



BUREAU MINERAL LABORATORIES
VERITAS Canada

www.bureauveritas.com/um

Bureau Veritas Commodities Canada Ltd.
9050 Shaughnessy St Vancouver British Columbia V6P 6E5 Canada
PHONE (604) 253-3158

Client: **Noble Exploration Services Ltd.**
3890 Trailhead Drive
Jordan River British Columbia V9Z 1L1 Canada

Submitted By: Wayne Jackaman
Receiving Lab: Canada-Vancouver
Received: March 04, 2020
Analysis Start: March 19, 2020
Report Date: March 24, 2020
Page: 1 of 5

CERTIFICATE OF ANALYSIS

VAN20000436.1

CLIENT JOB INFORMATION

Project: HMC_2019_BS
Shipment ID:
P.O. Number
Number of Samples: 110

SAMPLE DISPOSAL

IMM-PLP Return immediately after analysis
IMM-RJT Return immediately after analysis

Bureau Veritas does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

Invoice To: Noble Exploration Services Ltd.
3890 Trailhead Drive
Jordan River British Columbia V9Z 1L1
Canada

CC:

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
DY060	110	Dry at 60C			VAN
SS80	98	Dry at 60C sieve 100g to -80 mesh			VAN
SVRJT	98	Save all or part of Soil Reject			VAN
AQ250_EXT_REE	110	1:1:1 Aqua Regia digestion Ultratrace ICP-MS analysis	0.5	Completed	VAN
TG001	110	LOI by loss on ignition	1	Completed	VAN

ADDITIONAL COMMENTS


MAY LAI
Data Validation Specialist

This report supersedes all previous preliminary and final reports with this file number dated prior to the date on this certificate. Signature indicates final approval; preliminary reports are unsigned and should be used for reference only. All results are considered the confidential property of the client. Bureau Veritas assumes the liabilities for actual cost of analysis only. Results apply to samples as submitted.
*** asterisk indicates that an analytical result could not be provided due to unusually high levels of interference from other elements.



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Method Analyte Unit MDL		AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250
		Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P
		ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%
		0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	1	0.01	0.001
HMC-1001 DUP of HMC-1017	Pulp DUP	0.61	3.53	5.22	58.0	47	6.3	4.9	464	1.96	0.9	3.3	3.8	7.0	27.3	0.18	0.06	0.22	33	0.27	0.066
HMC-1002	Stream	1.06	6.63	4.81	55.7	31	11.3	5.6	487	1.72	0.8	4.3	0.5	6.1	48.9	0.10	0.03	0.04	34	0.30	0.074
HMC-1003	Stream	1.00	10.11	3.72	62.4	34	35.8	12.5	621	2.93	0.7	1.6	0.7	3.6	58.7	0.14	0.02	0.03	62	0.63	0.141
HMC-1004	Stream	1.78	18.56	8.80	67.9	73	29.9	11.4	722	2.84	3.2	3.5	0.5	5.3	86.7	0.12	0.10	0.08	65	0.55	0.105
HMC-1005	Stream	0.49	6.37	6.46	56.6	42	10.3	6.3	485	3.40	0.6	3.9	<0.2	14.7	52.5	0.12	<0.02	0.15	66	0.46	0.094
HMC-1006	Stream	0.37	11.17	6.37	53.6	41	13.8	7.2	518	4.02	0.5	9.6	0.2	17.1	64.1	0.07	0.03	0.13	81	0.64	0.151
HMC-1007	Rock Pulp	13.34	158.17	6.59	47.3	80	12.8	10.9	399	4.17	5.9	0.4	29.0	1.2	51.4	0.20	0.14	0.50	94	0.70	0.053
HMC-1008	Stream	0.27	7.39	3.43	50.6	24	10.3	4.8	362	2.14	0.2	1.4	<0.2	5.4	24.1	0.03	<0.02	0.15	38	0.33	0.090
HMC-1009	Stream	0.62	12.92	8.31	54.6	43	17.7	8.5	406	2.39	1.0	6.9	<0.2	7.5	36.5	0.11	0.03	0.26	47	0.66	0.192
HMC-1010	Stream	0.69	9.89	8.10	56.2	31	19.2	6.8	358	2.27	0.7	6.5	<0.2	11.4	53.7	0.08	0.02	0.08	50	0.56	0.174
HMC-1011	Stream	0.90	11.94	7.29	50.7	27	26.4	9.6	333	2.64	2.0	7.3	<0.2	9.6	48.2	0.05	0.04	0.09	73	0.56	0.182
HMC-1012	Stream	0.74	11.92	5.49	43.0	29	30.1	10.7	285	3.55	2.0	3.3	1.1	9.1	40.7	0.07	0.06	0.12	131	0.62	0.201
HMC-1013	Stream	0.86	16.09	4.67	71.1	78	15.3	6.5	450	2.47	3.2	1.3	0.2	5.8	77.4	0.41	0.20	0.11	53	0.77	0.126
HMC-1014	Stream	2.23	10.65	5.85	61.0	70	7.2	5.8	489	2.46	1.5	2.7	<0.2	7.1	29.9	0.15	0.03	0.10	45	0.34	0.091
HMC-1015	Stream	0.97	8.24	4.75	64.1	38	14.0	7.3	531	2.37	0.8	1.4	<0.2	7.0	26.0	0.10	<0.02	0.25	44	0.39	0.117
HMC-1016	Stream	0.80	7.42	5.96	61.1	50	11.0	9.4	594	2.86	0.6	1.8	11.1	4.3	36.6	0.11	<0.02	0.18	58	0.45	0.126
HMC-1017	Stream	0.69	3.47	5.13	57.8	35	6.2	4.3	457	1.86	1.0	1.5	<0.2	7.1	26.7	0.18	<0.02	0.12	32	0.27	0.070
HMC-1018	Stream	1.15	12.35	3.77	57.1	453	15.6	6.6	527	2.76	7.0	1.0	4392.6	3.1	41.5	0.20	0.22	0.05	54	0.40	0.084
HMC-1019	Stream	0.75	6.33	4.91	60.7	21	13.7	5.2	380	1.90	0.6	2.8	<0.2	8.6	25.8	0.08	<0.02	0.19	37	0.33	0.088
HMC-1020	Stream	0.95	4.82	9.45	53.3	39	11.2	4.2	356	1.58	0.6	5.7	0.7	7.4	23.5	0.08	<0.02	0.16	30	0.21	0.059
HMC-1021 DUP of HMC-1037	Pulp DUP	0.88	9.69	10.72	57.9	38	15.3	8.5	478	2.80	2.0	4.0	0.3	23.5	46.4	0.17	0.04	0.11	67	0.42	0.100
HMC-1022	Stream	1.22	24.82	6.23	67.6	42	12.4	7.9	405	2.70	5.7	2.2	1.8	10.3	39.6	0.08	0.06	0.72	78	0.38	0.093
HMC-1023	Stream	3.19	20.32	8.50	68.2	77	8.7	5.0	398	1.77	0.7	6.3	1.1	8.3	31.6	0.13	0.03	0.09	38	0.26	0.062
HMC-1024	Stream	1.03	10.69	8.55	58.4	32	15.3	7.1	353	2.93	2.7	6.3	1.5	12.2	46.8	0.06	<0.02	0.10	72	0.54	0.177
HMC-1025	Stream	0.71	14.67	19.81	63.6	75	29.7	13.3	428	8.08	1.4	4.3	3.2	22.5	55.0	0.19	0.04	0.24	210	0.77	0.314
HMC-1026	Stream	2.27	14.78	14.87	73.6	105	19.8	10.0	474	3.05	3.0	5.5	2.7	11.7	69.7	0.26	0.13	0.20	69	0.68	0.165
HMC-1027	Stream	1.28	10.23	26.23	121.1	97	10.6	6.0	382	2.81	0.7	11.3	<0.2	28.9	58.7	0.23	0.03	0.39	62	0.43	0.140
HMC-1028	Stream	0.77	19.21	9.44	58.6	59	20.4	9.5	396	3.71	1.7	2.3	3.6	8.6	77.7	0.30	0.08	0.13	102	1.02	0.221
HMC-1029	Stream	0.41	15.13	4.92	47.9	21	29.7	11.8	344	3.65	0.2	1.5	<0.2	8.0	87.5	0.06	<0.02	0.02	144	0.76	0.253
HMC-1030	Stream	0.80	12.41	14.40	51.8	55	20.3	7.9	452	3.24	1.2	4.7	<0.2	8.7	46.1	0.09	0.06	0.11	90	0.51	0.167



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		La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Ti	S	Hg	Se	Te	Ga	Cs	Ge	Hf
		ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm	ppm
		0.5	0.5	0.01	0.5	0.001	20	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1	0.02
HMC-1001 DUP of HMC-1017	Pulp DUP	16.7	12.1	0.45	43.2	0.053	<20	0.80	0.016	0.14	0.1	2.0	0.13	<0.02	6	<0.1	0.03	4.0	1.54	<0.1	0.06
HMC-1002	Stream	17.5	14.4	0.37	79.3	0.097	<20	0.86	0.021	0.11	0.1	1.9	0.10	<0.02	5	<0.1	<0.02	4.0	0.94	<0.1	0.04
HMC-1003	Stream	20.1	37.1	0.65	95.5	0.245	<20	1.25	0.031	0.08	<0.1	3.0	0.08	<0.02	9	<0.1	<0.02	4.9	0.73	<0.1	0.08
HMC-1004	Stream	20.4	35.8	0.68	137.5	0.147	<20	1.33	0.032	0.18	0.1	3.5	0.15	0.03	10	<0.1	0.02	5.7	1.80	<0.1	0.11
HMC-1005	Stream	27.7	23.6	0.55	46.6	0.068	<20	1.01	0.012	0.09	0.4	2.4	0.07	<0.02	7	<0.1	<0.02	5.2	1.35	<0.1	<0.02
HMC-1006	Stream	26.4	30.1	0.52	74.0	0.083	<20	1.03	0.011	0.09	0.2	2.1	0.10	<0.02	15	<0.1	<0.02	5.8	1.82	<0.1	0.03
HMC-1007	Rock Pulp	4.6	19.7	0.69	52.3	0.138	<20	1.91	0.022	0.04	<0.1	5.5	0.03	0.58	20	2.6	0.54	5.6	0.36	<0.1	0.07
HMC-1008	Stream	17.8	19.6	0.46	47.5	0.049	<20	0.62	0.018	0.08	0.2	2.2	0.06	<0.02	<5	<0.1	<0.02	4.4	1.03	<0.1	0.05
HMC-1009	Stream	26.1	32.4	0.65	81.8	0.086	<20	0.90	0.026	0.15	0.4	3.7	0.11	0.05	8	<0.1	<0.02	4.8	1.52	0.1	0.04
HMC-1010	Stream	37.4	42.9	0.62	342.4	0.133	<20	0.93	0.019	0.25	0.3	3.1	0.19	0.02	7	0.1	0.02	4.6	2.03	<0.1	0.03
HMC-1011	Stream	34.8	72.2	0.70	148.9	0.156	<20	0.89	0.017	0.25	0.3	2.7	0.20	<0.02	9	0.1	<0.02	4.6	2.20	<0.1	<0.02
HMC-1012	Stream	33.2	124.6	0.73	141.6	0.148	<20	0.76	0.019	0.26	0.4	2.2	0.16	<0.02	7	<0.1	<0.02	4.3	1.48	0.1	<0.02
HMC-1013	Stream	15.7	19.8	0.59	56.4	0.087	<20	1.28	0.020	0.12	0.8	2.8	0.10	<0.02	5	0.3	<0.02	5.4	1.61	<0.1	0.03
HMC-1014	Stream	20.5	12.7	0.54	68.3	0.059	<20	0.89	0.012	0.12	0.3	2.5	0.11	<0.02	<5	<0.1	<0.02	4.3	1.46	<0.1	<0.02
HMC-1015	Stream	20.4	22.2	0.57	121.2	0.089	<20	0.89	0.016	0.12	0.2	2.7	0.10	<0.02	8	<0.1	<0.02	4.2	1.06	<0.1	0.04
HMC-1016	Stream	17.7	20.6	0.53	79.5	0.169	<20	0.89	0.019	0.11	0.2	2.8	0.09	<0.02	<5	0.2	<0.02	4.0	1.05	<0.1	0.06
HMC-1017	Stream	18.2	12.2	0.44	44.8	0.054	<20	0.78	0.016	0.13	0.1	1.8	0.13	<0.02	<5	<0.1	<0.02	3.8	1.52	<0.1	0.03
HMC-1018	Stream	11.5	23.7	0.57	47.6	0.056	<20	0.99	0.011	0.07	0.1	2.6	0.05	<0.02	15	0.2	<0.02	3.5	0.75	<0.1	<0.02
HMC-1019	Stream	26.3	22.3	0.49	61.7	0.062	<20	0.81	0.017	0.09	0.7	2.6	0.08	<0.02	6	<0.1	<0.02	4.9	1.57	<0.1	<0.02
HMC-1020	Stream	26.5	21.8	0.32	112.1	0.041	<20	0.71	0.010	0.09	0.2	1.5	0.08	<0.02	6	<0.1	<0.02	3.8	1.06	<0.1	<0.02
HMC-1021 DUP of HMC-1037	Pulp DUP	31.7	30.0	0.60	87.7	0.091	<20	0.84	0.020	0.12	2.0	1.9	0.09	<0.02	<5	<0.1	0.02	3.9	1.30	<0.1	0.03
HMC-1022	Stream	19.5	25.4	0.59	60.8	0.064	<20	0.89	0.015	0.10	0.2	3.6	0.06	<0.02	6	<0.1	<0.02	4.8	1.07	<0.1	0.03
HMC-1023	Stream	34.2	18.3	0.37	83.2	0.045	<20	0.90	0.008	0.08	0.3	1.9	0.08	<0.02	<5	0.2	<0.02	4.0	2.12	<0.1	<0.02
HMC-1024	Stream	46.7	47.5	0.52	121.2	0.111	<20	0.77	0.017	0.14	0.3	1.8	0.08	<0.02	6	<0.1	<0.02	4.9	1.18	0.1	0.02
HMC-1025	Stream	82.2	195.6	0.54	87.5	0.132	<20	0.72	0.018	0.12	0.7	2.3	0.09	<0.02	10	<0.1	<0.02	6.8	1.54	0.2	0.12
HMC-1026	Stream	43.2	43.3	0.77	122.0	0.112	<20	1.15	0.025	0.13	0.8	3.3	0.13	<0.02	9	0.3	0.04	5.6	3.10	0.1	0.04
HMC-1027	Stream	61.1	34.9	0.36	72.8	0.084	<20	0.68	0.014	0.09	2.0	1.4	0.07	<0.02	6	<0.1	0.04	4.3	1.72	<0.1	0.02
HMC-1028	Stream	42.9	76.9	0.65	93.5	0.135	<20	1.23	0.034	0.16	0.7	3.3	0.10	<0.02	<5	<0.1	0.03	5.7	1.81	0.2	0.04
HMC-1029	Stream	34.6	95.5	0.85	365.0	0.146	<20	0.90	0.026	0.30	0.6	2.2	0.11	<0.02	<5	<0.1	<0.02	5.2	0.87	0.1	0.04
HMC-1030	Stream	48.4	74.9	0.55	142.1	0.114	<20	0.86	0.019	0.17	0.2	2.1	0.10	<0.02	9	<0.1	<0.02	4.4	1.48	0.1	0.03



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		Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
HMC-1001 DUP of HMC-1017	Pulp DUP	0.35	17.0	0.3	<0.05	0.9	4.48	31.4	0.03	<1	0.2	19.1	3.34	10.74	1.77	0.36	1.41	0.29	0.94	0.20
HMC-1002	Stream	1.09	13.6	0.5	<0.05	2.8	7.77	35.5	<0.02	2	0.4	21.9	3.85	13.58	2.30	0.41	1.84	0.34	1.52	0.27
HMC-1003	Stream	1.94	9.0	0.4	<0.05	5.1	10.90	37.4	<0.02	2	0.4	14.6	4.70	17.20	3.29	0.67	2.74	0.45	2.09	0.34
HMC-1004	Stream	0.77	16.0	0.5	<0.05	6.3	12.27	39.0	0.02	1	0.4	18.8	4.77	17.50	3.43	0.69	2.87	0.50	2.32	0.39
HMC-1005	Stream	0.99	9.8	0.1	<0.05	1.3	4.70	44.0	<0.02	<1	0.3	18.2	4.42	12.15	1.72	0.37	1.13	0.18	1.02	0.15
HMC-1006	Stream	1.18	9.5	0.2	<0.05	1.2	4.66	43.6	0.02	<1	0.2	19.4	4.32	14.78	2.02	0.45	1.32	0.20	0.96	0.15
HMC-1007	Rock Pulp	0.22	1.7	0.6	<0.05	4.4	5.86	9.5	0.06	14	0.2	4.1	1.31	5.12	1.23	0.44	1.22	0.24	1.21	0.25
HMC-1008	Stream	0.42	7.2	0.4	<0.05	2.4	4.97	32.8	0.02	<1	0.3	18.0	3.41	11.84	1.94	0.47	1.36	0.21	0.87	0.17
HMC-1009	Stream	0.79	14.1	0.6	<0.05	1.8	8.44	45.3	<0.02	<1	0.5	19.6	5.38	18.00	2.93	0.75	2.27	0.30	1.75	0.30
HMC-1010	Stream	2.22	29.7	0.8	<0.05	1.8	14.19	68.2	0.03	<1	0.7	18.2	7.96	27.93	5.36	0.54	4.58	0.65	3.05	0.54
HMC-1011	Stream	1.70	33.1	0.4	<0.05	1.4	9.72	61.2	<0.02	<1	0.4	19.0	7.21	24.07	3.96	0.54	3.03	0.43	1.91	0.33
HMC-1012	Stream	1.04	25.3	0.3	<0.05	1.3	8.80	61.3	<0.02	<1	0.5	15.7	6.98	24.22	4.02	0.48	2.74	0.37	1.74	0.31
HMC-1013	Stream	0.67	9.7	0.2	<0.05	1.2	4.64	25.5	<0.02	<1	0.4	20.6	2.92	9.75	1.58	0.36	1.09	0.15	0.83	0.16
HMC-1014	Stream	0.25	16.4	0.2	<0.05	0.8	6.55	35.1	<0.02	2	0.4	19.6	3.90	13.02	2.05	0.46	1.64	0.25	1.05	0.20
HMC-1015	Stream	0.36	13.0	0.2	<0.05	1.7	6.38	39.7	<0.02	<1	0.5	16.4	4.37	14.94	2.21	0.57	1.91	0.26	1.24	0.24
HMC-1016	Stream	0.65	12.9	0.5	<0.05	4.0	9.16	34.5	<0.02	<1	0.4	14.9	4.26	15.51	2.81	0.52	2.29	0.36	1.71	0.34
HMC-1017	Stream	0.27	16.7	0.2	<0.05	0.9	4.80	33.9	<0.02	<1	0.5	19.7	3.39	11.49	1.79	0.39	1.14	0.19	0.94	0.19
HMC-1018	Stream	0.25	6.8	<0.1	<0.05	1.1	7.06	17.3	<0.02	<1	0.4	17.0	2.37	8.58	1.69	0.45	1.33	0.24	1.33	0.23
HMC-1019	Stream	0.90	12.4	0.6	<0.05	0.7	6.29	45.5	0.02	<1	0.7	31.7	5.01	16.36	2.28	0.52	1.75	0.26	1.29	0.20
HMC-1020	Stream	1.12	11.2	0.4	<0.05	0.4	7.21	48.5	<0.02	<1	0.5	19.9	5.68	18.25	3.07	0.51	2.11	0.32	1.41	0.28
HMC-1021 DUP of HMC-1037	Pulp DUP	1.26	11.5	0.1	<0.05	1.8	5.57	47.6	<0.02	1	1.1	15.9	4.97	15.13	2.22	0.43	1.59	0.24	1.21	0.20
HMC-1022	Stream	0.44	10.4	0.2	<0.05	1.6	5.64	36.5	<0.02	<1	0.7	18.8	3.87	13.66	2.35	0.44	1.62	0.25	1.19	0.20
HMC-1023	Stream	0.79	12.7	0.3	<0.05	0.5	8.28	49.7	<0.02	2	1.1	22.5	6.97	23.49	3.39	0.65	2.48	0.34	1.45	0.29
HMC-1024	Stream	1.39	14.2	0.4	<0.05	1.7	8.24	75.5	0.02	1	0.6	20.5	8.39	27.02	3.77	0.61	2.18	0.38	1.69	0.29
HMC-1025	Stream	2.41	16.3	0.4	<0.05	4.3	10.81	121.7	<0.02	<1	0.7	13.2	13.58	43.25	6.00	1.01	3.64	0.51	2.55	0.40
HMC-1026	Stream	1.38	17.8	0.3	<0.05	2.8	9.50	68.4	0.02	2	0.9	19.0	8.18	27.44	4.01	0.77	2.74	0.39	1.76	0.33
HMC-1027	Stream	3.19	14.0	0.4	<0.05	1.7	6.65	90.4	<0.02	<1	0.9	14.4	9.12	27.51	3.47	0.60	2.00	0.32	1.48	0.25
HMC-1028	Stream	1.26	15.9	1.5	<0.05	2.0	9.33	69.5	<0.02	<1	0.3	15.6	7.78	26.65	4.21	0.68	2.43	0.35	1.71	0.32
HMC-1029	Stream	0.64	19.6	0.4	<0.05	1.9	8.77	66.5	<0.02	1	0.4	11.0	8.47	31.40	5.18	0.70	3.25	0.44	1.97	0.30
HMC-1030	Stream	1.41	18.2	3.9	<0.05	2.8	9.48	79.6	0.02	<1	0.9	15.7	10.13	34.24	5.12	0.92	3.45	0.48	2.15	0.32



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Project: HMC_2019_BS

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CERTIFICATE OF ANALYSIS

VAN20000436.1

Method Analyte Unit MDL		AQ250	AQ250	AQ250	AQ250	AQ250	TG001
		Tm	Yb	Lu	Pd	Pt	LOI
		ppm	ppm	ppm	ppb	ppb	%
		0.02	0.02	0.02	10	2	-5.11
HMC-1001 DUP of HMC-1017	Pulp DUP	0.08	0.49	0.08	<10	<2	2.1
HMC-1002	Stream	0.09	0.60	0.07	<10	<2	3.1
HMC-1003	Stream	0.14	0.98	0.16	<10	<2	5.5
HMC-1004	Stream	0.16	0.97	0.16	<10	<2	4.7
HMC-1005	Stream	0.07	0.47	0.09	<10	<2	2.6
HMC-1006	Stream	0.06	0.39	0.06	<10	<2	4.7
HMC-1007	Rock Pulp	0.10	0.59	0.07	<10	<2	5.6
HMC-1008	Stream	0.06	0.39	0.05	<10	<2	1.6
HMC-1009	Stream	0.12	0.76	0.11	<10	<2	2.3
HMC-1010	Stream	0.16	0.99	0.13	<10	<2	3.1
HMC-1011	Stream	0.11	0.69	0.08	<10	<2	3.1
HMC-1012	Stream	0.11	0.60	0.10	<10	<2	2.2
HMC-1013	Stream	0.07	0.42	0.07	<10	<2	2.7
HMC-1014	Stream	0.09	0.55	0.09	<10	<2	2.8
HMC-1015	Stream	0.10	0.52	0.08	<10	<2	2.7
HMC-1016	Stream	0.12	0.80	0.12	<10	<2	3.7
HMC-1017	Stream	0.06	0.44	0.06	<10	<2	1.8
HMC-1018	Stream	0.11	0.63	0.09	<10	2	3.3
HMC-1019	Stream	0.08	0.54	0.07	<10	<2	2.6
HMC-1020	Stream	0.09	0.58	0.07	<10	<2	3.5
HMC-1021 DUP of HMC-1037	Pulp DUP	0.07	0.52	0.07	<10	<2	2.2
HMC-1022	Stream	0.05	0.46	0.07	<10	<2	2.1
HMC-1023	Stream	0.10	0.60	0.09	<10	<2	3.5
HMC-1024	Stream	0.11	0.64	0.09	<10	<2	2.3
HMC-1025	Stream	0.14	0.92	0.11	<10	<2	1.9
HMC-1026	Stream	0.11	0.77	0.10	<10	<2	3.9
HMC-1027	Stream	0.09	0.54	0.07	<10	<2	2.9
HMC-1028	Stream	0.13	0.77	0.11	<10	<2	2.8
HMC-1029	Stream	0.10	0.59	0.09	<10	<2	1.8
HMC-1030	Stream	0.12	0.73	0.09	<10	<2	3.4



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Project: HMC_2019_BS

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CERTIFICATE OF ANALYSIS

VAN20000436.1

Method Analyte Unit MDL		AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250
		Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P
		ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%
		0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	1	0.01	0.001
HMC-1031	Stream	0.72	7.44	7.81	48.1	32	39.3	8.0	490	2.24	0.6	6.0	0.4	5.0	59.1	0.09	0.03	0.10	55	0.53	0.131
HMC-1032	Stream	6.65	17.95	45.97	146.2	150	24.5	11.8	890	6.86	1.5	15.9	<0.2	57.5	99.9	0.63	0.09	0.40	133	0.94	0.334
HMC-1033	Rock Pulp	12.76	162.86	6.44	49.1	84	12.4	10.6	394	4.10	5.7	0.4	31.7	1.2	50.1	0.22	0.13	0.55	91	0.65	0.054
HMC-1034	Stream	3.66	15.41	21.03	117.5	83	38.8	14.7	1299	3.90	1.3	5.4	4.1	16.2	140.7	0.55	0.05	0.15	81	1.04	0.346
HMC-1035	Stream	0.89	9.86	12.53	55.7	21	11.3	7.4	497	4.15	0.5	4.3	<0.2	15.2	66.7	0.10	0.04	0.13	100	0.73	0.214
HMC-1036	Stream	1.38	9.54	20.02	77.9	55	9.7	6.5	439	3.23	0.5	6.3	<0.2	21.5	76.8	0.13	<0.02	0.30	72	0.52	0.148
HMC-1037	Stream	0.88	9.02	10.58	58.3	37	14.5	7.7	482	2.85	2.5	2.9	2.9	16.6	45.0	0.20	0.06	0.14	69	0.42	0.097
HMC-1038	Stream	1.53	31.65	5.15	57.2	59	20.1	9.9	332	2.42	1.2	2.1	0.6	3.6	54.5	0.17	0.04	1.17	67	0.62	0.112
HMC-1039	Stream	1.53	14.31	5.56	56.8	27	25.8	7.5	368	2.05	0.5	6.2	<0.2	3.8	31.8	0.11	0.03	0.21	51	0.37	0.093
HMC-1040	Stream	0.46	15.44	3.87	59.5	15	8.6	5.8	256	2.17	0.3	1.1	0.3	10.1	14.0	0.09	0.04	0.04	44	0.28	0.099
HMC-1041 DUP of HMC-1055	Pulp DUP	0.40	14.87	2.90	30.1	20	11.0	9.3	293	2.21	0.5	3.8	<0.2	20.9	42.8	0.05	0.02	0.03	45	0.30	0.066
HMC-1042	Stream	0.75	14.95	5.79	56.8	27	71.7	14.6	429	3.56	0.4	5.7	0.4	7.1	68.3	0.10	<0.02	0.11	99	0.62	0.161
HMC-1043	Stream	0.79	9.47	7.46	62.8	20	34.8	8.3	375	2.84	0.4	5.4	<0.2	9.1	60.2	0.11	<0.02	0.36	74	0.48	0.131
HMC-1044	Rock Pulp	11.73	154.39	6.40	49.2	74	12.5	10.2	391	3.96	5.3	0.4	25.9	1.2	52.0	0.23	0.12	0.49	90	0.65	0.050
HMC-1045	Stream	0.75	6.78	7.18	69.6	21	18.3	5.5	374	1.90	0.5	10.2	<0.2	5.0	35.5	0.12	0.04	0.10	39	0.39	0.106
HMC-1046	Stream	0.87	3.82	4.67	28.8	27	5.5	3.2	233	2.13	0.5	4.3	<0.2	13.2	73.2	0.05	0.02	0.04	53	0.40	0.142
HMC-1047	Stream	1.26	5.36	10.13	50.8	25	6.7	4.4	334	3.53	0.6	5.0	<0.2	16.5	67.5	0.08	0.03	0.12	87	0.51	0.132
HMC-1048	Stream	2.31	18.35	6.68	53.1	80	15.2	7.4	279	2.52	3.1	2.9	<0.2	10.4	51.4	0.12	0.11	0.06	64	0.45	0.112
HMC-1049	Stream	0.94	16.64	6.96	50.2	130	9.8	7.4	503	2.25	1.2	5.5	<0.2	4.5	50.7	0.12	0.06	0.07	49	0.50	0.053
HMC-1050	Stream	0.76	6.71	5.49	31.4	38	8.8	4.2	216	2.22	0.5	5.1	0.2	25.0	62.1	0.07	<0.02	0.06	56	0.50	0.160
HMC-1051	Stream	0.47	7.14	1.28	30.4	22	13.9	5.9	259	1.80	0.4	0.6	<0.2	4.5	23.1	0.04	<0.02	<0.02	40	0.42	0.118
HMC-1052	Stream	0.75	9.01	2.52	55.1	37	15.7	11.2	534	3.15	0.5	0.9	<0.2	4.2	53.6	0.10	<0.02	<0.02	63	0.59	0.140
HMC-1053	Stream	1.37	17.30	6.24	60.1	85	30.4	9.1	1242	2.61	2.6	1.4	0.5	5.3	107.4	0.28	0.08	0.09	63	0.60	0.129
HMC-1054	Stream	0.24	2.26	2.85	24.1	3	4.4	2.8	165	1.41	0.1	2.1	<0.2	15.6	38.4	0.03	<0.02	<0.02	31	0.22	0.067
HMC-1055	Stream	0.33	11.02	2.65	27.6	21	10.5	8.6	279	2.09	0.5	3.2	0.3	14.3	36.3	0.03	<0.02	0.04	43	0.30	0.064
HMC-1056	Stream	0.71	6.50	4.02	49.5	38	20.2	7.1	357	2.61	1.0	3.9	0.4	6.8	51.3	0.05	0.03	0.05	58	0.41	0.104
HMC-1057	Stream	0.45	19.80	7.26	57.9	59	26.4	12.5	398	3.10	2.2	0.8	0.5	3.5	58.6	0.13	0.05	0.08	95	0.61	0.069
HMC-1058	Stream	1.20	6.92	6.94	58.6	57	9.3	7.0	599	2.33	1.4	7.8	0.6	20.1	29.5	0.06	0.03	0.10	50	0.38	0.082
HMC-1059	Stream	1.65	17.38	4.51	48.7	78	9.8	6.0	369	2.28	6.6	1.4	17.3	3.8	42.6	0.10	0.10	0.10	53	0.50	0.061
HMC-1060	Stream	1.09	21.76	2.89	50.2	35	15.4	9.0	409	2.44	1.2	1.9	0.4	7.1	40.4	0.06	0.02	0.29	59	0.61	0.089



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CERTIFICATE OF ANALYSIS

VAN20000436.1

Method	Analyte	Unit	MDL	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250
				La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Ti	S	Hg	Se	Te	Ga	Cs
				ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm
				0.5	0.5	0.01	0.5	0.001	20	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02
HMC-1031	Stream			23.1	59.1	0.63	80.8	0.087	<20	1.05	0.016	0.13	0.2	2.1	0.11	<0.02	9	0.3	<0.02	4.4	2.06
HMC-1032	Stream			157.8	78.8	0.62	296.8	0.110	<20	0.94	0.016	0.22	4.8	2.8	0.18	0.02	12	0.4	0.04	6.2	1.88
HMC-1033	Rock Pulp			4.4	20.4	0.67	49.9	0.134	<20	1.83	0.020	0.04	<0.1	5.3	0.03	0.52	25	3.1	0.45	5.2	0.35
HMC-1034	Stream			81.9	77.0	0.96	488.4	0.185	<20	1.08	0.020	0.34	3.7	2.2	0.23	<0.02	11	0.2	<0.02	5.2	3.50
HMC-1035	Stream			84.7	39.9	0.45	78.2	0.120	<20	0.69	0.039	0.11	0.6	1.5	0.05	<0.02	<5	<0.1	<0.02	4.5	0.88
HMC-1036	Stream			57.7	25.7	0.36	72.2	0.096	<20	0.61	0.022	0.09	4.0	1.4	0.07	<0.02	7	<0.1	<0.02	3.9	1.12
HMC-1037	Stream			32.3	29.5	0.60	83.3	0.088	<20	0.83	0.021	0.12	1.7	1.8	0.08	<0.02	<5	0.1	<0.02	3.8	1.29
HMC-1038	Stream			12.1	32.3	0.81	161.4	0.130	<20	1.26	0.026	0.24	6.9	3.3	0.14	<0.02	<5	0.1	0.08	4.6	2.05
HMC-1039	Stream			15.7	34.2	0.65	93.1	0.088	<20	0.99	0.020	0.14	1.2	2.3	0.10	<0.02	6	0.2	0.02	3.6	1.53
HMC-1040	Stream			26.8	16.2	0.50	139.8	0.153	<20	0.91	0.017	0.46	0.5	3.4	0.24	<0.02	8	<0.1	<0.02	5.5	1.37
HMC-1041 DUP of HMC-1055	Pulp DUP			53.4	9.2	0.72	53.0	0.076	<20	0.68	0.022	0.09	<0.1	1.9	0.06	<0.02	<5	<0.1	0.02	3.7	0.59
HMC-1042	Stream			28.0	68.0	1.20	121.1	0.110	<20	0.79	0.021	0.14	0.6	2.0	0.07	<0.02	6	0.1	<0.02	4.1	0.92
HMC-1043	Stream			25.6	44.6	0.64	124.4	0.090	<20	0.66	0.018	0.13	0.4	1.7	0.09	<0.02	<5	<0.1	<0.02	4.1	1.05
HMC-1044	Rock Pulp			4.3	18.5	0.66	48.6	0.129	<20	1.83	0.020	0.04	<0.1	5.3	0.03	0.50	18	2.7	0.42	5.2	0.31
HMC-1045	Stream			19.1	25.8	0.56	86.4	0.098	<20	0.91	0.020	0.15	1.2	2.2	0.15	<0.02	13	0.2	<0.02	5.0	2.05
HMC-1046	Stream			55.9	13.3	0.24	64.9	0.088	<20	0.63	0.017	0.10	0.2	1.4	0.07	<0.02	9	0.1	<0.02	3.5	0.94
HMC-1047	Stream			59.3	20.0	0.38	45.4	0.106	<20	0.86	0.017	0.09	0.9	2.2	0.04	<0.02	10	<0.1	<0.02	5.7	0.89
HMC-1048	Stream			35.8	21.7	0.44	120.5	0.072	<20	0.87	0.016	0.11	<0.1	2.8	0.11	0.05	<5	0.6	<0.02	4.1	1.00
HMC-1049	Stream			36.7	18.6	0.56	130.8	0.065	<20	1.31	0.015	0.11	0.1	3.2	0.10	0.05	16	0.5	<0.02	4.8	1.42
HMC-1050	Stream			52.5	21.7	0.29	74.2	0.075	<20	0.69	0.015	0.09	0.8	1.8	0.07	<0.02	11	0.4	<0.02	3.7	0.79
HMC-1051	Stream			16.3	17.0	0.42	56.4	0.129	<20	0.61	0.026	0.10	<0.1	1.9	0.05	<0.02	8	<0.1	<0.02	2.8	0.36
HMC-1052	Stream			17.7	21.7	0.57	71.7	0.260	<20	0.97	0.031	0.08	<0.1	2.8	0.06	<0.02	8	0.2	<0.02	4.1	0.42
HMC-1053	Stream			20.5	35.3	0.76	144.1	0.118	<20	1.09	0.036	0.16	<0.1	4.0	0.16	<0.02	9	0.3	0.03	4.5	1.94
HMC-1054	Stream			44.0	8.5	0.19	50.6	0.068	<20	0.47	0.016	0.09	<0.1	1.2	0.06	<0.02	9	<0.1	<0.02	3.3	0.53
HMC-1055	Stream			41.4	8.7	0.70	48.5	0.070	<20	0.65	0.019	0.09	<0.1	1.7	0.06	<0.02	<5	<0.1	<0.02	3.2	0.55
HMC-1056	Stream			21.6	24.8	0.53	78.1	0.136	<20	0.75	0.031	0.09	<0.1	2.1	0.06	<0.02	11	0.2	<0.02	4.1	0.68
HMC-1057	Stream			13.4	31.5	0.88	102.7	0.076	<20	1.27	0.035	0.16	0.6	3.5	0.09	<0.02	12	<0.1	0.03	4.3	0.99
HMC-1058	Stream			20.8	18.3	0.54	87.4	0.060	<20	0.97	0.015	0.07	0.3	3.4	0.07	<0.02	12	<0.1	0.02	4.4	0.85
HMC-1059	Stream			15.1	16.9	0.46	57.5	0.067	<20	0.92	0.018	0.08	2.9	2.9	0.06	<0.02	<5	0.6	0.03	3.9	1.11
HMC-1060	Stream			11.8	24.8	0.64	55.9	0.081	<20	1.21	0.020	0.14	0.2	3.6	0.08	<0.02	7	0.2	0.04	4.6	1.36



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Project: HMC_2019_BS

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Method Analyte Unit MDL		AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250
		Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
HMC-1031	Stream	1.05	17.3	1.1	<0.05	0.8	6.87	39.4	<0.02	1	1.0	21.7	4.94	16.81	2.94	0.57	2.10	0.27	1.21	0.20	0.63
HMC-1032	Stream	4.21	31.8	0.6	<0.05	4.4	17.96	220.6	0.02	<1	1.4	16.5	24.13	74.86	9.21	1.66	6.39	0.69	3.53	0.61	1.82
HMC-1033	Rock Pulp	0.20	1.6	0.5	<0.05	4.0	5.60	8.7	0.08	12	0.2	3.6	1.23	4.82	1.12	0.35	1.17	0.20	1.15	0.20	0.57
HMC-1034	Stream	2.56	41.0	0.2	<0.05	3.2	11.40	121.0	0.02	<1	1.6	22.7	13.65	43.22	5.75	1.10	3.41	0.52	2.11	0.36	0.90
HMC-1035	Stream	2.83	10.6	0.2	<0.05	9.1	9.38	127.8	<0.02	<1	0.9	15.2	13.35	40.72	4.90	1.10	2.84	0.44	2.00	0.34	0.85
HMC-1036	Stream	3.34	11.0	0.3	<0.05	4.7	7.57	84.2	<0.02	<1	0.8	10.5	9.35	28.88	3.78	0.71	2.24	0.30	1.37	0.26	0.69
HMC-1037	Stream	1.36	11.4	0.2	<0.05	2.0	5.64	48.7	<0.02	<1	1.8	16.3	5.07	14.76	2.09	0.39	1.54	0.21	1.00	0.21	0.56
HMC-1038	Stream	0.83	17.6	<0.1	<0.05	1.9	4.26	21.5	<0.02	<1	0.7	21.7	2.47	8.02	1.26	0.30	0.93	0.15	0.89	0.16	0.43
HMC-1039	Stream	0.99	14.1	0.3	<0.05	1.0	5.33	25.8	<0.02	<1	0.6	25.7	3.36	10.95	1.85	0.44	1.55	0.19	0.98	0.21	0.53
HMC-1040	Stream	1.19	45.9	1.7	<0.05	0.5	7.87	50.9	0.03	<1	<0.1	13.4	5.85	18.96	3.28	0.34	2.31	0.35	1.78	0.30	0.69
HMC-1041 DUP of HMC-1055	Pulp DUP	0.94	9.2	0.6	<0.05	1.6	8.14	94.0	<0.02	<1	0.6	9.9	10.71	34.05	5.66	0.49	2.64	0.41	1.83	0.30	0.72
HMC-1042	Stream	1.16	12.0	0.1	<0.05	1.8	5.93	48.4	<0.02	<1	0.4	15.2	5.51	18.12	2.61	0.42	2.02	0.25	1.16	0.20	0.58
HMC-1043	Stream	1.21	13.8	0.3	<0.05	1.7	5.78	46.4	<0.02	<1	0.8	17.8	5.21	16.51	2.57	0.51	1.72	0.22	1.26	0.20	0.60
HMC-1044	Rock Pulp	0.21	1.5	0.6	<0.05	4.5	5.72	8.6	0.06	16	0.2	4.0	1.22	4.46	1.19	0.39	1.13	0.20	1.16	0.23	0.71
HMC-1045	Stream	1.93	22.4	0.8	<0.05	0.9	6.19	33.0	<0.02	<1	0.3	38.6	3.82	12.30	1.88	0.38	1.71	0.20	1.19	0.22	0.60
HMC-1046	Stream	1.98	11.8	0.4	<0.05	1.4	7.68	95.4	<0.02	<1	0.3	13.8	11.67	36.84	5.10	0.65	2.99	0.36	1.79	0.28	0.67
HMC-1047	Stream	2.00	9.3	0.6	<0.05	2.3	9.36	100.2	<0.02	<1	0.5	17.5	12.14	38.87	5.61	0.64	3.38	0.46	2.02	0.33	0.83
HMC-1048	Stream	0.70	13.9	0.2	<0.05	1.7	9.18	57.7	<0.02	1	0.6	12.3	8.09	27.40	4.19	0.74	2.93	0.34	1.75	0.31	0.85
HMC-1049	Stream	1.05	14.7	0.3	<0.05	2.5	13.38	34.9	<0.02	<1	0.5	19.0	8.45	28.58	4.74	1.01	3.36	0.42	2.27	0.44	1.20
HMC-1050	Stream	1.34	10.9	0.3	<0.05	1.3	9.10	88.3	<0.02	<1	0.6	12.5	11.31	36.52	5.59	0.73	3.30	0.43	2.07	0.31	0.91
HMC-1051	Stream	0.55	7.6	<0.1	<0.05	3.3	5.98	29.3	<0.02	<1	0.1	6.7	3.42	12.21	2.07	0.25	1.42	0.20	1.13	0.21	0.63
HMC-1052	Stream	0.67	6.7	0.4	<0.05	9.3	8.84	32.8	0.03	<1	0.4	9.6	4.19	14.25	2.81	0.49	2.31	0.32	1.87	0.35	0.83
HMC-1053	Stream	0.36	19.3	0.4	<0.05	5.6	12.83	38.1	0.02	<1	0.4	19.7	4.93	17.27	3.71	0.57	2.97	0.43	2.43	0.46	1.29
HMC-1054	Stream	1.20	10.6	0.4	<0.05	2.4	6.68	75.4	<0.02	<1	0.3	9.0	8.87	28.47	4.08	0.39	2.80	0.33	1.52	0.25	0.73
HMC-1055	Stream	0.81	8.0	0.3	<0.05	1.5	7.00	73.1	<0.02	<1	0.1	9.1	8.27	27.53	4.08	0.43	2.48	0.33	1.61	0.26	0.64
HMC-1056	Stream	0.85	8.4	0.5	<0.05	5.5	8.79	38.4	<0.02	<1	0.6	12.1	4.63	16.63	3.06	0.45	2.08	0.33	1.60	0.33	0.86
HMC-1057	Stream	0.20	11.2	<0.1	<0.05	2.6	6.11	23.0	<0.02	<1	0.5	12.4	3.15	10.13	1.84	0.32	1.38	0.20	1.15	0.22	0.61
HMC-1058	Stream	0.56	8.9	0.3	<0.05	2.0	9.80	31.3	<0.02	<1	0.6	16.8	4.87	17.51	2.86	0.66	2.25	0.31	1.80	0.33	0.95
HMC-1059	Stream	0.66	7.5	0.2	<0.05	1.3	6.81	23.9	<0.02	1	0.5	13.1	3.36	11.59	2.04	0.39	1.72	0.20	1.11	0.22	0.62
HMC-1060	Stream	0.21	12.3	<0.1	<0.05	1.3	5.11	21.2	<0.02	1	<0.1	17.3	2.68	9.68	1.86	0.28	1.21	0.16	0.90	0.18	0.59



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Method Analyte Unit MDL		AQ250	AQ250	AQ250	AQ250	AQ250	TG001
		Tm	Yb	Lu	Pd	Pt	LOI
		ppm	ppm	ppm	ppb	ppb	%
		0.02	0.02	0.02	10	2	-5.11
HMC-1031	Stream	0.09	0.53	0.09	<10	<2	4.1
HMC-1032	Stream	0.23	1.53	0.21	<10	<2	5.2
HMC-1033	Rock Pulp	0.09	0.55	0.08	<10	<2	5.9
HMC-1034	Stream	0.13	0.70	0.11	<10	<2	4.9
HMC-1035	Stream	0.11	0.64	0.10	<10	<2	2.2
HMC-1036	Stream	0.11	0.55	0.10	<10	<2	2.1
HMC-1037	Stream	0.09	0.55	0.07	<10	<2	2.1
HMC-1038	Stream	0.06	0.39	0.05	<10	<2	2.8
HMC-1039	Stream	0.06	0.52	0.06	<10	<2	3.1
HMC-1040	Stream	0.11	0.56	0.09	<10	<2	1.4
HMC-1041 DUP of HMC-1055	Pulp DUP	0.10	0.58	0.08	<10	<2	2.1
HMC-1042	Stream	0.08	0.49	0.06	<10	<2	2.3
HMC-1043	Stream	0.09	0.45	0.08	<10	<2	2.2
HMC-1044	Rock Pulp	0.09	0.58	0.08	<10	<2	5.6
HMC-1045	Stream	0.08	0.40	0.07	<10	<2	3.3
HMC-1046	Stream	0.10	0.62	0.08	<10	<2	2.6
HMC-1047	Stream	0.13	0.73	0.08	<10	2	2.8
HMC-1048	Stream	0.12	0.78	0.10	<10	<2	3.2
HMC-1049	Stream	0.18	1.10	0.17	<10	<2	8.1
HMC-1050	Stream	0.12	0.74	0.10	<10	<2	2.8
HMC-1051	Stream	0.08	0.44	0.07	<10	<2	1.6
HMC-1052	Stream	0.12	0.75	0.11	<10	<2	3.5
HMC-1053	Stream	0.19	1.21	0.18	<10	<2	3.7
HMC-1054	Stream	0.08	0.50	0.07	<10	<2	1.6
HMC-1055	Stream	0.10	0.51	0.08	<10	<2	2.0
HMC-1056	Stream	0.13	0.71	0.10	<10	<2	2.4
HMC-1057	Stream	0.09	0.50	0.08	<10	<2	3.7
HMC-1058	Stream	0.12	0.84	0.14	<10	<2	3.8
HMC-1059	Stream	0.10	0.55	0.08	<10	<2	3.4
HMC-1060	Stream	0.07	0.46	0.07	<10	<2	2.5



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Method Analyte Unit MDL		AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250
		Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P
		ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%
		0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	1	0.01	0.001
HMC-1061 DUP of HMC-1080	Pulp DUP	0.71	14.88	9.79	57.4	44	11.7	9.0	371	3.09	1.3	6.7	0.4	33.6	108.3	0.09	0.05	0.10	83	0.58	0.155
HMC-1062	Stream	0.88	12.14	9.03	56.6	99	12.6	8.1	512	2.71	2.8	11.3	0.6	8.3	27.0	0.21	0.05	0.20	52	0.44	0.129
HMC-1063	Stream	0.68	15.63	6.38	61.8	85	9.1	7.6	485	2.57	3.1	1.3	0.5	5.5	24.5	0.18	0.06	0.12	57	0.39	0.102
HMC-1064	Stream	0.63	6.18	3.92	48.7	60	7.8	5.8	420	2.15	2.0	1.3	<0.2	7.3	23.6	0.16	0.05	0.06	39	0.32	0.093
HMC-1065	Stream	0.59	4.39	3.13	43.9	25	5.8	4.4	411	2.01	0.4	2.0	<0.2	5.4	18.5	0.07	<0.02	0.03	39	0.32	0.100
HMC-1066	Stream	0.47	4.72	5.12	42.3	15	10.4	5.1	319	2.16	0.3	3.3	<0.2	10.5	50.1	0.07	<0.02	0.05	45	0.44	0.118
HMC-1067	Stream	0.69	5.59	3.77	45.5	21	11.6	5.3	290	2.09	0.6	4.2	<0.2	7.4	30.4	0.07	<0.02	0.05	47	0.29	0.083
HMC-1068	Stream	0.51	9.98	4.61	38.4	23	24.1	8.1	299	4.07	0.5	3.2	<0.2	20.2	63.2	0.07	<0.02	0.02	119	0.63	0.226
HMC-1069	Stream	0.91	7.81	4.19	39.4	16	35.6	9.8	303	3.08	0.8	2.4	0.2	8.8	68.8	0.07	<0.02	0.02	82	0.53	0.174
HMC-1070	Stream	0.65	12.20	5.88	52.5	38	11.6	8.0	438	2.58	1.9	2.1	1.0	6.6	36.0	0.13	0.05	0.09	59	0.40	0.108
HMC-1071	Stream	0.65	8.02	5.50	49.3	125	10.3	5.8	380	2.69	2.3	3.4	<0.2	9.0	36.1	0.12	0.06	0.11	52	0.41	0.105
HMC-1072	Stream	1.91	18.08	7.19	63.1	42	7.0	8.6	1060	3.25	1.4	3.2	2.0	11.0	89.5	0.07	0.09	0.17	84	0.50	0.099
HMC-1073	Stream	0.91	13.66	5.05	44.5	27	52.4	9.3	238	2.82	0.2	2.5	1.7	11.0	165.4	0.05	<0.02	0.07	74	1.26	0.522
HMC-1074	Rock Pulp	0.85	31.81	32.90	156.4	304	19.4	13.7	3584	3.21	19.1	6.6	2.3	0.7	26.9	1.05	1.86	0.61	46	1.56	0.151
HMC-1075	Stream	0.77	9.79	3.26	40.7	10	66.2	11.8	295	3.34	0.6	1.7	1.0	8.1	49.6	0.04	<0.02	0.03	79	0.69	0.284
HMC-1076	Stream	0.82	16.10	11.38	58.3	112	21.5	8.5	1042	3.06	1.8	2.2	0.2	4.6	178.1	0.12	0.06	0.11	66	0.72	0.136
HMC-1077	Stream	3.40	57.87	18.46	178.0	250	20.0	15.1	871	4.33	74.7	0.9	11.1	4.7	60.9	1.45	1.45	0.33	98	0.77	0.093
HMC-1078	Stream	0.40	5.64	5.05	38.1	32	11.3	4.4	195	2.02	0.5	6.5	1.0	11.9	41.3	0.04	0.03	0.03	54	0.32	0.094
HMC-1079	Stream	0.66	11.15	10.19	70.6	81	9.6	6.3	369	2.51	4.0	4.4	0.5	17.5	177.3	0.14	0.10	0.11	67	0.59	0.135
HMC-1080	Stream	0.71	14.69	9.61	55.4	35	10.9	8.5	391	3.27	1.3	5.0	<0.2	24.2	92.2	0.05	0.05	0.09	85	0.63	0.160
HMC-1081 DUP of HMC-1087	Pulp DUP	0.81	10.46	7.47	47.9	50	10.7	6.0	319	2.90	1.2	2.5	<0.2	12.5	38.3	0.07	0.04	0.08	71	0.47	0.144
HMC-1082	Stream	0.23	3.85	4.51	30.1	5	8.1	4.1	170	2.01	0.6	3.1	<0.2	8.7	72.2	0.01	0.02	0.04	52	0.40	0.095
HMC-1083	Stream	0.58	16.14	7.06	61.9	42	24.3	9.8	528	3.82	2.9	1.4	0.4	5.2	64.1	0.10	0.14	0.06	126	0.76	0.114
HMC-1084	Stream	0.51	16.92	11.70	60.4	58	55.8	12.6	431	3.98	14.2	1.9	2.2	13.5	64.9	0.20	0.17	0.14	91	0.44	0.128
HMC-1085	Stream	0.72	11.23	4.36	43.1	11	70.3	12.3	338	4.83	0.3	2.3	0.3	12.3	46.8	0.03	<0.02	0.05	151	0.62	0.243
HMC-1086	Stream	1.69	20.85	7.40	62.1	33	82.4	18.4	758	5.11	1.2	4.8	0.6	9.9	71.9	0.09	0.02	0.06	140	1.01	0.344
HMC-1087	Stream	0.78	10.37	7.11	48.9	50	11.4	5.9	314	2.75	1.2	3.0	1.2	20.3	35.6	0.06	0.04	0.14	66	0.45	0.137
HMC-1088	Stream	0.44	6.59	4.77	51.3	22	9.0	5.9	354	4.21	0.4	2.0	<0.2	16.9	54.4	0.05	0.03	0.04	104	0.63	0.240
HMC-1089	Stream	0.85	11.92	6.26	47.6	70	8.4	4.9	311	2.11	0.5	3.9	<0.2	7.0	34.5	0.06	0.04	0.11	51	0.37	0.084
HMC-1090	Stream	0.42	9.37	4.20	36.8	26	19.4	6.0	220	2.12	0.2	1.5	0.9	7.9	37.7	0.05	<0.02	0.03	66	0.53	0.169



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		La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Ti	S	Hg	Se	Te	Ga	Cs	Ge	Hf
		ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm	ppm
		0.5	0.5	0.01	0.5	0.001	20	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1	0.02
HMC-1061 DUP of HMC-1080	Pulp DUP	47.9	30.8	0.62	134.9	0.130	<20	0.95	0.032	0.19	0.3	2.8	0.10	<0.02	10	0.1	<0.02	5.0	1.54	0.1	0.10
HMC-1062	Stream	24.6	23.8	0.60	68.8	0.053	<20	0.89	0.013	0.11	1.6	3.0	0.11	0.04	<5	0.2	0.02	4.3	1.17	<0.1	<0.02
HMC-1063	Stream	17.9	18.4	0.62	67.4	0.064	<20	0.98	0.015	0.10	1.1	3.7	0.09	<0.02	12	<0.1	0.04	4.7	1.31	<0.1	0.03
HMC-1064	Stream	16.2	14.1	0.48	43.1	0.069	<20	0.75	0.015	0.09	1.2	2.2	0.07	<0.02	<5	0.2	0.02	3.3	0.91	<0.1	0.03
HMC-1065	Stream	17.4	11.0	0.31	55.2	0.068	<20	0.63	0.014	0.10	<0.1	1.7	0.10	<0.02	12	<0.1	<0.02	3.3	0.90	<0.1	<0.02
HMC-1066	Stream	28.7	16.9	0.38	51.9	0.086	<20	0.77	0.017	0.10	<0.1	2.1	0.07	<0.02	6	<0.1	<0.02	4.4	0.86	<0.1	0.03
HMC-1067	Stream	22.1	19.4	0.46	68.4	0.088	<20	0.77	0.017	0.12	0.2	1.8	0.13	<0.02	10	0.2	0.02	4.5	1.24	<0.1	<0.02
HMC-1068	Stream	65.3	56.4	0.55	138.6	0.119	<20	0.87	0.021	0.21	0.1	1.5	0.12	<0.02	8	0.3	<0.02	6.2	1.11	0.1	0.03
HMC-1069	Stream	38.3	87.0	0.78	105.7	0.103	<20	0.99	0.020	0.14	0.2	1.4	0.10	<0.02	20	0.2	0.02	4.8	0.89	<0.1	<0.02
HMC-1070	Stream	20.2	21.7	0.65	68.9	0.077	<20	1.04	0.020	0.11	<0.1	3.4	0.09	<0.02	7	0.2	<0.02	4.8	1.19	<0.1	0.04
HMC-1071	Stream	21.9	19.0	0.46	67.1	0.073	<20	0.99	0.016	0.10	<0.1	2.8	0.10	<0.02	18	0.3	<0.02	4.3	1.11	<0.1	<0.02
HMC-1072	Stream	29.5	16.5	0.55	78.5	0.068	<20	1.10	0.015	0.10	0.2	3.4	0.09	<0.02	11	<0.1	<0.02	6.1	1.75	<0.1	0.04
HMC-1073	Stream	97.3	56.4	0.85	194.5	0.160	<20	0.98	0.017	0.25	<0.1	1.8	0.11	<0.02	8	<0.1	0.02	5.0	0.61	<0.1	0.04
HMC-1074	Rock Pulp	20.5	25.4	0.72	259.6	0.026	<20	1.09	0.024	0.07	0.2	3.6	0.23	0.21	100	1.6	0.06	3.6	1.00	<0.1	0.03
HMC-1075	Stream	47.0	85.5	1.04	118.1	0.078	<20	0.62	0.013	0.15	0.2	1.3	0.08	<0.02	5	<0.1	<0.02	3.8	0.62	<0.1	<0.02
HMC-1076	Stream	48.3	30.7	0.61	226.1	0.059	<20	1.32	0.018	0.12	0.1	3.2	0.09	<0.02	26	0.4	<0.02	5.8	2.61	<0.1	0.07
HMC-1077	Stream	18.9	26.5	0.87	103.5	0.062	<20	1.60	0.022	0.09	0.7	5.1	0.09	0.04	<5	0.9	0.09	5.8	2.34	<0.1	0.05
HMC-1078	Stream	39.8	24.2	0.32	73.9	0.068	<20	0.75	0.014	0.10	0.1	1.7	0.07	<0.02	13	<0.1	<0.02	4.8	1.16	<0.1	0.03
HMC-1079	Stream	57.5	27.5	0.44	117.8	0.087	<20	1.04	0.024	0.11	1.1	2.7	0.09	<0.02	9	<0.1	0.03	5.0	1.36	0.1	0.07
HMC-1080	Stream	47.1	31.6	0.63	127.1	0.132	<20	0.97	0.032	0.18	0.3	2.8	0.08	<0.02	<5	<0.1	0.03	4.8	1.43	0.1	0.11
HMC-1081 DUP of HMC-1087	Pulp DUP	40.5	33.6	0.43	70.2	0.077	<20	0.65	0.022	0.10	0.3	2.2	0.06	<0.02	<5	<0.1	<0.02	4.4	0.87	0.1	0.05
HMC-1082	Stream	38.0	18.8	0.30	55.2	0.090	<20	0.78	0.014	0.09	0.1	1.8	0.05	<0.02	<5	<0.1	<0.02	4.5	0.65	<0.1	0.03
HMC-1083	Stream	26.9	33.8	0.83	62.6	0.143	<20	1.06	0.018	0.10	0.3	4.3	0.06	<0.02	<5	<0.1	<0.02	5.3	1.85	<0.1	0.16
HMC-1084	Stream	36.8	106.5	1.10	79.6	0.065	<20	1.11	0.021	0.08	1.7	3.4	0.04	<0.02	<5	0.1	<0.02	4.5	1.04	<0.1	0.07
HMC-1085	Stream	51.1	92.7	1.06	107.5	0.097	<20	0.60	0.013	0.18	0.2	1.6	0.09	<0.02	<5	<0.1	<0.02	4.4	0.92	0.1	0.07
HMC-1086	Stream	56.7	160.2	1.45	272.0	0.196	<20	1.19	0.019	0.35	0.2	3.0	0.18	<0.02	7	0.2	0.02	5.6	2.64	0.1	0.05
HMC-1087	Stream	40.5	33.4	0.43	73.1	0.065	<20	0.64	0.019	0.09	0.3	2.1	0.06	<0.02	<5	<0.1	<0.02	4.3	0.85	<0.1	0.05
HMC-1088	Stream	52.6	26.9	0.41	118.9	0.090	<20	0.88	0.013	0.13	0.1	2.0	0.09	<0.02	13	<0.1	<0.02	5.6	0.57	<0.1	0.04
HMC-1089	Stream	28.0	16.8	0.36	58.5	0.044	<20	0.75	0.014	0.06	0.1	2.1	0.06	<0.02	<5	<0.1	<0.02	3.4	1.17	<0.1	0.04
HMC-1090	Stream	29.5	45.6	0.51	120.3	0.086	<20	0.70	0.019	0.15	0.2	1.7	0.08	<0.02	<5	<0.1	<0.02	3.5	0.93	<0.1	0.02



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Project: HMC_2019_BS

Report Date: March 24, 2020

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CERTIFICATE OF ANALYSIS

VAN20000436.1

Method Analyte Unit MDL		AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250
		Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
HMC-1061 DUP of HMC-1080	Pulp DUP	1.04	16.1	0.2	<0.05	5.1	8.31	81.6	<0.02	<1	0.3	14.3	9.42	30.22	4.52	0.74	2.39	0.35	1.68	0.35	0.80
HMC-1062	Stream	0.32	12.6	0.2	<0.05	1.1	8.38	43.2	<0.02	<1	0.3	17.2	5.19	17.65	2.89	0.62	2.25	0.32	1.58	0.30	0.91
HMC-1063	Stream	0.29	11.2	0.2	<0.05	1.1	7.09	30.9	<0.02	<1	0.5	22.0	3.71	12.64	2.08	0.47	1.68	0.23	1.21	0.25	0.71
HMC-1064	Stream	0.28	9.6	<0.1	<0.05	2.3	5.79	28.2	<0.02	<1	0.3	15.8	3.33	11.53	1.97	0.43	1.29	0.18	1.02	0.21	0.50
HMC-1065	Stream	0.78	12.7	0.3	<0.05	1.0	6.15	32.9	<0.02	<1	0.4	15.1	3.54	12.22	2.08	0.33	1.66	0.24	1.23	0.21	0.70
HMC-1066	Stream	0.92	11.5	0.3	<0.05	1.9	7.26	52.6	<0.02	<1	0.6	15.8	5.78	18.83	3.12	0.47	2.17	0.30	1.51	0.22	0.69
HMC-1067	Stream	1.50	15.9	0.7	<0.05	1.3	6.12	41.1	<0.02	<1	0.5	24.0	4.57	15.83	2.98	0.31	1.93	0.22	1.28	0.24	0.62
HMC-1068	Stream	1.57	20.5	0.4	<0.05	1.9	10.21	112.3	<0.02	<1	0.4	15.0	12.24	39.17	5.68	0.70	3.50	0.47	2.37	0.35	0.99
HMC-1069	Stream	1.21	13.3	0.3	<0.05	1.0	7.17	70.4	<0.02	<1	0.4	12.5	7.78	26.89	4.04	0.54	2.59	0.32	1.52	0.25	0.74
HMC-1070	Stream	0.35	12.9	0.5	<0.05	1.7	6.50	35.3	0.02	<1	0.3	22.1	4.18	14.31	2.45	0.40	1.78	0.23	1.20	0.24	0.65
HMC-1071	Stream	0.54	11.2	0.2	<0.05	1.4	9.58	37.4	<0.02	<1	0.5	19.2	4.84	16.48	3.13	0.63	2.22	0.32	1.62	0.35	0.94
HMC-1072	Stream	0.62	10.8	0.6	<0.05	2.6	8.12	54.7	0.02	<1	0.6	19.1	6.15	20.87	3.88	0.54	2.41	0.36	1.76	0.35	0.90
HMC-1073	Stream	1.43	17.2	0.3	<0.05	1.5	11.19	191.5	<0.02	<1	0.3	14.0	21.91	82.52	11.98	2.03	8.04	0.60	2.99	0.39	1.03
HMC-1074	Rock Pulp	0.56	7.5	1.7	<0.05	0.6	21.72	33.4	0.05	1	0.4	8.1	5.60	24.01	4.86	1.06	4.68	0.61	3.79	0.66	2.17
HMC-1075	Stream	0.90	13.2	0.3	<0.05	1.4	8.90	87.7	<0.02	<1	0.2	7.5	9.29	34.44	5.23	0.89	3.74	0.43	2.30	0.30	0.82
HMC-1076	Stream	1.18	14.7	0.5	<0.05	3.2	13.03	77.8	0.03	<1	2.0	18.3	10.35	39.59	6.87	1.22	5.68	0.50	2.54	0.40	1.21
HMC-1077	Stream	0.87	9.0	0.4	<0.05	2.0	8.45	37.9	0.04	<1	0.8	19.2	4.05	15.59	2.75	0.46	2.56	0.29	1.65	0.30	0.76
HMC-1078	Stream	1.25	12.2	0.4	<0.05	1.2	6.81	70.0	<0.02	<1	0.4	17.3	8.01	29.83	4.22	0.64	3.00	0.29	1.44	0.24	0.57
HMC-1079	Stream	1.12	11.7	0.4	<0.05	5.1	9.70	93.6	<0.02	<1	0.4	15.2	11.99	41.61	6.29	1.06	3.66	0.42	1.93	0.31	1.01
HMC-1080	Stream	1.23	15.8	0.4	<0.05	4.8	7.93	77.1	<0.02	<1	0.2	13.5	9.35	28.97	3.93	0.67	2.41	0.31	1.62	0.29	0.82
HMC-1081 DUP of HMC-1087	Pulp DUP	1.33	9.6	0.5	<0.05	2.9	7.14	65.5	<0.02	<1	0.4	13.7	7.43	23.82	3.64	0.57	2.37	0.31	1.52	0.27	0.71
HMC-1082	Stream	1.23	10.7	0.5	<0.05	1.7	6.78	66.2	<0.02	<1	0.4	12.7	8.16	27.41	4.21	0.59	2.85	0.29	1.40	0.23	0.65
HMC-1083	Stream	1.52	8.9	0.5	<0.05	7.8	9.05	48.2	0.02	<1	0.6	13.1	5.52	21.99	3.35	0.52	3.20	0.33	1.66	0.28	0.87
HMC-1084	Stream	0.75	7.5	0.5	<0.05	3.5	4.84	61.4	<0.02	<1	0.3	12.9	6.14	23.03	3.04	0.69	2.42	0.22	1.15	0.17	0.51
HMC-1085	Stream	1.03	18.1	0.3	<0.05	2.4	9.67	91.9	<0.02	<1	0.3	10.6	9.76	35.06	5.67	0.67	3.91	0.42	1.98	0.30	0.82
HMC-1086	Stream	1.47	33.2	0.4	<0.05	3.2	13.67	106.6	0.03	<1	0.7	18.5	13.29	51.30	7.26	1.10	6.30	0.57	2.89	0.53	1.31
HMC-1087	Stream	1.18	9.3	0.3	<0.05	2.5	6.77	70.3	<0.02	<1	0.4	15.9	7.42	24.11	3.74	0.50	2.69	0.30	1.62	0.24	0.82
HMC-1088	Stream	1.61	15.0	0.5	<0.05	1.5	11.02	101.5	<0.02	<1	0.3	12.1	10.93	44.00	7.22	0.74	5.12	0.46	2.62	0.43	1.05
HMC-1089	Stream	1.03	9.2	0.4	<0.05	0.9	6.51	45.5	<0.02	<1	0.5	23.7	5.23	17.89	3.01	0.48	2.36	0.25	1.44	0.24	0.60
HMC-1090	Stream	1.19	16.6	0.4	<0.05	1.1	8.76	57.3	<0.02	<1	0.3	9.9	6.65	24.91	4.11	0.44	3.66	0.34	2.12	0.30	0.90



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CERTIFICATE OF ANALYSIS

VAN20000436.1

Method Analyte Unit MDL		AQ250	AQ250	AQ250	AQ250	AQ250	TG001
		Tm	Yb	Lu	Pd	Pt	LOI
		ppm	ppm	ppm	ppb	ppb	%
		0.02	0.02	0.02	10	2	-5.11
HMC-1061 DUP of HMC-1080	Pulp DUP	0.12	0.71	0.09	<10	<2	2.3
HMC-1062	Stream	0.11	0.71	0.11	<10	3	3.1
HMC-1063	Stream	0.10	0.64	0.10	<10	<2	2.7
HMC-1064	Stream	0.08	0.48	0.07	<10	<2	2.2
HMC-1065	Stream	0.10	0.49	0.08	<10	<2	2.4
HMC-1066	Stream	0.09	0.60	0.08	<10	<2	2.2
HMC-1067	Stream	0.10	0.49	0.08	<10	3	3.1
HMC-1068	Stream	0.14	0.78	0.09	<10	<2	3.0
HMC-1069	Stream	0.09	0.59	0.06	<10	<2	4.4
HMC-1070	Stream	0.10	0.53	0.09	<10	3	2.4
HMC-1071	Stream	0.14	0.78	0.13	<10	<2	3.3
HMC-1072	Stream	0.12	0.68	0.10	<10	<2	3.3
HMC-1073	Stream	0.12	0.76	0.09	<10	<2	5.3
HMC-1074	Rock Pulp	0.28	1.77	0.26	<10	<2	31.5
HMC-1075	Stream	0.11	0.66	0.08	<10	3	2.5
HMC-1076	Stream	0.14	0.81	0.15	<10	<2	6.8
HMC-1077	Stream	0.10	0.77	0.10	<10	<2	5.4
HMC-1078	Stream	0.07	0.45	0.06	<10	<2	3.3
HMC-1079	Stream	0.10	0.71	0.10	<10	<2	3.5
HMC-1080	Stream	0.12	0.63	0.10	<10	<2	2.4
HMC-1081 DUP of HMC-1087	Pulp DUP	0.08	0.55	0.07	<10	<2	1.6
HMC-1082	Stream	0.09	0.52	0.06	<10	<2	3.1
HMC-1083	Stream	0.13	0.77	0.11	<10	<2	4.2
HMC-1084	Stream	0.05	0.38	0.04	<10	<2	2.8
HMC-1085	Stream	0.09	0.69	0.08	<10	<2	1.9
HMC-1086	Stream	0.15	0.99	0.13	<10	<2	4.9
HMC-1087	Stream	0.07	0.50	0.08	<10	<2	1.9
HMC-1088	Stream	0.11	0.75	0.10	<10	<2	3.4
HMC-1089	Stream	0.10	0.53	0.07	<10	<2	3.4
HMC-1090	Stream	0.11	0.62	0.08	<10	<2	2.2



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CERTIFICATE OF ANALYSIS

VAN20000436.1

Method Analyte Unit MDL		AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250
		Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P
		ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%
		0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	1	0.01	0.001
HMC-1091	Stream	1.06	56.88	9.78	65.9	104	17.3	11.1	719	3.69	17.3	1.0	5.7	6.0	90.5	0.20	0.38	0.12	85	2.11	0.118
HMC-1092	Stream	0.65	11.71	8.18	54.9	65	13.8	7.2	413	2.54	4.1	3.0	1.2	6.6	63.4	0.14	0.16	0.08	72	0.49	0.101
HMC-1093	Stream	0.52	12.12	4.20	48.2	40	16.6	8.9	480	3.45	3.1	0.8	1.2	6.0	31.5	0.05	0.07	0.04	88	0.56	0.096
HMC-1094	Stream	0.78	7.78	12.87	60.4	23	10.5	6.4	548	3.49	0.3	3.1	<0.2	15.2	34.9	0.07	0.04	0.12	81	0.41	0.128
HMC-1095	Rock Pulp	13.41	157.25	6.80	50.2	95	12.6	11.4	416	4.15	5.4	0.4	32.9	1.2	49.5	0.26	0.16	0.49	94	0.69	0.057
HMC-1096	Stream	0.54	4.65	7.40	45.9	14	32.5	5.6	378	3.04	0.3	4.4	<0.2	15.4	49.7	0.06	0.03	0.14	60	0.32	0.087
HMC-1097	Stream	0.33	13.19	11.77	49.0	16	101.9	12.9	323	2.19	0.3	5.1	0.3	8.8	71.1	0.07	<0.02	0.15	40	0.53	0.181
HMC-1098	Stream	0.49	6.20	6.05	43.7	10	9.1	5.2	355	2.60	0.3	2.3	1.0	10.6	54.8	0.06	0.02	0.08	70	0.50	0.122
HMC-1099	Stream	0.51	11.44	6.13	42.4	21	35.9	8.3	286	4.62	0.5	1.8	0.5	11.0	72.9	0.05	<0.02	0.05	151	0.63	0.179
HMC-1100	Stream	0.66	14.08	4.53	48.8	19	53.9	11.8	299	5.07	0.4	1.9	0.7	13.3	31.8	0.03	<0.02	0.04	168	0.61	0.224
HMC-1101 DUP of HMC-1108	Pulp DUP	0.76	36.63	13.73	155.0	191	86.5	13.7	973	3.19	13.4	0.6	18.0	4.3	106.7	1.01	0.33	0.14	63	4.00	0.087
HMC-1102	Stream	0.74	9.42	5.36	48.1	28	24.9	7.0	329	3.28	0.2	4.4	<0.2	10.9	35.0	0.09	<0.02	0.09	91	0.46	0.145
HMC-1103	Stream	1.57	14.87	8.29	57.4	50	21.9	8.2	461	4.40	1.9	3.7	0.6	11.9	53.9	0.10	0.10	0.07	133	0.68	0.228
HMC-1104	Stream	1.67	9.39	15.44	55.6	154	10.5	5.2	441	3.24	1.4	3.9	0.3	23.5	34.8	0.07	0.08	0.14	75	0.67	0.158
HMC-1105	Stream	1.37	13.09	11.64	61.7	38	12.3	6.4	411	3.40	1.8	2.1	1.4	14.2	32.1	0.11	0.08	0.12	84	0.44	0.125
HMC-1106	Rock Pulp	13.58	153.28	6.86	49.9	94	12.7	11.0	414	4.17	5.2	0.4	30.2	1.5	47.9	0.26	0.12	0.47	95	0.69	0.055
HMC-1107	Stream	0.64	10.35	7.75	45.3	43	11.2	6.2	355	2.34	0.4	3.2	<0.2	13.3	19.9	0.08	<0.02	0.09	47	0.41	0.084
HMC-1108	Stream	0.72	38.54	14.09	153.9	238	87.2	13.1	977	3.18	14.6	0.5	5.6	4.2	112.0	1.03	0.36	0.14	62	3.91	0.084
HMC-1109	Stream	0.39	10.24	3.89	29.7	26	11.7	6.1	235	1.80	<0.1	1.1	0.3	6.6	21.6	0.06	<0.02	0.07	48	0.47	0.087
HMC-1110	Stream	1.64	11.13	9.40	73.0	59	22.1	10.4	737	2.81	2.4	2.1	4.4	8.5	60.2	0.31	0.04	0.18	55	0.63	0.186



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Project: HMC_2019_BS

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CERTIFICATE OF ANALYSIS

VAN20000436.1

Method Analyte Unit MDL		AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250
		La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Ti	S	Hg	Se	Te	Ga	Cs	Ge
		ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm
		0.5	0.5	0.01	0.5	0.001	20	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1
HMC-1091	Stream	34.7	29.9	0.53	105.7	0.106	<20	0.97	0.036	0.12	0.5	2.7	0.15	0.04	36	<0.1	0.04	4.7	1.66	0.1
HMC-1092	Stream	37.3	25.7	0.53	93.6	0.082	<20	0.96	0.028	0.12	0.2	3.1	0.07	<0.02	9	0.2	<0.02	4.5	1.78	<0.1
HMC-1093	Stream	14.2	36.4	0.58	84.9	0.082	<20	0.87	0.030	0.12	0.3	2.6	0.07	<0.02	6	0.2	<0.02	4.7	0.92	<0.1
HMC-1094	Stream	48.9	31.9	0.39	79.3	0.082	<20	0.70	0.019	0.11	0.3	2.1	0.09	<0.02	<5	<0.1	<0.02	4.3	1.48	0.1
HMC-1095	Rock Pulp	4.6	19.8	0.70	56.7	0.124	<20	1.98	0.024	0.04	<0.1	5.7	0.03	0.57	18	2.9	0.54	5.8	0.36	<0.1
HMC-1096	Stream	36.8	42.1	0.52	57.4	0.059	<20	0.75	0.015	0.12	0.1	1.6	0.10	<0.02	<5	<0.1	<0.02	5.4	1.18	<0.1
HMC-1097	Stream	36.4	186.9	1.06	102.3	0.082	<20	0.87	0.014	0.16	<0.1	1.4	0.15	<0.02	5	<0.1	<0.02	3.8	1.08	0.1
HMC-1098	Stream	37.0	26.0	0.42	70.7	0.093	<20	0.89	0.016	0.11	0.2	2.3	0.07	<0.02	<5	<0.1	<0.02	6.1	0.82	<0.1
HMC-1099	Stream	47.5	52.7	0.68	81.4	0.093	<20	0.76	0.019	0.14	0.3	2.3	0.07	<0.02	<5	<0.1	<0.02	5.4	0.96	<0.1
HMC-1100	Stream	54.7	95.4	0.97	110.8	0.131	<20	0.78	0.015	0.27	0.2	1.7	0.12	<0.02	<5	<0.1	<0.02	5.9	1.30	0.1
HMC-1101 DUP of HMC-1108	Pulp DUP	25.8	64.9	1.22	164.0	0.063	<20	1.49	0.025	0.14	0.2	3.5	0.09	0.04	23	0.5	0.04	4.9	2.46	<0.1
HMC-1102	Stream	41.0	45.3	0.62	79.8	0.083	<20	0.79	0.017	0.13	0.2	2.3	0.09	<0.02	9	<0.1	<0.02	4.9	1.05	<0.1
HMC-1103	Stream	57.9	95.5	0.58	129.7	0.134	<20	0.90	0.025	0.21	0.3	2.1	0.13	<0.02	6	<0.1	<0.02	5.1	2.73	0.1
HMC-1104	Stream	70.6	37.6	0.38	162.5	0.094	<20	0.71	0.025	0.11	0.3	2.3	0.07	<0.02	<5	<0.1	<0.02	5.0	1.25	0.1
HMC-1105	Stream	43.3	38.6	0.45	64.1	0.097	<20	0.78	0.019	0.11	0.2	2.5	0.07	<0.02	5	<0.1	<0.02	5.2	1.92	0.2
HMC-1106	Rock Pulp	4.5	20.7	0.68	58.9	0.120	<20	1.95	0.024	0.04	<0.1	5.4	0.03	0.53	25	2.8	0.45	5.7	0.35	<0.1
HMC-1107	Stream	37.8	27.0	0.49	88.8	0.066	<20	1.02	0.019	0.17	0.8	2.6	0.12	<0.02	7	<0.1	<0.02	4.9	1.21	<0.1
HMC-1108	Stream	27.2	65.6	1.22	172.1	0.065	<20	1.49	0.024	0.14	0.1	3.4	0.10	0.04	22	0.5	0.05	5.1	2.55	<0.1
HMC-1109	Stream	21.8	24.2	0.39	60.3	0.075	<20	0.93	0.032	0.13	2.5	3.0	0.09	<0.02	8	<0.1	<0.02	4.1	1.19	<0.1
HMC-1110	Stream	34.6	37.5	0.64	221.4	0.095	<20	1.10	0.021	0.18	0.8	3.2	0.17	<0.02	11	<0.1	0.03	4.7	1.85	<0.1



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CERTIFICATE OF ANALYSIS

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Method Analyte Unit MDL		AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250
		Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
HMC-1091	Stream	1.21	10.0	0.5	<0.05	6.6	6.10	59.9	0.04	2	0.4	11.4	6.26	22.78	3.53	0.61	2.06	0.25	1.44	0.21	0.66
HMC-1092	Stream	1.24	12.8	0.3	<0.05	4.0	6.85	61.5	<0.02	<1	0.4	15.4	6.84	24.64	4.01	0.76	2.78	0.27	1.54	0.24	0.62
HMC-1093	Stream	0.59	10.8	1.0	<0.05	1.7	4.00	25.8	<0.02	<1	0.1	11.3	2.48	10.08	1.70	0.30	1.29	0.16	0.77	0.15	0.47
HMC-1094	Stream	2.13	15.1	0.5	<0.05	6.0	6.37	79.8	<0.02	<1	0.8	24.6	6.99	25.42	3.26	0.56	2.97	0.27	1.55	0.23	0.63
HMC-1095	Rock Pulp	0.26	1.6	0.5	<0.05	4.3	5.50	9.4	0.08	20	0.2	4.2	1.14	5.94	1.35	0.39	1.52	0.18	1.14	0.21	0.54
HMC-1096	Stream	1.46	17.3	0.7	<0.05	2.4	5.88	64.7	<0.02	<1	0.7	23.9	5.98	21.42	3.47	0.44	2.53	0.22	1.44	0.20	0.50
HMC-1097	Stream	0.80	19.6	0.5	<0.05	1.2	5.79	67.4	<0.02	<1	0.7	21.2	6.24	23.17	3.29	0.63	2.62	0.24	1.46	0.24	0.48
HMC-1098	Stream	1.40	11.5	0.6	<0.05	2.4	6.60	66.4	<0.02	<1	0.6	15.1	6.86	24.74	3.97	0.53	2.90	0.25	1.49	0.22	0.70
HMC-1099	Stream	0.97	12.8	0.5	<0.05	2.0	8.52	92.5	<0.02	<1	0.3	11.6	9.40	35.55	5.47	0.63	3.96	0.38	2.08	0.28	0.76
HMC-1100	Stream	1.27	27.7	0.4	<0.05	2.1	9.36	110.3	0.02	<1	0.3	10.9	11.21	41.66	6.59	0.62	4.39	0.41	2.48	0.40	0.92
HMC-1101 DUP of HMC-1108	Pulp DUP	1.01	13.0	0.3	<0.05	2.7	5.68	49.3	0.03	2	0.6	21.3	4.92	16.94	3.00	0.60	2.06	0.22	1.36	0.22	0.57
HMC-1102	Stream	0.90	15.0	0.4	<0.05	1.9	8.08	78.7	0.03	<1	0.5	18.1	8.12	29.28	4.60	0.57	2.98	0.31	1.90	0.29	0.71
HMC-1103	Stream	1.78	22.9	0.6	<0.05	4.2	11.28	106.4	<0.02	<1	0.8	17.7	10.99	39.22	5.72	0.72	4.94	0.45	2.52	0.41	1.06
HMC-1104	Stream	4.00	11.3	1.0	<0.05	14.2	12.03	124.3	0.03	<1	1.0	15.3	12.12	41.88	6.12	0.63	4.97	0.50	2.69	0.44	1.18
HMC-1105	Stream	1.17	15.0	0.6	<0.05	4.7	8.83	74.7	0.03	<1	0.6	17.5	7.61	28.19	4.40	0.64	3.05	0.35	1.88	0.36	1.08
HMC-1106	Rock Pulp	0.25	1.6	0.5	<0.05	4.5	5.27	9.3	0.07	16	0.4	4.6	1.19	5.24	1.27	0.41	1.54	0.20	1.08	0.23	0.55
HMC-1107	Stream	0.92	25.3	0.7	<0.05	1.7	10.59	66.4	0.03	<1	0.8	15.3	7.23	26.03	4.41	0.66	4.09	0.43	2.62	0.39	1.09
HMC-1108	Stream	1.16	13.6	0.4	<0.05	2.5	5.91	50.8	0.04	1	0.5	23.8	4.63	16.96	2.45	0.66	2.26	0.23	1.26	0.19	0.50
HMC-1109	Stream	0.97	17.3	0.5	<0.05	1.0	7.83	42.2	<0.02	<1	0.5	12.3	4.70	17.70	3.33	0.40	2.62	0.34	1.71	0.29	0.74
HMC-1110	Stream	1.41	26.9	0.3	<0.05	1.5	7.62	56.3	<0.02	<1	0.4	15.8	5.73	21.69	3.14	0.65	2.54	0.31	1.72	0.26	0.80



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CERTIFICATE OF ANALYSIS

VAN20000436.1

Method Analyte Unit MDL		AQ250	AQ250	AQ250	AQ250	AQ250	TG001
		Tm	Yb	Lu	Pd	Pt	LOI
		ppm	ppm	ppm	ppb	ppb	%
		0.02	0.02	0.02	10	2	-5.11
HMC-1091	Stream	0.06	0.41	0.07	<10	2	4.6
HMC-1092	Stream	0.07	0.50	0.07	<10	<2	3.2
HMC-1093	Stream	0.05	0.37	0.06	<10	<2	2.3
HMC-1094	Stream	0.09	0.51	0.07	<10	<2	1.7
HMC-1095	Rock Pulp	0.09	0.50	0.08	24	<2	5.7
HMC-1096	Stream	0.08	0.41	0.07	<10	<2	2.3
HMC-1097	Stream	0.06	0.47	0.05	<10	3	3.6
HMC-1098	Stream	0.08	0.54	0.07	<10	<2	2.5
HMC-1099	Stream	0.10	0.66	0.07	<10	<2	2.1
HMC-1100	Stream	0.09	0.73	0.08	<10	<2	2.1
HMC-1101 DUP of HMC-1108	Pulp DUP	0.07	0.50	0.05	<10	<2	10.1
HMC-1102	Stream	0.09	0.78	0.08	<10	<2	2.3
HMC-1103	Stream	0.13	0.68	0.10	<10	<2	2.8
HMC-1104	Stream	0.14	0.91	0.12	<10	3	1.9
HMC-1105	Stream	0.09	0.80	0.10	<10	<2	2.3
HMC-1106	Rock Pulp	0.08	0.48	0.08	15	<2	5.6
HMC-1107	Stream	0.12	0.77	0.12	<10	<2	3.4
HMC-1108	Stream	0.08	0.39	0.06	<10	<2	10.1
HMC-1109	Stream	0.09	0.53	0.08	<10	<2	2.1
HMC-1110	Stream	0.09	0.54	0.08	<10	<2	3.3



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QUALITY CONTROL REPORT

VAN20000436.1

	Method Analyte Unit MDL	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250
		Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P
		ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%
		0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	1	0.01	0.001
Pulp Duplicates																					
HMC-1013	Stream Sedim	0.86	16.09	4.67	71.1	78	15.3	6.5	450	2.47	3.2	1.3	0.2	5.8	77.4	0.41	0.20	0.11	53	0.77	0.126
REP HMC-1013	QC	0.87	16.59	4.80	69.3	91	16.3	6.9	454	2.45	3.4	1.5	0.8	6.2	80.4	0.43	0.21	0.11	54	0.76	0.122
HMC-1037	Stream Sedim	0.88	9.02	10.58	58.3	37	14.5	7.7	482	2.85	2.5	2.9	2.9	16.6	45.0	0.20	0.06	0.14	69	0.42	0.097
REP HMC-1037	QC																				
HMC-1045	Stream Sedim	0.75	6.78	7.18	69.6	21	18.3	5.5	374	1.90	0.5	10.2	<0.2	5.0	35.5	0.12	0.04	0.10	39	0.39	0.106
REP HMC-1045	QC	0.76	6.54	7.14	70.5	17	17.2	5.2	362	1.86	0.5	9.5	<0.2	5.1	36.4	0.17	0.03	0.09	37	0.38	0.107
HMC-1075	Stream Sedim	0.77	9.79	3.26	40.7	10	66.2	11.8	295	3.34	0.6	1.7	1.0	8.1	49.6	0.04	<0.02	0.03	79	0.69	0.284
REP HMC-1075	QC																				
HMC-1080	Stream Sedim	0.71	14.69	9.61	55.4	35	10.9	8.5	391	3.27	1.3	5.0	<0.2	24.2	92.2	0.05	0.05	0.09	85	0.63	0.160
REP HMC-1080	QC	0.65	14.15	9.01	52.3	46	11.0	8.4	368	3.04	1.3	4.1	1.3	23.6	86.7	0.05	0.04	0.08	79	0.56	0.144
HMC-1109	Stream Sedim	0.39	10.24	3.89	29.7	26	11.7	6.1	235	1.80	<0.1	1.1	0.3	6.6	21.6	0.06	<0.02	0.07	48	0.47	0.087
REP HMC-1109	QC	0.31	9.94	3.90	30.0	30	10.7	5.9	237	1.86	<0.1	1.2	<0.2	7.0	21.4	0.07	<0.02	0.08	44	0.45	0.084
Reference Materials																					
STD BVGEO01	Standard	10.60	4325.77	194.32	1693.2	2573	161.7	25.4	693	3.68	118.5	3.8	224.5	14.5	53.6	6.56	2.53	23.85	74	1.25	0.072
STD BVGEO01	Standard	9.88	4276.85	184.44	1674.0	2469	151.8	23.9	666	3.52	116.3	3.8	213.7	15.1	56.3	6.33	2.46	25.96	73	1.24	0.069
STD DOLOMITE-3	Standard																				
STD DOLOMITE-3	Standard																				
STD DOLOMITE-3	Standard																				
STD DS11	Standard	14.20	140.14	133.70	346.8	1722	76.5	12.9	957	2.96	45.3	2.6	107.4	7.5	66.3	2.36	8.77	12.48	48	0.99	0.072
STD DS11	Standard	14.27	136.07	140.22	368.7	1619	81.7	13.6	1002	3.09	43.4	2.5	75.4	7.7	64.8	2.45	6.56	10.61	50	1.03	0.073
STD DS11	Standard	14.82	148.71	140.03	354.0	1748	81.5	13.2	985	3.09	44.6	2.5	59.6	7.9	66.5	2.65	8.49	12.03	50	1.03	0.070
STD OREAS262	Standard	0.63	111.14	54.63	151.7	470	59.8	25.7	499	3.19	35.5	1.2	65.8	9.0	39.5	0.64	3.29	1.05	21	2.78	0.037
STD OREAS262	Standard	0.62	111.01	55.48	144.1	442	62.3	27.3	539	3.29	35.8	1.2	61.1	8.4	33.7	0.66	3.13	0.94	22	2.91	0.042
STD OREAS262	Standard	0.64	113.93	60.04	158.7	507	68.9	28.2	552	3.34	38.5	1.3	63.9	9.8	35.4	0.59	2.72	0.97	22	2.94	0.039
STD OREAS262	Standard	0.61	108.71	56.56	148.4	453	60.5	26.1	505	3.20	36.6	1.2	66.3	9.1	36.1	0.65	2.59	1.03	22	2.83	0.038
STD OREAS262	Standard	0.65	115.30	60.28	156.3	461	63.7	28.4	538	3.31	37.6	1.3	67.5	9.8	36.6	0.71	3.62	1.08	22	2.86	0.041
STD DOLOMITE-3 Expected																					
STD BVGEO01 Expected		10.8	4415	187	1741	2530	163	25	733	3.7	121	3.77	219	14.4	55	6.5	2.2	25.6	73	1.3219	0.0727



Bureau Veritas Commodities Canada Ltd.

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QUALITY CONTROL REPORT

VAN20000436.1

	Method Analyte Unit MDL	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	
		La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Ti	S	Hg	Se	Te	Ga	Cs	Ge	Hf
		ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm	ppm
		0.5	0.5	0.01	0.5	0.001	20	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1	0.02
Pulp Duplicates																					
HMC-1013	Stream Sedim	15.7	19.8	0.59	56.4	0.087	<20	1.28	0.020	0.12	0.8	2.8	0.10	<0.02	5	0.3	<0.02	5.4	1.61	<0.1	0.03
REP HMC-1013	QC	16.0	21.9	0.59	58.3	0.088	<20	1.29	0.021	0.12	0.6	2.7	0.09	<0.02	<5	0.4	<0.02	5.5	1.61	<0.1	0.04
HMC-1037	Stream Sedim	32.3	29.5	0.60	83.3	0.088	<20	0.83	0.021	0.12	1.7	1.8	0.08	<0.02	<5	0.1	<0.02	3.8	1.29	<0.1	0.04
REP HMC-1037	QC																				
HMC-1045	Stream Sedim	19.1	25.8	0.56	86.4	0.098	<20	0.91	0.020	0.15	1.2	2.2	0.15	<0.02	13	0.2	<0.02	5.0	2.05	<0.1	<0.02
REP HMC-1045	QC	19.8	25.7	0.54	88.1	0.094	<20	0.88	0.018	0.15	1.3	2.3	0.15	<0.02	7	0.3	0.03	4.5	1.93	<0.1	<0.02
HMC-1075	Stream Sedim	47.0	85.5	1.04	118.1	0.078	<20	0.62	0.013	0.15	0.2	1.3	0.08	<0.02	5	<0.1	<0.02	3.8	0.62	<0.1	<0.02
REP HMC-1075	QC																				
HMC-1080	Stream Sedim	47.1	31.6	0.63	127.1	0.132	<20	0.97	0.032	0.18	0.3	2.8	0.08	<0.02	<5	<0.1	0.03	4.8	1.43	0.1	0.11
REP HMC-1080	QC	41.8	28.9	0.60	125.9	0.102	<20	0.88	0.027	0.17	0.3	2.5	0.08	<0.02	<5	<0.1	<0.02	4.4	1.33	<0.1	0.10
HMC-1109	Stream Sedim	21.8	24.2	0.39	60.3	0.075	<20	0.93	0.032	0.13	2.5	3.0	0.09	<0.02	8	<0.1	<0.02	4.1	1.19	<0.1	<0.02
REP HMC-1109	QC	20.6	22.5	0.39	62.3	0.075	<20	0.90	0.029	0.13	1.5	2.7	0.09	<0.02	<5	<0.1	<0.02	3.6	1.17	<0.1	0.03
Reference Materials																					
STD BVGEO01	Standard	26.9	158.8	1.27	365.4	0.214	<20	2.19	0.184	0.88	4.1	6.4	0.62	0.63	77	4.6	0.97	7.2	7.64	0.2	0.24
STD BVGEO01	Standard	27.5	157.5	1.21	338.9	0.229	<20	2.12	0.174	0.85	3.2	5.5	0.63	0.62	95	4.7	1.00	7.1	7.42	0.1	0.23
STD DOLOMITE-3	Standard																				
STD DOLOMITE-3	Standard																				
STD DOLOMITE-3	Standard																				
STD DS11	Standard	18.6	56.1	0.80	408.4	0.092	<20	1.08	0.066	0.39	2.8	2.9	4.77	0.28	268	2.1	4.66	4.8	2.94	<0.1	0.03
STD DS11	Standard	19.0	57.1	0.83	452.5	0.082	<20	1.13	0.073	0.39	2.6	3.4	5.13	0.27	258	2.1	4.87	5.2	2.94	0.1	0.05
STD DS11	Standard	19.5	58.7	0.82	429.2	0.096	<20	1.11	0.070	0.40	2.8	3.3	4.84	0.27	267	2.2	4.53	4.9	3.01	<0.1	0.06
STD OREAS262	Standard	15.8	39.8	1.14	234.3	0.003	<20	1.17	0.065	0.30	0.1	3.2	0.44	0.24	159	0.3	0.21	3.7	2.56	<0.1	0.11
STD OREAS262	Standard	15.0	39.6	1.18	253.0	0.003	<20	1.17	0.070	0.30	0.1	3.9	0.43	0.26	152	0.2	0.19	3.3	2.54	<0.1	0.21
STD OREAS262	Standard	18.3	43.6	1.22	278.7	0.003	<20	1.27	0.072	0.31	0.1	3.6	0.48	0.26	200	0.3	0.22	4.2	2.54	<0.1	0.18
STD OREAS262	Standard	16.9	40.6	1.14	251.0	0.003	<20	1.23	0.067	0.31	<0.1	3.4	0.46	0.26	180	0.5	0.25	4.0	2.42	<0.1	0.14
STD OREAS262	Standard	18.7	45.1	1.18	264.0	0.003	<20	1.25	0.070	0.31	0.1	3.5	0.47	0.26	169	0.4	0.21	3.7	2.82	<0.1	0.14
STD DOLOMITE-3 Expected																					
STD BVGEO01 Expected		25.9	171	1.2963	340	0.233		2.347	0.1924	0.89	3.5	5.97	0.62	0.6655	100	4.84	1.02	7.37	7.36	0.15	0.32



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Project: HMC_2019_BS

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QUALITY CONTROL REPORT

VAN20000436.1

Method Analyte Unit MDL		AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250
		Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Pulp Duplicates																					
HMC-1013	Stream Sedim	0.67	9.7	0.2	<0.05	1.2	4.64	25.5	<0.02	<1	0.4	20.6	2.92	9.75	1.58	0.36	1.09	0.15	0.83	0.16	0.50
REP HMC-1013	QC	0.64	10.4	0.2	<0.05	1.2	4.86	26.3	<0.02	<1	0.5	22.6	2.87	9.94	1.57	0.41	1.08	0.16	0.93	0.18	0.51
HMC-1037	Stream Sedim	1.36	11.4	0.2	<0.05	2.0	5.64	48.7	<0.02	<1	1.8	16.3	5.07	14.76	2.09	0.39	1.54	0.21	1.00	0.21	0.56
REP HMC-1037	QC																				
HMC-1045	Stream Sedim	1.93	22.4	0.8	<0.05	0.9	6.19	33.0	<0.02	<1	0.3	38.6	3.82	12.30	1.88	0.38	1.71	0.20	1.19	0.22	0.60
REP HMC-1045	QC	1.77	20.9	0.6	<0.05	0.8	6.16	34.5	0.03	<1	0.4	37.1	3.89	13.41	2.09	0.37	1.60	0.22	1.16	0.18	0.51
HMC-1075	Stream Sedim	0.90	13.2	0.3	<0.05	1.4	8.90	87.7	<0.02	<1	0.2	7.5	9.29	34.44	5.23	0.89	3.74	0.43	2.30	0.30	0.82
REP HMC-1075	QC																				
HMC-1080	Stream Sedim	1.23	15.8	0.4	<0.05	4.8	7.93	77.1	<0.02	<1	0.2	13.5	9.35	28.97	3.93	0.67	2.41	0.31	1.62	0.29	0.82
REP HMC-1080	QC	1.00	15.3	0.3	<0.05	4.5	6.82	72.5	<0.02	<1	0.3	12.8	7.23	26.37	3.90	0.74	3.32	0.28	1.45	0.24	0.76
HMC-1109	Stream Sedim	0.97	17.3	0.5	<0.05	1.0	7.83	42.2	<0.02	<1	0.5	12.3	4.70	17.70	3.33	0.40	2.62	0.34	1.71	0.29	0.74
REP HMC-1109	QC	0.89	17.3	0.5	<0.05	1.0	7.30	41.4	0.02	<1	0.4	10.8	4.17	15.33	3.00	0.35	2.82	0.28	1.62	0.28	0.70
Reference Materials																					
STD BVGEO01	Standard	0.20	96.5	5.2	<0.05	9.3	13.75	56.0	0.47	3	0.5	19.3	6.14	24.15	3.96	0.52	3.85	0.44	2.91	0.44	1.36
STD BVGEO01	Standard	0.21	90.4	5.4	<0.05	8.4	13.95	54.9	0.48	3	0.5	20.4	6.72	22.06	4.14	0.44	3.31	0.52	2.84	0.53	1.48
STD DOLOMITE-3	Standard																				
STD DOLOMITE-3	Standard																				
STD DOLOMITE-3	Standard																				
STD DS11	Standard	1.07	33.6	1.7	<0.05	2.2	7.87	37.4	0.24	42	0.8	22.3	4.18	14.30	2.66	0.44	2.03	0.31	1.65	0.29	0.84
STD DS11	Standard	1.15	34.3	1.8	<0.05	2.8	7.56	38.2	0.26	45	0.7	26.3	3.87	14.69	2.65	0.58	2.33	0.25	1.56	0.29	0.81
STD DS11	Standard	1.28	34.0	1.8	<0.05	3.0	8.13	38.2	0.26	51	0.7	22.2	4.28	14.78	2.57	0.55	2.03	0.27	1.57	0.31	0.85
STD OREAS262	Standard	<0.02	18.3	0.3	<0.05	6.4	11.31	31.9	0.03	3	0.6	18.5	3.86	13.94	3.03	0.65	2.86	0.42	2.36	0.38	1.11
STD OREAS262	Standard	<0.02	17.1	0.4	<0.05	7.8	9.44	30.8	0.04	<1	1.2	16.7	3.25	13.73	3.04	0.64	3.02	0.38	2.14	0.34	0.97
STD OREAS262	Standard	<0.02	19.5	0.4	<0.05	6.9	10.99	36.9	0.05	3	1.1	19.4	3.92	16.00	3.43	0.73	3.20	0.40	2.49	0.38	1.04
STD OREAS262	Standard	<0.02	17.5	0.4	<0.05	5.0	10.37	32.9	0.02	<1	0.9	17.2	3.98	15.17	2.96	0.62	2.69	0.42	2.10	0.39	1.00
STD OREAS262	Standard	<0.02	19.4	0.4	<0.05	6.8	10.95	36.1	0.03	1	1.1	16.8	4.51	16.73	3.29	0.68	3.08	0.42	2.35	0.40	1.17
STD DOLOMITE-3 Expected																					
STD BVGEO01 Expected		0.17	95	5.64		9.1	14.5	53	0.47	4	0.69	21.4	6.19	22.4	4.08	0.48	3.53	0.48	2.85	0.54	1.5



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Project: HMC_2019_BS

Report Date: March 24, 2020

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QUALITY CONTROL REPORT

VAN20000436.1

	Method Analyte Unit MDL	AQ250	AQ250	AQ250	AQ250	AQ250	TG001
		Tm	Yb	Lu	Pd	Pt	LOI
		ppm	ppm	ppm	ppb	ppb	%
		0.02	0.02	0.02	10	2	-5.11
Pulp Duplicates							
HMC-1013	Stream Sedim	0.07	0.42	0.07	<10	<2	2.7
REP HMC-1013	QC	0.06	0.44	0.06	<10	<2	
HMC-1037	Stream Sedim	0.09	0.55	0.07	<10	<2	2.1
REP HMC-1037	QC	2.0					
HMC-1045	Stream Sedim	0.08	0.40	0.07	<10	<2	3.3
REP HMC-1045	QC	0.07	0.48	0.09	<10	<2	
HMC-1075	Stream Sedim	0.11	0.66	0.08	<10	3	2.5
REP HMC-1075	QC	2.5					
HMC-1080	Stream Sedim	0.12	0.63	0.10	<10	<2	2.4
REP HMC-1080	QC	0.08	0.54	0.09	<10	<2	
HMC-1109	Stream Sedim	0.09	0.53	0.08	<10	<2	2.1
REP HMC-1109	QC	0.08	0.57	0.05	<10	<2	2.1
Reference Materials							
STD BVGEO01	Standard	0.20	1.16	0.15	125	206	
STD BVGEO01	Standard	0.23	1.37	0.16	138	171	
STD DOLOMITE-3	Standard	48.9					
STD DOLOMITE-3	Standard	49.0					
STD DOLOMITE-3	Standard	49.0					
STD DS11	Standard	0.10	0.79	0.09	105	165	
STD DS11	Standard	0.11	0.64	0.09	140	192	
STD DS11	Standard	0.12	0.80	0.10	94	175	
STD OREAS262	Standard	0.13	0.90	0.14	<10	<2	
STD OREAS262	Standard	0.11	0.85	0.11	<10	<2	
STD OREAS262	Standard	0.14	1.04	0.12	<10	<2	
STD OREAS262	Standard	0.14	0.94	0.12	<10	<2	
STD OREAS262	Standard	0.15	1.00	0.14	<10	4	
STD DOLOMITE-3 Expected		48.69					
STD BVGEO01 Expected		0.21	1.32	0.18	134	182	



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QUALITY CONTROL REPORT

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		AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250
		Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P
		ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%
		0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	1	0.01	0.001
STD DS11 Expected		13.9	149	138	345	1710	77.7	14.2	1055	3.1	42.8	2.59	79	7.65	67.3	2.37	7.2	12.2	50	1.063	0.0701
STD OREAS262 Expected		0.68	118	56	154	450	62	26.9	530	3.284	35.8	1.22	65	9.33	36	0.61	3.39	1.03	22.5	2.98	0.04
BLK	Blank	<0.01	0.02	<0.01	<0.1	<2	<0.1	<0.1	<1	<0.01	0.2	<0.1	<0.2	<0.1	<0.5	<0.01	<0.02	<0.02	<1	<0.01	<0.001
BLK	Blank	<0.01	0.07	0.03	<0.1	<2	<0.1	<0.1	<1	<0.01	<0.1	<0.1	<0.2	<0.1	<0.5	<0.01	<0.02	<0.02	<1	<0.01	<0.001
BLK	Blank	<0.01	0.01	0.03	<0.1	<2	<0.1	<0.1	<1	<0.01	<0.1	<0.1	<0.2	<0.1	<0.5	<0.01	<0.02	<0.02	<1	<0.01	<0.001
BLK	Blank	<0.01	<0.01	0.02	<0.1	<2	<0.1	<0.1	<1	<0.01	<0.1	<0.1	<0.2	<0.1	<0.5	<0.01	<0.02	<0.02	<1	<0.01	<0.001
BLK	Blank	<0.01	0.02	0.03	<0.1	<2	<0.1	<0.1	<1	<0.01	<0.1	<0.1	<0.2	<0.1	<0.5	<0.01	<0.02	<0.02	<1	<0.01	<0.001



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QUALITY CONTROL REPORT

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		AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	
		La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Ti	S	Hg	Se	Te	Ga	Cs	Ge	Hf
		ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm	ppm
		0.5	0.5	0.01	0.5	0.001	20	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1	0.02
STD DS11 Expected		18.6	61.5	0.85	417	0.0976		1.129	0.0694	0.4	2.9	3.1	4.9	0.2835	260	2.2	4.56	4.7	2.88	0.08	0.06
STD OREAS262 Expected		15.9	41.7	1.17	248	0.003		1.204	0.071	0.312	0.13	3.24	0.47	0.253	170	0.4	0.23	3.73	2.8		0.17
BLK	Blank	<0.5	<0.5	<0.01	<0.5	<0.001	<20	<0.01	<0.001	<0.01	<0.1	<0.1	<0.02	<0.02	<5	<0.1	<0.02	<0.1	<0.02	<0.1	<0.02
BLK	Blank	<0.5	<0.5	<0.01	<0.5	<0.001	<20	<0.01	<0.001	<0.01	<0.1	<0.1	<0.02	<0.02	<5	<0.1	<0.02	<0.1	<0.02	<0.1	<0.02
BLK	Blank	<0.5	<0.5	<0.01	<0.5	<0.001	<20	<0.01	<0.001	<0.01	<0.1	<0.1	<0.02	<0.02	<5	<0.1	<0.02	<0.1	<0.02	<0.1	<0.02
BLK	Blank	<0.5	<0.5	<0.01	<0.5	<0.001	<20	<0.01	<0.001	<0.01	<0.1	<0.1	<0.02	<0.02	5	<0.1	<0.02	<0.1	<0.02	<0.1	<0.02
BLK	Blank	<0.5	<0.5	<0.01	<0.5	<0.001	<20	<0.01	<0.001	<0.01	<0.1	<0.1	<0.02	<0.02	<5	<0.1	<0.02	<0.1	<0.02	<0.1	<0.02



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Report Date: March 24, 2020

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Part: 3 of 4

QUALITY CONTROL REPORT

VAN20000436.1

		AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250	AQ250
		Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
STD DS11 Expected		1.2	33.6	1.8		2.4	7.82	37	0.24	50	0.67	23.3	4	14.9	2.68	0.54	2.22	0.29	1.57	0.29	0.81
STD OREAS262 Expected			18.6	0.5		8.3	11.2	32	0.033		1.14	17.8	4	15	3.3	0.72	2.93	0.43	2.29	0.41	1.17
BLK	Blank	<0.02	<0.1	<0.1	<0.05	<0.1	<0.01	<0.1	<0.02	<1	<0.1	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
BLK	Blank	<0.02	<0.1	<0.1	<0.05	<0.1	<0.01	<0.1	<0.02	<1	<0.1	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
BLK	Blank	<0.02	<0.1	<0.1	<0.05	<0.1	<0.01	<0.1	<0.02	<1	<0.1	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
BLK	Blank	<0.02	<0.1	<0.1	<0.05	<0.1	<0.01	<0.1	<0.02	<1	0.1	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
BLK	Blank	<0.02	<0.1	<0.1	<0.05	<0.1	<0.01	<0.1	<0.02	<1	<0.1	<0.1	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02



Bureau Veritas Commodities Canada Ltd.

9050 Shaughnessy St Vancouver British Columbia V6P 6E5 Canada

PHONE (604) 253-3158

Client: **Noble Exploration Services Ltd.**
3890 Trailhead Drive
Jordan River British Columbia V9Z 1L1 Canada

Project: HMC_2019_BS
Report Date: March 24, 2020

Page: 2 of 2

Part: 4 of 4

QUALITY CONTROL REPORT

VAN20000436.1

		AQ250	AQ250	AQ250	AQ250	AQ250	TG001
		Tm	Yb	Lu	Pd	Pt	LOI
		ppm	ppm	ppm	ppb	ppb	%
		0.02	0.02	0.02	10	2	-5.11
STD DS11 Expected		0.11	0.75	0.11	100	172	
STD OREAS262 Expected		0.14	0.86	0.13			
BLK	Blank	<0.02	<0.02	<0.02	<10	<2	
BLK	Blank	<0.02	<0.02	<0.02	<10	<2	
BLK	Blank	<0.02	<0.02	<0.02	<10	<2	
BLK	Blank	<0.02	<0.02	<0.02	<10	<2	
BLK	Blank	<0.02	<0.02	<0.02	<10	<2	



Your P.O. #: 19208
 Your Project #: VAN20000436A
 Your C.O.C. #: N/A

Attention: Susie Woo

Bureau Veritas Commodities
 9050 Shaughnessy Street
 Vancouver, BC
 Canada V6P 6E5

Report Date: 2020/04/16
 Report #: R6145744
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C079067

Received: 2020/03/26, 10:40

Sample Matrix: Solid
 # Samples Received: 110

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Trace Metals by Neutron Activation	110	N/A	2020/04/16	BQL SOP-00001	Neutron Activation

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

Encryption Key



Bureau Veritas Laboratories
 16 Apr 2020 11:43:55

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
 Mayank Nigam, Project Manager
 Email: Mayank.Nigam@bvlabs.com
 Phone# (905) 826-3080

=====

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BV Labs Job #: C079067
Report Date: 2020/04/16

Bureau Veritas Commodities
Client Project #: VAN20000436A
Your P.O. #: 19208

RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF010	MIF011	MIF012	MIF013	MIF014	MIF015		
Sampling Date									
COC Number		N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1001 DUP OF HMC-1017	HMC-1002	HMC-1003	HMC-1004	HMC-1005	HMC-1006	RDL	QC Batch
Bromine	ppm	0.7	2.3	3.8	1.3	0.9	2.1	0.5	6657977
Antimony (Sb)	ppm	0.1	<0.1	<0.1	0.2	0.1	<0.1	0.1	6657977
Arsenic (As)	ppm	0.9	0.7	1.1	3.5	1.2	<0.5	0.5	6657977
Barium (Ba)	ppm	990	1300	940	1100	780	850	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	57	140	91	81	110	130	5	6657977
Cesium (Cs)	ppm	2.7	2.8	1.5	4.1	3.0	2.6	0.5	6657977
Chromium (Cr)	ppm	34	54	180	150	80	130	20	6657977
Cobalt (Co)	ppm	<5	10	18	17	8	9	5	6657977
Europium (Eu)	ppm	<1	2	2	1	2	3	1	6657977
Gold (Au)	ppm	<0.002	<0.002	<0.002	<0.002	0.010	<0.002	0.002	6657977
Hafnium (Hf)	ppm	5	6	10	7	9	11	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	27000	24000	49000	38000	59000	62000	2000	6657977
Lanthanum (La)	ppm	28	71	44	42	60	74	2	6657977
Lutetium (Lu)	ppm	<0.2	0.3	0.4	0.4	0.5	0.5	0.2	6657977
Molybdenum (Mo)	ppm	<1	2	2	2	<1	<1	1	6657977
Nickel (Ni)	ppm	<10	<10	46	32	<10	21	10	6657977
Rubidium (Rb)	ppm	110	120	56	100	97	77	5	6657977
Samarium (Sm)	ppm	4.2	7.9	7.4	6.7	7.8	10.0	0.1	6657977
Scandium (Sc)	ppm	5.8	6.8	14.0	11.0	8.3	8.9	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	27200	26100	23500	20400	25800	23700	200	6657977
Tantalum (Ta)	ppm	1.6	2.4	2.2	2.0	2.6	2.9	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	<0.5	0.6	0.9	0.7	0.7	1.1	0.5	6657977
Thorium (Th)	ppm	9.3	23.8	9.4	12.0	22.3	23.6	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	2500	3100	6900	4800	3800	4300	500	6657977
Tungsten (W)	ppm	<1	1	<1	2	6	<1	1	6657977
Uranium (U)	ppm	3.7	7.1	5.0	6.8	7.8	10.0	0.2	6657977
Ytterbium (Yb)	ppm	<2	<2	2	2	3	2	2	6657977
Zinc (Zn)	ppm	<100	<100	<100	<100	<100	110	100	6657977
Zirconium (Zr)	ppm	<200	<200	400	<200	<200	<200	200	6657977
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									



BV Labs Job #: C079067
Report Date: 2020/04/16

Bureau Veritas Commodities
Client Project #: VAN20000436A
Your P.O. #: 19208

RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF016	MIF017	MIF018	MIF019	MIF020	MIF021	MIF022		
Sampling Date										
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1007	HMC-1008	HMC-1009	HMC-1010	HMC-1011	HMC-1012	HMC-1013	RDL	QC Batch
Bromine	ppm	5.9	<0.5	1.2	2.4	1.7	2.2	1.1	0.5	6657977
Antimony (Sb)	ppm	0.8	<0.1	<0.1	<0.1	0.1	0.1	0.5	0.1	6657977
Arsenic (As)	ppm	7.9	<0.5	1.4	0.5	2.0	2.0	4.4	0.5	6657977
Barium (Ba)	ppm	460	1200	1100	1200	970	930	1200	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	35	85	230	290	240	140	97	5	6657977
Cesium (Cs)	ppm	1.0	2.1	2.4	2.7	3.5	2.0	2.5	0.5	6657977
Chromium (Cr)	ppm	74	54	120	140	250	410	72	20	6657977
Cobalt (Co)	ppm	15	7	12	12	14	23	9	5	6657977
Europium (Eu)	ppm	<1	<1	4	<1	2	2	<1	1	6657977
Gold (Au)	ppm	0.039	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	6657977
Hafnium (Hf)	ppm	4	7	11	11	12	12	6	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	58000	33000	49000	38000	52000	77000	45000	2000	6657977
Lanthanum (La)	ppm	16	49	140	160	130	78	53	2	6657977
Lutetium (Lu)	ppm	0.3	0.2	0.7	0.5	0.5	0.4	0.5	0.2	6657977
Molybdenum (Mo)	ppm	16	<1	2	<1	2	<1	<1	1	6657977
Nickel (Ni)	ppm	22	12	<10	22	32	49	15	10	6657977
Rubidium (Rb)	ppm	25	98	64	110	100	66	80	5	6657977
Samarium (Sm)	ppm	3.9	5.6	15.9	21.1	14.9	11.0	7.7	0.1	6657977
Scandium (Sc)	ppm	22.3	6.4	16.0	13.0	17.0	20.7	14.0	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	17000	29000	24000	22200	21800	21500	23500	200	6657977
Tantalum (Ta)	ppm	0.8	2.2	5.2	2.1	3.1	3.0	2.0	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	0.6	0.6	1.6	1.5	1.1	1.0	0.8	0.5	6657977
Thorium (Th)	ppm	2.7	13.0	33.8	67.6	41.9	20.0	14.0	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	6000	3000	7300	3700	4900	5500	4300	500	6657977
Tungsten (W)	ppm	1	2	4	<1	2	2	2	1	6657977
Uranium (U)	ppm	1.4	3.7	8.3	11.0	12.0	6.4	4.7	0.2	6657977
Ytterbium (Yb)	ppm	<2	<2	4	<2	2	3	2	2	6657977
Zinc (Zn)	ppm	<100	<100	<100	140	<100	140	140	100	6657977
Zirconium (Zr)	ppm	<200	<200	<200	<200	430	<200	<200	200	6657977

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch



BV Labs Job #: C079067
Report Date: 2020/04/16

Bureau Veritas Commodities
Client Project #: VAN20000436A
Your P.O. #: 19208

RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF023	MIF024	MIF025	MIF026	MIF027	MIF028	MIF029		
Sampling Date										
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1014	HMC-1015	HMC-1016	HMC-1017	HMC-1018	HMC-1019	HMC-1020	RDL	QC Batch
Bromine	ppm	0.9	1.6	1.6	0.7	1.8	1.4	4.1	0.5	6657977
Antimony (Sb)	ppm	0.1	0.1	<0.1	0.2	0.8	<0.1	<0.1	0.1	6657977
Arsenic (As)	ppm	1.5	1.1	0.8	1.1	7.4	<0.5	0.8	0.5	6657977
Barium (Ba)	ppm	970	1200	1000	1000	920	1200	1400	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	60	70	66	54	45	110	160	5	6657977
Cesium (Cs)	ppm	3.1	1.7	2.0	2.8	2.7	3.5	2.6	0.5	6657977
Chromium (Cr)	ppm	25	100	52	32	140	93	82	20	6657977
Cobalt (Co)	ppm	8	10	11	<5	9	7	<5	5	6657977
Europium (Eu)	ppm	2	<1	2	<1	<1	<1	<1	1	6657977
Gold (Au)	ppm	0.214	<0.002	0.017	<0.002	0.005	<0.002	<0.002	0.002	6657977
Hafnium (Hf)	ppm	8	7	10	5	9	7	7	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	41000	39000	44000	28000	51000	35000	26000	2000	6657977
Lanthanum (La)	ppm	33	36	36	27	25	61	90	2	6657977
Lutetium (Lu)	ppm	0.3	0.3	0.4	<0.2	0.4	0.3	0.3	0.2	6657977
Molybdenum (Mo)	ppm	<1	2	1	<1	1	1	<1	1	6657977
Nickel (Ni)	ppm	<10	14	<10	<10	26	34	27	10	6657977
Rubidium (Rb)	ppm	90	86	89	110	81	120	160	5	6657977
Samarium (Sm)	ppm	5.2	5.7	6.0	4.1	5.2	8.0	10.0	0.1	6657977
Scandium (Sc)	ppm	8.4	10.0	11.0	5.6	12.0	8.7	5.8	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	25500	25500	25500	27100	22000	28800	25500	200	6657977
Tantalum (Ta)	ppm	1.9	1.9	1.6	1.3	1.5	3.2	4.2	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	0.6	0.7	0.7	<0.5	0.7	0.8	0.9	0.5	6657977
Thorium (Th)	ppm	10.0	10.0	9.5	10.0	6.8	18.0	32.0	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	3400	4400	5500	2700	4000	4200	2600	500	6657977
Tungsten (W)	ppm	3	2	<1	1	2	4	3	1	6657977
Uranium (U)	ppm	4.5	3.9	3.8	4.0	2.9	6.7	11.0	0.2	6657977
Ytterbium (Yb)	ppm	<2	<2	<2	<2	3	2	<2	2	6657977
Zinc (Zn)	ppm	<100	130	120	<100	130	<100	<100	100	6657977
Zirconium (Zr)	ppm	<200	<200	<200	<200	440	<200	<200	200	6657977

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch



BV Labs Job #: C079067
Report Date: 2020/04/16

Bureau Veritas Commodities
Client Project #: VAN20000436A
Your P.O. #: 19208

RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF030	MIF031	MIF032	MIF033	MIF034	MIF035		
Sampling Date									
COC Number		N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1021 DUP OF HMC-1037	HMC-1022	HMC-1023	HMC-1024	HMC-1025	HMC-1026	RDL	QC Batch
Bromine	ppm	2.7	1.6	3.4	1.2	2.8	3.2	0.5	6657977
Antimony (Sb)	ppm	0.3	0.3	0.3	<0.1	0.3	0.6	0.1	6657977
Arsenic (As)	ppm	3.2	6.1	1.4	0.9	1.6	3.4	0.5	6657977
Barium (Ba)	ppm	1400	1300	1400	1200	1100	1200	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	110	180	190	200	360	160	5	6657977
Cesium (Cs)	ppm	2.0	2.9	4.4	2.0	2.1	4.9	0.5	6657977
Chromium (Cr)	ppm	82	62	41	140	430	150	20	6657977
Cobalt (Co)	ppm	11	19	8	12	21	17	5	6657977
Europium (Eu)	ppm	<1	<1	<1	<1	3	3	1	6657977
Gold (Au)	ppm	<0.002	0.004	<0.002	<0.002	<0.002	<0.002	0.002	6657977
Hafnium (Hf)	ppm	11	7	7	11	39	13	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	50000	49000	33000	53000	160000	56000	2000	6657977
Lanthanum (La)	ppm	70	95	110	99	180	83	2	6657977
Lutetium (Lu)	ppm	0.4	0.3	0.2	0.3	0.7	0.4	0.2	6657977
Molybdenum (Mo)	ppm	<1	<1	4	2	1	3	1	6657977
Nickel (Ni)	ppm	<10	<10	<10	15	48	29	10	6657977
Rubidium (Rb)	ppm	85	110	160	110	110	130	5	6657977
Samarium (Sm)	ppm	6.7	10.0	10.9	11.3	16.7	8.6	0.1	6657977
Scandium (Sc)	ppm	12.0	14.0	9.0	11.0	14.0	16.0	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	26200	26800	26600	28300	27200	29000	200	6657977
Tantalum (Ta)	ppm	3.7	0.9	3.4	4.2	8.7	3.8	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	<0.5	0.7	0.9	0.9	1.3	0.6	0.5	6657977
Thorium (Th)	ppm	20.7	29.6	31.8	22.3	39.8	20.0	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	4200	4200	3500	4700	6700	4800	500	6657977
Tungsten (W)	ppm	6	4	2	2	3	5	1	6657977
Uranium (U)	ppm	5.9	4.5	9.2	6.9	10.0	8.7	0.2	6657977
Ytterbium (Yb)	ppm	<2	<2	<2	<2	3	2	2	6657977
Zinc (Zn)	ppm	180	170	160	220	<100	100	100	6657977
Zirconium (Zr)	ppm	<200	<200	<200	710	1200	590	200	6657977
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									



BV Labs Job #: C079067
Report Date: 2020/04/16

Bureau Veritas Commodities
Client Project #: VAN20000436A
Your P.O. #: 19208

RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF036	MIF037	MIF038	MIF039	MIF040	MIF041	MIF042		
Sampling Date										
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1027	HMC-1028	HMC-1029	HMC-1030	HMC-1031	HMC-1032	HMC-1033	RDL	QC Batch
Bromine	ppm	2.5	2.0	0.9	2.8	3.8	5.1	5.9	0.5	6657977
Antimony (Sb)	ppm	0.2	0.3	<0.1	0.2	0.2	0.2	0.8	0.1	6657977
Arsenic (As)	ppm	1.2	1.8	0.6	1.6	1.1	1.5	8.1	0.5	6657977
Barium (Ba)	ppm	1400	1200	1500	1400	1400	1400	490	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	320	140	150	130	93	350	32	5	6657977
Cesium (Cs)	ppm	3.5	2.8	1.4	3.1	3.7	2.5	0.9	0.5	6657977
Chromium (Cr)	ppm	64	160	280	160	240	120	58	20	6657977
Cobalt (Co)	ppm	8	15	20	12	13	14	15	5	6657977
Europium (Eu)	ppm	3	2	2	2	1	3	<1	1	6657977
Gold (Au)	ppm	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.035	0.002	6657977
Hafnium (Hf)	ppm	20	15	7	9	7	36	4	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	52000	62000	64000	51000	37000	87000	61000	2000	6657977
Lanthanum (La)	ppm	190	75	86	76	53	222	15	2	6657977
Lutetium (Lu)	ppm	0.5	0.4	0.2	0.3	0.3	0.7	0.4	0.2	6657977
Molybdenum (Mo)	ppm	2	2	<1	1	<1	8	16	1	6657977
Nickel (Ni)	ppm	<10	28	40	30	70	24	18	10	6657977
Rubidium (Rb)	ppm	140	84	78	120	99	150	17	5	6657977
Samarium (Sm)	ppm	13.5	10.0	10.2	9.0	6.7	16.2	3.7	0.1	6657977
Scandium (Sc)	ppm	7.8	16.0	16.0	11.0	11.0	9.5	21.5	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	33100	21900	21500	27700	24300	22500	17000	200	6657977
Tantalum (Ta)	ppm	11.0	2.8	1.4	2.9	2.0	13.0	<0.5	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	1.0	1.0	0.8	0.5	0.7	1.2	0.5	0.5	6657977
Thorium (Th)	ppm	47.2	18.0	20.0	16.0	11.0	86.6	2.3	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	4700	5400	5700	4600	3700	6600	5700	500	6657977
Tungsten (W)	ppm	8	2	3	2	<1	26	<1	1	6657977
Uranium (U)	ppm	17.0	5.5	3.0	6.9	7.9	22.9	1.4	0.2	6657977
Ytterbium (Yb)	ppm	2	2	<2	<2	<2	3	<2	2	6657977
Zinc (Zn)	ppm	160	140	170	110	<100	170	<100	100	6657977
Zirconium (Zr)	ppm	840	600	<200	<200	<200	960	<200	200	6657977

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch



BV Labs Job #: C079067
Report Date: 2020/04/16

Bureau Veritas Commodities
Client Project #: VAN20000436A
Your P.O. #: 19208

RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF043	MIF044	MIF045	MIF046	MIF047	MIF048	MIF049		
Sampling Date										
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1034	HMC-1035	HMC-1036	HMC-1037	HMC-1038	HMC-1039	HMC-1040	RDL	QC Batch
Bromine	ppm	5.9	3.2	3.1	2.2	1.0	2.6	1.1	0.5	6657977
Antimony (Sb)	ppm	0.2	0.2	<0.1	0.3	0.2	0.1	<0.1	0.1	6657977
Arsenic (As)	ppm	1.5	1.1	0.6	2.9	1.4	0.5	<0.5	0.5	6657977
Barium (Ba)	ppm	2000	1500	1300	1400	1100	1200	1300	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	270	280	220	100	55	87	300	5	6657977
Cesium (Cs)	ppm	4.2	1.6	2.1	1.6	2.5	2.3	2.0	0.5	6657977
Chromium (Cr)	ppm	180	93	68	74	130	200	41	20	6657977
Cobalt (Co)	ppm	21	15	12	10	15	16	9	5	6657977
Europium (Eu)	ppm	2	3	2	2	1	<1	3	1	6657977
Gold (Au)	ppm	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	6657977
Hafnium (Hf)	ppm	14	16	12	10	6	6	10	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	61000	77000	51000	47000	47000	42000	37000	2000	6657977
Lanthanum (La)	ppm	160	170	130	67	34	48	160	2	6657977
Lutetium (Lu)	ppm	0.5	0.5	0.4	0.4	0.3	0.2	0.4	0.2	6657977
Molybdenum (Mo)	ppm	5	<1	2	<1	2	2	<1	1	6657977
Nickel (Ni)	ppm	33	<10	<10	21	24	47	<10	10	6657977
Rubidium (Rb)	ppm	120	100	130	81	50	83	120	5	6657977
Samarium (Sm)	ppm	13.9	14.1	11.1	6.4	5.0	7.2	19.7	0.1	6657977
Scandium (Sc)	ppm	15.0	10.0	8.1	12.0	21.5	15.0	12.0	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	24200	29300	30300	25300	20900	24700	23600	200	6657977
Tantalum (Ta)	ppm	8.6	7.8	7.7	3.7	1.5	2.2	1.2	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	1.1	1.0	0.9	0.6	0.6	0.6	1.4	0.5	6657977
Thorium (Th)	ppm	34.2	30.5	33.3	21.3	7.3	15.0	60.3	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	6600	6400	5200	3900	4300	3800	4100	500	6657977
Tungsten (W)	ppm	8	2	8	4	11	7	2	1	6657977
Uranium (U)	ppm	10.0	8.5	10.0	5.5	3.5	9.2	5.0	0.2	6657977
Ytterbium (Yb)	ppm	<2	2	2	<2	<2	2	<2	2	6657977
Zinc (Zn)	ppm	220	130	130	140	140	<100	150	100	6657977
Zirconium (Zr)	ppm	680	570	510	370	<200	<200	<200	200	6657977

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch



BV Labs Job #: C079067
Report Date: 2020/04/16

Bureau Veritas Commodities
Client Project #: VAN20000436A
Your P.O. #: 19208

RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF050	MIF051	MIF052	MIF053	MIF054	MIF055		
Sampling Date									
COC Number		N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1041 DUP OF HMC-1055	HMC-1042	HMC-1043	HMC-1044	HMC-1045	HMC-1046	RDL	QC Batch
Bromine	ppm	3.0	2.1	1.3	6.1	3.2	2.2	0.5	6657977
Antimony (Sb)	ppm	0.1	<0.1	<0.1	0.8	0.2	<0.1	0.1	6657977
Arsenic (As)	ppm	1.2	0.6	1.0	7.8	1.3	1.0	0.5	6657977
Barium (Ba)	ppm	1400	960	1100	480	1100	1800	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	573	120	130	32	130	270	5	6657977
Cesium (Cs)	ppm	0.9	2.0	2.3	0.6	3.0	2.1	0.5	6657977
Chromium (Cr)	ppm	39	450	220	58	100	53	20	6657977
Cobalt (Co)	ppm	11	27	16	16	7	8	5	6657977
Europium (Eu)	ppm	<1	2	2	<1	2	3	1	6657977
Gold (Au)	ppm	<0.002	<0.002	<0.002	0.045	<0.002	<0.002	0.002	6657977
Hafnium (Hf)	ppm	11	8	7	4	7	22	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	36000	66000	44000	60000	34000	39000	2000	6657977
Lanthanum (La)	ppm	338	58	68	16	68	140	2	6657977
Lutetium (Lu)	ppm	0.4	0.3	0.3	0.4	0.3	0.3	0.2	6657977
Molybdenum (Mo)	ppm	<1	1	2	17	1	2	1	6657977
Nickel (Ni)	ppm	<10	140	44	<10	23	<10	10	6657977
Rubidium (Rb)	ppm	110	83	120	26	98	91	5	6657977
Samarium (Sm)	ppm	28.8	8.5	8.4	3.8	9.1	13.8	0.1	6657977
Scandium (Sc)	ppm	8.2	19.0	11.0	22.0	11.0	8.7	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	22400	21700	24400	17000	26000	29200	200	6657977
Tantalum (Ta)	ppm	5.7	3.1	3.5	0.7	4.2	3.8	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	1.4	1.1	0.8	<0.5	0.7	0.9	0.5	6657977
Thorium (Th)	ppm	116	13.0	19.0	2.4	18.0	30.2	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	6200	5200	4000	6100	4300	6400	500	6657977
Tungsten (W)	ppm	1	4	2	<1	3	2	1	6657977
Uranium (U)	ppm	17.0	8.0	7.9	1.4	15.0	7.8	0.2	6657977
Ytterbium (Yb)	ppm	<2	2	<2	2	<2	<2	2	6657977
Zinc (Zn)	ppm	180	<100	<100	<100	110	160	100	6657977
Zirconium (Zr)	ppm	<200	<200	<200	<200	450	540	200	6657977
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									



BV Labs Job #: C079067
Report Date: 2020/04/16

Bureau Veritas Commodities
Client Project #: VAN20000436A
Your P.O. #: 19208

RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF056	MIF057	MIF058	MIF059	MIF060	MIF061	MIF062		
Sampling Date										
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1047	HMC-1048	HMC-1049	HMC-1050	HMC-1051	HMC-1052	HMC-1053	RDL	QC Batch
Bromine	ppm	1.6	1.9	6.6	2.8	0.8	1.8	1.9	0.5	6657977
Antimony (Sb)	ppm	0.1	0.3	0.3	<0.1	<0.1	<0.1	0.2	0.1	6657977
Arsenic (As)	ppm	1.0	4.0	2.0	0.6	0.6	0.9	2.6	0.5	6657977
Barium (Ba)	ppm	1300	1600	1200	1600	1100	940	1200	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	320	190	79	270	99	76	69	5	6657977
Cesium (Cs)	ppm	2.3	1.9	3.1	1.6	0.9	0.7	3.9	0.5	6657977
Chromium (Cr)	ppm	69	88	59	90	120	90	200	20	6657977
Cobalt (Co)	ppm	7	11	8	6	11	17	10	5	6657977
Europium (Eu)	ppm	<1	<1	2	3	2	<1	2	1	6657977
Gold (Au)	ppm	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	6657977
Hafnium (Hf)	ppm	25	13	10	22	11	10	8	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	58000	43000	32000	44000	38000	48000	35000	2000	6657977
Lanthanum (La)	ppm	170	110	58	150	51	41	37	2	6657977
Lutetium (Lu)	ppm	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.2	6657977
Molybdenum (Mo)	ppm	3	3	1	2	<1	<1	2	1	6657977
Nickel (Ni)	ppm	<10	27	19	18	21	20	32	10	6657977
Rubidium (Rb)	ppm	120	78	82	97	44	56	110	5	6657977
Samarium (Sm)	ppm	15.0	11.8	8.0	15.0	7.3	7.5	6.0	0.1	6657977
Scandium (Sc)	ppm	11.0	12.0	11.0	10.0	13.0	13.0	11.0	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	27000	24600	22600	26200	24800	22400	20300	200	6657977
Tantalum (Ta)	ppm	4.5	1.8	1.2	3.5	1.2	1.9	1.7	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	1.1	1.0	0.7	0.9	0.7	0.9	0.7	0.5	6657977
Thorium (Th)	ppm	38.3	19.0	10.0	32.8	13.0	10.0	10.0	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	7400	5300	3500	6500	4400	7500	4500	500	6657977
Tungsten (W)	ppm	6	2	2	<1	<1	<1	1	1	6657977
Uranium (U)	ppm	10.0	4.9	7.3	8.4	2.8	3.1	3.6	0.2	6657977
Ytterbium (Yb)	ppm	<2	<2	<2	<2	2	2	2	2	6657977
Zinc (Zn)	ppm	130	<100	<100	<100	<100	120	<100	100	6657977
Zirconium (Zr)	ppm	860	670	<200	770	430	<200	<200	200	6657977

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch



BV Labs Job #: C079067
Report Date: 2020/04/16

Bureau Veritas Commodities
Client Project #: VAN20000436A
Your P.O. #: 19208

RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF063	MIF064	MIF065	MIF066	MIF067	MIF068	MIF069		
Sampling Date										
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1054	HMC-1055	HMC-1056	HMC-1057	HMC-1058	HMC-1059	HMC-1060	RDL	QC Batch
Bromine	ppm	1.3	2.6	1.6	3.0	4.3	3.3	1.3	0.5	6657977
Antimony (Sb)	ppm	<0.1	<0.1	0.1	0.3	0.2	0.4	0.2	0.1	6657977
Arsenic (As)	ppm	<0.5	0.9	1.2	2.9	2.0	6.9	1.5	0.5	6657977
Barium (Ba)	ppm	1500	1300	1000	750	950	1100	960	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	440	561	160	62	92	67	68	5	6657977
Cesium (Cs)	ppm	1.2	1.2	1.7	1.9	2.2	2.2	2.2	0.5	6657977
Chromium (Cr)	ppm	33	36	160	200	50	48	110	20	6657977
Cobalt (Co)	ppm	6	12	9	25	9	8	15	5	6657977
Europium (Eu)	ppm	3	4	<1	<1	<1	1	2	1	6657977
Gold (Au)	ppm	<0.002	<0.002	<0.002	0.120	0.003	0.007	<0.002	0.002	6657977
Hafnium (Hf)	ppm	11	11	12	8	10	7	9	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	25000	34000	39000	59000	35000	34000	51000	2000	6657977
Lanthanum (La)	ppm	251	320	93	36	55	38	35	2	6657977
Lutetium (Lu)	ppm	0.3	0.5	0.5	0.3	0.3	0.3	0.4	0.2	6657977
Molybdenum (Mo)	ppm	<1	2	2	<1	2	2	1	1	6657977
Nickel (Ni)	ppm	<10	24	30	37	23	<10	24	10	6657977
Rubidium (Rb)	ppm	120	110	97	57	86	83	63	5	6657977
Samarium (Sm)	ppm	21.8	28.1	11.0	5.5	7.5	5.3	6.2	0.1	6657977
Scandium (Sc)	ppm	6.0	8.1	9.3	19.0	12.0	9.4	20.0	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	23900	22500	22500	18000	24900	22000	21600	200	6657977
Tantalum (Ta)	ppm	3.5	5.7	3.6	1.4	2.8	1.8	1.4	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	1.1	1.4	1.0	0.7	0.7	0.6	0.7	0.5	6657977
Thorium (Th)	ppm	84.5	112	33.2	10.0	18.0	12.0	13.0	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	5000	6200	4900	5200	4700	3200	4500	500	6657977
Tungsten (W)	ppm	1	1	1	3	5	7	2	1	6657977
Uranium (U)	ppm	9.0	16.0	11.0	3.0	10.0	5.2	4.7	0.2	6657977
Ytterbium (Yb)	ppm	<2	<2	3	<2	2	<2	2	2	6657977
Zinc (Zn)	ppm	<100	140	160	120	120	100	<100	100	6657977
Zirconium (Zr)	ppm	<200	430	370	390	<200	<200	<200	200	6657977

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch



BV Labs Job #: C079067
Report Date: 2020/04/16

Bureau Veritas Commodities
Client Project #: VAN20000436A
Your P.O. #: 19208

RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF070	MIF071	MIF072	MIF073	MIF074	MIF075		
Sampling Date									
COC Number		N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1061 DUP OF HMC-1080	HMC-1062	HMC-1063	HMC-1064	HMC-1065	HMC-1066	RDL	QC Batch
Bromine	ppm	1.6	0.9	1.0	1.0	1.4	1.5	0.5	6657977
Antimony (Sb)	ppm	0.3	0.2	0.2	0.2	<0.1	<0.1	0.1	6657977
Arsenic (As)	ppm	1.9	2.5	3.1	1.3	<0.5	<0.5	0.5	6657977
Barium (Ba)	ppm	1500	1000	1000	1100	1200	1300	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	180	68	53	51	79	140	5	6657977
Cesium (Cs)	ppm	2.5	2.3	2.7	2.2	1.5	1.4	0.5	6657977
Chromium (Cr)	ppm	77	100	64	46	51	56	20	6657977
Cobalt (Co)	ppm	13	9	11	7	8	9	5	6657977
Europium (Eu)	ppm	<1	1	1	<1	1	<1	1	6657977
Gold (Au)	ppm	<0.002	<0.002	0.092	0.002	<0.002	<0.002	0.002	6657977
Hafnium (Hf)	ppm	10	9	6	6	8	9	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	47000	40000	41000	34000	32000	34000	2000	6657977
Lanthanum (La)	ppm	96	38	31	26	42	75	2	6657977
Lutetium (Lu)	ppm	0.4	0.3	0.3	0.2	0.3	0.3	0.2	6657977
Molybdenum (Mo)	ppm	2	2	<1	1	1	<1	1	6657977
Nickel (Ni)	ppm	14	<10	<10	<10	<10	23	10	6657977
Rubidium (Rb)	ppm	99	96	82	90	77	100	5	6657977
Samarium (Sm)	ppm	10.7	5.7	4.9	4.2	6.1	9.1	0.1	6657977
Scandium (Sc)	ppm	13.0	11.0	12.0	7.9	7.1	7.9	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	25300	23000	22400	24400	25800	25100	200	6657977
Tantalum (Ta)	ppm	2.7	1.9	1.6	1.4	2.0	2.3	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	0.9	0.6	0.7	0.6	0.6	0.6	0.5	6657977
Thorium (Th)	ppm	27.6	11.0	8.7	8.8	12.0	26.5	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	4700	3700	3700	3300	3400	3800	500	6657977
Tungsten (W)	ppm	2	5	5	1	1	<1	1	6657977
Uranium (U)	ppm	7.1	6.1	4.0	3.2	4.9	6.2	0.2	6657977
Ytterbium (Yb)	ppm	2	<2	<2	<2	<2	<2	2	6657977
Zinc (Zn)	ppm	<100	<100	<100	<100	<100	150	100	6657977
Zirconium (Zr)	ppm	<200	<200	<200	<200	420	330	200	6657977
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									



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RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF076	MIF077	MIF078	MIF079	MIF080	MIF081	MIF082		
Sampling Date										
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1067	HMC-1068	HMC-1069	HMC-1070	HMC-1071	HMC-1072	HMC-1073	RDL	QC Batch
Bromine	ppm	2.8	3.5	3.8	0.9	5.4	3.0	3.1	0.5	6657977
Antimony (Sb)	ppm	<0.1	<0.1	<0.1	0.2	0.2	0.6	<0.1	0.1	6657977
Arsenic (As)	ppm	0.6	1.4	0.7	2.0	2.6	1.8	0.5	0.5	6657977
Barium (Ba)	ppm	1100	1200	1200	1100	1000	1300	1300	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	150	360	240	92	92	260	450	5	6657977
Cesium (Cs)	ppm	2.2	1.6	1.3	2.2	1.6	3.3	0.7	0.5	6657977
Chromium (Cr)	ppm	88	300	440	71	68	30	240	20	6657977
Cobalt (Co)	ppm	<5	15	24	13	6	12	21	5	6657977
Europium (Eu)	ppm	<1	2	2	2	<1	<1	3	1	6657977
Gold (Au)	ppm	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	6657977
Hafnium (Hf)	ppm	6	11	11	5	10	8	19	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	35000	65000	62000	41000	46000	48000	56000	2000	6657977
Lanthanum (La)	ppm	79	205	130	50	49	140	221	2	6657977
Lutetium (Lu)	ppm	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.2	6657977
Molybdenum (Mo)	ppm	<1	<1	<1	1	<1	3	1	1	6657977
Nickel (Ni)	ppm	22	39	73	<10	15	<10	110	10	6657977
Rubidium (Rb)	ppm	110	88	75	81	85	120	53	5	6657977
Samarium (Sm)	ppm	10.0	20.1	13.7	6.4	7.0	14.4	27.2	0.1	6657977
Scandium (Sc)	ppm	8.9	16.0	18.0	13.0	10.0	10.0	15.0	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	24100	20400	18000	25500	25600	25500	21700	200	6657977
Tantalum (Ta)	ppm	3.5	4.0	2.0	1.7	1.3	2.9	1.9	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	0.9	1.4	0.9	0.6	0.7	0.9	1.2	0.5	6657977
Thorium (Th)	ppm	29.7	70.5	35.6	14.0	14.0	46.4	30.6	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	3600	5900	5100	4100	4100	4200	5900	500	6657977
Tungsten (W)	ppm	<1	2	<1	2	1	<1	<1	1	6657977
Uranium (U)	ppm	10.0	8.3	5.0	4.7	6.3	7.4	5.2	0.2	6657977
Ytterbium (Yb)	ppm	<2	<2	<2	<2	2	<2	<2	2	6657977
Zinc (Zn)	ppm	<100	120	<100	<100	160	<100	120	100	6657977
Zirconium (Zr)	ppm	<200	<200	440	<200	<200	<200	600	200	6657977

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch



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RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF083	MIF084	MIF085	MIF086	MIF087	MIF088	MIF089		
Sampling Date										
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1074	HMC-1075	HMC-1076	HMC-1077	HMC-1078	HMC-1079	HMC-1080	RDL	QC Batch
Bromine	ppm	36.0	1.9	5.6	4.4	4.0	2.5	1.2	0.5	6657977
Antimony (Sb)	ppm	3.1	<0.1	0.3	3.0	<0.1	0.4	0.3	0.1	6657977
Arsenic (As)	ppm	21.0	0.8	2.1	75.4	<0.5	4.3	2.2	0.5	6657977
Barium (Ba)	ppm	670	1100	1500	1100	1700	1500	1500	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	56	330	110	67	270	260	170	5	6657977
Cesium (Cs)	ppm	1.8	0.9	5.6	4.7	2.1	2.1	2.4	0.5	6657977
Chromium (Cr)	ppm	89	610	79	63	93	55	67	20	6657977
Cobalt (Co)	ppm	23	27	7	14	<5	6	13	5	6657977
Europium (Eu)	ppm	3	3	<1	1	<1	2	2	1	6657977
Gold (Au)	ppm	0.007	<0.002	<0.002	0.014	<0.002	<0.002	<0.002	0.002	6657977
Hafnium (Hf)	ppm	7	15	7	8	10	10	11	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	51000	76000	40000	55000	35000	38000	47000	2000	6657977
Lanthanum (La)	ppm	30	180	65	37	150	150	95	2	6657977
Lutetium (Lu)	ppm	0.6	0.3	0.4	0.3	0.2	0.3	0.4	0.2	6657977
Molybdenum (Mo)	ppm	<1	<1	1	4	1	<1	1	1	6657977
Nickel (Ni)	ppm	19	120	17	24	<10	<10	<10	10	6657977
Rubidium (Rb)	ppm	26	60	150	85	84	92	100	5	6657977
Samarium (Sm)	ppm	7.0	18.3	8.8	5.3	15.4	14.8	10.7	0.1	6657977
Scandium (Sc)	ppm	15.0	23.3	9.4	13.0	8.0	8.9	13.0	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	15000	20600	20400	20400	24700	23300	25600	200	6657977
Tantalum (Ta)	ppm	0.6	2.6	2.3	1.5	2.2	2.0	2.3	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	0.9	1.1	0.9	0.6	0.9	0.9	0.9	0.5	6657977
Thorium (Th)	ppm	3.4	40.3	16.0	11.0	45.4	50.3	28.5	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	4000	6100	4700	4200	4900	4600	4900	500	6657977
Tungsten (W)	ppm	<1	<1	1	3	<1	3	1	1	6657977
Uranium (U)	ppm	7.9	5.3	5.6	4.1	9.3	10.0	7.4	0.2	6657977
Ytterbium (Yb)	ppm	4	<2	2	<2	<2	<2	<2	2	6657977
Zinc (Zn)	ppm	220	150	120	200	130	<100	<100	100	6657977
Zirconium (Zr)	ppm	<200	490	<200	<200	<200	<200	500	200	6657977

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch



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RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF090	MIF091	MIF092	MIF093	MIF094	MIF095		
Sampling Date									
COC Number		N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1081 DUP OF HMC-1087	HMC-1082	HMC-1083	HMC-1084	HMC-1085	HMC-1086	RDL	QC Batch
Bromine	ppm	1.2	3.4	6.8	1.5	0.9	4.5	0.5	6657977
Antimony (Sb)	ppm	0.2	<0.1	0.7	0.4	<0.1	<0.1	0.1	6657977
Arsenic (As)	ppm	1.3	1.0	4.3	14.0	0.6	1.1	0.5	6657977
Barium (Ba)	ppm	1300	1700	1200	1200	1600	1200	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	150	380	75	170	180	160	5	6657977
Cesium (Cs)	ppm	2.2	1.3	3.2	1.7	1.4	3.5	0.5	6657977
Chromium (Cr)	ppm	95	91	250	820	420	520	20	6657977
Cobalt (Co)	ppm	9	6	12	17	22	27	5	6657977
Europium (Eu)	ppm	2	4	2	2	2	2	1	6657977
Gold (Au)	ppm	<0.002	<0.002	<0.002	0.322	<0.002	<0.002	0.002	6657977
Hafnium (Hf)	ppm	9	14	12	11	14	9	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	45000	40000	52000	64000	72000	77000	2000	6657977
Lanthanum (La)	ppm	88	215	43	95	100	83	2	6657977
Lutetium (Lu)	ppm	0.3	0.2	0.3	0.3	0.3	0.4	0.2	6657977
Molybdenum (Mo)	ppm	<1	<1	1	<1	<1	2	1	6657977
Nickel (Ni)	ppm	<10	<10	42	100	90	130	10	6657977
Rubidium (Rb)	ppm	110	85	83	64	93	87	5	6657977
Samarium (Sm)	ppm	10.0	19.0	6.2	9.1	12.0	12.1	0.1	6657977
Scandium (Sc)	ppm	9.3	8.8	15.0	13.0	14.0	20.9	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	25700	26000	22200	22000	22100	17000	200	6657977
Tantalum (Ta)	ppm	3.5	2.4	1.3	2.0	2.3	2.0	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	0.8	1.0	0.5	0.6	0.9	0.9	0.5	6657977
Thorium (Th)	ppm	23.5	51.3	11.0	29.3	23.9	15.0	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	4100	7200	4300	5600	5800	5800	500	6657977
Tungsten (W)	ppm	2	<1	1	6	<1	<1	1	6657977
Uranium (U)	ppm	5.0	6.8	3.1	6.8	4.3	6.3	0.2	6657977
Ytterbium (Yb)	ppm	<2	<2	<2	<2	<2	<2	2	6657977
Zinc (Zn)	ppm	120	<100	100	170	<100	150	100	6657977
Zirconium (Zr)	ppm	<200	<200	380	350	450	<200	200	6657977
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									



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RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF096	MIF097	MIF098	MIF099	MIF100	MIF101	MIF102		
Sampling Date										
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1087	HMC-1088	HMC-1089	HMC-1090	HMC-1091	HMC-1092	HMC-1093	RDL	QC Batch
Bromine	ppm	1.3	3.4	4.9	1.4	4.5	2.5	4.2	0.5	6657977
Antimony (Sb)	ppm	0.2	<0.1	0.2	<0.1	2.0	0.7	0.5	0.1	6657977
Arsenic (As)	ppm	1.4	<0.5	1.0	<0.5	22.0	5.3	3.2	0.5	6657977
Barium (Ba)	ppm	1300	1400	1100	1200	1300	1500	1100	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	160	300	200	160	98	93	79	5	6657977
Cesium (Cs)	ppm	2.1	0.9	2.7	1.4	3.3	3.2	0.9	0.5	6657977
Chromium (Cr)	ppm	89	70	51	150	140	77	170	20	6657977
Cobalt (Co)	ppm	9	9	10	13	13	10	17	5	6657977
Europium (Eu)	ppm	<1	3	2	2	2	<1	<1	1	6657977
Gold (Au)	ppm	<0.002	<0.002	<0.002	<0.002	0.006	<0.002	0.004	0.002	6657977
Hafnium (Hf)	ppm	8	18	12	9	8	10	10	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	45000	67000	40000	41000	57000	38000	65000	2000	6657977
Lanthanum (La)	ppm	92	170	120	88	54	53	41	2	6657977
Lutetium (Lu)	ppm	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.2	6657977
Molybdenum (Mo)	ppm	1	<1	2	<1	2	<1	<1	1	6657977
Nickel (Ni)	ppm	12	<10	<10	32	17	16	39	10	6657977
Rubidium (Rb)	ppm	120	76	110	88	80	85	55	5	6657977
Samarium (Sm)	ppm	10.0	16.7	12.0	10.7	6.2	6.3	6.1	0.1	6657977
Scandium (Sc)	ppm	10.0	9.4	13.0	13.0	11.0	11.0	18.0	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	25700	25200	23200	22400	17000	24000	19000	200	6657977
Tantalum (Ta)	ppm	3.7	2.5	2.6	2.7	1.8	1.5	1.4	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	0.8	1.0	0.9	1.0	0.5	0.6	0.9	0.5	6657977
Thorium (Th)	ppm	25.4	34.9	35.7	23.8	12.0	12.0	11.0	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	4000	6300	4800	5000	4400	3800	6100	500	6657977
Tungsten (W)	ppm	1	1	2	1	3	2	3	1	6657977
Uranium (U)	ppm	5.9	3.9	6.6	3.7	3.4	3.3	3.6	0.2	6657977
Ytterbium (Yb)	ppm	<2	<2	<2	<2	<2	<2	2	2	6657977
Zinc (Zn)	ppm	<100	180	<100	130	110	<100	<100	100	6657977
Zirconium (Zr)	ppm	<200	520	<200	<200	<200	<200	<200	200	6657977

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch



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RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF103	MIF104	MIF105	MIF106	MIF107	MIF108	MIF109		
Sampling Date										
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1094	HMC-1095	HMC-1096	HMC-1097	HMC-1098	HMC-1099	HMC-1100	RDL	QC Batch
Bromine	ppm	1.6	5.5	1.4	1.8	1.6	1.1	1.2	0.5	6657977
Antimony (Sb)	ppm	<0.1	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	6657977
Arsenic (As)	ppm	0.7	7.8	0.6	<0.5	0.7	0.9	0.6	0.5	6657977
Barium (Ba)	ppm	1200	460	1100	730	1400	1600	1400	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	170	32	210	150	330	310	410	5	6657977
Cesium (Cs)	ppm	2.5	0.5	1.9	1.6	1.6	1.9	1.8	0.5	6657977
Chromium (Cr)	ppm	94	58	370	1100	82	240	370	20	6657977
Cobalt (Co)	ppm	12	15	13	31	6	13	19	5	6657977
Europium (Eu)	ppm	2	<1	<1	2	2	2	<1	1	6657977
Gold (Au)	ppm	<0.002	0.044	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	6657977
Hafnium (Hf)	ppm	12	4	9	7	9	14	16	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	53000	64000	45000	49000	40000	71000	83000	2000	6657977
Lanthanum (La)	ppm	95	15	110	70	170	170	231	2	6657977
Lutetium (Lu)	ppm	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.2	6657977
Molybdenum (Mo)	ppm	<1	16	<1	<1	<1	<1	<1	1	6657977
Nickel (Ni)	ppm	20	25	65	260	22	50	75	10	6657977
Rubidium (Rb)	ppm	140	20	120	65	110	84	91	5	6657977
Samarium (Sm)	ppm	9.1	3.8	12.0	10.4	16.9	15.6	20.9	0.1	6657977
Scandium (Sc)	ppm	7.5	22.5	7.3	16.0	8.6	13.0	15.0	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	31300	18000	26800	18000	25700	24300	20000	200	6657977
Tantalum (Ta)	ppm	5.8	0.6	3.7	3.0	2.5	2.5	1.7	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	0.9	0.6	0.8	0.8	0.9	1.1	1.1	0.5	6657977
Thorium (Th)	ppm	27.9	2.5	32.8	14.0	53.0	38.3	63.4	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	4400	5800	3300	3100	4700	6200	6900	500	6657977
Tungsten (W)	ppm	2	<1	<1	<1	<1	<1	<1	1	6657977
Uranium (U)	ppm	8.3	1.2	9.0	7.8	5.5	4.8	4.6	0.2	6657977
Ytterbium (Yb)	ppm	<2	2	<2	<2	<2	<2	<2	2	6657977
Zinc (Zn)	ppm	<100	120	<100	110	100	120	160	100	6657977
Zirconium (Zr)	ppm	<200	<200	<200	280	<200	<200	390	200	6657977

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch



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RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF110	MIF111	MIF112	MIF113	MIF114	MIF115		
Sampling Date									
COC Number		N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	HMC-1101 DUP OF HMC-1108	HMC-1102	HMC-1103	HMC-1104	HMC-1105	HMC-1106	RDL	QC Batch
Bromine	ppm	8.6	2.6	2.4	0.8	1.8	5.8	0.5	6657977
Antimony (Sb)	ppm	1.3	<0.1	0.3	0.3	0.3	0.8	0.1	6657977
Arsenic (As)	ppm	16.0	<0.5	2.2	2.5	2.6	7.7	0.5	6657977
Barium (Ba)	ppm	1200	1300	1300	1300	1300	500	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	74	190	180	180	130	32	5	6657977
Cesium (Cs)	ppm	5.2	2.0	4.3	3.7	3.8	0.6	0.5	6657977
Chromium (Cr)	ppm	280	160	220	72	97	70	20	6657977
Cobalt (Co)	ppm	15	11	15	7	9	15	5	6657977
Europium (Eu)	ppm	1	2	2	<1	<1	<1	1	6657977
Gold (Au)	ppm	0.006	<0.002	<0.002	<0.002	<0.002	0.036	0.002	6657977
Hafnium (Hf)	ppm	5	9	24	27	22	4	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	45000	47000	68000	43000	48000	60000	2000	6657977
Lanthanum (La)	ppm	39	100	96	99	68	15	2	6657977
Lutetium (Lu)	ppm	0.3	0.2	0.4	0.5	0.4	0.3	0.2	6657977
Molybdenum (Mo)	ppm	1	1	3	3	2	16	1	6657977
Nickel (Ni)	ppm	110	34	33	17	15	26	10	6657977
Rubidium (Rb)	ppm	82	100	120	180	150	22	5	6657977
Samarium (Sm)	ppm	4.8	10.7	11.2	9.3	7.4	3.8	0.1	6657977
Scandium (Sc)	ppm	11.0	9.4	14.0	7.4	11.0	22.2	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	17000	23700	24900	28300	26800	17000	200	6657977
Tantalum (Ta)	ppm	1.5	2.5	3.8	4.5	3.1	<0.5	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	0.5	0.8	0.9	0.8	0.5	0.6	0.5	6657977
Thorium (Th)	ppm	10.0	30.7	22.2	27.1	20.0	2.6	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	4000	4000	6100	4200	5000	5800	500	6657977
Tungsten (W)	ppm	2	2	2	2	2	1	1	6657977
Uranium (U)	ppm	2.6	7.5	8.0	8.0	6.1	1.3	0.2	6657977
Ytterbium (Yb)	ppm	<2	<2	2	2	2	<2	2	6657977
Zinc (Zn)	ppm	200	<100	100	<100	160	<100	100	6657977
Zirconium (Zr)	ppm	<200	<200	770	810	790	<200	200	6657977
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									



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RESULTS OF ANALYSES OF SOLID

BV Labs ID		MIF116	MIF117	MIF118	MIF119		
Sampling Date							
COC Number		N/A	N/A	N/A	N/A		
	UNITS	HMC-1107	HMC-1108	HMC-1109	HMC-1110	RDL	QC Batch
Bromine	ppm	2.3	8.6	2.4	3.3	0.5	6657977
Antimony (Sb)	ppm	<0.1	1.3	<0.1	0.2	0.1	6657977
Arsenic (As)	ppm	0.9	15.0	0.5	2.7	0.5	6657977
Barium (Ba)	ppm	840	1200	700	1300	50	6657977
Cadmium (Cd)	ppm	<5	<5	<5	<5	5	6657977
Cerium (Ce)	ppm	190	74	220	180	5	6657977
Cesium (Cs)	ppm	2.3	5.0	1.8	2.2	0.5	6657977
Chromium (Cr)	ppm	70	300	95	130	20	6657977
Cobalt (Co)	ppm	9	15	12	17	5	6657977
Europium (Eu)	ppm	1	1	2	2	1	6657977
Gold (Au)	ppm	<0.002	0.005	<0.002	<0.002	0.002	6657977
Hafnium (Hf)	ppm	10	5	13	10	1	6657977
Iridium (Ir)	ppm	<0.05	<0.05	<0.05	<0.05	0.05	6657977
Iron (Fe)	ppm	36000	44000	47000	51000	2000	6657977
Lanthanum (La)	ppm	100	40	110	100	2	6657977
Lutetium (Lu)	ppm	0.5	0.2	0.7	0.4	0.2	6657977
Molybdenum (Mo)	ppm	1	<1	<1	2	1	6657977
Nickel (Ni)	ppm	16	110	26	35	10	6657977
Rubidium (Rb)	ppm	150	82	77	81	5	6657977
Samarium (Sm)	ppm	12.8	4.8	16.4	9.4	0.1	6657977
Scandium (Sc)	ppm	11.0	11.0	16.0	16.0	0.2	6657977
Selenium (Se)	ppm	<5	<5	<5	<5	5	6657977
Silver (Ag)	ppm	<2	<2	<2	<2	2	6657977
Sodium (Na)	ppm	20000	18000	17000	24600	200	6657977
Tantalum (Ta)	ppm	2.6	1.6	3.3	3.8	0.5	6657977
Tellurium (Te)	ppm	<10	<10	<10	<10	10	6657977
Terbium (Tb)	ppm	1.2	<0.5	1.5	0.9	0.5	6657977
Thorium (Th)	ppm	37.3	10.0	40.0	19.0	0.2	6657977
Tin (Sn)	ppm	<100	<100	<100	<100	100	6657977
Titanium (Ti)	ppm	4400	4000	7400	4500	500	6657977
Tungsten (W)	ppm	5	1	3	5	1	6657977
Uranium (U)	ppm	6.0	2.6	6.2	5.8	0.2	6657977
Ytterbium (Yb)	ppm	3	<2	3	2	2	6657977
Zinc (Zn)	ppm	100	290	110	140	100	6657977
Zirconium (Zr)	ppm	370	<200	330	330	200	6657977
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							



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GENERAL COMMENTS

Results relate only to the items tested.



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Your P.O. #: 19208

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

A handwritten signature in black ink, appearing to read "Blake Barber", written over a horizontal line.

Blake Barber, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.