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PRELIMINARY CALCINING TEST WORK OF LIMESTONE FINES FROM WESTERN CANADA LIMESTONE LTD FOR DEVELOPING DESIGN CRITERIA OF A LIME PRODUCTION FACILITY

Blue 2000 Claim Group – Tenure number 559349

119 33’ 33’’W 50 0’ 23’’ N

Prepared for

Western Canada Limestone Ltd.
13 – 2550 Acland Road
Kelowna, B.C.
V1X 7L4

Attention: Mr. Don Sandberg

November 15, 2012

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Prepared by

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Signed and Sealed

Jeffrey B. Austin, P.Eng. – President
International Metallurgical and Environmental Inc.

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INTRODUCTION

Western Canada Limestone Ltd operates a limestone mining operation located approximately 17 kilometres from downtown Kelowna, B.C. The operation produces aggregates for use in construction and landscaping.

The Crown granted tenure is contained within the Blue 2000 claim group. Mineral Tenure is held under Tenure Number 559349. On-going mining operations are shown in Figure 1 below.

Figure 1. – Photo of Western Canada Limestone Ltd. Quarry Operation(August 2012)

Western Canada Limestone Ltd. has contracted International Metallurgical and Environmental Inc. to evaluate the calcining of limestone fines as a means of producing lime for sale into the local industrial market. Lime is produced by the heating of limestone to drive CO_2 from the $CaCO_3$ to produce CaO. Pure calcite, the primary carbonate mineral in limestone is 56 percent CaO.

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Lime has uses in mining operations, pulp and paper processing and water treatment and the local market in the southern B.C. region is estimated at 200,000 tonnes annually. The local market is estimated to be worth approximately 40 to 50 million dollars.

This report outlines the results of calcining tests conducted in the facilities of International Metallurgical and Environmental Inc. Generally, the limestone production of Western Canada Limestone Ltd. is capable of making excellent lime products.

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PROJECT LOCATION

The project is located at kilometer 10.5 on the Bear Lake Main Road on the western shore of Lake Okanagan. The map below shows Tenure 559349 which holds the operations of Western Canada Limestone Ltd.

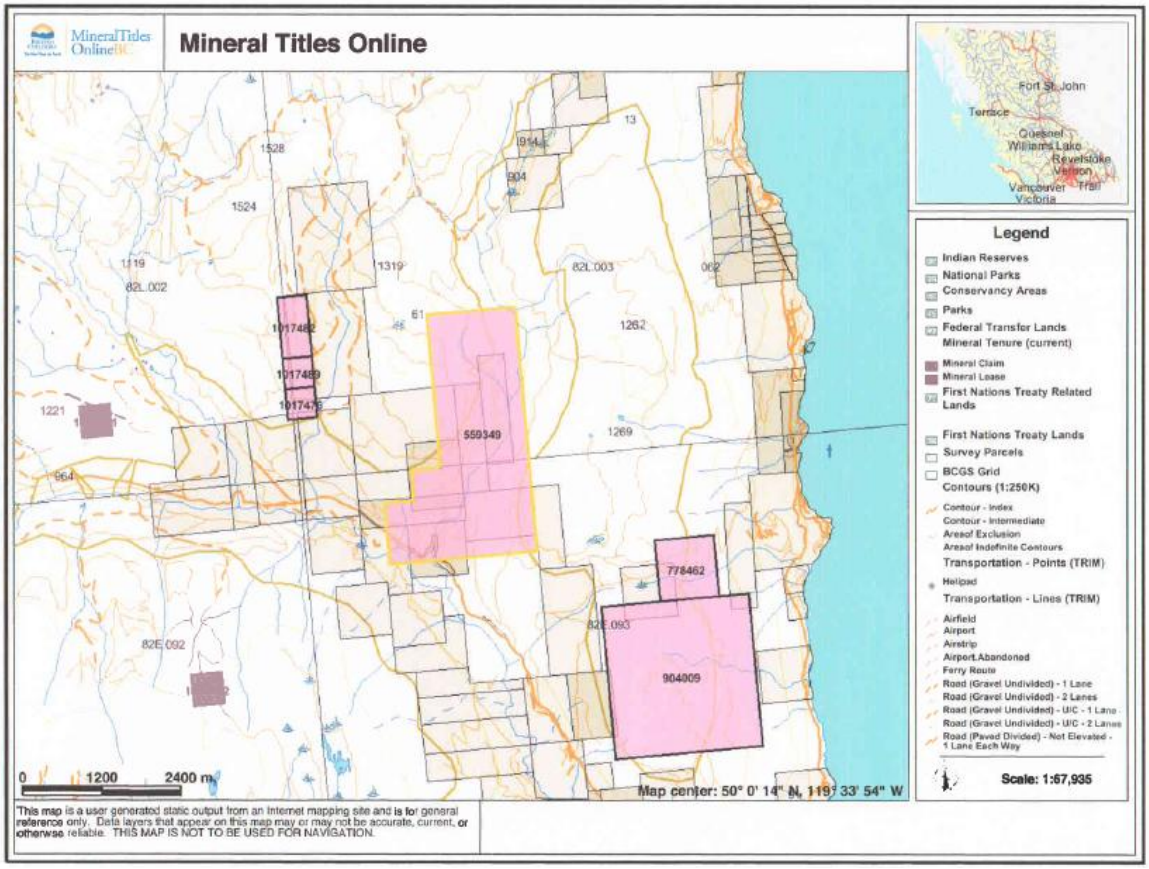

Figure 2. – Location of Mineral Tenure 559349 and Western Canada Limestone Ltd.

RESULTS AND DISCUSSION

Test Samples

A representative limestone sample was provided to International Metallurgical and Environmental Inc. for use in this test work program. Approximately 100 kilograms of 75 mm stone was provided from the on-going operations in the quarry.

The sample material was crushed to approximately 6 mm in a laboratory jaw crusher in order to provide material for screening and preparing material for calcining tests. Analysis of the feed material is shown in Table 1 below and indicates the high grade nature of the sample material.

Table 1
Summary of Analysis – Western Canada Limestone Ltd. Quarry Production Sample

Sample	CaO %	$CaCO_3$ %	MgO %	SiO_2 %	S %	LOI %
WCL Quarry Prod.	54.8	97.8	0.15	0.7	0.02	43.4

A photograph of the crushed limestone is shown in Figure 3. The limestone from this deposit is coarse grained and relatively hard. The crushing and handling of this material generates fines which range to approximately 5 percent minus 75 microns(200 mesh). This generation of fines is approaching the upper limit for meeting the characteristics of structural aggregates used in highway construction. Screening of these fines is simple, although a use for the fines is needed and using them to produce lime is an attractive option. These materials are well-received as structural aggregates in the local market.

The sample material was screened into 5 separate fractions in order to evaluate each of the particle sizes separately. The rationale behind looking at each size fraction separately was to determine if particle size played a major role in calcine times and ultimately reaction rates. The sample was screened into the following fractions. This is a key factor in selection of screen sizes in classification prior to calcining.

Table 2

Summary of Feed Sample Size Distribution

Sieve size fraction	Percent passing
2.36 mm	68.1
1.40 mm	49.0
0.85 mm	28.9
0.300 mm	11.3
Minus 0.300 mm	-

Figure 3. – Photograph of Limestone Sample Used in Calcining Test Work.

Methods and Procedures

A series of calcining tests were conducted to evaluate the effect of particle size and retention time on the rate of the calcine reaction. The test work was done using a high-temperature furnace in the facilities of International Metallurgical and Environmental Inc.

The furnace was set to a target temperature and the sample materials heated for a fixed amount of time after which the sample was removed from the furnace and then quickly cooled to stop the calcining process. Sample weights were used to determine the degree to which the calcining process was completed. With this data it is possible to track the calcining process as time is varied for each of 5 particle sizes used in the test work.

A photo of the Thermolyne furnace is shown in the photo below.

Figure 4. – Thermolyne High Temperature furnace used in Calcining Test Work

Five separate size fractions were evaluated in the study to look at calcining rates. A summary of the test numbers and test parameters are shown in Table 3.

Table 3

Summary of Test Work Parameters

Test Number	Sample	Calcining Temp	Calcining Time
1	+2.36 mm	950-975 C	10
2	+2.36 mm	950-975 C	20
3	+2.36 mm	950-975 C	30
6	2.36-1.40 mm	950-975 C	30
7	2.36-1.40 mm	950-975 C	20
8	2.36-1.40 mm	950-975 C	10
10	1.40 - 0.85 mm	950-975 C	30
11	1.40 - 0.85 mm	950-975 C	20
12	1.40 - 0.85 mm	950-975 C	10
14	0.85 – .300 mm	950-975 C	30
15	0.85 – .300 mm	950-975 C	20
16	0.85 – .300 mm	950-975 C	10
18	minus 0.300 mm	950-975 C	30
19	minus 0.300 mm	950-975 C	20
20	minus 0.300 mm	950-975 C	10

In each of the tests, a 100 gram sample was weighed prior to placement in the high temperature furnace. A tundish of high grade silica was used to hold the sample during the calcining test. The tundish was heated to operating temperature prior to placing the sample in the test apparatus, this was done to remove any thermal inertia in the system due to the tundish being cool.

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The hot tundish and the limestone sample were then placed into the furnace and held in the high temperature furnace for a prescribed time and then remove and placed on a large metal plate which acts as a heat sink to quickly bring the tundish temperature below reaction temperatures and therefore halting the calcining process. The sample was not mixed during time in the furnace.

The sample is weighed to record the mass loss during placement in the kiln.

Detailed Test Results

A series of calcining tests were conducted to evaluate the effect of particle size and retention time on the rate of calcining.

The furnace was set to a target temperature and the sample materials heated for a fixed amount of time after which the sample was removed from the furnace and then quickly cooled to stop the calcining process. Sample weights were used to determine the degree to which the calcining process was completed. With this data it is possible to track the calcining process as time is varied for each of 5 particle sizes used in the test work. All five samples were subjected to 10, 20 and 30 minute calcining tests.

Five separate size fractions were evaluated in the study to look at calcining rates. The detailed test results are shown below in Table 3. As can be seen in the results table, the material has the ability to produce high-grade lime suitable to marketing into the local lime markets. Typically, lime specifications require a lime content of 95 to 96 percent lime, the material produced in these tests typically exceeded these specifications.

Table 4
Detailed Calcining Test Results

Test Number	Sample	Calcining Temp	Calcining Time Min.	Retained mass %	Lime content %
1	+2.36 mm	950-975 C	10	56.3	99.5
2	+2.36 mm	950-975 C	20	56.6	98.9
3	+2.36 mm	950-975 C	30	56.5	99.2
6	2.36-1.40 mm	950-975 C	30	57.3	97.7
7	2.36-1.40 mm	950-975 C	20	57.0	98.2
8	2.36-1.40 mm	950-975 C	10	63.1	88.7
10	1.40 - 0.85 mm	950-975 C	30	57.5	97.4
11	1.40 - 0.85 mm	950-975 C	20	56.9	98.5
12	1.40 - 0.85 mm	950-975 C	10	66.5	84.2
14	0.85 – .300 mm	950-975 C	30	57.0	98.3
15	0.85 – .300 mm	950-975 C	20	56.6	98.9
16	0.85 – .300 mm	950-975 C	10	66.7	83.9
18	minus 0.300 mm	950-975 C	30	56.5	99.2
19	minus 0.300 mm	950-975 C	20	56.7	98.8
20	minus 0.300 mm	950-975 C	10	74.1	75.6

The results are in a sense contradictory, with coarse material performing very well in all three calcining tests, showing no dependence on calcining time in the range of 10 to 30 minutes. The finer samples showed better results for longer calcining times. This effect is likely due to the limestone insulating the sample from complete heat penetration, as the slow-down of the calcining process is more pronounce in the finer samples. This effect points to the need to agitate the sample during heating to allow for better heat adsorption in the kiln.

Based on the results of these tests, the following graphical presentations of the data can be made and points to short retention times in the heating and calcining of the limestone fines.

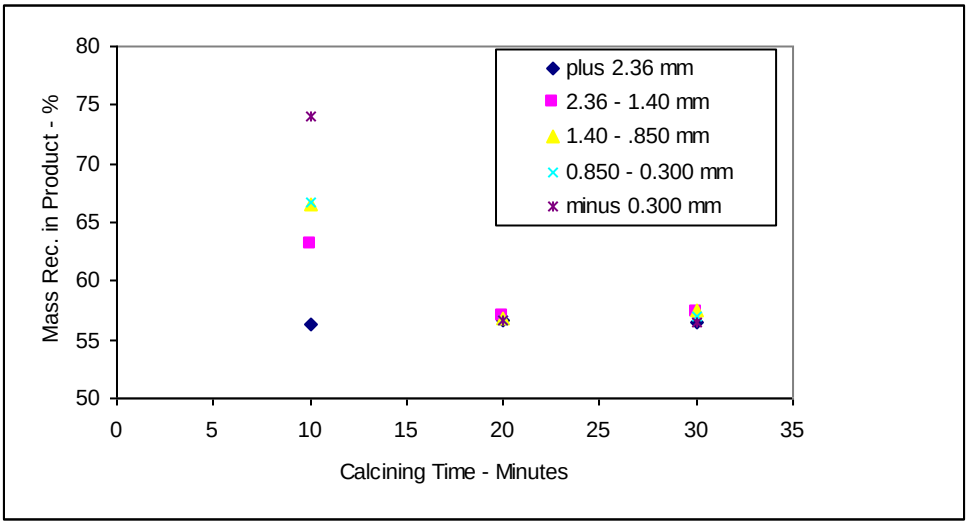

Figure 5. – Mass Retained of Calcined Product as a Function of Calcining Time

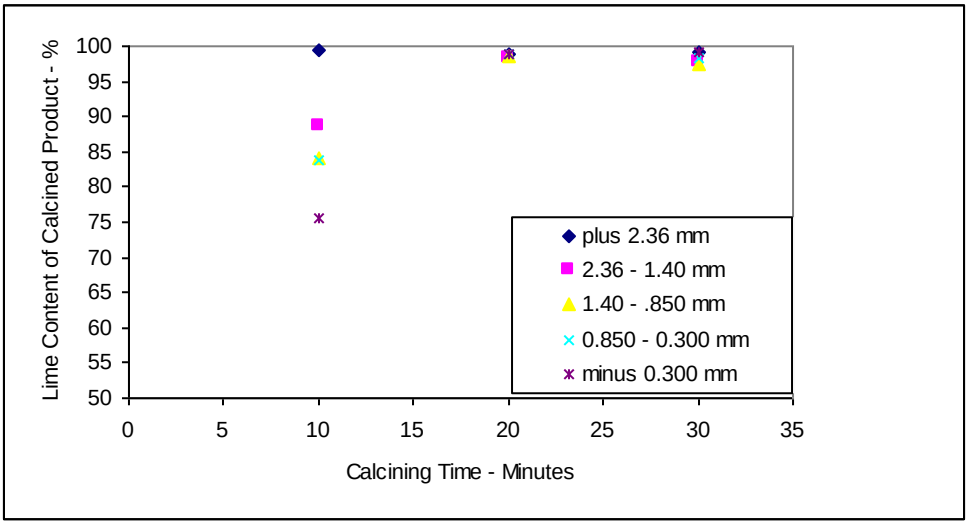

Figure 6. – Lime Content of Calcined Product as a Function of Calcining Time

These results point to a required retention time in the range of 10 minutes in a kiln at a temperature of 950C. There appears to be little impact on the calcining rates observed in the particle sizes tested, namely less than 2.36 mm.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of completing calcining tests, it can be concluded that the materials currently being mined and sold by Western Canada Limestone Ltd. has the potential to be converted into high-quality lime products. Lime products from Western Canada Limestone Ltd. quarry operations will likely range from 97 to 99 percent lime

The use of limestone fines for the production of lime has the ability to alleviate a minor issue of fines generation which is affecting the quality of structural aggregates from the mining operation.

The option of screening material in the quarry at approximately 2 mm would provide feed material to a kiln and this size is readily screened in most standard screening equipment. This removal of fines would bring aggregate specifications well into target ranges for the local market.

It is recommended that further engineering design work be considered on this project, including the completion of heat requirements and gas flow calculations in a low air velocity kiln. It is also recommended that a fixed hearth kiln be considered for this application.

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austin@internationalmet.com

CERTIFICATE OF QUALIFIED PERSON

Jeffrey B. Austin, P.Eng.

I, Jeffrey B. Austin, P.Eng., do hereby certify that:

1. I am a Consulting Engineer and President of International Metallurgical and Environmental Inc., residing at 906 Fairway Crescent, Kelowna, B.C., Canada. 2

2. This certificate applies to the technical report titled "PRELIMINARY CALCINING TEST WORK OF LIMESTONE FINES FROM WESTERN CANADA LIMESTONE LTD FOR DEVELOPING DESIGN CRITERIA OF A LIME PRODUCTION FACILITY", dated November 15, 2012 (the "Technical Report").

3. I fulfill the requirements of a qualified person for the purposes of NI 43-101 based on my academic qualifications, professional membership and relevant experience, as set out below:
   a. I hold the following academic qualifications:

BASc.	University of British Columbia	1984

   b. I am a member in good standing of the following professional and technical associations:

Association of Professional Engineers and Geoscientists of BC	15708

   c. I have worked in the minerals industry as a Consulting Process Engineer continuously since 1987, a period of 26 years.

4. I have personally inspected the property.

5. I am responsible for all aspects of the Technical Report.

6. I am not independent of Western Canada Limestone Ltd. as defined in section 1.5 of NI 43-101. I currently serve as president of Western Canada Limestone Ltd.

7. I have read and am familiar with NI 43-101 and the sections of the Technical Report for which I am responsible. To the best of my knowledge, information, and belief, the parts of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.

8. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 16nd day of December, 2012

"Signed and Sealed"

_____
Jeffrey B. Austin, P.Eng.

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INVOICE

December 4, 2012

Invoice Number: 21511
HST No.: 898084686

Western Canada Limestone Ltd.
906 Fairway Crescent
Kelowna, B.C.
V1Y4S7

Dear Sir/Madam,

This invoice covers the costs of completing calcining test work on composite samples from Western Canada Limestone Ltd.

14 calcining tests @ $800 each		$11,200.00
Analytical costs		$1,600
Reporting of results – 20 hours @ $120 per hour		$2,400
Sub-total		$15,200
	HST	$1,824.00
	Invoice total	**$17,024.00**

Thank-you for the opportunity to provide this service.

Yours very truly,

Jeffrey B. Austin, P.Eng. – President
International Metallurgical and Environmental Inc.