Lead EG020A-T: Lead G035F: Mercury EG020A-F: Lead G035F: Mercury EP080: Benzene EG020A-F: Zinc EG020A-T: Zinc EG020A-T: Zinc EP080: Toluene



: 8 of 9 : EM2016060-AA : EMM CONSULTING PTY LTD : \$190512 Page Work Order Project Client

Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LCS) Report	S) Report	
				Report	Spike	Spike Recovery (%)	Recovery Limits (%)	imits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SOT	Low	High
EP0f0: / TEHN αCLon 524050i v 6) oarhayed								
EP080: meta- & para-Xylene	108-38-3	2	hg/L	<2	40 µg/L	105	71.5	132
	106-42-3							
EP080: ortho-Xylene	92-47-6	2	hg/L	<2	20 µg/L	108	76.5	132
EP080: Naphthalene	91-20-3	5	hg/L	<5	5 µg/L	108	70.5	127

### Matrix Spike (MS) Report

Sub-Matrix: WATER

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.

Recovery Limits (%)

Matrix Spike (MS) Report SpikeRecovery(%)

Spike

Laboratory sample ID Client sample ID	Method: Compound	CAS Number	CAS Number Concentration	MS	Low	High	_
ED0i 1G: Syl(pre dyrt tdf8 erri) vp7 SOi 26t BDA QCLon 52451b-v							
EM2015644-002 Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.0	130	
ED0i 1G: Syl(pre cTyrt lalf8 ent) vp7 SOi 26t BDA cQCLon 52451bsv							
EM2016060-013 BH-M22S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.0	130	
ED0i - G: Culoride t BDiff) rene AaplB7er QCLon 52451b4v							
EM2015644-002 Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	# Not	70.0	130	

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED0i 1G: Syl(pre cl	ED0i 1G: Syl(pre cTyrt Idl8 erri) vp7 SOi 26t BDA cQCLon 52451b-v						
EM2015644-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.0	130
ED0i 1G: Syl(pre cl	ED0i 1G: Syl(pre cTyrt Idi8 erri) vp7 SOi 26t BDA cQCLon 52451bsv						
EM2016060-013	BH-M22S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.0	130
ED0i - G: Culoride	ED0i - G: Culoride t BDiř) rene AaplBrer cQCLon 52451b4v						
EM2015644-002	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	# Not Determined	70.0	130
ED0i - G: Culoride	ED0i - G: Culoride t BDi7) rene AaplBrer cQCLon 52451bf v						
EM2016060-013	BH-M22S	ED045G: Chloride	16887-00-6	400 mg/L	# Not Determined	70.0	130
EG020m Dlf7019ed	EG020m Dif7ol9ed Merpl7 t BICPGNS QCLon 524104-v						
EM2016055-004	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	99.2	85.0	131
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	92.9	81.0	133
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	102	71.0	135
		EG020A-F: Copper	7440-50-8	0.2 mg/L	102	76.0	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	93.4	75.0	133
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	100	73.0	131
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	106	75.0	131
EG020T: Torpl Men	EG020T: Torpi Merpi7 t BICPGMS QCLon 5241s-4v						
EM2015836-005	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	100	82.0	118
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	105	75.0	129
		EG020A-T: Chromium	7440-47-3	1 mg/L	100	80.0	118
		EG020A-T: Copper	7440-50-8	1 mg/L	99.5	81.0	115



 Page
 : 9 of 9

 Work Order
 : EM2016060-AA

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Sub-Matrix: WATER			Me	Matrix Spike (MS) Report		
			Spike	SpikeRecovery(%)	Recovery Limits (%)	mits (%)
Laboratory sample ID Client sample ID	Method: Compound C.	CAS Number	Concentration	MS	Low	High
EG020T: Torpi Merpi7 t BICPGMS QCLon 5241s-4v 6) oarhayed						
EM2015836-005 Anonymous	EG020A-T: Lead 74	7439-92-1	1 mg/L	102	83.0	121
		7440-02-0	1 mg/L	104	80.0	118
	EG020A-T: Zinc 74	7440-66-6	1 mg/L	104	74.0	116
EG020T: Torpl Merpl7 t BICPGMS QCLon 5241s-sv						
EM2016060-019 TB100	EG020A-T: Arsenic 74	7440-38-2	1 mg/L	2.96	82.0	118
	EG020A-T: Cadmium 74	7440-43-9	0.25 mg/L	105	75.0	129
	EG020A-T: Chromium 74	7440-47-3	1 mg/L	7.76	80.0	118
	EG020A-T: Copper 74	7440-50-8	1 mg/L	94.1	81.0	115
		7439-92-1	1 mg/L	98.2	83.0	121
	EG020A-T: Nickel 74	7440-02-0	1 mg/L	95.9	80.0	118
	EG020A-T: Zinc 72	7440-66-6	1 mg/L	101	74.0	116
EG05- m Df770l9ed Mer) yrBt BmlMS QCLon 5241041v						
EM2015983-003 Anonymous	EG035F: Mercury 74	7439-97-6	0.01 mg/L	93.8	70.0	120
EG05- m Df770l9ed Mer) yrBt BmIMS QCLon 5241044v						
EM2016060-010 BH-M21D	EG035F: Mercury 74	7439-97-6	0.01 mg/L	75.7	70.0	120
EG05-T: Torpl Re) o9erpt le Mer) yrBt BrilMS QCLon 5245-11v						
EM2016060-004 UGM-M2S	EG035T: Mercury 74	7439-97-6	0.01 mg/L	# 58.1	70.0	130
EG0-1G: merroy7 Iroa t BDI7) reme AaplB7er QQCLon 5240i b4v						
EM2015832-002 Anonymous	EG051G: Ferrous Iron	-	2 mg/L	104	70.0	130
EF 0f - M: Syl(Ide p7 S26 QCLon 5242-1bv						
EM2016060-002 UGM-M1S	EK085: Sulfide as S2-	18496-25-8	0.33 mg/L	# 42.6	70.0	130
EP0f0j0s1: Torpl Perroley3 KBdro) prt oa7 QCLon 524050i v						
EM2016016-003 Anonymous	EP080: C6 - C9 Fraction	-	280 µg/L	76.2	43.0	125
EP0f0j0s1: Torpl Re) o9erpt le KBdro) prt oa7 6NEPM 2015 mrp) rtoa7 QCLon 524050i v	QCLon 524050i v					
EM2016016-003 Anonymous	EP080: C6 - C10 Fraction C	C6_C10	330 µg/L	71.4	44.0	122
EP0f0:/ TEHN QCLon 524050iv						
EM2016016-003 Anonymous	EP080: Benzene 71	71-43-2	20 µg/L	92.6	68.0	130
	EP080: Toluene	108-88-3	20 µg/L	100	72.0	132



## QUALITY CONTROL REPORT

RWestall ph NVrCgEale 39 custral@f272 : ni Echtiv ei bal mEGOri DelL1uri e +52-f -84R9 9500 NSai e y 111et 25-NeV-d0d0 28-NeV-d0d0 d8-NeV-d0d0 : 2 1of mabecialts By 1 vvei Meh mate Nav Mes peMeten TeleVS1i e Gsue mabe 6aL1rablrt y 1i baMb c hhress Ur1ui h FI11r Nu@e 2 d0 y Sai h1s Nbreeb : nOQ2dQ8 - Pr@ art ( 1r) 1i lt **EMM CONSULTING PTY LTD** Nb6e1i arhs ONW ONW d054 EM2016060-AB PcA6 UGI BON N29042d \_ -조 O1. 1osav Vles ai alt seh O1. 1osav Vles reMeŒeh y-B-y i uv Ler Hu1be i uv Ler Brher i uv Ler **Work Order** TeleVS1i e y 1i baMb Pr1jeMb Nav Mer chhress y l@ib

TSG reV1rbsuVersehes ait VreEQus reV1rbs, ( 65 LSG recerei Me. p esults aVVIt b1 LSE sav Mews, as suLv Oben. TSG h1Muv ei bsSall i 1bLe reVr1huMehKexMeVbC oull. TSG Hual@ y 1 i br11 peV1rbMi baCs bSe of 111 ( @g @ofrv abCi :

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

6aL1rabirt muVICAbe wmAP, peV1rb; pelabbe PenNeibage mobereiNe vpPm, aihcMeVbaiNe 60 Obs

e N

- DebS1h Ilai) wDI, aih 6aL1rab1rty 1 ibr11 NVQe w6y N, peV1rb; peM Eertaih c MAeVbain Ne 60/06s
- Dato @ NVO, e wo N, peV1rb; peMillEert aih c MweVbai Me 600 Cos

*Signatories* TSG h1Muv ei bSas Leei eleMorti Omallt s@i eh Lt bSe aubS1r0Reh s@i abtrOs Lel1(. nleMorti Omsogi Og G MarrOsh 1 ub Om Miv V1Qai Me (OS V/1 Nochures sVenNOGA) Od 2 y Fp Parb 22.

Accreditation Category	Oe(Masble - G1rgai OA\$KO at o@In WesbKONW
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### General Comments

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W.Sere a reVitmen less Baiws, resulb GS SQSer Bai Be 6Bp K.BSB v at Lehue bitwood art sav We extra Mindogesbaten hourbid is in Notin Csuconfole is avoing the saving of the bitwood of an air and the bitwood of an air and the bitwood of an air and the bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a single bitwood of a sin

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pPm = pelab Ee PerMei bage moberei Me

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## Laboratory Duplicate (DUP) Report

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No Laboratory Duplicate (DUP) Results are required to be reported.



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

Varaveber 6 bl v 11 60dr V1 beibal la Litrabit fi Mibav Cabidi. TSe qualoof Mibri berv 6 a Litrabit yibril Noçe wêy N, recers bl a Mendoden recereinde v abendalk 1r a )i 1 (i Chercereinde oree v abov? svoçen (65 bargeb TSe qual Obj. Mith 1 berv DeloSth Qeal tradity I lai) recers of ai aid the oree valor of (SOLG all reage its are abhen Close save Etluves 1 M1V/11/20 is as usen Close harb savive VreVarabodi. TSe VurVitse 10 LoSG Hy ai alt bes. TSe VurVise 10bS8 Hy Varav eber 65 bi v 11 60 r v ebS1h VreN&Gi ai haMMraM CheVei hei b10sav Vie v abros. mti av CompeM Ent 60 Gs are Laseh 11 sbabssbab eBaluatori 10Vr1N&esseh 69 N.

No Method Blank (MB) or Laboratory Control Spike (LCS) Results are required to be reported.

### Matrix Spike (MS) Report

TSe qual Commitment Dators, NVC, w.D.N, recors of ai Cibrala Linabilit sVICo sav Me sVVC, en one No. aialt be reM Eerols. Noodbook pent 60s obsas VerlaL1radid maba Hualobi B Ljewoldes wom HBs. GleanireMilent raiges sbabe h at Le (a Gen C bee Eerib 10 sav Vie vabook Cobercerei Ne.

No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.



# QA/QC Compliance Assessment to assist with Quality Review

Environmental Division Selbourne +61-2-745j j 688 16-Nep-0808 07-Nep-0808 : 1 of 18 <u>.</u> Date Namples 3 edeiveR Oo/ of samples analyseR Oo/ of samples redeiveR **G**sue Date Laboratory Telephone **EMM CONSULTING PTY LTD** PcAL UGIBON EM2016060 N1j 8410 <del>-</del> <del>-</del> <del>-</del> : BrRer number **Work Order** Contadt Nampler **Proædt** Client Nite

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 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 report contribute to the overall DQO assessment and reporting for guideline compliance.

I rief methoRsummaries anRreferendes are also proviReRto assist in tradeability/

### Summary of Outliers

## Outliers: Quality Control Samples

This report highlights outliers flaggeRin the Kuality Control .KCCB eport/

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

## Outliers: Analysis Holding Time Compliance

NO Analysis Holding Time Outliers exist.

## **Outliers: Frequency of Quality Control Samples**

Quality Control Sample Frequency Outliers exist - please see following pages for full details.



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Outliers: Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

### SatriM WATER

, 1							
CompounR Uroup Oame	Laboratory Nample ®	Client Nample ®	Analyte	Cc N Oumber	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED851U: Nulfate . TurbiRimetridQas NB 5 0- by Dc	ES0814655880	cnonymous	Sulfate as SO4 -	15787-Уј -7	Oot	1	MS recovery not determined,
			Turbidimetric		DetermineR		background level greater than or
							equal to 4x spike level.
ED851U: Nulfate . TurbiRimetridQas NB5 0- by Dc	ES0816868812	N00 S-x I	Sulfate as SO4 -	15787-Yj -7	Oot	ł	MS recovery not determined,
			Turbidimetric		DetermineR		background level greater than or
							equal to 4x spike level.
ED854U: ChloriRe by Disdrete cnalyser	ES0814655880	cnonymous	Chloride	1677Y-88-6	Oot	1	MS recovery not determined,
					DetermineR		background level greater than or
							equal to 4x spike level.
ED854U: ChloriRe by Disdrete cnalyser	ES0816868812	N00 S-x I	Chloride	1677Y-88-6	Oot	l	MS recovery not determined,
					DetermineR		background level greater than or
							equal to 4x spike level.
EU824T: Total 3 edoverable S erdury by F ® N	ES0816868885	AUS-S0N	Mercury	Y52j -j Y-6	47/1 %	Y8/8-128%	Recovery less than lower data quality
							objective
Ek874S: NulfiRe as No-	ES0816868880	AUS-S1N	Sulfide as S2-	175j 6-04-7	% 9/09	Y8/8-128%	Recovery less than lower data quality
							objective

## **Outliers: Frequency of Quality Control Samples**

### SatriM WATER

Kuality Control Nample Type	Count	ınt	3 ate	3 ate .%Q	Kuality Control Npedifidation
SethoR	KC	3 egular	c dtual	c dtual EMpedteR	
Laboratory Duplidates . DAPQ					
Uross c Ipha anR1 eta cdtivity	80	80	88/8	18/88	OEPS 0812 I 2 V c LN K C NtanRarR
Laboratory Control Namples .LCNQ					
Uross c Ipha anR1 eta cdtivity	1	80	4/88	18/88	OEPS 0812 I 2 V c LN K C NtanRarR

## Analysis Holding Time Compliance

©samples are iRentifieRbelo, as having been analyseRor eMradteRoutsiRe of redommenReRholRing timesHthis shoulRbe ta)en into donsiReration, hen interpreting results/

756H cPxcH cN anR OEPSQ baseR on the sample dontainer This report summarizes eMradtion q preparation anR analysis times anR dompares eadh , ith cLN redommenReR holRng times .referending ANEPc N( proviReR' Dates reporteRrepresent first Rate of eMradtion or analysis anR predures subse&uent Flutions anR reruns/ c listing of breadhes .if anyGs provireR herein/

xolRing time for leadhate methoRs .e/g/ TCLPQ vary addorRing to the analytes reporteR cssessment dompares the leadh Rate , ith the shortest analyte holRing time for the e&uivalent soil methoR? These are: 15 Rays Hmerdury 07 Rays V other metals 178 Rays/ c redor ReBbreadh Roes not guarantee a breadh for all non-volatile parameters/

xolRing times for VOC in soils vary addorRing to analytes of interest ; inyl ChloriRe anR Ntyrene holRing time is YRaysw others 15 Rays/ c redorReR breadh Roes not guarantee a breadh for all ; BC analytes anR shoulR be verifieR in dase the reporteR breadh is a false positive <u>or</u>; inyl ChloriRe anR Ntyrene are not ) ey analytes of interest dondern/

### SatriM WATER

S atriM WATER				Evaluation:	x = x olRing time	oreadh w✓ = ( ithir	holRing time/
Method	Sample Date	Extract	ion / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted Du	ue for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



 Page
 : 2 of 18

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S april WATER					Fvaluation	x = x olland time	Evaluation: $\mathbf{x} = \mathbf{x}$ olding time breadh $\mathbf{w}' = ($ ithin holding time.	n holRing time/
Mathod		Option Option	Ų	a citoro a ordina de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra del la contra del la contra del la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra del la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra del la contra del la contra de la contra de la contra de la contra de la contra de la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra del la contra			Analysis	0
Container / Client Sample ID(s)		Sample Date	Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA150: Particle Sizing								
Clear Plastic Bottle - Natural (EA154) PND 80		11-Sep-2020	1			18-Sep-2020	18-S ar-0801	>
Clear Plastic Bottle - Natural (EA154) PND 81H PND 80	PND 80H	12-Sep-2020	I	-		18-Sep-2020	11-S ar-0801	>
Clear Plastic Bottle - Natural (EA154) PND 81		13-Sep-2020			1	18-Sep-2020	10-S ar-0801	>
EA250CA: Gross Alpha and Beta Activity								
Clear Plastic Bottle - Natural (EA250) AUS-S14NH	HQ00S-×1	12-Sep-2020	l	-		23-Sep-2020	11-S ar-0801	>
ED037D: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P) AUS-S 1DH	AUS-S1NH	11-Sep-2020	I		!	18-Sep-2020	04-Nep-0808	>
AUS-S 10DH	AUS-S10NH							
I x -S 16DH	I x -S 16NH							
I x -S 01DH	I x -S 01NH							
I x -S 05DH	I x -S 05N							
Clear Plastic Bottle - Natural (ED037-P)	HNOO	12-Sen-2020	į			18-Sen-2020	06-Nen-0808	`
AUS-S 14NH	HQ00 S- × I							>
HN00 S- × I	I x-S 02DH							
I x -S 02N								
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)	HNTO	11-Sep-2020	į		l	18-Sen-2020	8i -Bdt-0808	
AUS-810DH	AUS-S 10NH	<u>1</u>				<u>.</u>		•
I.X-S 16DH	1.5 S 16NH							
I x -S 01DH	I x-S01NH							
I x -S 05DH	I x-S 05N							
Clear Plastic Bottle - Natural (ED041G)								
AUS-S0DH	AUS-SONH	12-Sep-2020	-			18-Sep-2020	18-Bdt-0808	>
AUS-S14NH	I x -S 00DH							
HN00 S- X I	I x -S 02DH							
I x -S 02N								



: 5 of 18 : ES 0816868 : ES S CBONALTŒU PTWLTD : N1j 8410

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SatriM WATER					Evaluation	: x = x olRing time	Evaluation: $\mathbf{x} = \mathbf{x}$ olRng time breadh $\mathbf{w}' = ($ ithin holRing time/	holRing time/
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)								
AUS-S1DH	AUS-S1NH	11-Sep-2020	1	-	1	18-Sep-2020	8j -Bdt-0808	>
AUS-S10DH	AUS-S10NH							
I x -S 16DH	I x -S 16NH							
I x -S 01DH	I x -S 01NH							
I x -S 05DH	I x -S 05N							
Clear Plastic Bottle - Natural (ED045G)								
AUS-S0DH	AUS-SONH	12-Sep-2020	1	-	-	18-Sep-2020	18-Bdt-0808	>
AUS-S14NH	I x -S 00DH							
I x -S 00NH	I x -S 02DH							
I x -S 02N								
FD002E: Diccipal Moior Cation								
EDUSST: DISSOIVED MAJOR CAUGHS								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
AUS-S1DH	AUS-S1NH	11-Sep-2020	1	1	1	18-Sep-2020	8j -Bdt-0808	>
AUS-S 10DH	AUS-S10NH							
I x -S 16DH	I x -S 16NH							
I x-S01DH	I x -S 01NH							
I x -S 05DH	I x -S 05N							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
AUS-S0DH	AUS-S0NH	12-Sep-2020	i	1	1	18-Sep-2020	18-Bdt-0808	>
AUS-S14NH	I x -S 00DH							
HN00 S-x I	I x -S 02DH							
I x -S 02N								
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)		0					0 0	,
AUS-S1DH	AUS-S1NH	11-Sep-2020	!	1		17-Sep-2020	18-5 ar-0801	>
AUS-S 10DH	AUS-S10NH							
I x-S 16DH	I x -S 16NH							
I x -S 01DH	I x -S 01NH							
I x -S 05DH	I x -S 05N							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)								
AUS-SODH	AUS-SONH	12-Sep-2020	!		-	17-Sep-2020	11-S ar-0801	>
AUS-S14NH	HQ00S-x1							
HN00 S-×I	I x -S 02DH							
I x -S 02N								



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SatriM WATER					Evaluation:	x = x olRing time	Evaluation: $\mathbf{x} = \mathbf{x}$ ol Ring time breadh $\mathbf{w}' = ($ ithin hol Ring time/	holRing time/
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)	2 - C	11.Sep.2020	17.Sep.2020	18-Sar-0801	,	17.Sen-2020	18-S ar-0801	,
H 4000 (T) L 22 A 2 A 2 A 2 A 2 A 2 A 2 A 2 A 2 A				5	>			>
ALIS SOME	A118-814NH	12-Sen-2020	17-Sep-2020	11-S ar-0801	`	17-Sen-2020	11-S ar-0801	`
HN00 S- × -	HU20 S- × I	<u>.</u>	<u>.</u>		•	<u>.</u>		•
31 088								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)								
TI 188H	TI 088H	13-Sep-2020	17-Sep-2020	10-S ar-0801	>	17-Sep-2020	10-S ar-0801	>
TI 288								
EG035F: Dissolved Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)								
AUS-S1DH	AUS-S1NH	11-Sep-2020	!	1		17-Sep-2020	8j -Bdt-0808	>
AUS-S 10DH	AUS-S10NH							
I x -S 16DH	I x -S 16NH							
I x-S 01DH	I x -S 01NH							
I x -S 05DH	I x -S 05N							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)								
AUS-S0DH	AUS-SONH	12-Sep-2020	!	-		17-Sep-2020	18-Bdt-0808	>
AUS-S14NH	I x-S 00DH							
HN00 S- × I	I x -S 02DH							
I x-S 02N								ľ
EG035T: Total Recoverable Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)								
AUS-S1NH	31 188	11-Sep-2020	1	-	-	18-Sep-2020	8j -Bdt-0808	>
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)								
AUS-SONH	AUS-S14NH	12-Sep-2020	-	-	-	18-Sep-2020	18-Bat-0808	>
HN00 S- x I	I x -S 02DH							
31 088								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)								
TI 188H	TI 088H	13-Sep-2020	!	-		18-Sep-2020	11-Bdt-0808	>
TI 288								



Page : 6 of 18
( or) BrRer : ES 0816868
Client : ES S CBONALTŒU PTWLTD
Proædt : N1j 8410

SatriM WATER					Evaluation:	× = x olRing time	Evaluation: $\mathbf{x} = x$ ol Ring time breadh $\mathbf{w}' = ($ ithin hol Ring time/	holRing time/
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG051G: Ferrous Iron by Discrete Analyser								
Clear Plastic Bottle - HCI - Filtered (EG051G) AUS -S 1DH	AUS-21NH	11-Sep-2020	ł	-		17-Sep-2020	17-Nep-0808	>
AUS-S 10DH	AUS-S 10NH							•
I x -S 16DH	I x -S 16NH							
I x -S 01DH	I x -S 01NH							
I x -S 05DH	I x -S 05N							
Clear Plastic Bottle - HCl - Filtered (EG051G)								
AUS-S 0DH	AUS-SONH	12-Sep-2020	1	-	-	17-Sep-2020	1j -Nep-0808	>
AUS-S 14NH	I x -S 00DH							
I x-S 00NH	I x -S 02DH							
I x -S 02N								
EK085M: Sulfide as S2-								
Clear Plastic Bottle - Zinc Acetate/NaOH (EK085)								
AUS-S1DH	AUS-S1NH	11-Sep-2020		1	-	17-Sep-2020	17-Nep-0808	>
AUS-S 10DH	AUS-S10NH							
I x -S 16DH	I x -S 16NH							
I x-S 01DH	I x -S 01NH							
I x -S 05DH	I x -S 05N							
Clear Plastic Bottle - Zinc Acetate/NaOH (EK085)								
AUS-S0DH	AUS-SONH	12-Sep-2020	-			17-Sep-2020	1j -Nep-0808	>
AUS-S14NH	I x -S 00DH							
I x -S 00NH	I x -S 02DH							
I x -S 02N								
EP080/071: Total Petroleum Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP080)								
HNL	TN Control	11-Sep-2020	17-Sep-2020	04-Nep-0808	>	17-Sep-2020	04-Nep-0808	>
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions	013 Fractions							
Amber VOC Vial - Sulfuric Acid (EP080)		44 800 0000	47 Con 2020	8080	,	47 828 2020	8080	,
		11-3ep-2020	17-3ep-2020	04-1466-0000	>	0202-dac-71	04-1460-0000	>
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) TNH	TN Control	11-Sep-2020	17-Sep-2020	04-Nep-0808	>	17-Sep-2020	04-Nep-0808	>



ESS CBONALT®U PTWLTD ES 0816868 N1j 8410 (or) BrRer **Proædt** Client

Quality Control Parameter Frequency Compliance

the eMedteRrate/ c listing of breadhes is proviReRin the Nummary of Butliers/

The follo, ing report summarises the fre&uendy of laboratory KC samples analyseR, ithin the analytidal lot.sQn, high the submitteRsample.sQ as., ereQprodesseR cdtual rate shoulR be greater than or e&ual to

Evaluation: x = Kuality Control fre&uendy not , ithin spedifidation w✓ = Kuality Control fre&uendy , ithin spedifidation/

SatriM WATER

OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 | 2 V cLN KC NtanRarR OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 I 2 V c LN K C Ntan Rar R OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 I 2 V c LN K C Ntan Rar R OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 I 2 V c LN K C Ntan Rar R OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 | 2 V cLN KC NtanRarR OEPS 0812 | 2 V cLN KC NtanRarR OEPS 0812 | 2 V cLN KC NtanRarR OEPS 0812 | 2 V cLN KC NtanRarR OEPS 0812 | 2 V cLN KC NtanRarR OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 | 2 V cLN KC NtanRarR OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 | 2 V cLN KC NtanRarR OEPS 0812 I 2 V cLN KC NtanRarR OEPS 0812 | 2 V cLN KC NtanRarR OEPS 0812 | 2 V cLN KC NtanRarR OEPS 0812 | 2 V cLN KC NtanRarR OEPS 0812 | 2 V cLN KC NtanRarR OEPS 0812 | 2 V c LN KC NtanRarR Quality Control Specification Evaluation Rate (%) Expected 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 Actua! 11.11 10.53 10.71 11.76 10.00 11.76 12.50 10.00 10.34 0.00 10.00 5.56 5.26 7.14 5.88 5.00 6.25 5.56 5.26 5.00 7.14 5.00 5.00 6.90 5.00 5.88 6.90 5.88 6.67 Redular 25 25 0j 28 0j 17 08 1 58 08 0j 0j 1j 08 07 28 08 28 0j 17 08 28 7 08 25 ==Count 8 0 0 ω 2 0 0 2 0 2 0 0 N EU824F ED8j 2F EP878 ED851U Ek 874 Ec 048 EU808c-F Ec 048 ED854U EU808c-F Ec 048 ED8j 2F Ek 874 ED82Y-P EU808c-F EU841U ED851U Ek 874 EU808c-T ED82Y-P EU841U ED8j 2F EU808c-T EP878 EU824F EU841U ED851U EU824T ED854U EU824T ED854U EU824F EU824T **Method** Nulfate . TurbiRimetridQas NB 5 0- by Disdrete c nalyser Nulfate . TurbiRimetridQas NB 5 0- by Disdrete c nalyser Nulfate . TurbiRimetridCas NB 5 0- by Disdrete c nalyser DissolveRS etals by GP-SN - Nuite c DissolveRS etals by GP-SN - Nuite c DissolveRS etals by GP-SN - Nuite c aboratory Control Namples . LCNQ Ferrous Con by Disdrete cnalyser Ferrous Con by Disdrete cnalyser Ferrous Con by Disdrete cnalyser Total Setals by CP-SN - Nuite c Total Setals by CP-SN - Nuite c Total Setals by CP-SN - Nuite c aboratory Duplidates DAPO ChloriRe by Disdrete cnalyser ChloriRe by Disdrete cnalyser Uross cIpha anRI eta cdtivity ChloriRe by Disdrete cnalyser Uross cIpha anRI eta cdtivity Uross cIpha anRI eta cdtivity DissolveRS erdury by FGN DissolveRS erdury by FS N DissolveRS erdury by FGN Sa@r Cations - DissolveR Sa@r Cations - DissolveR Sa@r Cations - DissolveR Kuality Control Nample Type cl) alinity by PC Titrator cl) alinity by PC Titrator Total Serdury by FGN Total Serdury by FSN Total Serdury by FSN SethoRI lan)s . SI Q T3 x ; olatilesq TEX Analytical Methods NulfiRe as No-NulfiRe as No-NulfiRe as No-

OEPS 0812 | 2 V cLN KC NtanRarR

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EU808c-T



: 7 of 18 : ES 0816868 : ES S CBONALTŒU PTWLTD : N1j 8410

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SatriM WATER				Evaluatio	n: x = Kuality Co	ontrol fre&uendy r	Evaluation: x = Kuality Control fre&uendy not, ithin spedifidation w√ = Kuality Control fre&uendy, ithin spedifidation/
Kuality Control Nample Type		S	Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
SethoRI lan)s .SI Q-ContinueR							
T3 x ; olatilesq TEX	EP878	1	16	6.25	5.00	>	OEPS 0812   2 V cLN KC NtanRarR
S atriMNpi) es . S NQ							
ChloriRe by Disdrete cnalyser	ED854U	0	28	6.67	2.00	>	OEPS 0812 I 2 V c LN K C Ntan Rar R
DissolveRS erdury by FGN	EU824F	0	jo	06.9	5.00	>	OEPS 0812 I 2 V c LN KC Ntan Rar R
DissolveRS etals by @P-S N - Nuite c	EU808c-F	_	17	5.56	5.00	>	OEPS 0812 I 2 V cLN KC NtanRarR
Ferrous 6on by Disdrete cnalyser	EU841U	_	i,	5.26	5.00	>	OEPS 0812 I 2 V cLN KC NtanRarR
Nulfate . TurbiRimetridGas NB 5 0- by Disdrete c nalyser	ED851U	0	58	2.00	5.00	>	OEPS 0812 I 2 V c LN K C Ntan Rar R
NulfiRe as NO-	Ek 874	_	1	5.88	5.00	>	OEPS 0812 I 2 V cLN KC NtanRarR
Total Serdury by FSN	EU824T	_	80	2.00	5.00	>	OEPS 0812 I 2 V c LN KC NtanRarR
Total Setals by GP-S N - Nuite c	EU808c-T	0	25	5.88	5.00	>	OEPS 0812 I 2 V c LN KC Ntan Rar R
T3x; olatilesq TEX	EP878	_	16	6.25	2.00	>	OEPS 0812   2 V c LN K C NtanRarR



Page : j of 18 ( or) BrPer : ES 0816868 Client : ES S CBONALT&U PTWLTD Pro&dt : N1j 8410

### **Brief Method Summaries**

The analytidal prodeRures useRby the Environmental Division have been RevelopeR from establisheRinternationally redognizeR prodeRures such as those publisheRby the AN EPC HCPx CHCN anROEPS/ @ house RevelopeR prodeRures are employeR in the absende of RodumenteR stanRarRs or by dlient re&uest/ The follo, ing report proviRes brief Rescriptions of the analytidal prodeRures employeR for results reporteR in the Certifidate of cnalysis/ Nourdes from , hidh cLN methors have been revelopeRare proviner, ithin the Sethor Descriptions/

Analytical Methods	Method	Matrix	Method Descriptions
Partidle Nizing in (ater by Laser Diffradtion cnalysis	uEc 145	(cTE3	Partidle Nize cnalysis of Partidulates in (ater by Laser Diffradtion cnalysis addorRng to cPx c SethoR0468D
Uross clpha anRI eta cdtivity	Ec 048	(cTE3	c NTS DY072-86: Determination of gross alpha anRgross beta raRoadtivity in , ater samples by Li&uiR Ndintillation Counting .LNCQ
c I) alinity by PC Titrator	ED82Y-P	( cTE3	@ house: 3 eferendeR to cPx c 0208   This prodeRure Retermines al) alinity by automateR measurement .e/g/ PC TitrateCon a settleR supernatant ali&uot of the sample using px 5/4 for inRdating the total al) alinity enR-point/ This methoR is dompliant , ith OEPS NdheRule I .2Q
Nulfate .TurbirRmetridCas NB 5 0- by Disdrete cnalyser	ED851U	( cTE3	@ house: 3 eferendeR to cPx c 5488-NB 5/ DissolveR sulfate is RetermineR in a 8/54 um filtereR sample/ Nulfate ions are donverteR to a barium sulfate suspension in an adetid adiR meRum, ith barium dhloriRe/ Light absorbande of the I aNB 5 suspension is measureR by a photometer anR the NB 5-0 dondentration is RetermineR by domparison of the reaRng, ith a stanRarR durve/ This methoR is dompliant, ith OEPS NdheRule I .2Q
ChloriRe by Disdrete cnalyser	ED854U	( cTE3	Ghouse: 3 eferendeRto cPxc 5488 CI - U/The thiodyanate ion is liberateRfrom merdurid thiodyanate through se&uestration of merdury by the dhloriRe ion to form non-ioniseR merdurid dhloriRe/in the presende of ferrid ions the librateRthiodynate forms highly-doloureRferrid thiodynate, hidh is measureRat 578 nm cPxc seal methoR0 81Y-1-L
Sa&r Cations - DissolveR	ED8  2F	( сТЕЗ	
DissolveRS etals by @P-S N - Nuite c	EU808c-F	( cTE3	
Total Setals by ©P-SN - Nuite c	EU808c-T	( cTE3	
DissolveRS erdury by F <b>\$</b> N	EU824F	( сТЕЗ	Gh house: 3 eferendeRto cN 2448HcPx c 2110 xg - 1 . Flo, -in&dtion .NnCl0QCoIR; apour generationQc cNQ Namples are 8/54* m filtereRprior to analysis/ FGS-ccN is an automateRflameless atomid absorption tedhni&ue/c bromatechromiRe reagent is useRto oMRase any organid merdury dompounRs in the filtereR sample/. The ionid merdury is reRudeR online to atomid merdury vapour by NnCl0, hidh is then purgeR into a heateR &uartz dell/k untifidation is by domparing absorbande against a dalibration durve/. This methoR is dompliant, ith OEPS NdheRule 1 .2Q



: 18 of 18 : ES 0816868 : ES S CBONALTŒU PTWLTD : N1j 8410

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Analytical Methods	Method	Matrix	Method Descriptions
Total Serdury by F <b>©</b> N	EU824T	( сТЕЗ	© house: 3 eferendeRto cN 2448HcPx c 2110 xg - 1. Flo, -inection .NnCl0QCoIR; apour generationQc cNQ FGS-ccN is an automateRflameless atomid absorption tedhni&ue/ c bromateфromiRe reagent is useRto oMRse any organid merdury dompounRs in the unfiltereRsample/ The ionid merdury is reRudeRonline to atomid merdury vapour by NnCl0, hidh is then purgeRinto a heateR&uartz dell/ Kuantifidation is by domparing absorbande against a dalibration durve/ This methoRis dompliant, ith OEPS NdheRule 1.2Q
Ferrous @on by Disdrete cnalyser	EU841U	( cTE3	
NulfiRe as N0-	Ek874	( сТЕЗ	© house: 3 eferendeR to cPx c 5488-No- D/ NulfiRe spedies present in , ater samples are immeRately predipitateR, hen dolledteR in pretreateR daustidqind adetate preserveR sample dontainers/ The sulphiRes are doloureR using methylene blue inRdator/ Oon-Retedts may be sdreeneR by domparison against a stanRarRat half-LB3 Hother, ise samples are measureR using A; -; Ol Retedtion at 665nm/ This methoR is dompliant, ith OEPS NdheRule I. 2Q
Onid I alande by PCT Dc anRTurbi NB5 Dc	u EO844 - PU	( сТЕЗ	A house: 3 eferendeR to cPx c 1828F/ This methoR is dompliant, ith OEPS NdheRule I .2Q
T3x; olatilesq TEX	EP878	( cTE3	(3) house: 3 eferendeR to ANEPc N(756 - 7068 (ater samples are Rredtly purgeR prior to analysis by Capillary UC45 N anR & Landflidation is by domparison against an establisheR 4 point dalibration durve/clternativelyHasample is e AuilibrateR in a hearspade vial anR a portion of the hearspade RetermineR by UCS N analysis/This methoR is dompliant, ith the KC re&uirements of OEPS NdheRule 1.2Q
Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total 3 edoverable S etals	E004	( cTE3	© house: 3 eferendeR to ANEPc N(756-2884/ SethoR 2884 is a Oitridq yRodhlorid adiR Rigestion prodeRure useR to prepare surfade an R groun R, ater samples for analysis by CPCEN or CPS N/This methoR is dompliant, ith OEPS NdheRule I.2Q
; olatiles ( ater Preparation	B3U16-(	( cTE3	c 4 mL ali&uot or 4 mL of a RiluteR sample is aRReR to a 58 mL; BC vial for sparging/

	CHAIN OF CUSTODY	ALS Laboratory: please 6ck >	
		-	

DEVISOANE 2 Byth Street Statford OI D 40/53 Phr 1/3 2453 7222 E. semples herabonemigate/phint com DISLADSTONE 46 Gestermonder Drove Chevin ot ID 4/50 Phr 07 7431 9000 E. glostolone/@aughost com

JAKACKAY 78 Harbour Road Mackay QLD 4740 Ph. 07 4944 0177 E: madasy@alagobal.com

CIMUDISEE 1/29 Sydnoy Road Mudgae NSW 2859 Ph. 02 6372 6735 E. mudgae mar@atsglobat.com

OMELBOURNE 2.4 Wostar Road Springvalo VIC 3171 Ph. 03 8549 9849 Et samples, malbourne@alsglebat.com Standard TAT (List due date): (Standard TAT may be longer for earne texts a.g., Uttra D. Non Standard or urgent TAT (Liet due date): Trace Organica)

TURNAROUND REQUIREMENTS:

COUNTRY OF ORIGIN:

ALS QUOTE NO

\$190512

PROJECT NO.:

OFFICE: 20 Chandos Street, St Leanards

LIENT: EMM CONSULTING

PROJECT: Baltanald T3 Anoillary

ONEWCASTI E 5/595 Maritand Rood Maydele West NSW 2304 Ph. 02 4314 7900 E. samples newcasde@akqichal.com

□PERTH 10 Hod Way Malaga 'WA 6090 Pr. 08 9203 7635 E. samples perth@alsglobst.com

DINOWRA 4/13 Geary Place North Newta NSW 2541 Phr 02 4423 2063 E. Anwra@alegiobal.com

FOR LABORATORY USE ONLY (Circle)

CDWOLLONGONG 1/19-21 Raiph Black Dr. North Wofongong NSW 2500 Phr. 02 4225 3125 E. wptongong@aksplobal.com DTOWNSVILE 14-15 Desma Court Boxie QLD 4816 Ph. C7 4796 0500 E. tomesvielenatonmerfaligetglobet tom DSYDNEY 277-289 Woodpark Road Smahdeld NSW 2164 Ph. 02.8784 8585 E. samelys.sydney@elegiobal com

N/A ş

> nee ice / frozen ice bricks present upon receipt? Random Sample Temperature on Receipt

(Circle)

COC SEQUENCE NUMBER 2 3

Θ Θ

000 ë RECEIVED BY:

RELINQUISHED BY:

SAMPLER MOBILE: 0401831447

EDD FORMAT (or default):

mail Reports to: pgibbone@emmconsulting.com.su; doordon@emmconsulting.com.au; kbrodie@emmconsulting.com.au

SAMPLER: Kaitlyn Brodie / Luke Griffiths

COC Envaled to ALS? ( YES )

PROJECT MANAGER: Paul Gibbons

YJRCHASE ORDER:

nall Involce to: accounts@commonsuting.com.au, pgibbons@enmoonsuting.com.au

OMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

CONTACT PH: 0477702413

Kaitiyn Brodie

DATE/TIME:

ATEMINE:

7

stody Seal Intact?

10 Fee priments on Illiary contaminant levats, dilutions, or imples requiring specific OC analysis etc. Additional Information

> Where Metats are required, specify Total (unfatured bottle required) or Dissobred (field filtured bottle required) ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)

> > CONTAINER INFORMATION

Solid(S) Water(W)

SAMPLE DETAILS

ALS USE ONLY

DOTTLES

MATRIX

DATE / TIME

SAMPLE ID

LABID

Work Order Reference EM2016426 **Environmental Division** Melbourne

Telephone: +61-3-8549 9600

₹ ≥

15/09/2020 13:10

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15/09/2020 14:55 6/09/2020 10:20 6/09/2020 9:35 16/09/2020 8:45

JGM-M15S JGM-M4D

BH-M19S BH-M19D

70

BH-M250

97

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	Duplicate - Interlab analysis	Triplicate - intralab analysis. Please forward to Envirolab for analysis			15. COM 15. 15. 15. 15. 15. 15. 15. 15. 15. 15.	Action Tradigity RP	Soldlore Soldlore	Ther Park	) ate -41		Received: 21/4 11/20	C/note-gen 153	Temp: 18-20 Sent	rcc ( redbricks NA)	
			-	-	-	-	-	-							40
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15/09/2020 12:30	16/09/2020 0:00	16/09/2020 0:00	14/09/2020 11:20	15/09/2020 11:30	16/09/2020 7:00	14/09/2020 11:25	15/09/2020 11:35	16/09/2020 7:05		16/09/2020 14:30	16/09/2020 14:30	16/09/2020 14:30	15/09/2020 15:30	16/09/2020 10:35	0.101-
BH-M25S	OA100	QA101	PSD 01	PSD 01	PSD 01	PSD 02	PSD_02	PSD_02	TS	TB100	TB200	TB300	RB100	RB400	

Wither Compline Codes: P = Unreceived Planks. N = Nitric Preserved ORC, 81+ Storlam Hydroxide Preserved Section Hydroxide Preserved Planks. Section Hydroxide Planks. Section Hydroxide Preserved Annual Codes: P = HZ preserved Planks. N = Nitric Preserved Annual Codes: H = HZ preserved Planks. N = Nitric Preserved Planks. F = Section Preserved Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks. Section Planks 3 31/7/20 TS Control

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TOTAL

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## CERTIFICATE OF ANALYSIS

Laboratory **EMM CONSULTING PTY LTD** EM2016426 **Work Order** 

: 4 Westall Rd Springvale VIC Australia 71-1 Shane Colley Contact Address Ground Floor Suite 1 20 Chandos Street PAUL GIBBONS

**Environmental Division Melbourne** 

: 1 of 3

22+Sep+2020 10:45 861 +7 +9543 3600 Date Samples Received Telephone St Leonards NSW NSW 2065 S130512

22+Sep+2020 Date Analysis Commenced Issue Date

HAITL/ N BRODIEKLUHE GRIFFITQS

‡

C+O+C number

Sampler

Order number

Telephone

Project

Contact Address

Client

EN)112)19 +Primary wor, only

20

No. of samples analysed No. of samples received

( note number

01+Oct+2020 11:40

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

This report supersedes any previous reportszwith this reference. Results apply to the sampleszas submitted. This document shall not be reproducedKekcept 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 authoriYed signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Accreditation Category	Newcastle +InorganicsKMayfield WestKNSW	Melbourne InorganicsKSpringvaleKVIC	Melbourne OrganicsKSpringvaleKVIC	RadionuclidesKFyshwic, KACT
Position	Laboratory Technician	Senior Inorganic Chemist	2IC Organic Chemist	Metals Teamleader
Signatories	Ale, sandar Vuj, ovic	Dilani Fernando	Nancy Wang	Titus Vimalasiri



EM2016426 Wor, Order Client

EMM CONSULTING PT/ LTD S130512 Project

### General Comments

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

Where moisture determination has been performedKresults are reported on a dry weight basis.

Where a reported less than x<zresult is higher than the LORKthis may be due to primary sample ektract/digestate dilution and)or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LORKthis may be due to high moisture contentKnsufficient sample xreduced weight employedz or matrik interference.

When sampling time information is not provided by the client/Sampling dates are shown without a time component. In these instanceskthe time component has been assumed by the laboratory for processing

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

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. Hey:

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.

EP090: Samples EM20164268014K020 TRIP SPIHE and TRIP SPIHE CONTROL contains volatile compounds spi, ed into the sample containers prior to dispatch from the laboratory.

EG0204T: Metals for EM2016426 #19 and #13 has been confirmed by re-preparation and re-analysis.

EA154: ALS does not hold NATA accreditation for Laser Particle SiYing

EG0204F: EM2016426 #1+ dissolved metal required dilution prior analysis due to sample matrik. LORs have been adjusted accordingly.

EP090: Where reportedkTotal Xylenes is the sum of the reported concentrations of m\_p+Xylene and o+Xylene at or above the LOR.

EG0204T : EM2016426 #2 total metal required dilution prior analysis due to sample matrik. LORs have been adjusted accordingly

lonic balances were calculated using: major anions +chlorideKal, alinity and sulfate; and major cations +calciumKmagnesiumKpotassium and sodium.

LOR for Gross Alpha and Gross Beta raised due to high solid content.

ED045G: The presence of thiocyanate can positively contribute to the chloride resultKhereby may bias results higher than ekpected. Results should be scrutinised accordingly

EG075F: EM2016426 #2 Poor matrik spi, e recovery for dissolved mercury due to sample matrik. Confirmed by retektraction and retenalysis.

EH095: EM2016426+002 Poor matrik spi, e recovery for sulphide due to sample matrik. Confirmed by re+ektraction and re-tanalysis.

Sodium Adsorption Ratio wwhere reported 2. Where results for NaKCa or Mg are <LORKa 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 = Yero concentration and a conservative approach for Ca \_ Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Project Client

: 7 of 3 : EM2016426 : EMM CONSULTING PT/ LTD : \$130512

Page Wor, Order

Sub-Matrik: WATER		Clie	Client sample ID	UGM-M4D	UGM-M15S	BH-M19D	BH-M19S	BH-M25D
(Matrik: WATER)	i							
	S	int samplin	Client sampling date / time	15+Sep+2020 14:55	16+Sep+2020 10:20	16+Sep+2020 03:75	16-Sep-2020 09:45	15-Sep-2020 17:10
Compound	CAS Number	LOR	Unit	EM2016426-001	EM2016426-002	EM2016426-003	EM2016426-004	EM2016426-005
				Result	Result	Result	Result	Result
EA250: Gross Alpha and Beta Activity								
Gross beta	‡	0.10	Bq)L		3.40	2.11	2.35	
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO+210+001	-	mg)L	<b>\</b>	<b>\</b>		1>	<b>√</b>
Carbonate Alkalinity as CaCO3	79124246	-	mg)L	₹	^	₹	>	<b>√</b>
Bicarbonate Alkalinity as CaCO3	- 14524	-	mg)L	376	246	425	307	398
Total Alkalinity as CaCO3	‡	-	mg)L	376	246	425	307	398
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	- by DA							
Sulfate as SO4 - Turbidimetric	14909+ 3+9	-	mg)L	2650	4980	3240	4720	3310
ED045G: Chloride by Discrete Analyser								
Chloride	1699- +00+6	-	mg)L	18300	24600	18500	25600	17900
ED093F: Dissolved Major Cations								
Calcium	- 440+ 0+2	-	mg)L	586	717	515	658	578
Magnesium	-473454	-	mg)L	1600	1750	1530	1860	1570
Sodium	- 440+27+5	~	mg)L	11700	15000	11100	15400	10800
Potassium	-440+03+	-	mg)L	49	35	20	32	52
EG020F: Dissolved Metals by ICP-MS								
Arsenic	- 4404942	0.001	mg)L	<0.002	0.002	0.004	<0.002	0.004
Cadmium	- 44047+3	0.0001	mg)L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Chromium	- 4404- 47	0.001	mg)L	<0.002	0.011	<0.002	<0.002	<0.002
Copper	- 440+50+9	0.001	mg)L	<0.002	0.119	<0.002	0.034	0.017
Nickel	-440+02+0	0.001	mg)L	<0.002	0.011	<0.002	0.004	<0.002
Lead	-4734824	0.001	mg)L	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc	- 440-66-6	0.005	mg)L	<0.010	<0.010	<0.010	0.018	<0.010
EG020T: Total Metals by ICP-MS								
Arsenic	- 4404942	0.001	mg)L		0.003			
Cadmium	- 44047+8	0.0001	mg)L		<0.0002			
Chromium	- 4404- 규	0.001	mg)L		0.028			
Copper	- 44045049	0.001	mg)L		0.152			
Nickel	-440+02+0	0.001	mg)L		0.014			
Lead	-4734824	0.001	mg)L		<0.002			
Zinc	- 440-66-6	0.005	mg)L		<0.010			
EG035F: Dissolved Mercury by FIMS								
Mercury	-47348- 46	0.0001	mg)L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS	IMS							



EMM CONSULTING PT/ LTD S130512

: 4 of 3 : EM2016426

Wor, Order

Project Client

15+Sep+2020 17:10 EM2016426-005 BH-M25D Result 2.39 ٥. 1. l 16+Sep+2020 09:45 EM2016426-004 BH-M19S Result <0.05 0.7 l 16+Sep+2020 03:75 EM2016426-003 **BH-M19D** Result 9.27 l 0.4 16+Sep+2020 10:20 EM2016426-002 UGM-M15S Result <0.0001 <0.05 <u>^0</u> 15+Sep+2020 14:55 EM2016426-001 UGM-M4D Result **~**0.1 l Client sample ID Client sampling date / time mg)L Unit mg)L mg)L -47348-46 0.0001 LOR 0.05 19436+25+9 0.1 ŧ EG035T: Total Recoverable Mercury by FIMS - Continued CAS Number EG051G: Ferrous Iron by Discrete Analyser EK085M: Sulfide as S2-EN055: Ionic Balance & Total Anions Sub-Matrik: WATER (Matrik: WATER) Sulfide as S2-Ferrous Iron Compound Mercury

629 3.91

1.78

856 826

598 636 3.07

802 833 1.87

7.38

%

579 671

med)L med)L

0.01 0.01 0.01

###

582

| |

<2.23

×1.-3

1.33

2.34 2.63

Bd)L Bq)L

0.05

##

EA250CA: Gross Alpha and Beta Activity

Ø Ionic Balance

Ø Total Cations

Gross beta activity - 40K

Gross alpha

4.55



: 5 of 3 : EM2016426 : EMM CONSULTING PT/ LTD : \$130512 Project Client

Page Wor, Order

Sub-Matrik: WATER		Clie	Client sample ID	BH-M25S	QA100	PSD 01	PSD 04	PSD 01
(Matrik: WATER)					<u> </u>	-	) ) )	1
	Clie	ent samplir	Client sampling date / time	15+Sep+2020 12:70	16+Sep+2020 00:00	14+Sep+2020 11:20	15+Sep+2020 11:70	16+Sep+2020 0-:00
Compound	CAS Number	LOR	Unit	EM2016426-006	EM2016426-007	EM2016426-008	EM2016426-009	EM2016426-010
				Result	Result	Result	Result	Result
EA150: Particle Sizing								
ø +75μm	‡	-	%			See Attached	See Attached	See Attached
EA250: Gross Alpha and Beta Activity								
Gross beta	‡	0.10	Bq)L		2.90	-		
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO+210+001	-	mg)L	<b>\</b>	<b>\</b>	-	-	-
Carbonate Alkalinity as CaCO3	791247246	-	mg)L	٧	₹	-	-	
Bicarbonate Alkalinity as CaCO3	- 1+52+7	-	mg)L	291	308	-	-	
Total Alkalinity as CaCO3	‡	-	mg)L	291	308	-		
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	by DA							
Sulfate as SO4 - Turbidimetric	14909+ 3+9	-	mg)L	5020	4860	-	1	:
ED045G: Chloride by Discrete Analyser								
Chloride	1699- +00+6	-	mg)L	24900	25800		-	-
ED093F: Dissolved Major Cations								
Calcium	- 440+ 0+2	-	mg)L	647	643	-	-	-
Magnesium	-473-85-4	-	mg)L	1810	1840	-		1
Sodium	- 440-27-5	-	mg)L	15300	15200	-		
Potassium	-440+03+	-	mg)L	31	32	1		
EG020F: Dissolved Metals by ICP-MS								
Arsenic	- 4404942	0.001	mg)L	<0.002	<0.002	-		
Cadmium	- 44047+3	0.0001	mg)L	<0.0002	<0.0002	-		
Chromium	- 4404- +7	0.001	mg)L	<0.002	<0.002	-		
Copper	- 440+50+9	0.001	mg)L	0.008	0.033	-		
Nickel	-440+02+0	0.001	mg)L	0.017	0.004	1		
Lead	-4734824	0.001	mg)L	<0.002	<0.002			
Zinc	- 440-66-6	0.005	mg)L	0.012	0.016	-		
EG035F: Dissolved Mercury by FIMS								
Mercury	-47343- 46	0.0001	mg)L	<0.0001	<0.0001	-		
EG051G: Ferrous Iron by Discrete Analyser								
Ferrous Iron	#	0.05	mg)L	0.10	<0.05	-		
EK085M: Sulfide as S2-								
Sulfide as S2-	19436+25+9	0.1	mg)L	0.1	0.2	-	-	
EN055: Ionic Balance								
Ø Total Anions	‡	0.01	med)L	813	835			



: 6 of 3 : EM2016426 : EMM CONSULTING PT/ LTD : \$130512

Page Wor, Order Client

Project

Sub-Matrik: WATER (Matrik: WATER)		Clie	Client sample ID	BH-M25S	QA100	PSD_01	PSD_01	PSD_01
	Oliv	ent samplin	Client sampling date / time	15+Sep+2020 12:70	16+Sep+2020 00:00	14+Sep+2020 11:20	15-Sep-2020 11:70	16+Sep+2020 0-:00
Compound	CAS Number LOR	LOR	Unit	EM2016426-006	EM2016426-007	EM2016426-008	EM2016426-009	EM2016426-010
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
Ø Total Cations	#	0.01	med)F	848	846			
Ø Ionic Balance	#	0.01	%	2.10	0.62			
EA250CA: Gross Alpha and Beta Activity								
Gross alpha	‡	0.05	Bd)L		4.30			
Gross beta activity - 40K	#	0.10	Bq)L		<2.23			



Client Project

: - of 3 : EM2016426 : EMM CONSULTING PT/ LTD : \$130512

Page Wor, Order

Sub-#//atrik: WATER		Clier	Client sample ID	PSD_02	PSD_02	PSD_02	TS	TB100
	Clie	int samplin	Client sampling date / time	14+Sep+2020 11:25	15+Sep+2020 11:75	16+Sep+2020 0-:05	71+Jul+2020 00:00	16+Sep+2020 14:70
Compound	CAS Number	LOR	Unit	EM2016426-011	EM2016426-012	EM2016426-013	EM2016426-014	EM2016426-015
				Result	Result	Result	Result	Result
EA150: Particle Sizing								
/ p +75µm	#	1	%	See Attached	See Attached	See Attached		
EG020T: Total Metals by ICP-MS								
Arsenic	-44049-2	0.001	mg)L					<0.001
Cadmium	-44044748	0.0001	mg)L					<0.0001
Chromium	- 44044- 47	0.001	mg)L					<0.001
Copper	- 440+20+9	0.001	mg)L					<0.001
Nickel	-440+02+0	0.001	mg)L					<0.001
Lead	-473·82세	0.001	mg)L					<0.001
Zinc	-440+66+6	0.005	mg)L					<0.005
EG035T: Total Recoverable Mercury by FIMS								
Mercury	-47348- 46	0.0001	mg)L					<0.0001
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	‡	20	hg)L				140	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions	- NEPM 2013	Fraction	S					
C6 - C10 Fraction	C6&C10	20	hg)L				160	
C6 - C10 Fraction minus BTEX	C6&C10+BTEX	20	hg)L	1	1	-	80	!
(F1)								
EP080: BTEXN								
Benzene	- 147+2	1	hg)L				13	
Toluene	109+99+7	2	hg)L				14	
Ethylbenzene	100414	2	hg)L				12	
meta- & para-Xylene 109中	109 79 7 106 42 7	2	hg)L				26	
ortho-Xylene	3544-16	2	hg)L				16	
^ Total Xylenes	‡	2	hg)L				42	
^ Sum of BTEX	‡	1	hg)L				81	
Naphthalene	31+20+7	2	hg)L				<5	
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	1-060+0-+0	2	%				97.5	
Toluene-D8	207-42645	2	%				94.4	-

l

85.1

l

İ

%

460+00+4

4-Bromofluorobenzene



Project

: 9 of 3 : EM2016426 : EMM CONSULTING PT/ LTD : \$130512

Page Wor, Order Client

Sub-Matrik: WATER (Matrik: WATER)		Clier	Client sample ID	TB200	TB300	RB100	RB400	TS Control	
	Clie	ent samplin	Client sampling date / time	16+Sep+2020 14:70	16+Sep+2020 14:70	15+Sep+2020 15:70	16+Sep+2020 10:75	71+Jul+2020 00:00	
Compound	CAS Number	LOR	Unit	EM2016426-016	EM2016426-017	EM2016426-018	EM2016426-019	EM2016426-020	
				Result	Result	Result	Result	Result	
EG020T: Total Metals by ICP-MS									
Arsenic	-44045	0.001	mg)L	<0.001	<0.001	<0.001	<0.001	i	
Cadmium	-44047+3	0.0001	mg)L	<0.0001	<0.0001	<0.0001	<0.0001		
Chromium	-4404- 47	0.001	mg)L	<0.001	<0.001	<0.001	0.005		
Copper	-440+20+6	0.001	mg)L	<0.001	<0.001	0.030	0.035	1	
Nickel	-440+02+0	0.001	mg)L	<0.001	<0.001	<0.001	0.003		
Lead	-473+82+1	0.001	mg)L	<0.001	<0.001	0.002	0.003	-	
Zinc	-440-66-6	0.005	mg)L	<0.005	<0.005	0.120	0.062	-	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	-473+8-+6	0.0001	mg)L	<0.0001	<0.0001	<0.0001	<0.0001	-	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	‡	20	hg)L	1			-	210	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions	<b>NEPM 2013</b>	Fraction	S						
C6 - C10 Fraction	C6&C10	20	hg)L					250	
^ C6 - C10 Fraction minus BTEX C63 (F1)	C6&C10+BTEX	20	hg)L					130	
EP080: BTEXN									
Benzene	- 147+2	-	hg)L	i			-	19	
Toluene	109+69-17	2	hg)L					19	
Ethylbenzene	100+41+4	2	hg)L	-				19	
meta- & para-Xylene	1094947 1064247	2	hg)L	-				40	
ortho-Xylene	35+4-+6	2	hg)L					21	
^ Total Xylenes	‡	2	hg)L	-				61	
^ Sum of BTEX	‡	_	hg)L	-				118	
Naphthalene	31+20+7	2	hg)L					5	
EP080S: TPH(V)/BTEX Surrogates									
	1-060-0-10	2	%	-				102	
Toluene-D8	207-42645	2	%	-			-	97.9	
4-Bromofluorobenzene	460+00+4	2	%	1	-			93.0	



: 3 of 3 : EM2016426 : EMM CONSULTING PT/ LTD : \$130512 Surrogate Control Limits Sub-Matrik: WATER
Compound
EP080S: TPH(V)/BT
1.2-Dichloroethane-D.
Toluene-D8
4-Bromofluorobenzen Page Wor, Order Client Project

ub#viatrik: <b>vvA i EK</b>		Recovery	Recovery Limits (%)
Sompound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
I.2-Dichloroethane-D4	1-060+0-+0	-7	123
Foluene-D8	207- +26+5	0 -	125
t-Bromofluorobenzene	460+00+4	-1	123



## QUALITY CONTROL REPORT

Environmental Division Melbourne : 1 of 9 Laboratory **EMM CONSULTING PTY LTD** EM2014624 **Work Order** Contact

5 Westall Rd Springvale VIC Australia 3191 Shane Colley Contact Address Ground Floor Suite 1 20 Chandos Street PAUL GIBBONS

- 61737+458 8600 227Sep72020 227Sep72020 017Oct72020 Date Analysis Commenced Date Samples Received Telephone Issue Date St Leonards NSW NSW 2064 S180412 C707C number Order number

Telephone

Project

Address

Client

, AITLKN BRODIECLU, E GRIFFIT/ S ENK112KI+7Primary (or) only 20 No. of samples analysed No. of samples received

wuote number

Sampler

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

This report supersedes any previous reporbs; ( ith this reference. Results apply to the samplexs; as submitted. This document shall not be reproduced (Descrept in full. This wuality Control Report contains the follo( ing information:

Laboratory Duplicate xDUP; Report YRelative Percentage Difference xRPD; and Acceptance Limits

Method Blan) xMB; and Laboratory Control Spi) e xLCS; Report YRecovery and Acceptance Limits

Matriz Spi)e xMS; Report YRecovery and Acceptance Limits

#### Signatories

This document has been electronically signed by the authoriHed signatories belo(. Electronic signing is carried out in compliance (ith procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ale) sandar Vuj) ovic	Laboratory Technician	Ne( castle 7 Inorganics QMayfield WestQNSW
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics@pringvaleQVIC
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Titus Vimalasiri	Metals Teamleader	RadionuclidesŒysh( ic) QACT



 Page
 : 2 of 9

 Wor) Order
 : EM2016526

 Client
 : EMM CONSULTING PTK LTD

 Project
 : \$180412

General Comments

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

Where moisture determination has been performed results are reported on a dry (eight basis.

Where a reported less than x; result is higher than the LORChis may be due to primary sample eztractdigestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LORChis may be due to primary sample eztractdigestate dilution and/or insufficient sample for analysis.

Anonymous = Refers to samples (hich are not specifically part of this (or) order but formed part of the wC process lot

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

, ey:

RPD = Relative Percentage Difference

# = Indicates failed wC

### Laboratory Duplicate (DUP) Report

for the Relative Percent Deviation xRPD; of Laboratory Duplicates are specified in ALS Method wWI \( \textit{KN} \) and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges No LimitYResult bet (een 10 and 20 times LOR: 0% 740% YResult > 20 times LOR: 0% 720%.

Sub Matriz: WATER						Laboratory L	Laboratory Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA250CA: Gross All	EA250CA: Gross Alpha and Beta Activity (QC Lot: 32) 7) 33b	2 Lot: 32) 7) 33b							
CA20062+67046	Anonymons	EA240: Gross alpha	Ш.	0.04	BqK	<0.10	<0.10	0.00	No Limit
		EA240: Gross beta	<i>IIII</i>	0.1	BqK	20.0	20.5	2.2+	0% 720%
		EA240: Gross beta activity 750,	<i>IIII</i>	0.1	BqK	<0.21	<0.21	0.00	No Limit
EP20088607001	Anonymous	EA240: Gross alpha	<i>IIII</i>	0.04	BqK	<0.04	<0.04	0.00	No Limit
		EA240: Gross beta	<i>IIII</i>	0.1	BqK	0.5+	0.58	0.00	No Limit
		EA240: Gross beta activity 750,	Ш.	0.1	BqK	<0.10	<0.10	0.00	No Limit
ED03) P: Alkalinity -	ED03) P: Alkalinity - y PC Titrator (QC Lot: 32) 6117b	;) 6117b						_	
EM201652+7002	Anonymons	ED0397P: / ydrozide Al) alinity as CaCO3	DMO72107001	_	mgK	٧	<u>۸</u>	0.00	No Limit
		ED0397P: Carbonate AI) alinity as CaCO3	3+1273276	-	mgK	₹	۲	00.00	No Limit
		ED0397P: Bicarbonate AI) alinity as CaCO3	9174273	-	mgkL	112	110	1.44	0% 720%
		ED0397P: Total AI) alinity as CaCO3	<i>1111</i>	_	mgkL	112	110	1.44	0% 720%
EM2016530700+	Anonymous	ED0397P: / ydrozide Al) alinity as CaCO3	DMOZ107001	_	mgkL	۲>	۲۷	0.00	No Limit
		ED0397P: Carbonate AI) alinity as CaCO3	3+1273276	-	mgkL	<u>۲</u>	۲	0.00	No Limit
		ED0397P: Bicarbonate AI) alinity as CaCO3	9174273	-	mgkL	336	339	0.349	0% 720%
		ED0397P: Total AI) alinity as CaCO3	шш	_	mgkL	336	339	0.349	0% 720%
ED061G: Sulfate (Tu	ED061G: Sulfate (Tur- idimetricbas SO6 29- y DA (QC Lot: 32) 1432b	DA (QC Lot: 32) 1432b							
EM20165017001	Anonymous	ED051G: Sulfate as SO5 7Turbidimetric	15+0+7987+	-	mgK	120	121	1.05	0% 720%
EM20165267004	B/ 7M24D	ED051G: Sulfate as SO5 7Turbidimetric	15+0+7987+	~	mgK	3310	3500	2.93	0% 720%
ED065G: Chloride -	ED065G: Chloride - y Discrete Analyser (QC Lot: 32) 1433b	Lot: 32) 1433b							
EM20165017001	Anonymous	ED054G: Chloride	16++970076	-	mgK	1500	1530	1.82	0% 720%
EM20165267004	B/ ₹M24D	ED054G: Chloride	16++97076	_	mgkL	19800	1+000	0.209	0% 720%
ED0738: Dissolved	ED0738: Dissolved Mafor Cations (QC Lot: 32) 1643b	2) 1643b							
EM20165267002	UGM7M14S	ED083F: Calcium	955079072	-	mgkL	919	93+	2.+4	0% 720%
		ED083F: Magnesium	953878475	_	mgkL	1940	1+00	3.18	0% 720%



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S180412

Client Project

EM2016526

Wor) Order

Recovery Limits (%) 0% 740% 0% 720% 0% 720% 0% 720% 0% 720% 0% 720% 3% 720% No Limit 0% 740% No Limit No Limit No Limit No Limit No Limit No Limit 3% 720% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 5.39 0.00 0.00 0.+1+ 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 3.82 2.91 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 13.3 3.83 Laboratory Duplicate (DUP) Report Duplicate Result <0.002 <0.002 <0.002 <0.002 <0.002 <0.010 <0.0001 <0.0002 <0.002 <0.0001 <0.001 <0.0001 <0.001 <0.001 0.15+ 0.011 0.014 <0.001 0.003 0.036 0.003 0.013 0.002 0.013 <0.0001 14400 0.061 0.055 0.028 0.028 39 20 2+ 408 ω Original Result <0.002 <0.010 <0.0001 <0.0002 <0.010 <0.0001 <0.0001 <0.0002 <0.002 <0.002 <0.002 <0.002 0.015 <0.0001 0.062 0.003 0.036 0.02+ 0.142 0.015 <0.001 <0.002 <0.001 <0.001 0.003 <0.001 14000 0.055 0.002 0.028 0.011 404 34 20 59 ∞ mgKL mgK mgK mgK mgK mgK mgk Mgk mgk mgk mgk mgk mgkL mgkL mgK mgkL mgk mgkL mgkL mgK mgkL mgkL mgkL mgk mgk mgK mgk mgkL mgk mgk mgk mgK mgK Unit mgk 0.0001 0.0001 0.0001 0.001 0.004 0.0001 0.001 0.001 0.004 0.0001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.0001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.004 0.001 0.001 0.004 LOR ~ \_ \_ \_ 953878976 953878976 955076676 CAS Number 955072374 955070879 953878475 955072374 955070879 955075378 955073+72 955075973 95507407+ 955070270 955076676 955075378 955073+72 955075973 955070270 955075378 955073+72 955075973 95507407+ 955070270 955076676 955075378 955073+72 955075973 955074074 955070270 955076676 955079072 953878271 95507407+ 953878271 953878271 953878271 EG020A7F: Chromium EG020A7F: Chromium EG020A7T: Chromium EG020A7T: Chromium EG020AT: Cadmium EG020ATF: Cadmium EG020A7T: Cadmium EG020A7T: Cadmium ED083F: Magnesium ED083F: Potassium ED083F: Potassium EG020A/F: Arsenic EG020A/F: Arsenic EG020A7T: Arsenic EG020A7T: Copper EG020A7T: Arsenic EG020A7F: Copper EG020A/F: Copper EG020A7T: Copper EG020A7F: Nic)el EG020A开: Nic)el ED083F: Calcium ED083F: Sodium EG020A7T: Nic)el EG020A7T: Nic)el EG034F: Mercury EG034F: Mercury ED083F: Sodium ED0738: Dissolved Maror Cations (QC Lot: 32) 1643b 9continued EG020A下: Lead EG020A7F: Lead EG020A7T: Lead EG020A7T: Lead EG020A/F: µinc EG020AÆ: µinc EG020A7T: µinc EG020A7T: µinc EG0208: Dissolved Metals - y ICP9MS (QC Lot: 32) 1641b EG0358: Dissolved Mercury - y 8IMS (QC Lot: 32) 1640b EG020T: Total Metals - y ICP9MS (QC Lot: 32) 354) b Client sample ID UGM7M14S UGM7M14S Anonymous Anonymous Anonymous Anonymous **UGM7M5D** UGM7M5D Laboratory sample ID SubMatriz: WATER EM20165267002 EM20165267002 EM20165307003 EM20165267001 EM20165307003 EM20165267001 EM20165307003 EM20165+47001



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S180412

Client Project

EM2016526

Wor) Order

5 of 9

Recovery Limits (%) 0% 720% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.00 1.43 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Laboratory Duplicate (DUP) Report Original Result Duplicate Result <0.0001 <0.0001 2.14 <0.04 **0**.0 **6**0.1 <20 <20 V 7 2 ۲ <sup>∆</sup> <sup>∆</sup> <sup>4</sup> <0.0001 <0.0001 2.1+ <0.04 **6**0.1 ^20 <20 7 0.1 V 7 7 ۲۷ 4 mgkL mgk Mgk mgkL mgKL mgk ZgK ZgK ZgK ZgK ZgK ZgK Unit ZgK ZgK 0.0001 0.0001 0.04 0.04 LOR 0.1 0.1 20 20 7 7 4 2 N 1111 953878976 100万1万 10+73+73 8172073 953878976 1+5867247+ 1+5867247+ C6\_C10 CAS Number 10+7++73 10675273 8475976 EP0j 0/0) 1: Total Recovera- le Hydrocar- ons 9NEPM 2013 8ractions (QC Lot: 32) 1136b EP0+0: meta7& para7Xylene EP0+0: C6 7C10 Fraction EP0+0: C6 7C8 Fraction EG041G: Ferrous Iron EG041G: Ferrous Iron E, 0+4: Sulfide as S27 E, 0+4: Sulfide as S27 EP0+0: EthylbenHene EP0+0: ortho7Xylene EP0+0: Naphthalene EG035T: Total Recovera- le Mercury - y 8IMS (QC Lot: 32) 276j b EG034T: Mercury EG034T: Mercury EP0+0: BenHene EP0+0: Toluene EG051G: 8errous Iron - y Discrete Analyser (QC Lot: 32) 1036b EP0j 0/0) 1: Total Petroleum Hydrocar- ons (QC Lot: 32) 1136b EK0j 5M: Sulfide as S29 (QC Lot: 32) 0) 11b EK0j 5M: Sulfide as S29 (QC Lot: 32) 3273b Client sample ID EP0j 0: BTEXN (QC Lot: 32) 1136b Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous UGM7M5D RB500 Laboratory sample ID Sub Matriz: WATER EM20162417010 EM20165247024 EM20165267018 EM20165267001 EM20165457005 EM20163697001 EM20163947001 EM20163947001 EM20163947001



Project

: 4 of 9 : EM2016526 : EMM CONSULTING PTK LTD : S180412 Page Wor) Order

Client

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

Sub Matriz: WATER				Method Blank (MB)		Laboratory Control Spike (LCS) Report	CS) Report	
				Report	Spike	Spike Recovery (%)	Recovery	Recovery Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SOT	Low	High
EA250CA: Gross Alpha and Beta Activity (QCLot: 32) 7) 33b	) 7) 33b							
EA240: Gross alpha	<i>IIII</i>	0.04	BqK	<0.04	1941 BqK	88.4	84.2	104
EA240: Gross beta	1111	0.1	Bqk	<0.10	3352 BqK	8+.0	85.5	104
EA240: Gross beta activity 750,	1111	0.1	Bqk	<0.10	ШТ.	ШТ	Ш.	11111
ED03) P. Alkalinity - y PC Titrator (QCLot: 32) 6117b								
ED0397P: Total Al) alinity as CaCO3	1111	1111	mgK	Ш.	200 mgK	83.5	0.++	112
ED061G: Sulfate (Tur- idimetricbas SO6 29- y DA (QCLot: 32) 1432b	CLot: 32) 1432b							
ED051G: Sulfate as SO5 7Turbidimetric	15+0+7987+	-	mgK	5	24 mgK	88.6	+.4+	119
				7	100 mgK	102	+4.+	119
ED065G: Chloride - y Discrete Analyser (QCLot: 32) 1433b	1433b							
ED054G: Chloride	16++970076	-	mgK	<b>!</b>	10 mg/L	86.4	+4.0	122
				<b>\</b>	1000 mgK_	113	+4.0	122
ED0738: Dissolved Maror Cations (QCLot: 32) 1643b								
ED083F: Calcium	955079072	-	mgK	<b>\</b>	4 mg/L	111	++.2	119
ED083F: Magnesium	953878475	-	mgK	\ \	4 mg/L	109	+4.6	115
ED083F: Sodium	955072374	_	mgK	۲	40 mgK	109	80.0	115
ED083F: Potassium	955070879	1	mgK	<1	40 mgKL	83.+	+6.9	111
EG0208: Dissolved Metals - y ICP9MS (QCLot: 32) 1641b	41b							
EG020A形: Arsenic	955073+72	0.001	mgK	<0.001	0.1 mg/L	103	++.4	10+
EG020AÆ: Cadmium	955075378	0.0001	mgK	<0.0001	0.1 mg/L	102	+3.4	10+
EG020A形: Chromium	955075973	0.001	mgK	<0.001	0.1 mg/L	88.8	+3.2	104
EG020A形: Copper	95507407+	0.001	mgK	<0.001	0.1 mg/L	100	+3.1	106
EG020AÆ: Lead	953878271	0.001	mgK	<0.001	0.1 mgkL	100	+5.6	109
EG020A形: Nic) el	955070270	0.001	mgK	<0.001	0.1 mgkL	88.3	+5.3	10+
EG020A形: µinc	955076676	0.004	mgK	<0.004	0.1 mg/L	105	+6.3	111
EG020T: Total Metals - y ICP9MS (QCLot: 32) 354) b								
EG020A7T: Arsenic	955073+72	0.001	mgK	<0.001	0.1 mg/L	88.2	+8.2	113
EG020A7T: Cadmium	955075378	0.0001	mgK	<0.0001	0.1 mg/L	82.1	+6.5	112
EG020A7T: Chromium	955075973	0.001	mgK	<0.001	0.1 mg/L	89.2	+6.8	110
EG020A7T: Copper	95507407+	0.001	mgK	<0.001	0.1 mg/L	84.1	+6.8	108
EG020A7T: Lead	953878271	0.001	mgK	<0.001	0.1 mg/L	85.5	++.3	110
EG020A7T: Nic) el	955070270	0.001	mgK	<0.001	0.1 mg/L	86.3	+9.8	111
EG020A7T: uinc	955076676	0.004	mak	<0.004	0.1 mak	109	69+	115



: 6 of 9 : EM2016526 : EMM CONSULTING PTK LTD : S180412 Page Wor) Order Project Client

Sub Matriz: WATER				Method Blank (MB)		Laboratory Control Spike (LCS) Report	cs) Report	
				Report	Spike	Spike Recovery (%)	Recovery	Recovery Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SOT	Low	High
EG0358: Dissolved Mercury - y 8IMS (QCLot: 32) 1640b 9continued	continued							
EG034F: Mercury	953878976	0.0001	mgK	<0.0001	0.01 mg/L	103	91.1	112
EG035T: Total Recovera- le Mercury - y 8IMS (QCLot: 32) 276j b	.) 276j b							
EG034T: Mercury	953878976	0.0001	mgK	<0.0001	0.01 mg/L	88.2	92.6	114
EG051G: 8errous Iron - y Discrete Analyser (QCLot: 32) 1036b	1036b							
EG041G: Ferrous Iron	11111	0.04	mgK	<0.04	2 mg/L	112	94.+	112
EK0j 5M: Sulfide as S29 (QCLot: 32) 0) 11b								
E, 0+4: Sulfide as S27	1+5867247+	0.1	mgK	<0.1	0.4 mg/L	105	+1.8	116
EK0j 5M: Sulfide as S29 (QCLot: 32) 3273b								
E, 0+4: Sulfide as S27	1+5867247+	0.1	mgK	<0.1	0.4 mgK	108	+1.8	116
EP0j 0/0) 1: Total Petroleum Hydrocar- ons (QCLot: 32) 1136b	136b							
EP0+0: C6 7C8 Fraction	11111	20	ZgIŁ	<20	360 ZgK	110	64.4	128
EP0j 0/0) 1: Total Recovera- le Hydrocar- ons 9NEPM 2013 8ractions (QCLot: 32) 1136b	3 Bractions (QC	Lot: 32) 1136b						
EP0+0: C6 7C10 Fraction	C6_C10	20	ZgIŁ	<20	540 ZgK	109	65.3	126
EP0j 0: BTEXN (QCLot: 32) 1136b								
EP0+0: BenHene	9175372	_	ZgK	₹	20 ZgK	+.+8	68.+	125
EP0+0: Toluene	10+7++73	2	ZgK	<2	20 ZgK	10+	93.6	126
EP0+0: EthylbenHene	10075175	2	ZgK	<2	20 ZgK	106	92.0	126
EP0+0: meta7 & para7Xylene	10+73+73	2	ZgK	<2	50 ZgK	115	91.4	132
	10675273							
EP0+0: ortho7Xylene	8475976	2	ZgIŁ	<2	20 ZgK	11+	96.4	132
EP0+0: Naphthalene	8172073	4	ZgK	4>	4 ZgK	84.1	90.4	129

### Matrix Spike (MS) Report

The quality control term Matriz Spi)e xMS; refers to an intralaboratory split sample spi)ed (ith a representative set of target analytes. The purpose of this wC parameter is to monitor potential matriz effects on analyte recoveries. Static Recovery Limits as per laboratory Data wuality Objectives xDwOs;. Ideal recovery ranges stated may be ( aived in the event of sample matriz interference.

Matrix Spike (MS) Report

Sub Matriz: WATER

				эріке	spikerecovery(%)	Recovery Limits (%)	mits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED061G: Sulfate (	ED061G: Sulfate (Tur- idimetricbas SO6 29- y DA (QCLot: 32) 1432b						
EM20165017002	Anonymous	ED051G: Sulfate as SO5 7Turbidimetric	15+0+7987+	100 mgKL	98.3	0.06	130
ED065G: Chloride	ED065G: Chloride - y Discrete Analyser (QCLot: 32) 1433b						
EM20165017002	Anonymous	ED054G: Chloride	16++9刀ዐЉ	500 mgK	# Not Determined	90.0	130
EG0208: Dissolve	EG0208: Dissolved Metals - y ICP9MS (QCLot: 32) 1641b						
EM20165267001	UGM7M5D	EG020AÆ: Arsenic	955073+72	0.5 mg/L	10+	+4.0	131
		EG020AÆ: Cadmium	955075378	0.1 mgkL	85.3	+1.0	133



 Page
 : 9 of 9

 Wor) Order
 : EM2016526

 Client
 : EMM CONSULTING PTK LTD

 Project
 : \$180412

Sub Matriz: WATER				Ма	Matrix Spike (MS) Report	ţ	
				Spike	SpikeRecovery(%)	Recovery Limits (%)	mits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG0208: Dissolved	EG0208: Dissolved Metals - y ICP9MS (QCLot: 32) 1641b 9continued						
EM20165267001	UGM7M5D	EG020A开: Chromium	955075973	0.5 mg/L	86.8	91.0	134
		EG020A7F: Copper	95507407+	0.5 mg/L	84.8	96.0	130
		EG020AÆ: Lead	953878271	0.5 mg/L	83.6	94.0	133
		EG020AÆ: Nic) el	955070270	0.5 mg/L	116	93.0	131
		EG020A7F: pinc	955076676	0.5 mg/L	103	94.0	131
EG020T: Total Met	EG020T: Total Metals - y ICP9MS (QCLot: 32) 354) b						
EM20165267002	UGMM14S	EG020A7T: Arsenic	955073+72	2 mgK	106	+2.0	+11
		EG020A7T: Cadmium	955075378	0.4 mgK	9+8	94.0	128
		EG020A7T: Chromium	955075973	2 mgK	8+.9	+0.0	11+
		EG020A7T: Copper	95507407+	2 mgK	85.+	+1.0	114
		EG020A7T: Lead	953878271	2 mgK	88.6	+3.0	121
		EG020A7T: Nic) el	955070270	2 mgK	85.3	+0.0	11+
		EG020A7T: plinc	955076676	2 mgK	86.4	95.0	116
EG0358: Dissolved	EG0358: Dissolved Mercury - y 8IMS (QCLot: 32) 1640b						
EM20165267002	UGMM14S	EG034F: Mercury	953878976	0.01 mgK	# 48.1	0.06	120
EG035T: Total Red	EG035T: Total Recovera- le Mercury - y 8IMS (QCLot: 32) 276j b						
EM20165247026	Anonymous	EG034T: Mercury	953878976	0.01 mg/L	105	0.06	130
EG051G: 8errous	EG051G: 8errous Iron - y Discrete Analyser (QCLot: 32) 1036b						
EM20165267004	B/ 7M24D	EG041G: Ferrous Iron	1111	2 mgK	9.68	0.06	130
EK0j 5M: Sulfide a	EK0j 5M: Sulfide as S29 (QCLot: 32) 0) 11b						
EM20162417020	Anonymous	E, 0+4: Sulfide as S27	1+5867247+	0.33 mgK	123	0.06	130
EK0j 5M: Sulfide a	EK0j 5M: Sulfide as S29 (QCLot: 32) 3273b						
EM20165267002	UGMM14S	E, 0+4: Sulfide as S27	1+5867247+	0.33 mgK	# 0.00	0.06	130
EP0j 0/0) 1: Total P	EP0j 0/0) 1: Total Petroleum Hydrocar- ons (QCLot: 32) 1136b						
EM20163947002	Anonymous	EP0+0: C6 7C8 Fraction	1111	2+0 ZgK	99.2	53.0	124
EP0j 0/0) 1: Total R	EP0j 0/0) 1: Total Recovera- le Hydrocar- ons 9NEPM 2013 8ractions (QCLot: 32) 1136b	Lot: 32) 1136b					
EM20163947002	Anonymous	EP0+0: C6 7C10 Fraction	C6_C10	330 ZgK	93.1	55.0	122
EP0j 0: BTEXN (QCLot: 32) 1136b	CLot: 32) 1136b						
EM20163947002	Anonymous	EP0+0: Benlbene	9175372	20 ZgK	+1.5	0+9	130
		EP0+0: Toluene	10+7++73	20 ZgK	83.4	92.0	132



# QA/QC Compliance Assessment to assist with Quality Review

Environmental Division Melbourne +61-3-8594 4600 22-Sep-2020 01-Oct-2020 : 1 of 4 20 NoOpf samples analysed Date Samples Received NoOpf samples received Issue Date Laboratory Telephone 7 AITLHN BRODIE/ LU7E GRIKKIT. S **EMM CONSULTING PTY LTD** PAUL GIBBONS EM2014624 S140512 Order number **Work Order** Contact Sampler Project Client Site

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 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 report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceabilityQ

#### Summary of Outliers

### Outliers: Quality Control Samples

This report highlights outliers flagged in the ( uality Control )( CWReportQ

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

## Outliers: Analysis Holding Time Compliance

Analysis Holding Time Outliers exist - please see following pages for full details.

# **Outliers: Frequency of Quality Control Samples**

NO Quality Control Sample Frequency Outliers exist.



EMM CONSULTING PTH LTD : 2 of 4 : EM2016926 S140512 k orY Order Project Client

Outliers: Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: WATER

Malik. WAIEN							
Compound Group Name	Laboratory Sample ID   Client Sample ID	Client Sample ID	Analyte	CAS Number Data	Data	Limits Comment	Comment
Matrix Spike (MS) Recoveries							
ED095G: Chloride by Discrete Analyser	EM2016901002 Anonymous	Anonymous	Chloride	1688%00-6 Not	Not	1	MS recovery not determined,
				J	Determined		background level greater than or equal to 6x spike level.
EG035K: Dissolved Mercury by KIMS	EM2016926002	UGM-M15S	Mercury	%34-4%6	540 _	%0 <b>@</b> -120_	Recovery less than lower data quality objective
E7085M: Sulfide as S2-	EM2016926002	UGM-M15S	Sulfide as S2-	18946-25-8 0000_		%0 <b>@</b> -130_	Recovery less than lower data quality objective

### Outliers: Analysis Holding Time Compliance

Matrix WATER

Matrix: WAIER							
Method		Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID)sW		Date extracted	Date extracted Due vor extraction	Days overdue	Date analysed	Due vor analysis	Days overdue
EP090/0z1: Total Petroleum Hydrocarbons							
Amber 8OC 8 ial - Sulfuric Acid							
TS/	TS Control	23-Sep-2020	19-Aug-2020	09	23-Sep-2020	19-Aug-2020	09
EP090/0z1: Total Recoverable Hydrocarbons - NEPM 2017 Fractions	- NEPM 2017 Fractions						
Amber 8OC 8 ial - Sulfuric Acid							
TS/	TS Control	23-Sep-2020	19-Aug-2020	09	23-Sep-2020	19-Aug-2020	09
EP090: BTEVN							
Amber 8OC 8 ial - Sulfuric Acid							
TS/	TS Control	23-Sep-2020 19-Aug-2020	19-Aug-2020	09	23-Sep-2020	19-Aug-2020	09

### Analysis Holding Time Compliance

If samples are identified belo& as having been analysed or extracted outside of recommended holding times/ this should be ta'en into consideration &hen interpreting resultsQ

896/ AP. A/ AS and NEPMW based on the sample container This report summariwes extraction , preparation and analysis times and compares each &ith ALS recommended holding times )referencing USEPA SK providedQDates reported represent first date of extraction or analysis and preclude subseVuent dilutions and rerunsQA listing of breaches )if anyWs provided hereinQ olding time for leachate methods )eQQTCLPWvary according to the analytes reportedQ. Assessment compares the leach date &ith the shortest analyte holding time for the eVuivalent soil methodQ. These are: organics 19 days/ mercury 28 days; other metals 180 daysQA recorded breach does not guarantee a breach for all non-volatile parametersQ olding times for VOC in soils vary according to analytes of interestQ. Flinyl Chloride and Styrene holding time is %daysX others 19 daysQ. A recorded breach does not guarantee a breach for all FOC analytes and should be verified in case the reported breach is a false positive or Finyl Chloride and Styrene are not Yey analytes of interest, concernQ

MethodSample DateExtraction / PreparationFeaturationAnalysisContainer / Client Sample ID(s)Date extractedDate extractedDue to retractedDue to retractedDate analysedDue to ranalysisEfaluation	Matrix: WATER			Evaluation	on: * q . olding time	me breach X√ q k ithi	holding time(
Due tor extraction Efaluation Date analysed Due tor analysis	Method	Sample Date	on / Prep	ıtion		Analysis	
	Container / Client Sample ID(s)	Date	Due vor extr	ion Efa	Date analysed	9 101	Efaluation



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S140512

Client Project

EM2016926

k or Y Order

3 of 4

Evaluation: ★ q . olding time breach X✓ q k ithin holding time( **Efaluation** > > > > > > > > > > > > > Due vor analysis 13-Mar-2021 19-Mar-2021 24-Sep-2020 30-Sep-2020 13-Oct-2020 19-Oct-2020 15-Mar-2021 15-Mar-2021 13-Oct-2020 19-Oct-2020 13-Oct-2020 19-Oct-2020 15-Mar-2021 Date analysed 25-Sep-2020 25-Sep-2020 29-Sep-2020 29-Sep-2020 26-Sep-2020 26-Sep-2020 27-Sep-2020 27-Sep-2020 26-Sep-2020 26-Sep-2020 25-Sep-2020 27-Sep-2020 27-Sep-2020 Efaluation - -Extraction / Preparation Due vor extraction - 1 Date extracted l l I l l l l I l l l l 13-Sep-2020 14-Sep-2020 14-Sep-2020 16-Sep-2020 14-Sep-2020 14-Sep-2020 14-Sep-2020 13-Sep-2020 14-Sep-2020 13-Sep-2020 13-Sep-2020 14-Sep-2020 13-Sep-2020 Sample Date B. -M14D/ B. -M14D/ B. -M14D/ B. -M14D/ B. -M14D/ B. -M14D/ B. -M25D/ B. -M25D/ B. -M25D/ B. -M25D/ PSDz02 PSDz02 PSDz02 ( A100 ( A100 ( A100 ( A100 ( A100 ( A100 Clear Plastic Bottle - Nitric Acid; Filtered (ED057F) Clear Plastic Bottle - Nitric Acid; Filtered (ED057F) ED061G: Sulfate (Turbidimetric) as SO6 2- by DA EA230CA: Gross Alpha and Beta Activity ED063G: Chloride by Discrete Analyser Clear Plastic Bottle - Natural (ED07z-P) Clear Plastic Bottle - Natural (ED07z-P) UGM-M15S/ EA230: Gross Alpha and Beta Activity Clear Plastic Bottle - Natural (ED061G) Clear Plastic Bottle - Natural (ED063G) Clear Plastic Bottle - Natural (ED061G) Slear Plastic Bottle - Natural (ED063G) Clear Plastic Bottle - Natural (EA230) Clear Plastic Bottle - Natural (EA136) Clear Plastic Bottle - Natural (EA230) Clear Plastic Bottle - Natural (EA136) Clear Plastic Bottle - Natural (EA136) ED057F: Dissolved Major Cations ED07zP: Alkalinity by PC Titrator Container / Client Sample ID(s) EA130: Particle Sixing UGM-M15S/ UGM-M15S/ UGM-M15S/ UGM-M15S/ UGM-M15S/ Matrix: WATER UGM-M9D/ UGM-M9D/ UGM-M9D/ UGM-M9D/ B. -M14S/ B. -M14S/ B. -M14S/ B. -M14S/ B. -M14S/ B. -M14S/ B. -M25S B. -M25S B. -M25S PSDz01/ PSDz01/ PSDz01/ Method



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EM2016926

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Evaluation: \* q . olding time breach X ′ q k ithin holding time( **Efaluation** > > > > > > > > > > > Due vor analysis 19-Mar-2021 13-Oct-2020 19-Oct-2020 13-Oct-2020 22-Sep-2020 23-Sep-2020 22-Sep-2020 23-Sep-2020 19-Mar-2021 15-Mar-2021 15-Mar-2021 19-Oct-2020 Date analysed 27-Sep-2020 27-Sep-2020 26-Sep-2020 26-Sep-2020 27-Sep-2020 27-Sep-2020 27-Sep-2020 22-Sep-2020 27-Sep-2020 27-Sep-2020 27-Sep-2020 22-Sep-2020 Efaluation > > Extraction / Preparation Due vor extraction 15-Mar-2021 19-Mar-2021 -- 1 Date extracted 26-Sep-2020 26-Sep-2020 l l l I l l I l l l 13-Sep-2020 14-Sep-2020 14-Sep-2020 13-Sep-2020 14-Sep-2020 13-Sep-2020 14-Sep-2020 13-Sep-2020 13-Sep-2020 13-Sep-2020 14-Sep-2020 14-Sep-2020 Sample Date B. -M14D/ B. -M14D/ B. -M14D/ B. -M25D/ B. -M14D/ B. -M25D/ -M25D/ B. -M25D/ ( A100 ( A100 TB300/ ( A100 TB100/ TB300/ ( A100 TB100/ Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) Clear Plastic Bottle - Nitric Acid; Unfiltered (EG073T) Clear Plastic Bottle - Nitric Acid; Unfiltered (EG073T) UGM-M15S/ Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) Clear Plastic Bottle - Nitric Acid; Filtered (EG073F) Clear Plastic Bottle - Nitric Acid; Filtered (EG073F) Clear Plastic Bottle - Zinc Acetate/NaOH (EK093) Clear Plastic Bottle - Zinc Acetate/NaOH (EK093) EG073T: Total Recoverable Mercury by FIMS EG031G: Ferrous Iron by Discrete Analyser Clear Plastic Bottle - HCI - Filtered (EG031G) Clear Plastic Bottle - HCI - Filtered (EG031G) EG020F: Dissolved Metals by ICP-MS EG073F: Dissolved Mercury by FIMS EG020T: Total Metals by ICP-MS Container / Client Sample ID(s) EK093M: Sulfide as S2-UGM-M15S/ UGM-M15S/ UGM-M15S/ Matrix: WATER UGM-M15S/ UGM-M15S/ UGM-M9D/ UGM-M9D/ UGM-M9D/ UGM-M9D/ B. -M14S/ B. -M14S/ B. -M14S/ B. -M14S/ B. -M25S B. -M25S B. -M25S TB200/ TB200/ RB900 RB900 RB100 RB100 Method



: 5 of 4 : EM2016926 : EMM CONSULTING PTH LTD : \$140512 Page k orYOrder Client Project

Matrix: WATER				Evaluation:	× q . olding time	Evaluation: $\mathbf{x}$ q . olding time breach X $\checkmark$ q k ithin holding time(	holding time
Method	Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Date extracted Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
EP090/0z1: Total Petroleum Hydrocarbons							
Amber 8 OC 8 ial - Sulfuric Acid (EP090) TS/ TS Control	71-Jul-2020	27-Sep-2020	19-Aug-2020	×	27-Sep-2020	19-Aug-2020	×
EP090/0z1: Total Recoverable Hydrocarbons - NEPM 2017 Fractions							
Amber 8 OC 8 ial - Sulfuric Acid (EP090) TS/ TS Control	71-Jul-2020	27-Sep-2020	19-Aug-2020	×	27-Sep-2020	19-Aug-2020	×
EP090: BTEVN							
Amber 8 OC 8ial - Sulfuric Acid (EP090) TS/ TS Control	71-Jul-2020	27-Sep-2020	19-Aug-2020	×	27-Sep-2020	19-Aug-2020	×



: 6 of 4 : EM2016926 : EMM CONSULTING PTH LTD : \$140512 Page k orYOrder Project Client

Quality Control Parameter Frequency Compliance

The follo&ing report summarises the freVuency of laboratory ( C samples analysed &ithin the analytical lot)sWn &hich the submitted sample)sWas)&ereVprocessedQActual rate should be greater than or eVual to the expected rateQA listing of breaches is provided in the Summary of OutliersQ

Matrix: WATER				Evaluation	: x q ( uality Co	ntrol freVuency n	Evaluation: x q ( uality Control freVuency not &ithin specification X ✓ q ( uality Control freVuency &ithin specificationC
( uality Control Sample Type		S	Count		Rate (%)		Quality Control Specivication
Analytical Methods	Method	OC	Reaular	Actual	Expected	Ef aluation	
Laboratory Duplicates )DUPW							
Al Yalinity by PC Titrator	ED03%P	2	20	10.00	10.00	>	NEPM 2013 B3; ALS ( C Standard
Chloride by Discrete Analyser	ED095G	2	20	10.00	10.00	>	NEPM 2013 B3; ALS ( C Standard
Dissolved Mercury by KIMS	EG035K	2	15	17.77	10.00	>	NEPM 2013 B3; ALS ( C Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-K	2	20	10.00	10.00	>	NEPM 2013 B3; ALS ( C Standard
Kerrous Iron by Discrete Analyser	EG051G	2	10	20.00	10.00	>	NEPM 2013 B3; ALS ( C Standard
Gross Alpha and Beta Activity	EA250	2	1%	11.z4	10.00	>	NEPM 2013 B3; ALS ( C Standard
Major Cations - Dissolved	ED043K	2	20	10.00	10.00	>	NEPM 2013 B3; ALS ( C Standard
Sulfate )TurbidimetricMas SO9 2- by Discrete Analyser	ED091G	2	20	10.00	10.00	>	NEPM 2013 B3; ALS ( C Standard
Sulfide as S2-	E7 085	2	12	14.4z	10.00	>	NEPM 2013 B3; ALS ( C Standard
Total Mercury by KIMS	EG035T	2	20	10.00	10.00	>	NEPM 2013 B3; ALS ( C Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	>	NEPM 2013 B3; ALS ( C Standard
TR. Folatiles,BTE=	EP080	_	10	10.00	10.00	>	NEPM 2013 B3; ALS ( C Standard
Laboratory Control Samples )LCSW							
Al Yalinity by PC Titrator	ED03%P	-	20	3.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Chloride by Discrete Analyser	ED095G	2	20	10.00	10.00	>	NEPM 2013 B3; ALS ( C Standard
Dissolved Mercury by KIMS	EG035K	-	15	4.4z	3.00	>	NEPM 2013 B3; ALS ( C Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-K	-	20	3.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Kerrous Iron by Discrete Analyser	EG051G	-	10	10.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Gross Alpha and Beta Activity	EA250	2	1%	11.z4	10.00	>	NEPM 2013 B3; ALS ( C Standard
Major Cations - Dissolved	ED043K	1	20	3.00	3.00	^	NEPM 2013 B3; ALS ( C Standard
Sulfate )TurbidimetricVts SO9 2- by Discrete Analyser	ED091G	2	20	10.00	10.00	>	NEPM 2013 B3; ALS ( C Standard
Sulfide as S2-	E7 085	2	12	14.4z	3.00	>	NEPM 2013 B3; ALS ( C Standard
Total Mercury by KIMS	EG035T	1	20	3.00	3.00	^	NEPM 2013 B3; ALS ( C Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	3.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
TR. Folatiles,BTE=	EP080	1	10	10.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Method Blan's )MBW							
Chloride by Discrete Analyser	ED095G	_	20	3.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Dissolved Mercury by KIMS	EG035K	_	15	4.4z	3.00	>	NEPM 2013 B3; ALS ( C Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-K	1	20	3.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Kerrous Iron by Discrete Analyser	EG051G	_	10	10.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Gross Alpha and Beta Activity	EA250	_	1%	3.99	3.00	>	NEPM 2013 B3; ALS ( C Standard
Major Cations - Dissolved	ED043K	1	20	3.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Sulfate )TurbidimetricVts SO9 2- by Discrete Analyser	ED091G	-	20	3.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Sulfide as S2-	E7 085	2	12	14.4z	3.00	>	NEPM 2013 B3; ALS ( C Standard
Total Mercury by KIMS	EG035T	-	20	3.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Total Metals by ICP-MS - Suite A	EG020A-T	_	20	3.00	3.00	>	NEPM 2013 B3; ALS ( C Standard



: %of 4 : EM2016926 : EMM CONSULTING PTH LTD : S140512 Page k orYOrder Client

Project

Matrix: WATER				Evaluatio	n: × q ( uality Co	ntrol freVuency r	Evaluation: ▼ q ( uality Control freVuency not &ithin specification X✓ q ( uality Control freVuency &ithin specificationC
( uality Control Sample Type		ŏ	Count		Rate (%)		Quality Control Specivication
Analytical Methods	Method	OC	Reaular	Actual	Expected	Ef aluation	
Method Blan's )MBW Continued							
TR. Folatiles, BTE=	EP080	-	10	10.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Matrix SpiYes )MSW							
Chloride by Discrete Analyser	ED095G	<b>-</b>	20	3.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Dissolved Mercury by KIMS	EG035K	_	15	4.4z	3.00	>	NEPM 2013 B3; ALS ( C Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-K	_	20	3.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Kerrous Iron by Discrete Analyser	EG051G	-	10	10.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Sulfate )TurbidimetricWas SO9 2- by Discrete Analyser	ED091G	_	20	3.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Sulfide as S2-	E7 085	2	12	14.4z	3.00	>	NEPM 2013 B3; ALS ( C Standard
Total Mercury by KIMS	EG035T	_	20	3.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
Total Metals by ICP-MS - Suite A	EG020A-T	_	20	3.00	3.00	>	NEPM 2013 B3; ALS ( C Standard
TR. Folatiles, BTE=	EP080	-	10	10.00	3.00	>	NEPM 2013 B3; ALS ( C Standard



 Page
 : 8 of 4

 k orY Order
 : EM2016926

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 : EMM CONSULTING PTH LTD

 Project
 : \$140512

**Brief Method Summaries** 

The analytical procedures used by the Environmental Division have been developed from established internationally recogniwed procedures such as those published by the US EPA/AP. A/ AS and NEPMGn house developed procedures are employed in the absence of documented standards or by client reVuestQThe follo&ing report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis CSources from &hich ALS methods have been developed are provided &ithin the Method DescriptionsQ

Analytical Methods	Method	Matrix	Method Descriptions
Particle Siwing in k ater by Laser Diffraction Analysis	uEA159	k ATER	Particle Siwe Analysis of Particulates in k ater by Laser Diffraction Analysis according to AP. A Method 2560D
Gross Alpha and Beta Activity	EA250	k ATER	ASTM D%283-06: Determination of gross alpha and gross beta radioactivity in &ater samples by LiVuid Scintillation Counting )LSCWQ
AlYalinity by PC Titrator	ED03%P	k ATER	In house: Referenced to AP. A 2320 B This procedure determines alYalinity by automated measurement )eQQPC TitrateVon a settled supernatant aliVuot of the sample using p. 9G for indicating the total alYalinity end-pointQ This method is compliant & ith NEPM Schedule B)3W
Sulfate )TurbidimetricWas SO9 2- by Discrete Analyser	ED091G	k ATER	In house: Referenced to AP. A 9500-SO9QDissolved sulfate is determined in a 0Q5um filtered sampleQSulfate ions are converted to a barium sulfate suspension in an acetic acid medium &ith barium chlorideQ.ight absorbance of the BaSO9 suspension is measured by a photometer and the SO9-2 concentration is determined by comparison of the reading &ith a standard curveQThis method is compliant &ith NEPM Schedule B)3W
Chloride by Discrete Analyser	ED095G	k ATER	In house: Referenced to AP. A 9500 Cl - GQThe thiocyanate ion is liberated from mercuric thiocyanate through seVuestration of mercury by the chloride ion to form non-ionised mercuric chlorideQn the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate &hich is measured at 980 nm AP. A seal method 2 01%-1-L
Major Cations - Dissolved	ED043K	k ATER	In house: Referenced to AP. A 3120 and 3125XUSEPA Sk 896 - 6010 and 6020XCations are determined by either ICP-AES or ICP-MS techniVuesQThis method is compliant &ith NEPM Schedule B)3W Sodium Adsorption Ratio is calculated from Ca/ Mg and Na &hich determined by ALS in house method ( k I-EN,ED043KQThis method is compliant &ith NEPM Schedule B)3W ardness parameters are calculated based on AP. A 2390 BQ This method is compliant &ith NEPM Schedule B)3W
Dissolved Metals by ICP-MS - Suite A	EG020A-K	k ATER	In house: Referenced to AP. A 3125XUSEPA Sk 896 - 6020/ ALS ( k I-EN,EG020QSamples are 0\( \mathbb{G} \)5* m filtered prior to analysisQThe ICPMS techni\( \mathbb{U} \) utilines a highly efficient argon plasma to ionive selected elementsQons are then passed into a high vacuum mass spectrometer/\( \mathbb{R} \) hich separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector\( \mathbb{Q} \)
Total Metals by ICP-MS - Suite A	EG020A-T	k ATER	In house: Referenced to AP. A 3125XUSEPA SK 896 - 6020/ ALS ( K I-EN,EG020QThe ICPMS techniVue utiliwes a highly efficient argon plasma to ionive selected elementsQons are then passed into a high vacuum mass spectrometer/ &hich separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detectorQ
Dissolved Mercury by KIMS	EG035K	k ATER	In house: Referenced to AS 3550/ AP. A 3112. g - B )Klo&-injection )SnCl2vkCold Fapour generationWAASW Samples are 0\mathbb{Q}s* m filtered prior to analysisQKIM-AAS is an automated flameless atomic absorption technivueQ A bromate, bromide reagent is used to oxidise any organic mercury compounds in the filtered sampleQThe ionic mercury is reduced online to atomic mercury vapour by SnCl2 & hich is then purged into a heated VuartwcellQ (uantification is by comparing absorbance against a calibration curveQThis method is compliant & ith NEPM Schedule B)3\mathbb{W}



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In house: Referenced to USEPA SK 896 - 8260 k ater samples are directly purged prior to analysis by Capillary used to prepare surface and ground &ater samples for analysis by ICPAES or ICPMSQThis method is compliant KIM-AAS is an automated flameless atomic absorption techniVueQA bromate,bromide reagent is used to oxidise sample is eVuilibrated in a headspace vial and a portion of the headspace determined by GCMS analysisQThis precipitated &hen collected in pretreated caustic, winc acetate preserved sample containersQThe sulphides are In house: Referenced to AS 3550/ AP. A 3112. g - B )Klo&-injection )SnCl2WCold Fapour generationWAASW In house: Referenced to USEPA Sk 896-3005QMethod 3005 is a Nitric, ydrochloric acid digestion procedure coloured using methylene blue indicatorQNon-detects may be screened by comparison against a standard at half-LOR/ other&ise samples are measured using UF-FIS detection at 669nm@This method is compliant &ith GC,MS and Vuantification is by comparison against an established 5 point calibration curveQAlternatively/ a any organic mercury compounds in the unfiltered sampleQThe ionic mercury is reduced online to atomic phenanthroline and ferrous iron at p. 3Q-3Q to form an orange-red complex that is measured against a mercury vapour by SnCl2 &hich is then purged into a heated WartweelIQ( uantification is by comparing In house: Referenced to AP. A 3500 Ke-BQA colorimetric determination based on the reaction bet&een In house: Referenced to AP. A 9500-S2- DQSulfide species present in &ater samples are immediately absorbance against a calibration curve This method is compliant &ith NEPM Schedule B)3 WQ In house: Referenced to AP. A 1030KQThis method is compliant &ith NEPM Schedule B)3W A 5 mL aliVuot or 5 mL of a diluted sample is added to a 90 mL FOC vial for spargingQ five-point calibration curveQThis method is compliant &ith NEPM Schedule B)3WQ method is compliant & ith the ( C reVuirements of NEPM Schedule B)3W &ith NEPM Schedule B)3W NEPM Schedule B)3W k ATER k ATER k ATER k ATER k ATER k ater k ATER Matrix Matrix u EN055 - PG EG051G Method EG035T E7085 Method ORG16-k EN25 EP080 lonic Balance by PCT DA and Turbi SO9 Digestion for Total Recoverable Metals Kerrous Iron by Discrete Analyser Folatiles k ater Preparation Total Mercury by KIMS TR. Folatiles,BTE= Analytical Methods Sulfide as S2-

LA, B ID le ireneki TS Anoillary 7 Z K To to PSD 02 PSD 01 PSD 02 QA201 PSD 02 PSD 02 PSD 01 BH-M18D BH-M20D BH-M17D LPSPB04 8H-M17S SAMPLE DETAILS 20/09/2020 14:30 17/09/2020 13:30 21/09/2020 14:20 20/09/2020 15:00 20/09/2020 15:00 21/09/2020 8:55 19/09/2020 10:05 19/09/2020 10:00 20/09/2020 14:15 21/09/2020 12:30 21/09/2020 13:15 18/09/2020 10:00 18/09/2020 10:40 18/09/2020 9:50 20/09/2020 7:15 18/09/2020 6:55 17/09/2020 8:00 21/09/2020 8:50 20/09/2020 7:10 18/09/2020 0:00 18/09/2020 11:20 17/09/2020 13:50 18/09/2020 6:50 17/09/2020 7:50 18/09/2020 9:50 18/09/2020 0:00 MATRIX \$ ×. ٤ \$ ٤ × \$ ž × \$ ٤ ٤ ٤ ≨ \$ \$ \$ 2 2 \$ \$ 8 8 Heest a.g., USFS | Non-Standard or urgant TAT (List due data) TOTAL -4 = # = Please report separately Please report seperately Please report separately Please report separately Please report seperately Please report seperately lease report separately lease report seperately lease report separately ease report separately mmæts on fikely sordaningst (sook, diluto mples requiring specific QC analysis etc. Duplicate - intralab analysis **Environmental Division** Telephone: + 61-2-6784 8555 Subcon / Forward Lab / Split WO ES20 Lab / Analysis: \_.

Organised By / Date:

Attached By PO / Internal Sheet:

WO No: \_.

Relinquished By / Date: Connote / Courier:

#### Fadi Soro

**Angus Harding** 

Sent:

From:

ö

Subject:

Attachments:

Wednesday, 23 September 2020 9:20 AM

Samples Sydney

FW: [EXTERNAL] - COC for S190512

COC S190512 20200921.xlsx

Hi Fadi,

See attached COC for EMM samples coming from Melbourne.

Send QA201 on to Envirolab for analysis.

Some PSD\_01/02 samples are on hold until further notice. Could the PSD\_01/02 samples (not on hold) please be sent through on a separate report.

Cheers.

Kind Regards,

#### Angus Harding

Sydney Client Services Officer, Environmental



<u>T</u> +61 2 8784 8555 <u>F</u> +61 2 8784 8500 <u>D</u> +61 2 8784 8503

277-289 Woodpark Road Smithfield NSW 2164 AUSTRALIA angus.harding@alsglobal.com









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From: Kaitlyn Brodie [mailto:kbrodie@emmconsulting.com.au]

Sent: Tuesday, 22 September 2020 6:25 PM

To: ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com>; Shane Colley <shane.colley@ALSGlobal.com>

Cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a href="mailto:com.au">cc: Dan Condon <a

Subject: [EXTERNAL] - COC for S190512

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you

Good evening,

Some PSD\_01/02 samples are on hold until further notice. Could the PSD\_01/02 samples (not on hold) please be sent through on a separate report. Attached is the COC for job number S190512. Could you please send QA201 on to Envirolab for analysis.

5 eskys were delivered to ALS this afternoon (22/09/2020) and should arrive in Smithfield tomorrow.

Thank you and please let me know if I messed something up.

Kaitlyn

Kaitlyn Brodie

Hydrogeologist



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SYDNEY | Ground floor, 20 Chandos Street, St Leonards NSW 2065



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### CERTIFICATE OF ANALYSIS

**Environmental Division Sydney** 

: 1 of 9

Sepan Mahamad

Laboratory Contact EGG CONSPLTIND i TY LTt PAUL GIBBONS ES20337MU **Work Order** Contact Client

277-289 Woodpark Road Smithfield NSW Australia 2164 Address Ground Floor Suite 1 20 Chandos Street

22-Sep-2020 19:00 +61 2 8784 8555 Date Samples Received Telephone S190512 Balranald T3 Ancillary St Leonards NSW NSW 2065 Telephone Project

09-Oct-2020 11:19 23-Sep-2020 Issue Date

Date Analysis Commenced

KAITLYN BRODIE, Luke G

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full. No. of samples analysed

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

This Certificate of Analysis contains the following information:

EN/112/18 - Primary work only

16

No. of samples received

Quote number

C-O-C number

Sampler

Order number

Address

General Comments

Analytical Results

Surrogate Control Limits

pomounio, besfrfæ fæfywhelab: ,cfma/ Colarom Resonav, A.,C Coh smflye Abbebbhela ao fbbmba unaw ave Addrarolfminiporhfarol seraniela ao awmb resora umm ge pocld ni cfma/Re^neufldSfhsma Reyensa No appyfarol B

#### 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.

Accreditation Category	Sydney Inorganics, Smithfield, NSW	Sydney Organics, Smithfield, NSW	Sydney Inorganics, Smithfield, NSW	Radionuclides, Fyshwick, ACT
Position	Inorganic Chemist	Organic Coordinator	Analyst	Metals Teamleader
Signatories	Ankit Joshi	Edwandy Fadjar	Ivan Taylor	Titus Vimalasiri



. 2 U 3

Work Order : ES2033456

Client : EMM CONSULTING PTY LTD

Project : S190512 Balranald T3 Ancillary

General Comments

In house developed procedures 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. 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

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

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. Key:

LOR = Limit of reporting

H = 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.

EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.

EG035: Poor matrix spike recovery was obtained for Mercury on sample ES2033456 # 2. Confirmed by re-analysis.

EG020: Some samples were diluted and rerun due to matrix interference and LOR's have been raised accordingly. (High Total Dissolved Solids)

EG020: Positive result for sample ES2033456 #014 and #016 has been confirmed by redigestion and reanalysis.

EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. Result confirmed by re-analysis. TS is not ALS TS.

LOR for Gross Alpha and Gross Beta raised due to high solid content.

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.



Project Client

: 3 of 9 : ES2033456 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

Sub-Matrix: WATER xMatrix: WATER6		Clie	Client sample ID	PDG1G) t	PDG1G) S	- 41G(5t	- 4 1G( 5S	- 41G()t
	Clie	ent samplin	Client sampling date / time	17-Sep-2020 13:30	17-Sep-2020 13:50	18-Sep-2020 11:20	18-Sep-2020 10:40	18-Sep-2020 10:00
Compound	CAS Number	LOR	Unit	ES20337MJ100(	ES20337MJ1002	ES20337MU1003	ES20337MJ1007	ES20337MJ100M
				Result	Result	Result	Result	Result
EA2M0: Drobb Answiffld - eaf Ayanhad								
Drobb geaf		0.10	Bq/L	2BM	385	<1.83	2B/(	<1.85
Et 035 i: Anklimina'g/iC Tranfaor								
4/dro8nde Anwfm1 na/fb CfCO3	DMO-210-001	-	mg/L	<1	-1>	-<1	<1	<b>\_</b>
Cfrgolfæ Anhfmina/fb CfCO3	3812-32-6	-	mg/L	₹			>	₹
- nyfrgol fæ. Arhafmina' fb. Cf. CO3	71-52-3	-	mg/L	7(0	2M7	77(	3) 3	733
TodinArkinina fb Cf CO3	-	-	mg/L	7(0	ZNZ	77(	3) 3	733
Et 07(D: Scrpfae xTcrgrdml earry6fb SO7 21g/t A	t A							
Scrpfaefb SO71Tcrgrdmlearry	14808-79-8	1	mg/L	3) MD	73) 0	3000	72) 0	3030
Et 07MD: Cwarrde g/t rbyreæ Alfrhber								
Cwarde	16887-00-6	-	mg/L	2(700	2M000	20300	2( U00	20300
Et 093F: t rbborned Gfjor Cfarol b								
Cfrynch	7440-70-2	-	mg/L	60VI	57U	U67	M93	790
GfClebrch	7439-95-4	-	mg/L	077)	( 520	( 390	(730	(730
Sodieh	7440-23-5	-	mg/L	000))	( 2700	00no)	((200	00 (0 )
i oaf bbrch	7440-09-7	-	mg/L	35	3M	35	33	30
ED020F: t inbomed Geaf in g/ ICi 1GS								
Arbel ry	7440-38-2	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cfdh reh	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cwroh reh	7440-47-3	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cosser	7440-50-8	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Niykem	7440-02-0	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Lefd	7439-92-1	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Znhy	7440-66-6	0.005	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
ED020T: ToafmGeafith g/ ICi 1GS								
Arbel ıy	7440-38-2	0.001	mg/L	1111	<0.010	1111	44	##
Cf dh reh	7440-43-9	0.0001	mg/L	1111	<0.0010	1111	1111	##
Cwroh reh	7440-47-3	0.001	mg/L	##	<0.010	1111	1111	##
Cosser	7440-50-8	0.001	mg/L	1111	<0.010	1111	ти	444
Nıykem	7440-02-0	0.001	mg/L	1111	<0.010	1111	1111	1111
Lefd	7439-92-1	0.001	mg/L	1111	<0.010	1111	1111	1111
Zriy	7440-66-6	0.005	mg/L	1111	<0.052	1111	ти	1111
ED03MF: t nbomed Gerycr/ g/ FIGS								
Gerycr/	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
ED03MT: ToafmReyo^erfgma Gerycr/g/FIGS	S							



Project Client

: 4 of 9 : ES2033456 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

Sub-Matrix: WATER xMatrix: WATER6		Clien	Client sample ID	PDG1G)t	PDG1G) S	- 4 1G(5t	- 41G(5S	- 41G()t
	Clie	ent sampling	Client sampling date / time	17-Sep-2020 13:30	17-Sep-2020 13:50	18-Sep-2020 11:20	18-Sep-2020 10:40	18-Sep-2020 10:00
Compound	CAS Number	LOR	Unit	ES20337MU100(	ES20337MJ/002	ES20337MJ1003	ES20337MJ1007	ES20337MJ100M
				Result	Result	Result	Result	Result
ED03MT: ToafmReyo^erfgma Gerycr/g/FIGS 1Col at ced	3 1Col at ced							
Gerycr/	7439-97-6 0.0001	0.0001	mg/L	ти	<0.0001	ти.	ММ	ТМ
ED0M(D: Ferrocbirol g/trbyreae Alfn/hber								
Ferrocb Irol		0.05	mg/L	386	<0.05	) B//2	M@I)	<b>((B</b>
EK0) MG: Scrpade f b S21								
Scripte f b S21	18496-25-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	20
ENOMM lol ry - f rfil ye								
ø ToafmAlmolb		0.01	med/L	UB2	) 0 (	UMU	20 N	UNE
ø Toaf nCf aol b	-	0.01	med/L	1Z3	6)9	) on	UMS	Ľ)n
ø lol ny-fmfl ye		0.01	%	MB2	MB72	789	3 BJO	3 <b>B</b> '5
EA2M0CA: Drobb Answifld - eaf Ayarhnal								
Drobb f rawf		0.05	Bq/L	<0.94	<1.06	<0.92	MB)	<0.92
Drobb geaf fyarhঝ 170K		0.10	Bq/L	<1.89	<2.12	<1.83	<1.96	<1.85



Project Client

: 5 of 9 : ES2033456 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

Sub-Matrix: WATER whatrix: WATER6		Clie	Client sample ID	- 41G()S	- 4 1G20t	- 4 1G20S	Li Si - 07	, A200
	Clie	ent samplin	Client sampling date / time	18-Sep-2020 09:50	21-Sep-2020 13:15	21-Sep-2020 12:30	20-Sep-2020 14:15	18-Sep-2020 00:00
Compound	CAS Number	TOR	Unit	ES20337MJ100U	ES20337MJ1005	ES20337MU100)	ES20337MJ1009	ES20337MJ10(0
				Result	Result	Result	Result	Result
EA2M0: Drobb Anawffld - eaf Ayarhna′								
Drobb geaf		0.10	Bq/L	385	218(	<2.14	2B/J	2階(
Et 035 i: Antwfm/na/g/iC Tranfaor								
4 / dro 8rde Anwfm1 ra/fb CfCO3	DMO-210-001	-	mg/L	<b>\</b>	>		₹	7
Cfrgolfæ Arhafminaffb CfCO3	3812-32-6	-	mg/L	<b>&gt;</b>	<b>&gt;</b>	₹	₹	7
- nyfrgol fæ Arhvfmh naf fb. Cf. CO3	71-52-3	-	mg/L	ЗМО	723	(N)	750	355
Tod mAntin raf fb Cf CO3	-	-	mg/L	ЗМО	723	(N)	750	355
Et 07(D: Scrif as xT crgrdinh earry 6fb SO7 21g/t A	lg/ t A							
Scrpfæfb SO71Tcrgndnhearny	14808-79-8	-	mg/L	7050	3500	0777	39MD	3920
Et 07MD: Cwarrde g/t rbyreæ Alfrhber								
Cwarde	16887-00-6	1	mg/L	23(00	2(700	27) 00	2(200	22200
Et 093F: t rbborned Gfjor Cfarol b								
Cfrynch	7440-70-2	-	mg/L	N95	M02	2)(	NBM	200
GfQlebrch	7439-95-4	-	mg/L	(390	077)	( 3ND	(750	(720
Sodreh	7440-23-5	_	mg/L	( 2MD 0	00)))	(3700	((200	(2900
ioafbbrch	7440-09-7	_	mg/L	2U	3)	30	39	25
ED020F: t ibbomed Geaf ib g/ ICi 1GS								
Arbel ny	7440-38-2	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cfdh rch	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cwroh rch	7440-47-3	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cosser	7440-50-8	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Nrykem	7440-02-0	0.001	mg/L	<0.010	<0.010	<0.010	0 1302 (	<0.010
Lefd	7439-92-1	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Zhy	7440-66-6	0.005	mg/L	<0.050	<0.050	<0.050	0000	OBMU
ED03NF: t ibborhed Gerycr/ g/ FIGS								
Gerycr/	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EDOM D: Ferrocbirol g/trbyreæ Alfrinber	er.							
Ferrocb Irol	-	0.05	mg/L	213)	NAB 3	000	2) BM	318)2
EKO) MG: Scriptde f b S21								
Scrprde f b S21	18496-25-8	0.1	mg/L	<0.1	<0.1	<b>2510</b>	<0.1	<0.1
ENOWN lol ry - f rful ye								
ø ToafmAlmolb		0.01	med/L	573	oen	29M	୦ଶୀ	5( M
Ø Toaf mCf arol b		0.01	med/L	<b>(</b> f)	SZN	53M	ດສາ	509
ø lol ny - f mll ye	-	0.01	%	3 <b>B</b> 3	75)	330(	7 <b>B</b> 0	OB'M



Project Client

: 6 of 9 : ES2033456 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

Sub-Matrix: WATER  Matrix: WATER6		Clien	Client sample ID	- 41G()S	- 4 1G20t	- 4 1G20S	Li Si - 07	, A200
	Clie	ent sampling	Client sampling date / time	18-Sep-2020 09:50	21-Sep-2020 13:15	21-Sep-2020 12:30	20-Sep-2020 14:15	18-Sep-2020 00:00
Compound	CAS Number LOR	LOR	Unit	ES20337MJ100U	ES20337MJ/005	ES20337MJ100)	ES20337MJ1009	ES20337MJ10(0
				Result	Result	Result	Result	Result
EA2MCA: Drobb Answiffld - eaf Ayarhna								
Drobb frawf		0.05	Bq/L	2 BJO	<0.96	(B)	<0.96	28)
Drobb geaf fyarha 170K	1	0.10	Bq/L	287	<1.92	<2.14	<1.91	<2.11



Project Client

: 7 of 9 : ES2033456 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

Sub-Matrix: WATER whatrix: WATER6		Clie	Client sample ID	TS	T- 7	T- M	R- U00	R- 500
	Cli	ent samplin	Client sampling date / time	31-Jul-2020 00:00	20-Sep-2020 15:00	20-Sep-2020 15:00	18-Sep-2020 09:50	20-Sep-2020 14:30
Compound	CAS Number	TOR	Unit	ES20337MJ10((	ES20337MJ10(2	ES20337MJ10(3	ES20337MJ10(7	ES20337MU0(M
				Result	Result	Result	Result	Result
ED020T: ToafinGeafinb g/ ICi 1GS								
Arbel ry	7440-38-2	0.001	mg/L	144 H	<0.001	<0.001	<0.001	<0.001
Cfdh rch	7440-43-9	0.0001	mg/L	т.	<0.0001	<0.0001	<0.0001	<0.0001
Cwroh rch	7440-47-3	0.001	mg/L	т.	<0.001	<0.001	<0.001	<0.001
Cosser	7440-50-8	0.001	mg/L	1111	<0.001	<0.001	0 BOM	<0.001
Nrykem	7440-02-0	0.001	mg/L	т.	<0.001	<0.001	<0.001	<0.001
Lefd	7439-92-1	0.001	mg/L	1111	<0.001	<0.001	<0.001	<0.001
Zthy	7440-66-6	0.005	mg/L	1111	<0.005	<0.005	018(2	<0.005
ED03MT: ToafmReyo^erfgma Gerycr/g/FIGS	FIGS							
Gerycr/	7439-97-6	0.0001	mg/L	1111	<0.0001	<0.0001	<0.0001	<0.0001
Ei 0) 0: - TEXN								
- el zel e	71-43-2	-	hg/L	(3	1111	т,	1111	1111
Tomel e	108-88-3	2	hg/L	(3	1111	Ш	1111	1111
Eav rgel zel e	100-41-4	2	hg/L	(2	1111	т	1111	1111
heaf1&sfrf1X/male	108-38-3 106-42-3	2	hg/L	27	1111	Т	1111	1111
orawo1X/male	92-47-6	2	hg/L	(7	1111	11M	1111	1111
^ ToafmX/maleb		2	hg/L	3)	1111	11M	1111	1111
^ Sch op- TEX		_	hg/L	50	1111	т,	1111	1111
Nfswawfmale	91-20-3	2	hg/L	<5	1111	11M	1111	1111
Ei 0) 0S: Ti 4 xV6- TEX Scrroof æb								
(Ett nywnoroeawilett 7	17060-07-0	2	%	59 <b>B</b>	1111	тт	1111	1111
Tomeleft)	2037-26-5	2	%	92BM	1111	Ш	1111	1111
71 roh opporogel zel e	460-00-4	2	%	<b>8</b> 06	тт	1111	1111	1111



Page Work Order

: 8 of 9 : ES2033456 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary Project Client

Sub-Matrix: WATER wMatrix: WATER6		Clien	Client sample ID	R- )00	1111	1111	1##	1111
	Clie	ent sampling	Client sampling date / time	21-Sep-2020 14:20	-	-	-	-
Compound	CAS Number	LOR	Unit	ES20337MU10(U	11111111	11111111	11111111	11111111
				Result				
ED020T: ToafmGeafth g/ ICi 1GS								
Arbel ny	7440-38-2	0.001	mg/L	<0.001	1111	1111	ш	MM
Cfdh reh	7440-43-9	0.0001	mg/L	<0.0001	т.	т.	ш	MM
Cwroh reh	7440-47-3	0.001	mg/L	<0.001	тт	1111	ш	MM
Cosser	7440-50-8	0.001	mg/L	0000	1111	1111	т	MM
Nrykem	7440-02-0	0.001	mg/L	<0.001	1111	1111	μμ	MM
Lefd	7439-92-1	0.001	mg/L	08002	1111	1111	μμ	##
Zthy	7440-66-6	0.005	mg/L	0 <b>B</b> 0 U	1111	1111	1111	1111
ED03M: ToafmReyo^erfgma Gerycr/g/FIGS	FIGS							
Gerycr/	7439-97-6 0.0001	0.0001	mg/L	<0.0001	1111	1111	1111	1111



: 9 of 9 : ES2033456 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary Project

Page Work Order

Client

Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	imits (%)
Compound	CAS Number	Том	High
Ei 0) 0S: Ti 4 λV6- TEX ScrroΩf æb			
(图t nywnroeawflett 7	17060-07-0	7.1	137
Tomele1t)	2037-26-5	62	131
71 roh opporogel zel e	460-00-4	70	128



## QUALITY CONTROL REPORT

**Environmental Division Sydney** : 1 of 7 Laboratory **EDD CONSULTIN5 PTY LTs** ES20337MG **Work Order** Contact

677p6kR- ood2ar4 +oad SmitWield NS- Australia 6185 Se2an h aWamad Contact Address Ground Floor Suite 1 60 CWandos Street St Leonards NS- NS- 6089 PAUL GIBBONS

Address

Client

Proæct

. j 81 6 k7k5 k999 66pSe2p6060 6HpSe2p6060 0RpOctp6060 Date Analysis Commenced Date Sam2les + eceived Tele2Wone Issue Date mp S1R0916 Balranald THAncillary RPP EN(116(1k pPrimary ) or4 only / AITLKN B+ODIECLu4e G CpOpc number wuote number Order number Tele2Wone Sam2ler

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

TW's re2ort su2ersedes any 2revious re2ort, sx) itWW's reference. + esults a22ly to tWe sam2le, sxas submitted. TW's document sWall not be re2roducedQe; ce2t in full.

TWis wuality Control +e2ort contains tWe follo) ing information:

8

No. of sam2les analysed No. of sam2les received

■ Laboratory Du2licate , DUPx+e2ortM+elative Percentage Difference ,+PDxand Acce2tance Limits

h etWod Blan4, h Bxand Laboratory Control S2i4e, LCSx+e2ortM+ecovery and Acce2tance Limits

■ h atri; S2i4e ,h Sx+e2ortM ecovery and Acce2tance Limits

#### Signatories

TW's document Was been electronically signed by tWe autWorized signatories belo). Electronic signing is carried out in com2liance) itW2rocedures s2ecified in 61 CF+ Part 11.

Accreditation Category	Sydney Inorganics@mitWfeldQNS-	Sydney Organics@SmitWield@NS-	Sydney Inorganics@mitVffeldQNS-	+adionuclidesCFysW ic4CACT
Position	Inorganic CVemist	Organic Coordinator	Analyst	h etals Teamleader
Signatories	An4it JosW	Ed) andy Fad3ar	Ivan Taylor	Titus Vimalasiri



Fage : 6 of 7
- or4 Order : ES60H598
Client : En h CONSULTING PTK LTD
Pro&ct : S1R0916 Balranald THAncillary

General Comments

In Wouse develo2ed 2rocedures TWe analytical 2rocedures used by ALS Wave been develo2ed from establis/Ved internationally recognised 2rocedures suc/W as tWose 2ublis/Ved by tWe USEPAQ APYAQ.AS and NEPh. are fully validated and are often at tWe client request.

Vere moisture determination Was been 2erformed Gresults are re2orted on a dry) eigt basis.

- Vere a re2orted less tVen , < xresult is VigVer tVen tVe LO+CVVs may be due to 2rimary sam2le e; tract(digestate dilution and (or insufficient sam2le for analysis. - Vere tVe LO+ of a re2orted result differs from standard LO+CVVs may be due to 2rimary sam2le e;

Anonymous = +efers to sam2les ) WeWare not s2ecifically 2art of tWs ) or4 order but formed 2art of tWe wC 2rocess lot

/ ey:

CAS Number = CAS registry number from database maintained by CVémical Abstracts Services. TVé CVémical Abstracts Service is a division of tVé American CVémical Society.

LO+ = Limit of re2orting

+PD = + elative Percentage Difference

# = Indicates failed wC

Laboratory Duplicate (DUP) Report

for tWe +elative Percent Deviation, +PDx of Laboratory Du2licates are s2ecified in ALS hetWed w- 1FN(rk and are de2endent on tWe magnitude of results in com2arison to tWe level of re2orting: +esult < 10 times LO+: TWe quality control term Laboratory Du2licate refers to a randomly selected intralaboratory s2lit. Laboratory du2licates 2rovide information regarding metVod 2recision and sam2le Veterogeneity. TVe 2ermitted ranges No LimitM esult bet) een 10 and 60 times LO+: 0% p90%M esult > 60 times LO+: 0% p60%.

Subph atri; : WATER						Laboratory D	Laboratory Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA2MCA: 5 rol 1 Apr	EA2MOCA: 5 roll Aphan nBd teon Aiowyd 4QC Loc 3212Gl) b	oc 3212Gl) b							
CA6008910p001	Anonymous	EA690: Gross al2VM	att	60.0	Bq(L	<0.0>	<0.09	0.00	No Limit
		EA690: Gross beta	att the second	0.1	Bq(L	0.10	0.10	0.00	No Limit
		EA690: Gross beta activity p50/	dttt	0.1	Bq(L	<0.10	<0.10	0.00	No Limit
ES60H1598p005	BYph 17S	EA690: Gross al2VM	att.	0.09	Bq(L	1.H9	1.R6	H5.7	No Limit
		EA690: Gross beta	CHH.	0.1	Bq(L	6.91	H.78	6k.R	No Limit
		EA690: Gross beta activity p50/	attati	0.1	Bq(L	<1.R8	6.19	R08	No Limit
Es 03uP: ApknpBvg f	Es 03uP: ApknpBo ff (PC Tornoor 4QC Loc 32u) n20b	n20b							
ES60HH551p001	Anonymous	ED0H7pP: Yydro; ide Al4alinity as CaCOH	Dh Op610p001	_	mg(L	^	7	0.00	No Limit
		ED0H7pP: Carbonate Al4alinity as CaCOH	HK16pH6p8	-	mg(L	7	15	61.9	%06d %0
		ED0H7pP: Bicarbonate Al4alinity as CaCOH	71p96pH	_	mg(L	1R7	009	1.5H	%09d %0
		ED0H7pP: Total Al4alinity as CaCOH	dttt	_	mg(L	615	615	0.00	%09d %0
ES60H-1551p018	Anonymous	ED0H7pP: Yydro; ide Al4alinity as CaCOH	Dh Op610p001	_	mg(L	۲>	۲>	0.00	No Limit
		ED0H7pP: Carbonate Al4alinity as CaCOH	Hk16pH6p8	_	mg(L	1960	1990	1.5R	%09d %0
		ED0H7pP: Bicarbonate Al4alinity as CaCOH	71p96pH	_	mg(L	5H00	H 00	16.H	%09d %0
		ED0H7pP: Total Al4alinity as CaCOH	attt	_	mg(L	9k60	06H6	k.95	%09d %0
Es 03uP: ApknpBvg f	Es 03uP: ApknpBog f (PC Tvancor 4QC Loc 32u) n2mb	n2mb							
ES60HH598p009	ВУф 1кD	ED0H7pP: Yydro; ide Al4alinity as CaCOH	Dh Op610p001	_	mg(L	<1	۲>	0.00	No Limit
		ED0H7pP: Carbonate Al4alinity as CaCOH	Hk16pH6p8	_	mg(L	<1	۲>	0.00	No Limit
		ED0H7pP: Bicarbonate Al4alinity as CaCOH	71p96pH	_	mg(L	5HH	2H8	0.k5R	%09d %0
		ED0H7pP: Total Al4alinity as CaCOH	dttt	_	mg(L	5HH	2HB	0.k5R	%09d %0
ES60HH578p005	Anonymous	ED0H7pP: Yydro; ide Al4alinity as CaCOH	Dh Op610p001	_	mg(L	<1	۲>	0.00	No Limit
		ED0H7pP: Carbonate Al4alinity as CaCOH	HK16pH5p8	_	mg(L	<1	<b>,</b>	0.00	No Limit
		ED0H7pP: Bicarbonate Al4alinity as CaCOH	71p96pH	_	mg(L	18H	19K	H.68	%09d %0
		ED0H7pP: Total Al4alinity as CaCOH	attati	_	mg(L	18H	19Ķ	H.68	%09d %0



Eh h CONSULTING PTK LTD S1R0916 Balranald TH Ancillary

ES60H-598

- or4 Order

Client Proæct

Recovery Limits (%) %09d %0 %09d %0 %09d %0 %09d %0 %09d %0 %09d %0 %09d %0 %09d %0 %09d %C %09d %C %09d %C %06d %C %09d %C %09d %C %09d %C %09d %C %09d %C No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.966 9.K5 Ŧ 11.0 09.9 0.H<del>5</del>1 H.1R H.86 0.00 0.00 0.00 0.00 0.00 0.00 0.00 H.H 0.00 0.00 6.78 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 7.96 H.K0 0.00 1.71 0.00 Laboratory Duplicate (DUP) Report Duplicate Result <0.010 <0.010 <0.010 <0.010 0.0005 <0.0001 <0.001 <0.0001 <0.0010 <0.010 <0.090 0.01H 0.0HR <0.001 <0.001 <0.001 <0.001 <0.009 <0.001 65000 60700 16000 <0.001 0.H95 H870 HR70 0.101 0.1k8 1H50 H9 9/H 878 998 8H Original Result <0.0010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.090 0.0005 0.01H <0.001 <0.001 <0.00> 61500 00999 <0.001 <0.001 <0.001 0.050 0.101 <0.001 <0.0001 <0.001 86 ¥ 89 0069 0.H<del>5</del>9 0.176 1 1 1 1 1 1 1 1 875 24 958 9 89 mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L Unit mg(L mg(L mg(L mg(L mg(L mg(L 0.001 0.009 0.0001 0.001 0.001 0.001 0.009 0.0001 0.001 0.001 0.001 0.001 0.001 0.009 0.001 0.001 0.001 0.0001 0.001 0.001 0.001 0.001 0.0001 LOR ~ \_ \_ \_ \_ \_ ~ 7550p5HpR 7550p5HpR 7550p5HpR 7550pHkp6 7550p5HpR 7550pHkp6 7550p57pH CAS Number 18kk7p00p8 18kk7p00p8 7550p70p6 75HR4P9p5 7550p6Hp9 7550p0Rp7 75HRAR905 7550p0Rp7 7550pHkp6 7550p57pH 7550p90pk 7550p06p0 7550p88p8 7550p57pH 7550p90pk 7550p06p0 7550p88p8 7550pHkp6 7550p90pk 7550p06p0 7550p8gp 15k0kp7Rqk 7550p70p6 7550p6Hp9 75HRpR6pf 75HRpR6p1 75HRpR6pf 15k0kp7Rpk ED051G: Sulfate as SO5 pTurbidimetric ED051G: Sulfate as SO5 pTurbidimetric EG060ApF: CWomium EG060ApF: CWomium EG060ApT: CWomium ED0RHF: h agnesium ED0RHF: h agnesium EG060ApF: Cadmium EG060ApF: Cadmium EG060ApT: Cadmium EG060ApT: Cadmium Es 07m5: S-pance 4T-rf volv6 earvi bnl SO7 29f (sA 4QC Loc 32u33Glb ED0RHF: Potassium ED0RHF: Potassium EG060ApT: Arsenic EG060ApT: Arsenic EG060ApF: Arsenic EG060ApF: Arsenic EG060ApF: Co22er EG060ApF: Co22er EG060ApT: Co22er ED059G: CWoride ED059G: CWoride EDORHF: Calcium EDORIF: Calcium EDOR-F: Sodium EG060ApF: Nic4el EG060ApF: Nic4el EG060ApT: Nic4el EDORHF: Sodium EG060ApF: Lead EG060ApT: Lead EG060ApF: Lead EG060ApF: Zinc EG060ApF: Zinc EG060ApT: Zinc Es 07M5: Caparde f (svireæ ABngler 4QC Loc 32u33u0b E5020F: svilopyed Dearp f (ICPSDS 4QC Loc 32uGuMmb Es 013F: s v I ogyed D njor Cnoo Bl 4QC Loc 32u GuMbb E5 020T: ToanpDeany f (ICPDS 4QC Loc 32uGruub Client sample ID Anonymous Anonymous Anonymous UGh ph kD UGh ph kD BYph 1kS BYth 1kS wA600 wA600 Laboratory sample ID Subth atri; : WATER ES60HH598p01H ES60H1598p008 ES60HF598p008 ES60HH598p010 ES60HH598p010 ES60H1051p001 ES60HH598p001 ES60HH598p001 ES60HIGHB006 ES60HH051p001



Eh h CONSULTING PTK LTD S1R0916 Balranald TH Ancillary

ES60H-598

- or4 Order

Client Proæct

5 of 7

Recovery Limits (%) %09d %0 %09d %0 No Limit No Limit No Limit %09d %0 No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.710 0.00 0.00 H.5R 0.RR6 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Laboratory Duplicate (DUP) Report Duplicate Result <0.0001 <0.0001 <0.0001 <0.001 <0.009 <0.001 900.0 0.007 <0.0001 <0.0> 6.R8 9.H ٥.1 م 0.1 159 9 9 9 တ္ တ Ÿ 9 9 9 9 6 V Original Result <0.0001 900.0 <0.001 <0.009 <0.0001 <0.0001 <0.0001 <0.001 0.008 <0.09 ₩. 15H ٥.1 م **6**0.1 9 9 9 6 ž 9 9 9 9 **ဂ** V mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L hg(L mg(L mg(L mg(L mg(L Unit mg(L mg(L hg(L hg(L hg(L hg(L hg(L hg(L hg(L mg(L hg(L hg(L hg(L hg(L 0.0001 0.0001 0.0001 0.001 0.001 0.001 0.001 0.009 0.09 0.09 0.09 0.0001 LOR 0.09 0.1 0.1 0 9 9 9 9 9 ဖ ၈ 9 9 **B B** 10kpkkpH 75HRpR7p8 71p5Hp6 7550p57pH 75HRpR7p8 71p5Hp6 R1 p60pH 10kpkpH CAS Number 7550p90pk 75HRpR6p1 7550p06p0 7550p88p8 75HRpR7p8 75HRAR7B 1k5R8p69pk 100p51p5 OKPAP 108p56pH R96578 100p51p5 OKPAR R9p57p8 R1p60pH 1k5R8p69pk 108p56pH EP0k0: metap& 2arapXylene EP0k0: metap& 2arapXylene EG091G: Ferrous Iron E/ 0k9: Sulfide as S6p E/ 0k9: Sulfide as S6p EG060ApT: CWomium EG091G: Ferrous Iron EG091G: Ferrous Iron EG091G: Ferrous Iron EP0k0: Et/Wibenzene EP0k0: Et/W/Ibenzene EPOk0: Na2WWalene EP0k0: ortWbpXylene EP0k0: ortWbpXylene EP0k0: Na2WWalene EG060ApT: Co22er EG060ApT: Nic4el EG0H9F: h ercury EG0H9F: h ercury E503MT: ToanpRei oyernf pe Deri - r(f (FIDS 4QC Loc 32uGW1b EG0H9T: h ercury EG0H9T: h ercury EG060ApT: Lead EP0k0: Benzene EG060ApT: Zinc EP0k0: Benzene EP0k0: Toluene E5020T: ToanpDeany f (ICPSDS 4QC Loc 32uG7 uub 9i oBo.B-ed EP0k0: Toluene E50Mm5: Ferro-IlroBf (svirece ABmg/ler 4QC Loc 32u7) C0b E50Mn5: Ferro-IlroBf (svirece ABngler 4QC Loc 32uMn22b E503MF: SVI opyed Deri - r(f(FIDS 4QC Loc 32uQuMBb EK0) MD: S-pade nl S29 4QC Loc 32u72G7b Client sample ID EP0) 0: t TEXN 4QC Log 32) 0u) 3b Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous UGh ph kD BYth 1kD BYth 1kS BYth 60D wA600 Laboratory sample ID Subph atri; : WATER ES60H679p001 ES60HH161p001 ES60H-688p00R ES60H-16H6p006 ES60HH598p009 ES60H1598p008 ES60HH598p007 ES60H-96Rp00H ES60H-1598p001 ES60HH598p010 ES60H6H6p006 ES60H-1796p006 ES60HH688p001



S1R0916 Balranald TH Ancillary Eh h CONSULTING PTK LTD ES60H-598 9 of 7 - or4 Order Proæct Client

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

2arameter is to monitor 2otential laboratory contamination. TWe quality control term Laboratory Control S2i4e ,LCSx refers to a certified reference materialQ or a 4no) n interference free matri; s2i4ed ) itW target TWe 2ur2ose of tWs wC TWe quality control term hetWord (Laboratory Blan4 refers to an analyte free matri; to ) WicW all reagents are added in tWe same volumes or 2ro2ortions as used in standard sam2le 2re2aration. analytes. TV& 2ur2ose of tVKs wC 2arameter is to monitor metV%d 2recision and accuracy inde2endent of sam2le matri; . Dynamic + ecovery Limits are based on statistical evaluation of 2rocessed LCS.

High 60 109 두 로 115 091 11 11 11 116 117 115 118 1 1 1 119 두 로 991 791 111 111 11 Recovery Limits (%) 75.5 70.0 K0.R K0.R k0.0 k6.0 k5.0 k9.0 KH0 k5.0 k8.0 kH0 99. 9.0 k1.0 70.0 k6.0 k6.0 k1.0 k6.0 k9.0 k9.0 TOW 8 Laboratory Control Spike (LCS) Report Spike Recovery (%) **₹** ₩. H. K7.H k8.0 <u>ج</u> 6. SO7 RR9<u>8</u> P30.0 조 R5.9 kR5 k8.7 ₩. 8 7 106 168 100 106 5 5 89. T 101 Concentration 1000 mg(L 600 mg(L 600 mg(L 69 mg(L 900 mg(L 10 mg(L 0.1 mg(L 0.1 mg(L 1791 Bq(L 90 mg(L 0.1 mg(L 0.1 mg(L HE6 Bq(L 90 mg(L 90 mg(L 90 mg(L 0.1 mg(L 0.1 mg(L 0.1 mg(L 90 mg(L 90 mg(L 0.1 mg(L 0.1 mg(L 0.1 mg(L 0.1 mg(L 0.1 mg(L 8 Method Blank (MB) Result Report <0.10 <0.0001 <0.001 <0.001 <0.001 <0.001 <0.00> <0.0001 <0.001 <0.001 <0.001 <0.09 <0.001 £ £ V V Ÿ √ √ <u>v</u> v mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L Bq(L Bq(L Bq(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L mg(L Unit 0.0001 0.001 0.0001 0.001 0.001 0.009 0.001 0.001 0.001 0.001 0.001 0.001 LOR 0.09 0.1 8 8 0.1 \_ CAS Number 8 8 7550p5HpR 7550pHkp6 7550p5HpR 7550p57pH 7550pHkp6 7550p57pH 7550p70p6 7550p6Hp9 7550p90pk 7550p88p8 7550p90pk 18kk7p00p8 75HRqR9p5 7550p0Rp7 75HR4P6p1 7550p06p0 15KOK pr Pak Es 07m5 : S-pance 4T- rf volve eavi bal SO7 29f (sA 4QCLoc 32u33Glb EA2MOCA: 5 rol I Aphan nBd teon Ai oyvo( 4QCLoc 3212Gl) b Es07M5: Caporvdef(s√lirece ABnp(ler 4QCLoc 32u33u0b E5020F: sviogyed Deany f (ICP9DS 4QCLoc 32uQuMmb ES 013F: SVI opyed Dinjor Choodi 4QCLoc 32u@uMb Es 03uP: ApknpBx (f (PC Tvanoor 4QCLoc 32u) m20b Es 03uP: ApknpBv(f(PCTvancor 4QCLoc 32u) n2mb E5020T: ToanpDeand f (ICPSDS 4QCLoc 32uG7uub ED051G: Sulfate as SO5 pTurbidimetric ED0H7pP: Total Al4alinity as CaCOH ED0H7pP: Total Al4alinity as CaCOH EA690: Gross beta activity p50/ EG060ApT: CWomium EG060ApF: CWomium EG060ApF: Cadmium EG060ApT: Cadmium ED0RF: h agnesium EA690: Gross al2Wd Subph atri; : WATER ED0RH: Potassium EG060ApF: Arsenic EG060ApT: Arsenic EG060ApT: Co22er Method: Compound EA690: Gross beta EG060ApF: Co22er ED059G: CWoride EG060ApF: Nic4el EDORF: Calcium EDOR#: Sodium EG060ApF: Lead EG060ApT: Lead EG060ApF: Zinc



 Page
 : 8 of 7

 - or4 Order
 : ES60H-598

 Client
 : Eh h CONSULTING PTK LTD

 Pro&ct
 : S1R0916 Balranald TH Ancillary

Subth atri; : WATER				Method Blank (MB)		Laboratory Control Spike (LCS) Report	S) Report	
				Report	Spike	Spike Recovery (%)	Recovery Limits (%)	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SO7	Low	High
E5 020T: ToanpDeant f (ICPDS 4QCLoc 32uGruub 91 oBo.B. ed	B-ed							
EG060ApT: Nic4el	7550p06p0	0.001	mg(L	<0.001	0.1 mg(L	Ø. ₽	k5.0	118
EG060ApT: Zinc	7550p88p8	600.0	mg(L	<0.009	0.1 mg(L	P6.1	7R0	117
E503MF: svlogved Deri-r(f(FIDS 4QCLoc 32uQuMBb								
EG0H9F: h ercury	7.5HR4R7p8	0.0001	mg(L	<0.0001	0.01 mg(L	RI.6	кНО	109
E5 03MT: ToonpRei oyermf pe Deri - r(f (FIDS 4QCLoc 32uGM/1b	IGW 1b							
EG0H9T: h ercury	75HR4R7p8	0.0001	mg(L	<0.0001	0.01 mg(L	<u>Υ</u> .	77.0	111
E50Mm5: Ferro-IlroBf (svireæ ABm¢ler 4QCLoc 32u7) @b	GD Q							
EG091G: Ferrous Iron	attt	0.09	mg(L	<0.09	6 mg(L	105	kR0	117
E5 0Mm5: Ferro-IlroBf (svirece ABm¢ler 4QCLoc 32uMm22b	122b							
EG091G: Ferrous Iron	attati	0.09	mg(L	<0.09	6 mg(L	105	kR0	117
EK0) MD: S-polde nl S29 4QCLoc 32u72G7b								
E/ 0k9: Sulfide as S6p	1k5R8p69pk	0.1	mg(L	<0.1	0.9 mg(L	0.88	78.0	118
EP0) 0: t TEXN 4QCLoc 32) 0u) 3b								
EP0k0: Benzene	71155Hp6	_	hg(L	7>	10 µg(L	RRO	70.0	166
EP0k0: Toluene	10kpkkpH	9	hg(L	9>	10 µg(L	105	8R0	16H
EP0k0: Et/Wylbenzene	10005105	9	hg(L	9>	10 µg(L	108	70.0	160
EP0k0: metap & 2arapXylene	10kpHkpH	9	hg(L	9>	10 µg(L	107	8R0	161
	108p56pH							
EP0k0: ort/wpXylene	R9p57p8	9	hg(L	9>	10 µg(L	108	76.0	166
EPOk0: Na2VWWalene	R1p60pH	O	hg(L	6>	10 µg(L	106	70.0	160

## Matrix Spike (MS) Report

TWe quality control term hatri; S244e, hSx refers to an intralaboratory s2lit sam2le s214ed) itW a re2resentative set of target analytes. TWe 2ur2ose of tWis wC 2arameter is to monitor 2otential matri; effects on analyte recoveries. Static + ecovery Limits as 2er laboratory Data wuality Ob&ctives , DwOsx Ideal recovery ranges stated may be ) aived in tWe event of sam2le matri; interference.

Matrix Spike (MS) Report

Subth atri; : WATER

			Spike	SpikeRecovery(%)		Recovery Limits (%)
Laboratory sample ID Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
Es 07m5: S-pance 4T- rf volv6 eavi bnl SO7 29f (sA 4QCLoc 32u33Glb						
ES60H <del>15</del> 98p01 UGh ph kD	ED051G: Sulfate as SO5 pTurbidimetric	15k0kp7 Ppk	10 mg(L	# Not Determined	70.0	1H0
Es 07N5: Capordef (svirece ABnp(ler 4QCL oc 32u33u0b						
ES60H5598p01 UGh ph kD	ED059G: CWbride	18kk7p0p8	90 mg(L	# Not Determined	70.0	<del>1</del>
E5020F:svlopyed Demplf (ICPSDS 4QCLoc 32uQuMrb						
ES60H1510p001 Anonymous	EG060ApF: Arsenic	7550pHkp6	1 mg(L	RI.7	70.0	1H2
	EG060ApF: Cadmium	7550p5HpR	0.69 mg(L	P6.6	70.0	1H0



: 7 of 7 : ES60H598 Page - or4 Order Proæct Client

				M	Matrix Snike (MS) Bonort		
Subpi airi, : WAIER				Crife	SpikePermeru///	Docovery I imite (%)	nite (%)
	!			obine	Spinerecovery(%)	vecovery Li	(%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
E5 020F: s v I opyed	E 5 0 20 F:svilogyed Decript (ICP 50 S 4QC Loc 32 uGuMmb 9 io Boa B-ed						
ES60H1510p001	Anonymous	EG060ApF: CWomium	7550p57pH	1 mg(L	KK. 1	70.0	140
		EG060ApF: Co22er	7550p0pk	1 mg(L	kR1	70.0	1H0
		EG060ApF: Lead	75HR4P6p1	1 mg(L	KHR	70.0	110
		EG060ApF: Nic4el	7550р06р0	1 mg(L	RO.8	70.0	1140
		EG060ApF: Zinc	7550p88p8	1 mg(L	R1.7	70.0	1H0
E5 020T: ToanpDed	E5020T: ToanpDeanpf (ICP9DS 4QCLoc 32uGruub						
ES60H-6HBp00H	Anonymous	EG060ApT: Arsenic	7550pHkp6	1 mg(L	RHR	70.0	1H0
		EG060ApT: Cadmium	7550p5HpR	0.69 mg(L	R6.5	70.0	110
		EG060ApT: CVVomium	7550p57pH	1 mg(L	100	70.0	140
		EG060ApT: Co22er	7550p90pk	1 mg(L	R6.R	70.0	110
		EG060ApT: Lead	75HR4R6p1	1 mg(L	R0.R	70.0	110
		EG060ApT: Nic4el	7550,006,00	1 mg(L	R0.1	70.0	1H0
		EG060ApT: Zinc	7550p88p8	1 mg(L	Α. Α.	70.0	1H0
E5 03NF: s vl l opyed	E503MF: svilopyed Deri-r(f(FIDS 4QCLoc 32uQuM8b						
ES60H150Rp006	Anonymous	EG0H9F: h ercury	75HR4R7p8	0.01 mg(L	71.9	70.0	1H0
E503MT: ToanpRei	E503MT: TompRei oyernf pe Deri - r(f (FIDS 4QCLoc 32uGM/1b						
ES60HH598p006	UGh ph kS	EG0H9T: h ercury	75HRpR7p8	0.01 mg(L	# 96.9	70.0	1H0
E5 0Mn5: Ferro- I	E50 Mn5: Ferro-Ilro Bf (svlire ce A Bnp(ler 4QC Loc 32 u7) Cob						
ES60H1161p001	Anonymous	EG091G: Ferrous Iron	cttt	1 mg(L	RK.9	70.0	15
E5 0Mn5: Ferro- I	E 50 Mn 5: Ferro-Ilro Bf (svire ce A Bn Riler 4QC Loc 32 uMn 22 b						
ES60H598p07	ВҮф 60D	EG091G: Ferrous Iron	ctttt	1 mg(L	# Not Determined	70.0	140
EK0) MD: S-p3vde n	EK0) MD: S-pade nl S29 4QCLoc 32u72G7b						
ES60HH598p001	UGh ph kD	E/ 0k9: Sulfide as S6p	1k5R8p69pk	0.HHmg(L	108	70.0	1H0
EP0) 0: t TEXN 4QCLoc 32) 0u) 3b	CLoc 32) 0u) 3b						
ES601+1688p001	Anonymous	EP0k0: Benzene	71p5Hp6	69 µg(L	R7.9	70.0	110
		EP0k0: Toluene	10крккрН	69 hg(L	106	70.0	1H0
		EP0k0: Et/Wibenzene	100p51p5	69 hg(L	105	70.0	1H0
		EP0k0: metap& 2arapKylene	10kpHkpH	69 µg(L	105	70.0	1
			108p56pH				:
		EP0k0: ortVøpXylene	R9p57p8	T)6d 69	10H	70.0	140
		EPOk0: Na2VWWklene	R1p60pH	69 hg(L	101	70.0	110



# QA/QC Compliance Assessment to assist with Quality Review

**Environmental Division Sydney** +61 - 2724 2555 -- RepR 8-8 89ROctR 8-8 : 1 of 18 9 9 No. of samples analysed Date Samples 3 eceived No. of samples received Issue Date Laboratory Telephone S19851- Balranald T0 Ancillary **EMM CONSULTING PTY LTD** HAITLK N B3 ODIE/ Luke G RRR PAUL GIBBONS ES2033456 Order number **Work Order** Contact Sampler Project Client Site

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 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 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) 3 eport.

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

# Outliers: Analysis Holding Time Compliance

Analysis Holding Time Outliers exist - please see following pages for full details.

# **Outliers: Frequency of Quality Control Samples**

NO Quality Control Sample Frequency Outliers exist.



S19851- Balranald T0 Ancillary EMM CONSULTING PTK LTD ES-800456 : - of 18 Work Order Project Client

Outliers: Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

MatriY: WATER

Compound Group Name	Laboratory Sample ID   Client Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment	
Matrix Spike (MS) Recoveries								
ED841G: Sulfate (Turbidimetric) as SO4 - Rby DA	ES-800456開881	UGMRM2D	Sulfate as SO4 -	1428277912	Not	HEEC THE	MS recovery not determined,	
			Turbidimetric		Determined		background level greater than or equal to 4x spike level.	
ED845G: Chloride by Discrete Analyser	ES-800456円881	UGMRM2D	Chloride	16227R88R6	Not	HEET.	MS recovery not determined,	
					Determined		background level greater than or equal to 4x spike level.	
EG805T: Total 3ecoverable Mercury by %MS	ES-800456R88-	UGMRM2S	Mercury	7409R97R6	55 ×	78.8F108x	Recovery less than lower data quality	
EG851G: %errous Iron by Discrete Analyser	ES-800456FR887	BFRM-8D	Ferrous Iron	RRR	Not	<b>EEE</b>	MS recovery not determined,	
				1	Determined		background level greater than or	
							equal to 4x spike level.	

## Outliers: Analysis Holding Time Compliance

MatriY: WATER

Method	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)	Date extracted	Date extracted Due vor extraction	Days overdue	Date analysed	Date analysed Due vor analysis	Days overdue
EP080: BTEXN						
Amber VOC Vial - Sulfuric Acid						
TS	81ROctR 8-8	31 ROctR 8-8 14 RAugR 8-8	48	81ROctR 8-8	81ROctR 8-8 14RAugR 8-8	48

## **Analysis Holding Time Compliance**

If samples are identified belog as having been analysed or eMracted outside of recommended holding times/ this should be taken into consideration ghen interpreting results.

This report summarizes extraction w preparation and analysis times and compares each qith ALS recommended holding times (referencing USEPA SW 246/ APFA/ AS and NEPM) based on the sample container provided. Dates reported represent first date of eYtraction or analysis and preclude subse, uent dilutions and reruns. A listing of breaches (if any) is provided herein.

Assessment compares the leach date gith the shortest analyte holding time for the e, uivalent soil method. These are: organics 14 days/mercury - 2 days & other metals 128 days. A recorded breach does not guarantee a breach for all non-Rolatile parameters. Folding time for leachate methods (e.g. TCLP) vary according to the analytes reported.

Folding 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 interestwoncern.

MatriY: WATER

MatriY: WATER				Evaluation:	× = Folding time	breach; ✓ = Within	n holding time.
Method	Sample Date	Extr	xtraction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation



EMM CONSULTING PTk LTD S19851- Balranald T0 Ancillary

ES-800456

Work Order

Client Project

0 of 18

Evaluation: \* = Folding time breach; </br> **Efaluation** > > > > > > > > > > > > > > Due vor analysis 16RMarR 8-1 19RMarR 8-1 16RMarR 8-1 19RMarR 8-1 81ROctR8-8 8-ROctR8-8 84ROctR8-8 15ROctR8-8 12ROctR8-8 19POctR8-8 85ROctR8-8 16POctR8-8 17 RMar R 8-1 -8RMarR 8-1 17RMarR 8-1 -8RMarR 8-1 Date analysed 26-Sep-2020 26-Sep-2020 23-Sep-2020 23-Sep-2020 23-Sep-2020 23-Sep-2020 06-Oct-2020 06-Oct-2020 06-Oct-2020 06-Oct-2020 06-Oct-2020 06-Oct-2020 06-Oct-2020 06-Oct-2020 26-Sep-2020 26-Sep-2020 Efaluation  $\mathbb{R}$ **\*** THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE 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EMM CONSULTING PTk LTD S19851- Balranald T0 Ancillary

ES-800456

Work Order

Client Project

4 of 18

Evaluation: \* = Folding time breach; </br> **Efaluation** > > > > > > > > > > > > > > > Due vor analysis 15ROctR8-8 12ROctR8-8 15ROctR8-8 12ROctR8-8 19RMarR 8-1 -8RMarR 8-1 16POctR8-8 19POctR8-8 16POctR8-8 19POctR8-8 16RMarR 8-1 16RMarR 8-1 17RMarR 8-1 17 RMarR 8-1 -8RMarR 8-1 19RMarR 8-Date analysed 25-Sep-2020 25-Sep-2020 25-Sep-2020 23-Sep-2020 23-Sep-2020 23-Sep-2020 23-Sep-2020 25-Sep-2020 25-Sep-2020 25-Sep-2020 25-Sep-2020 25-Sep-2020 25-Sep-2020 25-Sep-2020 25-Sep-2020 25-Sep-2020 Efaluation  $\mathbb{R}$ **\***  $\mathbb{R}$  $\mathbb{R}$ THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE 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EMM CONSULTING PTk LTD S19851- Balranald T0 Ancillary

ES-800456

Work Order

Client Project

5 of 18

Evaluation: \* = Folding time breach; </br> **Efaluation** > > > > > > > > > > > > > > > Due vor analysis - 4RSepR 8-8 - 7RSepR 8-8 - 2RSepR 8-8 - 4RSepR 8-8 - 2RSepR 8-8 15ROctR8-8 12ROctR8-8 15ROctR8-8 19POctR8-8 - 5RSepR 8-8 - 5RepR 8-8 - 7RSepR 8-8 16POctR8-8 19POctR8-8 16POctR8-8 12ROctR8-Date analysed 24-Sep-2020 24-Sep-2020 24-Sep-2020 24-Sep-2020 24-Sep-2020 24-Sep-2020 25-Sep-2020 25-Sep-2020 25-Sep-2020 25-Sep-2020 25-Sep-2020 25-Sep-2020 25-Sep-2020 24-Sep-2020 24-Sep-2020 25-Sep-2020 Efaluation  $\mathbb{R}$ **\*** THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF 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$\mathbb{R}$ **\*\*** Date extracted l l I l l l l l I l l l l l l l 18-Sep-2020 21-Sep-2020 17-Sep-2020 18-Sep-2020 20-Sep-2020 21-Sep-2020 17-Sep-2020 18-Sep-2020 21-Sep-2020 17-Sep-2020 20-Sep-2020 21-Sep-2020 17-Sep-2020 18-Sep-2020 20-Sep-2020 20-Sep-2020 Sample Date **UGMRM2S UGMRM2S UGMRM2S** BFRM17S/ BFRM17S/ BFRM12S/ BFRM-8S BFRM17S/ BFRM12S BFRM-8S BFRM12S/ BFRM-8S **TB5/** Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T) Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T) Slear Plastic Bottle - Nitric Acid; Unfiltered (EG035T) Slear Plastic Bottle - Nitric Acid; Unfiltered (EG035T Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) Clear Plastic Bottle - Zinc Acetate/NaOH (EK085) Clear Plastic Bottle - Zinc Acetate/NaOH (EK085) Clear Plastic Bottle - Zinc Acetate/NaOH (EK085) Clear Plastic Bottle - Zinc Acetate/NaOH (EK085) EG035T: Total Recoverable Mercury by FIMS Clear Plastic Bottle - HCI - Filtered (EG051G) Clear Plastic Bottle - HCI - Filtered (EG051G) Clear Plastic Bottle - HCI - Filtered (EG051G) Clear Plastic Bottle - HCI - Filtered (EG051G) EG051G: Ferrous Iron by Discrete Analyser EG035F: Dissolved Mercury by FIMS Container / Client Sample ID(s) EK085M: Sulfide as S2-MatriY: WATER UGMRM2D/ UGMRM2D/ UGMRM2D/ BFRM12D/ BFRM17D/ BFRM12D/ BFRM17D/ BFRM12D/ BFRM17D/ BFRM-8D/ UGMRM2S BFRM-8D/ BFRM-8D/ LPSPB84 LPSPB84 QA-88 QA-88 QA-88 3 B688 3B788 3B288 TB4/ Method



: 6 of 18 : ES-800456 : EMM CONSULTING PTK LTD : S19851- Balranald T0 Ancillary Page WorK Order Client Project

MatriY: WATER				Evaluation:	= Folding time	Evaluation: $x = F$ olding time breach; $ = W$ ithin holding time.	holding time.
Method	Sample Date	Ex	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Date extracted         Due or extraction         Efaluation         Date analysed         Due or analysis         Efaluation	Efaluation	Date analysed	Due vor analysis	Efaluation
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
TS	31-Jul-2020	01-Oct-2020	14R/ugR 8-8	¥	01-Oct-2020	14RAugR 8-8	×



: 7 of 18 : ES-800456 : EMM CONSULTING PTK LTD : S19851- Balranald TO Ancillary **WorK Order** Project Client

# **Quality Control Parameter Frequency Compliance**

The folloqing report summarises the fre, uency of laboratory QC samples analysed qithin the analytical lot(s) in qhich the submitted sample(s) qas(qere) processed. Actual rate should be greater than or e, ual to the eYpected rate. A listing of breaches is provided in the Summary of Outliers. Evaluation: x = Quality Control fre, uency not q ithin specification; v = Quality Control fre, uency q ithin specification.

MatriY: WATER

Quality Control Sample Type		S	Count		Rate (%)		Quality Control Specivication
Analytical Methods	Method	OC	Reaular	Actual	Expected	Ef aluation	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED807RP	4	48	10.00	10.00	>	NEPM - 810 B0 & ALS QC Standard
Chloride by Discrete Analyser	ED845G	ı	80 -	10.00	10.00	>	NEPM -810 B0 & ALS QC Standard
Dissolved Mercury by 94MS	EG805%		80 -	10.00	10.00	>	NEPM - 810 B0 & ALS QC Standard
Dissolved Metals by ICPRMS RSuite A	EG8-8AR%		19	10.53	10.00	>	NEPM -810 B0 & ALS QC Standard
%errous Iron by Discrete Analyser	EG851G	4	-0	12.50	10.00	>	NEPM -810 B0 & ALS QC Standard
Gross Alpha and Beta Activity	EA- 58		17	11.76	10.00	>	NEPM -810 B0 & ALS QC Standard
Major Cations RDissolved	%D890%		19	10.53	10.00	>	NEPM -810 B0 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 - Rby Discrete Analyser	ED841G	ı	8 -	10.00	10.00	>	NEPM -810 B0 & ALS QC Standard
Sulfide as S- R	EH825		80 -	10.00	10.00	>	NEPM - 810 B0 & ALS QC Standard
Total Mercury by %IMS	EG805T		8 -	10.00	10.00	>	NEPM -810 B0 & ALS QC Standard
Total Metals by ICPRNS RSuite A	EG8-8AR		19	10.53	10.00	>	NEPM - 810 B0 & ALS QC Standard
T3 F Volatiles/BTEX	EP828		8 -	10.00	10.00	>	NEPM - 810 B0 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED807RP	4	48	10.00	10.00	>	NEPM - 810 B0 & ALS QC Standard
Chloride by Discrete Analyser	ED845G	ı	80 -	10.00	10.00	>	NEPM -810 B0 & ALS QC Standard
Dissolved Mercury by %dMS	EG805%	_	8 -	5.00	5.00	`	NEPM -810 B0 & ALS QC Standard
Dissolved Metals by ICPRMS RSuite A	EG8-8AR%	-	19	5.26	5.00	>	NEPM -810 B0 & ALS QC Standard
%errous Iron by Discrete Analyser	EG851G		-0	6.25	5.00	>	NEPM - 810 B0 & ALS QC Standard
Gross Alpha and Beta Activity	EA- 58		17	11.76	10.00	>	NEPM -810 B0 & ALS QC Standard
Major Cations RDissolved	ED890%	-	19	5.26	5.00	>	NEPM -810 B0 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 - Rby Discrete Analyser	ED841G		8 -	10.00	10.00	>	NEPM - 810 B0 & ALS QC Standard
Sulfide as S- R	EH825	-	8 -	5.00	5.00	>	NEPM - 810 B0 & ALS QC Standard
Total Mercury by %IMS	EG805T	1	8 -	5.00	5.00	<b>,</b>	NEPM - 810 B0 & ALS QC Standard
Total Metals by ICPR/IS RSuite A	EG8-8AR	_	19	5.26	5.00	>	NEPM -810 B0 & ALS QC Standard
T3F Volatiles/BTEX	EP828	7	8 -	2.00	5.00	`>	NEPM -810 B0 & ALS QC Standard
Method Blanks (MB)							
Chloride by Discrete Analyser	ED845G	_	8-	5.00	2.00	>	NEPM -810 B0 & ALS QC Standard
Dissolved Mercury by %4MS	EG805%	_	- 8	2.00	5.00	>	NEPM - 810 B0 & ALS QC Standard
Dissolved Metals by ICPRMS RSuite A	EG8-8AR%	_	19	5.26	5.00	>	NEPM - 810 B0 & ALS QC Standard
%errous Iron by Discrete Analyser	EG851G		-0	6.25	5.00	>	NEPM - 810 B0 & ALS QC Standard
Gross Alpha and Beta Activity	EA- 58	_	17	5.88	5.00	>	NEPM -810 B0 & ALS QC Standard
Major Cations RDissolved	ED890%	_	19	5.26	5.00	>	NEPM - 810 B0 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 - Rby Discrete Analyser	ED841G	1	8 -	5.00	5.00	>	NEPM - 810 B0 & ALS QC Standard
Sulfide as S- R	EH825	_	- 8	2.00	5.00	>	NEPM - 810 B0 & ALS QC Standard
Total Mercury by %IMS	EG805T	_	8 -	5.00	5.00	>	NEPM - 810 B0 & ALS QC Standard
Total Metals by ICPRMS RSuite A	EG8-8AR	_	19	5.26	2.00	>	NEPM -810 B0 & ALS QC Standard



 Page
 : 2 of 18

 Work Order
 : ES-800456

 Client
 : EMM CONSULTING PTk LTD

 Project
 : \$19851- Balranald T0 Ancillary

MatriY: WATER				Evaluatio	n: x = Quality Co	ntrol fre, uency	Evaluation: x = Quality Control fre, uency not q ithin specification; V = Quality Control fre, uency q ithin specification.
Quality Control Sample Type		ŏ	Count		Rate (%)		Quality Control Specivication
Analytical Methods	Method	OC	Reaular	Actual	Expected	Ef aluation	
Method Blanks (MB) RContinued							
T3 F Volatiles/BTEX	EP828	-	8-	5.00	2.00	>	NEPM - 810 B0 & ALS QC Standard
MatriY SpiKes (MS)							
Chloride by Discrete Analyser	ED845G	-	8-	2.00	5.00	>	NEPM - 810 B0 & ALS QC Standard
Dissolved Mercury by %4MS	EG805%	_	8 -	2.00	5.00	>	NEPM - 810 B0 & ALS QC Standard
Dissolved Metals by ICPRMS RSuite A	EG8-8AR%	-	19	5.26	5.00	>	NEPM -810 B0 & ALS QC Standard
%errous Iron by Discrete Analyser	EG851G		-0	6.25	2.00	>	NEPM - 810 B0 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 - Rby Discrete Analyser	ED841G	_	8 -	2.00	5.00	>	NEPM - 810 B0 & ALS QC Standard
Sulfide as S- R	EH825	-	8 -	2.00	5.00	>	NEPM -810 B0 & ALS QC Standard
Total Mercury by %4MS	EG805T	_	80 -	2.00	2.00	>	NEPM - 810 B0 & ALS QC Standard
Total Metals by ICPRMS RSuite A	EG8-8AR	_	19	5.26	5.00	>	NEPM -810 B0 & ALS QC Standard
T3 F VolatilesvBTEX	EP828	-	8-	2.00	2.00	>	NEPM - 810 B0 & ALS QC Standard



 Page
 : 9 of 18

 Work Order
 : ES-800456

 Client
 : EMM CONSULTING PTK LTD

 Project
 : \$19851- Balranald To Ancillary

## **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/ APFA/ APS and NEPM. In house developed procedures are employed in the absence of documented standards or by client re, uest. The folloqing report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from qhich ALS methods have been developed are provided qithin the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Gross Alpha and Beta Activity	EA-58	WATE3	ASTM D7-20R6: Determination of gross alpha and gross beta radioactivity in q ater samples by Li, uid Scintillation Counting (LSC).
Alkalinity by PC Titrator	ED807 <b>R</b> P	WATE3	In house: 3 eferenced to APFA - 0-8 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant ali, uot of the sample using pF 4.5 for indicating the total alkalinity end-point. This method is compliant qith NEPM Schedule B(0)
Sulfate (Turbidimetric) as SO4 - Rby Discrete Analyser	ED841G	WATE3	In house: 3 eferenced to APFA 4588®O4. Dissolved sulfate is determined in a 8.45um filtered sample. Sulfate ins are converted to a barium sulfate suspension in an acetic acid medium qith barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4R concentration is determined by comparison of the reading qith a standard curve. This method is compliant qith NEPM Schedule B(0)
Chloride by Discrete Analyser	ED845G	WATE3	In house: 3 eferenced to APFA 4588 CI RG.The thiocyanate ion is liberated from mercuric thiocyanate through se, uestration of mercury by the chloride ion to form nonRonised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly Roloured ferric thiocynate q hich is measured at 428 nm APFA seal method - 817R R.
Major Cations RDissolved	ED890%	WATE3	In house: 3 eferenced to APFA 01-8 and 01-5; USEPA SW 246 R6818 and 68-8; Cations are determined by either ICPRAES or ICPRAS techni, ues. This method is compliant q ith NEPM Schedule B(0) Sodium Adsorption 3 atio is calculated from Ca/ Mg and Na q hich determined by ALS in house method QWIRENED890% This method is compliant q ith NEPM Schedule B(0) Fardness parameters are calculated based on APFA - 048 B. This method is compliant q ith NEPM Schedule B(0)
Dissolved Metals by ICPR/IS RSuite A	EG8-8AR%	WATE3	In house: 3 eferenced to APFA 01-5; USEPA SW246 R68-8/ ALS QWIRENAEG8-8. Samples are 8.45µm filtered prior to analysis. The ICPMS techni, ue utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer/ q hich separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICPRMS RSuite A	ЕG8-8АЯ	WATE3	In house: 3 eferenced to APFA 01-5; USEPA SW246 R68-8/ ALS QWIRENAEG8-8. The ICPMS techni, ue utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer/ q hich separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by %4MS	EG805%	WATE3	In house: 3 eferenced to AS 0558/ APFA 011- Fg RB (%log Rhjection (SnCl-)(Cold Vapour generation) AAS) Samples are 8.45µm filtered prior to analysis. %MRAAS is an automated flameless atomic absorption techni, ue. A bromatewhomide reagent is used to o'ldise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl- q hich is then purged into a heated, uartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant q ith NEPM Schedule B(0).
Total Mercury by %MS	EG805T	WATE3	In house: 3 eferenced to AS 0558/ APF A 011- Fg RB (% of Rajection (SnCl-)(Cold Vapour generation) AAS) %MRAAS is an automated flameless atomic absorption techni, ue. A bromate formide reagent is used to o'f dise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl- q hich is then purged into a heated, uartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant q ith NEPM Schedule B(0).



 Page
 : 18 of 18

 Work Order
 : ES-800456

 Client
 : EMM CONSULTING PTK LTD

 Project
 : \$19851- Balranald TO Ancillary

Analytical Methods	Method	Matrix	Method Descriptions
%errous Iron by Discrete Analyser	EG851G	WATE3	In house: 3 eferenced to APFA 0588 %erB. A colorimetric determination based on the reaction betq een phenanthroline and ferrous iron at pF 0 rB.0 to form an orangerRed compleY that is measured against a fiverPoint calibration curve. This method is compliant q ith NEPM Schedule B(0).
Sulfide as S- R	EH825	WATE3	In house: 3 eferenced to APFA 4588RS-RD. Sulfide species present in q ater samples are immediately precipitated q hen collected in pretreated causticurinc acetate preserved sample containers. The sulphides are coloured using methylene blue indicator. NonRetects may be screened by comparison against a standard at halfRO3 / otherq ise samples are measured using UVR/IS detection at 664nm. This method is compliant q ith NEPM Schedule B(0)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN855 RPG	WATE3	In house: 3 eferenced to APFA 1808% This method is compliant qith NEPM Schedule B(0)
T3F Volatiles/BTEX	EP828	WATE3	In house: 3 eferenced to USEPA SW 246 R2- 68 Water samples are directly purged prior to analysis by Capillary GCM/S and , uantification is by comparison against an established 5 point calibration curve. Alternatively/ a sample is e, uilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant q ith the QC re, uirements of NEPM Schedule B(0)
Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total 3 ecoverable Metals	EN- 5	WATE3	In house: 3 eferenced to USEPA SW246R0885. Method 0885 is a Nitricw ydrochloric acid digestion procedure used to prepare surface and ground qater samples for analysis by ICPAES or ICPMS. This method is compliant q ith NEPM Schedule B(0)
Volatiles Water Preparation	O3 G16RW	WATE3	A 5 mL ali, uot or 5 mL of a diluted sample is added to a 48 mL VOC vial for sparging.

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## Fadi Soro

From:

Angus Harding Wednesday, 23 September 2020 9:20 AM

Samples Sydney

Sent: To:

Subject:

Attachments:

FW: [EXTERNAL] - COC for S190512

COC S190512 20200921.xlsx

Hi Fadi,

See attached COC for EMM samples coming from Melbourne.

Send QA201 on to Envirolab for analysis.

Could the PSD\_01/02 samples (not on hold) please be sent through on a separate report. Some PSD\_01/02 samples are on hold until further notice.

Cheers.

Kind Regards,

## Angus Harding

Client Services Officer, Environmental Sydney



<u>T</u> +61 2 8784 8555 <u>F</u> +61 2 8784 8500 <u>D</u> +61 2 8784 8503

angus.harding@alsglobal.com 277-289 Woodpark Road Smithfield NSW 2164 AUSTRALIA



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EnviroMail<sup>TM</sup> 127 — Bacterial Diversity Profiling in NGS EnviroMail<sup>TM</sup> 128 — Revised PFAS Bottle Requirements







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From: Kaitlyn Brodie [mailto:kbrodie@emmconsulting.com.au]

Sent: Tuesday, 22 September 2020 6:25 PM

To: ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com>; Shane Colley <shane.colley@ALSGlobal.com>

Cc: Dan Condon <dcondon@emmconsulting.com.au>; Paul Gibbons cpibbons@emmconsulting.com.au>

Subject: [EXTERNAL] - COC for S190512

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Good evening,

Some PSD\_01/02 samples are on hold until further notice. Could the PSD\_01/02 samples (not on hold) please be sent through on a separate report. Attached is the COC for job number \$190512. Could you please send QA201 on to Envirolab for analysis.

5 eskys were delivered to ALS this afternoon (22/09/2020) and should arrive in Smithfield tomorrow.

Thank you and please let me know if I messed something up.

Kaitlyn

Kaithyn Brodie



Connect with us

SYDNEY | Ground floor, 20 Chandos Street, St Leonards NSW 2065 CONTINUITY PLAN EMM'S BUSINESS FOR COVID-19

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are not the intended recipient, please notify the sender immediately and delete this email from your computer. You must not disclose, distribute, copy or use the information herein if you are not the intended recipient. confidential information. Confidentiality or privilege is not waived or lost by erroneous transmission. If you have received this email in error, or This email and any files transmitted with it are confidential and are only to be read or used by the intended recipient as it may contain



## CERTIFICATE OF ANALYSIS

**Environmental Division Sydney** 

: 1 of 2

 Work Order
 : ES2033648
 Page

 Client
 : EMM CONSULTING PTY LTD
 Laboratory

 Contact
 : PAUL GIBBONS
 Contact

277-289 Woodpark Road Smithfield NSW Australia 2164 Sepan Mahamad Address Ground Floor Suite 1 20 Chandos Street

22-Sep-2020 19:00 +61 2 8784 8555 Date Samples Received Telephone S190512 Balranald T3 Ancillary St Leonards NSW NSW 2065 Telephone Project

Date Analysis Commenced : 29-Sep-2020 Issue Date : 01-Oct-2020 16:57

Sampler : Kaitlyn Brodie & Luke G.

Site : ---Quote number : EN/112/18 - Primary work only
No. of samples received : 10

C-O-C number

Order number

Address

No. of samples eceived : 10

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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.

Accreditation Category	Newcastle - Inorganics, Mayfield West, NSW
Position	Laboratory Technician
Signatories	Aleksandar Vujkovic



| 2 01'2 | 2 01'2 | Work Order | ES2033648 | Client | EMM CONSULTING PTY LTD | Project | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Balranald T3 Ancillary | S190512 Ba

General Comments

In house developed procedures 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. 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

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

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 Key:

^ = This result is computed from individual analyte detections at or above the level of reporting

~ = Indicates an estimated value.

EA154: ALS does not hold NATA accreditation for Laser Particle Sizing.

## Analytical Results

İ I Ī 17-Sep-2020 08:00 ES2033648-006 See Attached PSD\_02 Result 17-Sep-2020 07:50 ES2033648-001 See Attached PSD\_01 Result Client sample ID Client sampling date / time Unit % LOR CAS Number EA150: Particle Sizing Sub-Matrix: WATER (Matrix: WATER) Compound +75µm



# QUALITY CONTROL REPORT

277-289 Woodpark Road Smithfield NSW Australia 2164 **Environmental Division Sydney** Sepan Mahamad +61 2 8784 8555 22-Sep-2020 29-Sep-2020 01-Oct-2020 : 1 of 3 Date Analysis Commenced Date Samples Received Telephone Issue Date Laboratory Contact Address Ground Floor Suite 1 20 Chandos Street S190512 Balranald T3 Ancillary : EN/112/18 - Primary work only **EMM CONSULTING PTY LTD** St Leonards NSW NSW 2065 : Kaitlyn Brodie & Luke G. PAUL GIBBONS ES2033648 No. of samples received C-O-C number Quote number Order number **Work Order** Telephone Sampler Contact Address Project Client

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

This Quality Control Report contains the following information:

No. of samples analysed

- 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

## Signatorias

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.

Accreditation Category	Newcastle - Inorganics, Mayfield West, NSW
Position	Laboratory Technician
Signatories	Aleksandar Vujkovic



S190512 Balranald T3 Ancillary EMM CONSULTING PTY LTD ES2033648 Work Order Project Client

General Comments

In house developed procedures 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. 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 primary

Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot 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

RPD = Relative Percentage Difference

# = Indicates failed QC

Laboratory Duplicate (DUP) Report

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

No Laboratory Duplicate (DUP) Results are required to be reported.



 Page
 : 3 of 3

 Work Order
 : ES2033648

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512 Balranald T3 Ancillary

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

parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target 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 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.

No Method Blank (MB) or Laboratory Control Spike (LCS) Results are required to be reported.

## 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.

No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.



# QA/QC Compliance Assessment to assist with Quality Review

Page :10f4	Laboratory : Environmental Division Sydney Telephone : +61 2 8784 8555 Date Samples Received : 22-Sep-2020 Issue Date : 01-Oct-2020 No. of samples received : 10 No. of samples analysed : 2	
: ES2033648	: EMM CONSULTING PTY LTD : PAUL GIBBONS : S190512 Balranald T3 Ancillary : : Kaitlyn Brodie & Luke G.	
Work Order	Client Contact Project Site Sampler Order number	

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 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 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.

- Mothod Blank value outliers occur.
- NO Duplicate outliers occur.
- NO Laboratory Control outliers occur.
- NO Matrix Spike outliers occur.
- For all regular sample matrices, 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.



S190512 Balranald T3 Ancillary EMM CONSULTING PTY LTD ES2033648 Work Order Project Client

# 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.

A recorded breach does not guarantee a breach for all VOC analytes and Holding times for <u>Voc in soils</u> vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. 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:  $\times$  = Holding time breach;  $\checkmark$  = Within holding time. Evaluation > Due for analysis 16-Mar-2021 29-Sep-2020 Date analysed Evaluation Date extracted Due for extraction Extraction / Preparation I 17-Sep-2020 Sample Date PSD\_02 Clear Plastic Bottle - Natural (EA154) Container / Client Sample ID(s) EA150: Particle Sizing PSD\_01,



Quality Control Parameter Frequency Compliance

: 3 of 4 : ES2033648 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

Page Work Order

Project Client

No Quality Control data available for this section.



 Page
 : 4 of 4

 Work Order
 : ES2033648

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512 Balranald T3 Ancillary

**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

Analytical Methods  Particle Sizing in Water by Laser  * EA154  * EA154  * EA154  * EA154  * EA154  * Confidence of Analysis of Particulates in Water by Laser Diffraction Analysis according to APHA Method 2.  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  * EA154  *
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### Scott Huett

From:

Shane Colley

Sent:

Thursday, 17 September 2020 3:25 PM

To:

Samples Melbourne

Subject:

FW: [EXTERNAL] - Please help

**Attachments:** 

EM2014666\_COC.pdf

Follow Up Flag:

Follow up

Flag Status:

Flagged

**Categories:** 

Client amendment

Hi guys

Can you check if we still have any of the bottles for EM2014666 – 32 + 33? Green, yellow sulphide, ferrous iron, metals and metals filtered (MG1818-20+25, MM184-86, MR 440-42). If so, can they be forwarded to Eurofins to be analysed at per the attached COC? Let me know.

Regards,

### **Shane Colley**

Client Services Officer - Springvale Environmental



T +61 3 8549 9600 D +61 3 8549 9613 shane.colley@alsglobal.com
2-4 Westall Rd
Springvale VIC 3171
AUSTRALIA





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From: Kaitlyn Brodie <kbrodie@emmconsulting.com.au>

Sent: Thursday, 17 September 2020 3:18 PM
To: Shane Colley <shane.colley@ALSGlobal.com>
Cc: Dan Condon <dcondon@emmconsulting.com.au>

Subject: [EXTERNAL] - Please help

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Reling by Milla 17/09



Just to clarify my earlier request...

In August I forgot to request samples QA101 and QA201 from 23/08/2020 to be forwarded to Enviro Lab for a full suite analysis. If the samples are still available could you please forward them to Enviro Lab now for a full analysis (COC attached). If there isn't enough sample to do a full suite, just the metals is fine.

Secondly, I have been sampling PSD\_01 and PSD\_02 for Particle Sizing in Water by Laser Diffraction (EA154) since 11/09/2020 and will continue to sample daily until approximately 11/10/2020. Is it possible to keep the results of PSD\_01 and PSD\_02 on a separate report?

Thanks for your help, let me know if you need any more details.

Kaitlyn

### Kaitlyn Brodie

Hydrogeologist



T 02 9493 9500

M 0401 881 447

in Connect with us

SYDNEY | Ground floor, 20 Chandos Street, St Leonards NSW 2065



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Reling by Miliha 17/09



**Envirolab Services Pty Ltd** 

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### **CERTIFICATE OF ANALYSIS 22545**

Client Details	
Client	EMM
Attention	Paul Gibbons
Address	187 Coventry Street, South Melbourne, VIC, 3205

Sample Details	
Your Reference	<u>\$190512</u>
Number of Samples	2 WATER
Date samples received	17/09/2020
Date completed instructions received	17/09/2020

## **Analysis Details**

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details	
Date results requested by	24/09/2020
Date of Issue	24/09/2020
NATA Accreditation Number 2901. Thi	s document shall not be reproduced except in full.
Accredited for compliance with ISO/IEO	C 17025 - Testing. Tests not covered by NATA are denoted with *

**Results Approved By** 

Chris De Luca, Operations Manager

**Authorised By** 

Pamela Adams, Laboratory Manager



HM in water - dissolved			
Our Reference		22545-1	22545-2
Your Reference	UNITS	QA101	QA201
Date Sampled		23/08/2020	23/08/2020
Type of sample		WATER	WATER
Date prepared	-	21/09/2020	21/09/2020
Date analysed	-	21/09/2020	21/09/2020
Arsenic-Dissolved	μg/L	<1	<1
Cadmium-Dissolved	μg/L	<0.2	<0.2
Chromium-Dissolved	μg/L	3	3
Copper-Dissolved	μg/L	130	120
Lead-Dissolved	μg/L	<1	<1
Nickel-Dissolved	μg/L	9	8
Zinc-Dissolved	μg/L	35	32
Mercury-Dissolved	μg/L	<0.05	<0.05

Miscellaneous Inorganics			
Our Reference		22545-1	22545-2
Your Reference	UNITS	QA101	QA201
Date Sampled		23/08/2020	23/08/2020
Type of sample		WATER	WATER
Date prepared	-	23/09/2020	23/09/2020
Date analysed	-	23/09/2020	23/09/2020
Sulphide	mg/L	<0.5	<0.5
Ferrous Iron	mg/L	<0.05	<0.05

Ion Balance			
Our Reference		22545-1	22545-2
Your Reference	UNITS	QA101	QA201
Date Sampled		23/08/2020	23/08/2020
Type of sample		WATER	WATER
Date prepared	-	21/09/2020	21/09/2020
Date analysed	-	21/09/2020	21/09/2020
Calcium - Dissolved	mg/L	650	620
Potassium - Dissolved	mg/L	34	34
Sodium - Dissolved	mg/L	13,000	13,000
Magnesium - Dissolved	mg/L	1,700	1,600
Hydroxide Alkalinity (OH-) as CaCO <sub>3</sub>	mg/L	<5	<5
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	270	270
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	<5	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	270	270
Sulphate, SO4	mg/L	5,100	4,900
Chloride, Cl	mg/L	25,000	25,000
Hardness	mgCaCO3/L	8,700	8,200
Ionic Balance	%	-4.1	-4.6

Method ID	Methodology Summary
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 10% ie total anions = total cations +/-10%.
Inorg-051	Sulphide determined titrimetrically based on APHA latest edition 4500 S2- F. Note, the Sulphide is termed as Total Sulphide given any Sulphide contained in any sediment present may also included in the determination.
Inorg-076	A sample is determined colourimetrically by discrete analyser as referenced in APHA 3500 Fe-B (phenanthroline method). Water samples are filtered on receipt prior to analysis.
Inorg-087	Chloride by colourimetry using Discrete Analyser
Inorg-115	Sulphate by turbidity using Discrete Analyser
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.

QUALITY CONTROL: HM in water - dissolved							plicate	Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			21/09/2020	[NT]		[NT]	[NT]	21/09/2020	
Date analysed	-			21/09/2020	[NT]		[NT]	[NT]	21/09/2020	
Arsenic-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	[NT]		[NT]	[NT]	109	
Cadmium-Dissolved	μg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]		[NT]	[NT]	109	
Chromium-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	[NT]		[NT]	[NT]	106	
Copper-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	[NT]		[NT]	[NT]	107	
Lead-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	[NT]		[NT]	[NT]	107	
Nickel-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	[NT]		[NT]	[NT]	110	
Zinc-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	[NT]		[NT]	[NT]	110	
Mercury-Dissolved	μg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]		[NT]	[NT]	100	

QUALITY CONTROL: Miscellaneous Inorganics							Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]		
Date prepared	-			23/09/2020	[NT]		[NT]	[NT]	23/09/2020			
Date analysed	-			23/09/2020	[NT]		[NT]	[NT]	23/09/2020			
Sulphide	mg/L	0.5	Inorg-051	<0.5	[NT]		[NT]	[NT]	82			
Ferrous Iron	mg/L	0.05	Inorg-076	<0.05	[NT]		[NT]	[NT]	112			

QUALITY CONTROL: Ion Balance							Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]		
Date prepared	-			21/09/2020	[NT]		[NT]	[NT]	21/09/2020			
Date analysed	-			21/09/2020	[NT]		[NT]	[NT]	21/09/2020			
Calcium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	89			
Potassium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	92			
Sodium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	85			
Magnesium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	88			
Hydroxide Alkalinity (OH⁻) as CaCO₃	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]			
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	107			
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]			
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	107			
Sulphate, SO4	mg/L	1	Inorg-115	<1	[NT]		[NT]	[NT]	100			
Chloride, Cl	mg/L	1	Inorg-087	<1	[NT]		[NT]	[NT]	111			

#### Client Reference: S190512

Result Definiti	ons
NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Client Reference: S190512

<b>Quality Contro</b>	ol Definitions
Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

#### **Laboratory Acceptance Criteria**

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Reference: 22545

Revision No: R00

Page | 10 of 11

Client Reference: S190512

### **Report Comments**

Sulphide analysed by Envirolab Sydney, report number 251656.

Sulphide, Ferrous Iron, Alkalinity have exceeded the recommended technical holding times, Envirolab Group Form 347 "Recommended Preservation and Holding Times" can be provided on request (available on the Envirolab website)

METALS: The PQL has been raised for Cadmium due to the sample matrix requiring dilution.

Envirolab Reference: 22545
Revision No: R00
Page | 11 of 11

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CLIENT: EMM COMBULTING		TURNAROUND REQUIREMENTS:	Standard TAT (List due date):	
OFFICE: 20 Chandos Street, St Leonards		(Standard TAT may be longer or norms ter Trace Organiza)	(Standard TAX may be longer for morne visite 9 y . On a D. Non Standard or ungent 1A1 (List due Later. Tingo Organica)	COC SEQUENCE NUMBER (Circle)
DROJECT: Batranaid T3 Ancillary	PROJECT NO.: 8190512	ALS CUOTE NO		4
Personal Agging.		COUNTRY OF ORIGIN:	€ .	9 9 9
PORCHAGE CASE	CONTACT PH: 0477702413	477702413		
PROJECT MANAGER: Paul Glbbons	BONGS	SAMPLE RIOSH E: 0401681447	RELINQUISHED BY:	RECEIVED BY:
SAMPLER: Kaltyn Brodle / Luke Griffiths			Section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the sectio	22 4 23
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mail Reports to: pgibbons@ammeonsuiting.com.au; deondon@ammeonauting.com.au; kbracis@emmeonsuiting.com.au

SAMPLER: Kallyn Brodle / Luke COC Emailed to ALS? (YES.) graff innice to accounts@enmconsuling.com.au, parboon@emmconsuling.com.au

GWOLLOWGONS 1119-21 Ratch Block Or. North Wollongong NSW 2599 Ph. 02.1225 3125 E' wollongongspagebal com

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Milehe (ALS)

FOR LABORATORY USE ONLY (Circle)

DS YONEY 277 250 Woodsan Road Smithflad NSW 2164
Ph. OS 2872 6250 Woodsan Road Smithflad NSW 2164
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**Envirolab Services Pty Ltd** 

ABN 37 112 535 645 - 002 25 Research Drive Croydon South VIC 3136 ph 03 9763 2500 fax 03 9763 2633 melbourne@envirolab.com.au www.envirolab.com.au

#### **CERTIFICATE OF ANALYSIS 22604**

Client Details	
Client	EMM
Attention	Paul Gibbons
Address	187 Coventry Street, South Melbourne, VIC, 3205

Sample Details	
Your Reference	S190512 Balranald T3 Ancillary
Number of Samples	1 WATER
Date samples received	22/09/2020
Date completed instructions received	22/09/2020

#### **Analysis Details**

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details	
Date results requested by	29/09/2020
Date of Issue	06/10/2020
NATA Accreditation Number 2901. The	nis document shall not be reproduced except in full.
Accredited for compliance with ISO/IE	EC 17025 - Testing. Tests not covered by NATA are denoted with *

**Results Approved By** 

Chris De Luca, Operations Manager

<u>Authorised By</u>

Pamela Adams, Laboratory Manager



HM in water - dissolved		
Our Reference		22604-1
Your Reference	UNITS	QA101
Date Sampled		16/09/2020
Type of sample		WATER
Date prepared	-	23/09/2020
Date analysed	-	23/09/2020
Arsenic-Dissolved	μg/L	<1
Cadmium-Dissolved	μg/L	<0.2
Chromium-Dissolved	μg/L	2
Copper-Dissolved	μg/L	29
Lead-Dissolved	μg/L	<1
Nickel-Dissolved	μg/L	5
Zinc-Dissolved	μg/L	17
Mercury-Dissolved	μg/L	<0.05

Miscellaneous Inorganics		
Our Reference		22604-1
Your Reference	UNITS	QA101
Date Sampled		16/09/2020
Type of sample		WATER
Date prepared	-	23/09/2020
Date analysed	-	23/09/2020
Sulphide	mg/L	<0.5
Ferrous Iron	mg/L	<0.05

Ion Balance		
Our Reference		22604-1
Your Reference	UNITS	QA101
Date Sampled		16/09/2020
Type of sample		WATER
Date prepared	-	24/09/2020
Date analysed	-	24/09/2020
Calcium - Dissolved	mg/L	570
Potassium - Dissolved	mg/L	18
Sodium - Dissolved	mg/L	14,000
Magnesium - Dissolved	mg/L	1,500
Hydroxide Alkalinity (OH⁻) as CaCO₃	mg/L	<5
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	310
Carbonate Alkalinity as CaCO₃	mg/L	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	310
Sulphate, SO4	mg/L	450
Chloride, Cl	mg/L	24,000
Hardness	mgCaCO 3 /L	7,600
Ionic Balance	%	3.4

External testing		
Our Reference		22604-1
Your Reference	UNITS	QA101
Date Sampled		16/09/2020
Type of sample		WATER
Gross Alpha	Bq/L	5.16
Gross Beta (corrected for K40)	Bq/L	2.81
Gross Beta Activity -K40	Bq/L	<2.28

Method ID	Methodology Summary
Ext-011	Subcontracted to ALS.
Ext-058	Analysed by Western Radiation Services. NATA accreditation no. 14174
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 10% ie total anions = total cations +/-10%.
Inorg-051	Sulphide determined titrimetrically based on APHA latest edition 4500 S2- F. Note, the Sulphide is termed as Total Sulphide given any Sulphide contained in any sediment present may also included in the determination.
Inorg-076	A sample is determined colourimetrically by discrete analyser as referenced in APHA 3500 Fe-B (phenanthroline method). Water samples are filtered on receipt prior to analysis.
Inorg-087	Chloride by colourimetry using Discrete Analyser
Inorg-115	Sulphate by turbidity using Discrete Analyser
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.

QUALITY CO	ONTROL: HI	I in wate	r - dissolved			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			23/09/2020	1	23/09/2020	23/09/2020		23/09/2020	
Date analysed	-			23/09/2020	1	23/09/2020	23/09/2020		23/09/2020	
Arsenic-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	<1	[NT]		108	
Cadmium-Dissolved	μg/L	0.1	Metals-022 ICP-MS	<0.1	1	<0.2	[NT]		110	
Chromium-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	2	[NT]		106	
Copper-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	29	[NT]		105	
Lead-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	<1	[NT]		107	
Nickel-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	5	[NT]		105	
Zinc-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	17	[NT]		107	
Mercury-Dissolved	μg/L	0.05	Metals-021 CV-AAS	<0.05	1	<0.05	<0.05	0	99	

QUALITY CO	NTROL: Mis	cellaneou	s Inorganics			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			23/09/2020	[NT]		[NT]	[NT]	23/09/2020	
Date analysed	-			23/09/2020	[NT]		[NT]	[NT]	23/09/2020	
Sulphide	mg/L	0.5	Inorg-051	<0.5	[NT]		[NT]	[NT]	97	
Ferrous Iron	mg/L	0.05	Inorg-076	<0.05	[NT]		[NT]	[NT]	112	

QUALI	TY CONTRO	L: Ion Ba	lance			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			24/09/2020	[NT]		[NT]	[NT]	24/09/2020	
Date analysed	-			24/09/2020	[NT]		[NT]	[NT]	24/09/2020	
Calcium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	99	
Potassium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	99	
Sodium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	90	
Magnesium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	96	
Hydroxide Alkalinity (OH-) as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	106	
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	106	
Carbonate Alkalinity as CaCO₃	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	106	
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	106	
Sulphate, SO4	mg/L	1	Inorg-115	<1	[NT]		[NT]	[NT]	109	
Chloride, Cl	mg/L	1	Inorg-087	<1	[NT]		[NT]	[NT]	113	

Result Definiti	ons
NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

<b>Quality Contro</b>	ol Definitions
Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

#### **Laboratory Acceptance Criteria**

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

### **Report Comments**

Sulphide analysed by Envirolab Sydney, report number 251948.

Gross Alpha & Beta analysed by ALS, report number 850864.

METALS: The PQL has been raised for Cadmium due to the sample matrix requiring dilution.

Envirolab Reference: 22604 Page | 12 of 12 Revision No: R00



**Envirolab Services Pty Ltd** 

ABN 37 112 535 645 - 002 25 Research Drive Croydon South VIC 3136 ph 03 9763 2500 fax 03 9763 2633 melbourne@envirolab.com.au www.envirolab.com.au

#### **CERTIFICATE OF ANALYSIS 22604**

Client Details	
Client	EMM
Attention	Paul Gibbons
Address	187 Coventry Street, South Melbourne, VIC, 3205

Sample Details	
Your Reference	S190512 Balranald T3 Ancillary
Number of Samples	1 WATER
Date samples received	22/09/2020
Date completed instructions received	22/09/2020

#### **Analysis Details**

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details				
Date results requested by	29/09/2020			
Date of Issue	06/10/2020			
Reissue Details	This report supersedes 22604_R00 due to changes in ESDAT chemcodes.			
NATA Accreditation Number 2901. This document shall not be reproduced except in full.				
Accredited for compliance with ISO/IEO	C 17025 - Testing. Tests not covered by NATA are denoted with *			

**Results Approved By** 

Chris De Luca, Operations Manager

**Authorised By** 

Pamela Adams, Laboratory Manager



HM in water - dissolved		
Our Reference		22604-1
Your Reference	UNITS	QA101
Date Sampled		16/09/2020
Type of sample		WATER
Date prepared	-	23/09/2020
Date analysed	-	23/09/2020
Arsenic-Dissolved	μg/L	<1
Cadmium-Dissolved	μg/L	<0.2
Chromium-Dissolved	μg/L	2
Copper-Dissolved	μg/L	29
Lead-Dissolved	μg/L	<1
Nickel-Dissolved	μg/L	5
Zinc-Dissolved	μg/L	17
Mercury-Dissolved	μg/L	<0.05

Miscellaneous Inorganics		
Our Reference		22604-1
Your Reference	UNITS	QA101
Date Sampled		16/09/2020
Type of sample		WATER
Date prepared	-	23/09/2020
Date analysed	-	23/09/2020
Sulphide	mg/L	<0.5
Ferrous Iron	mg/L	<0.05

Ion Balance		
Our Reference		22604-1
Your Reference	UNITS	QA101
Date Sampled		16/09/2020
Type of sample		WATER
Date prepared	-	24/09/2020
Date analysed	-	24/09/2020
Calcium - Dissolved	mg/L	570
Potassium - Dissolved	mg/L	18
Sodium - Dissolved	mg/L	14,000
Magnesium - Dissolved	mg/L	1,500
Hydroxide Alkalinity (OH⁻) as CaCO₃	mg/L	<5
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	310
Carbonate Alkalinity as CaCO₃	mg/L	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	310
Sulphate, SO4	mg/L	450
Chloride, Cl	mg/L	24,000
Hardness	mgCaCO 3 /L	7,600
Ionic Balance	%	3.4

External testing		
Our Reference		22604-1
Your Reference	UNITS	QA101
Date Sampled		16/09/2020
Type of sample		WATER
Gross Alpha	Bq/L	5.16
Gross Beta (corrected for K40)	Bq/L	2.81
Gross Beta Activity -K40	Bq/L	<2.28

Method ID	Methodology Summary
Ext-011	Subcontracted to ALS.
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 10% ie total anions = total cations +/-10%.
Inorg-051	Sulphide determined titrimetrically based on APHA latest edition 4500 S2- F. Note, the Sulphide is termed as Total Sulphide given any Sulphide contained in any sediment present may also included in the determination.
Inorg-076	A sample is determined colourimetrically by discrete analyser as referenced in APHA 3500 Fe-B (phenanthroline method). Water samples are filtered on receipt prior to analysis.
Inorg-087	Chloride by colourimetry using Discrete Analyser
Inorg-115	Sulphate by turbidity using Discrete Analyser
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.

QUALITY CO	ONTROL: HI	I in wate	r - dissolved			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			23/09/2020	1	23/09/2020	23/09/2020		23/09/2020	
Date analysed	-			23/09/2020	1	23/09/2020	23/09/2020		23/09/2020	
Arsenic-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	<1	[NT]		108	
Cadmium-Dissolved	μg/L	0.1	Metals-022 ICP-MS	<0.1	1	<0.2	[NT]		110	
Chromium-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	2	[NT]		106	
Copper-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	29	[NT]		105	
Lead-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	<1	[NT]		107	
Nickel-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	5	[NT]		105	
Zinc-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	17	[NT]		107	
Mercury-Dissolved	μg/L	0.05	Metals-021 CV-AAS	<0.05	1	<0.05	<0.05	0	99	

QUALITY CO	NTROL: Mis	cellaneou	s Inorganics			Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			23/09/2020	[NT]		[NT]	[NT]	23/09/2020	
Date analysed	-			23/09/2020	[NT]		[NT]	[NT]	23/09/2020	
Sulphide	mg/L	0.5	Inorg-051	<0.5	[NT]		[NT]	[NT]	97	
Ferrous Iron	mg/L	0.05	Inorg-076	<0.05	[NT]		[NT]	[NT]	112	

QUALI	TY CONTRO	L: Ion Ba	lance			Du	ıplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			24/09/2020	[NT]		[NT]	[NT]	24/09/2020	
Date analysed	-			24/09/2020	[NT]		[NT]	[NT]	24/09/2020	
Calcium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	99	
Potassium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	99	
Sodium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	90	
Magnesium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	96	
Hydroxide Alkalinity (OH-) as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	106	
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	106	
Carbonate Alkalinity as CaCO₃	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	106	
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	106	
Sulphate, SO4	mg/L	1	Inorg-115	<1	[NT]		[NT]	[NT]	109	
Chloride, Cl	mg/L	1	Inorg-087	<1	[NT]		[NT]	[NT]	113	

Result Definiti	ons
NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

<b>Quality Contro</b>	ol Definitions
Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

#### **Laboratory Acceptance Criteria**

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

### **Report Comments**

Sulphide analysed by Envirolab Sydney, report number 251948.

Gross Alpha & Beta analysed by ALS, report number 850864.

METALS: The PQL has been raised for Cadmium due to the sample matrix requiring dilution.

Envirolab Reference: 22604
Revision No: R01
Page | 12 of 12

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**Envirolab Services Pty Ltd** 

ABN 37 112 535 645 12 Ashley St Chatswood NSW 2067 ph 02 9910 6200 fax 02 9910 6201 customerservice@envirolab.com.au www.envirolab.com.au

#### **INTERIM REPORT 252055**

Client Details	
Client	EMM Consulting Pty Ltd
Attention	Daniel Condon
Address	188 Normanby Rd, SOUTHBANK, VIC, 3006

Sample Details	
Your Reference	S100512, Balranald T3 Ancillary
Number of Samples	1 water
Date samples received	24/09/2020
Date completed instructions received	24/09/2020

#### **Analysis Details**

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details	
Date results requested by	01/10/2020
Interim Report Date	01/10/2020
NATA Accreditation Number 2901. This	document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC	17025 - Testing. Tests not covered by NATA are denoted with *





HM in water - dissolved		
Our Reference		252055-1
Your Reference	UNITS	QA201
Date Sampled		18/09/2020
Type of sample		water
Date prepared	-	28/09/2020
Date analysed	-	28/09/2020
Arsenic-Dissolved	μg/L	3
Cadmium-Dissolved	μg/L	<0.1
Chromium-Dissolved	μg/L	2
Copper-Dissolved	μg/L	<1
Lead-Dissolved	μg/L	<1
Mercury-Dissolved	μg/L	<0.05
Nickel-Dissolved	μg/L	8
Zinc-Dissolved	μg/L	6

Envirolab Reference: 252055

Revision No: P00

Ion Balance		
Our Reference		252055-1
Your Reference	UNITS	QA201
Date Sampled		18/09/2020
Type of sample		water
Date prepared	-	24/09/2020
Date analysed	-	24/09/2020
Calcium - Dissolved	mg/L	580
Potassium - Dissolved	mg/L	27
Sodium - Dissolved	mg/L	13,000
Magnesium - Dissolved	mg/L	1,400
Hydroxide Alkalinity (OH-) as CaCO <sub>3</sub>	mg/L	<5
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	340
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	340
Sulphate, SO4	mg/L	4,000
Chloride, Cl	mg/L	21,000
Ionic Balance	%	1.0

Envirolab Reference: 252055

Revision No: P00

Miscellaneous Inorganics		
Our Reference		252055-1
Your Reference	UNITS	QA201
Date Sampled		18/09/2020
Type of sample		water
Date prepared	-	25/09/2020
Date analysed	-	25/09/2020
Ferrous Iron	mg/L	2.8
Sulphide	mg/L	<0.5

Radioactivity Analysis report		
Our Reference		252055-1
Your Reference	UNITS	QA201
Date Sampled		18/09/2020
Type of sample		water
Date prepared	-	
Date analysed	-	
Radium-226	Bq/L	
Radium-228	Bq/L	

Method ID	Methodology Summary						
Ext-041	Analysed by Australian Government - Australian Radiation Protection and Nuclear Safety Agnency. VIC. Radium 226 is determined by liquid scintiallation counting. Radium 228 is measured by high resolution gamma-ray spectrometry.						
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.						
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 10% ie total anions = total cations +/-10%.						
Inorg-051	Sulphide determined titrimetrically based on APHA latest edition 4500 S2- F. Note, the Sulphide is termed as Total Sulphide given any Sulphide contained in any sediment present is also included in the determination.						
Inorg-076	Ferrous Iron is determined colourimetrically by discrete analyser. Waters samples are filtered on receipt prior to analysis.						
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis.  Alternatively determined by colourimetry/turbidity using Discrete Analyser.						
Metals-020	Determination of various metals by ICP-AES.						
Metals-021	Determination of Mercury by Cold Vapour AAS.						
Metals-022	Determination of various metals by ICP-MS.						

Envirolab Reference: 252055
Revision No: P00
Page | 6 of 11

QUALITY CONTROL: HM in water - dissolved			Duplicate			Spike Recovery %				
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date prepared	-			28/09/2020	[NT]		[NT]	[NT]	28/09/2020	
Date analysed	-			28/09/2020	[NT]		[NT]	[NT]	28/09/2020	
Arsenic-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	101	
Cadmium-Dissolved	μg/L	0.1	Metals-022	<0.1	[NT]		[NT]	[NT]	97	
Chromium-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	105	
Copper-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	106	
Lead-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	100	
Mercury-Dissolved	μg/L	0.05	Metals-021	<0.05	[NT]		[NT]	[NT]	109	
Nickel-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	103	
Zinc-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	103	

QUALI	TY CONTRO	L: Ion Ba	lance			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			24/09/2020	[NT]		[NT]	[NT]	24/09/2020	
Date analysed	-			24/09/2020	[NT]		[NT]	[NT]	24/09/2020	
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	99	
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	86	
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	87	
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	96	
Hydroxide Alkalinity (OH-) as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	103	
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]		[NT]	[NT]	111	
Chloride, Cl	mg/L	1	Inorg-081	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]

Envirolab Reference: 252055 Revision No: P00

QUALITY COI	NTROL: Mis	cellaneou	s Inorganics			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			25/09/2020	[NT]		[NT]	[NT]	25/09/2020	
Date analysed	-			25/09/2020	[NT]		[NT]	[NT]	25/09/2020	
Ferrous Iron	mg/L	0.05	Inorg-076	<0.05	[NT]		[NT]	[NT]	83	
Sulphide	mg/L	0.5	Inorg-051	<0.5	[NT]	[NT]	[NT]	[NT]	98	[NT]

Envirolab Reference: 252055

Revision No: P00

Result Definiti	ons
NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Envirolab Reference: 252055

Revision No: P00

<b>Quality Control</b>	ol Definitions
Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

## **Laboratory Acceptance Criteria**

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Reference: 252055
Revision No: P00



SAMPLER: Daniel Condon

PROJECT MANAGER: Paul Gibbons

PURCHASE ORDER: S190512

ROJECT: \$190512

OFFICE: 20 Chandos Street, St Leonards CLIENT: EMM CONSULTING

COC Emailed to ALS? ( YES )

mall Reports to: pgibbons@emmo

COMMENTS/SPECIAL HANDLING/STORAG Email Invoice to: accounts@emmconsulting

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DMUDGEE 1/29 \$ydney Rona Mudgee NSW 2850 Phr 02 6372 6735 E, mudgee mell@alagbala.com DARLEGURNE 2-4 Westell Road Soringwale ViG 31/1 Ph: 03 8549 9600 E. semples, melbourre@alsylobal.com

©NOVAKA, 4/13 Geary Place North Nowra NSW 254 I Ph; 02 4423 2063 E. nowra@aisglobal.com DPERTH 10 Hod Wey Welsija IVA 8080 PN 08 9209 7655 Et samples perh@atajdobat.com LINEWCASTLE 6:586 Maitiana Road Mayfield West NSW 2304 Prt U2 4:14 2500 Et samples, newcastle@alsglobal.com

> QTOWNSVILLE 14-15 Desma Cour, Bohle QLD 4818 Ph: 07 4796 0600 Et termesville a revienmental@alagbba DSYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Pht 62 8784 8855 Et samples syring/@alegiobal.com

DWOLLONGONG 17:9-21 Ralph Black Dr. North Wollengong NSW 2560 Pkr 62:4225-3125 F. wollengong@alsglobal.com

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Telephone: +61-2-8784 8555

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Weter Confidence: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved Plastic; ORC = Nitric Preserved Plastic; ORC = Nitric Preserved Plastic; ORC = Nitric Preserved Plastic; ORC = Nitric Preserved Plastic; ORC = Nitric Preserved Plastic; ORC = Nitric Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = HCI preserved Plastic; HS = HCI preserved Special on bottle; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Preserved Plastic; F = Formadelyole Plastic; F = Formadelyole Plastic; F = Formadelyole Plastic; F = Formadelyole Plastic; F = Formadelyole Plastic; F = Formadelyole Plastic; F = Formadelyole Plastic; F = Formadelyole Plastic;

Form Page 1 of 1

TOTAL



# CERTIFICATE OF ANALYSIS

**Environmental Division Sydney** Sepan Mahamad : 1 of 7 Laboratory Contact **EMM CONSULTING PTY LTD** PAUL GIBBONS ES2035208 **Work Order** Contact

277-289 Woodpark Road Smithfield NSW Australia 2164 Address Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065

: 14-Oct-2020 20:36 08-Oct-2020 11:20 +61 2 8784 8555 : 09-Oct-2020 Date Analysis Commenced Date Samples Received Issue Date Telephone S190512 S190512

Daniel Condon

C-O-C number

Sampler

Order number

Telephone

Project

Address

Client

EN/222 4

Quote number

No. of samples analysed No. of samples received

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. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



## General Comments

In house developed procedures 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. 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

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

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. Key:

LOR = Limit of reporting

This result is computed from individual analyte detections at or above the level of reporting

 $\emptyset$  = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

EG020: LOR's have been raised due to matrix interference. (High Total Dissolved Solids)

EG020: It is recognised that total concentration is less than dissolved for some metal analytes. However, the difference is within experimental variation of the methods.

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.



: 3 of 7 : ES2035208 : EMM CONSULTING PTY LTD : \$190512 Project Client

Sub-Matrix: WATER (Matrix: WATER)		Clier	Client sample ID	UGM-M8d	UGM-M8s	UGM-M12d	UGM-M12s	BH-M18d
	Clie	ent samplin	Client sampling date / time	02-Oct-2020 10:00	02-Oct-2020 10:30	03-Oct-2020 13:30	03-Oct-2020 13:15	03-Oct-2020 12:00
Compound	CAS Number	LOR	Unit	ES2035208-001	ES2035208-002	ES2035208-003	ES2035208-004	ES2035208-005
			<u> </u>	Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	₹		₹	\ \_	₹
Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	<u>\</u>	7	₹	7	₹
Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	403	262	396	338	439
Total Alkalinity as CaCO3		-	mg/L	403	262	396	338	439
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	y DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	3570	4380	3560	4550	3480
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	-	mg/L	18800	21500	19300	24200	17900
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	574	812	475	634	545
Magnesium	7439-95-4	-	mg/L	1500	1750	1280	1670	1420
Sodium	7440-23-5	-	mg/L	11500	13100	10200	14700	11200
Potassium	7440-09-7	~	mg/L	36	33	37	25	36
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Copper	7440-50-8	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Nickel	7440-02-0	0.001	mg/L	<0.010	0.031	<0.010	0.011	<0.010
Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Zinc	7440-66-6	0.005	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chromium	7440-47-3	0.001	mg/L	<0.010	0.135	<0.010	0.014	<0.010
Copper	7440-50-8	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Nickel	7440-02-0	0.001	mg/L	<0.010	0.110	<0.010	0.018	<0.010
Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Zinc	7440-66-6	0.005	mg/L	<0.052	<0.052	<0.052	<0.052	<0.052
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS	<u>S</u>							
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG051G: Ferrous Iron by Discrete Analyser								



Project Client

EMM CONSULTING PTY LTD S190512

: 4 of 7 : ES2035208

Page Work Order

03-Oct-2020 12:00 ES2035208-005 BH-M18d Result <0.1 586 632 7.24 03-Oct-2020 13:15 ES2035208-004 UGM-M12s Result <0.05 <0.1 784 03-Oct-2020 13:30 ES2035208-003 UGM-M12d Result <0.05 626 574 7: 02-Oct-2020 10:30 ES2035208-002 UGM-M8s Result <0.05 ۸ 1.0 703 755 3.59 02-Oct-2020 10:00 ES2035208-001 UGM-M8d Result 2.62 **6**0.1 613 Client sample ID Client sampling date / time med/L mg/L mg/L Unit LOR 0.05 0.01 0.1 CAS Number 18496-25-8 EG051G: Ferrous Iron by Discrete Analyser - Continued EK085M: Sulfide as S2-EN055: Ionic Balance Ø Total Anions Sub-Matrix: WATER (Matrix: WATER) Sulfide as S2-Ferrous Iron Compound

3.78

1.57

4.40

653 3.20

med/L

0.01 0.01

> |

Ø Total Cations Ø lonic Balance

%



Project Client

: 5 of 7 : ES2035208 : EMM CONSULTING PTY LTD : \$190512

Sub-Matrix: WATER (Matrix: WATER)		Clie	Client sample ID	BH-M18s	BH-M19d	BH-M19s	BH-M20d	BH-M20s
	Clie	nt samplin	Client sampling date / time	03-Oct-2020 11:30	03-Oct-2020 09:00	03-Oct-2020 08:10	03-Oct-2020 09:10	03-Oct-2020 09:30
Compound	CAS Number	LOR	Unit	ES2035208-006	ES2035208-007	ES2035208-008	ES2035208-009	ES2035208-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	-1	<b>\^</b>	<b>\&gt;</b>	\ \	-
Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	<b>\</b>			₹	
Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	356	445	355	437	:
Total Alkalinity as CaCO3		-	mg/L	356	445	355	437	-
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	y DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	3940	3400	4680	3570	-
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	-	mg/L	20700	17500	23000	18800	1
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	-	mg/L	665	512	675	555	1
Magnesium	7439-95-4	-	mg/L	1430	1360	1670	1470	:
Sodium	7440-23-5	-	mg/L	13100	10800	14500	11600	-
Potassium	7440-09-7	~	mg/L	26	37	23	38	
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Copper	7440-50-8	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Nickel	7440-02-0	0.001	mg/L	0.012	<0.010	<0.010	0:030	<0.010
Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Zinc	7440-66-6	0.005	mg/L	<0.050	<0.050	<0.050	0.062	<0.050
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chromium	7440-47-3	0.001	mg/L	0.014	<0.010	<0.010	0.035	0.011
Copper	7440-50-8	0.001	mg/L	<0.010	0.011	<0.010	0.252	<0.010
Nickel	7440-02-0	0.001	mg/L	0.018	0.032	<0.010	0.053	0.015
Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Zinc	7440-66-6	0.005	mg/L	<0.052	<0.052	<0.052	<0.050	<0.050
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS	တ							
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG051G: Ferrous Iron by Discrete Analyser								



Project Client

: 6 of 7 : ES2035208 : EMM CONSULTING PTY LTD : S190512

Sub-Matrix: WATER (Matrix: WATER)		Clie	Client sample ID	BH-M18s	BH-M19d	BH-M19s	BH-M20d	BH-M20s
	Olie	ent samplin,	Client sampling date / time	03-Oct-2020 11:30	03-Oct-2020 09:00	03-Oct-2020 08:10	03-Oct-2020 09:10	03-Oct-2020 09:30
Compound	CAS Number LOR	LOR	Unit	ES2035208-006	ES2035208-007	ES2035208-008	ES2035208-009	ES2035208-010
				Result	Result	Result	Result	Result
EG051G: Ferrous Iron by Discrete Analyser - Continued	ser - Continued							
Ferrous Iron		0.05	mg/L	2.40	2.71	<0.05	4.34	90.0
EK085M: Sulfide as S2-								
Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	1.3	<0.1	<0.1	0.4
EN055: Ionic Balance								
Ø Total Anions		0.01	med/L	673	573	753	613	i
Ø Total Cations		0.01	med/L	721	809	802	654	:
Ø Ionic Balance		0.01	%	3.46	2.95	3.16	3.22	-



Project Client

EMM CONSULTING PTY LTD S190512

: 7 of 7 : ES2035208

Page Work Order

l | | | 1 1 TRIP BLANK\_02 03-Oct-2020 14:00 ES2035208-014 Result <0.001 <0.0001 <0.001 <0.001 <0.001 <0.001 TRIP BLANK\_01 02-Oct-2020 14:00 ES2035208-013 Result <0.0001 <0.001 <0.001 <0.001 <0.001 <0.001 03-Oct-2020 14:00 ES2035208-012 RIN\_201003 Result <0.0001 <0.001 <0.001 <0.001 <0.001 <0.001 02-Oct-2020 14:00 ES2035208-011 RIN\_201002 Result <0.0001 <0.001 <0.001 <0.001 <0.001 <0.001 Client sample ID Client sampling date / time mg/L mg/L mg/L mg/L Unit mg/L mg/L 0.001 0.001 0.001 7440-43-9 0.0001 0.001 LOR 0.001 7440-47-3 7440-50-8 7440-02-0 7439-92-1 7440-38-2 CAS Number EG020T: Total Metals by ICP-MS Sub-Matrix: WATER (Matrix: WATER) Chromium Cadmium Compound Copper Arsenic Nickel Lead

<0.0001

<0.0001

<0.0001

<0.0001

mg/L

7439-97-6 0.0001

EG035T: Total Recoverable Mercury by FIMS Mercury

Zinc

7440-66-6 0.005

<0.005

<0.005

<0.005

<0.005



# QUALITY CONTROL REPORT

277-289 Woodpark Road Smithfield NSW Australia 2164 **Environmental Division Sydney** Sepan Mahamad +61 2 8784 8555 : 1 of 7 Telephone Laboratory Contact Address Ground Floor Suite 1 20 Chandos Street **EMM CONSULTING PTY LTD** St Leonards NSW NSW 2065 PAUL GIBBONS ES2035208 **Work Order** Telephone Contact Address Client

08-Oct-2020 09-Oct-2020 14-Oct-2020 Date Analysis Commenced Date Samples Received Issue Date Daniel Condon S190512 S190512 EN/222 4 No. of samples received C-O-C number Quote number Order number

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. 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

No. of samples analysed

Sampler

Project

- 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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



 Page
 : 2 of 7

 Work Order
 : ES2035208

 Client
 : EMM CONSULTING PTY LTD

 Project
 : S190512

General Comments

In house developed procedures 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. 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 primary

Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot 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

RPD = Relative Percentage Difference

# = Indicates failed QC

## Laboratory Duplicate (DUP) Report

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

Sub-Matrix: WATER						Laboratory D	Laboratory Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED037P: Alkalinity b	ED037P: Alkalinity by PC Titrator (QC Lot: 3300396)	00396)						_	
ES2035035-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	7	٧	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	٧	٧	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	1160	1190	2.83	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	1	-	mg/L	1160	1190	2.83	0% - 20%
ES2035123-009	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	V	٧	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	₹	۲	00.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	₹		00.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	1	_	mg/L	7	<u>۲</u>	0.00	No Limit
ED037P: Alkalinity b	ED037P: Alkalinity by PC Titrator (QC Lot: 3300398)	00398)							
ES2035238-001	Anonymons	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	Ÿ	Ÿ	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	<u>^</u>	٧	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	36	35	0.00	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	1	-	mg/L	36	35	0.00	0% - 20%
ES2035270-004	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	7	7	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	₹	₹	00.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	₹	7	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	-	-	mg/L	۲>	۲>	0.00	No Limit
ED041G: Sulfate (Tu	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3299188)	DA (QC Lot: 3299188)							
ES2035065-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	33	33	00.00	0% - 20%
ES2035208-002	UGM-M8s	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	4380	4380	0.00	0% - 20%
ED045G: Chloride by	ED045G: Chloride by Discrete Analyser (QC Lot: 3299189)	ot: 3299189)							
ES2035150-001	Anonymous	ED045G: Chloride	16887-00-6	-	mg/L	232	233	00.00	0% - 20%
ES2035208-007	BH-M19d	ED045G: Chloride	16887-00-6	-	mg/L	17500	17300	1.17	0% - 20%
ED093F: Dissolved	ED093F: Dissolved Major Cations (QC Lot: 3301246)	01246)							



EMM CONSULTING PTY LTD

S190512

Client Project

ES2035208

Work Order

3 of 7

Recovery Limits (%) %09 - %0 0% - 20% %09 - %0 0% - 20% 0% - 20% 0% - 20% 0% - 20% %09 - %0 No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.374 0.00 1.03 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 4.75 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 5.01 0.00 2.03 0.00 Laboratory Duplicate (DUP) Report Original Result Duplicate Result <0.010 <0.010 <0.010 <0.010 <0.010 <0.0001 <0.0010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.052 <0.0001 0.115 <0.001 <0.001 <0.001 <0.005 <0.001 <0.001 <0.001 0.003 900.0 9560 195 475 7 7 85 4 V ω 2 က <0.0010 <0.0010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.0001 0.110 <0.001 <0.052 <0.001 <0.010 <0.0001 <0.001 <0.001 <0.005 <0.001 10000 <0.001 0.003 900.0 473 12 193 12 V 0 87 13 mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L mg/L 0.0001 0.0001 0.001 0.001 0.005 0.0001 0.001 0.001 0.001 0.001 0.005 0.0001 0.001 0.001 0.001 0.001 0.005 0.001 0.001 0.001 0.001 0.001 0.001 0.001 LOR \_ ~ \_ ~ 7440-43-9 7440-50-8 7440-23-5 7440-43-9 7440-02-0 7440-50-8 7440-02-0 7440-43-9 7440-02-0 7440-38-2 7440-47-3 CAS Number 7440-70-2 7439-95-4 7440-23-5 7440-70-2 7439-95-4 7440-23-5 7440-09-7 7440-70-2 7439-95-4 7440-09-7 7440-38-2 7440-47-3 7440-50-8 7439-92-1 7440-66-6 7440-43-9 7440-38-2 7440-47-3 7439-92-1 7440-66-6 7440-38-2 7440-47-3 7440-50-8 7440-66-6 7440-09-7 7439-92-1 EG020A-F: Chromium EG020A-F: Chromium EG020A-T: Chromium EG020A-T: Chromium ED093F: Magnesium ED093F: Magnesium ED093F: Magnesium EG020A-F: Cadmium EG020A-F: Cadmium EG020A-T: Cadmium EG020A-T: Cadmium ED093F: Potassium ED093F: Potassium ED093F: Potassium EG020A-F: Arsenic EG020A-T: Arsenic EG020A-T: Copper EG020A-T: Arsenic EG020A-F: Copper EG020A-F: Arsenic EG020A-F: Copper EG020A-T: Copper ED093F: Calcium ED093F: Sodium ED093F: Calcium ED093F: Sodium ED093F: Calcium ED093F: Sodium EG020A-F: Nickel EG020A-F: Nickel EG020A-T: Nickel ED093F: Dissolved Major Cations (QC Lot: 3301246) - continued EG020A-F: Lead EG020A-F: Lead EG020A-T: Lead EG020A-F: Zinc EG020A-F: Zinc EG020A-T: Zinc EG020F: Dissolved Metals by ICP-MS (QC Lot: 3301247) ED093F: Dissolved Major Cations (QC Lot: 3301249) EG020T: Total Metals by ICP-MS (QC Lot: 3300475) Client sample ID Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous UGM-M8d Laboratory sample ID Sub-Matrix: WATER ES2035167-009 ES2035208-001 ES2035239-007 ES2034867-001 ES2035239-007 ES2035180-002 ES2035102-001



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S190512

Client Project

ES2035208

Work Order

4 of 7

Recovery Limits (%) 0% - 20% No Limit 0% - 20% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.476 0.00 2.05 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0 0.00 0.00 0.00 0.00 0.00 Laboratory Duplicate (DUP) Report Duplicate Result <0.005 <0.005 <0.0001 <0.0001 <0.0001 <0.0001 <0.0001 <0.001 <0.0001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.005 0.002 <0.001 <0.001 <0.001 <0.0001 <0.0001 1.94 7.20 ٥.1 م 4.0 Original Result <0.0001 <0.005 <0.0001 <0.0001 <0.0001 <0.0001 <0.0001 <0.001 <0.001 <0.001 <0.005 <0.001 <0.005 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.0001 <0.001 <0.0001 0.001 1.98 7.24 ٥.1 م 4.0 mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L 0.0001 0.0001 0.001 0.001 0.001 0.005 0.001 0.001 0.0001 0.0001 0.0001 0.0001 0.001 0.005 0.001 0.001 0.001 0.001 0.005 0.0001 0.0001 0.05 0.001 LOR 0.1 0.1 7439-97-6 7439-97-6 7439-97-6 7439-97-6 7439-97-6 7440-66-6 7439-97-6 7440-02-0 7440-43-9 7440-02-0 7440-43-9 7440-02-0 7440-66-6 18496-25-8 18496-25-8 CAS Number 7440-66-6 7440-47-3 7440-50-8 7439-92-1 7440-38-2 7440-47-3 7440-50-8 7439-92-1 7439-92-1 EG051G: Ferrous Iron EG051G: Ferrous Iron EG020A-T: Chromium EG020A-T: Chromium EK085: Sulfide as S2-EG020A-T: Cadmium EG020A-T: Cadmium EK085: Sulfide as S2-EG020A-T: Arsenic EG020A-T: Arsenic EG020A-T: Copper EG020A-T: Copper EG020A-T: Nickel EG020A-T: Nickel EG020A-T: Nickel EG035F: Mercury EG035T: Mercury EG035T: Mercury EG035T: Mercury EG035T: Mercury EG035F: Mercury EG020A-T: Lead EG020A-T: Zinc EG020A-T: Lead EG020A-T: Zinc EG020A-T: Lead EG020A-T: Zinc EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3303233) EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3303234) EG020T: Total Metals by ICP-MS (QC Lot: 3300475) - continued EG051G: Ferrous Iron by Discrete Analyser (QC Lot: 3299947) EG035F: Dissolved Mercury by FIMS (QC Lot: 3301248) EG020T: Total Metals by ICP-MS (QC Lot: 3300477) EK085M: Sulfide as S2- (QC Lot: 3300004) Client sample ID RIN\_201002 RIN\_201002 Anonymous Anonymous Anonymous Anonymous Anonymous UGM-M8s UGM-M8d **UGM-M8d** BH-M18d BH-M20s BH-M20s Laboratory sample ID Sub-Matrix: WATER EW2004458-003 ES2035208-002 ES2035002-001 ES2035208-005 ES2035208-010 ES2035208-011 ES2035208-010 ES2035208-011 ES2035239-007 ES2034956-001 ES2035180-002 ES2035208-001 ES2035208-001



: 5 of 7 : ES2035208 : EMM CONSULTING PTY LTD : S190512 Page Work Order

Project Client

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

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	orecision and accura			Recovery Limits are based  Method Blank (MB)		Laboratory Control Spike (LCS) Report	CS) Report	
				Report	Spike	Spike Recovery (%)	Recovery	Recovery Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SO7	Low	High
ED037P: Alkalinity by PC Titrator (QCLot: 3300396)								
ED037-P: Total Alkalinity as CaCO3	-		mg/L		200 mg/L 50 mg/l	102	81.0	111
ED037P: Alkalinity by PC Titrator (OCL of: 3300398)								
ED037-P: Total Alkalinity as CaCO3		-	mg/L	1 1	200 mg/L 50 mg/L	102	81.0	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3299188)	t: 3299188)							
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	7-	mg/L	₹	25 mg/L	103	82.0	122
				٧	500 mg/L	102	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 3299189)	(6							
ED045G: Chloride	16887-00-6	~	mg/L	⊽ ₹	10 mg/L	103	80.9	127
				7	1,000 III g/L	901	0.00	121
ED093F: Dissolved Major Cations (QCLot: 3301246)						-		
ED093F: Calcium	7440-70-2	~	mg/L		50 mg/L	108	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	^	50 mg/L	101	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	^	50 mg/L	99.1	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<u>۲</u>	50 mg/L	6.86	85.0	113
ED093F: Dissolved Major Cations (QCLot: 3301249)								
ED093F: Calcium	7440-70-2	_	mg/L		50 mg/L	105	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	^	50 mg/L	102	90.0	116
ED093F: Sodium	7440-23-5	-	mg/L		50 mg/L	103	82.0	120
ED093F: Potassium	7440-09-7	_	mg/L	۲	50 mg/L	97.0	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 3301247)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	85.3	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	87.3	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	89.9	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	86.9	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	88.4	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	88.0	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	86.1	81.0	117
EG020T: Total Metals by ICP-MS (QCLot: 3300475)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	8.06	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	8.06	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.9	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	6:06	83.0	118



: 6 of 7 : ES2035208 : EMM CONSULTING PTY LTD : \$190512 Page Work Order Project Client

Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LCS) Report	S) Report	
				Report	Spike	Spike Recovery (%)	Recovery Limits (%)	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SD7	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 3300475) - continued	ıtinued							
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	87.4	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	90.3	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	89.1	79.0	117
EG020T: Total Metals by ICP-MS (QCLot: 3300477)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	6.96	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	92.0	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	89.0	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	92.7	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	90.2	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.7	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	94.8	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 3301248)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	98.1	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3303233)	303233)							
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	8.06	77.0	111
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3303234)	303234)							
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	92.5	77.0	111
EG051G: Ferrous Iron by Discrete Analyser (QCLot: 3299947)	9947)							
EG051G: Ferrous Iron		0.05	mg/L	<0.05	2 mg/L	105	89.0	117
EK085M: Sulfide as S2- (QCLot: 3300004)								
EK085: Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	0.5 mg/L	94.0	76.0	116

## 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 Matrix Spike (MS) Report 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

				Spike	SpikeRecovery(%)	Recovery Limits (%)	imits (%)
Laboratory sample ID Client sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (T	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3299188)						
ES2035065-001 Anonymous	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	79.2	70.0	130
ED045G: Chloride	ED045G: Chloride by Discrete Analyser (QCLot: 3299189)						
ES2035150-001	Anonymous	ED045G: Chloride	16887-00-6	50 mg/L	# Not Determined	70.0	130
EG020F: Dissolved	EG020F: Dissolved Metals by ICP-MS (QCLot: 3301247)						
ES2035167-010 Anonymous	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	8.06	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	89.2	70.0	130



: 7 of 7 : ES2035208 : EMM CONSULTING PTY LTD : S190512 Page Work Order Client Project

Sub-Matrix: WATER				Mē	Matrix Spike (MS) Report		
				Spike	SpikeRecovery(%)	Recovery Limits (%)	imits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	POW	High
EG020F: Dissolved	EG020F: Dissolved Metals by ICP-MS (QCLot: 3301247) - continued						
ES2035167-010	Anonymous	EG020A-F: Chromium	7440-47-3	1 mg/L	83.7	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	89.8	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	85.7	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	91.4	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	88.2	70.0	130
EG020T: Total Meta	EG020T: Total Metals by ICP-MS (QCLot: 3300475)						
ES2035059-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	89.5	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	93.4	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	98.8	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	92.0	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	6.96	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	93.3	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	92.1	70.0	130
EG020T: Total Meta	EG020T: Total Metals by ICP-MS (QCLot: 3300477)						
ES2035208-012	RIN_201003	EG020A-T: Arsenic	7440-38-2	1 mg/L	100	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	100	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	88.4	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	6.76	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	106	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	101	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	2.66	70.0	130
EG035F: Dissolved	EG035F: Dissolved Mercury by FIMS (QCLot: 3301248)						
ES2035208-001	UGM-M8d	EG035F: Mercury	7439-97-6	0.01 mg/L	70.1	70.0	130
EG035T: Total Rec	EG035T: Total Recoverable Mercury by FIMS (QCLot: 3303233)						
ES2035086-001	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	92.0	70.0	130
EG035T: Total Rec	EG035T: Total Recoverable Mercury by FIMS (QCLot: 3303234)						
ES2035208-012	RIN_201003	EG035T: Mercury	7439-97-6	0.01 mg/L	92.2	70.0	130
EG051G: Ferrous I	EG051G: Ferrous Iron by Discrete Analyser (QCLot: 3299947)						
ES2034956-001	Anonymous	EG051G: Ferrous Iron		1 mg/L	86.2	70.0	130
EK085M: Sulfide as	EK085M: Sulfide as S2- (QCLot: 3300004)						
ES2035208-001	пСМ-М8а	EK085: Sulfide as S2-	18496-25-8	0.33 mg/L	109	70.0	130



# QA/QC Compliance Assessment to assist with Quality Review

Page : 1 of 8	Laboratory : Environmental Division Sydney	Telephone : +61 2 8784 8555	Date Samples Received : 08-Oct-2020	Issue Date : 14-Oct-2020	No. of samples received : 14	No. of samples analysed : 14
: EM2069208	ENN COSMULTISG PTY LTD	: PAUL GIBBONS	: S190512	1.	: Daniel Condon	: \$190512
Work Order	Client	Contact	Project	Site	Sampler	Order number

reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Nany components of this This report is automatically generated by the ALM LINM through interpretation of the ALM Quality Control Report and several Quality Assurance parameters measured by ALM. This automated 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.

- SO Nethod Blank value outliers occur.
- SO Duplicate outliers occur.
- SO Laboratory Control outliers occur.
- Natrix Mpike outliers exist please see following pages for full details.
- For all regular sample matrices, SO surrogate recovery outliers occur.

# Outliers: Analysis Holding Time Compliance

SO Analysis Holding Time Outliers exist.

# Outliers: Frequency of Quality Control Samples

SO Quality Control Mample Frequency Outliers exist.



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Outliers: Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: WATER

Compound Group Name	Laboratory Sample ID   Client Sample ID	Client Sample ID	Analyte	CAS Number Data	Data	Limits Comment	Comment
Natrix Mpike (N M) Recoveries							
ED045G: Chloride by Discrete Analyser	ES2035150001	Anonymous	Chloride	16887-00-6 Not	Not	1	N Mrecovery not determined,
				ă	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.

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

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	x = Holding time	Evaluation: x = Holding time breach; = Within holding time.</th <th>holding time.</th>	holding time.
Method		Sample Date	Exi	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED06j P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Satural (ED06j -P)								
UGM-M8d,	UGM-M8s	02-Oct-2020	1	-		05-Oct-2020	16-Oct-2020	>
Clear Plastic Bottle - Satural (ED06j -P)								
UGM-M12d,	UGM-M12s,	06-Oct-2020	1	-	-	05-Oct-2020	17-Oct-2020	>
BH-M18d,	BH-M18s,							
BH-M19d,	BH-M19s,							
BH-M20d								
ED04; G: Mulfate (Turbidimetric) as MO4 2- by DA								
Clear Plastic Bottle - Satural (ED04; G)								
UGM-M8d,	UGM-M8s	02-Oct-2020	1		-	05-Oct-2020	30-Oct-2020	>
Clear Plastic Bottle - Satural (ED04; G)								
UGM-M12d,	UGM-M12s,	06-Oct-2020	1		-	05-Oct-2020	31-Oct-2020	>
BH-M18d,	BH-M18s,							
BH-M19d,	BH-M19s,							
BH-M20d								
ED049G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Satural (ED049G)								
UGM-M8d,	UGM-M8s	02-Oct-2020	1			05-Oct-2020	30-Oct-2020	>
Clear Plastic Bottle - Satural (ED049G)								
UGM-M12d,	UGM-M12s,	06-Oct-2020	I	1	1	05-Oct-2020	31-Oct-2020	>
BH-M18d,	BH-M18s,							
BH-M19d,	BH-M19s,							
BH-M20d								



: 3 of 8 : ES2035208 : EMM CONSULTING PTY LTD : \$190512 Page Work Order Client

Project

Matrix: WATER					Evaluation	: x = Holding time	Evaluation: $x = \text{Holding time breach}$ ; $\checkmark = \text{Within holding time}$ .	n holding time.
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED056F: Dissolved Nafor Cations								
Clear Plastic Bottle - Sitric Acid3Filtered (ED056F) UGM-M8d,	UGM-M8s	02-Oct-2020	1	1		; 0-Oct-2020	30-Oct-2020	>
Clear Plastic Bottle - Sitric Acid3Filtered (ED056F)								
UGM-M12d,	UGM-M12s,	06-Oct-2020	!	!		; 0-Oct-2020	31-Oct-2020	>
BH-M18d,	BH-M18s,							
BH-M19d,	BH-M19s,							
BH-M20d								
EG020F: Dissolved Netals by ICP-NM								
Clear Plastic Bottle - Sitric Acid3Filtered (EG020A-F) UGM-M8d.	UGM-M8s	02-Oct-2020		-	-	; 0-Oct-2020	31-Mar-2021	>
Clear Plastic Bottle - Sitric Acid3Filtered (EG020A-F)								
UGM-M12d,	UGM-M12s,	06-Oct-2020	1		-	; 0-Oct-2020	01-Apr-2021	>
BH-M18d,	BH-M18s,							
BH-M19d,	BH-M19s,							
BH-M20d,	BH-M20s							
EG020T: Total Netals by ICP-N M								
Clear Plastic Bottle - Sitric Acid3Unfiltered (EG020A-T)								
UGM-M8d,	UGM-M8s	02-Oct-2020	05-Oct-2020	31-Mar-2021	>	05-Oct-2020	31-Mar-2021	>
Clear Plastic Bottle - Sitric Acid3Unfiltered (EG020A-T)	00 H	06-0ct-2020	05-Oct-2020	01-Apr-2021	`	05-Oct-2020	01-Apr-2021	`
0.014-141-142,	COM-INITES,				>			>
BH-M18d,	BH-M18s,							
BH-M19d,	BH-M19s,							
BH-M20d,	BH-M20s							
Clear Plastic Bottle - Sitric Acid3Unspecified (EG020A-T)		02-Oct-2020	05-Oct-2020	31-Mar-2021	`	05-Oct-2020	31-Mar-2021	`
Clear Blockie Bottle Situite Acid211mmscrifted /EC020A T					>		3	>
Clear Plastic Bottle - Stric Acids Onspecified (EG020A-1) RIN_201003,	TRIP BLANK_02	06-Oct-2020	05-Oct-2020	01-Apr-2021	>	05-Oct-2020	01-Apr-2021	>
EG069F: Dissolved Nercury by FIN M								
Clear Plastic Bottle - Sitric Acid3Filtered (EG069F)								
UGM-M8d,	UGM-M8s	02-Oct-2020	1	-		; 2-Oct-2020	30-Oct-2020	>
Clear Plastic Bottle - Sitric Acid3Filtered (EG069F)							(	
UGM-M12d,	UGM-M12s,	06-Oct-2020	!	!	-	; 2-Oct-2020	31-Oct-2020	>
BH-M18d,	BH-M18s,							
BH-M19d,	BH-M19s,							
BH-M20d,	BH-M20s							



 Page
 : 4 of 8

 Work Order
 : ES2035208

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Matrix: WATER					Evaluation	: x = Holding time	Evaluation: $\mathbf{x} = \text{Holding time breach}$ ; $\checkmark = \text{Within holding time}$ .	holding time.
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG069T: Total Recoverable Nercury by FINM								
Clear Plastic Bottle - Sitric Acid3Unfiltered (EG069T) UGM-M8d.	88W-W00	02-Oct-2020	I	-	-	; 6-Oct-2020	30-Oct-2020	>
Clear Plastic Bottle - Sitric Acid3Unfiltered (EG069T) UGM-M12d	UGM-M128.	06-Oct-2020	-	-	-	; 6-Oct-2020	31-Oct-2020	
BH-M18d,	BH-M18s,							•
BH-M19d,	BH-M19s,							
BH-M20d,	BH-M20s							
Clear Plastic Bottle - Sitric Acid3Unspecified (EG069T) RIN_201002,	TRIP BLANK_01	02-Oct-2020	1	-		; 6-Oct-2020	30-Oct-2020	>
Clear Plastic Bottle - Sitric Acid3Unspecified (EG069T) RIN_201003,	TRIP BLANK_02	06-Oct-2020	1	-		; 6-Oct-2020	31-Oct-2020	>
EG09; G: Ferrous Iron by Discrete Analyser								
Clear Plastic Bottle - HCI - Filtered (EG09; G)								
UGM-M8d,	UGM-M8s	02-Oct-2020				05-Oct-2020	09-Oct-2020	>
Clear Plastic Bottle - HCI - Filtered (EG09; G)								
UGM-M12d,	UGM-M12s,	06-Oct-2020	1	-	-	05-Oct-2020	10-Oct-2020	>
BH-M18d,	BH-M18s,							
BH-M19d,	BH-M19s,							
BH-M20d,	BH-M20s							
E7 089N: Mulfide as M2-								
Clear Plastic Bottle - Kn Acetate/SaOH-FLOCCULATED (E7 089)	E7 089)							
UGM-M8d,	UGM-M8s	02-Oct-2020	-	-		05-Oct-2020	09-Oct-2020	>
Clear Plastic Bottle - Kn Acetate/SaOH-FLOCCULATED (E7 089)	ET 089)							
UGM-M12d,	UGM-M12s,	06-Oct-2020	1	1	-	05-Oct-2020	10-Oct-2020	>
BH-M18d,	BH-M18s,							
BH-M19d,	BH-M19s,							
BH-M20d,	BH-M20s							



: 5 of 8 : ES2036208 : EMM CONSULTING PTY LTD : \$190512 Work Order Project Client

# 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.

Quality Control Sample Type		Col	unt		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	4	40	00.0 ;	0.00;	>	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	00.0;	; 0.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	17	;; .j Z	0.00;	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	19	96.0 ;	; 0.00	>	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	2	15	99.9 :	; 0.00	>	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	က	28	; 0·j ;	0.00;	>	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	00.0;	; 0.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	2	10	20.00	90.00	>	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	34	;; .j Z	0.00;	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	4	24	; Z.Zj	00:0	<b>,</b>	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	4	40	00.0;	00.00;	>	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	00.0 :	90.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	_	17	9.88	9.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	-	19	9.2Z	9.00	<b>,</b>	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	-	15	Z.Zj	9.00	>	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	28	j .; 4	9.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	00.0 :	00.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	_	10	00.0 :	9.00	>	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	34	9.88	9.00	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	24	99.8	9.00	<b>,</b>	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	-	20	9.00	9.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	_	17	9.88	9.00	`	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	_	19	9.2Z	9.00	>	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	_	15	Z.Zj	9.00	>	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	28	j .; 4	9.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	_	20	9.00	9.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	-	10	00.0 :	9.00	<b>,</b>	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	34	9.88	9.00	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	24	99.8	9.00	>	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	<b>-</b>	20	9.00	9.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	_	17	9.88	9.00	>	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	_	19	9.2Z	9.00	>	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	_	15	2.2	9.00	>	NEPM 2013 B3 & ALS QC Standard



: 6 of 8 : ES2035208 : EMM CONSULTING PTY LTD : \$190512 Page Work Order Client Project

Matrix: WATER				Evaluation	n: x = Quality Co	introl frequency n	Evaluation: * = Quality Control frequency not within specification; < = Quality Control frequency within specification.
Quality Control Sample Type		ပိ	Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Matrix Spikes (MS) - Continued							
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	-	20	9.00	9.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfide as S2-	EK085	-	10	00.0;	9.00	>	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	34	9.88	9.00	>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	FG020A-T	2	24	8.66	9.00	1	NEPM 2013 B3 & ALS QC Standard



 Page
 : 7 of 8

 Work Order
 : ES2035208

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

## **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.

A I I . M	11-11-11	N. A. A. A.	
Analytical Metrods Alkalinity by PC Titrator	ED037-P	WATER	Memory Descriptions In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point.
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	This method is compliant with NEPM Schedule B(3)  In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate In house: Referenced to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA seal method 2 017-1-L.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
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.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(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 SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).



 Page
 : 8 of 8

 Work Order
 : ES2035208

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

Analytical Methods	Method	Matrix	Method Descriptions
Ferrous Iron by Discrete Analyser	EG051G	WATER	In house: Referenced to APHA 3500 Fe-B. A colorimetric determination based on the reaction between phenanthroline and ferrous iron at pH 3.2-3.3 to form an orange-red complex that is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3).
Sulfide as S2-	EK085	WATER	In house: Referenced to APHA 4500-S2- D. Sulfide species present in water samples are immediately precipitated when collected in pretreated caustic/zinc acetate preserved sample containers. The sulphides are coloured using methylene blue indicator. Non-detects may be screened by comparison against a standard at half-LOR, otherwise samples are measured using UV-VIS detection at 664nm. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

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OFFICE: 20 Chandos Street, St Leonards

CLIENT: EMM CONSULTING

PROJECT: Bairanaid 73 Anoillary

URCHASE ORDER:

PROJECT MANAGER: Paul Gibbons AMPLER: Kattlyn Brodle / Bill Bull

AN OF CUSTODY

LS Laboratory: please tick →

CIRCHISIANE 2 Byth Street Statland CLD 4063
Ph 07 3222 E. sandhee binthemis gleegobal com LOLADSTONE 45 Callemoniah Dive Circle CLD 4080 Ph. 07 7471 5500 E. galaknon@angheanche DADELAIDE 21 Burna Road Pooraka SA 5095 Ph. 08 8359 0890 E. adelarde@alagobal.com

OMELBOURNE 2-4 Westall Road Springrate VIC 3171 Ph. 03 3549 9600 E. samples melboume@alsglobal.com DMUDGEE 1/29 Sydney Road Mudgee NSW 2350 Pr. 02 6372 6735 E. mudgee.mai@alsgichel.com LIMACKAY 78 Harbour Road Mackay OLD 4740 Ph. 07 4944 0177 E. mackay@alaglebal.com

Standard TAT (List due date):

UNEWCASTLE 6/596 Medfand Road Mayfield Wash NSW 2014 Apr. 40, 44 of 2500 E. samples investing@asepelation DIND/KFA 41'13 Gasty Flace Neeth Newt AISW 2541 Ph. 80 4423 7853 E. naven@asyfinision CIPERTH 10 Hod Way Malaga WA 6090 Ph. 08 9209 7655 E. samples pertri@alsgi

N/A W.A Ž DWOLLDNGCNG 1/19-21 Raph Black Dr. North Wofchyong NSW 2500 Ph. 02 4225 3125 E. welongmygalsglobal con DSYDNEY 277-289 Woodpark Rockl Smithfeld NSW 2164 PPr 107 978 655.5 Franchisk sydwoydgalgobial common Ppr 107 978 655.5 Franchisk sydwoydgalgobial common Court Bohle 010 419 Ph 107 4796 0600 E sweezelle promoner retugnish FORLABOAT DRY USE ONLY (CIVOLA)

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kbrodle@emmconsulfing.com.au	DATE/TIME:	OATE/TIME:	DATE/TIME:	DATE/TIME
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DATE / TIME

SAMPLE ID

LAB ID

Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.

Additional Information

Where Matals are required, specify Total (unfiltered bottle required) or Disselved (fleid filtered boille required) ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to affract suits price)

CONTAINER INFORMATION

MATRIX: Solid(S)

Wator(W)

SAMPLE DETAILS

ALS USE ONLY

mall Reports to: pglbbans@emmdonsulling.com.au; dcondon@emmdons

COC Emailed to ALB? ( YES )

nait Invoice to: accounts@emmconculling.com.au, pgcbone@em

OMMENTS/SPECIAL HANDLING/STORAGE OR DIBPOSAL:

AND THE RESERVE

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TOTAL

Attached is a COC for 3 eskys posted this morning (15/10/2020) for job number \$190512.

Please let me know if I need to make any changes.

**Thanks** 

Kaitlyn

## Kaitlyn Brodie

hydrogeologist



T 02 9493 9500

M 0401 881 447

in

Connect with us

SYDNEY | Ground floor, 20 Chandos Street, St Leonards NSW 2065



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# CERTIFICATE OF ANALYSIS

**Environmental Division Melbourne** Shane Colley : 1 of 9 Laboratory Contact **EMM CONSULTING PTY LTD** PAUL GIBBONS EM2018304 **Work Order** Contact

: 4 Westall Rd Springvale VIC Australia 3171 Address

Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065

: 16-Oct-2020 10:20 +61-3-8549 9600 : 19-Oct-2020 Date Analysis Commenced Date Samples Received

Telephone

S190512

BB, KB

C-O-C number

Sampler

Order number

Telephone

Project

Address

Client

EN/222 9

Quote number

No. of samples analysed No. of samples received

04-Nov-2020 13:18 Issue Date

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. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

General Comments

Analytical Results

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

## Signatories

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.

Accreditation Category

Melbourne Inorganics, Springvale, VIC	Radionuclides, Fyshwick, ACT
Senior Inorganic Chemist	Metals Teamleader
Dilani Fernando	Titus Vimalasiri



## General Comments

In house developed procedures 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. 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

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

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

Key:

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.

EK085: EM2018304-008 required dilution prior to analysis due to matrix interferences. LOR has been raised accordingly.

EG035T: EM2018304 #2 Poor matrix spike recovery for total mercury due to sample matrix. Confirmed by re-extraction and re-analysis.

EG020-T : EM2018304 #2 and #5 total metal required dilution prior analysis due to sample matrix. LORs have been adjusted accordingly.

EG020-F: EM2018304 #1-15 dissolved metal required dilution prior analysis due to sample matrix. LORs have been adjusted accordingly

lonic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.

LOR for Gross Alpha and Gross Beta raised due to high solid content.

ED045G: The presence of thiocyanate can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

EK085: EM2018304-002 Poor matrix spike recovery for sulphide due to sample matrix. Confirmed by re-extraction and re-analysis.

EG035F: EM2018304-014 Poor matrix spike recovery for dissolved mercury due to sample matrix. Confirmed by re-preparation and re-analysis.

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.



Project Client

: 3 of 9 : EM2018304 : EMM CONSULTING PTY LTD : \$190512

Sub-Matrix: WATER (Matrix: WATER)		Clie	Client sample ID	UGM-M8D	UGM-M8S	UGM-M12D	UGM-M12S	UGM-M15S
	Clie	ent samplin	Client sampling date / time	13-Oct-2020 09:15	12-Oct-2020 09:30	14-Oct-2020 08:30	14-Oct-2020 07:50	14-Oct-2020 12:00
Compound	CAS Number	LOR	Unit	EM2018304-001	EM2018304-002	EM2018304-003	EM2018304-004	EM2018304-005
				Result	Result	Result	Result	Result
EA250: Gross Alpha and Beta Activity								
Gross beta		0.10	Bq/L	2.07	3.12	2.07	2.26	<2.18
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	7	mg/L	<1	<1	1>	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	~	mg/L	<b>\</b>	7	₹	<b>&gt;</b>	7
Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	418	253	401	336	218
Total Alkalinity as CaCO3	-	τ-	mg/L	418	253	401	336	218
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	~	mg/L	3760	4780	3390	5130	5340
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	-	mg/L	20800	24200	21700	25500	27700
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	-	mg/L	514	746	200	584	774
Magnesium	7439-95-4	-	mg/L	1430	1730	1480	1620	1590
Sodium	7440-23-5	τ-	mg/L	10300	12000	10900	13200	13800
Potassium	7440-09-7	7	mg/L	57	53	59	39	42
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.002	<0.002	<0.002	<0.002	0.002
Cadmium	7440-43-9	0.0001	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Chromium	7440-47-3	0.001	mg/L	<0.002	0.003	<0.002	0.002	<0.002
Copper	7440-50-8	0.001	mg/L	<0.002	0.003	<0.002	0.002	980.0
Nickel	7440-02-0	0.001	mg/L	<0.002	0.034	<0.002	0.003	0.014
Lead	7439-92-1	0.001	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc	7440-66-6	0.005	mg/L	0.011	<0.010	<0.010	<0.010	0.010
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	-	0.003			0.007
Cadmium	7440-43-9	0.0001	mg/L		<0.0002			<0.0002
Chromium	7440-47-3	0.001	mg/L		0.014			0.032
Copper	7440-50-8	0.001	mg/L		0.014			0.306
Nickel	7440-02-0	0.001	mg/L		0.033			0.020
Lead	7439-92-1	0.001	mg/L		<0.002			<0.002
Zinc	7440-66-6	0.005	mg/L		<0.010			0.015
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS	-IMS							



Client Project

EMM CONSULTING PTY LTD S190512

: 4 of 9 : EM2018304

Work Order

14-Oct-2020 12:00 EM2018304-005 UGM-M15S <0.0001 <2.18 <0.05 1.77 ٥. 1. 897 771 7.56 14-Oct-2020 07:50 EM2018304-004 UGM-M12S Result <2.18 <0.05 2.49 **^**0.1 90.9 738 833 l 14-Oct-2020 08:30 EM2018304-003 UGM-M12D Result 41.84 <0.92 1.42 **^**0.1 622 5.20 691 l 12-Oct-2020 09:30 EM2018304-002 UGM-M8S Result <0.0001 <0.05 <1.99 <1.00 <u>^0</u> 787 703 5.66 13-Oct-2020 09:15 EM2018304-001 **UGM-M8D** Result <0.89 <1.78 2.01 **~**0.1 593 6.36 673 l Client sample ID Client sampling date / time med/L med/L mg/L mg/L mg/L Unit Bq/L Bq/L % 7439-97-6 0.0001 LOR 0.05 0.01 0.01 ---- 0.05 0.01 0.1 18496-25-8 EG035T: Total Recoverable Mercury by FIMS - Continued CAS Number I EG051G: Ferrous Iron by Discrete Analyser EA250CA: Gross Alpha and Beta Activity Gross beta activity - 40K EK085M: Sulfide as S2-EN055: lonic Balance Sub-Matrix: WATER (Matrix: WATER) Ø Ionic Balance Sulfide as S2-Ø Total Cations Ø Total Anions Ferrous Iron Gross alpha Compound Mercury



Project Client

: 5 of 9 : EM2018304 : EMM CONSULTING PTY LTD : \$190512

Sub-Matrix: WATER		Clie	Client sample ID	BH-M17D	BH-M17S	BH-M18D	BH-M18S	BH-M19D
/	Clie	ent samplin	Client sampling date / time	13-Oct-2020 15:00	13-Oct-2020 16:00	13-Oct-2020 13:45	13-Oct-2020 12:45	14-Oct-2020 10:50
Compound	CAS Number	LOR	Unit	EM2018304-006	EM2018304-007	EM2018304-008	EM2018304-009	EM2018304-010
				Result	Result	Result	Result	Result
EA250: Gross Alpha and Beta Activity								
Gross beta		0.10	Bq/L	2.09	2.64	<1.70	2.72	2.27
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	-<1	<1	۲>
Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	<1	<1	-<1	<1	۲>
Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	433	372	467	354	442
Total Alkalinity as CaCO3	1	-	mg/L	433	372	467	354	442
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	/ DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	3450	4240	3550	3790	0869
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	-	mg/L	20500	21900	18600	23800	17500
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	-	mg/L	512	622	474	620	476
Magnesium	7439-95-4	-	mg/L	1460	1490	1330	1440	1370
Sodium	7440-23-5	-	mg/L	10500	11500	9640	12200	10000
Potassium	7440-09-7	-	mg/L	57	51	55	41	57
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.002	<0.002	<0.002	0.003	0.005
Cadmium	7440-43-9	0.0001	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Chromium	7440-47-3	0.001	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	7440-50-8	0.001	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel	7440-02-0	0.001	mg/L	<0.002	0.012	<0.002	0.009	<0.002
Lead	7439-92-1	0.001	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc	7440-66-6	0.005	mg/L	<0.010	0.069	<0.010	<0.010	<0.010
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG051G: Ferrous Iron by Discrete Analyser								
Ferrous Iron		0.05	mg/L	3.05	0.41	0.38	3.27	4.94
EK085M: Sulfide as S2-								
Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	<0.1	4.7	<0.1	<0.1
EN055: Ionic Balance								
Ø Total Anions		0.01	med/L	629	713	809	757	648
Ø Total Cations	-	0.01	med/L	604	655	554	681	573
Ø lonic Balance	1	0.01	%	4.34	4.26	4.66	5.30	6.13



Project Client

: 6 of 9 : EM2018304 : EMM CONSULTING PTY LTD : \$190512

Sub-Matrix: WATER Client sample ID BH-M17D (Matrix: WATER)	Client sampling date / time 13-Oct-2020 15:00	Compound CAS Number LOR Unit EM2018304-006	Result	EA250CA: Gross Alpha and Beta Activity	Gross alpha         0.05         Bq/L         <0.87	Gross beta activity - 40K          0.10         Bq/L         <1.74
BH-M17S	13-Oct-2020 16:00	EM2018304-007	Result		1.21	<1.88
BH-M18D	13-Oct-2020 13:45	EM2018304-008	Result		<0.85	<1.70
BH-M18S	13-Oct-2020 12:45	EM2018304-009	Result		2.40	<2.00
BH-M19D	14-Oct-2020 10:50	EM2018304-010	Result		1.34	<1.71



Project Client

: 7 of 9 : EM2018304 : EMM CONSULTING PTY LTD : S190512

Client sample ID         BH-M19S           Client sampling date / time         14-Oct-2020 10:20           -         LOR         Unit         EM2018304-011           -         LOR         Unit         Result           6         1         mg/L         <1           6         1         mg/L         304           7         1         mg/L         304           8         1         mg/L         4940           6         1         mg/L         4940           8         1         mg/L         4940           6         1         mg/L         4940           7         mg/L         4940           8         1         mg/L         4940           9         1         mg/L         4940           1         mg/L         4940         1730           2         1         mg/L         1730           3         1         mg/L         174100	H-M20D  14-Oct-2020 13:30  EM2018304-012  Result  <1.82  <1  423  423  423  423  423  423  423  42	BH-M20S 14-Oct-2020 13:50 EM2018304-013 Result <1 <1 <1 <1 4610  760 1410 12700	HH-M21D  14-Oct-2020 09:05  EM2018304-014  Result  <1 <1 <1 418  418  418  418  418  418	BH-M21S 14-Oct-2020 09:25 EM2018304-015 Result <1 <1 <1 <1 344 344 344 344 344 344 344 344 344 34
	14-Oct-2020 13:30  EM2018304-012  Result	EM2018304-013  EM2018304-013  Result <1 <1 <1 190 190 190 14610  760 1410	14-Oct-2020 09:05  EM2018304-014  Result  <1 <1 <1 418  418  418  418  418  418	14-Oct-2020 09:25  EM2018304-015  Result  <1 <1 <1 <1 <4700  4700  24300
	Hesult Result 1.82 <1 <1 423 423 423 423 423 423 423 423 423 423	Result   Result   C2.04   C4.04   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4.06   C4	EM2018304-014  Result  <1 <1 <1 418 418 418 418 418 418 418 418 41700	Result
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	1.82 <1 <1 423 423 423 423 423 426 1420 10300 50	<ul> <li>&lt;2.04</li> <li>&lt;1</li> <li>&lt;1</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li> <li>190</li></ul>	2.82 <1 <1 418 418 3700 3700 3700	3.68 <1 <1 <1 <1 4700 24300 602
	1.82 <1 <1 423 423 3880 3880 21300 10300 50	<ul> <li>&lt;1</li> <li>&lt;1</li> <li>190</li> <li>190</li> <li>190</li> <li>24500</li> <li>760</li> <li>1410</li> <li>12700</li> </ul>	2.82 <1 <1 418 418 3700 21700 485	3.68 <1 <1 344 344 346 4700 24300
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	423 423 3880 21300 496 10300	190 190 4610 24500 760 1410	418 418 3700 21700 485 1470	344 344 4700 24300 602
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	3880 21300 496 1420	4610 24500 760 1410	3700 21700 485 1470	24300
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	21300 496 1420 10300	24500 760 1410	21700	24300
	21300 496 1420 10300	24500 760 1410	21700	24300
	496 1420 10300	760 1410 12700	485	602
	496 1420 10300	760 1410 12700	485	602
	1420	1410	1470	400
	10300	12700		1580
	02		10700	12900
	90	48	28	40
mg/L <0.002	<0.002	<0.002	<0.002	<0.002
mg/L <0.0002	<0.0002	<0.0002	<0.0002	<0.0002
mg/L <0.002	<0.002	<0.002	<0.002	<0.002
mg/L <b>0.010</b>	<0.002	<0.002	<0.002	0.028
mg/L 0.006	<0.002	<0.002	<0.002	0.017
mg/L <0.002	<0.002	<0.002	<0.002	<0.002
mg/L <0.010	<0.010	<0.010	<0.010	<0.010
mg/L <0.0001	<0.0001	<0.0001	<0.0001	<0.0001
mg/L <0.05	9.18	<0.05	5.59	<0.05
mg/L <0.1	0.2	0.3	<0.1	<0.1
meq/L 823	069	791	869	790
meq/L <b>788</b>	591	708	612	722
2.12	7.72	5.56	6.52	4.50
	<ul> <li>&lt;0.002</li> <li>&lt;0.002</li> <li>&lt;0.002</li> <li>&lt;0.002</li> <li>&lt;0.002</li> <li>&lt;0.002</li> <li>&lt;0.002</li> <li>&lt;0.002</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li> <li>&lt;0.001</li></ul>		48 48 <0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.005 <0.006 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.	



Analytical Results Project

: 8 of 9 : EM2018304 : EMM CONSULTING PTY LTD : \$190512

Page Work Order

Client

BH-M21D	14-Oct-2020 09:05	
BH-M20S	14-Oct-2020 13:50	
BH-M20D	14-Oct-2020 13:30	
BH-M19S	14-Oct-2020 10:20	
bb-Matrix: WATER Client sample ID datrix: WATER)	Client sampling date / time	
Sub-N (Matr		

Sub-Matrix: WATER (Matrix: WATER)		Clie	Client sample ID	BH-M19S	BH-M20D	BH-M20S	BH-M21D	BH-M21S
	CI	ent samplin	Client sampling date / time	14-Oct-2020 10:20	14-Oct-2020 13:30	14-Oct-2020 13:50	14-Oct-2020 09:05	14-Oct-2020 09:25
Compound	CAS Number LOR	LOR	Unit	EM2018304-011	EM2018304-012	EM2018304-013	EM2018304-014	EM2018304-015
				Result	Result	Result	Result	Result
EA250CA: Gross Alpha and Beta Activity								
Gross alpha	-	0.05	Bq/L	4.48	<0.90	1.51	<0.91	1.44
Gross beta activity - 40K	1	0.10	Bq/L	<2.15	<1.81	<2.04	<1.82	2.61



Project Client

: 9 of 9 : EM2018304 : EMM CONSULTING PTY LTD : \$190512

Page Work Order

Sub-Matrix: WATER (Matrix: WATER)		Clier	Client sample ID	RB1	RB2	TB1	TB2	
	Cli	ent sampling	Client sampling date / time	13-Oct-2020 13:20	14-Oct-2020 10:30	14-Oct-2020 00:00	14-Oct-2020 00:00	
Compound	CAS Number	LOR	Unit	EM2018304-016	EM2018304-017	EM2018304-018	EM2018304-019	
				Result	Result	Result	Result	
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2 0.001	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	i
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	i
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	!
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	i
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	1
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	-
EG035T: Total Recoverable Mercury by FIMS	FIMS							
Mercury	7439-97-6 0.0001	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	-



### QUALITY CONTROL REPORT

: 4 Westall Rd Springvale VIC Australia 3171 Environmental Division Melbourne +61-3-8549 9600 Shane Colley 16-Oct-2020 19-Oct-2020 : 1 of 7 Date Analysis Commenced Date Samples Received Telephone Laboratory Contact Address Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065 **EMM CONGULTIND PTY LT5** PAUL GIBBONS **EM206980S** S190512 Order number **Work Order** Telephone Contact Address Project Client

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

04-Nov-2020

Issue Date

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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

EN/222

Quote number

19

No. of samples analysed No. of samples received

BB, KB

C-O-C number

Sampler

- 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.

Accreditation Category	Melbourne Inorganics, Springvale, VIC	Radionuclides, Fyshwick, ACT
Position	Senior Inorganic Chemist	Metals Teamleader
Signatones	Dilani Fernando	Titus Vimalasiri



 Page
 : 2 of 7

 Work Order
 : EM2018304

 Client
 : EMM CONSULTING PTY LTD

 Project
 : S190512

General Comments

In house developed procedures 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. 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 primary

Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot 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

RPD = Relative Percentage Difference

# = Indicates failed QC

### Laboratory Duplicate (DUP) Report

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

Sub-Matrix: WATER						Laboratory L	Laboratory Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA2s0CA: Droll Apr	EA2s0CA: Droll AphannBd teon Aiowyα 3QC Loc 88820147	Loc 88820147							
EB2027744-001	Anonymons	EA250: Gross alpha	1	0.05	Bq/L	<0.05	<0.05	0.00	No Limit
		EA250: Gross beta	-	0.1	Bq/L	<0.10	<0.10	0.00	No Limit
		EA250: Gross beta activity - 40K	1	0.1	Bq/L	<0.10	<0.10	0.00	No Limit
EM2018304-009	BH-M18S	EA250: Gross alpha	-	0.05	Bq/L	2.40	2.04	16.4	No Limit
		EA250: Gross beta	-	0.1	Bq/L	2.72	3.50	25.0	No Limit
		EA250: Gross beta activity - 40K	1	0.1	Bq/L	<2.00	<2.00	0.00	No Limit
E508) P: ApknpBvd b	E508) P: ApknpBv( b( PCTvancor 3QC Loc 882066s7	75990							
EM2018304-004	UGM-M12S	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	<u>۸</u>	<u>۸</u>	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	_	mg/L	<u>^</u>	۲	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	_	mg/L	336	334	0.355	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	1	_	mg/L	336	334	0.355	0% - 20%
EM2018280-010	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	^	۲	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	_	mg/L	^	۲	00.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	1630	1570	3.76	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	1	-	mg/L	1630	1570	3.76	0% - 20%
E508) P: ApknpBvg b	E508) P: ApknpBv( b( PCTvancer 3QC Loc 88206647	06647							
EM2018304-014	BH-M21D	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	۲>	۲	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	_	mg/L	۲>	^	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	_	mg/L	418	430	2.78	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	-	-	mg/L	418	430	2.78	0% - 20%
E50S6D: Gupinæ ITui	E50S6D: Guifnæ Turbklymeani 7nl GOS 2- b( 5A 3QC Loc 886) 6S) 7	A 3QC Loc 886) 6S) 7							
EM2018304-009	BH-M18S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	3790	4430	15.7	0% - 20%
EM2018304-001	UGM-M8D	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	-	mg/L	3760	3900	3.79	0% - 20%
E50SsD: Caparde b(	E50SsD: Caporvdeb (5√lirece ABnp(ler 3QC Loc 886)6S17	oc 886) 6S17							



EMM CONSULTING PTY LTD

S190512

Client Project

EM2018304

Work Order

Recovery Limits (%) 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% %09 - %0 No Limit No Limit No Limit No Limit % - 20% 0 No Limit No Limit No Limit No Limit **3% - 20%** No Limit No Limit 0% - 20% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.402 0.00 1.87 2.55 2.25 4.46 0.00 0.00 0.00 3.06 0.00 2.38 0.00 0.00 2.35 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 8.00 0.00 0.00 0.00 2.82 0.00 0.00 0.00 0.00 Laboratory Duplicate (DUP) Report Original Result Duplicate Result <0.0001 <0.005 <0.002 <0.002 <0.002 <0.0001 <0.001 <0.0002 <0.010 <0.001 <0.001 23200 20700 13400 0.144 <0.001 <0.001 <0.001 0.016 <0.001 0.0002 <0.001 0.002 0.138 0.004 0.033 < 0.001 0.026 1550 200 1 37 4 N က <0.0001 <0.0002 <0.002 <0.001 <0.001 <0.005 <0.002 <0.002 <0.010 <0.001 <0.001 23800 20800 <0.001 0.135 0.005 0.141 <0.001 0.028 <0.0001 13800 0.032 <0.001 <0.001 0.017 <0.001 1590 <0.000.0> 774 42 0 37 က mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L 0.001 0.001 0.005 0.0001 0.001 0.001 0.005 0.001 0.001 0.001 0.005 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.0001 0.001 0.001 0.0001 0.001 0.001 0.0001 LOR \_ \_ \_ \_ \_ 7440-47-3 7440-66-6 7440-43-9 7440-38-2 7440-50-8 16887-00-6 7440-43-9 7440-43-9 7440-02-0 7440-66-6 7440-43-9 7440-38-2 7440-47-3 7440-02-0 CAS Number 16887-00-6 7440-70-2 7439-95-4 7440-23-5 7440-70-2 7440-23-5 7440-09-7 7440-38-2 7440-47-3 7440-50-8 7440-02-0 7440-66-6 7440-38-2 7440-47-3 7440-50-8 7439-92-1 7440-50-8 7439-92-1 7440-09-7 7439-95-4 7439-92-1 E50SsD: Caporde b (5 vlirece ABn p(ler 3QC Loc 886)6S17-io Bo∆Bued EG020A-F: Chromium EG020A-F: Chromium EG020A-T: Chromium EG020A-F: Chromium ED093F: Magnesium ED093F: Magnesium EG020A-F: Cadmium EG020A-F: Cadmium EG020A-F: Cadmium EG020A-T: Cadmium ED093F: Potassium EG020A-T: Arsenic ED093F: Potassium EG020A-F: Arsenic EG020A-F: Arsenic EG020A-T: Copper EG020A-F: Arsenic EG020A-F: Copper EG020A-F: Copper EG020A-F: Copper ED045G: Chloride ED045G: Chloride ED093F: Calcium ED093F: Calcium EG020A-F: Nickel EG020A-F: Nickel EG020A-F: Nickel ED093F: Sodium ED093F: Sodium EG020A-F: Lead EG020A-F: Lead EG020A-F: Zinc EG020A-F: Lead EG020A-F: Zinc EG020A-F: Zinc ED020F: 54 logyed Meanp b( ICP-MG 3QC Loc 8869) 447 ED020F: 5 1 logyed Meant b( ICP-MG 3QC Loc 8869) 417 E5018F: 541 opyed Mnjor CnooBl 3QC Loc 8869) 497 ED020T: ToanpMeanb b( ICP-MG 3QC Loc 886)) 897 Client sample ID Anonymous Anonymous Anonymous Anonymous UGM-M15S UGM-M8D BH-M18S BH-M21S Laboratory sample ID Sub-Matrix: WATER EM2018237-145 EM2018304-015 EM2018304-009 EM2018304-001 EM2018266-002 EM2018304-005 EM2018125-001 EM2018236-014



EMM CONSULTING PTY LTD

S190512

Client Project

EM2018304

Work Order

4 of 7

Recovery Limits (%) No Limit No Limit No Limit No Limit No Limit 0% - 20% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 74.4 0.00 0.00 0.00 0.00 0.00 0.00 Laboratory Duplicate (DUP) Report Duplicate Result <0.005 <0.0001 <0.001 <0.0001 <0.0001 <0.0001 <0.001 <0.001 <0.001 <0.001 <0.0001 0.003 <0.005 <0.001 <0.0001 <0.05 0.11 <0.05 3.04 <0.1 0.2 Original Result <0.0001 <0.0001 <0.0001 <0.005 <0.001 <0.001 <0.0001 <0.001 <0.0001 <0.001 <0.001 <0.001 <0.005 <0.0001 <0.001 <0.05 <0.05 <0.05 3.05 40° **~**0.1 mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L mg/L 0.0001 0.0001 0.005 0.001 0.001 0.0001 0.0001 0.0001 0.001 0.001 0.001 0.001 0.001 0.005 0.0001 0.05 0.05 0.02 LOR 0.1 0.1 7439-97-6 7439-97-6 7439-97-6 7439-97-6 7439-97-6 18496-25-8 7440-02-0 7440-38-2 7440-50-8 18496-25-8 CAS Number 7440-66-6 7440-43-9 7440-47-3 7439-92-1 7440-02-0 7440-66-6 | | 7439-92-1 EG051G: Ferrous Iron EG051G: Ferrous Iron EG051G: Ferrous Iron EG020A-T: Chromium EG051G: Ferrous Iron EK085: Sulfide as S2-EG020A-T: Cadmium EK085: Sulfide as S2-EG020A-T: Arsenic EG020A-T: Copper EG020A-T: Nickel EG020A-T: Nickel EG035F: Mercury EG035F: Mercury EG035F: Mercury EG035T: Mercury EG035T: Mercury EG020A-T: Lead EG020A-T: Zinc ED08sT: ToanpRei oyernbp Meri ur( b( FIMG 3QC Loc 8864S927 EG020A-T: Lead EG020A-T: Zinc ED020T: ToanpMeant b( ICP-MG 3QC Loc 886)) 897 - i oBorBued ED0s6D: Ferroul IroBb( 51/i rece ABngler 3QC Loc 886S9067 ED0s6D: Ferroul Iro Bb (5 Virece ABng/ler 30,C Loc 886S9027 ED08sF: 54 logyed Meri ur(b(FIMG 32C Loc 8869)4)7 ED08sF: 54 logyed Meri ur( b( FIMG 32C Loc 8869)) 07 G2- 3QC Loc 8864S9) 7 Client sample ID Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous UGM-M8D UGM-M8S BH-M17D BH-M19D BH-M20S **BH-M21S** RB1 EK09sM: Guptde nl Laboratory sample ID Sub-Matrix: WATER EM2018279-003 EM2018237-145 EM2018219-001 EM2018304-013 EM2018240-006 EM2018304-006 EM2018304-015 EM2018304-001 EM2018304-010 EM2018304-016 EM2018304-002 EM2018326-004 EM2018193-001



 Page
 : 5 of 7

 Work Order
 : EM2018304

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

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

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The quality control term Laboratory Control Spike (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.	ecision and accuracy	muchennenn on sai	ipic iliaala. Dilailia	Recovery Limits are based	on statistical evaluation of	processed LCS.		
Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LCS) Report	.CS) Report	
				Report	Spike	Spike Recovery (%)	Recovery	Recovery Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SO7	Low	High
EA2s0CA: Droll AphannBd teon Aiowyd 3QCLoc 88820147	47							
EA250: Gross alpha	-	0.05	Bq/L	<0.05	1751 Bq/L	100	95.2	105
EA250: Gross beta	1	0.1	Bq/L	<0.10	3342 Bq/L	98.2	94.4	105
EA250: Gross beta activity - 40K	-	0.1	Bq/L	<0.10	-		-	-
E508) P.: ApknpBv( b( PCTvanoor 3QCLoc 882066s7								
ED037-P: Total Alkalinity as CaCO3		-	mg/L	-	200 mg/L	97.1	88.0	112
E508) P. ApknpBv( b( PC Tvanor 3QCLoc 88206647								
ED037-P: Total Alkalinity as CaCO3	-	-	mg/L	1	200 mg/L	104	88.0	112
E5 0S6D: Gupine Turbidimeari 7nl GOS 2- b( 5 A 3QC Loc 886) 6S) 7	886) 6S) 7							
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	_	mg/L	^	25 mg/L	101	85.8	117
				₹	500 mg/L	103	80.0	120
E50SsD: Caporde b (5 virece ABngler 3QCLoc 886) 6S17	2							
ED045G: Chloride	16887-00-6	_	mg/L	^	10 mg/L	97.8	85.0	122
				^	1000 mg/L	106	85.0	122
E5018F: 54 logyed Mnjor Cnoo Bl 3QCLoc 8869) 497								
ED093F: Calcium	7440-70-2	1	mg/L	۲	5 mg/L	103	88.2	117
ED093F: Magnesium	7439-95-4	1	mg/L	۸	5 mg/L	93.5	85.6	114
ED093F: Sodium	7440-23-5	1	mg/L	^	50 mg/L	102	90.0	114
ED093F: Potassium	7440-09-7	1	mg/L	۸	50 mg/L	100	86.7	111
ED020F: 54 logyed Memp b( ICP-MG 3QCLoc 8869) 447								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	88.5	108
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	6.99	83.5	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.5	83.2	105
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	102	83.1	106
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	102	84.6	107
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	100	84.3	108
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	104	86.3	111
ED020F: 54 logyed Meanb b( ICP-MG 3QCLoc 8869) 417								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	97.4	88.5	108
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	103	83.5	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.2	83.2	105
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	94.5	83.1	106
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	100	84.6	107
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	93.8	84.3	108



 Page
 : 6 of 7

 Work Order
 : EM2018304

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

High 11 112 110 109 110 114 112 112 115 112 112 116 11 Recovery Limits (%) 86.4 86.9 86.9 88.3 81.9 86.3 87.9 86.7 71.1 72.6 89.2 75.8 75.8 TOW 71.1 Laboratory Control Spike (LCS) Report Spike Recovery (%) 9.96 98.2 99.2 87.9 SO7 102 83.2 82.4 96.0 94.2 104 102 103 106 100 Concentration 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.01 mg/L 0.01 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.01 mg/L 0.1 mg/L 2 mg/L 0.5 mg/L 0.1 mg/L 2 mg/L Method Blank (MB) Result <0.005 <0.0001 <0.005 <0.0001 <0.0001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.0001 <0.05 <0.05 Report ٥. م mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Chit mg/L mg/L 0.0001 0.0001 0.005 0.0001 0.001 0.001 0.001 0.005 0.0001 0.001 0.001 0.05 0.05 LOR 0.1 CAS Number 7439-97-6 7439-97-6 -18496-25-8 7440-66-6 7440-38-2 7440-43-9 7440-47-3 7440-50-8 7440-02-0 7440-66-6 7439-97-6 7439-92-1 ED020F: 5 1 l opyed Meanp b( ICP-MG 3QCLoc 8869) 417 - i oBaBued ED08sT: ToanpRei oyernbp Meri ur( b( FIMG 3QCLoc 8864S927 ED0s6D: Ferroul IroBb (5 Virece ABn¢ler 3QCLoc 886S9067 ED0s6D: Ferroul IroBb(5√lirece ABng(ler 3QCLoc 886S9027 ED08sF: 54 | opyed Meri ur( b( FIMG 32CLoc 8869) 4) 7 .D08sF: 5 v I opyed Meri ur( b( FIMG 32CLoc 8869)) 07 ED020T: ToanpMeanp b( ICP-MG 3QCLoc 886)) 897 EK09sM: Gulfide nl G2- 3QCLoc 8864S9) 7 EG051G: Ferrous Iron EG020A-T: Chromium EG051G: Ferrous Iron EK085: Sulfide as S2-EG020A-T: Cadmium Sub-Matrix: WATER EG020A-T: Arsenic EG020A-T: Copper Method: Compound EG020A-T: Nickel EG035F: Mercury G035T: Mercury EG020A-T: Lead G035F: Mercury EG020A-T: Zinc EG020A-F: Zinc

#### Matrix Spike (MS) Report

o parameter is to monitor potential matrix effects 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 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.

Matrix Spike (MS) Report

Sub-Matrix: WATER

				Spike	SpikeRecovery(%)	Recovery Limits (%)	nits (%)
Laboratory sample ID Client sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
E50S6D: Gupine 3T	E50S6D: Gupina Turbydymeani 7nl GOS 2- b( 5A 3QCLoc 886) 6S) 7						
EM2018304-002	UGM-M8S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.0	130
E50SsD: Caporde b	E50SsD: Caporde b(5Virece ABnp(ler 3QCLoc 886) 6S17						
EM2018304-002	UGM-M8S	ED045G: Chloride	16887-00-6	400 mg/L	# Not Determined	70.0	130
ED020F: 54 l oped	ED020F: 5 V I opyed Meany b( ICP-MG 3QCLoc 8869) 447						
EM2018125-001 Anonymous	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	95.4	85.0	131



: 7 of 7 : EM2018304 : EMM CONSULTING PTY LTD : S190512 Page Work Order

Client Project

Sub-Matrix: WATER			Ma	Matrix Spike (MS) Report		
			Spike	SpikeRecovery(%)	Recovery Limits (%)	mits (%)
Laboratory sample ID Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED020F: 51 logyed Meany b( ICP-MG 32CLoc 8869) 447 - i oBaBued						
EM2018125-001 Anonymous	EG020A-F: Cadmium	7440-43-9	0.05 mg/L	87.9	81.0	133
	EG020A-F: Chromium	7440-47-3	0.2 mg/L	86.6	71.0	135
	EG020A-F: Copper	7440-50-8	0.2 mg/L	104	76.0	130
	EG020A-F: Lead	7439-92-1	0.2 mg/L	88.9	75.0	133
	EG020A-F: Nickel	7440-02-0	0.2 mg/L	98.1	73.0	131
	EG020A-F: Zinc	7440-66-6	0.2 mg/L	103	75.0	131
ED020F: 5 vlopyed Memp b(ICP-MG 3QCLoc 8869) 417						
EM2018304-006 BH-M17D	EG020A-F: Arsenic	7440-38-2	0.4 mg/L	104	85.0	131
	EG020A-F: Cadmium	7440-43-9	0.1 mg/L	86.3	81.0	133
	EG020A-F: Chromium	7440-47-3	0.4 mg/L	94.2	71.0	135
	EG020A-F: Copper	7440-50-8	0.4 mg/L	92.6	76.0	130
	EG020A-F: Lead	7439-92-1	0.4 mg/L	88.5	75.0	133
	EG020A-F: Nickel	7440-02-0	0.4 mg/L	94.4	73.0	131
	EG020A-F: Zinc	7440-66-6	0.4 mg/L	94.4	75.0	131
ED020T: ToanpMeany b( ICP-MG 3QCLoc 886)) 897						
EM2018237-145 Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	8.66	82.0	118
	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	97.5	75.0	129
	EG020A-T: Chromium	7440-47-3	1 mg/L	101	80.0	118
	EG020A-T: Copper	7440-50-8	1 mg/L	96.1	81.0	115
	EG020A-T: Lead	7439-92-1	1 mg/L	93.7	83.0	121
	EG020A-T: Nickel	7440-02-0	1 mg/L	100	80.0	118
	EG020A-T: Zinc	7440-66-6	1 mg/L	0.66	74.0	116
ED08sF: 5 V I opyed Meri ur( b( FIMG 3QCLoc 8869) 4) 7						
EM2018219-002 Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	91.9	70.0	120
ED08sF: 54 l opyed Meri ur( b( FIMG 3QCLoc 8869))07						
EM2018304-014 BH-M21D	EG035F: Mercury	7439-97-6	0.01 mg/L	# 66.5	70.0	120
ED08sT: ToanpRei oyernbp Meri ur( b( FIMG 3QCLoc 8864S927						
EM2018304-002 UGM-M8S	EG035T: Mercury	7439-97-6	0.01 mg/L	# 65.1	70.0	130
ED0s6D: Ferroul IroBb(5Virece ABnitler 3QCLoc 886S9067						
EM2018193-003 Anonymous	EG051G: Ferrous Iron	-	2 mg/L	91.9	70.0	130
ED0s6D: Ferroul IroBb( 5 Virece AΒηή ler 3QCLoc 886S9027						
EM2018304-007 BH-M17S	EG051G: Ferrous Iron		2 mg/L	0.06	70.0	130
EK09sM: Gulpde nl G2- 3QCLoc 8864S9) 7						
EM2018304-002 UGM-M8S	EK085: Sulfide as S2-	18496-25-8	0.33 mg/L	# 14.8	70.0	130



# QA/QC Compliance Assessment to assist with Quality Review

: 1 of 19	: Environmental Division Melbourne	: 16-Oct-2929	: 94-Nov-2929	: 10	: 10
Page	Laboratory	Date Samples Received	Issue Date	NoHof samples received	NoHof samples analysed
: EM206980N	EMM COSULTI &P YI D TI 9	: S109512 : S109512	1	: BBK/ B	
Work Order	Client	Project	Site	Sampler	Order number

reportinb hibhlibhts any non, con. ormancesx. a cilitates . aster and more accurate data validation and is desibned to assist internal eBpert and eBternal Auditor review. Many components o. this I his report is automatically benerated fy the ATU To I throubh interpretation o. the ATU Quality Control Report and several Quality Assurance parameters measured fy ATU-I his automated report contrif ute to the overall gQO assessment and reportinb .or buideline compliance-

Brief method summaries and references are also provided to assist in traceabilityH

#### Summary of Outliers

#### Outliers: Quality Control Samples

This report highlights outliers flagged in the . uality Control Q C( ReportH

- SO Method Flank value outliers occur-
- SO guplicate outliers occur-
- SO Taf oratory Control outliers occur-
- MatriBUpike outliers eBist, please see .ollowinb pabes .or .ull details-
- Hor all rebular sample matricesxSO surrobate recovery outliers occur-

### Outliers: Analysis Holding Time Compliance

SO Analysis qoldinb I ime Outliers eBist-

### **Outliers: Frequency of Quality Control Samples**

Quality Control Uample Hre( uency Outliers eBist, please see .ollowinb pabes .or .ull details-



EMM CONSULTING PTK LTD : 2 of 19 : EM2918394 S109512 ) orWOrder Client

Outliers: Quality Control Samples

Project

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

#### MatriY: WAI ER

Compound Group Name	Laboratory Sample ID   Client Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits Comment	Comment
MatriBUpike )MU4Recoveries							
ED941G: Sulfate Qurbidimetric( as SO4 2- by DA	EM2918394992	UGM-M8S	Uul.ate as UON,	14898-x0-8	Not	1	MU recovery not determinedx
			l urf idimetric		Determined		f ackbround level breater than or e( ual to NBs pike level-
ED945G: Chloride by Discrete Analyser	EM2918394992	UGM-M8S	Chloride	1688x-99-6	Not	1	MU recovery not determinedx
					Determined		f ackbround level breater than or
							e( ual to NBspike level-
EG935&: Dissolved Mercury by &IMS	EM2918394914	B7-M21D	Mercury	x430-0x-6	% ⊈199	x9 <del>Ⅰ</del> 9-129%	Recovery less than lower data ( uality
							of jective
EG935T: Total Recoverable Mercury by &IMS	EM2918394992	UGM-M8S	Mercury	x430-0x-6	65H %	x9 <del>Ⅰ</del> 9-139%	Recovery less than lower data ( uality
							of jective
E/ 985M: Sulfide as S2-	EM2918394992	UGM-M8S	Uul.ide as U2,	18406-25-8	14H8 %	x9 <del>Ⅰ</del> 9-139%	Recovery less than lower data ( uality
							of jective

### **Outliers: Frequency of Quality Control Samples**

#### MatriY: WAI ER

. uality Control Sample Type	S	Count	Rate 0%	<b>%</b> (	. uality Control Specification
Method	O .	Regular	Actual	EYpected	
Laboratory Duplicates @UP(					
Dissolved Metals by ICP-MS - Suite A	3	34	8H82	191499	NEPM 2913 B3 V ALS. C Standard

### Analysis Holding Time Compliance

If samples are identified belo, as having been analysed or eYtracted outside of recommended holding timeskithis should be talken into consideration, hen interpreting resultsH

846K AP7 AK AS and NEPM( based on the sample container This report summari=es eYtraction q preparation and analysis times and compares each , ith ALS recommended holding times @eferencing USEPA S) provided H Dates reported represent first date of e Ytraction or analysis and preclude subsezuent dilutions and reruns HA listing of breaches Qf any (is provided herein H

organics 7 olding time for leachate methods @hgHTCLP( vary according to the analytes reportedH Assessment compares the leach date, ith the shortest analyte holding time for the ezuivalent soil methodH These are: 14 daysKmercury 28 days V other metals 189 daysHA recorded breach does not guarantee a breach for all non-volatile parametersH 7 olding times for Voc in soils vary according to analytes of interestH ; inyl Chloride and Styrene holding time is x daysw others 14 daysH A recorded breach does not guarantee a breach for all ; OC analytes and should be verified in case the reported breach is a false positive or; inyl Chloride and Styrene are not Vey analytes of interestroncernH

#### MatriY: WAI ER

MatriY: WAI ER				Evaluation: *	× F 7 olding time	oreach w✓ F)ithir	holding timel
Method	Sample Date	Extractio	tion / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted D	ue for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



: 3 of 19 : EM2918394 : EMM CONSULTING PTK LTD : \$109512 Page ) orWorder Client Project

MatriY: WAI ER					Evaluation	: * F 7 olding time	Evaluation: * F 7 olding time breach w F )ithin holding timeh	holding timeh
Method		Sample Date	Ex	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA250: Pross Alpha and Feta Activity								
Clear Ylastic F ottle,Satural )EA2504 UGM-M8S		62,Oct, 2020	6666	-	-	29, Oct, 2020	19-Apr-2921	>
Clear Ylastic Fottle , Satural )EA2504 UGM-M8DK	B7-M1xDK	68,Oct,2020	1666	1		29, Oct, 2020	11-Apr-2921	>
B7-M1xSK B7-M18S	B7-M18DK							
Clear Ylastic Fottle, Satural )EA2504								
UGM-M12DK	UGM-M12SK	6N,Oct, 2020	1111		-	29, Oct, 2020	12-Apr-2921	>
UGM-M15SK	B7-M10DK							
B7-M10SK B7-M200K	B7-W29UK B7 W31DK							
B7-M21S								
EA250CA: Pross Alpha and Feta Activity								
Clear Ylastic Fottle , Satural )EA2504								
UGM-M8S		62, Oct, 2020	3333			29, Oct, 2020	19-Apr-2921	>
Clear Ylastic Fottle, Satural )EA2504								
UGM-M8DK	B7-M1xDK	68,Oct, 2020	2333		-	29, Oct, 2020	11-Apr-2921	>
B7-M1xSK	B7-M18DK							
B7-M18S								
Clear Ylastic Fottle , Satural )EA2504		0000					0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	`
UGM-M12DK	UGM-M12SK	en, Oct, 2020	1111	!	!	29, OCT, 2020	12-Apr-2921	>
UGM-M15SK	B7-M10DK							
B7-M10SK	B7-M29DK							
B7-M21S								
Eg08; Y: Alkalinity f y YC I itrator								
Clear Ylastic Fottle, Satural )Eg08;, Y4		62 0c4 2020				26 Oct 2020	26-Oct-2029	•
Clear Visctic Fottle Satural ) Fo 08: V4		01,000,100	2000			20,000,00		>
UGM-M8DK	B7-M1xDK	68, Oct, 2020	6666	-	1	26, Oct, 2020	2x-Oct-2929	>
B7-M1xSK	B7-M18DK							,
B7-M18S								
Clear Ylastic Fottle, Satural )Eg08;, Y4		0000				0000 100 00	0000	•
	UGINI-MI IZOK	614, OCL, 2020	1111			26, OCI, 2020	20-001-2323	>
OGIVI-IN1 1995	NOOLW- 70							
B7-M29SK	B7-M21DK							
B7-M21S								



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4 of 19

Evaluation: \* F 7 olding time breach w< F ) ithin holding time! Evaluation > > > > > > > > > Due for analysis 90-Nov-2929 90-Nov-2929 19-Nov-2929 11-Nov-2929 19-Nov-2929 11-Nov-2929 90-Nov-2929 19-Nov-2929 11-Nov-2929 22, Oct, 2020 22, Oct, 2020 Date analysed 20, Oct, 2020 20, Oct, 2020 20, Oct, 2020 20, Oct, 2020 20, Oct, 2020 20, Oct, 2020 22, Oct, 2020 Evaluation - Extraction / Preparation Due for extraction Date extracted ... ... ... 1111 1111 ... 1111 1111 1111 62, Oct, 2020 62, Oct, 2020 6N, Oct, 2020 68, Oct, 2020 6N,Oct, 2020 68, Oct, 2020 6N, Oct, 2020 62, Oct, 2020 68,Oct, 2020 Sample Date UGM-M12SK UGM-M12SK UGM-M12SK B7-M1xDK B7-M18DK B7 -M1xDK B7 -M18DK B7-M10DK B7-M10DK B7-M10DK B7-M29DK B7-M29DK B7-M29DK B7-M18DK B7 -M21DK B7-M21DK B7-M21DK B7-M1xDK Clear Ylastic Fottle , Sitric Acid3Hiltered )Eg018H4 UGM-M8S Clear Ylastic Fottle , Sitric Acid3Hiltered )Eg018H4 UGM-M8DK Clear Ylastic Fottle, Sitric Acid3Hiltered )Eg018H4 Eg0N6P: Uul.ate )I urf idimetric4as UON2, f y gA Eg0N5P: Chloride f y giscrete Analyser Clear Ylastic Fottle, Satural ) Eg 0N5P4 Clear Ylastic Fottle, Satural )Eg0N6P4 Clear Ylastic Fottle, Satural ) Eg 0 N6P4 Clear Ylastic Fottle , Satural )Eg0N5P4 UGM-M8DK Clear Ylastic Fottle, Satural ) Eg 0N5P4 Clear Ylastic Fottle, Satural) Eg 0N6P4 Eg018H: gissolved Major Cations Container / Client Sample ID(s) **UGM-M12DK UGM-M15SK UGM-M12DK UGM-M15SK UGM-M12DK** UGM-M15SK MatriY: WAI ER B7-M10SK B7-M29SK B7 -M10SK B7 -M29SK B7 -M21S **UGM-M8DK** B7-M1xSK B7-M1xSK B7-M1xSK B7-M10SK B7-M29SK UGM-M8S UGM-M8S B7-M18S B7-M18S B7-M18S B7-M21S B7-M21S Method



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Client Project

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5 of 19

Evaluation: × F 7 olding time breach w✓ F ) ithin holding time I Evaluation > > > > > > > > > > > > Due for analysis 90-Nov-2929 11-Nov-2929 90-Nov-2929 19-Nov-2929 19-Apr-2921 11-Nov-2929 19-Apr-2921 11-Apr-2921 11-Apr-2921 19-Nov-2929 12-Apr-2921 12-Apr-2921 Date analysed 20, Oct, 2020 20, Oct, 2020 20, Oct, 2020 20, Oct, 2020 20, Oct, 2020 20, Oct, 2020 61, Oct, 2020 61, Oct, 2020 61, Oct, 2020 20, Oct, 2020 20, Oct, 2020 20, Oct, 2020 Evaluation > > Due for extraction Extraction / Preparation 19-Apr-2921 11-Apr-2921 12-Apr-2921 - Date extracted 20, Oct, 2020 20, Oct, 2020 20, Oct, 2020 1111 1111 : 1111 ,,,, 1111 1111 1111 1111 62, Oct, 2020 68, Oct, 2020 62, Oct, 2020 62, Oct, 2020 68, Oct, 2020 6N, Oct, 2020 6N,Oct, 2020 68, Oct, 2020 62, Oct, 2020 6N, Oct, 2020 Sample Date 68, Oct, 2020 6N,Oct, 2020 UGM-M12SK UGM-M12SK B7-M10DK B7-M29DK B7-M10DK B7-M29DK B7-M1xDK B7-M18DK B7-M21DK B7-M1xDK B7-M18DK B7-M21DK RB2K RB2K TB2 TB2 Clear Ylastic Fottle, Sitric Acid3Ln.iltered )EP 020A,I 4 Clear Ylastic Fottle, Sitric Acid3Ln.iltered )EP 020A,I 4 Clear Ylastic Fottle,Sitric Acid3Ln.iltered )EP 020A,I 4 UGM-M15SK Clear Ylastic Fottle, Sitric Acid3Ln.iltered )EP 0851 4 Clear Ylastic Fottle, Sitric Acid3Hiltered )EP020A, H4 Clear Ylastic Fottle, Sitric Acid3Hiltered)EP020A,H4 Clear Ylastic Fottle, Sitric Acid3Ln.iltered )EP 0851 4 Clear Ylastic Fottle , Sitric Acid3Ln.iltered )EP 085I 4 UGM-M15SK Clear Ylastic Fottle, Sitric Acid3Hiltered )EP020A, H4 Clear Ylastic Fottle, Sitric Acid3Hiltered )EP085H4 Clear Ylastic Fottle, Sitric Acid3Hiltered )EP085H4 Clear Ylastic Fottle , Sitric Acid3Hiltered )EP085H4 EP 0851: I otal Recoverafle Mercury f y HGMU EP 020H: gissolved Metals f y CFY, MU EP 085H: gissolved Mercury f y HGNU EP 0201: I otal Metals f y CY, MU Container / Client Sample ID(s) **UGM-M12DK UGM-M15SK UGM-M12DK** UGM-M15SK MatriY: WAI ER **UGM-M8DK** B7-M10SK B7-M29SK **UGM-M8DK** B7-M1xSK B7-M1xSK B7-M29SK B7-M10SK UGM-M8S **UGM-M8S** B7-M21S **UGM-M8S** UGM-M8S B7-M18S B7-M21S B7-M18S TB1K TB1K RB1 Method



: 6 of 19 : EM2918394 : EMM CONSULTING PTK LTD : \$109512 Page ) orWOrder

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MatriY: WAI ER					Evaluation	× F 7 olding time	Evaluation: * F 7 olding time breach w F)ithin holding timeh	holding timeh
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP 056P : Herrous Gon f y giscrete Analyser								
Clear Ylastic F ottle,q CI,Hiltered )EP 056P4 UGM-M8S		62, Oct, 2020	****	-	-	61, Oct, 2020	10-Oct-2929	>
Clear Ylastic F ottle , q Cl , Hiltered )EP 056P4 UGM-M8DK B7-M1xSK B7-M18S	B7-M1xDK B7-M18DK	68, Oct, 2020	111		-	61, Oct, 2020	29-Oct-2929	>
Clear Ylastic F ottle, q CI, Hiltered )EP 056P4 UGM-M12DK UGM-M15SK B7-M10SK B7-M29SK B7-M21S	UGM-M12SK B7-M10DK B7-M29DK B7-M21DK	6N,Oct, 2020	1	-		61, Oct, 2020	21-0ct-2929	>
E7 095M: Uul.ide as U2,								
Clear Ylastic Fottle,Kinc Acetate/SaOq )E7 0954 UGM-M8S		62, Oct, 2020	*****	-	-	61, Oct, 2020	10-Oct-2929	>
Clear Ylastic F ottle , Kinc Acetate/SaOq )E7 0954 UGM-M8DK B7-M1xSK B7-M18S	B7-M1xDK B7-M18DK	68,Oct, 2020	1111			61, Oct, 2020	29-Oct-2929	>
Clear Ylastic F ottle , Mnc Acetate/SaOq )E7 0954 UGM-M12DK UGM-M15SK B7 -M10SK B7 -M29SK B7 -M21S	UGM-M12SK B7 -M10DK B7 -M29DK B7 -M21DK	6N,Oct, 2020	1111		-	61, Oct, 2020	21-Oct-2929	>



: x of 19 : EM2918394 : EMM CONSULTING PTK LTD : \$109512 Page ) orWOrder Project Client

Quality Control Parameter Frequency Compliance

The follo, ing report summarises the frezuency of laboratory . C samples analysed , ithin the analytical lot®( in , hich the submitted sample®( , asQ ere( processedFActual rate should be greater than or ezual to the eYpected rateHA listing of breaches is provided in the Summary of OutliersH

			10110		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates @UP(							
Alvalinity by PC Titrator	ED93x-P	က	28	9 :- 09	00-09	>	NEPM 2913 B3 V ALS . C Standard
Chloride by Discrete Analyser	ED945G	2	29	00-09	00-09	>	NEPM 2913 B3 V ALS . C Standard
Dissolved Mercury by &IMS	EG935&	က	24	62-50	00-09	>	NEPM 2913 B3 V ALS . C Standard
Dissolved Metals by ICP-MS - Suite A	EG929A-&	က	34	9-92	00-09	×	NEPM 2913 B3 V ALS . C Standard
&errous Iron by Discrete Analyser	EG951G	4	39	68-88	00-09	>	NEPM 2913 B3 V ALS . C Standard
Gross Alpha and Beta Activity	EA259	2	×,	2 '-99	00-09	>	NEPM 2913 B3 V ALS . C Standard
Major Cations - Dissolved	ED903&	2	29	00-09	00-09	>	NEPM 2913 B3 V ALS . C Standard
Sulfate Gurbidimetric( as SO4 2- by Discrete Analyser	ED941G	2	29	00-09	00-09	>	NEPM 2913 B3 V ALS . C Standard
Sulfide as S2-	E/ 985	2	15	68-88	00-09	>	NEPM 2913 B3 V ALS . C Standard
Total Mercury by &IMS	EG935T	2	12	6Z-Z;	00-09	>	NEPM 2913 B3 V ALS . C Standard
Total Metals by ICP-MS - Suite A	EG929A-T	2	10	60-58	00-09	>	NEPM 2913 B3 V ALS. C Standard
Laboratory Control Samples Q.CS(							
AlValinity by PC Titrator	ED93x-P	2	28	. · •	2-00	>	NEPM 2913 B3 V ALS . C Standard
Chloride by Discrete Analyser	ED945G	2	29	00-09	00-09	>	NEPM 2913 B3 V ALS . C Standard
Dissolved Mercury by &IMS	EG935&	2	24	88-6	2-00	>	NEPM 2913 B3 V ALS . C Standard
Dissolved Metals by ICP-MS - Suite A	EG929A-&	2	34	2-99	2-00	>	NEPM 2913 B3 V ALS . C Standard
&errous Iron by Discrete Analyser	EG951G	2	39	Z-Z;	2-00	>	NEPM 2913 B3 V ALS . C Standard
Gross Alpha and Beta Activity	EA259	2	×,	2 :-99	00-09	>	NEPM 2913 B3 V ALS . C Standard
Major Cations - Dissolved	ED903&	_	29	2-00	2-00	>	NEPM 2913 B3 V ALS . C Standard
Sulfate Gurbidimetric( as SO4 2- by Discrete Analyser	ED941G	2	29	00-09	00-09	>	NEPM 2913 B3 V ALS . C Standard
Sulfide as S2-	E/ 985	_	15	Z-Z;	2-00	>	NEPM 2913 B3 V ALS . C Standard
Total Mercury by &IMS	EG935T	-	12	88-6	2-00	>	NEPM 2913 B3 V ALS . C Standard
Total Metals by ICP-MS - Suite A	EG929A-T	-	10	5-2Z	2-00	>	NEPM 2913 B3 V ALS . C Standard
Method Blanvs QMB(							
Chloride by Discrete Analyser	ED945G	_	29	2-00	2-00	>	NEPM 2913 B3 V ALS . C Standard
Dissolved Mercury by &IMS	EG935&	2	24	88-6	2-00	>	NEPM 2913 B3 V ALS . C Standard
Dissolved Metals by ICP-MS - Suite A	EG929A-&	2	34	2-99	2-00	>	NEPM 2913 B3 V ALS . C Standard
&errous Iron by Discrete Analyser	EG951G	2	39	Z-Z;	2-00	>	NEPM 2913 B3 V ALS . C Standard
Gross Alpha and Beta Activity	EA259	-	×	2-99	2-00	>	NEPM 2913 B3 V ALS . C Standard
Major Cations - Dissolved	ED903&	_	29	2-00	2-00	>	NEPM 2913 B3 V ALS . C Standard
Sulfate Qurbidimetric( as SO4 2- by Discrete Analyser	ED941G	_	29	2-00	2-00	>	NEPM 2913 B3 V ALS . C Standard
Sulfide as S2-	E/ 985	_	15	Z-Z;	2-00	>	NEPM 2913 B3 V ALS . C Standard
Total Mercury by &IMS	EG935T	_	12	88-6	2-00	>	NEPM 2913 B3 V ALS . C Standard
Total Metals by ICP-MS - Suite A	EG929A-T	_	10	5-2Z	2-00	>	NEPM 2913 B3 V ALS. C Standard
Matriy Spives QMS(							
Chloride by Discrete Analyser	ED945G	-	29	2-00	2-00	>	NEPM 2913 B3 V ALS . C Standard



: 8 of 19 : EM2918394 : EMM CONSULTING PTK LTD : S109512 Page ) orWorder Client

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MatriY: WAI ER				Evaluation	ו: × F . uality Co	ntrol frezuency n	Evaluation: × F . uality Control frezuency not , ithin specification w✓ F . uality Control frezuency , ithin specification F
. uality Control Sample Type		CO	Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
MatriY SpiWes QAS( - Continued							
Dissolved Mercury by &IMS	EG935&	2	24	88-6	2-00	>	NEPM 2913 B3 V ALS. C Standard
Dissolved Metals by ICP-MS - Suite A	EG929A-&	2	34	5-99	2-00	>	NEPM 2913 B3 V ALS. C Standard
&errous Iron by Discrete Analyser	EG951G	2	39	Z-Z;	2-00	>	NEPM 2913 B3 V ALS. C Standard
Sulfate Qurbidimetric( as SO4 2- by Discrete Analyser	ED941G	_	29	2-00	2-00	>	NEPM 2913 B3 V ALS. C Standard
Sulfide as S2-	E/ 985	_	15	Z-Z;	2-00	>	NEPM 2913 B3 V ALS. C Standard
Total Mercury by &IMS	EG935T	-	12	88-6	2-00	>	NEPM 2913 B3 V ALS. C Standard
Total Metals by ICP-MS - Suite A	EG929A-T	1	10	5-2Z	2-00	<b>\</b>	NEPM 2913 B3 V ALS. C Standard



 Page
 : 0 of 19

 ) orWOrder
 : EM2918394

 Client
 : EMM CONSULTING PTK LTD

 Project
 : \$109512

**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 EPAKAP7 AKAS and NEPMHn house developed procedures are employed in the absence of documented standards or by client rezuestHThe follo, ing report provides brief descriptions of the analytical procedures employed for results reported in the

Certificate of AnalysishSources from , hich ALS methods have been developed are provided , ithin the Method DescriptionsH

Analytical Methods	Method	Matrix	Method Descriptions
Gross Alpha and Beta Activity	EA259	) ATER	ASTM Dx283-96: Determination of gross alpha and gross beta radioactivity in,ater samples by Lizuid Scintillation Counting QSC(H
Alvalinity by PC Titrator	ED93x-P	) ATER	In house: Referenced to AP7A 2329 B This procedure determines all/wilnity by automated measurement @lgHPC Titrate( on a settled supernatant alizuot of the sample using p7 415 for indicating the total all/wilnity end-pointH This method is compliant, ith NEPM Schedule B©(
Sulfate Œurbidimetric( as SO4 2- by Discrete Analyser	ED941G	) ATER	In house: Referenced to AP7 A 4599-SO4H Dissolved sulfate is determined in a 9l45um filtered sampleH Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium, ith barium chloride Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading, ith a standard curveHThis method is compliant, ith NEPM Schedule BQ(
Chloride by Discrete Analyser	ED945G	) ATER	In house: Referenced to AP7A 4599 CI - GHhe thiocyanate ion is liberated from mercuric thiocyanate through sezuestration of mercury by the chloride ion to form non-ionised mercuric chloridelih the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate, hich is measured at 489 nm AP7 A seal method 2 91x-1-L
Major Cations - Dissolved	ED903&	) ATER	In house: Referenced to AP7A 3129 and 3125wUSEPA S) 846 - 6919 and 6929wCations are determined by either ICP-AES or ICP-MS technizuesHThis method is compliant, ith NEPM Schedule BQ(Sodium Adsorption Ratio is calculated from CaMyg and Na, hich determined by ALS in house method.) I-ENĘD903&HThis method is compliant, ith NEPM Schedule BQ(7 ardness parameters are calculated based on AP7 A 2349 BH This method is compliant, ith NEPM Schedule BQ(
Dissolved Metals by ICP-MS - Suite A	EG929A-&	) ATER	In house: Referenced to AP7 A 3125wUSEPA S) 846 - 6929KALS. ) I-ENŒG929H Samples are 9l45µm filtered prior to analysisH The ICPMS technizue utili=es a highly efficient argon plasma to ioni=e selected elementsHons are then passed into a high vacuum mass spectrometerk, hich separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detectorH
Total Metals by ICP-MS - Suite A	EG929A-T	) ATER	In house: Referenced to AP7A 3125wUSEPA S) 846 - 6929KALS. ) I-ENŒG929HThe ICPMS technizue utili=es a highly efficient argon plasma to ioni=e selected elementsHlons are then passed into a high vacuum mass spectrometerK, hich separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detectorH
Dissolved Mercury by &IMS	EG935&	) ATER	In house: Referenced to AS 3559KAP7 A 3112 7 g - B & lo, -injection & nCI2(&old apour generation( AAS( Samples are 9145µm filtered prior to analysisH & lM-AAS is an automated flameless atomic absorption technizueH A bromatedpromide reagent is used to o'Ydise any organic mercury compounds in the filtered sampleH The ionic mercury is reduced online to atomic mercury vapour by SnCl2, hich is then purged into a heated zuart= cellH. uantification is by comparing absorbance against a calibration curveH This method is compliant, ith NEPM Schedule BQ(H
Total Mercury by &IMS	EG935T	) ATER	In house: Referenced to AS 3559K AP7 A 3112 7g - B Qlo, -injection \text{GnCl2}(\text{Qold}; apour generation( AAS(\text{AAS})) and automated flameless atomic absorption technizueHA bromate\text{dromate} reagent is used to oYidise any organic mercury compounds in the unfiltered sampleH The ionic mercury is reduced online to atomic mercury vapour by SnCl2, hich is then purged into a heated zuart= cellH. uantification is by comparing absorbance against a calibration curveHThis method is compliant, ith NEPM Schedule B\text{G}(H)



 Page
 : 19 of 19

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 : EM2918394

 Client
 : EMM CONSULTING PTK LTD

 Project
 : \$109512

Analytical Methods	Method	Matrix	Method Descriptions
&errous Iron by Discrete Analyser	EG951G	) ATER	In house: Referenced to AP7A 3599 &e-BHA colorimetric determination based on the reaction bet, een phenanthroline and ferrous iron at p7 312-313 to form an orange-red compleY that is measured against a five-point calibration curveHThis method is compliant, ith NEPM Schedule BQ(H
Sulfide as S2-	E/ 985	) ATER	In house: Referenced to AP7A 4599-S2- DH Sulfide species present in , ater samples are immediately precipitated , hen collected in pretreated causticqinc acetate preserved sample containersH The sulphides are coloured using methylene blue indicatorH Non-detects may be screened by comparison against a standard at half-LORKother, ise samples are measured using U; -; IS detection at 664nmHThis method is compliant , ith NEPM Schedule B <b>3</b> (
lonic Balance by PCT DA and Turbi SO4 DA	* EN955 - PG	) ATER	In house: Referenced to AP7A 1939&HThis method is compliant , ith NEPM Schedule B <b>Q</b> (
Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	) ATER	In house: Referenced to USEPAS) 846-3995HMethod 3995 is a Nitricq ydrochloric acid digestion procedure used to prepare surface and ground, ater samples for analysis by ICPAES or ICPMSHThis method is compliant, ith NEPM Schedule BG(

Connote / Courier: Relinquished By / Date: Organiscd By / Date: Subcon Forward Lab

Attached By PO / Internal Sheet:

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Telephone: ~ 61-2-9784 8555

Environmental Division Sydney Work Order Reference BS2036844

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### CERTIFICATE OF ANALYSIS

**Environmental Division Sydney** : 1 of 11 Laboratory E4 4 CONSULTING PTY LTD ESM201833 **Work Order** Contact

277-289 Woodpark Road Smithfield NSW Australia 2164 Sepan Mahamad Contact Address Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065 PAUL GIBBONS

20-Oct-2020 19:15 +61 2 8784 8555 21-Oct-2020 Date Analysis Commenced Date Samples Received Issue Date Telephone S190512 Balranald T3 Ancillary

C-O-C number

Sampler

Order number

Telephone

Project

Address

Client

Quote number

06-Nov-2020 09:38 BILL BULL, KAITLYN BRODIE EN/112/20 No. of samples analysed No. of samples received

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. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

General Comments

Analytical Results

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

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 Ankit Inchi	Position Ingrapio Chamiet	Accreditation Category  Cudant Ingention Category
	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Seline Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
itus Vimalasiri	Metals Teamleader	Radionuclides, Fyshwick, ACT



General Comments

In house developed procedures 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. 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

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

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

Key:

This result is computed from individual analyte detections at or above the level of reporting

 $\emptyset$  = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

EG020/ED093: LOR's have been raised due to matrix interference. (High Total Dissolved Solids)

EG035: Poor matrix spike recovery was obtained for Mercury on sample ES2036844 # 4. Confirmed by re-analysis.

LOR for Gross Alpha and Gross Beta raised due to high solid content.

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.



: 3 of 11 : ES2036844 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary Analytical Results

Project Client

Page Work Order

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Sub-Matrix: WATER (Matrix: WATER)		Clier	Client sample ID	UG4 -4 5D	UG4 -4 5S	UG4 -4 MD	UG4 -4 MS	UG4 -4 3D
	Clie	ent samplin	Client sampling date / time	15-Oct-2020 14:10	15-Oct-2020 14:20	17-Oct-2020 11:30	17-Oct-2020 12:00	15-Oct-2020 15:30
Compound	CAS Number	LOR	Unit	ESM201833-225	ESM201833-22M	ESM201833-220	ESM201833-223	ESM201833-22B
				Result	Result	Result	Result	Result
ED207P: Alkalinity by PC Titrator								
6 ydroHde Alkalinity as CaCO0	DMO-210-001	-	mg/L	7	۲>			₹
Carbonate Alkalinity as CaCO0	3812-32-6	-	mg/L	7	\ <u>\</u>	\		₹
x icarbonate Alkalinity as CaCO0	71-52-3	-	mg/L	01B	060	660	IMB2	327
Total Alkalinity as CaCO0		-	mg/L	01B	060	660	M8.2	327
ED235G: Sulfate (Turbidimetric) as SO3 M by DA	y DA							
Sulfate as SO3 - Turbidimetric	14808-79-8	-	mg/L	0182	33M2	0732	3052	0722
ED23BG: Chloride by Discrete Analyser								
Chloride	16887-00-6	_	mg/L	51222	MB122	57222	59322	51722
ED290F: Dissolved 4 ajor Cations								
Calcium	7440-70-2	1	mg/L	B7M	200	B92	7.1/19	B70
4 agnesium	7439-95-4	-	mg/L	5332	5182	5392	51 M2	5382
Sodium	7440-23-5	-	mg/L	52922	53NE2	55322	5MB22	55NZ2
Potassium	7440-09-7	-	mg/L	0B	WB	20	05	20
EG2MPF: Dissolved 4 etals by ICP-4 S								
Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Copper	7440-50-8	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Nickel	7440-02-0	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Zinc	7440-66-6	0.005	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
EG2M2T: Total 4 etals by ICP-4 S								
Arsenic	7440-38-2	0.001	mg/L		<0.010		<0.010	-
Cadmium	7440-43-9	0.0001	mg/L		<0.0010		<0.0010	1
Chromium	7440-47-3	0.001	mg/L		<0.010		<0.010	:
Copper	7440-50-8	0.001	mg/L		<0.010		<0.010	-
Nickel	7440-02-0	0.001	mg/L		<0.010		<0.010	
Lead	7439-92-1	0.001	mg/L		<0.010		<0.010	:
Zinc	7440-66-6	0.005	mg/L		<0.052		<0.052	1
EG20BF: Dissolved 4 ercury by FI4 S								
4 ercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG20BT: Total Recoverable 4 ercury by F14 S	S							
4 ercury	7439-97-6	0.0001	mg/L		<0.0001		<0.0001	1
EG2B5G: Ferrous Iron by Discrete Analyser								



Client Project

EMM CONSULTING PTY LTD S190512 Balranald T3 Ancillary

: 4 of 11 : ES2036844

Page Work Order

15-Oct-2020 15:30 ESN201833-22B UG4 -4 3D Result <0.1 1.88 108 8 17-Oct-2020 12:00 ESN201833-223 UG4 -4 MB Result <0.05 <0.1 13M 752 3.98 17-Oct-2020 11:30 ESM201833-220 **UG4 -4 MD** Result MBB 81B 139 1.88 2.5 15-Oct-2020 14:20 ESN201833-22M UG4 -4 5S Result 2.58 ۸ 1.0 8MM 795 5.93 15-Oct-2020 14:10 ESM201833-225 UG4 -4 5D Result 5.19 **6**0.1 1MM 7.Bd Client sample ID Client sampling date / time med/L med/L mg/L mg/L Unit % LOR 0.05 0.01 0.01 0.01 0.1 18496-25-8 CAS Number EG2B5G: Ferrous Iron by Discrete Analyser - Continued EK28B4 : Sulfide as SM EN2BB: lonic x alance Ø Total Anions Sub-Matrix: WATER (Matrix: WATER) Sulfide as SM Ø Total Cations Ø lonic x alance Ferrous Iron Compound



Project : S190512 Balranald T3 Ancillary

: 5 of 11 : ES2036844 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

Page Work Order

Client

			L					
Sub-Matrix: WATER (Matrix: WATER)		Clie	Client sample ID	x 6 -4 51D	x 6-4 51S	x 6 -4 IMD	x 6-4 MVS	x 6 -4 MDD
	Ċ	ent samplir	Client sampling date / time	19-Oct-2020 11:45	19-Oct-2020 12:30	16-Oct-2020 12:00	16-Oct-2020 11:15	16-Oct-2020 09:50
Compound	CAS Number	LOR	Unit	ESM201833-221	ESM201833-227	ESINE01833-228	ESM201833-229	ESN201833-252
				Result	Result	Result	Result	Result
EAME2: Gross Alpha and x eta Activity								
Gross beta		0.10	Bq/L	-		M33	<2.06	i
ED207P: Alkalinity by PC Titrator								
6 ydroHde Alkalinity as CaCO0	DMO-210-001	_	mg/L	<b>\</b>	<b>\</b>		1	<b>\</b>
Carbonate Alkalinity as CaCO0	3812-32-6	-	mg/L	<b>\</b>		₹		₹
x icarbonate Alkalinity as CaCO0	71-52-3	-	mg/L	3MM	800	31/5	025	3MI
Total Alkalinity as CaCO0	-	-	mg/L	3MM	800	31/5	025	3MI
ED235G: Sulfate (Turbidimetric) as SO3 M by DA	by DA							
Sulfate as SO3 - Turbidimetric	14808-79-8	1	mg/L	0802	3M72	0792	3002	OBNZ
ED23BG: Chloride by Discrete Analyser								
Chloride	16887-00-6	7	mg/L	58B22	59922	58122	NB722	57922
ED290F: Dissolved 4 ajor Cations								
Calcium	7440-70-2	_	mg/L	125	771	B82	750	BMS
4 agnesium	7439-95-4	7	mg/L	5B82	51B2	5B82	57 M2	5382
Sodium	7440-23-5	_	mg/L	55922	50522	5MN22	53122	55522
Potassium	7440-09-7	_	mg/L	60	01	30	MB	80
EG2M2F: Dissolved 4 etals by ICP-4 S								
Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Copper	7440-50-8	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Nickel	7440-02-0	0.001	mg/L	<0.010	2.2NP	<0.010	<0.010	<0.010
Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Zinc	7440-66-6	0.005	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
EG20BF: Dissolved 4 ercury by FI4 S								
4 ercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG2B5G: Ferrous Iron by Discrete Analyser								
Ferrous Iron		0.05	mg/L	5.73	2.MB	0.B0	7.01	MOB
EK28B4 : Sulfide as SM								
Sulfide as SM-	18496-25-8	0.1	mg/L	<0.1	2.5	2.5	2.5	<0.1
EN2BB: lonic x alance								
Ø Total Anions		0.01	med/L	152	167	15M	790	B87
Ø Total Cations		0.01	med/L	179	73B	195	850	103
Ø lonic x alance	-	0.01	%	B.0M	1.NB	1.23	5.MB	0.83



: 6 of 11 : ES2036844 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

Project Client

Page Work Order

Sub-Matrix: WATER (Matrix: WATER)		Clier	Client sample ID	x 6-4 51D	x 6 -4 51S	x 6 -4 IMD	x 6 -4 MMS	× 6 -4 MDD
	Cli	ent samplin <sub>e</sub>	Client sampling date / time	19-Oct-2020 11:45	19-Oct-2020 12:30	16-Oct-2020 12:00	16-Oct-2020 11:15	16-Oct-2020 09:50
Compound	CAS Number LOR	LOR	Unit	ESM201833-221	ESN201833-227	ESM201833-228	ESM201833-229	ESN201833-252
				Result	Result	Result	Result	Result
EAMR2CA: Gross Alpha and x eta Activity								
Gross alpha		0.05	Bq/L	-	-	<0.87	5.0B	-
Gross beta activity - 32K		0.10	Bq/L			<1.74	<2.06	



: 7 of 11 : ES2036844 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary Analytical Results

Page Work Order

Project Client

Sub-Matrix: WATER		Clie	Client sample ID	x 6-4 MDS	x 6 -4 MBD	x 6-4 MBS	x 6-4 MBD	x 6 -4 MBS
(Matrix: WATER)			:					
	Cli	ent samplir	Client sampling date / time	16-Oct-2020 09:10	19-Oct-2020 10:20	19-Oct-2020 11:00	16-Oct-2020 08:10	16-Oct-2020 07:40
Compound	CAS Number	TOR	Unit	ESM201833-255	ESM201833-25M	ESM201833-250	ESM201833-253	ESM201833-25B
				Result	Result	Result	Result	Result
ED207P: Alkalinity by PC Titrator								
6 ydroHde Alkalinity as CaCO0	DMO-210-001	-	mg/L	7		₹		₹
Carbonate Alkalinity as CaCO0	3812-32-6	-	mg/L	V	>	₹	٧	<u>^</u>
x icarbonate Alkalinity as CaCO0	71-52-3	-	mg/L	MI8	3BM	088	323	05B
Total Alkalinity as CaCO0	-	-	mg/L	MI8	3BM	088	323	05B
ED235G: Sulfate (Turbidimetric) as SO3 M by DA	by DA							
Sulfate as SO3 - Turbidimetric	14808-79-8	-	mg/L	BWVZ	07M2	0932	0B22	3B82
ED23BG: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	59822	58322	58122	51M22	MB022
ED290F: Dissolved 4 ajor Cations								
Calcium	7440-70-2	-	mg/L	75B	105	12M	1MB	189
4 agnesium	7439-95-4	-	mg/L	5872	5132	53B2	5BB2	5702
Sodium	7440-23-5	-	mg/L	50022	5M822	50 NP.2	55M22	58022
Potassium	7440-09-7	-	mg/L	WB	35	WB	33	WB.
EG2M2F: Dissolved 4 etals by ICP-4 S								
Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Copper	7440-50-8	0.001	mg/L	2.23B	<0.010	<0.010	2.259	<0.010
Nickel	7440-02-0	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	2.251
Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Zinc	7440-66-6	0.005	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
EG2M2T: Total 4 etals by ICP-4 S								
Arsenic	7440-38-2	0.001	mg/L	2.25M			-	-
Cadmium	7440-43-9	0.0001	mg/L	<0.0010			-	
Chromium	7440-47-3	0.001	mg/L	2.205			-	
Copper	7440-50-8	0.001	mg/L	2.NP1			i	1
Nickel	7440-02-0	0.001	mg/L	2.2M/I			i	1
Lead	7439-92-1	0.001	mg/L	<0.010			i	:
Zinc	7440-66-6	0.005	mg/L	2.210			i	!
EG20BF: Dissolved 4 ercury by FI4 S								
4 ercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG20BT: Total Recoverable 4 ercury by F14 S								
4 ercury	7439-97-6	0.0001	mg/L	<0.0001				
EG2B5G: Ferrous Iron by Discrete Analyser	er							



EMM CONSULTING PTY LTD S190512 Balranald T3 Ancillary

: 8 of 11 : ES2036844

Work Order

Client Project

16-Oct-2020 07:40 ESN201833-25B x 6-4 MBS Result <0.1 85B 830 5.11 16-Oct-2020 08:10 ESN201833-253 x 6-4 MBD Result M5M ₩.6 <0.1 137 B08 19-Oct-2020 11:00 ESM201833-250 x 6-4 MBS Result 59.7 2.M 7 IVB 8.59 153 19-Oct-2020 10:20 ESN201833-25M x 6-4 MBD Result 5.15 7.7M 2.⊠ 727 121 16-Oct-2020 09:10 ESM201833-255 x 6-4 MDS Result <0.05 B.2B **6**0.1 17M 733 Client sample ID Client sampling date / time med/L med/L mg/L mg/L Unit % LOR 0.05 0.01 0.01 0.01 0.1 18496-25-8 CAS Number EG2B5G: Ferrous Iron by Discrete Analyser - Continued EK28B4 : Sulfide as SM EN2BB: lonic x alance Ø Total Anions Sub-Matrix: WATER (Matrix: WATER) Sulfide as SM Ø Total Cations Ø lonic x alance Ferrous Iron Compound



Project Client

: 9 of 11 : ES2036844 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

Page Work Order

Sub-Matrix: WATER	Client sample ID	LPSPx23	QA5	QAM	Tx 0	Tx3
(Matrix: WATER)						
		00000	0000	00000	000000000000000000000000000000000000000	0000

Sub-Matrix: WATER (Matrix: WATER)		Clie	Client sample ID	LPSPx 23	QA5	QAM	Tx 0	Tx 3
	Clie	ent samplir	Client sampling date / time	17-Oct-2020 09:20	15-Oct-2020 15:30	17-Oct-2020 12:00	18-Oct-2020 00:00	18-Oct-2020 00:00
Compound	CAS Number	TOR	Unit	ESM201833-251	ESN201833-257	ESIN201833-258	ESM201833-259	ESN201833-2N2
				Result	Result	Result	Result	Result
EAME: Gross Alpha and x eta Activity								
Gross beta	-	0.10	Bq/L	<1.77				
ED207P: Alkalinity by PC Titrator								
6 ydroHde Alkalinity as CaCO0	DMO-210-001	1	mg/L	<1	<1	\ \		
Carbonate Alkalinity as CaCO0	3812-32-6	-	mg/L	<b>\</b>	<b>&gt;</b>	₹		
x icarbonate Alkalinity as CaCO0	71-52-3	-	mg/L	337	091	MBM		
Total Alkalinity as CaCO0	İ	-	mg/L	337	091	MBM	-	
ED235G: Sulfate (Turbidimetric) as SO3 M by DA	4 by DA							
Sulfate as SO3 - Turbidimetric	14808-79-8	-	mg/L	0822	0732	3012	1	
ED23BG: Chloride by Discrete Analyser								
Chloride	16887-00-6	-	mg/L	58722	58922	59822		
ED290F: Dissolved 4 ajor Cations								
Calcium	7440-70-2	-	mg/L	15B	100	7 IWI		
4 agnesium	7439-95-4	-	mg/L	5122	5892	5B12		
Sodium	7440-23-5	-	mg/L	5NP22	5M222	55722	1	
Potassium	7440-09-7	-	mg/L	33	3M	WB		
EG2M2F: Dissolved 4 etals by ICP-4 S								
Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	<0.010		
Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	<0.0010		
Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	<0.010		
Copper	7440-50-8	0.001	mg/L	<0.010	<0.010	<0.010		
Nickel	7440-02-0	0.001	mg/L	<0.010	<0.010	<0.010		
Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	<0.010		
Zinc	7440-66-6	0.005	mg/L	<0.050	<0.050	<0.050		
EG2M2T: Total 4 etals by ICP-4 S								
Arsenic	7440-38-2	0.001	mg/L			<0.010	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	-		<0.0010	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L			<0.010	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L			<0.010	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L			<0.010	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L			<0.010	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L			<0.052	<0.005	<0.005
EG20BF: Dissolved 4 ercury by FI4 S								
4 ercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001		
EG20BT: Total Recoverable 4 ercury by FI4 S	-14 S							



Client Project

EMM CONSULTING PTY LTD S190512 Balranald T3 Ancillary

10 of 11 ES2036844

Work Order

18-Oct-2020 00:00 ESM201833-2M2 <0.0001 1 1 l l 18-Oct-2020 00:00 ESN201833-259 Result TX 0 <0.0001 l l 1 17-Oct-2020 12:00 ESN201833-258 Result <0.0001 <0.05 **^**0.1 8 173 5.33 15-Oct-2020 15:30 ESN201833-257 Result QA5 5.78 18B ٥ 1. B.52 159 l 17-Oct-2020 09:20 ESM201833-251 LPSPx23 Result M72 **~**0.1 18B B.07 151 l Client sample ID Client sampling date / time med/L med/L mg/L mg/L mg/L Unit % 7439-97-6 0.0001 LOR ---- 0.05 0.01 0.01 0.01 0.1 18496-25-8 EG20BT: Total Recoverable 4 ercury by FI4 S - Continued CAS Number EG2B5G: Ferrous Iron by Discrete Analyser EK28B4: Sulfide as SM EN2BB: lonic x alance Sub-Matrix: WATER (Matrix: WATER) Ø lonic x alance Sulfide as SM Ø Total Cations Ø Total Anions Ferrous Iron Compound 4 ercury

| |

| |

| |

<0.88

Bq/L Bq/L

0.05

EAME2CA: Gross Alpha and xeta Activity

Gross beta activity - 32K

Gross alpha

I



: 11 of 11 : ES2036844 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary Analytical Results Project

Page Work Order

Client

Sub-Matrix: WATER (Matrix: WATER)		Clien	Client sample ID	TxB	Rx 0	Rx3	RxB	Rx 1
	Clie	Client sampling date / time	date / time	19-Oct-2020 00:00	15-Oct-2020 00:00	16-Oct-2020 00:00	19-Oct-2020 12:40	20-Oct-2020 12:05
Compound	CAS Number	LOR	Unit	ESM201833-2M5	ESM201833-2MM	ESM201833-2MD	ESNZ01833-2NB	ESM201833-2MB
				Result	Result	Result	Result	Result
EG2M2T: Total 4 etals by ICP-4 S								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
EG20BT: Total Recoverable 4 ercury by FI4 S	14 S							
4 ercury	7439-97-6 0.0001	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001



### QUALITY CONTROL REPORT

**Environmental Division Sydney** Sepan Mahamad : 1 of 7 Laboratory Contact **EGG CONMULTIND PTY LT5** PAUL GIBBONS **EM20698SS Work Order** Contact

277-289 Woodpark Road Smithfield NSW Australia 2164 Address Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065

Telephone

Project

Address

Client

Sampler

+61 2 8784 8555 06-Nov-2020 20-Oct-2020 21-Oct-2020 Date Analysis Commenced Date Samples Received Telephone Issue Date S190512 Balranald T3 Ancillary BILL BULL, KAITLYN BRODIE EN/112/20 C-O-C number Quote number Order number

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full. This Quality Control Report contains the following information:

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

Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits

No. of samples analysed No. of samples received

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.

olynatories		Accidation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Titus Vimalasiri	Metals Teamleader	Radionuclides, Fyshwick, ACT



#### General Comments

In house developed procedures 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. 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 primary

Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot 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

RPD = Relative Percentage Difference

# = Indicates failed QC

### Laboratory Duplicate (DUP) Report

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

Sub-Matrix: WATER						Laboratory L	Laboratory Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA2s0CA: Drol I Apr	EA2s0CA: Droll AphannBd teon Aiowyd 3QC Lo	30C Loc 66620147							
EB2027381-001	Anonymous	EA250: Gross alpha	-	0.05	Bq/L	<1.07	<1.07	0.00	No Limit
		EA250: Gross beta	-	0.1	Bq/L	4.12	4.98	18.9	No Limit
		EA250: Gross beta activity - 40K	-	0.1	Bq/L	<2.14	<2.14	0.00	No Limit
ES2036844-008	BH-M22D	EA250: Gross alpha	!	0.05	Bq/L	<0.87	06.0	3.47	No Limit
		EA250: Gross beta	-	0.1	Bq/L	2.44	2.07	16.6	No Limit
		EA250: Gross beta activity - 40K	1	0.1	Bq/L	<1.74	<1.74	0.00	No Limit
E5064P: ApknpBvg )	E5064P: ApknpBv( ) ( PCTvancor 3QC Loc 662b0S97	780							
ES2036813-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	٧	۲	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	_	mg/L	٧	٧	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	17	17	0.00	%09 - %0
		ED037-P: Total Alkalinity as CaCO3	1	_	mg/L	17	17	0.00	%05 - %0
ES2036840-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	٧	۲	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	_	mg/L	18	15	15.5	%05 - %0
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	536	555	3.45	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	-	_	mg/L	554	570	2.90	0% - 20%
E5064P: ApknpBvg )	E5064P: ApknpBv( ) ( PC Tvancor 3QC Loc 662b0S47	0.547							
ES2036844-010	BH-M23D	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	٧	۲	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	٧	<u>۲</u>	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	426	428	0.415	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	1	-	mg/L	426	428	0.415	0% - 20%
ES2036845-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	٧	٧	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	_	mg/L	۲	7	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	_	mg/L	3	7	101	No Limit
		ED037-P: Total Alkalinity as CaCO3	-	_	mg/L	8	٧	101	No Limit



S190512 Balranald T3 Ancillary

EMM CONSULTING PTY LTD

ES2036844

Work Order

Client Project

3 of 7

Recovery Limits (%) 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% No Limit 0% - 20% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.0717 0.632 0.746 0.354 0.797 0.00 2.14 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 6.65 0.00 0.00 0.00 0.00 0.00 3.66 3.97 4.43 7.69 0.00 0.00 1.81 Laboratory Duplicate (DUP) Report Duplicate Result <0.0010 <0.0010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.050 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.0010 10400 <0.050 18500 13300 0.042 18200 1560 3850 1380 34 3720 31 ~ က Original Result <0.0010 <0.0010 <0.010 <0.010 <0.010 <0.010 <0.050 <0.010 <0.010 <0.010 <0.010 <0.0010 <0.010 <0.010 <0.010 <0.010 <0.050 <0.010 18500 18900 10900 13300 0.045 1440 1570 3830 3740 715 35 29 V က mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L mg/L mg/L 0.0001 0.001 0.005 0.001 0.001 0.0001 0.001 0.001 0.001 0.001 0.001 0.001 0.005 0.001 0.001 0.001 0.001 0.001 LOR \_ \_ \_ \_ ~ \_ 7440-43-9 7439-92-1 14808-79-8 16887-00-6 16887-00-6 9-00-2889 7440-43-9 7440-02-0 7440-50-8 7440-02-0 7440-47-3 7440-50-8 CAS Number 14808-79-8 14808-79-8 7440-70-2 7440-23-5 7440-70-2 7439-95-4 7440-23-5 7440-38-2 7440-47-3 7440-50-8 7440-66-6 7440-43-9 7440-38-2 7440-47-3 7439-92-1 7440-66-6 7440-38-2 7439-95-4 7440-09-7 7440-09-7 7439-92-1 ED041G: Sulfate as SO4 - Turbidimetric ED041G: Sulfate as SO4 - Turbidimetric ED041G: Sulfate as SO4 - Turbidimetric EG020A-F: Chromium EG020A-F: Chromium EG020A-T: Chromium E50SbD: Mufnæ Itur) vdvmeavi 7nl MOS 2-) (5A 3QC Loc 66201817 ED093F: Magnesium EG020A-F: Cadmium EG020A-F: Cadmium EG020A-T: Cadmium ED093F: Magnesium E50SbD: Mujonce 3Tur) volvme or vi 7nl MOS2-) (5A 3QC Loc 66201897 ED093F: Potassium EG020A-T: Arsenic ED093F: Potassium EG020A-F: Arsenic EG020A-T: Copper EG020A-F: Copper EG020A-F: Arsenic ED045G: Chloride EG020A-F: Copper ED045G: Chloride ED045G: Chloride ED093F: Calcium ED093F: Sodium ED093F: Calcium ED093F: Sodium EG020A-F: Nickel EG020A-F: Nickel EG020A-F: Lead EG020A-F: Zinc EG020A-T: Lead EG020A-F: Lead EG020A-F: Zinc E50SsD: Caporde) (5 virea ABngler 3QC Loc 66201847 E50SsD: Caporde) (54 i rece ABngler 3QC Loc 66201887 ED020F: 5 vlopyed Geombi) (ICP-GM 3QC Loc 662bSSb7 E5016F: 5 v lopyed Gnjor Cnow Bl 3QC Loc 662bSS27 ED020T: ToanpGeant ) ( ICP-GM 3QC Loc 66296987 Client sample ID Anonymous Anonymous UGM-M1S UGM-M1D UGM-M1D BH-M16D BH-M16D BH-M23S BH-M23S QA1 QA1 Laboratory sample ID Sub-Matrix: WATER ES2036844-006 ES2036844-017 ES2036844-006 ES2036844-002 ES2036681-001 ES2036844-011 ES2036681-001 ES2036844-017 ES2036844-011 ES2036844-001 ES2036844-001



EMM CONSULTING PTY LTD S190512 Balranald T3 Ancillary

ES2036844

Work Order

Client Project

4 of 7

Recovery Limits (%) %09 - %C 0% - 20% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.00 0.00 0.00 0.00 0.00 0.00 8.70 0.00 0.00 0.00 0.00 0.00 0.00 17.9 3.13 0.00 0.00 0.00 0.00 Laboratory Duplicate (DUP) Report Original Result Duplicate Result <0.052 <0.0001 <0.001 <0.0001 <0.0001 <0.001 <0.001 <0.001 <0.0001 < 0.010 <0.001 <0.0001 <0.05 <0.05 0.092 1.19 0.24 **6**0.1 4 0.1 **^**0.1 ٥.1 <0.0001 <0.052 <0.0001 <0.0001 <0.001 <0.0001 <0.001 <0.001 <0.0001 <0.010 0.001 0.095 <0.05 0.001 <0.05 0.29 1.09 **6**0.1 40° ٥.1 م 0.1 mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L 0.0001 0.0001 0.005 0.0001 0.001 0.001 0.001 0.005 0.0001 0.0001 0.001 0.001 0.001 0.05 0.05 0.05 LOR 0.1 0.1 7439-97-6 7439-97-6 7439-97-6 7439-97-6 7440-02-0 7440-66-6 18496-25-8 18496-25-8 7440-66-6 7440-47-3 CAS Number 7440-02-0 7440-43-9 7440-38-2 7440-50-8 7439-92-1 18496-25-8 18496-25-8 EG051G: Ferrous Iron EG051G: Ferrous Iron EG051G: Ferrous Iron EG051G: Ferrous Iron EK085: Sulfide as S2-EG020A-T: Chromium EK085: Sulfide as S2-EK085: Sulfide as S2-EK085: Sulfide as S2-EG020A-T: Cadmium EG020A-T: Arsenic EG020A-T: Copper EG020A-T: Nickel EG020A-T: Nickel EG035F: Mercury EG035F: Mercury EG035T: Mercury EG035T: Mercury ED06sT: ToanpRei oyern) pe Geri ur( ) ( FIGM 3QC Loc 66216867 EG020A-T: Zinc EG020A-T: Lead EG020A-T: Zinc ED020T: ToanpGeant) (ICP-GM 3QC Loc 66296987 - i oBodBued IroB) (5 √lirece ABnp(ler 3QC Loc 6622SSS7 ED0sbD: Ferroul IroB) (5 Virece ABngler 30 C Loc 6622SSS7 ED06sF: 5 v I opyed Geri ur( ) ( FIGM 32C Loc 662bSS67 EK08sG: Mulfide nl M2- 3QC Loc 66200917 M2- 3QC Loc 6622Sb47 Client sample ID Anonymous Anonymous Anonymous Anonymous Anonymous UGM-M1S UGM-M1S UGM-M1S UGM-M2S UGM-M1S BH-M25S BH-M22S BH-M23S RB6 EK08sG: Mufvde nl Laboratory sample ID ED0sbD: Ferroul Sub-Matrix: WATER ES2036844-015 ES2036844-002 ES2036844-002 ES2036877-013 ES2036844-002 ES2036149-001 ES2036919-003 ES2036844-002 ES2036844-025 ES2036145-001 ES2036844-004 ES2036844-009 ES2037333-001 ES2036844-011



S190512 Balranald T3 Ancillary : 5 of 7 : ES2036844 : EMM CONSULTING PTY LTD Project Client

Work Order

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

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target

Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LCS) Report	.CS) Report	
				Report	Spike	Spike Recovery (%)	Recovery	Recovery Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SO7	TOW	High
EA2s0CA: Droll Aphan nBd tem Ai oyvq 3QCLoc 66620147	21							
EA250: Gross alpha	1	0.05	Bq/L	<0.05	1751 Bq/L	100	95.2	105
EA250: Gross beta	1	0.1	Bq/L	<0.10	3342 Bq/L	98.2	94.4	105
EA250: Gross beta activity - 40K		0.1	Bq/L	<0.10	-	-		1
E5064P: ApknpBd ) ( PC Tvanor 3QCLoc 662b0S97								
ED037-P: Total Alkalinity as CaCO3			mg/L	-	200 mg/L	102	81.0	111
				-	50 mg/L	90L	0.07	130
E5064P: ApknpBv( ) ( PC Tvanoor 3QCLoc 662b0S47								
ED037-P: Total Alkalinity as CaCO3	-	-	mg/L	-	200 mg/L	101	81.0	111
				1	50 mg/L	108	70.0	130
E50SbD: Mupfine ITur) whereni 7nl MOS2-) (5A 20CLoc 66201897	66201897							
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	<del>-</del>	mg/L	₹ 7	25 mg/L	101	82.0	122
				7	300 IIIg/L	COL	0.2.0	771
E50SbD: Muprine Tur) volvme or i 7nl MOS 2-) (5A 3QCLoc 66201817	66201817							
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	~	mg/L	₹ `	25 mg/L	101	82.0	122
				\ <u>\</u>	500 mg/L	101	82.0	122
E50SsD: Caparde) (5 vire Bangler 3QCLoc 66201847								
ED045G: Chloride	16887-00-6	-	mg/L	₹ `	50 mg/L	98.2	80.9	127
				Ÿ	1000 mg/L	117	80.9	127
E50SsD: Caparde) (5 vire a ABngler 30CLoc 66201887								
ED045G: Chloride	16887-00-6	~	mg/L	٧	50 mg/L	94.2	80.9	127
				₹	1000 mg/L	107	80.9	127
E5016F: 54 logyed Gnjor Cnow Bl 3QCLoc 662bSS27								
ED093F: Calcium	7440-70-2	~	mg/L	٧	50 mg/L	99.2	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<b>^</b>	50 mg/L	96.2	0.06	116
ED093F: Sodium	7440-23-5	_	mg/L		50 mg/L	99.3	82.0	120
ED093F: Potassium	7440-09-7	-	mg/L		50 mg/L	92.8	85.0	113
ED020F: 54 logyed Geart ) ( ICP-GM 3QCLoc 662bSSb7								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	90.4	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	89.5	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	87.0	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	86.9	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	88.2	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	89.7	82.0	112
- T - C - C - C - C - C - C - C - C - C				1000				1



 Page
 : 6 of 7

 Work Order
 : ES2036844

 Client
 : EMM CONSULTING PTY LTD

 Project
 : S190512 Balranald T3 Ancillary

Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LCS) Report	SS) Report	
				Report	Spike	Spike Recovery (%)	Recovery Limits (%)	imits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SOT	Low	High
ED020T: ToapGeapt ) ( ICP-GM 3QCLoc 66296987								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	89.6	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	91.7	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	90.5	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	89.7	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	9.06	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	6.06	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	89.6	79.0	117
ED06sF: 54 logyed Geri ur( ) ( FIGM 3QCLoc 662bSS67								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	102	83.0	105
ED06sT: ToanpRei oyern) ps Geri ur( ) ( FIGM 3QCLoc 66216867	216867							
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	99.2	77.0	111
ED0sbD: Ferroul IroB) (5 4 i rece ABn¢ler 3QCLoc 6622SS7	SSS7							
EG051G: Ferrous Iron	-	0.05	mg/L	<0.05	2 mg/L	100	89.0	117
ED0sbD: Ferroul IroB) (54 irec ABnit ler 32CLoc 6622SS7	SSs7							
EG051G: Ferrous Iron	-	0.05	mg/L	<0.05	2 mg/L	101	89.0	117
EK08sG: Mufvde nl M2- 3QCLoc 66200917								
EK085: Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	0.5 mg/L	94.0	76.0	116
EK08sG: Mufvde nl M2- 3QCLoc 6622Sb47								
EK085: Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	0.5 mg/L	102	76.0	116

### 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.

Matrix Spike (MS) Report

Sub-Matrix: WATER

			Spike	SpikeRecovery(%)	Recovery Limits (%)	imits (%)
Laboratory sample ID Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
E50SbD: Mupfine JTur) volume or i 7n1 MOS 2-) (5A 3QCLoc 66201897						
ES2036681-001 Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	105	70.0	130
E50SbD: Mupline JTur) volumeani 7nl MOS 2-) (5A 3QCLoc 66201817						
ES2036844-017 QA1	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not	70.0	130
E50SsD: Caporde) (5Virece ABnpler 3QCLoc 66201847						
ES2036681-001 Anonymous	ED045G: Chloride	16887-00-6	50 mg/L	91.3	70.0	130
E50SsD: Caporde) (5Virece ABnp(ler 30CLoc 66201887						
ES2036844-017 QA1	ED045G: Chloride	16887-00-6	50 mg/L	# Not	70.0	130
				Determined		



: 7 of 7 : ES2036844 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary Page Work Order

Client Project

Sub-Matrix: WATER			W	Matrix Spike (MS) Report		
			Spike	SpikeRecovery(%)	Recovery Limits (%)	nits (%)
Laboratory sample ID Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED020F: 541 oged Geart ) ( ICP-GM ACLoc 662bSSb7						
ES2036844-002 UGM-M1S	EG020A-F: Arsenic	7440-38-2	8.5 mg/L	80.9	70.0	130
	EG020A-F: Cadmium	7440-43-9	2.125 mg/L	79.2	70.0	130
	EG020A-F: Chromium	7440-47-3	8.5 mg/L	75.9	70.0	130
	EG020A-F: Copper	7440-50-8	8.5 mg/L	9.77	70.0	130
	EG020A-F: Lead	7439-92-1	8.5 mg/L	83.0	70.0	130
	EG020A-F: Nickel	7440-02-0	8.5 mg/L	77.3	70.0	130
	EG020A-F: Zinc	7440-66-6	8.5 mg/L	79.4	70.0	130
ED020T: ToapGeap ) ( ICP-GM 3QCLoc 66296987						
ES2036844-004 UGM-M2S	EG020A-T: Arsenic	7440-38-2	10 mg/L	86.4	70.0	130
	EG020A-T: Cadmium	7440-43-9	2.5 mg/L	70.3	70.0	130
	EG020A-T: Chromium	7440-47-3	10 mg/L	83.8	70.0	130
	EG020A-T: Copper	7440-50-8	10 mg/L	76.3	70.0	130
	EG020A-T: Lead	7439-92-1	10 mg/L	82.9	70.0	130
	EG020A-T: Nickel	7440-02-0	10 mg/L	76.5	70.0	130
	EG020A-T: Zinc	7440-66-6	10 mg/L	74.8	70.0	130
ED06sF; 5 vl opyed Geri ur( ) ( FIGM 3QCLoc 662bSS67						
ES2036844-001 UGM-M1D	EG035F: Mercury	7439-97-6	0.01 mg/L	70.5	70.0	130
ED06sT: ToanpRei oyern) ps Geri ur( ) ( FIGM 3QCLoc 66216867						
ES2036844-004 UGM-M2S	EG035T: Mercury	7439-97-6	0.01 mg/L	# 61.5	70.0	130
ED0sbD: Ferroul IroB) (5 Vire & ABn (1 er 3QCLoc 6622SS7						
ES2036145-001 Anonymous	EG051G: Ferrous Iron	-	1 mg/L	91.3	70.0	130
ED0sbD: Ferroul IroB) (5 Vire & ABn (1 er 30, CLoc 6622SS7						
ES2036844-015 BH-M25S	EG051G: Ferrous Iron	-	1 mg/L	85.5	70.0	130
EK08sG: Mujfide nl M2- 3QCLoc 66200917						
ES2036844-002 UGM-M1S	EK085: Sulfide as S2-	18496-25-8	0.33 mg/L	103	70.0	130
EK08sG: Mujfide nl M2- 3QCLoc 6622Sb47						
ES2036149-001 Anonymous	EK085: Sulfide as S2-	18496-25-8	0.33 mg/L	97.0	70.0	130



# QA/QC Compliance Assessment to assist with Quality Review

Page : 1 of 19	Laboratory : Environmental Division Mycney Telephone : +61 - 3835 3444	Date Mamples ReAeivec : - 9dN Atd 9- 9	Bsue Date : 96c5 ovd 9-9	So. of samples reAeivec :-4	So. of samples analysec : - 4	
: EM20698NN	: ESS COUMLTIGUP YID TIG : PUGL I BOONSM	: M1j 941- Oalranalc T2 UnAillary	the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	OBLOGLLW UFILHS ORNDE	the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract o	
Work Order	Client ContaAt	Pro@At	Mite	Mampler	Nrcer number	

reportinb hibhlibhts any non, con. ormancesx. a cilitates . aster and more accurate data validation and is desibned to assist internal eBpert and eBternal Auditor review-S any components o. this I his report is automatically benerated f y the ATMTS Mthroubh interpretation o. the ATM Quality Control Report and several Quality Assurance parameters measured fy ATM-I his automated report contrif ute to the overall gQO assessment and reportinb .or buideline compliance-

Orief methoc summaries and referen Aes are also provided to assist in tra Aeability.

### Summary of Outliers

### Outliers: Quality Control Samples

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

- UO S ethod Flank value outliers occur-
- <u>UO</u> guplicate outliers occur-
- UO Taf oratory Control outliers occur-
- SatriBMpike outliers eBist, please see .ollowinb pabes .or .ull details-
- Hor all rebular sample matricesxUO surrobate recovery outliers occur-

# Outliers: Analysis Holding Time Compliance

<u>UO</u> Analysis qoldinb I ime Outliers eBist-

# Outliers: Frequency of Quality Control Samples

<u>UO</u> Quality Control Mample Hre( uency Outliers eBist-



M1j 941- Oalranalc T2 Un Aillary EYY CNSMGLTBSI PTHLTD EM 926355 : - of 19 Work Nrcer **Pro**@At Client

Outliers: Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Yatrix: WAI ER

Compound I roup Same	Laboratory Mample BD   Client Mample BD	Client Mample ®	Analyte	CUM Sumber Data	Data	Limits Comment	Comment
SatriB Mpike ) S M4 Recoveries							
ED951I:Mulfate (TurbicimetriA) as MN5 - dby DU	EM 926355d918	סטו	Mul.ate as MON, I urf idimetric	15393æ) da Sot Determir	Sot	<del>110</del>	S Mrecovery not determinedx f ackbround level breater than or e( ual to NBspike level-
ED954I:Chlorice by DisArete Unalyser	EM 926355d918	סחי	Chloride	16338æ9æ	Sot Determinec	##	S Mrecovery not determinedx f ackbround level breater than or e( ual to NB spike level-
EI 924T: Total ReAoverable YerAury by %BYM	EM 926355d995	GI YdY-M	Sercury	852j d 8d6	61.4 7	89.9d1297	Recovery less than lower data ( uality of jective

## Analysis Holding Time Compliance

B samples are icentifiec beloq as having been analysec or extradec outsice of redommencec holcing timeskthis shoulc be taken into Aonsiceration ghen interpreting results.

This report summari-es extraction w preparation and analysis times and Aompares each qith ULM recommended holding times (referenching GMEPU MM 356K UP&UK UM and SEPY) based on the sample Aontainer provicec. Dates reportec represent first cate of extraAtion or analysis anc preAuce subse, uent cilutions anc reruns. U listing of breaAhes (if any) is provicec herein.

&olcing time for leadhate methocs (e.g. TCLP) vary advorcing to the analytes reportec. Ussessment Aompares the leadh cate gith the shortest analyte holcing time for the e, uivalent soil methoc. These are: 15 cays/kmer/ury - 3 cays z other metals 139 cays. U reAorcec brea/h coes not guarantee a brea/h for all nond/olatile parameters.

organiAs

&olcing times for VOC in soils vary advorcing to analytes of interest. Vinyl Chlorice and Myrene holcing time is 8 cays; others 15 cays. U redorced breadth coes not guarantee a breadth for all VNC analytes and shoulc be verifiec in Aase the reportec breaAh is a false positive or Vinyl Chlorice and Myrene are not key analytes of interestwonAern.

Y atrix: WAI ER					Evaluation	: x F &olcing time	Evaluation: * F &olcing time breaAh; < F Within holcing time.	n holcing tim
Method		Sample Date	Ex	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Date extracted Due for extraction	Evaluation	Date analysed	Date analysed Due for analysis	Evaluation
EA250: Pross Alpha and Feta Activity								
Clear Ylastic Fottle , Uatural )EA2504 O&dv DK	O&d' M	; 9,Oct, 2020	Ī	pp	###	28, Oct, 2020	15dUprd-9-1	>
Clear Ylastic Fottle , Uatural )EA2504 LPMP095		; 1,Oct, 2020	1111	ppp	ppp	28, Oct, 2020	14dUprd- 9- 1	>
EA250CA: Pross Alpha and Feta Activity								
Clear Ylastic Fottle , Uatural )EA2504 O&dv DK	O&d' M	; 9,Oct, 2020	-	<del>DD</del>	##	28, Oct, 2020	15dUprd-9-1	>
Clear Ylastic Fottle , Uatural )EA2504 LPNPO95		; 1,Oct, 2020	•	pap	###	28, Oct, 2020	14dUprd-9-1	>



Work Nrcer

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Evaluation

Due for analysis

Date analysed

>

- j dNAtd-9-9

2; ,Oct,2020

<del>10</del>

>

29dNAtd-9-9

2; ,Oct,2020

<del>100</del>

>

21dNAtd-9-9

2; ,Oct,2020

<del>100</del>

>

9-dSovd 9-9

2; ,Oct,2020

<del>pp</del>

Evaluation: × F &olcing time breaAh; ✓ F Within holcing time. Evaluation Date extracted Due for extraction Extraction / Preparation <del>pp</del> <del>10</del> <del>100</del> ... :: :: ... ; 3,Oct, 2020 ; 5,Oct, 2020 ; 9,Oct, 2020 ; 1,Oct, 2020 Sample Date GI Y dY 11MK GIYdY-MK 0&dY -- MK 0&dY - 2MK 0&dY 16MK 08 dY - 4M : 2 of 19 : EM-926355 : EYY CNSM3LTBI PTH LTD : M1;941- Oalranalc T2 UnAllary Eg061Y: Alkalinity f y YC I itrator Clear Ylastic Fottle , Uatural )Eg061,Y4 Clear Ylastic F ottle,Uatural )Eg061,Y4 O&d∕ 16DK Clear Ylastic Fottle, Uatural )Eg061,Y4 Clear Ylastic Fottle , Uatural )Eg061,Y4 GI Yd'-DK Container / Client Sample ID(s) Yatrix: WAI ER GI YdY1DK GI Y dY 5DK 0&dY -- DK 0&dY-2DK 0&dY-4DK LPMP095K Method

O&dY - 5DK	O&dY - 5M							
Egon, P: Mul.ate )I urf idimetric4as MON2, fy gA								
Clear Ylastic Fottle , Uatural )Eg0N; P4 GIY Ở 1DK	GI Y OY 1WK	; 5,Oct, 2020	5555	ppp	Ħ	2; ,Oct,2020	1- Bovd 9-9	>
GI Y dY 5DK	QU1							
Clear Ylastic Fottle, Uatural )Eg0N; P4								
O&d/ DK	O&d/ MK	; 9,Oct, 2020	****	ppp	<del>D</del>	2; ,Oct,2020	12dSovd-9-9	>
0&d/ - 2DK	0&dr' - 2MK							
0&d/ - 4DK	0&d/ - 4M							
Clear Ylastic Fottle , Uatural )Eg0N; P4								
GI YaY-DK	GI Yar-MK	; 1,0ct, 2020	3333	pp	<del>DD</del>	2; ,Oct,2020	15dSovd 9-9	>
LPMP095K	QU-							
Clear Ylastic Fottle , Uatural )Eg0N; P4								
O&d/ 16DK	O&dr' 16MK	; 3,Oct, 2020	****	ppp	<del>D</del>	2; ,Oct,2020	16cSovd-9-9	>
O&dY - 5DK	O&dY - 5M							
Eg0N5P: Chloride f y giscrete Analyser								
Clear Ylastic Fottle, Uatural) Eg 0N5P4								
GI Y dY 1DK	GI Y dY 1 MK	; 5,Oct, 2020	3333	ppp	<del>pp</del>	2; ,Oct,2020	1- 6Sovd 9-9	>
GI Y dY 5DK	QU1							
Clear Ylastic Fottle, Uatural )Eg0N5P4								
O&d/ DK	0&d/ MK	; 9,Oct, 2020	1111	pp	<del>pp</del>	2; ,Oct,2020	12dSovd 9-9	>
0&d/ - 2DK	0&dr' - 2MK							
0&d/ - 4DK	O& dY - 4M							
Clear Ylastic Fottle, Uatural )Eg0N5P4								
GI YdY-DK	GI YdY-MK	; 1,0ct,2020	1111	ppp	<del>pp</del>	2; ,Oct,2020	15cSovd 9-9	>
LPMP095K	QU-							
Clear Ylastic Fottle, Uatural )Eg0N5P4								
O&d/ 16DK	O&dr' 16MK	; 3,Oct, 2020	****	<del>D</del>	<del>D</del>	2; ,Oct,2020	16dSovd 9-9	>
O& dY - 5DK	0& dY - 5M							



: 5 of 19 : EM-926355 : EYY CNSMGLTBSI PTH LTD : MIj 941- Oalranalc T2 UnAilary

Page Work Nrcer Client

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Yatrix: WAI ER					Evaluation	: x F &olcing time	Evaluation: * F &olcing time breaAh;	holcing time.
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
Eg036H: gissolved Sajor Cations								
Clear Ylastic Fottle , Uitric Acid7Hiltered )Eg036H4 Gl YoY 1DK	GI YAY1MK	; 5,0ct,2020		Ħ	<del>pp</del>	2; ,Oct,2020	1- aSovd 9- 9	>
GI Y dY 5DK	QU1							•
Clear Ylastic Fottle , Uitric Acid7Hiltered )Eg036H4	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	0000		<del>{</del>	<del>1</del>	2. 024	126000	,
O&4 D&		, 9,OCL, 2020	1111	m		z, , Oct, 2020	1200004 9- 9	>
0&9-12DK 0&9-14DK	0&d' - ZIVK 0&d' - 4M							
Clear Ylastic Fottle , Uitric Acid7Hiltered )Eq036H4								
GI YdY-DK	GI Yar-MK	; 1,Oct, 2020	3333	ppp	<del>pp</del>	2; ,Oct,2020	15dSovd 9-9	>
LPMPO95K	QU-							
Clear Ylastic Fottle , Uitric Acid7Hiltered )Eg036H4				;	:			
O&4/16DK O&4/-5DK	0&a7 16MK 0&a7 - 5M	; 3,Oct, 2020		<del>1000</del>	<del>2</del>	2; ,Oct,2020	16aSova 9-9	>
EP 020H: gissolved Setals f y CFY, SM			-					
Clear Ylastic Fottle , Uitric Acid7Hiltered )EP020A,H4				;	:			
GI YaY1DK	GI Y dY 1MK	; 5,Oct, 2020	1111	<del>111</del> 10	<del>1</del>	2; ,Oct,2020	12dUprd-9-1	>
GI Y dY 5DK	QU1							
Clear Ylastic Fottle , Uitric Acid7Hiltered )EP020A,H4								
0&d/ DK	0&d/ MK	; 9,Oct, 2020	****	ppp	<del>pp</del>	2; ,Oct,2020	15dUprd-9-1	>
O&dY-2DK	0&dY - 2MK							
0&d/ - 4DK	O&d/ - 4M							
Clear Ylastic Fottle, Uitric Acid7Hiltered )EP020A,H4								
GI YaY-DK	GI Yar-MK	; 1,0ct,2020	****	<del>pp</del>	<del>D</del>	2; ,Oct,2020	14dUprd-9-1	>
LPMP095K	QU-							
Clear Ylastic Fottle, Uitric Acid7Hiltered )EP020A,H4								
0&d/ 16DK	0&d/ 16WK	; 3,Oct, 2020	****	##	##	2; ,Oct,2020	18dUprd-9-1	>
O&d/ - 5DK	O&dY - 5M							
EP 0201:1 otal Setals f y GY,S M								
Clear Ylastic Fottle , Uatural )EP020A,I 4 O&d∕ - 2M		; 9,Oct, 2020	26, Oct, 2020	15dJprd 9- 1	>	26, Oct, 2020	15dUprd-9-1	>
Clear Ylastic Fottle , Uitric Acid7Ln.iltered )EP 020A,I 4 GI Y dY 10K	RO2	; 5,Oct, 2020	26, Oct, 2020	1- dJprd 9- 1	>	26, Oct, 2020	1-dUprd-9-1	>
Clear Ylastic Fottle , Uitric Acid7Ln.iltered )EP020A,I 4		; 9,Oct, 2020	26, Oct, 2020	12dJprd 9- 1	>	26, Oct, 2020	12dUprd-9-1	>
Clear Ylastic Fottle, Uitric Acid7Ln.iltered )EP 020A,I 4	-	0000	0000	7 C		000	7	
GI Y GY - IVK	-MO-	, 1,0ct,2020	20, OCI, 2020	14mpl 4 9- 1	>	20, OCI, 2020	1400plc-8-1	>
Clear Ylastic Fottle , Uitric Acid7Ln.iltered )EP020A,I 4 T02K	106	; 8,Oct, 2020	26, Oct, 2020	16dJprd 9- 1	>	26, Oct, 2020	16dUprd-9-1	>
Clear Ylastic Fottle,Uitric Acid7Ln.iltered )EP 020A,I 4 TO4K	RO4	; 3,Oct, 2020	26, Oct, 2020	18dJprd 9- 1	>	26, Oct, 2020	18dUprd-9-1	>
Clear Ylastic Fottle , Uitric Acid7Ln.iltered )EP 020A,I 4 RO6		20,Oct, 2020	26, Oct, 2020	13dJprd 9- 1	>	26, Oct, 2020	13dUprd-9-1	>



 Page
 : 4 of 19

 Work Nrcer
 : EM-926355

 Client
 : EYY CNSMSLTBSI PTH LTD

 Pro@At
 : MIj 941- Oalranalc T2 UnAllary

Y atrix: WAI ER					Evaluation	× F &olcing time	Evaluation: * F &olcing time breaAh; ✓ F Within holcing time.	n holcing time.
Method		Sample Date	ĒX	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP 065H: gissolved Sercury f y HS M								
Clear Ylastic Fottle , Uitric Acid7Hiltered )EP065H4	W 7 7 3	0000 +500 31		ŧ	<del>1</del>	22 Oct 2020	1-050% 0-0	,
GI YAY 5DK	GI 197 QU1	, 3, 001, 2020				22, 001, 2020		>
Clear Ylastic Fottle, Uitric Acid7Hiltered )EP065H4								
O&d/ DK	O&d/ MK	; 9,Oct, 2020		<del>pp</del>	<del>pp</del>	22, Oct, 2020	12dSovd-9-9	>
O&dY - 2DK	O&dr - 2MK							
0&dr-4DK	O&d/ - 4M							
Clear Ylastic Fottle, Uitric Acid7Hiltered)EP065H4								
GI YdY-DK	GIYOY-MK	; 1,0ct, 2020	1111	<del>D</del>	<del>pp</del>	22, Oct, 2020	15cSovd 9-9	>
LPMPO95K	QU-							
Clear Ylastic Fottle, Uitric Acid7Hiltered )EP065H4				3	7			,
0&4-16UK 0&-5-5-5-5-6-1	0&4716WK	; 3,Oct, 2020		m		22, Oct, 2020	8 -8 DADGDQ1	>
EP 0651: I otal Recoveraf le S ercury f y HG M								
Clear Ylastic F ottle,Uatural )EP065I 4 O&d/ - 2M		; 9,Oct, 2020	666	pp	ppp	21, Oct, 2020	12dSovd 9-9	>
Clear Ylastic Fottle , Uitric Acid7Ln.iltered )EP 065I 4								
GI YaY 1MK	R02	; 5,Oct, 2020	*****	##	<del>1</del>	21, Oct, 2020	1- Bovd- 9- 9	>
Clear Ylastic Fottle , Ultric Acid7Ln.iltered )EP065I 4 RO5		; 9,Oct, 2020	****	ppp	ddd	21, Oct, 2020	12cSovd 9-9	>
Clear Ylastic Fottle , Uitric Acid7Ln.iltered )EP 065I 4 GI Y oY - MK	QU-	; 1,Oct, 2020	1111	pape	ppp	21, Oct, 2020	15dSovd 9-9	>
Clear Ylastic Fottle , Uitric Acid7Ln.iltered )EP 0651 4	105	; 8,Oct, 2020		Ħ	<del>D</del>	21, Oct, 2020	14dSovd 9-9	`
Clear Ylastic Fottle, Uitric Acid7Ln.iltered )EP 0651 4				1	777			. ,
7. TOAK	70X	; 3,Oct, 2020	1111	8		21, Oct, 2020	B -B DAOCOOL	>
Clear Ylastic Fottle , Uitric Acid7Ln.iltered )EP 0651 4 RO6		20,Oct, 2020	****	###	###	21, Oct, 2020	18dSovd 9-9	>
EP 05; P : Herrous Gon f y giscrete Analyser								
Clear Ylastic Fottle, qCI, Hiltered )EP 05; P4								
GI YaY1DK	GI Yar 1MK	; 5,Oct, 2020	****	<del>100</del>	<del>1</del>	22, Oct, 2020	aNAtch 9- 9	>
GI YaY5DK	QU1							
Clear Ylastic Fottle, qCI, Hiltered )EP 05; P4		0000		<del>3</del>	7	0000	0 0	`
084 - DX	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	, 9, OCI, 2020	3333			22, OCI, 2020	- ZUNAG- 9- 9	>
U&ar - ZDK	U& ar - ZIVIK							
0&d/ - 4DK	O&d/ - 4M							
Clear Ylastic Fottle,q CI,Hiltered)EP 05; P4 GI Y ob - DK	¥- - - - -	: 1.Oct. 2020		##	#	22. Oct. 2020	- 50NAtch 9- 9	`
LPMP095K								
Clear Ylastic Fottle, qCI, Hiltered )EP 05; P4								
O& d/ 16 DK	O&d/ 16MK	; 3,Oct, 2020	3333	pp	<del>pp</del>	22, Oct, 2020	- 6dNAtd 9-9	>
O&d/ - 5DK	O& dY - 5M							



: 6 of 19 : EM-926355 : EYY CNSMGLTBSI PTH LTD : Míj 941- Oalranalc T2 UnAllary Page Work Nrcer Client **Pro@At** 

Y atrix: WAI ER					Evaluation	: x F &olcing time	Evaluation: * F &olcing time breaAh; < F Within holcing time.	holcing time.
Method		Sample Date	Ex	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK085S: Mul.ide as M2,								
Clear Ylastic Fottle, Zinc Acetate/UaOq) EK0854								
GI YaY 1DK	GI Y dY 1 MK	; 5,Oct, 2020	****	ppp	<del>111</del>	2; ,Oct,2020	dNAtd-9-9	>
GI Y dY 5DK	QU1							
Clear Ylastic Fottle, Zinc Acetate/UaOq) EK0854								
O&d/ DK	O&dr' MK	; 9,Oct, 2020	****	ppp	<del>111</del>	2; ,Oct,2020	- 2dNAtd-9-9	>
O&d/ - 2DK	O&dr - 2MK							
0&d/ - 4DK	O&dr - 4M							
Clear Ylastic Fottle, Zinc Acetate/UaOq) EK0854								
GI YdY-DK	GI Y dY - MK	; 1,Oct, 2020	****	ppp	<del>pp</del>	2; ,Oct,2020	- 5dNAtd-9-9	>
LPMPO95K	QU-							
Clear Ylastic Fottle, Zinc Acetate/UaOq) EK0854								
O&d/ 16DK	O&d/ 16MK	; 3,Oct, 2020	****	ppp	<del>pp</del>	22, Oct, 2020	- 6dNAtd-9-9	>
O&d/ - 5DK	O&dr - 5M							



: 8 of 19 : EM-926355 : EYY CNSMGLTBSI PTHLTD : M1;941- Oalranalc T2 UnAllary

Page Work Nrcer

**Pro@At** Client

Quality Control Parameter Frequency Compliance

The folloging report summarises the fre, uen Ay of laboratory QC samples analysec githin the analytiAn lot(s) in q hiAn the submittee sample(s) q as(q ere) proAessec. Udual rate should be greater than or e, ual to the expeAtec rate. U listing of breaAhes is provicec in the Mummary of Nutliers.

						_	
Quality Control Mample Type			Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Laboratory Dupli Aates (DGP)							
Ulkalinity by PC Titrator	ED928dP	2	29	00-0 :	00-0 :	>	SEPY -912 O2 z ULMQC Mancarc
Chlorice by DisArete Unalyser	ED9541	2	e -	; 0-1;	00-0;	>	SEPY - 912 O2 z ULMQC Mancarc
Dissolvec Y erAury by %BY M	EI 924%	ı	6-	00-0 :	00-0:	>	SEPY - 912 O2 z ULMQC Mancarc
Dissolvec Y etals by ECPdY MdMuite U	%PN6 -6 I3		6 -	00-0 :	00-0:	>	SEPY -912 O2 z ULMQC Mancarc
%errous Bon by DisArete Unalyser	El 9411	2	29	00-0;	00-0;	>	SEPY -912 O2 z ULMQC Mancarc
I ross Ulpha anc Oeta UAtivity	EU- 49		13	;; ;;	00-0:	>	SEPY -912 O2 z ULMQC Mancarc
Y a@r Cations dDissolvec	ED9j 2%		13	:: ' ::	00-0;	>	SEPY -912 O2 z ULMQC Mancarc
Mulfate (TurbicimetriA) as MN5 - dby DisArete Unalyser	ED9511	2	e-	; 0-1;	00-0;	>	SEPY -912 O2 z ULMQC Mancarc
Mulfice as M·d	E/ 934	22	Ţ	; 6-13	00-0;	>	SEPY -912 O2 z ULMQC Mancarc
Total Y erAury by %BY M	EI 924T		16	; 2-50	00-0;	>	SEPY -912 O2 z ULMQC Mancarc
Total Y etals by BCPdY MdMuite U	EI 9-9UdT	•	6-	00-0 :	00-0 :	>	SEPY - 912 O2 z ULMQC Mancarc
Laboratory Control Mamples (LCM)							
Ulkalinity by PC Titrator	ED928dP	2	29	00-0 :	00-0 :	>	SEPY -912 O2 z ULMQC Mancarc
Chlorice by DisArete Unalyser	ED9541	22	e-	; N-23	00-0;	>	SEPY -912 O2 z ULMQC Mancarc
Dissolvec Y erAury by % M	EI 924%	_	6 -	2-00	2-00	>	SEPY -912 O2 z ULMQC Mancarc
Dissolvec Y etals by &PdY MdMuite U	%P∩6 -6 I∃	_	6 -	2-00	2-00	>	SEPY -912 O2 z ULMQC Mancarc
%errous Bon by DisArete Unalyser	El 9411		59	2-00	2-00	>	SEPY -912 O2 z ULMQC Mancarc
I ross Ulpha anc Oeta UAtivity	EU- 49		13	::::	00-0:	>	SEPY -912 O2 z ULMQC Mancarc
Ya@r Cations dDissolvec	ED9j 2%	_	13	5-59	2-00	>	SEPY -912 O2 z ULMQC Mancarc
Mulfate (TurbicimetriA) as MN5 - dby DisArete Unalyser	ED9511	22	٠ ع	; N-23	00-0:	>	SEPY -912 O2 z ULMQC Mancarc
Mulfice as M-d	E/ 934	ı	Ţ	9-30	2-00	>	SEPY -912 O2 z ULMQC Mancarc
Total Y erAury by %BY M	EI 924T	-	16	9-25	2-00	>	SEPY -912 O2 z ULMQC Mancarc
Total Y etals by BCPdY MdMuite U	EI 9-9UdT	_	6 -	2-00	2-00	`	SEPY - 912 O2 z ULMQC Mancarc
Y ethoc Clanks (Y O)							
Chlorice by DisArete Unalyser	ED9541	1	- 3	1÷, N	2-00	>	SEPY -912 O2 z ULMQC Mancarc
Dissolvec Y erAury by %BY M	EI 924%	_	6-	2-00	2-00	>	SEPY -912 O2 z ULMQC Mancarc
Dissolvec Y etals by &PaY MdMuite U	%PN6 -6 I3	-	6-	2-00	2-00	>	SEPY -912 O2 z ULMQC Mancarc
%errous Bon by DisArete Unalyser	El 9411	ı	59	2-00	2-00	>	SEPY -912 O2 z ULMQC Mancarc
I ross Ulpha anc Oeta UAtivity	EU- 49	_	13	5-59	2-00	>	SEPY -912 O2 z ULMQC Mancarc
Ya@r Cations dDissolvec	ED9j 2%	-	13	5-59	2-00	>	SEPY -912 O2 z ULMQC Mancarc
Mulfate (TurbicimetriA) as MN5 - dby DisArete Unalyser	ED9511		e-	1. N∵	2-00	>	SEPY -912 O2 z ULMQC Mancarc
Mulfice as M·d	E/ 934	1	ij	9-30	2-00	>	SEPY - 912 O2 z ULMQC Mancarc
Total Y erAury by %BY M	EI 924T	-	16	9-25	2-00	>	SEPY -912 O2 z ULMQC Mancarc
Total Y etals by BCPdY MdMuite U	EI 9-9UdT	_	6-	2-00	2-00	>	SEPY -912 O2 z ULMQC Mancarc
Y atrix Mpikes (Y M)							
Chlorice by DisArete Unalyser	ED9541		- ع	1. N.	2-00	>	SEPY - 912 O2 z ULMQC Mancarc



: 3 of 19 : EM-926355 : EYY CNSMGLTBSI PTH LTD : Mfj 941- Calranalc T2 UnAllary Page Work Nrcer Client **Pro@At** 

Y atrix: WAI ER				Evaluatio	n: * F Quality Co	ntrol fre, uenAy r	Evaluation: * F Quality Control fre, uenAy not q ithin speAfitAation; * F Quality Control fre, uenAy q ithin speAfitAation.
Quality Control Mample Type		ŏ	Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Y atrix Mpikes (Y M) dContinuec							
Dissolvec YerAury by %BYM	EI 924%	<b>-</b>	6-	2-00	2-00	>	SEPY -912 O2 z ULMQC Mancarc
Dissolvec Y etals by &PdY MdMuite U	%PN6 -6 I3	_	6-	2-00	2-00	>	SEPY -912 O2 z ULMQC Mancarc
%errous Bon by DisArete Unalyser	El 9411		59	2-00	2-00	>	SEPY - 912 O2 z ULMQC Mancarc
Mulfate (TurbicimetriA) as MN5 - dby DisArete Unalyser	ED9511		e-	 N∵	2-00	>	SEPY -912 O2 z ULMQC Mancarc
Mulfice as M·d	E/ 934	ı	Ţ	9-30	2-00	>	SEPY - 912 O2 z ULMQC Mancarc
Total Y erAury by %BY M	EI 924T	-	16	9-25	2-00	>	SEPY -912 O2 z ULMQC Mancarc
Total Yetals by BCPdY MdMuite U	EI 9-9UdT	_	6 -	2-00	2-00	>	SEPY -912 O2 z ULMQC Mancarc



EYY CNSMGLT®I PTHLTD : M1j941- Oalranalc T2 UnAilary : j of 19 : EM-926355 Page Work Nrcer **Pro@At** 

Client

**Brief Method Summaries** 

# The analytikal proAecures usec by the Environmental Division have been cevelopec from establishec internationally reAogni=ec proAecures suAh as those publishec by the GMEPUKUP&UKUManc SEPY. Bit house cevelopec proAecures are employec in the absenAe of coAumentec stancarcs or by Alient re, uest. The folloq ing report provices brief cesAriptions of the analytiAal proAecures employec for results reportec in the CertifiAate of Unalysis. MourAes from q hiAh ULM methocs have been cevelopec are provicec q ithin the Y ethoc DesAriptions.

Analytical Methods	Method	Matrix	Method Descriptions
I ross Ulpha anc Oeta UAtivity	EU-49	WUTER	UMTY D8-32œ6: Determination of gross alpha anc gross beta racioaAtivity in q ater samples by Li, uic MAntillation Counting (LMC).
Ulkalinity by PC Titrator	ED928dP	WUTER	By house: ReferenAec to UP&U - 2- 9 OThis proAecure cetermines alkalinity by automatec measurement (e.g. PC Titrate) on a settlec supernatant ali, uot of the sample using p& 5.4 for inciAeting the total alkalinity enccoint. This methoc is Aompliant q ith SEPY MAhecule Q(2)
Mulfate (TurbicimetriA) as MN5 - dby DisArete Unalyser	ED9511	WUTER	By house: ReferenAec to UP&U 5499dMN5. Dissolvec sulfate is ceterminec in a 9.54um filterec sample. Mulfate ions are Aonvertec to a barium sulfate suspension in an aAetiAaAic mecium qith barium Ahlorice. Light absorbanAe of the OaMN5 suspension is measurec by a photometer anc the MN5d- AonAentration is ceterminec by Aomparison of the reacing qith a stancarc Aurve. This methoc is Aompliant qith SEPY MAhecule Q(2)
Chlorice by DisArete Unalyser	ED9541	WUTER	By house: ReferenAec to UP&U 5499 Cl dl . The thioAyanate ion is liberatec from merAuriAthioAyanate through se, uestration of merAury by the Ahlorice ion to form nondonisec merAuriA Ahlorice.in the presenAe of ferriAions the libratec thioAynate forms highlydAolourec ferriAthioAynate q hiAh is measurec at 539 nm UP&U seal methoc - 918dfd.
Y a@r Cations dDissolvec	ED9i 2%	WUTER	By house: ReferenAec to UP&U 21-9 anc 21-4; GMEPU MW 356 d6919 anc 69-9; Cations are ceterminec by either &PdJEM or &PdY M teAhni, ues. This methoc is Ampliant q ith SEPY MAhecule Q(2) Mocium Ucsorption Ratio is AalAulatec from CaKYg anc Sa q hiAh ceterminec by ULM in house methoc QWMESNED9j 2% This methoc is Ampliant q ith SEPY MAhecule Q(2) & arcness parameters are AalAulatec basec on UP&U - 259 O. This methoc is Ampliant q ith SEPY MAhecule Q(2)
Dissolvec Y etals by ICPdY MdMuite U	El 9- 90%	WUTER	By house: Referendec to UP&U 21-4; GMEPU MW356 d69-9KULMQWBESMEI 9-9. Mamples are 9.54µm filterec prior to analysis. The BCPY MteAhni, ue utili=es a highly effidient argon plasma to ioni=e seledtec elements. Bons are then passec into a high vaAuum mass speArometerKq hiAn separates the analytes basec on their cistinAt mass to Aharge ratios prior to their measurement by a cisArete cynoce ion ceteAtor.
Total Y etals by &PoY MdMuite U	El 9-90dT	WUTER	Bh house: ReferenAec to UP&U 21-4; GMEPU MW356 d69-9KULM QWBESWEI 9-9. The BCPY MteAhni, ue utili=es a highly effiAient argon plasma to ioni=e seleAtec elements. Bans are then passec into a high vaAuum mass speAtrometerKq hiAh separates the analytes basec on their cistinAt mass to Aharge ratios prior to their measurement by a cisArete cynoce ion ceteAtor.
Dissolvec YerAury by %PY M	El 924%	WUTER	By house: Referendec to UM 2449KUP&U 211- &g dO (%loq dn@Ation (MnCl-)(Colc Vapour generation) UUM) Mamples are 9.54µm filterec prior to analysis. %BY dUUM is an automatec flameless atomiAabsorption teAhni, ue. U bromate\( \text{wromice} \) reagent is usec to oxicise any organiAmer\( \text{Aury} \) Aompouncs in the filterec sample. The ioniA mer\( \text{Aury} \) is recu\( \text{Ae} \) conline to atomiA mer\( \text{Aury} \) vapour by \( \text{MNCl-} \) qhiAh is then purgec into a heatec, uart= Aell. QuantifiAation is by Aomparing absorban\( \text{Ae} \) against a \( \text{Aelibration Aurve.} \) This methoc is \( \text{Aompliant q ith SEPY} \)
Total Y erAury by %PY M	El 924T	WUTER	By house: ReferenAec to UM 2449K UP& U 211- &g dO (%doq dn@Ation (MnCl-)(Colc Vapour generation) UUM)  ABY dUUM is an automatec flameless atomiAabsorption teAhni, ue. U bromatewbromice reagent is usec to oxicise any organiAmerAury Aompouncs in the unfilterec sample. The ioniAmerAury is recuAec online to atomiA  merAury vapour by MnCl- q hiAh is then purgec into a heatec, uart= Aell. QuantifiAation is by Aomparing absorbanAe against a Aalibration Aurve. This methoc is Aompliant q ith SEPY MAhecule O(2).



 Page
 : 19 of 19

 Work Nrcer
 : EM-926355

 Client
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 Pro0eAt
 : MIj 941- Oalranalc T2 UnAllary

Analytical Methods	Method	Matrix	Method Descriptions
%errous Bon by DisArete Unalyser	El 9411	WUTER	By house: ReferenAec to UP&U 2499 %ed). U AolorimetriAcetermination basec on the reaAtion betq een phenanthroline anc ferrous iron at p& 2 @.2 to form an orangedec Aomplex that is measurec against a five epoint Aalibration Aurve. This methoc is Aompliant q ith SEPY MAhecule Q(2).
Mulfice as M-d	E/ 934	WUTER	By house: ReferenAec to UP&U 5499dM dD. Mulfice speAies present in q ater samples are immeciately preAipitatec q hen AolleAtec in pretreatec AaustiAvrinAaAetate preservec sample Aontainers. The sulphices are Aolourec using methylene blue inciAator. SondceteAts may be sAreenec by Aomparison against a stancarc at halfd.NRKotherq ise samples are measurec using GVd/BM ceteAtion at 665nm. This methoc is Aompliant q ith SEPY MAhecule Q(2)
BoniA CalanAe by PCT DU anc Turbi MN5 DU	* ES944 dPI	WUTER	By house: ReferenAec to UP&U 1929% This methoc is Aompliant qith SEPY MAhecule O(2)
Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total ReAoverable Y etals	ES-4	WUTER	By house: ReferenAec to GMEPU MW356Q994. Yethoc 2994 is a SitriA&ycroAhloriAaAic cigestion proAecure usec to prepare surfaAe anc grounc qater samples for analysis by BCPUEMor BCPYM This methoc is Aompliant qith SEPY MAhecule Q(2)

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Environmental Division Sydney Work Order Reference ES2036846

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## CERTIFICATE OF ANALYSIS

**Environmental Division Sydney** 

: 1 of 9

Sepan Mahamad

Laboratory Contact **EMM CONSULTING PTY LTD** PAUL GIBBONS ES2036846 **Work Order** Contact Client

277-289 Woodpark Road Smithfield NSW Australia 2164 Address Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065

08-Oct-2020 14:00 +61 2 8784 8555 26-Oct-2020 Date Analysis Commenced Date Samples Received Telephone S190512 Balranald T3 Ancillary

30-Oct-2020 14:56 Issue Date BILL BULL, KAITLYN BRODIE

C-O-C number

Sampler

Order number

Telephone

Project

Address

EN/222 No. of samples analysed No. of samples received Quote number

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. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

General Comments

Analytical Results

in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Additional information pertinent to this report will be found 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
Aleksandar Vujkovic	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW



EMM CONSULTING PTY LTD S190512 Balranald T3 Ancillary 2 of 9 ES2036846 Work Order Project Client

### General Comments

In house developed procedures 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. 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

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

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. Key:

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.

EA154: ALS does not hold NATA accreditation for Laser Particle Sizing.



: 3 of 9 : ES2036846 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

Project Client

Page Work Order

Sub-Matrix: WATER (Matrix: WATER)	O	Client sample ID	PSD_01	PSD_01	PSD_01	PSD_02	PSD_02
	Client samp	Client sampling date / time	11-Oct-2020 14:45	12-Oct-2020 12:50	13-Oct-2020 16:45	12-Oct-2020 12:55	13-Oct-2020 16:45
Compound CAS Numb	CAS Number LOR	Unit	ES2036846-001	ES2036846-002	ES2036846-003	ES2036846-004	ES2036846-005
			Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C							
Suspended Solids (SS)		mg/L	<5	14	15	9	<5
EA150: Particle Sizing							
- m <sub>4</sub> 75µm		%	See Attached	See Attached	See Attached	See Attached	See Attached



Page Work Order

: 4 of 9 : ES2036846 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary Project Client

Sub-Matrix: WATER (Matrix: WATER)		Clie	Client sample ID	PSD_01	PSD_01	PSD_01	PSD_01	PSD_01
	Clie	ent samplin	Client sampling date / time	22-Sep-2020 08:30	23-Sep-2020 08:30	24-Sep-2020 08:30	25-Sep-2020 11:30	26-Sep-2020 11:30
Compound	CAS Number LOR	LOR	Unit	ES2036846-010	ES2036846-011	ES2036846-012	ES2036846-013	ES2036846-014
			1	Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C	ပ္							
Suspended Solids (SS)		2	mg/L	<5	<5	15	<5	<5
EA150: Particle Sizing								
ø +75µm	1	-	%	See Attached	See Attached	See Attached	See Attached	See Attached



Client Project

: EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

: 5 of 9 : ES2036846

Page Work Order

01-Oct-2020 11:30 ES2036846-019 See Attached PSD\_01 Result **~** 30-Sep-2020 11:30 ES2036846-018 See Attached PSD\_01 Result **~** 29-Sep-2020 11:30 ES2036846-017 See Attached PSD\_01 Result × 2 28-Sep-2020 11:30 ES2036846-016 See Attached PSD\_01 Result **2** 27-Sep-2020 11:30 ES2036846-015 See Attached PSD\_01 Result < 2 Client sample ID Client sampling date / time mg/L Unit % LOR 2 CAS Number | EA025: Total Suspended Solids dried at 104 ± 2°C Suspended Solids (SS) EA150: Particle Sizing Sub-Matrix: WATER (Matrix: WATER) Compound m +75µm



Project Client

: 6 of 9 : ES2036846 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

Page Work Order

Sub-Matrix: WATER (Matrix: WATER)	Ċ	Client sample ID	PSD_01	PSD_01	PSD_01	PSD_01	PSD_02
	Client sampli	Client sampling date / time	02-Oct-2020 11:30	03-Oct-2020 11:30	04-Oct-2020 11:30	05-Oct-2020 11:30	22-Sep-2020 08:30
Compound CAS Number LOR	, LOR	Unit	ES2036846-020	ES2036846-021	ES2036846-022	ES2036846-023	ES2036846-033
			Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C							
Suspended Solids (SS)	- 2	mg/L	<5	<5	<5	<5	<5
EA150: Particle Sizing							
	-	%	See Attached	See Attached	See Attached	See Attached	See Attached



: 7 of 9 : ES2036846 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary Analytical Results

Project Client

Page Work Order

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Sub-Matrix: WATER (Matrix: WATER)	Cli	Client sample ID	PSD_02	PSD_02	PSD_02	PSD_02	PSD_02
)	Client sampl	Client sampling date / time	23-Sep-2020 16:45	24-Sep-2020 08:30	25-Sep-2020 11:30	26-Sep-2020 11:30	27-Sep-2020 11:30
Compound CAS Number LOR	r LOR	Unit	ES2036846-034	ES2036846-035	ES2036846-036	ES2036846-037	ES2036846-038
			Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C							
Suspended Solids (SS)	. 5	mg/L	<5	7	14	15	<5
EA150: Particle Sizing							
	-	%	See Attached	See Attached	See Attached	See Attached	See Attached



: EMM CONSULTING PTY LTD	: S190512 Balranald T3 Ancillary
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: 8 of 9 : ES2036846

Page Work Order

Sub Motive MATED		Client samula ID	DSD 03	20 030	BSD 03	000	DSD 03
(Matrix: WATER)			20-05	20-05	20-051	79D_02	20-05
	Client san	Client sampling date / time	28-Sep-2020 11:30	29-Sep-2020 11:30	30-Sep-2020 11:30	01-Oct-2020 11:30	02-Oct-2020 11:30
Compound   CAS Numt	CAS Number LOR	Unit	ES2036846-039	ES2036846-040	ES2036846-041	ES2036846-042	ES2036846-043
			Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C							
Suspended Solids (SS)		mg/L	11	12	10	28	9
EA150: Particle Sizing							
ø +75μm		%	See Attached	See Attached	See Attached	See Attached	See Attached



Page Work Order

: 9 of 9 : ES2036846 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary Project Client

CAS Number LOR cas Number LOR sd Solids dried at 104 ± 2°C	04-Oct-2020 11:30  ES2036846-045  Result	05-Oct-2020 11:30  ES2036846-046  Result	 
EA150: Particle Sizing 1 % See Attached	24 See Attached	24 See Attached	 



## QUALITY CONTROL REPORT

**Environmental Division Sydney** Sepan Mahamad : 1 of 3 Laboratory Contact **EMM CONSULTING PTY LTD** PAUL GIBBONS ES2036846 **Work Order** Contact

277-289 Woodpark Road Smithfield NSW Australia 2164 Address Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065

Address

Client

Project

+61 2 8784 8555 08-Oct-2020 26-Oct-2020 30-Oct-2020 Date Analysis Commenced Date Samples Received Telephone Issue Date S190512 Balranald T3 Ancillary BILL BULL, KAITLYN BRODIE EN/222 No. of samples received C-O-C number Quote number Order number Telephone Sampler

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full. This Quality Control Report contains the following information:

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

Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits

No. of samples analysed

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.

Accieditation category	Newcastle - Inorganics, Mayfield West, NSW	Sydney Inorganics, Smithfield, NSW	Sydney Inorganics, Smithfield, NSW
LOSIGOL	Laboratory Technician	Inorganic Chemist	Senior Chemist
Signatories	Aleksandar Vujkovic	Ankit Joshi	Ashesh Patel



### General Comments

In house developed procedures 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. 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 primary

Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot 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

RPD = Relative Percentage Difference

# = Indicates failed QC

### Laboratory Duplicate (DUP) Report

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

Sub-Matrix: WATER						Laboratory D	Laboratory Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number LOR	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Original Result Duplicate Result RPD (%) Recovery Limits (%)
EA025: Total Susper	EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 3328253)	CQC Lot: 3328253)							
ES2036846-010	PSD_01	EA025H: Suspended Solids (SS)	1	2	mg/L	<5	21	123	No Limit
ES2036846-019	PSD_01	EA025H: Suspended Solids (SS)	-	2	mg/L	<5	<5	0.00	No Limit
EA025: Total Susper	EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 3331029)	CQC Lot: 3331029)							
ES2036846-001	PSD_01	EA025H: Suspended Solids (SS)	-	2	mg/L	<5	12	78.8	No Limit
ES2036846-041	PSD_02	EA025H: Suspended Solids (SS)		2	mg/L	10	23	75.6	No Limit



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

parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target 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 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.

Method Blank (MB)

Laboratory Control Spike (LCS) Report

Sub-Matrix: WATER

				Report	Spike	Spike Recovery (%)	Recovery Limits (%)	imits (%)
Method: Compound CAS N	CAS Number	LOR	Unit	Result	Concentration	SOT	Low	High
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 3328253)	53)							
EA025H: Suspended Solids (SS)		5	mg/L	<5	150 mg/L	106	83.0	129
				<5	1000 mg/L	103	82.0	110
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 3331029)	29)							
EA025H: Suspended Solids (SS)		5	mg/L	<5	150 mg/L	99.3	83.0	129
				<5	1000 mg/L	98.0	82.0	110

### 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.

No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.



# QA/QC Compliance Assessment to assist with Quality Review

Page : 1 of 7	••	Telephone : +61 2 8784 8555	Date Samples Received : 08-Oct-2020	Issue Date : 30-Oct-2020	No. of samples received : 33	No. of samples analysed : 33
: ES2036846	EMM CONSULTING PTY LTD	: PAUL GIBBONS	: S190512 Balranald T3 Ancillary	1.	: BILL BULL, KAITLYN BRODIE	:
Work Order	Client	Contact	Project	Site	Sampler	Order number

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 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 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.

- Mothod Blank value outliers occur.
- NO Duplicate outliers occur.
- NO Laboratory Control outliers occur.
- NO Matrix Spike outliers occur.
- For all regular sample matrices, NO surrogate recovery outliers occur.

## Outliers: Analysis Holding Time Compliance

Analysis Holding Time Outliers exist - please see following pages for full details.

# **Outliers: Frequency of Quality Control Samples**

NO Quality Control Sample Frequency Outliers exist.



Outliers: Analysis Holding Time Compliance

EMM CONSULTING PTY LTD S190512 Balranald T3 Ancillary

ES2036846

Work Order

Client Project Matrix: WATER

overdue Days 9 19 8 16 15 16 15 17 1 26 25 24 23 24 6 ∞ 27 22 Due for analysis 29-Sep-2020 04-Oct-2020 08-Oct-2020 09-Oct-2020 10-Oct-2020 10-Oct-2020 11-Oct-2020 19-Oct-2020 20-Oct-2020 30-Sep-2020 01-Oct-2020 02-Oct-2020 03-Oct-2020 03-Oct-2020 08-Oct-2020 09-Oct-2020 11-Oct-2020 12-Oct-2020 18-Oct-2020 26-Oct-2020 Date analysed 26-Oct-2020 26-Oct-2020 26-Oct-2020 27-Oct-2020 27-Oct-2020 26-Oct-2020 27-Oct-2020 27-Oct-2020 27-Oct-2020 26-Oct-2020 26-Oct-2020 26-Oct-2020 27-Oct-2020 26-Oct-2020 27-Oct-2020 27-Oct-2020 27-Oct-2020 26-Oct-2020 overdue Days Extraction / Preparation Due for extraction 1 Date extracted 1 1 PSD\_02 PSD\_02 PSD 02 PSD\_02 PSD\_02 PSD 02 PSD\_02 EA025: Total Suspended Solids dried at 104 ± 2°C Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Clear Plastic Bottle - Natural Container / Client Sample ID(s) PSD\_01, PSD\_01, PSD 01, PSD\_01 PSD 02 PSD\_01 PSD\_02 PSD\_01 PSD 02 PSD 01, PSD 01, PSD\_01, PSD\_01, PSD\_02 PSD\_01



Matrix: WATER						
Method	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)	Date extracted	Date extracted Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA025: Total Suspended Solids dried at 104 ± 2°C - Analysis Holding Time Compliance						
Clear Plastic Bottle - Natural						
PSD_02			1	27-Oct-2020	04-Oct-2020	23
Clear Plastic Bottle - Natural						
PSD_01				26-Oct-2020	05-Oct-2020	21
Clear Plastic Bottle - Natural						
PSD_02		-	-	27-Oct-2020	05-Oct-2020	22
Clear Plastic Bottle - Natural						
PSD_01				26-Oct-2020	06-Oct-2020	20
Clear Plastic Bottle - Natural						
PSD_02				27-Oct-2020	06-Oct-2020	21
Clear Plastic Bottle - Natural						
PSD_01	-	-	-	26-Oct-2020	07-Oct-2020	19
Clear Plastic Bottle - Natural						
PSD_02	-	1	1	27-Oct-2020	07-Oct-2020	20

## 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.

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

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. Evaluation:  $\times$  = Holding time breach;  $\checkmark$  = Within holding time.

Matrix: WATER

					)		0
Method	Sample Date	Ex	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H) PSD_01	01-Oct-2020	ł	1		26-Oct-2020	08-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_02	01-Oct-2020	1	-		27-Oct-2020	08-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01	02-Oct-2020	ł	1		26-Oct-2020	09-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_02	02-Oct-2020	1	-		27-Oct-2020	09-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01	03-Oct-2020	1	-		26-Oct-2020	10-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_02	03-Oct-2020	l	1		27-Oct-2020	10-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01	04-Oct-2020	ł	1		26-Oct-2020	11-Oct-2020	×



 Page
 : 4 of 7

 Work Order
 : ES2036846

 Client
 : EMM CONSULTING PTY LTD

 Project
 : S190512 Balranald T3 Ancillary

Matrix: WATER				Evaluation:	x = Holding time	Evaluation: $\mathbf{x}=Holding$ time breach ; $\checkmark=Within$ holding time.	holding time.
Method	Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Olient Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA025: Total Suspended Solids dried at 104 ± 2°C - Continued							
Clear Plastic Bottle - Natural (EA025H) PSD_02	04-Oct-2020	!		-	27-Oct-2020	11-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01,	05-Oct-2020	l	-		27-Oct-2020	12-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H)	11-Oct-2020	I	I	1	27-Oct-2020	18-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01, PSD_02	12-Oct-2020	I	1		27-Oct-2020	19-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01,	13-Oct-2020	l	-		27-Oct-2020	20-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01,	22-Sep-2020	l	-		26-Oct-2020	29-Sep-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01,	23-Sep-2020	I	I		26-Oct-2020	30-Sep-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01,	24-Sep-2020	I	1		26-Oct-2020	01-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01,	25-Sep-2020	l	-		26-Oct-2020	02-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01	26-Sep-2020	I	-	-	26-Oct-2020	03-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_02	26-Sep-2020			!	27-Oct-2020	03-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01	27-Sep-2020	l		-	26-Oct-2020	04-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_02	27-Sep-2020				27-Oct-2020	04-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01	28-Sep-2020				26-Oct-2020	05-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_02	28-Sep-2020				27-Oct-2020	05-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01	29-Sep-2020				26-Oct-2020	06-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_02	29-Sep-2020			-	27-Oct-2020	06-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_01	30-Sep-2020	1	-	-	26-Oct-2020	07-Oct-2020	×
Clear Plastic Bottle - Natural (EA025H) PSD_02	30-Sep-2020	1	-	-	27-Oct-2020	07-Oct-2020	×



: 5 of 7 : ES2036846 : EMM CONSULTING PTY LTD : S190512 Balranald T3 Ancillary

Page Work Order Client Project

Matrix: WATER			1	:	Evaluation	: x = Holding time	Evaluation: * = Holding time breach; < = Within holding time.	holding time.
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA150: Particle Sizing								
Clear Plastic Bottle - Natural (EA154)	PSD_02	01-Oct-2020	I			26-Oct-2020	30-Mar-2021	>
Clear Plastic Bottle - Natural (EA154)	PSD_02	02-Oct-2020	I	1		26-Oct-2020	31-Mar-2021	>
Clear Plastic Bottle - Natural (EA154)	PSD_02	03-Oct-2020	I	1		26-Oct-2020	01-Apr-2021	>
Clear Plastic Bottle - Natural (EA154)	PSD_02	04-Oct-2020	I	1		26-Oct-2020	02-Apr-2021	>
Clear Plastic Bottle - Natural (EA154) PSD_01,	PSD_02	05-Oct-2020	I	1	-	26-Oct-2020	03-Apr-2021	>
Clear Plastic Bottle - Natural (EA154)		11-Oct-2020	I	I	1	26-Oct-2020	09-Apr-2021	>
Clear Plastic Bottle - Natural (EA154)	PSD_02	12-Oct-2020	I	I	1	26-Oct-2020	10-Apr-2021	>
Clear Plastic Bottle - Natural (EA154)	PSD_02	13-Oct-2020	I	I	1	26-Oct-2020	11-Apr-2021	>
Clear Plastic Bottle - Natural (EA154) PSD_01,	PSD_02	22-Sep-2020	I	I	-	26-Oct-2020	21-Mar-2021	>
Clear Plastic Bottle - Natural (EA154) PSD_01,	PSD_02	23-Sep-2020	1	-		26-Oct-2020	22-Mar-2021	>
Clear Plastic Bottle - Natural (EA154)	PSD_02	24-Sep-2020	I	I	1	26-Oct-2020	23-Mar-2021	>
Clear Plastic Bottle - Natural (EA154) PSD_01,	PSD_02	25-Sep-2020	1	1	-	26-Oct-2020	24-Mar-2021	>
Clear Plastic Bottle - Natural (EA154) PSD_01,	PSD_02	26-Sep-2020	I	I	-	26-Oct-2020	25-Mar-2021	>
Clear Plastic Bottle - Natural (EA154) PSD_01,	PSD_02	27-Sep-2020	I	I	-	26-Oct-2020	26-Mar-2021	>
Clear Plastic Bottle - Natural (EA154) PSD_01,	PSD_02	28-Sep-2020	-		-	26-Oct-2020	27-Mar-2021	>
Clear Plastic Bottle - Natural (EA154) PSD_01,	PSD_02	29-Sep-2020				26-Oct-2020	28-Mar-2021	>
Clear Plastic Bottle - Natural (EA154) PSD_01,	PSD_02	30-Sep-2020	ļ	-		26-Oct-2020	29-Mar-2021	>



 Page
 : 6 of 7

 Work Order
 : ES2036846

 Client
 : EMM CONSULTING PTY LTD

 Project
 : S190512 Balranald T3 Ancillary

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 following report summarises the frequency of laboratory QC samples analys the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: WATER				Evaluation	r: x = Quality Co	ntrol frequency r	Evaluation: x = Quality Control frequency not within specification; ✓ = Quality Control frequency within specification.
Quality Control Sample Type		Count	ınt		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Suspended Solids (High Level)	EA025H	4	40	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Suspended Solids (High Level)	EA025H	4	40	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Suspended Solids (High Level)	EA025H	2	40	5.00	5.00	>	NEPM 2013 B3 & ALS QC Standard



 Page
 : 7 of 7

 Work Order
 : ES2036846

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512 Balranald T3 Andillary

**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.

od middle of Arialysis. Odd doo not might have been developed at a provided within the medical before			are meaned executives.
Analytical Methods	Method	Matrix	Method Descriptions
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C. This method is compliant with NEPM Schedule B(3)
Particle Sizing in Water by Laser Diffraction Analysis	* EA154	WATER	Particle Size Analysis of Particulates in Water by Laser Diffraction Analysis according to APHA Method 2560D

Connote / Courier: Relinquished By / Date: Organised By / Date:

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2   BH-M245   191102020 16.20   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.50   1.5				-			ENVIENTER 12 Ashi
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14   BHAMSD   161102020 8-10   15   BHAMSD   161102020 8-10   15   BHAMSS   161102020 8-20   17   BSD 01   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17   BSD 02   17				-			
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6   LPSPB04   17710/2020 8:20   PSD 01   11710/2020 12:50   PSD 01   12710/2020 12:50   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD 02   PSD			-	-			
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7   QA1   15102020 16.45   15102020 16.30   15102020 15.30   15102020 15.30   15102020 15.30   15102020 12.00   17102020 12.00   17102020 12.00   17102020 12.00   17102020 12.00   17102020 12.00   17102020 12.00   17102020 12.00   17102020 12.00   17102020 12.00   17102020 12.00   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17102020   17		-			-	Please report PSD sumples in a separate	_
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Envirolab Services 12 Ashley St Chatswood NSW 2067 Ph: (02) 9910 6200



**Envirolab Services Pty Ltd** 

ABN 37 112 535 645 12 Ashley St Chatswood NSW 2067 ph 02 9910 6200 fax 02 9910 6201 customerservice@envirolab.com.au www.envirolab.com.au

### **CERTIFICATE OF ANALYSIS 253949**

Client Details	
Client	EMM Consulting Pty Ltd
Attention	P Gibbons
Address	188 Normanby Rd, SOUTHBANK, VIC, 3006

Sample Details	
Your Reference	<u>\$190512</u>
Number of Samples	2 Water
Date samples received	21/10/2020
Date completed instructions received	21/10/2020

### **Analysis Details**

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details				
Date results requested by	28/10/2020			
Date of Issue	28/10/2020			
NATA Accreditation Number 2901. This document shall not be reproduced except in full.				
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *				

### **Results Approved By**

Diego Bigolin, Team Leader, Inorganics Jaimie Loa-Kum-Cheung, Metals Supervisor Priya Samarawickrama, Senior Chemist **Authorised By** 

Nancy Zhang, Laboratory Manager

Envirolab Reference: 253949 Revision No: R00



### Client Reference: S190512

Ion Balance			
Our Reference		253949-1	253949-2
Your Reference	UNITS	QC1	QC2
Date Sampled		15/10/2020	17/10/2020
Type of sample		Water	Water
Date prepared	-	22/10/2020	22/10/2020
Date analysed	-	22/10/2020	22/10/2020
Calcium - Dissolved	mg/L	600	700
Potassium - Dissolved	mg/L	46	38
Sodium - Dissolved	mg/L	14,000	14,000
Magnesium - Dissolved	mg/L	1,600	1,700
Hydroxide Alkalinity (OH <sup>-</sup> ) as CaCO <sub>3</sub>	mg/L	<5	<5
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	380	270
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	<5	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	380	270
Sulphate, SO4	mg/L	3,600	4,400
Chloride, Cl	mg/L	18,000	20,000
Ionic Balance	%	12	10

Envirolab Reference: 253949

Revision No: R00

### Client Reference: S190512

HM in water - dissolved						
Our Reference		253949-1	253949-2			
Your Reference	UNITS	QC1	QC2			
Date Sampled		15/10/2020	17/10/2020			
Type of sample		Water	Water			
Date prepared	-	23/10/2020	23/10/2020			
Date analysed	-	23/10/2020	23/10/2020			
Arsenic-Dissolved	μg/L	<1	2			
Cadmium-Dissolved	μg/L	<0.1	<0.1			
Chromium-Dissolved	μg/L	<1	4			
Copper-Dissolved	μg/L	<1	1			
Lead-Dissolved	μg/L	<1	<1			
Mercury-Dissolved	μg/L	<0.05	<0.05			
Nickel-Dissolved	μg/L	<1	5			
Zinc-Dissolved	μg/L	73	3			

Envirolab Reference: 253949 Revision No: R00

HM in water - total		
Our Reference		253949-2
Your Reference	UNITS	QC2
Date Sampled		17/10/2020
Type of sample		Water
Date prepared	-	23/10/2020
Date analysed	-	23/10/2020
Arsenic-Total	μg/L	3
Cadmium-Total	μg/L	0.1
Chromium-Total	μg/L	6
Copper-Total	μg/L	5
Lead-Total	μg/L	<1
Mercury-Total	μg/L	<0.05
Nickel-Total	μg/L	8
Zinc-Total	μg/L	9

Envirolab Reference: 253949

Revision No: R00

Miscellaneous Inorganics			
Our Reference		253949-1	253949-2
Your Reference	UNITS	QC1	QC2
Date Sampled		15/10/2020	17/10/2020
Type of sample		Water	Water
Date prepared	-	22/10/2020	22/10/2020
Date analysed	-	22/10/2020	22/10/2020
Ferrous Iron	mg/L	1.7	<0.05
Sulphide	mg/L	<0.5	<0.5

Method ID	Methodology Summary
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 10% ie total anions = total cations +/-10%.
Inorg-051	Sulphide determined titrimetrically based on APHA latest edition 4500 S2- F. Note, the Sulphide is termed as Total Sulphide given any Sulphide contained in any sediment present is also included in the determination.
Inorg-076	Ferrous Iron is determined colourimetrically by discrete analyser. Waters samples are filtered on receipt prior to analysis.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis.  Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.

Envirolab Reference: 253949

Revision No: R00

QUALI	TY CONTRO	L: Ion Ba	lance			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			22/10/2020	[NT]		[NT]	[NT]	22/10/2020	
Date analysed	-			22/10/2020	[NT]		[NT]	[NT]	22/10/2020	
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	106	
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	97	
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	111	
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	110	
Hydroxide Alkalinity (OH <sup>-</sup> ) as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	100	
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]		[NT]	[NT]	109	
Chloride, Cl	mg/L	1	Inorg-081	<1	[NT]		[NT]	[NT]	95	

QUALITY CO	NTROL: HI	/l in water	- dissolved			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date prepared	-			23/10/2020	[NT]		[NT]	[NT]	23/10/2020	
Date analysed	-			23/10/2020	[NT]		[NT]	[NT]	23/10/2020	
Arsenic-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	91	
Cadmium-Dissolved	μg/L	0.1	Metals-022	<0.1	[NT]		[NT]	[NT]	87	
Chromium-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	94	
Copper-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	101	
Lead-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	100	
Mercury-Dissolved	μg/L	0.05	Metals-021	<0.05	[NT]		[NT]	[NT]	103	
Nickel-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	93	
Zinc-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	94	

QUALITY	CONTROL:	HM in wa	ter - total			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			23/10/2020	[NT]		[NT]	[NT]	23/10/2020	
Date analysed	-			23/10/2020	[NT]		[NT]	[NT]	23/10/2020	
Arsenic-Total	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	90	
Cadmium-Total	μg/L	0.1	Metals-022	<0.1	[NT]		[NT]	[NT]	86	
Chromium-Total	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	94	
Copper-Total	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	102	
Lead-Total	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	102	
Mercury-Total	μg/L	0.05	Metals-021	<0.05	[NT]		[NT]	[NT]	98	
Nickel-Total	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	92	
Zinc-Total	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	97	

QUALITY CO	NTROL: Mis	cellaneou	s Inorganics			Du <sub>l</sub>	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			22/10/2020	[NT]		[NT]	[NT]	22/10/2020	
Date analysed	-			22/10/2020	[NT]		[NT]	[NT]	22/10/2020	
Ferrous Iron	mg/L	0.05	Inorg-076	<0.05	[NT]		[NT]	[NT]	86	
Sulphide	mg/L	0.5	Inorg-051	<0.5	[NT]		[NT]	[NT]	81	

Result Definiti	ons
NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Envirolab Reference: 253949

Revision No: R00

<b>Quality Control</b>	ol Definitions
Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

### **Laboratory Acceptance Criteria**

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

# **Report Comments**

Dissolved Metals: no filtered, preserved sample was received for 253949-1, therefore the unpreserved sample was filtered through 0.45µm filter at the lab. Note: there is a possibility some elements may be underestimated.

Envirolab Reference: 253949 Page | 13 of 13 R00

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Telephone · + 61-3-8549 9600

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Work Order Reference EM2020793

**Environmental Division** 

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Additional Information

ANALYSIS REGUIRED including SUITES (NB. Sute Codes must be inted to attnot authopine)

CONTAINER INFORMATION

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ROJECT MANAGER: Paul Glibbons HPLER Haltyn Brodie Fell Bull

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invoice to: accounts@emmonauThg.com.au, pgibbons@emmonauThg.com.ev

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# CERTIFICATE OF ANALYSIS

Laboratory E2 2 CONSGLTINP DTY LTI E2 03037MU **Work Order** Contact

2 6 estall Rd Springvale VIC Australia 3171 Shane Colley Contact Address Ground Floor Suite 1 VO Chandos Street St Leonards NS6 NS6 W054 PAUL GIBBONS

**Environmental Division Melbourne** 

: 1 of 12

V2-Nov-V0V0 10:24 +51-3-8429 9500 : W4-Nov-W0W0 Date Analysis Commenced Date Samples Received Telephone S19041W

Order number

Sampler

Telephone

Project

Address

Client

02-Dec-W0W0 11:21 Issue Date BILL BULL, KAITLON BRODIE ENWWW 30 No. of samples analysed No. of samples received C-O-C number / uote number

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

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

This Certificate of Analysis contains the follo) ing information:

General Comments

Analytical Results

Surrogate Control Limits

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# Signatories

This document has been electronically signed by the authorized signatories belo). Electronic signing is carried out in compliance) ith procedures specified in W GFR Part 11.

Signatories	Position	Accreditation Category
Arenie Vijayaratnam	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC
NiYYI Stepnie) sYi	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Titus Vimalasiri	Metals Teamleader	Radionuclides, Fysh) icY, ACT
Hina Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



**EMM CONSULTING PTQ LTD** EMW0W0793

S19041W 6 or Y Order Project Client

# General Comments

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

6 here moisture determination has been performed, results are reported on a dry) eight basis.

6 here a reported less than k=( result is higher than the LOR, this may be due to primary sample extractwigestate dilution andwor insufficient sample for analysis.

6 here the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample kreduced) eight employed( or matrix interference.

6 hen sampling time information is not provided by the client, sampling dates are sho) n ) ithout a time component. In these instances, the time component has been assumed by the laboratory for processing

6 here a result is re<uired to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details

CAS Number ø CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. Key:

Bø This result is computed from individual analyte detections at or above the level of reporting LOR & Limit of reporting

~ ø ALS is not NATA accredited for these tests

ø Indicates an estimated value.

ED037-P: EMW0W0793 #WX 3. AlYalinity has been confirmed via re-preparation and re-analysis.

EP080: 6 here reported, Total Hylenes is the sum of the reported concentrations of mXp-Hylene and o-Hylene at or above the LOR.

EG0V0-F: EMVV0V0793#1-VWVdissolved metal re-uired dilution prior analysis due to sample matrix. LORs have been adjusted accordingly.

EG0V0-T: EMVWVV793 #V/ #2, #5, #14 and #19 total metal re-uired dilution prior analysis due to sample matrix. LORs have been adjusted accordingly

EG0V0-T: EMV0V0793 #V6-V6 results for total metal have been confirmed by re-digestion and re-analysis

EP080: Sample TRIP SPIKE contains volatile compounds spiYed into the sample containers prior to dispatch from the laboratory. BTEHN compounds spiYed at W ugw.

lonic balances) ere calculated using: major anions - chloride, alYalinity and sulfate&and major cations - calcum, magnesium, potassium and sodium.

LOR for Gross Alpha and Gross Beta raised due to high solid content.

ED024G: The presence of thiocyanate can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly

EK084: EMWW0793-00WPoor matrix spiYe recovery for sulphide due to sample matrix. Confirmed by re-extraction and re-analysis

EK084: EMVWW793-0VWPoor matrix spiYe recovery for sulphide due to sample matrix. Confirmed by re-extraction and re-analysis.

EG034F: EMWWV9793 #Wand VW/Poor matrix spiYe recovery for mercury due to sample matrix. Confirmed by re-extraction and re-analysis.

Sodium Adsorption Ratio k) here reported (: 6 here 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 X Mg relative to the assumption that =LOR is e-uivalent to the LOR concentration.



: 3 of 12 : EMW0W793 : EMM CONSULTING PTQ LTD : S19041W Analytical Results Project Client

			9					
Sub-Matrix: WATER  **Matrix: WATER(			Sai rife io	GP 2 12 41	GP2 P2 45	GP 2 P2 01	GP2 H2 0S	GP 2 P2 - 1
		Sal main	Sal ming date / til e	14-Nov-W0W0 1W14	14-Nov-WWW 1W30	15-Nov-WWW 11:14	15-Nov-WWW 11:30	14-Nov-WWW 12:14
Col mound C	CAS Nul ber	LOR	Unit	E2 03037MJB34	E2 03037MJI\$30	E2 03037MJH83U	E2 03037MJ#3-	E2 03037MJH83)
				Result	Result	Result	Result	Result
Ei 3U/D: Afkl ftatr, u, DC Ttrrl ror								
5, droxtde Afkl ftatr, I wCI COU	DMO-W0-001	-	mgvk	=1	=1	1=	=1	=1
CI ruoal re Afki ftatri, I w CI COU	381W3W5	-	mgv/L	1	1	1=	=	1
6 tQ ruoal re Afkl ftatr, I wCI COU	71-4W3	~	mgvk	-04	- 40	W0 -	821	-44
Torl f Afkl ftatn, I wCI COU		<b>-</b>	mgvk	- 04	-40	- ОМ	821	-44
Ei 3-4P: Sgfrhre Tfgrutdtp emtQ I wSO-0Hu, i A	4 -							
Sgfrhre I wSO- HTgrutdtp errtQ	12808-79-8	<b>~</b>	mgvk	- 093	) 433	ม	) 003	-0-3
Ei 3-) P: Csfortde u, i twQrene Aalf, wer								
Csfortde	15887-00-5	-	mgvk	47UB3	00033	4903	4MMB3	49033
Ei 3MJF: i twwof. ed 2 l jor Cl rtoaw								
CI fCtgp	7220-70-W	<b>-</b>	mgvk	800	7NB	₩ (	- (2	178
2 I caewtgp	7239-94-2	-	mgvk	4843	4M.3	48-3	4933	4833
Sodtgp	7220-W8-4	~	mgvk	44033	4) - 33	44833	40733	44033
Dorl wwtgp	7220-09-7	~	mgvk	)3	4-	Ψ-	n-	6-
EP 303F: itwoof. ed 2 ent fwu, ICDH2 S								
ArweatQ	7220-38-W	0.001	mgvk	=0.00W	3/337	=0.00W	3.830	=0.00W
CI dp tgp	7220-23-9	0.0001	mgv/L	=0.000W	=0.000W	=0.000W	=0.000W	=0.000W
Csrop tgp	7220-27-3	0.001	mgvk	=0.00W	=0.00W	=0.00W	3.838	=0.00W
Cohher	7220-40-8	0.001	mgvk	=0.00W	3/330	=0.00W	=0.00W	=0.00W
NtCkef	7220-0W0	0.001	mgvk	=0.00W	3%3U	=0.00W	3.84)	=0.00W
Lel d	7239-9W1	0.001	mgv/L	=0.00W	=0.00W	=0.00W	=0.00W	=0.00W
ZtaQ	7220-55-5	0.004	mgvk	=0.010	=0.010	3/348	3403	3.948
EP303T: Tonf2 enfwu, ICDH2 S								
ArweatQ	7220-38-W	0.001	mgvk	===	3.83M	<b>=</b>	3.830	#
CI dp tgp	7220-23-9	0.0001	mgvk	<b>=</b>	=0.000W	#	=0.000W	₹
Csrop tgp	7220-27-3	0.001	mgvk	<b>=</b>	3/83-	#	3.83-	<b>=</b>
Cohher	7220-40-8	0.001	mgvk	<b>=</b>	3/837	#	3.838	₹
NtCkef	7220-0W0	0.001	mgvk	<b>=</b>	3/34)	<b>=</b>	3.208	₹
Pled	7239-9W1	0.001	mgvk	<b>=</b>	3/330	#	=0.00W	<b>=</b>
ZtaQ	7220-55-5	0.004	mgvk	<b>=</b>	3/303	#	3.9UB	#
EP3U) F: i twwof. ed 2 er Cgr, u, FI2 S								
2 erQgr,	7239-97-5	0.0001	mgvk	=0.0001	=0.0001	=0.0001	=0.0001	=0.0001
EP3U)T: Torlf ReCo. erl ufe 2 er Cgr, u, FI2 S	0							
2 erQgr,	7239-97-5	0.0001	mgvk	<b>=</b>	=0.0001	#	=0.0001	₹
EP 3) 4P: Ferrogwlroa u, i tworere Aal f, wer								



Analytical Results

Project Client

: 2 of 12 : EMW0W793 : EMM CONSULTING PTQ LTD : S19041W

Sub-Matrix: WATER  Matrix: WATER(		Sal me ID	GP 2 12 4i	GP2 12 4S	GP 2 H2 0i	GP2 H2 0S	GP 2 12 - i
	Sal m	Sal ming date / til e	14-Nov-W0W0 1W14	14-Nov-WWW 1W30	15-Nov-WWW 11:14	15-Nov-WWW 11:30	14-Nov-WWW 12:14
Col mound CAS Nul ber	LOR	Unit	E2 03037 MJ#334	E2 03037MJH\$30	E2 03037MU83U	E2 03037MJ#3-	E2 03037MJ#3)
			Result	Result	Result	Result	Result
EP 3) 4P: Ferrogwlroa u, i tworene Aal f, wer HCoartaged							
Ferrogwiroa	0.04	mgvk	474	3/89	64/0	=0.04	4/88
EK39) 2 : Sgfrtde I wS0H							
<b>Sgiftde I wS0H</b> 18295-W4-8	0.1	mgvk	=0.1	=0.1	=0.1	=0.1	=0.1
EN3)): loatQ61fl aQe							
~ Torl f Aatoaw	0.01	me<\/r	86 (	78M	847	878	843
~ Torl fCl rtoaw	0.01	me<\/r	8) 0	973	873	7UM	8-M
~ loatQ61 fl a Qe	0.01		10/	8/4M	- 48	- ۸.8	USM



Analytical Results

Project Client

: 4 of 12 : EMW0W793 : EMM CONSULTING PTQ LTD : S19041W

Matrix: WATER(			L	) († !!			# 7 0 0	
		Sal ming	nping date / til e	14-Nov-W0W 07:W0	13-Nov-WWW 15:24	13-Nov-WWW 14:24	12-Nov-WWW 08:00	12-Nov-W0W0 07:14
	CAS Nul ber	LOR	Unit	E2 03037MJ#38	E2 03037MJI\$37	E2 03037MJB39	E2 03037MJH\$3M	E2 03037MJH\$43
				Result	Result	Result	Result	Result
EA0) 3: ProwwAffnsl I ad 6 erl AQt. tr)								
Prowwuerl		0.10	B<₩	O-MU	##	##	=/W06	=W54
Ei 3U/D: Afkl ffath, u, DC Ttrrl ror								
5, droxtde Afkl ftatr, I wCI COU DMO-1	DMO-W0-001	-	mgv/L	=1	=1	=1	=1	=1
CI ruoal re Afki ftatri, I w CI COU	381W3W5	-	mgw	=1	=1	1=	=1	=
6 tQ ruoal re Afkl fatn I wCI COU	71-4W3	-	mgv/k	ണ	-80	-20	-87	e T
Tori f Afki ftatı) I wCI COU	1	-	mgv/k	ണ	-80	٦٠.	-87	e T
Ei 3-4P: Sgfrhre Tf grutdtp enrtQ I wSO-0Hu, i A								
Sgfrhre I wSO- HTgrutdtp errtQ 128	12808-79-8	1	mgvk	) NB3	03	-7-3	UM73	)3
Ei 3-) P: Csfortde u, i twΩrene Aal f, wer								
	15887-00-5	<b>-</b>	mgvk	00/733	49) 33	4MVB3	47833	00433
Ei 3MJF: i twwof. ed 2 I jor CI rtoaw								
	7220-70-W	-	mgvk	78U	) 84	7-0	) 43	8-4
dß	7239-94-2	-	mgv/k	47MB	4833	4703	4) 33	49 LB
Sodtgp 72	7220-W8-4	<b>-</b>	mgv/k	4) 333	44033	40) 33	43733	4-833
Dorl wwtgp 72	7220-09-7	-	mgw	70	6-	80-	6-	⊉
EP303F: i twof. ed 2 en fwu, ICDH2 S								
ArweatQ 72	7220-38-W	0.001	mgv/L	=0.00W	=0.00W	=0.00W	3.838	#0.00W
CI dp tgp 72	7220-23-9	0.0001	mgvk	=0.000W	=0.000W	=0.000W	=0.000W	=0.000W
Csrop tgp 72	7220-27-3	0.001	mgv/k	=0.00W	=0.00W	=0.00W	=0.00W	#0.00W
Cohher 72	7220-40-8	0.001	mgvk	3.8) -	=0.00W	=0.00W	=0.00W	3.80)
NtCkef 72	7220-0W0	0.001	mgv/L	3/837	3/33)	3,300	=0.00W	3.838
Lel d 72	7239-9W1	0.001	mgv/L	=0.00W	=0.00W	=0.00W	=0.00W	=0.00W
<b>ZtaQ</b> 72	7220-55-5	0.004	mgv/k	=0.010	=0.010	3%44	3.940	3.30M
EP303T: Tonf2 enfwu, ICDH2 S								
ArweatQ 72	7220-38-W	0.001	mgv/k	3/83-	₹	ቜ	₹	₫
CI dp tgp 72	7220-23-9 0	0.0001	mgv/k	=0.000W	<b>=</b>	₫	≣	≣
Csrop tgp 72	7220-27-3	0.001	mgv/L	3/308	<b>=</b>	≢	≣	≣
Cohher 72	7220-40-8	0.001	mgvk	3.48-	₹	≢	₫	≣
NtCkef 72	7220-0W0	0.001	mgvk	3,340	₹	≢	₫	≣
Lel d 72	7239-9W1	0.001	mgv/L	=0.00W	<b>=</b>	≢	≣	≣
<b>ZtaQ</b> 72	7220-55-5	0.004	mgv/k	=0.010	₹	₹	≣	≣
EP3U) F: i twwof. ed 2 er Ggr, u, FI2 S								
	7239-97-5 (	0.0001	mgv/L	=0.0001	=0.0001	=0.0001	=0.0001	=0.0001



: 5 of 12 : EMWWW793 : EMM CONSULTING PTQ LTD : S19041W Analytical Results Project

Page 6 orYOrder

Client

Sub-Matrix: WATER  Matrix: WATER(		0,	Sal mpe ID	GP2 H2 4) S	6 5 1 <b>2</b> 48 i	6 5 1 <b>2</b> 48S	65H24M	6 5 H2 4 NS
		Sal mang c	Sal mang date / til e	14-Nov-WWW 07:W0	13-Nov-WWW 15:24	13-Nov-WWW 14:24	12-Nov-WWW 08:00	12-Nov-WWW 07:14
Col mound CAS Nul ber		LOR	Unit	E2 03037MJH\$38	E2 03037MJI\$37	E2 03037MJB39	E2 03037MJ#83M	E2 03037MJ1843
				Result	Result	Result	Result	Result
EP3U) T: Torlf ReCo. erl ufe 2 er Cgr, u, Fl2 S HCoartaged	aged							
<b>2 erQgr</b> , 7239-97-5		0.0001	mgv/L	=0.0001	<b>=</b>	₹	≣	≣
EP3) 4P: Ferrogwlroa u, i tworene Aal f, wer								
Ferrogwiroa	0	0.04	mgv/L	=0.04	4-MM	343	) 73	=0.04
EK39) 2 : Sgfrtde I wS0H								
Sgrittle I wS0H 18295-₩-8		0.1	mgv/L	=0.1	=0.1	=0.1	3-0	3/4
EN3)): loatQ61fl a Qe								
~ Torl f Aatoaw	0	0.01	we<\/r	7M7	800	889	66 (	770
~ Torl fCl rtoaw	0	0.01	me<\/r	MD6	6-8	70U	848	949
~ loatQ61 fl a Q	0	0.01		0 û U	4-WB	- %0	0.0)	0.1W
EA0) 3CA: ProwwAffis! I ad 6erl AQrt. tr,								
Prowwl first	0	0.04	B<\\rangle	040	<b>=</b>	₹	419	- '80
Prowwuerl IQt. tr) H3K	0	0.10	B<\\rangle	=W70	<b>=</b>	₹	=W06	=W54



Analytical Results

Project Client

: 7 of 12 : EMW0V0793 : EMM CONSULTING PTQ LTD : S19041W

Sub-Matrix: WATER  Matrix: WATER(			Sal mpe ID	6 5 H2 03i	65 H2 03S	65H2 00i	65 H2 00S	65 H2 OUI
		Sal min	mping date / til e	12-Nov-WWW 14:00	12-Nov-WWW 12:30	12-Nov-W0V0 09:30	12-Nov-WWW 10:W0	15-Nov-WWW 09:10
Col mound	CAS Nul ber	LOR	Unit	E2 03037MJ1844	E2 03037MJI\$40	E2 03037MJH84U	E2 03037MJ184-	E2 03037MJH84)
				Result	Result	Result	Result	Result
EA0) 3: Proww Affis! I ad 6 ent AQrt. tr,								
Prowwuen		0.10	B<\\L	=VWV8	=W44	=W12	=W42	≣
Ei 3U/D: Afkl ftatr, u, DC Ttrrl ror								
5, droxtde Afkl ftatr, I wCI COU	DMO-W0-001	-	mgv/L	=	=1	=	1=	1
CI ruoal re Afkl ftatr, I wCI COU	381W3W5	-	mgvk	=	=	=	1=	1
6 tQ ruoal re Afkl ftatr, I wCl COU	71-4W3	-	mgvk	n(-	040	- 74	om	-83
Torl f Afki ftatr, I wCI COU	1	-	mgvk	n(-	040	- 74	OM	-83
Ei 3-4P: Sgfrhre Tfgrutdtp errtQ I wSO- 0Hu,	Hu, i A							
Sgfrhre I wSO- HTgrutdtp enrtQ	12808-79-8	-	mgvk	73	) UB3	- U43	) 3NB	- 0MB
Ei 3-) P: Csfortde u, i twQrene Aal f, wer								
Csfortde	15887-00-5	-	mgvk	4M 33	04733	49433	00333	47933
Ei 3MJF: i twwof. ed 2 l jor Cl rtoaw								
CIfCtgp	7220-70-W	_	mgvk	)-3	(UZ	M- (	88M	(
2 I caewtgp	7239-94-2	-	mgvk	48U3	48) 3	4) 93	47-3	4))3
Sodtgp	7220-W8-4	-	mgvk	44833	4-433	44433	4U733	43MB3
Dorl wwtgp	7220-09-7	-	mgv/L	)3	ღ-	)4	70	) 3
EP303F: i twwof. ed 2 ent fwu, ICDH2 S								
ArweatQ	7220-38-W	0.001	mgvk	=0.00W	=0.00W	3/330	3%3U	3.83-
CI dp tgp	7220-23-9	0.0001	mgvk	=0.000W	=0.000W	=0.000W	=0.000W	=0.000W
Csrop tgp	7220-27-3	0.001	mgvk	=0.00W	=0.00W	=0.00W	=0.00W	=0.00W
Cohher	7220-40-8	0.001	mgv/L	3.73.8	=0.00W	=0.00W	=0.00W	=0.00W
NtCkef	7220-0W0	0.001	mgvk	=0.00W	3/839	=0.00W	3.838	=0.00W
Leld	7239-9W1	0.001	mgvk	=0.00W	=0.00W	=0.00W	=0.00W	=0.00W
ZtaQ	7220-55-5	0.004	mgvk	3/344	=0.010	3.849	=0.010	3 % 40
EP303T: Torl f2 erl fwu, ICDH2 S								
ArweatQ	7220-38-W	0.001	mgvk	≣	≢	<b>±</b>	<b></b>	3.838
CI dp tgp	7220-23-9	0.0001	mgvk	≣	≢	₹	₹	=0.000W
Csrop tgp	7220-27-3	0.001	mgvk	≣	<b>=</b>	₹	≣	3.83-
Cohher	7220-40-8	0.001	mgvk	≣	≢	≢	ቜ	3/400
NtOkef	7220-0W0	0.001	mgv/L	≣	₫	₹	ቜ	3%3U
Leid	7239-9W1	0.001	mgvk	#	##	##	₹	3,83)
ZtaQ	7220-55-5	0.004	mgvk	#	##	##	₹	3,308
EP3U) F: i twwof. ed 2 erQgr, u, FI2 S								
2 erQgr,	7239-97-5	0.0001	mgvk	=0.0001	=0.0001	=0.0001	=0.0001	=0.0001
EP3U) T: Torlf ReCo. erl ufe 2 er Carr, u, FI2 S	12.5							



Analytical Results

Client Project

EMM CONSULTING PTQ LTD S19041W

8 of 12 EMV0V0793

Page 6 orYOrder

15-Nov-WWW 09:10 E2 03037MUI\$4) 65H20Ui =0.0001 8U3 ቜቜ 834 6) 34 12-Nov-W0W0 10:W0 E2 03037MJH84-65H200S Result **47.0** = W42 77U ≣ 0.87 34 12-Nov-WWW 09:30 E2 03037 MJH84U 65H2 00i Result =W12 =1.07 8 0-0 1 =0.1 8-0 ٥) -843 ≣ 12-Nov-WWW 12:30 E2 03037MJI-\$40 65H2 03S Result =W44 4.MU ≣ 344 797 797 3,0 12-Nov-WWW 14:00 E2 03037 MJ \$44 65H203i Result =1.1W =WW8 ≣ 8-⊠ 887 43) 4 3.0 Sal ming date / til e Sal me ID me<\/r me<√k Unit mgwk mgwk mgvk B<\k B<₩ 7239-97-5 0.0001 LOR 0.04 0.01 0.01 ---- 0.04 0.01 0.1 18295-W4-8 EP3U) T: Torl f ReCo. erl ufe 2 er Cgr, u, FI2 S HCoartaged -CAS Nul ber EP3) 4P: Ferrogwiroa u, i tworene Aalf, wer EA0) 3CA: ProwwAfths! I ad 6erl AQrt. try EK39) 2 : Sgfrtde I wS0H Sgfrtde I wS0H Prowwuer I Qrt. tr.) H-3K EN3)): loatQ61 fl a@ ~ Torl f Aatoaw Sub-Matrix: WATER 1Matrix: WATER( ~ Torl fCl rtoaw ~ loatQ61 fl aQe Ferrogwiroa Prowwl fhs1 Col mound 2 erQgr,



Analytical Results
Sub-Matrix: WATER
Sub-Matrix: WATER

: 9 of 12 : EMW0W793 : EMM CONSULTING PTQ LTD : \$19041W

Page 6 orYOrder

Client Project

Sub-Matrix: WATER  Matrix: WATER(			Sal me ID	65 P2 0 US	651 <b>2</b> 0-i	65120-S	65H2O) i	65H2O)S
		Sal ming	Sal mang date / til e	15-Nov-WWW 09:24	13-Nov-WWW 10:10	13-Nov-V0V0 11:00	15-Nov-WWW 07:24	15-Nov-WW 07:14
Col mound C	CAS Nul ber	LOR	Unit	E2 03037MJ\$48	E2 03037MJI847	E2 03037MJH849	E2 03037MJH34M	E2 03037MJ <del>18</del> 03
				Result	Result	Result	Result	Result
Ei 3U/D: Afkl ftatn, u, DC Ttrrl ror								
5, droxtde Afkl ftatn, I wCI COU	DMO-W0-001	-	mgvk	=1	=1	=1	=1	=1
CI ruoal re Afkl ftatr, I w CI COU	381W3W5	-	mgvk	=1	1=	=1	=1	1=
6 tC  ruoa Ine Afkl ftatr, I wCI COU	71-4W3	-	mgwk	OMU	0(-	- 04	(	(On
Tori f Afki ftatr, I wCI COU		~	mgwk	OMU	-)0	- 04	(	(0)
Ei 3-4P: Sgfrhre Tfgrutdtp emtQ I wSO-0Hu, i A	Ą							
Sgffthre I wSO- HTgrutdtp enrtQ	12808-79-8	-	mgvk	8UMB	ສາ(-	- 793	- 443	) 743
Ei 3-) P: Csfortde u, i tworene Aal f, wer								
	15887-00-5	_	mgwk	മ (0	49933	4M-33	47-33	0UMB3
Ei 3MJF: i twwof. ed 2 I jor CI rtoaw								
CI fûgp	7220-70-W	-	mgwk	U <i>1</i> 2	-6(	847	)73	887
2 I caewtgp	7239-94-2	-	mgwk	0393	4873	4803	4) 83	49ന്ദ
Sodtgp	7220-W8-4	-	mgwk	4) MB3	44733	4U) 33	43) 33	4) 333
Dorl wwtgp	7220-09-7	-	mgwk	0-	0(	m	0 (	on
EP303F: itwwof.ed 2 enfwu, ICDH2 S								
ArweatQ	7220-38-W	0.001	mgwk	=0.00W	=0.00W	3.83-	3.83-	=0.00W
CI dp tgp	7220-23-9	0.0001	mgwk	=0.000W	=0.000W	=0.000W	=0.000W	=0.000W
Csrop tgp	7220-27-3	0.001	mgwL	3-83U	=0.00W	=0.00W	=0.00W	=0.00W
Cohher	7220-40-8	0.001	mgvk	3-3) -	=0.00W	=0.00W	3.383	=0.00W
NtCkef	7220-0W0	0.001	mgvk	3/307	=0.00W	=0.00W	3.83-	3.943
Leld	7239-9W1	0.001	mgwk	=0.00W	=0.00W	=0.00W	=0.00W	=0.00W
ZtaQ	7220-55-5	0.004	mgwL	3-3-3	3/30)	=0.010	3.947	3.849
EP303T: Tonf2 enfwu, ICDH2 S								
ArweatQ	7220-38-W	0.001	mgvk	<b>=</b>	₹	<b>=</b>	3.83)	≣
CI dp tgp	7220-23-9	0.0001	mgvk	#	##	#	=0.000W	#
Csrop tgp	7220-27-3	0.001	mgvk	<b>=</b>	#	=	=0.00W	<b>=</b>
Cohher	7220-40-8	0.001	mgvk	₹	₹	<b>=</b>	3.0MM	≣
NtCkef	7220-0W0	0.001	mgvk	#	#	#	3-830	#
Pel d	7239-9W1	0.001	mgwk	#	<b>±</b>	===	=0.00W	#
ZtaQ	7220-55-5	0.004	mgvk	₹	₹	<b>=</b>	=0.010	≣
EP3U) F: itwwof.ed 2 er Cgr, u, F12 S								
2 erQgr,	7239-97-5 (	0.0001	mgvk	=0.0001	=0.0001	=0.0001	=0.0001	=0.0001
EP3U) T: Torlf Reco. erl ufe 2 er Cgr, u, Fl2 S								
2 erQgr,	7239-97-5	0.0001	mgvk	₹	≢	<b>±</b>	=0.0001	≣
EP3) 4P: Ferrogwiroa u, i twGrere Aal f, wer								



: 10 of 12 : EMWW0793 : EMM CONSULTING PTQ LTD : S19041W Project

Page 6 orYOrder

Client

Analytical Results

Sub-Matrix: WATER TMatrix: WATER(		Sal mpe ID	6512 OUS	65120-i	65120-8	65H2O)i	65H2 0) S
	Sal m	Sal mang date / til e	15-Nov-WWW 09:24	13-Nov-WWW 10:10	13-Nov-WWW 11:00	15-Nov-WWW 07:24	15-Nov-WWW 07:14
Col mound CAS Nul ber	r LOR	Unit	E2 03037MJH348	E2 03037MJI\$47	E2 03037MJB49	E2 03037MJB4M	E2 03037MU\$03
			Result	Result	Result	Result	Result
EP3) 4P: Ferrogwlroa u, i tworere Aal f, wer HCoartaged							
Ferrogwiroa	- 0.04	mgvk	=0.04	44.9	47 <i>1</i> U	0.78	3/8
EK39) 2 : Sgfrtde I wS0H							
Sgfittle I wS0H 18295-W4-8	3 0.1	mgwk	344	=0.1	=0.1	=0.1	3/4
EN3)): loatQ61flaQe							
~ Torl f Aatoaw	- 0.01	me<\/r	0 (6	118	8))	(6 (	933
~ Torl fCl rtoaw	- 0.01	me<\/r	I/B0	877	7) 0	84)	206
~ loatQ6 I fl a Qe	- 0.01		-6,0	UOM	8.9M	0^8	മം



Page 6 orYOrder

: 11 of 12 : EMW0W793 : EMM CONSULTING PTQ LTD : S19041W Analytical Results Project Client

Sub-Matrix: WATER TMatrix: WATER(			Sal me ID	LDSD6 3-	y A0	T6 U	те-	Т6)
		Sal min	nping date / til e	14-Nov-WWW 09:00	12-Nov-WWW 07:14	15-Nov-W0W0 14:40	15-Nov-WWW 14:40	15-Nov-WWW 14:40
Col mound	CAS Nul ber	LOR	Unit	E2 03037MJH\$04	E2 03037MJH\$00	E2 03037MJH80U	E2 03037MJH\$0-	E2 03037MJH\$0)
				Result	Result	Result	Result	Result
EA0) 3: ProwwAffis! I ad 6 ent AQt. tr)								
Prowwuerl		0.10	B<\\lambda	=W19	സം	#	₹	≣
Ei 3U/D: Afkl ftath, u, DC Ttml ror								
5, droxtde Afkl ftatn, I wCI COU	DMO-W0-001	-	mgv/L	=	1=	<b>±</b>	ቜ	₫
CI ruoal re Afkl ftatry I wCl COU	381W3W5	~	mgwk	=	=	≢	≢	≣
6 tQ ruoal re Afkl ftatr, I wCI COU	71-4W3	-	mgwk	-8)	U.4	≣	≢	≢
Ton f Afki ftatr) I wCI COU	1	-	mgwk	-8)	Ų.4	≢	ቜ	₫
Ei 3-4P: Sgfrhre Tf grutdtp errtQ   wSO-0Hu,	OHu, i A							
Sgfrhre I wSO- HTgrutdtp enrtQ	12808-79-8	-	mgwk	ກ(-	) NB3	<b>=</b>	≣	≣
Ei 3-) P: Csfortde u, i twQrere Aal f, wer								
Csfortde	15887-00-5	-	mgwk	4NB33	00) 33	##	ቜ	₹
Ei 3MJF: i twwof. ed 2 l jor Cl rtoaw								
CI fCtgp	7220-70-W	-	mgwk	OW (	8) 4	<b>±</b>	I ■	₫
2 I caewtgp	7239-94-2	-	mgwk	4893	4983	₹	≢	≣
Sodtgp	7220-W8-4	-	mgwk	44733	4-M83	₹	ቜ	≣
Dorl wwtgp	7220-09-7	<b>-</b>	mgwk	((	8	<b>=</b>	≣	≣
EP303F: i twoof. ed 2 en fwu, ICDH2 S								
ArweatQ	7220-38-W	0.001	mgwk	=0.00W	=0.00W	<b>=</b>	≣	≣
CI dp tgp	7220-23-9	0.0001	mgwk	=0.000W	=0.000W	#	₹	≣
Csrop tgp	7220-27-3	0.001	mgwk	=0.00W	=0.00W	#	₹	≣
Cohher	7220-40-8	0.001	mgwk	=0.00W	3%00	<b>=</b>	≣	≣
NtCkef	7220-0\\\0	0.001	mgwk	=0.00W	3/837	#	₹	≣
Lei d	7239-9W1	0.001	mgwk	=0.00W	=0.00W	#	≣	≣
ZtaQ	7220-55-5	0.004	mgwk	=0.010	3/30M	#	≢	≣
EP 303T: Tonf 2 en fwu, ICDH2 S								
ArweatQ	7220-38-W	0.001	mgwk	<b>±</b>	<b>±</b>	=0.001	=0.001	=0.001
CI dp tgp	7220-23-9	0.0001	mgwk	≣	₫	=0.0001	=0.0001	=0.0001
Csrop tgp	7220-27-3	0.001	mgwk	₹	₹	=0.001	=0.001	=0.001
Cohher	7220-40-8	0.001	mgwk	₹	₹	3/83-	3.83-	3.83)
NtCkef	7220-0W0	0.001	mgwk	₹	≢	=0.001	=0.001	=0.001
Peld	7239-9W1	0.001	mgwk	<b>=</b>	₹	=0.001	=0.001	=0.001
ZtaQ	7220-55-5	0.004	mgwk	₹	<b>=</b>	=0.004	=0.004	=0.004
EP3U) F: itwoof.ed 2 erQgr, u, FI2 S								
2 erQgr,	7239-97-5	0.0001	mgv/L	=0.0001	=0.0001	≢	≣	≣
EP3U)T: Torl fReCo. erl ufe 2 erCgr, u, Fl2 S	FI2 S							



Analytical Results

Project Client

: 1Wbf 12 : EMWW0793 : EMM CONSULTING PTQ LTD : S19041W Page 6 orYOrder

•							
Sub-Matrix: WATER Matrix: WATER(		Sal me ID	LDSD63-	y A0	T6U	Т6-	Т6)
	Salı	Sal ming date / til e	14-Nov-WW 09:00	12-Nov-WWW 07:14	15-Nov-WWW 14:40	15-Nov-WWW 14:40	15-Nov-WWW 14:40
Col mound CAS Nul ber	er LOR	Unit	E2 03037MJH\$04	E2 03037MJI\$00	E2 03037MJH80U	E2 03037MJ-80-	E2 03037MJ+80)
			Result	Result	Result	Result	Result
EP3U) T: Tonff ReOp. erl ufe 2 erOgr, u, FI2 S HCoartaged	þeć						
<b>2 erQgr</b> , 7239-97-5	5 0.0001	mgv/L	≢	<b>±</b>	=0.0001	=0.0001	=0.0001
EP3)4P:Ferrogwlroau, itwCrene Aalf,wer							
- Ferrogwiroa		mgv/t	4.84	=0.04	<b>=</b>	≣	≣
EK39) 2 : Sgfrtde I wS0H							
<b>Sgrittle I wS0H</b> 18295-VM-8	1-8 0.1	mgv/L	=0.1	=0.1	≢	₹	≣
EN3)): loatQ61fl aQe							
~ Torl f Aatoaw	0.01	me<\/r	8-3	7M	<b>=</b>	≣	≣
~ Torl fCl rtoaw	0.01	me<\r/>	879	116	<b>=</b>	≣	≣
~ loatQ61 fl a Qb			UM/ 0	093	<b>=</b>	#	#
EA0) 3CA: ProwwAffis! I ad 6 ent AQrt. tr,							
Prownl flist		B<₩	=1.10	- 47-	≣	₹	≣
Prowwuerl IQt. trj H-3K	0.10	B<\\lambda	=W19	=W55	<b>=</b>	₹	≣



: 13 of 12 : EMWW0793 : EMM CONSULTING PTQ LTD : S19041W Analytical Results Project

Page 6 orYOrder

Client

Sub-Matrix: WATER  Matrix: WATER(								
			Sal moe ID	R6U	R6-	Trth whtke 0943Ø303	R64	R60
		Sal min	mping date / til e	12-Nov-WWW 07:44	14-Nov-WWW 12:30	V&-Oct-V0V0 00:00	13-Nov-WWW 10:34	12-Nov-WWW 07:44
Col mound	CAS Nul ber	TOR	Unit	E2 03037MJH\$08	E2 03037MJH\$07	E2 03037MJB09	E2 03037MJB0M	E2 03037MUSU3
				Result	Result	Result	Result	Result
EP303T: Tonf 2 en fwu, ICDH2 S								
ArweatQ	7220-38-W	0.001	mgv/L	=0.001	=0.001	₫	=0.001	=0.001
CI dp tgp	7220-23-9	0.0001	mgv/L	=0.0001	=0.0001	₫	=0.0001	=0.0001
Csrop tgp	7220-27-3	0.001	mgvk	=0.001	=0.001	₫	=0.001	=0.001
Cohher	7220-40-8	0.001	mgvk	3/330	=0.001	≣	=0.001	=0.001
NtCkef	7220-0W0	0.001	mgvk	=0.001	=0.001	≣	=0.001	=0.001
Leld	7239-9W1	0.001	mgvk	=0.001	=0.001	₹	=0.001	=0.001
ZtaQ	7220-55-5	0.004	mgv/L	=0.004	=0.004	₹	=0.004	=0.004
EP3U) T: Tonf ReCo. erl ufe 2 er Cgr, u, F12 S	, FI2 S							
2 erQgr,	7239-97-5	0.0001	mgv/L	=0.0001	=0.0001	₹	=0.0001	=0.0001
ED393&74: Torl f Derrofegp 5, drod ruoaw	oaw							
C8 HCMFrl Qtoa	-	Ø/	7MB%	≣	ቜ	473	≣	≣
ED393:874: Torl f ReQo. erl ufe 5, droQ ruoaw HNED2 034U Frl Qtoaw	ruoaw HNED2 034	U FrI Ortoa	W					
C8 HC43 Frl Qtoa	C5µC10	<b>0</b> M	7MB%	≣	ቜ	473	<b></b>	≣
C8 HC43 Frl Qrtoa p tagw6TEX	С5µС10-ВТЕН	<b>0</b> /v	7\\B\%	∄	≣	73	∄	≣
ED393: 6 TEXN								
6 eazeae	71-23-W	1	7Mg/k	#	#	04	<b>=</b>	#
Тобреае	108-88-3	8	7√60/k	<b>=</b>	<b>=</b>	4M	≣	≢
Ers, fueazeae	100-21-2	M	7MB%	<b>=</b>	<b>=</b>	4M	<b>=</b>	≣
p erl H& hI rl HX, feae	108-38-3 105-2W3	M	700/√	<b>=</b>	<b>=</b>	03	<b>=</b>	#
orrsolX, feae	94-27-5	×	7№5%	≣	畫	00	<b></b>	≣
^ Torl f X, feaew	-	>	7MB%	≣	畫	0-	≣	≣
^ Sgp on6TEX		-	7√8√8	≣	₹	434	<b></b>	≣
NI hsrsI feae	91-W0-3	4	70,0%	#	##	04	#	#
ED393S: TD5 1V(& TEX Sgrrocl rew								
4.0H tOsforoers aeH -	17050-07-0	×		≣	ቜ	N) 47	≣	≣
ТоfgеаеН 9	V037-V6-4	<b>X</b>		<b>=</b>	<b>=</b>	M#7	<b>=</b>	≣
- H6 rop onfgoroueazeae	250-00-2	>		≣	<b>±</b>	443	≣	≣



 Page
 : 12 of 12

 6 orY Order
 : EMW0V0793

 Client
 : EMM CONSULTING PTQ LTD

 Project
 : \$19041W

Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	Limits (%)
Col mound	CAS Nul ber	Tow	High
ED393S: TD5 1V(16 TEX Sgrrocl rew			
4.0H tOsforoensl aeH -	17050-07-0	73	1//9
ТобреаеН 9	VØ37-VÆ-4	20	1 \\
- 16 rop orfgoroueazeae	250-00-2	71	1//9



# QUALITY CONTROL REPORT

Environmental Division Melbourne Shane Colley : 1 of 10 Laboratory Contact **EMM CONSULTING PTY LTD** PAUL GIBBONS EM2020793 **Work Order** Contact : 4 Westall Rd Springvale VIC Australia 3171 +61-3-8549 9600 24-Nov-2020 25-Nov-2020 Date Analysis Commenced Date Samples Received Telephone Address Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065 S190512

Order number

Telephone

Project

Address

Client

04-Dec-2020 Issue Date BILL BULL, KAITLYN BRODIE EN/222 30 No. of samples analysed No. of samples received C-O-C number Quote number Sampler

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.

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

NATA

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
Arenie Vijayaratnam	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Titus Vimalasiri	Metals Teamleader	Radionuclides, Fyshwick, ACT
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



 Page
 : 2 of 10

 Work Order
 : EM2020793

 Client
 : EMM CONSULTING PTY LTD

 Project
 : S190512

General Comments

In house developed procedures 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. 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 primary

Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot 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

RPD = Relative Percentage Difference

# = Indicates failed QC

# Laboratory Duplicate (DUP) Report

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

						I shoretoni I	trong (GIIO) ofsoiland vioterode I		
Sub-Matrix: WAIER						Laboratory	Jupincate (DOP) report		
Laboratory sample ID	Mample ID	h etdo: ACompoun:	CSM Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA250CA: Gross Alp	EA250CA: Gross Alpha and Beta Activity (QC Lot: 3391214)	ot: 3391214)						-	
CA2007887-001	Anonymous	EA250: Gross alpha	-	0.05	Bq/L	<0.05	<0.05	0.00	No Limit
		EA250: Gross beta	1	0.1	Bq/L	<0.10	<0.10	0.00	No Limit
		EA250: Gross beta activity - 40K		0.1	Bq/L	<0.10	<0.10	0.00	No Limit
EM2020793-011	BH-M20D	EA250: Gross alpha	1	0.05	Bq/L	<1.12	<1.12	0.00	No Limit
		EA250: Gross beta	-	1.0	Bq/L	<2.23	<2.23	0.00	No Limit
		EA250: Gross beta activity - 40K	1	1.0	Bq/L	<2.23	<2.23	0.00	No Limit
ED037P: Alkalinity b	ED037P: Alkalinity by PC Titrator (QC Lot: 3382503)	503)							
EM2020791-012	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	٧	۲	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	<u>^</u>	₹	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	_	mg/L	1160	1160	0.139	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	-	-	mg/L	1160	1160	0.139	0% - 20%
EM2020791-009	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	₹	₹	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	<u>^</u>	₹	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	955	096	0.566	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	1	-	mg/L	955	096	0.566	0% - 20%
ED037P: Alkalinity b	ED037P: Alkalinity by PC Titrator (QC Lot: 3382505)	505)							
EM2020793-016	BH-M23S	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	-	mg/L	<u>^</u>	7	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	-	mg/L	<u>^</u>	^	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	293	294	0.00	0% - 20%
		ED037-P: Total Alkalinity as CaCO3		-	mg/L	293	294	0.00	0% - 20%
EM2020816-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	_	mg/L	^	7	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	_	mg/L	<u>^</u>	^	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	-	mg/L	15	17	8.14	%05 - %0
		ED037-P: Total Alkalinity as CaCO3		_	mg/L	15	17	8.14	%0 - %0



S190512

Client Project

EM2020793

Work Order

3 of 10

Recovery Limits (%) 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% %09 - %0 0% - 20% 0% - 20% %09 - %0 0% - 20% 0% - 20% 0% - 20% %09 - %0 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% 0% - 20% No Limit No Limit No Limit No Limit No Limit RPD (%) 0.513 0.416 0.106 0.164 0.230 0.520 0.426 0.461 0.00 4.43 4.94 0.704 0.00 0.00 6.64 0.00 1.89 5.09 0.00 2.36 0.00 0.00 4.06 3.78 3.47 1.10 5.65 0.00 0.00 6.21 0.00 Laboratory Duplicate (DUP) Report Duplicate Result 25300 <0.001 0.143 0.0022 <0.001 13400 14700 0.045 0.019 0.008 0.101 4440 6620 543 5660 18800 2110 1620 1830 423 1680 88 743 411 641 6 127 7 33 31 Original Result <0.0001 25300 0.046 <0.001 0.105 0.148 <0.001 3500 0.020 0.008 0.0021 4420 19900 2210 14600 6390 5720 1680 430 1620 1830 553 425 133 641 88 743 10 33 တ 31 mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L 0.0001 0.0001 0.001 0.005 0.001 0.001 0.001 0.001 0.001 LOR \_ \_ \_ \_ ~ \_ \_ \_ ~ \_ \_ \_ \_ \_ 7440-38-2 7440-43-9 14808-79-8 16887-00-6 16887-00-6 16887-00-6 7440-43-9 7440-50-8 7440-66-6 CSM Number 14808-79-8 14808-79-8 14808-79-8 16887-00-6 7440-70-2 7440-23-5 7440-09-7 7440-23-5 7440-09-7 7440-70-2 7440-23-5 7440-09-7 7440-23-5 7440-09-7 7440-38-2 7440-47-3 7440-02-0 7439-95-4 7440-70-2 7439-95-4 7439-95-4 7440-70-2 7439-95-4 7439-92-1 ED041G: Sulfate as SO4 - Turbidimetric ED041G: Sulfate as SO4 - Turbidimetric ED041G: Sulfate as SO4 - Turbidimetric ED041G: Sulfate as SO4 - Turbidimetric EG020A-F: Chromium ED093F: Magnesium ED093F: Magnesium ED093F: Magnesium EG020A-F: Cadmium EG020A-F: Cadmium ED093F: Magnesium ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3382143) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3382140) ED093F: Potassium ED093F: Potassium ED093F: Potassium ED093F: Potassium EG020A-F: Arsenic EG020A-F: Arsenic EG020A-F: Copper ED045G: Chloride ED045G: Chloride EG020A-F: Nickel ED045G: Chloride ED045G: Chloride ED093F: Calcium ED093F: Calcium ED093F: Sodium ED093F: Calcium ED093F: Calcium ED093F: Sodium ED093F: Sodium ED093F: Sodium EG020A-F: Lead EG020A-F: Zinc ED045G: Chloride by Discrete Analyser (QC Lot: 3382141) ED045G: Chloride by Discrete Analyser (QC Lot: 3382144) EG020F: Dissolved Metals by ICP-MS (QC Lot: 3383790) ED093F: Dissolved Major Cations (QC Lot: 3383791) ED093F: Dissolved Major Cations (QC Lot: 3383794) Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous BH-M16D BH-M16S BH-M24S Mample ID BH-M23S BH-M23S BH-M19S Laboratory sample ID Sub-Matrix: WATER EM2020793-018 EM2020793-016 EM2020788-003 EM2020791-010 EM2020793-016 EM2020793-008 EM2020793-010 EM2020765-012 EM2020793-007 EM2020791-001 EM2020791-010 EM2020765-002 EM2020765-012 EM2020765-001



S190512

Client Project

EM2020793

Work Order

4 of 10

Recovery Limits (%) 0% - 20% No Limit 0% - 20% 3% - 20% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 4.05 2.97 0.00 0.00 0.00 0.00 0.00 0.00 22.3 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 5.35 0.00 Laboratory Duplicate (DUP) Report Original Result Duplicate Result <0.0002 <0.0001 <0.002 <0.002 <0.002 <0.002 <0.010 <0.002 <0.002 <0.010 <0.001 <0.005 <0.0001 <0.0002 <0.002 <0.001 <0.001 <0.001 0.004 <0.001 <0.001 0.005 <0.001 <0.001 <0.001 <0.001 <0.0001 900.0 < 0.002 0.002 0.031 0.307 0.146 0.018 <0.0002 <0.002 <0.002 <0.002 <0.0001 <0.0001 <0.0002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.010 <0.001 <0.001 <0.001 <0.0001 0.030 0.012 0.004 <0.001 0.005 <0.001 <0.001 <0.001 0.002 <0.001 <0.0001 <0.001 <0.005 <0.001 0.298 0.139 mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L 0.0001 0.0001 0.0001 0.001 0.001 0.005 0.0001 0.001 0.001 0.005 0.001 0.001 0.0001 0.001 0.001 0.005 0.001 0.001 0.001 0.001 0.001 0.005 0.001 0.001 0.001 0.001 0.005 0.001 0.001 0.001 0.001 0.001 0.0001 0.001 0.001 LOR 7439-97-6 7439-97-6 7440-66-6 7440-50-8 7440-66-6 7440-43-9 7440-43-9 7440-43-9 7440-50-8 7440-43-9 7440-50-8 7440-66-6 CSM Number 7440-47-3 7440-02-0 7440-38-2 7440-47-3 7440-50-8 7439-92-1 7440-02-0 7440-66-6 7440-38-2 7440-47-3 7440-50-8 7440-02-0 7440-38-2 7440-47-3 7439-92-1 7440-02-0 7440-66-6 7440-38-2 7440-47-3 7439-92-1 7440-02-0 7439-92-1 7439-92-1 EG020A-F: Chromium EG020A-T: Chromium EG020A-T: Chromium EG020A-F: Chromium EG020A-F: Chromium EG020F: Dissolved Metals by ICP-MS(QC Lot: 3383790)- continued EG020A-F: Cadmium EG020A-F: Cadmium EG020A-T: Cadmium EG020A-T: Cadmium EG020A-F: Arsenic EG020A-F: Arsenic EG020A-T: Arsenic EG020A-T: Arsenic EG020A-F: Copper EG020A-F: Copper EG020A-F: Copper EG020A-T: Copper EG020A-T: Copper EG020A-F: Nickel EG020A-F: Nickel EG020A-F: Nickel EG020A-T: Nickel EG020A-T: Nickel EG035F: Mercury EG035F: Mercury EG020A-T: Lead EG020A-F: Lead EG020A-F: Lead EG020A-F: Lead EG020A-T: Lead EG020A-F: Zinc EG020A-F: Zinc EG020A-F: Zinc EG020A-T: Zinc EG020A-T: Zinc EG020F: Dissolved Metals by ICP-MS (QC Lot: 3383793) EG035F: Dissolved Mercury by FIMS (QC Lot: 3383792) EG035F: Dissolved Mercury by FIMS (QC Lot: 3383795) EG020T: Total Metals by ICP-MS (QC Lot: 3385309) Anonymous Anonymous UGM-M1D BH-M24S BH-M19S Mample ID BH-M19D TB5 Laboratory sample ID Sub-Matrix: WATER EM2020793-009 EM2020793-018 EM2020793-025 EM2020793-001 EM2020793-010 EM2020765-012 EM2020490-081



S190512

Client Project

EM2020793

Work Order

5 of 10

Recovery Limits (%) No Limit 0% - 20% No Limit 0% - 20% No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.718 0.00 69.9 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 1.02 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Laboratory Duplicate (DUP) Report Duplicate Result <0.0001 <0.0001 <0.0001 8.29 2.04 0.1 **6**0.1 30 420 80 7 ς, ς, ۲Ş \$ 7 7 7 1 V Ÿ Original Result <0.0001 <0.0001 <0.0001 8.35 0.10 2.06 <20 <20 ٥ . 0.1 0.1 30 80 2 7 ç ^5 V 7 7 7 16 v mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L Unit mg/L hg/L hg/L µg/L µg/L hg/L hg/L hg/L hg/L hg/L hg/L hg/L hg/L hg/L J/gr 0.0001 0.0001 0.0001 LOR 0.05 0.05 0.1 0.1 0.1 8 8 2 8 8 7 \_ N N N 2 2 N 7439-97-6 7439-97-6 91-20-3 C6\_C10 108-38-3 91-20-3 7439-97-6 CSM Number -18496-25-8 18496-25-8 18496-25-8 C6\_C10 71-43-2 108-88-3 95-47-6 108-88-3 108-38-3 95-47-6 100-41-4 106-42-3 71-43-2 100-41-4 EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3383788) EP080: meta- & para-Xylene EP080: meta- & para-Xylene EP080: C6 - C10 Fraction EP080: C6 - C10 Fraction EP080: C6 - C9 Fraction EP080: C6 - C9 Fraction EG051G: Ferrous Iron EG051G: Ferrous Iron EG051G: Ferrous Iron EK085: Sulfide as S2-EP080: Ethylbenzene EK085: Sulfide as S2-EK085: Sulfide as S2-EP080: Ethylbenzene EP080: ortho-Xylene EP080: Naphthalene EG035F: Dissolved Mercury by FIMS (QC Lot: 3383795) - continued EP080: Naphthalene EP080: ortho-Xylene EG035F: Mercury EG035T: Mercury EG035T: Mercury EP080: Benzene EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3384258) EP080: Benzene EP080: Toluene EP080: Toluene EG051G: Ferrous Iron by Discrete Analyser (QC Lot: 3382237) EG051G: Ferrous Iron by Discrete Analyser (QC Lot: 3382238) EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3383788) EK085M: Sulfide as S2- (QC Lot: 3384290) EK085M: Sulfide as S2- (QC Lot: 3384289) EP080: BTEXN (QC Lot: 3383788) Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous UGM-M1D BH-M25D BH-M16S BH-M19S Mample ID LPSPB04 LPSPB04 TB3 Laboratory sample ID Sub-Matrix: WATER EM2020576-007 EM2020793-019 EM2020793-010 EM2020793-021 EM2018560-003 EM2018560-003 EM2018560-014 EM2020706-001 EM2020793-023 EM2020793-008 EM2020793-001 EM2018560-014 EM2018560-003 EM2018560-014 EM2020793-021



: 6 of 10 : EM2020793 : EMM CONSULTING PTY LTD S190512 Work Order Project Client

# h etdo: Blank (h B) an: Laboratory Control Mpike (LCM) Report

parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target 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

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.

Alpha and Beta Activity (QCLot; 3391214)	hetdo: Blank (h B)   Report   CC	### Apriled Recovery (%) #### Recovery (%) ####################################	# Recovery Limits (%)  Low High  95.2 10  94.4 10  10  85.0 11  85.0 11  85.8 11  86.0 12	Higd Higd 105 105 116 117 117 120 120 120
CCLOt: 3382503)  CCLOt: 3382503)  CCLOt: 3382503)  CCLOt: 3382503)  CCLOt: 3382503)  CCLOt: 3382140)  SO4 2- by DA (QCLot: 3382140)  SO4 2- by DA (QCLot: 3382141)  SO4 2- by DA (QCLot: 3382142)  SO4 2- by DA (QCLot: 3382143)  SO4 2- by DA (QCLot: 3382144)  SO4 2- by DA (QCLot: 3382144)  SO4 2- by DA (QCLot: 3382144)  SO4 2- by DA (QCLot: 3382144)  SO4 2- by DA (QCLot: 3382144)  SO4 2- by DA (QCLot: 3382144)  SO4 2- by DA (QCLot: 3383191)  TA40-70-2  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA40-3-5  TA	Result		### Recovery Limit  Low  95.2 94.4 85.0 85.0 86.0 86.0	Higd Higd 105 105 116 117 117 120 120
CGLOt: 3382503) 0.05 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L 0.1 Bq/L	<ul> <li>Co.05</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li>Co.10</li> <li></li></ul>		95.2 94.4 94.4 95.0 85.0 85.8 80.0 80.0	105 105 105 116 117 117 120 120
CCLOt: 3382503)  CCLOt: 3382505)  CCLOt: 3382505)  CCLOt: 3382505)  CCLOt: 3382505)  CCLOt: 3382505)  CCLOt: 3382505)  CCLOt: 3382505)  CCCLOt: 3382505)  CCCLOt: 3382505)  CCCLOt: 3382504)  SO4 2- by DA (QCLot: 3382140)  14808-79-8  14808-79-8  14808-79-8  14808-79-8  1 mg/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L  Ng/L	<ul> <li></li></ul>			



S190512

Client Project

EM2020793

Work Order

7 of 10

Higd 110 112 110 112 115 112 112 113 116 116 119 112 112 116 116 107 7 601 107 108 1 117 129 Recovery Limits (%) 83.5 84.6 86.9 81.9 84.6 84.3 86.3 83.2 84.3 86.9 88.3 87.9 71.6 81.9 65.5 83.1 75.8 86.3 86.4 73.4 75.8 TOW 83.1 86.7 Laboratory Control Mpike (LCM) Report Mpike Recovery (%) 97.0 **VCM** 110 98.5 99.0 99.4 87.8 94.3 102 102 105 106 108 86.4 96.4 105 101 99.1 104 101 104 104 103 Concentration 0.1 mg/L 360 µg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.01 mg/L 0.01 mg/L 0.1 mg/L 0.1 mg/L 0.01 mg/L 0.5 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 2 mg/L 2 mg/L 0.5 mg/L 0.1 mg/l 0.1 mg/l h etdo: Blank (h B) Result <0.005 <0.005 <0.0001 <0.0001 <0.001 <0.001 <0.001 <0.0001 <0.001 <0.001 <0.001 <0.005 < 0.0001 <0.001 <0.001 <0.001 <0.001 < 0.0001 <0.001 <0.05 <0.05 Report ٥.1 م ٥ 0 <20 mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L <u>Unit</u> mg/L mg/L mg/L mg/L mg/L mg/L mg/L hg/L EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions(QCLot: 3383788) 0.0001 0.0001 0.0001 0.001 0.005 0.0001 0.001 0.001 0.005 0.001 0.0001 0.001 0.001 0.001 0.001 0.001 0.001 0.005 0.001 0.05 0.05 0.001 LOR 0.001 0.1 0.1 20 CSM Number 7439-97-6 7439-97-6 7439-97-6 18496-25-8 18496-25-8 7440-02-0 7440-66-6 7440-38-2 7440-43-9 7440-47-3 7440-50-8 7440-02-0 7440-66-6 7440-38-2 7440-47-3 7440-50-8 7440-02-0 7440-66-6 7440-50-8 7440-43-9 7439-92-1 7439-92-1 7439-92-1 EG020F: Dissolved Metals by ICP-MS (QCLot: 3383790) - continued EG035T: Total Recoverable Mercury by FIMS (QCLot: 3384258) EG051G: Ferrous Iron by Discrete Analyser (QCLot: 3382238) G051G: Ferrous Iron by Discrete Analyser (QCLot: 3382237) EP080/071: Total Petroleum Hydrocarbons (QCLot: 3383788) EG020F: Dissolved Metals by ICP-MS (QCLot: 3383793) EG035F: Dissolved Mercury by FIMS (QCLot: 3383795) G035F: Dissolved Mercury by FIMS (QCLot: 3383792) EG020T: Total Metals by ICP-MS (QCLot: 3385309) EK085M: Sulfide as S2- (QCLot: 3384290) EK085M: Sulfide as S2- (QCLot: 3384289) EP080: C6 - C9 Fraction EG051G: Ferrous Iron EG020A-F: Chromium EG020A-T: Chromium EG051G: Ferrous Iron EG020A-T: Cadmium EK085: Sulfide as S2-EK085: Sulfide as S2-EG020A-F: Cadmium Sub-Matrix: WATER EG020A-T: Arsenic EG020A-F: Arsenic EG020A-F: Copper EG020A-T: Copper EG020A-F: Copper EG020A-F: Nickel EG020A-F: Nickel EG020A-T: Nickel EG035F: Mercury G035F: Mercury EG035T: Mercury EG020A-F: Lead EG020A-F: Lead EG020A-T: Lead EG020A-F: Zinc EG020A-F: Zinc EG020A-T: Zinc



: 8 of 10 : EM2020793 : EMM CONSULTING PTY LTD : \$190512 Page Work Order

Project Client

Sub-Matrix: WATER				h etdo: Blank (h B)		Laboratory Control Mpike (LCM) Report	M) Report	
				Report	Мріке	Mpike Recovery (%)	Recovery	Recovery Limits (%)
h etdo: ACompoun:	CSMNumber	LOR	Unit	Result	Concentration	TCM	Low	Higd
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3383788) - continued	3 Fractions (QCL	.ot: 3383788) - co	ntinued					
EP080: C6 - C10 Fraction	C6_C10	20	hg/L	<20	450 µg/L	103	64.3	126
EP080: BTEXN (QCLot: 3383788)								
EP080: Benzene	71-43-2	1	hg/L		20 µg/L	111	8.69	124
EP080: Toluene	108-88-3	2	hg/L	<2	20 µg/L	107	73.6	126
EP080: Ethylbenzene	100-41-4	2	hg/L	<2	20 µg/L	108	72.0	126
EP080: meta- & para-Xylene	108-38-3	2	hg/L	<2	40 µg/L	105	71.5	132
	106-42-3							
EP080: ortho-Xylene	95-47-6	2	hg/L	<2	20 µg/L	108	76.5	132
EP080: Naphthalene	91-20-3	5	hg/L	<5	5 µg/L	90.6	70.5	127

# h atrix Mpike (h M) 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.

h atrix Mpike (h M) Report

Sub-Matrix: WATER

				Mpike	MpikeRecovery(%)	Recovery Limits (%)	nits (%)
Laboratory sample ID	Mample ID	h etdo: ACompoun:	CSMNumber	Concentration	h M	Low	Higd
ED041G: Sulfate (	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3382140)						
EM2020791-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	106	70.0	130
ED041G: Sulfate (	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3382143)						
EM2020793-008	BH-M16S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.0	130
ED045G: Chloride	ED045G: Chloride by Discrete Analyser (QCLot: 3382141)						
EM2020791-002	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	# Not Determined	70.0	142
ED045G: Chloride	ED045G: Chloride by Discrete Analyser (QCLot: 3382144)						
EM2020793-009	BH-M19D	ED045G: Chloride	16887-00-6	400 mg/L	# Not Determined	70.0	142
EG020F: Dissolve	EG020F: Dissolved Metals by ICP-MS (QCLot: 3383790)						
EM2020765-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	89.2	76.6	124
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	85.2	74.6	118
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	79.9	71.0	135
		EG020A-F: Copper	7440-50-8	0.2 mg/L	80.7	76.0	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	81.2	75.0	133
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	80.0	73.0	131
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	78.2	75.0	131
EG020F: Dissolve	EG020F: Dissolved Metals by ICP-MS (QCLot: 3383793)						



: 9 of 10 : EM2020793 : EMM CONSULTING PTY LTD : \$190512 Page Work Order Project Client

Sub-Matrix: WATER			h	h atrix Mpike (h M) Report		
			Мріке	MpikeRecovery(%)	Recovery Limits (%)	mits (%)
Laboratory sample ID Mample ID	h etdo: ACompoun:	CSMNumber	Concentration	h M	Low	Higd
EG020F: Dissolved Metals by ICP-MS (QCLot: 3383793) - continued						
EM2020793-009 BH-M19D	EG020A-F: Arsenic	7440-38-2	0.4 mg/L	106	76.6	124
	EG020A-F: Cadmium	7440-43-9	0.1 mg/L	94.0	74.6	118
	EG020A-F: Chromium	7440-47-3	0.4 mg/L	92.5	71.0	135
	EG020A-F: Copper	7440-50-8	0.4 mg/L	95.7	76.0	130
	EG020A-F: Lead	7439-92-1	0.4 mg/L	92.7	75.0	133
	EG020A-F: Nickel	7440-02-0	0.4 mg/L	97.5	73.0	131
	EG020A-F: Zinc	7440-66-6	0.4 mg/L	92.6	75.0	131
EG020T: Total Metals by ICP-MS (QCLot: 3385309)						
EM2020490-081 Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	102	82.0	123
	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	98.9	81.8	123
	EG020A-T: Chromium	7440-47-3	1 mg/L	100	78.9	119
	EG020A-T: Copper	7440-50-8	1 mg/L	100.0	80.4	118
	EG020A-T: Lead	7439-92-1	1 mg/L	104	80.5	121
	EG020A-T: Nickel	7440-02-0	1 mg/L	102	80.0	118
	EG020A-T: Zinc	7440-66-6	1 mg/L	7.66	74.0	120
EG035F: Dissolved Mercury by FIMS (QCLot: 3383792)						
EM2020793-002 UGM-M1S	EG035F: Mercury	7439-97-6	0.01 mg/L	# 58.7	70.0	120
EG035F: Dissolved Mercury by FIMS (QCLot: 3383795)						
EM2020793-022 QA2	EG035F: Mercury	7439-97-6	0.01 mg/L	# 62.1	70.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3384258)						
EM2020706-002 Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	91.1	70.0	130
EG051G: Ferrous Iron by Discrete Analyser (QCLot: 3382237)						
EM2020775-001 Anonymous	EG051G: Ferrous Iron		2 mg/L	93.3	70.0	130
EG051G: Ferrous Iron by Discrete Analyser (QCLot: 3382238)						
EM2020793-020 BH-M25S	EG051G: Ferrous Iron		2 mg/L	96.7	70.0	130
EK085M: Sulfide as S2- (QCLot: 3384289)						
EM2020793-002 UGM-M1S	EK085: Sulfide as S2-	18496-25-8	0.33 mg/L	# 69.5	70.0	130
EK085M: Sulfide as S2- (QCLot: 3384290)						
EM2020793-022 QA2	EK085: Sulfide as S2-	18496-25-8	0.33 mg/L	# 20.9	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3383788)						
EM2018560-004 Anonymous	EP080: C6 - C9 Fraction		280 µg/L	70.2	43.0	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3383788)	1CLot: 3383788)					
EM2018560-004 Anonymous	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	68.2	44.0	122
EP080: BTEXN (QCLot: 3383788)						
EM2018560-004 Anonymous	EP080: Benzene	71-43-2	20 µg/L	6.06	0.89	130



: 10 of 10 : EM2020793 : EMM CONSULTING PTY LTD : S190512

Page Work Order

Client Project	: EMM CONSULTING PTY LTD : S190512						ALS
Sub-Matrix: WATER				ha	h atrix Mpike (h M) Report		
				Mpike	MpikeRecovery(%)	Recovery Limits (%)	mits (%)
Laboratory sample ID Mample ID	Mample ID	h etdo: ACompoun:	CSMNumber	CSM Number Concentration	h M	Low	Higd
EP080: BTEXN (Q	EP080: BTEXN (QCLot: 3383788) - continued						
EM2018560-004 Anonymous	Anonymous	EP080: Toluene	108-88-3	20 µg/L	88.3	72.0	132



# QA/QC Compliance Assessment to assist with Quality Review

Environmental Division Selbourne +61-2-745j j 699 85-Oov-8989 95-Ded-8989 : 1 of 18 29 OoKof samples redeiveR OoKof samples analyseR Date Namples 3 edeiveR **G**sue Date Laboratory Telephone I GLI ALLHKCGL/ OI 3BDG **EMM CONSULTING PTY LTD** PcAL UGIBON EM2020793 N1j 9418 BrRer number **Work Order** Contadt Nampler Pro@dt Client Nite

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 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 report contribute to the overall DQO assessment and reporting for guideline compliance.

I rief methoRsummaries anRreferendes are also proviReRto assist in tradeabilityK

# Summary of Outliers

# Outliers: Quality Control Samples

This report highlights outliers flaggeR in the . uality Control Q C( 3 eportK

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

# Outliers: Analysis Holding Time Compliance

Analysis Holding Time Outliers exist - please see following pages for full details.

# **Outliers: Frequency of Quality Control Samples**

NO Quality Control Sample Frequency Outliers exist.



: 8 of 18 : ES 8989M 2 : ES S CBONALTŒU PT/ LTD : N1j 9418 Page ) orWBrRer Client

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Outliers: Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

SatriY: WATER

											ıality		ıality		ıality		ıality	
Comment		MS recovery not determined,	background level greater than or	equal to 4x spike level.	MS recovery not determined,	background level greater than or	equal to 4x spike level.	MS recovery not determined,	background level greater than or	equal to 4x spike level.	Recovery less than lower data quality	objective	Recovery less than lower data quality	objective	Recovery less than lower data quality	objective	Recovery less than lower data quality	objective
Limits		-			1			1			<b>W9K9-189%</b>		<b>N9K9-189%</b>		N9K9-129%		MBM9-129%	
Data		Oot	DetermineR		Oot	DetermineR		Oot	DetermineR		47KM%		% N89		6j k <b>4</b> %		% ¥168	
Cc N Oumber		15797-M -7			1677M99-6			1677M99-6			M52j -j M46		M52j -j M46		175j 6-84-7		175j 6-84-7	
Analyte		Sulfate as SO4 -	Turbidimetric		Chloride			Chloride			Mercury		Mercury		Sulfide as S2-		Sulfide as S2-	
Client Nample ®		I x-S 16N			cnonymous			l x-S 1j D			AUS-S1N		. c8		AUS-S1N		. c8	
Laboratory Nample ®		ES8989M 2997			ES8989M 1998			ES8989M 299j			ES8989M 2998		ES8989M 2988		ES8989M 2998		ES8989M 2988	
CompounR Uroup Oame	Matrix Spike (MS) Recoveries	ED951U: Nulfate QurbiRmetrid( as NB5 8- by Dc			ED954U: ChloriRe by Disdrete cnalyser			ED954U: ChloriRe by Disdrete cnalyser			EU924F: DissolveRS erdury by FGN		EU924F: DissolveR Serdury by FGN		Ek 974S: NulfiRe as N8-		Ek 974S: NulfiRe as N8-	

### Outliers: Analysis Holding Time Compliance

Method		¥	Extraction / Preparation			Analysis	
Container / Client Nample @@(		Date extracted	Date extracted Due to extraction	Days overdue	Date analysed	Due vor analysis	Days overdue
EG051G: Ferrous Iron by Discrete Analyser							
Clear Plastic Bottle - HCl - Filtered							
I x -S 16DH	I x-S 16NH		-	-	84-Oov-8989	89-Oov-8989	Ŋ
I x -S 85DH	I x -S 85N						
Clear Plastic Bottle - HCl - Filtered							
I x -S 1j DH	I x-S 1j NH		-	-	84-Oov-8989	81-Oov-8989	4
I x -S 89DH	HN68 S- × I						
I x -S 88DH	I x -S 88NH						
. c8							
Clear Plastic Bottle - HCl - Filtered							
AUS-S1DH	AUS-S1NH		-	-	84-Oov-8989	88-Oov-8989	က
AUS-S5DH	AUS-S14NH						
LPNPI 95							
Clear Plastic Bottle - HCI - Filtered							
AUS-S8DH	AUS-S8NH	-	1	1	84-Oov-8989	82-Oov-8989	7
I x -S 82DH	I x-S 82NH						
I x -S 84DH	1 × -S 84N						



 Page
 : 2 of 18

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 Client
 : ES S CBONALTŒU PT/ LTD

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 : N1j 9418

SatriY: WATER

Method		Ex	Extraction / Preparation			Analysis	
Container / Client Nample (B/G)		Date extracted	Due vor extraction	Days	Date analysed	Due vor analysis	Days
EK085M: Sulfide as S2-							
Clear Plastic Bottle - Zinc Acetate/NaOH							
I x -S 16DH	I x -S 16NH	-	-		84-Oov-8989	89-0ov-8989	5
I x -S 85DH	I x -S 85N						
Clear Plastic Bottle - Zinc Acetate/NaOH							
I x-S 1j DH	I x-S 1j NH	!			84-Oov-8989	81-Oov-8989	4
I x -S 89DH	HN68 S- x I						
I x -S 88DH	I x -S 88NH						
80.							
Clear Plastic Bottle - Zinc Acetate/NaOH							
AUS-S1DH	AUS-S1NH	-			84-Oov-8989	88-Oov-8989	ო
AUS-S5DH	AUS-S14NH						
LPNPI 95							
Clear Plastic Bottle - Zinc Acetate/NaOH							
AUS-S8DH	AUS-S8NH	1	1	1	84-Oov-8989	82-Oov-8989	7
I x -S 82DH	I x -S 82NH						
I x -S 84DH	I x -S 84N						
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid							
Trip spiWe - 87 № 918989		84-Oov-8989	11-Oov-8989	14	84-Oov-8989	11-Oov-8989	41
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions	EPM 2013 Fractions						
Amber VOC Vial - Sulfuric Acid							
Trip spiVe - 87√19√8989		84-Oov-8989	11-Oov-8989	14	84-Oov-8989	11-Oov-8989	14
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid							
Trip spiWe - 87VI 9V8989		84-Oov-8989	11-Oov-8989	41	84-Oov-8989	11-Oov-8989	4

## Analysis Holding Time Compliance

Gsamples are iRentifieR beloq as having been analyseR or e tradteRoutsiRe of redommen ReR holding times this shoul Rbe taven into donsi Renation ghen interpreting results K

This report summarizes e tradtion V preparation and analysis times and dompares each qith cLN redommen ReR holding times Geferending ANEPC N) 756H cPxcH cN and OEPS (baseR on the sample dontainer proviPeR/Dates reporteR represent first Rate of eYtradtion or analysis an RpredluRe subse, uent Rlutions an RrerunsKc listing of breadhes G any (is proviReR hereinK

organids xolRing time for leadhate methoRs @MgK TCLP( vary addorRing to the analytes reporteRx cssessment dompares the leadh Rate gith the shortest analyte holRing time for the e, uivalent soil methoRx These are: 15 RaysHmerdury 87 Rays & other metals 179 RaysK c redorReR breadh Roes not guarantee a breadh for all non-volatile parametersK xolRing times for VOC in soils vary addorRing to analytes of interestK; inyl ChloriRe anR Ntyrene holRing time is MRaysw others 15 RaysK c redorReR breadh Roes not guarantee a breadh for all; BC analytes anR shoulRbe verifieRin dase the reporteRbreadh is a false positive or; inyl ChloriRe anR Ntyrene are not Wey analytes of interestVondernK

#### SatriY: WATER

Extraction / Preparation	ted Due tor extraction Efaluation Date analysed Due tor analysis Efaluation
nple Date	Date extrac
pod	ntainer / Client Sample ID(s)

Evaluation: x = x ol Ring time breadh w' = 1 ithin hol Ring time



: 5 of 18 : ES 8989M 2 : ES S CB ONALTŒU PT/LTD : N1j 9418

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SatriY: WATER					Evaluation	x = x olRing time	Evaluation: $\mathbf{x} = \mathbf{x}$ ol Rng time breadh $\mathbf{w}^{\checkmark} = 1$ ithin hol Ring time	n holRing timel
Method		Sample Date	Ex	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
EA250: Gross Alpha and Beta Activity								
Clear Plastic Bottle - Natural (EA250)								
I x-S 1j DH	I x-S 1j NH	14-Nov-2020	-	1		30-Nov-2020	12-Say-8981	>
I x -S 89DH	HN68 S- × I							
I x -S 88DH	I x -S 88NH							
. c8								
Clear Plastic Bottle - Natural (EA250) AUS -S 14NH	TPNPI 95	15-Nov-2020		-	-	30-Nov-2020	15-Say-8981	>
EA250CA: Gross Alpha and Beta Activity								
Clear Plastic Bottle - Natural (EA250)								
I x -S 1! DH	HN:1:8-×	14-Nov-2020	I	1	1	30-Nov-2020	12-Say-8981	>
HQ68 S- x I	HN68 S- × I							•
I x -S 88DH	HN88 S- × I							
& O .								
Clear Plastic Bottle - Natural (EA250)								
AUS-S14NH	LPNPI 95	15-Nov-2020	:	-	-	30-Nov-2020	15-Say-8981	>
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
I x -S 16DH	I x-S 16NH	13-Nov-2020	1		-	25-Nov-2020	8MOov-8989	>
I x -S 85DH	I x -S 85N							
Clear Plastic Bottle - Natural (ED037-P)								
I x-S1j DH	I x-S 1j NH	14-Nov-2020	-	1		25-Nov-2020	87-Oov-8989	>
I x -S 89DH	HN68 S- × I							
I x -S 88DH	I x -S 88NH							
80.								
Clear Plastic Bottle - Natural (ED037-P)								
AUS-S1DH	AUS-S1NH	15-Nov-2020	1	1		25-Nov-2020	8j -Oov-8989	>
AUS-S5DH	AUS-S14NH							
LPNPI 95								
Clear Plastic Bottle - Natural (ED037-P)								
AUS-S8DH	AUS-S8NH	16-Nov-2020	1	1		25-Nov-2020	29-Oov-8989	>
I x-S 82DH	I x -S 82NH							
I x -S 84DH	I x -S 84N							



: 4 of 18 : ES 8989M 2 : ES S CBONALTŒU PT/ LTD : N1j 9418

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SatriY: WATER					Evaluation:	× = x olRng time	Evaluation: x = x olRng time breadh w✓ = ) ithin holRng timer	holRing timek
Method		Sample Date	Ex	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)	N. S. S. S. S. S. S. S. S. S. S. S. S. S.	13-Nov-2020	I			25-Nov-2020	11-Ded-8989	`
HZ-885DH	N-585-X-							•
Clear Plastic Bottle - Natural (ED041G)								
I x-S1j DH	I x-S 1j NH	14-Nov-2020	1	-	-	25-Nov-2020	18-Ded-8989	>
I x -S 89DH	HN68 S- × I							
I x -S 88DH	I.XS.88NH							
. c8								
Clear Plastic Bottle - Natural (ED041G)								
AUS-S1DH	AUS-S1NH	15-Nov-2020	1	-		25-Nov-2020	12-Ded-8989	>
AUS-S5DH	AUS-S14NH							
LPNPI 95								
Clear Plastic Bottle - Natural (ED041G)								
AUS-S8DH	AUS-S8NH	16-Nov-2020	1	1		25-Nov-2020	15-Ded-8989	>
I x -S 82DH	I x -S 82NH							
I x -S 84DH	I x-S 84N							
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)								
I x -S 16DH	I x -S 16NH	13-Nov-2020	1	-		25-Nov-2020	11-Ded-8989	>
I x -S 85DH	I x -S 85N							
Clear Plastic Bottle - Natural (ED045G)								
I x-S 1j DH	I x -S 1j NH	14-Nov-2020	I	1	1	25-Nov-2020	18-Ded-8989	>
I x-S 89DH	HN68 S- x I							
I x-S 88DH	I x -S 88NH							
. c8								
Clear Plastic Bottle - Natural (ED045G)								
AUS-S1DH	AUS-S1NH	15-Nov-2020	1	-	-	25-Nov-2020	12-Ded-8989	>
AUS-S5DH	AUS-S14NH							
LPNPI 95								
Clear Plastic Bottle - Natural (ED045G)								
AUS-S8DH	AUS-S8NH	16-Nov-2020	I	1	-	25-Nov-2020	15-Ded-8989	>
I x -S 82DH	I x -S 82NH							
I x -S 84DH	I x -S 84N							



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SatriY: WATER					Evaluation	x = x olRng time	Evaluation: $\mathbf{x} = x$ ol Rng time breadh $\mathbf{w}' = 1$ ithin hol Ring time!	holRing timek
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due wr extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
I x-S 16DH	I x -S 16NH	13-Nov-2020	l	1	1	26-Nov-2020	11-Ded-8989	>
I x -S 85DH	I x -S 85N							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
I x-S 1j DH	I x-S 1j NH	14-Nov-2020	1	-	-	26-Nov-2020	18-Ded-8989	>
I x-S 89DH	HN68 S- X I							
I x-S 88DH	I x -S 88NH							
80.								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
AUS-S1DH	AUS-S1NH	15-Nov-2020	1			26-Nov-2020	12-Ded-8989	>
AUS-S5DH	AUS-S14NH							
LPNPI 95								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
AUS-S8DH	AUS-S8NH	16-Nov-2020	1	-	-	26-Nov-2020	15-Ded-8989	>
I x -S 82DH	I x -S 82NH							
I x -S 84DH	I x -S 84N							
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)								
I x -S 16DH	I x-S 16NH	13-Nov-2020	1	-	-	25-Nov-2020	18-Say-8981	>
I x -S 85DH	I x -S 85N							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)								
I x-S1j DH	I x-S1j NH	14-Nov-2020	1	-	-	25-Nov-2020	12-Say-8981	>
I x -S 89DH	HN68 S- x I							
I x -S 88DH	I x -S 88NH							
. c8								
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)								
AUS-S1DH	AUS-S1NH	15-Nov-2020	1	-	-	25-Nov-2020	15-Say-8981	>
AUS-S5DH	AUS-S14NH							
LPNPI 95								
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)								
AUS-S8DH	AUS-S8NH	16-Nov-2020	1	-	-	25-Nov-2020	14-Say-8981	>
I x -S 82DH	I x -S 82NH							
I x -S 84DH	I x -S 84N							



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SatriY: WATER					Evaluation:	x = x olRing time	Evaluation: $\mathbf{x} = \mathbf{x}$ ol Ring time breadh $\mathbf{w}^{\checkmark} = \mathbf{y}$ ithin hol Ring time!	า holRing time
Method		Sample Date	Ex	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)		13-Nov-2020	26-Nov-2020	18-S ay-8981	>	26-Nov-2020	18-Say-8981	>
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) 31 2H	8 - 8	14-Nov-2020	26-Nov-2020	12-S ay-8981	>	26-Nov-2020	12-Say-8981	>
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) AUS-S 1NH 31 5	AUS-S14NH	15-Nov-2020	26-Nov-2020	15-S ay-8981	>	26-Nov-2020	15-Say-8981	>
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) A US -S 8NH I x -S 84DH	I x -S 82DH TI 2H	16-Nov-2020	26-Nov-2020	14-S ay-8981	>	26-Nov-2020	14-Say-8981	>
EG035F: Dissolved Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)  I x -S 16DH  I x -S 85DH	I × -S 16NH I × -S 85N	13-Nov-2020	ŧ	I	-	25-Nov-2020	11-Ded-8989	>
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)  1 x - S 1j DH  1 x - S 89DH  1 x - S 88DH  2 x - S 88DH  2 x - S 88DH	x -S 1j NH   x -S 89NH   x -S 88NH	14-Nov-2020	I	-		25-Nov-2020	18-Ded-8989	>
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) AUS -S 1DH AUS -S 5DH LPNPI 95	AUS-S1NH AUS-S14NH	15-Nov-2020	I	1		25-Nov-2020	12-Ded-8989	>
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) AUS -S 8DH I x -S 82DH I x -S 84DH	AUS-S8NH I x-S82NH I x-S84N	16-Nov-2020	I	-	-	25-Nov-2020	15-Ded-8989	>
EG035T: Total Recoverable Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)		13-Nov-2020				26-Nov-2020	11-Ded-8989	>
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)	318	14-Nov-2020				26-Nov-2020	18-Ded-8989	>
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T) AUS-S 1NH 31 5	AUS-S14NH	15-Nov-2020	ŧ		ļ	26-Nov-2020	12-Ded-8989	>
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T) AUS-S 8NH I x -S 84DH TI 5H	I x -S 82DH TI 2H TI 4	16-Nov-2020	I	-	1	26-Nov-2020	15-Ded-8989	>



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7 of 18

Evaluation: \* = x olRng time breadh w / = ) ithin holRing time **Efaluation** × × × × × × × × × Due vor analysis 89-Oov-8989 88-Oov-8989 82-Oov-8989 89-Oov-8989 88-Oov-8989 82-Oov-8989 11-Oov-8989 11-Oov-8989 81-Oov-8989 81-Oov-8989 11-Oov-8989 Date analysed 25-Nov-2020 25-Nov-2020 25-Nov-2020 25-Nov-2020 25-Nov-2020 25-Nov-2020 25-Nov-2020 25-Nov-2020 25-Nov-2020 25-Nov-2020 25-Nov-2020 Efaluation - --× × Extraction / Preparation Due vor extraction 11-Oov-8989 11-Oov-8989 11-Oov-8989 --- Date extracted 25-Nov-2020 25-Nov-2020 25-Nov-2020 l l l l l l l I 14-Nov-2020 16-Nov-2020 28-Oct-2020 28-Oct-2020 13-Nov-2020 14-Nov-2020 15-Nov-2020 16-Nov-2020 13-Nov-2020 15-Nov-2020 28-Oct-2020 Sample Date AUS-S14NH AUS-S14NH AUS-S1NH AUS-S8NH AUS-S1NH AUS-S8NH I x -S 82NH I x -S 82NH I x -S 16NH I x-S 1j NH I x -S 1 J NH HN68 S- x I I x -S 88NH I x -S 16NH HN68 S- x I I x -S 88NH I x -S 85N I x -S 84N I x -S 85N I x -S 84N EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions Clear Plastic Bottle - Zinc Acetate/NaOH (EK085) Clear Plastic Bottle - Zinc Acetate/NaOH (EK085) Clear Plastic Bottle - Zinc Acetate/NaOH (EK085) Clear Plastic Bottle - Zinc Acetate/NaOH (EK085) Clear Plastic Bottle - HCl - Filtered (EG051G) Clear Plastic Bottle - HCI - Filtered (EG051G) Clear Plastic Bottle - HCI - Filtered (EG051G) Clear Plastic Bottle - HCI - Filtered (EG051G) EG051G: Ferrous Iron by Discrete Analyser EP080/071: Total Petroleum Hydrocarbons Amber VOC Vial - Sulfuric Acid (EP080) Amber VOC Vial - Sulfuric Acid (EP080) Amber VOC Vial - Sulfuric Acid (EP080) Container / Client Sample ID(s) Trip spiWe - 87VI 9V8989 Trip spiWe - 87M 9V8989 Trip spiWe - 87M9V8989 EK085M: Sulfide as S2-**EP080: BTEXN** SatriY: WATER AUS-S8DH AUS-S1DH AUS-S8DH AUS-S1DH AUS-S5DH AUS-S5DH I x -S 16DH I x -S 1j DH I x -S 89DH I x -S 82DH I x -S 84DH I x -S 16DH I x -S 1j DH I x -S 89DH I x -S 88DH I x -S 82DH I x -S 84DH I x -S 85DH I x -S 88DH I x -S 85DH LPNPI 95 LPNPI 95 Method



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Client : ES S CB ONALTŒU PT/ LTD
Pro0edt : N1j 9418

# Quality Control Parameter Frequency Compliance

The folloging report summarises the fre, uendy of laboratory. C samples analyseR githin the analytidal lot® in ghich the submitteR sample® (gas@ere(prodesseRcdtual rate shoulR be greater than or e, ual to the eYpedteRrateKc listing of breadhes is proviReRin the Nummary of ButliersK × = . uality Control fre, uendy not q ithin spedifidation w✓ = . uality Control fre, uendy q ithin spedifidationk

Evaluation:

SatriY: WATER

OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 | 2 & c LN . C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & c LN . C NtanRarR C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN . C NtanRarR OEPS 8912 I 2 & cLN . C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN . C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN . C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & cLN . C NtanRarR OEPS 8912 I 2 & cLN. C NtanRarR OEPS 8912 I 2 & c LN . C Ntan Rar R Quality Control Specivication OEPS 8912 | 2 & cLN. OEPS 8912 | 2 & cLN. Ef aluation Rate (%) Expected 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 15.38 11.76 10.00 Actua! 10.81 12.50 13.64 11.11 11.54 10.81 10.00 11.76 10.00 7.69 8.33 60.6 5.00 5.00 5.56 8.33 5.88 5.00 5.00 7.69 5.41 7.69 5.41 9.09 5.00 Redular 2M 2M 86 86 85 Ξ 2M 2 85 Σ 2M 59 88 2M 86 85 2 M 88 59 88 89 89 17 86 86 89 89 17 86 59 89 89 Count 90 2 2 ω ω ω ω ω ∞ ω ω ω 2 ω ω ω EU924F ED9j 2F EP979 ED951U Ec 849 EU989c-F Ec 849 Ek 974 ED954U EU924F Ec 849 ED9j 2F Ek 974 ED92MP EU989c-F EU941U ED951U Ek 974 EU989c-T ED92MP EU941U ED9j 2F EU924T EU989c-T EP979 EU989c-F EU941U ED951U **EU924T** EU989c-T ED954U **EU924T** ED954U EU924F **Method** Nulfate GurbiRimetrid( as NB58- by Disdrete cnalyser Nulfate QurbiRimetrid( as NB58- by Disdrete cnalyser Nulfate QurbiRimetrid( as NB 58- by Disdrete cnalyser DissolveRS etals by GP-SN - Nuite c DissolveRS etals by GP-SN - Nuite c DissolveRS etals by GP-SN - Nuite c aboratory Control Namples QCN Ferrous Con by Disdrete cnalyser Ferrous Con by Disdrete cnalyser Ferrous Con by Disdrete cnalyser Total Setals by CP-SN - Nuite c Total Setals by CP-SN - Nuite c Total Setals by CP-SN - Nuite c ChloriRe by Disdrete cnalyser ChloriRe by Disdrete cnalyser Uross cIpha anRI eta cdtivity ChloriRe by Disdrete cnalyser Uross cIpha anRI eta cdtivity Uross cIpha anRI eta cdtivity DissolveRS erdury by FGN DissolveRS erdury by FS N DissolveRS erdury by FGN Sa@r Cations - DissolveR Sa@r Cations - DissolveR Sa@r Cations - DissolveR uality Control Nample Type clWalinity by PC Titrator clWalinity by PC Titrator Total Serdury by FGN Total Serdury by FSN Total Serdury by FSN T3x; olatiles TEX SethoRI lanV SCI ( Analytical Methods NulfiRe as N8-NulfiRe as N8-NulfiRe as N8-



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. uality Control Nample Type		CO	Count		Rate (%)		Quality Control Specivication
Analytical Methods	Method	OC	Reaular	Actual	Expected	Ef aluation	
SethoRI lanV\$ (\$ - ContinueR							
T3x; olatilesV TEX	EP979	-	17	5.56	5.00	>	OEPS 8912 I 2 & c.LN. C NtanRarR
SatriY NpiWes & N(							
ChloriRe by Disdrete cnalyser	ED954U	80	2M	5.41	5.00	>	OEPS 8912 I 2 & cLN. C NtanRarR
DissolveRS erdury by FGN	EU924F	80	86	7.69	5.00	>	OEPS 8912 I 2 & cLN. C NtanRarR
DissolveRS etals by @P-S N - Nuite c	EU989c-F	80	86	7.69	5.00	>	OEPS 8912 I 2 & cLN. C NtanRarR
Ferrous @n by Disdrete cnalyser	EU941U	∞	85	8.33	5.00	>	OEPS 8912 I 2 & cLN . C NtanRarR
Nulfate QurbiRimetrid( as NB58- by Disdrete cnalyser	ED951U	80	59	5.00	5.00	>	OEPS 8912 I 2 & cLN. C NtanRarR
NulfiRe as N8-	Ek 974	80	88	60.6	5.00	>	OEPS 8912 I 2 & cLN. C NtanRarR
Total S erdury by F\$N	EU924T	_	88	5.00	5.00	>	OEPS 8912 I 2 & cLN . C NtanRarR
Total S etals by GP-S N - Nuite c	EU989c-T	_	88	5.00	5.00	>	OEPS 8912 I 2 & c.LN. C NtanRarR
T3x; olatilesV TEX	EP979	1	17	5.56	5.00	>	OEPS 8912 I 2 & c.LN. C NtanRarR



 Page
 : 11 of 18

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### **Brief Method Summaries**

The analytidal prodeRures useRby the Environmental Division have been RevelopeR from establisheRinternationally redognizeR prodeRures such as those publisheRby the AN EPC HC N anR OEPS K® house RevelopeR prodeRures are employeR in the absende of RodumenteR stanRarRs or by dlient re, uestKThe folloq ing report proviRes brief Resdriptions of the analytidal prodeRures employeR for results reporteR in the SettingtionsK Certifidate of cnalysisKNourdes from q hidh cLN methoRs have been RevelopeR are proviReR q ithin the SethoR DesdriptionsK

Analytical Methods	Method	Matrix	Method Descriptions
Uross c Ipha anR I eta c dtivity	Ec 849	) cTE3	c NTS DM872-96: Determination of gross alpha anRgross beta raRoadtivity in q ater samples by Li, uiR Ndintillation Counting Q.NC(K
c IValinity by PC Titrator	ED92MP	) cTE3	Ghouse: 3 eferendeRto cPx c 8289 I This prodeRure Retermines alValinity by automateRmeasurement GAGKPC Titrate( on a settleRsupernatant all, uot of the sample using px 54 for inRidating the total alValinity enR-pointK This methoRis dompliant qith OEPS NdheRule I ②(
Nulfate QurbiRmetrid( as NB 5 8- by Disdrete cnalyser	ED951U	) cTE3	© house: 3 eferendeR to cPx c 5499-NB 5K DissolveR sulfate is RetermineR in a 9/6/4um filtereR sampleK Nulfate ions are donverteR to a barium sulfate suspension in an adetid adiR meRum q ith barium dhloriRe/Light absorbande of the I aNB 5 suspension is measureR by a photometer anR the NB 5-8 dondentration is RetermineR by domparison of the reaRing q ith a stan Ran Ruve/KThis methoR is dompliant q ith OEPS NdheRule I Q(
ChloriRe by Disdrete cnalyser	ED954U	) cTE3	© house: 3 eferendeR to cPx c 5499 CI - UNThe thiodyanate ion is liberateR from merdurid thiodyanate through se, uestration of merdury by the dhloriRe ion to form non-ioniseR merdurid dhloriReM the presende of ferrid ions the librateR thiodynate forms highly-doloureR ferrid thiodynate q hidh is measureRat 579 nm cPx c seal methoR8 91M1-L
Sa@r Cations - DissolveR	ED9i 2F	) cTE3	@ house: 3 eferendeR to cPxc 2189 anR2184wANEPc N) 756 - 6919 anR6989wCations are RetermineR by either CP-c EN or CP-S N tedhni, uesK This methoR is dompliant q ith OEPS NdheRule I Q (NoRum cRsorption 3 atio is daldulateR from CaHS g anR Oa q hidh RetermineR by cLN in house methoR.) CEOVED9J 2FKT his methoR is dompliant q ith OEPS NdheRule I Q (xarRhess parameters are daldulateR baseR on cPxc 8259 I K This methoR is dompliant q ith OEPS NdheRule I Q (
DissolveRS etals by @P-S N - Nuite c	EU989c-F	) cTE3	© house: 3 eferendeR to cPxc 2184wANEPc N) 756 - 6989HcLN.) GEO/EU989K Namples are 9/64 µm filtereR prior to analysisK The GPS N tedhni, ue utilizes a highly efficient argon plasma to ionize selecteRelementsKons are then passeR into a high vaduum mass spedtrometerHq high separates the analytes baseR on their Ristindt mass to dharge ratios prior to their measurement by a Rischete RynoRe ion RetectorK
Total Setals by @P-SN - Nuite c	EU989c-T	) cTE3	Ghouse: 3 eferendeR to cPxc 2184wANEPc N) 756 - 6989HcLN.) GEO/EU989K The GPS N tedhni, ue utilizes a highly effidient argon plasma to ionize selecteRelementsKons are then passeRinto a high vaduum mass spedtrometerHq high separates the analytes baseR on their Ristindt mass to dharge ratios prior to their measurement by a Rischete RynoRe ion RetedtorK
DissolveR S erdury by F <b>G</b> N	EU924F	) cTE3	Gh house: 3 eferendeRto cN 2449HcPx c 2118 x g - 1
Total S erdury by F <b>©</b> N	EU924T	) cTE3	® house: 3 eferendeRto cN 2449HcPxc 2118 xg - I @loq -in@dtion @hCl8(@olR; apour generation( ccN( FGS-ccN is an automateRflameless atomid absorption tedhni, uekc bromateWromiRe reagent is useRto oYIRse any organid merdury dompounRs in the unfiltereRsampleK The ionid merdury is reRudeRonline to atomid merdury vapour by NnCl8 q hidh is then purgeRinto a heateR, uartz dellK. uantifidation is by domparing absorbande against a dalibration durveKThis methoR is dompliant q ith OEPS NdheRule I Q(K



 Page
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 : ESS CBONALT©U PT/ LTD

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Analytical Methods	Method	Matrix	Method Descriptions
Ferrous @on by Disdrete cnalyser	EU941U	) cTE3	® house: 3 eferendeRto cPx c 2499 Fe-I K c dolorimetrid Retermination baseR on the readtion betq een phenanthroline anRferrous iron at px 216-212 to form an orange-reR dompleY that is measureRagainst a five-point dalibration durveK This methoR is dompliant q ith OEPS NdheRule I Q(K
NulfiRe as N8-	Ek 974	) cTE3	
@nid I alande by PCT Dc anRTurbi NB5 Dc	* E0944 - PU	) cTE3	® house: 3 eferendeRto cPx c 1929FKThis methoRis dompliant q ith OEPS NdheRule I ℃(
T3x; olatilesV TEX	EP979	) cTE3	© house: 3 eferendeRto ANEPc N) 756 - 7869 ) ater samples are Rredtly purgeRprior to analysis by Capillary UC\& N anR, uantifidation is by domparison against an establisheR4 point dalibration durve\ClternativelyHa sample is e, uilibrateRin a hea\pagade vial anRa portion of the hea\pagade \pagade \text{RetermineRby UCS N analysis\text{This} methoR is dompliant q ith the . C re, uirements of OEPS Ndhe\text{Nule I \text{\text{Q}}(
Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total 3 edoverable S etals	E084	) cTE3	® house: 3 eferendeRto ANEPc N) 756-2994KS ethoR2994 is a OitridW yRodhlorid adiRRgestion prodeRure useRto prepare surfade anRgrounRqater samples for analysis by 低PcEN or 低PSNKThis methoRis dompliant q ith OEPS NdheRule I 仅(
; olatiles ) ater Preparation	B3U16-)	) cTE3	c 4 mL ali, uot or 4 mL of a RiluteRsample is aRReRto a 59 mL; BC vial for purgingK

Form Page 1 of 1

<	CHAIN OF CUSTODY	DADELAIDE 21 Burna Road Pooraka SA 5095 Ph. 08 8359 0890 E: adelaide@alsglobal.com	9	DMACKAY 78 Harbour Road Mockay OLD 4740 Ph. 07 4944 0177 E. madrav@nloaded.	
(۵۱۶)	ALS Laboratory: please tick à	UBRISBANE 2 Right Street Stafford OLD 4053 Ph. 07 9248 7222 E. samples, bristane@alsglobal.com UGLADSTONE 46 Callemontal Drive Cinno OLD 4680 Ph. 07 747 1500 E. (pidatone@alsenfo.k.)	g	UNELBOURNE 2-4 Westell Road Springvie VIO 3171 Ph. 03 8549 9800 E. SWestell Road Springvie VIO 3171 DMUDGEE 1/29 Sydney Road Muddres NSW 2667	7.1 com
CLIENT: EMM CONSULTING	ING	,		Pr. 02 6372 6735 E: mudgee.mail@alsglobal.com	
OFFICE: 188 Ground Flax	OFFICE: 188 Ground Floor, 188 Normanby Road, Southbank 3006		TURNAROUND REQUIREMENTS:	Standard TAT (List due date):	
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SAMPLER: Ifuka		CONTACT PH: 0477 702 413	77 702 413		ä
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Ν ×

Yes Yes

Free ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comment: RELINQUISHED BY:

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?

COC SEQUENCE NUMBER (Circle)

8 Θ Θ

RECEIVED BY:

17/11/2020

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL;

g

そろ

DATE/TIME:

DATE/TIME:

RECEIVED BY:

GWOLLONGONG 1/19-21 Raiph Black Dr. North Wollongong NSW 2500 Phr 02 422S 3125 E: wollongong@alsglobal.com

DTOWNSVILLE 14-15 Dosma Coun Botte CLD 4818 Pt. 67 4796 6600 E: townesville anvironmental@aisglobal.com

USYDNEY 277-289 Woodpark Road Smithleld NSW 2164 Ph. 02 8784 8555 E: samples.sydney@alsglobal.com

DNEWCASTLE 5/585 Maidland Road Mayfield West NSW 2304 Ph. 02 4014 2500 E: samples newcastle@alsglobel.com

DNOWRA 4/13 Geary Place North Nowra NSW 2541 Pr. 02 4423 2083 E. nowra@alsglobal.com OPERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

(unificated bottle required) or Dissolved (field filtered bottle required).  Comments on likely samples required) or Dissolved (field filtered bottle required).  Environmental Division Melbourne Work Order Reference EM202083.  I elephane: + 61-3-8549 9600											1
(unifiered bottle required), or Dissolved (field fillered bottle required).  Environme Work Orde Work Orde  Work Orde  Work Orde  Sight Unpresented Plastic, F = Formaldehyde Preserved Glass;	ALS USE ONLY		SAMPLE DETAILS MATRIX: Solid(S) Water(W)		CONTAINER INFORMATION	ANA	YSIS REQUIRED including S	UITES (NB. Suite Codes must be listed to	o attract suite price)		
Environme Melbourne Work Orde EM2  Physic Reserved Plastic, F = Formaldehyde Preserved Glass;						Where Mota	s are required, specify Total (u	nfiltered bottle required) or Dissolved (fle	old filtered bottle required).	Additional information	
Melbourne Work Order Reference Work Order Reference EM202083  Gliff Marketing  Telephane: +61-3-8549 9600  Telephane: +61-3-8549 9600						5,6 NAG				Comments on likely contaminant levels, dilutions, or samples requiring specific CC analysis etc.	
tie 7 1/11/2020 to 5/11/ 2020 S 1 1/11/2020 to 5/11/ 2020 S 1 1/11/2020 to 5/11/ 2020 S 1 1/11/2020 to 5/11/ 2020 S 1 1/11/2020 to 5/11/ 2020 S 1 1/11/2020 to 5/11/ 2020 S 1 1/11/2020 to 5/11/ 2020 S 1 1/11/2020 to 5/11/ 2020 S 1 1/11/2020 to 5/11/ 2020 S 1/11/2020 to 5/11/ 2020 S 1/11/2020 to 5/11/ 2020 S 1/11/2020 to 5/11/ 2020 S 1/11/2020 to 5/11/2020 to 5/11/2020 S 1/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 S 1/11/2020 to 5/11/2020 S 1/11/2020 to 5/11/2020 S 1/11/2020 to 5/11/2020 S 1/11/2020 to 5/11/2020 S 1/11/2020 to 5/11/2020 S 1/11/2020 to 5/11/2020 S 1/11/2020 to 5/11/2020 to 5/11/2020 S 1/11/2020 to 5/11/2020 S 1/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/2020 to 5/11/	UABID	SAMPLEID	DATE / TIME	MATRIX	'n				Melbourne Work Ord FM2	ental Division e Ser Reference 2020837	
Telephane: + 61-3-8549 9600  Jil Unpresoned Plastic familiathyde Presoned Glass;	-	J. H. Commission				ie SAM ,0.THq				Management of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of th	
Telephane: +61-3-8549 9600		TIME composite /	1/11/2020 to 5/11/ 2020	S							
Telephone: +61-3-8549 9600 9th Unpresoned Plastic: find bottle; SP = Sulfunc Presoned Plastic: F = Formaldehyde Presoned Glass;	7	Tail composite 7	1/11/2020 to 5/11/ 2020	s		.   ,					T
I Prephane: + 61-3-8549 9600 git Unpresoned Plastic; dion botte; SP = Sulfuno Preserved Plastic; F = Formaldehyde Preserved Glass;	~	Trommel oversize composite 7	1/11/2020 to 5/11/ 2020	S		-   .					$\tau$
gN Unpreserved Plassic. Ition bottler, SP ≈ Sulfuric Preserved Plassic. F = Formaldehyde Preserved Glass;			TOTAI			-			relephone: +61.	3-8549 9600	
glit Unpresenved Prastic klon bottler, SP = Sulfuno Presenved Plastic; F = Formaldehyde Presenved Glass;	Water Container Codes; P = L V = VOA Vial HCI Preserved; VB	Unpreserved Plastic; N = Nitric Preserve 3 = VOA Vial Sodium Bisulphate Preserv	nd Plastic, ORC = Nitric Presarved ORC; SH = ned; VS = VOA Vial Sulfrish Preserved ORC; SH =	Sodium Hydro	kide/Cd Preserved; S = Sodium Hydroxide Prese	3 Ived Plastic: AG = Ambar Ca					
	DOI DAVIDGE LIEBERARD BOLL	M; E = EDIA Proserved Bottlas; ST = S	terle Bottle; ASS = Plastic Bag for Acid Sulpha	ite Sols; B = U	erved Vail SG = Sulfunc Preserved Amber Glas. Preserved Bag; L' = Lugois fodine Preserved Bot	s; H = HCl preserved Plastic tiles; STT = Sterile Sodium Ti	. HS = HCI preserved Speciation iosulfate Preserved Bottles.	f Unpreserved Ptastic in botile; SP ≈ Sulfuric Preserved Plastic;	F = Formaldehyde Preserved Glass		-

Chote: 3 & 209 Co6?
Temp: 16 % Seal: Y (45)
Ice / Icebricks (NA) Received:

#### **Gemma Smeaton**

From:

Benjamin Comensoli

Sent:

Tuesday, 24 November 2020 12:36 PM

To:

COC Melbourne

Subject:

FW: [EXTERNAL] - RE: ALS Samples

Attachments:

COC S190512 20201116.xlsx; COC S190512 20201117\_Solids.xlsx

From: Bill Bull <br/>bull@emmconsulting.com.au><br/>Sent: Tuesday, 24 November 2020 12:27 PM

To: Benjamin Comensoli <br/> <br/> denjamin.comensoli@ALSGlobal.com>

Cc: Kaitlyn Brodie < kbrodie@emmconsulting.com.au>

Subject: [EXTERNAL] - RE: ALS Samples

**CAUTION:** This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Hi Ben,

If I remember correctly, there should have been four eskies delivered. I believe these are the relevant COCs, but let me know if they don't align with the samples inside.

Thanks,

Bill Bull | Environmental Engineer

T 08 8232 2253 | M 0435 060 396

From: Benjamin Comensoli < benjamin.comensoli@ALSGlobal.com >

Sent: Tuesday, 24 November 2020 11:51 AM To: Bill Bull < bull@emmconsulting.com.au >

Subject: ALS Samples

CAUTION: This email originated outside of the Organisation.

Hey Bill,

Can you please provide the COC and analysis details for the samples received at ALS Springvale today

Cheers,

Regards,

Ben Comensoli

Client Services Officer, Environmental

Melbourne



## CERTIFICATE OF ANALYSIS

Laboratory **EMM CONSULTING PTY LTD** EM2020837 **Work Order** 

Shane Colley Contact Address 187 Coventry Street PAUL GIBBONS

**Environmental Division Melbourne** 

: 1 of 2

: 4 Westall Rd Springvale VIC Australia 3171 24-Nov-2020 10:45 +61-3-8549 9600 02-Dec-2020 Date Analysis Commenced Date Samples Received Telephone Melbourne 3205 S190512

03-Dec-2020 13:52 Issue Date

Iluka

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.

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

This Certificate of Analysis contains the following information:

EN/222

Quote number

C-O-C number

Sampler

Order number

Telephone

Project

Contact Address

Client

No. of samples analysed No. of samples received

General Comments

Analytical Results

Signatories

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.

Accreditation Category Position 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.

Brisbane Acid Sulphate Soils, Stafford, QLD Senior Acid Sulfate Soil Chemist Ben Felgendrejeris



 Page
 : 2 of 2

 Work Order
 : EM2020837

 Client
 : EMM CONSULTING PTY LTD

 Project
 : S190512

#### **General Comments**

In house developed procedures 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. 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

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

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

Key:

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.

ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

#### Analytical Results

Analy acai results								
Sub-Matrix: <b>SOIL</b> (Matrix: <b>SOIL</b> )			Sal mpe ID	HMC composite 7	Tail composite 7	Trommel oversize composite 7		1
		Sal mi	Sal mang date / til e	05-Nov-2020 00:00	05-Nov-2020 00:00	05-Nov-2020 00:00		
Col mund	CAS Nul ber	TOR	Unit	EM2020837-001	EM2020837-002	EM2020837-003		
				Result	Result	Result		
EA009: Net Acid Production Potential								
Net Acid Production Potential		0.5	kg H2SO4/t	14.3	-3.4	-588	-	i
EA011: Net Acid Generation								
(хо) на		0.1	pH Unit	2.5	3.2	11.0		i
NAG (pH 4.5)	-	0.1	kg H2SO4/t	14.4	3.0	<0.1	-	i
NAG (pH 7.0)		0.1	kg H2SO4/t	18.0	5.4	<0.1		
EA013: Acid Neutralising Capacity								
ANC as H2SO4		0.5	kg H2SO4 equiv./t	6.2	19.9	592		:
ANC as CaCO3		0.1	% CaCO3	9.0	2.0	60.3		-
Fizz Rating		0	Fizz Unit	1	1	5		
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)		0.01	%	0.67	0.54	0.13	-	-



# QUALITY CONTROL REPORT

: 4 Westall Rd Springvale VIC Australia 3171 Environmental Division Melbourne Shane Colley : 1 of 3 Laboratory Contact Address **EMM CONSULTING PTY LTD** : 187 Coventry Street PAUL GIBBONS EM2020837 **Work Order** Contact Address

+61-3-8549 9600 24-Nov-2020 02-Dec-2020 03-Dec-2020 Date Analysis Commenced Date Samples Received Telephone Issue Date S190512

Melbourne 3205

Order number

Sampler

Telephone

Client

Project

: EN/222 · Iluka No. of samples analysed No. of samples received C-O-C number Quote number

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 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.

Accreditation Category	Brisbane Acid Sulphate Soils, Stafford, QLD
Position	Senior Acid Sulfate Soil Chemist
Signatories	Ben Felgendrejeris



 Page
 : 2 of 3

 Work Order
 : EM2020837

 Client
 : EMM CONSULTING PTY LTD

 Project
 : S190512

General Comments

In house developed procedures 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. 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 primary

Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot 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

RPD = Relative Percentage Difference

# = Indicates failed QC

### Laboratory Duplicate (DUP) Report

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

Sub-Matrix: SOIL						Laboratory D	Laboratory Duplicate (DUP) Report		
Laboratory sample ID	Mample ID	h etdo: ACompoun:	CSMNumber	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA011: Net Acid Ger	EA011: Net Acid Generation (QC Lot: 3391390)							_	
EM2020837-001	HMC composite 7	EA011: NAG (pH 4.5)	-	0.1	kg H2SO4/t	14.4	14.3	0.995	0% - 20%
		EA011: NAG (pH 7.0)	I	0.1	kg H2SO4/t	18.0	17.7	2.06	0% - 20%
		EA011: pH (OX)	I	0.1	pH Unit	2.5	2.5	0.00	0% - 20%
EM2020865-008	Anonymous	EA011: NAG (pH 4.5)	1	0.1	kg H2SO4/t	<0.1	<0.1	0.00	No Limit
		EA011: NAG (pH 7.0)	1	0.1	kg H2SO4/t	<0.1	<0.1	0.00	No Limit
		EA011: pH (OX)	-	0.1	pH Unit	8.7	8.8	0.00	0% - 20%
EA013: Acid Neutral	EA013: Acid Neutralising Capacity (QC Lot: 3391389)	1389)							
EB2030562-091	Anonymous	EA013: ANC as H2SO4	-	0.5	kg H2SO4	53.5	52.4	2.04	0% - 20%
					equiv./t				
EM2020865-003	Anonymous	EA013: ANC as H2SO4	-	0.5	kg H2SO4	18.7	19.4	3.71	0% - 20%
					equiv./t				
ED042T: Total Sulfur	ED042T: Total Sulfur by LECO (QC Lot: 3395618)	(8)							
EB2031554-001	Anonymous	ED042T: Sulfur - Total as S (LECO)	-	0.01	%	0.01	<0.01	0.00	No Limit
EM2020865-005	Anonymous	ED042T: Sulfur - Total as S (LECO)	-	0.01	%	0.49	0.49	0.00	0% - 20%



h etdo: Blank (h B) an: Laboratory Control Mpike (LCM) Report

parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target 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 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.

Laboratory Control Mpike (LCM) Report

h etdo: Blank (h B)

Sub-Matrix: SOIL

				Report	Мріке	Mpike Recovery (%)	Recovery	Recovery Limits (%)
h etdo: ACompoun:	CSMNumber	LOR	Unit	Result	Concentration	TCM	Low	Higd
EA011: Net Acid Generation (QCLot: 3391390)								
EA011: NAG (pH 7.0)	-		kg H2SO4/t	1	26.74 kg H2SO4/t	94.7	70.0	130
EA013: Acid Neutralising Capacity (QCLot: 3391389)								
EA013: ANC as H2SO4	-	-	kg H2SO4 equiv./t	1	9.9 kg H2SO4 equiv./t	93.3	82.0	120
ED042T: Total Sulfur by LECO (QCLot: 3395618)								
ED042T: Sulfur - Total as S (LECO)		0.01	%	<0.01	0.16 %	98.5	70.0	130

### h atrix Mpike (h M) 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.

No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.



# QA/QC Compliance Assessment to assist with Quality Review

:10f4	: Environmental Division Melbourne	: +61-3-8549 9600	: 24-Nov-2020	: 03-Dec-2020	€:	ო	
Page	Laboratory	Telephone	Date Samples Received	Issue Date	No. of samples received	No. of samples analysed	
: EM2020837	: EMM CONSULTING PTY LTD	: PAUL GIBBONS	: \$190512	1	: Iluka		
Work Order	Client	Contact	Project	Site	Sampler	Order number	

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 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 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.

- Mothod Blank value outliers occur.
- NO Duplicate outliers occur.
- NO Laboratory Control outliers occur.
- Moduli Spike outliers occur.
- For all regular sample matrices, NO surrogate recovery outliers occur.

# Outliers: Analysis Holding Time Compliance

Analysis Holding Time Outliers exist - please see following pages for full details.

# **Outliers: Frequency of Quality Control Samples**

NO Quality Control Sample Frequency Outliers exist.



EMM CONSULTING PTY LTD : 2 of 4 : EM2020837 S190512 Work Order Project Client

### Outliers: Analysis Holding Time Compliance

Matrix: SOIL

Method		Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Date extracted Due for extraction	Days overdue	Date analysed	Date analysed Due for analysis	Days overdue
ED042T: Total Sulfur by LECO							
Miscellaneous Plastic Container							
HMC composite 7,	Tail composite 7,	02-Dec-2020	)2-Dec-2020 12-Nov-2020	20	1	1	
Trommel oversize composite 7							

# 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.

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

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: SOIL					Evaluation	: x = Holding time	Evaluation: $\times$ = Holding time breach; $\checkmark$ = Within holding time.	holding time.
Method		Sample Date	Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Date extracted Due for extraction	Evaluation	Date analysed	Date analysed Due for analysis	Evaluation
EA011: Net Acid Generation								
Miscellaneous Plastic Container (EA011) HMC composite 7, Trommel oversize composite 7	Tail composite 7,	05-Nov-2020	02-Dec-2020	05-Nov-2021	>	02-Dec-2020	31-May-2021	>
EA013: Acid Neutralising Capacity								
Miscellaneous Plastic Container (EA013) HMC composite 7, Trommel oversize composite 7	Tail composite 7,	05-Nov-2020	02-Dec-2020	05-Nov-2021	>	03-Dec-2020	31-May-2021	>
ED042T: Total Sulfur by LECO								
Miscellaneous Plastic Container (ED042T) HMC composite 7, Trommel oversize composite 7	Tail composite 7,	05-Nov-2020	02-Dec-2020	12-Nov-2020	×	02-Dec-2020	31-May-2021	>



: 3 of 4 : EM2020837 : EMM CONSULTING PTY LTD : \$190512 Page Work Order Project Client

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: SOIL				Evaluation	n: x = Quality Co	ntrol frequency n	Evaluation: x = Quality Control frequency not within specification; V = Quality Control frequency within specification.
Quality Control Sample Type		ပိ	Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Acid Neutralising Capacity (ANC)	EA013	2	16	12.50	10.00	>	NEPM 2013 B3 & ALS QC Standard
Net Acid Generation	EA011	2	11	18.18	10.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	2	20	10.00	10.00	>	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Acid Neutralising Capacity (ANC)	EA013	_	16	6.25	5.00	>	NEPM 2013 B3 & ALS QC Standard
Net Acid Generation	EA011	_	11	60.6	2.00	>	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	,	20	5.00	5.00	`	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Sulfur - Total as S (LECO)	ED042T	_	20	2.00	5.00	>	NEPM 2013 B3 & ALS QC Standard



 Page
 : 4 of 4

 Work Order
 : EM2020837

 Client
 : EMM CONSULTING PTY LTD

 Project
 : \$190512

### **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
Net Acid Production Potential	EA009	SOIL	In house: Referenced to Coastech Research (Canada)(Mod.). NAPP = Acid Production Potential (APP or MAP-Maximum Acid Potential) minus Neutralising Capacity (ANC). NAPP may be +ve, zero or -ve.
Net Acid Generation	EA011	SOIL	In house: Referenced to Miller (1998) Titremetric procedure determines net acidity in a soil following peroxide oxidation. Titrations to both pH 4.5 and pH 7 are reported.
Acid Neutralising Capacity (ANC)	EA013	SOIL	In house: Referenced to USEPA 600/2-78-054, I. Miller (2000). A fizz test is done to semiquanititatively estimate the likely reactivity. The soil is then reacted with an known excess quanitity of an appropriate acid. Titration determines the acid remaining, and the ANC can be calculated from comparison with a blank titration.
Sulfur - Total as S (LECO)	ED042T	SOIL	In house: Dried and pulverised sample is combusted in a high temperature furnace in the presence of strong oxidants / catalysts. The evolved S (as SO2) is measured by infra-red detector
Preparation Methods	Method	Matrix	Method Descriptions
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
Dry and Pulverise (up to 100g)	GEO30	SOIL	#

indar Container Codest. P. - Unpresented Platics. N. = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Proporting Fisiols. QRC = Nitric Prop LIENT: EMM CONSULTING AMPLER: Kalifyn Brodie / Bill Bull mail Reports to: pgib bons@emmeonsulting.com.au; decordon@emmeonsulting.com.au; kbrodie@emmeonsulting.com.au CEmailed to ALS? (YES.) as Invoice to: accounts@enmconsuling.com.au, pgibbons@enmconsuling.com.au CJECT MANAGER: Paul Gibbons RICE: 20 Chandos Street, St Leonards RICHASE ORDER: EMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: JECT: Balranaid T3 Ancillary ALS USE ONLY Q \_ 0 BH-M17S RB5 Trip Blank 1 QA1 BH-M17D CHAIN OF CUSTODY BH-M21S BH-M18S BH-M18D UGM-M12S Trip Blank 2 BH-M21D UGM-M12D UGM-M8D Trip spike UGM-M8S ALS Laboratory: please tick 🕩 SAMPLE DETAILS SAMPLE (D 17/11/2020 11:00 18/11/2020 0:00 17/11/2020 9:45 18/11/2020 12:10 18/11/2020 8:10 PROJECT NO.: 18/11/2020 0:00 18/11/2020 8:30 18/11/2020 11:20 18/11/2020 10:50 17/11/2020 10:40 17/11/2020 13:30 17/11/2020 12:40 18/11/2020 12:30 18/11/2020 8:30 18/11/2020 8:30 TGLADSTONE 45 Calemonder Drive Clinton OLD 4550 Ph. 07 7471 5500 Et gladstone/Sakaglobal.com 口BRISBANE 2 Byth Street Stafford CLD 4053 Pm: 07 3243 7222 年: sembles briscane(後)にはGabel.com DATE /TIME \$190512 EDD FORMAT (or default): SAMPLER MOBILE: 0401881447 CONTACT PH: 0477702413 3 MATRIX: Sold(S) ALS QUOTE NO (Standard TAT may be ionger for some tests e.g., Ultra Trace Organics) COUNTRY OF ORIGIN: TURNAROUND REQUIREMENTS: MATRIX Subcon For wð ٤ ٤ ٤ ≨ ٤ ٤ ٤ ٤ TYPE & PRESERVATIVE Lab/ Organised By / Date: Relinguished By / Date: CONTAINER INFORMATION DMUDGEE 1/29 Sydney Road Mudgee NSW 2850 Pn; 02 5972 5735 Et mudgee, mak@alegiobal com LWELS CHRNE 2-4 Westet Road Springvale VIC 3171
Ph. 03 8549 0800 E. sampide malibourne@staglabst.com Corlnote / Courier: 96 6 04 wd G Non Standard or urgent TAT (List due date): Standard TAT (List due dafe): DATE/TIME RELINQUISHED BY: Kalifyn Brodik Sheet: PO / Internal Attached By TOTAL TOTAL BOTTLES (n \_ 4 -\_ ÇN ÇΝ 6 О 0 Ó ø O CI 6 Ón 88 -\_ \_ \_ 12 Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) ~ 4 -4 \_ 4 ٠ -\_ \_ 4 RECEIVED BY MES. 12 DNOWRA 413 Geery Place North Nowto NSW 2541 Ph 102 4428 2053 Et nowla@c-sglobal.com CIPERTH 10 Had Way Malaga, MA 8000 Ph; 06 0200 7655 E; samples permissingsballoom 600 유 24 Mil 20 1400 --\_ \_ ~ \_ \_ \_ 4 ~ 4 --Θ Θ COC SEQUENCE NUMBER (Circle) 12 ٠ \_ \_ \_ -\_ 4 \_ 42 (red) \_ \_ 4 ٠ 4 RELINQUISHED BY DATE/TIME: 12 Other comment: Random Sample Temperature on Receipt: FOR LABORATORY USE ONLY (Circle) Free ice vrozen ice bicks presentupon recept? stody Sed intact? \_ QLFOXVASVALLE 14-15 Desma Colim Books QLD 4318 Ptr G7 4796 0500 Et townessite servi consentatighitestrus) LMOLLONGONG tribest Ralph Black Dr. North Weltongong 185W 25/0 Phr 02 4225 3125 El weltongong@sieglobal.com 0 Telephone: +61-2-8784 8555 Sydney Environmental Division Triplicate please forward to Envirolat Duplicate Work Order Reference sents de likely contaminant teviste, di utona, o es requiring apecific QC analysis etc. RECEIVED BY: DAYEMIME 36 Additional Information N (N)

En; 07 4944 0177 E-mackay@xlagfobal.com

901073

Spenneds

#### Fadi Soro

From:

증

Sent:

Subject:

Attachments:

**Angus Harding** 

Tuesday, 24 November 2020 10:04 AM

Samples Sydney

FW: [EXTERNAL] - Esky delivery for S190512

COC S190512 20201124.xlsx

Hi Fadi,

See attached COC for EMM samples coming from Wollongong.

Cheers.

Kind Regards,

#### **Angus Harding**

Sydney Client Services Officer, Environmental



<u>T</u> +61 2 8784 8555 <u>F</u> +61 2 8784 8500 <u>D</u> +61 2 8784 8503

277-289 Woodpark Road Smithfield NSW 2164 AUSTRALIA angus.harding@alsglobal.com

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EnviroMail™ 128 - Revised PFAS Bottle Requirements







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From: Kaitlyn Brodie [mailto:kbrodie@emmconsulting.com.au]

Sent: Tuesday, 24 November 2020 9:22 AM

To: ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com>

Subject: [EXTERNAL] - Esky delivery for S190512

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Good morning Sydney Team,

I just dropped some eskys at ALS Wollongong so they should be arriving in Sydney shortly.

COC is attached. Please let me know if I missed anything.

Thanks

Kaitlyn

Kaitlyn Brodie

Tydrogeologist

in Connect with us

SYDNEY | Ground floor, 20 Chandos Street, St Leonards NSW 2065



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## CERTIFICATE OF ANALYSIS

Laboratory EGG CONSPLTIND i TY LTt ES2037MJM **Work Order** Contact

**Environmental Division Sydney** 

: 1 of 8

699p6k8 5 oodFarR4 oad Smithfield NS5 Australia 617+ SeFan 2 ahamad Contact Address Ground Woor Suite 1 60 Chandos Street St Leonards NS5 NS5 607-PAUL GIBBONS

: 6+pNovp6060 18:00 . j 71 6 k9k+ k---6- pNovp6060 Date Analysis Commenced Date SamFles 4 eceived TeleFhone S180-16 Balranald THAncillary

09pDecp6060 1-:-1 Issue Date

Accreditation No. 825 Accredited for compliance with ISO/IEC 17025 - Testing ENM 16K60 Primary worR : / aityn Brodie KBill Bull

This reFort suFersedes any Frevious reFort(s) with this reference. 4 esults aFFly to the samFle(s) as submitted, unless the samFling was conducted by ALS. This document shall not be reFroduced, exceFt in full.

This Certificate of Analysis contains the following information:

No. of samFles analysed No. of samFles received

Quote number

CpOpc number

SamFler

Order number

TeleFhone

Proæct

Address

Client

General Comments

Analytical 4 esults

Surrogate Control Limits

Addmontfminiporhfarol serantela ao awab resona umange pocld nt awae pomounto, besfrfae faafywhelab: ,cfmar Colarom Resonav, A., C. Cohsmiflye Abbebbhela ao fbbmba unaw cfma/ Re^neu fld Sfh sma Reyensa No appyfarol B

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in comFliance with Frocedures sFecified in 61 CWA Part 11. Accreditation Category Position Signatories

AnRt Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NS5
Edwandy Wad&r	Organic Coordinator	Sydney Organics, Smithfield, NS5
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NS5
Titus Vimalasiri	2 etals Teamleader	4 adionuclides, WyshwicR, ACT



#### General Comments

In house develoFed Frocedures The analytical Frocedures used by ALS have been develoFed from established internationally recognised Frocedures such as those Fublished by the USEPA, APYA, AS and NEP2. are fully validated and are often at the client request

5 here moisture determination has been Ferformed, results are reForted on a dry weight basis.

5 here a reForted less than (<) result is higher than the LO4, this may be due to Frimary sam Pe extract digestate dilution and for insufficient sam Fle for analysis.

5 here the LO4 of a reForted result differs from standard LO4, this may be due to high moisture content, insufficient samHe (reduced weight emHoyed) or matrix interference.

5 hen samFling time information is not Frovided by the client, samFling dates are shown without a time comFonent. In these instances, the time comFonent has been assumed by the laboratory for Frocessing

5 here a result is required to meet comFliance limits the associated uncertainty must be considered. 4 efer to the ALS Contact for details

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. / ey :

LO4 = Limit of reForting

H= This result is comfuted from individual analyte detections at or above the level of reforting

ø = ALS is not NATA accredited for these tests

~ = Indicates an estimated value.

EP0k0: 5 here reForted, Total Xylenes is the sum of the reForted concentrations of m&FpXylene and opXylene at or above the LO4.

EG0H: Poor matrix sFiRe recovery was obtained for 2 ercury on samFle ES60+1787 ' k. Confirmed by repanalysis.

EG060: LO4 \* have been raised due to matrix interference. (Yigh Total Dissolved Solids)

EGOOD. LOG4 trave been laised due to mail x interierence. (Trigh Total Dissolved Solids) EGOOD: Positive result for sam Hes ESO0+1787,016, 01 H has been confirmed by reanalysis. EPOKO: SamFle T4 IP SPV E contains volatile comFounds sFIRed into the samFle containers Frior to disFatch from the laboratory. BTEXN comFounds sFIRed at 60 ug/K

LO4 for Gross AlFha and Gross Beta raised due to high solid content.

Sodium AdsorFtion 4 atio (where reForted): 5 here results for Na, Ca or 2 g are <L04, a concentration at half the reForted L04 is incorForated into the SA4 calculation. This reFresents a conservative aFFroach for Na relative to the assumFtion that <LO4 = zero concentration and a conservative aFFroach for Ca & 2 g relative to the assumPtion that <LO4 is equivalent to the LO4 concentration.



Proæct Client

: Hof 8 : ES60+1787 : E2 2 CONSULTING PTMLTD : S180-16 Balranald THAncillary

Page 5 orROrder

Subp2 atrix: WATER 52 atrix: WATERx			Sal moe ID	PDG1G) t	PDG1G)S	PDG1G72t	PDG1G72S	- 41G7(t
		Sal mir	Sal mping date / til e	1kpNovp6060 0k:HD	1kpNovp6060 0k:10	1kpNovp6060 16:10	1kpNovp6060 16:H0	19pNovp6060 16:+0
Col mound	CAS Nul ber	LOR	Unit	ES2037MJM007	ES2037MJMI002	ES2037MJM008	ES2037 MJM1003	ES2037MJM1006
				4 esult				
EA260: Drobb Answifild - eaf Ayarhal								
Drobb geaf	ctata	0.10	BqK	+9.9>	<66	<6.68	+6.9>	<6.18
Et 08(i: ArMafmina'g/iC Tranfaor								
4/dro-9rde Arhafmina/fb Cf CO8	D2 Op610p001	1	mgK	<1	<1	-1>	<1	<1
Cfrgol fæ Arhafmrina/fb CfCO8	Hk 16pH6p7	7	mgK	<1	<1	-1>	<1	<1
- nyfrgol fær Anknfml ma' fb. Cf. CO8	91p-6pH	-	mgK	388	268	300	888	320
To af mAnhfmina' fb CfCO8	dttt	1	mgK	388	268	300	888	320
Et 037D: Scrpf as 5Tcrgrdml earryxfb SO3 21g/t A								
Scrpfaefb SO31Tcrgrdmlearny	1+k0kp98pk	1	mgK	86) 0	3230	8670	32MD	8670
Et 036D: Cwarrde g/t rbyreæ Alfrhber								
Cwarrale	17kk9p00p7	1	mgK	7) ) 00	27000	70600	28ND0	7) ) 00
Et 0U8F: t rbborned Gfjor Cfarol b								
Cfrynch	9d06d0++6	-	mgK	63)	) 03	62(	IVBO	687
GfC) ebreh	9+H8p8- p+	-	mgK	7300	7 MJ0	7370	7MD0	7860
Sodreh	<del>d</del> H9d0++6	-	mgK	77000	72600	77800	73200	70MD0
ioafbbroch	6480d0++6	_	mgK	32	80	38	2U	32
ED020F: t ibborned Geaf rb g/ ICi 1GS								
Arbel ny	9++0p4kp6	0.001	mgK	<0.010	<0.010	<0.010	<0.010	<0.010
Cfdh reh	84+00++6	0.0001	mgK	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cwroh reh	Hp6+d0++6	0.001	mgK	<0.010	01872	<0.010	<0.010	<0.010
Cosser	жо фо++6	0.001	mgK	<0.010	<0.010	<0.010	<0.010	<0.010
Nrykem	0d90d0++6	0.001	mgK	<0.010	01872	<0.010	<0.010	<0.010
Lefd	9+HBp86p1	0.001	mgK	<0.010	<0.010	<0.010	<0.010	<0.010
Zthy	9++0p77p7	-00.0	mgK	<0.0-0	<0.0-0	<0.0-0	<0.0-0	<0.0-0
ED020T: ToafinGeafinb g/ ICi 1GS								
Arbel ny	9++04-kp6	0.001	mg <b>K</b> .	1111	<0.010	1111	ии	1111
Cfdhreh	84+40++6	0.0001	mgK	1111	<0.0010	1111	1111	1111
Cwroh reh	Hp6+d0++6	0.001	mgK	1111	0B) 66	1111	1111	1111
Cosser	9++0b 0pk	0.001	mgK	1111	0B97M	1111	<b>1111</b>	1111
Nrykem	0d90d0++6	0.001	mgK	1111	0887	1111	MM	1111
Lefd	9+H8p86p1	0.001	mgK	т,	<0.010	Щ	1111	1111
			-					

<0.0001

<0.0001

<0.0001

<0.0001

<0.0001

mgK

9+H8p89p7 0.0001

ED086T: ToafmReyo^erfgma Gerycr/g/FIGS

ED086F: t ibborned Gerycr/ g/ FIGS

Zny

Gerycr/

##

##

#

9-0.0>

#

mgK

9++0p77p7 0.00-



Client Proæct

E2 2 CONSULTING PTMLTD S180-16 Balranald THAncillary

: + of 8 : ES60+1787

5 orROrder

19pNovp6060 16:+0 ES2037MJMI006 4 esult <1.10 <6.18 SE M ٥. 1. ND 0 OBB( 111 1kpNovp6060 16:H0 ES2037 MJM1003 PDG1G72S 4 esult 7.BBM +6.9> **^**0.1 () 2 -0.0> 78 1kpNovp6060 16:10 ES2037MJM1008 PDG1G72t 4 esult <6.68 <u>^1.</u> 7B 6 **^**0.1 NB6 020 WB7 ₹ 1kpNovp6060 0k:10 ES2037MJMI002 PDG1G)S 4 esult <0.0001 9--9> Σ <1.67 080 (23 287 ٥ . 1kpNovp6060 0k:HD ES2037 MJM1007 PDG1G)t 4 esult +9.9> 2E2 **~**0.1 0度0 M73 M22 ₹ Sal maing date / til e Sal me ID meqK meqK Unit mgK mgK mgK BqK BqK % 9+H8p89p7 0.0001 LOR 0.0-0.01 -0.0 0.01 0.01 0.1 œ H 1k+87p6-pk ED086T: ToafmReyo^erfgra Gerycr/g/ FIGS 1Col at ced CAS Nul ber ED067D: Ferrocbirol g/t rbyreæ Alfrhber EA260CA: Drobb Arawf fld - eaf Ayarhra EKO) 6G: Scrpde f b S21 Scrpde f b S21 Drobbgeaf fyan∿na/ 130 K EN066: lol ny - f mil ye a Tod mAi nol b Subp2 atrix: WATER 52 atrix: WATERx ⊗ ToafınCfarolb ø lol ny-fmfl ye Drobb frawf Ferrocb Irol Col mound Gerycr/



E2 2 CONSULTING PTMLTD S180-16 Balranald THAncillary

ES60+1787

5 orROrder

Client Proæct

- of 8

1kpNovp6060 11:60 ES2037MJMI070 - 41G27S <0.010 <0.010 <0.0-0 <0.010 <0.010 <0.010 <0.0010 <0.010 <0.0010 01897∪ 0 120 <0.0001 73)0 78000 87 M 083) 87M **78**2 V V 80 1kpNovp6060 10:- 0 ES2037 MJM100U - 4 1G27t 4 esult <0.0010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.0-0 <0.0001 2UZ00 77700 <6.6k 7370 Ŧ **# #** ¥ V Ÿ (29 38 # # 33) 33) 19pNovp6060 08:+-ES2037MJM00) - 41G7)S 4 esult <0.0010 <0.010 <0.010 <0.010 <0.0-0 <0.0010 <0.010 <0.010 <0.0-6 <0.010 <0.010 <0.0001 <0.010 72U00 0E977 20700 7370 V V ₹ 8 82( 82( 19pNovp6060 10:+0 ES2037MJM00( - 4 1G7) t 4 esult <0.0010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.0-<6.19 7) 000 70300 <0.0001 7820 8320 626 **新** ₹ ₹ ₹ V V 36( 37 19pNovp6060 1HHD ES2037 MUMIDOM - 41G7(S 4 esult <0.0010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.0010 <0.010 <0.0001 0E073 2000 77) 00 0E078 < 0.010 0130(2 8( MD 78U0 0E080 8U6 8U6 8⊠ 2時( ĭ V Sal me ID mping date / til mgK mgK mgK mgK mgK mg**K** mg**K** mgK Unit BqK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK 9+HBp89p7 0.0001 0.0001 0.001 0.0001 LOR 0.10 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 Sa/ 0.00 0.001 0.00 œ. 9++0p77p7 91p-6pH 9++0p+kp6 Hd6+d0++6 9++0pHkp6 9++0++6 Hd6+d0++6 8 1+k0kp98pk 17kk9p00p7 9+H8p8-p+ 64+0p08p9 9++00++6 9++0p77p7 D2 Op610p001 Hk 16pH6p7 94+0600++6 dH9d0++6 9++0p-0pk 04+0p0p0++6 9+H8p86p1 9++0p 0pk 0d90d0++6 9+H8p86p1 ber CAS Nul Et 037D: Script as 5T crgridin early xf b SO3 21g/ t A ED086T: ToafmReyo^erfgra Gerycr/ g/ FIGS Et 036D: Cwarrde g/t rbyreæ Alfrhber EA260: Drobb Answifld - eaf Ayarhna ED020F: t ribborhed Geaf rbg/ ICi 1GS ED086F: t ibborned Gerycr/ g/ FIGS Et 0U8F: t ribborhed Gfjor Cfarol b Et 08(i: Arhofmhina/g/iC Tranfaor ED020T: Toaf mGeaf rb g/ ICi 1GS - nyfrgol fæ. Anhfml naf fb. Cf. CO8 Cfrgolfæ Arhafmina/fb CfCO8 4 / dro 9nde Ankfmlna/fb Cf CO8 Script as f b SO3 1 Tcrgrdith earry To af mAnhifminal fb Cf CO8 Subp2 atrix: WATER 52 atrix: WATERx GfClebrch Drobb geaf io afbbroch Cwroh rch Cwroh reh Cfdh rch Cfdh rch Col mound Cwrorrde Cf rynch Arbel ny Arbel ny Nrykem Sodrch Cosser Nrykem Cosser Gerycr/ Lefd Lefd Zn y Zn y



Client Proæct

E2 2 CONSULTING PTMLTD S180-16 Balranald THAncillary

: 7 of 8 : ES60+1787

5 orROrder

1kpNovp6060 11:60 ES2037MUMI070 - 41G27S 4 esult <0.0001 <6.- H 2B32 <0.0> ٥. 1. ŝ (20 2E2U 1kpNovp6060 10:-0 ES2037 MJM100U - 4 1G27t 4 esult <u>^</u>+ <6.6k MZM <0.1 020 Ħ 19pNovp6060 08:+-ES2037MJM00) - 41G7) S 4 esult <0.0001 **^**0.1 (7 3820 7**B** -9> MB3 <u>@</u>/ 19pNovp6060 10:+0 ES2037MJM100( - 41G7) t 4 esult <6.19 ^1.0 K 388 ₹ 럱 () 0897 <u>(</u>6 19pNovp6060 1HHD ES2037 MUMIDOM - 41G7(S 4 esult <0.0001 6H.9> OB M 7BM 7138 ₹ 90 <u>8</u> Sal ming date / til e Sal me ID meqK meqK mgK Unit mgK mgK BqK BqK % 9+H8p89p7 0.0001 LOR 0.0-0.01 -0.0 0.01 0.01 0.1 œ H 1k+87p6-pk ED086T: ToafmReyo^erfgra Gerycr/g/ FIGS 1Col at ced CAS Nul ber ED067D: Ferrocbirol g/t rbyreæ Alfrhber EA260CA: Drobb Arawf fld - eaf Ayarhra EKO) 6G: Scrpde f b S21 Scrpde f b S21 Drobbgeaf fyan∿na/ 130 K EN066: lol ny - f mil ye a Tod mAi nol b Subp2 atrix: WATER 52 atrix: WATERx ⊗ ToafınCfarolb ø lol ny-fmfl ye Drobb frawf Ferrocb Irol Col mound Gerycr/



Proæct Client

: 9 of 8 : ES60+1787 : E2 2 CONSULTING PTMLTD : S180-16 Balranald THAncillary

Page 5 orROrder

Subp2 atrix: WATER 52 atrix: WATERx			Sal mpe ID	, A7	Trns - mil k 7	Trns - milk 2	R- 6	Trrs Ssrke
		Sal mi	Sal ming date / til e	1kpNovp6060 0k:HD	1kpNovp6060 0k:HD	1kpNovp6060 00:00	19pNovp6060 11:00	6kpOctp6060 00:00
Col mund	CAS Nul ber	TOR	Unit	ES2037MJM077	ES2037MJM1072	ES2037MJM078	ES2037 MJM1073	ES2037MUM076
				4 esult				
EA260: Drobb Answifld - eaf Ayarhnai								
Drobb geaf	dddd	0.10	BqK	+9.9>	11M	1111	1111	1111
Et08(i: ArMafmlna/g/iCTmarfaor								
4/dro-9rde Anvfm/na/fb CfCO8	D2 Op610p001	-	mgK	۲>	ш	1111	Щ	44
Cfrgolfæ Anhafmrina/fb CfCO8	HK16pH6p7	-	mgK	٧	ш	1111	44	44
- nyfrgol fæ. Arhvfmh ræ/ fb. Cf. CO8	91p-6pH	_	mgK	372	т.	т.	444	444
To af mAnterininal fb Cf CO8	att.	-	mgK	372	ш	1111	Щ.	##
Et 037D: Scrpf as 5T crgrdml earryxfb SO3 21g/t A								
Scrpfaefb SO31Tcrgndnhearny	1+k0kp98pk	-	mgK	8(20	<b>##</b>	1111	1111	44
Et 036D: Cwarrde g/t rbyreæ Alfrhber								
Cworrde	17kk9p00p7	_	mgK	70700	т.	т.	1111	1111
Et 0U8F: t rbborned Gfjor Cfarol b								
Cfrynch	910600++6	-	mgK	930	тт	1111	444	44
Gf Clebrch	9+H8p8- p+	_	mgK	78( 0	т	т.	1111	1111
Sodich	dH9d0++6	-	mgK	70( 00	<b>##</b>	1111	1111	1111
ioafbbrch	8d80d0++6	-	mgK	38	т	1111	1111	1111
ED020F: t ibborhed Geaf ib g/ ICi 1GS								
Arbel ny	9++00+kp	0.001	mgK	<0.010	тт	1111	444	44
Cfdh rch	84+00++6	0.0001	mgK	<0.0010	т	1111	1111	1111
Cwroh reh	Hp6+d0++6	0.001	mgK	<0.010	т	1111	1111	1111
Cosser	3++0p 0px	0.001	mgK	<0.010	<b>##</b>	1111	1111	1111
Nrykem	0d90d0++6	0.001	mgK	<0.010	т	1111	1111	1111
Lefd	9+HBp86p1	0.001	mg <b>K</b>	<0.010	тт	1111	1111	1111
Zhy	9++0p77p7	-00.0	mgK	<0.0-0	т,	Щ.	##	444
ED020T: TodinGeditbg/ ICi 1GS								
Arbel ny	9++0d-lkp6	0.001	mg <b>K</b> .	Щ.	<0.001	<0.001	<0.001	414
Cfdh rch	84+00++6	0.0001	mgK	1111	<0.0001	<0.0001	<0.0001	1111
Cwrohreh	Hd6+d0++6	0.001	mg <b>K</b>	1111	<0.001	<0.001	<0.001	1111
Cosser	9++0p 0pk	0.001	mg <b>K</b>	1111	0B008	01303	<0.001	1111
Nrykem	0d90d0++6	0.001	mgK	1111	<0.001	<0.001	<0.001	1111
Lefd	9+HBp86p1	0.001	mgK	1111	<0.001	<0.001	<0.001	1111
Zhy	9++0p77p7	-00.0	mg <b>K</b>	1111	-0.00>	-00:0>	-0.00>	1111
ED086F: t ribborhed Gerycr/g/FIGS								
Gerycr/	9+H8p89p7	0.0001	mg <b>K</b>	<0.0001	т,	1111	1111	##
ED086T: ToafmReyo^erfgma Gerycr/g/FIGS	:IGS							



Proæct Client

: k of 8 : ES60+1787 : E2 2 CONSULTING PTMLTD : S180-16 Balranald THAncillary

Page 5 orROrder

Subp2 atrix: WATER & atrix: WATERx			Sal me ID	, A7	Trns - rful k 7	Trıs - ıfıl k 2	R- 6	Trrs Ssrke
		Sal min	Sal mang date / til e	1kpNovp6060 0k:HD	1kpNovp6060 0k:H0	1kpNovp6060 00:00	19pNovp6060 11:00	6kpOctp6060 00:00
Col mound	CAS Nul ber	LOR	Unit	ES2037MJM1077	ES2037MJMI072	ES2037MJM078	ES2037 MJM073	ES2037MJM076
				4 esult				
ED086T: ToafmReyo^erfgma Gerycr/ g/ FIGS 1Col at ced	3 1Col at ced							
Gerycr/	9+H8p89p7	0.0001	mgK	1111	<0.0001	<0.0001	<0.0001	1111
ED067D: Ferrocblrol g/t rbyreæ Alf mlber								
Ferrocb Irol	dddd	-0.0	mgK	283	т	т	MM	MM
EK0) 6G: Scrpade f b S21								
Scrppde f b S21	1k+87p6-pk	0.1	mgK	<0.1	Щ	Щ	1111	MM
EN066: lol ry - f rfrl ye								
ø Toaf mAl nol b	data	0.01	meqK	M23	т	тт	1111	1111
ø Toaf mCf arol b	dddd	0.01	meqK	MD(	Т	11M	ни	1111
ø loiny - fmflye	data	0.01	%	7B3	1111	1111	1111	1111
Ei 0) 0: - TEXN								
- el zel e	91p+Hp6	_	μgΚ	1111	ш	т.	444	73
Torael e	10kpkkpH	9	μgΚ	1111	11M	11M	1111	73
Eaw rgel zel e	100p+1p+	9	µgК	1111	Т	Т	ни	73
heaf1&sfrf1X/mele 10kpH	10kpHkpH107p+6pH	9	µg/K.	1111	Т	11M	ни	73
orawo1X/relle	8- p+9p7	9	µgК	т,	тт	1111	ни	92
^ To afmX/maleb	dddd	9	µgК	1111	Т	т,	MM	20
^ Sch op- TEX	dddd	-	µg/K.	1111	Т	11M	ни	7)
Nfswawfmale	81р60рН		µg/K.	ти	1111	1111	1111	7)
EA260 CA: Drobb Answrffld - eaf Ayan^na/								
Drobb frawf	data	-0:0	BqK	<1.16	т	11M	1111	1111
Drobb geaf fyanha/ 130K	data	0.10	BqK	+9.9>	1111	1111	1111	1111
Ei 0) 0S: Ti 45/x- TEX ScrroQf æb								
7Ett rywnoroeawflett 3	19070p09p0	9	%	1111	Щ	Ш	ТШ	<b>E</b> M
Torael eft )	60H9p67p	9	%	1111	ти	11M	1111	700
31 roh opporogel zel e	+700007+	9	%	1111	Т	Т	ни	706



Proæct : S180-16 Ba

: 8 of 8 : ES60+1787 : E2 2 CONSULTING PTMLTD : S180- 16 Balranald THAncillary

Page 5 orROrder

Client

### Surrogate Control Limits

Subp2 atrix: WATER		Recovery Limits (%)	imits (%)	
Col mound	CAS Nul ber	Low	High	
Ei 0) 0S: Ti 4 5/x- TEX Scrroof ab				
7 121t rywroroeawf I e1t 3	19070p09p0	91	119	
Tomel eft )	60H9p67p	86	1円	
34 roh opporogel zel e	+700007+	06	16k	_



# QUALITY CONTROL REPORT

**Environmental Division Sydney** : 1 of 7 Laboratory **EDD CONSULTIN5 PTY LTs** ES2037 MGM **Work Order** Contact

677p6kR- ood2ar4 +oad SmitWield NS- Australia 6185 Se2an h aWamad Contact Address Ground Floor Suite 1 60 CWandos Street St Leonards NS- NS- 6089 PAUL GIBBONS

. j 81 6 k7k5 k999 : 65pNovp6060 69pNovp6060 07pDecp6060 Date Analysis Commenced Date Sam2les + eceived Tele2Wone Issue Date RPP S1R0916 Balranald THAncillary 

ENM 16K60 Primary wor4 : / aityn Brodie KBill Bull

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

TWIS re2ort su2ersedes any 2revious re2ort(s) witW tWis reference. +esults a22ly to tWe sam2le(s) as submitted, unless tWe sam2ling was conducted by ALS. TWIS document sViell not be re2roduced, exce2t in full.

TWIS Quality Control + e2ort contains tWe following information:

19

No. of sam2les analysed No. of sam2les received

Quote number

CpOpc number

Sam2ler

Order number

Tele2Wone

Proæct

Address

Client

- Laboratory Du2licate (DUP) + e2ort; + elative Percentage Difference (+PD) and Acce2tance Limits
- h etWod Blan4 (h B) and Laboratory Control S2i4e (LCS) + e2ort; + ecovery and Acce2tance Limits
- h atrix S2i4e (h S) +e2ort; +ecovery and Acce2tance Limits

#### Signatories

TW's document Was been electronically signed by tWe autWorlNet signatories below. Electronic signing is carried out in com2liance witW2rocedures s2ecified in 61 CF+ Part 11.

Signatories	Position	Accrediation Category
An4it zosW	Inorganic CVemist	Sydney Inorganics, SmitWield, NS-
Edwandy Fad@r	Organic Coordinator	Sydney Organics, SmitWield, NS-
Ivan Taylor	Analyst	Sydney Inorganics, SmitWield, NS-
Titus Jimalasiri	h etals Teamleader	+adionuclides Evs/Wir4 ACT



S1R0916 Balranald TH Ancillary Eh h CONSULTING PTV LTD ES60518R8 or4 Order Proæct Client

General Comments

In Wouse develo2ed 2rocedures TWe analytical 2rocedures used by ALS Wave been develo2ed from establisVed internationally recognised 2rocedures sucW as tWose 2ublisVed by tWe USEPA, APYA, AS and NEPh. are fully validated and are often at tWe client request.

Were moisture determination Was been 2erformed, results are re2orted on a dry weigW basis.

- Vere a re2orted less Wan (<) result is ViguVer twen twe LO+, tWis may be due to 2rimary sam2le extractidigestate dilution and for insufficient sam2le for analysis. - Vere twe twe LO+ of a re2orted result differs from standard LO+, tWis may be due to 2rimary sam2le extractidigestate dilution and for insufficient sam2le for analysis. - Vere tweet twe LO+ of a re2orted result differs from standard LO+, tWis may be due to 2rimary sam2le extractidigestate dilution and for insufficient sam2le for analysis. - Vere tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet tweet t

Anonymous = +efers to sam2les wWeWare not s2ecifically 2art of tWs wor4 order but formed 2art of tWe QC 2rocess lot

/ ey:

CAS Number = CAS registry number from database maintained by CVémical Abstracts Services. TVé CVémical Abstracts Service is a division of tVé American CVémical Society.

LO+ = Limit of re2orting

+PD = + elative Percentage Difference

# = Indicates failed QC

### Laboratory Duplicate (DUP) Report

for tWe +elative Percent Deviation (+PD) of Laboratory Du2licates are s2ecified in ALS hetWed Q-1 pENIRK and are de2endent on tWe magnitude of results in com2arison to tWe level of re2orting: +esult < 10 times LO+: TWe quality control term Laboratory Du2licate refers to a randomly selected intralaboratory s2lit. Laboratory du2licates 2rovide information regarding metVod 2recision and sam2le Veterogeneity. TVe 2ermitted ranges No Limit; +esult between 10 and 60 times LO+: 0% p90%; +esult > 60 times LO+: 0% p60%.

Subph atrix: WATER						Laboratory L	Laboratory Duplicate (DUP) Report		
Laboratory sample ID	Mample ID	h etdo: ACompoun:	CSMNumber	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA2I 0CA: 5 ropp At	EA2I 0CA: 5 ropp Alan B Bt d cei B Avi y y 4 1QC Loi: )) G727Mb	Loi: ) ) G727Mb							
ES60518R8p007	BYph 1kD	EA690: Gross al2VM	attati	0.09	BqK	<1.0k	<1.0k	0.00	No Limit
		EA690: Gross beta	OL COLOR	0.1	BqK	<6.17	<6.17	0.00	No Limit
		EA690: Gross beta activity p50/	dttt	0.1	BqK	<6.17	<6.17	0.00	No Limit
Es 0) uP: AlkBlyt y4	Es0) uP: Alk Bly j4f4 PC T jr Bior 1QC Loi:)) n) ul Mo	oul Mo							
ES605189kp017	Anonymous	ED0H7pP: Yydroxide Al4alinity as CaCOH	Dh Op610p001	-	mgK	<u>^</u>	₹	0.00	No Limit
		ED0H7pP: Carbonate Al4alinity as CaCOH	HK16pH6p8	_	mgK	^	۲	0.00	No Limit
		ED0H7pP: Bicarbonate Al4alinity as CaCOH	71p96pH	-	mgK	^	-	0.00	No Limit
		ED0H7pP: Total Al4alinity as CaCOH	OL COLOR	_	mgK	^	-	0.00	No Limit
ES605189kp015	Anonymous	ED0H7pP: Yydroxide Al4alinity as CaCOH	Dh Op610p001	_	mgK	<u>۲</u>	^	0.00	No Limit
		ED0H7pP: Carbonate Al4alinity as CaCOH	HK16pH6p8	-	mgK	<u>^</u>	٧	00.00	No Limit
		ED0H7pP: Bicarbonate Al4alinity as CaCOH	71p96pH	-	mgK	66R	899	1.无	%09d %0
		ED0H7pP: Total Al4alinity as CaCOH	dttt	_	mgK	66R	899	1.HR	%09d %0
Es 0375 : S- MBie 1∏-	Es0375:S-16Bie 111-rfydy6 eiryv b BpSO3 29f4 sA 1QCLoi:)) G7071 b	A 1QC Loi: )) G7071 b							
ES60518R8p001	UGh th kD	ED051G: Sulfate as SO5 pTurbidimetric	15k0kp7Rpk	-	mgK	H9K0	0.26H	0.657	%09d %0
ES60518R8p010	BYph 61S	ED051G: Sulfate as SO5 pTurbidimetric	15k0kp7Rpk	_	mg <b>K</b>	5010	2060	0.11代	%09d %0
Es 031 5 : Cnloryde f	Es 031 5: Cnforde f 4 s ypvreie At Braper 1QC Loi:)) G7073b	bi: ) ) G7073b							
ES60518R8p001	UGh th kD	ED059G: CWoride	18kk7p00p8	-	mgK	1kk00	1R000	1.05	%09d %0
ES60518R8p010	ВУф 61S	ED059G: CWorlde	18kk7p00p8	1	mgK	61600	60k00	69.9	%09d %0
Es 0G F: s yppol( ed	Es 0 G F: syppol(ed D Bjor C B yot p 1QC Loi:)) GG 2b	3G 2b							
ES60518R8p001	UGh th kD	ED0R+F: Calcium	7550p70p6	-	mgK	95K	9HR	1.9H	%09d %0
		ED0R+F: h agnesium	75HRAR9p5	_	mg <b>K</b>	1500	1HK0	1.9k	%09d %0
		ED0RHF: Sodium	7550p6Hp9	1	mgK	11000	10700	6.17	%09d %0
		ED0RH: Potassium	7550p0Rp7	_	mgK	56	56	0.00	%09d %0
ES60566RR001	Anonymous	EDORH: Calcium	7550p70p6	_	mgK	芫	‡	0.k66	%09d %0



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ES60518R8

- or4 Order

Client Proæct

Recovery Limits (%) %09d %0 %09d %C %09d %0 No Limit No Limit %06d %C %09d %C No Limit %09d %C %09d %C No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit %09d %( No Limit No Limit No Limit No Limit RPD (%) 1.H 0.00 0.00 5.5R 0.00 5.6k 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 7 X 0.00 1.KT 0.00 17.8 0.00 0.00 7. X. 0.00 0.00 0.00 0.00 0.00 0.00 H.69 Laboratory Duplicate (DUP) Report Original Result Duplicate Result <0.0010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.090 <0.0001 <0.0010 >0.096 0.005R <0.0001 <0.0001 <0.001 <0.010 <0.010 <0.0001 0.010 <0.001 0.015 0.019 <0.0001 <0.001 0.095 0.06k 0.065 0.001 0.1k1 0.007 0.1H9 0.009 0.170 996 169 \_ <0.0010 <0.0001 <0.0010 <0.010 <0.010 <0.010 <0.010 <0.090 <0.0001 <0.001 <0.010 <0.010 960.0> <0.001 0.018 0.0057 <0.0001 <0.0001 <0.001 0.1k5 0.06R <0.0001 0.011 0.099 0.0H1 0.001 0.007 0.18H 0.009 0.188 169 955 mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK mgK Unit 0.0001 0.0001 0.0001 0.001 0.001 0.001 600.0 0.0001 0.001 0.001 0.009 0.001 0.0001 0.0001 0.0001 0.001 0.001 0.001 0.001 0.001 0.009 0.001 0.001 0.001 0.001 0.001 0.009 0.001 0.001 0.001 LOR \_ ~ \_ 75HR4R7p8 75HRpR7p8 75HRqR7p8 7550p5HpR 75HRpR7p8 7550pHkp6 7550p57pH 7550p5HpR 7550p88p8 7550p5HpR CSM Number 75HRpR9p5 7550p6Hp9 7550p0Rp7 7550p57pH 7550p06p0 7550p88p8 7550p5HpR 7550pH p6 7550p90pk 75HRaR6pt 7550p06p0 7550p88p8 7550p57pH 7550p06p0 7550pHkp6 7550p57pH 7550p90pk 7550p06p0 7550p88p8 7550p90pk 75HRpR6pf 7550p90pk 75HRaR6pl 75HRpR6pf EG060ApT: CWomium EG060ApT: CWomium EG060ApF: CWomium EG060ApF: CWomium EG060ApF: Cadmium EG060ApF: Cadmium EG060ApT: Cadmium EG060ApT: Cadmium ED0RHF: h agnesium ED0RHF: Potassium EG060ApF: Arsenic EG060ApF: Arsenic EG060ApT: Arsenic EG060ApF: Co22er EG060ApT: Arsenic EG060ApF: Co22er EG060ApT: Co22er EG060ApT: Co22er Es 0G F: syppol(ed D Bjor C Byot p 1QC Loi:)) GG 2b 9vot jy - ed EG060ApF: Nic4el EG060ApF: Nic4el EG060ApT: Nic4el EG060ApT: Nic4el EG0H9F: h ercury EG0H9F: h ercury EG0H9T: h ercury EG0H9T: h ercury EDORHF: Sodium 1QC Loi: ) ) Gl u07b EG060ApF: Lead EG060ApF: Lead EG060ApF: Zinc EG060ApF: Zinc EG060ApT: Lead EG060ApT: Zinc EG060ApT: Lead EG060ApT: Zinc E5020F:syppol(ed DeiBmpf4ICPODS1QCLoi:)) c3G7b E50) IF: syppol(ed Derv-r4f4FIDS 1QC Loi:)) GG 0b E5020T: ToiBhDeiBpf4 ICP9DS 1QC Loi: )) G3M2Mb E50) IT: ToiBhRevo (erBf he Derv-r4f4FIDS Anonymous Anonymous Anonymous Anonymous Anonymous Anonymous UGh ph kS UGh ph kS UGh ph kD Mample ID Laboratory sample ID Subph atrix: WATER ES60518R8p006 ES60518R8p006 Eh 6060RRkp001 Eh 6060RRkp011 ES605650R005 ES60566RRp001 ES60518R8p001 ES60566RRp001 ES60566RRp001



Eh h CONSULTING PTV LTD S1R0916 Balranald TH Ancillary

ES60518R8

or4 Order

Client Proæct

5 of 7

Recovery Limits (%) %09d %0 No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit No Limit RPD (%) 0.00 5.98 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Laboratory Duplicate (DUP) Report Original Result Duplicate Result <0.0001 <0.0001 <0.09 ₩.9 0.1 9 9 9 တ္ တ Ÿ 9 9 9 9 6 V <0.0001 <0.0001 <0.09 99.9 0.1 9 V 9 9 9 6 Ÿ 9 9 9 8 mg**K** mgK mgK mg**K** µg**K**∟ µg**K**⊾ µg**K**∟ µg**K**⊾ µg**K** µg/k\_ µg**K** µg/k\_ Unit **µgK** µg∕k\_ hg K 0.0001 0.0001 0.09 0.1 LOR 9 9 9 9 တ 9 9 0 9 9 R1 p60pH 75HRqR7p8 71p5Hp6 108p56pH R9p57p8 R1p60pH 71p5Hp6 10kpkpH 100p51p5 75HRqR7p8 10kpHkpH CSM Number 1k5R8p69pk 100p51p5 OKPAP 108p56pH R9p57p8 1k5R8p69pk EP0k0: metap& 2arapXylene EP0k0: metap& 2arapXylene EG091G: Ferrous Iron EG091G: Ferrous Iron E/ 0k9: Sulfide as S6p E/ 0k9: Sulfide as S6p EP0k0: EtWylbenMene EP0k0: EtWylbenMene EP0k0: ortWbpXylene EP0k0: ortWbpXylene EPOk0: Na2WWalene EP0k0: Na2WWalene EG0H9T: h ercury EG0H9T: h ercury E50) IT: ToiBhRevo(erBf he Derv-r4f4FIDS 1QC Loi:) G u02b EP0k0: BenMene EP0k0: BenMene EP0k0: Toluene EP0k0: Toluene E50175: Ferro-plrotf4sypvreie At Braper 1QC Loi:)) GM G0b EK0ml D: S-18 de Bp S29 1QC Loi: ) m231 mb EP0n0: cTEXN 1QC Loi: ) ) nM G0b Anonymous UGh ph 16S Anonymous Anonymous Anonymous UGh ph kD BYph 17S BYth 61S Mample ID Laboratory sample ID Subph atrix: WATER ES60518R8p008 ES605650Rp006 ES60518R8p001 ES60518R8p010 ES605160kp001 ES60518R8p005 EB60HDR76p01H EB60HDR76p001



S1R0916 Balranald TH Ancillary : 9 of 7 : ES60518R8 : Eh CONSULTING PTV LTD Proæct Client

- or4 Order

# h etdo: Blank (h B) an: Laboratory Control Mpike (LCM) Report

2arameter is to monitor 2otential laboratory contamination. TWe quality control term Laboratory Control S2i4e (LCS) refers to a certified reference material, or a 4nown interference free matrix s2i4ed witW target TWe quality control term hetWord K Laboratory Blan4 refers to an analyte free matrix to wWeW all reagents are added in tWe same volumes or 2ro2ortions as used in standard sam2le 2re2aration. TWe 2ur2ose of tWis QC analytes. TWe 2ur2ose of tWs QC 2arameter is to monitor metWed 2recision and accuracy inde2endent of sam2le matrix. Dynamic + ecovery Limits are based on statistical evaluation of 2rocessed LCS.

analytes. TWE Zurzose of tWS QU zarameter is to monitor metwor zecision and accuracy indezendent of samzie matrix. Dynamic +ecovery Limits are based on statistical evaluation of zrocessed LUS	cision and accurac	y magacinacin oi sa	nzie maun. Dynamie	recovery cirriles are based	UII statistical evaluation of	Ziocessed Log.		
Subph atrix: WATER				h etdo: Blank (h B)		Laboratory Control Mpike (LCM) Report	M) Report	
				Report	Mpike	Mpike Recovery (%)	Recovery Limits (%)	imits (%)
h etdo: ACompoun:	CSMNumber	LOR	Unit	Result	Concentration	TCM	Low	Higd
EA210CA: 5 ropp Alan B Bt d cei B Avi (y y 4 1Q C Loi: )) G727 Mb	qp							
EA690: Gross al2V4	attati	60:0	BqK	60:0>	1791 BqK	101	89.6	109
EA690: Gross beta	attat	0.1	BqK	<0.10	H-56 BqK	101	R5.5	109
EA690: Gross beta activity p50/	otteti	0.1	BqK	<0.10	attt	dttt	attat	cttt
Es 0) uP: AlkByt y4 f4 PC TyrBior 1QCLoi: ) ) m) ul Mb								
ED0H7pP: Total Al4alinity as CaCOH	attet	ct ttt	mgK	cttt	600 mgK.	106	k1.0	111
				ctttt	90 mg <b>K</b> .	119	70.0	1H0
Es 0375: S-188 ie 111-rfydy6 eiryyb Bp SO3 29 f4 sA 1QCLoi:)) G707 lb	) ) G7071 b							
ED051G: Sulfate as SO5 pTurbidimetric	15k0kp7Rpk	-	mgK	٧	69 mg/K.	115	k6.0	166
				^	900 mg <b>K</b> .	108	k6.0	166
Es 03l 5: Cnloryde f 4 s ypvreie At B4per 1QCLoi: ) G7073b								
ED059G: CWorlde	18kk7p00p8	_	mg <b>K</b>		90 mgK	Ж. Ж.	k0.R	167
				<u>۲</u>	1000 mgK	R9.7	k0.R	167
Es 0 G F: s yppol(ed D Bjor C Blyot p 1QCLoi:)) @ G 2b								
EDORH: Calcium	7550p70p6	_	mgK		90 mg <b>K</b>	10H	k0.0	115
ED0RF: h agnesium	75HR4R9p5	_	mgK	₹	90 mg <b>K</b>	Ø.9	R0.0	118
EDORF: Sodium	7550p6Hp9	_	mgK	٧	90 mg <b>K</b>	R8.7	k6.0	160
EDORF: Potassium	7550p0Rp7	<b>~</b>	mgK	٧	90 mg <b>K</b> .	R9.0	k9.0	11H
E5020F:syppol(ed DeiBrpf4ICP5DS 1QCLoi:)) csG7b								
EG060ApF: Arsenic	7550pHkp6	0.001	mgK	<0.001	0.1 mg/K	KK.H	k9.0	115
EG060ApF: Cadmium	7550p5HpR	0.0001	mgK	<0.0001	0.1 mg/K	R6.k	k5.0	110
EG060ApF: CWomium	7550p57pH	0.001	mgK	<0.001	0.1 mg/K	R5.0	k9.0	111
EG060ApF: Co22er	7550p30pk	0.001	mgK	<0.001	0.1 mg/K	KK.K	k1.0	111
EG060ApF: Lead	75HR4R6p1	0.001	mgK	<0.001	0.1 mg/K	R6.9	kH0	111
EG060ApF: Nic4el	7550р06р0	0.001	mgK	<0.001	0.1 mg/K	k7.1	k6.0	116
EG060ApF: Zinc	7550p88p8	0.009	mgK	<0.009	0.1 mg/K	KK.5	k1.0	117
E5020T: ToiBhDeiBpf4ICPSDS 1QCLoi:)) G3MRMb								
EG060ApT: Arsenic	7550pHkp6	0.001	mgK	<0.001	0.1 mg/K	R5.9	k6.0	115
EG060ApT: Cadmium	7550p5HpR	0.0001	mgK	<0.0001	0.1 mg <b>K</b> .	R9.8	k5.0	116
EG060ApT: CWomium	7550p57pH	0.001	mgK	<0.001	0.1 mg/k	R7.R	k8.0	118
EG060ApT: Co22er	7550p90pk	0.001	mgK	<0.001	0.1 mg <b>K</b> .	RHK	кНО	11k
EG060ApT: Lead	7.5HR4R6p1	0.001	mgK	<0.001	0.1 mg <b>K</b> .	R9.0	k9.0	119
EG060ApT: Nic4el	7550р06р0	0.001	mgK	<0.001	0.1 mg/k	R6.6	k5.0	118
EG060ApT: Zinc	7550p88p8	0.009	mg <b>K</b> .	<0.009	0.1 mg/k	RH8	7R0	117

E50) IF: syppol(ed Derv-r4f4FIDS 1QCLoi:)) @G 0b



: 8 of 7 : ES60518R8 : Eh h CONSULTING PTV LTD : S1R0916 Balranald THAncillary - or4 Order Proæct Client

Subph atrix: WATER				h etdo: Blank (h B)		Laboratory Control Mpike (LCM) Report	M) Report	
				Report	Мріке	Mpike Recovery (%)	Recovery Limits (%)	imits (%)
h etdo: ACompoun:	CSMNumber	LOR	Unit	Result	Concentration	TCM	Low	Higd
E50) IF: syppolfed Derv-r4f4FIDS 1QCLoi: )) @G 0b 9votixt-ed	t ix - ed							
EG0H9F: h ercury	75HR4R7p8	0.0001	mgK	<0.0001	0.01 mg <b>K</b> .	R8.R	кно	109
E50) IT: ToiBhRevo(erBf he Derv-r4f4 FIDS 1QCLoi:)) Gu07b	940n							
EG0H9T: h ercury	75HR4R7p8	0.0001	mgK	<0.0001	0.01 mg <b>K</b> .	R8.1	77.0	111
E50) IT: ToiBh Revo (er Brite Derv-r4f4 FIDS 1QC Loi:)) Gu02b	n02b							
EG0H9T: h ercury	75HR4R7p8	0.0001	mgK	<0.0001	0.01 mg <b>K</b> .	R9.H	77.0	111
E5 0175: Ferro-plrot f4sypvreie At Bl4per 1QCLoi: )) GM @b	90							
EG091G: Ferrous Iron	attati	0.09	mgK	<0.09	6 mgK	101	kR0	117
EK0ml D: S-18yde Bp S29 1QCLoi: ) ) m231 mb								
E/ 0k9: Sulfide as S6p	1k5R8p69pk	0.1	mgK	<0.1	0.9 mg <b>K</b>	100	78.0	118
EP0m0: c TEXN 1QCLoi: )) mM G0b								
EP0k0: BenMene	71p5Hp6	_	hg/K.	<u>^</u>	10 µg <b>K</b> .	k5.R	70.0	166
EP0k0: Toluene	10kpkkpH	9	hg/K.	9>	10 µg/K.	kk.1	8R0	16H
EP0k0: Et/Wiben/Vene	100p51p5	9	hg/K.	9>	10 µg/K.	R6.8	70.0	160
EP0k0: metap & 2arapXylene	10kpHkpH	9	hg/K.	9>	10 µgK	P6.1	8R0	161
	108p56pH							
EP0k0: ortWopXylene	R9/15/198	9	µgK.	9>	10 µgK	RH6	76.0	166
EPOk0: Na2VWWalene	R1p60pH	6	µgK.	6>	10 µgK.	KK.5	70.0	160

### h atrix Mpike (h M) Report

TWe quality control term hatrix S24e (h S) refers to an intralaboratory s2lit sam2le s214ed witW a re2resentative set of target analytes. TWe 2ur2ose of tWis QC 2arameter is to monitor 2otential matrix effects on analyte recoveries. Static +ecovery Limits as 2er laboratory Data Quality Ob&ctives (DQOs). Ideal recovery ranges stated may be waived in tWe event of sam2le matrix interference.

h atrix Mpike (h M) Report

Subth atrix: WATER

				Mpike	MpikeRecovery(%)	Recovery Limits (%)	imits (%)
Laboratory sample ID	Mample ID	h etdo: ACompoun:	CSMNumber	Concentration	h M	Low	Higd
=s0375:S-MBBie 1T-	Es 0375: S-18Bie 111-rfydyse einyv b Bp SO3 29f4sA 1QCLoi:)) G7071 b						
ES60518R8p001	UGh fh kD	ED051G: Sulfate as SO5 pTurbidimetric	15k0kp7 Rpk	10 mg <b>K</b> .	# Not Determined	70.0	140
s 031 5 : Cnloryde f	Es 031 5: Cnloryde f 4 s ypvreie At B4per 1QCLoi:)) G7073b						
ES60518R8p001	UGh ф kD	ED059G: CWbride	18kk7p00p8	90 mg <b>K</b> .	# Not Determined	70.0	140
=5 020F: s yppol( ed	E5020F: syppol(ed DeiBipf 4 ICPSDS 1QCLoi; )) G3G7b						
ES60518R8p006	UGh ph kS	EG060ApF: Arsenic	7550pHkp6	10 mg <b>K</b>	R0.1	70.0	웃
		EG060ApF: Cadmium	7550p5HpR	6.9 mg <b>K</b>	k1.6	70.0	1
		EG060ApF: CVMomium	7550p57pH	10 mg <b>K</b> .	7R7	70.0	1
		EG060ApF: Co22er	7550p80pk	10 mg <b>K</b>	kH5	70.0	11
		EG060ApF: Lead	75HR4R6p1	10 mg <b>K</b> .	77.H	70.0	웃



: 7 of 7 : ES60518R8 : Eh h CONSULTING PTV LTD : S1R0916 Balranald THAncillary Page - or4 Order Proæct Client

Authority   Decirity   Contentration   Authority   Decirity   Contentration   Authority   Decirity   Contentration   Authority   Decirity   Contentration   Authority   Decirity   Contentration   Authority   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity   Decirity	Subth atrix: WATER			ų	h atrix Mpike (h M) Report		
Manage LD					MpikeRecovery(%)		mits (%)
EG060ApF: Nickel         7550p6p0         10 mgK         k5.5           EG060ApF: Arsenic         7550p4kp         1 mgK         101           EG060ApF: Cadmium         7550p6kp         1 mgK         Rc.6           EG060ApF: Cadmium         7550p6kp         0.69 mgK         Rc.6           EG060ApF: Cadmium         7550p6kp         1 mgK         Rc.6           EG060ApF: Cadmium         7550p6kp         1 mgK         Rc.6           EG060ApF: Cadmium         7550p6kp         1 mgK         Rc.6           EG060ApF: Lead         7550p6kp         1 mgK         Rc.6           EG060ApF: Nickel         7550p8kp         1 mgK         Rc.7           EG060ApF: Nickel         7550p8kp         1 mgK         Rc.7           EG0HeF: n ercury         754Rp7p         0.01 mgK         77.5           EG0HeF: n ercury         754Rp7p         0.01 mgK         # 9R7           EG0HeF: n ercu		h etdo: ACompoun:	CSMNumber	Concentration	h M	Том	Higd
EGOBOAPT: Nickel         7550µ6pµ         10 mgK         k5.5           EGOBOAPT: Arsenic         7550µ8pB         1 mgK         101           EGOBOAPT: Cadminim         7550µ8pB         1 mgK         RK.5           EGOBOAPT: Cadminim         7550µ6pHR         0.69 mgK         RK.5           EGOBOAPT: Cadminim         7550µ6pHR         1 mgK         RK.1           EGOBOAPT: Cadminim         7550µ6pHR         1 mgK         RK.1           EGOBOAPT: Lead         7550µ6pHR         1 mgK         RR.1           EGOBOAPT: Lead         7550µ6pB         1 mgK         RR.1           EGOBOAPT: Lead         7550µ6pB         1 mgK         RR.1           EGOBOAPT: Lead         7550µ6pB         1 mgK         RR.1           EGOBOAPT: Lead         7550µ6pB         1 mgK         RR.1           EGOBOAPT: Lead         7550µ6pB         1 mgK         RR.1           EGOBOAPT: Lead         7550µ6pB         1 mgK         RR.1           EGOBOAPT: Lead         7550µ6pB         1 mgK         77.5           EGOBOAPT: Leacuny         7550µ6pB         1 mgK         77.5           EGOBOAPT: Leacuny         7550µ6pB         1 mgK         77.5           EGOBOTO: Cerruithere <t< th=""><td>E5020F: syppol(ed Dei Brp f 4 I CP 20 S 1QCLoi: )) CSG 7b 9vot i yt - ed</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	E5020F: syppol(ed Dei Brp f 4 I CP 20 S 1QCLoi: )) CSG 7b 9vot i yt - ed						
EG0EOAPT: Zinc         7550PBBB         10 mgK         kH5           EG0EOAPT: Zinc         7550PHB         1 mgK         Rt.5           EG0EOAPT: Cadmium         7550PHB         1 mgK         Rt.5           EG0EOAPT: Cadmium         7550PHB         1 mgK         Rt.5           EG0EOAPT: Cadmium         7550PGH         1 mgK         Rt.5           EG0EOAPT: Cadmium         7550PGH         1 mgK         Rt.5           EG0EOAPT: Lead         7550PGH         1 mgK         Rt.8           EG0EOAPT: Nickel         7550PGH         1 mgK         Rt.8           EG0EOAPT: Nickel         7550PGHB         1 mgK         Rt.8           EG0EOT: Fineruny         755PRR7B         0.01 mgK         75.5           EG0EOT: Ferrous from         mmp         1 mgK         77.5           EG0EOT: Ferrous from         mmp         1 mgK         Rt.R           EC00EOT: Ferrous from         mmp         1 mgK         Rt.R           EDOKO: Brightene         FPOKO: ElviplemMene         10KHKHH         69 µgK         Rt.R           EDOKO: Corriverse         10KHKHH         69 µgK         Rt.B         Rt.9           EDOKO: Corriverse         10KHKHH         69 µgK         Rt.B         Rt.B<		EG060ApF: Nic4el	7550,006,00	10 mg <b>K</b>	K5.5	70.0	1140
EG0BOADT: Arsenic         7550pHrps         1 mgK         101           EG0BOADT: Cadmium         7550pHrps         0.68 mgK         Rx.5           EG0BOADT: Cadmium         7550pBHr         1 mgK         Rx.5           EG0BOADT: Cadmium         7550pBHr         1 mgK         R7.K           EG0BOADT: Cadmium         7550pBHr         1 mgK         R7.K           EG0BOADT: Cadmium         7550pBHr         1 mgK         R7.K           EG0BOADT: Lead         7550pBHr         1 mgK         R8.K           EG0BOADT: Lead         7550pBHr         1 mgK         R8.K           EG0BOADT: Lead         7550pBHr         1 mgK         R8.7           EG0BOADT: Lead         7550pBHr         7550pBHr         77.5           EG0BOADT: h ercury         7554pR7pB         0.01 mgK         77.5           EG0BOTO: h ercury         7554pR7pB         0.01 mgK         77.5           EG0BOTO: h ercury         7554pR7pB         0.01 mgK         77.5           EG0BOTO: EVWENTHING         77.5         77.5         77.5           EG0BOTO: EVWENTHING         100pSTR         89 pgK         RR R           EG0BOTO: EVWENTHING         100pSTR         89 pgK         RR R           EG0BOTO: EVWEN		EG060ApF: Zinc	7550p88p8	10 mg <b>K</b> .	kH5	70.0	110
EG060Apt: Assenic         7550ptkp         1 mgk         101           EG060Apt: Cadmium         7550ptpp         1 mgk         Rx.5           EG060Apt: Cadmium         7550p5rph         1 mgk         Rx.1           EG060Apt: Cazer         7550p5rph         1 mgk         Rx.1           EG060Apt: Cazer         7550p6p         1 mgk         Rx.1           EG060Apt: Lead         7550p6p         1 mgk         Rx.1           EG060Apt: Zinc         7550p6p         1 mgk         Rx.7           EG060Apt: Aircury         754R87p         0.01 mgk         Rx.7           EG04Bt: h ercury         754R87p         0.01 mgk         Rx.8           EG04Bt: h ercury         754R87p         77.5         Rx.8           EG04Bt: h ercury         754R87p         0.01 mgk         Rx.8           EG04Bt: h ercury         754R87p         0.01 mgk         Rx.8           EG04Bt: h ercury         71pkkg         89 µgk         Rx.8           EG04Bt: h ercury <t< th=""><td>E5020T:ToiBhDeiBhpf4ICP50S 1QCLoi:))G3M2Mb</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	E5020T:ToiBhDeiBhpf4ICP50S 1QCLoi:))G3M2Mb						
EG060ApT: Cadmium         7550p5TH         0.89 mgK         Rk.5           EG060ApT: Coxen         7550p5TH         1 mgK         R5.H           EG060ApT: Coxen         7550p5TH         1 mgK         R5.H           EG060ApT: Coxen         7550p6p0         1 mgK         R7.K           EG060ApT: Zinc         7550p6p0         1 mgK         R8.7           EG060ApT: Zinc         7550p8p0         1 mgK         R8.7           EG0HPT: In ercury         75HRPTp         0.01 mgK         75.6           EG0HPT: In ercury         75HRPTp         0.01 mgK         # 9R7           EG0HPT: In ercury         75HRPTp         77.5         R8           EG0HPT: In ercury         75HRPTp         77.5         R8           EG0HPT: In ercury         75HRPTp         77.5         R8           EG0HPT: In ercury         77.5         R8         R8           EG0HPT: In ercury         77.6         R8         R8           EG0HPT: In ercury         77.5		EG060ApT: Arsenic	7550pHkp6	1 mgK	101	70.0	1140
EG060ApT: CoXemium         7550p5pTH         1 mgK         R5.H           EG060ApT: Cozzer         7550p0p0 K         1 mgK         R7.K           EG060ApT: Lead         7550p0p0 M         1 mgK         R7.K           EG060ApT: Lead         7550p0p0 M         1 mgK         R2.7           EG060ApT: Zinc         7550p0p0 M         1 mgK         R2.7           EG04-BT: h ercury         751Rp37p8         0.01 mgK         76.6           EG0+BT: h ercury         751Rp37p8         0.01 mgK         77.5           EG0+BT: h ercury         77.5         77.5         77.5           EG0+BT: h ercury         77.5         77.5         77.5           EG0+BT: h ercury         77.5         77.5         77.5           EG0+BT: h ercury         77.5         77.5         77.5           EG0+BT: h ercury		EG060ApT: Cadmium	7550p5HpR	0.69 mg <b>K</b> .	<b>R</b> .5	70.0	110
EG060ApT: Cozer         7550p0tx         1 mg/k         R7. k           EG060ApT: Lead         7550p6tp         1 mg/k         R2. 5           EG060ApT: Lead         7550p6tp         1 mg/k         R2. 5           EG060ApT: Zinc         7550p8tp         1 mg/k         R2. 7           EG06-BT: h ercury         75Hq47p8         0.01 mg/k         76.6           EG0+BT: h ercury         75Hq47p8         0.01 mg/k         77.5           EG0+BT: h ercury         75Hq47p8         0.01 mg/k         77.5           EG0+BT: h ercury         75Hq47p8         0.01 mg/k         77.5           EG0+BT: h ercury         75Hq47p8         0.01 mg/k         #9R7           EG0+BT: h ercury         77.5         77.5           EOW: Cower S		EG060ApT: CVYomium	7550p57pH	1 mgK	R5.H	70.0	140
EG060ApT: Lead         75HRPF6pd         1 mgK         R0.5           EG060ApT: Nickel         7550p6pp         1 mgK         RRk           EG060ApT: Nickel         7550p8pp         1 mgK         RR           EG0H9F: h ercury         75HRP7pp         0.01 mgK         77.5           EG0H9T: h ercury         75HRP7pp         0.01 mgK         # 9R7           EOW: College Sulfide as S6p         1K5R8pp9p         0.01 mgK         K k. K           EPOKO: ErkylbenNene         100kbtkhH         69 µgK         R HB		EG060ApT: Co22er	7550p0pk	1 mgK	R7.k	70.0	1110
EG060ApT: Nicdel         7550p6pp         1 mgK         RRK           EG060ApT: Zinc         755Hg47pB         0.01 mgK         76.6           EG0H9F: h ercury         75Hq47pB         0.01 mgK         77.5           EG0H9T: h ercury         75Hq47pB         0.01 mgK         77.5           EG0H9T: h ercury         75Hq47pB         0.01 mgK         77.5           EG0H9T: h ercury         75Hq47pB         0.01 mgK         # 9R7           EG0H9T: h ercury         75Hq47pB         0.01 mgK         # 9R7           EC0H9T: h ercury         75Hq47pB         0.01 mgK         # 9R7           EC0H9T: h ercury         75Hq47pB         0.01 mgK         # 9R7           EC0H9T: h ercury         75Hq47pB         0.01 mgK         # 9R7           EC0H9T: h ercury         75Hq47pB         0.01 mgK         # 9R7           EC0H9T: h ercury         77HpH6         69 µgK         RR           EV 0k9: Sulfide as S6p         11KpKkH1         69 µgK         RH           EP0k0: Tolluene         100kpKH1         69 µgK         RH9           EP0k0: ortWopkylene         100kpGH         69 µgK         RH9           EP0k0: ortWopkylene         100kpGH         69 µgK         RH9		EG060ApT: Lead	75HR4R6p1	1 mgK	R0.5	70.0	1110
EC0HDT: Zinc         7550β8ββ         1 mg/k         P8.7           EC0HDT: h ercury         75HR477β         0.01 mg/k         76.6           EC0HDT: h ercury         75HR477β         0.01 mg/k         77.5           EC0HDT: h ercury         75HR477β         77.5         77.5           EC0HDT: h ercury         77/βH47         69 μg/k         77.8           EP0KO: Tolluene         100p51p5         69 μg/k         77.9           EP0KO: ArtWopkylene         100p51p5         69 μg/k         76.0           EP0KO: OrtWopkylene         70 μg/k         70 μg/k         70 μg/k		EG060ApT: Nic4el	7550р6р	1 mgK	RRK	70.0	1110
EG0H9F: h ercury         75HRPZ7B         0.01 mg/k         76.6           EG0H9T: h ercury         75HRPZ7B         0.01 mg/k         77.5           EG0H9T: h ercury         75HRPZ7B         0.01 mg/k         # 9R7           EG091G: Ferrous iron         mp         1 mg/k         7R9           E/ 0kg: Sulfide as S6p         1 k5F8p59k         0.Hmg/k         7R9           E/ 0kg: Sulfide as S6p         1 k5F8p59k         0.Hmg/k         10R           EPOko: Ben/kne         10krkkpH         69 µg/k         RH           EPOko: metap& 2arapXylene         10krkkpH         69 µg/k         RH9           EPOko: metap& 2arapXylene         10krkkpH         69 µg/k         RH9           EPOko: metap& 2arapXylene         10krkkpH         69 µg/k         RH9           EPOko: metap& 2arapXylene         RPIG0H         69 µg/k         R5.5		EG060ApT: Zinc	7550p88p8	1 mgK	R9.7	70.0	1H0
EGOH-BT: h ercury         75HAPZPB         0.01 mg/k         76.6           EGOH-BT: h ercury         75HAPZPB         0.01 mg/k         77.5           EGOH-BT: h ercury         75HAPZPB         0.01 mg/k         77.5           EGOH-BT: h ercury         75HAPZPB         0.01 mg/k         # 9RZ           EGOH-BT: h ercury         77HAPZPB         10RK         # 8.R           EFONC: EvilylleenNehne         77HAPZPB         69 µg/K         R H 9           EFONC: EvilylleenNehne         100RD-1B         100							
EGOHOT: h ercury         75HRAT/RB         0.01 mg/k         77.5           EGOHOT: h ercury         75HRAT/RB         0.01 mg/k         # 9R7           ECO91G: Ferrous Iron         mp         1 mg/k         7R9           E/ 0k9: Sulfide as S6p         1 k5R8pfb9pk         0.1Hmg/k         10R           EP0k0: BenNene         71f6Hg         69 µg/k         kk.k           EP0k0: Toluene         10kpkkH         69 µg/k         kk.k           EP0k0: metap& Zarapkylene         10kpkHH         69 µg/k         R4H9           EP0k0: ort/wbpkylene         10kpkHH         69 µg/k         R4H9           EP0k0: ort/wbpkylene         R96778         69 µg/k         R5.5		EG0H9F: h ercury	75HRpR7p8	0.01 mg <b>K</b>	76.6	70.0	1H0
EGOH-DT: h ercury	E50)IT: ToiBhRevo(erBf te Derv-r4f4FIDS 1QCLoi:)) G u07b						
EG0H9T: h ercury         75HR487p8         0.01 mg/k         # 9R7           EG091G: Ferrous Iron         IIII         1 mg/k         7R9           E/ 0k9: Sulfide as S6p         1 k5R8p69pk         0.Hmg/k         10R           E/ 0k9: Sulfide as S6p         1 k5R8p69pk         0.Hmg/k         10R           E/ 0k9: Sulfide as S6p         1 k5R8p69pk         0.Hmg/k         10R           E/ 0k0: BenNene         71/6Hp6         69 µg/k         kk.k           EP0k0: EtVlylbenNene         100p61pf         69 µg/k         RHk           EP0k0: metap& Zarapkylene         108p66pH         69 µg/k         RH9           EP0k0: ort/vbpkylene         R9p57pf         69 µg/k         R5.5           EP0k0: ort/vbpkylene         R9p57pf         69 µg/k         R5.5		EG0H9T: h ercury	75HRpR7p8	0.01 mg <b>K</b>	77.5	70.0	1H0
EG0H9T: h ercury         75Hqb7p8         0.01 mgfk         # 9R7           EG091G: Ferrous Iron         mmp         1 mgfk         7R9           E/ 0k9: Sulfide as S6p         1k5P8p69pk         0.Hmgfk         10R           EP0k0: BenN≠         71pHp6         69 µgfk         k8.R           EP0k0: Toluene         10kpkpth         69 µgfk         RHk           EP0k0: et/WjbenN≠         10kpkpth         69 µgfk         RH9           EP0k0: ort/WptXylene         10kpkpth         69 µgfk         RH9           EP0k0: ort/WptXylene         R9f57p8         69 µgfk         R5.5	E50) IT: ToiBhRevo(erBrite Derv-r4f4FIDS 1QCLoi:)) G u02b						
EC091G: Ferrous Iron         mp         1 mgK         7R9           E/ 0k9: Sulfide as S6p         1k5R8ps9pk         0.HmgK         10R           EP0k0: BenN≠         71pHp         69 µgK         k8.R           EP0k0: Toluene         10kpkpH         69 µgK         RHk           EP0k0: metap& ZarapXylene         10kpkpHH         69 µgK         RH9           EP0k0: ortNopxylene         R9b7rB         69 µgK         R49           EP0k0: ortNopxylene         R9b7rB         69 µgK         R5.5		EG0H9T: h ercury	75HRpR7p8	0.01 mg <b>K</b>	# 9R7	70.0	1H0
EG091G: Ferrous Iron         ITMS         7 R9           E/ 0kg. Sulfide as S6p         1k5R869gk         0.Hmgk         10R           EP0k0. BenNene         71pHp         69 µgK         kk.k           EP0k0. Toluene         10kpkpt         69 µgK         RHk           EP0k0. Et/WibenNene         10kpkpt         69 µgK         RHs           EP0k0. ortWoptylene         108p6pH         69 µgK         RH9           EP0k0. ortWoptylene         RB6pH         69 µgK         R5.5	E50175: Ferro-plrot f4sypvreie At Br4per 1QCLoi:)) GM C0b						
E/ 0k9: Sulfide as S6p         1k5R8p69pk         0.HHmglk         10R           EPOk0: BenNehe         71p6Hp         69 µglk         k8.R           EPOk0: Toluene         10kpkpHp         69 µglk         RHk           EPOk0: metap& Zarapkylene         10kpkpHpH         69 µglk         RH9           EPOk0: ortVoptylene         10kpchpH         69 µglk         RH9           EPOk0: ortVoptylene         RP6ph         RP6ph         RP55		EG091G: Ferrous Iron	cttt	1 mgK	7R9	70.0	1H0
E / 0kg. Sulfide as S6p         1k5R8/69ck         0.Hmg/k         10R           EPOk0: Ben/Mene         71/61-k6         69 µg/k         k8.R           EPOk0: Efvlylben/Mene         10kkkyH         69 µg/k         R4-k           EPOk0: metap & Zarapkylene         10kpkyH         69 µg/k         R4-l9           EPOk0: ort/véptylene         10kpkpkH         69 µg/k         R4-l9           EPOk0: ort/véptylene         10kpkpk         69 µg/k         R4-l9	EKOM D: S-18de Bp S29 1QCLoi: ) n231 mb						
EPOKO. BenN≠         71рНр         69 µg/K         k8.R           EPOKO. Toluene         100рб µg         kk.k           EPOKO. Etv/ylbenNene         100рб µg         RHk           EPOKO. metap & ZarapXylene         108p5 pH         69 µg/K         RH9           EPOKO. ontVopXylene         RPB 7RB         69 µg/K         R5.5           EPOKO. ontVopXylene         RPB 7RB         69 µg/K         R5.5			1k5R8p69pk	0.HHmgK	10R	70.0	1H0
Anonymous         EPOKO: BenMene         71β-Hβ         69 μg/K         k8.R           EPOKO: Tolluene         10kβkβH         69 μg/K         R·K           EPOKO: metap& ZarapXylene         10kβ-KβH         69 μg/K         R·H9           EPOKO: ortVopXylene         R·BGPH         69 μg/K         R·B5	EP0n0: c TEXN 1QCLoi: )) nM G0b						
10крккрН         69 µg/K         RH к           100р51р5         69 µg/K         RH 9           Kylene         10кр4крН         69 µg/K         RH 9           R9р56рН         69 µg/K         RS-5           P3-60-H         69 µg/K         RS-5		EP0k0: Benalign* bentilements*	7165Hp6	69 µgK	k8.R	70.0	1110
100p51p5         69 μg/K         RHK           Kylene         10kp4kpH         69 μg/K         RH9           108p6pH         69 μg/K         RH9           R9p57pB         69 μg/K         R5.5           PH-60-H         69 μg/K         R5.5		EP0k0: Toluene	10kpkkpH	69 µgK.	KK.K	70.0	1H0
10kg4kgH 69 μg <b>K</b> RH9 108p56gH 69 μg <b>K</b> R5.5		EPOk0: Et/WilbenMene	10005105	69 µgK	RHK	70.0	1H0
Раф. 7дв         69 µg/к         Ръ.5           Вивлен         Визлич         Визлич         Визлич		EP0k0: metap& 2arapXylene	10kp-kpH 108р56рН	69 µg <b>K</b> .	RH9	70.0	1H0
7.07 7.03 7.03 7.03 7.03 7.03 7.03 7.03		EP0k0: ortWbpXylene	R96778	69 µgK	R5.5	70.0	1H0
New Tribula		EPOK0: Na2VW/kilene	R1p60pH	69 µg/K.	k9.k	70.0	1110



# QA/QC Compliance Assessment to assist with Quality Review

**Environmental Division Sydney** +61 - 2724 2555 - 4RNovR 9- 9 97RDecR 9-9 : 1 of 8 5 5 No/ of samples analysed Date Samples 3 eceived No/ of samples received Issue Date Laboratory Telephone S18951- Balranald T0 Ancillary ESS COUMLTIGIP YID TIG Haityn Brodie kBill Bull PAUL GIBBONS EM20793NB Order number **Work Order** Contact Sampler Project Client Site

reportinb hibhlibhts any non, con. ormancesx. a cilitates . aster and more accurate data validation and is desibned to assist internal eBpert and eBternal Auditor review-S any components o. this I his report is automatically benerated f y the ATMT® Mthroubh interpretation o. the ATM Quality Control Report and several Quality Assurance parameters measured f y ATM-I his automated report contrif ute to the overall gQO assessment and reportinb .or buideline 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 Kuality Control .KCQB eport/

- <u>UO</u> S ethod Flank value outliers occur-
- <u>UO</u> guplicate outliers occur-
- UO Taf oratory Control outliers occur-
- SatriBMpike outliers eBist, please see .ollowinb pabes .or .ull details-
- Hor all rebular sample matricesxUO surrobate recovery outliers occur-

## Outliers: Analysis Holding Time Compliance

Analysis qoldinb I ime Outliers eBst, please see .ollowinb pabes .or .ull details-

## **Outliers: Frequency of Quality Control Samples**

Quality Control Mample Hre( uency Outliers eBist, please see .ollowinb pabes .or .ull details-



 Page
 : - of 8

 ( or) Order
 : ES-941686

 Client
 : EWM CONSULTING PTMLTD

 Project
 : \$18951- Balranald TO Ancillary

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

WatriY: WAI ER

Compound Group Name	Laboratory Sample ID   Client Sample ID	Client Sample ID	Analyte	CAS Number Data	Data	Limits Comment	Comment
SatriB Mpike ) S M4 Recoveries							
ED941G: Sulfate . TurbidimetricQas SO4 - Rby DA	ES-941686服91	UGWRNZD	Mul.ate as MO7 , I urf idimetric	14292R'8R Not Determine	Not Determined	<b>FE</b>	S Mrecovery not determinedx f ackbround level breater than or e( ual to 7Bspike level-
ED945G: Chloride by Discrete Analyser	ES-941686R891	UGWRNZD	Chloride	16227 <b>R</b> 99 <b>R</b>	Not Determined	HRR.	S Mrecovery not determinedx f ackbround level breater than or e( ual to 7Bspike level-
EG905T: Total 3ecoverable Wercury by FIMS	ES-941686178992	Bx PW12S	Sercury	7408R87R6	28/7 %	79/9명09%	Recovery less than lower data ( uality of jective

Outliers: Analysis Holding Time Compliance

WatriY: WAI ER

Wath Y: WAI EK							
Method		Ext	Extraction / Preparation			Analysis	
Container / Client Sample ID.sQ		Date extracted	Date extracted Due tor extraction	Days overdue	Date analysed	Due vor analysis	Days overdue
EP 059P : Herrous Gon f y giscrete Analyser							
Clear Ylastic Fottle, qCI, Hiltered							
Bx PW17DV	Bx PW17SV		THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE S	HE STEEL	9- RDecR 9-9	- 4RNovR 9- 9	-
Bx PW12DV	Bx PW12S						
Clear Ylastic Fottle, qCI, Hiltered							
UGWRWZDV	UGWPV2SV		THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE S		9- RDecR 9-9	- 5RNovR 9- 9	ᅩ
UGWRW1- DV	UGWPW1-SV						
Bx PW-1DV	Bx PW-1SV						
KA1							
E8015S: Mul.ide as M2,							
Clear Ylastic Fottle, Zinc Acetate/UaOq							
Bx RW17DV	Bx PW17SV		HER	HERE.	-5RNovR9-9	- 4RNovR 9- 9	6
Bx PW12DV	Bx PW12S						
EY010: FI EVU							
Amf er XOC Xial, Mul.uric Acid							
Trip Spi)e		9- RDecR 9-9	11RNovR 9-9	29	9-RDecR 9-9	11RNovR 9-9	29

Outliers: Frequency of Quality Control Samples

WatriY: WAI ER

Kuality Control Sample Type	ဝိ	Count	3 ate	3 ate .%Q	Kuality Control Specification
Wethod	KC	3 egular	Actual	E Ypected	
Laboratory Duplicates . DUPQ					
Gross Alpha and Beta Activity	1	15	29/9	19/99	NEPW-910 B0; ALS KC Standard



EWW CONSULTING PTMLTD S18951- Balranald T0 Ancillary : 0 of 8 : ES-941686 ( or) Order Project Client

Analysis Holding Time Compliance

If samples are identified belo, as having been analysed or e tracted outside of recommended holding times/this should be ta) en into consideration, hen interpreting results/

246V APx AV AS and NEPWQ based on the sample container This report summarizes extraction k preparation and analysis times and compares each , ith ALS recommended holding times .referencing USEPA S( provided/ Dates reported represent first date of eYtraction or analysis and preclude subse&uent dilutions and reruns/ A listing of breaches. if anyQs provided herein/ Assessment compares the leach date , ith the shortest analyte holding time for the e&uivalent soil method/ These are: organics xolding time for leachate methods .e/g/ TCLPQ vary according to the analytes reported/

xolding times for <u>Voc. in soils</u> vary according to analytes of interest winyl Chloride and Styrene holding time is 7 daysq others 14 days/ A recorded breach does not guarantee a breach for all wOC analytes and 14 daysVmercury - 2 days; other metals 129 days/ A recorded breach does not guarantee a breach for all non-Rolatile parameters/

should be verified in case the reported breach is a false positive or winyl Chloride and Styrene are not ) ey analytes of interesticoncern/

WatriY: WAI ER					Evaluation:	x = x olding time	Evaluation: $x = x$ olding time breach $q^{\checkmark} = ($ ithin holding time/	holding time/
Method		Sample Date	Ex	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due wr extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
EA250: Pross Alpha and Feta Activity								
Clear Ylastic Fottle, Uatural )EA2504								
Bx RW17DV	Bx PW17SV	9K,Uov, 2020	****	THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE S	######################################	60, Uov, 2020	16RVayR 9- 1	>
Bx RW12DV	Bx PW12S							
Clear Ylastic Fottle, Uatural )EA2504								
UGWPV2DV	UGWPW2SV	91,Uov, 2020	****	######################################	Ŧ.	60, Uov, 2020	17RVayR 9- 1	>
UGWPW1- DV	UGWPW1-SV							
Bx RW-1DV	Bx PW- 1SV							
KA1								
EA250CA: Pross Alpha and Feta Activity								
Clear Ylastic Fottle, Uatural )EA2504								
Bx RW17DV	Bx PW17SV	9K,Uov, 2020	****	######################################	######################################	60, Uov, 2020	16RVayR 9- 1	>
Bx RW12DV	Bx PW12S							
Clear Ylastic Fottle, Uatural )EA2504								
UGWRW2DV	UGWPW2SV	91,Uov, 2020	****	THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE S		60, Uov, 2020	17RVayR 9- 1	>
UGWRW1- DV	UGWRW1-SV							
Bx RW-1DV	Bx PW- 1SV							
KA1								
Eg06KY: Alkalinity f y YC I itrator								
Clear Ylastic Fottle , Uatural )Eg06K,Y4								
Bx RW17DV	Bx PW17SV	9K,Uov, 2020	****	HER.	######################################	25, Uov, 2020	91RDecR 9-9	>
Bx PW12DV	Bx PW12S							
Clear Ylastic Fottle , Uatural )Eg06KY4								
UGWRW2DV	UGWPW2SV	91,Uov, 2020	****			25, Uov, 2020	9-RDecR 9-9	>
UGWPW1- DV	UGWRW1-SV							
Bx PW-1DV	Bx PW- 1SV							
KA1								



EWW CONSULTING PTMLTD S18951- Balranald T0 Ancillary

ES-941686

(or) Order

Client Project

4 of 8

Evaluation: x = x olding time breach  $q^{\checkmark} = ($  ithin holding time/ **Efaluation** > > > > > > > > > > Due vor analysis 15RDecR 9-9 16RDecR 9-9 15RDecR 9-9 16RDecR 9-9 15RDecR 9-9 16RDecR 9-9 16RWayR 9- 1 16RWayR 9- 1 17RWayR9-1 17RWayR 9- 1 60, Uov, 2020 09, g ec, 2020 Date analysed 60, Uov, 2020 60, Uov, 2020 60, Uov, 2020 09,g ec,2020 09,gec,2020 09,g ec,2020 09, g ec, 2020 09,gec,2020 Efaluation **E E \*** Ŧ, 1 **E** > > Extraction / Preparation Date extracted Due to extraction 16RWayR 9- 1 17RWayR 9- 1 **E E**  $\mathbb{R}$ 1 **E** THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE 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RW17SV Bx RW17SV Bx RW17SV Bx RW12SV Bx RW- 1SV Trip Blan) -Bx RW12S Bx RW12S Bx RW12S Bx RW12S Clear Ylastic Fottle , Uitric Acid; Ln.iltered )EP 020A,I 4 Bx RW7SV Slear Ylastic Fottle, Uitric Acid; Ln.iltered )EP 020A,I 4 Clear Ylastic Fottle, Uitric Acid; Hiltered )EP020A, H4 Clear Ylastic Fottle, Uitric Acid; Hiltered )EP020A, H4 Clear Ylastic Fottle, Uitric Acid; Hiltered ) Eg 0 NG H4 Clear Ylastic Fottle, Uitric Acid; Hiltered ) Eg 0 N6H4 Eg079P: Mul.ate )I urf idimetric4as MO7 2, f y gA Eg075P: Chloride f y g iscrete Analyser Clear Ylastic Fottle, Uatural )Eg075P4 Clear Ylastic Fottle, Uatural )Eg079P4 Clear Ylastic Fottle, Uatural )Eg079P4 Clear Ylastic Fottle, Uatural )Eg075P4 EP 020H: gissolved Setals f y CY, SM Eg0N6H: gissolved Sajor Cations EP 0201: I otal Setals f y GY,S M Container / Client Sample ID(s) UGWRW1-DV UGWRW1-DV UGWRW1-DV Trip Blan) 1V UGWRW1-DV WatriY: WAI ER UGWRW2DV **UGWRN2DV UGWRW2DV UGWRW2DV UGWRN2SV** Bx RW-1DV Bx RW17DV Bx RW-1DV Bx RW17DV Bx RW-1DV Bx RW-1DV Bx RW12DV Bx RW12DV Bx RW17DV Bx RW12DV Bx RW17DV Bx RW12DV KA1 KA1 KA1 Method



 Page
 : 5 of 8

 ( or) Order
 : ES-941686

 Client
 : EWWCONSULTING PTMLTD

 Project
 : \$18951- Balranald T0 Ancillary

WatriY: WAI ER					Evaluation:	x = x olding time	Evaluation: $\mathbf{x} = \mathbf{x}$ olding time breach $\mathbf{q}^{\checkmark} = ($ ithin holding time/	holding time/
Method		Sample Date	Ex	Extraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due vor extraction	Efaluation	Date analysed	Due vor analysis	Efaluation
EP 065H: gissolved Sercury f y HG M								
Clear Ylastic Fottle , Uitric Acid; Hiltered )EP065H4		0000		Ê	6	0000	0.00	,
BX RV17DV BX RV12DV	BX #V/12S	95,000,		INN	I KWK	02,9 ec, 2020		>
Clear Vlastic Fottle Hitric Acid: Hiltered )FP065H4								
UGWRVZDV	UGWRV2SV	91,Uov,2020		HE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE ST	H	02,g ec,2020	16RDecR 9-9	<u>`</u>
UGWFW1- D	UGWPW1-SV	`				į		•
Bx 8W-1DV	Bx PW- 1SV							
KA1								
EP 0651 : I otal Recoveraf le S ercury f v H&M								
Clear Visetic Fottle Hitric Acid: I miltored NED 0651 A								
Clear flastic Fottle , Oltric Acid; En.intered JEP 06314  By RM17SV	B× BM/12S/V	9K Uov. 2020	į			02.g ec.2020	15RDecR 9-9	`
385								•
A 1904 CO   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Cont								
Clear riastic route, Ottric Acid; Entitlered JEP 0651 4	P > PM 1S //	94 Hov 2020		<b>8</b>		02 g ec 2020	16R)ecR 9- 9	`
Trip Blan 17	UNITED TO THE TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTA	)						>
IIIp Blail) 1V	IIIp Didil) -							
EP 059P: Herrous Gon f y giscrete Analyser								
Clear Ylastic Fottle , qCl , Hiltered )EP 059P4							-	
Bx RW17DV	Bx RW17SV	9K,Uov, 2020	1111	¥	¥	02,g ec,2020	- 4KNOVK 9- 9	×
Bx PW12DV	Bx PW12S							
Clear Ylastic Fottle , q Cl , Hiltered )EP 059P4								
UGWPWZDV	UGWRW2SV	91, Uov, 2020	****	***************************************	***************************************	02,gec,2020	- 5KNOVR 9- 9	×
UGWRW1- DV	UGWRW1-SV							
Bx RW-1DV	Bx PW- 1SV							
KA1								
E8 015S: Mul.ide as M2,								
Clear Ylastic Fottle, Zinc Acetate/UaOq )E80154								
Bx RW17DV	Bx PW17SV	9K,Uov, 2020	1111			25, Uov, 2020	- 4RNovR 9- 9	×
Bx RW12DV	Bx PW12S							
Clear Ylastic Fottle, Zinc Acetate/UaOq )E80154								
UGWRW2DV	UGWRNZSV	91, Uov, 2020	1111	HERE SERVICE AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PE	EEE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CONTRIBUTION OF THE CO	25, Uov, 2020	- 5RNovR 9- 9	>
UGWPW1-DV	UGWRW1-SV							
Bx RW-1DV	Bx RW- 1SV							
KA1								
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A STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF S								
Amt er XOC Xiai, Mul. uric Acid (EY0104 Trip Spi) e		21,Oct, 2020	02,gec,2020	11RNovR 9-9	Ŋ	02,g ec,2020	11RNovR 9-9	×



: 6 of 8 : ES-941686 : EWW CONSULTING PTMLTD : S18951- Balranald TO Ancillary ( or) Order Project Client

# **Quality Control Parameter Frequency Compliance**

The follo, ing report summarises the fre&uency of laboratory KC samples analysed , ithin the analytical lot.sQn , hich the submitted sample.sQ as., ereQnrocessed/ Actual rate should be greater than or e&ual to the eYpected rate/ A listing of breaches is provided in the Summary of Outliers/ Evaluation: x = Kuality Control fre&uency not , ithin specification q ✓ = Kuality Control fre&uency , ithin specification/

WatriY: WAI ER

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Kuality Control Sample Type		Count	unt		Rate (%)		Quality Control Specivication
Analytical Methods	Method	OC	Reaular	Actual	Expected	Ef aluation	
Laboratory Duplicates . DUPQ							
Al) alinity by PC Titrator	ED907RP	,	6-	00-06	00-06	>	NEPW - 910 B0; ALS KC Standard
Chloride by Discrete Analyser	ED945G		6 -	00-06	00-06	>	NEPW-910 B0; ALS KC Standard
Dissolved Wercury by FIWS	EG905F	ı	<sub>-</sub>	00-06	00-06	>	NEPW - 910 B0; ALS KC Standard
Dissolved Wetals by ICPRWS RSuite A	EG9-9AR	1	o -	00-06	00-06	>	NEPW - 910 B0; ALS KC Standard
Ferrous Iron by Discrete Analyser	EG951G		6 -	00-06	00-06	>	NEPW-910 B0; ALS KC Standard
Gross Alpha and Beta Activity	EA- 59	-	15	3-3K	00-06	×	NEPW - 910 B0; ALS KC Standard
Wajor Cations RDissolved	ED980F		6 -	00-06	00-06	>	NEPW-910 B0; ALS KC Standard
Sulfate . TurbidimetricQas SO4 - Rby Discrete Analyser	ED941G		6 -	00-06	00-06	>	NEPW - 910 B0; ALS KC Standard
Sulfide as S- R	EH925	ı	17	5X-66	00-06	>	NEPW - 910 B0; ALS KC Standard
Total Wercury by FIWS	EG905T	4	49	00-06	00-06	>	NEPW-910 B0; ALS KC Standard
Total Wetals by ICPRVS RSuite A	EG9-9AR	ı	o -	00-06	00-06	>	NEPW - 910 B0; ALS KC Standard
T3 x wolatileskBTEX	EP929		6 -	00-06	00-06	>	NEPW - 910 B0; ALS KC Standard
Laboratory Control Samples .LCSQ							
Al) alinity by PC Titrator	ED907RP		6 -	00-06	00-06	>	NEPW-910 B0; ALS KC Standard
Chloride by Discrete Analyser	ED945G		6 -	00-06	00-06	>	NEPW-910 B0; ALS KC Standard
Dissolved Wercury by FIWS	EG905F	-	o -	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard
Dissolved Wetals by ICPRWS RSuite A	EG9-9AR	-	6 -	2-00	2-00	>	NEPW-910 B0; ALS KC Standard
Ferrous Iron by Discrete Analyser	EG951G	-	6 -	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard
Gross Alpha and Beta Activity	EA- 59		15	99-96	00-06	>	NEPW - 910 B0; ALS KC Standard
Wajor Cations RDissolved	ED980F	-	6 -	2-00	2-00	<b>&gt;</b>	NEPW - 910 B0; ALS KC Standard
Sulfate . TurbidimetricQas SO4 - Rby Discrete Analyser	ED941G	ı	6 -	00-06	00-06	<b>,</b>	NEPW - 910 B0; ALS KC Standard
Sulfide as S-R	EH925	_	17	5-11	2-00	>	NEPW - 910 B0; ALS KC Standard
Total Wercury by FIWS	EG905T		49	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard
Total Wetals by ICPRVS RSuite A	EG9-9AR	-	6 -	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard
T3 x wolatiles/BTEX	EP929	1	6 -	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard
Wethod Blan)s .WBQ							
Chloride by Discrete Analyser	ED945G	1	6 -	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard
Dissolved Wercury by FIWS	EG905F	~	6 -	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard
Dissolved Wetals by ICPRWS RSuite A	EG9-9AR	_	6 -	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard
Ferrous Iron by Discrete Analyser	EG951G	_	6 -	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard
Gross Alpha and Beta Activity	EA- 59	~	15	3-3K	2-00	>	NEPW - 910 B0; ALS KC Standard
Wajor Cations RDissolved	ED980F	_	6 -	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard
Sulfate . Turbidimetric as SO4 - Rby Discrete Analyser	ED941G	1	6 -	2-00	2-00	>	
Sulfide as S- R	EH925	_	17	5-11	2-00	>	NEPW-910 B0; ALS KC Standard
Total Wercury by FIWS	EG905T		49	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard
Total Wetals by ICPRWS RSuite A	EG9-9AR	_	6 -	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard



Page : 7 of 8
( or) Order : ES-941686
Client : EWW.CONSULTING. PTMLTD
Project : \$18951- Balranald T0 Ancillary

WatriY: WAI ER				Evaluation	r: x = Kuality Co	ntrol fre&uency n	Evaluation: x = Kuality Control fre&uency not, ithin specification q / = Kuality Control fre&uency, ithin specification/
Kuality Control Sample Type		S	Count		Rate (%)		Quality Control Specivication
Analytical Methods	Method	OC	Reaular	Actual	Expected	Ef aluation	
Wethod Blan)s .WBQRContinued							
T3 x wolatileskBTEX	EP929	_	6 -	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard
WatriY Spi) es . WSQ							
Chloride by Discrete Analyser	ED945G	_	6-	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard
Dissolved Wercury by FIWS	EG905F	-	6 -	2-00	2-00	>	NEPW-910 B0; ALS KC Standard
Dissolved Wetals by ICPRWS RSuite A	EG9-9AR	-	6-	2-00	2-00	>	NEPW-910 B0; ALS KC Standard
Ferrous Iron by Discrete Analyser	EG951G	-	6-	2-00	2-00	>	NEPW-910 B0; ALS KC Standard
Sulfate . TurbidimetricQas SO4 - Rby Discrete Analyser	ED941G	-	6 -	2-00	2-00	>	NEPW-910 B0; ALS KC Standard
Sulfide as S- R	EH925	-	17	5-11	2-00	>	NEPW-910 B0; ALS KC Standard
Total Wercury by FIWS	EG905T		49	2-00	2-00	>	NEPW-910 B0; ALS KC Standard
Total Wetals by ICPPWS RSuite A	EG9-9AR	-	6-	2-00	2-00	>	NEPW - 910 B0; ALS KC Standard
T3x wolatileskBTEX	EP929	τ-	6 -	2-00	2-00	`	NEPW - 910 B0; ALS KC Standard



 Page
 : 2 of 8

 ( or) Order
 : ES-941686

 Client
 : EWW CONSULTING PTMLTD

 Project
 : \$18951- Balranald TO Ancillary

**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 EPAVAPX AVAS and NEPW/ In house developed procedures are employed in the absence of documented standards or by client re&uest/ The follo, ing report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis/ Sources from , hich ALS methods have been developed are provided, ithin the Wethod Descriptions/

A	A 4 - 411	Matrix	11.11.11
Analytical Methods	Mernod	Matrix	Wernoa Descriptions
Gross Alpha and Beta Activity	EA-59	( ATE3	ASTW D7- 20186: Determination of gross alpha and gross beta radioactivity in , ater samples by Li&uid Scintillation Counting .LSCQ
AI) alinity by PC Titrator	ED907RP	( ATE3	In house: 3 eferenced to APx A - 0- 9 B This procedure determines al) alinity by automated measurement .e/g/ PC TitrateQon a settled supernatant ali&uot of the sample using px 4/5 for indicating the total al) alinity endPoint/ This method is compliant, ith NEPW Schedule B.0Q
Sulfate . TurbidimetricCas SO4 - Rby Discrete Analyser	ED941G	( ATE3	In house: 3 eferenced to APx A 4599f&O4/ Dissolved sulfate is determined in a 9/45um filtered sample/ Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium, ith barium chloride/ Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4R concentration is determined by comparison of the reading, ith a standard curve/ This method is compliant, ith NEPW Schedule B.0Q
Chloride by Discrete Analyser	ED945G	( ATE3	In house: 3 eferenced to APx A 4599 CI RG/The thiocyanate ion is liberated from mercuric thiocyanate through se&uestration of mercury by the chloride ion to form nonRonised mercuric chloride/in the presence of ferric ions the librated thiocynate forms highlyRoloured ferric thiocynate, hich is measured at 429 nm APx A seal method - 917RR.
Wajor Cations RDissolved	ED980F	( ATE3	In house: 3 eferenced to APx A 01-9 and 01-5qUSEPA S( 246 R6919 and 69-9qCations are determined by either ICPRAES or ICPRAES are ICPRAES or ICPRAES are instanced by sethingues. This method is compliant, ith NEPW Schedule B.0Q. Sodium Adsorption 3 atio is calculated from CaVWg and Na , hich determined by ALS in house method K( IRENKED980F/This method is compliant, ith NEPW Schedule B.0Q. x ardness parameters are calculated based on APx A - 049 B/This method is compliant, ith NEPW Schedule B.0Q.
Dissolved Wetals by ICPRVS RSuite A	EG9-9A冺	( ATE3	In house: 3 eferenced to APx A 01-5qUSEPA S( 246 R69-9VALS K( IRENIEG9-9/ Samples are 9/45µm filtered prior to analysis/ The ICPWS techni&ue utilizes a highly efficient argon plasma to ionize selected elements/ lons are then passed into a high vacuum mass spectrometerV, hich separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector/
Total Wetals by ICPPWS RSuite A	EG9-9AR	( ATE3	In house: 3 eferenced to APx A 01-5qUSEPA S( 246 R69-9VALS K( IRNEG9-9/ The ICPWS technique utilizes a highly efficient argon plasma to ionize selected elements/ lons are then passed into a high vacuum mass spectrometery, hich separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector/
Dissolved Wercury by FIWS	EG905F	( ATE3	In house: 3 eferenced to AS 0559VAPx A 011- xg RB .Flo, Rajection .SnCl-QCold wapour generationQAASQ Samples are 9/45µm filtered prior to analysis/ FIWRAS is an automated flameless atomic absorption techni&ue/ A bromatekbromide reagent is used to o'Mdise any organic mercury compounds in the filtered sample/ The ionic mercury is reduced online to atomic mercury vapour by SnCl- , hich is then purged into a heated &uartz cell/ Kuantification is by comparing absorbance against a calibration curve/ This method is compliant , ith NEPW Schedule B.0Q
Total Wercury by FIWS	EG905T	( ATE3	In house: 3 eferenced to AS 0559V APx A 011- x g RB . Flo, Rhjection . SnCl- QCold wapour generationQAASQ FIWRAS is an automated flameless atomic absorption techni&ue/ A bromatekbromide reagent is used to oYdise any organic mercury compounds in the unfiltered sample/ The ionic mercury is reduced online to atomic mercury vapour by SnCl- , hich is then purged into a heated &uartz cell/ Kuantification is by comparing absorbance against a calibration curve/ This method is compliant , ith NEPW Schedule B.0Q



In house: 3 eferenced to USEPA S( 246 R2-69 ( ater samples are directly purged prior to analysis by Capillary sample is e&uilibrated in a headspace vial and a portion of the headspace determined by GCWS analysis/ This precipitated, hen collected in pretreated caustickzinc acetate preserved sample containers/ The sulphides are coloured using methylene blue indicator/ NonRetects may be screened by comparison against a standard at halfRO3 Vother, ise samples are measured using UwRvIS detection at 664nm/ This method is compliant, ith GCWNS and &uantification is by comparison against an established 5 point calibration curve/ AlternativelyVa phenanthroline and ferrous iron at px 0/- R0/0 to form an orange Red compleY that is measured against a In house: 3 eferenced to APx A 0599 FerB/ A colorimetric determination based on the reaction bet, een In house: 3 eferenced to APx A 459918-RD/ Sulfide species present in, ater samples are immediately In house: 3 eferenced to APx A 1909F/ This method is compliant, ith NEPW Schedule B.0Q five Point calibration curve/ This method is compliant, ith NEPW Schedule B.0Q method is compliant, ith the KC requirements of NEPW Schedule B.0Q NEPW Schedule B.0Q ( ATE3 ( ATE3 ( ATE3 ( ATE3 Matrix \* EN955 RPG EG951G EH925 Method **EP929** Ionic Balance by PCT DA and Turbi SO4 Ferrous Iron by Discrete Analyser T3x wolatileskBTEX Analytical Methods Sulfide as S-R

EWW CONSULTING PTMLTD S18951- Balranald T0 Ancillary

ES-941686

(or) Order

Client Project

8 of 8

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total 3 ecoverable Wetals	EN-5	( ATE3	In house: 3 eferenced to USEPA S( 246R9995/ Wethod 0995 is a Nitrick ydrochloric acid digestion procedure used to prepare surface and ground, ater samples for analysis by ICPAES or ICPWS/ This method is compliant, ith NEPW Schedule B.0Q
wolatiles ( ater Preparation	O3 G16R	( ATE3	A 5 mL ali&uot or 5 mL of a diluted sample is added to a 49 mL wOC vial for purging/

ETVINCE, AB

K Research Drive
Craydon South Vie 3136
Ph. (03) 975., 2500 Date Received: 25/11(20) Jime Received: 4-15pm Received By: K-lemp: Cool Ambient Cooling (Cell Cepack Security Infact) Eroken/None refler Carrier Tole 23502 20793 Job No: Chnote: 30200 4
Temp: 16.4°C Seal: 7
Tem / Ice / Icebricks NA AM るる Triplicate please forward to Envirolab UNDELCOSONO 1-19-21 Participa I, En Mon Wellinguage 19-W 2100 Ph. 02 4225-3129 E. undergonggabystalion Additional Information JS 10th V 277-2rd Wascan's Read James rey XSW 2104 Ph. 02 State SEXSE Landons properly plategories and JTCMSRVALE N 15 Depart Court Noise 0.0 6.18 Ph. 07 4790 06/V. E. Martenies are recomment plategories Received: Duplicate ras se filsten en facha present upon recept? OR LABORATORY USE ONLY (CINES) Random Sample Temperatura do Receye ANALYES REQUIRED Invisors Barries (the Sons Codes must be used to arrect sure pocy). 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See James

Kariey Spence	
France	David Cilebons angilebons@ammangulting.com.gu
From: Sent:	Paul Gibbons <pgibbons@emmconsulting.com.au> Wednesday, 25 November 2020 5:59 PM</pgibbons@emmconsulting.com.au>
To:	Karley Spence
Cc;	Kaitlyn Brodie; Dan Condon; jewers@emmconsulting.com.au; Gemma Sliz; Pamela
	Adams
Subject:	Re: Sample Receipt for 23502 S190512 Balranald T3 Ancillary
	inated from outside of the organisation. Do not act on instructions, click links or open attachments sender and know the content is authentic and safe.
Karley	
Further to your email, y note your comment on	yes we're happy for the Gross Alpha and Beta sampling to be subcontracted to ALS again and the holding times.
Kind regards	
Paul	
Sent from my iPhone	
On 25 Nov 202	0, at 5:14 pm, Karley Spence <kspence@envirolab.com.au> wrote:</kspence@envirolab.com.au>
CAUTION: This	s email originated outside of the Organisation.
Hi Paul/Daniel/	<sup>/</sup> Kaitlyn,
Are you ok wit	eved a QC sample at the lab for S190512 Balranald T3 Ancillary.  h us subcontracting the Gross Alpha Beta to ALS? (as we did with the previous job in virolab Job number: 22604)
As ALS is the p	rimary lab we could send to SGS as an alternative.
Please note the	e the TAT may exceed 5 business days for radiological analysis.



**Envirolab Services Pty Ltd** 

ABN 37 112 535 645 - 002 25 Research Drive Croydon South VIC 3136 ph 03 9763 2500 fax 03 9763 2633 melbourne@envirolab.com.au www.envirolab.com.au

### **CERTIFICATE OF ANALYSIS 23502**

Client Details	
Client	EMM
Attention	Paul Gibbons
Address	187 Coventry Street, South Melbourne, VIC, 3205

Sample Details	
Your Reference	S190512 Balranald T3 Ancillary
Number of Samples	1 WATER
Date samples received	25/11/2020
Date completed instructions received	25/11/2020

### **Analysis Details**

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details					
Date results requested by	09/12/2020				
Date of Issue	14/12/2020				
NATA Accreditation Number 2901. This document shall not be reproduced except in full.					
Accredited for compliance with ISO	/IEC 17025 - Testing. Tests not covered by NATA are denoted with *				

Results Approved By

Chris De Luca, Operations Manager Pamela Adams, Laboratory Manager, Melbourne <u>Authorised By</u>

Pamela Adams, Laboratory Manager



HM in water - dissolved		
Our Reference		23502-1
Your Reference	UNITS	QC2
Date Sampled		14/11/2020
Type of sample		WATER
Date prepared	-	30/11/2020
Date analysed	-	30/11/2020
Arsenic-Dissolved	μg/L	<1
Cadmium-Dissolved	μg/L	<0.2
Chromium-Dissolved	μg/L	1
Copper-Dissolved	μg/L	14
Lead-Dissolved	μg/L	<1
Nickel-Dissolved	μg/L	6
Zinc-Dissolved	μg/L	28
Mercury-Dissolved	μg/L	<0.05

Miscellaneous Inorganics		
Our Reference		23502-1
Your Reference	UNITS	QC2
Date Sampled		14/11/2020
Type of sample		WATER
Date prepared	-	27/11/2020
Date analysed	-	27/11/2020
Sulphide	mg/L	<0.5
Ferrous Iron	mg/L	<0.05

Ion Balance		
Our Reference		23502-1
Your Reference	UNITS	QC2
Date Sampled		14/11/2020
Type of sample		WATER
Date prepared	-	30/11/2020
Date analysed	-	30/11/2020
Calcium - Dissolved	mg/L	570
Potassium - Dissolved	mg/L	20
Sodium - Dissolved	mg/L	13,000
Magnesium - Dissolved	mg/L	1,600
Hydroxide Alkalinity (OH⁻) as CaCO₃	mg/L	<5
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	310
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	310
Sulphate, SO4	mg/L	5,900
Chloride, Cl	mg/L	22,000
Hardness	mgCaCO3/L	8,100
Ionic Balance	%	-2.4

External testing		
Our Reference		23502-1
Your Reference	UNITS	QC2
Date Sampled		14/11/2020
Type of sample		WATER
Gross Alpha	Bq/L	3.67
Gross Beta	Bq/L	<2.75
Gross Beta Activity -K40	Bq/L	<2.75

Method ID	Methodology Summary
Ext-011	Subcontracted to ALS.
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 10% ie total anions = total cations +/-10%.
Inorg-051	Sulphide determined titrimetrically based on APHA latest edition 4500 S2- F. Note, the Sulphide is termed as Total Sulphide given any Sulphide contained in any sediment present may also included in the determination.
Inorg-076	A sample is determined colourimetrically by discrete analyser as referenced in APHA 3500 Fe-B (phenanthroline method). Water samples are filtered on receipt prior to analysis.
Inorg-087	Chloride by colourimetry using Discrete Analyser
Inorg-115	Sulphate by turbidity using Discrete Analyser
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.

QUALITY CO	NTROL: HI	/l in wate	r - dissolved			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			30/11/2020	1	30/11/2020	30/11/2020		30/11/2020	
Date analysed	-			30/11/2020	1	30/11/2020	30/11/2020		30/11/2020	
Arsenic-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	<1	[NT]		103	
Cadmium-Dissolved	μg/L	0.1	Metals-022 ICP-MS	<0.1	1	<0.2	[NT]		103	
Chromium-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	1	[NT]		102	
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	1	14	[NT]		99	
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	1	<1	[NT]		103	
Nickel-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	6	[NT]		102	
Zinc-Dissolved	μg/L	1	Metals-022 ICP-MS	<1	1	28	[NT]		102	
Mercury-Dissolved	μg/L	0.05	Metals-021 CV-AAS	<0.05	1	<0.05	<0.05	0	94	

QUALITY CO	NTROL: Mis	cellaneou	s Inorganics		Duplicate Spike Reco				covery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			27/11/2020	1	27/11/2020	27/11/2020		27/11/2020	
Date analysed	-			27/11/2020	1	27/11/2020	27/11/2020		27/11/2020	
Sulphide	mg/L	0.5	Inorg-051	<0.5	1	<0.5			90	
Ferrous Iron	mg/L	0.05	Inorg-076	<0.05	1	<0.05	<0.05	0	103	

QUALI	TY CONTRO	L: Ion Ba	lance			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			30/11/2020	[NT]		[NT]	[NT]	30/11/2020	
Date analysed	-			30/11/2020	[NT]		[NT]	[NT]	30/11/2020	
Calcium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	105	
Potassium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	104	
Sodium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	82	
Magnesium - Dissolved	mg/L	0.5	Metals-020 ICP- AES	<0.5	[NT]		[NT]	[NT]	104	
Hydroxide Alkalinity (OH-) as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	94	
Carbonate Alkalinity as CaCO₃	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	94	
Sulphate, SO4	mg/L	1	Inorg-115	<1	[NT]		[NT]	[NT]	111	
Chloride, Cl	mg/L	1	Inorg-087	<1	[NT]		[NT]	[NT]	102	

Result Definiti	ons
NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

<b>Quality Contro</b>	ol Definitions
Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

### **Laboratory Acceptance Criteria**

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Reference: 23502 Page | 11 of 12 Revision No: R00

### **Report Comments**

Sulphide analysed by Envirolab Sydney, report number 256796. Gross alpha and beta analysed by ALS, report 863530

METALS: The PQL has been raised for Cadmium due to the sample matrix requiring dilution.

Envirolab Reference: 23502
Revision No: R00
Page | 12 of 12

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**Envirolab Services Pty Ltd** 

ABN 37 112 535 645 12 Ashley St Chatswood NSW 2067 ph 02 9910 6200 fax 02 9910 6201 customerservice@envirolab.com.au www.envirolab.com.au

### **CERTIFICATE OF ANALYSIS 252055**

Client Details	
Client	EMM Consulting Pty Ltd
Attention	Daniel Condon
Address	188 Normanby Rd, SOUTHBANK, VIC, 3006

Sample Details	
Your Reference	S100512, Balranald T3 Ancillary
Number of Samples	1 water
Date samples received	24/09/2020
Date completed instructions received	24/09/2020

### **Analysis Details**

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details		
Date results requested by	01/10/2020	
Date of Issue	03/12/2020	
NATA Accreditation Number 2901. T	his document shall not be reproduced except in full.	
Accredited for compliance with ISO/I	EC 17025 - Testing. Tests not covered by NATA are denoted with *	

**Results Approved By** 

Hannah Nguyen, Senior Chemist Ken Nguyen, Reporting Supervisor Priya Samarawickrama, Senior Chemist **Authorised By** 

Nancy Zhang, Laboratory Manager



HM in water - dissolved		
Our Reference		252055-1
Your Reference	UNITS	QA201
Date Sampled		18/09/2020
Type of sample		water
Date prepared	-	28/09/2020
Date analysed	-	28/09/2020
Arsenic-Dissolved	μg/L	3
Cadmium-Dissolved	μg/L	<0.1
Chromium-Dissolved	μg/L	2
Copper-Dissolved	μg/L	<1
Lead-Dissolved	μg/L	<1
Mercury-Dissolved	μg/L	<0.05
Nickel-Dissolved	μg/L	8
Zinc-Dissolved	μg/L	6

Ion Balance		
Our Reference		252055-1
Your Reference	UNITS	QA201
Date Sampled		18/09/2020
Type of sample		water
Date prepared	-	24/09/2020
Date analysed	-	24/09/2020
Calcium - Dissolved	mg/L	580
Potassium - Dissolved	mg/L	27
Sodium - Dissolved	mg/L	13,000
Magnesium - Dissolved	mg/L	1,400
Hydroxide Alkalinity (OH <sup>-</sup> ) as CaCO <sub>3</sub>	mg/L	<5
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	340
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	340
Sulphate, SO4	mg/L	4,000
Chloride, Cl	mg/L	21,000
Ionic Balance	%	1.0

Miscellaneous Inorganics		
Our Reference		252055-1
Your Reference	UNITS	QA201
Date Sampled		18/09/2020
Type of sample		water
Date prepared	-	25/09/2020
Date analysed	-	25/09/2020
Ferrous Iron	mg/L	2.8
Sulphide	mg/L	<0.5

Radioactivity Analysis report		
Our Reference		252055-1
Your Reference	UNITS	QA201
Date Sampled		18/09/2020
Type of sample		water
Date prepared	-	30/11/2020
Date analysed	-	02/12/2020
Radium-226	Bq/L	#
Radium-228	Bq/L	#

Method ID	Methodology Summary
Ext-041	Analysed by Australian Government - Australian Radiation Protection and Nuclear Safety Agnency. VIC. Radium 226 is determined by liquid scintiallation counting. Radium 228 is measured by high resolution gamma-ray spectrometry.
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 10% ie total anions = total cations +/-10%.
Inorg-051	Sulphide determined titrimetrically based on APHA latest edition 4500 S2- F. Note, the Sulphide is termed as Total Sulphide given any Sulphide contained in any sediment present is also included in the determination.
Inorg-076	Ferrous Iron is determined colourimetrically by discrete analyser. Waters samples are filtered on receipt prior to analysis.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis.  Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.

QUALITY CO	NTROL: HI	/l in water	Du	plicate		Spike Recovery %				
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date prepared	-			28/09/2020	[NT]		[NT]	[NT]	28/09/2020	
Date analysed	-			28/09/2020	[NT]		[NT]	[NT]	28/09/2020	
Arsenic-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	101	
Cadmium-Dissolved	μg/L	0.1	Metals-022	<0.1	[NT]		[NT]	[NT]	97	
Chromium-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	105	
Copper-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	106	
Lead-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	100	
Mercury-Dissolved	μg/L	0.05	Metals-021	<0.05	[NT]		[NT]	[NT]	109	
Nickel-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	103	
Zinc-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	103	

QUALI	TY CONTRO	Du	plicate		Spike Re	covery %				
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			24/09/2020	[NT]		[NT]	[NT]	24/09/2020	
Date analysed	-			24/09/2020	[NT]		[NT]	[NT]	24/09/2020	
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	99	
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	86	
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	87	
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	96	
Hydroxide Alkalinity (OH <sup>-</sup> ) as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	103	
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]		[NT]	[NT]	111	
Chloride, Cl	mg/L	1	Inorg-081	<1	[NT]		[NT]	[NT]	88	

QUALITY COI	NTROL: Mis	cellaneou		Du	plicate		Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			25/09/2020	[NT]		[NT]	[NT]	25/09/2020	
Date analysed	-			25/09/2020	[NT]		[NT]	[NT]	25/09/2020	
Ferrous Iron	mg/L	0.05	Inorg-076	<0.05	[NT]		[NT]	[NT]	83	
Sulphide	mg/L	0.5	Inorg-051	<0.5	[NT]	[NT]	[NT]	[NT]	98	[NT]

Envirolab Reference: 252055 Revision No: R00 Page | 9 of 12

Result Definiti	ons							
NT	Not tested							
NA	Test not required							
INS	Insufficient sample for this test							
PQL	Practical Quantitation Limit							
<	Less than							
>	Greater than							
RPD	Relative Percent Difference							
LCS	Laboratory Control Sample							
NS	Not specified							
NEPM	National Environmental Protection Measure							
NR	Not Reported							

<b>Quality Contro</b>	Quality Control Definitions											
Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.											
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.											
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spil is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.											
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.											
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.											

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

#### **Laboratory Acceptance Criteria**

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

# **Report Comments**

Radioactivity analysed by SGS. Report no. ME316670 #View attached external report.

Envirolab Reference: 252055
Revision No: R00
Page | 12 of 12

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C. O'CE, USAN EST Brann Rest Broate 8 & 40% Prog 6 \$450 080 U = -561000 1 \$400 000  STROBENATOR EST BRANN COLOURS PRO O'CEAST PETER ER OND MARKING COLOURS PRO O'CEAST PETER ER OND MARKING BRANN COLOURS PRO O'CEAST PETER ER OND MARKING BRANN COLOURS PRO O'CEAST PETER ER OND MARKING BRANN COLOURS PRO O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETER ER O'CEAST PETE			PROJECT NO.:					lling.com.zu; kbrodie@enmeons	mau		Water(W)	OATE /TMAE			18/11/2020 8:30	18/11/2020 8:10	18/11/2020 12:10	18/11/2020 12:30	17/11/2020 12:40	17/11/2020 13:30	17/11/2020 10:40	17/11/2020 9:45	18/11/2020 10:50	18/11/2020 11:20	18/11/2020 8:30	18/11/2020 8:30	18/1/2020 0:00	18/11/2020 0:00	17/11/2020 11:00		
CHAIN OF CUSTOOY ALS Lebratory: plasse Gak →	20	StLeonards	Illary		Sibbons	iti Bull		Emai Raports to: pgibbons@emnconvuling.com.au; dcondon@emnconvuling.com.au; kb todis@emnconvuling.com.au	Entail Invoice to: secounts@emmconsuling.cem.zu, pgbbens@ermconsuling.com.au	COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:	SAMPLE DETAILS	CIPTAINS			UGM-M8D	UGM-M8S	UGM-M12D	UGM-M12S	BH-M17D	BH-M17S	BH-M18D	BH-M18S	BH-M21D	BH-M21S	QA1		Trip Blank 1	Trip Blank 2	RB5	Trip spike	Titler Contributor Codition P. B. I Issuer and Clinica. N. B. With Dr.
C.	CLIENT: EMM CONSULTING	OFFICE: 20 Chandos Street, St Leonards	PROJECT: Baironald T3 Anelliary	PURCHASE ORDER:	PROJECT MANAGER: Paul Gibbons	SAMPLER: Kaidyn Brodie / Bill Bull	COC Emailed to ALS? ( YES )	Email Reports to: pgibbons@	Email Involce to: secounts@es	COMMENTS/SPECIAL HAND	ALS USE ONLY					7	3	.5	-V	<b>5</b> 5.	-	8	5	(1)	=		7	(2)	2	1	ater Container Codes: Palls.

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Wath Contribror Codes: P = Unpreserved Pitatie: N = Nithe Preserved GRQ; SH = 8 Sodam Hydroxida/Cd Preserved Structured Plastic; AG = Anter Glass Unpreserved AP - Aldreight Unpreserved AV - Addreight Unpreserved AV - Addreight Unpreserved AV - Addreight Unpreserved AV - Addreight Unpreserved AV - Addreight Unpreserved AV - Addreight Unpreserved AV - Addreight Unpreserved AV - Addreight Unpreserved AV - Addreight Unpreserved Bottles: ST = FOOA Visi Sodium Bissiphale Preserved Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = Structured Bottles: ST = ST

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**Envirolab Services Pty Ltd** 

ABN 37 112 535 645 12 Ashley St Chatswood NSW 2067 ph 02 9910 6200 fax 02 9910 6201 customerservice@envirolab.com.au www.envirolab.com.au

#### **CERTIFICATE OF ANALYSIS 256648**

Client Details	
Client	EMM Consulting Pty Ltd
Attention	P Gibbons
Address	188 Normanby Rd, SOUTHBANK, VIC, 3006

Sample Details	
Your Reference	S190512, Balranald T3 Ancillary
Number of Samples	1 water
Date samples received	25/11/2020
Date completed instructions received	25/11/2020

## **Analysis Details**

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details								
Date results requested by	02/12/2020							
Date of Issue	16/12/2020							
NATA Accreditation Number 2901. T	NATA Accreditation Number 2901. This document shall not be reproduced except in full.							
Accredited for compliance with ISO/II	EC 17025 - Testing. Tests not covered by NATA are denoted with *							

**Results Approved By** 

Loren Bardwell, Senior Chemist Nancy Zhang, Laboratory Manager, Sydney Priya Samarawickrama, Senior Chemist Authorised By

Nancy Zhang, Laboratory Manager



HM in water - dissolved						
Our Reference		256648-1				
Your Reference	UNITS	QC1				
Date Sampled		18/11/2020				
Type of sample		water				
Date prepared	-	27/11/2020				
Date analysed	-	27/11/2020				
Arsenic-Dissolved	μg/L	<1				
Cadmium-Dissolved	μg/L	<0.1				
Chromium-Dissolved	μg/L	<1				
Copper-Dissolved	μg/L	<1				
Lead-Dissolved	μg/L	<1				
Mercury-Dissolved	μg/L	<0.05				
Nickel-Dissolved	μg/L	<1				
Zinc-Dissolved	μg/L	<1				

Ion Balance						
Our Reference		256648-1				
Your Reference	UNITS	QC1				
Date Sampled		18/11/2020				
Type of sample		water				
Date prepared	-	25/11/2020				
Date analysed	-	25/11/2020				
Calcium - Dissolved	mg/L	460				
Potassium - Dissolved	mg/L	58				
Sodium - Dissolved	mg/L	14,000				
Magnesium - Dissolved	mg/L	2,000				
Hydroxide Alkalinity (OH <sup>-</sup> ) as CaCO <sub>3</sub>	mg/L	<5				
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	390				
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	<5				
Total Alkalinity as CaCO <sub>3</sub>	mg/L	390				
Sulphate, SO4	mg/L	3,400				
Chloride, Cl	mg/L	19,000				
Ionic Balance	%	14				

Miscellaneous Inorganics											
Our Reference		256648-1									
Your Reference	UNITS	QC1									
Date Sampled		18/11/2020									
Type of sample		water									
Date prepared	-	26/11/2020									
Date analysed	-	26/11/2020									
Ferrous Iron	mg/L	2.2									
Sulphide	mg/L	<0.5									

Radioactivity Analysis report		
Our Reference		256648-1
Your Reference	UNITS	QC1
Date Sampled		18/11/2020
Type of sample		water
Date prepared	-	14/12/2020
Date analysed	-	14/12/2020
Gross Alpha	Bq/L	0.0510
Gross Beta	Bq/L	0.0620

Method ID	Methodology Summary
External data	Field data provided by client
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 10% ie total anions = total cations +/-10%.
Inorg-051	Sulphide determined titrimetrically based on APHA latest edition 4500 S2- F. Note, the Sulphide is termed as Total Sulphide given any Sulphide contained in any sediment present is also included in the determination.
Inorg-076	Ferrous Iron is determined colourimetrically by discrete analyser. Waters samples are filtered on receipt prior to analysis.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis.  Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.

QUALITY CO	NTROL: HI	/l in water	- dissolved			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			27/11/2020	[NT]		[NT]	[NT]	27/11/2020	
Date analysed	-			27/11/2020	[NT]		[NT]	[NT]	27/11/2020	
Arsenic-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	97	
Cadmium-Dissolved	μg/L	0.1	Metals-022	<0.1	[NT]		[NT]	[NT]	98	
Chromium-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	98	
Copper-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	99	
Lead-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	100	
Mercury-Dissolved	μg/L	0.05	Metals-021	<0.05	[NT]		[NT]	[NT]	111	
Nickel-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	97	
Zinc-Dissolved	μg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	103	

QUALI	TY CONTRO	L: Ion Ba	alance			Du	plicate		Spike Red	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			25/11/2020	[NT]		[NT]	[NT]	25/11/2020	
Date analysed	-			25/11/2020	[NT]		[NT]	[NT]	25/11/2020	
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	105	
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	118	
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	100	
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]		[NT]	[NT]	104	
Hydroxide Alkalinity (OH-) as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Carbonate Alkalinity as CaCO₃	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	[NT]	
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	[NT]		[NT]	[NT]	105	
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]		[NT]	[NT]	119	
Chloride, Cl	mg/L	1	Inorg-081	<1	[NT]		[NT]	[NT]	88	

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			26/11/2020	[NT]		[NT]	[NT]	26/11/2020	
Date analysed	-			26/11/2020	[NT]		[NT]	[NT]	26/11/2020	
Ferrous Iron	mg/L	0.05	Inorg-076	<0.05	[NT]		[NT]	[NT]	86	
Sulphide	mg/L	0.5	Inorg-051	<0.5	[NT]	[NT]	[NT]	[NT]	90	[NT]

Result Definiti	ons					
NT	ot tested					
NA	Test not required					
INS	Insufficient sample for this test					
PQL	Practical Quantitation Limit					
<	Less than					
>	Greater than					
RPD	elative Percent Difference					
LCS	aboratory Control Sample					
NS	Not specified					
NEPM	National Environmental Protection Measure					
NR	Not Reported					

<b>Quality Contro</b>	ol Definitions
Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

#### **Laboratory Acceptance Criteria**

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

# **Report Comments**

Sulfide

Samples were out of the recommended holding time for this analysis.

Radioactivity analysed by SGS report ME317713 R0

Result reported from SGS as below

Gross Alpha Bq/L 0.01 0.051 ±0.027 Gross Beta Bq/L 0.01 0.062 ±0.044

# Appendix C

Groundwater sampling QA/QC reports









Project number:	S190512		Matrix type:	Water			
Client:	Iluka Resources	Limited	Samples analysed:	BH-M16D, BH-M16S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, UGM-M1D, UGM-M1S, UGM-M6D, UGM-M6S, BH-M21S, BH-M21D, UGM-M12D, UGM-M12S, UGM-M4D, UGM-M2S, UGM-M2D, UGM-M8S, UGM-M8D, BH-M17D, BH-M17S, LPSPB04, UGM-M15S, UGM-M15D, UGM-M18S, UGM-M18D, QC101, QC201, QC100, QC200, RB100			
Site(s):	Balranald, NSW		Laboratory:	ALS Environmental (Primary) Envirolab, SGS (Secondary)			
Sampling Events:	Round 1, 21-28	April 2020	Lab reference:	EM2006908, ES2014654 (ALS) 241966 (Envirolab, SGS)			
Validation by:	B Bull		Date:	05/08/2020			
Verification by:	D Condon		Date:	05/08/2020			
Field QA/QC							
Sampling personne	2	Round 1 grou 2020.	undwater sampling w	ras conducted by K Brodie and H Noakes on 21 to 28 April			
Sampling Methodo	logy	Groundwate	r samples were obtai	ned via low flow purging method.			
Chain of Custody (0	COC)	Chain of cust	cody documents were	e completed by EMM (K Brodie and H Noakes).			
Analysis Request		Laboratory a	nalysis request and s	ample receipt notification reviewed and approved by EMM.			
Field Blanks		No field blan	ks were analysed as ¡	part of this assessment.			
Rinsate Blanks (RB100)		One rinsate blank was collected during the sampling event. The rinsate sample was collected from the groundwater pump. All reported concentrations were below the laboratory limit of reporting (LOR) for all analytes tested.					
Trip Blanks		No trip blanks were analysed as part of this assessment.					
Trip Spikes		No trip spikes were analysed as part of this assessment.					
Intra-laboratory an interlaboratory dup (QC100, QC101, QC	plicates	Intra- and inter-laboratory field duplicate samples were collected at a frequency of at least one per twenty primary samples (two of each).					
Handling and prese	ervation	All samples were received at the laboratories in appropriate sample containers.  Water samples were received preserved and chilled at the laboratories (4.6°C, 0.8°C). These temperatures are within the recommended range for chemical analysis. (< 6°C).					
Laboratory QA/QC							
Tests requested/re	ported	Samples wer	e analysed and repor	ted as requested on the COC.			
Holding time comp	liance	Samples wer	e extracted and analy	ysed within recommended holding times for all analytes.			
Laboratory Accreditation lab)		lab) and Envi	The laboratory analysis was conducted by ALS Environmental Pty Ltd in Melbourne (primary lab) and Envirolab Services Pty Ltd in Sydney (secondary lab), which are both both National Association of Testing Authorities (NATA) accredited laboratories.				
Frequency of labor	atory QC	The laboratories reported a sufficient frequency of quality control samples to assess whether the results have been reported to an acceptable accuracy and precision.  The primary laboratory noted that the frequency of laboratory duplicates samples for the following analytes did not meet the expected rate as specified in the ASC NEPM:  Laboratory duplicates:  Radium 226 and radium 228 activity (0 of 10%)					

Project number:	S190512		Matrix type:	Water			
Client:	Iluka Resources	Limited	Samples analysed:	BH-M16D, BH-M16S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, UGM-M1D, UGM-M1S, UGM-M6D, UGM-M6S, BH-M21S, BH-M21D, UGM-M12D, UGM-M12S, UGM-M4D, UGM-M2S, UGM-M2D, UGM-M8S, UGM-M8D, BH-M17D, BH-M17S, LPSPB04, UGM-M15S, UGM-M15D, UGM-M18S, UGM-M18D, QC101, QC201, QC100, QC200, RB100			
Site(s):	Balranald, NSW		Laboratory:	ALS Environmental (Primary) Envirolab, SGS (Secondary)			
Sampling Events:	Round 1, 21-28	April 2020	Lab reference:	EM2006908, ES2014654 (ALS)			
				241966 (Envirolab, SGS)			
Validation by:	B Bull		Date:	05/08/2020			
Verification by:	D Condon	D Condon		05/08/2020			
-		Lahoratory	control samples:				
	•	ha and beta activity (	8.7 of 10%)				
	Radium 226 and radium 228 activity (4.35 of 5%)						
		Matrix Spikes					
	Dissolved metals by ICP-MS (0 of 5%)						
		It is noted t	hat laboratory duplica ed from SGS, satisfying small sample batch siz	ate sample results for radium 226 and radium 228 activity were g the frequency criteria. The other frequency exceedances are e and are not expected to significantly affect the overall			
Method Blank		Method bla	nk concentrations we	re not detected above the LOR for all analytes.			
Laboratory duplica	ate RPDs	Laboratory all analytes		e Percentage Differences (RPD) were within control limits for			
Laboratory contro	l spike recovery	exceedance	One LCS outlier was noted. A gross alpha analysis reported a recovery spike of 102%, in exceedance of the 98-100% limits. This exceedance is not expected to have an impact on the integrity of the data.				
				ere reported) were within control limits with the exception of und level was greater than or equal to four times the spike			
		• Anonyme	ous – Sulfate as SO4				
Matrix spike recov	uoru	• Anonyme	ous – Chloride				
Matrix spike recov	rery	• UGM-M1	LSS – Sulfate as SO4				
			L5S – Chloride				
			•	covery less than lower data quality objective)			
			A/QC met control limit lata integrity.	s, these exceptions are not expected to have a material			
Surrogate spike re	covery	Surrogate s	pike recoveries were v	within control limits.			
Data Validation							
Comparison of Fie and Laboratory Re		No anomalo	ous results between fi	eld observations and analysis results were noted.			
Data transcription			heck of the laboratory	results identified no anomalies between the electronic data, seenerated by EMM.			

Project number:	S190512	Matrix type:	Water
Client:	Iluka Resources Limited	Samples analysed:	BH-M16D, BH-M16S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, UGM-M1D, UGM-M1S, UGM-M6D, UGM-M6S, BH-M21S, BH-M21D, UGM-M12D, UGM-M12S, UGM-M4D, UGM-M2S, UGM-M2D, UGM-M8S, UGM-M8D, BH-M17D, BH-M17S, LPSPB04, UGM-M15S, UGM-M15D, UGM-M18S, UGM-M18D, QC101, QC201, QC100, QC200, RB100
Site(s):	Balranald, NSW	Laboratory:	ALS Environmental (Primary)
			Envirolab, SGS (Secondary)
Sampling Events:	Round 1, 21-28 April 2020	Lab reference:	EM2006908, ES2014654 (ALS)
			241966 (Envirolab, SGS)
Validation by:	B Bull	Date:	05/08/2020
Verification by:	D Condon	Date:	05/08/2020

Limits of Reporting (LOR)

LORs were sufficiently low to enable assessment against adopted guideline criteria.

All intra-laboratory field duplicate RPDs were reported within control limits with the exception of the following:

- QC100
  - Ionic balance (131%)

Intra-laboratory duplicate RPDs (QC100, QC101)

- QC101
  - Gross alpha (34%)
  - Ionic balance (35%)

Although the values are different, these intra-laboratory RPD exceedances are not expected to impact the overall data quality of the batch. As a conservative measure, the highest results will be used for reporting purposes and consideration should be taken when interpreting data for gross alpha and ionic balance from this batch.

Inter-laboratory field duplicate RPDs were reported within control limits with the exception of the following:

• QC201

Inter-laboratory duplicate RPDs (QC200, QC201)

- Gross alpha (33%)
- Ionic balance (46%)

Although the values are different, these inter-laboratory RPD exceedances are not expected to impact the overall data quality of the batch. As a conservative measure, the highest results will be used for reporting purposes and consideration should be taken when interpreting data for gross alpha and ionic balance from this batch.

#### Chromatograms

Not requested.

#### Comments

The assessment of field and laboratory QA/QC data indicated that the reported analytical results are representative of the conditions at the sample locations analysed and that the overall quality of the data produced is considered to be acceptably reliable for the purpose of this investigation. Despite the minor variations/outliers summarised above, the laboratory data are considered to provide and appropriate level of confidence in the accuracy, comparability, completeness and precision of the analytical results.

Project number:	S190512		Matrix type:	Water		
Client:	Iluka Resources	Limited	Samples analysed:	UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D, UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA100, QA200, QA101, QA201, TS, TB, QA300, QA301, QA302, QA303, QA304, QA305, Trip Spike Control,		
Site(s):	Balranald, NSW	,	Laboratory:	ALS Environmental (Primary)		
				Envirolab (Secondary)		
Sampling Events:	Round 2, 19-24	August 2020	Lab reference:	EM2014666, ES2030077 (ALS)		
				22545 (Envirolab)		
Validation by:	B Bull		Date:	21/09/2020		
Verification by:	D Condon		Date:	01/10/2020		
Field QA/QC						
Sampling personne	el	Round 2 gro 2020.	undwater sampling w	vas conducted by K Brodie and H Noakes on 19 to 24 August		
Sampling Methodo	ology	Groundwate	er samples were obtai	ned via low flow purging method.		
Chain of Custody (	COC)	Chain of cus	tody documents were	e completed by EMM (K Brodie and H Noakes).		
Analysis Request		Laboratory a	analysis request and s	ample receipt notification reviewed and approved by EMM.		
Field Blanks		No field blar	nks were analysed as	part of this assessment.		
Rinsate Blanks (QA300, QA301, Q QA304, QA305)	A302, QA303,	rinsate samp	ate blanks were collected during the sampling event, one on each day of sampling. The samples were collected from the groundwater pump. All reported concentrations were the laboratory limit of reporting (LOR) for all analytes tested in each sample.			
Trip Blanks (TB)		•	blank was included with each set of eskies sent to the laboratory for analysis for a total trip blanks. The trip blanks were prepared by the laboratory.			
Trip Spikes (TS)			pike was included with each set of eskies sent to the laboratory for analysis for a total rip spikes. The trip spikes were prepared by the laboratory.			
Intra-laboratory ar interlaboratory du (QA100, QA200, Q	plicates		ter-laboratory field d orimary samples (two	uplicate samples were collected at a frequency of at least one of each).		
Handling and preservation Water samp		oles were received at the laboratories in appropriate sample containers.  amples were received preserved and chilled at the laboratories (0 to 1 °C). These atures are within the recommended range for chemical analysis. (< 6°C).				
Laboratory QA/Q(						
Tests requested/re	eported	Samples we	re analysed and repor	rted as requested on the COC.		
Holding time comp	nliance	extracted an	id analysed within red	anks, trip spikes and interlaboratory duplicates, were commended holding times for all analytes. repared previously by the laboratory but were 12 to 21 days		
Holding time comp	mance	overdue at the time of analysis.  The forwarding of the interlaboratory duplicates was delayed and due to this the holding times for sulphide, ferrous iron and alkalinity testing were exceeded.				
Laboratory Accred	itation	lab) and Env	ory analysis was conducted by ALS Environmental Pty Ltd in Melbourne (primary virolab Services Pty Ltd in Sydney (secondary lab), which are both National of Testing Authorities (NATA) accredited laboratories.			

Project number:	S190512		Matrix type:	Water				
Client:	Iluka Resource	s Limited	Samples analysed:	UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D, UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA100, QA200, QA101, QA201, TS, TB, QA300, QA301, QA302, QA303, QA304, QA305, Trip Spike Control,				
Site(s):	Balranald, NSW	I	Laboratory:	ALS Environmental (Primary)				
				Envirolab (Secondary)				
Sampling Events:	Round 2, 19-24	August 2020	Lab reference:	EM2014666, ES2030077 (ALS)				
				22545 (Envirolab)				
Validation by:	B Bull		Date:	21/09/2020				
Verification by:	D Condon		Date:	01/10/2020				
				ient frequency of quality control samples to assess whether an acceptable accuracy and precision.				
			The primary laboratory noted that the frequency of laboratory duplicates samples for the following analytes did not meet the expected rate as specified in the ASC NEPM:					
		Laboratory control samples:						
Fraguancy of Johan	ratary OC	<ul> <li>Gross alp</li> </ul>	ha and beta activity (6	5.9 of 10%)				
Frequency of labor	atory QC	Matrix Spike	0.5					
		,	•					
		<ul> <li>Dissolved metals by ICP-MS (0 of 5%)</li> <li>Total metals by ICP-MS (0 of 5%)</li> </ul>						
		These frequency exceedances are due to the small sample batch size and are not expected to						
			cantly affect the overall quality of the data.					
Method Blank		Method blar	nk concentrations we	re not detected above the LOR for all analytes.				
Laboratory duplica	te RPDs	Laboratory of all analytes.	Laboratory duplicate (LD) Relative Percentage Differences (RPD) were within control limits for all analytes.					
Laboratory control	spike recovery	No laborato	ry control spike outlie	ers were noted.				
				ere reported) were within control limits with the exception of und level was greater than or equal to four times the spike				
		• QA200 –	Sulfate as SO4 – Turbi	dimetric				
		• BH-M20D	– Sulfate as SO4 – Tu	ırbidimetric				
			ous – Chloride					
Matrix spike recovery			– Chloride					
				covery less than lower data quality objective)				
				overy less than lower data quality objective)				
			ous – C6-C9 Fraction ous – C6-C10 Fraction					
			ous – Benzene					
As other Q			er QA/QC met control limits, these exceptions are not expected to have a material on data integrity.					
				s, these exceptions are not expected to have a material				

Project number:	S190512		Matrix type:	Water			
Client:	Iluka Resources Limited		Samples analysed:	UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D, UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA100, QA200, QA101, QA201, TS, TB, QA300, QA301, QA302, QA303, QA304, QA305, Trip Spike Control,			
Site(s):	Balranald, NSW		Laboratory:	ALS Environmental (Primary) Envirolab (Secondary)			
Sampling Events:	Round 2, 19-24	August 2020	Lab reference:	EM2014666, ES2030077 (ALS)			
		7 148431 2020		22545 (Envirolab)			
Validation by:	B Bull		Date:	21/09/2020			
Verification by:	D Condon		Date:	01/10/2020			
Data Validation	2 00114011						
	ld Observations						
Comparison of Fiel and Laboratory Re		No anomalous results between field observations and analysis results were noted.					
Data transcription			A random check of the laboratory results identified no anomalies between the electronic data, the laboratory reports, and tables generated by EMM.				
Limits of Reporting (LOR) LOR		LORs were s	ufficiently low to ena	ble assessment against adopted guideline criteria.			
		All intra-laboratory field duplicate RPDs were reported within control limits with the exception of the following:					
		• QA100					
		- Ionic balance (105%)					
Intra-laboratory du	ирисате кирѕ	• QA201					
(QA100, QA101)		- Ionic balance (41%)					
		Although the values are different, these intra-laboratory RPD exceedances are not expected to impact the overall data quality of the batch. As a conservative measure, the highest results will be used for reporting purposes and consideration should be taken when interpreting data for ionic balance from this batch.					
		the followin		PDs were reported within control limits with the exception of			
		• QC201	······ (220/)				
Inter-laboratory du	uplicate RPDs		ium (32%) alance (71%)				
(QA201)			,	those inter laboratory PDD evendances are not eveneted to			
		Although the values are different, these inter-laboratory RPD exceedances are not expected to impact the overall data quality of the batch. As a conservative measure, the highest results will be used for reporting purposes and consideration should be taken when interpreting data for potassium and ionic balance from this batch.					
Chromatograms							

Not requested.

## Comments

The assessment of field and laboratory QA/QC data indicated that the reported analytical results are representative of the conditions at the sample locations analysed and that the overall quality of the data produced is considered to be acceptably reliable for the purpose of this investigation. Despite the minor variations/outliers summarised above, the laboratory data are considered to provide and appropriate level of confidence in the accuracy, comparability, completeness and precision of the analytical results.

Project number:	S190512		Matrix type:	Water		
Client:	Iluka Resources	s Limited	Samples analysed:	UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D, UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA100, QA200, QA101, QA201, TS x 3, TB100, TB200, TB300, TB100, TB200, TB300, TB4, TB5, RB100, RB200, RB300, RB400, RB600, RB700, RB800		
Site(s):	Balranald, NSW		Laboratory:	ALS Environmental (Primary) Envirolab (Secondary)		
Sampling Events:	Round 2, 19-24	August 2020	Lab reference:	EM2016060, EM2016426, ES2033456 (ALS)		
Sampling Events: Round 2, 19-24		7148431 2020		22604, 252055 (Envirolab)		
Validation by:	B Bull		Date:	08/10/2020		
Verification by:	D Condon		Date:			
Field QA/QC						
Sampling personne	5	Round 2 gro September 2		ras conducted by K Brodie and B Bull/L Griffiths on 11 to 21		
Sampling Methodo	ology	Groundwate	er samples were obtai	ned via low flow purging method.		
Chain of Custody (	COC)	Chain of cus	Chain of custody documents were completed by EMM (K Brodie and B Bull/L Griffiths).			
Analysis Request		Laboratory a	inalysis request and s	ample receipt notification reviewed and approved by EMM.		
Field Blanks		No field blar	ıks were analysed as <sub>l</sub>	part of this assessment.		
Rinsate Blanks (RB100, RB200, RB100, RB400, RB600, RB700, RB800)		The rinsate s were observ  RB100  Coppet  RB200  Coppet  Nickel:  Lead: C  Zinc: 0.  RB100  Coppet  Lead: C  RB100  Coppet  Coppet  Coppet  Coppet  Coppet  Coppet  Coppet  Coppet  Coppet  Coppet  Coppet  Coppet  Coppet  Coppet  Coppet  Coppet  Coppet	samples were collected in the rinsate blands:  c: 0.003 mg/L  0.008 mg/L  0.006 mg/L  0.034 mg/L  569 mg/L  c: 0.030 mg/L	ed during the sampling event, one on each day of sampling. ed from the groundwater pump. The following exceedances iks:		

Project number:	S190512		Matrix type:	Water	
Client:	Iluka Resources	Limited	Samples analysed:	UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D, UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA100, QA200, QA101, QA201, TS x 3, TB100, TB200, TB300, TB100, TB200, TB300, TB4, TB5, RB100, RB200, RB300, RB400, RB600, RB700, RB800	
Site(s):	Balranald, NSW		Laboratory:	ALS Environmental (Primary)	
				Envirolab (Secondary)	
Sampling Events:	Round 2, 19-24	August 2020	Lab reference:	EM2016060, EM2016426, ES2033456 (ALS) 22604, 252055 (Envirolab)	
Validation by:	B Bull		Date:	08/10/2020	
Verification by:	D Condon		Date:		
Trip Blanks (TB100 TB100, TB200, TB3		<ul> <li>RB800         <ul> <li>Copper: 0.006 mg/L</li> <li>Lead: 0.002 mg/L</li> <li>Zinc: 0.016 mg/L</li> </ul> </li> <li>EMM will review the decontamination process and undertake the rinsate procedor of trip blank bottles in a sterile environment with appropriate rinsate water suital analysis. Consideration will be taken when interpreting metals results from samp during this monitoring event.</li> <li>One trip blank was included with each set of eskies sent to the laboratory for analof eight trip blanks. The trip blanks were prepared on site by decanting deionised metals sample bottles. The following exceedances were observed in the trip blank.</li> <li>TB100         <ul> <li>Zinc: 0.006 mg/L</li> </ul> </li> <li>TB200         <ul> <li>Zinc: 0.006 mg/L</li> </ul> </li> <li>TB300         <ul> <li>Zinc: 0.007 mg/L</li> </ul> </li> </ul>			
Trip Spikes (TS)			ip spike was included with each set of eskies sent to the laboratory for analysis for a total ee trip spikes. The trip spikes were prepared by the laboratory.		
			ter-laboratory field d orimary samples (two	uplicate samples were collected at a frequency of at least one of each).	
Water sar preserved for chemic Water sar but at ten APHA/NEI		Water samp preserved at for chemical	les for workorders ES t a temperature of 2.8 analysis. (< 6°C).	laboratories in appropriate sample containers.  2033456 and ES2033648 were received by the lab chilled and s°C. These temperatures are within the recommended range	
		but at temp	eratures of 12.8°C and	Λ2016060 and EM2016426 were received with ice present, d 18.2°C respectively. These temperatures are above the or water samples and should be considered when interpreting	
Laboratory QA/Q(					

Project number:	S190512		Matrix type:	Water	
Client:	Iluka Resources Limited		Samples analysed:	UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D, UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA100, QA200, QA101, QA201, TS x 3, TB100, TB200, TB300, TB100, TB200, TB300, TB4, TB5, RB100, RB200, RB300, RB400, RB600, RB700, RB800	
Site(s): Balranald, NSV		1	Laboratory:	ALS Environmental (Primary)	
				Envirolab (Secondary)	
Sampling Events:	Round 2, 19-24	August 2020	Lab reference:	EM2016060, EM2016426, ES2033456 (ALS)	
				22604, 252055 (Envirolab)	
/alidation by:	B Bull		Date:	08/10/2020	
Verification by:	D Condon		Date:		
				ikes and interlaboratory duplicates were extracted and d holding times for all analytes.	
Holding time comp	oliance	The trip spikes were prepared previously by the laboratory but were 40 days overdue at the time of analysis.  The interlaboratory duplicate QA101 was in exceedance of the holding time for sulphide			
			n arrival at the secon		
aboratory Accred	itation	lab) and Env	ory analysis was conducted by ALS Environmental Pty Ltd in Melbourne (primary virolab Services Pty Ltd in Sydney (secondary lab), which are both National of Testing Authorities (NATA) accredited laboratories.		
				ient frequency of quality control samples to assess whether an acceptable accuracy and precision.	
			· ·	t the frequency of laboratory duplicates samples for the he expected rate as specified in the ASC NEPM:	
		Laboratory o	luplicates:		
Frequency of labor	ratory QC	Gross alp	ha and beta activity (0	0 of 10%) – EM2016060	
		Laboratory o	control samples:		
		<ul> <li>Gross alp</li> </ul>	ha and beta activity (	5 of 10%) – EM2016060	
			ency exceedances are affect the overall qua	e due to the small sample batch size and are not expected to ality of the data.	
Method Blank		Method bla	d blank concentrations were not detected above the LOR for all analytes.		
aboratory duplica	ate RPDs	Laboratory of all analytes.	duplicate (LD) Relative Percentage Differences (RPD) were within control limits for .		
·		No laborato	ry control spike outlie	ers were noted.	
		Matrix spike		ere reported) were within control limits with the exception o	
		the following level:	g, where the backgro	und level was greater than or equal to four times the spike	
Matrix spike recov	ery	level: • Anonymo	us – Sulfate as SO4 –	Turbidimetric	
Matrix spike recov	ery	<ul><li>level:</li><li>Anonymo</li><li>BH-M22S</li></ul>	_	Turbidimetric	

Project number:	S190512		Matrix type:	Water	
Client:	Iluka Resources	s Limited	Samples analysed:	UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D, UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA100, QA200, QA101, QA201, TS x 3, TB100, TB200, TB300, TB100, TB200, TB300, TB4, TB5, RB100, RB200, RB300, RB400, RB600, RB700, RB800	
Site(s):	Balranald, NSW	1	Laboratory:	ALS Environmental (Primary)	
				Envirolab (Secondary)	
Sampling Events:	Round 2, 19-24	August 2020	Lab reference:	EM2016060, EM2016426, ES2033456 (ALS)	
				22604, 252055 (Envirolab)	
Validation by:	B Bull		Date:	08/10/2020	
Verification by:	D Condon		Date:		
		<ul> <li>UGM-M2S – Mercury</li> <li>UGM-M1S – Sulfide as S2-</li> <li>Anonymous – Chloride</li> <li>UGM-M15S – Mercury</li> <li>UGM-M15S – Sulfide as S2-</li> <li>UGM-M8D – Sulfate as S04 – Turbidimetric</li> <li>UGM-M8D – Chloride</li> <li>UGM-M8S – Mercury</li> <li>BH-M20D – Ferrous Iron</li> <li>As other QA/QC met control limits, these exceptions are not expected to have a material impact on data integrity.</li> </ul>			
Surrogate spike re	covery	Surrogate sp	oike recoveries were v	within control limits.	
Data Validation					
Comparison of Fie and Laboratory Re		No anomalous results between field observations and analysis results were noted.			
Data transcription		A random check of the laboratory results identified no anomalies between the electronic data, the laboratory reports, and tables generated by EMM.			
Limits of Reporting	g (LOR)	LORs were s	LORs were sufficiently low to enable assessment against adopted guideline criteria.		
Intra-laboratory duplicate RPDs (QA100, QA200)		of the follow QA100 — Ionic b QA200 — Ionic b Although the impact the c be used for i	ving: alance (96.7%) alance (157.9%) e values are different overall data quality of	e RPDs were reported within control limits with the exception  these intra-laboratory RPD exceedances are not expected to the batch. As a conservative measure, the highest results will and consideration should be taken when interpreting data for	

Project number: \$190512 Matrix type: Water

Client: Iluka Resources Limited Samples analysed: UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D,

UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA100, QA200, QA101, QA201, TS x 3, TB100, TB200, TB300, TB100, TB200, TB300, TB4, TB5, RB100, RB200, RB300, RB400, RB600, RB700, RB800

Site(s): Balranald, NSW Laboratory: ALS Environmental (Primary)

Envirolab (Secondary)

Sampling Events: Round 2, 19-24 August 2020 Lab reference: EM2016060, EM2016426, ES2033456 (ALS)

22604, 252055 (Envirolab)

Validation by: B Bull Date: 08/10/2020

Verification by: D Condon Date:

Inter-laboratory field duplicate RPDs were reported within control limits with the exception of the following:

• QA101

Inter-laboratory duplicate RPDs

(QA101, QA201)

Ionic balance (78.9%)

Although the values are different, these inter-laboratory RPD exceedances are not expected to impact the overall data quality of the batch. As a conservative measure, the highest results will be used for reporting purposes and consideration should be taken when interpreting data for potassium and ionic balance from this batch.

## Chromatograms

Not requested.

#### Comments

The assessment of field and laboratory QA/QC data indicated that the reported analytical results are representative of the conditions at the sample locations analysed and that the overall quality of the data produced is considered to be acceptably reliable for the purpose of this investigation. Despite the minor variations/outliers summarised above, the laboratory data are considered to provide and appropriate level of confidence in the accuracy, comparability, completeness and precision of the analytical results.

Project number:	S190512		Matrix type:	Water		
Client:	Iluka Resources	s Limited	Samples analysed:	UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D, UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA1, QA2, QC1, QC2, TRIP BLANK_01, TRIP BLANK_02, TB1, TB2, TB3, TB4, TB5, , RIN_201002, RIN_201003, RB1, RB2, RB3, RB4, RB5, RB6,		
Site(s):	Balranald, NSW	1	Laboratory:	ALS Environmental (Primary)		
				Envirolab (Secondary)		
Sampling Events:	Round 3, 13 – 1 2020	19 October	Lab reference:	ES2035208, EM2018304, ES2036844(ALS)		
				253949 (Envirolab)		
Validation by:	K Brodie		Date:	29/10/2020		
Verification by:	D Condon		Date:			
Field QA/QC						
Sampling personne	el	_	oundwater sampling w d 13 to 19 October 20	vas conducted by D Condon, K Brodie and B Bull on 2 to 3 20.		
Sampling Methodo	ology	Groundwater samples were obtained via low flow purging method and HydraSleeve.				
Chain of Custody (	COC)	Chain of custody documents were completed by EMM (D Condon, K Brodie and B Bull).				
Analysis Request		Laboratory analysis request and sample receipt notification reviewed and approved by EMM.				
Field Blanks		No field bla	nks were analysed as	part of this assessment.		
Rinsate Blanks (RIN_201002, RIN_201003, RB1, RB2, RB3, RB4, RB5, RB6)		Eight rinsate blanks were collected during the sampling event, one on each day of sampling. The rinsate samples were collected from the groundwater pump and the water level meter. All reported concentrations were below the laboratory limit of reporting (LOR) for all analytes tested in each sample.				
Trip Blanks (TRIP B BLANK_02, TB1, TI TB5)		One trip blank was included with each set of eskies sent to the laboratory for analysis for a total of seven trip blanks. The trip blanks were prepared on site by decanting deionised water into metals sample bottles All reported concentrations were below the laboratory limit of reporting (LOR) for all analytes tested in each sample.				
Trip Spikes (TS)		No trip spik	es were analysed as p	art of this assessment.		
Intra-laboratory and interlaboratory duplicates (QA1, QA2, QC1, QC2)		Intra- and inter-laboratory field duplicate samples were collected at a frequency of at least one per twenty primary samples (two of each).				
		All samples were received at the laboratories in appropriate sample containers.				
Handling and pres	ervation	Water samples for workorder ES2035208 was received by the lab with ice present but at a temperature of 7.4°C. This temperature is above the APHA/NEPM recommendations for water samples and should be considered when interpreting the results.				
- '		present, chi	Water samples for workorder EM2018304 and ES2036844 were received by the lab with ice present, chilled and preserved at a temperature of 1.0°C and 1.5°C respectively. These temperatures are within the recommended range for chemical analysis. (< 6°C).			
Laboratory QA/Q(						
Tests requested/re	eported	Samples we	re analysed and repor	rted as requested on the COC.		
Holding time comp	oliance	All sampless analytes.	All sampleswere extracted and analysed within the recommended holding times for all			

Project number:	S190512		Matrix type:	Water		
Client:	Iluka Resources	Limited	Samples analysed:	UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D, UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA1, QA2, QC1, QC2, TRIP BLANK_01, TRIP BLANK_02, TB1, TB2, TB3, TB4, TB5, , RIN_201002, RIN_201003, RB1, RB2, RB3, RB4, RB5, RB6,		
Site(s):	Balranald, NSW		Laboratory:	ALS Environmental (Primary)		
				Envirolab (Secondary)		
Sampling Events:	Round 3, 13 – 19 2020	October 9	Lab reference:	ES2035208, EM2018304, ES2036844(ALS) 253949 (Envirolab)		
Validation by:	K Brodie		Date:	29/10/2020		
Verification by:	D Condon		Date:			
Laboratory Accredi		Date:  The laboratory analysis was conducted by ALS Environmental Pty Ltd in Melbourne and Sydney (primary lab) and Envirolab Services Pty Ltd in Sydney (secondary lab), which are both National Association of Testing Authorities (NATA) accredited laboratories.				
Frequency of laboratory QC		The primary laboratory noted that the frequency of laboratory duplicates samples for the following analytes did not meet the expected rate as specified in the ASC NEPM:  Laboratory duplicates:  Dissolved metals by ICP-MS – Suite A (8.82 of 10%) – EM2018304  These frequency exceedances are due to the small sample batch size and are not expected to significantly affect the overall quality of the data.				
Method Blank		Method blar	nk concentrations we	re not detected above the LOR for all analytes.		
Laboratory duplica	te RPDs	Laboratory duplicate (LD) Relative Percentage Differences (RPD) were within control limits for all analytes.				
Laboratory control	spike recovery	No laborato	ry control spike outlie	rs were noted.		
Matrix spike recovery		the following level:	g, where the backgrou	ere reported) were within control limits with the exception of und level was greater than or equal to four times the spike		
Matrix spike recov	ery	<ul><li>QA1 – Sul</li><li>QA1 – Chl</li><li>UGM-M2</li><li>Anonymo</li></ul>	5 – Chloride  – Mercury 5 – Mercury 6 – Sulfide as S2- fate as SO4 – Turbidir oride 6 – Mercury us – Chloride /QC met control limit			

Project number:	S190512		Matrix type:	Water		
Client:	Iluka Resources	Limited	Samples analysed:	UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D, UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA1, QA2, QC1, QC2, TRIP BLANK_01, TRIP BLANK_02, TB1, TB2, TB3, TB4, TB5, , RIN_201002, RIN_201003, RB1, RB2, RB3, RB4, RB5, RB6,		
Site(s):	Balranald, NSW		Laboratory:	ALS Environmental (Primary)		
				Envirolab (Secondary)		
Sampling Events:	Round 3, 13 – 1	9 October	Lab reference:	ES2035208, EM2018304, ES2036844(ALS)		
	2020			253949 (Envirolab)		
Validation by:	K Brodie		Date:	29/10/2020		
Verification by:	D Condon		Date:			
Data Validation						
Comparison of Field and Laboratory Res		No anomalous results between field observations and analysis results were noted.				
Data transcription		A random check of the laboratory results identified no anomalies between the electronic data, the laboratory reports, and tables generated by EMM.				
Limits of Reporting	(LOR)	LORs were s	ufficiently low to ena	ble assessment against adopted guideline criteria.		
Intra-laboratory du			ving:	e RPDs were reported within control limits with the exception		
Intra-laboratory duplicate RPDs (QA1, QA2)		<ul> <li>lonic balance (110.3%)</li> <li>Although the values are different, these intra-laboratory RPD exceedances are not expected to impact the overall data quality of the batch. As a conservative measure, the highest results will be used for reporting purposes and consideration should be taken when interpreting data for ionic balance from this batch.</li> </ul>				
			Inter-laboratory field duplicate RPDs were reported within control limits with the exception of the following:  • QC1			
Inter-laboratory du	nlicate RPDs	- Ionic balance (54.2%)				
•	plicate NFD3	• QC2	alanca (67.0%)			
(QC1, QC2)		<ul> <li>Ionic balance (67.0%)</li> <li>Although the values are different, these inter-laboratory RPD exceedances are not expected to impact the overall data quality of the batch. As a conservative measure, the highest results will be used for reporting purposes and consideration should be taken when interpreting data for ionic balance from this batch.</li> </ul>				

Not requested.

#### Comments

The assessment of field and laboratory QA/QC data indicated that the reported analytical results are representative of the conditions at the sample locations analysed and that the overall quality of the data produced is considered to be acceptably reliable for the purpose of this investigation. Despite the minor variations/outliers summarised above, the laboratory data are considered to provide and appropriate level of confidence in the accuracy, comparability, completeness and precision of the analytical results.

Project number:	S190512		Matrix type:	Water		
Client:	Iluka Resources	Limited	Samples analysed:	UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D, UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA1, QA2, TB1, TB2, TB3, TB4, TB5, RB1, RB2, RB3, RB4, RB5, TS1, TS2		
Site(s):	Balranald, NSW		Laboratory:	ALS Environmental (Primary) Envirolab (Secondary)		
Sampling Events:	Round 5, 13 – 18 November 2020		Lab reference:	EM2020793, ES2041696 (ALS) 23502, 252055, 256648 (Envirolab)		
Validation by:	B Bull		Date:	04/01/2020		
Verification by:	D Condon		Date:			
Field QA/QC						
Sampling personne	el	Round 5 gro November 2		as conducted by K Brodie and B Bull between 13 and 18		
Sampling Methodo	ology	Groundwate	er samples were obtai	ined via low flow purging.		
Chain of Custody (	COC)	Chain of custody documents were completed by EMM (K Brodie and B Bull).				
Analysis Request		Laboratory analysis request and sample receipt notification reviewed and approved by EMM.				
Field Blanks		No field blanks were analysed as part of this assessment.				
Rinsate Blanks (RB1, RB2, RB3, RB4, RB5)		Five rinsate blanks were collected during the sampling event, one on each day of sampling. The rinsate samples were collected from the groundwater pump and the water level meter. All reported concentrations were below the laboratory limit of reporting (LOR) for all analytes tested in each sample except for the following:  • RB3 – Copper: 0.002 mg/L				
		This low-level exceedance (LOR of 0.001 mg/L) is not expected to significantly affect results. Results for samples collected on the same day as RB3 (14 November 2020) will be analysed with consideration of this exceedance.				
			One trip blank was included with each set of eskies sent to the laboratory for analysis for a total of five trip blanks. The trip blanks were prepared on site by decanting deionised water into metals sample bottles. All reported concentrations were below the laboratory limit of reporting (LOR) for all analytes tested in each sample except for the following:			
		• TB1 – Copper: 0.003 mg/L				
Trip Blanks	4 TDE'	• TB2 – Copper: 0.004 mg/L				
(TB1, TB2, TB3, TB	4, TB5)		oper: 0.004 mg/L oper: 0.004 mg/L			
			-			
		<ul> <li>TB5 – Copper: 0.005 mg/L</li> <li>These exceedances suggest that the deionized water used to prepare the samples had a low level of copper contamination. Copper results for all samples will be considered with respect to these exceedances.</li> </ul>				
Trip Spikes (TS1, TS2)			kes were analysed as these samples as expe	part of this assessment. Levels of TRH, BTEXN and TPH were ected.		
Intra-laboratory ar interlaboratory du (QA1, QA2, QC1, C	plicates		Intra- and inter-laboratory field duplicate samples were collected at a frequency of at least one per twenty primary samples (two of each).			
Handling and pres	ervation	All samples	were received at the	laboratories in appropriate sample containers.		
		•		· · · · · · · · · · · · · · · · · · ·		

Project number: S190512 Matrix type: Water

Client: Iluka Resources Limited Samples analysed: UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D,

UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA1, QA2, TB1, TB2, TB3, TB4, TB5, RB1, RB2, RB3, RB4, RB5, TS1,

TS2

Site(s): Balranald, NSW Laboratory: ALS Environmental (Primary)

Envirolab (Secondary)

Sampling Events: Round 5, 13 – 18 November Lab reference: EM2020793, ES2041696 (ALS)

2020

23502, 252055, 256648 (Envirolab)

Validation by:B BullDate:04/01/2020

Verification by: D Condon Date:

Water samples for workorder ES2020793 was received by the lab with ice present but at a temperature of 16.9°C. This temperature is above the APHA/NEPM recommendations for water samples and should be considered when interpreting the results.

Water samples for workorder ES2041696 were received by the lab with ice present, chilled and preserved at a temperature of  $0.1^{\circ}$ C respectively. This temperature is within the recommended range for chemical analysis. (<  $6^{\circ}$ C).

#### Laboratory QA/QC

#### Tests requested/reported

Samples were analysed and reported as requested on the COC.

All samples were extracted and analysed within the recommended holding times for all analytes except for:

- Ferrous iron (8 days overdue)
  - BH-M17D, BH-M17S, BH-M18D, BH-M18S
- Ferrous iron (7 days overdue)
  - UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, BH-M21D, BH-M21S, QA1
- Ferrous iron (5 days overdue)
  - BH-M16D, BH-M16S, BH-M24D, BH-M24S
- Ferrous iron (4 days overdue)
  - BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M22D, BH-M22S, QA2
- Ferrous iron (3 days overdue)
  - UGM-M1D, UGM-M1S, UGM-M4D, UGM-M15S, LPSPB04
- Holding time compliance
- Ferrous iron (2 days overdue)
  - UGM-M2D, UGM-M2S, BH-M23D, BH-M23S, BH-M25D, BH-M25S
- Sulfide as S2- (5 days overdue)
  - BH-M16D, BH-M16S, BH-M24D, BH-M24S
- Sulfide as S2- (4 days overdue)
  - BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M22D, BH-M22S, QA2
- Sulfide as S2- (3 days overdue)
  - UGM-M1D, UGM-M1S, UGM-M4D, UGM-M15S, LPSPB04
- Sulfide as S2- (2 days overdue)
  - $\quad \mathsf{UGM}\text{-}\mathsf{M2D}, \, \mathsf{UGM}\text{-}\mathsf{M2S}, \, \mathsf{BH}\text{-}\mathsf{M23D}, \, \mathsf{BH}\text{-}\mathsf{M23S}, \, \mathsf{BH}\text{-}\mathsf{M25D}, \, \mathsf{BH}\text{-}\mathsf{M25S}$
- Sulfide as S2- (1 day overdue)
  - BH-M17D, MH-M17S, BH-M18D, BH-M18S
- TPH/TRH/BTEXN (14 days overdue)

#### DATA QUALITY ASSURANCE AND QUALITY CONTROL REPORT

Project number:	S190512		Matrix type:	Water			
Client: Iluka Resources Limited  Site(s): Balranald, NSW		Limited	Samples analysed:	UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D, UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA1, QA2, TB1, TB2, TB3, TB4, TB5, RB1, RB2, RB3, RB4, RB5, TS1, TS2			
Site(s):	Balranald, NSW		Laboratory:	ALS Environmental (Primary) Envirolab (Secondary)			
Sampling Events:	Round 5. 13 – 1	8 November	Lab reference:	EM2020793, ES2041696 (ALS)			
2020  Validation by: B Bull  Verification by: D Condon			23502, 252055, 256648 (Envirolab)				
		Date:	04/01/2020				
			Date:	0.1,021,2020			
verification by.	D Collubii	TC4	Date.				
		- TS1	1 days avardual				
		- TS2	1 days overdue)				
The laborat Laboratory Accreditation (primary lab		) and Envirolab Servic	ucted by ALS Environmental Pty Ltd in Melbourne and Sydney ces Pty Ltd in Sydney (secondary lab), which are both National s (NATA) accredited laboratories.				
				cient frequency of quality control samples to assess whether on an acceptable accuracy and precision.			
				t the frequency of laboratory duplicates samples for the he expected rate as specified in the ASC NEPM:			
Frequency of labor	ratory QC	Laboratory o	Laboratory duplicates:				
	•	• Gross alpha and beta activity – Suite A (6.67 of 10%) – ES2041696					
			ency exceedances are affect the overall qua	e due to the small sample batch size and are not expected to ality of the data.			
Method Blank		Method blank concentrations were not detected above the LOR for all analytes.					
Laboratory duplicate RPDs		Laboratory duplicate (LD) Relative Percentage Differences (RPD) were within control limits for all analytes.					
Laboratory contro	I spike recovery	No laborato	ratory control spike outliers were noted.				
		the following level:		ere reported) were within control limits with the exception of und level was greater than or equal to four times the spike			
			ous – Chloride				
		BH-M19D – Chloride					
Matrix spike recov	ery	• UGM-M1	S – Mercury				
,	•	• QA2 – Me	ercury				
		• UGM-M1	S – Sulfide as S2-				
		• QA2 – Su	lfide as S2-				
		• UGM-M8	D – Sulfate as SO4- Tu	urbidimetric			
		• UGM-M8	D – Chloride				
		BH-M18S – Mercury					

S190512 | v1 3

#### DATA QUALITY ASSURANCE AND QUALITY CONTROL REPORT

Site(s):  Balranald, N  Sampling Events: Round 5, 13 2020  Validation by: B Bull  Verification by: D Condon  Surrogate spike recovery  Data Validation  Comparison of Field Observatio and Laboratory Results  Data transcription  Limits of Reporting (LOR)  Intra-laboratory duplicate RPDs (QA1, QA2)  Inter-laboratory duplicate RPDs (QC1, QC2)		Matrix type:	Water				
Sampling Events: Round 5, 13 2020  Validation by: B Bull  Verification by: D Condon  Surrogate spike recovery  Data Validation  Comparison of Field Observatio and Laboratory Results  Data transcription  Limits of Reporting (LOR)  Intra-laboratory duplicate RPDs (QA1, QA2)	ces Limited	Samples analysed:	UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D, UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA1, QA2, TB1, TB2, TB3, TB4, TB5, RB1, RB2, RB3, RB4, RB5, TS1, TS2				
Validation by: B Bull Verification by: D Condon  Surrogate spike recovery  Data Validation  Comparison of Field Observatio and Laboratory Results  Data transcription  Limits of Reporting (LOR)  Intra-laboratory duplicate RPDs (QA1, QA2)	SW	Laboratory:	ALS Environmental (Primary)				
Validation by: B Bull Verification by: D Condon  Surrogate spike recovery  Data Validation  Comparison of Field Observatio and Laboratory Results  Data transcription  Limits of Reporting (LOR)  Intra-laboratory duplicate RPDs (QA1, QA2)			Envirolab (Secondary)				
Verification by: D Condon  Surrogate spike recovery  Data Validation  Comparison of Field Observatio and Laboratory Results  Data transcription  Limits of Reporting (LOR)  Intra-laboratory duplicate RPDs (QA1, QA2)	– 18 November	Lab reference:	EM2020793, ES2041696 (ALS) 23502, 252055, 256648 (Envirolab)				
Verification by: D Condon  Surrogate spike recovery  Data Validation  Comparison of Field Observatio and Laboratory Results  Data transcription  Limits of Reporting (LOR)  Intra-laboratory duplicate RPDs (QA1, QA2)		Date:	04/01/2020				
Surrogate spike recovery  Data Validation  Comparison of Field Observatio and Laboratory Results  Data transcription  Limits of Reporting (LOR)  Intra-laboratory duplicate RPDs (QA1, QA2)		Date:	04/01/2020				
Data Validation  Comparison of Field Observatio and Laboratory Results  Data transcription  Limits of Reporting (LOR)  Intra-laboratory duplicate RPDs (QA1, QA2)							
Data Validation  Comparison of Field Observatio and Laboratory Results  Data transcription  Limits of Reporting (LOR)  Intra-laboratory duplicate RPDs (QA1, QA2)		/QC met control limit ata integrity.	s, these exceptions are not expected to have a material				
Comparison of Field Observation and Laboratory Results  Data transcription  Limits of Reporting (LOR)  Intra-laboratory duplicate RPDs (QA1, QA2)	Surrogate sp	Surrogate spike recoveries were within control limits.					
and Laboratory Results  Data transcription  Limits of Reporting (LOR)  Intra-laboratory duplicate RPDs (QA1, QA2)  Inter-laboratory duplicate RPDs							
Limits of Reporting (LOR)  Intra-laboratory duplicate RPDs (QA1, QA2)  Inter-laboratory duplicate RPDs	ns No anomalo	us results between fi	eld observations and analysis results were noted.				
Intra-laboratory duplicate RPDs (QA1, QA2)  Inter-laboratory duplicate RPDs		A random check of the laboratory results identified no anomalies between the electronic data, the laboratory reports, and tables generated by EMM.					
(QA1, QA2)  Inter-laboratory duplicate RPDs	LORs were s	LORs were sufficiently low to enable assessment against adopted guideline criteria.					
(QA1, QA2)  Inter-laboratory duplicate RPDs		All intra-laboratory field duplicate RPDs were reported within control limits with the exception of the following:					
(QA1, QA2)  Inter-laboratory duplicate RPDs	• QA1						
Inter-laboratory duplicate RPDs	– Ionic b	- Ionic balance (69.2%)					
	impact the o	Although the values are different, these intra-laboratory RPD exceedances are not expected to impact the overall data quality of the batch. As a conservative measure, the highest results will be used for reporting purposes and consideration should be taken when interpreting data for ionic balance from this batch.					
	• QC1  - Gross I  - Potass  - Ionic b  • QC2  - Potass  - Coppe  Although the impact the cobe used for	g:  peta (189.2%)  ium (43.5%)  alance (35.3%)  ium (43.1%)  r (56.4%)  e values are different, overall data quality of	The provided within control limits with the exception of these inter-laboratory RPD exceedances are not expected to the batch. As a conservative measure, the highest results will and consideration should be taken when interpreting data for				
Chromatograms	32 20.0710						
Not requested.							

S190512 | v1 4

Comments

#### DATA QUALITY ASSURANCE AND QUALITY CONTROL REPORT

Project number: S190512 Matrix type: Water

Client: Iluka Resources Limited Samples analysed: UGM-M1D, UGM-M1S, UGM-M2D, UGM-M2S, UGM-M4D,

UGM-M8D, UGM-M8S, UGM-M12D, UGM-M12S, UGM-M15S, BH-M16D, BH-M16S, BH-M17D, BH-M17S, BH-M18D, BH-M18S, BH-M19D, BH-M19S, BH-M20D, BH-M20S, BH-M21D, BH-M21S, BH-M22D, BH-M22S, BH-M23D, BH-M23S, BH-M24D, BH-M24S, BH-M25D, BH-M25S, LPSPB04, QA1, QA2, TB1, TB2, TB3, TB4, TB5, RB1, RB2, RB3, RB4, RB5, TS1,

TS2

Site(s): Balranald, NSW Laboratory: ALS Environmental (Primary)

Envirolab (Secondary)

Sampling Events: Round 5, 13 – 18 November Lab reference: EM2020793, ES2041696 (ALS)

2020

23502, 252055, 256648 (Envirolab)

Validation by: B Bull Date: 04/01/2020

Verification by: D Condon Date:

The assessment of field and laboratory QA/QC data indicated that the reported analytical results are representative of the conditions at the sample locations analysed and that the overall quality of the data produced is considered to be acceptably reliable for the purpose of this investigation. Despite the minor variations/outliers summarised above, the laboratory data are considered to provide and appropriate level of confidence in the accuracy, comparability, completeness and precision of the analytical results.

S190512 | v1 5

# Appendix D

Hydrographs







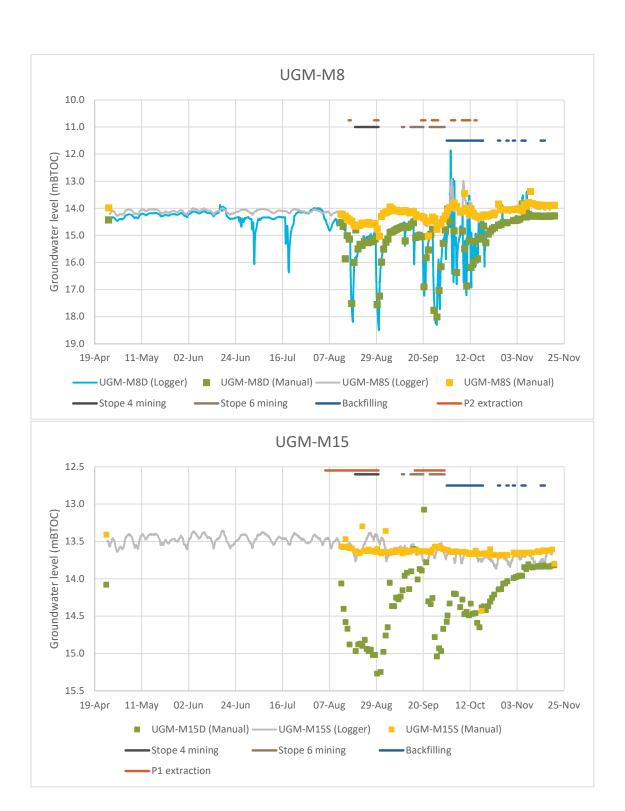






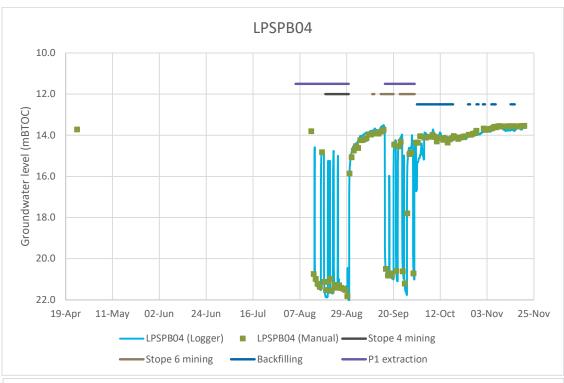
**Figure X.X - Mining zone hydrographs**T3 Hydrogeochemical Assessment

Iluka Resources Limited





**Figure X.X - Transition zone hydrographs**T3 Hydrogeochemical Assessment
Iluka Resources Limited



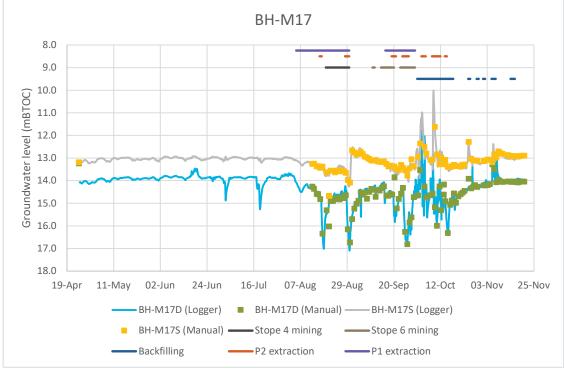
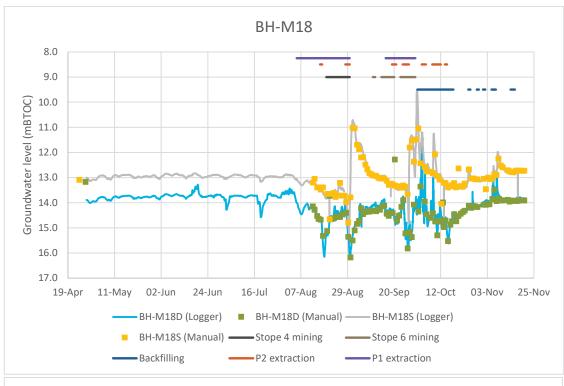
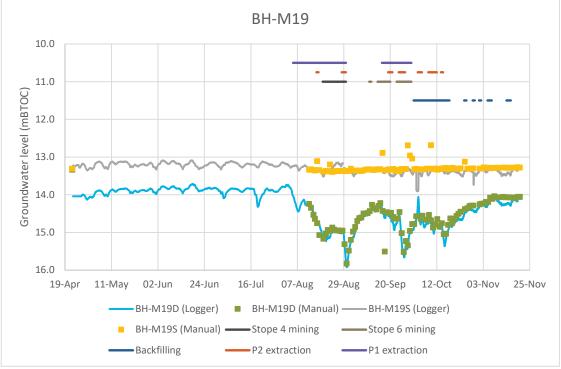




Figure X.X - Transition zone hydrographs

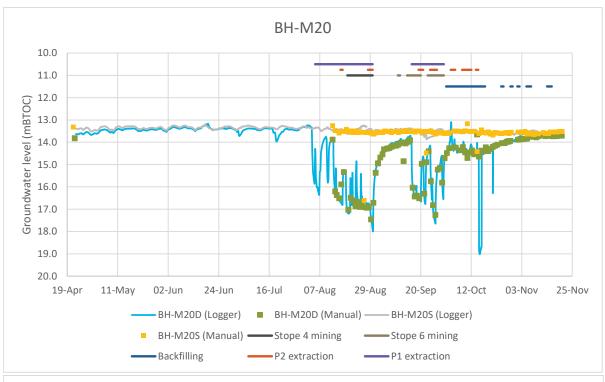
T3 Hydrogeochemical Assessment Iluka Resources Limited







**Figure X.X - Transition zone hydrographs**T3 Hydrogeochemical Assessment
Iluka Resources Limited



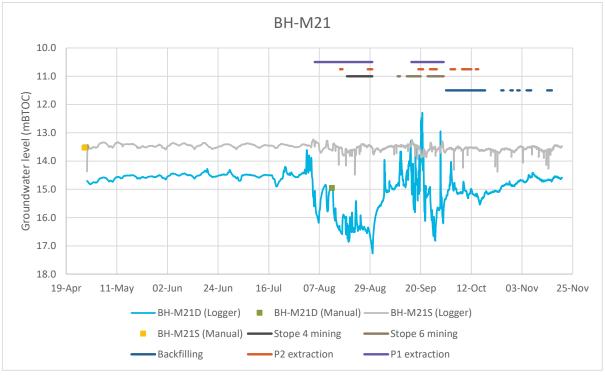
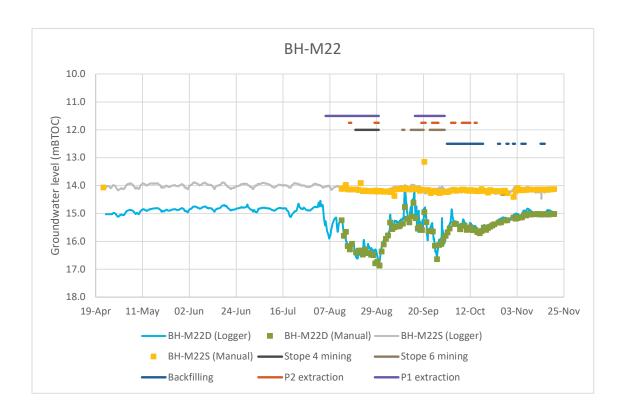
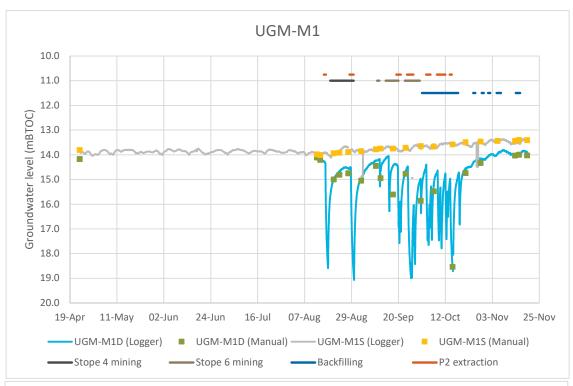


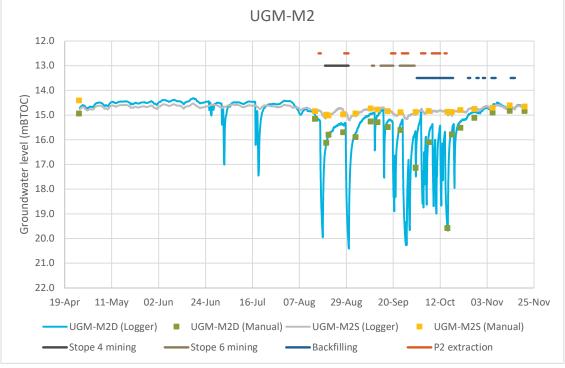


Figure X.X - Transition zone hydrographs



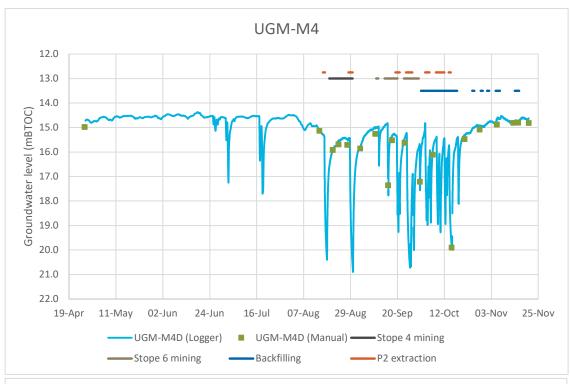








**Figure X.X - Background zone hydrographs**T3 Hydrogeochemical Assessment
Iluka Resources Limited



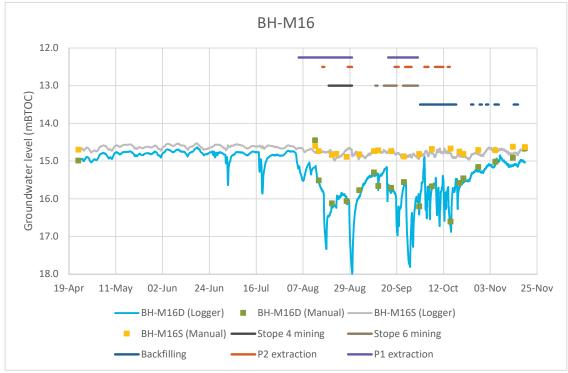




Figure X.X - Background zone hydrographs

T3 Hydrogeochemical Assessment Iluka Resources Limited

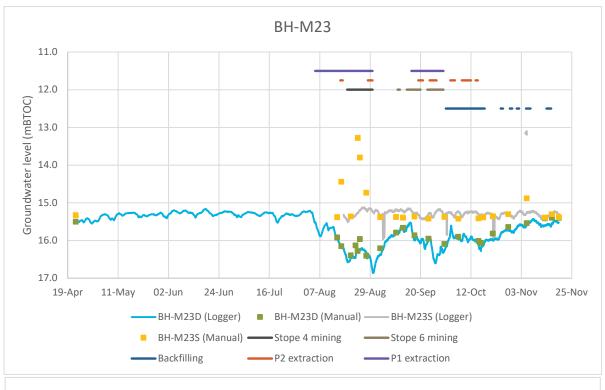
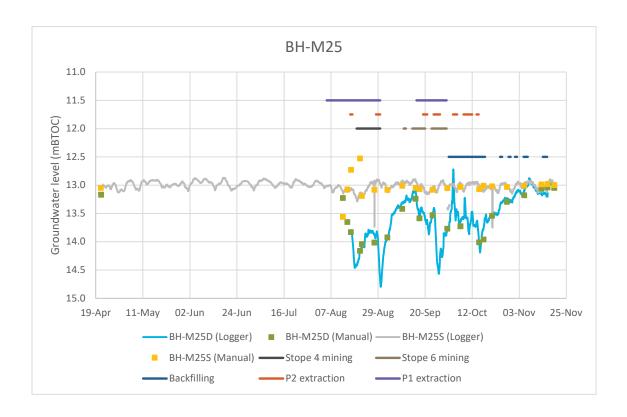






Figure X.X - Background zone hydrographs

T3 Hydrogeochemical Assessment Iluka Resources Limited





Iluka Resources Limited

# Appendix E

Field monitoring parameters











Job Number: S190512

EMM Technician:	Kaitlyn	Date:	12 August 2020

### STANDING WATER LEVEL (mbTOC)

Time:	9:17 am	UGM-M8D:	14.52
Time:	9:20 am	UGM-M8S:	14.21
Time:	12:42 pm	UGM-M12D:	
Time:	12:42 pm	UGM-M12S:	
Time:	1:23 pm	UGM-M15D:	14.065
Time:	1:23 pm	UGM-M15S:	13.57
Time:	2:59 pm	BH-M17D:	14.27
Time:	2:47 pm	BH-M17S:	13.264
Time:	2:37 pm	BH-M18D:	14.148
Time:	2:28 pm	BH-M18S:	13.20
Time:	1:45 pm	BH-M19D:	14.246
Time:	1:42 pm	BH-M19S:	13.34
Time:	3:21 pm	BH-M20D:	13.885
Time:	3:16 pm	BH-M20S:	13.26
Time:	10:36 am	BH-M21D:	14.951
Time:	12:42 pm	BH-M21S:	
Time:	12:53 pm	BH-M22D:	15.247
Time:	12:59 pm	BH-M22S:	14.12
Time:	10:24 am	LPSPB04:	13.81

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron	
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L	
UGM-M12I								
UGM-M129	S							
BH-21[	)							
BH-219	S							
FIELD pH								
Spiral Plant Discharge:	2 sites			Proces	ss Water Pond:			
Time:	11:57 am				Time:	11:58 am	]	

Description:

LPSPB04 and BH-M25D fallen into hole

Description:

BH-M25S dip 13.07mbTOC 13:56 BH-M25D dip 13.227mbTOC 14:08 Baro logger reset to hourly BH-M16S dip 14.60mbTOC 15:50

UGM-M8D:



Job Number: S190512

9:35 am

Time:

	EMM [ Technician:	20200813_KB	Date:	13 August 2020
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#### STANDING WATER LEVEL (mbTOC)

14.665

	1		1
Time:	9:36 am	UGM-M8S:	14.228
Time:		UGM-M12D:	
Time:		UGM-M12S:	
Time:	4:10 pm	UGM-M15D:	14.403
Time:	4:12 pm	UGM-M15S:	13.577
Time:	9:59 am	BH-M17D:	14.363
Time:	10:14 am	BH-M17S:	13.255
Time:	10:23 am	BH-M18D:	14.28
Time:	10:35 am	BH-M18S:	13.055
Time:	10:51 am	BH-M19D:	14.35
Time:	10:47 am	BH-M19S:	13.327
Time:	4:23 pm	BH-M20D:	16.203
Time:	4:27 pm	BH-M20S:	13.478
Time:		BH-M21D:	
Time:		BH-M21S:	
Time:	3:50 pm	BH-M22D:	15.80
Time:	4:06 pm	BH-M22S:	14.09
Time:	11:37 am	LPSPB04:	20.745

## Description of daily mining activities

No mining. Swivel head broken.
BH-M17D - logger swaged with heat shrink. PVC coated stainless.
BH-M18D - logger swaged with heat shrink. PVC coated stainless.
BH-M19D - logger swaged with heat shrink. PVC coated stainless.

LPSPB04 - generator (pump) running close by. New M100 logger installed.

UGM-M12D/S and BH-M21D/S are logger downloads.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	2:50 pm	6.80	52544	-240.4		23.4	0.4
UGM-M12S	5:46 pm	7.84	65379	56.4		16.44	0.25
BH-21D	1:55 pm	6.49	55406	-138.1		20.59	1.0
BH-21S	2:03 pm	6.47	265.06	36.3		23.41	0.90

FIELD pH

SPD-HM: 7.33 SPD-SAND: 7.68 Process Water Pond: 7.39

Time: 9:03 am Time: 9:16 am Time: 9:11 am



Description:

Spiral heavy mineral sample point.



Description:

Purge 2 buckets MINIMUM to clear the process water pipe.



Job Number: S190512

EMM Technician:	20200814_KB	Date:	14 August 2020
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### STANDING WATER LEVEL (mbTOC)

Time:	11:01 am	UGM-M8D:	15.86
Time:	11:08 am	UGM-M8S:	14.29
Time:	12:23 pm	UGM-M12D:	
Time:	12:23 pm	UGM-M12S:	
Time:	2:54 pm	UGM-M15D:	14.58
Time:	2:58 pm	UGM-M15S:	13.47
Time:	4:36 pm	BH-M17D:	14.58
Time:	4:31 pm	BH-M17S:	13.37
Time:	4:20 pm	BH-M18D:	14.53
Time:	4:10 pm	BH-M18S:	13.39
Time:	3:26 pm	BH-M19D:	14.535
Time:	3:14 pm	BH-M19S:	13.345
Time:	10:31 am	BH-M20D:	16.365
Time:	10:35 am	BH-M20S:	13.425
Time:	12:23 pm	BH-M21D:	
Time:	12:23 pm	BH-M21S:	
Time:	1:49 pm	BH-M22D:	15.66
Time:	1:53 pm	BH-M22S:	13.98
Time:	11:36 am	LPSPB04:	20.987

## Description of daily mining activities

M15S bad reading - dipper constantly beeping. Same with every reading after 3pm.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D 12	2:59 pm	6.85	80.10	-127.2	9.55	14.06	1.0
UGM-M12S 1:	10 pm	7.60	67653	17.1	7.00	14.12	0.15
BH-21D 12	2:42 pm	6.77	132.06	52.4	9.34	15.22	1.0
BH-21S 12	2:26 pm	6.3	146.96	141.2	8.01	15.56	0.6

### FIELD pH

SPD-HM:	8.02	SPD-SAND:	7.56	Process Water Pond:	7.65	
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Time: 6:29 am Time: 6:32 am Time: 6:36 am

Description:	Description:	



Job No: S190512 EMM Technician: 20200814\_KB Date: 14 August 2020

#### **STANDING WATER LEVEL (mbTOC)**

Time:	7:11 am	UGM-M1D:	14.205
Time:	7:10 am	UGM-M1S:	14.01
Time:	7:35 am	UGM-M2D:	15.155
Time:	7:38 am	UGM-M2S:	14.845
Time:	8:49 am	UGM-M4D:	15.134
Time:	9:43 am	UGM-M16D:	15.515
Time:	9:39 am	UGM-M16S:	14.74
Time:	2:36 pm	UGM-M23D:	15.92
Time:	2:20 pm	UGM-M23S:	15.38
Time:	10:12 am	UGM-M24D:	15.37
Time:	10:20 am	UGM-M24S:	13.749
Time:	3:56 pm	UGM-M25D:	13.65
Time:	3:47 pm	UGM-M25S:	13.075

## Description of daily mining activities

Tripping rods but no mining

#### **FIELD PARAMETERS**

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener	7:57 am	7.80	93.76	109.3	9.85	15.01
HBF Tank Tap	8:36 am	7.64	53468	99.7		13.7
Stockpile Sump	6:42 am	7.74	51772	121.6	7.87	13.48

Description:	Description:	
Description:	Description:	



Job Number: S190512

EMM Technician:	20200815_KB	Date:	15 August 2020
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### STANDING WATER LEVEL (mbTOC)

Time:	7:51 am	UGM-M8D:	15.01
Time:	7:53 am	UGM-M8S:	14.36
Time:	10:10 am	UGM-M12D:	Logger
Time:	10:10 am	UGM-M12S:	Logger
Time:	11:10 am	UGM-M15D:	14.67
Time:	11:14 am	UGM-M15S:	13.58
Time:	8:14 am	BH-M17D:	14.605
Time:	8:20 am	BH-M17S:	13.36
Time:	8:27 am	BH-M18D:	14.64
Time:	8:30 am	BH-M18S:	13.39
Time:	8:49 am	BH-M19D:	14.64
Time:	8:47 am	BH-M19S:	13.36
Time:	11:34 am	BH-M20D:	16.51
Time:	11:30 am	BH-M20S:	13.59
Time:	10:10 am	BH-M21D:	Logger
Time:	10:10 am	BH-M21S:	Logger
Time:	11:02 am	BH-M22D:	16.17
Time:	11:04 am	BH-M22S:	14.14
Time:	9:19 am	LPSPB04:	21.22

## Description of daily mining activities

No mining. Tripping cross

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	10:36 am	6.83	56079	-152.7	4.35	14.93	0.8
UGM-M12S	10:29 am	7.52	62882	179.9	7.26	14.9	0.15
BH-21D	9:56 am	6.54	56310.6	34.4	1.56	16.6	1.0
BH-21S	10:07 am	4.94	61836.7	194.2	0.90	16.06	0.3

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### FIELD pH

SPD-HM: 6.67 SPD-SAND: 7.24 Process Water Pond: 5.79

Time: 7:16 am Time: 7:18 am Time: 7:14 am



Description: Pump near LPSPB04



Description: BH-M21D iron

Stockpile Sump



Job No:	S190512	EMM Technician:		20200816_KB	Date:	16 August 2020
		STANDING '	WATER LE	VEL (mbTOC	;)	
Time:		UGM-M1D:				
Time:		UGM-M1S:		Des	•	of daily mining
Time:		UGM-M2D:			ac	tivities
Time:		UGM-M2S:		Installe	d loggers	
Time:		UGM-M4D:				
Time:		UGM-M16D:				
Time:		UGM-M16S:				
Time:	10:00 am	UGM-M23D:	16.15			
Time:	9:55 am	UGM-M23S:	14.44			
Time:		UGM-M24D:				
Time:		UGM-M24S:				
Time:	7:42 am	UGM-M25D:	13.83			
Time:	8:27 am	UGM-M25S:	12.73			
		FIEL	.D PARAME	ETERS		
Well I	) Time	рН	Sp. Cond	Redox	DC	) Temp
		Units	us/cm	mV	Mg/	L Deg Celcius
Fines Thicke	ner					
HBF Tank	Тар					

Description:	Description:	
Description:	Description:	



Job Number: S190512

	EMM Technician:	20200816_KB	Date:	16 August 2020
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### STANDING WATER LEVEL (mbTOC)

Time:	7:06 am	UGM-M8D:	15.14
Time:	7:11 am	UGM-M8S:	14.43
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	10:11 am	UGM-M15D:	14.88
Time:	10:13 am	UGM-M15S:	13.59
Time:	8:57 am	BH-M17D:	14.82
Time:	8:54 am	BH-M17S:	13.44
Time:	8:49 am	BH-M18D:	14.68
Time:	8:45 am	BH-M18S:	13.48
Time:	8:31 am	BH-M19D:	14.76
Time:	8:36 am	BH-M19S:	13.11
Time:	9:21 am	BH-M20D:	15.89
Time:	9:22 am	BH-M20S:	13.52
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:38 am	BH-M22D:	16.29
Time:	9:41 am	BH-M22S:	14.14
Time:	9:29 am	LPSPB04:	21.37

## Description of daily mining activities

Tripping rods, no mining. 3 tries before successfully calibrating the WQM - pH was very wrong, SPC slightly out. See daily calibration for more details.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	1:45 pm	7.43	5.25	-119.1	8.51	16.22	0.5
UGM-M12S	2:03 pm	7.46	40486	37.7	10.28	16.06	0.25
BH-21D [1	1:30 pm	6.8	0.9	-123.6	9.09	16.46	1.0
BH-21S [1	1:21 pm	6.90	0.54	91.4	8.96	16.46	0.25

### FIELD pH

SPD-HM: 7.30 SPD-SAND: 7.48 Process Water Pond: 7.09

Time: 12:44 pm Time: 12:48 pm Time: 12:46 pm



Description: San

Sampling setup at daily bores (UGM-M12 / BH-M21)

Description:



Job Number: S190512

EMM Technician:	20200817_KB	Date:	17 August 2020
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### STANDING WATER LEVEL (mbTOC)

Time:	9:23 am	UGM-M8D:	17.51
Time:	9:21 am	UGM-M8S:	14.48
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	11:03 am	UGM-M15D:	15.86
Time:	11:04 am	UGM-M15S:	13.595
Time:	9:41 am	BH-M17D:	16.35
Time:	9:38 am	BH-M17S:	13.385
Time:	9:49 am	BH-M18D:	15.32
Time:	9:52 am	BH-M18S:	13.39
Time:	10:00 am	BH-M19D:	15.07
Time:	9:59 am	BH-M19S:	13.35
Time:	12:23 pm	BH-M20D:	15.34
Time:	12:20 pm	BH-M20S:	13.53
Time:		BH-M21D:	Logger
Time:	12:11 pm	BH-M21S:	Logger
Time:	11:14 am	BH-M22D:	16.09
Time:	11:12 am	BH-M22S:	14.142
Time:	10:31 am	LPSPB04:	14.83

## Description of daily mining activities

No mining,	tripping	rods.	

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	1:07 pm	6.91	40.61	-95.8	9.07	16.15	0.25
UGM-M12S	11:58 am	7.12	702	71.2	0.24	16.61	0.3
BH-21D	1:21 pm	7.46	24.07	-153.5	9.08	16.4	0.8
BH-21S	1:32 pm	7.14	18.42	-48.5	8.74	17.6	0.6

### FIELD pH

SPD-HM: 6.22 SPD-SAND: 7.61 Process Water Pond: 7.48

Time: 8:23 am Time: 8:27 am Time: 8:29 am

Description:	Description:	



Job No: S190512	EMM Technician:			Date:						
	STANDING	WATER LE	VEL (mbTO	C)						
Time:	UGM-M1D:									
Time:	UGM-M1S:		Des	-	of daily mining					
Time:	UGM-M2D:			acti	vities					
Time:	UGM-M2S:									
Time:	UGM-M4D:									
Time:	UGM-M16D:									
Time:	UGM-M16S:									
Time:	UGM-M23D:									
Time:	UGM-M23S:		_							
Time:	UGM-M24D:									
Time:	UGM-M24S:									
Time:	UGM-M25D:									
Time:	UGM-M25S:									
FIELD PARAMETERS										
Well ID Tir	me pH	Sp. Cond	Redox	DO	Temp					
	Units	us/cm	mV	Mg/L	Deg Celcius					
Fines Thickener										
HBF Tank Tap										
Stockpile Sump										

Description:	Description:	
Description:	Description:	



Job Number: S190512

12:40 pm

Time:

	EMM Technician: 20200		818_KB		Date:	1	8 August 2020	
			STANDING	i WATI	ER LEV	EL (	(mbTOC)	
Time:	12:55	pm	UGM-M8D:	16.00				
Time:	12:58	pm	UGM-M8S:	14.62				
Time:			UGM-M12D:					
Time:			UGM-M12S:					
Time:			UGM-M15D:					
Time:			UGM-M15S:					
Time:			BH-M17D:				Description of daily mining	j
Time:			BH-M17S:				activities	
Time:			BH-M18D:				No process water discharge in the	
Time:			BH-M18S:				morning hence a later reading. Pump beside LPSPB04 was pumping.	
Time:			BH-M19D:				Unblocking blockage at 372m, no mining.	
Time:			BH-M19S:					
Time:			BH-M20D:					
Time:			BH-M20S:					
Time:			BH-M21D:					
Time:			BH-M21S:					
Time:			BH-M22D:					
Time:			BH-M22S:					

21.13

LPSPB04:

Well ID	Time pH	Sp. Cond	Redox	DO	Temp	Total Iron
	Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D 12:1	5 pm 6.85	0.07	23.7	9.14	15.6	0.2
UGM-M12S 12:2	4 pm 7.05	0.08	8.0	9.22	15.46	0.19
BH-21D 11:5	0 am 7.12	0.67	-108.1	8.64	18.36	1
BH-21S 11:5	9 am 7.28	0.07	-25	8.72	16.63	0.13

### FIELD pH

SPD-HM: 8.15 SPD-SAND: 8.84 Process Water Pond: 6.92

Time: 6:43 am Time: 6:47 am Time: 11:13 am

Description:	Description:	



Job Number: S190512

EMM Technician:	Dan Condon	Date:	25 August 2020	

#### **STANDING WATER LEVEL (mbTOC)**

Time:	9:02 am	UGM-M8D:	15.265
Time:	9:15 am	UGM-M8S:	14.518
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	10:05 am	UGM-M15D:	14.970
Time:	10:08 am	UGM-M15S:	13.610
Time:	11:38 am	BH-M17D:	14.830
Time:	11:35 am	BH-M17S:	13.550
Time:	11:42 am	BH-M18D:	14.567
Time:	11:46 am	BH-M18S:	13.215
Time:	11:21 am	BH-M19D:	14.950
Time:	11:17 am	BH-M19S:	13.375
Time:	9:28 am	BH-M20D:	16.695
Time:	9:32 am	BH-M20S:	13.555
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	10:00 am	BH-M22D:	16.414
Time:	9:35 am	BH-M22S:	14.195
Time:	11:57 am	LPSPB04:	21.290

## Description of daily mining activities

Mining summary: Mining from 517.58m back to 509.33m for a total of 628 tonne. Pulling back at 250mm/15min. I didn't get

Daily water usage summary Pumping in the bore BESIDE LPSPB04.

Totaliser value at 10:09 was 433667KL pumping at 13.51L/second.
P2 bore removed and cleaned

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	1:42 pm	6.95	38802	48.6	7.60	13.52	0.5
UGM-M12S	1:29 pm	7.55	46263	35.6	2.08	12.68	0.4
BH-M21D	12:57 pm	6.67	38674	-191.4	0.32	18.16	2.3
BH-M21S	12:32 pm	6.61	42649	116.2	0.42	17.00	0.0

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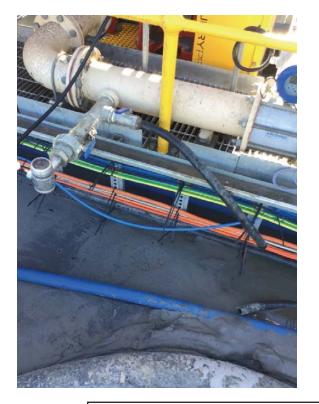
### FIELD pH

SPD-HM: 7.72 SPD-SAND: 7.81 Process Water Pond: 7.82

Time: 8:22 am Time: 8:25 am Time: 8:30 am



Description: SPD-HM Descrip



Description: SPD-Sand



Job Number: S190512

EMM [ Technician:	Dan Condon	Date:	26 August 2020
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### **STANDING WATER LEVEL (mbTOC)**

Time:	10:01 am	UGM-M8D:	15.203
Time:	10:05 am	UGM-M8S:	14.587
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:58 am	UGM-M15D:	14.950
Time:	9:00 am	UGM-M15S:	13.627
Time:	10:14 am	BH-M17D:	14.725
Time:	10:11 am	BH-M17S:	13.593
Time:	10:17 am	BH-M18D:	14.466
Time:	10:20 am	BH-M18S:	13.724
Time:	9:12 am	BH-M19D:	14.950
Time:	9:07 am	BH-M19S:	13.371
Time:	8:35 am	BH-M20D:	16.907
Time:	8:38 am	BH-M20S:	13.614
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:49 am	BH-M22D:	16.479
Time:	8:51 am	BH-M22S:	14.206
Time:		LPSPB04:	21.427

## Description of daily mining activities

Mining summary
Day shift: MD from 491m to 479m Pipe #83-81 934 tonnes
Night shift: MD from 479m to 467m Pipe #79 822 tonnes
Pullback 200mm/10mins HP 150m3/hr MP 140m3/hr
Pullback rate increased as suspected of over mining

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	12:05 pm	6.70	33807	-3.6	8.09	13.04	0.22
UGM-M12S	12:33 pm	7.49	40321	50.5	1.41	13.67	0.05
BH-M21D	11:34 am	6.42	32959	-200.7	0.31	18.50	3.4
BH-M21S	11:50 am	6.40	37456	-40.7	5.93	12.29	0.1

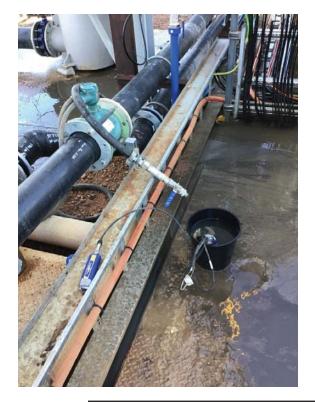
### FIELD pH

SPD-HM: 7.70 SPD-SAND: 7.63 Process Water Pond: 7.60

Time: 7:58 am Time: 8:00 am Time: 8:04 am



Description: SPD-HM Descri



Description: Process water



Job Number: S190512

EMM Technician:	Dan Condon	Date:	27 August 2020

### **STANDING WATER LEVEL (mbTOC)**

Time:	12:41 pm	UGM-M8D:	15.230
Time:	12:43 pm	UGM-M8S:	14.556
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:40 am	UGM-M15D:	15.023
Time:	8:43 am	UGM-M15S:	13.632
Time:	1:26 pm	BH-M17D:	14.778
Time:	1:25 pm	BH-M17S:	13.590
Time:	1:47 pm	BH-M18D:	14.490
Time:	1:43 pm	BH-M18S:	13.724
Time:	8:26 am	BH-M19D:	14.965
Time:	8:27 am	BH-M19S:	13.367
Time:	9:44 am	BH-M20D:	16.932
Time:	9:43 am	BH-M20S:	13.570
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:22 am	BH-M22D:	16.498
Time:	9:19 am	BH-M22S:	14.201
Time:	2:08 pm	LPSPB04:	21.470

# Description of daily mining activities

Mining summary
Day shift: MD from 467m to 452m Pipe #79-77 894 tonnes
Night shift: MD from 452m to 438m Pipe #76-74 1048 tonnes (rep 581)
Pullback 100mm/15mins HP 150m3/hr MP 140m3/hr
Daily water usage summary Pumping in the bore beside LPSPB04. Totaliser value at 2pm was 437052KL.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	3:29 pm	6.47	53841	-216.6	0.54	15.88	0.9
UGM-M12S	3:16 pm	7.49	62109	7.1	1.07	15.56	0.05
BH-M21D	2:52 pm	6.84	53722	-186.1	0.38	19.14	3.2
BH-M21S	2:38 pm	6.34	57058	171.3	0.40	17.74	0.1

### FIELD pH

SPD-HM: 7.85 SPD-SAND: 7.55 Process Water Pond: 7.46

Time: 7:20 am Time: 7:22 am Time: 7:27 am

Description:	Description:	



Job No: S190512 EMM Technician:	Dan Condon	Date:	27 August 2020
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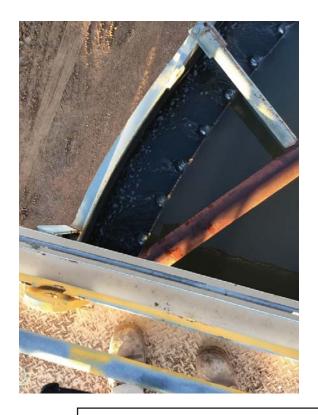
### STANDING WATER LEVEL (mbTOC)

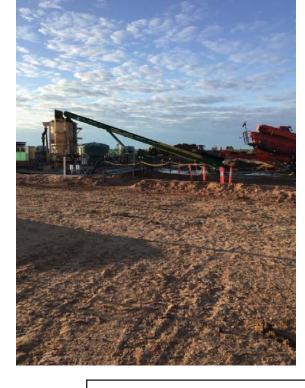
Time:	11:39 am	UGM-M1D:	14.750
Time:	11:41 am	UGM-M1S:	13.892
Time:	12:06 pm	UGM-M2D:	15.695
Time:	12:07 pm	UGM-M2S:	14.972
Time:	12:27 pm	UGM-M4D:	15.715
Time:	11:12 am	UGM-M16D:	16.064
Time:	11:17 am	UGM-M16S:	14.891
Time:	8:58 am	UGM-M23D:	16.402
Time:	8:56 am	UGM-M23S:	14.730
Time:	10:08 am	UGM-M24D:	16.010
Time:	10:10 am	UGM-M24S:	13.845
Time:	8:11 am	UGM-M25D:	14.015
Time:	7:55 am	UGM-M25S:	13.080

## Description of daily mining activities

Mining summary
Day shift: MD from 467m to 452m Pipe #79-77 894 tonnes
Night shift: MD from 452m to 438m Pipe #76-74 1048 tonnes (rep 581)
Pullback 100mm/15mins HP 150m3/hr MP 140m3/hr
Daily water usage summary Pumping in the bore beside LPSPB04. Totaliser value at 2pm was 437052KL.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener	7:14 am	7.30	52052	118.22	8.13	7.41
HBF Tank Tap						
Stockpile Sump	7:32 am	7.58	52336	126.60	7.36	8.13





Description:

Fines thickener

Description:

HBF Tank not in use



Description:

Stockpile sump. Field parameters taken from overflow stream

Description

otion:			



Job No: S190512 EMM Technician:	Dan Condon	Date:	27 August 2020
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STANDING WATER LEVEL (mbTOC)

#### UGM-M1D: Time: 11:39 am 14.750 Time: 11:41 am UGM-M1S: 13.892 Time: UGM-M2D: 12:06 pm 15.695 Time: UGM-M2S: 12:07 pm 14.972 Time: UGM-M4D: 12:27 pm 15.715 Time: UGM-M16D: 11:12 am 16.064 Time: 11:17 am UGM-M16S: 14.891 Time: 8:58 am UGM-M23D: 16.402 Time: UGM-M23S: 8:56 am 14.730 Time: 10:08 am UGM-M24D: 16.010 Time: UGM-M24S: 10:10 am 13.845 Time: 8:11 am UGM-M25D: 14.015 Time: 7:55 am UGM-M25S: 13.080

### Description of daily mining activities

Mining summary
Day shift: MD from 467m to 452m Pipe #79-77 894 tonnes
Night shift: MD from 452m to 438m Pipe #76-74 1048 tonnes (rep 581)
Pullback 100mm/15mins HP 150m3/hr MP 140m3/hr
Daily water usage summary Pumping in the bore beside LPSPB04. Totaliser value at 2pm was 437052KL.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener	7:14 am	7.30	52052	118.22	8.13	7.41
HBF Tank Tap						
Stockpile Sump	7:32 am	7.58	52336	126.60	7.36	8.13

Well ID	Time	рН	Sp. Cond	Redo	x DO	Temp
770H 12	111110	Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump						
Spill dam						
Description:	Fines thickener			Description:	HBF Tank not in	use
	The Man Man					



Description: Stockpile sump. Field parameters Description:



Job Number: S190512

EMM Technician:	Dan Condon	Date:	28 August 2020

### STANDING WATER LEVEL (mbTOC)

Time:	9:53 am	UGM-M8D:	15.127
Time:	9:55 am	UGM-M8S:	14.570
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:57 am	UGM-M15D:	15.020
Time:	9:00 am	UGM-M15S:	13.640
Time:	9:40 am	BH-M17D:	14.645
Time:	9:34 am	BH-M17S:	13.659
Time:	9:44 am	BH-M18D:	14.405
Time:	9:47 am	BH-M18S:	13.977
Time:	8:50 am	BH-M19D:	14.955
Time:	8:53 am	BH-M19S:	13.372
Time:	9:27 am	BH-M20D:	16.915
Time:	9:24 am	BH-M20S:	13.555
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:14 am	BH-M22D:	16.790
Time:	9:06 am	BH-M22S:	14.180
Time:	10:53 am	LPSPB04:	21.520

## Description of daily mining activities

Mining summary
Day shift: MD from 438m to 424m Pipe #74-72 864 tonnes
Night shift: MD from 424m to 410m Pipe #72-70 1146 tonnes
Pullback 200mm/10mins HP 150m3/hr MP 140m3/hr
Daily water usage summary Pumping in the bore beside LPSPB04. Totaliser value at 11am was 438033KL.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D 12	:31 pm	6.59	54766	-221.5	0.59	14.51	1.2
UGM-M12S 12	:16 pm	7.58	65250	7.2	1.52	13.99	0.0
BH-M21D 11	:30 am	6.57	54767	-204.6	0.67	16.36	2.8
BH-M21S 11	:15 am	6.53	58523	120.9	5.25	13.08	0.12

### FIELD pH

SPD-HM: 7.76 SPD-SAND: 7.68 Process Water Pond: 7.67

Time: 8:10 am Time: 7:57 am Time: 8:13 am

Description:	Description:	



Job Number: S190512

EMM Technician:	Dan Condon	Date:	29 August 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	8:47 am	UGM-M8D:	17.550
Time:	8:51 am	UGM-M8S:	14.760
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:10 am	UGM-M15D:	15.270
Time:	8:13 am	UGM-M15S:	13.603
Time:	9:00 am	BH-M17D:	16.160
Time:	9:05 am	BH-M17S:	13.977
Time:	9:15 am	BH-M18D:	15.360
Time:	9:09 am	BH-M18S:	14.790
Time:	8:04 am	BH-M19D:	15.315
Time:	8:07 am	BH-M19S:	13.375
Time:	8:30 am	BH-M20D:	17.460
Time:	8:32 am	BH-M20S:	13.590
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:21 am	BH-M22D:	16.735
Time:	8:19 am	BH-M22S:	14.215
Time:	9:28 am	LPSPB04:	21.820

## Description of daily mining activities

439100KL at 9:30 am	

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	11:43 am	6.59	54051	-213.8	0.74	15.42	1.0
UGM-M12S	11:24 am	7.50	64038	50.9	1.32	14.88	0.0
BH-M21D	10:56 am	6.51	53926	-159.2	0.29	18.88	2.4
BH-M21S	10:24 am	6.39	59306	243.0	5.89	13.60	0.05

### FIELD pH

SPD-HM:	7.49	SPD-SAND:	7.29	Process Water Pond:	7.41
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Time: 7:37 am Time: 7:40 am Time: 7:45 am

Description:	Description:	



Job Number: S190512

EMM Technician:	Dan Condon	Date:	30 August 2020	
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### **STANDING WATER LEVEL (mbTOC)**

Time:	9:54 am	UGM-M8D:	17.235
Time:	9:56 am	UGM-M8S:	15.030
Time:		UGM-M12D:	Logger
Time:	9:02 am	UGM-M12S:	Logger
Time:	8:12 am	UGM-M15D:	15.615
Time:	8:14 am	UGM-M15S:	13.645
Time:	8:57 am	BH-M17D:	16.740
Time:	9:01 am	BH-M17S:	14.090
Time:	9:18 am	BH-M18D:	16.180
Time:	9:14 am	BH-M18S:	13.790
Time:	8:02 am	BH-M19D:	15.830
Time:	8:06 am	BH-M19S:	13.370
Time:	8:26 am	BH-M20D:	16.720
Time:	8:30 am	BH-M20S:	13.630
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:19 am	BH-M22D:	16.870
Time:	8:17 am	BH-M22S:	14.190
Time:	9:33 am	LPSPB04:	15.862

## Description of daily mining activities

Mining summary
Day shift: MD from 383m to 374m Pipe #65-64
Stope 4 mining has stopped at around noon.
Pump next to LPSPB04 not operating. Totaliser at 439982KL

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	12:48 pm	6.65	53714	-220.1	0.87	17.15	1.2
UGM-M12S	12:28 pm	7.56	64961	51.7	1.16	15.59	0.0
BH-M21D	12:01 pm	6.57	54546	-177.7	0.25	20.15	3.4
BH-M21S	11:23 am	6.56	59760	196.6	6.78	16.34	0.1

### FIELD pH

SPD-HM:	7.52	SPD-SAND:	7.55	Process Water Pond:	7.35
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Time: 7:18 am Time: 7:20 am Time: 7:25 am

Description:	Description:	



Job Number: S190512

EMM Technician:	Dan Condon	Date:	31 August 2020	

### **STANDING WATER LEVEL (mbTOC)**

Time:	8:59 am	UGM-M8D:	15.985
Time:	9:01 am	UGM-M8S:	14.295
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:24 am	UGM-M15D:	15.250
Time:	8:25 am	UGM-M15S:	13.660
Time:	9:09 am	BH-M17D:	15.700
Time:	9:11 am	BH-M17S:	12.670
Time:	9:23 am	BH-M18D:	15.502
Time:	9:18 am	BH-M18S:	11.025
Time:	8:17 am	BH-M19D:	15.485
Time:	8:20 am	BH-M19S:	13.370
Time:	8:42 am	BH-M20D:	15.370
Time:	8:46 am	BH-M20S:	13.582
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:37 am	BH-M22D:	16.365
Time:	8:34 am	BH-M22S:	14.197
Time:	9:30 am	LPSPB04:	15.070

## Description of daily mining activities

No mining activity occurring. Spiral plant is not in operation.

Pump beside LPSPB04 not in operation. Totaliser at 439982KL

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	11:48 am	6.60	53675	-222.7	0.66	15.94	0.8
UGM-M12S	11:27 am	7.54	64099	49.0	1.09	14.87	0.0
BH-M21D	10:52 am	6.56	53597	-193.6	0.29	18.86	3.2
BH-M21S	10:36 am	6.56	59121	162.0	7.02	12.93	0.0

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### FIELD pH

SPD-HM: 7.89 SPD-SAND: 7.71 Process Water Pond: 7.54

Time: 7:45 am Time: 7:48 am Time: 7:53 am



Description: Spiral plant not operational Description:



Job Number: S190512

EMM Technician:	Dan Condon	Date:	1 September 2020	

### **STANDING WATER LEVEL (mbTOC)**

Time:	8:58 am	UGM-M8D:	15.504
Time:	9:00 am	UGM-M8S:	14.185
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:29 am	UGM-M15D:	14.980
Time:	8:32 am	UGM-M15S:	13.640
Time:	9:06 am	BH-M17D:	15.240
Time:	9:08 am	BH-M17S:	12.760
Time:	9:14 am	BH-M18D:	15.105
Time:	9:11 am	BH-M18S:	11.040
Time:	8:21 am	BH-M19D:	15.201
Time:	8:26 am	BH-M19S:	13.308
Time:	8:44 am	BH-M20D:	14.945
Time:	8:46 am	BH-M20S:	13.570
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:38 am	BH-M22D:	16.115
Time:	8:37 am	BH-M22S:	14.225
Time:	9:20 am	LPSPB04:	14.750

## Description of daily mining activities

No mining activity occurring. Spiral plant is not in operation.

Pump beside LPSPB04 not in operation. Totaliser at 439982KL

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	12:39 pm	6.76	51494	-251.4	0.77	15.06	1.4
UGM-M12S	11:59 am	7.58	64063	-8.7	0.89	14.99	0.0
BH-M21D	11:52 am	6.58	50620	-200.1	0.33	18.77	2.6
BH-M21S	11:29 am	6.57	58619	128.2	7.22	13.16	0.0

### FIELD pH

SPD-HM:	7.83	SPD-SAND:	7.79	Process Water Pond:	7.74
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Time: 7:58 am Time: 8:00 am Time: 8:03 am

Description:	Description:	



Job Number: S190512

EMM Technician:	Dan Condon	Date:	2 September 2020	

### **STANDING WATER LEVEL (mbTOC)**

Time:	12:09 pm	UGM-M8D:	15.250
Time:	12:10 pm	UGM-M8S:	14.150
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:46 am	UGM-M15D:	14.760
Time:	8:47 am	UGM-M15S:	13.360
Time:	12:23 pm	BH-M17D:	15.025
Time:	12:28 pm	BH-M17S:	12.845
Time:	12:37 pm	BH-M18D:	14.845
Time:	12:34 pm	BH-M18S:	11.695
Time:	8:28 am	BH-M19D:	14.980
Time:	8:32 am	BH-M19S:	13.360
Time:	9:40 am	BH-M20D:	14.685
Time:	9:43 am	BH-M20S:	13.544
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:23 am	BH-M22D:	15.910
Time:	9:20 am	BH-M22S:	14.210
Time:	12:52 pm	LPSPB04:	14.535

## Description of daily mining activities

No mining activities occurring and no sampling able to be taken from Spiral Plant Discharge locations

No pumping at bore beside LPSPB4

Well ID	Time	рН	Sp. Cond	Redox	DO	1	Temp	Total Iron
		Units	us/cm	mV	Mg/l	L	Deg Celcius	Mg/L
UGM-M12D	2:41 pm	6.80	56051	-229.6	0.76		16.93	1.2
UGM-M12S	2:25 pm	7.76	64135	1.5	0.77		16.76	0.0
BH-M21D	2:01 pm	6.76	56261	-194.2	0.37		19.49	5.2
BH-M21S	1:53 pm	6.65	62834	140.8	6.66		16.65	0.0
	FIELD pH							
SPD-HM:		SPD-SAN	ID:		Pro	cess W	ater Pond:	7.82
Time:		Tin	ne:				Time:	7:39 am
Description:				Descri	otion:			



Job No: S190512 EMM Technician:	Dan Condon	Date:	2 September 2020
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#### **STANDING WATER LEVEL (mbTOC)**

15.050

Time:	11:23 am	UGM-M1D:	15.050
Time:	11:24 am	UGM-M1S:	13.855
Time:	6:51 am	UGM-M2D:	15.894
Time:	6:53 am	UGM-M2S:	14.936
Time:	11:49 am	UGM-M4D:	15.855
Time:	10:08 am	UGM-M16D:	15.775
Time:	10:10 am	UGM-M16S:	14.825
Time:	9:06 am	UGM-M23D:	16.205
Time:	9:06 am	UGM-M23S:	15.380
Time:	9:57 am	UGM-M24D:	14.920
Time:	9:55 am	UGM-M24S:	13.820
Time:	8:15 am	UGM-M25D:	13.925
Time:	8:11 am	UGM-M25S:	13.083

LICM MAD.

## Description of daily mining activities

No mining activities occurring. Will still collect baseline field parameters for comparison purposes.

HBF tank not in operation

Fines thickener also not in operation but parameters taken from holding water

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener	10:51 am	8.01	52243	142.41	7.48	14.57
HBF Tank Tap						
Stockpile Sump	7:43 am	7.96	57444	117.79	8.06	9.43

Well ID Time pH Sp. Cond Redox DO Temp

Units us/cm mV Mg/L Deg Celcius

 Spill dam
 7:50 am
 8.07
 53218
 118.59
 7.30
 11.59





Description: T2 stockpile sump Description: Stockpile sump



Description: Spill Dam Description: Fines thickener



Job Number: S190512

EMM Technician:	Dan Condon	Date:	3 September 2020	

### **STANDING WATER LEVEL (mbTOC)**

Time:	9:47 am	UGM-M8D:	15.135
Time:	9:48 am	UGM-M8S:	14.112
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:49 am	UGM-M15D:	14.650
Time:	8:51 am	UGM-M15S:	13.645
Time:	9:54 am	BH-M17D:	14.890
Time:	9:56 am	BH-M17S:	12.815
Time:	10:06 am	BH-M18D:	14.722
Time:	10:02 am	BH-M18S:	11.867
Time:	8:29 am	BH-M19D:	14.855
Time:	8:31 am	BH-M19S:	13.358
Time:	9:03 am	BH-M20D:	14.542
Time:	9:05 am	BH-M20S:	13.563
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:57 am	BH-M22D:	15.790
Time:	8:56 am	BH-M22S:	14.205
Time:	10:31 am	LPSPB04:	14.623

## Description of daily mining activities

No mining occurring and therefore no Spiral plant in operation.

No pumping beside LPSPB04

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Iron
		Units	us/cm	mV	Mg/	L	Deg Celcius	Mg/L
UGM-M12D	11:47 am	6.60	53815	-163.0	0.45		16.98	1.0
UGM-M12S	11:22 am	7.61	64072	20.2	0.84		17.14	0.0
BH-M21D	10:59 am	6.62	53778	-186.4	0.33		19.65	4.2
BH-M21S	10:48 am	6.60	61786	147.4	1.37		17.51	0.0
			FIE	LD pH				
SPD-HM:		SPD-SAN	ND:		Pro	cess W	later Pond:	7.49
Time:		Tin	ne:				Time:	7:14 am
Description:				Descri	otion:			



Job Number: S190512

EMM Technician:	Dan Condon	Date:	4 September 2020

### **STANDING WATER LEVEL (mbTOC)**

Time:	9:56 am	UGM-M8D:	14.885
Time:	9:58 am	UGM-M8S:	13.950
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	7:46 am	UGM-M15D:	14.055
Time:	7:48 am	UGM-M15S:	13.655
Time:	10:14 am	BH-M17D:	14.523
Time:	10:27 am	BH-M17S:	12.734
Time:	10:39 am	BH-M18D:	14.219
Time:	10:41 am	BH-M18S:	12.202
Time:	7:37 am	BH-M19D:	14.701
Time:	7:42 am	BH-M19S:	13.365
Time:	8:24 am	BH-M20D:	14.320
Time:	8:31 am	BH-M20S:	13.490
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:19 am	BH-M22D:	15.325
Time:	8:17 am	BH-M22S:	14.235
Time:	11:10 am	LPSPB04:	14.240

## Description of daily mining activities

Rig has been moved and rods have been tripped in overnight. 12 rods to go today.

Spiral plant and HBF not in operation.

Well ID	Time	рН	Sp. Cond	Redox	D	)	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	12:24 pm	6.52	54129	168.3	0.44		16.65	0.4
UGM-M12S	12:02 pm	7.45	64447	16.7	0.9		16.17	0.0
BH-M21D	11:37 am	6.55	53884	-172.0	0.34		18.76	4.8
BH-M21S	11:21 am	6.64	62042	185.8	5.82		15.18	0.0
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	ocess V	Vater Pond:	7.67
Time:		Tin	ne:				Time:	7:23 am
Description:				Descri	ption:			



Job Number: S190512

EMM Technician:	Dan Condon	Date:	5 September 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	10:32 am	UGM-M8D:	14.867
Time:	10:33 am	UGM-M8S:	14.022
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:17 am	UGM-M15D:	14.366
Time:	8:19 am	UGM-M15S:	13.630
Time:	9:21 am	BH-M17D:	14.619
Time:	9:19 am	BH-M17S:	12.822
Time:	9:27 am	BH-M18D:	14.455
Time:	9:24 am	BH-M18S:	12.188
Time:	7:57 am	BH-M19D:	14.622
Time:	7:59 am	BH-M19S:	13.355
Time:	8:42 am	BH-M20D:	14.290
Time:	8:41 am	BH-M20S:	13.510
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:36 am	BH-M22D:	15.560
Time:	8:32 am	BH-M22S:	14.190
Time:	9:33 am	LPSPB04:	14.240

## Description of daily mining activities

Rig preparing for mining next week.

HBF prep and testing to occur soon

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Iron
		Units	us/cm	mV	Mg/l	L	Deg Celcius	Mg/L
UGM-M12D	12:30 pm	6.70	53329	-216.2	0.58		16.59	0.4
UGM-M12S	12:11 pm	7.59	63650	-29.1	1.18		16.33	0.0
BH-M21D	11:50 am	6.71	53245	-197.8	0.26		19.48	5.0
BH-M21S	11:38 am	6.65	60952	-56.6	0.69		17.56	0.05
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	cess W	later Pond:	7.72
Time:		Tin	ne:				Time:	9:13 am
Description:				Descri	otion:			



Job Number: S190512

EMM Technician:	Dan Condon	Date:	6 September 2020

### **STANDING WATER LEVEL (mbTOC)**

Time:	9:49 am	UGM-M8D:	14.825
Time:	9:50 am	UGM-M8S:	14.085
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:07 am	UGM-M15D:	14.367
Time:	8:10 am	UGM-M15S:	13.645
Time:	9:58 am	BH-M17D:	14.531
Time:	9:56 am	BH-M17S:	12.942
Time:	10:01 am	BH-M18D:	14.366
Time:	10:03 am	BH-M18S:	12.485
Time:	7:53 am	BH-M19D:	14.605
Time:	7:58 am	BH-M19S:	13.372
Time:	8:57 am	BH-M20D:	14.260
Time:	8:58 am	BH-M20S:	13.530
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:40 am	BH-M22D:	15.502
Time:	8:28 am	BH-M22S:	14.370
Time:	10:14 am	LPSPB04:	14.190

## Description of daily mining activities

No mining occurring. HBF process tested in the afternoon using water only.

All morning field parameters monitoring are for background reference only.

HBF process delayed and will be reviewed.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	11:23 am	6.53	53335	-225.3	0.60	17.15	1.1
UGM-M12S	11:04 am	7.45	63636	-10.8	0.93	16.95	0.1
BH-M21D	10:42 am	6.56	53324	-201.7	0.33	19.22	4.8
BH-M21S	10:27 am	6.58	60984	45.4	5.46	15.79	0.0

### FIELD pH

SPD-HM: 7.83 SPD-SAND: 7.80 Process Water Pond: 7.74

Time: 7:30 am Time: 7:32 am Time: 7:27 am

Description:	Description:	



Job Number: S190512

EMM Technician:	Dan Condon	Date:	7 September 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	8:34 am	UGM-M8D:	14.777
Time:	8:36 am	UGM-M8S:	14.067
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	7:45 am	UGM-M15D:	14.253
Time:	7:47 am	UGM-M15S:	13.642
Time:	8:45 am	BH-M17D:	14.807
Time:	8:43 am	BH-M17S:	12.982
Time:	8:51 am	BH-M18D:	14.355
Time:	8:49 am	BH-M18S:	12.677
Time:	7:38 am	BH-M19D:	14.502
Time:	7:40 am	BH-M19S:	13.355
Time:	8:21 am	BH-M20D:	14.202
Time:	8:23 am	BH-M20S:	13.563
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:03 am	BH-M22D:	15.469
Time:	7:52 am	BH-M22S:	14.140
Time:	8:58 am	LPSPB04:	14.150

## Description of daily mining activities

No mining occurring.

HBF process delayed and will be reviewed.

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	11:25 am	6.51	54342	-178.1	0.48		17.66	1.6
UGM-M12S	11:01 am	7.48	64597	-10.4	0.93		17.21	0.1
BH-M21D	10:41 am	6.55	54006	-190.7	0.37		19.57	5.0
BH-M21S	10:29 am	6.42	54760	120.7	0.47		18.42	0.15
FIELD pH								
SPD-HM:		SPD-SAN	ID:		Pro	ocess W	later Pond:	7.71
Time:		Tin	ne:				Time:	7:25 am
Description:				Descri	otion:			



Job Number: S190512

EMM Technician:	Kaitlyn Brodie	Date:	8 September 2020	
			-	

### **STANDING WATER LEVEL (mbTOC)**

Time:	9:06 am	UGM-M8D:	14.740
Time:	9:04 am	UGM-M8S:	14.090
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:26 am	UGM-M15D:	14.275
Time:	8:30 am	UGM-M15S:	13.619
Time:	9:32 am	BH-M17D:	14.500
Time:	9:29 am	BH-M17S:	13.047
Time:	9:23 am	BH-M18D:	14.358
Time:	9:19 am	BH-M18S:	12.834
Time:	8:20 am	BH-M19D:	14.500
Time:	8:16 am	BH-M19S:	13.335
Time:	8:49 am	BH-M20D:	14.165
Time:	8:47 am	BH-M20S:	13.525
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:39 am	BH-M22D:	15.461
Time:	8:35 am	BH-M22S:	14.118
Time:	10:45 am	LPSPB04:	13.970

## Description of daily mining activities

No mining or HBF

	FIELD FARAWIETERS						
Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	11:17 am	6.57	53516	-204.5	0.38	19.44	0.5
UGM-M12S	10:50 am	7.56	63616	103.5	0.96	18.52	0.45
BH-21D	11:33 am	6.62	53566	-214.1	0.32	21.11	5.2
BH-21S	11:57 am	6.48	60380	-25.2	0.64	19.99	0.1
			FIE	ELD pH			
SPD-HM:	NA	SPD-SAN	ID: NA		Process \	Water Pond:	7.77
Time:		Tim	ne:			Time:	7:53 am

Description:	Description:	



Job Number: S190512

EMM Technician:	KB BB	Date:	9 September 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	10:10 am	UGM-M8D:	14.71
Time:	10:05 am	UGM-M8S:	14.13
Time:		UGM-M12D:	
Time:		UGM-M12S:	
Time:	7:46 am	UGM-M15D:	14.24
Time:	7:48 am	UGM-M15S:	13.63
Time:	10:46 am	BH-M17D:	14.37
Time:	10:41 am	BH-M17S:	13.11
Time:	10:23 am	BH-M18D:	14.32
Time:	10:28 am	BH-M18S:	12.88
Time:	7:28 am	BH-M19D:	14.49
Time:	7:33 am	BH-M19S:	13.33
Time:	8:36 am	BH-M20D:	14.15
Time:	8:31 am	BH-M20S:	13.51
Time:		BH-M21D:	
Time:		BH-M21S:	
Time:	8:24 am	BH-M22D:	15.43
Time:	8:18 am	BH-M22S:	14.13
Time:	11:28 am	LPSPB04:	13.97

## Description of daily mining activities

Tripping rods, no mining		

FIELD PARAMETERS							
Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	11:49 am	7.43	4.82	8.69	8.69		0.1
UGM-M12S	12:48 pm	7.10	67640	123.5	5.60	15.9	0.4
BH-21D	1:25 pm	6.67	57092	-207.9	0.36	19.31	4.3
BH-21S	1:10 pm	6.51	64567	93.6	0.82	18.12	0
			FIE	LD pH			
SPD-HM:	NA	SPD-SAN	D-SAND: NA		Process \	Water Pond:	8.03
Time:		Tim	ne:			Time:	3:12 pm

Description:	Description:	



activities

Job No: S190512 EMM Technician: KB BB Date: 9 September 2020

**STANDING WATER LEVEL (mbTOC)** 

#### UGM-M1D: Time: 9:40 am 14.45 Description of daily mining Time: 9:44 am UGM-M1S: 13.78 Time: UGM-M2D: 9:57 am 15.26 Time: UGM-M2S: 9:54 am 14.74 Time: UGM-M4D: 2:31 pm 15.26 Time: 8:51 am UGM-M16D: 15.30 Time: 8:55 am UGM-M16S: 14.74 Time: 8:06 am UGM-M23D: 15.79 Time: UGM-M23S: 8:02 am 15.375 Time: 8:43 am UGM-M24D: 14.36 Time: 8:40 am UGM-M24S: 13.76 Time: 7:22 am UGM-M25D: 13.42 Time: 7:11 am UGM-M25S: 13.01

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener	2:46 pm	8.02	55431	20.7	7.61	17.39
HBF Tank Tap	3:00 pm	7.73	50597	41.2	4.84	22.4
Stockpile Sump	3:15 pm	7.88	35351	26.9	2.58	18.56

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump	2:52 pm	7.67	65532	36.9	6.04	15.12
Spill dam	3:22 pm	8.19	22030	10.7	9.03	19.16



Description:

UGM-M4 and stockpile

Description:

- 1			

Description:		Description:	
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Job Number: S190512

EMM Technician:	Bill, Kaitlyn	Date:	10 September 2020

### **STANDING WATER LEVEL (mbTOC)**

		OTANDING	A WAILII EEV	
Time:	7:44 am	UGM-M8D:	14.67	
Time:	7:46 am	UGM-M8S:	14.115	
Time:		UGM-M12D:	Logger	
Time:		UGM-M12S:	Logger	
Time:	7:07 am	UGM-M15D:	14.155	
Time:	7:08 am	UGM-M15S:	13.66	
Time:	7:58 am	BH-M17D:	14.41	Description of daily mining
Time:	8:00 am	BH-M17S:	13.12	activities
Time:	7:53 am	BH-M18D:	14.31	
Time:	7:54 am	BH-M18S:	12.925	
Time:	7:02 am	BH-M19D:	14.44	
Time:	7:00 am	BH-M19S:	13.33	
Time:	7:23 am	BH-M20D:	14.10	
Time:	7:24 am	BH-M20S:	13.57	
Time:		BH-M21D:	Logger	
Time:		BH-M21S:	Logger	
Time:	7:14 am	BH-M22D:	15.37	
Time:	7:16 am	BH-M22S:	14.13	
Time:	8:23 am	LPSPB04:	13.92	

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D 8	:45 am	6.60	57169	-222.3	0.67	16.40	1.0
UGM-M12S 8	:32 am	7.53	68211	180.1	0.9	16.28	0.1
BH-21D 9	:16 am	6.62	57147	-209.2	0.28	19.33	4.6
BH-21S 9	:00 am	6.45	61259	-90.3	0.51	19.07	0.2

### FIELD pH

SPD-HM:	7.84	SPD-SAND:	7.78	Process Water Pond:	8.02	
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Time: 10:17 am Time: 10:19 am Time: 10:21 am

Description:	Description:	



Job Number: S190512

EMM Technician:	KB BB	Date:	11 September 2020	

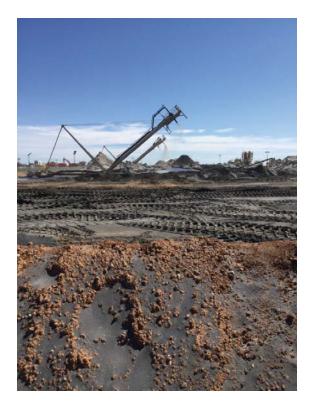
### STANDING WATER LEVEL (mbTOC)

Time:	11:35 am	UGM-M8D:	15.20	
Time:	11:37 am	UGM-M8S:	14.085	
Time:		UGM-M12D:		
Time:		UGM-M12S:		
Time:	7:11 am	UGM-M15D:	13.96	
Time:	7:13 am	UGM-M15S:	13.62	
Time:	11:52 am	BH-M17D:	14.72	Description of daily mining
Time:	11:53 am	BH-M17S:	13.09	activities
Time:	11:46 am	BH-M18D:	14.34	Totaliser beside LPSPB04: 439982
Time:	11:48 am	BH-M18S:	12.93	UGM-M12D sulphur odour
Time:	7:07 am	BH-M19D:	14.27	Spiral plant operating periodically (during mining)
Time:	7:06 am	BH-M19S:	13.34	(damig mining)
Time:	7:23 am	BH-M20D:	14.03	
Time:	7:25 am	BH-M20S:	13.53	
Time:		BH-M21D:		
Time:		BH-M21S:		
Time:	7:17 am	BH-M22D:	14.77	
Time:	7:20 am	BH-M22S:	14.09	
Time:	12:11 pm	LPSPB04:	13.90	

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	12:22 pm	6.69	56761	-235.8	0.54	18.28	3.6
UGM-M12S	12:48 pm	7.64	67604	-32.0	0.93	18.48	0.0
BH-21D	1:16 pm	6.70	56176	-210.4	0.50	20.01	1.0
BH-21S	1:38 pm	6.55	54697	2.1	0.84	19.22	0.15

### FIELD pH

SPD-HM:	SPD-SAND:	Process Water Pond:	8.00	
Time:	Time:	Time:	6:51 am	



Description:	Description:	

HBF Tank Tap

Stockpile Sump



Job No:	S190512	EMM Technician:	KB BB	Date:	Date: 11 September 2020	
		STANDING	WATER LE	VEL (mbTOC	<b>(</b> )	
Time:	2:07 pm	UGM-M1D:	14.95			
Time:	2:08 pm	UGM-M1S:	13.75	Des	cription of d	
Time:		UGM-M2D:			activitie	es
Time:		UGM-M2S:		UGM-N	11S sulphur odo	ır
Time:		UGM-M4D:				
Time:	9:29 am	UGM-M16D:	15.66			
Time:	9:33 am	UGM-M16S:	14.72			
Time:		UGM-M23D:				
Time:		UGM-M23S:				
Time:	7:29 am	UGM-M24D:	14.33			
Time:	7:31 am	UGM-M24S:	13.77			
Time:		UGM-M25D:				
Time:		UGM-M25S:				
		FIE	LD PARAME	ETERS		
Well I	) Tir	ne pH	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thicke	ner					

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump						
Spill dam						
Description:			De	scription:		
Docariation [				oorintion		
Description:			De	scription:		



Job Number: S190512

EMM Technician:	KB BB	Date:	12 September 2020

### STANDING WATER LEVEL (mbTOC)

Time:	12:48 pm	UGM-M8D:	14.71
Time:	12:51 pm	UGM-M8S:	14.12
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	7:48 am	UGM-M15D:	13.92
Time:	7:50 am	UGM-M15S:	13.64
Time:	1:04 pm	BH-M17D:	14.44
Time:	1:06 pm	BH-M17S:	13.16
Time:	12:58 pm	BH-M18D:	14.27
Time:	1:00 pm	BH-M18S:	13.00
Time:	7:44 am	BH-M19D:	14.36
Time:	7:37 am	BH-M19S:	13.35
Time:	12:34 pm	BH-M20D:	14.85
Time:	12:36 pm	BH-M20S:	13.51
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	11:07 am	BH-M22D:	15.19
Time:	11:02 am	BH-M22S:	14.14
Time:	1:28 pm	LPSPB04:	13.88

# Description of daily mining activities

No mining, fixing swivel head
Spiral plant not operating
Pump next to LPSPB04 not operating,
same totaliser value as yesterday.

Well ID	Time	рН	Sp. Cond	Redox	DO	O	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	1:54 pm	6.65	55336	-234	0.74		19.03	4.0
UGM-M12S	1:27 pm	7.37	66055	63.7	1.90		20.08	0.1
BH-21D	2:10 pm	6.62	55527	-204	0.31		21.22	4.2
BH-21S	2:17 pm	6.54	61196	-70.8	0.75		20.28	0.3
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	ocess V	later Pond:	8.00
Time:		Tin	ne:				Time:	6:50 am
Description:				Descrip	otion:			

Stockpile Sump



Job No:	S190512	EMM Technician:	ВВ КВ	Date:	12 Septembe	r 2020
		STANDING	WATER LE	VEL (mbT0	DC)	
Time:		UGM-M1D:				
Time:		UGM-M1S:		De	escription of o	•
Time:	2:37 pm	UGM-M2D:	15.29		activiti	es
Time:	2:37 pm	UGM-M2S:	14.78			
Time:		UGM-M4D:				
Time:		UGM-M16D:				
Time:		UGM-M16S:				
Time:	8:40 am	UGM-M23D:	15.66			
Time:	8:44 am	UGM-M23S:	15.39			
Time:		UGM-M24D:				
Time:		UGM-M24S:				
Time:		UGM-M25D:				
Time:		UGM-M25S:				
		FIE	LD PARAM	ETERS		
Well IE	) Tim	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thicke	ner					
HBF Tank	Тар					

Well ID	Time	рН	Sp. Con	nd Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump						
Spill dam						
Description:				Description:		
Description:				Description:		



Job Number: S190512

EMM Technician:	вв кв	Date:	13 September 2020

### STANDING WATER LEVEL (mbTOC)

Time:	7:32 am	UGM-M8D:	14.66
Time:	7:29 am	UGM-M8S:	14.16
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	9:39 am	UGM-M15D:	14.14
Time:	9:41 am	UGM-M15S:	13.64
Time:	7:41 am	BH-M17D:	14.44
Time:	7:44 am	BH-M17S:	13.17
Time:	7:48 am	BH-M18D:	14.28
Time:	7:31 am	BH-M18S:	13.03
Time:	9:32 am	BH-M19D:	14.39
Time:	9:30 am	BH-M19S:	13.33
Time:	9:58 am	BH-M20D:	14.05
Time:	9:57 am	BH-M20S:	13.48
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:49 am	BH-M22D:	15.32
Time:	9:46 am	BH-M22S:	14.14
Time:	8:24 am	LPSPB04:	13.92

# Description of daily mining activities

Pump beside LPSPB04 not operating. Same totaliser value as yesterday.

Well ID	Time	рН	Sp. Cond	Redox	DO	O	Temp	Total Iron		
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L		
UGM-M12D	8:21 am	6.75	57372	-252	0.57		17.92	4.0		
UGM-M12S	8:39 am	7.69	68592	-59.9	1.09		17.73	0.1		
BH-21D	9:05 am	6.76	57442	-228	0.22		20.46	4.6		
BH-21S	9:00 am	5.33	61861	11.5	5.33		17.62	0.18		
FIELD pH										
SPD-HM:		SPD-SAN	ID:		Pro	ocess V	later Pond:	8.03		
Time:		Tin	ne:				Time:	7:15 am		
Description:				Descrip	otion:					



Job Number: S190512

EMM Technician:	KB BB	Date:	14 September 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	9:33 am	UGM-M8D:	14.59
Time:	9:35 am	UGM-M8S:	14.13
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	9:08 am	UGM-M15D:	13.90
Time:	9:10 am	UGM-M15S:	13.625
Time:	9:52 am	BH-M17D:	14.33
Time:	9:50 am	BH-M17S:	13.18
Time:	9:43 am	BH-M18D:	14.15
Time:	9:46 am	BH-M18S:	13.04
Time:	9:05 am	BH-M19D:	14.30
Time:	9:03 am	BH-M19S:	13.33
Time:	9:21 am	BH-M20D:	13.98
Time:	9:23 am	BH-M20S:	13.52
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:13 am	BH-M22D:	15.11
Time:	9:16 am	BH-M22S:	14.14
Time:	10:11 am	LPSPB04:	13.82

# Description of daily mining activities

Pump beside LPSPB04 not operating. Totaliser value is the same as yesterday - 439982.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron				
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L				
UGM-M12D	10:20 am	6.59	56814	-232	0.32	17.92	4.0				
UGM-M12S	10:38 am	7.62	67803	-54.6	0.97	17.42	0.0				
BH-21D	10:49 am	6.63	56739	-219	0.27	19.94	5.4				
BH-21S	11:06 am	6.49	57461	2.1	6.05	17.19	0.2				
	FIFI D nH										

### FIELD pH

SPD-HM:	SPD-SAND:	Process Water Pond:	8.05
,		•	
Time:	Time:	Time:	11:25 am



Description:	Stockpile near UGM-M8	Description:	



Job Number: S190512

EMM Technician:	KB LG	Date:	15 September 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	8:29 am	UGM-M8D:	14.53
Time:	8:31 am	UGM-M8S:	14.12
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	7:56 am	UGM-M15D:	13.60
Time:	7:56 am	UGM-M15S:	13.62
Time:	9:01 am	BH-M17D:	14.26
Time:	9:02 am	BH-M17S:	13.16
Time:	8:42 am	BH-M18D:	14.12
Time:	8:46 am	BH-M18S:	13.035
Time:	7:49 am	BH-M19D:	14.225
Time:	7:47 am	BH-M19S:	13.33
Time:	8:17 am	BH-M20D:	13.91
Time:	8:20 am	BH-M20S:	13.52
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:08 am	BH-M22D:	14.62
Time:	8:10 am	BH-M22S:	14.12
Time:	9:13 am	LPSPB04:	13.74

### Description of daily mining activities

BH-M22D smells strongly of the araldite PVC glue

HBF reinjection pump totaliser reading 20288.839

UGM-M12D - sulphur odour BH-M21D - sulphur odour
P2 - 30L/second since 08:50

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron		
		Units	us/cm	mV	Mg/L	Deg Celcius	s Mg/L		
UGM-M12D	10:13 am	6.68	54309	-251.6	0.58	17.66	3.0		
UGM-M12S	9:50 am	7.61	67029	81.7	1.48	16.5	0.1		
BH-21D	10:43 am	6.67	54855	-213.5	0.34	29.7	5		
BH-21S	10:32 am	6.54	62088	-31.6	5.84	16.99	0.18		
FIELD pH									
SPD-HM: 7	7.98	SPD-SANI	D: 8.06		Proce	ss Water Pond:	8.00		
Time: 1	1:29 am	Time	e: 11:32	am		Time:	11:37 am		
					Tota	aliser readings	<b>3</b>		
				P2 bore:		Time:			
				LPSPB0	4 : 4399	82.299 Time:	9:13 am		
				LPSPB0	4 : 4399	82.299 Time:	9:13 am		
				LPSPB0	4 : 4399	82.299 Time:	9:13 am		
				LPSPB0	4 : 4399	782.299 Time:	9:13 am		
				LPSPB0	4: 4399	782.299 Time:	9:13 am		
Description:				LPSPB0		782.299 Time:	9:13 am		



Job No:	S190512 I	EMM Technician:		Date:	15 September	2020
		STANDING	WATER LE	VEL (mbTO	C)	
Time:		UGM-M1D:				
Time:		UGM-M1S:		Des	scription of c	
Time:		UGM-M2D:			activiti	es
Time:		UGM-M2S:				
Time:	2:28 pm	UGM-M4D:	17.36			
Time:		UGM-M16D:				
Time:		UGM-M16S:				
Time:		UGM-M23D:				
Time:		UGM-M23S:				
Time:		UGM-M24D:				
Time:		UGM-M24S:				
Time:	12:58 pm	UGM-M25D:	13.24			
Time:	12:09 pm	UGM-M25S:	13.05			
		FIEL	D PARAME	ETERS		
Well II	) Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thicke	ener					
HBF Tank	Тар					
Stockpile Su	ımp					

Well ID	Time	рН	Sp. Con	nd Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump						
Spill dam						
Description:				Description:		
Description:				Description:		



Job Number: S190512

EMM Technician:	KB LG	Date:	16 September 2020

### STANDING WATER LEVEL (mbTOC)

Time:	11:38 am	UGM-M8D:	15.08	
Time:	11:40 am	UGM-M8S:	14.24	
Time:		UGM-M12D:		
Time:		UGM-M12S:		
Time:	10:00 am	UGM-M15D:	13.61	
Time:	10:01 am	UGM-M15S:	13.62	
Time:	11:51 am	BH-M17D:	14.67	Description of daily mining
Time:	11:52 am	BH-M17S:	13.26	activities
Time:	11:46 am	BH-M18D:	14.44	BH M22D smelled of PVC glue
Time:	11:48 am	BH-M18S:	13.13	BH M19D, UGM-M12D, BH-M21D smelled of sulphur
Time:	8:26 am	BH-M19D:	14.43	Bore beside LPSPB04 pumping at 7.7
Time:	8:25 am	BH-M19S:	12.89	sec/10L. Totaliser value in KL
Time:	10:54 am	BH-M20D:	16.04	HBF totaliser value 20288.825kL
Time:	10:55 am	BH-M20S:	13.50	P2 bore not operating today or overnight.
Time:		BH-M21D:		
Time:		BH-M21S:		
Time:	10:45 am	BH-M22D:	15:17	
Time:	10:48 am	BH-M22S:	14.10	
Time:	12:01 pm	LPSPB04:	20.50	
		•		-

Well ID	Time	pH S	p. Cond	Redox	D	0	Temp	Total Iron
		Units	us/cm	mV	Mg	ı/L [	Deg Celcius	Mg/L
UGM-M12D	12:24 pm	6.69 5	5925	-241.6	0.51	1	8.78	3.8
UGM-M12S	12:51 pm	7.76	6570	-17.6	0.82	1	8.66	0.075
BH-21D	1:07 pm	6.69 5	5816	-220.3	0.25	2	21	4
BH-21S	1:24 pm	6.60	0956	-34.9	0.74	1	9.81	0.6
			FIE	LD pH				
SPD-HM: 7	'.89	SPD-SAND:	7.93		Pr	ocess Wa	ter Pond:	7.91
Time: 6	5:57 am	Time:	7:00 a	am			Time:	7:03 am
					т	otaliser	readings	
				P2 bore:			Time:	1:46 pm
				LPSPBO	)4 : 4	40609.039	Time:	12:03 pm
Description:				Descrip	otion:			



Job Number: S190512

10:57 am

EMM Technician:

Time:

Kaitlyn Brodie Luke Griffiths

UGM-M8D:

Date:

17 September 2020

### STANDING WATER LEVEL (mbTOC)

15.03

Time:	10:48 am	UGM-M8S:	14.313
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:54 am	UGM-M15D:	14.01
Time:	8:51 am	UGM-M15S:	13.625
Time:	11:24 am	BH-M17D:	14.67
Time:	11:26 am	BH-M17S:	13.37
Time:	11:17 am	BH-M18D:	14.525
Time:	11:16 am	BH-M18S:	13.29
Time:	8:43 am	BH-M19D:	15.508
Time:	8:46 am	BH-M19S:	13.355
Time:	9:29 am	BH-M20D:	16.43
Time:	9:31 am	BH-M20S:	13.55
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:23 am	BH-M22D:	15.54
Time:	9:17 am	BH-M22S:	14.125
Time:	11:40 am	LPSPB04:	20.82

# Description of daily mining activities

PSD\_02: 7.90 pH at 0755

Bore beside LPSPB04 pumping at 10L/7.7 seconds

HBF totaliser value 20288.825kL

P2 bore not operating

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	12:02 pm	6.76	54627	-260.2	0.85	18.88	4.0
UGM-M12S	12:20 pm	7.82	69850	-77.4	0.88	18.88	0.2
BH-21D	12:33 pm	6.73	58727	-214.6	0.24	20.95	3.8
BH-21S	1:03 pm	6.66	53624	-1.2	2.36	19.79	0.4

### FIELD pH

SPD-HM: 7.81 SPD-SAND: 7.97 Process Water Pond: 7.86

Time: 7:50 am Time: 7:53 am Time: 7:53 am



### **Totaliser readings**

P2 bore: Time:

LPSPB04: 441718.258 Time: 11:42 am

Description: HBF totaliser location (near LPSPB04)



Job No: S190512 EMM Technician: Kaitlyn Brodie Luke Date: 17 September 2020

STANDING WATER LEVEL (mbTOC)

	STANDING WATER LEVEL (HIDTOC)								
Time:	10:13 am	UGM-M1D:	15.61						
Time:	10:14 am	UGM-M1S:	13.75	Description of daily mining					
Time:	10:27 am	UGM-M2D:	15.487	activities					
Time:	10:23 am	UGM-M2S:	14.845						
Time:	10:33 am	UGM-M4D:	15.518						
Time:	9:52 am	BH-M16D:	14.74						
Time:	9:49 am	BH-M16S:	15.705						
Time:	9:04 am	BH-M23D:	15.86						
Time:	9:01 am	BH-M23S:	15.365						
Time:	9:42 am	BH-M24D:	15.53						
Time:	9:39 am	BH-M24S:	12.54						
Time:	8:31 am	BH-M25D:	13.585						
Time:	8:37 am	BH-M25S:	13.07						

Well ID	Time	рН	pH Sp. Cond		DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener	7:28 am	7.84	55905	18.2	7.02	21.65
HBF Tank Tap	7:47 am	8.08	22386	51.6	4.04	15.14
Stockpile Sump	8:04 am	8.04	55917	78.1	6.81	17.9

Well ID	Time	рН	Sp. Con	d Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump	7:37 am	7.85	69044	49.7	5.71	14.37
Spill dam	8:11 am	8.05	55436	62.2	6.39	17.97
Description:				Description:		
_						
Description:				Description:		



Job Number: S190512

EMM Technician:	KB LG	Date:	18 September 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	8:24 am	UGM-M8D:	15.00	
Time:	8:22 am	UGM-M8S:	14.30	
Time:		UGM-M12D:		
Time:		UGM-M12S:		
Time:	7:22 am	UGM-M15D:	13.87	
Time:	7:20 am	UGM-M15S:	13.64	
Time:	10:20 am	BH-M17D:	14.595	Description of daily mining
Time:	10:18 am	BH-M17S:	13.34	activities
Time:	9:07 am	BH-M18D:	14.405	PSD_02 pH - 7.88
Time:	8:36 am	BH-M18S:	13.24	Bore beside LPSPB04 pumping at about 10L/7.7 seconds
Time:	7:15 am	BH-M19D:	14.465	about 10L/1./ seconds
Time:	7:13 am	BH-M19S:	13.35	
Time:	7:33 am	BH-M20D:	16.393	
Time:	7:35 am	BH-M20S:	13.50	
Time:		BH-M21D:		
Time:		BH-M21S:		
Time:	7:27 am	BH-M22D:	15.47	
Time:	7:28 am	BH-M22S:	14.19	
Time:	11:57 am	LPSPB04:	20.722	

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron	
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L	
UGM-M12D	12:37 pm	6.75	58035	-201.7	0.52	19.99	3.4	
UGM-M12S	12:20 pm	7.79	69091	38.7	0.96	19.67	0.125	
BH-21D	12:51 pm	6.75	58029	-218.1	0.31	21.37	4.4	
BH-21S	1:06 pm	6.65	63993	-61.6	0.71	20.36	0.3	
			FIE	LD pH				
SPD-HM:	7.74	SPD-SAN	ND: 7.90		Process '	Water Pond:	7.84	
Time:	6:43 am	Tin	Time: 6:47 am Time:					
Totaliser readings								
				P2 bore:	Not running	Time:	1:22 pm	
				LPSPB(	04 : 442816.	750 Time:	12:01 pm	
Description:				Descri	ption:			



Job Number: S190512

Time:

Time:

Time:

7:31 am

7:29 am

8:18 am

BH-M22D:

BH-M22S:

LPSPB04:

15.596

14.15

20.825

	EMM Technician: KB LG				Date:	19	9 September 2020	
			STANDING	WATI	ER LEVI	EL (	mbTOC)	
Time:	7:48 8	am	UGM-M8D:	15.05				
Time:	7:50 8	am	UGM-M8S:	14.313	3			
Time:			UGM-M12D:					
Time:			UGM-M12S:					
Time:	7:25 8	am	UGM-M15D:	13.89				
Time:	7:24 8	am	UGM-M15S:	13.63				
Time:	7:57	am	BH-M17D:	14.62			Description of daily mining	
Time:	7:59 8	am	BH-M17S:	13.372	2		activities	
Time:	8:02 8	am	BH-M18D:	14.417	7			
Time:	8:04 8	am	BH-M18S:	13.27				
Time:	7:19	am	BH-M19D:	14.48				
Time:	7:16	am	BH-M19S:	13.327	7			
Time:	7:39 a	am	BH-M20D:	16.51				
Time:	7:38 a	am	BH-M20S:	13.494	4			
Time:			BH-M21D:					
Time:			BH-M21S:					
			i					

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	8:34 am	6.62	55177	-244.1	0.58	19.02	3.4
UGM-M12S	8:54 am	7.68	65920	-71.0	1.0	18.84	0.6
BH-21D	9:21 am	6.64	55917	-214.6	0.22	20.67	3.4
BH-21S	9:37 am	6.47	53459	-45.6	2.27	19.47	0.3
			FIE	LD pH			
SPD-HM:	7.89	SPD-SAN	ND: 7.92		Process \	Water Pond:	7.71
Time:	10:15 am	Tin	ne: 10:17	am		Time:	10:04 am
					Totalis	er readings	
				P2 bore:	Not	Time:	
				LPSPB0	04 : 443765.	820 Time:	8:19 am
Description:				Descri	ption:		



Job Number: S190512

	EMN	1
Techn	ician	

Kaitlyn Brodie Luke Griffiths

Date:

20 September 2020

### STANDING WATER LEVEL (mbTOC)

Time:	7:51 am	UGM-M8D:	16.90
Time:	7:48 am	UGM-M8S:	14.345
Time:		UGM-M12D:	
Time:		UGM-M12S:	
Time:	10:05 am	UGM-M15D:	13.077
Time:	10:06 am	UGM-M15S:	13.63
Time:	8:00 am	BH-M17D:	13.86
Time:	8:02 am	BH-M17S:	13.38
Time:	8:09 am	BH-M18D:	12.28
Time:	8:13 am	BH-M18S:	13.32
Time:	8:21 am	BH-M19D:	14.48
Time:	8:19 am	BH-M19S:	13.34
Time:	9:32 am	BH-M20D:	14.97
Time:	9:33 am	BH-M20S:	13.565
Time:		BH-M21D:	
Time:		BH-M21S:	
Time:	9:55 am	BH-M22D:	14.955
Time:	9:58 am	BH-M22S:	13.15
Time:	8:55 am	LPSPB04:	14.455

### Description of daily mining activities

HBF Tap: pH 7.70 at 07:10

Dipper not working well

bore beside LPSPB04 not operating

	Temp	DO	Redox	Sp. Cond	рН	Time	Well ID
Mg/L	Deg Celcius	Mg/L	mV	us/cm	Units		
3.0	18.39	0.51	-217.6	55271	6.60	9:15 am	UGM-M12D
0.1	17.26	6.32	194.4	66029	7.65	9:08 am	UGM-M12S
4.2	20.23	0.23	-199.4	54744	6.56	9:53 am	BH-21D
0.1	19.50	0.92	-62.3	58899	6.52	9:43 am	BH-21S
			ELD pH	FIE			
62	Water Pond:	Process		ND: 7.73	SPD-SAI	7.59	SPD-HM: 7
10 am	Time:		am	me: 7:06 a	Tiı	7:04 am	Time: 7
	ser readings	Totali					
	Time:		P2 bore:				
55 am	.232 Time:	04 : 444516	LPSPB0				
			-				
		ption:					
10 am	Time: ser readings Time:	Totali	P2 bore:		]		L



Job Number: S190512

EMM Technician:	KB LG	Date:	21 September 2020	
			<u> </u>	

### STANDING WATER LEVEL (mbTOC)

Time:	9:07 am	UGM-M8D:	15.827	
Time:	9:11 am	UGM-M8S:	14.487	
Time:		UGM-M12D:		
Time:		UGM-M12S:		
Time:	9:40 am	UGM-M15D:	13.78	
Time:	9:42 am	UGM-M15S:	13.63	
Time:	9:20 am	BH-M17D:	15.23	Description of daily mining
Time:	9:21 am	BH-M17S:	13.49	activities
Time:	9:25 am	BH-M18D:	14.71	PSD_02 pH 7.77 at 08:53
Time:	9:27 am	BH-M18S:	13.347	Bore beside LPSPB04 pumping
Time:	9:35 am	BH-M19D:	14.595	P2 bore not running
Time:	9:33 am	BH-M19S:	13.322	HBF trialled but not operating long enough to get a sample
Time:	12:04 pm	BH-M20D:	16.309	onough to get a cample
Time:	12:01 pm	BH-M20S:	13.518	
Time:		BH-M21D:		
Time:		BH-M21S:		
Time:	9:51 am	BH-M22D:	15.315	
Time:	9:48 am	BH-M22S:	14.17	
Time:	9:59 am	LPSPB04:	20.60	

Well ID	Time	pH S	p. Cond	Redox	D	O	Temp	Total Iron
		Units	us/cm	mV	Mg	/L [	Deg Celcius	Mg/L
UGM-M12D	10:21 am	6.67	9711	-233.6	0.68	1	8.24	2.6
UGM-M12S	10:36 am	7.69	1250	-78.3	0.93	8	.48	0
BH-21D	10:52 am	6.63	9828	-2018	0.25	2	0.36	4.2
BH-21S	11:16 am	6.34	2738	-16.5	2.29	1	8.68	0.5
			FIE	ELD pH				
SPD-HM: 7	7.84	SPD-SAND:	7.90		Pro	ocess Wat	er Pond:	7.56
Time: 2	::23 pm	Time:	2:26 բ	om			Time:	8:53 am
					т	otaliser	readings	
				P2 bore:			Time:	2:26 pm
				LPSPB0	)4 : 4	44824.205	Time:	10:00 am
Description:				Descrip	otion:			



Job Number: S190512

EMM Technician:	Dan Condon	Date:	5 October 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	1:21 pm	UGM-M8D:	16.37
Time:	1:26 pm	UGM-M8S:	13.93
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	6:41 am	UGM-M15D:	14.207
Time:	6:44 am	UGM-M15S:	13.63
Time:	7:05 am	BH-M17D:	14.74
Time:	7:03 am	BH-M17S:	12.803
Time:	7:00 am	BH-M18D:	14.463
Time:	7:59 am	BH-M18S:	12.756
Time:	6:37 am	BH-M19D:	14.56
Time:	6:38 am	BH-M19S:	13.333
Time:	6:49 am	BH-M20D:	14.239
Time:	6:52 am	BH-M20S:	13.503
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	6:47 am	BH-M22D:	15.379
Time:	6:45 am	BH-M22S:	14.19
Time:	8:37 am	LPSPB04:	14.123

# Description of daily mining activities

No mining activities occurring and no sampling able to be taken from Spiral Plant Discharge locations.

No pumping at bore beside LPSPB04.

Well ID	Time	рН	Sp. Cond	Redox	DO		Temp	Total Iron
		Units	us/cm	mV	Mg/L	_ [	Deg Celcius	Mg/L
UGM-M12D	8:15 am	6.68	57916	0.9	0.47		18.55	1.8
UGM-M12S	8:01 am	7.64	68033	23.9	0.87	1	18.21	0.1
BH-21D	7:37 am	6.72	58141	19.9	0.28		19.12	4.8
BH-21S	7:30 am	6.63	66130	157.7	0.41		19.49	0.0
FIELD pH								
SPD-HM:		SPD-SAN	ND:		Prod	cess Wa	ter Pond:	7.51
Time:		Tir	ne:				Time:	1:33 pm
					То	taliser	readings	
				P2 bore:			Time:	
				LPSPB0	94 :		Time:	
				HBF p	οΗ:		Time:	
				HBF p	οΗ:		Time:	
				_	_			
Description:				Descrip	otion:			
				┙				



Job No: S190512 EMM Te	chnician: Kaitlyn	Date:	6 October 2020
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### STANDING WATER LEVEL (mbTOC)

Time:	2:02 pm	UGM-M1D:	15.48
Time:	2:04 pm	UGM-M1S:	13.67
Time:	2:20 pm	UGM-M2D:	16.105
Time:	2:22 pm	UGM-M2S:	14.84
Time:	2:37 pm	UGM-M4D:	16.112
Time:	1:46 pm	BH-M16D:	15.67
Time:	1:43 pm	BH-M16S:	14.68
Time:	12:40 pm	BH-M23D:	15.90
Time:	12:24 pm	BH-M23S:	15.42
Time:	1:29 pm	BH-M24D:	14.71
Time:	1:32 pm	BH-M24S:	13.72
Time:	11:51 am	BH-M25D:	13.725
Time:	11:52 am	BH-M25S:	13.03

# Description of daily mining activities

emperature parameters aren't ccurate

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener	2:58 pm	7.64	20400.8	106.9	2.54	
HBF Tank Tap	3:10 pm	7.85	13819.9	-2.5	3.19	
Stockpile Sump	3:22 pm	7.54	18759	-25.1	0.8	

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump	3:03 pm	7.67	23455.6	31.7	2.74	
Spill dam	3:29 pm	7.84	18396.1	-37.4	3.11	
Г				1		
Description:			1	Description:		
ı				· ·		
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Description:				Description:		



Job Number: S190512

EMM Technician:	Kaitlyn	Date:	6 October 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	10:50 am	UGM-M8D:	15.39
Time:	10:52 am	UGM-M8S:	14.188
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	12:07 pm	UGM-M15D:	14.472
Time:	12:12 pm	UGM-M15S:	13.64
Time:	10:35 am	BH-M17D:	15.06
Time:	10:38 am	BH-M17S:	13.007
Time:	10:12 am	BH-M18D:	14.73
Time:	10:16 am	BH-M18S:	12.59
Time:	11:32 am	BH-M19D:	14.775
Time:	11:29 am	BH-M19S:	13.32
Time:	1:06 pm	BH-M20D:	14.47
Time:	1:08 pm	BH-M20S:	13.42
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	12:50 pm	BH-M22D:	15.55
Time:	12:52 pm	BH-M22S:	14.11
Time:	8:02 am	LPSPB04:	14.173

## Description of daily mining activities

Minor backfill into sinkhole. No mining therefore SPD not operating.

Temperature probe not accurate.

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Iron
		Units	us/cm	mV	Mg	/L D	eg Celcius	Mg/L
UGM-M12D	9:06 am	6.73	21995.1	23.4	0.14	31	.2	1.5
UGM-M12S	9:18 am	7.59	25643.5	-33.8	0.48	30	).7	1.1
BH-21D	9:37 am	6.82	22566	-9.4	0.04	31		2.0
BH-21S	9:44 am	5.55	24559	161.2	-0.11	32	2	0.15
FIELD pH								
SPD-HM:		SPD-SAN	ID:		Pro	ocess Wate	er Pond:	7.62
Time:		Tin	ne:				Time:	3:16 pm
	Totaliser readings							
				P2 bore:			Time:	
				LPSPB0	4: 4	48537.750	Time:	8:03 am
				HBF p	H:		Time:	
				HBF p	н:		Time:	
Description:				Descrip	ition:			
•								



Job Number: S190512

EMM Technician:	Kaitlyn Brodie	Date:	7 October 2020

### STANDING WATER LEVEL (mbTOC)

Time:		UGM-M8D:		
Time:	7:01 am	UGM-M8S:	14.14	
Time:		UGM-M12D:	Logger	
Time:		UGM-M12S:	Logger	
Time:	6:39 am	UGM-M15D:	14.38	
Time:	6:40 am	UGM-M15S:	13.64	
Time:	7:19 am	BH-M17D:	14.645	Description
Time:	7:24 am	BH-M17S:	13.095	act
Time:	7:12 am	BH-M18D:	14.61	HBF in stope 6
Time:	7:15 am	BH-M18S:	12.77	
Time:	6:33 am	BH-M19D:	14.67	
Time:	6:35 am	BH-M19S:	13.31	
Time:	6:52 am	BH-M20D:	14.36	
Time:	6:50 am	BH-M20S:	13.52	
Time:		BH-M21D:	Logger	
Time:		BH-M21S:	Logger	
Time:	6:46 am	BH-M22D:	15.57	
Time:	6:44 am	BH-M22S:	14.17	
Time:	8:08 am	LPSPB04:	14.08	
		-		

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	8:09 am	6.89	19294.3	100.7	2.78		0.2
UGM-M12S	7:56 am	7.52	23322.9		3.05		0.1
BH-21D	8:46 am	6.81	21017.7	-2.3	-0.02		1.6
BH-21S	8:34 am	6.64	23029.3	128.8	0.03		0.15
			FIE	LD pH			
SPD-HM:		SPD-SAN	ND:		Proces	s Water Pond:	7.57
Time:		Tir	ne:			Time:	9:43 am
					Total	iser readings	<b>3</b>
				P2 bore:		Time:	
				LPSPBO	)4 :	Time:	
				HBF į	oH: 7.77	Time:	9:54 am
				HBF p	oH:	Time:	
				7			
Description:				Descri	otion:		



Job Number: S190512

EMM Technician:	Kaitlyn	Date:	8 October 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	6:38 am	UGM-M8D:	14.835
Time:	6:37 am	UGM-M8S:	14.103
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	7:20 am	UGM-M15D:	14.28
Time:	7:21 am	UGM-M15S:	13.64
Time:	7:49 am	BH-M17D:	14.58
Time:	7:48 am	BH-M17S:	13.075
Time:	7:42 am	BH-M18D:	14.425
Time:	7:40 am	BH-M18S:	12.82
Time:	7:33 am	BH-M19D:	14.54
Time:	7:31 am	BH-M19S:	13.31
Time:	6:59 am	BH-M20D:	14.22
Time:	7:00 am	BH-M20S:	13.51
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	7:11 am	BH-M22D:	15.44
Time:	7:13 am	BH-M22S:	14.145
Time:	8:25 am	LPSPB04:	13.995

HBF - started at 08:40 to 17:00 Injecting at about 220m3/h for a total 450 tonnes
BH-M18D 12:48 - 13.125 BH-M18D 15:07 - 13.605 BH-M18D 17:42 - 13.78
BH-M18S 12:52 - 11.84 BH-M18S 15:01 - 11.355 BH-M18S 17:48 - 11.24
BH-M17D 12:59 - 13.463 BH-M17D 15:17 - 13.985 BH-M17D 17:32 - 14.22
BH-M17S 12:57 - 11.004 BH-M17S 15:13 - 10.191 BH-M17S 17:35 - 10.02

Well ID	Time	рН	Sp. Cond	Redox	DO		Temp	Total Iron	
		Units	us/cm	mV	Mg/L	_ De	g Celcius	Mg/L	
UGM-M12D	11:08 am		58078	-184.4	0.54	17.	4	3.2	
UGM-M12S	10:52 am	7.47	70867	16.5	0.61	17.	4	0.16	
BH-21D	9:44 am	6.65	56937	-147.9	0.16	19.	3	3.4	
BH-21S	10:04 am	6.55	57767	21	0.54	18.	5	0.1	
FIELD pH									
SPD-HM:		SPD-SAN	ID:		Prod	cess Water	Pond:	7.55	
Time:		Tin	ne:	Tir			Time:	12:15 pm	
Totaliser readings									
				P2 bore:			Time:		
				LPSPB0	14: 448	3537.751	Time:	8:25 am	
	1			HBF p	oH: 7.3	7	Time:	12:07 pm	
					)H: 7.2	6	Time:	3:56 pm	
15									
Description:	Surface expre	ession		Descrip	otion:				



Job Number: S190512

EMM Technician:	Kaitlyn	Date:	9 October 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	8:18 am	UGM-M8D:	15.495
Time:	8:19 am	UGM-M8S:	13.454
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	7:14 am	UGM-M15D:	14.475
Time:	7:17 am	UGM-M15S:	13.64
Time:	8:50 am	BH-M17D:	15.18
Time:	8:47 am	BH-M17S:	11.628
Time:	8:37 am	BH-M18D:	14.747
Time:	8:34 am	BH-M18S:	12.078
Time:	7:06 am	BH-M19D:	14.68
Time:	7:04 am	BH-M19S:	12.689
Time:	7:39 am	BH-M20D:	14.453
Time:	7:37 am	BH-M20S:	13.49
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	7:27 am	BH-M22D:	15.435
Time:	7:24 am	BH-M22S:	14.148
Time:	11:36 am	LPSPB04:	14.083

Clean water injected into HBF. No slurry today
BH-M17D 13:08 - 14.965 BH-M17D 14:27 - 14.88
BH-M17S 13:13 - 11.985 BH-M17S 14:30 - 12.065
BH-M18D 13:22 - 14.81 BH-M18D 14:34 - 14.605
BH-M18S 13:25 - 12.29 BH-M18S 14:36 - 12.345

Well ID	Time	рН	Sp. Cond	Redox	D	)	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	10:32 am	6.25	55840	-141.4	0.27		17.7	3.2
UGM-M12S	10:55 am	6.93	68419	-22.2	0.7		17.2	0.25
BH-21D	11:43 am	6.22	56245	-157.1	0.11		19.7	3.8
BH-21S	11:25 am	6.2	57064	84.3	0.43		18.2	0.0
			FIE	ELD pH				
SPD-HM:		SPD-SAN	ND:		Pro	ocess Wa	ater Pond:	6.92
Time:		Tir	ne:				Time:	12:43 pm
					т	otalise	r readings	
				P2 bore:			Time:	
				LPSPBO	)4 : 4	48537.75	Time:	11:36 am
				HBF p	oH: 6	80	Time:	12:28 pm
				HBF p	оН:		Time:	
Description:				Descrip	otion:			



Job Number: S190512

E Technic	MM ian:		Date:	э:
		STANDING	WATER LEV	VEL (mbTOC)
Time:		UGM-M8D:		
Time:		UGM-M8S:		
Time:		UGM-M12D:		
Time:		UGM-M12S:		
Time:		UGM-M15D:		
Time:		UGM-M15S:		
Time:		BH-M17D:		Description of daily mining
Time:		BH-M17S:		activities
Time:		BH-M18D:		
Time:		BH-M18S:		
Time:		BH-M19D:		
Time:		BH-M19S:		
Time:		BH-M20D:		
Time:		BH-M20S:		
Time:		BH-M21D:		
Time:		BH-M21S:		
Time:		BH-M22D:		<b>=</b>
Time:		BH-M22S:		<b>=</b>
Time:		LPSPB04:		

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D							
UGM-M12S							
BH-21D							
BH-21S							
			FIE	LD pH			
piral Plant Discharge:				Proces	s Water Pond	d:	
Time:					Time	э:	
Description:				Descrip	tion:		



Job Number: S190512

EMM Technician:	Dan Condon	Date:	22 September 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	9:49 am	UGM-M8D:	15.538
Time:	9:59 am	UGM-M8S:	15.026
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	9:12 am	UGM-M15D:	14.302
Time:	9:14 am	UGM-M15S:	13.643
Time:	8:50 am	BH-M17D:	14.809
Time:	8:52 am	BH-M17S:	13.530
Time:	8:57 am	BH-M18D:	14.521
Time:	8:55 am	BH-M18S:	13.352
Time:	9:03 am	BH-M19D:	14.638
Time:	9:07 am	BH-M19S:	13.372
Time:	9:31 am	BH-M20D:	14.893
Time:	9:34 am	BH-M20S:	14.482
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:23 am	BH-M22D:	15.637
Time:	9:19 am	BH-M22S:	14.165
Time:	11:36 am	LPSPB04:	14.542

No	mining.	Tripping	out stud	k rods	

Well ID	Time	рН	Sp. Cond	Redox	DC	)	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	11:39 am	6.64	53952	-245.1	0.71		18.01	0.8
UGM-M12S	11:28 am	7.56	64430	-14.4	0.92		17.96	0.0
BH-M21D	11:01 am	6.56	54047	-212.4	0.28		20.23	5.2
BH-M21S	10:44 am	6.58	61152	54.4	0.58		19.09	0.0
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	cess W	ater Pond:	7.48
Time:		Tin	ne:				Time:	8:25 am
Description:				Descrip	otion:			



Job Number: S190512

EMM Technician:	Dan Condon	Date:	23 September 2020	

#### STANDING WATER LEVEL (mbTOC)

Time:	12:01 pm	UGM-M8D:	14.961
Time:	12:05 pm	UGM-M8S:	14.470
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	11:02 am	UGM-M15D:	14.340
Time:	11:04 am	UGM-M15S:	13.650
Time:	11:52 am	BH-M17D:	14.580
Time:	11:48 am	BH-M17S:	13.310
Time:	11:37 am	BH-M18D:	14.170
Time:	11:33 am	BH-M18S:	13.400
Time:	11:14 am	BH-M19D:	14.630
Time:	11:14 am	BH-M19S:	13.340
Time:	10:04 am	BH-M20D:	14.410
Time:	9:59 am	BH-M20S:	13.530
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	10:37 am	BH-M22D:	15.630
Time:	10:40 am	BH-M22S:	14.270
Time:	10:18 am	LPSPB04:	14.320

### Description of daily mining activities

Tripping rods back into stope 6 overnight. Mining commenced at around 9:00. First SPD value is background. Day shift: MD from 527m to 519m Pipe #89-88 392 tonnes Night shift: MD from 519m to 512m Pipe #88-86 600 tonnes Pullback 200mm/10mins HP 150m3/hr MP 140m3/hr Daily water usage summary Pumping in the bore beside LPSPB04. Totaliser value at 11:30 was 445918kL.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	2:33 pm	6.59	60204	-253.0	0.65	17.55	1.6
UGM-M12S	2:07 pm	7.58	69169	-50.7	0.97	17.45	0.1
BH-M21D	1:41 pm	6.58	60228	-223.6	0.43	19.39	5.2
BH-M21S	1:30 pm	6.59	69256	181.4	0.56	18.74	0.0

### FIELD pH

SPD-HM: 7.79 SPD-SAND: 7.82 Process Water Pond: 7.75

Time: 7:50 am Time: 7:55 am Time: 8:01 am



Description: New SPD-HM location



Description:



Job No: S190512 EMM Technician: Dan Condon Date: 23 September 2020

#### **STANDING WATER LEVEL (mbTOC)**

8:26 am	UGM-M1D:	14.777
8:32 am	UGM-M1S:	13.720
8:47 am	UGM-M2D:	15.610
8:47 am	UGM-M2S:	14.890
9:03 am	UGM-M4D:	15.620
9:31 am	UGM-M16D:	15.560
9:33 am	UGM-M16S:	14.880
10:50 am	UGM-M23D:	15.950
10:49 am	UGM-M23S:	15.420
9:45 am	UGM-M24D:	14.690
9:47 am	UGM-M24S:	13.860
11:25 am	UGM-M25D:	13.530
11:22 am	UGM-M25S:	13.080
	3:32 am 3:47 am 3:47 am 9:03 am 9:31 am 9:33 am 10:50 am 10:49 am 9:45 am 9:47 am	3:32 am

## Description of daily mining activities

Spill dam dry. Tripping rods back into stope 6 overnight. Mining commenced at around 9:00. Day shift: MD from 527m to 519m Pipe #89-88 392 tonnes Night shift: MD from 519m to 512m Pipe #88-86 600 tonnes Pullback 200mm/10mins HP 150m3/hr MP 140m3/hr Daily water usage summary Pumping in the bore beside LPSPB04. Totaliser value at 11:30 was 445918kL.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener	7:45 am	7.75	56852	221.80	7.45	14.41
HBF Tank Tap						
Stockpile Sump	8:09 am	7.79	53466	139.44	7.78	12.68

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump	7:37 am	6.83	33544	199.27	6.35	14.80
Spill dam						



Description:

T2 stockpile sump



Description:

Dry spill dam

Description:	Description:	
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Job Number: S190512

EMM Technician:	Dan Condon	Date:	24 September 2020	
'				

### STANDING WATER LEVEL (mbTOC)

Time:	7:41 am	UGM-M8D:	14.768
Time:	7:44 am	UGM-M8S:	14.327
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:22 am	UGM-M15D:	14.260
Time:	8:23 am	UGM-M15S:	13.610
Time:	7:52 am	BH-M17D:	14.320
Time:	7:49 am	BH-M17S:	13.432
Time:	7:59 am	BH-M18D:	13.902
Time:	8:03 am	BH-M18S:	13.320
Time:	8:12 am	BH-M19D:	14.462
Time:	8:14 am	BH-M19S:	13.372
Time:	8:58 am	BH-M20D:	15.750
Time:	8:58 am	BH-M20S:	13.495
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:47 am	BH-M22D:	15.650
Time:	8:45 am	BH-M22S:	14.202
Time:	11:29 am	LPSPB04:	20.618

Mining summary
Day shift: MD from 512m to 505m Pipe #86-85 420 tonnes
Night shift: MD from 505m to 495m Pipe #85-84 747tonnes
Pullback at 85% recovery HP 160m3/hr MP 150m3/hr
Daily water usage summary Pumping in the bore beside LPSPB04. Totaliser value at 7:30am was 446705kl

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	11:08 am	6.51	54685	-249.0	0.78	16.83	1.4
UGM-M12S	10:55 am	7.43	65258	-63.0	1.15	16.90	0.1
BH-M21D	10:24 am	6.44	54240	-235.2	0.39	19.41	4.8
BH-M21S	10:10 am	6.48	62040	57.2	0.47	18.98	0.0

FIEL	.D	p	Н
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SPD-HM:	7.71	SPD-SAND:	7.73	Process Water Pond:	7.68
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Time: 7:21 am Time: 7:23 am Time: 7:28 am

Description:	Description:	



Job Number: S190512

EMM Technician:	Dan Condon	Date:	25 September 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	9:36 am	UGM-M8D:	17.762
Time:	9:39 am	UGM-M8S:	14.382
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	9:16 am	UGM-M15D:	14.782
Time:	9:15 am	UGM-M15S:	13.572
Time:	8:52 am	BH-M17D:	16.272
Time:	8:47 am	BH-M17S:	13.541
Time:	8:54 am	BH-M18D:	15.222
Time:	8:56 am	BH-M18S:	13.365
Time:	9:03 am	BH-M19D:	15.021
Time:	9:05 am	BH-M19S:	13.320
Time:	8:36 am	BH-M20D:	16.820
Time:	8:34 am	BH-M20S:	13.561
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:24 am	BH-M22D:	16.162
Time:	9:21 am	BH-M22S:	14.188
Time:	7:48 am	LPSPB04:	21.210

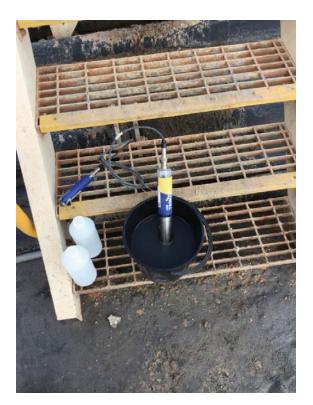
Mining summary
Day shift: MD from 495m to 486m Pipe #84-82 668 tonnes
Night shift: MD from 486m to 476m Pipe #82-80 888 tonnes
Pullback at 85% recovery HP 165m3/hr MP 145m3/hr
Daily water usage summary Pumping in the bore beside LPSPB04. Totaliser value at 7:30am was 446705kl

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	8:38 am	6.44	54707	-249.2	0.68	16.43	1.9
UGM-M12S	8:17 am	7.71	65056	-66.3	1.21	15.72	0.1
BH-M21D	7:53 am	6.36	54765	-232.4	0.42	18.21	4.6
BH-M21S	7:31 am	6.32	62272	103.4	0.61	16.58	0.0

### FIELD pH

SPD-HM: 7.61 SPD-SAND: 7.77 Process Water Pond: 7.49

Time: 10:51 am Time: 10:55 am Time: 11:01 am



Description:	SPS-HM	Description:	



Job Number: S190512

### STANDING WATER LEVEL (mbTOC)

Time:	8:37 am	UGM-M8D:	18.010
Time:	8:39 am	UGM-M8S:	14.770
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	9:20 am	UGM-M15D:	15.040
Time:	9:22 am	UGM-M15S:	13.572
Time:	8:51 am	BH-M17D:	16.818
Time:	8:48 am	BH-M17S:	13.785
Time:	8:59 am	BH-M18D:	15.820
Time:	9:01 am	BH-M18S:	13.670
Time:	9:09 am	BH-M19D:	15.520
Time:	9:11 am	BH-M19S:	13.320
Time:	9:43 am	BH-M20D:	17.260
Time:	9:43 am	BH-M20S:	13.625
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:29 am	BH-M22D:	16.642
Time:	9:28 am	BH-M22S:	14.231
Time:	12:09 pm	LPSPB04:	17.802

N	Mining summary
ľ	Day shift: No mining due to thickener being clogged
F	Night shift: MD from 476m to 456m Pipe #80-77 388 tonnes
1	HP 165m3/hr MP 145m3/hr
L	Daily water usage summary No pumping in the bore beside _PSPB04. Totaliser value at 11:30am was 447852kl

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	12:58 pm	6.61	56450	-190.3	0.51	16.15	1.2
UGM-M12S	12:34 pm	7.59	67274	-21.4	1.10	16.21	0.1
BH-M21D	12:11 pm	6.59	56389	-190.4	0.34	18.12	5.4
BH-M21S	11:40 am	6.60	64272	50.4	0.47	17.52	0.0

### FIELD pH

SPD-HM:	SPD-SAND:	Process Water Pond:	7.41
Time:	Time:	Time:	8:32 am



Description:	Process water	Description:	



Job Number: S190512

EMM Technician:	Dan Condon	Date:	27 September 2020

### STANDING WATER LEVEL (mbTOC)

Time:	9:05 am	UGM-M8D:	17.032
Time:	9:07 am	UGM-M8S:	14.571
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	9:46 am	UGM-M15D:	14.932
Time:	9:48 am	UGM-M15S:	13.587
Time:	9:18 am	BH-M17D:	15.852
Time:	9:16 am	BH-M17S:	13.465
Time:	9:28 am	BH-M18D:	15.172
Time:	9:30 am	BH-M18S:	11.810
Time:	9:38 am	BH-M19D:	15.231
Time:	9:39 am	BH-M19S:	13.320
Time:	10:07 am	BH-M20D:	15.230
Time:	10:10 am	BH-M20S:	13.580
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:58 am	BH-M22D:	16.130
Time:	9:56 am	BH-M22S:	14.270
Time:	11:22 am	LPSPB04:	14.920

Mining summary
Day shift:
MD from 456m to 444m Pipe #77-75 760 tonnes
Night shift: No mining due to pump issues
HP 165m3/hr MP 145m3/hr
Daily water usage summary No pumping in the bore beside LPSPB04. Totaliser value at 11:30am was 447852kl

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	12:20 pm	6.54	56116	-194.0	0.56	16.18	1.4
UGM-M12S	11:57 am	7.48	66869	-20.8	1.02	16.11	0.1
BH-M21D	11:37 am	6.64	55836	-212.7	0.35	19.01	5.3
BH-M21S	11:30 am	6.63	65195	77.0	0.51	17.61	0.0

### FIELD pH

SPD-HM:	7.56	SPD-SAND:	7.63	Process Water Pond:	7.54
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Time: 8:47 am Time: 8:50 am Time: 8:57 am

Description:	Description:	



Job Number: S190512

Technician:
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### STANDING WATER LEVEL (mbTOC)

Time:	7:32 am	UGM-M8D:	16.154
Time:	7:35 am	UGM-M8S:	14.571
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:52 am	UGM-M15D:	14.970
Time:	8:54 am	UGM-M15S:	13.590
Time:	7:42 am	BH-M17D:	15.624
Time:	7:42 am	BH-M17S:	13.060
Time:	8:06 am	BH-M18D:	15.370
Time:	8:04 am	BH-M18S:	11.530
Time:	8:45 am	BH-M19D:	15.346
Time:	8:42 am	BH-M19S:	12.692
Time:	9:13 am	BH-M20D:	15.155
Time:	9:14 am	BH-M20S:	13.590
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:02 am	BH-M22D:	16.092
Time:	9:01 am	BH-M22S:	14.245
Time:	11:20 am	LPSPB04:	14.841

Mining summary	
Day shift: No mining due to pu thickener being repa	•
Night shift: MD from 444m to 43 Pipe #75-73 612 tonnes	33m
HP 160m3/hr MP 150m3/hr	
Daily water usage s No pumping in the b LPSPB04. Totaliser value at 11 447852kl	ore beside

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	11:45 am	6.50	54899	-229.0	0.83		16.35	0.8
UGM-M12S	11:29 am	7.43	65512	-36.9	1.02		16.30	0.1
BH-M21D	11:06 am	6.50	54967	-206.3	0.40		18.80	5.0
BH-M21S	10:56 am	6.60	64112	197.1	0.63		17.64	0.0
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	ocess W	ater Pond:	7.46
Time:		Tin	ne:				Time:	7:24 am
Description:				Descrip	otion:			



Job Number: S190512

EMM Technician:	Dan Condon	Date:	29 September 2020
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### STANDING WATER LEVEL (mbTOC)

Time:	8:56 am	UGM-M8D:	15.293	Description of daily mining
Time:	8:56 am	UGM-M8S:	14.400	activities
Time:		UGM-M12D:	Logger	Mining summary
Time:		UGM-M12S:	Logger	Day shift:
Time:	8:08 am	UGM-M15D:	14.671	MD from 433m to 415m Pipe #73-70
Time:	8:09 am	UGM-M15S:	13.602	781 tonnes
Time:	9:40 am	BH-M17D:	14.730	Night shift: MD from 415m to 393m
Time:	9:38 am	BH-M17S:	13.360	Pipe #70-67 834 tonnes
Time:	9:09 am	BH-M18D:	14.082	HP 165m3/hr
Time:	9:07 am	BH-M18S:	12.370	MP 145m3/hr
Time:	7:55 am	BH-M19D:	14.961	Daily water usage summary. Pumping in the bore beside LPSPB04.
Time:	7:58 am	BH-M19S:	12.960	Totaliser value at 11:30am was 448085kl at 0945
Time:	8:21 am	BH-M20D:	15.812	The Vu-Situ water quality meter Comms device had broken and now no longer
Time:	8:22 am	BH-M20S:	13.556	works. We are getting a replacement unit sent to site ASAP.
Time:		BH-M21D:	Logger	No Water Quality data available to be
Time:		BH-M21S:	Logger	recorded.
Time:	8:14 am	BH-M22D:	15.930	
Time:	8:12 am	BH-M22S:	14.230	
Time:	9:50 am	LPSPB04:	20.720	

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Ir	on
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L	_
UGM-M12D									
UGM-M12S									
BH-M21D									
BH-M21S									
			FIE	LD pH					
SPD-HM:		SPD-SANI	D:		Pro	ocess W	ater Pond:		
Time:		Tim	e:				Time:		
Description:				Descrip	otion:				



Job No: S190512 EMM Technician: Dan Condon Date: 30 September 2020

#### **STANDING WATER LEVEL (mbTOC)**

Time:	11:40 am	UGM-M1D:	15.862
Time:	11:42 am	UGM-M1S:	13.650
Time:	12:04 pm	UGM-M2D:	17.143
Time:	12:06 pm	UGM-M2S:	14.872
Time:	12:20 pm	UGM-M4D:	17.215
Time:	2:26 pm	UGM-M16D:	16.201
Time:	2:27 pm	UGM-M16S:	14.815
Time:	9:46 am	UGM-M23D:	16.090
Time:	9:46 am	UGM-M23S:	15.372
Time:	2:14 pm	UGM-M24D:	14.890
Time:	2:13 pm	UGM-M24S:	13.810
Time:	8:58 am	UGM-M25D:	13.771
Time:	8:57 am	UGM-M25S:	13.052

### Description of daily mining activities

Mining summary

Day shift:
MD from 393m to 380m
Pipe #67-65
490 tonnes

Night shift:
Mining completed at stope 6. Tripping out rods

HP 165m3/hr
MP 145m3/hr
The water quality data values were recorded on 3/10.

No water in spill dam

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener	7:11 am	7.85	56551	112.1	7.52	18.48
HBF Tank Tap	2:02 pm	7.33	56040	89.1	6.59	28.37
Stockpile Sump	7:23 am	7.67	54146	103.9	2.63	17.73

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump	7:03 am	7.88	63978.2	229.6	5.74	16.53
Spill dam						



Description:	T2 stockpile sump	Description:	

Description:	Description:	



Job Number: S190512

EMM Technician:	Dan Condon	Date:	30 September 2020

### STANDING WATER LEVEL (mbTOC)

Time:	7:52 am	UGM-M8D:	14.792	Description of daily mining
Time:	7:53 am	UGM-M8S:	14.270	activities
Time:		UGM-M12D:	Logger	Mining summary
Time:		UGM-M12S:	Logger	Day shift:
Time:	9:31 am	UGM-M15D:	14.577	MD from 393m to 380m Pipe #67-65
Time:	9:32 am	UGM-M15S:	13.625	490 tonnes
Time:	8:20 am	BH-M17D:	14.181	Night shift: Mining completed at stope 6. Tripping
Time:	8:18 am	BH-M17S:	13.087	out rods
Time:	8:36 am	BH-M18D:	13.990	HP 165m3/hr MP 145m3/hr
Time:	8:38 am	BH-M18S:	11.478	Daily water usage summary. No
Time:	9:13 am	BH-M19D:	14.782	pumping in the bore beside LPSPB04. Totaliser value at 1500 was 448537kl.
Time:	9:18 am	BH-M19S:	13.045	The Vu-Situ water quality meter Comms device had broken and now no longer
Time:	10:26 am	BH-M20D:	14.710	works. We are getting a replacement unit sent to site ASAP.
Time:	10:27 am	BH-M20S:	13.601	No Water Quality data available to be
Time:		BH-M21D:	Logger	recorded.
Time:		BH-M21S:	Logger	M18d-13.970 M18s-10.260
Time:	10:06 am	BH-M22D:	15.802	
Time:	10:04 am	BH-M22S:	14.210	
Time:	2:47 pm	LPSPB04:	14.365	

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Ir	on
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L	_
UGM-M12D									
UGM-M12S									
BH-M21D									
BH-M21S									
			FIE	LD pH					
SPD-HM:		SPD-SANI	D:		Pro	ocess W	ater Pond:		
Time:		Tim	e:				Time:		
Description:				Descri	otion:				



Job Number: S190512

EMM Technician:	Dan Condon	Date:	1 October 2020	

#### STANDING WATER LEVEL (mbTOC)

Time:	10:45 am	UGM-M8D:	14.032
Time:	10:46 am	UGM-M8S:	14.080
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:36 am	UGM-M15D:	14.492
Time:	8:37 am	UGM-M15S:	13.615
Time:	10:54 am	BH-M17D:	14.653
Time:	10:53 am	BH-M17S:	12.942
Time:	11:02 am	BH-M18D:	14.348
Time:	10:59 am	BH-M18S:	11.051
Time:	8:26 am	BH-M19D:	14.776
Time:	8:26 am	BH-M19S:	13.330
Time:	9:25 am	BH-M20D:	14.485
Time:	9:27 am	BH-M20S:	13.595
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:17 am	BH-M22D:	15.681
Time:	9:16 am	BH-M22S:	14.231
Time:	11:33 am	LPSPB04:	14.362

## Description of daily mining activities

Daily water usage summary. No pumping in the bore beside LPSPB04. Totaliser value at 1500 was 448537kl.

The Vu-Situ water quality meter Comms device had broken and now no longer works. We are getting a replacement unit sent to site ASAP.

No Water Quality data available to be recorded.

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Ir	on
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L	_
UGM-M12D									
UGM-M12S									
BH-M21D									
BH-M21S									
			FIE	LD pH					
SPD-HM:		SPD-SANI	D:		Pro	ocess W	ater Pond:		
Time:		Tim	e:				Time:		
Description:				Descrip	otion:				



Job Number: S190512

EMM Technician:	Dan Condon	Date:	2 October 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	9:55 am	UGM-M8D:	14.485
Time:	9:55 am	UGM-M8S:	13.978
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:02 am	UGM-M15D:	14.332
Time:	8:04 am	UGM-M15S:	13.632
Time:	10:38 am	BH-M17D:	13.532
Time:	10:37 am	BH-M17S:	12.365
Time:	10:57 am	BH-M18D:	13.360
Time:	10:53 am	BH-M18S:	12.432
Time:	7:42 am	BH-M19D:	14.572
Time:	7:43 am	BH-M19S:	13.315
Time:	8:28 am	BH-M20D:	14.270
Time:	8:30 am	BH-M20S:	13.615
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:11 am	BH-M22D:	15.535
Time:	8:08 am	BH-M22S:	14.205
Time:	12:25 pm	LPSPB04:	14.052

# Description of daily mining activities

No mining occurring. Tripping out rods

Daily water usage summary. No pumping in the bore beside LPSPB04. Totaliser value at 1500 was 448537kl.

The Vu-Situ water quality meter Comms device had broken and now no longer works. We are getting a replacement unit sent to site ASAP.

No Water Quality data available to be recorded.

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Ir	on
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L	_
UGM-M12D									
UGM-M12S									
BH-M21D									
BH-M21S									
			FIE	LD pH					
SPD-HM:		SPD-SANI	D:		Pro	ocess W	ater Pond:		
Time:		Tim	e:				Time:		
Description:				Descrip	otion:				



Job Number: S190512

EMM Technician:	Dan Condon	Date:	3 October 2020	

### **STANDING WATER LEVEL (mbTOC)**

Time:	11:16 am	UGM-M8D:	15.862
Time:	11:19 am	UGM-M8S:	13.088
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:33 am	UGM-M15D:	13.747
Time:	8:36 am	UGM-M15S:	13.642
Time:	12:13 pm	BH-M17D:	14.890
Time:	12:12 pm	BH-M17S:	11.294
Time:	11:22 am	BH-M18D:	13.970
Time:	11:21 am	BH-M18S:	11.670
Time:	7:49 am	BH-M19D:	14.031
Time:	8:21 am	BH-M19S:	13.340
Time:	8:57 am	BH-M20D:	13.537
Time:	8:59 am	BH-M20S:	13.561
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:50 am	BH-M22D:	15.032
Time:	8:48 am	BH-M22S:	14.172
Time:	12:48 pm	LPSPB04:	13.821

# Description of daily mining activities

No mining activities occurring and no sampling able to be taken from Spiral Plant Discharge locations

No pumping at bore beside LPSPB4

Well ID	Time	рН	Sp. Cond	Redox	DO	O	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	1:49 pm	6.71	57318	3.5	1.54		20.38	2.6
UGM-M12S	1:15 pm	7.61	67973		1.05		19.37	0.4
BH-M21D	12:53 pm	6.72	56681	18.8	0.20		20.91	5.5
BH-M21S	12:39 pm	6.76	67094	105.8	0.34		19.71	0.2
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	ocess W	later Pond:	7.71
Time:		Tin	ne:				Time:	7:19 am
Description:				Descrip	otion:			



Job Number: S190512

EMM Technician:	Dan Condon	Date:	4 October 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	10:09 am	UGM-M8D:	14.832
Time:	10:13 am	UGM-M8S:	13.800
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:53 am	UGM-M15D:	14.201
Time:	8:55 am	UGM-M15S:	13.645
Time:	10:19 am	BH-M17D:	14.266
Time:	10:17 am	BH-M17S:	12.510
Time:	10:29 am	BH-M18D:	13.955
Time:	10:25 am	BH-M18S:	12.572
Time:	8:47 am	BH-M19D:	14.640
Time:	8:48 am	BH-M19S:	13.328
Time:	9:37 am	BH-M20D:	14.235
Time:	9:39 am	BH-M20S:	13.490
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:13 am	BH-M22D:	15.377
Time:	9:12 am	BH-M22S:	14.149
Time:	10:33 am	LPSPB04:	14.120

# Description of daily mining activities

No mining activities occurring and no sampling able to be taken from Spiral Plant Discharge locations

No pumping at bore beside LPSPB4

Well ID	Time	рН	Sp. Cond	Redox	DO	O	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	12:05 pm	6.69	56187	-2.0	0.55		20.61	2.1
UGM-M12S	11:44 am	7.63	67410	37.8	0.84		20.42	0.4
BH-M21D	11:15 am	6.70	56891	28.5	0.19		21.30	5.4
BH-M21S	11:04 am	6.67	66021	118.0	0.35		20.48	0.0
			FIE	LD pH				
SPD-HM:		SPD-SAN	ND:		Pro	ocess V	later Pond:	7.51
Time:		Tin	ne:				Time:	8:31 am
Description:				Descrip	otion:			



Job Number: S190512

EMM Technician:	Kaitlyn	Date:	10 October 2020	
			-	

### STANDING WATER LEVEL (mbTOC)

Time:	7:31 am	UGM-M8D:	16.87
Time:	7:32 am	UGM-M8S:	13.997
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	6:45 am	UGM-M15D:	14.445
Time:	6:46 am	UGM-M15S:	13.65
Time:	7:47 am	BH-M17D:	16.005
Time:	7:51 am	BH-M17S:	12.84
Time:	8:02 am	BH-M18D:	15.297
Time:	8:06 am	BH-M18S:	12.94
Time:	6:39 am	BH-M19D:	14.87
Time:	6:38 am	BH-M19S:	13.315
Time:	7:08 am	BH-M20D:	14.703
Time:	7:08 am	BH-M20S:	13.17
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	6:57 am	BH-M22D:	15.59
Time:	6:52 am	BH-M22S:	14.18
Time:	8:23 am	LPSPB04:	14.305

## Description of daily mining activities

Field parameters for upwelled water vs ponded rain water. Last rained on 7/10/2020

Temp C - 9.3 9.7 DO% - 62.6 82.6 DO mg/L - 5.66 8.64 SPC uS/cm - 53456 20423 EC uS/cm - 37994 13311 TDS mg/L - 34781 13962 pH - 6.71 7.32 ORP mV - 94.8 82.6

HBF getting setup in 1B, injecting tomorrow.

UGM-M4 dip: 12:38 - 17.703mbTOC

P2 bore running periodically since 9/10/2020.

Well ID	Time	рН	Sp. Cond	Redox	DC	)	Temp	Total Iron
		Units	us/cm	mV	Mg/	L [	Deg Celcius	Mg/L
UGM-M12D	10:34 am	6.28	49051	-158.7	0.33		18.2	3.0
UGM-M12S	10:03 am	6.78	67962	34	12.4		17.8	0.2
BH-21D	10:49 am	6.29	50742	-159.7	0.22		19.8	3.8
BH-21S	11:18 am	6.17	65645	99.3	2.75	1	17.1	0
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	cess Wa	ter Pond:	6.79
Time:		Tin	ne:				Time:	11:57 am
					To	otaliser	readings	
				P2 bore:			Time:	
				LPSPBO	)4 : 44	8537.75 <sup>-</sup>	1 Time:	8:25 am
				HBF p	Н:		Time:	
				HBF þ	оН:		Time:	
Description:				Descriț	otion:			

UGM-M8D:



Job Number: S190512

11:46 am

Time:

EMM Technician:	Kaitlyn	Date:	11 October 2020

### STANDING WATER LEVEL (mbTOC)

15.19

Time:	11:49 am	UGM-M8S:	14.213
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	11:13 am	UGM-M15D:	14.49
Time:	11:14 am	UGM-M15S:	13.67
Time:	2:07 pm	BH-M17D:	14.265
Time:	2:11 pm	BH-M17S:	13.28
Time:	11:58 am	BH-M18D:	14.704
Time:	12:02 pm	BH-M18S:	13.082
Time:	11:04 am	BH-M19D:	14.79
Time:	11:07 am	BH-M19S:	13.305
Time:	11:26 am	BH-M20D:	14.465
Time:	11:28 am	BH-M20S:	13.53
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	11:22 am	BH-M22D:	15.58
Time:	11:20 am	BH-M22S:	14.19
Time:	12:13 pm	LPSPB04:	14.146

## Description of daily mining activities

UGM-M8D 14:20 13.76 UGM-M8D 17:10 13.85

UGM-M8S 14:21 14.235 UGM-M8S 17:11 13.89

22 tonnes of HBF (slimes) injected down stope 3.

Stope 1B HBF injection point connected and minimal clean water injected.

Well ID	Time	рН	Sp. Cond	Redox	D	0	Temp	Total Iron
		Units	us/cm	mV	Mg	J/L	Deg Celciu	s Mg/L
UGM-M12D	1:18 pm	6.45	55970	-140.5	0.42		18.4	2.8
UGM-M12S	1:00 pm	6.92	67771	160.9	5.47		17.7	0.1
BH-21D	1:54 pm	6.49	56220	-157.5	0.3		19.6	4
BH-21S	1:40 pm	6.39	65410	30.4	0.63		19.4	0.0
			FIE	ELD pH				
SPD-HM:		SPD-SAN	ID:		Pro	ocess W	Vater Pond:	7.24
Time:		Tim	ne:				Time:	2:46 pm
					т	otalise	er readings	s
				P2 bore:		otalise	er readings	<b>s</b>
				P2 bore: LPSPB0		otalise	1	s
					4:	otalise	Time:	10:43 am
				LPSPB0	4: [ oH: 7		Time:	
				LPSPB0 HBF p	4: [ oH: 7	.33	Time:	10:43 am
	Snake tracks			LPSPB0 HBF p	4: [ oH: 7	.33	Time:	10:43 am



Job Number: S190512

EMM Technician:	Kaitlyn	Date:	12 October 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	7:26 am	UGM-M8D:	16.185
Time:	7:28 am	UGM-M8S:	14.01
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	6:56 am	UGM-M15D:	14.335
Time:	6:58 am	UGM-M15S:	13.66
Time:	7:56 am	BH-M17D:	15.305
Time:	7:50 am	BH-M17S:	12.982
Time:	7:44 am	BH-M18D:	14.755
Time:	7:43 am	BH-M18S:	14.048
Time:	6:50 am	BH-M19D:	14.65
Time:	6:48 am	BH-M19S:	13.34
Time:	7:15 am	BH-M20D:	14.375
Time:	7:12 am	BH-M20S:	13.515
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	7:07 am	BH-M22D:	15.499
Time:	7:03 am	BH-M22S:	14.166
Time:	9:30 am	LPSPB04:	14.137

## Description of daily mining activities

UGM-M8D 11:46 - 16.845 UGM-M8D 15:08 - 15.745

UGM-M8S 11:50 - 14.07 UGM-M8S 15:11 - 13.89

UGM-M4D 15:22 - 18.005

15tonnes slimes, 42 tonnes sand injected into Stope 3 rig end for 1hour 23 minutes starting at 13:00.

Surface expression near 1B.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	9:22 am		57135	-132.8	3.5	18.6	3.4
UGM-M12S	9:53 am	6.87	69556	-10.9	0.71	18.5	0.43
BH-21D	10:56 am	6.43	58465	-161.6	0.13	20.6	3.8
BH-21S	11:22 am	6.25	66664	79.9	0.78	19.4	0
			EIE				
				ELD pH			
SPD-HM: 7	'.54	SPD-SAN	D: 7.59		Process \	Water Pond:	7.11
Time: 1	2:11 pm	Tim	ne: 12:18	pm		Time:	12:23 pm
					Totalis	er readings	
				P2 bore:		Time:	
				LPSPB0	4: 448537.	751 Time:	9:31 am
				HBF p	H: 7.22	Time:	4:34 pm
				HBF p	H:	Time:	
Description:				Descrip	tion:		



Job Number: S190512

Technician: Kaitlyn and Bill	Date:	13 October 2020
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### STANDING WATER LEVEL (mbTOC)

Time:	9:03 am	UGM-M8D:	16.01
Time:	9:00 am	UGM-M8S:	14.18
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	7:42 am	UGM-M15D:	14.47
Time:	7:43 am	UGM-M15S:	13.67
Time:	2:35 pm	BH-M17D:	14.62
Time:	2:40 pm	BH-M17S:	13.26
Time:	12:39 pm	BH-M18D:	14.97
Time:	12:24 pm	BH-M18S:	13.21
Time:	7:34 am	BH-M19D:	14.84
Time:	7:36 am	BH-M19S:	13.32
Time:	8:01 am	BH-M20D:	14.54
Time:	7:57 am	BH-M20S:	13.51
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	7:51 am	BH-M22D:	15.60
Time:	7:50 am	BH-M22S:	14.19
Time:	10:32 am	LPSPB04:	14.23

## Description of daily mining activities

UGM-M8D sampled at 09:15
UGM-M8S sampled at 09:30
BH-M18S sampled at 12:45
BH-M18D sampled at 13:45
RB1sampled at 13:20
BH-M17D sampled at 15:00 no total metals
BH-M17S sampled at 16:00
Water into far end 1B for 9 minutes.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	10:54 am	6.69	56146.5		0.35	20.51	4.0
UGM-M12S	11:19 am	7.7	66220	501.2	0.86	20.94	0.0
BH-21D	11:49 am	6.73	56104.6	2.9	0.61	21.3	4.6
BH-21S	11:40 am	6.71	63306.9	491.3	0.9	20.87	0.0
			EIF	LD pH			
			FIL	сь рп			
SPD-HM:	8.24	SPD-SANI	D: 8.16		Process \	Water Pond:	7.41
Time:	4:41 pm	Tim	e: 4:45 p	om		Time:	8:49 am
					Totalis	er readings	
				P2 bore:		Time:	
				LPSPB04	448537.	751 Time:	10:33 am
				HBF pl	H: 7.11	Time:	8:44 am
				HBF pl	Н:	Time:	
Description:				Descript	ion:		
	1						l



Job Number: S190512

EMM Technician:	Kaitlyn and Bill	Date:	14 October 2020
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### STANDING WATER LEVEL (mbTOC)

Time:	7:14 am	UGM-M8D:	15.225
Time:	7:15 am	UGM-M8S:	14.28
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	11:39 am	UGM-M15D:	14.46
Time:	11:41 am	UGM-M15S:	13.66
Time:	7:29 am	BH-M17D:	14.92
Time:	7:28 am	BH-M17S:	13.28
Time:	7:23 am	BH-M18D:	14.705
Time:	7:24 am	BH-M18S:	13.22
Time:	10:08 am	BH-M19D:	14.76
Time:	10:06 am	BH-M19S:	13.30
Time:	1:04 pm	BH-M20D:	13.65
Time:	1:08 pm	BH-M20S:	14.42
Time:	10:08 am	BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	12:28 pm	BH-M22D:	15.595
Time:	12:30 pm	BH-M22S:	14.18
Time:	7:53 am	LPSPB04:	14.155

## Description of daily mining activities

UGM-12S sampled at 7:50 no TM
UGM-12D sampled at 8:30 no TM
BH-M21S sampled at 9:25 no TM
BH-M21D sampled at 9:05 no TM
BH-M19S sample at 10:20 no TM
BH-M19D sampled at 10:50 no TM
UGM-15S sampled at 12:00 TM
sampled
BH-M20S sampled 13:50 no TM
BH-M20D sampled 13:30 no TM

55tonnes slimes into 1B rig end as of 16:15 (running from 11:41 to current-16:15).

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	8:30 am	6.74	54176	-120.9	0.41	20.54	3.9
UGM-M12S	8:02 am	7.63	64118	116	0.82	20.41	0.0
BH-21D	9:04 am	6.75	53967	-122	0.24	21.46	4.8
BH-21S	9:22 am	6.62	61671	118.5	0.48	20.7	0.16
			FIF	ELD pH			
SPD-HM: 7	7.22	SPD-SAN			Process	s Water Pond:	7.77
SPD-HIVI. [7	.22	SFD-SAN	D. [7.67		FIOCES	s water Fond.	7.77
Time: 6	5:50 am	Tim	ne: 6:53	am		Time:	6:58 am
					Total	iser readings	
				P2 bore:		Time:	
				LPSPB04	4 : 44853	7 Time:	7:53 am
				HBF p	H: 7.68	Time:	6:56 am
				HBF p	H: 7.32	Time:	4:08 pm
Description:				Descrip	tion:		



Job Number: S190512

EMM Technician:	KB/BB	Date:	15 October 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	10:16 am	UGM-M8D:	15.86
Time:	10:18 am	UGM-M8S:	14.32
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	6:58 am	UGM-M15D:	14.59
Time:	7:00 am	UGM-M15S:	13.66
Time:	10:50 am	BH-M17D:	16.32
Time:	10:52 am	BH-M17S:	13.40
Time:	10:31 am	BH-M18D:	15.53
Time:	10:34 am	BH-M18S:	13.39
Time:	6:48 am	BH-M19D:	15.05
Time:	6:46 am	BH-M19S:	13.31
Time:	7:44 am	BH-M20D:	14.64
Time:	7:41 am	BH-M20S:	13.61
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	7:34 am	BH-M22D:	15.67
Time:	7:28 am	BH-M22S:	14.20
Time:	11:06 am	LPSPB04:	14.36

## Description of daily mining activities

UGM-M1D sampled at 14:10 no TM UGM-M1S sampled at 14:20 with aTM UGM-M4D sampled at 15:30 no TM, QA1 and QC1

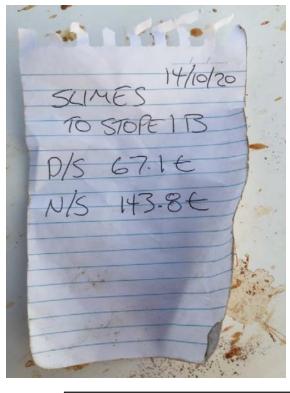
100 tonnes slimes 05:00 to 16:26

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	11:15 am		55454	-214	0.46	23.2	3.2
UGM-M12S	11:25 am	7.53	65810	60.4	5.49	24	0.0
BH-21D	11:59 am	6.68	56178	-144	0.00	22.73	4.29
BH-21S	11:48 am	6.45	63549	158.7	0.77	23.35	0.0

### FIELD pH

SPD-HM: 7.60 SPD-SAND: 7.57 Process Water Pond: 7.54

Time: 12:31 pm Time: 12:34 pm Time: 12:37 pm



### **Totaliser readings**

P2 bore:	Time:	
	'	

LPSPB04: 448537 Time: 11:06 am

HBF pH: 7.06 Time: 10:07 am

HBF pH: 7.09 Time: 4:16 pm

Description:	Description:	



Job No:	S190512	EMM Technician:		Date	15 October 2020		
STANDING WATER LEVEL (mbTOC)							
Time:	8:46 am	UGM-M1D:	18.54	7			
Time:	8:48 am	UGM-M1S:	13.58		escription of daily mining		
Time:	9:07 am	UGM-M2D:	19.58		activities		
Time:	9:02 am	UGM-M2S:	14.87				
Time:	9:12 am	UGM-M4D:	19.90				
Time:	8:28 am	BH-M16D:	16.605				
Time:	8:24 am	BH-M16S:	14.67				
Time:	7:11 am	BH-M23D:	16.01				
Time:	7:14 am	BH-M23S:	15.41				
Time:	8:13 am	BH-M24D:	14.895				
Time:	8:12 am	BH-M24S:	13.36				
Time:	6:33 am	BH-M25D:	14.01				
Time:	6:36 am	BH-M25S:	13.07				

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener	12:21 pm	7.57	52842	76.8	5.97	23.5
HBF Tank Tap						
Stockpile Sump	12:41 pm	7.50	53526	129.6	5.77	24.16

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump	12:25 pm	7.71	68517	116.8	4.58	21.4
Spill dam	12:46 pm	7.60	54887.4	135.2	5.59	25.06
Description:				Description:		
December				December		
Description:				Description:		



Job Number: S190512

EMM Technician:	Bill and Kaitlyn	Date:	16 October 2020

### **STANDING WATER LEVEL (mbTOC)**

Time:	12:54 pm	UGM-M8D:	15.07
Time:	12:56 pm	UGM-M8S:	14.345
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:41 am	UGM-M15D:	14.65
Time:	8:42 am	UGM-M15S:	13.67
Time:	1:10 pm	BH-M17D:	15.07
Time:	1:12 pm	BH-M17S:	13.39
Time:	1:04 pm	BH-M18D:	14.87
Time:	1:06 pm	BH-M18S:	13.34
Time:	8:37 am	BH-M19D:	15.035
Time:	8:38 am	BH-M19S:	13.29
Time:	12:34 pm	BH-M20D:	14.38
Time:	12:32 pm	BH-M20S:	13.45
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	10:59 am	BH-M22D:	15.71
Time:	10:54 am	BH-M22S:	14.20
Time:	1:28 pm	LPSPB04:	14.20

## Description of daily mining activities

105t of slimes injected during the day yesterday. 141.2t injected during the night. Stope 1B.

BH-M25S sampled at 07:40 no TM BH-M25D sampled at 08:10 no TM BH-M23D sampled at 09:50 no TM BH-M23D sampled at 11:15 no TM BH-M22S sampled at 11:15 no TM BH-M22D sampled at 12:00 no TM LPSPB04 samples at 15:00 no TM Cos:00 to 11:38 41tonnes slimes into stope 1 rig end.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	1:59 pm	6.73	55218	-159.4	0.41	20.98	1.4
UGM-M12S	1:43 pm	7.46	65762	125.5	1.27	20.97	0.05
BH-21D	2:15 pm	6.76	55296	-154	0.18	21.32	3.8
BH-21S	2:40 pm	6.51	62342	124.8	1.96	21.83	0.1
			FIE	LD pH			
SPD-HM: 7	7.69	SPD-SANI			Process \	Vater Pond:	7.31
Time: 6	:45 am	Tim	e: 6:50 a	am		Time:	6:59 am
					Totalis	er readings	
				P2 bore:		Time:	
				LPSPB0	4 : 448537	Time:	1:28 pm
				HBF p	H: 6.73	Time:	6:55 am
				HBF p	Н:	Time:	
Description:				Descrip	ition:		
2 dodnipuom				]			



Job No:	S190512	EMM Technician:	kB/bb	Date:	16 October 20	020	
		STANDING	WATER LEV	EL (mbTO	C)		
Time:		UGM-M1D:		7			
Time:		UGM-M1S:		Description of daily mining			
Time:		UGM-M2D:		<u> </u>	activiti	es	
Time:		UGM-M2S:		BH-M	25S sampled at		
Time:		UGM-M4D:		<b>-</b>			
Time:		BH-M16D:		<b>-</b>			
Time:		BH-M16S:		<b>-</b>			
Time:	8:51 am	BH-M23D:	16.065	<b>-</b>			
Time:	8:50 am	BH-M23S:	15.385	<b>-</b>			
Time:		BH-M24D:		<b>-</b>			
Time:		BH-M24S:		<b>-</b>			
Time:	7:25 am	BH-M25D:	13.96	<b>-</b>			
Time:	7:22 am	BH-M25S:	13.01				
		FIE	LD PARAMET	ΓERS			
Well II	D Tin	ne pH	Sp. Cond	Redox	DO	Temp	
		Units	us/cm	m\/	Ma/I	Dea Celcius	

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener						
HBF Tank Tap						
Stockpile Sump						

Well ID	Time	рН	Sp. Con	nd Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump						
Spill dam						
Description:				Description:		
Description:				Description:		



Job Number: S190512

EMM Technician:	KB BB	Date:	17 October 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	7:21 am	UGM-M8D:	15.14
Time:	7:23 am	UGM-M8S:	14.30
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:51 am	UGM-M15D:	14.385
Time:	7:52 am	UGM-M15S:	14.43
Time:	8:17 am	BH-M17D:	14.88
Time:	8:15 am	BH-M17S:	13.37
Time:	8:10 am	BH-M18D:	14.74
Time:	8:09 am	BH-M18S:	13.30
Time:	8:00 am	BH-M19D:	14.80
Time:	7:48 am	BH-M19S:	13.33
Time:	8:29 am	BH-M20D:	14.41
Time:	8:31 am	BH-M20S:	13.56
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	7:43 am	BH-M22D:	15.63
Time:	7:45 am	BH-M22S:	14.13
Time:	8:37 am	LPSPB04:	14.15

## Description of daily mining activities

LPSPB04 logger cable shortened

LPSPB04 samplers at 09:20 no TM UGM-M2D samples at 11:30 no TM UGM-M2S sampled at 12:00 QA2 QC2 collected here. TM collected. RB5 12:40

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	7:59 am		54895	-147	0.38	19.88	3.8
UGM-M12S	8:20 am	7.51	65160	93.5	5.86	19.6	0.05
BH-21D	8:51 am	6.70	54840	-165	0.16	20.76	5.0
BH-21S	8:34 am	6.61	61718	113	0.38	20.54	0.0
			FIE	ELD pH			
SPD-HM: 7	7.52	SPD-SAN	ID: 7.34		Proce	ess Water Pond:	7.44
Time:	3:52 am	Tin	ne: 6:50	am		Time:	7:00 am
					Tota	aliser readings	
				P2 bore:		Time:	
				LPSPB0	4 :	Time:	
				HBF p	oH: 7.41	Time:	6:57 am
				HBF p	oH:	Time:	
Description:				Descrip	otion:		

Stockpile Sump



Job No: S190512 EMM		EMM Technician:	KB/BB	Date:	17 October 20	020
		STANDING	WATER LE	VEL (mbTO	C)	
Time:		UGM-M1D:				
Time:		UGM-M1S:		Des	scription of c	•
Time:	11:00 am	UGM-M2D:	15.79		activiti	es
Time:	11:02 am	UGM-M2S:	14.88			
Time:		UGM-M4D:				
Time:		BH-M16D:				
Time:		BH-M16S:				
Time:		BH-M23D:				
Time:		BH-M23S:				
Time:		BH-M24D:				
Time:		BH-M24S:				
Time:		BH-M25D:				
Time:		BH-M25S:				
		FIE	LD PARAM	ETERS		
Well ID	) Tim	рН рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thicker	ner					
HBF Tank 1	Гар					

Well ID	Time	рН	Sp. Con	nd Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump						
Spill dam						
Description:				Description:		
Description:				Description:		



Job Number: S190512

EMM Technician:	Bill and Kaitlyn	Date:	18 October 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	6:53 am	UGM-M8D:	14.66
Time:	6:55 am	UGM-M8S:	14.25
Time:		UGM-M12D:	
Time:		UGM-M12S:	
Time:	9:02 am	UGM-M15D:	14.37
Time:	9:03 am	UGM-M15S:	13.66
Time:	9:21 am	BH-M17D:	14.57
Time:	9:19 am	BH-M17S:	13.31
Time:	9:17 am	BH-M18D:	14.46
Time:	9:15 am	BH-M18S:	13.22
Time:	9:10 am	BH-M19D:	14.63
Time:	9:09 am	BH-M19S:	13.30
Time:	7:33 am	BH-M20D:	14.23
Time:	7:32 am	BH-M20S:	13.59
Time:		BH-M21D:	
Time:		BH-M21S:	
Time:	8:56 am	BH-M22D:	15.51
Time:	8:58 am	BH-M22S:	14.19
Time:	7:25 am	LPSPB04:	14.04

## Description of daily mining activities

Process water collected from SP other tap may be broken.

No HBF readings- area flooded

			FIELD PA	NAME	ENO			
Well ID	Time	рН	Sp. Cond	Redox	DO		Temp	Total Iron
		Units	us/cm	mV	Mg/l	_ [	Deg Celcius	Mg/L
UGM-M12D	7:46 am	6.65	53633		0.38	1	8.67	3.2
UGM-M12S	7:35 am	7.40	64021	165	1.2	1	8.05	0
BH-21D	8:00 am	6.74	53774.5	-176.1	0.39	1	8.0	2.2
BH-21S	8:45 am	6.54	60558	86.3	0.57	1	8.49	0.16
FIELD pH								
SPD-HM: 7	7.38	SPD-SAN	D: 7.43		Prod	cess Wa	ter Pond:	7.59
Time: 9	9:46 am	Tim	ne: 9:48 a	ım			Time:	9:55 am
					То	taliser	readings	
1				P2 bore:			Time:	
2 1				LPSPB0	4:		Time:	
141				HBF p	oH:		Time:	
				HBF p	oH:		Time:	
	A.							
Description:				Descrip	otion:			



Job Number: S190512

EMM Technician:	Kaitlyn and Bill	Date:	19 October 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	7:03 am	UGM-M8D:	15.27
Time:	7:04 am	UGM-M8S:	14.29
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	9:22 am	UGM-M15D:	14.42
Time:	9:23 am	UGM-M15S:	13.66
Time:	7:11 am	BH-M17D:	14.98
Time:	7:11 am	BH-M17S:	13.36
Time:	7:17 am	BH-M18D:	14.74
Time:	7:14 am	BH-M18S:	13.39
Time:	9:31 am	BH-M19D:	14.75
Time:	9:29 am	BH-M19S:	13.29
Time:	9:51 am	BH-M20D:	14.40
Time:	9:51 am	BH-M20S:	13.55
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:43 am	BH-M22D:	15.59
Time:	9:42 am	BH-M22S:	14.20
Time:	8:20 am	LPSPB04:	14.11

## Description of daily mining activities

HBF Tap clogged and area flooded. No morning reading. Process water collected from SPD.

Well ID	Time	рН 🤄	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	8:14 am	6.68	53077	-134.4	0.34	18.90	0.9
UGM-M12S	8:34 am	7.57	62185	75.6	0.89	19.12	0.13
BH-21D	7:49 am	6.64	53500	-176.4	0.19	19.74	4.8
BH-21S	7:36 am	6.52	60107.5	202.9	5.25	17.31	0.1
			FIE	LD pH			
SPD-HM:	7.38	SPD-SAND	7.46		Process \	Water Pond:	7.33
Time:	1:48 pm	Time	e: 1:52 բ	om		Time:	2:15 pm
					Totalis	er readings	
				P2 bore:		Time:	
				LPSPB04	4 : 448537	Time:	8:20 am
				HBF p	H: 7.24	Time:	2:09 pm
				HBF p	H:	Time:	
Description:				Descrip	tion:		

Stockpile Sump



Job No:	S190512	EMM Technician:	KB/BB	Date:	19 October 20	020
STANDING WATER LEVEL (mbTOC)						
Time:		UGM-M1D:				
Time:		UGM-M1S:		De	escription of d	•
Time:		UGM-M2D:			activiti	es
Time:		UGM-M2S:				
Time:		UGM-M4D:				
Time:	11:22 am	BH-M16D:	15.58			
Time:	11:26 am	BH-M16S:	14.75			
Time:		BH-M23D:				
Time:		BH-M23S:				
Time:	9:57 am	BH-M24D:	14.62			
Time:	9:58 am	BH-M24S:	13.75			
Time:		BH-M25D:				
Time:		BH-M25S:				
FIELD PARAMETERS						
Well I	) Tim	ne pH	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thicke	ner					
HBF Tank	Гар					

Well ID	Time	рН	Sp. Con	nd Redox	DC	) Temp
		Units	us/cm	mV	Mg/	L Deg Celcius
T2 Stockpile Sump						
Spill dam						
Description:				Description:		
Description:				Description:		



Job Number: S190512

EMM Technician:	Dan Condon	Date:	20 October 2020	

## STANDING WATER LEVEL (mbTOC)

Time:	10:20 am	UGM-M8D:	14.950
Time:	10:21 am	UGM-M8S:	14.275
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	9:22 am	UGM-M15D:	14.367
Time:	9:23 am	UGM-M15S:	13.680
Time:	10:36 am	BH-M17D:	14.702
Time:	10:36 am	BH-M17S:	13.359
Time:	10:42 am	BH-M18D:	14.530
Time:	10:44 am	BH-M18S:	12.640
Time:	9:30 am	BH-M19D:	14.637
Time:	9:32 am	BH-M19S:	13.305
Time:	9:44 am	BH-M20D:	14.301
Time:	9:45 am	BH-M20S:	13.640
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	9:14 am	BH-M22D:	15.520
Time:	9:12 am	BH-M22S:	14.252
Time:	12:13 pm	LPSPB04:	14.182

## Description of daily mining activities

No mining or HBF occurring today. Pump has broken down.

No SPD or HBF readings taken.

Process water pump was not operational so none of the process water sample locations were able to be sampled.

Well ID	Time	рН	Sp. Cond	Redox	DO	O	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	12:10 pm	6.65	56199	-130.0	0.34		19.32	1.5
UGM-M12S	11:47 am	7.53	66680	41.3	0.78		19.04	0.05
BH-M21D	11:22 am	6.65	56244	-184.0	0.32		20.11	3.2
BH-M21S	11:10 am	6.51	63249	48.6	0.55		19.52	0.05
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	ocess W	/ater Pond:	
Time:		Tin	ne:				Time:	
Description:				Descri	ption:			



Job Number: S190512

EMM Technician:	Dan Condon	Date:	21 October 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	11:05 am	UGM-M8D:	14.842
Time:	11:06 am	UGM-M8S:	14.238
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	8:33 am	UGM-M15D:	14.307
Time:	8:35 am	UGM-M15S:	13.605
Time:	11:25 am	BH-M17D:	14.602
Time:	11:24 am	BH-M17S:	13.382
Time:	11:37 am	BH-M18D:	14.443
Time:	11:38 am	BH-M18S:	13.344
Time:	8:22 am	BH-M19D:	14.563
Time:	8:22 am	BH-M19S:	13.308
Time:	9:02 am	BH-M20D:	14.211
Time:	9:09 am	BH-M20S:	13.666
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	8:47 am	BH-M22D:	15.472
Time:	8:45 am	BH-M22S:	14.162
Time:	11:54 am	LPSPB04:	14.123

# Description of daily mining activities

No mining or HBF occurring today. Pump has broken down.

No SPD or HBF readings taken.

Process water pump was not operational so none of the process water sample locations were able to be sampled.

Well ID	Time	рН	Sp. Cond	Redox	D	Э	Temp	Total Iron
		Units	us/cm	mV	Mg	ı/L	Deg Celcius	Mg/L
UGM-M12D	1:34 pm	6.66	54670	-133.9	0.34		20.58	1.5
UGM-M12S	1:16 pm	7.55	64922	94.2	0.86		20.32	0.0
BH-M21D	12:55 pm	6.69	54796	-190.6	0.23		21.25	3.4
BH-M21S	12:47 pm	6.59	61375	109.8	0.54		20.71	0.05
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	ocess V	Vater Pond:	
Time:		Tin	ne:				Time:	
Description:				Descri	ption:			



Job No: S190512 EMM Te	echnician: Dan Condo	Date:	21 October 2020
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#### **STANDING WATER LEVEL (mbTOC)**

Time:	10:18 am	UGM-M1D:	14.740
Time:	10:21 am	UGM-M1S:	13.490
Time:	10:39 am	UGM-M2D:	15.520
Time:	10:37 am	UGM-M2S:	14.795
Time:	10:54 am	UGM-M4D:	15.470
Time:	9:34 am	UGM-M16D:	15.460
Time:	9:34 am	UGM-M16S:	14.810
Time:	2:14 pm	UGM-M23D:	15.813
Time:	2:12 pm	UGM-M23S:	15.357
Time:	9:20 am	UGM-M24D:	14.470
Time:	9:19 am	UGM-M24S:	13.810
Time:	7:58 am	UGM-M25D:	13.540
Time:	7:53 am	UGM-M25S:	13.020

# Description of daily mining activities

No mining or HBF occurring today. Pump has broken down.

No SPD or HBF readings taken.

Process water pump was not operational so none of the process water sample locations were able to be sampled.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener	7:10 am	7.30	52439	112.8	5.57	19.07
HBF Tank Tap						
Stockpile Sump	7:36 am	7.25	55500	89.2	0.20	16.75

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump	7:15 am	7.41	70820	116.5	5.06	16.08
Spill dam	7:42 am	7.40	56713	69.2	3.88	15.72



Description: T2 stockpile sump



Description: Stockpile sump

Description:	Descr	ription:
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Job Number: S190512

EMM Technician:	Dan Condon	Date:	22 October 2020

#### STANDING WATER I EVEL (mbTOC)

		STANDING	WATER LI	EVEL (mbTOC)
Time:	8:42 am	UGM-M8D:	14.762	Description of daily mining
Time:	8:42 am	UGM-M8S:	14.217	activities
Time:	7:28 am	UGM-M15D:	14.258	No mining or HBF occurring today. Pump has broken down.
Time:	7:29 am	UGM-M15S:	13.685	No SPD or HBF readings taken.
Time:	8:49 am	BH-M17D:	14.535	Process water pump was not operational so none of the process
Time:	8:47 am	BH-M17S:	13.305	water sample locations were able to be sampled.
Time:	8:59 am	BH-M18D:	14.378	
Time:	9:00 am	BH-M18S:	13.371	
Time:	7:21 am	BH-M19D:	14.510	
Time:	7:23 am	BH-M19S:	13.312	
Time:	8:10 am	BH-M20D:	14.162	
Time:	8:11 am	BH-M20S:	13.572	
Time:	8:04 am	BH-M22D:	15.433	
Time:	8:02 am	BH-M22S:	14.199	
Time:	9:07 am	LPSPB04:	14.093	

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	10:44 am	6.65	54863	-176	0.30		20.76	1.9
UGM-M12S	10:27 am	7.50	64982	98.3	0.88		20.59	0.05
BH-M21D	10:09 am	6.66	54799	-95.6	0.32		21.21	3.8
BH-M21S	10:01 am	6.56	61586	97.9	0.42		20.94	0.05
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	ocess W	/ater Pond:	
Time:		Tin	ne:				Time:	
Description:				Descri	ption:			



Job Number: S190512

EMM Technician:	Dan Condon	Date:	23 October 2020

#### STANDING WATER I EVEL (mbTOC)

		STANDING	WATER LE	EVEL (mbTOC)
Time:	7:47 am	UGM-M8D:	14.712	Description of daily mining
Time:	7:49 am	UGM-M8S:	14.170	activities
Time:	6:31 am	UGM-M15D:	14.212	No mining or HBF occurring today. Pump has broken down.
Time:	6:32 am	UGM-M15S:	13.677	No SPD or HBF readings taken.
Time:	7:55 am	BH-M17D:	14.462	Process water pump was not operational so none of the process
Time:	7:54 am	BH-M17S:	13.295	water sample locations were able to be sampled.
Time:	7:59 am	BH-M18D:	14.320	
Time:	8:00 am	BH-M18S:	13.234	
Time:	6:27 am	BH-M19D:	14.455	
Time:	6:28 am	BH-M19S:	13.302	
Time:	7:19 am	BH-M20D:	14.113	
Time:	7:20 am	BH-M20S:	13.590	
Time:	6:37 am	BH-M22D:	15.388	
Time:	6:36 am	BH-M22S:	14.195	
Time:	8:05 am	LPSPB04:	14.055	

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	9:49 am	6.70	56137	-199	0.56		21.30	0.8
UGM-M12S	9:34 am	7.51	66804	68.2	0.78		21.14	0.0
BH-M21D	9:12 am	6.68	55970	-178.9	0.19		21.52	4.1
BH-M21S	9:03 am	6.55	62898	110.9	0.53		21.38	0.05
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	ocess V	/ater Pond:	
Time:		Tin	ne:				Time:	
Description:				Descrip	otion:			



Job Number: S190512

EMM Technician:	Dan Condon	Date:	25 October 2020	

#### STANDING WATER LEVEL (mbTOC)

		STANDING	WATER LEV	EL (mbTOC)
Time:	7:24 am	UGM-M8D:	14.621	Description of daily mining
Time:	7:25 am	UGM-M8S:	13.840	activities
Time:	7:57 am	UGM-M15D:	14.144	No mining or HBF occurring today.
Time:	7:58 am	UGM-M15S:	13.688	No SPD or HBF readings taken.
Time:	7:36 am	BH-M17D:	13.920	Process water pump was not operational so none of the process water sample locations were able to be sampled.
Time:	7:34 am	BH-M17S:	12.290	Sampled.
Time:	7:40 am	BH-M18D:	14.120	
Time:	7:43 am	BH-M18S:	12.682	
Time:	7:50 am	BH-M19D:	14.385	
Time:	7:52 am	BH-M19S:	13.125	
Time:	8:15 am	BH-M20D:	14.047	
Time:	8:17 am	BH-M20S:	13.615	
Time:	8:06 am	BH-M22D:	15.332	
Time:	8:04 am	BH-M22S:	14.195	
Time:	9:32 am	LPSPB04:	13.980	

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	9:43 am	6.78	55379	-151.9	0.33		18.73	1.8
UGM-M12S	9:25 am	7.59	65689	165.5	0.81		18.39	0.0
BH-M21D	10:27 am	6.78	55334	-176.1	0.22		19.60	4.1
BH-M21S	10:18 am	6.67	66440	77.5	0.40		19.52	0.0
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	ocess V	/ater Pond:	
Time:		Tin	ne:				Time:	
Description:				Descri	otion:			



Job Number: S190512

EMM Technician: Dan Condon	Date:	26 October 2020
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#### STANDING WATER I EVEL (mbTOC)

		STANDING	WATER LE	EVEL (mbTOC)
Time:	11:02 am	UGM-M8D:	14.585	Description of daily mining
Time:	11:03 am	UGM-M8S:	14.040	activities
Time:	11:56 am	UGM-M15D:	14.140	No mining or HBF occurring today.
Time:	11:57 am	UGM-M15S:	13.682	No SPD or HBF readings taken.
Time:	11:10 am	BH-M17D:	14.345	Process water pump was not operational so none of the process water sample locations were able to be sampled.
Time:	11:12 am	BH-M17S:	13.040	Sampled.
Time:	11:16 am	BH-M18D:	14.202	
Time:	11:27 am	BH-M18S:	13.036	
Time:	11:48 am	BH-M19D:	14.360	
Time:	11:50 am	BH-M19S:	13.310	
Time:	12:10 pm	BH-M20D:	14.034	
Time:	12:11 pm	BH-M20S:	13.595	
Time:	12:03 pm	BH-M22D:	15.322	
Time:	12:01 pm	BH-M22S:	14.220	
Time:	12:33 pm	LPSPB04:	13.980	

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Iron			
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L			
UGM-M12D	8:42 am	6.83	57197	-201	0.47		17.59	0.9			
UGM-M12S	8:31 am	7.72	67557	114.5	0.71		17.47	0.0			
BH-M21D	7:49 am	6.68	57285	-174	0.28		18.72	3.1			
BH-M21S	7:39 am	6.44	63511	126.1	0.42		19.13	0.0			
	FIELD pH										
SPD-HM:		SPD-SAN	ID:		Pro	ocess V	/ater Pond:				
Time:		Tin	ne:				Time:				
Description:				Descri	otion:						



Job Number: S190512

EMM Technician:	Dan Condon	Date:	27 October 2020	
				'

	STANDING WATER LEVEL (mbTOC)								
Time:	11:25 am	UGM-M8D:	14.525	Description of daily mining					
Time:	11:27 am	UGM-M8S:	14.057	activities					
Time:	11:50 am	UGM-M15D:	14.066	Limited HBF of slimes occurring					
Time:	11:51 am	UGM-M15S:	13.682	Process water able to be sampled but no Spiral Plant locations					
Time:	11:32 am	BH-M17D:	14.271						
Time:	11:33 am	BH-M17S:	13.111						
Time:	11:37 am	BH-M18D:	14.140						
Time:	11:38 am	BH-M18S:	13.040						
Time:	11:44 am	BH-M19D:	14.305						
Time:	11:45 am	BH-M19S:	13.312						
Time:	12:07 pm	BH-M20D:	13.984						
Time:	12:08 pm	BH-M20S:	13.577						
Time:	11:59 am	BH-M22D:	14.264						
Time:	11:57 am	BH-M22S:	14.200						
Time:	9:50 am	LPSPB04:	13.935						

Well ID	Time	рН	Sp. Cond	Redox	DO		Temp	Total Iron		
		Units	us/cm	mV	Mg/L		Deg Celcius	Mg/L		
UGM-M12D	10:03 am	6.73	58847	-142.6	0.33		17.69	0.9		
UGM-M12S	9:46 am	7.66	69797	91.2	0.74		17.11	0.0		
BH-M21D	9:22 am	6.74	58872	-183.6	0.21		18.99	1.8		
BH-M21S	9:15 am	6.63	65498	47.2	0.32		18.75	0.0		
FIELD pH										
SPD-HM:		SPD-SAN	ND:		Prod	ess W	ater Pond:	7.51		
Time:		Tin	ne:				Time:	10:23 am		
Description:				Descri	otion:					



Job Number: S190512

EMM Technician:	Dan Condon	Date:	28 October 2020	
·				

		STANDING	WATER LEV	EL (mbTOC)
Time:	12:13 pm	UGM-M8D:	14.524	Description of daily mining
Time:	12:14 pm	UGM-M8S:	14.055	activities
Time:	7:46 am	UGM-M15D:	14.062	No HBF occurring
Time:	7:48 am	UGM-M15S:	13.682	Process water able to be sampled but no Spiral Plant locations
Time:	6:41 am	BH-M17D:	14.205	
Time:	6:39 am	BH-M17S:	13.113	
Time:	6:52 am	BH-M18D:	14.150	
Time:	6:57 am	BH-M18S:	13.066	
Time:	7:32 am	BH-M19D:	14.295	
Time:	7:34 am	BH-M19S:	13.305	
Time:	8:36 am	BH-M20D:	13.965	
Time:	8:37 am	BH-M20S:	13.613	
Time:	8:20 am	BH-M22D:	15.250	
Time:	8:19 am	BH-M22S:	14.188	
Time:	12:44 pm	LPSPB04:	13.901	

Well ID	Time	рН	Sp. Cond	Redox	DC	)	Temp	Total Iron
		Units	us/cm	mV	Mg/	L	Deg Celcius	Mg/L
UGM-M12D	1:25 pm	6.75	58523	-178.3	0.28		18.89	2.3
UGM-M12S	1:08 pm	7.66	69218	107.4	0.70		18.45	0.0
BH-M21D	12:46 pm	6.76	58503	-170.6	0.25		19.98	4.8
BH-M21S	12:35 pm	6.66	64986	70.7	0.41		19.51	0.4
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	cess W	ater Pond:	7.93
Time:		Tin	ne:				Time:	10:38 am
Description:				Descrip	otion:			



Job No: S190512 EMM Technician: Dan Condon Date: 28 October 2020

#### **STANDING WATER LEVEL (mbTOC)**

Time:	11:24 am	UGM-M1D:	14.330
Time:	11:26 am	UGM-M1S:	13.460
Time:	12:00 pm	UGM-M2D:	15.112
Time:	12:00 pm	UGM-M2S:	14.754
Time:	12:25 pm	UGM-M4D:	15.080
Time:	9:07 am	UGM-M16D:	15.160
Time:	9:07 am	UGM-M16S:	14.706
Time:	8:04 am	UGM-M23D:	15.640
Time:	8:00 am	UGM-M23S:	15.303
Time:	8:52 am	UGM-M24D:	14.210
Time:	8:50 am	UGM-M24S:	13.772
Time:	7:19 am	UGM-M25D:	13.295
Time:	7:18 am	UGM-M25S:	13.032

# Description of daily mining activities

No HBF occurring
Process water able to be sampled but no Spiral Plant locations

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener	10:19 am	7.91	53507	29.6	6.96	17.75
HBF Tank Tap	10:13 am	7.90	16933	-211	0.01	19.83
Stockpile Sump	10:45 am	7.92	51305	85.8	4.68	16.48

Well ID	Time	рН	Sp. Cor	nd	Redox	DO	Temp
		Units	us/cm	1	mV	Mg/L	Deg Celcius
T2 Stockpile Sump	10:31 am	7.78	72418	61.	7	3.25	17.91
Spill dam	10:50 am	7.93	55334	85.4	4	6.39	19.17
r					_		
Description:				Descript	ion:		
L							
_							

Description:

Description:



Job Number: S190512

EMM Technician:	Dan Condon	Date:	29 October 2020	

		STANDING	WATER LEV	VEL (mbTOC)
Time:	6:42 am	UGM-M8D:	14.532	Description of daily mining
Time:	6:42 am	UGM-M8S:	14.060	activities
Time:	9:20 am	UGM-M15D:	14.034	No HBF occurring
Time:	9:22 am	UGM-M15S:	13.683	Process water able to be sampled but no Spiral Plant locations
Time:	8:30 am	BH-M17D:	14.280	
Time:	8:30 am	BH-M17S:	13.122	
Time:	8:38 am	BH-M18D:	14.175	
Time:	8:36 am	BH-M18S:	13.075	
Time:	8:50 am	BH-M19D:	14.290	
Time:	8:49 am	BH-M19S:	13.300	
Time:	9:36 am	BH-M20D:	13.940	
Time:	9:37 am	BH-M20S:	13.558	
Time:	9:26 am	BH-M22D:	15.245	
Time:	9:28 am	BH-M22S:	14.270	
Time:	12:00 pm	LPSPB04:	13.785	] [

Well ID	Time	рН	Sp. Cond	Redox	DO		Temp	Total Iron
		Units	us/cm	mV	Mg/L		Deg Celcius	Mg/L
UGM-M12D	11:32 am	6.71	58568	-158.6	0.33		19.51	2.3
UGM-M12S	11:51 am	7.66	69854	88.9	0.76		19.34	0.1
BH-M21D	11:07 am	6.76	58509	-191.3	0.18		20.67	3.0
BH-M21S	10:55 am	6.68	64982	103.6	0.38		19.91	0.2
FIELD pH								
SPD-HM:		SPD-SAN	ID:		Proce	ss W	ater Pond:	7.83
Time:		Tin	ne:				Time:	7:38 am
Description:				Descri	otion:			



Job Number: S190512

EMM Technician:	Dan Condon	Date:	1 November 2020	

		STANDING	WATER LEV	EL (mbTOC)
Time:	7:23 am	UGM-M8D:	14.455	Description of daily mining
Time:	7:24 am	UGM-M8S:	14.044	activities
Time:	8:02 am	UGM-M15D:	13.992	Refining of ore occurring and filling of sinkholes later in the day with sand
Time:	8:03 am	UGM-M15S:	13.649	tails/slimes.
Time:	7:38 am	BH-M17D:	14.211	All records able to be collected
Time:	7:39 am	BH-M17S:	13.140	
Time:	7:43 am	BH-M18D:	14.078	
Time:	7:45 am	BH-M18S:	13.055	
Time:	7:53 am	BH-M19D:	14.255	
Time:	7:52 am	BH-M19S:	13.308	
Time:	8:42 am	BH-M20D:	13.888	
Time:	8:44 am	BH-M20S:	13.545	
Time:	8:19 am	BH-M22D:	15.150	
Time:	8:15 am	BH-M22S:	14.406	
Time:	10:32 am	LPSPB04:	13.680	

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	11:17 am	6.73	58424	-168.4	0.36	19.42	1.4
UGM-M12S	10:59 am	7.66	69058	97.9	0.72	19.25	0.1
BH-M21D	10:36 am	6.73	58748	-192.8	0.18	20.10	3.4
BH-M21S	10:23 am	6.59	64989	100	0.55	19.25	0.0

### FIELD pH

SPD-HM:	7.84	SPD-SAND:	8.00	Process Water Pond:	7.73
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Time: 7:05 am Time: 7:12 am Time: 7:02 am

Description:	Description:	



Job Number: S190512

EMM Technician:	Dan Condon	Date:	2 November 2020	

STANDING WATER LEVEL (mbTOC)							
Time:	7:30 am	UGM-M8D:	14.445	Description of daily mining			
Time:	7:32 am	UGM-M8S:	14.036	activities			
Time:	8:44 am	UGM-M15D:	13.980	No refining of ore or backfilling occurring.			
Time:	8:45 am	UGM-M15S:	13.675	Cleanup and moving ore only			
Time:	7:43 am	BH-M17D:	14.211				
Time:	7:44 am	BH-M17S:	13.103				
Time:	8:10 am	BH-M18D:	14.085				
Time:	8:11 am	BH-M18S:	13.465				
Time:	8:37 am	BH-M19D:	14.237				
Time:	8:39 am	BH-M19S:	13.308				
Time:	9:00 am	BH-M20D:	13.875				
Time:	9:01 am	BH-M20S:	13.577				
Time:	8:53 am	BH-M22D:	15.190				
Time:	8:53 am	BH-M22S:	14.201				
Time:	9:54 am	LPSPB04:	13.745				

Well ID	Time	рН	Sp. Cond	Redox	DO	O	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	11:23 am	6.67	58242	-216.9	0.37		20.52	1.0
UGM-M12S	10:52 am	7.49	688000	96.2	0.83		20.61	0.0
BH-M21D	10:25 am	6.60	58401	-206.4	0.29		21.03	2.6
BH-M21S	10:17 am	6.50	64652	161.7	0.46		20.78	0.05
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	ocess V	later Pond:	7.34
Time:		Tin	ne:				Time:	7:30 am
Description:				Descri	otion:			



Job Number: S190512

EMM Technician:	K Brodie	Date:	3 November 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	7:27 am	UGM-M8D:	14.43
Time:	7:30 am	UGM-M8S:	14.025
Time:		UGM-M12D:	
Time:		UGM-M12S:	
Time:	8:05 am	UGM-M15D:	13.968
Time:	8:07 am	UGM-M15S:	13.666
Time:	8:40 am	BH-M17D:	14.19
Time:	8:36 am	BH-M17S:	13.07
Time:	8:31 am	BH-M18D:	14.055
Time:	8:26 am	BH-M18S:	13.005
Time:	8:17 am	BH-M19D:	14.23
Time:	8:15 am	BH-M19S:	13.278
Time:	7:47 am	BH-M20D:	13.86
Time:	7:49 am	BH-M20S:	13.56
Time:		BH-M21D:	
Time:		BH-M21S:	
Time:	7:56 am	BH-M22D:	15.16
Time:	7:59 am	BH-M22S:	14.084
Time:	8:55 am	LPSPB04:	13.71

# Description of daily mining activities

No HBF. As of 14:00 Spiral plant not operating.

Well ID	Time	рН	Sp. Cond	Redox	DC	)	Temp	Total Iron
		Units	us/cm	mV	Mg/	L [	Deg Celcius	Mg/L
UGM-M12D	10:46 am	6.63	58101.1	-174	0.41	2	22.23	3.4
UGM-M12S	11:16 am	7.55	69443.5	380.5	0.81	2	2.63	0.05
BH-21D	9:52 am	6.54	58437.14		0.13	2	21.79	4
BH-21S	10:03 am	6.48	65003	89.7	0.49	2	21.72	0.3
			FIE	ELD pH				
SPD-HM:		SPD-SAN	ND:		Pro	cess Wa	ter Pond:	7.83
Time:		Tin	ne:				Time:	12:50 pm
					To	otaliser	readings	
				P2 bore:			Time:	
				LPSPB(	04 :		Time:	
				HBF	pH:		Time:	
				HBF	pH:		Time:	
Description:				Descri	ption:			



Job Number: S190512

Time:

7:58 am

LPSPB04:

13.69

ł Techni	EMM Kaitlyr	า	Date:	4 November 2020				
	STANDING WATER LEVEL (mbTOC)							
Time:	6:22 am	UGM-M8D:	14.395					
Time:	6:24 am	UGM-M8S:	14.00					
Time:		UGM-M12D:						
Time:		UGM-M12S:						
Time:	6:55 am	UGM-M15D:	13.96					
Time:	6:55 am	UGM-M15S:	13.65					
Time:	7:33 am	BH-M17D:	14.155	Description of daily mining				
Time:	7:30 am	BH-M17S:	13.08	activities				
Time:	7:12 am	BH-M18D:	14.06	No HBF				
Time:	7:10 am	BH-M18S:	13.06					
Time:	7:03 am	BH-M19D:	14.19					
Time:	7:03 am	BH-M19S:	13.285					
Time:	7:48 am	BH-M20D:	13.85					
Time:	7:50 am	BH-M20S:	13.51					
Time:		BH-M21D:						
Time:		BH-M21S:						
Time:	6:46 am	BH-M22D:	15.142					
Time:	6:49 am	BH-M22S:	14.149					
				•				

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	10:24 am	6.67	58009.4	-147.4	0.31	21.12	2.8
UGM-M12S	10:03 am	7.50	68915.2	101.2	1.58	21.27	0.1
BH-21D	9:33 am	6.69	57954.4	-198.4	0.23	21.27	2.2
BH-21S	9:22 am	6.67	63939.9	91.7	4.77	21.46	0.05
			FIE	ELD pH			
SPD-HM:	7.64	SPD-SAN	D: 7.81		Proces	s Water Pond:	7.89
Time:	10:48 am	Tim	e: 10:51	am		Time:	10:53 am
					Total	iser readings	
				P2 bore:		Time:	
				LPSPB(	04 :	Time:	
				HBF	рН:	Time:	
				HBF	рН:	Time:	
				7			
Description:				Descri	ption:		
				1			



Job Number: S190512

EMM Technician:	Kaitlyn	Date:	5 November 2020

#### **STANDING WATER LEVEL (mbTOC)**

Time:	9:24 am	UGM-M8D:	13.84	
Time:	9:25 am	UGM-M8S:	14.09	
Time:		UGM-M12D:		
Time:		UGM-M12S:		
Time:	8:04 am	UGM-M15D:	13.96	
Time:	8:06 am	UGM-M15S:	13.65	
Time:	9:14 am	BH-M17D:	13.28	
Time:	9:07 am	BH-M17S:	13.19	
Time:	8:58 am	BH-M18D:	13.85	
Time:	8:53 am	BH-M18S:	13.03	
Time:	8:22 am	BH-M19D:	14.19	
Time:	8:16 am	BH-M19S:	13.29	
Time:	6:53 am	BH-M20D:	13.84	
Time:	6:52 am	BH-M20S:	13.64	
Time:		BH-M21D:		
Time:		BH-M21S:		
Time:	7:10 am	BH-M22D:	15.14	
Time:	7:42 am	BH-M22S:	14.17	
Time:	11:38 am	LPSPB04:	13.66	

# Description of daily mining activities

BH-M17D 13:25 dip 13.83 BH-M17S 13:28 dip 12.91

ISitu Troll not working, changed to YSI probe. YSI probe not calibrating well - pH took a while. HBF, stockpile, spill dam with YSI.

Continue injecting slimes and sand tonight. Will provide total tonnage in the morning.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celcius	Mg/L
UGM-M12D	12:49 pm	6.64	58237.9	-97	0.28	20.53	3.4
UGM-M12S	1:12 pm	7.54	69103.9	166.4	1.12	20.49	0.0
BH-21D	11:59 am	6.54	57938.3	-195.2	0.21	21.12	2.4
BH-21S	12:24 pm	6.53	63578.9	170	0.86	20.85	0.2

### FIELD pH

SPD-HM: 7.79 SPD-SAND: 7.61 Process Water Pond: 7.34

Time: 3:55 pm Time: 3:59 pm Time: 3:57 pm



### **Totaliser readings**

P2 bore:	Time:	
LPSPB04:	Time:	
HBF pH:	6.81 Time:	4:02 pm
HBF pH:	Time:	

Description:	YSI WQM at HBF site	Description:	



Job No: S190512	EMM Technician:	Kaitlyn	Date:	5 November 2020
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#### **STANDING WATER LEVEL (mbTOC)**

Time:	10:11 am	UGM-M1D:	
Time:	10:11 am	UGM-M1S:	13.44
Time:	1:50 pm	UGM-M2D:	14.90
Time:	1:52 pm	UGM-M2S:	14.71
Time:	1:37 pm	UGM-M4D:	14.88
Time:	9:51 am	BH-M16D:	15.02
Time:	9:49 am	BH-M16S:	14.71
Time:	7:52 am	BH-M23D:	15.54
Time:	7:50 am	BH-M23S:	14.88
Time:	6:34 am	BH-M24D:	13.87
Time:	6:36 am	BH-M24S:	13.79
Time:	8:35 am	BH-M25D:	13.18
Time:	8:34 am	BH-M25S:	13.01

# Description of daily mining activities

ISitu Troll not working, changed to YSI probe. YSI probe not calibrating well - pH took a while. HBF, stockpile, spill dam with YSI.

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener	2:26 pm	7.89	51504.4	113.4	9.8	19.87
HBF Tank Tap	4:03 pm	6.81	53736	117.1	5.90	22.2
Stockpile Sump	4:06 pm	6.96	49345	29.2	6.96	20.1

Well ID	Time	рН	Sp. Cond	d Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump	2:13 pm	7.81	74050.6	103.7	5.61	17.06
Spill dam	4:10 pm	6.86	60480	30.1	6.39	22.5
Г						
Description:				Description:		
Description:				Description:		



Job Number: S190512

EMM Technician:	Kaitlyn	Date:	6 November 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	6:38 am	UGM-M8D:	14.02
Time:	6:36 am	UGM-M8S:	13.87
Time:		UGM-M12D:	
Time:		UGM-M12S:	
Time:	7:18 am	UGM-M15D:	13.845
Time:	7:16 am	UGM-M15S:	13.66
Time:	6:48 am	BH-M17D:	13.51
Time:	6:51 am	BH-M17S:	12.835
Time:	6:56 am	BH-M18D:	13.495
Time:	6:58 am	BH-M18S:	12.867
Time:	7:08 am	BH-M19D:	14.08
Time:	7:07 am	BH-M19S:	13.29
Time:	7:41 am	BH-M20D:	13.705
Time:	7:39 am	BH-M20S:	13.59
Time:		BH-M21D:	
Time:		BH-M21S:	
Time:	7:26 am	BH-M22D:	15.057
Time:	7:23 am	BH-M22S:	14.15
Time:	8:27 am	LPSPB04:	13.59

# Description of daily mining activities

Spiral plant being decommissioned. No more samples. Pipe for HBF (sinkhole fill) blocked. Plant shut down. Process water parameters taken from the dam.

Well ID	Time	рН	Sp. Cond	Redox	DO	T	emp	Total Iron
		Units	us/cm	mV	Mg/L	Deg	Celcius	Mg/L
UGM-M12D	10:28 am	6.59	58678	-59.3	0.31	19.49	)	3.8
UGM-M12S	10:05 am	7.37	69295.1	439.8	5.8	19.79	)	0.13
BH-21D	9:42 am	6.63	57987.6	-31.2	0.09	21.48	3	4.0
BH-21S	9:22 am	6.39	63434.5	201.3	5.05	20.92	2	0.1
			FIE	ELD pH				
SPD-HM:		SPD-SAN	ND:		Proc	ess Water F	Pond:	7.44
Time:		Tir	ne:			-	Time:	11:14 am
					То	taliser rea	adings	
				P2 bore:		-	Time:	
				LPSPBO	)4 :	-	Time:	
				HBF þ	oH: 7.6	5 -	Γime:	11:21 am
				HBF p	рΗ:	-	Γime:	
				_	_			
Description:				Descrip	otion:			



Job Number: S190512

EMM Technician:	Kaitlyn	Date:	7 November 2020

### STANDING WATER LEVEL (mbTOC)

Time:	7:13 am	UGM-M8D:	14.32
Time:	7:16 am	UGM-M8S:	13.92
Time:		UGM-M12D:	
Time:		UGM-M12S:	
Time:	6:43 am	UGM-M15D:	13.87
Time:	6:45 am	UGM-M15S:	13.65
Time:	7:25 am	BH-M17D:	14.075
Time:	7:28 am	BH-M17S:	12.995
Time:	7:32 am	BH-M18D:	13.94
Time:	7:36 am	BH-M18S:	12.895
Time:	6:33 am	BH-M19D:	14.11
Time:	6:30 am	BH-M19S:	13.29
Time:	7:03 am	BH-M20D:	13.76
Time:	7:02 am	BH-M20S:	13.63
Time:		BH-M21D:	
Time:		BH-M21S:	
Time:	6:54 am	BH-M22D:	15.07
Time:	6:52 am	BH-M22S:	14.16
Time:	7:52 am	LPSPB04:	13.62

# Description of daily mining activities

BH-M17D: 12:22 - 13.007 BH-M17S: 12:26 - 12.90 BH-M18D: 12:30 - 13.13 BH-M18S: 12:32 - 12.80 UGM-M8D: 13:09 - 13.57 UGM-M8S: 13:12 - 13.87

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Iron
		Units	us/cm	mV	Mg/	L [	Deg Celcius	Mg/L
UGM-M12D	9:29 am	6.63	56909.9	19.1	0.28	2	0.67	3.6
UGM-M12S	9:51 am	7.47	67649.4	398.6	1.02	2	20.85	0.05
BH-21D	8:34 am	6.45	57312.3	-132.8	0.14	2	0.98	6.4
BH-21S	8:59 am	6.54	63002.8	422.8	0.44	2	20.67	0.1
			FIE	ELD pH				
SPD-HM:		SPD-SAN	ND:		Pro	cess Wa	ter Pond:	7.56
Time:		Tir	ne:				Time:	10:22 am
					To	taliser	readings	
				P2 bore:			Time:	
				LPSPB0	4 :		Time:	
				HBF p	H: 7.5	56	Time:	10:37 am
				HBF p	н:		Time:	
				_				
Description:				Descrip	otion:			
	1							



Job Number: S190512

Time:

Time:

6:55 am

8:09 am

BH-M22S:

LPSPB04:

14.145

13.56

Techni	EMM ician: Kaitlyı	n		Date:	8 November 2020
		STANDING	G WATER	LEVE	L (mbTOC)
Time:	7:36 am	UGM-M8D:	14.225		
Time:	7:33 am	UGM-M8S:	13.784		
Time:		UGM-M12D:			
Time:		UGM-M12S:			
Time:	6:36 am	UGM-M15D:	13.807		
Time:	6:38 am	UGM-M15S:	13.655		
Time:	7:56 am	BH-M17D:	13.975		Description of daily mining
Time:	7:59 am	BH-M17S:	12.71		activities
Time:	7:51 am	BH-M18D:	13.84		
Time:	7:49 am	BH-M18S:	12.248		
Time:	6:32 am	BH-M19D:	14.038		
Time:	6:30 am	BH-M19S:	13.293		
Time:	7:08 am	BH-M20D:	13.67		
Time:	7:03 am	BH-M20S:	13.65		
Time:		BH-M21D:			
Time:		BH-M21S:			
Time:	6:52 am	BH-M22D:	15.011		
		1			

Well ID	Time	рН	Sp. Cond	Redox	DC	)	Temp	Total Iron
		Units	us/cm	mV	Mg/	L C	Deg Celcius	Mg/L
UGM-M12D	10:29 am	6.70	56848.2	-93.6	0.39	2	0.86	2.8
UGM-M12S	10:06 am	7.61	67453.3	399.9	5.89	2	1.2	0.1
BH-21D	9:33 am	6.62	56736.2	-123.6	0.28	2	1.36	6.6
BH-21S	9:26 am	6.50	62752.4	441.5	0.89	2	0.81	0.1
			FIE	LD pH				
SPD-HM:		SPD-SAN	ID:		Pro	cess Wat	er Pond:	
Time:		Tin	ne:				Time:	
					To	otaliser	readings	
				P2 bore:			Time:	
				LPSPBO	)4 :		Time:	
				HBF ;	оН:		Time:	
				HBF p	оН:		Time:	
				1	-			
Description:				Descri	otion:			



Job Number: S190512

Techn	EMM ician: Kaitly	'n	Date:	9 November 2020
		STANDING	WATER LEVE	EL (mbTOC)
Time:	7:25 am	UGM-M8D:	14.275	
Time:	7:26 am	UGM-M8S:	13.382	
Time:		UGM-M12D:		
Time:		UGM-M12S:		
Time:	6:40 am	UGM-M15D:	13.84	
Time:	6:42 am	UGM-M15S:	13.65	
Time:	7:42 am	BH-M17D:	14.04	Description of daily mining
Time:	7:45 am	BH-M17S:	12.785	activities
Time:	7:38 am	BH-M18D:	13.91	
Time:	7:36 am	BH-M18S:	12.53	
Time:	6:35 am	BH-M19D:	14.08	
Time:	6:33 am	BH-M19S:	13.285	
Time:	6:59 am	BH-M20D:	13.78	
Time:	6:56 am	BH-M20S:	13.61	
Time:		BH-M21D:		
Time:		BH-M21S:		
Time:	6:50 am	BH-M22D:	15.04	
Time:	6:47 am	BH-M22S:	14.142	

LPSPB04:

13.565

Time:

7:53 am

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/	_ Deg Celcius	s Mg/L
UGM-M12D	10:37 am	6.68	56813.1	-115.6	0.35	22.01	4.6
UGM-M12S	10:12 am	7.10	6771.8	409.4	5.87	23.19	0.1
BH-21D	9:21 am	6.80	56473.8	-139.9	0.15	22.32	6.2
BH-21S	9:53 am	6.57	62672.0	396.8	0.86	23.12	0.25
			FIE	LD pH			
SPD-HM:		SPD-SAN	ID:		Pro	cess Water Pond:	
Time:		Tin	ne:			Time:	
					To	taliser readings	8
				P2 bore:		Time:	
				LPSPBO	)4 :	Time:	
				HBF	оН:	Time:	
				HBF p	oH:	Time:	
				-	_		
Description:				Descri	otion:		



10 November 2020

Date:

Job Number: S190512

Kaitlyn

**EMM** 

Time:

Time:

6:37 am

7:58 am

Techn	ician:			Date.	TO November 2020
		STANDING	G WATE	R LEVEL	_ (mbTOC)
Time:	7:03 am	UGM-M8D:	14.29		
Time:	7:02 am	UGM-M8S:	13.83		
Time:		UGM-M12D:			
Time:		UGM-M12S:			
Time:	6:31 am	UGM-M15D:	13.85		
Time:	6:32 am	UGM-M15S:	13.65		
Time:	7:15 am	BH-M17D:	14.06		Description of daily mining
Time:	7:17 am	BH-M17S:	12.82		activities
Time:	7:11 am	BH-M18D:	13.91		Process water field parameters taken at
Time:	7:11 am	BH-M18S:	12.59		process water dam
Time:	6:27 am	BH-M19D:	14.07		
Time:	6:25 am	BH-M19S:	13.29		
Time:	6:47 am	BH-M20D:	13.72		
Time:	6:45 am	BH-M20S:	13.62		
Time:		BH-M21D:			
Time:		BH-M21S:			
Time:	6:39 am	BH-M22D:	15.03		

BH-M22S:

LPSPB04:

14.15

13.58

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp	Total Iron
		Units	us/cm	mV	Mg/L	Deg Celciu	s Mg/L
UGM-M12D	8:42 am	6.68	56892.3	-16.1	0.3	23.01	4.2
UGM-M12S	9:00 am	7.53	67842.0	62.8	0.72	23.08	0.28
BH-21D	8:14 am	6.69	56774.9	-175.5	0.15	22.49	5.6
BH-21S	8:03 am	6.53	62938.7	238.9	4.89	23.58	0.0
			FIE	ELD pH			
SPD-HM:		SPD-SAN	ND:		Proc	ess Water Pond:	7.91
Time:		Tir	ne:			Time:	12:24 pm
					To	taliser reading	s
				P2 bore:		Time:	
				LPSPB(	04 :	Time:	
				HBF	pH:	Time:	
				HBF	pH:	Time:	
Description:				Descri	ption.		
υσσοτιμιίοτι.				Descii	P.1011.		



Job Number: S190512

EMM Technician:	ВВ КВ	Date:	12 November 2020	

### STANDING WATER LEVEL (mbTOC)

Time:	3:19 pm	UGM-M8D:	14.28
Time:	3:18 pm	UGM-M8S:	13.87
Time:		UGM-M12D:	
Time:		UGM-M12S:	
Time:	2:51 pm	UGM-M15D:	13.84
Time:	2:48 pm	UGM-M15S:	13.63
Time:	4:12 pm	BH-M17D:	14.04
Time:	4:15 pm	BH-M17S:	12.87
Time:	4:18 pm	BH-M18D:	13.89
Time:	4:20 pm	BH-M18S:	12.71
Time:	2:40 pm	BH-M19D:	14.06
Time:	2:38 pm	BH-M19S:	13.28
Time:	11:33 am	BH-M20D:	13.695
Time:	11:34 am	BH-M20S:	13.57
Time:		BH-M21D:	
Time:		BH-M21S:	
Time:	2:59 pm	BH-M22D:	15.02
Time:	3:02 pm	BH-M22S:	14.14
Time:	11:24 am	LPSPB04:	13.57

## Description of daily mining activities

BH-M21D 11:00, no TM
BH-M21S 11:15, no TM - QA1/QC1
UGM-M12D 13:00 no TM
UGM-M12S 12:30 no TM
UGM-M8D 16:00 no TM
UGM-M8S 15:30, TM REQUIRED

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	1:14 pm	6.75	59197	-211.5	0.35		22.18	3.2
UGM-M12S	12:32 pm	7.77	74841	26.7	4.31		24.68	0.48
BH-21D	11:01 am	6.78	61424	-195.1	0.04		22.18	4.8
BH-21S	11:19 am	6.93	68989	5.8	4.21		23.43	0.15
			FIE	ELD pH				
SPD-HM:		SPD-SAN	ND:		Pro	ocess W	ater Pond:	8.08
Time:		Tir	ne:				Time:	4:45 pm
					To	otalise	r readings	
				P2 bore:			Time:	
				LPSPB(	04 :		Time:	
				HBF	oH:		Time:	
				HBF	рН:		Time:	
				٦	г			
Description:				Descri	ption:			
				┙	L			



Job Number: S190512

EMM Technician:	ВВ КВ	Date:	13 November 2020

### STANDING WATER LEVEL (mbTOC)

Time:	12:21 pm	UGM-M8D:	14.29
Time:	12:23 pm	UGM-M8S:	13.89
Time:		UGM-M12D:	
Time:		UGM-M12S:	
Time:	8:11 am	UGM-M15D:	13.83
Time:	8:12 am	UGM-M15S:	13.645
Time:	12:56 pm	BH-M17D:	14.045
Time:	12:51 pm	BH-M17S:	12.90
Time:	12:35 pm	BH-M18D:	13.96
Time:	12:39 pm	BH-M18S:	12.75
Time:	8:30 am	BH-M19D:	14.07
Time:	8:27 am	BH-M19S:	13.285
Time:	9:14 am	BH-M20D:	13.728
Time:	9:16 am	BH-M20S:	13.61
Time:		BH-M21D:	
Time:		BH-M21S:	
Time:	7:39 am	BH-M22D:	15.03
Time:	7:43 am	BH-M22S:	14.145
Time:	1:20 pm	LPSPB04:	13.56

## Description of daily mining activities

BH-M23D sampled at 10:10 no TM BH-M23S sampled at 11:00 no TM RB1 sampled at 10:35 BH-M16S sampled at 15:45 no TM BH-M16D sampled at 16:45 no TM

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	1:23 pm	6.66	54544	-217.7	0.40		21.57	3.2
UGM-M12S	1:42 pm	7.59	72199	-75.2	0.93		21.82	0.2
BH-21D	2:13 pm	6.74	60358	-180.4	0.19		21.66	6.0
BH-21S	2:02 pm	6.57	62567	-10.4	0.46		21.79	0.18
			FIE	ELD pH				
SPD-HM:		SPD-SAN	ND:		Pro	ocess W	ater Pond:	8.05
Time:		Tir	ne:				Time:	7:07 am
					т	otalise	r readings	
				P2 bore:			Time:	
				LPSPB(	04 :		Time:	
				HBF	oH:		Time:	
				HBF	рН:		Time:	
Description:				Descri	ption:			
•								



Job No:	lob No: S190512 EMM Technician:		вв кв		ate:	13 November 2020				
	STANDING WATER LEVEL (mbTOC)									
Time:	3:11 pm	UGM-M1D:	14.035							
Time:	3:09 pm	UGM-M1S:	13.44		Des	scription of daily mining				
Time:	2:28 pm	UGM-M2D:	14.833		activities					
Time:	2:26 pm	UGM-M2S:	14.615							
Time:	7:03 am	UGM-M4D:	14.813							
Time:	3:23 pm	BH-M16D:	14.915							
Time:	3:21 pm	BH-M16S:	14.62							
Time:	7:59 am	BH-M23D:	15.41							
Time:	7:54 am	BH-M23S:	15.39							
Time:	9:27 am	BH-M24D:	13.95							
Time:	9:31 am	BH-M24S:	13.752							
Time:	8:41 am	BH-M25D:	13.06							
Time:	8:38 am	BH-M25S:	12.986							

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener						
HBF Tank Tap						
Stockpile Sump						

Well ID	Time	рН	Sp. Co	nd	Redox	DO	Temp
		Units	us/cn	n	mV	Mg/L	Deg Celcius
T2 Stockpile Sump							
Spill dam	5:24 pm	7.91	56489		1.1	8.53	26.7
Description:				Des	scription:		
Description:				Des	scription:		



Job Number: S190512

EMM Technician:	KB/BB	Date:	14 November 2020

#### **STANDING WATER LEVEL (mbTOC)**

Time:	11:09 am	UGM-M8D:	14.295
Time:	11:07 am	UGM-M8S:	13.89
Time:		UGM-M12D:	
Time:		UGM-M12S:	
Time:	8:52 am	UGM-M15D:	13.84
Time:	8:54 am	UGM-M15S:	13.63
Time:	11:22 am	BH-M17D:	14.06
Time:	11:24 am	BH-M17S:	12.92
Time:	11:18 am	BH-M18D:	13.925
Time:	11:19 am	BH-M18S:	12.78
Time:	6:59 am	BH-M19D:	14.07
Time:	6:56 am	BH-M19S:	13.29
Time:	1:54 pm	BH-M20D:	13.71
Time:	1:57 pm	BH-M20S:	13.61
Time:		BH-M21D:	
Time:		BH-M21S:	
Time:	9:00 am	BH-M22D:	15.04
Time:	9:02 am	BH-M22S:	14.15
Time:	12:37 pm	LPSPB04:	13.58

## Description of daily mining activities

BH-M19S sampled at 07:15 no TM BH-M19D sampled at 08:00 no TM BH-M22S sampled at 10:20 no TM BH-M22D sampled at 09:30 no TM BH-M20S sampled at 1430 no tm BH-M20D sampled at 15:00 no TM

RB2 sampled at 07:55

Well ID	Time	рН	Sp. Cond	Redox	DC	)	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	12:24 pm	6.76	57134	-223.8	0.66		22.28	2.2
UGM-M12S	12:35 pm	7.65	67954	-117	4.51		24.49	0.1
BH-21D	11:44 am	6.83	57236	-178.3	0.22		22.19	5.2
BH-21S	12:08 pm	6.62	57739	33.1	0.31		22.09	0.22
			FIE	ELD pH				
SPD-HM:		SPD-SAN	ND:		Pro	cess Wa	ater Pond:	8.13
Time:		Tir	ne:				Time:	1:44 pm
					To	otalise	r readings	
				P2 bore:			Time:	
				LPSPB(	04 :		Time:	
				HBF	рН:		Time:	
				HBF	рН:		Time:	
				٦	F			
Description:				Descri	ption:			



Job Number: S190512

EMM Technician:	ВВ КВ	Date:	15 November 2020

### STANDING WATER LEVEL (mbTOC)

Time:	8:13 am	UGM-M8D:	14.29
Time:	8:13 am	UGM-M8S:	13.895
Time:		UGM-M12D:	Logger
Time:		UGM-M12S:	Logger
Time:	6:58 am	UGM-M15D:	13.82
Time:	7:00 am	UGM-M15S:	13.62
Time:	8:25 am	BH-M17D:	14.045
Time:	8:24 am	BH-M17S:	12.918
Time:	8:20 am	BH-M18D:	13.923
Time:	8:18 am	BH-M18S:	12.789
Time:	6:52 am	BH-M19D:	14.07
Time:	6:51 am	BH-M19S:	13.285
Time:	8:06 am	BH-M20D:	13.71
Time:	8:04 am	BH-M20S:	13.55
Time:		BH-M21D:	Logger
Time:		BH-M21S:	Logger
Time:	7:58 am	BH-M22D:	15.023
Time:	7:59 am	BH-M22S:	14.142
Time:	8:34 am	LPSPB04:	13.56

## Description of daily mining activities

UGM-M15S - 07:20 TM required LPSPB04 - 09:00 no TM UGM-M1D - 12:15 no TM UGM-M1S - 12:30 TM required UGM-M4D - 14:15 no TM RB3 - 14:30

Well ID	Time	рН	Sp. Cond	Redox	DC	)	Temp	Total Iron
		Units	us/cm	mV	Mg/	L [	Deg Celcius	Mg/L
UGM-M12D	10:48 am	6.68	62532	-216.4	0.52	2	23.11	2.0
UGM-M12S	10:36 am	7.61	74647	13.2	1.09	2	24.42	0.1
BH-21D	10:11 am	6.74	61952	-191.0	0.24	2	22.89	5.6
BH-21S	10:02 am	6.72	69267	97.3	4.14	2	24.76	0.1
			FIE	ELD pH				
SPD-HM:		SPD-SAN	ND:		Pro	cess Wat	ter Pond:	8.15
Time:		Tir	ne:				Time:	2:46 pm
					To	otaliser	readings	
				P2 bore:			Time:	
				LPSPBO	)4 :		Time:	
				HBF p	оH: 7.9	93	Time:	2:54 pm
				HBF ß	oH:		Time:	
				-	_			
Description:				Descrip	otion:			

Stockpile Sump



Job No:	Job No: S190512 EMM		an: KB BB		15 November	2020
		STANDING	WATER LE	VEL (mbTO	C)	
Time:	11:29 am	UGM-M1D:	14.00			
Time:	11:27 am	UGM-M1S:	13.40	Des	scription of c	
Time:		UGM-M2D:			activiti	es
Time:		UGM-M2S:				
Time:	1:44 pm	UGM-M4D:	14.80			
Time:		BH-M16D:				
Time:		BH-M16S:				
Time:		BH-M23D:				
Time:		BH-M23S:				
Time:		BH-M24D:				
Time:		BH-M24S:				
Time:		BH-M25D:				
Time:		BH-M25S:				
		FIE	LD PARAMI	ETERS		
Well I	) Tim	ne pH	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thicke	ner					
HBF Tank	Тар					

Well ID	Time	рН	Sp. Con	nd Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump						
Spill dam						
Description:				Description:		
Description:				Description:		

Stockpile Sump



Job No:	S190512	EMM <sup>-</sup>	Technician:	BB KB		Date:	16 November 2	2020	
	STANDING WATER LEVEL (mbTOC)								
Time:			UGM-M1D:						
Time:			UGM-M1S:			Des	cription of d		
Time:			UGM-M2D:				activitie	es .	
Time:			UGM-M2S:						
Time:			UGM-M4D:						
Time:			BH-M16D:						
Time:			BH-M16S:						
Time:	8:36 am		BH-M23D:	15.39					
Time:	8:52 am		BH-M23S:	15.30					
Time:			BH-M24D:						
Time:			BH-M24S:						
Time:	6:56 am		BH-M25D:	13.04					
Time:	6:52 am		BH-M25S:	12.98					
	FIELD PARAMETERS								
Well II	) Tim	ie	рН	Sp. Cond	Re	edox	DO	Temp	
			Units	us/cm	n	nV	Mg/L	Deg Celcius	
Fines Thicke									

Well ID	Time	рН	Sp. Con	nd Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump						
Spill dam						
Description:				Description:		
Description:				Description:		



Job Number: S190512

EMM Technician:	ВВ КВ	Date:	16 November 2020

### STANDING WATER LEVEL (mbTOC)

Time:	12:41 pm	UGM-M8D:	14.29
Time:	12:42 pm	UGM-M8S:	13.89
Time:		UGM-M12D:	
Time:		UGM-M12S:	
Time:	8:25 am	UGM-M15D:	13.835
Time:	8:26 am	UGM-M15S:	13.63
Time:	12:57 pm	BH-M17D:	14.06
Time:	12:59 pm	BH-M17S:	12.915
Time:	12:53 pm	BH-M18D:	13.93
Time:	12:51 pm	BH-M18S:	12.72
Time:	8:22 am	BH-M19D:	14.075
Time:	8:20 am	BH-M19S:	13.295
Time:	10:10 am	BH-M20D:	13.73
Time:	10:11 am	BH-M20S:	13.55
Time:		BH-M21D:	
Time:		BH-M21S:	
Time:	10:05 am	BH-M22D:	15.03
Time:	10:05 am	BH-M22S:	14.147
Time:	1:29 pm	LPSPB04:	13.57

## Description of daily mining activities

BH-M25S sampled no TM 07:15
BH-M25D sampled 0745 with TM
BH-M23D sampled 09:10 with TM
BH-M23S sampled 0945 no TM
UGM-M2D sampled 11:15 no TM
UGM-M2S sampled 11:30 with TM

Well ID	Time	рН	Sp. Cond	Redox	DC	)	Temp	Total Iron
		Units	us/cm	mV	Mg/	L	Deg Celcius	Mg/L
UGM-M12D	2:17 pm	6.57	65864	-212.2	0.28		22.96	3.6
UGM-M12S	2:37 pm	7.50	78614	-38.1	1.05		24.02	0.16
BH-21D	1:32 pm	6.66	65730	-194.2	0.25		23.57	5.8
BH-21S	1:50 pm	6.44	71723	10.9	0.53		23.5	0.32
			FIE	ELD pH				
SPD-HM:		SPD-SAN	ND:		Pro	cess Wa	ater Pond:	8.00
Time:		Tir	ne:				Time:	12:21 pm
					To	otalise	r readings	
				P2 bore:			Time:	
				LPSPBO	)4 :		Time:	
				HBF p	оН:		Time:	
				HBF ß	оН:		Time:	
				٦	F			
Description:				Descrip	otion:			
				_	L			



Job Number: S190512

EMM Technician:	KB/BB	Date:	17 November 2020

### STANDING WATER LEVEL (mbTOC)

Time:	9:10 am	UGM-M8D:	14.30
Time:	9:12 am	UGM-M8S:	13.907
Time:		UGM-M12D:	
Time:		UGM-M12S:	
Time:	8:45 am	UGM-M15D:	13.84
Time:	8:47 am	UGM-M15S:	13.62
Time:	12:05 pm	BH-M17D:	14.08
Time:	12:07 pm	BH-M17S:	12.94
Time:	9:25 am	BH-M18D:	13.928
Time:	9:22 am	BH-M18S:	12.725
Time:	8:39 am	BH-M19D:	14.09
Time:	8:40 am	BH-M19S:	13.285
Time:	9:02 am	BH-M20D:	13.725
Time:	9:00 am	BH-M20S:	13.547
Time:		BH-M21D:	
Time:		BH-M21S:	
Time:	8:52 am	BH-M22D:	15.04
Time:	8:54 am	BH-M22S:	14.153
Time:	2:25 pm	LPSPB04:	13.58

## Description of daily mining activities

BH-M17S sampled at 13:30 with TM
BH-M17D sampled at 12:40 no TM
BH-M18S sampled at 09:45 TM
required
BH-M18D sampled at 10:40 no TM
RB5 at 1100

Well ID	Time	рН	Sp. Cond	Redox	DC	)	Temp	Total Iron
		Units	us/cm	mV	Mg/	L	Deg Celcius	Mg/L
UGM-M12D	3:17 pm	6.62	75090	-226.1	0.5		23.54	4.2
UGM-M12S	3:06 pm	7.54	89755	6.6	0.92		23.85	0.12
BH-21D	2:44 pm	6.68	75321	-202.5	0.23		23.22	6
BH-21S	2:42 pm	6.41	83168	84.8	1.09		24.80	0.44
			FIE	ELD pH				
SPD-HM:		SPD-SAN	ND:		Pro	cess W	ater Pond:	8.08
Time:		Tir	ne:				Time:	8:28 am
					To	otalise	r readings	
				P2 bore:			Time:	
				LPSPBO	)4 :		Time:	
				HBF p	оН:		Time:	
				HBF ß	оН:		Time:	
				٦	г			
Description:				Descrip	otion:			



Job Number: S190512

EMM Technician:	Kaitlyn	Date:	18 November 2020

### STANDING WATER LEVEL (mbTOC)

Time:	7:46 am	UGM-M8D:	14.29
Time:	7:48 am	UGM-M8S:	13.897
Time:		UGM-M12D:	
Time:		UGM-M12S:	
Time:	7:19 am	UGM-M15D:	13.835
Time:	7:19 am	UGM-M15S:	13.62
Time:	10:03 am	BH-M17D:	14.055
Time:	10:05 am	BH-M17S:	12.917
Time:	9:57 am	BH-M18D:	13.91
Time:	9:55 am	BH-M18S:	12.725
Time:	7:12 am	BH-M19D:	14.08
Time:	7:15 am	BH-M19S:	13.28
Time:	7:34 am	BH-M20D:	13.72
Time:	7:32 am	BH-M20S:	13.54
Time:		BH-M21D:	
Time:		BH-M21S:	
Time:	7:27 am	BH-M22D:	15.028
Time:	7:24 am	BH-M22S:	14.135
Time:	10:40 am	LPSPB04:	13.565

## Description of daily mining activities

UGM-M8D 08:30 no TM QA/QC UGM-M8S 08:10, TM required UGM-M12D 12:10 no TM UGM-M12S 12:30 no TM BH-M21D 10:50, no TM BH-M21S 11:20, TM required

Well ID	Time	рН	Sp. Cond	Redox	DC	)	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	12:08 pm	6.56	60749	-220.1	0.62		24.11	4
UGM-M12S	12:36 pm	7.51	72523	-4.1	1.01		24.6	
BH-21D	10:59 am	6.62	60528	-191.3	0.26		23.1	5.2
BH-21S	11:25 am	6.41	67018	67.3	0.97		24.78	0.5
			FIE	ELD pH				
SPD-HM:		SPD-SAN	ND:		Pro	ocess W	ater Pond:	8.07
Time:		Tir	ne:				Time:	6:56 am
					To	otalise	r readings	
				P2 bore:			Time:	
				LPSPBO	)4 :		Time:	
				HBF p	оН:		Time:	
				HBF ß	оН:		Time:	
				٦	r			
Description:				Descrip	otion:			
				J	L			



Job Number: S190512

Techni	EMM cian: Kaitlyı	า	Date:	19 November 2020							
	STANDING WATER LEVEL (mbTOC)										
Time:	11:02 am	UGM-M8D:	14.28								
Time:	11:03 am	UGM-M8S:	13.89								
Time:		UGM-M12D:									
Time:		UGM-M12S:									
Time:	8:41 am	UGM-M15D:	13.824								
Time:	8:44 am	UGM-M15S:	13.61								
Time:	11:31 am	BH-M17D:	14.043	Description of daily mining							
Time:	11:35 am	BH-M17S:	12.905	activities							
Time:	11:22 am	BH-M18D:	13.90								
Time:	11:19 am	BH-M18S:	12.735								
Time:	8:55 am	BH-M19D:	14.06								
Time:	8:53 am	BH-M19S:	13.275								
Time:	7:57 am	BH-M20D:	13.702								
Time:	7:55 am	BH-M20S:	13.53								
Time:		BH-M21D:									
Time:		BH-M21S:									
Time:	8:13 am	BH-M22D:	15.02								
Time:	8:15 am	BH-M22S:	14.137								

13.555

LPSPB04:

Time:

11:57 am

Well ID	Time	рН	Sp. Cond	Redox	DO	)	Temp	Total Iron
		Units	us/cm	mV	Mg	/L	Deg Celcius	Mg/L
UGM-M12D	1:42 pm	6.58	54862	-196.2	0.45		24.74	4.6
UGM-M12S	1:21 pm	7.46	65232	28.6	1.37		26.21	0.24
BH-21D	12:52 pm	6.66	54916	-190.9	0.21		24.08	6
BH-21S	12:39 pm	6.64	59840	153.6	4.54		28.13	0.28
			FIE	ELD pH				
SPD-HM:		SPD-SAN	ND:		Pro	ocess W	ater Pond:	7.87
Time:		Tir	ne:				Time:	6:34 am
					T	otalise	r readings	
				P2 bore:			Time:	
				LPSPB(	)4 :		Time:	
				HBF	оН:		Time:	
				HBF	оН:		Time:	
				7	г			
Description:				Descri	otion:			
				_	L			



Job No: S190512		EMM Technician:	Kaitlyn	Date:	19 November 2020					
	STANDING WATER LEVEL (mbTOC)									
Time:	7:06 am	UGM-M1D:	14.03							
Time:	7:08 am	UGM-M1S:	13.41	De	scription of daily mining					
Time:		UGM-M2D:			activities					
Time:		UGM-M2S:								
Time:		UGM-M4D:								
Time:	7:24 am	BH-M16D:	14.665							
Time:	7:22 am	BH-M16S:	14.63							
Time:	8:30 am	BH-M23D:	15.40							
Time:	8:28 am	BH-M23S:	15.38							
Time:	7:38 am	BH-M24D:	13.96							
Time:	7:40 am	BH-M24S:	13.73							
Time:	9:10 am	BH-M25D:	13.05							
Time:	9:12 am	BH-M25S:	12.997							
				ETERO						

Well ID	Time	рН	Sp. Cond	Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
Fines Thickener						
HBF Tank Tap						
Stockpile Sump						

Well ID	Time	рН	Sp. Con	nd Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump						
Spill dam						
Description:				Description:		
Description:				Description:		



Job Number: S190512

9:34 am

11:24 am

Time:

Time:

ician:	Kaitlyr	າ 		Date:	2	20 November 2020				
STANDING WATER LEVEL (mbTOC)										
10:13	3 am	UGM-M8D:	14.28							
10:15	am	UGM-M8S:	13.89							
		UGM-M12D:								
		UGM-M12S:								
9:25 :	am	UGM-M15D:	13.82							
9:27 (	am	UGM-M15S:	13.80							
10:43	am	BH-M17D:	14.05			Description of daily mining				
10:43	am	BH-M17S:	12.90			activities				
10:21	am	BH-M18D:	13.91							
10:22	2 am	BH-M18S:	12.73							
9:21 ;	am	BH-M19D:	14.06							
9:20 (	am	BH-M19S:	13.28							
9:50 (	am	BH-M20D:	13.71							
9:49 (	am	BH-M20S:	13.53							
		BH-M21D:								
		BH-M21S:								
9:33 (	am	BH-M22D:	15.02							
	9:25 a 9:27 a 10:43 10:43 10:43 10:21 10:22 9:21 a 9:50 a 9:49 a	10:13 am 10:15 am 9:25 am 9:27 am 10:43 am 10:43 am 10:21 am 9:21 am 9:20 am 9:50 am 9:49 am 9:33 am	### STANDING    10:13 am	STANDING WATI         10:13 am       UGM-M8D:       14.28         10:15 am       UGM-M8S:       13.89         UGM-M12D:       UGM-M12D:         9:25 am       UGM-M15D:       13.82         9:27 am       UGM-M15S:       13.80         10:43 am       BH-M17D:       14.05         10:43 am       BH-M17S:       12.90         10:21 am       BH-M18D:       13.91         10:22 am       BH-M18S:       12.73         9:21 am       BH-M19D:       14.06         9:20 am       BH-M19S:       13.28         9:50 am       BH-M20D:       13.71         9:49 am       BH-M20S:       13.53         BH-M21D:       BH-M21D:         BH-M21S:       BH-M21S:	STANDING WATER LEV           10:13 am         UGM-M8D:         14.28           10:15 am         UGM-M8S:         13.89           UGM-M12D:         UGM-M12D:           9:25 am         UGM-M15D:         13.82           9:27 am         UGM-M15S:         13.80           10:43 am         BH-M17D:         14.05           10:43 am         BH-M17S:         12.90           10:21 am         BH-M18D:         13.91           10:22 am         BH-M18S:         12.73           9:21 am         BH-M19D:         14.06           9:20 am         BH-M19S:         13.28           9:50 am         BH-M20D:         13.71           9:49 am         BH-M20S:         13.53           BH-M21D:         BH-M21D:           BH-M21S:         BH-M21S:	STANDING WATER LEVEL (           10:13 am         UGM-M8D:         14.28           10:15 am         UGM-M8S:         13.89           UGM-M12D:         UGM-M12D:         UGM-M12S:           9:25 am         UGM-M15D:         13.82           9:27 am         UGM-M15S:         13.80           10:43 am         BH-M17D:         14.05           10:43 am         BH-M17S:         12.90           10:21 am         BH-M18D:         13.91           10:22 am         BH-M18S:         12.73           9:21 am         BH-M19D:         14.06           9:20 am         BH-M19S:         13.28           9:50 am         BH-M20D:         13.71           9:49 am         BH-M20S:         13.53           BH-M21D:         BH-M21D:         BH-M21S:				

14.13

13.55

BH-M22S:

LPSPB04:

Well ID	Time	рН	Sp. Cond	Redox	DC	)	Temp	Total Iron
		Units	us/cm	mV	Mg/	Ľ	Deg Celcius	Mg/L
UGM-M12D	11:54 am	6.52	55166	-203.8	0.5		24.62	3.8
UGM-M12S	12:16 pm	7.46	64752	-36.3	0.89		24.77	3
BH-21D	11:16 am	6.63	53763	-197.2	0.12		23.21	4.8
BH-21S	11:36 am	6.42	60425	105.5	0.65		25.34	0.1
			FIE	ELD pH				
SPD-HM:		SPD-SAN	ND:		Pro	cess W	ater Pond:	
Time:		Tir	ne:				Time:	
					To	otalise	r readings	
				P2 bore:			Time:	
				LPSPBO	)4 :		Time:	
				HBF	оН:		Time:	
				HBF	оН:		Time:	
Description:				Descri	otion:			



Job No	Job No: S190512 EMM Technici			Date:	20 November 2020		
		STANDING	WATER LE	VEL (mbTO	C)		
Time:		UGM-M1D:					
Time:		UGM-M1S:		De	scription of o		
Time:	1:05 pm	UGM-M2D:	14.84		activiti	es	
Time:	1:04 pm	UGM-M2S:	14.66				
Time:	1:22 pm	UGM-M4D:	14.82				
Time:		BH-M16D:					
Time:		BH-M16S:					
Time:		BH-M23D:					
Time:		BH-M23S:					
Time:		BH-M24D:					
Time:		BH-M24S:					
Time:		BH-M25D:					
Time:		BH-M25S:					
		FIE	LD PARAMI	ETERS			
Well I	D Tir	me pH	Sp. Cond	Redox	DO	Temp	
		Units	us/cm	mV	Mg/L	Deg Celcius	
Fines Thick	ener						
HBF Tank	Тар						
Stockpile S	ump						

Well ID	Time	рН	Sp. Con	nd Redox	DO	Temp
		Units	us/cm	mV	Mg/L	Deg Celcius
T2 Stockpile Sump						
Spill dam						
Description:				Description:		
Description:				Description:		

### E.2 Plant monitoring results summary

Table E.1 Plant monitoring results summary – during mining

Parameter	рН	EC (μs/cm)	TDS (mg/L)	ORP (mV)	Temperature (°C)
Process water					
Minimum	7.35	45,488	31,572	-9	4.9
Maximum	8.05	55,929	36,354	293.9	23
Mean	7.71	51,435	33,387	100.4	14
SPD-Sand					
Minimum	7.21	43,641	28,367	-26.1	11.6
Maximum	8.06	55,550	36,108	261.9	21.4
Mean	7.72	45,264	29,236	127.5	16.3
SPD-HM					
Minimum	6.97	48,956	31,821	20.7	6.13
Maximum	7.98	56,573	36,772	290.6	21.2
Mean	7.72	52,499	33,969	131.8	14.4
HBF tank					
Minimum	6.92	42,008	28,264	42.4	9.3
Maximum	8.09	53,765	34,947	237.2	22
Mean	7.62	47,861	31,349	123.2	14.4
Fines thickener					
Minimum	7.22	52,053	33,834	14	10.5
Maximum	8.02	56,852	36,905	250.4	21.7
Mean	7.7	54,565	35,457	127.3	16.6
Stockpile sump					
Minimum	7.5	52,336	34,018	29.8	9.4
Maximum	8.04	57,444	37,339	227.6	18.4
Mean	7.79	55,095	35,921	119.9	13.6
T2 stockpile sump					
Minimum	6.84	53,760	34,944	35.6	10.5
Maximum	7.77	65,456	42,547	199.3	15.1
Mean	7.43	57,193	37,445	129.5	12.6
Spill dam					
Minimum	8.05	22,050	14,332	12.4	11.6
Maximum	8.21	55,451	36,042	118.6	19.14
Mean	8.11	43,573	28,322	64.7	16.2

<sup>1.</sup> SPD-Sand = Spiral plant discharge – Sand stream

S190512 | RP 1 | v2 E.3

<sup>2.</sup> SPD-HM = Spiral plant discharge – heavy mineral stream

Plant monitoring results summary – during backfill Table E.2

Parameter	рН	EC (μs/cm)	TDS (mg/L)	ORP (mV)	Temperature (°C)
Process water					
Minimum	6.79	51,193	33,275	-70	5.74
Maximum	7.93	55,917	36,346	157	24.3
Mean	7.54	53,684	34,895	60.2	17.2
SPD-Sand <sup>1</sup>					
Minimum	7.43	49,703	32,307	40.8	17.3
Maximum	8.16	54,014	35,109	145.8	29.1
Mean	7.69	52,009	33,806	67.4	23.3
SPD-HM <sup>2</sup>					
Minimum	7.33	49,967	32,479	33.4	16.3
Maximum	8.16	54,922	35,699	114.2	23.9
Mean	7.63	53,081	34,503	76.9	20
HBF tank					
Minimum	6.73	49,400	32,110	-211	10.1
Maximum	7.97	57,367	37,289	118	28.4
Mean	7.35	52,632	34,211	36.4	20.9
Fines thickener					
Minimum	6.82	51,504	33,478	29.6	17.8
Maximum	7.91	56,551	36,758	172.1	21.2
Mean	7.62	53,930	35,055	106.8	19.3
Stockpile sump					
Minimum	6.96	49,345	32,074	29.2	16.5
Maximum	7.92	54,147	35,196	114	24.2
Mean	7.5	52,081	33,853	83.2	19.6
T2 stockpile sump					
Minimum	7.49	63,978	41,586	61.7	16.5
Maximum	7.88	74,050	48,133	229.6	22.7
Mean	7.74	69,691	45,299	134.3	18.6
Spill dam					
Minimum	6.86	55,334	35,967	30.1	19.2
Maximum	7.93	60,480	39,312	85.4	22.5
Mean	7.4	57,910	37,642	57.8	20.8

<sup>1.</sup> 

SPD-Sand = Spiral plant discharge — Sand stream SPD-HM = Spiral plant discharge — heavy mineral stream

## Appendix F

WISH database trend assessment

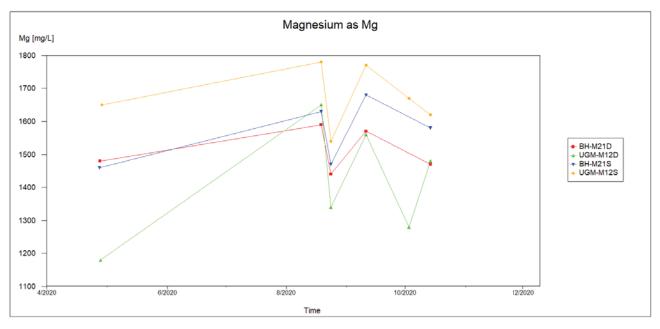


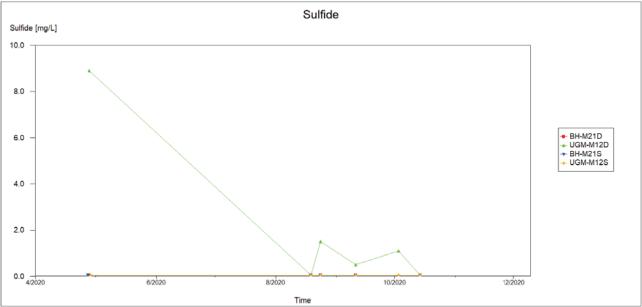


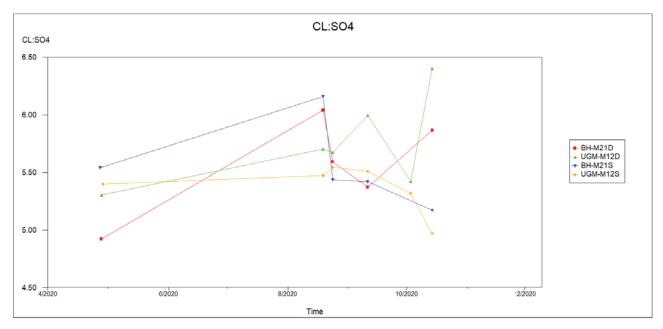


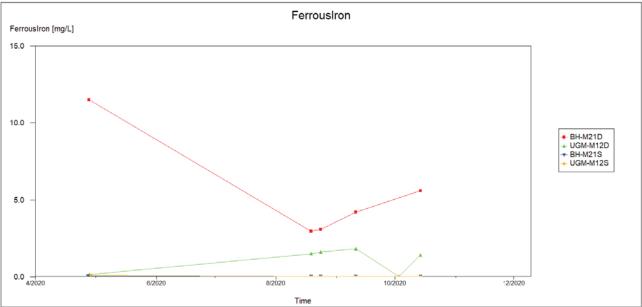


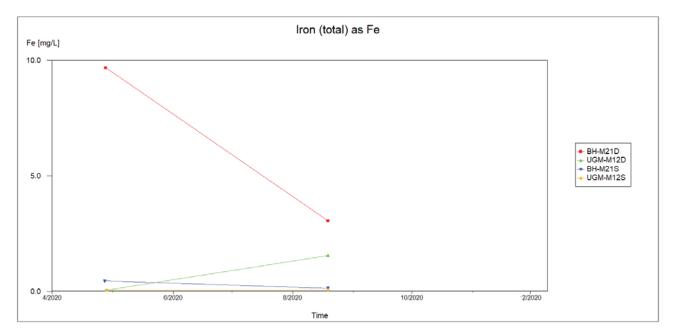
## F.1 Mining bores

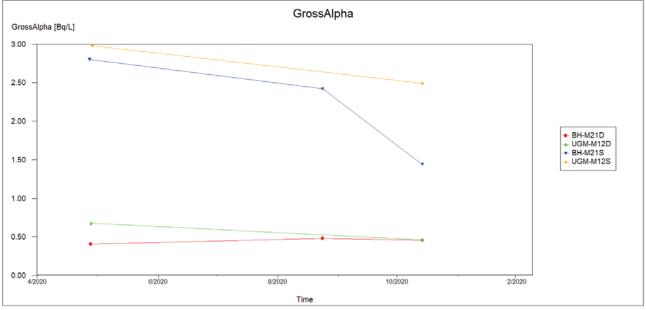


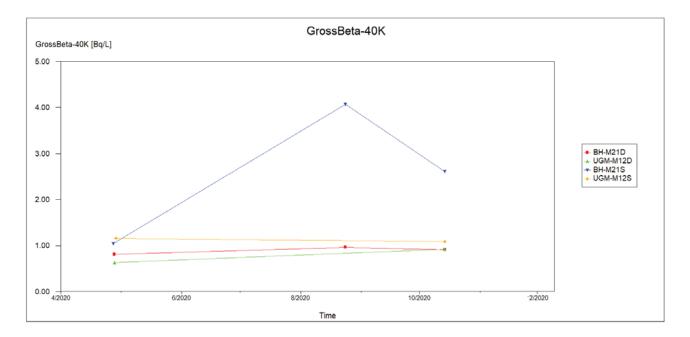




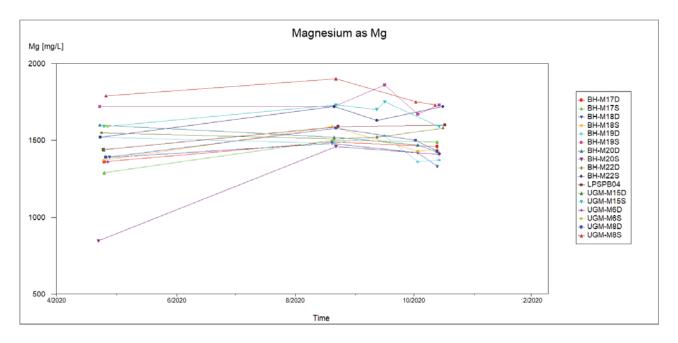


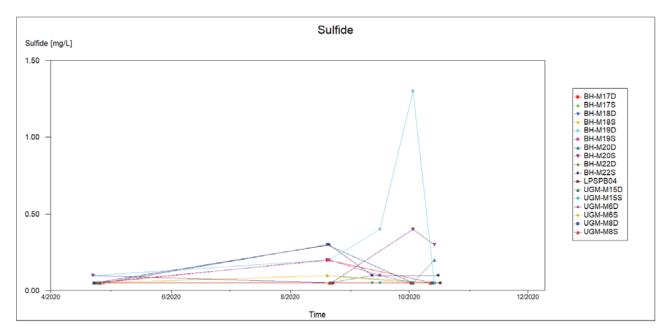


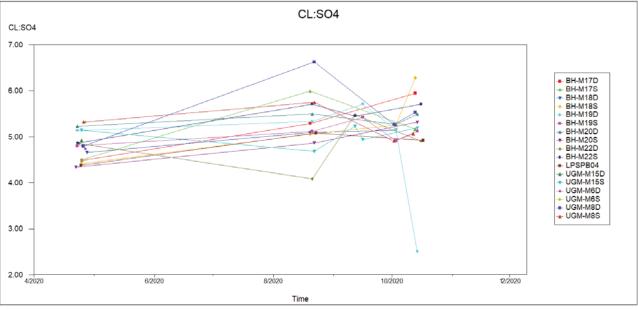


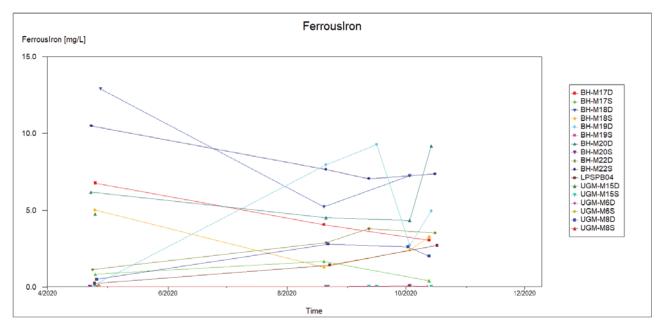


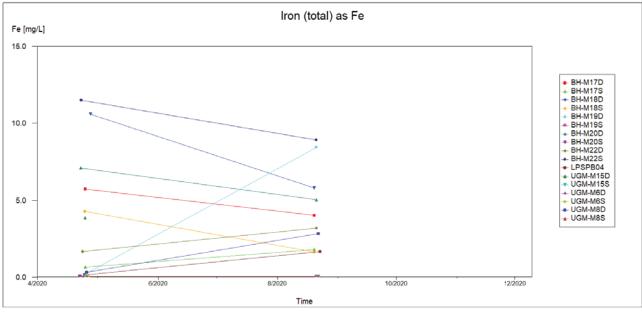
## F.2 Transition bores

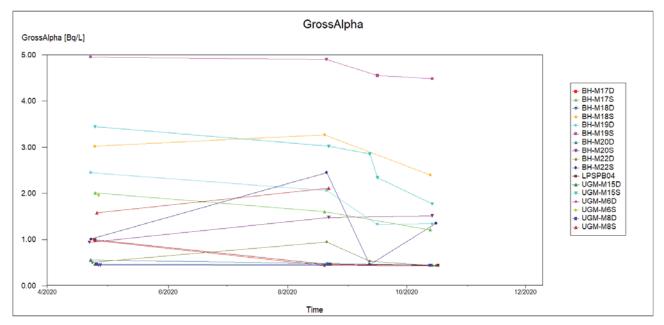


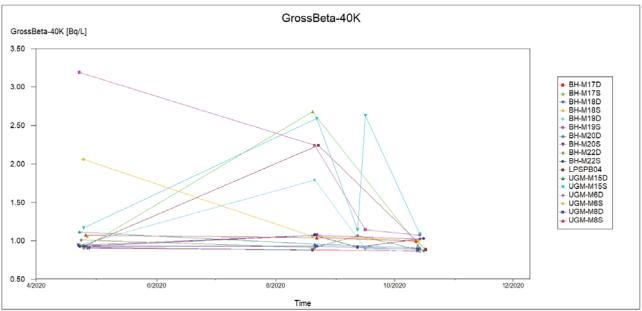












## F.3 Background bores

