



Australian Laboratory Services Pty. Ltd.

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ALS Perth is a NATA Accredited Testing Laboratory. Corporate Accreditation  
No: 825, Corporate Site No: 23001.

## QC CERTIFICATE AD18286728

Project: Thomas Creek

This report is for 1 Rock sample submitted to our lab in Burnie, TAS, Australia on 13-NOV-2018.

The following have access to data associated with this certificate:

PETER REID

ANDY RUST

Page: 1  
Total # Pages: 3 (A - D)  
Plus Appendix Pages  
Finalized Date: 6-DEC-2018  
Account: ACCELE

## SAMPLE PREPARATION

ALS CODE	DESCRIPTION
WEI-21	Received Sample Weight
LEV-01	Waste Disposal Levy
LOG-22	Sample login - Rcd w/o BarCode
CRU-21	Crush entire sample >70% -6 mm
PUL-23	Pulv Sample - Split/Retain

## ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION
ME-MS61	48 element four acid ICP-MS
Au-ICP21	Au 30g FA ICP-AES Finish ICP-AES

This is the Final Report and supersedes any preliminary report with this certificate number. Results apply to samples as submitted. All pages of this report have been checked and approved for release.

\*\*\*\*\* See Appendix Page for comments regarding this certificate \*\*\*\*\*

Signature:

Cameron Brosnan, Laboratory Manager, Perth



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Page: 2 - A  
Total # Pages: 3 (A - D)  
Plus Appendix Pages  
Finalized Date: 6-DEC-2018  
Account: ACCELE

## QC CERTIFICATE OF ANALYSIS AD18286728

Sample Description	Method Analyte Units LOD	Au-ICP21 Au ppm 0.001	ME-MS61 Ag ppm 0.01	ME-MS61 Al % 0.01	ME-MS61 As ppm 0.2	ME-MS61 Ba ppm 10	ME-MS61 Be ppm 0.05	ME-MS61 Bi ppm 0.01	ME-MS61 Ca % 0.01	ME-MS61 Cd ppm 0.02	ME-MS61 Ce ppm 0.01	ME-MS61 Co ppm 0.1	ME-MS61 Cr ppm 1	ME-MS61 Cs ppm 0.05	ME-MS61 Cu ppm 0.2	ME-MS61 Fe % 0.01
STANDARDS																
AMIS0354		0.712														
Target Range - Lower Bound		0.666														
Upper Bound		0.754														
GBM908-10			3.07	7.50	58.7	1120	1.49	1.28	3.90	1.76	111.0	26.7	148	3.95	3720	5.71
Target Range - Lower Bound			2.60	6.40	50.2	930	1.27	1.12	3.33	1.53	99.0	24.0	125	3.44	3350	4.98
Upper Bound			3.20	7.84	61.8	1280	1.66	1.39	4.10	1.91	121.0	29.6	155	4.32	3850	6.10
GPP-14		0.899														
Target Range - Lower Bound		0.853														
Upper Bound		0.965														
MRGeo08			4.50	7.90	33.9	1070	3.21	0.73	2.62	2.16	78.1	19.3	87	12.90	624	3.94
Target Range - Lower Bound			4.00	6.64	29.5	920	2.98	0.60	2.35	2.00	66.2	17.7	81	11.20	587	3.55
Upper Bound			4.92	8.14	36.5	1270	3.76	0.76	2.90	2.48	81.0	21.9	102	13.80	675	4.37
OREAS 24b			0.06	8.04	8.1	720	2.40	0.67	1.07	0.04	84.7	15.7	122	10.60	37.5	4.40
Target Range - Lower Bound			0.05	7.02	7.3	600	2.25	0.60	0.94	<0.02	76.8	14.3	105	9.58	35.1	3.94
Upper Bound			0.09	8.60	9.4	830	2.86	0.76	1.18	0.09	93.8	17.8	131	11.80	40.9	4.84
PMP-18		0.294														
Target Range - Lower Bound		0.281														
Upper Bound		0.319														
BLANKS																
BLANK		<0.001														
Target Range - Lower Bound		<0.001														
Upper Bound		0.002														
BLANK			0.01	<0.01	<0.2	<10	<0.05	0.05	<0.01	<0.02	0.01	<0.1	1	<0.05	0.2	<0.01
Target Range - Lower Bound			<0.01	<0.01	<0.2	<10	<0.05	<0.01	<0.01	<0.02	<0.01	<0.1	<1	<0.05	<0.2	<0.01
Upper Bound			0.02	0.02	0.4	20	0.10	0.02	0.02	0.04	0.02	0.2	2	0.10	0.4	0.02



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Page: 2 - B  
Total # Pages: 3 (A - D)  
Plus Appendix Pages  
Finalized Date: 6-DEC-2018  
Account: ACCELE

## QC CERTIFICATE OF ANALYSIS AD18286728

Sample Description	Method Analyte Units LOD	ME-MS61 Ga ppm 0.05	ME-MS61 Ge ppm 0.05	ME-MS61 Hf ppm 0.1	ME-MS61 In ppm 0.005	ME-MS61 K % 0.01	ME-MS61 La ppm 0.5	ME-MS61 Li ppm 0.2	ME-MS61 Mg % 0.01	ME-MS61 Mn ppm 5	ME-MS61 Mo ppm 0.05	ME-MS61 Na % 0.01	ME-MS61 Nb ppm 0.1	ME-MS61 Ni ppm 0.2	ME-MS61 P ppm 10	ME-MS61 Pb ppm 0.5
STANDARDS																
AMIS0354																
Target Range - Lower Bound																
Upper Bound																
GBM908-10		20.7	0.16	4.0	0.068	2.17	56.7	10.9	1.91	845	62.6	2.22	11.1	2290	1050	2160
Target Range - Lower Bound		18.65	0.13	3.3	0.064	1.87	49.0	9.8	1.61	715	57.9	1.93	9.5	2020	880	1845
Upper Bound		22.9	0.35	4.3	0.092	2.31	61.0	12.4	1.99	885	70.9	2.38	11.9	2470	1100	2250
GPP-14																
Target Range - Lower Bound																
Upper Bound																
MRGeo08		18.85	0.14	3.2	0.172	3.16	39.4	32.4	1.37	574	15.20	1.98	21.9	692	1060	1100
Target Range - Lower Bound		17.50	<0.05	2.8	0.155	2.79	31.1	29.5	1.17	497	13.65	1.76	19.0	622	930	971
Upper Bound		21.5	0.27	3.6	0.201	3.43	39.1	36.5	1.45	619	16.75	2.18	23.4	760	1160	1185
OREAS 24b		20.5	0.14	4.2	0.072	2.80	43.2	54.5	1.62	448	3.82	0.83	15.5	60.8	710	22.2
Target Range - Lower Bound		18.05	<0.05	3.4	0.063	2.52	37.7	48.4	1.39	391	3.46	0.70	13.0	53.8	610	20.3
Upper Bound		22.2	0.26	4.4	0.091	3.10	47.1	59.6	1.72	489	4.34	0.88	16.2	66.2	770	25.9
PMP-18																
Target Range - Lower Bound																
Upper Bound																
BLANKS																
BLANK		<0.05	<0.05	<0.1	<0.005	<0.01	<0.5	<0.2	<0.01	<5	0.07	<0.01	<0.1	0.5	<10	<0.5
Target Range - Lower Bound		<0.05	<0.05	<0.1	<0.005	<0.01	<0.5	<0.2	<0.01	<5	<0.05	<0.01	<0.1	<0.2	<10	<0.5
Upper Bound		0.10	0.10	0.2	0.010	0.02	1.0	0.4	0.02	10	0.10	0.02	0.2	0.4	20	1.0



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Project: Thomas Creek

Page: 2 - C  
Total # Pages: 3 (A - D)  
Plus Appendix Pages  
Finalized Date: 6-DEC-2018  
Account: ACCELE

**QC CERTIFICATE OF ANALYSIS AD18286728**

Sample Description	Method Analyte Units LOD	ME-MS61 Rb ppm 0.1	ME-MS61 Re ppm 0.002	ME-MS61 S % 0.01	ME-MS61 Sb ppm 0.05	ME-MS61 Sc ppm 0.1	ME-MS61 Se ppm 1	ME-MS61 Sn ppm 0.2	ME-MS61 Sr ppm 0.2	ME-MS61 Ta ppm 0.05	ME-MS61 Te ppm 0.05	ME-MS61 Th ppm 0.01	ME-MS61 Ti % 0.005	ME-MS61 Tl ppm 0.02	ME-MS61 U ppm 0.1	ME-MS61 V ppm 1
STANDARDS																
AMIS0354																
Target Range - Lower Bound																
Upper Bound																
GBM908-10		164.5	<0.002	0.39	1.94	18.4	1	3.2	309	0.78	0.06	18.70	0.685	1.26	2.3	148
Target Range - Lower Bound		153.0	<0.002	0.33	1.40	17.0	<1	2.7	258	0.68	<0.05	16.55	0.591	1.00	2.0	123
Upper Bound		187.0	0.006	0.43	2.01	21.0	3	3.9	316	0.97	0.16	20.3	0.733	1.40	2.6	153
GPP-14																
Target Range - Lower Bound																
Upper Bound																
MRGeo08		204	0.007	0.31	4.42	12.1	1	4.0	315	1.55	<0.05	21.9	0.487	1.09	5.8	111
Target Range - Lower Bound		173.5	0.005	0.27	3.89	11.1	<1	3.5	277	1.39	<0.05	17.90	0.443	0.89	4.9	97
Upper Bound		212	0.013	0.35	5.39	13.7	4	4.7	339	1.81	0.14	21.9	0.553	1.25	6.2	121
OREAS 24b		164.5	<0.002	0.20	0.96	14.9	<1	4.1	124.0	1.12	0.05	17.05	0.451	0.88	3.0	110
Target Range - Lower Bound		147.5	<0.002	0.17	0.76	13.7	<1	3.6	111.5	0.99	<0.05	14.75	0.387	0.71	2.7	96
Upper Bound		180.5	0.006	0.23	1.15	16.9	3	4.9	136.5	1.33	0.10	18.05	0.484	1.01	3.5	120
PMP-18																
Target Range - Lower Bound																
Upper Bound																
BLANKS																
BLANK		<0.1	<0.002	<0.01	0.05	<0.1	<1	<0.2	<0.2	<0.05	<0.05	<0.01	<0.005	<0.02	<0.1	<1
Target Range - Lower Bound		<0.1	<0.002	<0.01	<0.05	<0.1	<1	<0.2	<0.2	<0.05	<0.05	<0.01	<0.005	<0.02	<0.1	<1
Upper Bound		0.2	0.004	0.02	0.10	0.2	2	0.4	0.4	0.10	0.10	0.02	0.010	0.04	0.2	2



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Page: 2 - D  
Total # Pages: 3 (A - D)  
Plus Appendix Pages  
Finalized Date: 6-DEC-2018  
Account: ACCELE

**QC CERTIFICATE OF ANALYSIS AD18286728**

Sample Description	Method Analyte Units LOD	ME-MS61 W ppm 0.1	ME-MS61 Y ppm 0.1	ME-MS61 Zn ppm 2	ME-MS61 Zr ppm 0.5
STANDARDS					
AMIS0354					
Target Range - Lower Bound					
Upper Bound					
GBM908-10		3.2	38.8	1120	148.0
Target Range - Lower Bound		2.9	35.2	939	117.5
Upper Bound		4.1	43.2	1150	160.5
GPP-14					
Target Range - Lower Bound					
Upper Bound					
MRGeo08		4.8	27.3	820	109.5
Target Range - Lower Bound		4.1	23.8	722	92.2
Upper Bound		5.8	29.3	886	126.0
OREAS 24b		3.8	20.4	110	145.5
Target Range - Lower Bound		3.0	18.3	93	113.5
Upper Bound		4.3	22.5	118	154.5
PMP-18					
Target Range - Lower Bound					
Upper Bound					
BLANKS					
BLANK					
Target Range - Lower Bound					
Upper Bound					
BLANK		<0.1	<0.1	<2	<0.5
Target Range - Lower Bound		<0.1	<0.1	<2	<0.5
Upper Bound		0.2	0.2	4	1.0





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Project: Thomas Creek

Page: 3 - B  
Total # Pages: 3 (A - D)  
Plus Appendix Pages  
Finalized Date: 6-DEC-2018  
Account: ACCELE

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DUPLICATES																
ORIGINAL		24.5	0.14	2.0	0.085	3.60	42.1	28.9	1.84	687	0.39	2.15	13.8	43.3	730	3.6
DUP		25.6	0.17	2.0	0.087	3.69	43.8	30.0	1.92	699	0.41	2.20	14.5	45.0	750	3.8
Target Range - Lower Bound		23.7	0.10	1.8	0.077	3.45	40.3	27.8	1.78	653	0.33	2.06	13.3	41.7	690	3.0
Upper Bound		26.4	0.21	2.2	0.095	3.84	45.6	31.1	1.98	733	0.47	2.29	15.0	46.6	790	4.4
ORIGINAL		7.20	0.07	0.9	0.051	1.07	15.0	6.6	0.38	2050	0.73	0.44	5.8	11.5	270	6.0
DUP		7.41	0.06	1.0	0.051	1.10	15.7	6.5	0.38	2090	0.72	0.45	5.9	11.4	290	6.3
Target Range - Lower Bound		6.89	<0.05	0.8	0.043	1.02	14.1	6.0	0.35	1960	0.64	0.41	5.5	10.7	260	5.3
Upper Bound		7.72	0.10	1.1	0.059	1.15	16.6	7.1	0.41	2180	0.81	0.48	6.2	12.2	300	7.0







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Project: Thomas Creek

Page: 3 - D  
Total # Pages: 3 (A - D)  
Plus Appendix Pages  
Finalized Date: 6-DEC-2018  
Account: ACCELE

**QC CERTIFICATE OF ANALYSIS AD18286728**

Sample Description	Method Analyte Units LOD	ME-MS61 W ppm 0.1	ME-MS61 Y ppm 0.1	ME-MS61 Zn ppm 2	ME-MS61 Zr ppm 0.5
DUPLICATES					
ORIGINAL		2.6	11.2	38	70.2
DUP		2.7	11.9	39	73.3
Target Range - Lower Bound		2.4	10.9	35	65.9
Upper Bound		2.9	12.2	42	77.6
ORIGINAL		1.4	9.7	26	41.9
DUP		1.5	10.0	25	43.9
Target Range - Lower Bound		1.2	9.3	22	39.2
Upper Bound		1.7	10.4	29	46.6



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Page: Appendix 1  
Total # Appendix Pages: 1  
Finalized Date: 6-DEC-2018  
Account: ACCELE

**QC CERTIFICATE OF ANALYSIS AD18286728**

	CERTIFICATE COMMENTS
	<b>ANALYTICAL COMMENTS</b>
Applies to Method:	REE's may not be totally soluble in this method. ME-MS61
	<b>ACCREDITATION COMMENTS</b>
Applies to Method:	NATA Accreditation covers the performance of this service but does not cover the performance of ALS Perth Sample Preparation. Corporate Accreditation No: 825, Corporate Site No: 23001. The Technical Signatory is Wendy Wong, Senior QC Chemist Au-ICP21 ME-MS61
	<b>LABORATORY ADDRESSES</b>
Applies to Method:	Processed at ALS Perth located at 31 Denninup Way, Malaga, Australia. Processed at ALS Perth Sample Preparation at 79 Distinction Road, Wangara, WA, Australia Au-ICP21 ME-MS61
Applies to Method:	Processed at ALS Adelaide located at Unit 1, 1 Burma Road, Pooraka, Adelaide, SA, Australia. CRU-21 LEV-01 LOG-22 PUL-23 WEI-21