



ALS Scandinavia AB
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www.alsglobal.com/geochemistry

An INAB accredited testing laboratory Reg. No. 173T. Accredited methods are listed in the Scope of Accreditation available on request.

To: GEOLOGICAL SURVEY OF NORWAY (NGU)
POSTBOKS 6315 TORGARDEN
NO-7491 TRONDHEIM
NORWAY

Page: 1
Total # Pages: 5 (A - E)
Plus Appendix Pages
Finalized Date: 8-JAN-2019
Account: ONUSEG

QC CERTIFICATE PI18309689

Project: 379500

P.O. No.: 379500

This report is for 73 1/2 Core samples submitted to our lab in Pitea, Sweden on 5-DEC-2018.

The following have access to data associated with this certificate:

NOLWENN COINT

SVEN DAHLGREN

HENRIK SCHIELLERUP

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
WEI-21	Received Sample Weight
LOG-22	Sample login - Rcd w/o BarCode
CRU-31	Fine crushing - 70% <2mm
SPL-22Y	Split Sample - Boyd Rotary Splitter
PUL-31	Pulverize split to 85% <75 um
LOG-24	Pulp Login - Rcd w/o Barcode
CRU-QC	Crushing QC Test
PUL-QC	Pulverizing QC Test

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION
ME-MS61	48 element four acid ICP-MS
ME-MS81h	High grade REE by fusion/ICPMS ICP-MS

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 *****

Comments: Samples were received on 05-Dec-2018 and the SSF/Request on 28-Nov-2018.

Signature:

Andrey Tairov, Technical Manager, Ireland



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QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS81h Ce ppm 3	ME-MS81h Dy ppm 0.3	ME-MS81h Er ppm 0.2	ME-MS81h Eu ppm 0.2	ME-MS81h Gd ppm 0.3	ME-MS81h Hf ppm 1	ME-MS81h Ho ppm 0.05	ME-MS81h La ppm 3	ME-MS81h Lu ppm 0.05	ME-MS81h Nb ppm 1	ME-MS81h Nd ppm 0.5	ME-MS81h Pr ppm 0.2	ME-MS81h Rb ppm 1	ME-MS81h Sm ppm 0.2	ME-MS81h Sn ppm 5
STANDARDS																
AMIS0304		8120	135.0	33.7	154.5	346	26	18.10	3410	1.89	>5000	4020	1010	11	588	23
AMIS0304		7900	132.5	34.4	151.0	346	25	17.60	3360	2.07	>5000	3720	1005	11	557	23
AMIS0304		8510	127.0	33.4	154.5	343	26	17.80	3550	1.98	>5000	4000	1045	10	579	23
Target Range - Lower Bound		7520	122.5	31.4	139.5	319	25	16.70	3350	1.81	4830	3600	956	9	535	15
Upper Bound		8660	141.5	36.6	160.5	367	31	19.30	3870	2.19	>5000	4150	1100	13	615	36
EMOG-17																
EMOG-17																
Target Range - Lower Bound																
Upper Bound																
GRE-04		6160	96.0	26.9	99.8	222	19	13.60	2850	1.74	3700	2890	758	1	406	80
GRE-04		6150	91.5	27.0	95.8	219	23	13.25	2740	1.69	3790	2660	740	1	371	76
GRE-04		6020	90.3	26.6	99.8	220	21	13.15	2790	1.67	3780	2710	764	1	371	73
Target Range - Lower Bound		5700	89.5	26.4	93.3	216	18	12.50	2540	1.59	3300	2510	670	<1	363	59
Upper Bound		6560	103.5	30.8	108.0	249	23	14.50	2930	1.93	3800	2890	772	2	418	81
GRE-3		4080	89.7	26.8	70.9	178.0	18	12.80	2110	1.75	3660	1730	463	1	263	42
Target Range - Lower Bound		4050	85.6	26.6	69.8	177.5	17	12.55	2070	1.63	3280	1705	462	<1	260	34
Upper Bound		4660	99.1	31.1	80.7	205	22	14.55	2380	1.99	3770	1965	532	3	299	56
MRGeo08																
MRGeo08																
MRGeo08																
Target Range - Lower Bound																
Upper Bound																
OGGeo08																
OGGeo08																
OGGeo08																
Target Range - Lower Bound																
Upper Bound																
OREAS 920																
OREAS 920																
Target Range - Lower Bound																
Upper Bound																
REE-1		4000	869	704	23.1	440	504	201	1700	92.8	4070	1490	446	1020	391	513
Target Range - Lower Bound		3680	787	652	21.7	402	444	193.5	1540	85.9	3770	1355	404	973	354	458
Upper Bound		4240	907	750	25.3	464	514	223	1780	98.9	4330	1560	466	1120	408	538

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QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS81h Ta ppm 0.5	ME-MS81h Tb ppm 0.05	ME-MS81h Th ppm 0.3	ME-MS81h Tm ppm 0.05	ME-MS81h U ppm 0.3	ME-MS81h W ppm 5	ME-MS81h Y ppm 3	ME-MS81h Yb ppm 0.2	ME-MS81h Zr ppm 10	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
STANDARDS																
AMIS0304		11.7	35.3	438	3.47	23.3	5	419	17.2	1180						
AMIS0304		11.3	34.9	429	3.47	22.7	5	394	17.2	1080						
AMIS0304		11.8	33.7	455	3.45	22.9	<5	402	17.1	1150						
Target Range - Lower Bound		11.6	32.5	406	3.21	22.0	<5	378	15.6	1030						
Upper Bound		14.4	37.5	468	3.80	26.0	15	442	18.4	1210						
EMOG-17											67.5	4.58	575	280	1.67	6.00
EMOG-17											67.2	4.52	570	530	1.83	5.98
Target Range - Lower Bound											60.9	4.18	515	310	1.60	5.31
Upper Bound											74.5	5.13	629	440	2.06	6.51
GRE-04		125.5	23.4	136.5	2.99	131.5	<5	330	14.2	950						
GRE-04		124.5	23.1	134.5	2.89	130.5	<5	303	14.6	1020						
GRE-04		123.0	23.1	131.5	2.89	125.0	<5	305	14.7	970						
Target Range - Lower Bound		113.0	22.7	123.5	2.75	116.0	<5	294	13.8	870						
Upper Bound		131.0	26.2	142.5	3.27	134.0	10	345	16.3	1020						
GRE-3		153.5	21.3	109.0	2.95	108.5	<5	296	14.5	910						
Target Range - Lower Bound		149.5	20.1	109.0	2.81	103.5	<5	295	14.2	890						
Upper Bound		173.5	23.2	126.0	3.35	120.0	13	346	16.8	1050						
MRGeo08											4.57	7.52	31.5	1080	3.46	0.70
MRGeo08											4.56	7.39	35.9	1100	3.73	0.74
MRGeo08											4.40	7.62	31.3	1110	3.36	0.66
Target Range - Lower Bound											4.00	6.64	29.5	920	2.98	0.60
Upper Bound											4.92	8.14	36.5	1270	3.76	0.76
OGGeo08											19.35	6.87	119.0	850	3.00	10.25
OGGeo08											19.10	6.64	117.0	900	2.83	9.96
OGGeo08											19.00	6.80	113.0	930	2.84	10.05
Target Range - Lower Bound											18.15	6.07	106.0	700	2.59	9.44
Upper Bound											22.2	7.44	130.0	980	3.27	11.55
OREAS 920											0.09	7.38	5.7	530	2.55	0.62
OREAS 920											0.11	7.68	5.8	520	2.69	1.14
Target Range - Lower Bound											0.08	6.91	4.4	450	2.54	0.61
Upper Bound											0.13	8.47	5.8	640	3.22	0.77
REE-1		222	106.0	770	110.5	137.5	8	5540	692	20300						
Target Range - Lower Bound		214	98.7	668	98.5	127.0	<5	5090	630	17750						
Upper Bound		248	113.5	770	113.5	147.0	20	5870	726	20400						

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QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS61 Ca %	ME-MS61 Cd ppm	ME-MS61 Ce ppm	ME-MS61 Co ppm	ME-MS61 Cr ppm	ME-MS61 Cs ppm	ME-MS61 Cu ppm	ME-MS61 Fe %	ME-MS61 Ga ppm	ME-MS61 Ge ppm	ME-MS61 Hf ppm	ME-MS61 In ppm	ME-MS61 K %	ME-MS61 La ppm	ME-MS61 Li ppm
		0.01	0.02	0.01	0.1	1	0.05	0.2	0.01	0.05	0.05	0.1	0.005	0.01	0.5	0.2
STANDARDS																
AMIS0304																
AMIS0304																
AMIS0304																
Target Range - Lower Bound																
Upper Bound																
EMOG-17		1.94	21.2	48.5	754	51	7.80	8430	4.95	12.50	0.50	2.0	0.971	1.61	25.0	27.3
EMOG-17		1.89	21.0	47.1	760	55	7.27	8330	4.91	13.00	0.19	1.9	0.920	1.63	25.6	26.8
Target Range - Lower Bound		1.72	18.15	42.9	686	49	6.56	7750	4.42	10.75	0.07	1.6	0.823	1.49	20.7	23.9
Upper Bound		2.12	22.2	52.5	838	62	8.12	8910	5.42	13.25	0.29	2.2	1.015	1.85	26.4	29.7
GRE-04																
GRE-04																
GRE-04																
Target Range - Lower Bound																
Upper Bound																
GRE-3																
Target Range - Lower Bound																
Upper Bound																
MRGeo08		2.71	2.26	67.7	19.6	83	12.65	593	3.93	18.80	0.19	3.5	0.171	3.13	32.2	33.6
MRGeo08		2.62	2.46	69.6	21.4	92	12.70	647	3.98	21.1	0.16	3.6	0.191	3.11	33.2	35.1
MRGeo08		2.66	2.30	70.8	18.5	90	11.60	619	4.02	18.15	0.14	3.2	0.167	3.16	33.9	30.1
Target Range - Lower Bound		2.35	2.00	66.2	17.7	81	11.20	587	3.55	17.50	<0.05	2.8	0.155	2.79	31.1	29.5
Upper Bound		2.90	2.48	81.0	21.9	102	13.80	675	4.37	21.5	0.27	3.6	0.201	3.43	39.1	36.5
OGGeo08		2.27	19.70	68.0	91.9	85	10.90	8380	5.42	17.30	0.58	2.8	1.450	2.92	33.0	30.7
OGGeo08		2.26	18.60	67.4	91.9	81	10.60	8010	5.31	16.90	0.40	2.9	1.380	2.86	32.9	31.8
OGGeo08		2.25	19.50	67.6	94.9	80	11.25	7910	5.41	17.20	0.59	3.2	1.440	2.87	34.6	29.8
Target Range - Lower Bound		1.98	16.70	64.8	87.2	78	9.85	7800	4.81	16.05	0.25	2.5	1.320	2.59	31.0	29.7
Upper Bound		2.44	20.5	79.2	107.0	98	12.15	8980	5.91	19.75	0.49	3.3	1.620	3.19	39.0	36.7
OREAS 920		0.49	0.07	87.3	14.7	84	8.31	111.5	3.92	19.95	0.16	4.6	0.089	2.80	41.7	29.4
OREAS 920		0.50	0.05	93.1	15.0	82	8.76	106.0	4.12	20.1	0.17	4.6	0.078	2.80	46.5	27.4
Target Range - Lower Bound		0.44	0.04	84.6	13.9	70	7.72	104.0	3.72	18.65	0.06	4.0	0.070	2.59	41.0	26.0
Upper Bound		0.56	0.12	103.5	17.3	88	9.54	120.0	4.56	22.9	0.28	5.2	0.098	3.19	51.2	32.2
REE-1																
Target Range - Lower Bound																
Upper Bound																

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Sample Description	Method Analyte Units LOD	ME-MS61 Mg %	ME-MS61 Mn ppm	ME-MS61 Mo ppm	ME-MS61 Na %	ME-MS61 Nb ppm	ME-MS61 Ni ppm	ME-MS61 P ppm	ME-MS61 Pb ppm	ME-MS61 Rb ppm	ME-MS61 Re ppm	ME-MS61 S %	ME-MS61 Sb ppm	ME-MS61 Sc ppm	ME-MS61 Se ppm	ME-MS61 Sn ppm
		0.01	5	0.05	0.01	0.1	0.2	10	0.5	0.1	0.002	0.01	0.05	0.1	1	0.2
STANDARDS																
AMIS0304																
AMIS0304																
AMIS0304																
Target Range - Lower Bound																
Upper Bound																
EMOG-17		0.95	755	1100	1.11	15.0	7590	830	7350	115.0	0.325	3.25	753	8.1	8	2.7
EMOG-17		0.93	735	1110	1.07	15.5	7400	810	7270	111.5	0.310	3.24	755	8.4	6	2.7
Target Range - Lower Bound		0.86	670	997	0.99	12.7	6820	700	6570	98.9	0.286	2.91	643	7.2	4	2.2
Upper Bound		1.08	830	1220	1.23	15.7	8330	880	8030	121.0	0.354	3.57	869	9.0	9	3.2
GRE-04																
GRE-04																
GRE-04																
Target Range - Lower Bound																
Upper Bound																
GRE-3																
Target Range - Lower Bound																
Upper Bound																
MRGeo08		1.36	538	13.95	2.01	22.5	666	1010	1075	189.5	0.009	0.30	4.34	11.4	2	4.0
MRGeo08		1.31	558	16.35	1.97	23.4	699	1040	1090	187.0	0.010	0.31	4.81	12.6	2	4.4
MRGeo08		1.36	571	14.65	2.03	20.6	698	1050	1100	134.0	0.009	0.31	4.55	11.4	1	3.9
Target Range - Lower Bound		1.17	497	13.65	1.76	19.0	622	930	971	173.5	0.005	0.27	3.89	11.1	<1	3.5
Upper Bound		1.45	619	16.75	2.18	23.4	760	1160	1185	212	0.013	0.35	5.39	13.7	4	4.7
OGGeo08		1.27	538	927	1.87	17.6	8840	850	7510	184.0	1.330	2.83	26.9	9.3	12	13.8
OGGeo08		1.29	479	875	1.79	18.6	8260	820	7240	181.5	1.325	2.76	25.3	9.4	11	13.3
OGGeo08		1.27	454	857	1.78	17.1	8400	810	7220	186.5	1.325	2.68	25.6	10.0	10	13.6
Target Range - Lower Bound		1.11	447	841	1.62	15.4	8000	760	6520	164.5	1.285	2.51	22.8	9.2	8	12.5
Upper Bound		1.38	557	1030	2.00	19.0	9770	950	7970	201	1.575	3.09	31.0	11.4	14	15.7
OREAS 920		1.29	585	0.51	0.63	18.1	42.0	750	22.4	165.5	0.003	0.03	1.49	12.8	1	4.8
OREAS 920		1.30	603	0.44	0.63	18.0	40.7	730	23.5	176.0	0.004	0.03	1.53	14.0	1	4.8
Target Range - Lower Bound		1.23	535	0.34	0.56	15.6	37.4		20.7	158.5	<0.002	<0.01	1.22	12.8	<1	4.3
Upper Bound		1.53	665	0.58	0.71	19.2	46.2		26.4	193.5	0.004	0.05	1.76	15.8	2	5.7
REE-1																
Target Range - Lower Bound																
Upper Bound																

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Sample Description	Method Analyte Units LOD	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	ME-MS61 W ppm 0.1	ME-MS61 Y ppm 0.1	ME-MS61 Zn ppm 2	ME-MS61 Zr ppm 0.5
STANDARDS													
AMIS0304													
AMIS0304													
AMIS0304													
Target Range - Lower Bound													
Upper Bound													
EMOG-17		208	1.01	1.29	10.45	0.319	2.29	3.1	72	4.6	16.0	7580	56.2
EMOG-17		204	0.96	1.34	10.80	0.317	2.23	3.3	72	4.1	16.5	7450	69.4
Target Range - Lower Bound		184.5	0.78	1.10	10.35	0.294	1.89	2.8	67	3.3	14.3	6800	55.6
Upper Bound		226	1.08	1.46	12.65	0.370	2.61	3.7	84	4.7	17.7	8320	76.4
GRE-04													
GRE-04													
GRE-04													
Target Range - Lower Bound													
Upper Bound													
GRE-3													
Target Range - Lower Bound													
Upper Bound													
MRGeo08		296	1.65	<0.05	16.95	0.464	1.14	5.1	98	5.5	24.6	764	95.1
MRGeo08		309	1.63	<0.05	18.30	0.497	1.13	5.2	109	4.9	26.7	803	119.5
MRGeo08		310	1.49	<0.05	19.10	0.510	1.04	5.3	110	4.8	24.1	801	107.5
Target Range - Lower Bound		277	1.39	<0.05	17.90	0.443	0.89	4.9	97	4.1	23.8	722	92.2
Upper Bound		339	1.81	0.14	21.9	0.553	1.25	6.2	121	5.8	29.3	886	126.0
OGGeo08		254	1.35	0.12	17.20	0.398	1.73	4.8	86	4.7	21.3	7280	81.7
OGGeo08		244	1.27	0.17	18.15	0.364	1.67	4.7	78	4.5	22.2	7080	92.7
OGGeo08		236	1.26	0.18	17.25	0.360	1.70	4.9	78	4.3	22.7	6900	97.5
Target Range - Lower Bound		224	1.19	0.09	16.90	0.353	1.43	4.5	77	3.9	21.1	6500	78.6
Upper Bound		274	1.57	0.31	20.7	0.443	1.98	5.8	97	5.4	26.0	7950	107.5
OREAS 920		79.5	1.40	<0.05	18.10	0.472	0.92	3.5	96	3.2	30.6	120	157.0
OREAS 920		81.6	1.35	0.06	18.80	0.481	0.96	3.7	92	3.1	32.9	115	146.0
Target Range - Lower Bound		73.6	1.08	<0.05	17.35	0.434	0.76	3.3	86	2.5	29.8	102	128.0
Upper Bound		90.4	1.43	0.10	21.2	0.542	1.08	4.2	108	3.7	36.6	130	174.0
REE-1													
Target Range - Lower Bound													
Upper Bound													

Comments: Samples were received on 05-Dec-2018 and the SSF/Request on 28-Nov-2018.

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To: GEOLOGICAL SURVEY OF NORWAY (NGU)
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NO-7491 TRONDHEIM
NORWAY

Page: 3 - A
Total # Pages: 5 (A - E)
Plus Appendix Pages
Finalized Date: 8-JAN-2019
Account: ONUSEK

An INAB accredited testing laboratory Reg. No. 173T. Accredited methods are listed in the Scope of Accreditation available on request.

Project: 379500

QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS81h Ce ppm 3	ME-MS81h Dy ppm 0.3	ME-MS81h Er ppm 0.2	ME-MS81h Eu ppm 0.2	ME-MS81h Gd ppm 0.3	ME-MS81h Hf ppm 1	ME-MS81h Ho ppm 0.05	ME-MS81h La ppm 3	ME-MS81h Lu ppm 0.05	ME-MS81h Nb ppm 1	ME-MS81h Nd ppm 0.5	ME-MS81h Pr ppm 0.2	ME-MS81h Rb ppm 1	ME-MS81h Sm ppm 0.2	ME-MS81h Sn ppm 5
BLANKS																
BLANK																
BLANK																
BLANK																
BLANK																
BLANK																
BLANK																
Target Range - Lower Bound																
Upper Bound																
BLANK		<3	0.3	<0.2	<0.2	<0.3	<1	<0.05	<3	<0.05	<1	<0.5	<0.2	<1	<0.2	<5
BLANK		<3	<0.3	<0.2	<0.2	<0.3	<1	<0.05	<3	<0.05	<1	<0.5	<0.2	<1	<0.2	<5
BLANK		<3	<0.3	<0.2	<0.2	<0.3	<1	<0.05	<3	<0.05	<1	<0.5	<0.2	<1	<0.2	<5
BLANK		<3	<0.3	<0.2	<0.2	<0.3	<1	<0.05	<3	<0.05	2	<0.5	<0.2	<1	<0.2	<5
Target Range - Lower Bound		<3	<0.3	<0.2	<0.2	<0.3	<1	<0.05	<3	<0.05	<1	<0.5	<0.2	<1	<0.2	<5
Upper Bound		6	0.6	0.4	0.4	0.6	2	0.10	6	0.10	2	1.0	0.4	2	0.4	10
DUPLICATES																
199154		4820	11.4	3.2	21.3	36.3	1	1.35	3120	0.40	914	1305	443	8	104.5	5
DUP		5090	10.9	3.1	20.7	33.1	1	1.43	3180	0.38	923	1365	469	10	108.5	5
Target Range - Lower Bound		4780	10.5	2.8	20.1	33.2	<1	1.29	3040	0.33	885	1290	440	8	102.5	<5
Upper Bound		5130	11.8	3.5	21.9	36.2	2	1.49	3260	0.45	952	1380	472	10	110.5	10
199169		6050	8.8	2.0	28.7	41.3	<1	0.96	3890	0.17	366	1725	576	7	137.0	<5
DUP		5970	9.0	2.3	28.5	41.0	<1	0.89	3890	0.21	395	1725	572	7	138.0	<5
Target Range - Lower Bound		5800	8.3	1.9	27.4	39.4	<1	0.84	3750	0.13	366	1665	554	6	132.5	<5
Upper Bound		6220	9.5	2.4	29.8	42.9	2	1.01	4030	0.25	395	1785	594	8	142.5	10
199538																
DUP																
Target Range - Lower Bound																
Upper Bound																
199541		1680	8.2	2.2	13.3	26.3	1	1.10	944	0.29	1065	525	172.0	2	55.0	7
DUP		1630	8.1	2.2	13.1	26.1	1	1.10	909	0.32	1070	506	167.5	2	53.8	7
Target Range - Lower Bound		1595	7.6	1.9	12.5	25.0	<1	1.01	891	0.24	1030	497	163.5	<1	52.3	<5
Upper Bound		1715	8.7	2.5	13.9	27.4	2	1.19	962	0.37	1105	534	176.0	3	56.5	10

Comments: Samples were received on 05-Dec-2018 and the SSF/Request on 28-Nov-2018.

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



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To: GEOLOGICAL SURVEY OF NORWAY (NGU)
POSTBOKS 6315 TORGARDEN
NO-7491 TRONDHEIM
NORWAY

Page: 3 - B
Total # Pages: 5 (A - E)
Plus Appendix Pages
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Account: ONUSE

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Project: 379500

QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS81h Ta ppm 0.5	ME-MS81h Tb ppm 0.05	ME-MS81h Th ppm 0.3	ME-MS81h Tm ppm 0.05	ME-MS81h U ppm 0.3	ME-MS81h W ppm 5	ME-MS81h Y ppm 3	ME-MS81h Yb ppm 0.2	ME-MS81h Zr ppm 10	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
BLANKS																
BLANK											<0.01	<0.01	0.3	<10	<0.05	<0.01
BLANK											<0.01	<0.01	<0.2	<10	<0.05	0.01
BLANK											0.01	<0.01	<0.2	<10	<0.05	0.01
BLANK											<0.01	<0.01	<0.2	<10	<0.05	0.02
BLANK											<0.01	<0.01	0.2	<10	<0.05	0.01
BLANK											<0.01	<0.01	<0.2	<10	<0.05	<0.01
Target Range - Lower Bound											<0.01	<0.01	<0.2	<10	<0.05	<0.01
Upper Bound											0.02	0.02	0.4	20	0.10	0.02
BLANK		0.8	<0.05	<0.3	<0.05	<0.3	<5	<3	<0.2	<10						
BLANK		<0.5	<0.05	<0.3	<0.05	<0.3	<5	<3	<0.2	10						
BLANK		0.8	0.05	<0.3	<0.05	<0.3	<5	<3	<0.2	10						
BLANK		0.9	<0.05	<0.3	<0.05	<0.3	<5	<3	<0.2	<10						
Target Range - Lower Bound		<0.5	<0.05	<0.3	<0.05	<0.3	<5	<3	<0.2	<10						
Upper Bound		1.0	0.10	0.6	0.10	0.6	10	6	0.4	20						
DUPLICATES																
199154		11.3	3.45	160.0	0.44	8.6	5	33	2.6	80						
DUP		12.9	3.00	157.0	0.36	8.8	<5	34	2.8	90						
Target Range - Lower Bound		11.2	3.06	152.5	0.34	8.1	<5	29	2.4	70						
Upper Bound		13.0	3.39	164.5	0.46	9.3	10	38	3.0	100						
199169		8.0	2.90	124.5	0.22	11.0	<5	29	1.4	50						
DUP		8.8	2.89	124.0	0.22	11.1	<5	28	1.4	50						
Target Range - Lower Bound		7.6	2.74	119.5	0.16	10.4	<5	25	1.2	40						
Upper Bound		9.2	3.05	129.0	0.28	11.7	10	32	1.6	60						
199538											0.99	1.40	4.5	1310	1.82	0.24
DUP											1.85	1.40	4.0	1300	1.63	0.30
Target Range - Lower Bound											1.34	1.32	3.8	1200	1.59	0.25
Upper Bound											1.50	1.48	4.7	1410	1.86	0.29
199541		6.2	2.50	93.2	0.26	8.7	<5	24	2.1	40						
DUP		7.6	2.36	95.6	0.27	8.9	<5	24	2.0	40						
Target Range - Lower Bound		6.2	2.29	90.8	0.21	8.2	<5	20	1.8	30						
Upper Bound		7.6	2.57	98.0	0.32	9.4	10	28	2.3	50						

Comments: Samples were received on 05-Dec-2018 and the SSF/Request on 28-Nov-2018.

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Page: 3 - C
 Total # Pages: 5 (A - E)
 Plus Appendix Pages
 Finalized Date: 8-JAN-2019
 Account: ONUSEG

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Project: 379500

QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS61 Ca %	ME-MS61 Cd ppm	ME-MS61 Ce ppm	ME-MS61 Co ppm	ME-MS61 Cr ppm	ME-MS61 Cs ppm	ME-MS61 Cu ppm	ME-MS61 Fe %	ME-MS61 Ga ppm	ME-MS61 Ge ppm	ME-MS61 Hf ppm	ME-MS61 In ppm	ME-MS61 K %	ME-MS61 La ppm	ME-MS61 Li ppm
		0.01	0.02	0.01	0.1	1	0.05	0.2	0.01	0.05	0.05	0.1	0.005	0.01	0.5	0.2
BLANKS																
BLANK		<0.01	<0.02	<0.01	<0.1	<1	<0.05	<0.2	<0.01	<0.05	<0.05	<0.1	<0.005	<0.01	<0.5	<0.2
BLANK		<0.01	<0.02	<0.01	<0.1	<1	<0.05	<0.2	<0.01	<0.05	<0.05	<0.1	<0.005	<0.01	<0.5	<0.2
BLANK		<0.01	<0.02	0.02	<0.1	<1	<0.05	0.2	<0.01	<0.05	<0.05	<0.1	<0.005	<0.01	<0.5	0.3
BLANK		<0.01	0.04	0.01	<0.1	1	<0.05	0.2	<0.01	<0.05	<0.05	<0.1	<0.005	<0.01	<0.5	<0.2
BLANK		<0.01	<0.02	0.01	<0.1	1	<0.05	0.2	<0.01	<0.05	<0.05	<0.1	<0.005	<0.01	<0.5	<0.2
BLANK		<0.01	<0.02	0.02	<0.1	2	<0.05	0.4	<0.01	<0.05	<0.05	<0.1	<0.005	<0.01	<0.5	0.3
Target Range - Lower Bound		<0.01	<0.02	<0.01	<0.1	<1	<0.05	<0.2	<0.01	<0.05	<0.05	<0.1	<0.005	<0.01	<0.5	<0.2
Upper Bound		0.02	0.04	0.02	0.2	2	0.10	0.4	0.02	0.10	0.10	0.2	0.010	0.02	1.0	0.4
BLANK																
BLANK																
BLANK																
BLANK																
Target Range - Lower Bound																
Upper Bound																
DUPLICATES																
199154																
DUP																
Target Range - Lower Bound																
Upper Bound																
199169																
DUP																
Target Range - Lower Bound																
Upper Bound																
199538		17.20	2.80	>500	25.7	7	1.34	13.0	8.36	11.10	1.03	1.6	0.460	0.19	630	25.9
DUP		17.00	2.88	>500	24.0	6	1.33	11.3	8.33	11.75	1.15	1.4	0.438	0.19	680	25.1
Target Range - Lower Bound		16.25	2.68	475	23.5	5	1.22	11.5	7.92	10.80	0.99	1.3	0.422	0.17	622	24.0
Upper Bound		17.95	3.00	>500	26.2	8	1.45	12.8	8.77	12.05	1.19	1.7	0.476	0.21	688	27.0
199541																
DUP																
Target Range - Lower Bound																
Upper Bound																

Comments: Samples were received on 05-Dec-2018 and the SSF/Request on 28-Nov-2018.

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Page: 3 - D
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Project: 379500

QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS61 Mg %	ME-MS61 Mn ppm	ME-MS61 Mo ppm	ME-MS61 Na %	ME-MS61 Nb ppm	ME-MS61 Ni ppm	ME-MS61 P ppm	ME-MS61 Pb ppm	ME-MS61 Rb ppm	ME-MS61 Re ppm	ME-MS61 S %	ME-MS61 Sb ppm	ME-MS61 Sc ppm	ME-MS61 Se ppm	ME-MS61 Sn ppm
		0.01	5	0.05	0.01	0.1	0.2	10	0.5	0.1	0.002	0.01	0.05	0.1	1	0.2
BLANKS																
BLANK		<0.01	<5	0.07	<0.01	<0.1	0.3	<10	<0.5	<0.1	<0.002	<0.01	<0.05	<0.1	<1	<0.2
BLANK		<0.01	5	0.06	<0.01	0.1	<0.2	<10	<0.5	<0.1	<0.002	<0.01	<0.05	0.1	<1	<0.2
BLANK		<0.01	<5	0.05	<0.01	<0.1	0.3	10	<0.5	<0.1	<0.002	<0.01	0.06	<0.1	1	<0.2
BLANK		<0.01	<5	0.07	<0.01	0.1	0.2	<10	<0.5	0.1	0.002	<0.01	0.07	<0.1	1	<0.2
BLANK		<0.01	<5	<0.05	<0.01	<0.1	<0.2	<10	<0.5	<0.1	<0.002	<0.01	<0.05	<0.1	<1	<0.2
BLANK		<0.01	<5	<0.05	<0.01	<0.1	0.3	<10	<0.5	<0.1	<0.002	<0.01	<0.05	<0.1	1	<0.2
Target Range - Lower Bound		<0.01	<5	<0.05	<0.01	<0.1	<0.2	<10	<0.5	<0.1	<0.002	<0.01	<0.05	<0.1	<1	<0.2
Upper Bound		0.02	10	0.10	0.02	0.2	0.4	20	1.0	0.2	0.004	0.02	0.10	0.2	2	0.4
BLANK																
BLANK																
BLANK																
BLANK																
Target Range - Lower Bound																
Upper Bound																
DUPLICATES																
199154																
DUP																
Target Range - Lower Bound																
Upper Bound																
199169																
DUP																
Target Range - Lower Bound																
Upper Bound																
199538		6.80	7880	45.9	0.05	>500	8.2	8590	14.4	7.7	0.010	1.13	0.26	45.1	1	14.6
DUP		6.69	7700	45.0	0.05	>500	8.1	8480	13.5	7.7	0.010	1.13	0.30	44.1	1	14.6
Target Range - Lower Bound		6.40	7400	43.1	0.04	475	7.5	8100	12.8	7.2	0.008	1.06	0.21	42.3	<1	13.7
Upper Bound		7.09	8180	47.8	0.06	>500	8.8	8970	15.1	8.2	0.013	1.20	0.35	46.9	2	15.5
199541																
DUP																
Target Range - Lower Bound																
Upper Bound																

Comments: Samples were received on 05-Dec-2018 and the SSF/Request on 28-Nov-2018.

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Page: 3 - E
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Project: 379500

QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	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	ME-MS61 W ppm 0.1	ME-MS61 Y ppm 0.1	ME-MS61 Zn ppm 2	ME-MS61 Zr ppm 0.5
BLANKS													
BLANK		0.4	<0.05	<0.05	0.01	<0.005	<0.02	<0.1	<1	0.1	<0.1	<2	<0.5
BLANK		0.3	<0.05	<0.05	<0.01	<0.005	<0.02	<0.1	<1	0.1	<0.1	<2	<0.5
BLANK		<0.2	<0.05	<0.05	<0.01	<0.005	<0.02	<0.1	<1	0.1	<0.1	<2	<0.5
BLANK		0.2	<0.05	<0.05	0.01	<0.005	0.03	<0.1	<1	<0.1	<0.1	<2	<0.5
BLANK		<0.2	<0.05	<0.05	<0.01	<0.005	<0.02	<0.1	<1	0.1	<0.1	<2	<0.5
BLANK		<0.2	<0.05	<0.05	0.01	<0.005	<0.02	<0.1	<1	0.1	<0.1	<2	<0.5
Target Range - Lower Bound		<0.2	<0.05	<0.05	<0.01	<0.005	<0.02	<0.1	<1	<0.1	<0.1	<2	<0.5
Upper Bound		0.4	0.10	0.10	0.02	0.010	0.04	0.2	2	0.2	0.2	4	1.0
BLANK													
BLANK													
BLANK													
BLANK													
Target Range - Lower Bound													
Upper Bound													
DUPLICATES													
199154 DUP													
Target Range - Lower Bound													
Upper Bound													
199169 DUP													
Target Range - Lower Bound													
Upper Bound													
199538		2470	40.6	0.09	164.5	0.063	0.27	23.8	33	5.9	69.4	1210	42.0
DUP		2410	39.9	0.18	165.5	0.062	0.24	23.5	34	5.6	68.5	1200	41.6
Target Range - Lower Bound		2320	38.2	0.08	156.5	0.054	0.22	22.4	31	5.2	65.4	1145	38.2
Upper Bound		2560	42.3	0.19	173.5	0.071	0.29	24.9	36	6.3	72.5	1265	45.4
199541 DUP													
Target Range - Lower Bound													
Upper Bound													

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QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS81h Ce ppm 3	ME-MS81h Dy ppm 0.3	ME-MS81h Er ppm 0.2	ME-MS81h Eu ppm 0.2	ME-MS81h Gd ppm 0.3	ME-MS81h Hf ppm 1	ME-MS81h Ho ppm 0.05	ME-MS81h La ppm 3	ME-MS81h Lu ppm 0.05	ME-MS81h Nb ppm 1	ME-MS81h Nd ppm 0.5	ME-MS81h Pr ppm 0.2	ME-MS81h Rb ppm 1	ME-MS81h Sm ppm 0.2	ME-MS81h Sn ppm 5
DUPLICATES																
199548		17900	56.9	9.1	92.6	188.5	4	6.97	12500	0.78	154	5010	1565	2	465	40
DUP		18200	54.7	8.6	90.0	184.5	3	5.70	12600	0.73	150	5120	1585	2	473	38
Target Range - Lower Bound		17400	53.5	8.3	87.9	179.5	2	6.06	12100	0.68	146	4890	1520	<1	452	33
Upper Bound		18700	58.1	9.4	94.7	193.5	5	6.61	13000	0.83	158	5240	1630	3	486	45
199557																
DUP																
Target Range - Lower Bound																
Upper Bound																
199563		6670	27.8	6.0	48.6	92.9	1	3.38	3960	0.42	329	2160	688	1	202	<5
DUP		6780	29.0	6.0	50.3	96.5	1	3.57	4070	0.45	324	2210	697	1	207	<5
Target Range - Lower Bound		6490	27.1	5.6	47.5	91.1	<1	3.30	3870	0.37	314	2110	668	<1	197.0	<5
Upper Bound		6960	29.7	6.4	51.4	98.3	2	3.65	4160	0.50	339	2260	717	2	212	10
FEN198285																
DUP																
Target Range - Lower Bound																
Upper Bound																
199582		2820	27.0	8.0	26.0	57.0	1	3.86	1800	0.53	938	796	268	<1	96.7	7
DUP		2690	27.2	7.8	25.1	60.2	1	3.70	1730	0.53	914	745	253	<1	93.1	6
Target Range - Lower Bound		2660	25.9	7.4	24.5	56.2	<1	3.60	1700	0.46	893	743	251	<1	91.4	<5
Upper Bound		2850	28.3	8.4	26.6	61.0	2	3.96	1830	0.60	959	798	270	2	98.4	10
199591																
DUP																
Target Range - Lower Bound																
Upper Bound																
199597		1560	16.1	5.1	14.5	31.9	<1	2.39	815	0.32	110	512	163.0	<1	60.6	<5
DUP		1550	14.9	5.5	14.4	31.4	<1	2.23	830	0.25	123	513	164.0	<1	58.8	<5
Target Range - Lower Bound		1500	14.7	4.9	13.7	30.2	<1	2.18	791	0.23	111	494	157.5	<1	57.4	<5
Upper Bound		1610	16.3	5.7	15.2	33.1	2	2.44	854	0.34	122	531	169.5	2	62.0	10
191504																
DUP																
Target Range - Lower Bound																
Upper Bound																

Comments: Samples were received on 05-Dec-2018 and the SSF/Request on 28-Nov-2018.

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



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NORWAY

Page: 4 - B
Total # Pages: 5 (A - E)
Plus Appendix Pages
Finalized Date: 8-JAN-2019
Account: ONUSEG

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Project: 379500

QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS81h Ta ppm 0.5	ME-MS81h Tb ppm 0.05	ME-MS81h Th ppm 0.3	ME-MS81h Tm ppm 0.05	ME-MS81h U ppm 0.3	ME-MS81h W ppm 5	ME-MS81h Y ppm 3	ME-MS81h Yb ppm 0.2	ME-MS81h Zr ppm 10	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
DUPLICATES																
199548		0.7	26.4	1000	1.04	14.8	<5	120	5.5	140						
DUP		<0.5	24.9	957	1.05	14.2	<5	120	5.6	140						
Target Range - Lower Bound		<0.5	24.7	944	0.96	13.7	<5	113	5.2	130						
Upper Bound		1.0	26.6	1015	1.13	15.3	10	127	5.9	150						
199557											0.56	0.10	1.7	3060	0.81	0.29
DUP											0.55	0.10	1.4	4450	0.78	0.32
Target Range - Lower Bound											0.52	0.09	1.3	3460	0.71	0.28
Upper Bound											0.59	0.12	1.8	4050	0.88	0.33
199563		1.2	8.68	248	0.53	3.9	<5	79	3.4	60						
DUP		1.2	9.13	258	0.55	3.9	<5	80	3.3	60						
Target Range - Lower Bound		0.7	8.54	244	0.47	3.5	<5	74	3.0	50						
Upper Bound		1.7	9.27	262	0.61	4.3	10	85	3.7	70						
FEN198285											0.31	0.28	6.0	410	3.09	0.98
DUP											0.15	0.30	6.8	440	3.41	1.06
Target Range - Lower Bound											0.21	0.27	5.9	380	3.04	0.96
Upper Bound											0.25	0.31	6.9	470	3.46	1.08
199582		4.1	6.85	214	0.87	5.8	5	96	4.8	70						
DUP		4.0	6.92	210	0.81	5.9	5	91	4.3	60						
Target Range - Lower Bound		3.4	6.59	204	0.76	5.3	<5	87	4.2	50						
Upper Bound		4.7	7.18	220	0.92	6.4	10	100	4.9	80						
199591											1.03	0.06	6.6	1950	0.67	0.56
DUP											0.95	0.06	6.2	1990	0.63	0.58
Target Range - Lower Bound											0.93	0.05	5.9	1810	0.57	0.53
Upper Bound											1.05	0.07	6.9	2130	0.73	0.61
199597		0.8	3.71	95.5	0.55	2.1	<5	62	2.7	20						
DUP		0.8	3.62	94.6	0.51	1.7	<5	63	2.8	20						
Target Range - Lower Bound		<0.5	3.49	91.4	0.46	1.5	<5	57	2.5	<10						
Upper Bound		1.0	3.84	98.7	0.60	2.3	10	68	3.0	30						
191504											0.05	0.09	3.5	1380	0.44	0.35
DUP											0.04	0.09	3.6	1370	0.38	0.36
Target Range - Lower Bound											0.03	0.08	3.2	1260	0.34	0.33
Upper Bound											0.06	0.10	3.9	1490	0.48	0.38

Comments: Samples were received on 05-Dec-2018 and the SSF/Request on 28-Nov-2018.

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Page: 4 - C
Total # Pages: 5 (A - E)
Plus Appendix Pages
Finalized Date: 8-JAN-2019
Account: ONUSEG

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Project: 379500

QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS61 Ca %	ME-MS61 Cd ppm	ME-MS61 Ce ppm	ME-MS61 Co ppm	ME-MS61 Cr ppm	ME-MS61 Cs ppm	ME-MS61 Cu ppm	ME-MS61 Fe %	ME-MS61 Ga ppm	ME-MS61 Ge ppm	ME-MS61 Hf ppm	ME-MS61 In ppm	ME-MS61 K %	ME-MS61 La ppm	ME-MS61 Li ppm
		0.01	0.02	0.01	0.1	1	0.05	0.2	0.01	0.05	0.05	0.1	0.005	0.01	0.5	0.2
199548 DUP Target Range - Lower Bound Upper Bound		DUPLICATES														
199557 DUP Target Range - Lower Bound Upper Bound		19.05 19.65 18.35 20.3	0.66 0.71 0.63 0.74	>500 >500 475 >500	8.3 8.3 7.8 8.8	<1 <1 <1 2	0.11 0.11 <0.05 0.17	3.4 2.6 2.7 3.3	6.13 6.36 5.92 6.57	8.05 8.27 7.70 8.62	0.86 0.98 0.82 1.02	0.4 0.4 0.3 0.5	0.317 0.340 0.307 0.350	0.01 0.01 <0.01 0.02	790 820 764 846	2.0 2.0 1.7 2.3
199563 DUP Target Range - Lower Bound Upper Bound																
FEN198285 DUP Target Range - Lower Bound Upper Bound		24.6 26.1 24.1 26.6	0.11 0.10 0.08 0.13	>500 >500 475 >500	7.3 7.7 7.0 8.0	23 28 23 28	0.57 0.58 0.50 0.65	1.7 1.8 1.5 2.0	14.40 14.95 13.95 15.40	29.2 29.6 27.9 30.9	5.47 5.42 5.12 5.77	2.6 2.7 2.4 2.9	0.872 0.896 0.835 0.933	0.08 0.08 0.07 0.09	2560 2550 2430 2680	10.9 11.5 10.4 12.0
199582 DUP Target Range - Lower Bound Upper Bound																
199591 DUP Target Range - Lower Bound Upper Bound		20.4 20.7 19.50 21.6	2.73 2.74 2.58 2.89	>500 >500 475 >500	7.8 7.7 7.3 8.2	1 1 <1 2	<0.05 <0.05 <0.05 0.10	10.4 11.0 10.1 11.3	5.66 5.77 5.42 6.01	10.60 10.45 9.95 11.10	1.43 1.40 1.29 1.54	0.6 0.6 0.5 0.7	0.470 0.473 0.443 0.500	0.01 0.01 <0.01 0.02	990 1000 945 1045	1.5 1.6 1.3 1.8
199597 DUP Target Range - Lower Bound Upper Bound																
191504 DUP Target Range - Lower Bound Upper Bound		19.00 19.15 18.10 20.0	0.62 0.57 0.55 0.64	>500 >500 475 >500	8.6 8.3 7.9 9.0	3 3 2 4	0.05 <0.05 <0.05 0.10	6.0 5.3 5.3 6.0	5.53 5.52 5.24 5.81	5.52 5.32 5.10 5.74	0.67 0.64 0.57 0.74	0.4 0.3 0.2 0.5	0.357 0.365 0.338 0.384	0.01 0.01 <0.01 0.02	443 436 417 462	2.4 2.2 2.0 2.6

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Page: 4 - D
Total # Pages: 5 (A - E)
Plus Appendix Pages
Finalized Date: 8-JAN-2019
Account: ONUSEK

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QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS61 Mg %	ME-MS61 Mn ppm	ME-MS61 Mo ppm	ME-MS61 Na %	ME-MS61 Nb ppm	ME-MS61 Ni ppm	ME-MS61 P ppm	ME-MS61 Pb ppm	ME-MS61 Rb ppm	ME-MS61 Re ppm	ME-MS61 S %	ME-MS61 Sb ppm	ME-MS61 Sc ppm	ME-MS61 Se ppm	ME-MS61 Sn ppm
		0.01	5	0.05	0.01	0.1	0.2	10	0.5	0.1	0.002	0.01	0.05	0.1	1	0.2
199548 DUP Target Range - Lower Bound Upper Bound		DUPLICATES														
199557 DUP Target Range - Lower Bound Upper Bound		8.02 8.34 7.76 8.60	10800 11100 10400 11500	92.7 94.8 89.0 98.5	<0.01 <0.01 <0.01 0.02	145.5 154.5 142.5 157.5	1.6 1.7 1.4 1.9	1180 1220 1130 1270	17.9 18.1 16.6 19.4	0.4 0.4 0.3 0.5	0.008 0.005 0.004 0.009	0.33 0.37 0.32 0.38	0.10 0.11 0.05 0.16	18.0 18.7 17.3 19.4	<1 1 1 2	1.1 1.2 0.9 1.4
199563 DUP Target Range - Lower Bound Upper Bound																
FEN198285 DUP Target Range - Lower Bound Upper Bound		0.71 0.73 0.67 0.77	6980 7080 6670 7390	9.48 10.10 9.25 10.35	0.13 0.14 0.12 0.15	417 420 397 440	10.4 11.6 10.3 11.8	2640 2660 2510 2790	36.9 37.8 35.0 39.7	4.6 4.7 4.3 5.0	0.005 0.004 0.002 0.007	0.26 0.27 0.24 0.29	1.33 1.35 1.19 1.49	88.8 90.0 84.8 94.0	2 1 1 2	4.0 4.1 3.6 4.5
199582 DUP Target Range - Lower Bound Upper Bound																
199591 DUP Target Range - Lower Bound Upper Bound		7.60 7.67 7.24 8.03	9540 9770 9170 10150	122.0 123.5 116.5 129.0	<0.01 <0.01 <0.01 0.02	83.0 93.2 83.6 92.6	1.9 2.1 1.7 2.3	6150 6360 5930 6580	22.5 21.5 20.4 23.6	0.2 0.2 0.1 0.3	0.010 0.010 0.008 0.013	0.49 0.49 0.46 0.52	0.15 0.18 0.10 0.23	23.0 22.4 21.5 23.9	1 1 1 2	2.9 2.9 2.6 3.2
199597 DUP Target Range - Lower Bound Upper Bound																
191504 DUP Target Range - Lower Bound Upper Bound		8.60 8.51 8.12 8.99	9160 9100 8670 9590	55.8 57.0 53.5 59.3	0.02 0.02 0.01 0.03	>500 >500 475 >500	2.9 1.6 1.9 2.6	2490 2450 2340 2600	9.7 8.8 8.3 10.2	0.2 0.2 0.1 0.3	0.015 0.012 0.011 0.016	0.50 0.51 0.47 0.54	0.27 0.14 0.14 0.27	16.5 16.5 15.6 17.4	1 1 1 2	3.9 3.8 3.5 4.2

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Page: 4 - E
 Total # Pages: 5 (A - E)
 Plus Appendix Pages
 Finalized Date: 8-JAN-2019
 Account: ONUSEG

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Project: 379500

QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	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	ME-MS61 W ppm 0.1	ME-MS61 Y ppm 0.1	ME-MS61 Zn ppm 2	ME-MS61 Zr ppm 0.5
199548 DUP Target Range - Lower Bound Upper Bound		DUPLICATES											
199557 DUP Target Range - Lower Bound Upper Bound		4310 4450 4160 4600	1.40 1.47 1.31 1.56	0.07 0.08 <0.05 0.10	149.0 150.5 142.5 157.0	0.010 0.010 <0.005 0.016	0.03 0.03 <0.02 0.04	5.1 4.9 4.7 5.4	16 17 15 18	1.0 1.0 0.8 1.2	27.8 29.2 27.0 30.0	132 140 127 145	16.3 16.3 14.6 18.0
199563 DUP Target Range - Lower Bound Upper Bound													
FEN198285 DUP Target Range - Lower Bound Upper Bound		698 714 671 742	0.45 0.55 0.43 0.58	<0.05 <0.05 <0.05 0.10	1280 1310 1230 1360	0.045 0.046 0.038 0.053	0.08 0.08 0.05 0.11	5.4 5.7 5.2 5.9	42 42 39 45	4.5 4.8 4.2 5.1	214 219 206 227	78 77 72 83	179.0 187.0 169.0 197.0
199582 DUP Target Range - Lower Bound Upper Bound													
199591 DUP Target Range - Lower Bound Upper Bound		4060 4130 3890 4300	0.44 0.42 0.36 0.50	0.16 0.15 0.10 0.21	146.5 141.5 137.0 151.0	0.026 0.025 0.019 0.032	0.05 0.06 0.03 0.08	2.5 2.6 2.3 2.8	24 24 22 26	1.8 1.7 1.5 2.0	63.5 62.4 59.7 66.2	1060 1110 1030 1140	27.5 26.0 24.2 29.3
199597 DUP Target Range - Lower Bound Upper Bound													
191504 DUP Target Range - Lower Bound Upper Bound		3930 3920 3730 4120	3.71 3.63 3.44 3.90	0.07 0.09 <0.05 0.10	94.9 95.7 90.5 100.0	0.018 0.018 0.012 0.024	0.03 0.02 <0.02 0.04	8.8 8.5 8.1 9.2	16 17 15 18	3.2 3.2 2.9 3.5	36.2 36.1 34.2 38.1	201 195 186 210	17.5 17.8 15.8 19.5

Comments: Samples were received on 05-Dec-2018 and the SSF/Request on 28-Nov-2018.

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Page: 5 - A
 Total # Pages: 5 (A - E)
 Plus Appendix Pages
 Finalized Date: 8-JAN-2019
 Account: ONUSEG

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Project: 379500

QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS81h Ce ppm 3	ME-MS81h Dy ppm 0.3	ME-MS81h Er ppm 0.2	ME-MS81h Eu ppm 0.2	ME-MS81h Gd ppm 0.3	ME-MS81h Hf ppm 1	ME-MS81h Ho ppm 0.05	ME-MS81h La ppm 3	ME-MS81h Lu ppm 0.05	ME-MS81h Nb ppm 1	ME-MS81h Nd ppm 0.5	ME-MS81h Pr ppm 0.2	ME-MS81h Rb ppm 1	ME-MS81h Sm ppm 0.2	ME-MS81h Sn ppm 5
ORIGINAL DUP Target Range - Lower Bound Upper Bound	DUPLICATES															
ORIGINAL DUP Target Range - Lower Bound Upper Bound																
ORIGINAL DUP Target Range - Lower Bound Upper Bound																
		PREP DUPLICATES														
199586		2360	16.7	4.7	19.8	43.4	<1	2.22	1300	0.25	795	749	243	<1	82.6	5
199586 PREP DUP		2530	17.9	5.0	21.0	45.4	<1	2.19	1390	0.31	845	810	263	<1	89.0	5

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 NO-7491 TRONDHEIM
 NORWAY

Page: 5 - B
 Total # Pages: 5 (A - E)
 Plus Appendix Pages
 Finalized Date: 8-JAN-2019
 Account: ONUSEK

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QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS81h Ta ppm 0.5	ME-MS81h Tb ppm 0.05	ME-MS81h Th ppm 0.3	ME-MS81h Tm ppm 0.05	ME-MS81h U ppm 0.3	ME-MS81h W ppm 5	ME-MS81h Y ppm 3	ME-MS81h Yb ppm 0.2	ME-MS81h Zr ppm 10	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
DUPLICATES																
ORIGINAL											7.04	3.60	6.5	160	0.09	11.50
DUP											6.98	3.69	6.8	160	0.08	11.65
Target Range - Lower Bound											6.65	3.45	6.1	140	<0.05	11.00
Upper Bound											7.37	3.84	7.2	180	0.10	12.15
ORIGINAL											0.03	8.04	3.4	410	1.41	0.04
DUP											0.03	8.22	2.3	420	1.41	0.04
Target Range - Lower Bound											0.02	7.71	2.5	370	1.29	0.03
Upper Bound											0.04	8.55	3.2	460	1.53	0.05
ORIGINAL											0.51	8.37	2.9	780	1.52	0.24
DUP											0.50	8.31	2.8	780	1.40	0.25
Target Range - Lower Bound											0.47	7.91	2.5	710	1.34	0.22
Upper Bound											0.54	8.77	3.2	850	1.58	0.27
PREP DUPLICATES																
199586		5.1	4.42	137.5	0.45	4.9	<5	53	2.6	50	1.54	0.11	7.6	2290	0.80	0.40
199586 PREP DUP		5.8	4.73	146.5	0.50	5.1	<5	58	3.1	40	0.38	0.10	6.2	1540	0.76	0.33

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Page: 5 - C
 Total # Pages: 5 (A - E)
 Plus Appendix Pages
 Finalized Date: 8-JAN-2019
 Account: ONUSEK

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QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS61 Ca %	ME-MS61 Cd ppm	ME-MS61 Ce ppm	ME-MS61 Co ppm	ME-MS61 Cr ppm	ME-MS61 Cs ppm	ME-MS61 Cu ppm	ME-MS61 Fe %	ME-MS61 Ga ppm	ME-MS61 Ge ppm	ME-MS61 Hf ppm	ME-MS61 In ppm	ME-MS61 K %	ME-MS61 La ppm	ME-MS61 Li ppm
		0.01	0.02	0.01	0.1	1	0.05	0.2	0.01	0.05	0.05	0.1	0.005	0.01	0.5	0.2
DUPLICATES																
ORIGINAL		0.15	0.03	199.5	0.1	22	0.18	11.2	0.20	5.64	0.13	4.4	<0.005	1.34	107.5	2.0
DUP		0.17	0.03	196.0	0.1	20	0.19	12.5	0.20	5.64	0.13	4.5	<0.005	1.36	105.5	2.0
Target Range - Lower Bound		0.14	<0.02	188.0	<0.1	19	0.13	11.2	0.18	5.31	0.07	4.1	<0.005	1.27	100.5	1.7
Upper Bound		0.18	0.04	208	0.2	23	0.24	12.5	0.22	5.97	0.19	4.8	0.010	1.43	112.5	2.3
ORIGINAL		4.66	0.09	40.0	24.8	7	0.43	32.7	6.73	20.9	0.14	4.1	0.070	1.03	17.0	16.0
DUP		4.76	0.07	41.4	25.7	8	0.44	31.8	6.88	21.5	0.18	4.5	0.069	1.07	16.7	16.8
Target Range - Lower Bound		4.46	0.06	38.7	23.9	6	0.36	30.9	6.45	20.1	0.10	4.0	0.061	0.99	15.5	15.4
Upper Bound		4.96	0.10	42.7	26.6	9	0.51	33.6	7.16	22.3	0.22	4.6	0.078	1.11	18.2	17.4
ORIGINAL		0.87	0.14	20.8	6.2	7	0.77	496	2.01	24.4	0.14	2.4	0.043	3.83	10.1	10.7
DUP		0.89	0.11	20.4	6.4	8	0.80	519	2.03	24.4	0.13	2.3	0.055	3.89	9.9	10.6
Target Range - Lower Bound		0.83	0.10	19.55	5.9	6	0.70	490	1.91	23.1	0.08	2.1	0.042	3.66	9.0	9.9
Upper Bound		0.93	0.15	21.6	6.7	9	0.87	525	2.13	25.7	0.19	2.6	0.056	4.06	11.0	11.4
PREP DUPLICATES																
199586		20.0	2.15	>500	14.3	<1	<0.05	11.3	6.80	11.10	1.44	0.7	0.420	<0.01	1110	2.3
199586 PREP DUP		18.95	2.27	>500	13.8	4	<0.05	11.0	6.77	9.68	1.30	0.6	0.420	0.01	1100	2.2

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Page: 5 - D
 Total # Pages: 5 (A - E)
 Plus Appendix Pages
 Finalized Date: 8-JAN-2019
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An INAB accredited testing laboratory Reg. No. 173T. Accredited methods are listed in the Scope of Accreditation available on request.

Project: 379500

QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	ME-MS61 Mg %	ME-MS61 Mn ppm	ME-MS61 Mo ppm	ME-MS61 Na %	ME-MS61 Nb ppm	ME-MS61 Ni ppm	ME-MS61 P ppm	ME-MS61 Pb ppm	ME-MS61 Rb ppm	ME-MS61 Re ppm	ME-MS61 S %	ME-MS61 Sb ppm	ME-MS61 Sc ppm	ME-MS61 Se ppm	ME-MS61 Sn ppm
		0.01	5	0.05	0.01	0.1	0.2	10	0.5	0.1	0.002	0.01	0.05	0.1	1	0.2
DUPLICATES																
ORIGINAL		0.04	22	6.77	0.14	4.6	1.0	820	24.8	20.5	0.091	0.01	7.69	6.2	1	0.5
DUP		0.04	27	6.85	0.14	5.7	2.8	840	28.8	20.1	0.097	0.01	7.45	6.1	1	0.5
Target Range - Lower Bound		0.03	18	6.42	0.12	4.8	1.6	780	25.0	19.2	0.087	<0.01	6.95	5.7	<1	0.3
Upper Bound		0.05	31	7.20	0.16	5.5	2.2	880	28.6	21.4	0.101	0.02	8.19	6.6	2	0.7
ORIGINAL		2.00	1160	1.36	2.81	4.6	3.3	2110	5.8	19.2	<0.002	0.12	0.53	22.4	1	1.5
DUP		2.05	1180	1.47	2.83	4.8	3.4	2180	5.9	19.2	0.002	0.12	0.54	22.7	1	1.6
Target Range - Lower Bound		1.91	1105	1.29	2.67	4.4	3.0	2030	5.1	18.1	<0.002	0.10	0.44	21.3	<1	1.3
Upper Bound		2.14	1235	1.54	2.97	5.0	3.7	2260	6.6	20.3	0.004	0.14	0.63	23.8	2	1.8
ORIGINAL		0.49	239	3.96	1.26	2.2	2.6	470	10.9	90.1	<0.002	1.01	0.31	4.3	2	2.5
DUP		0.51	234	3.99	1.27	2.3	2.7	480	10.8	90.2	<0.002	1.03	0.32	4.3	2	2.6
Target Range - Lower Bound		0.47	220	3.73	1.19	2.0	2.3	440	9.8	85.5	<0.002	0.96	0.24	4.0	<1	2.2
Upper Bound		0.54	253	4.22	1.34	2.5	3.0	510	11.9	94.8	0.004	1.08	0.39	4.6	3	2.9
PREP DUPLICATES																
199586		7.35	10100	101.0	<0.01	>500	2.8	5720	15.7	0.2	0.011	0.89	0.17	20.1	<1	4.2
199586 PREP DUP		7.37	9920	106.0	0.02	>500	2.2	5880	16.9	0.2	0.009	0.87	0.19	19.3	1	4.1

Comments: Samples were received on 05-Dec-2018 and the SSF/Request on 28-Nov-2018.

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



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To: GEOLOGICAL SURVEY OF NORWAY (NGU)
 POSTBOKS 6315 TORGARDEN
 NO-7491 TRONDHEIM
 NORWAY

Page: 5 - E
 Total # Pages: 5 (A - E)
 Plus Appendix Pages
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 Account: ONUSEG

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QC CERTIFICATE OF ANALYSIS PI18309689

Sample Description	Method Analyte Units LOD	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	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		25.8	0.26	28.5	21.2	0.218	0.25	5.2	40	1.3	10.6	6	153.5
DUP		26.0	0.29	29.6	20.7	0.236	0.27	5.2	40	1.4	10.6	8	152.0
Target Range - Lower Bound		24.4	0.21	27.5	19.90	0.211	0.22	4.8	37	1.1	10.0	5	141.0
Upper Bound		27.4	0.34	30.6	22.0	0.243	0.30	5.6	43	1.6	11.2	9	164.5
ORIGINAL		608	0.26	<0.05	1.90	0.937	0.14	0.9	188	0.4	31.5	103	171.5
DUP		608	0.27	<0.05	1.91	0.954	0.15	0.9	190	0.4	32.9	106	178.0
Target Range - Lower Bound		577	0.20	<0.05	1.80	0.893	0.11	0.8	179	0.3	30.5	97	161.0
Upper Bound		639	0.33	0.10	2.01	0.998	0.18	1.0	199	0.5	33.9	112	188.5
ORIGINAL		137.5	0.13	0.14	0.94	0.195	0.50	0.6	50	0.7	6.3	38	77.7
DUP		138.0	0.15	0.20	0.97	0.193	0.56	0.6	52	0.7	6.4	39	78.5
Target Range - Lower Bound		130.5	0.08	0.11	0.90	0.179	0.47	0.5	47	0.5	5.9	35	71.7
Upper Bound		145.0	0.20	0.23	1.01	0.209	0.59	0.7	55	0.9	6.8	42	84.5
PREP DUPLICATES													
199586		3350	4.73	0.11	132.0	0.017	0.04	5.1	23	2.8	53.0	786	36.5
199586 PREP DUP		3290	4.26	0.12	147.0	0.016	0.03	4.9	22	2.3	53.2	937	39.1

Comments: Samples were received on 05-Dec-2018 and the SSF/Request on 28-Nov-2018.

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POSTBOKS 6315 TORGARDEN
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Page: Appendix 1
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Project: 379500

QC CERTIFICATE OF ANALYSIS PI18309689

CERTIFICATE COMMENTS

ANALYTICAL COMMENTS

Applies to Method: REE's may not be totally soluble in this method.
ME-MS61

ACCREDITATION COMMENTS

Applies to Method: The methods immediately below this line are ISO 17025:2005 Accredited. INAB Registration No: 173T
ME-MS61



LABORATORY ADDRESSES

Applies to Method: Processed at ALS Pitea located at Hammarvagen 22, SE-943 36, Ojebyn, Sweden.
CRU-31 CRU-QC LOG-22 LOG-24
PUL-31 PUL-QC SPL-22Y WEI-21

Applies to Method: Processed at ALS Loughrea located at Dublin Road, Loughrea, Co. Galway, Ireland.
ME-MS61 ME-MS81h