Appendix O

ARD Potential Report

Kami Iron Ore Project ARD/ML Potential at the Kami Mine Site

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Report

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1.0 INTRODUCTION

An Acid Rock Drainage (ARD) and Metal Leaching (ML) assessment of the Kami Project was part of the information required for the Environmental Impact Statement (EIS) for the Kami Project. This report presents the ARD/ML assessment based on the results of static tests completed to date on the different materials that will be exposed during the Kami Project, including:

- Overburden;
- Ore;
- Waste rock;
- Open pit walls;
- Tailings; and
- Concentrate.

2.0 METHODS

The study included examination of the lithology of the Rose Lake Deposit, and review of historical information on iron ore mines located in the region. Eighty-nine samples were selected from drill cores using borehole logs provided by Alderon. These samples included representatives of overburden, ore and waste rock. (Attachment 1). The samples were submitted to SGS Canada Inc., a certified laboratory for Acid Base Accounting (ABA), to measure the potential for ARD, and Shake-Flask Extraction (SFE) to measure the potential for ML. The ARD/ML potential was also measured in 12 samples of concentrate and tailings that had been generated from the ore during metallurgical testing. Process water from the metallurgical testing was analyzed for routine parameters and metals. The certificates of analyses including original results, quality checks, and references to analytical methods and calculations are presented in Attachments 1 to 4.

Usually, geochemical data are not normally distributed (Gaussian distribution). Therefore, medians and interquartile ranges were used to describe results of ABA for each lithology or face. Medians are more resistant to extremes and outliers than averages. For this reason, median values were used for calculations.

Masses of lithological units were preliminarily estimated to calculate the total net neutralization potential for each unit within the proposed open pit. These estimates were completed by Forbes West and were based on the current interpretation of geology (Poznikoff pers. comm. 2012). Details of the calculations and related assumptions are discussed below.

3.0 RESULTS AND DISCUSSION

3.1 GEOLOGICAL SETTING

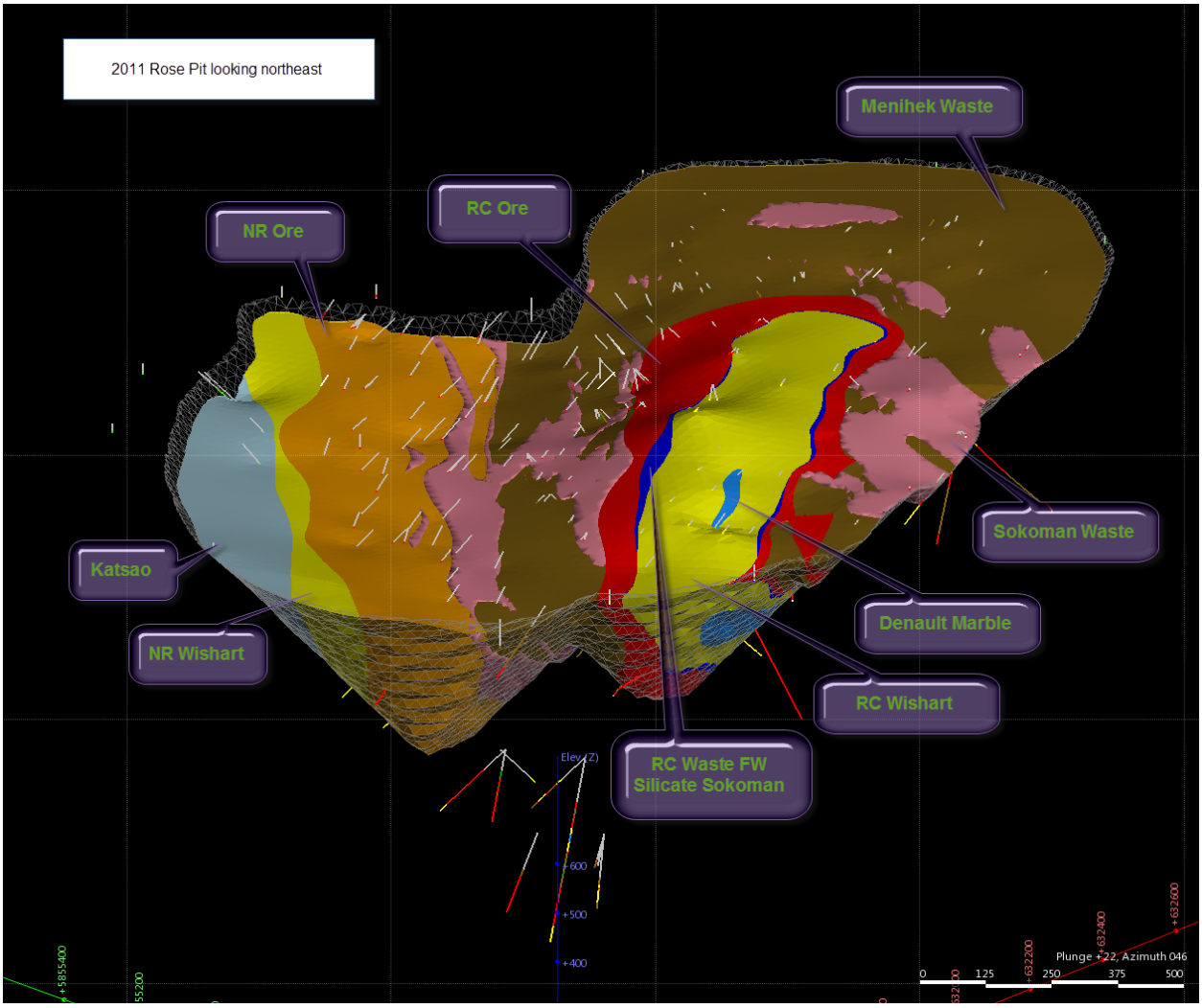
The Project is situated in the highly metamorphosed and deformed metasedimentary sequence of the Grenville Province, Gagnon Terrane of the Labrador Trough ("Trough"). The Trough is comprised of a sequence of Proterozoic sedimentary rocks, including iron formation, volcanic rocks and mafic intrusions. Trough rocks in the Grenville Province are highly metamorphosed and complexly folded. The high-grade metamorphism of the Grenville Province is responsible for recrystallization of both iron oxides and silica in primary iron formation, producing coarse-grained sugary quartz, magnetite, and specular hematite schist or gneiss (metataconites) that are of improved quality for concentration and processing.

3.2 LITHOLOGY OF THE PROPERTY

The locations and distribution of major formations in the Rose Deposit are shown on Figure 1. The lithology of bedrock formations can be summarized in stratigraphic order as follows (BBA 2011):

- Menihek (Nault) Formation consists of fine mica schists (variable muscovite and biotite with low quartz) and graphite-biotite schist with traces of pyrrhotite (sulphide) mostly developed as irregular lenses in the basal 50 m. The schists often contain amphibole-biotite-garnet gneiss.
- Sokoman (Wabush) Iron Formation consists of metataconite (ore) and associated ankeritic marble-quartz-Fe-silicate gneiss. Mineral grains are generally medium- to coarse-grained and interlocking, making the rock fairly coherent. Sokoman footwall in the Rose Central Pit between the Wishart Formation and the ore zone consist of mostly quartz and Fe-silicates (RC Waste FW silicate IF on Figure 1). The Sokoman non-ore formation between the Rose Central Ore and North Rose Ore contains an undefined mix of silicates and carbonates.
- Wishart (Carol) Formation is represented by granular quartzite and mica-quartz schist with disseminated calcite near the top.
- Denault (Duley) Formation consists of dolomitic marble with interlocking grains and generally is a competent unit. Bands of quartzite are common.
- Katsao Formation is represented by coarse leuco- and melanocratic banded gneiss with potassium and plagioclase feldspars, various micas, and quartz. It typically is free of sulphides, graphite, and carbonates.

Figure 1 Lithological model of the Rose Pit from Forbes West (Poznikoff pers. comm. 2012). Abbreviations: RC - Rose Central and NR - North Rose. See text for details



3.3 OVERBURDEN STOCKPILE

Approximately 151 Mt of the overburden will be removed during Kami project (Poznikoff pers. comm. 2012). Static tests indicated that the values of Neutralization Potential (NP) exceeded Acid Potential (AP) in 75% of samples. The NP/AP ratio, or Neutralization Potential Ratio (NPR), is used as a criterion in the recommended guidelines for the prediction of ARD potential in geologic materials (Price 2009). Usually, materials with NPR>2 are considered non-Potentially Acid Generating (non-PAG). The median NPR for overburden is 20, which greatly exceeds this threshold and indicates that the overburden stockpile can be classified as non-acid generating (Table 1). However, four of the twelve samples have a NPR below 2. Three of these four samples have a NPR value below 1, which indicates potential for acid generation whereas one of these samples has a NPR value between 1 and 2, which is an “uncertain” area

(Attachment 2). Moreover, paste pH in three of these samples was between 4 and 5, which shows that they had been generating acid or contained compounds lowering pH. One of these samples is surficial peat, the acidity of which is likely derived from naturally present organic acids. Two other samples are located in silty/sandy till in proximity to the bedrock contact, forming acid-generating pockets. In order to evaluate the extent of these pockets within the till, more samples have been collected for further analysis. Using the current median NPR values and assuming that the overburden would be well mixed during the disposal, it is concluded that overburden stockpile would not generate acidic runoff from sulfide oxidation.

Median values of metal concentrations and pH of Shake Flask Extraction (SFE) from overburden were compared to respective parameters prescribed by the Metal Mining Effluent Regulations (MMER 2002) in order to identify potential parameters of concern. Comparison of the SFE results to these guidelines has only qualitative sense because rock:solution ratio in the case of the project will be different from the laboratory one (1:3). Median concentrations of trace elements in SFE were below the MMER Guidelines. Copper and nickel exceeded the stipulated guidelines in two samples and zinc in one. Elevated concentrations of these metals were mostly associated with acid-generating samples, showing low pH of final extract (Attachment 3). On-going kinetic testing of overburden samples will provide better understanding of concentrations of metals in runoff from the stockpile. The results of these tests will be available in January 2013.

3.4 ORE

Over 645 Mt of metataconite ore will be mined during the Project from Sokoman formation (Poznikoff pers. comm. 2012). Acid-generating Potential (AP) in the ore is low because sulfur concentrations were below the detection limit (0.01 wt%) in 14 of 15 samples (Attachment 2). The absence of sulfur and relatively high Neutralization Potential (NP) resulted in high NPR values with the median calculated at 193. Other indicators such as paste pH and Net Neutralizing Potential (NNP) show that ore will not generate acid. Concentrations of trace elements are below the MMER Guidelines in all samples demonstrating low metal leaching potential of the Kami ore.

Table 1 Summary of ABA Statistics for Lithological Units of Kami Project

Parameter	Paste pH	NP[1]	AP[1]	Net NP[1]	NP/AP	Total S	Sulfate S	Sulfide S	C	CO_3[3]
Units	pH units	kg CaCO3/t			ratio	wt. %	wt. %	wt. %	wt. %	wt. %
Overburden, 12 samples										
n above DL[2]	12	12	12	12	12	11	8	5	12	12
Min	4.19	-16	0.3	-31.6	-1.3	0.01	< 0.01	0.01	0.03	0.06
25th, %ile	5.05	3.0	0.3	-20.1	0.5	0.01	0.01	0.21	0.06	0.11
Median	8.26	8.5	0.3	5.7	20	0.02	0.02	0.70	0.14	0.30
75th, %ile	8.80	14	20	11	37	0.86	0.14	1.08	2.13	7.26
Max	9.54	27	39	15	48	1.49	0.24	1.26	41.4	11.4
Ore Sokoman , 15 samples										
n above DL[2]	15	15	15	15	15	14	9	1	15	15
Min	7.62	2.6	0.31	2.3	1.9	0.01	0.01	< 0.01	0.03	0.02
25th, %ile	8.62	38.3	0.31	29.6	15.8	0.01	0.02	< 0.01	0.63	0.27
Median	8.84	61	0.31	59	193	0.02	0.02	< 0.01	1.1	2
75th, %ile	9.17	120	0.31	119	386	0.03	0.04	< 0.01	1.7	7
Max	9.25	186	32	186	601	1.1	0.1	1.0	2.2	10
Waste Sokoman Carbonate face, 8 samples										
n above DL[2]	8	8	8	8	8	8	8	5	8	8
Min	7.10	1.9	0.31	0.6	1.4	0.01	0.01	0.04	0.14	0.31
25th, %ile	8.62	37	0.31	33.1	8.5	0.02	0.01	0.065	1.64	6.9
Median	8.73	201	2.1	190	40	0.22	0.15	0.16	3.3	13
75th, %ile	9.04	220	11.5	219	505	0.62	0.32	0.58	4.0	18
Max	9.09	373	22	370	724	1.2	0.4	0.7	6.1	29
Waste Sokoman Silicate face, 12 samples										
n above DL[2]	12	12	12	12	12	11	11	9	12	12
Min	7.64	13.4	0.3	1.5	1.1	0.02	0.01	0.01	0.7	2.9
25th, %ile	8.63	44.9	0.32	45	7.8	0.02	0.02	0.02	1.5	6.2
Median	8.84	78	2.39	92	64	0.23	0.09	0.25	3.3	10
75th, %ile	9.24	224	14	212	217	0.82	0.33	0.63	6.1	20
Max	9.41	655	87	647	267	3.7	0.9	2.8	9	33
Waste Sokoman Silicate+Carbonate faces, 20 samples										
n above DL[2]	20	20	20	20	20	19	19	14	20	20
Min	7.10	1.9	0.3	0.6	1.1	0.01	0.01	0.01	0.1	0.3
25th, %ile	8.62	38.3	0.31	37.0	11.0	0.02	0.02	0.04	1.0	2.3
Median	8.83	83	0.31	82	124	0.03	0.04	0.25	1.7	7
75th, %ile	9.13	186	5	184	230	0.49	0.23	0.72	3.6	14
Max	9.41	655	87	647	724	3.7	0.9	2.8	9	33
Waste Menihek - all, 33 samples										
n above DL[2]	33	33	33	33	33	33	32	33	33	33
Min	4.45	2.2	0.4	-186.0	0.02	0.04	0.03	0.01	0.24	0.53
25th, %ile	8.15	7.5	6.5	-30.2	0.19	0.41	0.13	0.21	1.04	5.0
Median	9.01	11	20	-0.6	0.9	0.9	0.22	0.65	1.60	8
75th, %ile	9.32	33	49	17	3.4	2.1	0.4	1.6	5.7	26
Max	9.93	409	190	407	200	7.4	5.8	6.1	22	106
Waste Menihek - excluding graphite-rich schists, 26 samples										
n above DL[2]	26	26	26	26	26	26	25	26	26	26
Min	4.72	2.2	0.4	-79.5	0.1	0.04	0.03	0.01	0.2	0.5
25th, %ile	8.04	7.4	5.3	-15.3	0.3	0.32	0.11	0.17	0.9	4.1
Median	9.13	10	10	2.3	1.7	0.60	0.19	0.32	1.5	7.3
75th, %ile	9.55	44	28	25	6	1.18	0.33	0.90	3.0	14
Max	9.93	409	87	407	200	2.76	0.85	2.77	8	33
Waste Menihek - graphite-rich schists only, 7 samples										
n above DL[2]	7	7	7	7	7	7	7	7	7	7
Min	4.45	4	20	-186	0.02	0.85	0.19	0.65	1.0	4.9
25th, %ile	8.24	10	35	-160	0.1	2.32	0.22	1.11	8	39
Median	8.38	12	59	-49	0.2	2.86	0.44	1.88	16	63
75th, %ile	8.81	24	184	-10	0.5	6.9	1.54	5.9	19	77
Max	9.01	46	190	11	1.3	7.4	5.8	6.1	22	106
Waste Wishart, 9 Samples										
n above DL[2]	9	9	9	9	9	6	6	4	9	9
Min	7.98	2.7	0.3	2.4	7.2	0.01	0.01	0.02	0.02	0.05
25th, %ile	8.60	3.4	0.3	3.1	8.9	0.03	0.02	0.03	0.04	0.13
Median	9.06	4.9	0.3	4.6	15	0.05	0.03	0.08	0.07	0.27
75th, %ile	9.42	37	2	33	18	0.30	0.10	0.19	0.35	1.25
Max	9.57	50	7	47	21	0.34	0.23	0.22	0.66	2.96

Notes:
[1] - AP (Acid Potential) = % Sulfide Sulfur x 31.25; NP - Neutralization Potential;
[2] - Detection Limit
[3] - carbonate analysis also includes graphitic carbon.
See details of analytical methods in Certificates of Analyses.

3.5 WASTE ROCK

ARD/ML Characterization of Waste Rock Lithological Units

The estimated mass of waste rock generated during the project is approximately 1,044 Mt. Most of the waste rock will be composed of Sokoman (32%), Menihek (31%) and Whishart (28%) formations. Katsao (6%) and Denault (2%) formations will comprise the rest of the waste rock.

The non-ore portion of the Sokoman formation consists of silicate and carbonate faces. Both faces were classified as non-acid-generating, based on median NPR values, which are 64 and 40, respectively. Only two of twenty Sokoman waste rock samples had NPR between 1 and 2, which is an “uncertain” area. Overall, Sokoman waste is classified as non-acid generating with positive NNP (82 $CaCO_3$ kg/t), which can be used to balance AP in waste rock of other formations. It was not possible to determine unavailable NP because all paste pH values were above 7.10. Concentrations of trace elements in the SFE complied with the MMER Guidelines in all samples (Table 2). Therefore, potential trace element leaching from the Sokoman Formation was considered to be low.

Table 2 Summary of CCME and MMER Regulated Parameters Measured in Shake Flask Extraction Tests

Parameter, Units	Initial pH	Final pH	Hg	Ag	Al	As	Cd	Co	Cr	Cu	Fe	Mo	Ni	Pb	Se	Tl	U	Zn
	pH units	units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting limit	1-13		0.00001	0.00001	0.01	0.0002	0.000003	0.000002	0.0005	0.0005	0.003	0.00001	0.0001	0.00002	0.001	0.00002	0.000001	0.001
MMER Guideline	-		-	-	-	0.5	-	-	-	0.3	-	-	0.5	0.2	-	-	-	0.5
CCME FAL Guideline	4.5-9.5		0.000026	0.0001	0.1	0.005	0.00004	0.004	0.001	0.0028	0.3	0.073	0.113	0.0063	0.001	0.0008	0.015	0.03
Overburden, 12 samples																		
n above DL	12	12	12	2	11	11	8	11	11	11	11	11	11	11	4	6	11	10
Min	3.12	3.04	0.00001	< 0.00001	< 0.01	< 0.0002	0.000003	0.0001	0.001	0.0008	0.17	0.0003	0.0005	0.0001	< 0.001	0.00002	0.00014	0.00100
25th, %ile	5.19	5.12	0.00001	< 0.00001	0.53	0.0003	0.00001	0.0003	0.001	0.0035	0.7	0.001	0.0008	0.0003	< 0.001	0.00002	0.00029	0.00200
Median	6.69	8.21	0.00001	< 0.00001	1.0	0.0007	0.00002	0.001	0.002	0.0085	1.6	0.004	0.0031	0.0007	< 0.001	0.00005	0.0006	0.004
75th, %ile	8.80	9.05	0.00002	< 0.00001	3.7	0.0017	0.011	0.004	0.004	0.025	5.6	0.013	0.011	0.0028	0.269	0.00105	0.013	0.036
Max	9.06	9.36	0.00003	0.00055	25.3	0.0061	0.023	1.3	0.01	**21**	84	0.017	**4.14**	0.0271	0.342	0.00114	1.68	**3.87**
Ore Sokoman , 10 samples																		
n above DL	10	10	4	1	9	5	1	10	0	2	8	10	10	3	1	1	10	2
Min	8.36	7.86	< 0.00001	< 0.00001	< 0.01	< 0.0002	< 0.000003	0.00001	< 0.0005	< 0.0005	0.005	0.0005	0.0001	0.00002	< 0.001	< 0.00002	0.00005	< 0.001
25th, %ile	8.92	8.37	< 0.00001	< 0.00001	0.01	< 0.0002	< 0.000003	0.00001	< 0.0005	< 0.0005	0.005	0.0007	0.0002	0.00002	< 0.001	< 0.00002	0.00011	< 0.001
Median	9.28	8.80	< 0.00001	< 0.00001	0.03	0.0006	< 0.000003	0.00003	< 0.0005	< 0.0005	0.012	0.0012	0.0003	0.00009	< 0.001	< 0.00002	0.00014	< 0.001
75th, %ile	9.34	9.22	0.00001	< 0.00001	0.04	0.0022	< 0.000003	0.00004	< 0.0005	< 0.0005	0.109	0.0026	0.0004	0.00011	< 0.001	< 0.00002	0.00032	< 0.001
Max	9.48	9.31	0.00001	0.00004	0.29	0.0031	0.00005	0.00007	< 0.0005	0.00060	0.356	0.0076	0.0008	0.00011	0.008	0.00002	0.00051	0.003
Waste Sokoman Carbonate face, 8 samples																		
n above DL	8	8	3	0	5	4	1	8	0	2	3	8	7	4	1	1	8	3
Min	6.17	7.16	< 0.00001	< 0.00001	< 0.01	< 0.0002	< 0.000003	0.00001	< 0.0005	< 0.0005	0.020	0.0001	0.0001	0.00003	< 0.001	< 0.00002	0.00006	< 0.001
25th, %ile	9.14	8.29	< 0.00001	< 0.00001	0.01	< 0.0002	< 0.000003	0.00001	< 0.0005	< 0.0005	0.020	0.0002	0.0001	0.00003	< 0.001	< 0.00002	0.00012	0.001
Median	9.41	8.81	< 0.00001	< 0.00001	0.01	0.0006	< 0.000003	0.00003	< 0.0005	< 0.0005	0.034	0.0004	0.0003	0.00006	< 0.001	< 0.00002	0.00033	0.001
75th, %ile	9.61	9.23	0.00001	< 0.00001	0.02	0.0451	< 0.000003	0.00005	< 0.0005	< 0.0005	0.089	0.0007	0.0009	0.00046	< 0.001	< 0.00002	0.00158	0.003
Max	9.68	9.35	0.00001	< 0.00001	0.02	0.0590	0.00116	0.00024	< 0.0005	0.00060	0.089	0.0008	0.0016	0.00059	0.004	0.00006	0.00428	0.003
Waste Sokoman Silicate face, 11 samples																		
n above DL	11	11	6	1	7	8	2	11	2	1	8	11	11	3	1	1	11	4
Min	7.24	7.06	< 0.00001	< 0.00001	< 0.01	< 0.0002	< 0.000003	0.00002	< 0.0005	< 0.0005	0.004	0.0001	0.0002	0.00003	< 0.001	< 0.00002	0.00009	< 0.001
25th, %ile	8.80	8.30	< 0.00001	< 0.00001	0.02	< 0.0002	< 0.000003	0.00002	< 0.0005	< 0.0005	0.004	0.0008	0.0002	0.00003	< 0.001	< 0.00002	0.00015	< 0.001
Median	9.22	8.82	< 0.00001	< 0.00001	0.09	0.0012	< 0.000003	0.00003	< 0.0005	< 0.0005	0.009	0.0027	0.0004	0.00005	< 0.001	< 0.00002	0.00066	0.001
75th, %ile	9.46	9.17	0.00001	< 0.00001	0.36	0.0019	< 0.000003	0.00014	< 0.0005	< 0.0005	0.031	0.0093	0.0013	0.00024	< 0.001	< 0.00002	0.00194	0.002
Max	9.76	9.46	0.00001	0.00021	0.66	0.0021	0.00024	0.00098	0.0016	0.00060	0.286	0.0942	0.0030	0.00024	0.003	0.00002	0.00516	0.002
Waste Sokoman Silicate+Carbonate faces, 29 samples																		
n above DL*	29	29	13	2	21	17	4	29	2	5	19	29	28	10	3	3	29	9
Min	6.17	7.06	< 0.00001	< 0.00001	< 0.01	< 0.0002	< 0.000003	0.00001	< 0.0005	< 0.0005	0.004	0.00007	0.0001	0.00002	< 0.001	< 0.00002	0.00005	< 0.001
25th, %ile	8.98	8.34	< 0.00001	< 0.00001	0.01	0.0004	< 0.000003	0.00002	< 0.0005	< 0.0005	0.005	0.00055	0.0002	0.00003	< 0.001	< 0.00002	0.00012	< 0.001
Median	9.28	8.81	< 0.00001	< 0.00001	0.02	0.0011	< 0.000003	0.00003	< 0.0005	0.0005	0.011	0.00084	0.0003	0.00007	< 0.001	< 0.00002	0.00031	0.001
75th, %ile	9.46	9.21	0.00001	< 0.00001	0.07	0.0021	0.00002	0.00005	< 0.0005	0.0006	0.037	0.00289	0.0007	0.00014	< 0.001	< 0.00002	0.00087	0.003
Max	9.76	9.46	0.00001	0.00021	0.66	0.0590	0.00116	0.00098	0.0016	0.0006	0.356	0.09420	0.0030	0.00059	0.008	0.00006	0.00516	0.003
Waste Menihek - all, 32 samples																		
n above DL	32	32	11	19	29	26	9	32	7	21	27	32	32	26	18	9	32	23
Min	3.63	3.77	< 0.00001	< 0.00001	< 0.01	< 0.0002	< 0.000003	0.00001	< 0.0005	< 0.0005	0.003	0.0001	0.0001	0.00002	< 0.001	< 0.00002	0.00003	< 0.001
25th, %ile	7.98	7.88	< 0.00001	< 0.00001	0.14	0.0004	< 0.000003	0.00004	< 0.0005	0.0006	0.007	0.0012	0.0003	0.00005	< 0.001	< 0.00002	0.0004	0.002
Median	9.25	8.81	< 0.00001	0.00004	0.38	0.0008	< 0.000003	0.00008	< 0.0005	0.0007	0.038	0.0018	0.0007	0.00010	0.002	< 0.00002	0.0017	0.002
75th, %ile	9.62	9.38	0.00001	0.00005	1.52	0.0016	0.0001	0.00028	0.0017	0.0010	0.206	0.0062	0.0042	0.00027	0.005	< 0.00002	0.0061	0.005
Max	9.78	9.70	0.00003	0.00034	41.0	0.0041	0.1970	2.01	0.0264	**2.92**	64.4	0.0364	**6.3**	0.133	0.028	0.00117	2.0	**23.2**
Waste Menihek - excluding graphite-rich schists, 26 samples																		
n above DL	26	26	10	14	24	23	7	26	7	16	22	26	26	21	14	8	26	19
Min	3.63	3.77	< 0.00001	< 0.00001	< 0.01	< 0.0002	< 0.000003	0.00001	< 0.0005	< 0.0005	0.003	0.0004	0.0001	0.00002	< 0.001	< 0.00002	0.00003	< 0.001
25th, %ile	7.92	7.69	< 0.00001	< 0.00001	0.09	0.0003	< 0.000003	0.00004	< 0.0005	< 0.0005	0.007	0.0013	0.0003	0.00005	< 0.001	< 0.00002	0.0004	0.002
Median	9.31	8.82	< 0.00001	0.00006	0.47	0.0009	< 0.000003	0.00008	< 0.0005	0.0008	0.093	0.0018	0.0006	0.00012	0.001	< 0.00002	0.0017	0.003
75th, %ile	9.62	9.41	0.00001	0.00006	1.60	0.0015	0.0001	0.00030	0.0116	0.0010	0.232	0.0053	0.0078	0.00028	0.011	< 0.00002	0.0060	0.005
Max	9.78	9.70	0.00002	0.00034	41.0	0.0041	0.1970	2.01	0.0264	**2.33**	64.4	0.0364	**6.3**	0.001	0.022	0.00117	0.2	**8.7**
Waste Menihek - graphite-rich schists only, 6 samples																		
n above DL	6	6	1	5	5	3	2	6	0	5	5	6	6	5	4	1	6	4
Min	4.33	4.42	< 0.00001	< 0.00001	< 0.01	< 0.0002	< 0.000003	0.00002	< 0.0005	< 0.0005	0.006	0.0001	0.0001	0.00006	0.001	< 0.00002	0.00004	< 0.001
25th, %ile	7.86	7.31	< 0.00001	0.00002	0.14	< 0.0002	< 0.000003	0.00003	< 0.0005	0.0006	0.008	0.0001	0.0003	0.00007	0.001	< 0.00002	0.0005	0.001
Median	9.20	8.42	< 0.00001	0.00004	0.26	0.0005	< 0.000003	0.00005	< 0.0005	0.0006	0.013	0.0020	0.0012	0.00007	0.004	< 0.00002	0.0023	0.001
75th, %ile	9.44	8.92	< 0.00001	0.00005	1.07	0.0033	< 0.000003	0.01600	< 0.0005	**1.46**	3.650	0.0169	0.2034	0.00656	0.023	< 0.00002	0.5237	0.002
Max	9.68	9.02	0.00003	0.00006	1.6	0.0033	0.1960	0.06	< 0.0005	**2.92**	7.3	0.0309	**0.8**	0.133	0.028	0.00027	2.0	**23.2**
Waste Wishart, 7 Samples																		
n above DL	7	7	3	3	7	3	1	7	2	4	7	7	7	6	0	0	7	5
Min	7.51	7.74	< 0.00001	< 0.00001	0.03	< 0.0002	< 0.000003	0.00003	< 0.0005	< 0.0005	0.007	0.0004	0.0001	0.00002	< 0.001	< 0.00002	0.00004	< 0.001
25th, %ile	7.90	8.06	< 0.00001	< 0.00001	0.03	< 0.0002	< 0.000003	0.00005	< 0.0005	< 0.0005	0.050	0.0005	0.0001	0.00004	< 0.001	< 0.00002	0.0001	0.001
Median	8.49	8.93	< 0.00001	0.00004	0.62	0.0010	< 0.000003	0.00009	< 0.0005	0.0005	1.1	0.0008	0.0006	0.00007	< 0.001	< 0.00002	0.0002	0.002
75th, %ile	9.43	9.61	< 0.00001	0.00004	1.34	0.0015	< 0.000003	0.00028	< 0.0005	0.0011	1.8	0.0025	0.0012	0.00022	< 0.001	< 0.00002	0.0006	0.006
Max	9.66	9.80	0.00004	0.00004	1.6	0.0015	0.00003	0.00043	0.0007	0.0030	3.2	0.0043	0.0014	0.00023	< 0.001	< 0.00002	0.0008	0.008

Notes: MMER - Metal Mining Effluent Regulations (2002); CCME FAL - Canadian Council of Ministers of the Environment for Freshwater Aquatic Life (1999)
CCME FAL values for Cd, Cu and Ni were calculated based on hardness 125 mg/CaCO3
n above DL- number of samples above the Detection (Reporting) Limit
Values exceeding the MMER Guideliens are bolded.

The Menihek Formation is classified as Potentially Acid Generating (PAG) based on median NPR = 0.9 and NNP = -0.6 CaCO3 kg/t. Seventeen of 33 samples have negative Net Neutralization Potential and will generate acid (Attachment 2). Two of these samples showed pH below 5, indicating a depletion of NP. The highest NP in these samples was 4.0 $CaCO_3$ kg/t, which was used as a value for unavailable NP (Attachment 2). A high potential to generate acid was found in lenses of graphitic-biotite-muscovite-schists among rock varieties of the Menihek Formation. If graphitic schists are excluded from the sample population, NPR increases to 1.7 and NNP becomes positive (+2.3 $CaCO_3$ kg/t), which shifts classification of the formation from Potentially Acid Generating to Uncertain.

Median concentrations of trace elements in SFE from the Menihek Formation are below the MMER Guidelines. Concentrations of copper and zinc exceeded MMER Guidelines in two samples, and nickel in three of thirty-two samples. These exceedances are generally associated with acid-generating samples (Attachments 2 and 3). The rates of metal leaching are currently being investigated by kinetic tests using humidity cells, and will be available in January 2013.

The Wishart formations have an NPR value greater than 2 in all samples (Table 3). Therefore, the formations are considered to be non-Potentially Acid Generating. The median NNP value for the Wishart formations is 4.6 $CaCO_3$ kg/t. Concentrations of trace elements in all SFE leachates are in the compliance with MMER Guidelines (Attachment 3).

The Katsao and Denault formations were not initially assessed due to their relatively low mass in the total waste rock. From geological descriptions, there is no evidence that either Katsao or Denault formation will generate acid. Samples from these formations have been recently submitted for the ABA testing.

Evaluation of ARD/ML Potential of Waste Rock Disposal Area(s)

Total Net Neutralization Potential (TNNP) for waste rock was evaluated in order to provide a preliminary ARD assessment for the Disposal Area(s). Total neutralization potential for waste rock was determined using the following equation:

$$TNNP = \Sigma i(NNP_i - \text{unavailable } NP_i) \times Massi / 1000 \qquad (1)$$

where,

TNNP – Total Net Neutralization Potential for waste rock in tonnes of $CaCO_3$,

NNP_i – median value for lithology or formation i (Tables 1 and 3),

unavailable NP_i - unavalible Neutralization Potential assumed to be 4 $CaCO_3$ kg/t for all units based on data from Menihek formation,

$Mass_i$ – mass of the unit within the pit or pit segment in tonnes (Table 3),

1000 – conversion factor from kg to tonnes of $CaCO_3$.

Table 3 Tonnages and Total Net Neutralization Potential (TNNP) Estimated for Each Bedrock Lithological Unit at Different Elevation Segments Within the Proposed Rose Central (RC) and North Rose (NR) Open Pits

Formation	Unit	Median NNP[1]	Unavailible NP	unit TNNP	600-650m	550-600m	500-550m	450-500m	400-450m	350-400m	300-350m	250-300m	200-250m	150-200m	100-150m	Total
		CaC03 kg/tonne			Mass, tonnes											
Katsao	Katsao	0	0	0	3,594,378	12,739,033	16,225,004	12,080,252	8,175,179	4,768,563	1,966,229	556,642	24,704	0	0	60,129,984
Wishart	NR Wishart	4.6	4	0.6	1,771,177	4,800,305	12,215,021	10,466,790	9,054,271	7,956,213	6,149,609	3,602,986	1,247,299	55,261	0	57,318,932
Wishart	RC Wishart	4.6	4	0.6	14,892,109	38,415,890	41,842,950	41,450,210	36,317,690	28,484,410	23,147,719	12,056,311	2,716,362	24,939	0	239,348,590
Sokoman	NR Ore	59	4	55	690,828	10,129,200	61,051,200	65,008,350	59,308,950	53,895,900	49,938,750	45,481,350	39,174,750	29,962,905	8,289,660	422,931,843
Sokoman	RC Ore	59	4	55	4,792,050	34,582,800	49,034,850	52,374,450	53,319,750	54,924,000	49,993,950	40,699,650	33,348,735	22,897,995	3,580,410	399,548,640
Denault	RC Marble	0	0	0	135,439	1,584,517	3,623,452	5,992,012	7,035,092	5,687,880	418,557	0	0	0	0	24,506,948
Sokoman	RC Waste FW Silicate IF	92	4	88	1,192,093	3,543,795	3,988,485	3,987,875	4,231,460	4,399,015	4,478,315	4,751,290	4,498,750	827,374	0	35,928,451
Menihek	Waste Menihek	-0.6	4	-4.6	21,310,441	77,651,410	89,299,260	67,443,960	35,484,310	15,541,639	7,319,448	4,530,612	2,460,563	812,275	0	321,833,918
Sokoman	Waste Sokoman	82	4	78	10,628,030	32,226,300	44,926,500	40,443,000	44,999,700	43,764,450	36,499,350	28,011,200	16,863,145	6,482,165	129,046	304,972,886
	Total Waste				53,523,666	170,961,250	212,120,672	181,864,099	145,337,702	110,602,170	79,979,226	53,509,041	27,810,824	8,202,013	129,046	1,044,039,708
					Total Net Neutralization Potential, tonnes of $CaCO_3$											
Katsao	Katsao	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wishart	NR Wishart	4.6	4	0.6	1,063	2,880	7,329	6,280	5,433	4,774	3,690	2,162	748	33	0	34,391
Wishart	RC Wishart	4.6	4	0.6	8,935	23,050	25,106	24,870	21,791	17,091	13,889	7,234	1,630	15	0	143,609
Sokoman	NR Ore	59	4	55	37,996	557,106	3,357,816	3,575,459	3,261,992	2,964,275	2,746,631	2,501,474	2,154,611	1,647,960	455,931	23,261,251
Sokoman	RC Ore	59	4	55	263,563	1,902,054	2,696,917	2,880,595	2,932,586	3,020,820	2,749,667	2,238,481	1,834,180	1,259,390	196,923	21,975,175
Denault	RC Marble	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sokoman	RC Waste FW Silicate IF	92	4	88	104,904	311,854	350,987	350,933	375,008	387,113	394,092	418,114	395,890	72,809	0	3,161,704
Menihek	Waste Menihek	-0.6	4	-4.6	-98,028	-357,196	-410,777	-310,242	-163,136	-71,492	-33,669	-20,841	-11,319	-3,736	0	-1,480,436
Sokoman	Waste Sokoman	82	4	78	828,986	2,513,651	3,504,267	3,154,554	3,509,977	3,413,627	2,846,949	2,184,874	1,315,325	505,609	10,066	23,787,885
	Total Waste				845,860	2,494,239	3,476,912	3,226,395	3,749,072	3,751,113	3,224,950	2,591,542	1,702,275	574,729	10,066	25,647,153

Notes:

[1] - Median NNP from Table 1. See text for details.

RC Waste FW silicate IF is almost all silicate face of Sokoman.

Waste Sokoman are between the RC Ore and NR Ore and contains an undefined mix of silicate, and carbonate faces.

Wireframe mass totals slightly lower than pit volume due to some small gaps in wireframes

The Katsao and Denault formations were not included in the calculation due to lack of NNP values.

The calculations indicate that the Total Net Neutralization Potential for the waste rock pile will be positive, having a surplus of 25 Mt of $CaCO_3$ during the mine life (Table 3). This result means that if waste rock in the pile is relatively well mixed it will not generate acid even without segregation of graphitic schist from the Menihek Formation. Negative TNNP value from the Menihek Formation is greatly offset by positive TNNP mostly derived from the Sokoman Formation (Table 3).

Similar calculations were done for 50 m thick segments to provide a simulation of production of waste rock units during the mine operation. For each segment, the TNNP was positive, indicating that the vertical distribution of the lithology will not cause enrichment of acid-generating material within large parts of waste rock pile with due to the sequential disposal of different lithologies. There is potential for imperfect mixing to occur during waste rock deposition. This could cause acid generation in isolated regions of the pile. However, this is not anticipated to cause the overall acidification of discharge from the disposal area.

The probability of Metal Leaching from the waste rock is low taking into account that the exceedance of the MMER Guidelines is only observed in three of seventy bedrock samples. The exceedances are related to PAG materials from the Menihek formation. When acidic leachate with elevated metal concentrations migrates from the pockets of PAG rock, acid will be neutralized by lithologies with positive NNP comprising most of the pile. Neutralization will result in precipitation of metals within the disposal area through the adsorption of metals on iron oxides (hematite) and hydroxides (goethite), which are present in significant quantities. Based on the evidence presented above, the overall metal leaching potential from waste rock is low.

3.6 TAILINGS AND CONCENTRATE

Approximately 402 Mt of tailings will be produced over the life of mine according to the estimates. The samples of Kami concentrate and tailings had NPR values ranging from 7.3 to 233, which indicated that tailings and concentrate would not generate ARD (Table 4). In addition, process water and SFE leachates were alkaline, with the pH ranging from 8.1 to 9.1 (Table 5). The conclusion is that the concentrate and tailings will be non-acid generating. Metal concentrations in the process water and SFE leachates from tailings and concentrates were significantly below parameters prescribed by the MMER Guidelines.

Historical monitoring records of tailings discharges showed no signs of acidification associated with the two mines operating in the area (Table 6). The water quality of the discharges complied with the MMER Guidelines. Historical records and site data both indicate that discharge from the Kami tailings will not be acidic and will be in compliance with the MMER Guidelines.

Table 4 Acid Base Accounting of Kami Tailings and Concentrate from Metallurgical Testing

Sample ID		Alderon GC #1	Alderon GC #2	Alderon GC #3	Alderon GT #1	Alderon GT #2	Alderon GT #3	Alderon MC #1	Alderon MC #2	Alderon MC #3	Alderon MT #1	Alderon MT #2	Alderon MT #3
Analysis	Units	Gravity concentrate			Gravity tailings			Magnetic concentrate			Magnetic concentrate		
Paste pH	pH units	8.62	8.56	8.61	8.70	8.71	8.87	8.61	8.56	8.62	8.46	8.63	8.54
Fizz Rate	---	3	3	3	4	4	4	3	3	3	4	4	4
S	%	0.057	0.052	0.056	0.046	0.027	0.025	0.057	0.059	0.056	0.034	0.034	0.035
Sulfate-S	%	0.01	< 0.01	0.01	0.01	0.01	0.01	0.04	0.03	0.04	< 0.01	0.02	0.01
Sulfide	%	0.04	0.05	0.04	0.03	0.01	0.01	0.02	0.02	0.02	0.03	0.02	0.02
C	%	0.405	0.238	0.342	1.09	1.21	1.20	0.459	0.464	0.462	0.793	0.786	0.792
CO3	%	0.470	0.163	0.356	3.08	3.93	4.55	1.07	1.11	1.09	2.60	2.42	2.56
NP	t CaCO3/1000 t	19.1	11.4	14.7	64.9	72.2	71.0	20.3	21.5	20.5	43.6	44.0	44.0
AP	t CaCO3/1000 t	1.25	1.56	1.25	0.94	0.31	0.31	0.62	0.62	0.62	0.94	0.62	0.62
Net NP	t CaCO3/1000 t	17.8	9.84	13.4	64.0	71.9	70.7	19.7	20.9	19.9	42.7	43.4	43.4
NPR	ratio	15.3	7.31	11.8	69.0	233	229	32.7	34.7	33.1	46.4	71.0	71.0
Average NPR ± S.D.	ratio	11.5	±	3.3	177.0	±	76.4	33.5	±	0.9	62.8	±	11.6

Notes:
NP (Neutralization Potential)
AP (Acid Potential) = % Sulfide Sulfur x 31.25
Net NP (Net Neutralization Potential) = NP-AP
NPR(Neutralization Potential Ratio) = NP/AP
Samples with a % Sulfide value of <0.01 will be calculated using a 0.01 value.
Sulfur analysis performed following BC ARD Guidelines (Price 1997)

Table 5 Analysis of Process Water and Shake Flask Extraction

Analysis	Units	MMER Guideline	CCME FAL Guideline	Alderon Process Water #1		Alderon Process Water #2		Alderon Process Water #3		Alderon GC #1	Alderon GC #2	Alderon GC #3	Alderon GT #1	Alderon GT #2	Alderon GT #3	Alderon MC #1	Alderon MC #2	Alderon MC #3	Alderon MT #1	Alderon MT #2	Alderon MT #3	Reporting Limit
Routine water chemistry																						
TSS	mg/L	15	-	3		145		678		-	-	-	-	-	-	-	-	-	-	-	-	-
TDS	mg/L	-	-	200		234		171		-	-	-	-	-	-	-	-	-	-	-	-	-
pH*	units	-	6.5-9.0	8.12		8.31		8.17		9.10	9.07	9.13	8.90	8.99	8.96	8.8	8.77	8.89	8.79	8.82	8.71	-
Alkalinity	mg/L as CaCO3	-	-	114		164		118		-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivi	µS/cm	-	-	286		375		289		-	-	-	-	-	-	-	-	-	-	-	-	-
NH3+NH4	as N mg/L	-	0.14	< 0.1		0.1		0.1		-	-	-	-	-	-	-	-	-	-	-	-	-
Cl	mg/L	-	120	22		21		20		-	-	-	-	-	-	-	-	-	-	-	-	-
SO4	mg/L	-	-	8.7		15.0		8.6		-	-	-	-	-	-	-	-	-	-	-	-	-
NO2	as N mg/L	-	-	< 0.06		< 0.06		< 0.06		-	-	-	-	-	-	-	-	-	-	-	-	-
NO3	as N mg/L	-	10	0.23		< 0.05		0.20		-	-	-	-	-	-	-	-	-	-	-	-	-
Metal scan				Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	-
Hg	mg/L	-	0.000026	-	0.00001	-	0.00001	-	0.00002	< 0.00001	0.00001	0.00001	0.00001	< 0.00001	0.00001	0.00001	0.00001	0.00001	< 0.00001	< 0.00001	0.00001	0.00001
Ag	mg/L	-	0.0001	< 0.00001	< 0.00001	-	0.00008	0.00001	0.00011	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00001
Al	mg/L	-	0.1	0.02	0.04	0.15	0.54	0.08	0.76	0.16	0.16	0.16	0.03	0.03	0.02	0.02	0.01	0.02	< 0.01	< 0.01	< 0.01	0.01
As	mg/L	0.5	0.005	0.0004	0.0005	0.0012	0.0019	0.0010	0.0020	0.0008	0.0007	0.0010	0.0008	0.0008	0.0008	0.0002	< 0.0002	0.0002	< 0.0002	< 0.0002	< 0.0002	0.0002
Ba	mg/L	-	-	0.0807	0.0942	0.177	0.373	0.187	0.688	0.0384	0.0569	0.0597	0.0482	0.0569	0.0778	0.0147	0.0146	0.013	0.0193	0.0199	0.023	0.00001
Be	mg/L	-	-	0.00002	0.00005	0.00021	0.00061	0.00016	0.00105	0.0033	0.0027	0.0029	0.0497	0.0038	0.0034	0.0033	0.003	0.0026	0.0043	0.0044	0.005	0.0002
B	mg/L	-	-	0.0076	0.0077	0.0287	0.0283	0.0087	0.0096	0.00005	0.00006	0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00002
Ca	mg/L	-	-	42.1	43.6	48.1	55.7	44.7	64.7	7.60	6.97	7.28	12.0	9.34	10.3	12.2	12.7	11.3	15.5	14.2	15.3	0.02
Cd	mg/L	-	0.00004	0.000008	0.000016	< 0.000003	0.000045	0.000023	0.000096	0.000004	< 0.000003	< 0.000003	< 0.000003	0.000003	0.000003	0.000005	0.000006	0.000006	0.000003	0.000006	0.000006	0.000003
Co	mg/L	-	0.004	0.0004	0.0007	0.0015	0.0038	0.0015	0.0077	0.0002	0.0002	0.0002	0.0001	0.000094	0.000151	0.000067	0.000073	0.000067	0.000029	0.000036	0.000038	0.000002
Cr	mg/L	-	0.001	< 0.0005	0.0007	0.0039	0.0095	0.0011	0.0051	< 0.0005	0.0005	< 0.0005	0.0007	< 0.0005	0.0006	0.0038	0.0037	0.0036	< 0.0005	< 0.0005	< 0.0005	0.0005
Cu	mg/L	0.3	0.0028	0.0034	0.0043	0.0041	0.0079	0.0040	0.0128	0.0015	0.0017	0.0012	0.0014	0.001	0.0011	0.0023	0.0024	0.0021	0.0023	0.0018	0.0018	0.0005
Fe	mg/L	-	0.3	0.995	1.67	7.71	20.9	8.21	44.2	1.04	1.09	0.91	0.90	0.44	0.74	0.25	0.32	0.34	0.043	0.073	0.053	0.003
K	mg/L	-	-	1.98	1.98	7.76	8.15	2.18	2.56	0.27	0.21	0.25	0.57	2.04	2.01	0.476	0.447	0.479	1.44	1.72	1.66	0.006
Mn	mg/L	-	-	0.45	0.89	3.14	8.13	3.3	20.2	-	-	-	-	1.93	2.03	1.75	1.8	1.5	2.18	2.28	2.6	0.003
Mg	mg/L	-	-	4.84	5.13	15.7	19.1	6.64	15.2	2.08	1.93	2.07	3.00	0.0781	0.133	0.0223	0.0254	0.0232	0.029	0.0367	0.0463	0.001
Mo	mg/L	-	0.073	-	0.0011	-	0.0144	-	0.0005	0.0044	0.0039	0.0040	0.0062	0.00413	0.00367	0.00652	0.00649	0.00566	0.00752	0.0073	0.00804	0.00001
Na	mg/L	-	-	10.6	10.7	10.3	10.0	9.56	10.1	0.27	0.22	0.21	11.1	0.42	0.51	0.34	0.34	0.29	0.5	0.56	0.65	0.01
Ni	mg/L	0.5	0.113	0.0014	0.0016	0.0073	0.0095	0.0022	0.0049	0.0004	0.0004	0.0003	0.0003	0.0005	0.0011	0.0006	0.0006	0.0005	0.0006	0.0006	0.0006	0.0001
Pb	mg/L	0.2	0.0063	0.00008	0.00063	0.00046	0.00132	0.00046	0.00263	0.00012	0.00011	0.00007	0.00004	0.00004	0.00007	0.00006	0.00007	0.00008	< 0.00002	< 0.00002	< 0.00002	0.00002
Sb	mg/L	-		< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0003	0.0002	0.0003	0.0002	0.0002	0.0002	< 0.0002	< 0.0002	< 0.0002	0.0002
Se	mg/L	-	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001
Si	mg/L	-	-	3.27	3.04	14.3	13.6	6.10	10.7	3.46	2.97	3.37	5.38	4.88	4.78	1.49	1.55	1.42	1.48	1.65	1.65	0.01
Sn	mg/L	-	-	< 0.00001	0.00008	0.00007	0.00015	0.00005	0.00016	< 0.00001	< 0.00001	0.00002	0.00002	< 0.00001	0.00001	0.00002	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001
Tl	mg/L	-	0.0008	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00002
U	mg/L	-	0.015	0.0008	0.0008	0.0110	0.0113	0.0013	0.0017	0.0003	0.0002	0.0002	0.0012	0.000618	0.000648	0.00203	0.000069	0.000053	0.000085	0.000839	0.000075	0.000001
V	mg/L	-	-	0.00009	0.00016	0.00069	0.00084	0.00053	0.00144	0.00018	0.00015	0.00018	0.00018	0.00015	0.00014	< 0.00003	< 0.00003	< 0.00003	< 0.00003	< 0.00003	< 0.00003	0.00001
Zn	mg/L	0.5	0.03	0.003	0.005	0.008	0.014	0.008	0.032	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	0.001

Notes: MMER - Metal Mining Effluent Regulations (2002); CCME FAL - Canadian Council of Ministers of the Environment for Freshwater Aquatic Life (1999)
CCME FAL values for Cd, Cu and Ni were calculated based on minimum hardness estimated for process water (125 mg/CaCO3)
* Final pH values were reported for SFE results

Table 6 Comparison of MMER and CCME Guidelines to Kami Process Water and Discharge Water Quality from Tailings of Similar Iron Oxide Ore Mines in the Region

Parameter	Al	Alkalinity	As	Ca	Cd	Cu	Fe	Hardness	Hg	Mg	Mn	Mo	Na	NH3-N	Ni	NO3-N	Pb	Tot. P	pH(units)	Ra (Bq/L)	TDS	TSS	Zn
Units	mg/L	mg/L*	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L*	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Guidelines																							
MMER	-	-	1.0	-	-	0.6	-	-	-	-	-	-	-	-	1.0	-	0.4	-	-	1.1	-	15.0	1.0
CCME	0.10	-	0.005	-	0.000015	0.002	0.30	-	0.000026	-	-	0.073	-	0.14	0.11	100	0.0063	-	6.5-9.0	-	-	-	0.030
Iron Ore Company of Canada																							
DL**	n.d.	n.d.	0.001	n.d.	0.000017	0.002	0.05	n.d.	0.000013	n.d.	n.d.	0.002	n.d.	0.05	0.001	n.d.	0.0005	0.1	n.d.	0.01	n.d.	2.0	0.005
n analyses	19	16	175	16	17	178	18	15	17	16	10	17	12	17	177	16	177	16	180	27	16	179	178
n detects	19	16	0	16	6	14	16	15	0	16	10	3	12	10	2	16	8	0	180	4	16	52	40
95th percentile	0.050	47.8	n.d.	13.2	0.000047	0.0031	0.12	55.1	n.d.	5.34	0.052	0.0005	2.03	0.30	0.0020	1.21	0.0006	n.d.	8.08	0.007	72.3	5.9	0.012
Median	0.023	44.5	n.d.	11.5	0.000036	0.0023	0.07	48.0	n.d.	4.45	0.023	0.0004	1.40	0.08	0.0015	0.91	0.0003	n.d.	7.74	0.006	58.0	2.0	0.006
5th percentile	0.009	37.5	n.d.	9.9	0.000022	0.0010	0.05	40.7	n.d.	3.85	0.016	0.0003	1.16	0.06	0.0011	0.78	0.0001	n.d.	6.99	0.005	39.5	1.0	0.002
Average	0.027	43.3	n.d.	11.6	0.000035	0.0023	0.08	47.4	n.d.	4.47	0.030	0.0004	1.47	0.12	0.0015	0.96	0.0003	n.d.	7.65	0.006	55.5	3.2	0.007
St. Dev.	0.019	4.2	n.d.	1.1	0.000010	0.0007	0.03	4.6	n.d.	0.48	0.013	0.0001	0.30	0.11	0.0005	0.16	0.0002	n.d.	0.37	0.001	12.2	3.9	0.003
Wabush Mines																							
DL**	0.010000	n.d.	0.001	n.d.	0.0005	0.002	0.1	n.d.	0.000013	n.d.	n.d.	0.002	n.d.	0.05	0.002	0.1	0.0005	0.1	n.d.	0.01	1.0	2.0	0.005
n analyses	21	25	276	n.d.	26	275	263	25	26	21	465	26	n.d.	25	274	25	275	614	614	15	353	614	275
n detects	19	25	10	n.d.	1	81	195	25	1	21	465	1	n.d.	19	54	25	18	614	614	0	349	575	83
95th percentile	0.296	32.8	0.011	n.d.	0.05	0.0047	0.85	37.1	0.000020	4.02	0.717	0.0050	n.d.	0.16	0.006	1.70	0.0133	7.7	7.70	n.d.	73.2	20.0	0.050
Median	0.050	29.0	0.002	n.d.	0.05	0.0010	0.13	33.7	0.000020	3.42	0.110	0.0050	n.d.	0.05	0.001	1.20	0.0010	7.2	7.22	n.d.	48.0	3.0	0.011
5th percentile	0.019	23.0	0.001	n.d.	0.05	0.0010	0.03	28.7	0.000020	2.91	0.022	0.0050	n.d.	0.01	0.001	0.45	0.0005	6.6	6.56	n.d.	21.4	1.0	0.005
Average	0.103	28.3	0.005	n.d.	0.05	0.0029	0.26	33.4	0.000020	3.40	0.219	0.0050	n.d.	0.06	0.005	1.14	0.0039	7.2	7.21	n.d.	47.6	5.8	0.017
St. Dev.	0.198	3.5	0.004	n.d.	n.d.	0.0103	0.54	3.2	n.d.	0.32	0.376	n.d.	n.d.	0.05	0.027	0.44	0.0074	0.4	0.37	n.d.	17.0	9.6	0.016
Kami process water from metallurgical testing																							
Sample #1	0.04	114	0.0005	43.6	0.000016	0.0043	1.67	n.d.	0.00001	5.13	n.d.	0.00108	10.7	< 0.1	0.0016	0.23	0.00063	n.d.	8.12	n.d.	200	3	0.005
Sample #2	0.54	164	0.0019	55.7	0.000045	0.0079	20.9	n.d.	0.00001	19.1	n.d.	0.0144	10.0	0.1	0.0095	< 0.05	0.00132	n.d.	8.31	n.d.	234	145	0.014
Sample #3	0.76	118	0.0020	64.7	0.000096	0.0128	44.2	n.d.	0.00002	15.2	n.d.	0.00047	10.1	0.1	0.0049	0.20	0.00263	n.d.	8.17	n.d.	171	678	0.032

Notes: n.d. - no data
* Alkalinity and hardness as CaCO3 mg/L. **DL - Detection Limit.
Data source: Government of Newfoundland and Labrador, Department of Environment and Conservation (pers. comm.)
MMER - Metal Mining Effluent Regulations (2002); CCME FAL - Canadian Council of Ministers of the Environment for Freshwater Aquatic Life (1999)
CCME FAL values for Cd, Cu and Ni were calculated based on 5th percentile hardness for IOCC discharge (40 mg/CaCO3)

3.7 OPEN PIT

Historic data indicate that lakes formed in open-pit iron mines of the Labrador Trough are not acidic and have metal concentrations below the MMER Guidelines. Stantec previously assessed two mine sites in the Schefferville Area (Western Labrador), where mining activities have occurred since the 1950s (Labrador iron Mines (LIM), 2009). Surface drainage, including flooded open pits, did not show any evidence for ARD/ML.

The walls of the proposed open pits will be represented by the same lithologies as the waste rock. The waste rock disposal area is not expected to generate acidic discharge, therefore, it is unlikely that mine water will be acidic or contain trace elements in concentrations exceeding the MMER Guidelines.

4.0 CONCLUSIONS

Ore concentrate and tailings are considered non-acid generating with low metal leaching potential, based on the results of static tests.

Using median NPR values and assuming that overburden will be well mixed during the disposal, it is concluded that the overburden stockpile would not generate acidic runoff from sulfide oxidation. Approximately 25% of overburden samples were potentially acid-generating samples, with some of them exceeding the MMER Guidelines for copper, zinc, and nickel concentrations in shake flask extracts.

The waste rock disposal areas will have positive Total Net Neutralization Potential (TNNP), regardless of the presence of potentially acid-generating (PAG) rock mostly originating from the Menihek Formation. This fact indicates that if the waste-rock in disposal areas is relatively well mixed, they will not generate acidic runoff, even without segregation of PAG rock. Copper, zinc, and nickel are potential elements of concern associated with PAG rock. Based on the current understanding, metal leaching potential of waste rock is low.

Mine water from the pit is not expected to be acidic or contain elevated concentrations of trace elements above the MMER Guidelines based on historical data and static tests of rock cores.

5.0 REFERENCES

Pers. Comm. 2012. (via e-mail). From Larry Poznikoff from Forbes West to Nikolay Sidenko from Stantec on July 7, 2011 in relation to distribution of lithologies in the Rose Pit.

BBA 2011. Preliminary Economic Assessment Report of the Kamistiatusset (KAMI) Iron Ore Property, Labrador. Technical report prepared for Alderon Iron Ore Corp. September 2011.

LIM. 2009. Revised Environmental Impact Statement for Schefferville Area Iron Ore Mine (Western Labrador) Labrador Iron Mines, August 2009.

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Price, W.A. 2009, Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. Report prepared for MEND. Report 1.20.1.

ATTACHMENT 1

CERTIFICATES OF ANALYSES

SGS Canada Inc.
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June-22-12

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Date Rec. : 12 June 2012
LR Report: **CA10288-JUN12**
Reference: PO#: 121614000.324
Project: Alderon

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: ROB-11-09#1	6: ROB-11-09#7	7: ROB-11-09#19	8: ROB-11-09#23	9: ROB-11-17#4
Sample Date & Time			07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12
Paste pH [units]	20-Jun-12	13:20	5.84	8.27	8.82	4.19	8.73
Fizz Rate [---]	20-Jun-12	13:20	1	1	1	1	1
Sample weight [g]	20-Jun-12	13:20	2.01	1.97	2.00	2.02	2.02
HCl added [mL]	20-Jun-12	13:20	20.00	20.00	20.00	20.00	20.00
HCl [Normality]	20-Jun-12	13:20	0.10	0.10	0.10	0.10	0.10
NaOH [Normality]	20-Jun-12	13:20	0.10	0.10	0.10	0.10	0.10
NaOH to [pH=8.3 mL]	20-Jun-12	13:20	19.21	16.36	14.07	19.71	17.49
Final pH [units]	20-Jun-12	13:20	1.27	1.39	1.58	1.12	1.24
NP [t CaCO3/1000 t]	20-Jun-12	13:20	2.0	9.2	15	0.70	6.2
AP [t CaCO3/1000 t]	22-Jun-12	15:35	0.31	0.31	0.31	28.1	0.31
Net NP [t CaCO3/1000 t]	22-Jun-12	15:35	1.69	8.89	14.5	-27.4	5.89
NP/AP [ratio]	22-Jun-12	15:35	6.45	29.7	47.7	0.02	20.0
Sulphur (total) [%]	22-Jun-12	15:35	0.024	0.023	0.011	0.952	< 0.005
Acid Leachable SO4-S [%]	22-Jun-12	15:35	0.02	0.02	0.01	0.06	< 0.01
Sulphide [%]	21-Jun-12	09:39	< 0.01	< 0.01	< 0.01	0.90	< 0.01
Carbon (total) [%]	22-Jun-12	15:35	1.65	0.040	0.142	2.30	0.034
Carbonate [%]	18-Jun-12	10:01	0.162	0.090	0.498	11.4	0.061

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*NP (Neutralization Potential)

$$= \frac{50 \times (\text{N of HCL} \times \text{Total HCL added} - \text{N NaOH} \times \text{NaOH added})}{\text{Weight of Sample}}$$

*AP (Acid Potential) = % Sulphide Sulphur x 31.25
*Net NP (Net Neutralization Potential) = NP-AP
NP/AP Ratio = NP/AP
*Results expressed as tonnes CaCO3 equivalent/1000 tonnes of material
Samples with a % Sulphide value of <0.01 will be calculated using a 0.01 value.

Sulphur analysis performed following BC ARD Guidelines (Price 1997)

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Project Specialist
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OnLine LIMS

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CERTIFICATE OF ANALYSIS
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Analysis	10: ROB-11-17#21	11: ROB-11-17#47	12: ROB-11-18#2	13: ROB-11-18#7	14: ROB-11-18#17	15: ROB-11-20#3	16: ROB-11-20#13
Sample Date & Time	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12
Paste pH [units]	9.54	8.25	4.78	8.50	9.30	7.62	4.74
Fizz Rate [---]	1	1	1	1	1	1	1
Sample weight [g]	2.04	1.99	1.98	2.01	2.02	2.00	2.05
HCl added [mL]	20.00	20.00	20.00	20.00	20.00	20.00	20.00
HCl [Normality]	0.10	0.10	0.10	0.10	0.10	0.10	0.10
NaOH [Normality]	0.10	0.10	0.10	0.10	0.10	0.10	0.10
NaOH to [pH=8.3 mL]	15.01	9.19	26.29	16.25	14.34	17.65	16.82
Final pH [units]	1.36	1.95	1.72	1.24	1.38	1.22	1.39
NP [t CaCO3/1000 t]	12	27	-16	9.3	14	5.9	7.8
AP [t CaCO3/1000 t]	0.31	21.9	12.5	0.31	0.31	0.31	39.4
Net NP [t CaCO3/1000 t]	11.9	5.30	-28.4	8.99	13.7	5.59	-31.6
NP/AP [ratio]	39.4	1.24	-1.27	30.0	45.2	19.0	0.20
Sulphur (total) [%]	0.018	0.861	0.430	0.008	0.035	0.006	1.49
Acid Leachable SO4-S [%]	0.01	0.16	<0.01	< 0.01	0.02	< 0.01	0.24
Sulphide [%]	< 0.01	0.70	0.40	< 0.01	0.01	< 0.01	1.26
Carbon (total) [%]	0.087	2.17	41.4	0.090	0.144	0.056	2.02
Carbonate [%]	0.293	9.50	0.297	0.249	0.536	0.087	9.61

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*NP (Neutralization Potential)

$$= \frac{50 \times (\text{N of HCL} \times \text{Total HCL added} - \text{N NaOH} \times \text{NaOH added})}{\text{Weight of Sample}}$$

*AP (Acid Potential) = % Sulphide Sulphur x 31.25
*Net NP (Net Neutralization Potential) = NP-AP
NP/AP Ratio = NP/AP
*Results expressed as tonnes CaCO3 equivalent/1000 tonnes of material
Samples with a % Sulphide value of <0.01 will be calculated using a 0.01 value.

Sulphur analysis performed following BC ARD Guidelines (Price 1997)

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Final Report

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: ROB-11-09# 1	6: ROB-11-09# 7	7: ROB-11-09# 19	8: ROB-11-09# 23	9: ROB-11-17# 4	10: ROB-11-17# 21	11: ROB-11-17# 47	12: ROB-11-18# 2	13: ROB-11-18# 7	14: ROB-11-18# 17	15: ROB-11-20# 3	16: ROB-11-20# 13
Sample Date & Time			07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12
Sample weight [g]	09-Jul-12	10:10	250	90	250	250	48	250	250	7	250	250	250	88
Volume D.I. Water [mL]	09-Jul-12	10:10	750	270	750	750	144	750	750	21	750	750	750	264
Initial pH [units]	09-Jul-12	10:10	6.03	6.33	9.06	3.12	6.85	8.97	8.59	4.91	8.63	8.86	6.52	3.50
Final pH [units]	09-Jul-12	10:10	5.75	8.55	9.06	3.04	7.87	9.29	8.66	4.91	9.03	9.36	6.95	3.80
Mercury [mg/L]	09-Jul-12	16:01	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00002	0.00001	0.00001	0.00003	0.00001
Silver [mg/L]	11-Jul-12	15:14	< 0.00001	0.00055	0.00006	< 0.00001	< 0.00001	< 0.00001	< 0.00001	nss	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Aluminum [mg/L]	06-Jul-12	14:52	0.74	1.07	0.20	4.49	3.73	0.53	0.06	nss	0.72	1.00	3.55	25.3
Arsenic [mg/L]	11-Jul-12	15:14	0.0003	0.0007	0.0014	0.0061	0.0009	0.0007	0.0017	nss	0.0002	0.0006	0.0003	0.0017
Barium [mg/L]	11-Jul-12	15:14	0.0017	0.0154	0.00529	0.0508	0.0449	0.0116	0.0415	nss	0.0127	0.0224	0.0339	0.0626
Boron [mg/L]	11-Jul-12	15:14	0.486	0.328	0.183	0.321	0.638	0.283	0.313	nss	0.158	0.170	0.536	0.724
Beryllium [mg/L]	11-Jul-12	15:14	< 0.00002	0.00002	< 0.00002	0.00076	0.00006	< 0.00002	< 0.00002	nss	< 0.00002	< 0.00002	0.00004	0.00547
Calcium [mg/L]	06-Jul-12	14:52	0.19	2.17	9.36	55.9	1.69	5.59	14.2	nss	6.04	4.69	0.44	116
Cadmium [mg/L]	11-Jul-12	15:14	0.000010	0.000011	< 0.000003	0.0152	0.000039	0.000003	< 0.000003	nss	0.000009	0.000028	< 0.000003	0.0231
Cobalt [mg/L]	11-Jul-12	15:14	0.000598	0.00297	0.000064	0.351	0.00409	0.000336	0.000095	nss	0.000399	0.00144	0.00143	1.26
Chromium [mg/L]	11-Jul-12	15:14	0.0041	0.0041	0.0006	0.0066	0.0102	0.0014	0.0008	nss	0.0021	0.0019	0.0042	0.0024
Copper [mg/L]	11-Jul-12	15:14	0.0035	0.0093	0.0008	20.6	0.0250	0.0036	0.0027	nss	0.0045	0.0085	0.0085	5.48
Iron [mg/L]	06-Jul-12	14:53	1.59	1.84	0.187	83.5	5.55	0.685	0.167	nss	0.975	0.683	4.10	9.46
Potassium [mg/L]	06-Jul-12	14:53	1.66	6.30	7.10	8.33	4.39	5.28	6.45	nss	3.17	5.42	1.45	36.2
Lithium [mg/L]	11-Jul-12	15:14	< 0.001	0.006	0.004	0.005	0.002	0.005	0.007	nss	0.003	0.004	< 0.001	0.104
Magnesium [mg/L]	06-Jul-12	14:53	0.037	0.945	2.38	21.8	1.05	1.50	5.00	nss	2.56	1.75	1.03	53.1
Molybdenum [mg/L]	11-Jul-12	15:15	0.00032	0.00678	0.0125	0.00052	0.0135	0.00370	0.0168	nss	0.00204	0.00353	0.00051	0.00049
Sodium [mg/L]	06-Jul-12	14:53	14.1	21.1	11.6	14.6	34.7	14.0	16.8	nss	13.3	14.9	15.3	26.3

OnLine LIMS

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SFE Leach Test-3:1 L/S DI Water Extraction for 24hrs

LR Report : **CA10289-JUN12**

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: ROB-11-09# 1	6: ROB-11-09# 7	7: ROB-11-09# 19	8: ROB-11-09# 23	9: ROB-11-17# 4	10: ROB-11-17# 21	11: ROB-11-17# 47	12: ROB-11-18# 2	13: ROB-11-18# 7	14: ROB-11-18# 17	15: ROB-11-20# 3	16: ROB-11-20# 13
Nickel [mg/L]	11-Jul-12	15:15	0.0006	0.0051	0.0005	0.915	0.0112	0.0011	0.0008	nss	0.0011	0.0048	0.0031	4.14
Lead [mg/L]	11-Jul-12	15:15	0.00066	0.00180	0.00005	0.0271	0.00556	0.00035	0.00007	nss	0.00048	0.00026	0.00131	0.00284
Antimony [mg/L]	11-Jul-12	15:15	0.0003	0.0003	0.0008	0.0002	0.0013	0.0003	0.0005	nss	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Selenium [mg/L]	11-Jul-12	15:15	< 0.001	< 0.001	< 0.001	0.342	< 0.001	< 0.001	0.003	nss	0.002	< 0.001	< 0.001	0.048
Silicon [mg/L]	06-Jul-12	14:53	4.89	9.82	6.42	17.8	16.7	9.09	9.34	nss	4.70	6.22	19.3	22.4
Tin [mg/L]	11-Jul-12	15:15	0.00007	0.00009	0.00004	0.00002	0.00037	0.00018	0.00008	nss	0.00012	0.00013	0.00015	0.00002
Thallium [mg/L]	11-Jul-12	15:15	< 0.00002	0.00002	< 0.00002	0.00114	0.00007	< 0.00002	< 0.00002	nss	< 0.00002	0.00002	0.00003	0.00102
Uranium [mg/L]	11-Jul-12	15:15	0.000142	0.000269	0.000287	1.68	0.000383	0.000569	0.000800	nss	0.000583	0.0128	0.000334	0.892
Vanadium [mg/L]	11-Jul-12	15:15	0.00186	0.00381	0.00283	0.00463	0.00464	0.00644	0.00182	nss	0.00636	0.00896	0.00272	0.00005
Zinc [mg/L]	11-Jul-12	15:15	0.001	0.003	< 0.001	0.096	0.016	0.002	0.003	nss	0.002	0.005	0.012	3.87

Limited sample (7g) available for sample ROB-11-18#2. Mercury analysis performed but insufficient volume for remaining metals.

Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

OnLine LIMS

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Stantec
Attn : Nikolay Sidenko

603-386 Broadway Ave.
Winnipeg, MB
R3C 3R6,

Phone: 204-928-8862
Fax:204-942-2548

Thursday, June 14, 2012

Date Rec. : 17 May 2012
LR Report : **CA10408-MAY12**
Client Ref : PO#121614000.324 Project:Alderon

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Paste pH units	Fizz Rate ---	Sample weight g	HCl added mL	HCl Normality	NaOH Normality	NaOH to pH=8.3 mL	Final pH units	NP t CaCO3/1000 t	AP t CaCO3/1000 t	Net NP t CaCO3/1000 t	NP/AP ratio	Sulphur (total) %	Acid Leachable SO4-S %	Sulphide %	Carbon (total) %	Carbonate %
1: Analysis Start Date	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	---	---	---	07-Jun-12	08-Jun-12	08-Jun-12	07-Jun-12	08-Jun-12
2: Analysis Start Time	09:32	09:32	09:32	09:32	09:32	09:32	09:32	09:32	09:32	---	---	---	09:52	14:57	14:57	09:52	10:45
3: Analysis Approval Date	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	08-Jun-12	08-Jun-12	08-Jun-12	08-Jun-12	11-Jun-12
4: Analysis Approval Time	11:32	11:32	11:32	11:32	11:32	11:32	11:32	11:32	11:32	11:37	11:37	11:37	11:38	15:51	15:51	11:39	11:14
5: K140/1	8.11	4	1.95	116.00	0.10	0.10	33.22	1.84	212	68.0	144	3.12	2.76	0.58	2.18	3.87	16.9
6: K140/2	9.89	1	2.06	20.00	0.10	0.10	15.65	1.31	10.6	6.79	3.81	1.56	0.913	0.70	0.22	0.328	1.42
7: K140/3	9.14	4	1.96	40.00	0.10	0.10	13.72	1.81	67.0	3.76	63.2	17.8	0.214	0.09	0.12	1.34	5.92
8: K140/4	9.93	1	2.02	20.00	0.10	0.10	16.37	1.33	9.0	6.30	2.70	1.43	0.377	0.18	0.20	0.273	1.17
9: K140/5	9.01	1	2.02	20.00	0.10	0.10	15.75	1.41	10.5	20.4	-9.94	0.51	0.848	0.19	0.65	1.04	4.90
10: K140/6	9.09	3	1.97	20.00	0.10	0.10	9.42	1.82	26.9	9.18	17.7	2.93	0.349	0.06	0.29	0.915	4.13
11: K140/7	9.52	3	2.03	51.20	0.10	0.10	28.21	1.61	56.6	9.60	47.0	5.89	0.560	0.25	0.31	0.567	2.07
12: K140/8	9.09	2	1.97	20.00	0.10	0.10	15.39	1.22	11.7	0.31	11.4	37.7	0.016	0.02	< 0.01	0.137	0.314
13: K140/9	9.12	4	2.09	89.90	0.10	0.10	25.29	1.82	155	0.31	154	499	0.009	< 0.01	< 0.01	2.10	9.27
14: K140/10	8.70	4	2.00	79.00	0.10	0.10	36.49	1.95	106	0.48	106	222	0.042	0.03	0.02	1.50	6.12
15: K140/11	8.72	4	1.97	101.60	0.10	0.10	28.15	1.76	186	0.31	186	601	0.030	0.03	< 0.01	2.24	10.2
16: K140/12	9.15	3	2.01	38.10	0.10	0.10	18.42	1.67	49.0	0.31	48.7	158	0.020	0.02	< 0.01	0.803	0.270
17: K140/13	9.17	3	2.01	29.50	0.10	0.10	12.54	1.62	42.2	0.31	41.9	136	0.023	0.02	< 0.01	0.634	2.32
18: K143/1	9.40	3	1.96	88.20	0.10	0.10	41.47	1.85	119	24.4	94.8	4.88	1.32	0.54	0.78	4.06	16.6
19: K143/2	8.75	4	2.04	169.60	0.10	0.10	68.92	1.90	247	15.1	232	16.4	0.818	0.33	0.48	6.84	21.7
20: K20/1	4.72	1	1.95	20.00	0.10	0.10	18.70	1.26	3.3	17.3	-14.0	0.19	1.01	0.45	0.55	1.59	6.74
21: K20/2	9.12	1	2.01	20.00	0.10	0.10	17.02	1.34	7.4	22.9	-15.5	0.32	1.58	0.85	0.73	2.00	9.69
22: K20/3	8.33	2	1.99	25.80	0.10	0.10	16.11	1.62	24.3	184	-160	0.13	7.43	1.54	5.89	22.4	106
23: K20/4	9.41	2	1.97	20.00	0.10	0.10	13.98	1.46	15.3	0.36	14.9	42.6	0.022	0.01	0.01	1.53	7.43
24: K20/5	9.26	1	1.98	20.00	0.10	0.10	17.03	1.30	7.5	43.9	-36.4	0.17	1.87	0.46	1.41	4.66	22.2
25: K20/6	8.81	2	1.96	20.00	0.10	0.10	13.60	1.58	16.3	54.5	-38.2	0.30	2.54	0.79	1.74	19.0	77.0

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LR Report : **CA10408-MAY12**

Sample ID	Paste pH units	Fizz Rate ---	Sample weight g	HCl added mL	HCl Normality	NaOH Normality	NaOH to pH=8.3 mL	Final pH units	NP t CaCO3/1000 t	AP t CaCO3/1000 t	Net NP t CaCO3/1000 t	NP/AP ratio	Sulphur (total) %	Acid Leachable SO4-S %	Sulphide %	Carbon (total) %	Carbonate %
26: K20/7	9.22	2	1.97	48.30	0.10	0.10	32.77	1.61	39.4	21.5	17.9	1.83	0.819	0.13	0.69	0.241	0.529
27: K20/8	8.96	4	2.07	125.80	0.10	0.10	40.29	1.73	206	22.4	184	9.24	1.15	0.44	0.72	3.16	12.7
28: K20/9	8.89	4	1.99	278.20	0.10	0.10	115	1.59	409	2.37	407	172	0.209	0.13	0.08	6.71	30.7
29: K20/10	9.24	3	2.03	41.80	0.10	0.10	14.09	1.82	68.2	0.31	67.9	220	0.007	< 0.01	< 0.01	0.963	3.98
30: K20/11	9.57	3	2.00	27.40	0.10	0.10	17.28	1.64	25.3	1.18	24.1	21.4	0.066	0.03	0.04	0.198	0.780
31: K20/12	8.54	3	2.01	57.10	0.10	0.10	32.46	1.60	61.3	31.7	29.6	1.94	1.13	0.11	1.01	1.03	2.18
32: K20/13	9.14	2	2.00	25.60	0.10	0.10	21.52	1.59	10.2	0.50	9.70	20.3	0.040	0.02	0.02	0.033	0.051
33: K20/14	9.36	4	2.02	76.00	0.10	0.10	29.59	1.92	115	0.58	114	200	0.050	0.03	0.02	1.44	6.64
34: K86B/1	7.83	1	1.98	20.00	0.10	0.10	19.12	1.14	2.2	0.36	1.84	6.18	0.039	0.03	0.01	1.47	8.81
35: K66/1	8.79	4	2.04	75.80	0.10	0.10	26.93	1.69	120	0.31	119	386	0.015	0.01	< 0.01	1.71	7.30
36: K66/2	7.64	3	2.01	28.80	0.10	0.10	13.79	1.66	37.3	0.31	37.0	120	0.019	0.02	< 0.01	0.729	2.90
37: K66/4	7.64	1	1.98	20.00	0.10	0.10	17.16	1.65	7.2	86.7	-79.5	0.08	2.73	< 0.01	2.77	7.53	33.4
38: K66/5	8.65	4	2.03	132.50	0.10	0.10	69.40	1.62	155	4.30	151	36.1	0.225	0.09	0.14	3.62	13.6
39: K66/6	8.98	4	1.98	198.80	0.10	0.10	39.01	1.96	404	87.3	316	4.62	3.65	0.86	2.79	5.94	22.7
40: K66/7	9.27	1	2.01	20.00	0.10	0.10	16.48	1.42	8.7	9.26	-0.56	0.94	0.563	0.27	0.30	1.03	5.14
41: K66/8	8.76	2	2.02	38.40	0.10	0.10	19.88	1.60	45.8	34.7	11.1	1.32	6.86	5.75	1.11	18.4	68.5
42: K66/9	9.22	4	1.96	73.20	0.10	0.10	40.68	1.64	83.0	13.3	69.7	6.23	0.624	0.20	0.43	0.920	3.84
43: K66/10	9.06	1	1.98	20.00	0.10	0.10	13.20	1.82	17.2	29.5	-12.3	0.58	1.17	0.22	0.95	2.75	13.4
44: K66/11	7.19	1	1.99	20.00	0.10	0.10	17.80	1.56	5.5	56.4	-50.9	0.10	1.84	0.03	1.81	4.55	21.2
45: K66/12	8.76	4	2.00	158.10	0.10	0.10	68.30	1.64	224	0.31	224	724	0.014	0.01	< 0.01	4.12	18.6
46: K66/13	8.62	1	1.97	20.00	0.10	0.10	18.06	1.17	4.9	0.31	4.59	15.8	0.006	< 0.01	< 0.01	0.057	0.084
47: K66/14	8.62	4	2.05	105.30	0.10	0.10	68.83	1.61	89.0	0.42	88.6	214	0.053	0.04	0.01	6.15	10.6
48: K64/1	8.34	1	1.99	20.00	0.10	0.10	18.92	1.11	2.7	0.31	2.39	8.71	< 0.005	< 0.01	< 0.01	0.023	0.081
49: K64/2	9.33	1	1.99	20.00	0.10	0.10	18.19	1.21	4.5	0.31	4.19	14.5	0.014	0.01	< 0.01	0.044	0.184
50: K64/3-208.7	9.51	2	2.06	67.80	0.10	0.10	47.21	1.58	50.0	3.39	46.6	14.7	0.342	0.23	0.11	0.504	1.71
51: K64/3-163.5 (K66/3)	8.56	4	2.01	52.10	0.10	0.10	28.08	1.56	59.7	0.31	59.4	193	0.055	0.05	< 0.01	1.05	4.43
52: K64/4	8.93	4	2.01	70.30	0.10	0.10	37.06	1.58	82.7	0.31	82.4	267	< 0.005	< 0.01	< 0.01	3.07	6.62
53: K64/5	8.38	1	2.02	20.00	0.10	0.10	15.87	1.83	10.2	58.8	-48.6	0.17	2.32	0.44	1.88	8.24	39.1
54: K24/1	9.13	4	1.98	350.60	0.10	0.10	91.28	1.90	655	7.70	647	85.1	0.476	0.23	0.25	9.32	33.3
55: K24/2	9.07	4	2.02	132.50	0.10	0.10	48.22	1.70	209	5.02	204	41.5	0.513	0.35	0.16	3.49	16.0
56: K24/3	9.92	2	1.96	20.00	0.10	0.10	13.71	1.47	16.0	5.78	10.2	2.77	0.506	0.32	0.18	2.36	11.6
57: K24/4	9.83	3	1.98	20.00	0.10	0.10	10.07	1.77	25.1	9.45	15.6	2.66	0.566	0.26	0.30	1.78	8.39
58: K24/5	9.78	1	1.96	20.00	0.10	0.10	16.94	1.33	7.8	27.4	-19.6	0.28	1.20	0.33	0.88	1.29	6.37
59: K24/6-262.5 (K24/9)	9.20	2	2.05	52.60	0.10	0.10	20.78	1.74	77.6	0.31	77.3	250	0.015	0.01	< 0.01	1.14	1.79
60: K24/6-206.5 (K24/6)	8.61	4	1.97	77.10	0.10	0.10	33.04	1.77	112	13.6	98.2	8.21	0.661	0.22	0.44	2.42	7.62
61: K24/6-280 (K24/9) (284)	8.24	1	1.96	28.10	0.10	0.10	23.37	1.56	12.1	82.1	-70.0	0.15	2.86	0.23	2.63	12.8	63.2
62: K24/8	8.58	2	1.97	20.00	0.10	0.10	14.71	1.50	13.4	11.9	1.45	1.12	0.523	0.14	0.38	1.71	8.93
63: K24/10	8.95	3	2.01	39.90	0.10	0.10	20.00	1.56	49.5	6.88	42.6	7.19	0.280	0.06	0.22	0.664	2.96
64: K24/11	8.86	1	1.98	20.00	0.10	0.10	18.04	1.15	4.9	0.31	4.59	15.8	< 0.005	< 0.01	< 0.01	0.070	0.271
65: K163/1	7.77	1	2.03	20.00	0.10	0.10	17.64	1.44	5.8	29.8	-24.0	0.19	1.14	0.19	0.95	1.45	7.10
66: K163/2	8.18	1	2.02	20.00	0.10	0.10	16.80	1.53	7.9	10.2	-2.26	0.78	0.443	0.12	0.33	3.63	18.6
67: K163/3	9.62	2	2.00	20.00	0.10	0.10	15.17	1.35	12.1	1.10	11.0	11.0	0.174	0.14	0.04	0.335	1.35
68: K163/4	8.65	4	2.03	263.70	0.10	0.10	112	1.61	373	2.85	370	131	0.324	0.23	0.09	6.05	29.2
69: K163/5	4.45	1	1.97	20.00	0.10	0.10	18.43	1.30	4.0	190	-186	0.02	6.29	0.22	6.06	15.5	54.6
70: K163/6	7.10	1	2.00	20.00	0.10	0.10	19.24	1.16	1.9	1.35	0.55	1.40	0.109	0.07	0.04	1.38	6.62
71: K163/8	9.27	4	2.06	53.90	0.10	0.10	26.02	1.56	67.7	0.31	67.4	218	0.018	0.02	< 0.01	1.38	3.84
72: K163/9	9.25	4	1.98	79.90	0.10	0.10	31.94	1.68	121	0.31	121	391	< 0.005	< 0.01	< 0.01	2.14	7.83

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LR Report : **CA10408-MAY12**

Sample ID	Paste pH units	Fizz Rate ---	Sample weight g	HCl added mL	HCl Normality	NaOH Normality	NaOH to pH=8.3 mL	Final pH units	NP t CaCO3/1000 t	AP t CaCO3/1000 t	Net NP t CaCO3/1000 t	NP/AP ratio	Sulphur (total) %	Acid Leachable SO4-S %	Sulphide %	Carbon (total) %	Carbonate %
73: K163/12	9.06	1	2.03	20.00	0.10	0.10	18.37	1.22	4.0	0.31	3.69	12.9	0.032	0.03	< 0.01	0.078	0.289
74: K102/1	8.69	4	2.02	142.50	0.10	0.10	63.62	1.79	195	0.31	195	630	0.015	0.01	< 0.01	3.72	13.5
75: K102/2	8.88	4	1.99	51.20	0.10	0.10	22.85	1.66	71.2	0.31	70.9	230	0.006	< 0.01	< 0.01	1.29	4.65
76: K102/3	8.83	4	2.02	40.00	0.10	0.10	24.53	1.63	38.3	0.31	38.0	124	0.030	0.03	< 0.01	1.39	1.95
77: K102/4	8.84	1	2.06	20.00	0.10	0.10	18.60	1.13	3.4	0.31	3.09	11.0	0.009	< 0.01	< 0.01	0.026	0.048
78: K102/5	7.62	1	2.03	20.00	0.10	0.10	18.93	1.12	2.6	0.31	2.29	8.39	0.020	0.02	< 0.01	0.032	0.019
79: K152/1	8.18	1	2.06	20.00	0.10	0.10	16.73	1.46	7.9	23.1	-15.2	0.34	0.901	0.16	0.74	1.60	7.44
80: K152/2	6.92	1	2.04	20.00	0.10	0.10	18.92	1.24	2.7	0.72	1.98	3.74	0.057	0.03	0.02	1.49	7.74
81: Unknow (K163/11)	7.98	1	1.98	20.00	0.10	0.10	18.91	1.09	2.8	0.31	2.49	9.03	< 0.005	< 0.01	< 0.01	0.053	0.183

*NP (Neutralization Potential)

$$= \frac{50 \times (N \text{ of HCL} \times \text{Total HCL added} - N \text{ NaOH} \times \text{NaOH added})}{\text{Weight of Sample}}$$

*AP (Acid Potential) = % Sulphide Sulphur x 31.25
*Net NP (Net Neutralization Potential) = NP-AP
NP/AP Ratio = NP/AP
*Results expressed as tonnes CaCO3 equivalent/1000 tonnes of material
Samples with a % Sulphide value of <0.01 will be calculated using a 0.01 value.

Sulphur analysis performed following BC ARD Guidelines (Price 1997)

Dianne Griffin
Project Specialist

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Email: nikolay.sidenko@stantec.com; lorne.boone@stantec.com

OnLine LIMS

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Thursday, June 14, 2012

Stantec
Attn : Nikolay Sidenko

603-386 Broadway Ave.
Winnipeg, MB
R3C 3R6,

Phone: 204-928-8862
Fax:204-942-2548

Date Rec. : 25 May 2012
LR Report: **CA10410-MAY12**
Reference: PO#121614000.324 Project:Alderon

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CERTIFICATE OF ANALYSIS
Final Report

Sample ID	Silver µg/g	Aluminum µg/g	Arsenic µg/g	Barium µg/g	Beryllium µg/g	Bismuth µg/g	Calcium µg/g	Cadmium µg/g	Cobalt µg/g	Chromium µg/g	Copper µg/g
1: Analysis Start Date	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12
2: Analysis Start Time	15:29	08:20	15:29	15:29	15:29	15:29	08:20	15:29	15:29	15:29	15:29
3: Analysis Approval Date	14-Jun-12	13-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	13-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12
4: Analysis Approval Time	13:26	12:44	13:26	13:26	13:26	13:26	12:44	13:26	13:26	13:26	13:26
5: K140/1	0.84	48000	1.2	840	1.9	0.42	82000	1.4	14	140	130
6: K140/2	0.68	82000	< 0.5	760	2.7	0.35	17000	1.1	10	150	49
7: K140/3	0.51	69000	< 0.5	500	2.1	0.39	35000	2.7	6.8	210	53
8: K140/4	0.43	82000	0.9	890	2.5	0.31	10000	0.74	8.9	130	47
9: K140/5	0.99	74000	< 0.5	630	2.3	0.47	8400	21	13	180	120
10: K140/6	0.43	73000	< 0.5	750	2.0	0.31	16000	0.55	9.1	190	71
11: K140/7	0.18	69000	2.4	450	1.5	< 0.09	49000	1.1	33	120	48
12: K140/8	0.02	560	2.0	13	1.2	< 0.09	3100	0.08	14	160	2.5
13: K140/9	0.02	1200	1.5	7.8	6.3	< 0.09	33000	< 0.02	17	110	1.7
14: K140/10	0.04	630	7.6	35	3.7	< 0.09	27000	< 0.02	7.1	160	2.9
15: K140/11	0.04	580	3.7	1500	1.4	< 0.09	63000	< 0.02	8.4	130	0.6
16: K143/1	0.67	35000	0.7	590	4.1	0.46	36000	0.38	10	130	30
17: K143/2	0.25	8400	1.6	120	1.4	0.17	62000	0.23	7.9	36	21
18: K20/1	1.4	75000	0.9	600	2.4	0.46	7300	3.2	17	200	140
19: K20/2	1.0	89000	1.0	780	2.3	0.53	8400	3.6	15	160	120
20: K20/3	2.3	34000	17	450	2.4	1.3	14000	2.6	24	170	260

OnLine LIMS

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LR Report : **CA10410-MAY12**

Sample ID	Silver µg/g	Aluminum µg/g	Arsenic µg/g	Barium µg/g	Beryllium µg/g	Bismuth µg/g	Calcium µg/g	Cadmium µg/g	Cobalt µg/g	Chromium µg/g	Copper µg/g
21: K20/4	0.25	67000	1.0	230	0.35	< 0.09	30000	3.2	4.5	260	2.6
22: K20/5	0.84	72000	0.6	690	2.2	0.27	8000	2.2	14	160	85
23: K20/6	2.1	41000	5.4	290	1.3	0.57	14000	1.00	14	200	140
24: K20/7	0.35	62000	1.0	590	1.3	0.23	44000	0.20	39	120	50
25: K20/8	0.09	990	120	3.9	0.42	< 0.09	68000	0.06	3.9	220	3.6
26: K20/9	0.04	2800	5.6	23	0.28	< 0.09	94000	0.08	2.5	120	2.3
27: K20/10	0.09	1300	2.2	2.4	0.42	< 0.09	15000	< 0.02	16	120	0.6
28: K20/11	0.05	46000	0.5	710	7.0	0.10	52000	0.04	42	180	19
29: K20/12	0.21	1900	< 0.5	41	0.27	0.13	17000	0.03	10	200	50
30: K20/13	0.17	18000	< 0.5	140	0.85	< 0.09	760	0.05	4.2	230	1.5
31: K20/14	0.11	30000	< 0.5	410	1.6	< 0.09	28000	0.08	3.6	180	1.7
32: K86B/1	0.44	77000	0.7	620	2.1	0.30	300	0.25	4.3	140	42
33: K66/1	< 0.01	600	0.9	520	0.26	< 0.09	29000	< 0.02	11	140	1.5
34: K66/2	0.10	710	3.7	11	1.0	< 0.09	12000	0.03	8.7	140	5.2
35: K66/4	0.75	53000	2.1	720	4.3	0.59	3400	0.45	17	210	150
36: K66/5	0.07	430	0.5	17	0.88	< 0.09	42000	0.32	4.0	57	1.4
37: K66/6	0.69	11000	8.9	80	0.60	0.40	100000	0.95	12	130	230
38: K66/7	0.45	71000	< 0.5	360	1.8	0.30	4700	0.27	10	170	50
39: K66/8	0.86	48000	110	290	1.7	0.97	18000	0.44	27	230	120
40: K66/9	0.26	68000	1.1	330	1.2	< 0.09	35000	0.54	38	190	64
41: K66/10	0.41	69000	1.9	570	2.1	0.43	12000	0.79	19	250	99
42: K66/11	0.58	51000	0.8	430	1.6	0.28	2800	1.4	12	200	120
43: K66/12	0.01	320	< 0.5	6.7	0.44	< 0.09	54000	< 0.02	2.0	180	0.3
44: K66/13	0.03	1100	1.5	18	1.2	< 0.09	980	< 0.02	8.8	190	0.4
45: K66/14	0.04	540	1.1	13	0.63	< 0.09	22000	0.03	5.3	79	2.3
46: K64/1	< 0.01	320	< 0.5	6.8	0.03	< 0.09	200	< 0.02	1.2	340	0.9
47: K64/3-163.5 (K66/3)	0.08	2100	0.7	18	2.1	0.93	19000	0.05	10	110	6.5
48: K24/1	0.09	1000	0.6	240	0.65	< 0.09	160000	0.41	5.1	13	3.2
49: K24/2	0.06	900	< 0.5	29	0.26	< 0.09	60000	0.06	3.8	130	1.2
50: K24/3	0.61	84000	< 0.5	680	2.6	0.29	22000	1.6	9.0	170	75
51: K24/4	0.38	71000	< 0.5	750	2.5	0.21	22000	0.78	9.6	170	71
52: K24/5	0.89	74000	< 0.5	700	2.3	0.55	11000	4.0	12	170	120
53: K24/6-262.5 (K24/9)	0.03	1100	63	480	2.5	< 0.09	17000	0.05	20	100	1.8
54: K24/6-206.5 (K24/6)	0.02	860	1.5	39	1.1	< 0.09	33000	0.06	4.4	140	1.0
55: K24/6-280 (K24/9) (284)	2.2	44000	49	510	2.9	0.70	4300	1.0	16	160	150

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LR Report : **CA10410-MAY12**

Sample ID	Silver µg/g	Aluminum µg/g	Arsenic µg/g	Barium µg/g	Beryllium µg/g	Bismuth µg/g	Calcium µg/g	Cadmium µg/g	Cobalt µg/g	Chromium µg/g	Copper µg/g
56: K24/8	0.47	60000	3.3	740	2.1	0.24	5300	0.51	9.1	140	68
57: K24/10	0.27	56000	< 0.5	410	2.0	< 0.09	19000	0.15	15	200	53
58: K24/11	0.01	760	< 0.5	7.9	0.06	< 0.09	1100	< 0.02	1.1	280	1.7
59: K163/1	0.69	77000	1.2	740	1.8	0.54	2700	8.3	9.6	170	110
60: K163/2	0.85	74000	0.6	730	1.9	0.22	4400	0.50	11	160	87
61: K163/3	0.26	75000	1.1	600	2.2	0.26	22000	1.6	15	160	24
62: K163/4	0.05	640	1.6	9.0	0.38	< 0.09	100000	0.91	2.6	110	3.6
63: K163/5	2.2	48000	7.1	380	3.1	0.58	2100	13	53	180	290
64: K163/6	0.42	2300	25	16	0.59	< 0.09	470	0.93	20	180	5.0
65: K163/8	0.18	1100	0.5	1.6	0.54	< 0.09	14000	< 0.02	9.5	150	2.5
66: K163/9	0.01	1000	1.7	20	1.7	< 0.09	25000	< 0.02	8.1	200	1.8
67: K163/12	0.44	69000	4.6	680	2.4	< 0.09	210	0.18	4.4	220	14
68: K102/1	0.04	740	0.6	10	0.89	< 0.09	45000	< 0.02	3.9	130	1.5
69: K102/5	0.02	670	3.6	8.7	1.1	< 0.09	190	0.06	8.2	200	1.8
70: K152/1	0.73	73000	< 0.5	570	2.1	0.33	9400	2.2	17	190	84
71: K152/2	0.61	76000	1.2	300	1.9	0.38	420	1.1	36	210	320
72: Unknow (K163/11)	0.16	550	0.5	5.1	0.13	< 0.09	280	0.03	1.6	240	6.1

Dianne Griffin
Project Specialist

OnLine LIMS

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Thursday, June 14, 2012

Stantec
Attn : Nikolay Sidenko

603-386 Broadway Ave.
Winnipeg, MB
R3C 3R6,

Phone: 204-928-8862
Fax:204-942-2548

Date Rec. : 25 May 2012
LR Report: **CA10410-MAY12**
Reference: PO#121614000.324 Project:Alderon

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Sample ID	Iron µg/g	Potassium µg/g	Lithium µg/g	Magnesium µg/g	Manganese µg/g	Molybdenum µg/g	Sodium µg/g	Nickel µg/g	Phosphorus µg/g	Lead µg/g
1: Analysis Start Date	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12
2: Analysis Start Time	08:20	08:20	15:29	08:20	15:29	15:29	08:20	15:29	08:20	15:29
3: Analysis Approval Date	13-Jun-12	13-Jun-12	14-Jun-12	13-Jun-12	14-Jun-12	14-Jun-12	13-Jun-12	14-Jun-12	13-Jun-12	14-Jun-12
4: Analysis Approval Time	12:44	12:44	13:26	12:44	13:27	13:27	12:45	13:27	12:45	13:27
5: K140/1	56000	26000	24	27000	1700	14	2500	44	800	20
6: K140/2	37000	29000	26	15000	410	5.1	22000	22	870	32
7: K140/3	29000	22000	30	16000	1100	5.0	21000	22	550	28
8: K140/4	35000	39000	39	16000	310	4.4	14000	26	620	28
9: K140/5	36000	31000	25	16000	440	10	15000	58	710	34
10: K140/6	29000	28000	23	17000	470	7.1	16000	40	580	18
11: K140/7	110000	21000	23	25000	1300	3.3	9610	29	4400	12
12: K140/8	390000	170	3	1500	5900	1.4	27	2.8	57	1.6
13: K140/9	380000	94	< 2	14000	16000	1.1	57	3.7	120	0.52
14: K140/10	92000	210	3	13000	9500	1.5	130	3.6	55	0.69
15: K140/11	250000	270	4	10000	28000	1.6	170	2.5	44	0.54
16: K143/1	140000	31000	15	26000	3600	40	370	27	2900	8.5
17: K143/2	260000	4600	5	44000	12000	2.6	320	14	730	8.3
18: K20/1	34000	33000	26	14000	280	17	15000	90	500	34
19: K20/2	48000	40000	32	17000	290	15	15000	88	1100	20
20: K20/3	140000	15000	17	10000	550	240	5800	230	1100	26
21: K20/4	140000	9100	16	13000	6000	5.6	280	18	430	1.5

OnLine LIMS

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LR Report : **CA10410-MAY12**

Sample ID	Iron µg/g	Potassium µg/g	Lithium µg/g	Magnesium µg/g	Manganese µg/g	Molybdenum µg/g	Sodium µg/g	Nickel µg/g	Phosphorus µg/g	Lead µg/g
22: K20/5	51000	37000	24	13000	1100	42	7700	71	760	16
23: K20/6	58000	15000	18	10000	370	210	8000	180	1300	19
24: K20/7	110000	13000	22	25000	1300	2.8	18000	48	4000	12
25: K20/8	60000	160	< 2	28000	1100	3.6	310	7.8	53	2.3
26: K20/9	64000	1000	< 2	33000	1400	2.5	590	6.6	57	2.8
27: K20/10	380000	270	9	12000	19000	0.8	360	2.3	190	1.3
28: K20/11	120000	12000	19	23000	1800	2.1	9200	51	1500	4.2
29: K20/12	230000	810	2	17000	8000	1.8	180	7.5	29	1.2
30: K20/13	46000	12000	20	12000	440	1.5	120	4.9	18	0.93
31: K20/14	26000	23000	12	15000	770	1.1	440	5.5	940	9.4
32: K86B/1	31000	30000	29	7700	120	8.7	760	27	76	7.1
33: K66/1	390000	200	< 2	6800	14000	1.2	170	2.4	11	0.65
34: K66/2	190000	260	< 2	17000	6600	2.5	64	4.1	40	0.60
35: K66/4	66000	26000	22	15000	740	72	7600	130	880	21
36: K66/5	280000	110	3	39000	1600	0.9	150	3.1	79	1.1
37: K66/6	96000	4800	6	44000	2000	19	610	70	2000	7.4
38: K66/7	27000	22000	23	14000	110	5.2	30000	38	840	6.6
39: K66/8	95000	19000	23	27000	400	190	13000	300	1200	24
40: K66/9	87000	27000	37	29000	1000	2.9	16000	62	1200	6.7
41: K66/10	51000	26000	27	17000	740	23	17000	94	810	17
42: K66/11	52000	24000	21	11000	810	36	8300	81	770	12
43: K66/12	87000	140	< 2	24000	1500	1.3	140	4.0	3	0.75
44: K66/13	330000	250	4	540	2000	1.5	140	3.1	30	1.3
45: K66/14	270000	260	< 2	23000	6400	0.5	260	2.9	20	1.9
46: K64/1	3500	130	< 2	170	120	2.4	71	3.9	3	0.14
47: K64/3-163.5 (K66/3)	290000	940	< 2	11000	3600	2.4	140	3.0	130	1.3
48: K24/1	120000	690	2	60000	3300	0.8	150	4.5	180	6.5
49: K24/2	110000	320	< 2	29000	2300	1.3	290	4.2	18	2.1
50: K24/3	37000	33000	45	18000	480	9.7	22000	36	980	31
51: K24/4	30000	27000	19	14000	480	8.9	15000	40	670	21
52: K24/5	43000	28000	33	15000	490	16	17000	77	610	45
53: K24/6-262.5 (K24/9)	260000	420	159	13000	51000	0.7	6600	2.6	78	1.5
54: K24/6-206.5 (K24/6)	240000	250	3	29000	2000	0.8	180	3.9	16	1.7
55: K24/6-280 (K24/9) (284)	93000	18000	23	25000	1100	140	420	120	1400	12
56: K24/8	46000	33000	27	18000	560	9.5	3800	34	550	8.6
57: K24/10	23000	33000	19	10000	510	2.4	720	35	110	1.7

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LR Report : **CA10410-MAY12**

Sample ID	Iron µg/g	Potassium µg/g	Lithium µg/g	Magnesium µg/g	Manganese µg/g	Molybdenum µg/g	Sodium µg/g	Nickel µg/g	Phosphorus µg/g	Lead µg/g
58: K24/11	2800	320	< 2	360	52	1.4	210	3.6	28	0.21
59: K163/1	39000	37000	33	15000	250	16	8700	84	730	15
60: K163/2	39000	30000	31	18000	530	22	24000	63	1100	12
61: K163/3	43000	24000	34	15000	900	1.3	17000	40	690	31
62: K163/4	120000	79	< 2	37000	1800	0.9	170	4.4	41	5.2
63: K163/5	74000	25000	17	8200	420	200	870	170	890	74
64: K163/6	130000	620	< 2	1200	370	4.2	110	56	290	11
65: K163/8	320000	53	< 2	26000	8500	1.4	68	3.5	81	0.48
66: K163/9	200000	360	< 2	16000	5800	1.2	230	3.2	61	1.7
67: K163/12	29000	52000	10	6500	89	1.7	850	18	320	8.5
68: K102/1	170000	180	< 2	25000	4000	1.2	130	3.2	17	0.46
69: K102/5	370000	150	< 2	81	360	4.4	140	20	140	1.4
70: K152/1	83000	24000	28	15000	3100	9.0	7500	47	1200	28
71: K152/2	70000	10000	14	1000	2900	11	390	82	110	35
72: Unknow (K163/11)	15000	120	< 2	230	190	2.1	81	4.2	62	0.69

Dianne Griffin
Project Specialist

OnLine LIMS

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Thursday, June 14, 2012

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Date Rec. : 25 May 2012
LR Report: **CA10410-MAY12**
Reference: PO#121614000.324 Project:Alderon

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Sample ID	Antimony µg/g	Selenium µg/g	Tin µg/g	Strontium µg/g	Titanium µg/g	Thallium µg/g	Uranium µg/g	Vanadium µg/g	Yttrium µg/g	Zinc µg/g
1: Analysis Start Date	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12	12-Jun-12
2: Analysis Start Time	15:29	15:29	15:29	15:29	08:20	15:29	15:29	15:29	15:29	15:29
3: Analysis Approval Date	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	13-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12
4: Analysis Approval Time	13:27	13:27	13:27	13:27	12:45	13:27	13:27	13:27	13:27	13:27
5: K140/1	< 0.8	2.0	2.2	100	2400	0.90	7.2	270	26	92
6: K140/2	< 0.8	< 0.7	2.7	130	4400	1.2	7.4	80	22	110
7: K140/3	< 0.8	< 0.7	3.0	220	2900	0.76	6.3	59	25	96
8: K140/4	< 0.8	< 0.7	3.1	130	3900	1.3	6.7	81	20	140
9: K140/5	< 0.8	1.8	2.5	84	3700	1.0	9.5	120	18	390
10: K140/6	< 0.8	1.0	3.1	110	3200	0.86	8.5	74	22	110
11: K140/7	< 0.8	1.0	2.0	220	21000	1.3	1.6	170	49	230
12: K140/8	< 0.8	< 0.7	< 0.5	5.59	120	< 0.02	0.18	17	4.4	6.9
13: K140/9	< 0.8	< 0.7	< 0.5	25	170	< 0.02	0.097	17	11	6.8
14: K140/10	< 0.8	0.9	< 0.5	21	84	< 0.02	0.10	1	4.7	7.1
15: K140/11	< 0.8	< 0.7	0.9	35	30	< 0.02	2.2	3	7.7	3.2
16: K143/1	< 0.8	1.5	1.4	63	10000	1.1	14	510	22	28
17: K143/2	< 0.8	1.2	0.8	88	1600	0.14	1.9	97	20	32
18: K20/1	< 0.8	1.8	2.4	140	4100	1.8	11	200	15	340
19: K20/2	< 0.8	2.2	3.5	110	4500	2.0	9.0	230	16	400
20: K20/3	< 0.8	11	1.3	81	2700	1.3	93	1400	79	520
21: K20/4	< 0.8	< 0.7	1.4	16	2900	1.0	6.3	120	25	180

OnLine LIMS

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA10410-MAY12**

Sample ID	Antimony µg/g	Selenium µg/g	Tin µg/g	Strontium µg/g	Titanium µg/g	Thallium µg/g	Uranium µg/g	Vanadium µg/g	Yttrium µg/g	Zinc µg/g
22: K20/5	< 0.8	2.8	3.5	120	3900	2.1	23	310	28	440
23: K20/6	1.1	4.3	1.8	100	2200	1.2	62	710	37	270
24: K20/7	< 0.8	0.7	2.1	230	23000	0.36	1.0	180	39	140
25: K20/8	< 0.8	< 0.7	< 0.5	33	70	< 0.02	2.2	2	1.8	11
26: K20/9	< 0.8	< 0.7	< 0.5	61	130	0.04	1.8	6	1.9	13
27: K20/10	< 0.8	< 0.7	< 0.5	21	130	< 0.02	0.086	11	7.3	4.9
28: K20/11	< 0.8	< 0.7	1.0	140	9900	0.19	0.42	200	23	75
29: K20/12	< 0.8	< 0.7	< 0.5	21	75	0.07	0.11	3	4.1	15
30: K20/13	< 0.8	< 0.7	< 0.5	2.04	1000	0.50	1.3	17	3.1	30
31: K20/14	< 0.8	< 0.7	0.6	46	960	0.21	0.92	12	8.4	11
32: K86B/1	< 0.8	< 0.7	2.9	8.99	4300	1.4	12	180	13	95
33: K66/1	< 0.8	< 0.7	< 0.5	14	28	< 0.02	0.17	7	6.7	2.8
34: K66/2	< 0.8	< 0.7	< 0.5	4.07	54	< 0.02	0.52	17	2.7	8.6
35: K66/4	< 0.8	5.1	2.2	39	2700	1.3	28	380	28	120
36: K66/5	< 0.8	< 0.7	< 0.5	27	16	< 0.02	0.17	7	3.1	69
37: K66/6	< 0.8	1.5	< 0.5	160	460	0.39	9.5	91	17	68
38: K66/7	< 0.8	< 0.7	1.6	67	3400	0.46	6.7	96	16	20
39: K66/8	< 0.8	4.4	0.8	55	1400	0.82	75	890	22	34
40: K66/9	< 0.8	< 0.7	1.6	94	9000	0.77	2.6	180	23	97
41: K66/10	< 0.8	1.2	2.4	110	4200	1.1	11	170	21	190
42: K66/11	< 0.8	2.4	3.6	49	2700	1.0	15	260	32	300
43: K66/12	< 0.8	< 0.7	0.8	12	11	< 0.02	0.14	< 1	1.6	3.4
44: K66/13	< 0.8	< 0.7	0.8	1.61	53	< 0.02	0.068	< 1	3.1	4.4
45: K66/14	< 0.8	< 0.7	0.7	5.27	7.7	0.03	0.092	< 1	2.1	11
46: K64/1	< 0.8	< 0.7	0.6	0.76	14	< 0.02	0.043	< 1	0.25	< 0.7
47: K64/3-163.5 (K66/3)	< 0.8	< 0.7	< 0.5	11	120	< 0.02	0.18	14	2.8	8.1
48: K24/1	< 0.8	< 0.7	< 0.5	110	70	0.02	5.9	11	4.3	35
49: K24/2	< 0.8	0.8	1.1	33	18	< 0.02	0.47	< 1	1.9	11
50: K24/3	< 0.8	< 0.7	3.7	200	4600	1.3	9.4	230	28	260
51: K24/4	< 0.8	0.7	2.4	130	3600	0.79	7.0	110	19	110
52: K24/5	< 0.8	1.6	2.8	120	3400	1.9	7.3	170	16	310
53: K24/6-262.5 (K24/9)	< 0.8	< 0.7	< 0.5	52	28	0.03	0.15	6	15	4.3
54: K24/6-206.5 (K24/6)	< 0.8	< 0.7	0.6	37	34	< 0.02	0.14	4	2.9	9.7
55: K24/6-280 (K24/9) (284)	< 0.8	4.4	2.2	17	2900	0.81	58	820	49	160
56: K24/8	< 0.8	1.1	2.4	40	2700	1.1	9.0	130	17	86
57: K24/10	< 0.8	< 0.7	1.2	34	2400	0.41	3.4	43	6.2	28

OnLine LIMS

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA10410-MAY12**

Sample ID	Antimony µg/g	Selenium µg/g	Tin µg/g	Strontium µg/g	Titanium µg/g	Thallium µg/g	Uranium µg/g	Vanadium µg/g	Yttrium µg/g	Zinc µg/g
58: K24/11	< 0.8	< 0.7	1.0	1.05	13	< 0.02	0.23	< 1	0.40	< 0.7
59: K163/1	< 0.8	1.3	3.7	46	3900	1.5	7.6	210	15	510
60: K163/2	< 0.8	< 0.7	2.8	77	3900	1.4	10	160	24	170
61: K163/3	< 0.8	< 0.7	3.0	190	3900	1.4	3.9	75	24	170
62: K163/4	< 0.8	< 0.7	< 0.5	93	23	< 0.02	0.28	4	6.3	53
63: K163/5	3.8	12	2.3	26	2100	2.0	78	1190	60	1390
64: K163/6	< 0.8	< 0.7	0.8	2.53	92	0.59	4.1	10	7.9	270
65: K163/8	< 0.8	< 0.7	0.5	13	35	< 0.02	0.10	3	3.0	5.4
66: K163/9	< 0.8	< 0.7	< 0.5	33	86	< 0.02	0.078	5	2.9	3.3
67: K163/12	< 0.8	< 0.7	1.5	23	3200	0.93	2.0	45	7.3	43
68: K102/1	< 0.8	< 0.7	< 0.5	15	23	< 0.02	0.092	< 1	0.87	4.3
69: K102/5	1.4	< 0.7	0.5	1.14	21	0.05	1.1	16	9.5	24
70: K152/1	< 0.8	1.8	2.6	61	5000	0.90	10	150	34	280
71: K152/2	< 0.8	1.7	3.2	7.11	4100	0.16	70	170	37	66
72: Unknow (K163/11)	< 0.8	< 0.7	< 0.5	1.02	10	< 0.02	0.70	< 1	1.3	5.0

Dianne Griffin
Project Specialist

OnLine LIMS

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
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Friday, June 15, 2012

Stantec
Attn : Nikolay Sidenko

603-386 Broadway Ave.
Winnipeg, MB
R3C 3R6,

Phone: 204-928-8862
Fax:204-942-2548

Date Rec. : 25 May 2012
LR Report: **CA10409-MAY12**
Reference: PO#121614000.324 Project:Alderon

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Sample weight g	Volume D.I. Water mL	Initial pH units	Final pH units	Mercury mg/L	Silver mg/L	Aluminum mg/L	Arsenic mg/L	Barium mg/L	Boron mg/L	Beryllium mg/L
1: Analysis Start Date	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	12-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12
2: Analysis Start Time	07:47	07:47	07:47	07:47	13:46	11:05	11:20	11:05	11:05	11:05	11:05
3: Analysis Approval Date	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12
4: Analysis Approval Time	11:05	11:05	11:05	11:05	14:35	10:23	09:54	10:23	10:24	10:24	10:24
5: K140/1	250	750	8.86	8.12	< 0.00001	0.00023	0.06	0.0003	0.0602	0.0148	< 0.00002
6: K140/2	250	750	9.62	9.70	< 0.00001	0.00002	1.77	0.0011	0.00547	0.0060	< 0.00002
7: K140/3	250	750	9.64	9.39	< 0.00001	< 0.00001	0.60	0.0005	0.0159	0.0049	< 0.00002
8: K140/4	250	750	9.76	9.70	0.00001	< 0.00001	1.98	0.0010	0.00602	0.0082	< 0.00002
9: K140/5	250	750	9.30	8.88	< 0.00001	0.00006	0.51	0.0004	0.00658	0.0079	< 0.00002
10: K140/6	250	750	9.63	9.39	< 0.00001	< 0.00001	0.55	0.0005	0.00758	0.0082	< 0.00002
11: K140/7	250	750	9.78	9.56	< 0.00001	< 0.00001	0.93	0.0018	0.0158	0.0074	< 0.00002
12: K140/8	250	750	9.55	9.09	0.00001	< 0.00001	0.01	0.0011	0.0403	0.0025	< 0.00002
13: K140/9	250	750	9.48	9.21	< 0.00001	< 0.00001	0.03	0.0004	0.00475	0.0030	< 0.00002
14: K140/10	250	750	9.33	8.82	< 0.00001	< 0.00001	< 0.01	0.0017	0.0129	0.0483	< 0.00002
15: K140/11	250	750	9.44	8.85	< 0.00001	< 0.00001	< 0.01	0.0006	0.204	0.0098	< 0.00002
16: K143/1	250	750	9.22	9.17	< 0.00001	< 0.00001	0.36	0.0009	0.0435	0.0061	< 0.00002
17: K143/2	250	750	9.09	8.50	< 0.00001	< 0.00001	< 0.01	0.0003	0.0526	0.110	< 0.00002
18: K20/1	250	750	3.63	3.77	< 0.00001	< 0.00001	41.0	0.0026	0.0913	0.0087	0.00379
19: K20/2	250	750	7.96	8.82	< 0.00001	0.00005	1.67	0.0022	0.0112	0.0101	0.00005
20: K20/3	250	750	9.03	8.31	< 0.00001	0.00004	0.13	0.0005	0.0378	0.0041	< 0.00002
21: K20/4	250	750	9.39	9.46	0.00001	< 0.00001	0.66	0.0021	0.00995	0.0020	< 0.00002
22: K20/5	250	750	8.24	9.13	< 0.00001	0.00002	1.29	0.0011	0.00701	0.0310	0.00002
23: K20/6	250	750	9.36	9.02	< 0.00001	0.00004	0.26	< 0.0002	0.0870	0.0080	< 0.00002

OnLine LIMS

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

SFE Leach Test-3:1 L/S DI Water Extraction for 24hrs

LR Report : **CA10409-MAY12**

Sample ID	Sample weight g	Volume D.I. Water mL	Initial pH units	Final pH units	Mercury mg/L	Silver mg/L	Aluminum mg/L	Arsenic mg/L	Barium mg/L	Boron mg/L	Beryllium mg/L
24: K20/7	250	750	9.43	8.71	0.00001	0.00004	0.38	0.0018	0.00840	0.0051	< 0.00002
25: K20/8	250	750	9.63	9.35	0.00001	< 0.00001	< 0.01	0.0590	0.00079	0.0022	< 0.00002
26: K20/9	250	750	9.48	8.79	< 0.00001	< 0.00001	< 0.01	0.0004	0.00535	0.0039	< 0.00002
27: K20/10	250	750	9.04	9.31	0.00001	< 0.00001	0.05	< 0.0002	0.00112	0.0030	< 0.00002
28: K20/11	250	750	9.66	9.80	0.00001	< 0.00001	0.69	0.0005	0.0399	0.0296	< 0.00002
29: K20/12	250	750	9.28	8.43	0.00001	< 0.00001	0.01	< 0.0002	0.261	0.109	< 0.00002
30: K20/13	250	750	8.49	9.61	0.00001	< 0.00001	1.58	< 0.0002	0.00619	0.0105	0.00003
31: K20/14	250	750	9.68	9.33	0.00001	< 0.00001	0.25	0.0003	0.00298	0.0062	< 0.00002
32: K86B/1	250	750	7.03	7.25	< 0.00001	< 0.00001	< 0.01	< 0.0002	0.00455	0.0031	< 0.00002
33: K66/1	250	750	9.07	9.26	< 0.00001	< 0.00001	0.03	0.0004	0.566	0.0037	< 0.00002
34: K66/2	250	750	9.46	9.01	0.00001	< 0.00001	0.01	0.0015	0.0416	0.0165	< 0.00002
35: K66/4	250	750	9.43	7.36	< 0.00001	0.00004	0.01	0.0041	0.0505	0.0290	< 0.00002
36: K66/5	250	750	7.24	8.30	0.00001	< 0.00001	< 0.01	< 0.0002	0.158	0.0476	< 0.00002
37: K66/6	250	750	9.76	8.83	0.00001	< 0.00001	0.09	0.0008	0.0212	0.0055	< 0.00002
38: K66/7	250	750	8.65	8.82	0.00001	0.00002	0.36	0.0002	0.00726	0.0058	< 0.00002
39: K66/8	250	750	9.10	8.27	0.00003	0.00002	0.15	< 0.0002	0.0240	0.0045	< 0.00002
40: K66/9	250	750	9.62	9.06	0.00002	< 0.00001	0.31	< 0.0002	0.0234	0.0047	< 0.00002
41: K66/10	250	750	8.95	8.55	0.00001	0.00010	0.16	0.0003	0.0417	0.0053	< 0.00002
42: K66/11	250	750	7.79	7.02	0.00001	0.00002	0.02	0.0003	0.0119	0.0092	< 0.00002
43: K66/12	250	750	9.36	8.81	0.00001	< 0.00001	< 0.01	< 0.0002	0.0361	0.0022	< 0.00002
44: K66/13	250	750	8.55	8.37	0.00001	< 0.00001	0.03	< 0.0002	0.00949	0.0013	< 0.00002
45: K66/14	250	750	8.49	7.06	0.00001	< 0.00001	< 0.01	< 0.0002	0.0108	0.0018	< 0.00002
46: K64/1	250	750	8.13	8.06	0.00004	< 0.00001	0.03	< 0.0002	0.0160	0.0015	< 0.00002
47: K64/3-163.5 (K66/3)	250	750	9.27	8.35	< 0.00001	< 0.00001	0.01	< 0.0002	0.00727	0.0524	< 0.00002
48: K24/1	250	750	9.69	8.78	0.00001	< 0.00001	0.03	< 0.0002	0.282	0.0070	< 0.00002
49: K24/2	250	750	9.68	8.81	< 0.00001	< 0.00001	0.01	< 0.0002	0.0487	0.0032	< 0.00002
50: K24/3	250	750	9.53	9.63	0.00001	< 0.00001	1.66	0.0013	0.00935	0.0061	< 0.00002
51: K24/4	250	750	9.66	9.60	< 0.00001	< 0.00001	1.40	0.0015	0.0196	0.0077	< 0.00002
52: K24/5	250	750	9.19	9.35	< 0.00001	0.00004	2.16	0.0009	0.0132	0.0059	0.00003
53: K24/6-262.5 (K24/9)	250	750	9.18	9.27	< 0.00001	< 0.00001	0.01	0.0034	0.430	0.0465	< 0.00002
54: K24/6-206.5 (K24/6)	250	750	9.68	8.52	< 0.00001	< 0.00001	< 0.01	< 0.0002	0.219	0.0237	< 0.00002
55: K24/6-280 (K24/9) (284)	250	750	8.92	8.26	< 0.00001	0.00021	0.14	0.0020	0.0540	0.0311	< 0.00002
56: K24/8	250	750	9.29	8.75	< 0.00001	0.00004	0.29	0.0031	0.0225	0.0164	< 0.00002
57: K24/10	250	750	9.43	8.93	< 0.00001	0.00004	0.62	0.0015	0.00253	0.0098	< 0.00002
58: K24/11	250	750	9.13	9.19	< 0.00001	< 0.00001	0.03	0.0010	0.0573	0.0041	< 0.00002
59: K163/1	250	750	5.75	6.77	< 0.00001	0.00001	0.02	0.0007	0.0128	0.0225	< 0.00002
60: K163/2	250	750	6.39	7.80	0.00001	0.00005	0.31	0.0003	0.0110	0.0095	< 0.00002
61: K163/3	250	750	9.47	9.47	< 0.00001	0.00002	1.19	0.0014	0.0119	0.0031	< 0.00002
62: K163/4	250	750	9.46	8.33	< 0.00001	< 0.00001	< 0.01	< 0.0002	0.00436	0.0760	< 0.00002
63: K163/5	250	750	4.33	4.42	< 0.00001	0.00001	1.63	0.0033	0.109	0.0128	0.01017

SGS Canada Inc.
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SFE Leach Test-3:1 L/S DI Water Extraction for 24hrs

LR Report : **CA10409-MAY12**

Sample ID	Sample weight g	Volume D.I. Water mL	Initial pH units	Final pH units	Mercury mg/L	Silver mg/L	Aluminum mg/L	Arsenic mg/L	Barium mg/L	Boron mg/L	Beryllium mg/L
64: K163/6	250	750	6.17	7.16	< 0.00001	< 0.00001	0.01	0.0004	0.0119	0.0026	0.00004
65: K163/8	250	750	8.80	9.25	< 0.00001	< 0.00001	0.02	0.0004	0.00275	0.0015	< 0.00002
66: K163/9	250	750	9.31	9.21	< 0.00001	< 0.00001	0.02	0.0012	0.0158	0.0016	< 0.00002
67: K163/12	250	750	7.90	8.21	< 0.00001	0.00003	1.34	< 0.0002	0.00490	0.0083	0.00002
68: K102/1	250	750	9.12	8.27	< 0.00001	< 0.00001	0.02	< 0.0002	0.00686	0.0024	< 0.00002
69: K102/5	250	750	8.36	7.86	0.00001	< 0.00001	0.01	< 0.0002	0.00754	0.0014	< 0.00002
70: K152/1	250	750	8.03	8.32	0.00001	0.00034	0.03	0.0006	0.0435	0.0022	< 0.00002
71: K152/2	250	750	7.36	7.32	< 0.00001	< 0.00001	0.01	< 0.0002	0.00663	0.0025	< 0.00002
72: Unknow (K163/11)	250	750	7.51	7.74	< 0.00001	0.00004	0.11	< 0.0002	0.00154	0.0037	< 0.00002

Dianne Griffin
Project Specialist

OnLine LIMS

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Friday, June 15, 2012

Stantec
Attn : Nikolay Sidenko

603-386 Broadway Ave.
Winnipeg, MB
R3C 3R6,

Phone: 204-928-8862
Fax:204-942-2548

Date Rec. : 25 May 2012
LR Report: **CA10409-MAY12**
Reference: PO#121614000.324 Project:Alderon

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Sample weight g	Volume D.I. Water mL	Initial pH units	Final pH units	Calcium mg/L	Cadmium mg/L	Cobalt mg/L	Chromium mg/L	Copper mg/L	Iron mg/L	Potassium mg/L
1: Analysis Start Date	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12
2: Analysis Start Time	07:47	07:47	07:47	07:47	11:20	11:05	11:05	11:05	11:05	11:20	11:20
3: Analysis Approval Date	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12
4: Analysis Approval Time	11:05	11:05	11:05	11:05	09:54	10:24	10:24	10:24	11:10	09:55	09:55
5: K140/1	250	750	8.86	8.12	78.0	< 0.000003	0.000355	< 0.0005	0.0005	0.004	24.2
6: K140/2	250	750	9.62	9.70	3.13	< 0.000003	0.000052	< 0.0005	< 0.0005	0.114	16.2
7: K140/3	250	750	9.64	9.39	6.80	< 0.000003	0.000015	< 0.0005	0.0007	0.007	14.2
8: K140/4	250	750	9.76	9.70	2.36	< 0.000003	0.000077	< 0.0005	< 0.0005	0.166	19.2
9: K140/5	250	750	9.30	8.88	12.6	< 0.000003	0.000052	< 0.0005	< 0.0005	0.013	20.9
10: K140/6	250	750	9.63	9.39	7.22	< 0.000003	0.000069	< 0.0005	< 0.0005	0.089	13.2
11: K140/7	250	750	9.78	9.56	4.50	< 0.000003	0.000037	< 0.0005	0.0007	0.097	23.7
12: K140/8	250	750	9.55	9.09	10.3	< 0.000003	0.000013	< 0.0005	< 0.0005	0.089	0.859
13: K140/9	250	750	9.48	9.21	10.0	< 0.000003	0.000011	< 0.0005	< 0.0005	0.006	0.847
14: K140/10	250	750	9.33	8.82	11.8	< 0.000003	0.000030	< 0.0005	< 0.0005	0.037	0.843
15: K140/11	250	750	9.44	8.85	13.2	< 0.000003	0.000014	< 0.0005	< 0.0005	0.005	2.91
16: K143/1	250	750	9.22	9.17	10.8	< 0.000003	0.000016	< 0.0005	< 0.0005	0.009	45.5
17: K143/2	250	750	9.09	8.50	22.4	< 0.000003	0.000033	< 0.0005	< 0.0005	0.004	10.8
18: K20/1	250	750	3.63	3.77	11.5	0.197	2.01	0.0264	2.33	64.4	42.6
19: K20/2	250	750	7.96	8.82	0.29	0.000200	0.000288	0.0017	0.0011	0.609	15.0
20: K20/3	250	750	9.03	8.31	27.6	0.000053	0.000096	< 0.0005	0.0006	0.009	18.4
21: K20/4	250	750	9.39	9.46	5.55	< 0.000003	0.000462	< 0.0005	0.0006	0.286	12.8
22: K20/5	250	750	8.24	9.13	5.65	< 0.000003	0.000071	0.0007	0.0005	0.161	19.9
23: K20/6	250	750	9.36	9.02	12.3	< 0.000003	0.000040	< 0.0005	0.0007	0.020	27.0

SGS Canada Inc.
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SFE Leach Test-3:1 L/S DI Water Extraction for 24hrs

LR Report : **CA10409-MAY12**

Sample ID	Sample weight g	Volume D.I. Water mL	Initial pH units	Final pH units	Calcium mg/L	Cadmium mg/L	Cobalt mg/L	Chromium mg/L	Copper mg/L	Iron mg/L	Potassium mg/L
24: K20/7	250	750	9.43	8.71	11.4	< 0.000003	0.000023	< 0.0005	0.0006	0.010	13.7
25: K20/8	250	750	9.63	9.35	7.85	< 0.000003	0.000016	< 0.0005	< 0.0005	< 0.003	0.631
26: K20/9	250	750	9.48	8.79	11.5	< 0.000003	0.000024	< 0.0005	< 0.0005	< 0.003	1.76
27: K20/10	250	750	9.04	9.31	10.9	< 0.000003	0.000007	< 0.0005	< 0.0005	0.005	2.20
28: K20/11	250	750	9.66	9.80	4.50	< 0.000003	0.000033	< 0.0005	< 0.0005	0.050	14.4
29: K20/12	250	750	9.28	8.43	20.1	< 0.000003	0.000071	< 0.0005	< 0.0005	0.026	10.7
30: K20/13	250	750	8.49	9.61	0.12	< 0.000003	0.000093	0.0007	< 0.0005	1.14	15.7
31: K20/14	250	750	9.68	9.33	6.79	< 0.000003	0.000012	< 0.0005	< 0.0005	0.007	17.2
32: K86B/1	250	750	7.03	7.25	4.45	< 0.000003	0.000079	< 0.0005	0.0009	< 0.003	3.95
33: K66/1	250	750	9.07	9.26	11.9	< 0.000003	0.000009	< 0.0005	< 0.0005	< 0.003	0.744
34: K66/2	250	750	9.46	9.01	13.5	< 0.000003	0.000020	< 0.0005	< 0.0005	0.011	2.48
35: K66/4	250	750	9.43	7.36	23.4	< 0.000003	0.00129	< 0.0005	0.0009	0.004	22.2
36: K66/5	250	750	7.24	8.30	26.1	< 0.000003	0.000033	< 0.0005	< 0.0005	0.004	0.791
37: K66/6	250	750	9.76	8.83	14.5	< 0.000003	0.000021	< 0.0005	< 0.0005	< 0.003	9.04
38: K66/7	250	750	8.65	8.82	9.94	< 0.000003	0.000058	< 0.0005	0.0008	0.038	12.9
39: K66/8	250	750	9.10	8.27	22.7	< 0.000003	0.000048	< 0.0005	0.0005	0.006	21.7
40: K66/9	250	750	9.62	9.06	7.23	< 0.000003	0.000017	< 0.0005	< 0.0005	0.004	29.2
41: K66/10	250	750	8.95	8.55	25.8	< 0.000003	0.000146	< 0.0005	< 0.0005	< 0.003	23.0
42: K66/11	250	750	7.79	7.02	12.1	0.000038	0.00498	< 0.0005	< 0.0005	0.012	14.1
43: K66/12	250	750	9.36	8.81	18.2	< 0.000003	0.000055	< 0.0005	< 0.0005	< 0.003	1.73
44: K66/13	250	750	8.55	8.37	11.6	< 0.000003	0.000029	< 0.0005	0.0005	0.136	1.76
45: K66/14	250	750	8.49	7.06	69.5	< 0.000003	0.000975	0.0016	< 0.0005	< 0.003	0.980
46: K64/1	250	750	8.13	8.06	3.80	< 0.000003	0.000243	< 0.0005	0.0005	1.80	0.920
47: K64/3-163.5 (K66/3)	250	750	9.27	8.35	24.8	< 0.000003	0.000030	< 0.0005	< 0.0005	0.011	2.55
48: K24/1	250	750	9.69	8.78	12.1	< 0.000003	0.000016	0.0005	< 0.0005	< 0.003	11.8
49: K24/2	250	750	9.68	8.81	12.3	< 0.000003	0.000012	< 0.0005	< 0.0005	< 0.003	2.33
50: K24/3	250	750	9.53	9.63	5.51	< 0.000003	0.000080	0.0010	0.0007	0.309	20.8
51: K24/4	250	750	9.66	9.60	5.72	< 0.000003	0.000043	0.0006	< 0.0005	0.158	16.6
52: K24/5	250	750	9.19	9.35	4.39	< 0.000003	0.000165	0.0013	0.0011	0.483	19.6
53: K24/6-262.5 (K24/9)	250	750	9.18	9.27	7.55	< 0.000003	0.000017	< 0.0005	0.0005	0.020	3.69
54: K24/6-206.5 (K24/6)	250	750	9.68	8.52	21.3	< 0.000003	0.000018	< 0.0005	0.0006	< 0.003	4.46
55: K24/6-280 (K24/9) (284)	250	750	8.92	8.26	11.5	0.000013	0.000083	< 0.0005	< 0.0005	0.008	15.8
56: K24/8	250	750	9.29	8.75	12.8	< 0.000003	0.000040	< 0.0005	< 0.0005	0.012	19.9
57: K24/10	250	750	9.43	8.93	13.5	< 0.000003	0.000055	< 0.0005	0.0006	0.007	21.2
58: K24/11	250	750	9.13	9.19	9.27	< 0.000003	0.000048	< 0.0005	< 0.0005	0.052	1.27
59: K163/1	250	750	5.75	6.77	11.5	0.000934	0.0365	< 0.0005	< 0.0005	0.003	27.0
60: K163/2	250	750	6.39	7.80	6.36	< 0.000003	0.000997	< 0.0005	0.0006	0.206	14.5
61: K163/3	250	750	9.47	9.47	4.50	0.000022	0.000257	0.0010	0.0009	0.461	18.1
62: K163/4	250	750	9.46	8.33	24.5	< 0.000003	0.000043	< 0.0005	< 0.0005	< 0.003	0.641
63: K163/5	250	750	4.33	4.42	31.6	0.196	0.0637	< 0.0005	2.92	7.28	30.8

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SFE Leach Test-3:1 L/S DI Water Extraction for 24hrs

LR Report : **CA10409-MAY12**

Sample ID	Sample weight g	Volume D.I. Water mL	Initial pH units	Final pH units	Calcium mg/L	Cadmium mg/L	Cobalt mg/L	Chromium mg/L	Copper mg/L	Iron mg/L	Potassium mg/L
64: K163/6	250	750	6.17	7.16	6.59	0.00116	0.000237	< 0.0005	< 0.0005	0.034	1.91
65: K163/8	250	750	8.80	9.25	10.9	0.000243	0.000144	< 0.0005	< 0.0005	0.005	0.326
66: K163/9	250	750	9.31	9.21	11.7	0.000050	0.000042	< 0.0005	< 0.0005	< 0.003	1.96
67: K163/12	250	750	7.90	8.21	0.71	0.000032	0.000280	0.0007	0.0015	1.41	9.58
68: K102/1	250	750	9.12	8.27	31.2	< 0.000003	0.000048	< 0.0005	0.0006	< 0.003	2.78
69: K102/5	250	750	8.36	7.86	7.92	< 0.000003	0.000051	< 0.0005	0.0006	0.356	0.591
70: K152/1	250	750	8.03	8.32	27.7	0.000018	0.000212	< 0.0005	0.0010	0.007	21.9
71: K152/2	250	750	7.36	7.32	4.60	0.000071	0.000275	< 0.0005	0.0007	< 0.003	3.69
72: Unknow (K163/11)	250	750	7.51	7.74	3.39	< 0.000003	0.000426	< 0.0005	0.0030	3.23	1.18

Dianne Griffin
Project Specialist

OnLine LIMS

SGS Canada Inc.
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Friday, June 15, 2012

Stantec
Attn : Nikolay Sidenko

603-386 Broadway Ave.
Winnipeg, MB
R3C 3R6,

Phone: 204-928-8862
Fax:204-942-2548

Date Rec. : 25 May 2012
LR Report: **CA10409-MAY12**
Reference: PO#121614000.324 Project:Alderon

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Sample weight g	Volume D.I. Water mL	Initial pH units	Final pH units	Lithium mg/L	Magnesium mg/L	Molybdenum mg/L	Sodium mg/L	Nickel mg/L	Lead mg/L	Antimony mg/L
1: Analysis Start Date	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12
2: Analysis Start Time	07:47	07:47	07:47	07:47	11:05	11:20	11:05	11:20	11:05	11:05	11:05
3: Analysis Approval Date	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12
4: Analysis Approval Time	11:05	11:05	11:05	11:05	10:25	09:55	10:25	09:55	11:10	10:25	10:26
5: K140/1	250	750	8.86	8.12	0.009	18.6	0.00232	2.45	0.0046	< 0.00002	< 0.0002
6: K140/2	250	750	9.62	9.70	0.007	0.437	0.00100	3.82	0.0001	0.00019	0.0003
7: K140/3	250	750	9.64	9.39	0.009	0.993	0.00374	5.23	0.0002	0.00004	0.0003
8: K140/4	250	750	9.76	9.70	0.009	0.407	0.00134	2.29	0.0002	0.00024	0.0007
9: K140/5	250	750	9.30	8.88	0.005	1.79	0.00181	4.19	0.0007	0.00006	0.0030
10: K140/6	250	750	9.63	9.39	0.003	1.19	0.01070	3.65	0.0005	0.00012	0.0005
11: K140/7	250	750	9.78	9.56	0.003	0.620	0.00133	3.43	0.0002	0.00009	0.0003
12: K140/8	250	750	9.55	9.09	0.017	1.77	0.00059	0.17	0.0001	0.00008	< 0.0002
13: K140/9	250	750	9.48	9.21	0.013	7.43	0.00239	0.35	0.0002	< 0.00002	0.0003
14: K140/10	250	750	9.33	8.82	0.002	14.9	0.00649	0.53	0.0002	< 0.00002	< 0.0002
15: K140/11	250	750	9.44	8.85	0.003	7.94	0.00122	0.71	0.0002	< 0.00002	< 0.0002
16: K143/1	250	750	9.22	9.17	0.017	3.95	0.0112	1.35	0.0002	< 0.00002	< 0.0002
17: K143/2	250	750	9.09	8.50	0.005	20.5	0.00082	0.66	0.0003	< 0.00002	< 0.0002
18: K20/1	250	750	3.63	3.77	0.050	13.7	0.00130	3.05	6.29	0.00082	< 0.0002
19: K20/2	250	750	7.96	8.82	0.005	0.444	0.00289	3.15	0.0021	0.00055	0.0019
20: K20/3	250	750	9.03	8.31	0.006	4.89	0.0309	1.82	0.0028	0.00007	0.0014
21: K20/4	250	750	9.39	9.46	0.008	1.03	0.00269	0.48	0.0013	0.00003	0.0006
22: K20/5	250	750	8.24	9.13	0.009	0.996	0.00809	2.22	0.0005	0.00026	0.0009
23: K20/6	250	750	9.36	9.02	0.013	3.58	0.00212	5.47	0.0004	0.00011	0.0009

OnLine LIMS

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LR Report : **CA10409-MAY12**

Sample ID	Sample weight g	Volume D.I. Water mL	Initial pH units	Final pH units	Lithium mg/L	Magnesium mg/L	Molybdenum mg/L	Sodium mg/L	Nickel mg/L	Lead mg/L	Antimony mg/L
24: K20/7	250	750	9.43	8.71	0.005	1.87	0.0364	2.64	0.0004	0.00003	0.0006
25: K20/8	250	750	9.63	9.35	0.001	13.1	0.00079	0.41	0.0001	< 0.00002	0.0005
26: K20/9	250	750	9.48	8.79	0.003	28.2	0.00158	0.39	0.0002	< 0.00002	< 0.0002
27: K20/10	250	750	9.04	9.31	0.003	5.60	0.00308	0.34	0.0001	0.00002	< 0.0002
28: K20/11	250	750	9.66	9.80	0.002	0.574	0.00050	3.60	0.0001	0.00002	< 0.0002
29: K20/12	250	750	9.28	8.43	0.003	8.94	0.00076	0.34	0.0003	< 0.00002	< 0.0002
30: K20/13	250	750	8.49	9.61	0.002	0.451	0.00072	0.60	0.0001	0.00008	< 0.0002
31: K20/14	250	750	9.68	9.33	0.004	2.84	0.00092	0.76	0.0001	< 0.00002	0.0002
32: K86B/1	250	750	7.03	7.25	0.005	3.05	0.00113	1.16	0.0005	0.00005	< 0.0002
33: K66/1	250	750	9.07	9.26	0.001	7.12	0.00127	0.22	0.0001	< 0.00002	< 0.0002
34: K66/2	250	750	9.46	9.01	0.001	4.95	0.00932	0.25	0.0004	0.00005	< 0.0002
35: K66/4	250	750	9.43	7.36	0.012	10.2	0.0278	3.23	0.0463	< 0.00002	0.0019
36: K66/5	250	750	7.24	8.30	0.001	22.9	0.00162	0.27	0.0004	< 0.00002	0.0003
37: K66/6	250	750	9.76	8.83	0.003	21.5	0.00370	1.11	0.0003	< 0.00002	< 0.0002
38: K66/7	250	750	8.65	8.82	0.004	3.26	0.00185	8.32	0.0013	0.00003	0.0004
39: K66/8	250	750	9.10	8.27	0.007	7.56	0.0122	3.95	0.0017	0.00007	0.0026
40: K66/9	250	750	9.62	9.06	0.009	2.30	0.00175	5.67	0.0005	< 0.00002	0.0009
41: K66/10	250	750	8.95	8.55	0.009	7.90	0.0160	4.66	0.0213	0.00006	0.0004
42: K66/11	250	750	7.79	7.02	0.009	8.64	0.00480	3.65	0.172	0.00002	0.0003
43: K66/12	250	750	9.36	8.81	0.002	15.9	0.00084	0.34	0.0016	0.00003	< 0.0002
44: K66/13	250	750	8.55	8.37	0.007	2.12	0.00054	0.58	0.0005	< 0.00002	< 0.0002
45: K66/14	250	750	8.49	7.06	< 0.001	27.4	0.00007	0.12	0.0030	< 0.00002	< 0.0002
46: K64/1	250	750	8.13	8.06	< 0.001	1.09	0.00078	0.34	0.0012	0.00005	0.0003
47: K64/3-163.5 (K66/3)	250	750	9.27	8.35	0.001	10.9	0.00121	0.33	0.0002	< 0.00002	< 0.0002
48: K24/1	250	750	9.69	8.78	0.018	25.5	0.00056	1.25	0.0002	< 0.00002	< 0.0002
49: K24/2	250	750	9.68	8.81	0.006	14.1	0.00057	0.42	0.0001	< 0.00002	< 0.0002
50: K24/3	250	750	9.53	9.63	0.010	0.811	0.00192	3.28	0.0005	0.00030	0.0003
51: K24/4	250	750	9.66	9.60	0.004	0.706	0.00131	3.71	0.0003	0.00020	0.0004
52: K24/5	250	750	9.19	9.35	0.009	1.03	0.00170	4.03	0.0015	0.00106	0.0022
53: K24/6-262.5 (K24/9)	250	750	9.18	9.27	0.048	4.74	0.00019	2.57	< 0.0001	0.00003	< 0.0002
54: K24/6-206.5 (K24/6)	250	750	9.68	8.52	0.006	12.6	0.00011	0.26	0.0001	< 0.00002	< 0.0002
55: K24/6-280 (K24/9) (284)	250	750	8.92	8.26	0.003	8.08	0.0942	1.12	0.0010	< 0.00002	0.0015
56: K24/8	250	750	9.29	8.75	0.004	4.82	0.00761	2.44	0.0008	< 0.00002	0.0018
57: K24/10	250	750	9.43	8.93	0.003	2.40	0.00427	1.21	0.0006	< 0.00002	0.0003
58: K24/11	250	750	9.13	9.19	0.001	0.791	0.00037	0.39	0.0002	0.00004	< 0.0002
59: K163/1	250	750	5.75	6.77	0.014	7.25	0.00036	3.35	1.20	0.00003	< 0.0002
60: K163/2	250	750	6.39	7.80	0.010	3.61	0.00353	7.60	0.0172	0.00019	< 0.0002
61: K163/3	250	750	9.47	9.47	0.012	0.963	0.00075	3.66	0.0007	0.00029	0.0009
62: K163/4	250	750	9.46	8.33	0.002	26.7	0.00024	0.46	0.0009	< 0.00002	< 0.0002
63: K163/5	250	750	4.33	4.42	0.017	19.9	0.00012	1.36	0.805	0.133	0.0004

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SFE Leach Test-3:1 L/S DI Water Extraction for 24hrs

LR Report : **CA10409-MAY12**

Sample ID	Sample weight g	Volume D.I. Water mL	Initial pH units	Final pH units	Lithium mg/L	Magnesium mg/L	Molybdenum mg/L	Sodium mg/L	Nickel mg/L	Lead mg/L	Antimony mg/L
64: K163/6	250	750	6.17	7.16	0.003	1.79	0.00010	0.53	0.0003	0.00059	< 0.0002
65: K163/8	250	750	8.80	9.25	< 0.001	10.3	0.00137	0.15	0.0018	0.00024	< 0.0002
66: K163/9	250	750	9.31	9.21	< 0.001	11.0	0.00045	0.19	0.0004	0.00009	< 0.0002
67: K163/12	250	750	7.90	8.21	0.001	0.460	0.00247	0.96	0.0014	0.00023	< 0.0002
68: K102/1	250	750	9.12	8.27	< 0.001	20.5	0.00030	0.24	0.0004	< 0.00002	< 0.0002
69: K102/5	250	750	8.36	7.86	0.006	1.47	0.00080	0.23	0.0004	0.00011	< 0.0002
70: K152/1	250	750	8.03	8.32	0.014	12.1	0.00672	1.65	0.0013	0.00005	0.0007
71: K152/2	250	750	7.36	7.32	< 0.001	1.81	0.00046	0.92	0.0006	0.00007	< 0.0002
72: Unknow (K163/11)	250	750	7.51	7.74	0.001	1.01	0.00240	0.79	0.0008	0.00022	< 0.0002

Dianne Griffin
Project Specialist

OnLine LIMS

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Friday, June 15, 2012

Stantec
Attn : Nikolay Sidenko

603-386 Broadway Ave.
Winnipeg, MB
R3C 3R6,

Phone: 204-928-8862
Fax:204-942-2548

Date Rec. : 25 May 2012
LR Report: **CA10409-MAY12**
Reference: PO#121614000.324 Project:Alderon

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Sample weight g	Volume D.I. Water mL	Initial pH units	Final pH units	Selenium mg/L	Silicon mg/L	Tin mg/L	Thallium mg/L	Uranium mg/L	Vanadium mg/L	Zinc mg/L
1: Analysis Start Date	07-Jun-12	07-Jun-12	07-Jun-12	07-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12	11-Jun-12
2: Analysis Start Time	07:47	07:47	07:47	07:47	11:05	11:20	11:05	11:05	11:05	11:05	11:05
3: Analysis Approval Date	14-Jun-12	14-Jun-12	14-Jun-12	14-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12	15-Jun-12
4: Analysis Approval Time	11:05	11:05	11:05	11:05	10:26	09:55	10:26	10:26	11:10	10:26	11:10
5: K140/1	250	750	8.86	8.12	0.006	2.15	0.00005	0.00003	0.00368	0.00107	< 0.001
6: K140/2	250	750	9.62	9.70	< 0.001	3.41	0.00005	< 0.00002	0.00610	0.0162	0.001
7: K140/3	250	750	9.64	9.39	0.002	2.67	0.00017	< 0.00002	0.000758	0.00552	0.001
8: K140/4	250	750	9.76	9.70	< 0.001	3.24	0.00012	< 0.00002	0.005767	0.0146	0.002
9: K140/5	250	750	9.30	8.88	0.007	1.89	0.00001	< 0.00002	0.000848	0.00246	< 0.001
10: K140/6	250	750	9.63	9.39	0.005	3.09	0.00002	< 0.00002	0.000851	0.00699	< 0.001
11: K140/7	250	750	9.78	9.56	< 0.001	2.40	0.00027	< 0.00002	0.000247	0.0176	0.003
12: K140/8	250	750	9.55	9.09	< 0.001	15.2	< 0.00001	< 0.00002	0.000233	0.00035	< 0.001
13: K140/9	250	750	9.48	9.21	< 0.001	4.19	0.00006	< 0.00002	0.000050	0.00011	< 0.001
14: K140/10	250	750	9.33	8.82	< 0.001	8.47	0.00007	< 0.00002	0.000087	0.00009	< 0.001
15: K140/11	250	750	9.44	8.85	< 0.001	14.0	0.00003	< 0.00002	0.000352	0.00005	< 0.001
16: K143/1	250	750	9.22	9.17	< 0.001	1.41	0.00018	< 0.00002	0.000793	0.00512	0.001
17: K143/2	250	750	9.09	8.50	< 0.001	4.15	0.00003	< 0.00002	0.000323	0.00035	< 0.001
18: K20/1	250	750	3.63	3.77	0.017	13.3	< 0.00001	0.00117	0.227	0.00435	8.69
19: K20/2	250	750	7.96	8.82	< 0.001	4.12	0.00022	0.00004	0.00147	0.0117	0.009
20: K20/3	250	750	9.03	8.31	0.001	1.34	0.00021	< 0.00002	0.0383	0.00293	0.002
21: K20/4	250	750	9.39	9.46	< 0.001	3.64	0.00009	< 0.00002	0.00516	0.0117	0.002
22: K20/5	250	750	8.24	9.13	< 0.001	2.87	0.00017	< 0.00002	0.00602	0.0234	0.003
23: K20/6	250	750	9.36	9.02	< 0.001	1.76	0.00079	< 0.00002	0.000648	0.00119	0.001

SGS Canada Inc.
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Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

SFE Leach Test-3:1 L/S DI Water Extraction for 24hrs

LR Report : **CA10409-MAY12**

Sample ID	Sample weight g	Volume D.I. Water mL	Initial pH units	Final pH units	Selenium mg/L	Silicon mg/L	Tin mg/L	Thallium mg/L	Uranium mg/L	Vanadium mg/L	Zinc mg/L
24: K20/7	250	750	9.43	8.71	0.003	2.32	0.00016	< 0.00002	0.00748	0.0425	< 0.001
25: K20/8	250	750	9.63	9.35	< 0.001	6.87	0.00006	< 0.00002	0.00179	0.00129	< 0.001
26: K20/9	250	750	9.48	8.79	< 0.001	1.30	0.00009	< 0.00002	0.00163	0.00005	0.001
27: K20/10	250	750	9.04	9.31	< 0.001	4.91	0.00027	< 0.00002	0.000117	0.00015	0.002
28: K20/11	250	750	9.66	9.80	< 0.001	3.55	0.00012	< 0.00002	0.000043	0.0242	< 0.001
29: K20/12	250	750	9.28	8.43	< 0.001	6.22	0.00026	< 0.00002	0.000121	0.00008	< 0.001
30: K20/13	250	750	8.49	9.61	< 0.001	2.70	0.00064	< 0.00002	0.000102	0.00291	0.002
31: K20/14	250	750	9.68	9.33	< 0.001	3.58	0.00016	< 0.00002	0.000117	0.00182	0.002
32: K86B/1	250	750	7.03	7.25	< 0.001	3.44	0.00022	< 0.00002	0.000032	0.00007	0.003
33: K66/1	250	750	9.07	9.26	< 0.001	3.45	0.00013	< 0.00002	0.000311	0.00009	< 0.001
34: K66/2	250	750	9.46	9.01	< 0.001	5.38	0.00011	< 0.00002	0.000664	0.00291	0.001
35: K66/4	250	750	9.43	7.36	0.015	5.75	0.00008	0.00002	0.00192	0.00066	0.002
36: K66/5	250	750	7.24	8.30	< 0.001	6.13	0.00005	< 0.00002	0.000100	0.00004	0.001
37: K66/6	250	750	9.76	8.83	< 0.001	1.22	0.00005	< 0.00002	0.00127	0.00032	< 0.001
38: K66/7	250	750	8.65	8.82	0.001	2.98	0.00021	< 0.00002	0.000336	0.00247	< 0.001
39: K66/8	250	750	9.10	8.27	0.001	1.59	0.00017	< 0.00002	0.00378	0.00170	0.002
40: K66/9	250	750	9.62	9.06	< 0.001	2.21	0.00009	< 0.00002	0.000138	0.00308	< 0.001
41: K66/10	250	750	8.95	8.55	0.005	2.62	0.00002	< 0.00002	0.00255	0.00141	< 0.001
42: K66/11	250	750	7.79	7.02	0.009	8.70	0.00004	0.00002	0.000933	0.00049	0.005
43: K66/12	250	750	9.36	8.81	< 0.001	3.32	0.00005	< 0.00002	0.00428	< 0.00003	0.001
44: K66/13	250	750	8.55	8.37	< 0.001	5.39	0.00003	< 0.00002	0.000104	< 0.00003	< 0.001
45: K66/14	250	750	8.49	7.06	< 0.001	2.91	0.00003	0.00002	0.000147	< 0.00003	< 0.001
46: K64/1	250	750	8.13	8.06	< 0.001	6.93	0.00004	< 0.00002	0.000088	0.00015	0.002
47: K64/3-163.5 (K66/3)	250	750	9.27	8.35	< 0.001	8.30	0.00002	< 0.00002	0.000137	< 0.00003	< 0.001
48: K24/1	250	750	9.69	8.78	< 0.001	1.25	0.00064	< 0.00002	0.00208	< 0.00003	< 0.001
49: K24/2	250	750	9.68	8.81	< 0.001	4.76	0.00003	< 0.00002	0.000939	0.00007	< 0.001
50: K24/3	250	750	9.53	9.63	0.001	4.21	0.00017	< 0.00002	0.00951	0.0523	0.003
51: K24/4	250	750	9.66	9.60	< 0.001	4.62	0.00011	< 0.00002	0.00431	0.0218	< 0.001
52: K24/5	250	750	9.19	9.35	0.002	3.93	0.00013	0.00002	0.00168	0.0189	0.006
53: K24/6-262.5 (K24/9)	250	750	9.18	9.27	< 0.001	12.5	0.00015	< 0.00002	0.000055	0.00016	0.001
54: K24/6-206.5 (K24/6)	250	750	9.68	8.52	< 0.001	5.14	0.00009	< 0.00002	0.000038	0.00004	< 0.001
55: K24/6-280 (K24/9) (284)	250	750	8.92	8.26	0.003	1.74	0.00011	< 0.00002	0.00194	0.00184	< 0.001
56: K24/8	250	750	9.29	8.75	0.008	2.55	0.00012	0.00002	0.000508	0.00157	< 0.001
57: K24/10	250	750	9.43	8.93	< 0.001	1.98	0.00009	< 0.00002	0.000804	0.00174	< 0.001
58: K24/11	250	750	9.13	9.19	< 0.001	20.4	0.00016	< 0.00002	0.000253	0.00188	0.003
59: K163/1	250	750	5.75	6.77	0.022	5.50	0.00003	0.00004	0.000251	0.00009	0.010
60: K163/2	250	750	6.39	7.80	0.004	6.21	0.00030	< 0.00002	0.000369	0.00145	0.001
61: K163/3	250	750	9.47	9.47	< 0.001	4.15	0.00022	< 0.00002	0.00645	0.0134	0.002
62: K163/4	250	750	9.46	8.33	< 0.001	5.15	0.00017	< 0.00002	0.000390	0.00008	< 0.001
63: K163/5	250	750	4.33	4.42	0.028	10.3	0.00068	0.00027	1.98	0.00007	23.2

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SFE Leach Test-3:1 L/S DI Water Extraction for 24hrs

LR Report : **CA10409-MAY12**

Sample ID	Sample weight g	Volume D.I. Water mL	Initial pH units	Final pH units	Selenium mg/L	Silicon mg/L	Tin mg/L	Thallium mg/L	Uranium mg/L	Vanadium mg/L	Zinc mg/L
64: K163/6	250	750	6.17	7.16	0.004	7.69	0.00003	0.00006	0.00008	< 0.00003	< 0.001
65: K163/8	250	750	8.80	9.25	< 0.001	10.4	< 0.00001	< 0.00002	0.00036	0.00011	< 0.001
66: K163/9	250	750	9.31	9.21	< 0.001	6.99	0.00008	< 0.00002	0.00014	0.00007	< 0.001
67: K163/12	250	750	7.90	8.21	< 0.001	6.19	0.00015	< 0.00002	0.000551	0.00052	0.008
68: K102/1	250	750	9.12	8.27	< 0.001	2.66	< 0.00001	< 0.00002	0.000266	< 0.00003	0.003
69: K102/5	250	750	8.36	7.86	< 0.001	7.81	0.00004	< 0.00002	0.000166	< 0.00003	0.003
70: K152/1	250	750	8.03	8.32	0.008	2.51	0.00014	< 0.00002	0.0223	0.00046	0.003
71: K152/2	250	750	7.36	7.32	< 0.001	3.65	0.00022	0.00003	0.000369	< 0.00003	0.002
72: Unknow (K163/11)	250	750	7.51	7.74	< 0.001	7.31	0.00047	< 0.00002	0.000157	0.00087	0.002

Dianne Griffin
Project Specialist

OnLine LIMS

SGS Canada Inc.
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Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Sunday, April 08, 2012

Stantec
Attn : Nikolay Sidenko

603-386 Broadway Ave.
Winnipeg, MB
R3C 3R6,

Phone: 204-928-8862
Fax:204-942-2548

Date Rec. : 23 March 2012
LR Report: **CA11272-MAR12**
Reference: Alderon 121614000

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	9: Reporting Limit	5: Alderon GC #1 (Pipe Sampled)	6: Alderon GC #2 (Pipe Sampled)	7: Alderon GC #3 (Pipe Sampled)	8: Alderon GT #1 (From Survey)
Sample Date & Time				13-Mar-12	13-Mar-12	13-Mar-12	09-Mar-12
Sample weight [g]	03-Apr-12	12:09	---	250	250	250	250
Volume D.I. Water [mL]	03-Apr-12	12:09	---	750	750	750	750
Initial pH [units]	03-Apr-12	12:09	---	7.46	7.07	7.47	9.21
Final pH [units]	03-Apr-12	12:09	---	9.10	9.07	9.13	8.90
Mercury [mg/L]	03-Apr-12	14:44	0.00001	< 0.00001	0.00001	0.00001	0.00001
Silver [mg/L]	05-Apr-12	12:40	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Aluminum [mg/L]	03-Apr-12	14:50	0.01	0.16	0.16	0.16	0.03
Arsenic [mg/L]	05-Apr-12	12:40	0.0002	0.0008	0.0007	0.0010	0.0008
Barium [mg/L]	05-Apr-12	12:40	0.00001	0.0384	0.0569	0.0597	0.0482
Boron [mg/L]	05-Apr-12	12:40	0.0002	0.0033	0.0027	0.0029	0.0497
Beryllium [mg/L]	05-Apr-12	12:40	0.00002	0.00005	0.00006	0.00005	< 0.00002
Calcium [mg/L]	03-Apr-12	14:50	0.02	7.60	6.97	7.28	12.0
Cadmium [mg/L]	05-Apr-12	12:40	0.000003	0.000004	< 0.000003	< 0.000003	< 0.000003
Cobalt [mg/L]	05-Apr-12	12:40	0.000002	0.000209	0.000208	0.000186	0.000141
Chromium [mg/L]	05-Apr-12	12:40	0.0005	< 0.0005	0.0005	< 0.0005	0.0007
Copper [mg/L]	05-Apr-12	12:40	0.0005	0.0015	0.0017	0.0012	0.0014
Iron [mg/L]	03-Apr-12	14:50	0.003	1.04	1.09	0.911	0.897
Potassium [mg/L]	03-Apr-12	14:50	0.006	0.266	0.208	0.249	0.571
Magnesium [mg/L]	03-Apr-12	14:50	0.001	2.08	1.93	2.07	3.00
Molybdenum [mg/L]	05-Apr-12	12:41	0.00001	0.00436	0.00389	0.00401	0.00619
Sodium [mg/L]	03-Apr-12	14:50	0.01	0.27	0.22	0.21	11.1
Nickel [mg/L]	05-Apr-12	12:41	0.0001	0.0004	0.0004	0.0003	0.0003
Lead [mg/L]	05-Apr-12	12:41	0.00002	0.00012	0.00011	0.00007	0.00004
Antimony [mg/L]	05-Apr-12	12:41	0.0002	< 0.0002	< 0.0002	< 0.0002	0.0003
Selenium [mg/L]	05-Apr-12	12:41	0.001	< 0.001	< 0.001	< 0.001	< 0.001
Silicon [mg/L]	03-Apr-12	14:51	0.01	3.46	2.97	3.37	5.38
Tin [mg/L]	05-Apr-12	12:41	0.00001	< 0.00001	< 0.00001	0.00002	0.00002
Thallium [mg/L]	05-Apr-12	12:41	0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Uranium [mg/L]	05-Apr-12	12:41	0.000001	0.000255	0.000178	0.000187	0.00121
Vanadium [mg/L]	05-Apr-12	12:41	0.00001	0.00018	0.00015	0.00018	0.00018
Yttrium [mg/L]	05-Apr-12	12:41	0.000001	0.000138	0.000137	0.000121	0.000109
Zinc [mg/L]	05-Apr-12	12:41	0.001	< 0.001	< 0.001	< 0.001	< 0.001

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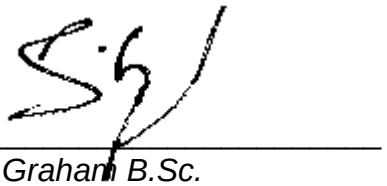
LR Report : **CA11272-MAR12**



Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

SGS Canada Inc.
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Modified ABA (Price 1997)

Stantec
Attn : Nikolay Sidenko

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Winnipeg, MB
R3C 3R6,

Phone: 204-928-8862
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Sunday, April 08, 2012

Date Rec. : 30 March 2012
LR Report: **CA11389-MAR12**
Reference: Alderon 121614000

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: Alderon GT #2	6: Alderon GT #3	7: Alderon MC #1	8: Alderon MC #2	9: Alderon MC #3	10: Alderon MT #1	11: Alderon MT #2	12: Alderon MT #3
Sample Date & Time			30-Mar-12	30-Mar-12	30-Mar-12	30-Mar-12	30-Mar-12	30-Mar-12	30-Mar-12	30-Mar-12
Paste pH [units]	05-Apr-12	10:45	8.71	8.87	8.61	8.56	8.62	8.46	8.63	8.54
Fizz Rate [---]	05-Apr-12	10:45	4	4	3	3	3	4	4	4
Sample weight [g]	05-Apr-12	10:45	2.00	2.05	2.01	1.99	2.01	1.99	1.97	2.01
HCl added [mL]	05-Apr-12	10:45	52.20	56.30	20.00	20.00	20.00	40.00	40.00	40.00
HCl [Normality]	05-Apr-12	10:45	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
NaOH [Normality]	05-Apr-12	10:45	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
NaOH to [pH=8.3 mL]	05-Apr-12	10:45	23.33	27.19	11.85	11.45	11.76	22.65	22.67	22.29
Final pH [units]	05-Apr-12	10:45	1.64	1.53	1.55	1.50	1.58	1.53	1.58	1.57
NP [t CaCO3/1000 t]	05-Apr-12	10:45	72.2	71.0	20.3	21.5	20.5	43.6	44.0	44.0
AP [t CaCO3/1000 t]	05-Apr-12	10:47	0.31	0.31	0.62	0.62	0.62	0.94	0.62	0.62
Net NP [t CaCO3/1000 t]	05-Apr-12	10:47	71.9	70.7	19.7	20.9	19.9	42.7	43.4	43.4
NP/AP [ratio]	05-Apr-12	10:47	233	229	32.7	34.7	33.1	46.4	71.0	71.0
Sulphur (total) [%]	03-Apr-12	18:38	0.027	0.025	0.057	0.059	0.056	0.034	0.034	0.035
Acid Leachable SO4-S [%]	03-Apr-12	18:39	0.01	0.01	0.04	0.03	0.04	< 0.01	0.02	0.01
Sulphide [%]	03-Apr-12	18:37	0.01	0.01	0.02	0.02	0.02	0.03	0.02	0.02
Carbon (total) [%]	03-Apr-12	18:39	1.21	1.20	0.459	0.464	0.462	0.793	0.786	0.792
Carbonate [%]	04-Apr-12	15:16	3.93	4.55	1.07	1.11	1.09	2.60	2.42	2.56

OnLine LIMS

SGS Canada Inc.
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*NP (Neutralization Potential)

$$= \frac{50 \times (\text{N of HCL} \times \text{Total HCL added} - \text{N NaOH} \times \text{NaOH added})}{\text{Weight of Sample}}$$

*AP (Acid Potential) = % Sulphide Sulphur x 31.25
*Net NP (Net Neutralization Potential) = NP-AP
NP/AP Ratio = NP/AP
*Results expressed as tonnes CaCO3 equivalent/1000 tonnes of material
Samples with a % Sulphide value of <0.01 will be calculated using a 0.01 value.

Sulphur analysis performed following BC ARD Guidelines (Price 1997)

Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

OnLine LIMS

SGS Canada Inc.
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April-04-12

Stantec
Attn : Nikolay Sidenko

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Phone: 204-928-8862
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Date Rec. : 30 March 2012
LR Report: **CA11388-MAR12**
Reference: Alderon 121614000

Copy: #1

CERTIFICATE OF ANALYSIS

Partial Report

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: Alderon Process Water #1	6: Alderon Process Water #2	7: Alderon Process Water #3
Sample Date & Time			30-Mar-12 15:30	30-Mar-12 15:30	30-Mar-12 15:30
Temperature Upon Receipt [°C]	---	---	7.0	7.0	7.0
Total Suspended Solids [mg/L]	04-Apr-12	14:56	3	145	678
Total Dissolved Solids [mg/L]	03-Apr-12	15:56	200	234	171
pH [no unit]	04-Apr-12	14:23	8.12	8.31	8.17
Alkalinity [mg/L as CaCO3]	04-Apr-12	14:23	114	164	118
Conductivity [µS/cm]	04-Apr-12	14:23	286	375	289
Ammonia+Ammonium (N) [mg/L]	04-Apr-12	07:02	< 0.1	0.1	0.1
Chloride [mg/L]	02-Apr-12	15:57	22	21	20
Sulphate [mg/L]	03-Apr-12	13:07	8.7	15	8.6
Nitrite (as N) [mg/L]	02-Apr-12	12:26	< 0.06	< 0.06	< 0.06
Nitrate (as N) [mg/L]	02-Apr-12	12:26	0.23	< 0.05	0.20
Mercury (total) [mg/L]	03-Apr-12	14:45	0.00001	0.00001	0.00002
Silver (total) [mg/L]	04-Apr-12	14:19	< 0.00001	0.00008	0.00011
Silver (dissolved) [mg/L]	04-Apr-12	14:19	< 0.00001	0.00001	0.00001
Aluminum (total) [mg/L]	03-Apr-12	17:23	0.04	0.54	0.76
Aluminum (dissolved) [mg/L]	03-Apr-12	17:23	0.02	0.15	0.08
Arsenic (total) [mg/L]	04-Apr-12	14:19	0.0005	0.0019	0.0020
Arsenic (dissolved) [mg/L]	04-Apr-12	14:19	0.0004	0.0012	0.0010
Barium (total) [mg/L]	04-Apr-12	14:19	0.0942	0.373	0.688
Barium (dissolved) [mg/L]	04-Apr-12	14:19	0.0807	0.177	0.187
Beryllium (total) [mg/L]	04-Apr-12	14:19	0.00005	0.00061	0.00105
Beryllium (dissolved) [mg/L]	04-Apr-12	14:19	0.00002	0.00021	0.00016
Boron (total) [mg/L]	04-Apr-12	14:19	0.0077	0.0283	0.0096
Boron (dissolved) [mg/L]	04-Apr-12	14:19	0.0076	0.0287	0.0087
Calcium (total) [mg/L]	03-Apr-12	17:23	43.6	55.7	64.7
Calcium (dissolved) [mg/L]	03-Apr-12	17:23	42.1	48.1	44.7
Cadmium (total) [mg/L]	04-Apr-12	14:21	0.000016	0.000045	0.000096
Cadmium (dissolved) [mg/L]	***	***	***	***	***
Cobalt (total) [mg/L]	04-Apr-12	14:19	0.000694	0.00375	0.00767
Cobalt (dissolved) [mg/L]	04-Apr-12	14:19	0.000368	0.00154	0.00151
Chromium (total) [mg/L]	04-Apr-12	14:19	0.0007	0.0095	0.0051
Chromium (dissolved) [mg/L]	04-Apr-12	14:19	< 0.0005	0.0039	0.0011

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA11388-MAR12**

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: Alderon Process Water #1	6: Alderon Process Water #2	7: Alderon Process Water #3
Copper (total) [mg/L]	04-Apr-12	14:19	0.0043	0.0079	0.0128
Copper (dissolved) [mg/L]	04-Apr-12	14:19	0.0034	0.0041	0.0040
Iron (total) [mg/L]	03-Apr-12	17:23	1.67	20.9	44.2
Iron (dissolved) [mg/L]	03-Apr-12	17:23	0.995	7.71	8.21
Potassium (total) [mg/L]	03-Apr-12	17:23	1.98	8.15	2.56
Potassium (dissolved) [mg/L]	03-Apr-12	17:23	1.98	7.76	2.18
Magnesium (total) [mg/L]	03-Apr-12	17:23	5.13	19.1	15.2
Magnesium (dissolved) [mg/L]	03-Apr-12	17:23	4.84	15.7	6.64
Molybdenum (total) [mg/L]	04-Apr-12	14:20	0.00108	0.0144	0.00047
Molybdenum (dissolved) [mg/L]	***	***	***	***	***
Sodium (total) [mg/L]	03-Apr-12	17:23	10.7	10.0	10.1
Sodium (dissolved) [mg/L]	03-Apr-12	17:23	10.6	10.3	9.56
Nickel (total) [mg/L]	04-Apr-12	14:20	0.0016	0.0095	0.0049
Nickel (dissolved) [mg/L]	04-Apr-12	14:20	0.0014	0.0073	0.0022
Lead (total) [mg/L]	04-Apr-12	14:20	0.00063	0.00132	0.00263
Lead (dissolved) [mg/L]	04-Apr-12	14:20	0.00008	0.00046	0.00046
Antimony (total) [mg/L]	04-Apr-12	14:20	< 0.0002	< 0.0002	< 0.0002
Antimony (dissolved) [mg/L]	04-Apr-12	14:20	0.0013	0.0013	0.0014
Selenium (total) [mg/L]	04-Apr-12	14:20	< 0.001	< 0.001	< 0.001
Selenium (dissolved) [mg/L]	04-Apr-12	14:20	< 0.001	< 0.001	< 0.001
Silicon (total) [mg/L]	03-Apr-12	17:23	3.04	13.6	10.7
Silicon (dissolved) [mg/L]	03-Apr-12	17:23	3.27	14.3	6.10
Tin (total) [mg/L]	04-Apr-12	14:20	0.00008	0.00015	0.00016
Tin (dissolved) [mg/L]	04-Apr-12	14:20	< 0.00001	0.00007	0.00005
Thallium (total) [mg/L]	04-Apr-12	14:20	< 0.0002	< 0.0002	< 0.0002
Thallium (dissolved) [mg/L]	04-Apr-12	14:20	< 0.0002	< 0.0002	< 0.0002
Uranium (total) [mg/L]	04-Apr-12	14:20	0.000802	0.0113	0.00173
Uranium (dissolved) [mg/L]	04-Apr-12	14:20	0.000797	0.0110	0.00126
Vanadium (total) [mg/L]	04-Apr-12	14:20	0.00016	0.00084	0.00144
Vanadium (dissolved) [mg/L]	04-Apr-12	14:20	0.00009	0.00069	0.00053
Zinc (total) [mg/L]	03-Apr-12	17:23	0.005	0.014	0.032
Zinc (dissolved) [mg/L]	03-Apr-12	17:23	0.003	0.008	0.008

Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

OnLine LIMS

SGS Canada Inc.
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Wednesday, April 11, 2012

Stantec
Attn : Nikolay Sidenko

603-386 Broadway Ave.
Winnipeg, MB
R3C 3R6,

Phone: 204-928-8862
Fax:204-942-2548

Date Rec. : 30 March 2012
LR Report: **CA11388-MAR12**
Reference: Alderon 121614000

Copy: #2

CERTIFICATE OF ANALYSIS

Final Report - Revised

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: Alderon Process Water #1	6: Alderon Process Water #2	7: Alderon Process Water #3
Sample Date & Time			30-Mar-12 15:30	30-Mar-12 15:30	30-Mar-12 15:30
Temperature Upon Receipt [°C]	---	---	7.0	7.0	7.0
Total Suspended Solids [mg/L]	04-Apr-12	14:56	3	145	678
Total Dissolved Solids [mg/L]	03-Apr-12	15:56	200	234	171
pH [no unit]	04-Apr-12	14:23	8.12	8.31	8.17
Alkalinity [mg/L as CaCO3]	04-Apr-12	14:23	114	164	118
Conductivity [µS/cm]	04-Apr-12	14:23	286	375	289
Ammonia+Ammonium (N) [mg/L]	04-Apr-12	07:02	< 0.1	0.1	0.1
Chloride [mg/L]	02-Apr-12	15:57	22	21	20
Sulphate [mg/L]	03-Apr-12	13:07	8.7	15	8.6
Nitrite (as N) [mg/L]	02-Apr-12	12:26	< 0.06	< 0.06	< 0.06
Nitrate (as N) [mg/L]	02-Apr-12	12:26	0.23	< 0.05	0.20
Mercury (total) [mg/L]	03-Apr-12	14:45	0.00001	0.00001	0.00002
Silver (total) [mg/L]	04-Apr-12	14:19	< 0.00001	0.00008	0.00011
Silver (dissolved) [mg/L]	04-Apr-12	14:19	< 0.00001	0.00001	0.00001
Aluminum (total) [mg/L]	03-Apr-12	17:23	0.04	0.54	0.76
Aluminum (dissolved) [mg/L]	03-Apr-12	17:23	0.02	0.15	0.08
Arsenic (total) [mg/L]	04-Apr-12	14:19	0.0005	0.0019	0.0020
Arsenic (dissolved) [mg/L]	04-Apr-12	14:19	0.0004	0.0012	0.0010
Barium (total) [mg/L]	04-Apr-12	14:19	0.0942	0.373	0.688
Barium (dissolved) [mg/L]	04-Apr-12	14:19	0.0807	0.177	0.187
Beryllium (total) [mg/L]	04-Apr-12	14:19	0.00005	0.00061	0.00105
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Calcium (dissolved) [mg/L]	03-Apr-12	17:23	42.1	48.1	44.7
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Cadmium (dissolved) [mg/L]	04-Apr-12	14:20	0.000008	< 0.000003	0.000023
Cobalt (total) [mg/L]	04-Apr-12	14:19	0.000694	0.00375	0.00767
Cobalt (dissolved) [mg/L]	04-Apr-12	14:19	0.000368	0.00154	0.00151
Chromium (total) [mg/L]	04-Apr-12	14:19	0.0007	0.0095	0.0051
Chromium (dissolved) [mg/L]	04-Apr-12	14:19	< 0.0005	0.0039	0.0011

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Copper (total) [mg/L]	04-Apr-12	14:19	0.0043	0.0079	0.0128
Copper (dissolved) [mg/L]	04-Apr-12	14:19	0.0034	0.0041	0.0040
Iron (total) [mg/L]	03-Apr-12	17:23	1.67	20.9	44.2
Iron (dissolved) [mg/L]	03-Apr-12	17:23	0.995	7.71	8.21
Potassium (total) [mg/L]	03-Apr-12	17:23	1.98	8.15	2.56
Potassium (dissolved) [mg/L]	03-Apr-12	17:23	1.98	7.76	2.18
Magnesium (total) [mg/L]	03-Apr-12	17:23	5.13	19.1	15.2
Magnesium (dissolved) [mg/L]	03-Apr-12	17:23	4.84	15.7	6.64
Molybdenum (total) [mg/L]	04-Apr-12	14:20	0.00108	0.0144	0.00047
Molybdenum (dissolved) [mg/L]	09-Apr-12	11:55	0.00102	0.0267	0.00195
Manganese (total) [mg/L]	11-Apr-12	08:49	0.886	8.13	20.2
Manganese (dissolved) [mg/L]	11-Apr-12	08:49	0.450	3.14	3.32
Sodium (total) [mg/L]	03-Apr-12	17:23	10.7	10.0	10.1
Sodium (dissolved) [mg/L]	03-Apr-12	17:23	10.6	10.3	9.56
Nickel (total) [mg/L]	04-Apr-12	14:20	0.0016	0.0095	0.0049
Nickel (dissolved) [mg/L]	04-Apr-12	14:20	0.0014	0.0073	0.0022
Lead (total) [mg/L]	04-Apr-12	14:20	0.00063	0.00132	0.00263
Lead (dissolved) [mg/L]	04-Apr-12	14:20	0.00008	0.00046	0.00046
Antimony (total) [mg/L]	04-Apr-12	14:20	< 0.0002	< 0.0002	< 0.0002
Antimony (dissolved) [mg/L]	04-Apr-12	14:20	< 0.0002	< 0.0002	< 0.0002
Selenium (total) [mg/L]	04-Apr-12	14:20	< 0.001	< 0.001	< 0.001
Selenium (dissolved) [mg/L]	04-Apr-12	14:20	< 0.001	< 0.001	< 0.001
Silicon (total) [mg/L]	03-Apr-12	17:23	3.04	13.6	10.7
Silicon (dissolved) [mg/L]	03-Apr-12	17:23	3.27	14.3	6.10
Tin (total) [mg/L]	04-Apr-12	14:20	0.00008	0.00015	0.00016
Tin (dissolved) [mg/L]	04-Apr-12	14:20	< 0.00001	0.00007	0.00005
Thallium (total) [mg/L]	04-Apr-12	14:20	< 0.0002	< 0.0002	< 0.0002
Thallium (dissolved) [mg/L]	04-Apr-12	14:20	< 0.0002	< 0.0002	< 0.0002
Uranium (total) [mg/L]	04-Apr-12	14:20	0.000802	0.0113	0.00173
Uranium (dissolved) [mg/L]	04-Apr-12	14:20	0.000797	0.0110	0.00126
Vanadium (total) [mg/L]	04-Apr-12	14:20	0.00016	0.00084	0.00144
Vanadium (dissolved) [mg/L]	04-Apr-12	14:20	0.00009	0.00069	0.00053
Zinc (total) [mg/L]	03-Apr-12	17:23	0.005	0.014	0.032
Zinc (dissolved) [mg/L]	03-Apr-12	17:23	0.003	0.008	0.008

Revised dissolved antimony results Apr. 11/12

Dianne Griffin
Project Specialist

OnLine LIMS

ATTACHMENT 2

RESULTS OF ACID-BASE ACCOUNTING FOR OVERBURDEN AND DIFFERENT BEDROCK LITHOLOGIES EXPOSED DURING KAMI PROJECT

Attachment 2. Results of Acid-Base Accounting for Overburden and Different Bedrock Lithologies Exposed During Kami Project

Core ID	Sample taken (m)		Sample ID	Formation/Face	Lithology Code[1]	Description [2]	Paste pH	NP[3]	AP[3]	Net NP[3]	NP/AP	Total S	Sulphate S	Sulphide S	Total C	CO_3[4]
	from	to					pH units	t CaCO3/1000 t			ratio	wt %				
K-08-20	169.25	169.6	K20-8	IF-carbonate	QCSIF	variable grey	8.96	206	22.4	184	9.24	1.15	0.44	0.72	3.16	12.7
K-08-24	40.7	41	K24-2	IF-carbonate	QCSIF	n/a	9.07	209	5.02	204	41.5	0.513	0.35	0.16	3.49	16.0
K-08-24	206.5	207	K24-6	IF-carbonate	QCIF	light grey	8.61	112	13.6	98.2	8.21	0.661	0.22	0.44	2.42	7.62
K-10-66	491.6	492	K66-12	IF-carbonate	QCIF	n/a	8.76	224	0.31	224	724	0.014	0.01	< 0.01	4.12	18.6
K-11-102	62	62.5	K102-1	IF-carbonate	LMQCIF	light grey	8.69	195	0.31	195	630	0.015	0.01	< 0.01	3.72	13.5
K-11-140	257	257.33	K140-8	IF-carbonate	QCIF (?)	light greyish-green	9.09	11.7	0.31	11.4	37.7	0.016	0.02	< 0.01	0.137	0.314
K-11-163	164.75	165	K163-4	IF-carbonate	QCIF	light greenish-grey	8.65	373	2.85	370	131	0.324	0.23	0.09	6.05	29.2
K-11-163	198.5	199.2	K163-6	IF-carbonate	QCIF	Reddish	7.10	1.9	1.35	0.55	1.40	0.109	0.07	0.04	1.38	6.62
K-08-20	213	213.5	K20-10	IF-Main	MIF	grey	9.24	68.2	0.31	67.9	220	0.007	< 0.01	< 0.01	0.963	3.98
K-08-20	412	412.63	K20-12	IF-Main	MIF	variable grey	8.54	61.3	31.7	29.6	1.94	1.13	0.11	1.01	1.03	2.18
K-08-24	262.5	263	K24-9	IF-Main	HMIF	variable grey	9.20	77.6	0.31	77.3	250	0.015	0.01	< 0.01	1.14	1.79
K-10-66	66	66.2	K66-1	IF-Main	LHMIF	grey	8.79	120	0.31	119	386	0.015	0.01	< 0.01	1.71	7.30
K-10-66	163.5	164	K66-3	IF-Main	MIF, QCSIF(?)	cream	8.56	59.7	0.31	59.4	193	0.055	0.05	< 0.01	1.05	4.43
K-10-66	556.7	557.3	K66-13	IF-Main	MIF	n/a	8.62	4.9	0.31	4.59	15.8	0.006	< 0.01	< 0.01	0.057	0.084
K-11-102	113.7	114.2	K102-2	IF-Main	HMIF	brown grey	8.88	71.2	0.31	70.9	230	0.006	< 0.01	< 0.01	1.29	4.65
K-11-102	166.1	166.4	K102-3	IF-Main	MIF	grey	8.83	38.3	0.31	38.0	124	0.030	0.03	< 0.01	1.39	1.95
K-11-102	231.7	232.2	K102-4	IF-Main	HMIF	grey	8.84	3.4	0.31	3.09	11.0	0.009	< 0.01	< 0.01	0.026	0.048
K-11-102	287	287.7	K102-5	IF-Main	HIF	brown grey	7.62	2.6	0.31	2.29	8.39	0.020	0.02	< 0.01	0.032	0.019
K-11-140	281	281.3	K140-9	IF-Main	MIF	dark grey	9.12	155	0.31	154	499	0.009	< 0.01	< 0.01	2.10	9.27
K-11-140	299.4	299.8	K140-11	IF-Main	LHMIF	light grey	8.72	186	0.31	186	601	0.030	0.03	< 0.01	2.24	10.2
K-11-140	335	335.4	K140-12	IF-Main	MIF	grey pink	9.15	49.0	0.31	48.7	158	0.020	0.02	< 0.01	0.803	0.270
K-11-140	481.5	428	K140-12	IF-Main	LHMIF	variable grey	9.17	42.2	0.31	41.9	136	0.023	0.02	< 0.01	0.634	2.32
K-11-163	414.5	415.9	K163-9	IF-Main	MIF	variable grey	9.25	121	0.31	121	391	< 0.005	< 0.01	< 0.01	2.14	7.83
K-11-140	286.7	287	K140-10	IF-Silicate	QSIF	greenish-grey	8.70	106	0.48	106	222	0.042	0.03	0.02	1.50	6.12
K-08-20	113.2	113.5	K20-4	IF-Silicate	CSIF	variable grey	9.41	15.3	0.36	14.9	42.6	0.022	0.01	0.01	1.53	7.43
K-08-24	23	23.5	K24-1	IF-Silicate	CSIF	n/a	9.13	655	7.70	647	85.1	0.476	0.23	0.25	9.32	33.3
K-08-24	236.7	237	K24-8	IF-Silicate	SIF	light grey	8.58	13.4	11.9	1.45	1.12	0.523	0.14	0.38	1.71	8.93
K-10-64	225.2	225.7	K64-4	IF-Silicate	SIF	tan grey	8.93	82.7	0.31	82.4	267	< 0.005	< 0.01	< 0.01	3.07	6.62
K-10-66	224	224.3	K66-5	IF-Silicate	SIF	cream	8.65	155	4.30	151	36.1	0.225	0.09	0.14	3.62	13.6
K-10-66	307.1	307.6	K66-6	IF-Silicate	CSIF	light grey	8.98	404	87.3	316	4.62	3.65	0.86	2.79	5.94	22.7
K-10-66	588	588.5	K66-14	IF-Silicate	SIF	tan	8.62	89.0	0.42	88.6	214	0.053	0.04	0.01	6.15	10.6
K-11-143	483.9	484.2	K143-1	IF-Silicate	HBG_GN	n/a	9.40	119	24.4	94.8	4.88	1.32	0.54	0.78	4.06	16.6
K-11-143	481.5	481.8	K143-2	IF-Silicate	SIF	n/a	8.75	247	15.1	232	16.4	0.818	0.33	0.48	6.84	21.7
K-11-163	364	364.35	K163-8	IF-Silicate	LMIF	variable grey	9.27	67.7	0.31	67.4	218	0.018	0.02	< 0.01	1.38	3.84
K-10-66	75	75.2	K66-2	IF-Silicate (?)	CSIF	light grey	7.64	37.3	0.31	37.0	120	0.019	0.02	< 0.01	0.729	2.90
K-08-20	162.35	162.9	K20-7	Menihek	B_MS_SCH	dark grey S	9.22	39.4	21.5	17.9	1.83	0.819	0.13	0.69	0.241	0.529
K-08-24	64.1	64.4	K24-3	Menihek	B_MS_SCH	variable grey	9.92	16.0	5.78	10.2	2.77	0.506	0.32	0.18	2.36	11.6
K-08-24	127.8	128	K24-4	Menihek	B_MS_SCH	grey	9.83	25.1	9.45	15.6	2.66	0.566	0.26	0.30	1.78	8.39
K-08-24	192.6	192.8	K24-5	Menihek	B_MS_SCH	grey	9.78	7.8	27.4	-19.6	0.28	1.20	0.33	0.88	1.29	6.37
K-10-66	184.7	185	K66-4	Menihek	B_MS_SCH	grey S	7.64	7.2	86.7	-79.5	0.08	2.73	< 0.01	2.77	7.53	33.4
K-10-66	424.6	424.9	K66-7	Menihek	B_MS_SCH	dark grey S	9.27	8.7	9.26	-0.56	0.94	0.563	0.27	0.30	1.03	5.14
K-10-66	457.5	457.9	K66-10	Menihek	B_MS_SCH	dark grey S	9.06	17.2	29.5	-12.3	0.58	1.17	0.22	0.95	2.75	13.4
K-10-66	486	486.5	K66-11	Menihek	B_MS_SCH	dark grey S	7.19	5.5	56.4	-50.9	0.10	1.84	0.03	1.81	4.55	21.2
K-11-140	13.9	14.2	K140-1	Menihek	B_MS_SCH	dark greyish-green S	8.11	212	68.0	144	3.12	2.76	0.58	2.18	3.87	16.9
K-11-140	41	41.38	K140-2	Menihek	B_MS_SCH	greenish-grey S	9.89	10.6	6.79	3.81	1.56	0.913	0.70	0.22	0.328	1.42
K-11-140	74.84	75.08	K140-3	Menihek	B_MS_SCH	grey S	9.14	67.0	3.76	63.2	17.8	0.214	0.09	0.12	1.34	5.92
K-11-140	101	101.3	K140-4	Menihek	B_MS_SCH	light grey	9.93	9.0	6.30	2.70	1.43	0.377	0.18	0.20	0.273	1.17
K-11-163	60.6	61	K163-1	Menihek	B_MS_SCH	grey S	7.77	5.8	29.8	-24.0	0.19	1.14	0.19	0.95	1.45	7.10
K-11-163	105	105.2	K163-2	Menihek	B_MS_SCH	grey S	8.18	7.9	10.2	-2.26	0.78	0.443	0.12	0.33	3.63	18.6
K-11-163	150	150.2	K163-3	Menihek	B_MS_SCH	grey S	9.62	12.1	1.10	11.0	11.0	0.174	0.14	0.04	0.335	1.35
K-08-24	230	230.4	K24-7	Menihek	GF_B_MS_SCH	dark grey S	8.2	12.1	82.1	-70.0	0.15	2.9	0.2	2.6	12.8	63.2
K-10-64	463.8	464.5	K64-5	Menihek	GF_B_MS_SCH	dark grey	8.38	10.2	58.8	-48.6	0.17	2.32	0.44	1.88	8.24	39.1
K-10-66	372.4	372.8	K66-8	Menihek	GF_B_MS_SCH	dark grey S	8.76	45.8	34.7	11.1	1.32	6.86	5.75	1.11	18.4	68.5
K-11-140	128.4	128.8	K140-5	Menihek	GF_B_MS_SCH	dark grey S, fault	9.01	10.5	20.4	-9.94	0.51	0.848	0.19	0.65	1.04	4.90
K-11-163	195.3	195.6	K163-5	Menihek	GF_B_MS_SCH	grey S	4.45	4.0	190	-186	0.02	6.29	0.22	6.06	15.5	54.6
K-08-20	103.7	104.45	K20-3	Menihek	GF_B_SCH	dark grey	8.33	24.3	184	-160	0.13	7.43	1.54	5.89	22.4	106
K-08-20	139.13	139.73	K20-6	Menihek	GF_B_SCH	grey	8.81	16.3	54.5	-38.2	0.30	2.54	0.79	1.74	19.0	77.0
K-10-66	419.1	419.5	K66-9	Menihek	HBG_GN	?	9.22	83.0	13.3	69.7	6.23	0.624	0.20	0.43	0.920	3.84
K-11-140	205.5	206	K140-7	Menihek	HBG_GN	dark green	9.52	56.6	9.60	47.0	5.89	0.560	0.25	0.31	0.567	2.07
K-08-20	84.5	85	K20-2	Menihek	MS_B_SCH	grey	9.12	7.4	22.9	-15.5	0.32	1.58	0.85	0.73	2.00	9.69
K-08-20	426	426.5	K20-14	Menihek	MS_B_SCH	grey	9.36	115	0.58	114	200	0.050	0.03	0.02	1.44	6.64
K-11-140	150.7	151.1	K140-6	Menihek	MS_B_SCH	dark grey	9.09	26.9	9.18	17.7	2.93	0.349	0.06	0.29	0.915	4.13
K-08-20	6	6.4	K20-1	Menihek	MS_SCH	grey	4.72	3.3	17.3	-14.0	0.19	1.01	0.45	0.55	1.59	6.74
K-08-20	135	135.4	K20-5	Menihek	MS_SCH	grey	9.26	7.5	43.9	-36.4	0.17	1.87	0.46	1.41	4.66	22.2
K-08-20	174	174.5	K20-9	Menihek	MS_SCH	n/a	8.89	409	2.37	407	172	0.209	0.13	0.08	6.71	30.7
K-10-86b	151.4	152	K86B-1	Menihek	QZ_MS_B_SCH	Reddish	7.83	2.2	0.36	1.84	6.18	0.039	0.03	0.01	1.47	8.81
K-11-152	58.3	58.6	K152-1	Menihek	QZ_MS_B_SCH	light grey	8.18	7.9	23.1	-15.2	0.34	0.901	0.16	0.74	1.60	7.44
K-11-152	143.2	143.7	K152-2	Menihek	QZ_MS_B_SCH	light grey	6.92	2.7	0.72	1.98	3.74	0.057	0.03	0.02	1.49	7.74
ROB-11-09	0	0.6	ROB-11-09#1	Overburden	OL PEAT/SM Till	black/brown	5.84	2.0	0.31	1.69	6.45	0.024	0.02	< 0.01	1.65	0.162
ROB-11-09	4.5	5.1	ROB-11-09#7	Overburden	SM Till	brown	8.27	9.2	0.31	8.89	29.7	0.023	0.02	< 0.01	0.040	0.090
ROB-11-09	18.3	18.9	ROB-11-09#19	Overburden	SM Till	brown	8.82	15	0.31	14.5	47.7	0.011	0.01	< 0.01	0.142	0.498
ROB-11-09	25.5	25.7	ROB-11-09#23	Overburden	SM Till	grey	4.19	0.70	28.1	-27.4	0.02	0.952	0.06	0.90	2.30	11.4
ROB-11-17	2.1	2.7	ROB-11-17#4	Overburden	SM Till	brown	8.73	6.2	0.31	5.89	20.0	< 0.005	< 0.01	< 0.01	0.034	0.061
ROB-11-17	15.9	16.5	ROB-11-17#21	Overburden	SM Till	grey	9.54	12	0.31	11.9	39.4	0.018	0.01	< 0.01	0.087	0.293
ROB-11-17	41.2	41.4	ROB-11-17#47	Overburden	SM Till	grey	8.25	27	21.9	5.30	1.24	0.861	0.16	0.70	2.17	9.50
ROB-11-18	0.6	1.2	ROB-11-18#2	Overburden	OL PEAT	black	4.78	-16	12.5	-28.4	-1.27	0.430	<0.01	0.40	41.4	0.297
ROB-11-18	4.5	5.1	ROB-11-18#7	Overburden	ML Till	grey	8.50	9.3	0.31	8.99	30.0	0.008	< 0.01	< 0.01	0.090	0.249
ROB-11-18	12.8	13.4	ROB-11-18#17	Overburden	SM Till	grey	9.30	14	0.31	13.7	45.2	0.035	0.02	0.01	0.144	0.536
ROB-11-20	2.5	3.1	ROB-11-20#3	Overburden	SM Till	ligh brown	7.62	5.9	0.31	5.59	19.0	0.006	< 0.01	< 0.01	0.056	0.087
ROB-11-20	9.1	9.7	ROB-11-20#13	Overburden	SM Till	brown	4.74	7.8	39.4	-31.6	0.20	1.49	0.24	1.26	2.02	9.61
K-08-20	227.2	227.5	K20-11	Wishart	QTZ	dark grey	9.57	25.3	1.18	24.1	21.4	0.066	0.03	0.04	0.198	0.780
K-08-20	417	417.7	K20-13	Wishart	QTZ-MS	grey	9.14	10.2	0.50	9.70	20.3	0.040	0.02	0.02	0.033	0.051
K-08-24	284.37	284.84	K24-10	Wishart	QZT_MS	light grey	8.95	49.5	6.88	42.6	7.19	0.280	0.06	0.22	0.664	2.96
K-08-24	296	296.35	K24-11	Wishart	QZT_MS	white	8.86	4.9	0.31	4.59	15.8	< 0.005	< 0.01	< 0.01	0.070	0.271
K-10-64	88.6	88.9	K64-1	Wishart	QTZ	reddish	8.34	2.7	0.31	2.39	8.71	< 0.005	< 0.01	< 0.01	0.023	0.081
K-10-64	149.5	150	K64-2	Wishart	QZ_MS_B_SCH	reddish	9.33	4.5	0.31	4.19	14.5	0.014	0.01	< 0.01	0.044	0.184
K-10-64	208.7	209	K64-3	Wishart	QTZ_MS	variable grey S	9.51	50.0	3.39	46.6	14.7	0.342	0.23	0.11	0.504	1.71
K-11-163	539.5	540	K163-11	Wishart	QTZ	Reddish	7.98	2.8	0.31	2.49	9.03	< 0.005	< 0.01	< 0.01	0.053	0.183
K-11-163	543.8	544	K163-12	Wishart	QZ_MS_B_SCH	grey pink	9.06	4.0	0.31	3.69	12.9	0.032	0.03	< 0.01	0.078	0.289

Notes:

1- Lithology Code	Description
B_MS_SCH	Biotite-muscovite quartz schist, often w/ Fe-sulfides
GF_B_MS_SCH	Graphitic biotite-muscovite quartz schist, often w/ Fe-sulphides
MS_B_SCH	Muscovite-biotite-quartz schist
MS_SCH	Muscovite-quartz schist
HBG_GN	Hornblende-biotite-garnet gneiss (+ coronite)
CSIF	Carbonate >50% + silicate iron formation
HIF	Hermatite >20%-quartzite (minor marble, Ca/Fe silicates)
HMIF	Hermatite>magnetite-quartzite [MT+HM >20%] (minor marble, Ca/Fe silicates)
LHMIF	Hermatite>magnetite (HM+MT 10-20%) quartzite (minor marble, Ca/Fe silicates)

1- Lithology Code	Description
LMIF	Magnetite (10-20%)-quartzite (minor marble, Ca/Fe-silicates)
LMFQCIF	Magnetite (10-20%) quartz carbonate silicate iron formation
MIF	Magnetite >20%-quartzite (minor marble, Ca/Fe-silicates)
QCIF	Quartz (0-90 qz)% carbonate iron formation
QSIF	Quartz (50-90% qz) + Ca-Fe silicates, + minor Fe oxides
SIF	Fe-Ca silicates >50% w/ qzt, marble, + minor Fe oxide
QZT	Quartzite (>90% qz + mica, carbonate, other)
QZ_MS_B_SCH	High quartz w/ muscovite>biotite schist
QZT-MS	Quartzite w/ muscovite; can range to 20% mica

2 - S stands for visible sulfides mentioned in borehole logs; n/a - description is not avalible
3 - AP (Acid Potential) = % Sulphide Sulphur x 31.25; NP - Neutralization Potential; See details of analythical methods in Certificates of Analyses.
4 - used method for carbonate cannot distinguish between carboante and graphitic carbon.

ATTACHMENT 3

CONCENTRATIONS OF ELEMENTS AND PH OF SHAKE FLASK EXTRACTIONS FROM OVERBURDEN AND DIFFERENT BEDROCK LITHOLOGIES DURING KAMI PROJECT

Attachment 3. Concentrations of Elements and pH of Shake Flask Extractions from Overburden and Different Bedrock Lithologies During Kami Project

Core ID	Sample taken (m)		Sample ID	Formation/ Face	Lithology Code[1]	Description[2]	Initial pH	Final pH	Hg	Ag	Al	As	Ba	B	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Li	Mg	Mo	Na	Ni	Pb	Sb	Se	Si	Sn	Tl	U	V	Zn
	from	to					pH units	pH units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
K-08-20	169.25	169.6	K20-8	IF-carbonate	QCSIF	variable grey	9.63	9.35	0.00001	< 0.00001	< 0.01	0.0590	0.00079	0.0022	< 0.00002	7.85	< 0.000003	0.000016	< 0.0005	< 0.0005	< 0.003	0.631	0.001	13.1	0.00079	0.41	0.0001	< 0.00002	0.0005	< 0.001	6.87	0.00006	< 0.00002	0.00179	0.00129	< 0.001
K-08-24	40.7	41	K24-2	IF-carbonate	QCSIF	n/a	9.68	8.81	< 0.00001	< 0.00001	0.01	< 0.0002	0.0487	0.0032	< 0.00002	12.3	< 0.000003	0.000012	< 0.0005	< 0.0005	< 0.003	2.33	0.006	14.1	0.00057	0.42	0.0001	< 0.00002	< 0.0002	< 0.001	4.76	0.00003	< 0.00002	0.000939	0.00007	< 0.001
K-08-24	206.5	207	K24-6	IF-carbonate	QCIF	light grey	9.18	9.27	< 0.00001	< 0.00001	0.01	0.0034	0.430	0.0465	< 0.00002	7.55	< 0.000003	0.000017	< 0.0005	0.0005	0.020	3.69	0.048	4.74	0.00019	2.57	< 0.0001	0.00003	< 0.0002	< 0.001	12.5	0.00015	< 0.00002	0.000055	0.00016	0.001
K-10-66	491.6	492	K66-12	IF-carbonate	QCIF	n/a	9.36	8.81	0.00001	< 0.00001	< 0.01	< 0.0002	0.0361	0.0022	< 0.00002	18.2	< 0.000003	0.000055	< 0.0005	< 0.0005	< 0.003	1.73	0.002	15.9	0.00084	0.34	0.0016	0.00003	< 0.0002	< 0.001	3.32	0.00005	< 0.00002	0.00428	< 0.00003	0.001
K-11-102	62	62.5	K102-1	IF-carbonate	LMQCIF	light grey	9.12	8.27	< 0.00001	< 0.00001	0.02	< 0.0002	0.00686	0.0024	< 0.00002	31.2	< 0.000003	0.000048	< 0.0005	0.0006	< 0.003	2.78	< 0.001	20.5	0.00030	0.24	0.0004	< 0.00002	< 0.0002	< 0.001	2.66	< 0.00001	< 0.00002	0.000266	< 0.00003	0.003
K-11-140	257	257.33	K140-8	IF-carbonate	QCIF (?)	light grey-green	9.55	9.09	0.00001	< 0.00001	0.01	0.0011	0.0403	0.0025	< 0.00002	10.3	< 0.000003	0.000013	< 0.0005	< 0.0005	0.089	0.859	0.017	1.77	0.00059	0.17	0.0001	0.00008	< 0.0002	< 0.001	15.2	< 0.00001	< 0.00002	0.000233	0.00035	< 0.001
K-11-163	164.75	165	K163-4	IF-carbonate	QCIF	light greenish-grey	9.46	8.33	< 0.00001	< 0.00001	< 0.01	< 0.0002	0.00436	0.0760	< 0.00002	24.5	< 0.000003	0.000043	< 0.0005	< 0.0005	< 0.003	0.641	0.002	26.7	0.00024	0.46	0.0009	< 0.00002	< 0.0002	< 0.001	5.15	0.00017	< 0.00002	0.000390	0.00008	< 0.001
K-11-163	198.5	199.2	K163-6	IF-carbonate	QCIF	Reddish	6.17	7.16	< 0.00001	< 0.00001	0.01	0.0004	0.0119	0.0026	0.00004	6.59	0.00116	0.000237	< 0.0005	< 0.0005	0.034	1.91	0.003	1.79	0.00010	0.53	0.0003	0.00059	< 0.0002	0.004	7.69	0.00003	0.00006	0.00008	< 0.00003	< 0.001
K-08-20	213	213.5	K20-10	IF-Main	MIF	grey	9.04	9.31	0.00001	< 0.00001	0.05	< 0.0002	0.00112	0.0030	< 0.00002	10.9	< 0.000003	0.000007	< 0.0005	< 0.0005	0.005	2.20	0.003	5.60	0.00308	0.34	0.0001	0.00002	< 0.0002	< 0.001	4.91	0.00027	< 0.00002	0.000117	0.00015	0.002
K-08-20	412	412.63	K20-12	IF-Main	MIF	variable grey	9.28	8.43	0.00001	< 0.00001	0.01	< 0.0002	0.261	0.109	< 0.00002	20.1	< 0.000003	0.000071	< 0.0005	< 0.0005	0.026	10.7	0.003	8.94	0.00076	0.34	0.0003	< 0.00002	< 0.0002	< 0.001	6.22	0.00026	< 0.00002	0.000121	0.00008	< 0.001
K-08-24	262.5	263	K24-9	IF-Main	HMIF	variable grey	9.29	8.75	< 0.00001	0.00004	0.29	0.0031	0.0225	0.0164	< 0.00002	12.8	< 0.000003	0.000040	< 0.0005	< 0.0005	0.012	19.9	0.004	4.82	0.00761	2.44	0.0008	< 0.00002	0.0018	0.008	2.55	0.00012	0.00002	0.000508	0.00157	< 0.001
K-10-66	66	66.2	K66-1	IF-Main	LHMIF	grey	9.07	9.26	< 0.00001	< 0.00001	0.03	0.0004	0.566	0.0037	< 0.00002	11.9	< 0.000003	0.000009	< 0.0005	< 0.0005	< 0.003	0.744	0.001	7.12	0.00127	0.22	0.0001	< 0.00002	< 0.0002	< 0.001	3.45	0.00013	< 0.00002	0.000311	0.00009	< 0.001
K-10-66	163.5	164	K66-3	IF-Main	MIF, QCSIF(?)	cream	9.27	8.35	< 0.00001	< 0.00001	0.01	< 0.0002	0.00727	0.0524	< 0.00002	24.8	< 0.000003	0.000030	< 0.0005	< 0.0005	0.011	2.55	0.001	10.9	0.00121	0.33	0.0002	< 0.00002	< 0.0002	< 0.001	8.30	0.00002	< 0.00002	0.000137	< 0.00003	< 0.001
K-10-66	556.7	557.3	K66-13	IF-Main	MIF	n/a	8.55	8.37	0.00001	< 0.00001	0.03	< 0.0002	0.00949	0.0013	< 0.00002	11.6	< 0.000003	0.000029	< 0.0005	0.0005	0.136	1.76	0.007	2.12	0.00054	0.58	0.0005	< 0.00002	< 0.0002	< 0.001	5.39	0.00003	< 0.00002	0.000104	< 0.00003	< 0.001
K-11-102	287	287.7	K102-5	IF-Main	HIF	brown grey	8.36	7.86	0.00001	< 0.00001	0.01	< 0.0002	0.00754	0.0014	< 0.00002	7.92	< 0.000003	0.000051	< 0.0005	0.0006	0.356	0.591	0.006	1.47	0.00080	0.23	0.0004	0.00011	< 0.0002	< 0.001	7.81	0.00004	< 0.00002	0.000166	< 0.00003	0.003
K-11-140	281	281.3	K140-9	IF-Main	MIF	dark grey	9.48	9.21	< 0.00001	< 0.00001	0.03	0.0004	0.00475	0.0030	< 0.00002	10.0	< 0.000003	0.000011	< 0.0005	< 0.0005	0.006	0.847	0.013	7.43	0.00239	0.35	0.0002	< 0.00002	0.0003	< 0.001	4.19	0.00006	< 0.00002	0.000050	0.00011	< 0.001
K-11-140	299.4	299.8	K140-11	IF-Main	LHMIF	light grey	9.44	8.85	< 0.00001	< 0.00001	< 0.01	0.0006	0.204	0.0098	< 0.00002	13.2	< 0.000003	0.000014	< 0.0005	< 0.0005	0.005	2.91	0.003	7.94	0.00122	0.71	0.0002	< 0.00002	< 0.0002	< 0.001	14.0	0.00003	< 0.00002	0.000352	0.00005	< 0.001
K-11-163	414.5	415.9	K163-9	IF-Main	MIF	variable grey	9.31	9.21	< 0.00001	< 0.00001	0.02	0.0012	0.0158	0.0016	< 0.00002	11.7	0.000050	0.000042	< 0.0005	< 0.0005	< 0.003	1.96	< 0.001	11.0	0.00045	0.19	0.0004	0.00009	< 0.0002	< 0.001	6.99	0.00008	< 0.00002	0.00014	0.00007	< 0.001
K-11-140	286.7	287	K140-10	IF-Silicate	QSIF	greenish-grey	9.33	8.82	< 0.00001	< 0.00001	< 0.01	0.0017	0.0129	0.0483	< 0.00002	11.8	< 0.000003	0.000030	< 0.0005	< 0.0005	0.037	0.843	0.002	14.9	0.00649	0.53	0.0002	< 0.00002	< 0.0002	< 0.001	8.47	0.00007	< 0.00002	0.000087	0.00009	< 0.001
K-08-20	113.2	113.5	K20-4	IF-Silicate	CSIF	variable grey	9.39	9.46	0.00001	< 0.00001	0.66	0.0021	0.00995	0.0020	< 0.00002	5.55	< 0.000003	0.000462	< 0.0005	0.0006	0.286	12.8	0.008	1.03	0.00269	0.48	0.0013	0.00003	0.0006	< 0.001	3.64	0.00009	< 0.00002	0.00516	0.0117	0.002
K-08-24	23	23.5	K24-1	IF-Silicate	CSIF	n/a	9.69	8.78	0.00001	< 0.00001	0.03	< 0.0002	0.282	0.0070	< 0.00002	12.1	< 0.000003	0.000016	0.0005	< 0.0005	< 0.003	11.8	0.018	25.5	0.00056	1.25	0.0002	< 0.00002	< 0.0002	< 0.001	1.25	0.00064	< 0.00002	0.00208	< 0.00003	< 0.001
K-08-24	236.7	237	K24-8	IF-Silicate	SIF	light grey	8.92	8.26	< 0.00001	0.00021	0.14	0.0020	0.0540	0.0311	< 0.00002	11.5	0.000013	0.000083	< 0.0005	< 0.0005	0.008	15.8	0.003	8.08	0.0942	1.12	0.0010	< 0.00002	0.0015	0.003	1.74	0.00011	< 0.00002	0.00194	0.00184	< 0.001
K-10-66	224	224.3	K66-5	IF-Silicate	SIF	cream	7.24	8.30	0.00001	< 0.00001	< 0.01	< 0.0002	0.158	0.0476	< 0.00002	26.1	< 0.000003	0.000033	< 0.0005	< 0.0005	0.004	0.791	0.001	22.9	0.00162	0.27	0.0004	< 0.00002	0.0003	< 0.001	6.13	0.00005	< 0.00002	0.000100	0.00004	0.001
K-10-66	307.1	307.6	K66-6	IF-Silicate	CSIF	light grey	9.76	8.83	0.00001	< 0.00001	0.09	0.0008	0.0212	0.0055	< 0.00002	14.5	< 0.000003	0.000021	< 0.0005	< 0.0005	< 0.003	9.04	0.003	21.5	0.00370	1.11	0.0003	< 0.00002	< 0.0002	< 0.001	1.22	0.00005	< 0.00002	0.00127	0.00032	< 0.001
K-10-66	588	588.5	K66-14	IF-Silicate	SIF	tan	8.49	7.06	0.00001	< 0.00001	< 0.01	< 0.0002	0.0108	0.0018	< 0.00002	69.5	< 0.000003	0.000975	0.0016	< 0.0005	< 0.003	0.980	< 0.001	27.4	0.00007	0.12	0.0030	< 0.00002	< 0.0002	< 0.001	2.91	0.00003	0.00002	0.000147	< 0.00003	< 0.001
K-11-143	483.9	484.2	K143-1	IF-Silicate	HBG_GN	n/a	9.22	9.17	< 0.00001	< 0.00001	0.36	0.0009	0.0435	0.0061	< 0.00002	10.8	< 0.000003	0.000016	< 0.0005	< 0.0005	0.009	45.5	0.017	3.95	0.0112	1.35	0.0002	< 0.00002	< 0.0002	< 0.001	1.41	0.00018	< 0.00002	0.000793	0.00512	0.001
K-11-143	481.5	481.8	K143-2	IF-Silicate	SIF	n/a	9.09	8.50	< 0.00001	< 0.00001	< 0.01	0.0003	0.0526	0.110	< 0.00002	22.4	< 0.000003	0.000033	< 0.0005	< 0.0005	0.004	10.8	0.005	20.5	0.00082	0.66	0.0003	< 0.00002	< 0.0002	< 0.001	4.15	0.00003	< 0.00002	0.000323	0.00035	< 0.001
K-11-163	364	364.35	K163-8	IF-Silicate	LMIF	variable grey	8.80	9.25	< 0.00001	< 0.00001	0.02	0.0004	0.00275	0.0015	< 0.00002	10.9	0.000243	0.000144	< 0.0005	< 0.0005	0.005	0.326	< 0.001	10.3	0.00137	0.15	0.0018	0.00024	< 0.0002	< 0.001	10.4	< 0.00001	< 0.00002	0.00036	0.00011	< 0.001
K-10-66	75	75.2	K66-2	IF-Silicate (?)	CSIF	light grey	9.46	9.01	0.00001	< 0.00001	0.01	0.0015	0.0416	0.0165	< 0.00002	13.5	< 0.000003	0.000020	< 0.0005	< 0.0005	0.011	2.48	0.001	4.95	0.00932	0.25	0.0004	0.00005	< 0.0002	< 0.001	5.38	0.00011	< 0.00002	0.000664	0.00291	0.001
K-08-20	162.35	162.9	K20-7	Menihek	B_MS_SCH	dark grey S	9.43	8.71	0.00001	0.00004	0.38	0.0018	0.00840	0.0051	< 0.00002	11.4	< 0.000003	0.000023	< 0.0005	0.0006	0.010	13.7	0.005	1.87	0.0364	2.64	0.0004	0.00003	0.0006	0.003	2.32	0.00016	< 0.00002	0.00748	0.0425	< 0.001
K-08-24	64.1	64.4	K24-3	Menihek	B_MS_SCH	variable grey	9.53	9.63	0.00001	< 0.00001	1.66	0.0013	0.00935	0.0061	< 0.00002	5.51	< 0.000003	0.000080	0.0010	0.0007	0.309	20.8	0.010	0.811	0.00192	3.28	0.0005	0.00030	0.0003	0.001	4.21	0.00017	< 0.00002	0.00951	0.0523	0.003
K-08-24	127.8	128	K24-4	Menihek	B_MS_SCH	grey	9.66	9.60	< 0.00001	< 0.00001	1.40	0.0015	0.0196	0.0077	< 0.00002	5.72	< 0.000003	0.000043	0.0006	< 0.0005	0.158	16.6	0.004	0.706	0.00131	3.71	0.0003	0.00020	0.0004	< 0.001	4.62	0.00011	< 0.00002	0.00431	0.0218	< 0.001
K-08-24	192.6	192.8	K24-5	Menihek	B_MS_SCH	grey	9.19	9.35	< 0.00001	0.00004	2.16	0.0009	0.0132	0.0059	0.00003	4.39	< 0.000003	0.000165	0.0013	0.0011	0.483	19.6	0.009	1.03	0.00170	4.03	0.0015	0.00106	0.0022	0.002	3.93	0.00013	0.00002	0.00168	0.0189	0.006
K-10-66	184.7	185	K66-4	Menihek	B_MS_SCH	grey S	9.43	7.36	< 0.00001	0.00004	0.01	0.0041	0.0505	0.0290	< 0.00002	23.4	< 0.000003	0.00129	< 0.0005	0.0009	0.004	22.2	0.012	10.2	0.0278	3.23	0.0463	< 0.00002	0.0019	0.015	5.75	0.00008	0.00002	0.00192	0.00066	0.002
K-10-66	424.6	424.9	K66-7	Menihek	B_MS_SCH	dark grey S	8.65	8.82	0.00001	0.00002	0.36	0.0002	0.00726	0.0058	< 0.00002	9.94	< 0.000003	0.000058	< 0.0005	0.0008	0.038	12.9	0.004	3.26	0.00185	8.32	0.0013	0.00003	0.0004	0.001	2.98	0.00021	< 0.00002	0.000336	0.00247	< 0.001
K-10-66	457.5	457.9	K66-10	Menihek	B_MS_SCH	dark grey S	8.95	8.55	0.00001	0.00010	0.16	0.0003	0.0417	0.0053	< 0.00002	25.8	< 0.000003	0.000146	< 0.0005	< 0.0005	< 0.003	23.0	0.009	7.90	0.0160	4.66	0.0213	0.00006	0.0004	0.005	2.62	0.00002	< 0.00002	0.00255	0.00141	< 0.001
K-10-66	486	486.5	K66-11	Menihek	B_MS_SCH	dark grey S	7.79	7.02	0.00001	0.00002	0.02	0.0003	0.0119	0.0092	< 0.00002	12.1	0.000038	0.00498	< 0.0005	< 0.0005	0.012	14.1	0.009	8.64	0.00480	3.65	0.172	0.00002	0.0003	0.009	8.70	0.00004	0.00002	0.000933	0.00049	0.005
K-11-140	13.9	14.2	K140-1	Menihek	B_MS_SCH	dark grey-green S	8.86	8.12	< 0.00001	0.00023	0.06	0.0003	0.0602	0.0148	< 0.00002	78.0	< 0.000003	0.000355	< 0.0005	0.0005	0.004	24.2	0.009	18.6	0.00232	2.45	0.0046	< 0.00002	< 0.0002	0.006	2.15	0.00005	0.00003	0.00368	0.00107	< 0.001
K-11-140	41	41.38	K140-2	Menihek	B_MS_SCH	greenish-grey S	9.62	9.70	< 0.00001	0.00002	1.77	0.0011	0.00547	0.0060	< 0.00002	3.13	< 0.000003	0.000052	< 0.0005	< 0.0005	0.114	16.2	0.007	0.437	0.00100	3.82	0.0001	0.00019	0.0003	< 0.001	3.41	0.00005	< 0.00002	0.00610	0.0162	0.001
K-11-140	74.84	75.08	K140-3	Menihek	B_MS_SCH	grey S	9.64	9.39	< 0.00001	< 0.00001	0.60	0.0005	0.0159	0.0049	< 0.00002	6.80	< 0.000003	0.000015	< 0.0005	0.0007	0.007	14.2	0.009	0.993	0.00374	5.23	0.0002	0.00004	0.0003	0.002	2.67	0.00017	< 0.00002	0.000758	0.00552	0.001
K-11-140	101	101.3	K140-4	Menihek	B_MS_SCH	light grey	9.76	9.70	0.00001	< 0.00001	1.98	0.0010	0.00602	0.0082	< 0.00002	2.36	< 0.000003	0.000077	< 0.0005	< 0.0005	0.166	19.2	0.009	0.407	0.00134	2.29	0.0002	0.00024	0.0007	< 0.001	3.24	0.00012	< 0.00002	0.005767	0.0146	0.002
K-11-163	60.6	61	K163-1	Menihek	B_MS_SCH	grey S	5.75	6.77	< 0.00001	0.00001	0.02	0.0007	0.0128	0.0225	< 0.00002	11.5	0.000934	0.0365	< 0.0005	< 0.0005	0.003	27.0	0.014	7.25	0.00036	3.35	1.20	0.00003	< 0.0002	0.022	5.50	0.00003	0.00004	0.000251	0.00009	0.010
K-11-163	105	105.2	K163-2	Menihek	B_MS_SCH	grey S	6.39	7.80	0.00001	0.00005	0.31	0.0003	0.0110	0.0095	< 0.00002	6.36	< 0.000003	0.000997	< 0.0005	0.0006	0.206	14.5	0.010	3.61	0.00353	7.60	0.0172	0.00019	< 0.0002	0.004	6.21	0.00030	< 0.00002	0.000369	0.00145	0.001
K-11-163	150	150.2	K163-3	Menihek	B_MS_SCH	grey S	9.47	9.47	< 0.00001	0.00002	1.19	0.0014	0.0119	0.0031	< 0.00002	4.50	0.000022	0.000257	0.0010	0.0009	0.461	18.1	0.012	0.963	0.00075	3.66	0.0007	0.00029	0.0009	< 0.001	4.15	0.00022	< 0.00002	0.00645	0.0134	0.002
K-08-24	230	230.4	K24-7	Menihek	GF_B_MS_SCH	dark grey S	9.68	8.52	< 0.00001	< 0.00001	< 0.01	< 0.0002	0.219	0.0237	< 0.00002	21.3	< 0.000003	0.000018	< 0.0005	0.0006	< 0.003	4.46	0.006	12.6	0.00011	0.26	0.0001	< 0.00002	< 0.0002	< 0.001	5.14	0.00009	< 0.00002	0.000038	0.00004	< 0.001
K-10-66	372.4	372.8	K66-8	Menihek	GF_B_MS_SCH	dark grey S	9.10	8.27	0.00003	0.00002	0.15	< 0.0002	0.0240	0.0045	< 0.00002	22.7	< 0.000003	0.000048	< 0.0005	0.0005	0.006	21.7	0.007	7.56	0.0122	3.95	0.0017	0.00007	0.0026	0.001	1.59	0.00017	< 0.00002	0.00378	0.00170	0.002
K-11-140	128.4	128.8	K140-5	Menihek	GF_B_MS_SCH	dark grey S, fault	9.30	8.88	< 0.00001	0.00006	0.51	0.0004	0.00658	0.0079	< 0.00002	12.6	< 0.000003	0.000052	< 0.0005	< 0.0005	0.013	20.9	0.005	1.79	0.00181	4.19	0.0007	0.00006	0.0030	0.007	1.89	0.00001	< 0.00002	0.000848	0.00246	< 0.001
K-11-163	195.3	195.6	K163-5	Menihek	GF_B_MS_SCH	grey S	4.33	4.42	< 0.00001	0.00001	1.63	0.0033	0.109	0.0128	0.01017	31.6	0.196	0.0637	< 0.0005	2.92	7.28	30.8	0.017	19.9	0.00012	1.36	0.805	0.133	0.0004	0.028	10.3	0.00068	0.00027	1.98	0.00007	23.2
K-08-20	103.7	104.45	K20-3	Menihek	GF_B_SCH	dark grey	9.03	8.31	< 0.00001	0.00004	0.13	0.0005	0.0378	0.0041	< 0.00002	27.6	0.000053	0.000096	< 0.0005	0.0006	0.009	18.4	0.006	4.89	0.0309	1.82	0.0028	0.00007	0.0014	0.001	1.34	0.00021	< 0.00002	0.0383	0.00293	0.002
K-08-20	139.13	139.73	K20-6	Menihek	GF_B_SCH	grey	9.36	9.02	< 0.00001	0.00004	0.26	< 0.0002	0.0870	0.0080	< 0.00002	12.3	< 0.000003	0.000040	< 0.0005	0.0007	0.020	27.0	0.013	3.58	0.00212	5.47	0.0004	0.00011	0.0009	< 0.001	1.76	0.00079	< 0.00002	0.000648	0.00119	0.001
K-10-66	419.1	419.5	K66-9	Menihek	HBG_GN	?	9.62	9.06	0.00002	< 0.00001	0.31	< 0.0002	0.0234	0.0047	< 0.00002	7.23	< 0.000003	0.000017	< 0.0005	< 0.0005	0.004	29.2	0.009	2.30	0.00175	5.67	0.0005	< 0.00002	0.0009	< 0.001	2.21	0.00009	< 0.00002	0.000138	0.00308	< 0.001
K-11-140	205.5	206	K140-7	Menihek	HBG_GN	dark green	9.78	9.56	< 0.00001	< 0.00001	0.93	0.0018	0.0158	0.0074	< 0.00002	4.50	< 0.000003	0.000037	< 0.0005	0.0007	0.097	23.7	0.003	0.620	0.00133	3.43	0.0002	0.00009	0.0003	< 0.001	2.40	0.00027	< 0.00002	0.000247	0.0176	0.003
K-08-20	84.5	85	K20-2	Menihek	MS_B_SCH	grey	7.96	8.82	< 0.00001	0.00005	1.67	0.0022	0.0112	0.0101	0.00005	0.29	0.000200	0.000288	0.0017	0.0011	0.609	15.0	0.005	0.444	0.00289	3.15	0.0021	0.00055	0.0019	< 0.001	4.12	0.00022	0.00004	0.00147	0.0117	0.009
K-08-20	426	426.5	K20-14	Menihek	MS_B_SCH	grey	9.68	9.33	0.00001	< 0.00001	0.25	0.0003	0.00298	0.0062	< 0.00002	6.79	< 0.000003	0.000012	< 0.0005	< 0.0005	0.007	17.2	0.004	2.84	0.00092	0.76	0.0001	< 0.00002	0.0002	< 0.001	3.58	0.00016	< 0.00002	0.000117	0.00182	0.002
K-11-140	150.7	151.1	K140-6	Menihek	MS_B_SCH	dark grey	9.63	9.39	< 0.00001	< 0.00001	0.55	0.0005	0.00758	0.0082	< 0.00002	7.22	< 0.000003	0.000069	< 0.0005	< 0.0005	0.089	13.2	0.003	1.19	0.01070	3.65	0.0005	0.00012	0.0005	0.005	3.09	0.00002	< 0.00002	0.000851	0.00699	< 0.001
K-08-20	6	6.4	K20-1	Menihek	MS_SCH	grey	3.63	3.77	< 0.00001	< 0.00001	41.0	0.0026	0.0913	0.0087	0.00379	11.5	0.197	2.01	0.0264	2.33	64.4	42.6	0.050	13.7	0.00130	3.05	6.29	0.00082	< 0.0002	0.017	13.3	< 0.00001	0.00117	0.227	0.00435	8.69
K-08-20	135	135.4	K20-5	Menihek	MS_SCH	grey	8.24	9.13	< 0.00001	0.00002	1.29	0.0011	0.00701	0.0310	0.00002	5.65	< 0.000003	0.000071	0.0007	0.0005	0.161	19.9	0.009	0.996	0.00809	2.22	0.0005	0.00026	0.0009	< 0.001	2.87	0.00017	< 0.00002	0.00602	0.0234	0.003
K-08-20	174	174.5	K20-9	Menihek	MS_SCH	n/a	9.48	8.79	< 0.00001	< 0.00001	< 0.01	0.0004	0.00535	0.0039	< 0.00002	11.5	< 0.000003	0.000024	< 0.0005	< 0.0005	< 0.003	1.76	0.003	28.2	0.00158	0.39	0.0002	< 0.00002	< 0.0002	< 0.001	1.30	0.00009	< 0.00002	0.00163	0.00005	0.001
K-10-86b	151.4	152	K86B-1	Menihek	QZ_MS_B_SCH	Reddish	7.03	7.25	< 0.00001	< 0.00001	< 0.01	< 0.0002	0.00455	0.0031	< 0.00002	4.45	< 0.000003	0.000079	< 0.0005	0.0009	< 0.003	3.95	0.005	3.05	0.00113	1.16	0.0005	0.00005	< 0.0002	< 0.001	3.44	0.00022	< 0.00002	0.000032	0.00007	0.003
K-11-152	58.3	58.6	K152-1	Menihek	QZ_MS_B_SCH	light grey	8.03	8.32	0.00001	0.00034	0.03	0.0006	0.0435	0.0022	< 0.00002	27.7	0.000018	0.000212	< 0.0005	0.0010	0.007	21.9	0.014	12.1	0.00672	1.65	0.0013	0.00005	0.0007	0.008	2.51	0.00014	< 0.00002	0.0223	0.00046	0.003
K-11-152	143.2	143.7	K152-2	Menihek	QZ_MS_B_SCH	light grey	7.36	7.32	< 0.00001	< 0.00001	0.01	< 0.0002	0.00663	0.0025	< 0.00002	4.60	0.000071	0.000275	< 0.0005	0.0007	< 0.003	3.69	< 0.001	1.81	0.00046	0.92	0.0006	0.00007	< 0.0002	< 0.001	3.65	0.00022	0.00003	0.000369	< 0.00003	0.002
ROB-11-09	0	0.6	ROB-11-09#1	Overburden	OL PEAT/SM Till	black/brown	6.03	5.75	0.00001	< 0.00001	0.74	0.0003	0.0017	0.486	< 0.00002	0.19	0.000010	0.000598	0.0041	0.0035	1.59	1.66	< 0.001	0.037	0.00032	14.1	0.0006	0.00066	0.0003	< 0.001	4.89	0.00007	< 0.00002	0.000142	0.00186	0.001
ROB-11-09	4.5	5.1	ROB-11-09#7	Overburden	SM Till	brown	6.33	8.55	0.00001	0.00055	1.07	0.0007	0.0154	0.328	0.00002	2.17	0.000011	0.00297	0.0041	0.0093	1.84	6.30	0.006	0.945	0.00678	21.1	0.0051	0.00180	0.0003	< 0.001	9.82	0.00009	0.00002	0.000269	0.00381	0.003
ROB-11-09	18.3	18.9	ROB-11-09#19	Overburden	SM Till	brown	9.06	9.06	0.00001	0.00006	0.20	0.0014	0.00529	0.183	< 0.00002	9.36	< 0.000003	0.000064	0.0006	0.0008	0.187	7.10	0.004	2.38	0.0125	11.6	0.0005	0.00005	0.0008	< 0.001	6.42	0.00004	< 0.00002	0.000287	0.00283	< 0.001
ROB-11-09	25.5	25.7	ROB-11-09#23	Overburden	SM Till	grey	3.12	3.04	0.00001	< 0.00001	4.49	0.0061	0.0508	0.321	0.00076	55.9	0.0152	0.351	0.0066	20.6	83.5	8.33	0.005	21.8	0.00052	14.6	0.915	0.0271	0.0002	0.342	17.8	0.00002	0.00114	1.68	0.00463	0.096
ROB-11-17	2.1	2.7	ROB-11-17#4	Overburden	SM Till	brown	6.85	7.87	0.00002	< 0.00001	3.73	0.0009	0.0449	0.638	0.00006	1.69	0.000039	0.00409	0.0102	0.0250	5.55	4.39	0.002	1.05	0.0135	34.7	0.0112	0.00556	0.0013	< 0.001	16.7	0.00037	0.00007	0.000383	0.00464	0.016
ROB-11-17	15.9	16.5	ROB-11-17#21	Overburden	SM Till	grey	8.97	9.29	0.00001	< 0.00001	0.53	0.0007	0.0116	0.283	< 0.00002	5.59	0.000003	0.000336	0.0014	0.0036	0.685	5.28	0.005	1.50	0.00370	14.0	0.0011	0.00035	0.0003	< 0.001	9.09	0.00018	< 0.00002	0.000569	0.00644	0.002
ROB-11-17	41.2	41.4	ROB-11-17#47	Overburden	SM Till	grey	8.59	8.66	0.00001	< 0.00001	0.06	0.0017	0.0415	0.313	< 0.00002	14.2	< 0.000003	0.000095	0.0008	0.0027	0.167	6.45	0.007	5.00	0.0168	16.8	0.0008	0.00007	0.0005	0.003	9.34	0.00008	< 0.00002	0.000800	0.00182	0.003
ROB-11-18	0.6	1.2	ROB-11-18#2	Overburden	OL PEAT	black	4.91	4.91	0.00002	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss	nss
ROB-11-18	4.5	5.1	ROB-11-18#7	Overburden	ML Till	grey	8.63	9.03	0.00001	< 0.00001	0.72	0.0002	0.0127	0.158	< 0.00002	6.04	0.000009	0.000399	0.0021	0.0045	0.975	3.17	0.003	2.56	0.00204	13.3	0.0011	0.00048	< 0.0002	0.002	4.70	0.00012	< 0.00002	0.000583	0.00636	0.002
ROB-11-18	12.8	13.4	ROB-11-18#17	Overburden	SM Till	grey	8.86	9.36	0.00001	< 0.00001	1.00	0.0006	0.0224	0.170	< 0.00002	4.69	0.000028	0.00144	0.0019	0.0085	0.683	5.42	0.004	1.75	0.00353	14.9	0.0048	0.00026	< 0.0002	< 0.001	6.22	0.00013	0.00002	0.0128	0.00896	0.005
ROB-11-20	2.5	3.1	ROB-11-20#3	Overburden	SM Till	ligh brown	6.52	6.95	0.00003	< 0.00001	3.55	0.0003	0.0339	0.536	0.00004	0.44	< 0.000003	0.00143	0.0042	0.0085	4.10	1.45	< 0.001	1.03	0.00051	15.3	0.0031	0.00131	< 0.0002	< 0.001	19.3	0.00015	0.00003	0.000334	0.00272	0.012
ROB-11-20	9.1	9.7	ROB-11-20#13	Overburden	SM Till	brown	3.50	3.80	0.00001	< 0.00001	25.3	0.0017	0.0626	0.724	0.00547	116	0.0231	1.26	0.0024	5.48	9.46	36.2	0.104	53.1	0.00049	26.3	4.14	0.00284	< 0.0002	0.048	22.4	0.00002	0.00102	0.892	0.00005	3.87
K-08-20	227.2	227.5	K20-11	Wishart	QTZ	dark grey	9.66	9.80	0.00001	< 0.00001	0.69	0.0005	0.0399	0.0296	< 0.00002	4.50	< 0.000003	0.000033	< 0.0005	< 0.0005	0.050	14.4	0.002	0.574	0.00050	3.60	0.0001	0.00002	< 0.0002	< 0.001	3.55	0.00012	< 0.00002	0.000043	0.0242	< 0.001
K-08-20	417	417.7	K20-13	Wishart	QTZ-MS	grey	8.49	9.61	0.00001	< 0.00001	1.58	< 0.0002	0.00619	0.0105	0.00003	0.12	< 0.000003	0.000093	0.0007	< 0.0005	1.14	15.7	0.002	0.451	0.00072	0.60	0.0001	0.00008	< 0.0002	< 0.001	2.70	0.00064	< 0.00002	0.000102	0.00291	0.002
K-08-24	284.37	284.84	K24-10	Wishart	QZT_MS	light grey	9.43	8.93	< 0.00001	0.00004	0.62	0.0015	0.00253	0.0098	< 0.00002	13.5	< 0.000003	0.000055	< 0.0005	0.0006	0.007	21.2	0.003	2.40	0.00427	1.21	0.0006	< 0.00002	0.0003	< 0.001	1.98	0.00009	< 0.00002	0.000804	0.00174	< 0.001
K-08-24	296	296.35	K24-11	Wishart	QZT_MS	white	9.13	9.19	< 0.00001	< 0.00001	0.03	0.0010	0.0573	0.0041	< 0.00002	9.27	< 0.000003	0.000048	< 0.0005	< 0.0005	0.052	1.27	0.001	0.791	0.00037	0.39	0.0002	0.00004	< 0.0002	< 0.001	20.4	0.00016	< 0.00002	0.000253	0.00188	0.003
K-10-64	88.6	88.9	K64-1	Wishart	QTZ	reddish	8.13	8.06	0.00004	< 0.00001	0.03	< 0.0002	0.0160	0.0015	< 0.00002	3.80	< 0.000003	0.000243	< 0.0005	0.0005	1.80	0.920	< 0.001	1.09	0.00078	0.34	0.0012	0.00005	0.0003	< 0.001	6.93	0.00004	< 0.00002	0.000088	0.00015	0.002
K-11-163	539.5	540	K163-11	Wishart	QTZ	Reddish	7.51	7.74	< 0.00001	0.00004	0.11	< 0.0002	0.00154	0.0037	< 0.00002	3.39	< 0.000003	0.000426	< 0.0005	0.0030	3.23	1.18	0.001	1.01	0.00240	0.79	0.0008	0.00022	< 0.0002	< 0.001	7.31	0.00047	< 0.00002	0.000157	0.00087	0.002
K-11-163	543.8	544	K163-12	Wishart	QZ_MS_B_SCH	grey pink	7.90	8.21	< 0.00001	0.00003	1.34	< 0.0002	0.00490	0.0083	0.00002	0.71	0.000032	0.000280	0.0007	0.0015	1.41	9.58	0.001	0.460	0.00247	0.96	0.0014	0.00023	< 0.0002	< 0.001	6.19	0.00015	< 0.00002	0.000551	0.00052	0.008

Notes:

1- Lithology Code	Description	Lithology Code	Description
B_MS_SCH	Biotite-muscovite quartz schist, often w/ Fe-sulfides	LMIF	Magnetite (10-20%)-quartzite (minor marble, Ca/Fe-silicates)
GF_B_MS_SCH	Graphitic biotite-muscovite quartz schist, often w/ Fe-sulphides	LMFQCIF	Magnetite (10-20%) quartz carbonate silicate iron formation
MS_B_SCH	Muscovite-biotite-quartz schist	MIF	Magnetite >20%-quartzite (minor marble, Ca/Fe-silicates)
MS_SCH	Muscovite-quartz schist	QCIF	Quartz (0-90 qz)% carbonate iron formation
HBG_GN	Hornblende-biotite-garnet gneiss (+ coronite)	QSIF	Quartz (50-90% qz) + Ca-Fe silicates, + minor Fe oxides
CSIF	Carbonate >50% + silicate iron formation	SIF	Fe-Ca silicates >50% w/ qzt, marble, + minor Fe oxide
HIF	Hermatite >20%-quartzite (minor marble, Ca/Fe silicates)	QZT	Quartzite (>90% qz + mica, carbonate, other)
HMIF	Hermatite>magnetite-quartzite [MT+HM >20%] (minor marble, Ca/Fe silicates)	QZ_MS_B_SCH	High quartz w/ muscovite>biotite schist
LHMIF	Hermatite>magnetite (HM+MT 10-20%) quartzite (minor marble, Ca/Fe silicates)	QZT-MS	Quartzite w/ muscovite; can range to 20% mica

2 - S stands for visible sulfides mentioned in borehole logs; n/a - description is not avalible

nss - not sufficient sample. See details of analytical methods in Certificates of Analyses.

ATTACHMENT 4

CONCENTRATIONS OF ELEMENTS IN BEDROCK LITHOLOGIES EXPOSED DURING KAMI PROJECT

Attachment 4. Concentrations of Elements in Bedrock Lithologies Exposed During Kami Project

Core ID	Sample taken (m)		Sample ID	Formation/Face	Lithology Code[1]	Description [2]	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Li	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Se	Sn	Sr	Ti	Tl	U	V	Y	Zn
	from	to					µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
K-08-20	169.25	169.6	K20-8	IF-carbonate	QCSIF	variable grey	0.09	990	120	3.9	0.42	< 0.09	68000	0.06	3.9	220	3.6	60000	160	< 2	28000	1100	3.6	310	7.8	53	2.3	< 0.8	< 0.7	< 0.5	33	70	< 0.02	2.2	2	1.8	11
K-08-24	40.7	41	K24-2	IF-carbonate	QCSIF	n/a	0.06	900	< 0.5	29	0.26	< 0.09	60000	0.06	3.8	130	1.2	110000	320	< 2	29000	2300	1.3	290	4.2	18	2.1	< 0.8	0.8	1.1	33	18	< 0.02	0.47	< 1	1.9	11
K-08-24	206.5	207	K24-6	IF-carbonate	QCIF	light grey	0.02	860	1.5	39	1.1	< 0.09	33000	0.06	4.4	140	1.0	240000	250	3	29000	2000	0.8	180	3.9	16	1.7	< 0.8	< 0.7	0.6	37	34	< 0.02	0.14	4	2.9	9.7
K-10-66	491.6	492	K66-12	IF-carbonate	QCIF	n/a	0.01	320	< 0.5	6.7	0.44	< 0.09	54000	< 0.02	2.0	180	0.3	87000	140	< 2	24000	1500	1.3	140	4.0	3	0.75	< 0.8	< 0.7	0.8	12	11	< 0.02	0.14	< 1	1.6	3.4
K-11-102	62	62.5	K102-1	IF-carbonate	LMQCIF	light grey	0.04	740	0.6	10	0.89	< 0.09	45000	< 0.02	3.9	130	1.5	170000	180	< 2	25000	4000	1.2	130	3.2	17	0.46	< 0.8	< 0.7	< 0.5	15	23	< 0.02	0.092	< 1	0.87	4.3
K-11-140	257	257.33	K140-8	IF-carbonate	QCIF (?)	light greyish-green	0.02	560	2.0	13	1.2	< 0.09	3100	0.08	14	160	2.5	390000	170	3	1500	5900	1.4	27	2.8	57	1.6	< 0.8	< 0.7	< 0.5	5.59	120	< 0.02	0.18	17	4.4	6.9
K-11-163	164.75	165	K163-4	IF-carbonate	QCIF	150	0.05	640	1.6	9.0	0.38	< 0.09	100000	0.91	2.6	110	3.6	120000	79	< 2	37000	1800	0.9	170	4.4	41	5.2	< 0.8	< 0.7	< 0.5	93	23	< 0.02	0.28	4	6.3	53
K-11-163	198.5	199.2	K163-6	IF-carbonate	QCIF	Reddish	0.42	2300	25	16	0.59	< 0.09	470	0.93	20	180	5.0	130000	620	< 2	1200	370	4.2	110	56	290	11	< 0.8	< 0.7	0.8	2.53	92	0.59	4.1	10	7.9	270
K-08-20	213	213.5	K20-10	IF-Main	MIF	grey	0.09	1300	2.2	2.4	0.42	< 0.09	15000	< 0.02	16	120	0.6	380000	270	9	12000	19000	0.8	360	2.3	190	1.3	< 0.8	< 0.7	< 0.5	21	130	< 0.02	0.086	11	7.3	4.9
K-08-20	412	412.63	K20-12	IF-Main	MIF	variable grey	0.21	1900	< 0.5	41	0.27	0.13	17000	0.03	10	200	50	230000	810	2	17000	8000	1.8	180	7.5	29	1.2	< 0.8	< 0.7	< 0.5	21	75	0.07	0.11	3	4.1	15
K-08-24	262.5	263	K24-9	IF-Main	HMIF	variable grey	0.03	1100	63	480	2.5	< 0.09	17000	0.05	20	100	1.8	260000	420	159	13000	51000	0.7	6600	2.6	78	1.5	< 0.8	< 0.7	< 0.5	52	28	0.03	0.15	6	15	4.3
K-10-66	66	66.2	K66-1	IF-Main	LHMIF	grey	< 0.01	600	0.9	520	0.26	< 0.09	29000	< 0.02	11	140	1.5	390000	200	< 2	6800	14000	1.2	170	2.4	11	0.65	< 0.8	< 0.7	< 0.5	14	28	< 0.02	0.17	7	6.7	2.8
K-10-66	163.5	164	K66-3	IF-Main	MIF, QCSIF(?)	cream	0.08	2100	0.7	18	2.1	0.93	19000	0.05	10	110	6.5	290000	940	< 2	11000	3600	2.4	140	3.0	130	1.3	< 0.8	< 0.7	< 0.5	11	120	< 0.02	0.18	14	2.8	8.1
K-10-66	556.7	557.3	K66-13	IF-Main	MIF	n/a	0.03	1100	1.5	18	1.2	< 0.09	980	< 0.02	8.8	190	0.4	330000	250	4	540	2000	1.5	140	3.1	30	1.3	< 0.8	< 0.7	0.8	1.61	53	< 0.02	0.068	< 1	3.1	4.4
K-11-102	287	287.7	K102-5	IF-Main	HIF	brown grey	0.02	670	3.6	8.7	1.1	< 0.09	190	0.06	8.2	200	1.8	370000	150	< 2	81	360	4.4	140	20	140	1.4	1.4	< 0.7	0.5	1.14	21	0.05	1.1	16	9.5	24
K-11-140	281	281.3	K140-9	IF-Main	MIF	dark grey	0.02	1200	1.5	7.8	6.3	< 0.09	33000	< 0.02	17	110	1.7	380000	94	< 2	14000	16000	1.1	57	3.7	120	0.52	< 0.8	< 0.7	< 0.5	25	170	< 0.02	0.097	17	11	6.8
K-11-140	299.4	299.8	K140-11	IF-Main	LHMIF	light grey	0.04	580	3.7	1500	1.4	< 0.09	63000	< 0.02	8.4	130	0.6	250000	270	4	10000	28000	1.6	170	2.5	44	0.54	< 0.8	< 0.7	0.9	35	30	< 0.02	2.2	3	7.7	3.2
K-11-163	414.5	415.9	K163-9	IF-Main	MIF	variable grey	0.01	1000	1.7	20	1.7	< 0.09	25000	< 0.02	8.1	200	1.8	200000	360	< 2	16000	5800	1.2	230	3.2	61	1.7	< 0.8	< 0.7	< 0.5	33	86	< 0.02	0.078	5	2.9	3.3
K-11-140	286.7	287	K140-10	IF-Silicate	QSIF	greenish-grey	0.04	630	7.6	35	3.7	< 0.09	27000	< 0.02	7.1	160	2.9	92000	210	3	13000	9500	1.5	130	3.6	55	0.69	< 0.8	0.9	< 0.5	21	84	< 0.02	0.10	1	4.7	7.1
K-08-20	113.2	113.5	K20-4	IF-Silicate	CSIF	variable grey	0.25	67000	1.0	230	0.35	< 0.09	30000	3.2	4.5	260	2.6	140000	9100	16	13000	6000	5.6	280	18	430	1.5	< 0.8	< 0.7	1.4	16	2900	1.0	6.3	120	25	180
K-08-24	23	23.5	K24-1	IF-Silicate	CSIF	n/a	0.09	1000	0.6	240	0.65	< 0.09	160000	0.41	5.1	13	3.2	120000	690	2	60000	3300	0.8	150	4.5	180	6.5	< 0.8	< 0.7	< 0.5	110	70	0.02	5.9	11	4.3	35
K-08-24	236.7	237	K24-8	IF-Silicate	SIF	light grey	0.47	60000	3.3	740	2.1	0.24	5300	0.51	9.1	140	68	46000	33000	27	18000	560	9.5	3800	34	550	8.6	< 0.8	1.1	2.4	40	2700	1.1	9.0	130	17	86
K-10-66	224	224.3	K66-5	IF-Silicate	SIF	cream	0.07	430	0.5	17	0.88	< 0.09	42000	0.32	4.0	57	1.4	280000	110	3	39000	1600	0.9	150	3.1	79	1.1	< 0.8	< 0.7	< 0.5	27	16	< 0.02	0.17	7	3.1	69
K-10-66	307.1	307.6	K66-6	IF-Silicate	CSIF	light grey	0.69	11000	8.9	80	0.60	0.40	100000	0.95	12	130	230	96000	4800	6	44000	2000	19	610	70	2000	7.4	< 0.8	1.5	< 0.5	160	460	0.39	9.5	91	17	68
K-10-66	588	588.5	K66-14	IF-Silicate	SIF	tan	0.04	540	1.1	13	0.63	< 0.09	22000	0.03	5.3	79	2.3	270000	260	< 2	23000	6400	0.5	260	2.9	20	1.9	< 0.8	< 0.7	0.7	5.27	7.7	0.03	0.092	< 1	2.1	11
K-11-143	483.9	484.2	K143-1	IF-Silicate	HBG_GN	n/a	0.67	35000	0.7	590	4.1	0.46	36000	0.38	10	130	30	140000	31000	15	26000	3600	40	370	27	2900	8.5	< 0.8	1.5	1.4	63	10000	1.1	14	510	22	28
K-11-143	481.5	481.8	K143-2	IF-Silicate	SIF	n/a	0.25	8400	1.6	120	1.4	0.17	62000	0.23	7.9	36	21	260000	4600	5	44000	12000	2.6	320	14	730	8.3	< 0.8	1.2	0.8	88	1600	0.14	1.9	97	20	32
K-11-163	364	364.35	K163-8	IF-Silicate	LMIF	variable grey	0.18	1100	0.5	1.6	0.54	< 0.09	14000	< 0.02	9.5	150	2.5	320000	53	< 2	26000	8500	1.4	68	3.5	81	0.48	< 0.8	< 0.7	0.5	13	35	< 0.02	0.10	3	3.0	5.4
K-10-66	75	75.2	K66-2	IF-Silicate (?)	CSIF	light grey	0.10	710	3.7	11	1.0	< 0.09	12000	0.03	8.7	140	5.2	190000	260	< 2	17000	6600	2.5	64	4.1	40	0.60	< 0.8	< 0.7	< 0.5	4.07	54	< 0.02	0.52	17	2.7	8.6
K-08-20	6	6.4	K20-1	Menihek	MS_SCH	grey	1.4	75000	0.9	600	2.4	0.46	7300	3.2	17	200	140	34000	33000	26	14000	280	17	15000	90	500	34	< 0.8	1.8	2.4	140	4100	1.8	11	200	15	340
K-08-20	84.5	85	K20-2	Menihek	MS_B_SCH	grey	1.0	89000	1.0	780	2.3	0.53	8400	3.6	15	160	120	48000	40000	32	17000	290	15	15000	88	1100	20	< 0.8	2.2	3.5	110	4500	2.0	9.0	230	16	400
K-08-20	103.7	104.45	K20-3	Menihek	GF_B_SCH	dark grey	2.3	34000	17	450	2.4	1.3	14000	2.6	24	170	260	140000	15000	17	10000	550	240	5800	230	1100	26	< 0.8	11	1.3	81	2700	1.3	93	1400	79	520
K-08-20	135	135.4	K20-5	Menihek	MS_SCH	grey	0.84	72000	0.6	690	2.2	0.27	8000	2.2	14	160	85	51000	37000	24	13000	1100	42	7700	71	760	16	< 0.8	2.8	3.5	120	3900	2.1	23	310	28	440
K-08-20	139.13	139.73	K20-6	Menihek	GF_B_SCH	grey	2.1	41000	5.4	290	1.3	0.57	14000	1.00	14	200	140	58000	15000	18	10000	370	210	8000	180	1300	19	1.1	4.3	1.8	100	2200	1.2	62	710	37	270
K-08-20	162.35	162.9	K20-7	Menihek	B_MS_SCH	dark grey S	0.35	62000	1.0	590	1.3	0.23	44000	0.20	39	120	50	110000	13000	22	25000	1300	2.8	18000	48	4000	12	< 0.8	0.7	2.1	230	23000	0.36	1.0	180	39	140
K-08-20	174	174.5	K20-9	Menihek	MS_SCH	n/a	0.04	2800	5.6	23	0.28	< 0.09	94000	0.08	2.5	120	2.3	64000	1000	< 2	33000	1400	2.5	590	6.6	57	2.8	< 0.8	< 0.7	< 0.5	61	130	0.04	1.8	6	1.9	13
K-08-20	426	426.5	K20-14	Menihek	MS_B_SCH	grey	0.11	30000	< 0.5	410	1.6	< 0.09	28000	0.08	3.6	180	1.7	26000	23000	12	15000	770	1.1	440	5.5	940	9.4	< 0.8	< 0.7	0.6	46	960	0.21	0.92	12	8.4	11
K-08-24	64.1	64.4	K24-3	Menihek	B_MS_SCH	variable grey	0.61	84000	< 0.5	680	2.6	0.29	22000	1.6	9.0	170	75	37000	33000	45	18000	480	9.7	22000	36	980	31	< 0.8	< 0.7	3.7	200	4600	1.3	9.4	230	28	260
K-08-24	127.8	128	K24-4	Menihek	B_MS_SCH	grey	0.38	71000	< 0.5	750	2.5	0.21	22000	0.78	9.6	170	71	30000	27000	19	14000	480	8.9	15000	40	670	21	< 0.8	0.7	2.4	130	3600	0.79	7.0	110	19	110
K-08-24	192.6	192.8	K24-5	Menihek	B_MS_SCH	grey	0.89	74000	< 0.5	700	2.3	0.55	11000	4.0	12	170	120	43000	28000	33	15000	490	16	17000	77	610	45	< 0.8	1.6	2.8	120	3400	1.9	7.3	170	16	310
K-08-24	230	230.4	K24-7	Menihek	GF_B_MS_SCH	dark grey S	2.2	44000	49	510	2.9	0.70	4300	1.0	16	160	150	93000	18000	23	25000	1100	140	420	120	1400	12	< 0.8	4.4	2.2	17	2900	0.81	58	820	49	160
K-10-66	184.7	185	K66-4	Menihek	B_MS_SCH	grey S	0.75	53000	2.1	720	4.3	0.59	3400	0.45	17	210	150	66000	26000	22	15000	740	72	7600	130	880	21	< 0.8	5.1	2.2	39	2700	1.3	28	380	28	120
K-10-66	424.6	424.9	K66-7	Menihek	B_MS_SCH	dark grey S	0.45	71000	< 0.5	360	1.8	0.30	4700	0.27	10	170	50	27000	22000	23	14000	110	5.2	30000	38	840	6.6	< 0.8	< 0.7	1.6	67	3400	0.46	6.7	96	16	20
K-10-66	372.4	372.8	K66-8	Menihek	GF_B_MS_SCH	dark grey S	0.86	48000	110	290	1.7	0.97	18000	0.44	27	230	120	95000	19000	23	27000	400	190	13000	300	1200	24	< 0.8	4.4	0.8	55	1400	0.82	75	890	22	34
K-10-66	419.1	419.5	K66-9	Menihek	HBG_GN	1	0.26	68000	1.1	330	1.2	< 0.09	35000	0.54	38	190	64	87000	27000	37	29000	1000	2.9	16000	62	1200	6.7	< 0.8	< 0.7	1.6	94	9000	0.77	2.6	180	23	97
K-10-66	457.5	457.9	K66-10	Menihek	B_MS_SCH	dark grey S	0.41	69000	1.9	570	2.1	0.43	12000	0.79	19	250	99	51000	26000	27	17000	740	23	17000	94	810	17	< 0.8	1.2	2.4	110	4200	1.1	11	170	21	190
K-10-66	486	486.5	K66-11	Menihek	B_MS_SCH	dark grey S	0.58	51000	0.8	430	1.6	0.28	2800	1.4	12	200	120	52000	24000	21	11000	810	36	8300	81	770	12	< 0.8	2.4	3.6	49	2700	1.0	15	260	32	300
K-10-86b	151.4	152	K86B-1	Menihek	QZ_MS_B_SCH	Reddish	0.44	77000	0.7	620	2.1	0.30	300	0.25	4.3	140	42	31000	30000	29	7700	120	8.7	760	27	76	7.1	< 0.8	< 0.7	2.9	8.99	4300	1.4	12	180	13	95
K-11-140	13.9	14.2	K140-1	Menihek	B_MS_SCH	dark greyish-green S	0.84	48000	1.2	840	1.9	0.42	82000	1.4	14	140	130	56000	26000	24	27000	1700	14	2500	44	800	20	< 0.8	2.0	2.2	100	2400	0.90	7.2	270	26	92
K-11-140	41	41.38	K140-2	Menihek	B_MS_SCH	greenish-grey S	0.68	82000	< 0.5	760	2.7	0.35	17000	1.1	10	150	49	37000	29000	26	15000	410	5.1	22000	22	870	32	< 0.8	< 0.7	2.7	130	4400	1.2	7.4	80	22	110
K-11-140	74.84	75.08	K140-3	Menihek	B_MS_SCH	grey S	0.51	69000	< 0.5	500	2.1	0.39	35000	2.7	6.8	210	53	29000	22000	30	16000	1100	5.0	21000	22	550	28	< 0.8	< 0.7	3.0	220	2900	0.76	6.3	59	25	96
K-11-140	101	101.3	K140-4	Menihek	B_MS_SCH	light grey	0.43	82000	0.9	890	2.5	0.31	10000	0.74	8.9	130	47	35000	39000	39	16000	310	4.4	14000	26	620	28	< 0.8	< 0.7	3.1	130	3900	1.3	6.7	81	20	140
K-11-140	128.4	128.8	K140-5	Menihek	GF_B_MS_SCH	dark grey S, fault	0.99	74000	< 0.5	630	2.3	0.47	8400	21	13	180	120	36000	31000	25	16000	440	10	15000	58	710	34	< 0.8	1.8	2.5	84	3700	1.0	9.5	120	18	390
K-11-140	150.7	151.1	K140-6	Menihek	MS_B_SCH	dark grey	0.43	73000	< 0.5	750	2.0	0.31	16000	0.55	9.1	190	71	29000	28000	23	17000	470	7.1	16000	40	580	18	< 0.8	1.0	3.1	110	3200	0.86	8.5	74	22	110
K-11-140	205.5	206	K140-7	Menihek	HBG_GN	dark green	0.18	69000	2.4	450	1.5	< 0.09	49000	1.1	33	120	48	110000	21000	23	25000	1300	3.3	9610	29	4400	12	< 0.8	1.0	2.0	220	21000	1.3	1.6	170	49	230
K-11-152	58.3	58.6	K152-1	Menihek	QZ_MS_B_SCH	light grey	0.73	73000	< 0.5	570	2.1	0.33	9400	2.2	17	190	84	83000	24000	28	15000	3100	9.0	7500	47	1200	28	< 0.8	1.8	2.6	61	5000	0.90	10	150	34	280
K-11-152	143.2	143.7	K152-2	Menihek	QZ_MS_B_SCH	light grey	0.61	76000	1.2	300	1.9	0.38	420	1.1	36	210	320	70000	10000	14	1000	2900	11	390	82	110	35	< 0.8	1.7	3.2	7.11	4100	0.16	70	170	37	66
K-11-163	60.6	61	K163-1	Menihek	B_MS_SCH	grey S	0.69	77000	1.2	740	1.8	0.54	2700	8.3	9.6	170	110	39000	37000	33	15000	250	16	8700	84	730	15	< 0.8	1.3	3.7	46	3900	1.5	7.6	210	15	510
K-11-163	105	105.2	K163-2	Menihek	B_MS_SCH	grey S	0.85	74000	0.6	730	1.9	0.22	4400	0.50	11	160	87	39000	30000	31	18000	530	22	24000	63	1100	12	< 0.8	< 0.7	2.8	77	3900	1.4	10	160	24	170
K-11-163	150	150.2	K163-3	Menihek	B_MS_SCH	grey S	0.26	75000	1.1	600	2.2	0.26	22000	1.6	15	160	24	43000	24000	34	15000	900	1.3	17000	40	690	31	< 0.8	< 0.7	3.0	190	3900	1.4	3.9	75	24	170
K-11-163	195.3	195.6	K163-5	Menihek	GF_B_MS_SCH	grey S	2.2	48000	7.1	380	3.1	0.58	2100	13	53	180	290	74000	25000	17	8200	420	200	870	170	890	74	3.8	12	2.3	26	2100	2.0	78	1190	60	1390
K-08-20	227.2	227.5	K20-11	Wishart	QTZ	dark grey	0.05	46000	0.5	710	7.0	0.10	52000	0.04	42	180	19	120000	12000	19	23000	1800	2.1	9200	51	1500	4.2	< 0.8	< 0.7	1.0	140	9900	0.19	0.42	200	23	75
K-08-20	417	417.7	K20-13	Wishart	QTZ-MS	grey	0.17	18000	< 0.5	140	0.85	< 0.09	760	0.05	4.2	230	1.5	46000	12000	20	12000	440	1.5	120	4.9	18	0.93	< 0.8	< 0.7	< 0.5	2.04	1000	0.50	1.3	17	3.1	30
K-08-24	284.37	284.84	K24-10	Wishart	QZT_MS	light grey	0.27	56000	< 0.5	410	2.0	< 0.09	19000	0.15	15	200	53	23000	33000	19	10000	510	2.4	720	35	110	1.7	< 0.8	< 0.7	1.2	34	2400	0.41	3.4	43	6.2	28
K-08-24	296	296.35	K24-11	Wishart	QZT_MS	white	0.01	760	< 0.5	7.9	0.06	< 0.09	1100	< 0.02	1.1	280	1.7	2800	320	< 2	360	52	1.4	210	3.6	28	0.21	< 0.8	< 0.7	1.0	1.05	13	< 0.02	0.23	< 1	0.40	< 0.7
K-10-64	88.6	88.9	K64-1	Wishart	QTZ	reddish	< 0.01	320	< 0.5	6.8	0.03	< 0.09	200	< 0.02	1.2	340	0.9	3500	130	< 2	170	120	2.4	71	3.9	3	0.14	< 0.8	< 0.7	0.6	0.76	14	< 0.02	0.043	< 1	0.25	< 0.7
K-11-163	539.5	540	K163-11	Wishart	QTZ	Reddish	0.16	550	0.5	5.1	0.13	< 0.09	280	0.03	1.6	240	6.1	15000	120	< 2	230	190	2.1	81	4.2	62	0.69	< 0.8	< 0.7	< 0.5	1.02	10	< 0.02	0.70	< 1	1.3	5.0
K-11-163	543.8	544	K163-12	Wishart	QZ_MS_B_SCH	grey pink	0.44	69000	4.6	680	2.4	< 0.09	210	0.18	4.4	220	14	29000	52000	10	6500	89	1.7	850	18	320	8.5	< 0.8	< 0.7	1.5	23	3200	0.93	2.0	45	7.3	43

Notes:

1- Lithology Code

B_MS_SCH	Biotite-muscovite quartz schist, often w/ Fe-sulfides
GF_B_MS_SCH	Graphitic biotite-muscovite quartz schist, often w/ Fe-sulphides
MS_B_SCH	Muscovite-biotite-quartz schist
MS_SCH	Muscovite-quartz schist
HBG_GN	Hornblende-biotite-garnet gneiss (+ coronite)
CSIF	Carbonate >50% + silicate iron formation
HIF	Hermatite >20%-quartzite (minor marble, Ca/Fe silicates)
HMIF	Hermatite>magnetite-quartzite [MT+HM >20%] (minor marble, Ca/Fe silicates)
LHMIF	Hermatite>magnetite (HM+MT 10-20%) quartzite (minor marble, Ca/Fe silicates)

Lithology Code	Description
LMIF	Magnetite (10-20%)-quartzite (minor marble, Ca/Fe-silicates)
LMFQCIF	Magnetite (10-20%) quartz carbonate silicate iron formation
MIF	Magnetite >20%-quartzite (minor marble, Ca/Fe-silicates)
QCIF	Quartz (0-90 qz)% carbonate iron formation
QSIF	Quartz (50-90% qz) + Ca-Fe silicates, + minor Fe oxides
SIF	Fe-Ca silicates >50% w/ qzt, marble, + minor Fe oxide
QZT	Quartzite (>90% qz + mica, carbonate, other)
QZ_MS_B_SCH	High quartz w/ muscovite>biotite schist
QZT-MS	Quartzite w/ muscovite; can range to 20% mica

2 - S stands for visible sulfides mentioned in borehole logs; n/a - description is not avalible

See details of analythical methods in Certificates of Analyses.