

MAR 20150006: FIREBAG

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20150006

Firebag Property

Opal Energy Corp.



OPAL ENERGY CORP.

ASSESSMENT REPORT: 2013 AND 2014 EXPLORATION OF THE FIREBAG PROPERTY, NORTHEAST ALBERTA

PART B

Metallic and Industrial Mineral Permits:

9313080500, 9313080501, 9313080502, 9313080503, 9313080504 and 9313090255

Geographic Coordinates:

57°30'N, 110°30'W

NTS Sheets:

74E/07 to 74E/10

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DATE: AUGUST 25TH, 2015

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SUMMARY

The Firebag Property, herein named “the Property”, is located in the northeastern Athabasca region of Alberta and is centered approximately 100 kilometers northeast of Fort McMurray and 75 km northeast of Fort McKay. The Property consists of six contiguous Metallic and Industrial Mineral (MAIM) permits, 9313080500, 9313080501, 9313080502, 9313080503, 9313080504 and 9313090255, totalling approximately 49,536 ha.

This assessment report addresses exploration work conducted on the Property dating back to November 2013. The primary objective of the exploration work was to locate and sample high quality silica or fracking sand on the Firebag Property. The field work was performed by Dahrouge Geological Consulting Ltd. (“Dahrouge”) on two helicopter supported site visits. Although the primary focus for exploration was on surficial silica sands with the potential for use as proppant in hydraulic fracturing, a review of historic sample databases, geophysical data, and oil sands core was also completed, with a focus on identifying large-scale geological structures with potential for uranium mineralization.

On November 11th 2013, Dahrouge on behalf of Declan Resources (“Declan”) performed a 1 day pitting program, targeting silica sand within a north-south trending ridge in the northeastern corner of the Property. Based on encouraging results from the 2013 site visit, a follow-up four day hand auger program was executed by Dahrouge from August 18th to August 21st, 2014. The program focused on sampling the ridge from 2013 at depth, in addition to numerous other targets across the Property.

In addition to the two field programs, a geologist from Dahrouge along with a representative from Declan conducted a three-day visit to the Energy Resources Conservation Board (“ERCB”) core laboratory in order to evaluate the sands for potential as proppants, as well as to identify geological structures or radioactivity associated with uranium mineralization.

Exploration in 2013 and 2014 identified several areas prospective for silica sand proppants on the Firebag Property. Pit and hand auger samples returned excellent sphericity, good roundness, and results primarily fell within those size fractions used for fracking sands.

Exploration expenditures for the Firebag Property totalled \$95,616.41. The expenditures were insufficient to maintain the entire Property. The details regarding which MAIM permits will be retained are outlined in Part A of this report. Exploration expenditures are displayed in Table 1.1.

Table 1.1: List of Total Expenditures

		AMOUNT SPENT
1	Prospecting (2013 Test Pit Program)	\$ 21,550.54
2	Geological mapping and petrography	\$ -
3	Geophysical Surveys	
	a. Airborne	\$ -
	b. Ground	\$ -
4	Geochemical Surveys	\$ -
5	Trenching and Stripping	\$ -
6	Drilling (2014 Hand Auger Program)	\$ 41,500.99
7	Assaying and whole rock analysis	\$ -
	a. 2013 (Loring Laboratories)	3,216.50
	b. 2014 (Loring Laboratories)	10,992.00
8	Other Work ERCB Core Lab Visit	\$ 5,663.98
	Data Analysis	4,000.00
SUBTOTAL		\$ 86,924.01
9	Administration (10% of subtotal)	\$ 8,692.40
TOTAL		\$ 95,616.41

1 INTRODUCTION

The 2013 and 2104 exploration programs were conducted by Dahrouge Geological Consulting on behalf of Declan Resources Inc. and Opal Energy Corp ("Opal"). This assessment report describes exploration performed on the Firebag Property, consisting of MAIM permits 9313080500, 9313080501, 9313080502, 9313080503, 9313080504 and 9313090255

The primary objective of the 2013 and 2014 exploration programs on the Firebag Property was to locate high quality silica sand to be used as a hydraulic fracturing proppant. The work described within this report consists of a one day site visit in November, 2013 as well as a four day hand auger program in August, 2014. In addition, three days were spent at the ERCB core laboratory in Calgary to evaluate the sands from core and cuttings for their potential use as proppants, as well as to identify geological structures or radioactivity associated with uranium mineralization.

2 LOCATION, MINERAL PERMITS, ACCESS AND TOPOGRAPHY

2.1 LOCATION

The Property is located in northern Alberta and is centered upon approximately 57°30'N, 110°30'W. The centre point of the Property is located approximately 100 km northeast of the city of Fort McMurray, and 75 km northeast of the community of Fort MacKay (Figure 2.1). It is situated within NTS map sheets 74E/07 to 74E/10.

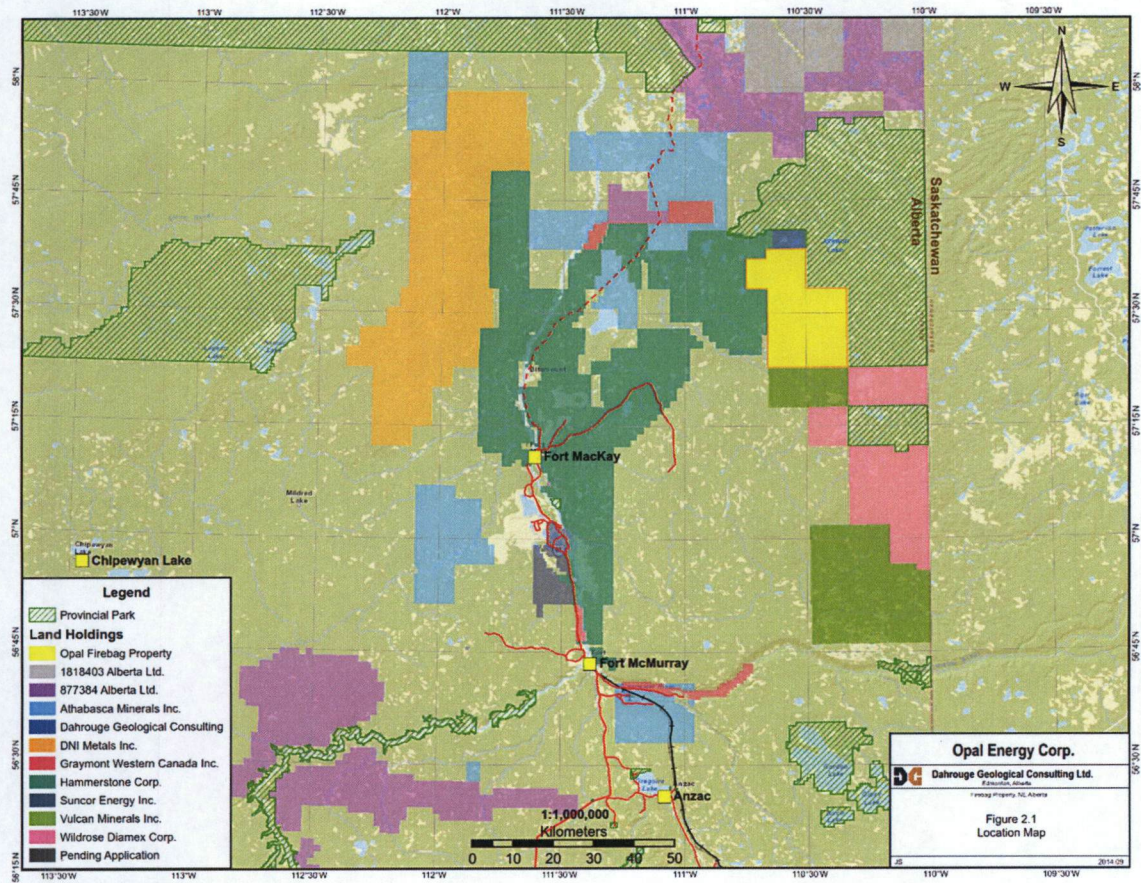


Figure 2.1 Location Map

2.2 MINERAL PERMITS

The Firebag Property is comprised of 6 MAIM permits, all of which are in good standing (Table 2.1; Figure 2.2). The tenures were map staked in August and September of 2013 by 877384 Alberta Ltd. Opal has a 70% interest in the Firebag Property; subject to the terms outlined in the option amendment agreement dated September 23, 2014.

Table 2.1: Mineral Dispositions, Firebag Property

Disposition	Area (ha)	Record Date	Anniversary Date	Required Work
9313080500	9,216.0	August 27, 2013	August 27, 2015	\$46,080.00
9313080501	9,216.0	August 27, 2013	August 27, 2015	\$46,080.00
9313080502	9,216.0	August 27, 2013	August 27, 2015	\$46,080.00
9313080503	9,216.0	August 27, 2013	August 27, 2015	\$46,080.00
9313080504	3,456.0	August 27, 2013	August 27, 2015	\$17,280.00
9313090255	9,216.0	September 27, 2013	September 27, 2015	\$46,080.00

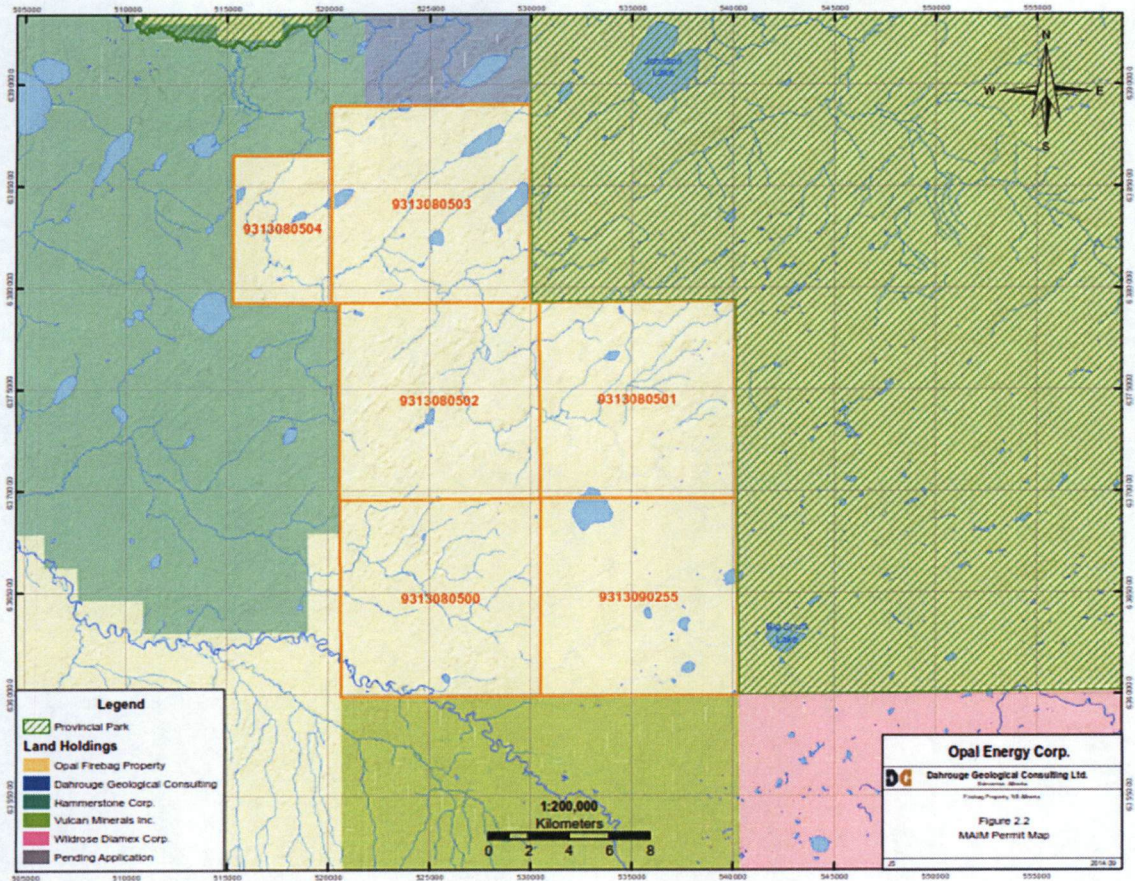


Figure 2.2 MAIM Permit Map

The MAIM permits for the Firebag Property are registered to 877384 Alberta Ltd. The Property was initially optioned to Declan Resources Inc. in an Option Agreement dated October 24, 2013. Opal has since entered into an Option Amendment Agreement, dated September 23, 2014, forming a two party joint venture, which grants Opal the exclusive right to acquire a 70% interest in the Property, with Declan Resources Inc. retaining a 30% interest.

2.3 ACCESSIBILITY

The nearest inhabited site is the community of Fort MacKay, which is located approximately 75 km by air southwest of the centre of the Property. Fort MacKay is accessible by road from Fort McMurray by driving 60 km north on Highway 63. Fort McMurray is located approximately 100 km by air southwest of the centre of the Property; it is serviced by frequent flights from most major Canadian cities.

The Property is crosscut by numerous cutlines, trails, oil well pads, and access roads. A winter road runs approximately 25 km to the northwest of the Firebag Property. Access to the Property would be by helicopter year round, or in the winter by 4x4 truck, or ATV. SilverWillow Energy is planning extensive development at their Audet SAGD project, located on the Firebag Property. Their currently planned development would see access roads driven to the centre of the Firebag Property, and extensively throughout it, in 2015 and 2016.

Aircraft are primarily available from Fort McMurray, Alberta, located approximately 100 km southwest of the centre of the Property. Fort McMurray services much of the exploration and oil sands industry in the area. It can be accessed from Edmonton by taking Highway 28 to Highway 63 and continuing north for 290 km.

2.4 TOPOGRAPHY AND VEGETATION

The Property is situated in the Boreal Plains Ecozone and the Mid-Boreal Uplands Ecoregion. Topography consists of gently sloping uplands with elevations ranging from 330 to 570 m. Bedrock is dominated by shales, whilst the uplands are generally covered by glacial till, lacustrine- or fluvioglacial-deposits. A large number of small lakes, ponds, and sloughs are found in depressions associated with glaciation. Vegetation on the Property is dominated by close stands of trembling aspen, balsam poplar, white and black spruce, and balsam fir. Poorly drained areas are generally covered by tamarack and black spruce.

3 GEOLOGY

3.1 REGIONAL GEOLOGY

Much of the following is summarized from Morton, 2014. The Firebag Property lies within the Interior Platform Geological Province and is primarily underlain by rocks of the Canadian Shield and the Western Canadian Sedimentary Basin ("WCSB"). The Interior Platform Geological Province extends from past the Alberta border in the south to the Arctic Platform in the north, and is bounded by the Cordilleran Orogen to the west and the Churchill Province in the east (Figure 3.1).

Within the Interior Platform lies the Western Canadian Sedimentary Basin. The WCSB comprises the Canadian Cordillera to the west and two sedimentary basins to the east, namely: the Alberta Basin (primarily located in Alberta) and the Williston Basin (centred in North Dakota and extending into Southern Saskatchewan and Manitoba) (Wright et al., 1994). Where the WCSB underlies the

Firebag Property, it is made up of flat-lying to gently dipping Phanerozoic strata that unconformably overlie Precambrian crystalline basement rocks of the Canadian Shield (Olson et al., 1994).

Roughly 30 km northeast of the northern boundary of the Firebag Property lies the edge of the Athabasca Basin. The basement of this sedimentary basin is made up of Precambrian gneisses and metasedimentary rocks. This crystalline basement is unconformably overlain by relatively undisturbed and unmetamorphosed flat-lying sandstones and conglomerates of the Athabasca Group. The Athabasca Basin hosts some of the world's largest known unconformity-related high-grade uranium deposits. It has been hypothesized by many explorers that the Athabasca Basin once covered a much larger area and has been eroded and reduced in area over time. Areas outside the current boundary of the Athabasca Basin may still represent previous sub-Athabasca basement rocks.

Due to the lack of exposed basement rock within the Property area, the basement geology is not well understood. Most of the basement terrain interpretation is based upon aeromagnetic surveys and chronological studies of core (Ross et al. 1991). Historically, basement rocks in the area have been assigned to the Clearwater domain of the Archean Rae Province. More recent aeromagnetic data (Eccles et al., 2014) have suggested that the basement rock in the region of the Property belongs to the 1.9 – 2.0 Ga Taltson Magmatic Zone (Chacko et al., 2000). The Taltson Magmatic zone ("TMZ") is made up of granitic plutonic rocks which intruded into quartzitic to pelitic supracrustal rocks (Ross et al., 1991) and is bounded by the Buffalo Head Terrane to the west (2.0 – 2.4 Ga) and the Archean Rae Province to the east. The Rae Province is bounded to the TMZ by a complex zone of brittle to ductile faulting and is comprised of north-south trending, foliated granitic rocks and amphibolite, metagabbro, and mafic gneiss. There are also minor remnants of high-grade pelitic paragneiss, similar to that intruded in the TMZ (Bostock and Van Breeman, 1994). This complex fault zone, which defines the boundary between the TMZ and the Rae Province, is located near the Property. As a result, the Rae Province, and more specifically the Clearwater domain, may also make up part of the basement underlying the Property, as recorded beneath the western Athabasca Basin (Ross et al., 1991).

In the WCSB, basement rocks are overlain unconformably by Paleozoic to Cenozoic bedrocks, made up of marine to non-marine sedimentary rocks. The sediment accumulation within the

WSCB is associated with episodes of orogenic deformation in the Cordillera (Wright et al., 1994)). The WCSB strata thicken from an erosional edge in the northeast, where it is bounded by the Canadian Shield, to more than 6 km thick at the western boundary (Olson et al., 1994). In northeastern Alberta, near the Property, middle and upper Devonian marine shales, carbonate and evaporitic lithologies are unconformably overlain by lower Cretaceous marine to deltaic sedimentary rocks.

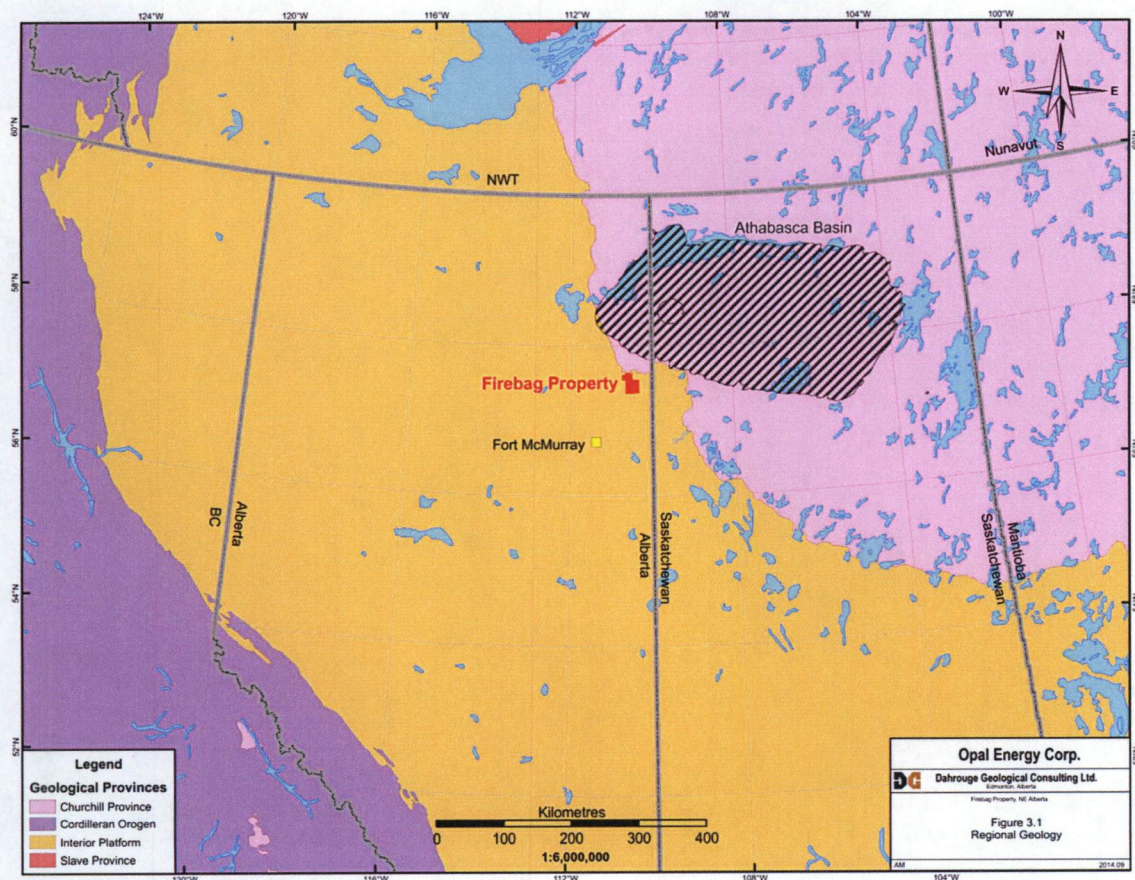


Figure 3.1 Regional Geology

3.2 PROPERTY GEOLOGY

Much of the following is summarized from Morton, 2014. The precise basement geology of the Firebag Property is still largely unknown, due to the limited number of drill holes that penetrated to the basement. The basement rock in the region has historically been mapped as the Clearwater Domain of the Archean Rae Province; however, more recent geophysical studies suggest that the

Property is likely underlain by bedrock from the Taltson Magmatic Zone (Eccles et al., 2014). The Taltson Magmatic Zone primarily comprises granitoids, metasedimentary gneisses, granitic basement gneisses, and amphibolite (Chacko, 2000).

The Firebag Property is primarily underlain by sands of the Cretaceous McMurray Formation (Figure 3.2). The McMurray Formation is generally fine-grained, moderately-sorted quartz sand, often saturated with bitumen (Carrigy, 1959). The McMurray Formation can be divided into three different members. The lower member, which has not been identified on the Firebag Property, has been described as poorly sorted conglomerate, argillaceous sand, silt, and clay. The middle member consists of massive- to thin-bedded, fine-grained oil sand. The upper member consists of very-fine-grained oil sand. In the area of the Firebag Property the McMurray Formation is expected to have a thickness of approximately 30 m and it may be devoid of oil (Glass, 1997).

The Firebag Property is crosscut by several faults identified in historic work and regional geophysical studies. These include the Beatty River Fault Zone, the Firebag Fault, the Johnson Lake Fault, and several other inferred faults. The detailed geological structure on the Firebag Property is still largely unknown.

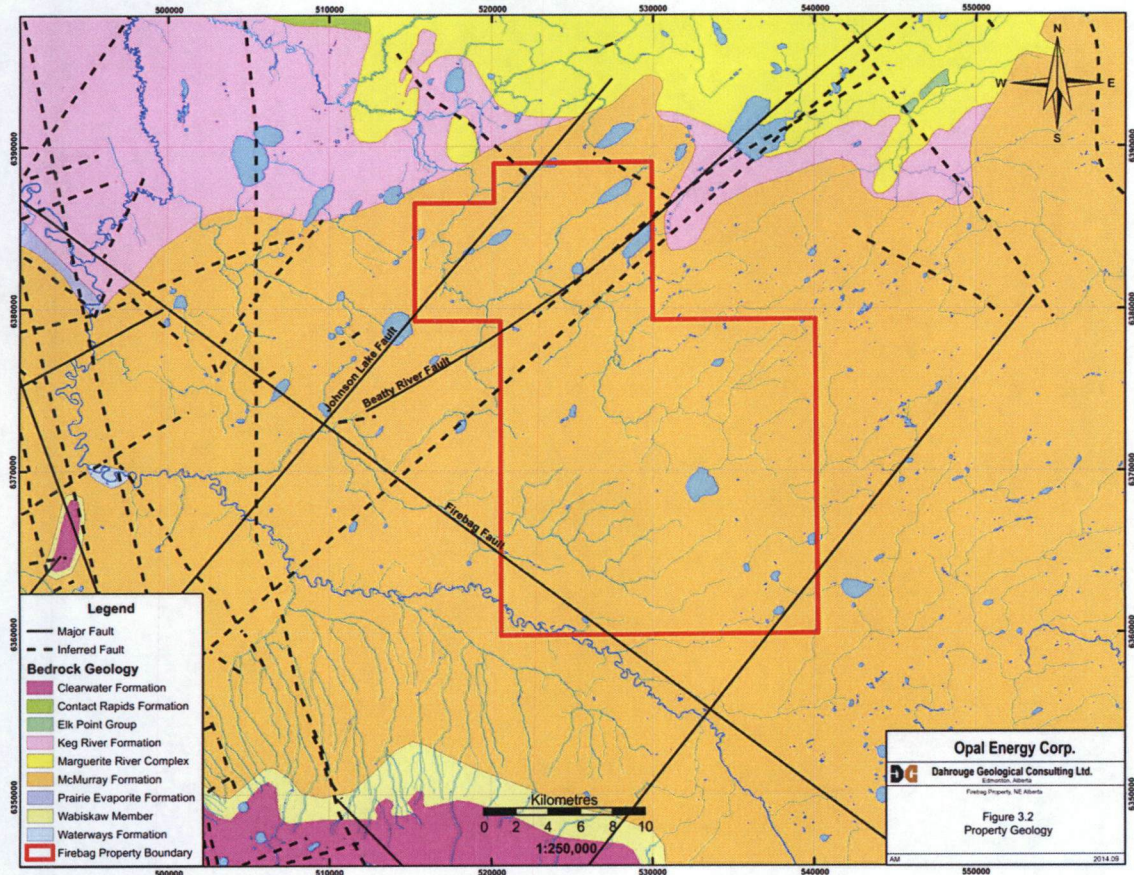


Figure 3.2 Property Geology

At surface the Firebag Property is dominated by a thick veneer of fluvioglacial Quaternary sediments. The surficial geology of Alberta was mapped by the Alberta Geological Survey during their Surficial Mapping Project. The Firebag Property was described as containing extensive outwash sand and gravel (often overridden by glaciation), stream alluvium, and ice-contact deposits. The 2013 and 2014 exploration programs primarily targeted the ice-contact sands as shown in Figure 3.3. Locally, these deposits have been described as multi-layered, with a thin upper quartz-rich sand layer (10 to 40 cm thick), a middle cobble and boulder layer (20 to 90 cm thick), and a thick lower quartz-rich sand layer open at depth (greater than 5 m thick).

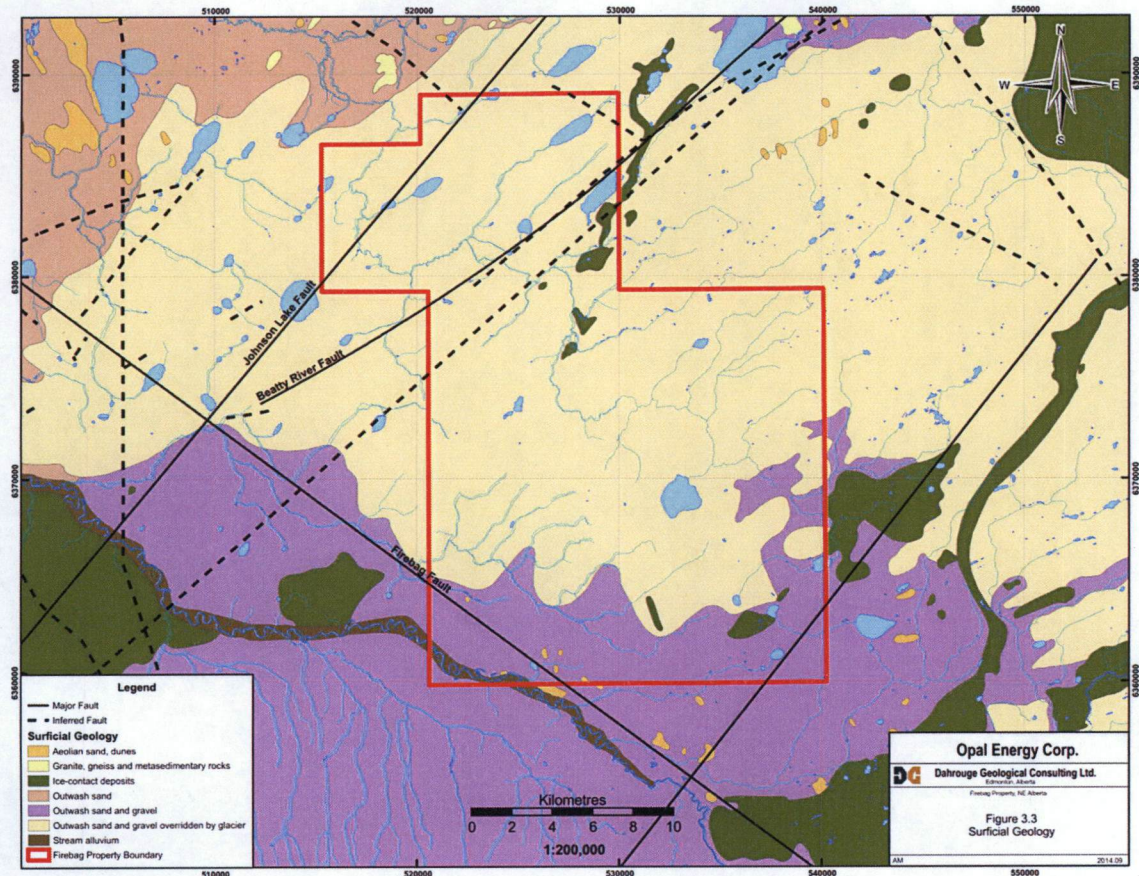


Figure 3.3 Surficial Geology

4 WORK PERFORMED

4.1 2013 TEST PIT PROGRAM

Dahrouge Geological Consulting Ltd., on behalf of Declan Resources Inc., executed a one day field program on November 11th, 2013. A prominent ridge in the northeastern corner of the Property was the primary target for the program. The target was originally identified from an Alberta Geological Survey map outlining sand and gravel deposits in the area.

A total of 10 test pits, totalling approximately 10 m in depth, were excavated across the Firebag Property. A total of 12 samples were collected from 8 pits. Test pits were dug using hand shovels and pick axes. The uppermost 0.1 to 0.5 m was frozen, making excavation in some areas difficult. Test pits were excavated to depths between 0.3 and 1.75 m and varied in diameter between 0.2 and 1.0 m. A summary of the location, total depth, and sampled depths for the 2013 test pits are

displayed in Table 4.1; locations are displayed in Figure 4.1. A full description of each individual sample is attached in Appendix 1.

Table 4.1: Test Pit Summary - 2013

Pit	Easting	Northing	Total Depth (m)	Sample Depths (m)
TP13-01	528585	6380602	0.3	0.3
TP13-02	528614	6380707	1.75	1.75
TP13-03	528584	6380700	1.22	1.22
TP13-04	528567	6380741	1	1
TP13-05	528634	6380829	-	-
TP13-06	528814	6381187	1.1	0.6, 1.1
TP13-07	528818	6381320	-	-
TP13-08	526982	6378562	1	1
TP13-09	529392	6383168	1	0.4, 1.0
TP13-10	529467	6383229	1	1

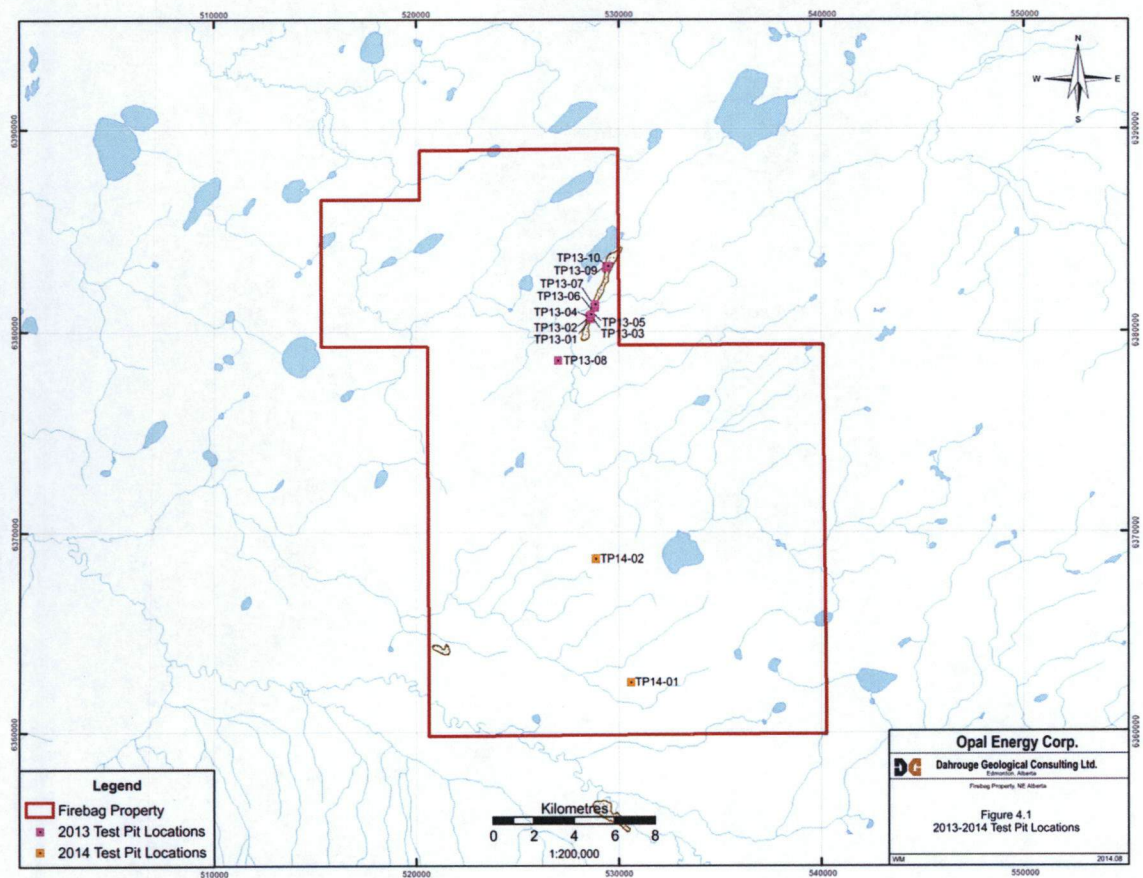


Figure 4.1 2013-2014 Test Pit Locations

In general, the ridge targeted by the 2013 test pits commonly had three distinct layers. The upper layer consisted of fine-grained, whitish grey quartz-rich sand, with minimal impurities and was typically less than 0.2 m thick. Two samples were collected from this layer. The middle layer averaged between 0.1 and 0.5 m thick, consisting of rusty orange, silty sand with varying amounts of cobbles and pebbles. The lower layer consisted of an unconsolidated, whitish brown to beige, fine-grained to coarse-grained, sub-rounded to rounded, quartz-rich sand. The lower sand layer was homogenous and nearly every test pit ended in this layer, leaving the true thickness untested. Sampling primarily targeted the sands of the lower layer; the remaining ten samples were collected from this horizon.

Samples were predominantly collected from the base of the test pits using a shovel to place sand into a pre-labelled plastic sample bag. The colour, grain size, sorting, silica content, grain sphericity, roundness, and amount of organics were noted by the field crew, where applicable. At least 5 kg of sand was collected for each sample to allow for the full proppant analysis suite to be conducted.

Samples were driven via truck from Fort McMurray to Dahrouge Geological Consulting Ltd.'s office in Edmonton. Samples were then evaluated under a microscope for sphericity and roundness. Photographs were also taken using the microscope, allowing the individual grains to be viewed while under magnification. The four samples that appeared to have the highest silica content and the most rounded and spherical grains were selected and sent to Loring Laboratories Ltd. in Calgary for analysis.

4.2 2014 ERCB SITE VISIT

In January 2014, one geologist from Dahrouge Geological Consulting Ltd. visited the ERCB Core Laboratory in Calgary to examine core and cuttings from historic drill holes in the Firebag River area. A total of 18 holes were examined, nine of which were core and the remainder were reverse circulation cuttings. It was noted that sand does exist at depth, but is mostly oil saturated and of undetermined quality. The extent of the McMurray Formation could not be determined, as limited data per hole was available. Figure 4.2 displays the locations of the drill holes that were re-logged at the ERCB. A copy of the logs are attached in Appendix 4.

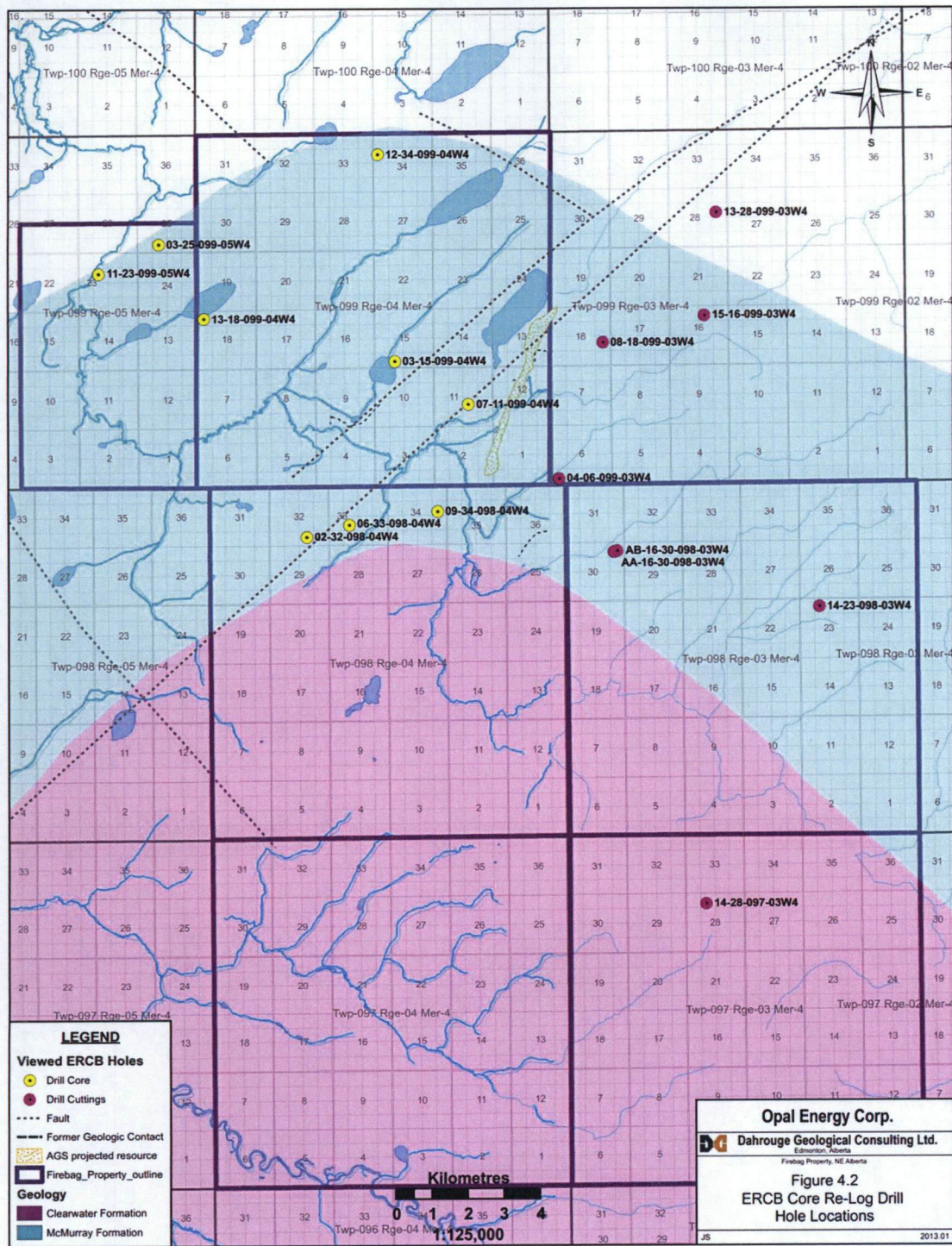


Figure 4.2 ERCB Core Re-Log Drill Hole Locations

4.3 2014 HAND AUGER PROGRAM

In August of 2014, Dahrouge Geological Consulting Ltd., on behalf of Declan Resources Inc., conducted a hand auger program on the Firebag Property with the intent of evaluating the potential for proppant silica sands at depth. The program focused on sampling the ridge in the northeastern section of the Property at depth, in addition to numerous newly defined targets across throughout the Property. The targets were predominantly outlined using high quality satellite photos focusing on topographic highs with visible light/beige coloring. These locations were generally found to be associated with surficial sands.

The 2014 hand auger program consisted of 13 holes, totalling approximately 43.82 m. A total of 13 silica sand samples were collected. Auger holes were terminated due to time constraints, the depth limits of the hand auger, or intersecting a boulder at depth. A summary of the location, total depth, and sampled depths for the 2014 hand auger holes are provided in Table 4.2; locations are displayed in Figure 4.2. A detailed description of each individual sand sample is provided in Appendix 5.

Table 4.2: Hand Auger Hole Summary - 2014

Pit	Easting	Northing	Azimuth (°)	Dip (°)	Total Depth (m)	Sample Depths (m)
FB14-01	528586	6380590	360	-90	5.3	1.5
FB14-02	528619	6380627	360	-90	3.95	2.55
FB14-03	529489	6383011	360	-90	3.25	3.25
FB14-04	526982	6378562	360	-90	1.07	n/a
FB14-05	527174	6378212	360	-90	5.1	2
FB14-06	531512	6368649	360	-90	3.75	0.3, 2.50
FB14-07	530631	6368369	360	-90	1.8	1.3
FB14-08	528801	6380410	360	-90	0.8	0.8
FB14-09	528495	6380392	360	-90	2.8	2
FB14-10	528419	6380127	360	-90	5.5	3
FB14-11	528552	6369010	360	-90	2.1	0.1
FB14-12	528661	6368695	360	-90	4.9	2.3
FB14-13	522978	6367093	360	-90	3.5	2.8

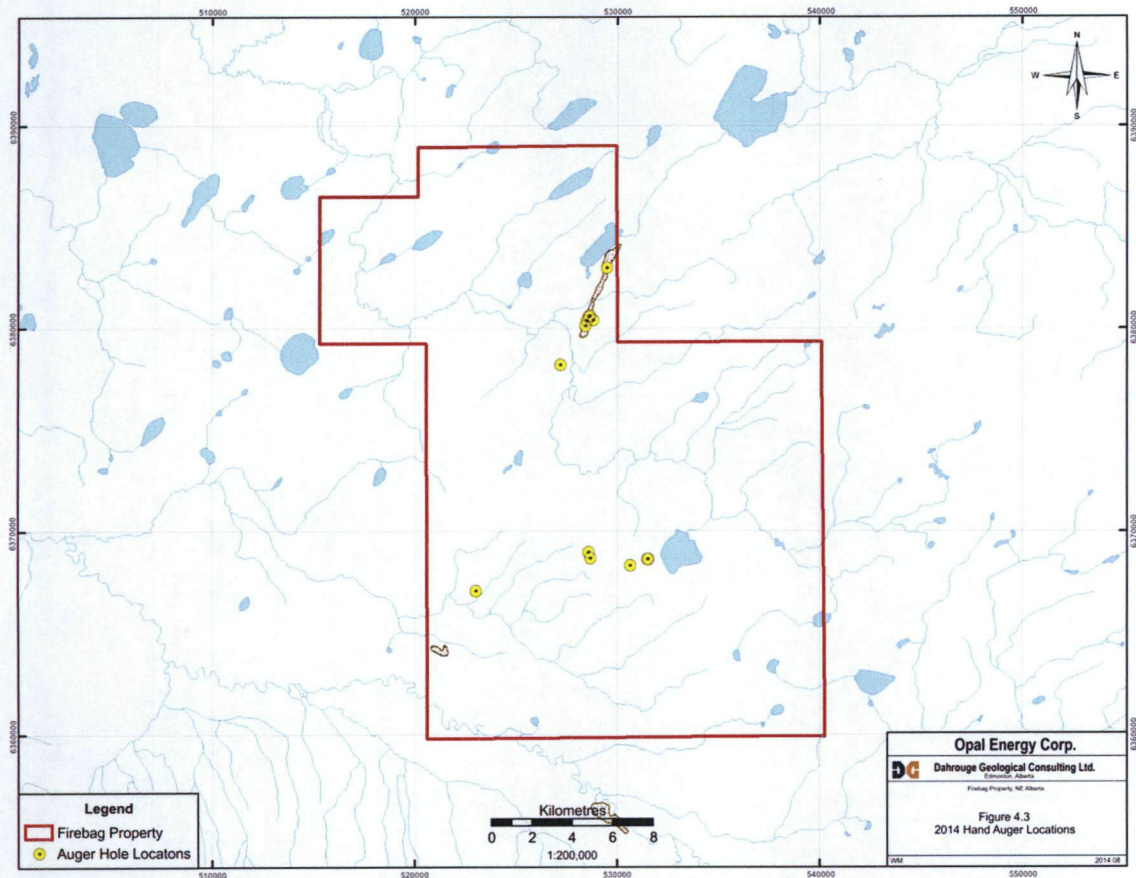


Figure 4.3 2014 Hand Auger Hole Locations

In addition to the 13 auger holes completed in 2014, two test pits were also excavated, each approximately 1 m deep. A sample was collected from base of each pit. The sampling process for the two test pits was identical to that described in Section 4.1. A summary of the location, total depth, and sampled depths for the 2014 test pits is provided in Table 4.3. The locations of the 2013 and 2014 test pits are shown in Figure 4.1.

Table 4.3: Test Pit Summary - 2014

Pit	Easting	Northing	Total Depth (m)	Sample Depths (m)
TP14-01	530582	6362513	1	1
TP14-02	528865	6368681	1	1

The 2014 hand auger holes were completed using both a shovel as well as a hand auger. A small pit was first excavated to a depth below the middle layer, as described in Section 4.1. Final pits were approximately 0.2 to 0.7 m in diameter and between 0.2 to 0.9 m in depth. A hand auger was used once the pit was excavated to a depth below the cobble/boulder unit and into the lowermost

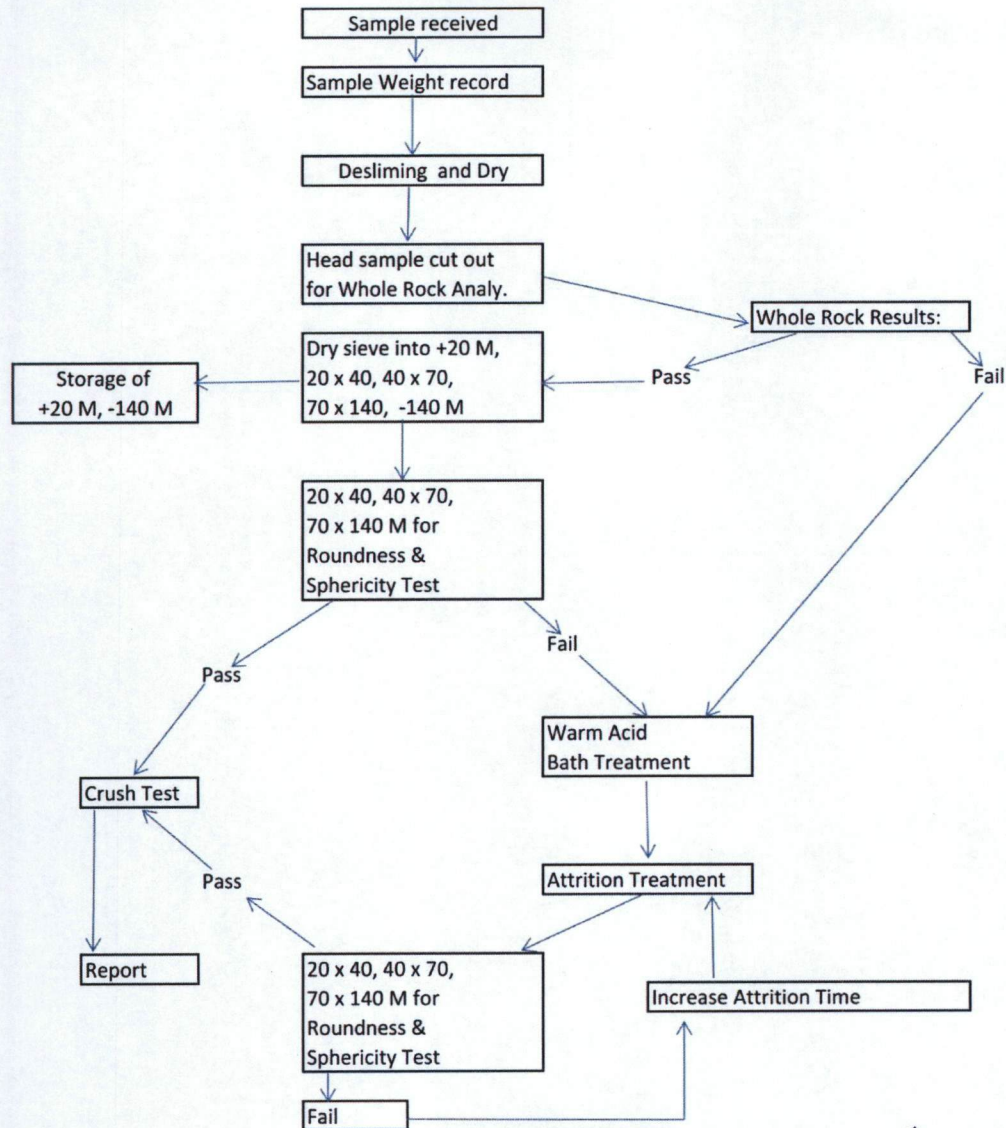
clean sand unit. The hand auger was advanced through the sand until the bit became filled with material. It was then removed from the auger hole and struck with a shovel until cleared. This process was repeated until enough material was removed or the hole was completed.

Samples were collected at varying depths within the auger holes across the Property. When sample collection was initiated, the depth of the auger hole was measured. The material from each advancement of the auger was placed into a rice bag until approximately 5 kg of material were recovered. The resulting sample intervals were between 0.5 m and 1.0 m. The colour, grain size, sorting, silica content, grain sphericity and roundness, and amount of organics were noted by the field crew where applicable. The sample was then placed into a pre-labelled plastic sample bag and sealed with a zip tie.

Samples were shipped from Fort McMurray to Dahrouge Geological Consulting Ltd.'s office in Edmonton. There, the samples were examined and photographed under a microscope. Ten samples displaying what appeared to be the highest silica content and the most rounded and spherical grains were selected and sent to Loring Laboratories in Calgary for analysis.

5 RESULTS

All analyses from the 2013 and 2014 programs were performed by Loring Laboratories Ltd. in Calgary. Loring is an independent laboratory with ISO 9001:2008 certification. Four samples from the 2013 test pit program and 10 samples from the 2014 hand auger program were submitted for testing according to API RP 56 parameters for fracking sand. The testing process used by Loring is summarized in Figure 5.1.



Flow Chart for Frac Sand Treatment and Testing



Loring Laboratories (Alberta) Ltd.

Figure 5.1 Loring Laboratories Ltd. - Fracking Sand Analysis Flow Chart

5.1 2013 RESULTS

The four 2013 test pit samples returned high-silica content, grain sphericity and roundness, as well as the majority of the grains falling within the desired mesh sizes. Results from the analysis are

summarized in Table 5.1 to 5.3. Original copies of the results from Loring Laboratories are attached in Appendix 2 and 3.

Table 5.1: Sieve Analysis - 2013 Test Pit Samples

Product (wt %)	Sample ID			
	82227	82232	82234	82236
+20	1.7	1.8	7.5	0.5
20/40	29.3	3.3	10.2	9.7
40/70	61.8	39.7	31.9	69.3
70/140	7.1	53.2	36.7	19.4
-140	0.2	2.0	13.6	1.1
Total Usable (wt %)	98.2	96.2	78.8	98.4

Table 5.2: Sphericity and Roundness Test - 2013 Test Pit Samples

Sample ID	Sieve Size	Sphericity	Roundness
82227	20/40	0.8	0.6
	40/70	0.8	0.6
	70/140	0.7	0.6
82232	20/40	0.9	0.6
	40/70	0.8	0.5
	70/140	0.8	0.5
82234	20/40	0.8	0.6
	40/70	0.8	0.6
	70/140	0.8	0.6
82236	20/40	0.8	0.5
	40/70	0.8	0.5
	70/140	0.9	0.5

Table 5.3: Whole Rock ICP Analysis (Major Constituents) - 2013 Test Pit Samples

Sample ID	Sieve Size	SiO ₂ %	Al ₂ O ₃ %	CaO %	Fe ₂ O ₃ %	K ₂ O %	Na ₂ O %	MgO %	TiO ₂ %
82227	+20	88.68	5.61	0.37	1.03	0.96	0.66	0.31	0.06
	20/40	96.96	1.30	0.12	0.35	0.18	0.15	0.07	0.02
	40/70	97.46	0.61	0.07	0.40	0.06	0.06	0.03	0.01
	70/140	97.12	0.80	0.11	0.51	0.06	0.08	0.06	0.03
	-140	90.96	3.47	0.57	1.46	0.33	0.36	0.44	0.19
82232	+20	88.92	5.48	0.40	0.97	0.84	0.59	0.32	0.06
	20/40	95.84	1.62	0.15	0.51	0.20	0.17	0.08	0.02
	40/70	96.76	0.84	0.08	0.32	0.10	0.08	0.04	0.01
	70/140	97.58	0.75	0.08	0.27	0.07	0.08	0.04	0.01
	-140	95.60	1.79	0.28	0.76	0.16	0.18	0.18	0.10
82234	+20	87.36	6.17	0.48	1.26	0.99	0.79	0.24	0.07
	20/40	96.02	1.46	0.12	0.40	0.19	0.17	0.04	0.02
	40/70	97.14	0.85	0.07	0.40	0.09	0.08	0.02	0.02
	70/140	96.06	1.22	0.13	0.38	0.15	0.14	0.04	0.04
	-140	94.72	2.02	0.23	0.44	0.24	0.22	0.10	0.12
82236	+20	66.00	11.24	3.49	11.77	0.35	1.99	2.54	0.82
	20/40	97.52	0.63	0.07	0.26	0.05	0.06	0.04	0.01
	40/70	98.36	0.47	0.06	0.35	0.03	0.04	0.02	0.01
	70/140	97.58	0.78	0.09	0.56	0.04	0.06	0.06	0.04
	-140	94.02	1.92	0.30	1.36	0.11	0.16	0.20	0.21

5.2 2014 RESULTS

Analysis results from the 2014 hand auger program were generally positive. For all samples, greater than 90% by weight fell within the 20/40, 40/70, and 70/140 mesh sizes, which are the commonly used grain sizes for fracking. Overall the samples showed excellent sphericity, ranging from 0.7 to 0.9. Roundness was less consistently high, ranging from 0.5 to 0.7. Opal will need to continue with attrition testing to see if grain roundness can be improved to consistently exceed the API RP 56 requirements of 0.6. Opal performed crush resistance, acid dissolution and turbidity tests on sample 99905, which returned the highest sphericity and roundness from the initial testing phase. Results from the analysis are summarized in Table 5.4 to 5.7. Original copies of the results from Loring Laboratories are attached in Appendix 6, 7 and 8.

Table 5.4: Sieve Analysis - 2014 Hand Auger Samples

Product (wt %)	Sample ID									
	99901	99904	99905	99906	99907	99908	99914	99915	99916	99918
+20	2.1	2.0	0.3	0.3	0.1	0.1	0.7	0.1	0.0	1.1
20/40	34.4	46.0	11.7	6.8	9.1	4.2	9.5	1.7	0.6	23.9
40/70	55.7	45.5	45.7	65.5	77.8	60.6	64.4	30.9	47.0	66.7
70/140	7.6	6.1	39.0	24.2	12.4	33.7	23.8	57.9	47.1	8.0
-140	2.0	0.5	3.3	3.1	0.7	1.4	1.5	9.4	5.3	0.4
Total Usable (wt %)	97.7	97.6	96.4	96.5	99.3	98.5	97.7	90.5	94.7	98.6

Table 5.5: Sphericity and Roundness Test – 2014 Hand Auger Samples

Sample ID	Sieve Size	Sphericity	Roundness
99901	20/40	0.8	0.6
	40/70	0.8	0.6
	70/140	0.7	0.6
99904	20/40	0.8	0.7
	40/70	0.8	0.5
	70/140	0.8	0.5
99905	20/40	0.8	0.7
	40/70	0.8	0.8
	70/140	0.7	0.7
99906	20/40	0.9	0.7
	40/70	0.9	0.6
	70/140	0.8	0.5
99907	20/40	0.9	0.6
	40/70	0.8	0.7
	70/140	0.8	0.5
99908	20/40	0.8	0.6
	40/70	0.8	0.6
	70/140	0.7	0.5
99914	20/40	0.9	0.6
	40/70	0.8	0.6
	70/140	0.8	0.6
99915	20/40	0.8	0.7
	40/70	0.8	0.7
	70/140	0.9	0.5
99916	20/40	0.8	0.6
	40/70	0.8	0.5
	70/140	0.8	0.6
99918	20/40	0.8	0.6
	40/70	0.7	0.7
	70/140	0.8	0.6

Table 5.6: Whole Rock ICP Analysis (Major Constituents) – 2014 Hand Auger Samples

Sample ID	SiO ₂ %	Al ₂ O ₃ %	CaO %	Fe ₂ O ₃ %	K ₂ O %	Na ₂ O %	MgO %	TiO ₂ %
99901	96.53	0.83	0.10	0.40	0.11	0.10	0.06	0.02
99904	97.04	0.65	0.08	0.34	0.07	0.08	0.05	0.02
99905	96.14	0.98	0.11	0.37	0.13	0.13	0.05	0.02
99906	93.24	0.33	0.05	0.22	0.04	0.03	0.02	0.02
99907	95.22	0.68	0.07	0.34	0.07	0.08	0.04	0.02
99908	92.58	0.88	0.09	0.34	0.09	0.10	0.04	0.02
99914	93.22	0.89	0.11	0.36	0.11	0.11	0.05	0.02
99915	96.96	0.46	0.05	0.29	0.06	0.05	0.02	0.02
99916	96.77	0.87	0.10	0.32	0.09	0.11	0.04	0.03
99918	96.60	1.07	0.11	0.36	0.15	0.14	0.05	0.02

Table 5.7: Crush Resistance, Acid Solubility and Turbidity Test Results – Sample 99905

Sample ID	Sieve Size	Crush Resistance Test		Acid Solubility Test		Turbidity Test	
		Crush Resistance % % Fines by Weight	Pressure (psi)	Acid Soluble % by Weight	Max Solubility % by Weight	Turbidity FTU	Max Turbidity FTU
99905	20/40	10.3	4000	1.7	2.0	180	250
	40/70	7.3	5000	3.0	3.0	310	250
	70/140	3.3	5000	3.4	3.0	220	250

6 CONCLUSIONS

Exploration between November 2013 and September 2014 identified several areas prospective for silica sand proppants on the Firebag Property. Hand augering and pitting programs tested the deposits to depths of up to 5.5 m. Samples from the basal sand unit returned excellent sphericity, good roundness, and primarily fell within those size fractions used for fracking sands.

The Firebag Property possesses several qualities making it prospective for the discovery of silica sand proppants (fracking sands):

1. The presence of Quaternary sands and gravels as well as the McMurray Formational sands.
2. The physical properties of the identified sands. Analysis of the 2013 and 2014 sand samples returned excellent sphericity and grain size. Grain roundness was generally

slightly below API RP 56 requirements, but could likely be improved by attrition or by classification.

3. The currently-tested sands are open at depth (> 5.5 m).
4. SilverWillow Energy's planned development of their Audet SAGD project, which would see extensive infrastructure improvements throughout the Firebag Property.

Future work is necessary to better define the extents prospective silica sand deposits, as well as evaluate the uranium potential of the Property.



William Miller, B.Sc., P.Geo.

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8 STATEMENT OF QUALIFICATIONS

I, William Miller, residing at [REDACTED] do hereby certify that:

- I am a geologist of Dahrouge Geological Consulting Ltd., Suite 18, 10509 – 81 Ave., Edmonton, Alberta, T6E 1X7.
- I am a 2009 graduate of the University of Alberta, Edmonton, Alberta, with a B.Sc. in Geology.
- I have practiced my profession as a geologist continuously since 2009.
- I am a registered Professional Geologist with the Association of Professional Engineers and Geoscientists of Alberta, member M119457.
- I hereby consent to the copying or reproduction of this Assessment Report following the one-year confidentiality period.
- I am the author of the report entitled "2013 and 2014 Exploration of the Firebag Property, Northeast Alberta" and accept responsibility for the veracity of technical data and results.

Dated this 25th day of August, 2015.



William Miller, B.Sc., P.Geo.

APEGA M119457

APPENDIX 1: 2013 TEST PIT PROGRAM SAMPLE DESCRIPTIONS

Sample No	Year Collected	Date	Test Pit	Waypoint	Easting	Northing	General Location	Sample Type	Depth (m)	Consolidated/ Unconsolidated	Sample Description	Comments	Samplers	Sent for Analysis
82226	2013	11-Nov-13	TP13-01	82226	528585	6380602	Firebag	Grab	0.3	semi-consolidated	Few rounded boulders up to 20cm wide, very mature, rnd-sub rnd, variable grain size (f.g.-m.g.), beige-w color, high qtz content	On south portion of previously mapped sand & gravel resource, on heli pad. Thin iron layer below w sand	AD, NS	No
82227	2013	11-Nov-13	TP13-02	82227	528614	6380707	Firebag	Grab	1.75	unconsolidated	soft, white, c.g., rnd, well sorted, consistent, mature sand. Trace Fe-grains.	~30cm of ovbd with the first 10cm white sand, and then a fe-rich silty sand, and beneath that (where sample was taken), very mature sand below 40cm. Aka. The "butter"	AD, NS	Yes
82228	2013	11-Nov-13	TP13-03	82228	528584	6380700	Firebag	Grab	1.22	unconsolidated	clean, white, m.g.-c.g., uniform sand with few impurities (Fe-grains).	Sample taken on hillside, more ovbd than previous two drill pits	AD, NS	No
82229	2013	11-Nov-13	TP13-04	82229	528567	6380741	Firebag	Grab	1	unconsolidated	wet, water saturated, beige-brown, f.g.-m.g., sub rnd-rnd, mature, uniform sand. Few fe-rich impurities.	Sample taken at the bottom of the hill in "marsh." Much less boulders in ovbd, and we hit the water table (very permeable) while digging the test pit. Top 30 cm is white-gray with few boulders.	AD, NS	No
82230	2013	11-Nov-13	TP13-05	82230	528634	6380829	Firebag	Grab	-	unconsolidated	white-br, c.g., well rnd, well sorted, mature sand. Few pbls within unit (sub rnd-rnd) but large enough to pick out.	Sample looks like pure glassy silica	AD, NS	No
82231	2013	11-Nov-13	TP13-06	82231	528814	6381187	Firebag	Grab	0.6	unconsolidated	gravelly ovbd with common sub rnd-rnd pebbles up to 10cm. Beige brown, sub-rnd sand with high variability in grain size (f.g.-v.c.g.). Poorly sorted, high SiO2 content, few organics	Sampling this sandy ovbd layer to test the difference in quality of sand from below	AD, NS	No
82232	2013	11-Nov-13	TP13-06	82232	528814	6381187	Firebag	Grab	1.1	unconsolidated	white, f.g.-m.g., well sorted, mature, rnd, homogenous sand. Appears to be almost pure SiO2.	Same test pit as 82231, test difference in sand quality	AD, NS	Yes
82233	2013	11-Nov-13	TP13-07	82233	528818	6381320	Firebag	Grab	-	unconsolidated	white-br, c.g.-m.g., very well sorted, rnd, homogenous, mature. Rare organics and pbls within. High SiO2 content.	Consistently we hit this same sand unit at ~0.5m along ridge that trends N-NE	AD, NS	No
82234	2013	11-Nov-13	TP13-08	82234	526982	6378562	Firebag	Grab	1	unconsolidated	f.g., poorly-moderately sorted, sub-rnd, w-br sand with more impurities than previously seen. Clearwater Fm?	Most south portion of ridge, slightly higher elevation, sample is definitely different from what we've seen. Sample taken on clear area at heli pad (heli-pad #2)	AD, NS	Yes
82235	2013	11-Nov-13	TP13-09	82235	529392	6383168	Firebag	Grab	0.4	unconsolidated	white, m.g., well rounded, well sorted, mature, homogenous sand. Rare impurities and organics with mild sucrosic texture in the sun.	Most northerly part of ridge close to property boundary and large lake to the west. Sampled first white sand ovbd layer that is only about 30cm thick just to test comparison for sand below	AD, NS	No
82236	2013	11-Nov-13	TP13-09	82236	529392	6383168	Firebag	Grab	1	unconsolidated	white, m.g.-c.g., well rnd, well sorted, mature, homogenous sand.	Same test pit as 82235, deeper white sand (below ~0.2m fe-rich rubbly layer). Took two samples for comparison.	AD, NS	Yes
82237	2013	11-Nov-13	TP13-10	82237	529467	6383229	Firebag	Grab	1	unconsolidated	f.g.-c.g., poorly sorted, brown (fe-rich?) sand. Common large pbls (up to 20cm, well rnd).	Sampled "middle" horizon/ layer. Same sequence we have seen.	AD, NS	No

**APPENDIX 2: 2013 LORING LABORATORIES SIEVE, ROUNDNESS AND
SPHERICITY TEST RESULTS**

**LORING LABORATORIES (ALBERTA) LTD.**

629 Beaverdam Road N.E. Calgary, Alberta T2K 4W7

Tel : (403) 274-2777 Fax : (403) 275-0541

ISO 9001:2008 Certified

TO: DECLAN RESOURCES
 301, 1620 West 8th Avenue
 Vancouver, BC
 V6J 1V4

Attn: Tyson King

Sample Type: Sand

FILE # : 56980

DATE : December 10, 2013

REPORT BY : David Ko



SAMPLE ID	As Rec'd Weight	WET SIEVE ANALYSIS					
	Kilogram		+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M
<u>82227</u>	7.486	WEIGHT GRAMS	121	2136	4500	516	11
		% by Weight	1.7	29.3	61.8	7.1	0.2
	<u>After Desliming</u> <u>Kilogram</u> <u>7.28</u>						

SAMPLE ID	Sphericity	Roundness
<u>82227</u>		
20 x 40 Mesh	0.8	0.6
40 x 70 Mesh	0.8	0.6
70 x 140 Mesh	0.7	0.6

Note: Sand sample was deslimmed, wet sieved, dried and weighed.
Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed.
High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater.

Samples received on: November 21, 2013


 ASSAYER

**LORING LABORATORIES (ALBERTA) LTD.**

629 Beaverdam Road N.E. Calgary, Alberta T2K 4W7

Tel : (403) 274-2777 Fax : (403) 275-0541

ISO 9001:2008 Certified

TO: DECLAN RESOURCES
 301, 1620 West 8th Avenue
 Vancouver, BC
 V6J 1V4

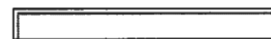
Attn: Tyson King

FILE # : 5 6 9 8 0

DATE : December 10, 2013

REPORT BY : David Ko

Sample Type: Sand



SAMPLE ID	As Rec'd Weight	WET SIEVE ANALYSIS					
	Kilogram		+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M
<u>82232</u>	6.6	WEIGHT GRAMS	112.7	210.6	2528	3385.4	125.5
		% by Weight	1.8	3.3	39.7	53.2	2.0
	<u>After Desliming</u>						
	<u>Kilogram</u>						
	<u>6.36</u>						

SAMPLE ID	Sphericity	Roundness
<u>82232</u>		
20 x 40 Mesh	0.9	0.6
40 x 70 Mesh	0.8	0.5
70 x 140 Mesh	0.8	0.5

Note: Sand sample was deslimmed, wet sieved, dried and weighed.
Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed.
High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater.

Samples received on: November 21, 2013



ASSAYER

**LORING LABORATORIES (ALBERTA) LTD.**

629 Beaverdam Road N.E. Calgary, Alberta T2K 4W7

Tel : (403) 274-2777 Fax : (403) 275-0541

ISO 9001:2008 Certified

TO: DECLAN RESOURCES
301, 1620 West 8th Avenue
Vancouver, BC
V6J 1V4

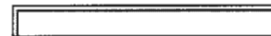
Attn: Tyson King

Sample Type: Sand

FILE # : 56980

DATE : December 10, 2013

REPORT BY : David Ko



SAMPLE ID	As Rec'd Weight	WET SIEVE ANALYSIS					
	Kilogram		+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M
<u>82234</u>	8.39	WEIGHT GRAMS	494.7	672.7	2100.9	2417.5	895.5
		% by Weight	7.5	10.2	31.9	36.7	13.6
	<u>After Desliming</u> <u>Kilogram</u> <u>6.59</u>						

SAMPLE ID	Sphericity	Roundness
<u>82234</u>		
20 x 40 Mesh	0.8	0.6
40 x 70 Mesh	0.8	0.6
70 x 140 Mesh	0.8	0.6

Note: Sand sample was deslimmed, wet sieved, dried and weighed.
Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed.
High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater.

Samples received on: November 21, 2013



ASSAYER

**LORING LABORATORIES (ALBERTA) LTD.**

629 Beaverdam Road N.E. Calgary, Alberta T2K 4W7

Tel : (403) 274-2777 Fax : (403) 275-0541

ISO 9001:2008 Certified

TO: DECLAN RESOURCES
 301, 1620 West 8th Avenue
 Vancouver, BC
 V6J 1V4

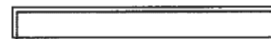
Attn: Tyson King

FILE # : 56980

DATE : December 10, 2013

REPORT BY : David Ko

Sample Type: Sand



SAMPLE ID	As Rec'd Weight	WET SIEVE ANALYSIS					
	Kilogram		+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M
<u>82236</u>	7.92	WEIGHT GRAMS	34.6	745.4	5302.5	1482.9	84.68
		% by Weight	0.5	9.7	69.3	19.4	1.1
	<u>After Desliming</u> <u>Kilogram</u> <u>7.65</u>						

SAMPLE ID	Sphericity	Roundness
<u>82236</u>		
20 x 40 Mesh	0.8	0.5
40 x 70 Mesh	0.8	0.5
70 x 140 Mesh	0.9	0.5

Note: Sand sample was deslimmed, wet sieved, dried and weighed.
Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed.
High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater.

Samples received on: November 21, 2013


 ASSAYER

**APPENDIX 3: 2013 LORING LABORATORIES WHOLE ROCK GEOCHEMISTRY
ANALYTICAL RESULTS**



Loring Laboratories(Alberta) Ltd.

629 Beaverdam Road N.E.,

Calgary Alberta T2K 4W7

Tel:403- 274-2777 Fax:403- 275-0541

ISO9001:2008 Certified

TO: Declan Resources
301, 1620 West 8th Avenue
Vancouver, B.C.
V6J 1V4
ATTN: Tyson King

FILE: 5 6 9 8 0

DATE: December 09, 2013

Sample: Rocks

WHOLEROCK ICP ANALYSIS

Sample I.D.	Al ₂ O ₃ %	Ba ppm	CaO %	Cr ppm	Fe ₂ O ₃ %	K ₂ O %	MgO %	MnO %	Na ₂ O %	Ni ppm	P ₂ O ₅ %	SO ₃ %	SiO ₂ %	Sr ppm	TiO ₂ %	V ppm	LOI@1000 %	SUM %
82227 +20	5.61	340	0.37	309	1.03	0.96	0.31	0.01	0.66	6	0.04	0.02	88.68	100	0.06	10	0.66	98.40
82227 20-40	1.30	98	0.12	150	0.35	0.18	0.07	<0.01	0.15	3	0.01	0.02	96.96	39	0.02	2	0.14	99.31
82227 40-70	0.61	56	0.07	271	0.40	0.06	0.03	<0.01	0.06	4	0.01	0.01	97.46	29	0.01	3	0.09	98.83
82227 70-140	0.80	56	0.11	240	0.51	0.06	0.06	<0.01	0.08	4	0.01	0.01	97.12	33	0.03	3	0.15	98.94
82227 -140	3.47	190	0.57	27	1.46	0.33	0.44	0.02	0.36	8	0.07	0.04	90.96	64	0.19	18	0.75	98.65
82232 +20	5.48	344	0.40	300	0.97	0.84	0.32	0.01	0.59	6	0.05	0.01	88.92	116	0.06	10	0.61	98.26
82232 20-40	1.62	109	0.15	213	0.51	0.20	0.08	<0.01	0.17	2	0.01	0.01	95.84	40	0.02	3	0.17	98.79
82232 40-70	0.84	67	0.08	208	0.32	0.10	0.04	<0.01	0.08	3	0.01	0.01	96.76	34	0.01	2	0.10	98.35
82232 70-140	0.75	57	0.08	147	0.27	0.07	0.04	<0.01	0.08	2	0.01	0.02	97.58	33	0.01	2	0.12	99.03
82232 -140	1.79	102	0.28	7	0.76	0.16	0.18	0.01	0.18	1	0.03	0.01	95.60	40	0.10	8	0.32	99.43
82234 +20	6.17	386	0.48	138	1.26	0.99	0.24	0.02	0.79	2	0.05	0.02	87.36	125	0.07	14	0.81	98.26
82234 20-40	1.46	115	0.12	225	0.40	0.19	0.04	<0.01	0.17	3	0.01	0.01	96.02	38	0.02	3	0.13	98.56
82234 40-70	0.85	71	0.07	279	0.40	0.09	0.02	<0.01	0.08	3	0.01	0.01	97.14	34	0.02	2	0.08	98.77
82234 70-140	1.22	99	0.13	169	0.38	0.15	0.04	<0.01	0.14	2	0.01	0.01	96.06	37	0.04	3	0.07	98.24
82234 -140	2.02	170	0.23	5	0.44	0.24	0.10	<0.01	0.22	<1	0.01	0.01	94.72	45	0.12	7	0.25	98.37
82236 +20	11.24	102	3.49	354	11.77	0.35	2.54	0.09	1.99	<1	0.26	0.02	66.00	133	0.82	40	1.01	99.57
82236 20-40	0.63	84	0.07	135	0.26	0.05	0.04	<0.01	0.06	2	0.01	0.01	97.52	27	0.01	2	0.16	98.82
82236 40-70	0.47	41	0.06	245	0.35	0.03	0.02	<0.01	0.04	3	0.01	0.01	98.36	26	0.01	2	0.12	99.48
82236 70-140	0.78	44	0.09	227	0.56	0.04	0.06	<0.01	0.06	3	0.01	0.01	97.58	29	0.04	5	0.20	99.42
82236 -140	1.92	80	0.30	11	1.36	0.11	0.20	0.02	0.16	1	0.03	0.04	94.02	37	0.21	17	0.52	98.89

Sample received on November 21, 2013

0.5 gm sample digested with multi acids and finished by ICP

Certified by: 

APPENDIX 4: 2014 ERCB CORE LABORATORY SITE VISIT CORE LOGS

DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: FIREBAY RIVER

Dip Tests

Claim:

UTM Co-ordinates (NAD83)

Date Started:

Hole No: 02-32-013

Core Size: 4W4

Depth Angle

Bearing:

Easting (m):

Date Finished:

Casing: core

Inclination:

Northing (m):

Date Logged: Jan 23 / 14

Total Depth: 101.37

Province: AB

Elevation (m):

Logged By:

From To
m m

CPE

Near Fault
Broad cpe 65

Description

73.50 84.50

BITUMEN SATURATED SANDSTONE

- weakly laminated f.g - v.c.g sand - laminations distinguished through grain-size. Itbds of bit sat mtx - sup. conglom - this are angular and avg. ~3mm. Few muddy lenses & rip-up clasts that are fractured - sometimes displays greenish hue.
- Sandstone is silty & very potent odor.

84.50 101.37

MUDSTONE

- very finely laminated mudstone with 2mm thick dk grey clay "stringers". Displays weak ripple marks. Very finely fractured with bitumen infilling fracs. - so thin many vugs also have infilled bitumen (1-2mm) - fizz when HCl test.

→ 84.50 - 88.75m

→ Then to 90.21m, back to bitumen saturated sandst.

90.21m - 101.37

- Gradually transitions downhole from a mudstone > packstone > boundstone. no real contact boundaries @ around 96.00m start to see re-crystallized organisms. Very intense from 96.21 - 101.00m - local areas of boundstone dominate that interval - see evidence of old recrystallized brachiopods & bivalves & others.
- intensely fractured & extremely vuggy - bitumen saturated displaying very unique textures - vugs fizz rapidly - core does not (dominantly do this)
- sections where bitumen is "leaking" out of core.

DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: Firebag River

Dip Tests

Depth Angle

Claim:

Bearing:

Inclination:

Province: AB

UTM Co-ordinates (NAD83)

Easting (m):

Northing (m):

Elevation (m):

Date Started:

Date Finished:

Date Logged: Jan. 22/14.

Logged By:

Hole No: 3-15-079-4

Core Size: CORE

Casing:

Total Depth: 80.70m

(only logged to 50.55m)

From To Tks
m m m

Description

670 2190

GLACIAL TILL

Most of the core is gone but few sub-rounded sandstone dropstones are present as evidence.

2190 5055

INTERBEDDED MUDSTONE + SANDSTONE

Gray-brown mudstone with common ripples, laminations + disruptions in the core. Slight bowditching locally.

Sandstone is entirely bitumen saturated with few mud rip-up clasts. Sand is laminated, and is mostly c.g., but slight variations do occur.

→ Ripple marks + common bioturbation throughout mudstone.

From 41.70m, laminated, completely saturated sandstone. Fine layers (5cm max) of matrix supported conglomerate.

DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: FIREBAG RIVER

Dip Tests

Depth Angle

Claim:

Bearing:

Inclination:

Province:

UTM Co-ordinates (NAD83)

Easting (m):

Northing (m):

Elevation (m):

Date Started:

Date Finished:

Date Logged:

Logged By:

Hole No: 03-25-099-

Core Size: 05 W4

Casing:

Total Depth: 89.37m

(only looked until 50.45m)

From m	To m	Pls m	Description
9.13	18.23	65	GLACIAL TILL / OVERBURDEN <ul style="list-style-type: none"> clay → v. c. g. sand. Poorly sorted, weakly consolidated with common angular (13-4mm avg.) looks like sand is possibly being cemented together by clayey mud
18.23	34.17		ITBD MUDSTONE (60%) + SANDSTONE (30%) + SILT (10%) <ul style="list-style-type: none"> Mostly dk gy-br. mudstone with common br-bk silt laminae gradational "patches" throughout. mudstone is very delicate + heavily cracked, difficult to see structure. However, silt displays x-laminae, ripples, w/ bioturbation a strong floor bedding locally. 24.75 - 25.50 - gyish-br silty bed w/ common silt. swirl pockets → Gradationally mudstone becomes less dominant litho, & silt (bitumen sat.) becomes more common.
34.17	50.45		BITUMEN SATURATED SANDSTONE <ul style="list-style-type: none"> → f.g. sandstone with rare mudstone laminations & common v.f.g. & clay laminae (bk). Overall, moderately sorted & consolidated Bitumen saturation varies, but in general increases down hole. Slight variations in grain size correlate with thickness of int. (i.e. f.g. = darker) Sedimentary characteristics: strong x-laminae & bedding Fine mud rip-up clasts (cracks) weak bioturbation (?) / closer bedding (?) locally.
			MUDSTONE = 75%

DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: FIREBAG RIVER

Dip Test

Claim:

UTM Co-ordinates (NAD83)

Date Started:

Hole No: 01-06-99-3W

Core Size: DC

Depth Angle

Bearing:

Easting (m):

Date Finished:

Casing:

Inclination:

Northing (m):

Date Logged: Jan 22/14

Total Depth: 290m

Province: AB

Elevation (m):

Logged By:

From To Tks
m m m

Description

0 200 Light br-beige, poorly sorted, sub-rnd to angular "sand"
↳ made up of sand (75%) with common (25%) angular pbls/clasts.
sand beige, clean sub-rnd - sub ang, moderately sorted, crystalline, (clear).
90% qtz, 10% fsp + clay.
clasts - very color (lgy - yellow - reddish - w) - looks like rock candy.
mix of sand, fsp, clay, etc.
↳ all roughly same size (2-4mm), all angular.

200 290 Similar to above but slightly darker grey + sand is more brown.
increased mica content + %. fines and sand increased.
* very lightly bitumen saturated attributes to slightly darker color (45% bitumen).

DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: FIREBAG

Dip Tests

Depth Angle

Claim:

UTM Co-ordinates (NAD83)

Date Started:

Hole No: 14-12-093-03W4

Core Size: cuttings

Bearing:

Easting (m):

Date Finished:

Casing:

Inclination:

Northing (m):

Date Logged: Jan 22/14

Total Depth: 157m

Province: AB.

Elevation (m):

Logged By: [redacted]

From To Tks
m m m

Description

0 60

very poorly sorted, sub-rounded to sub-angular with common 1cm angular pbls within (lots of fsp + mica within)

Alex Knox: 403-860-3019
2233 4 Ave. NW.
Sunt @ 8:15am

sand varies in color from dk brown to beige. Grades subtly from lighter beige to darker brown

403-259-6734

Don Oushamp

sand varies from medium sand to cobbles

80% coarse sand 20% coarse sand

60 80

same as above, but subtly darker brown. Less cobbles & more very coarse pieces, but still very angular

70% coarse sand 30% coarse sand

80 100

more aggregate looking, 30% coarse sand, the rest are angular pbls, some glassy looking - definitely not pure qtz. Lots of fsp & mica within - pinkish grains

30% coarse grained sand, 70% aggregate (pebble to cobble size)

100 140

Angular pbls only, no sand. Range from ~2cm to 1cm in diameter

140 157

Same as 80m-100m. Mostly very coarse grained sand to cbls, with few beige coarse sand. The sand that is present is nice white-beige clear silica with minor fsp and only approx. 20% of sample is nice sand.

DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: FIREBAG RIVER

Dip Test:

Claim:

UTM Co-ordinates (NAD83):

Date Started:

Hole No: 04-33-C98

Core Size: 4W4

Depth Angle

Bearing:

Easting (m):

Date Finished:

Casing:

Inclination:

Northing (m):

Date Logged: 12/23/14

Total Depth: 98.60m

Province: AB

Elevation (m):

Logged By:

From To Interval
m m m

Description

3CRND CPS: 60
→ deeper holes close to fault.

66.70 91.50 65 BITUMEN SATURATED SANDSTONE

- f.g. - c.g. sandy beds, blk with few angular pbls randomly throughout.
- subtle laminations, but overall itbd. f.g. sand + c.g. sand.
- core is medium to heavily saturated - strong odor comes off of core, & core is gooey/soft from it.

@ 74.15m, sand becomes dominantly c.g. to r.c.g. with lenses of mudstone. In local areas, it looks like a matrix supported conglomerate.

From 80.30m - 83.50m sharp contact between a section of f.g. bitumen sand with abnd. silty rip-up clast - rounded angular from 1cm to 7.5cm in diameter. The local silty rip-up clast under no specific structure but contains disc. mica (sp) within. Section abruptly ends & continues into heavily saturated sandst. with minor muddy/silty itbd.

• weakly laminated overall, but few sections of strong laminar.

• 87.75m - 89.50m, few small itbd. of mud rip-up clasts in c.g. sub mte. again. @ 89.50m, large mudstone clst w/ py pocket.

→ shp contact

91.50 98.60 ITBD SILTSTONE + MUDSTONE

- light br-gy mudstone with common siltstone + clay itbd. that are often br + have very mild oil saturation. Few random pocket that look like clayish silty areas very finely laminated with dk gy - blk clay layers - displays ripple marks.
- down itbd, common disc. mica + py throughout.

siltstone (30%), clay (1%), mud (60%)

DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: Firebag River

Dip Test:

Claim:

UTM Co-ordinates (NAD83)

Date Started:

Hole No: 07-11-99-W4W

Core Size: Core

Depth Angle

Bearing:

Easting (m):

Date Finished:

Casing: 3.10/2.80

Inclination:

Northing (m):

Date Logged: Jan 22/14.

Total Depth: 41.20m.

Province: AB.

Elevation (m):

Logged By: [Redacted]

From To Tkns
m m m

Description

4.80 22.0

GLACIAL TILL

dark brown, muddy sand. Very poorly sorted, consolidated (poorly) with common rounded dropstones up to 7cm wide. Smaller clasts 2-3cm are angular - mineralogy varying but mostly sandstones
→ definitely glacial derived, essentially being cemented together by mud.

22.0 22.15

Beige, v.f.g. sand, hrs. unconsolidated, well sorted, sub-round gravel.
90% SiO₂ 7 fsp + mica = 10%.

22.75 40.00m

GLACIAL TILL

same as previous till,
→ Very minor mudstone beds with subtle trough x-beds (heterolithic)
@ 34.75m (~40cm)

40.00m 41.2m

MUDSTONE.

• Bitumen saturated (lightly) with intense (crater?) structure
picture taken.

pic. 111 = 0191 → 0178

DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: FIREBAG RIVER

Dip Tests

Claim:

UTM Co-ordinates (NAD83)

Date Started:

Hole No: CB-18-99-3h

Core Size: DC

Depth Angle

Bearing:

Easting (m):

Date Finished:

Casing:

Inclination:

Northing (m):

Date Logged: Jan 22/14

Total Depth: 180m

Province:

Elevation (m):

Logged By: [REDACTED]

From To Tks
m m m

Description

0 180

Light brown, gradually moving towards a slightly darker brown sandstone.
↳ common angular clasts, as we have been seeing constantly.

65% S.D.
25% fsp
5% mica
5% clay

(2-3mm)

↳ very poorly sorted with common angular clasts. Sand is well-sorted, sub-silt- to very poorly sorted. Sub-silt- to angular, with silt- v.e.g. sized particles.

From 0m to 10m, angular clasts are more colorful (more "impurities")

↳ darker br attributes to increased micaceous content.

DIAMOND DRILL LOG

Page 1 of 2

Company: Declan Resources Inc.

Project: FIREBAG RIVER

Hole No: 29-31-078-04W4

Dip Tests

Claim:

UTM Co-ordinates (NAD83)

Date Started:

Core Size:

CORE

Depth Angle

Bearing:

Easting (m):

Date Finished:

Casing:

Inclination:

Northing (m):

Date Logged:

Total Depth:

135.05m

Province:

AB

Elevation (m):

Logged By:

Jan. 23/14

From To
m m m

BKRD CPS = 60
Near Fault

Description

66.50 89.00

SANDSTONE w/ HST mud.

- med. gy, poorly sorted, m.g.-c.g. sandstone with abnt pbs & cbs throughout.
- Larger pbs (5cm max) tend to be sub-rd to rd, where the smaller, more abnt (1m-1cm) are angular. sand is prevalent, but seems as though mud is the cementing agent. HST within m. pbs are varying mineralogy, but generally made up of qtz, fsp, mica (as well as sand).
- No sedimentary structure within this unit, only within rare muddy/silty layers (20cm max - rare) - displays weak bioturbation, ripple marks & x-laminations.
- @ 76.05m, see a small 1cm long core shell.
- Sand is fractured throughout.
- From 84.35m to end of interval, sand becomes weakly saturated & therefore dker brown.

Shp. C/C

89.00 105.00

ITBD SANDSTONE & MUDSTONE

- Consistent gy mudstone (diss py throughout - more conc along laminations).
- Itbd m. forming heavy sat. bitumen sandst. Contacts between these two beds are sharp & display flaser bedding between etc. margins commonly.
- Sandst. beds avg 10-15cm, often with 'stringers' protruding into mud layers.
- Few py pockets throughout mudstone (21.5cm) blocks disrupted.
- Laminations become thinner towards end of interval, avg. 1-5cm in between mud beds. Last 3m, lots of disturbance between beds.
- (fractured core, more intere flaser bedding, few rip up clasts)

NOL as heavily saturated as previous hole.

DIAMOND DRILL LOG

Page 4 of 2

Company: Declan Resources Inc.

Project:

Dip Test:

Hole No: 01-24-098-4W

Core Size: Core

Casing:

Total Depth:

Depth Angle

Claim:

UTM Co-ordinates (NAD83):

Date Started:

Bearing:

Easting (m):

Date Finished:

Inclination:

Northing (m):

Date Logged:

Province:

Elevation (m):

Logged By:

From To Fls
m m m

Near Fault (cont)
Brd CPS

Description

105.00 124.50

BITUMEN SATURATED SANDSTONE

- laminated heavily saturated sandstone. Laminations are deciphered by change in grain size. Laminations / beds are anywhere from 1mm to 1m in length. Very rare mudstone + siltstone laminations / stringers (2.5%)
- strong odor coming off core again. Laminations are very uniform, alternating very dk br (mg) + blk (+g) ^{intense saturation}
- No other sedimentary structures visible.
- Last 2.50m, v.c.g. sand with common 1-4mm pibls - mte. supported.

shp. etc

121.00 135.05

ITBD SILTSTONE + MUDSTONE

(75%)

(15%)

(+ 10% bitumen in sand pockets)

- Grayish brown (lt) siltstone very fine, thin (21mm) dker gy mudstone. Laminar displays ripple marks, x-bedding, x-lamination + very subtle flaser (?) bedding / bioturbation. Unit is moderately fractured, + bitumen has filled these cracks and/or vugs.
- common bitumen pockets ranging from 1cm to 7.3cm open. Dk brown saturation halo around these sections - very intense smelling.
- ↳ bitumen 'pockets' end @ ~128.50m - just very finely laminated siltstone w/ rare brown filled fracture

DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: FIREBAG RIVER.

Hole No: 11-23-099-05-1W

Dip Tests

Claim:

UTM Co-ordinates (NAD83)

Date Started:

Core Size:

Depth Angle

Bearing:

Easting (m):

Date Finished:

Casing:

Inclination:

Northing (m):

Date Logged:

Total Depth: 70.51m

Province:

AB

Elevation (m):

Logged By:

[Redacted]

(only looked until)

From To
m m m

BKIRND CPS: 60

Description

42.69m

6.91 24.69 65

MUDSTONE → 20% sandstone, 80% mudstone

- DE gray brown, thinly laminated mudstone. A lot of sedimentary evidence throughout:
 - x-lamination common
 - Flaser bedding common
 - ripple marks - locally
 - bioturbation locally
 - x-bedding locally - increases downhole
 - weak & rare boudinage of sandstone 'clasts' / laminae
- laminae consists of f.g. sandstone that is mildly bitumen saturated as well as thin blk clay laminae 1cm. contacts with laminae are sharp.
- 15.00m - 17.75m, intense bioturbation (pic)
- Bitumen saturated sandstone laminae increases downhole + laminae starts turning into thicker beds
- Sandstone is f.g. well-mod. sorted, semi-consolidated. From 21.00m to end of interval, rare mudstone rip-up (clasts?) throughout.

24.69 41.50

BITUMEN SATURATED SANDSTONE (25% mudstone)

- f.g. to r.c.g. sandstone, dominantly f.g. beds with intervals (occurrence increases downhole)
- cross laminated with rare mud laminae + elongated clasts along laminations (boudinage?)
- Bitumen saturation increases downhole + again, core is gooey.

@ 33.00m - 33.50m, common angular pbb 1-3mm diameter → sections like this are concentrated down interval a avg 5-10cm thickness (4E? R. p up clasts?)

→ most important thing to note is gradual transitions in grain size. Generally coarsening upwards sequences → no bioturbation in this unit. - just x-lamination

41.50 42.69

MUDSTONE

• heavily disrupted w/ clay laminae + rare sand packets 'mixed' in clay laminae is heavily disrupted + appear as almost horizontal (to core) stringers. Core is in rough shape, tough to see

other sedimentary structures

DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: FIREBAG RIVER

Dip Test:

Claim:

UTM Co-ordinates (NAD83):

Date Started:

Hole No: 12-34-79-444

Core Size: CORE

Depth Angle

Bearing:

Easting (m):

Date Finished:

Casing:

Inclination:

Northing (m):

Date Logged: Jan 23/14.

Total Depth: 84.40m

Province: AB.

Elevation (m):

Logged By: [Redacted]

only logged to 51.75m

From To Tks
m m m

Background cps = 65

Description

580 44.70 60

GLACIAL TILL

55

45

50

Significant core loss, 120%. Recovery from core. What exists are common rounded dropstone & small angular clasts (average 0.5m) of sandstone, feldspar, quartz mineralogy. matrix is mud-ey sand, weakly cemented & friable with fingers. First ~30cm is c.g. beige sandstone, poorly sorted, weakly consolidated

44.70 51.75 70

ITBD SANDSTONE + MUDSTONE

60

Intensely 'disrupted' interval. A lot of sedimentary characteristics of varying intensities displayed. Intensely bioturbated throughout. Common flaser bedding, x-bedding & ripple marks. rare rip-up clasts. Bitumen saturation is mild-med & hosted in sandy beds / laminae. Sand is v.f.g. well-sorted.

70% Mudstone

30% Sandstone



DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: FIREBAG RIVER

Dip Tests

Claim:

UTM Co-ordinates (NAD83)

Date Started:

Hole No: 13-18-99-06

Core Size: CORE

Depth Angle

Bearing:

Easting (m):

Date Finished:

Casing:

Inclination:

Northing (m):

Date Logged:

Total Depth: 67.05

Province: AB

Elevation (m):

Logged By:

(only viewed to 51.15m)

From To
m m m

BKEND CPS 65 CPS

Description

9.70 10.80

OVBD / GLACIAL TILL

10.60 35.00

MUDSTONE

Dark brown-gray mud with common laminations & ripple marks
Intense bioturbation locally

18.10 - 21.15m, laminations are very close together with mild oil saturation. Common angular rip-up clasts (max 1cm) in oil saturated sections, common bioturbation throughout.

Few packets of pyrite throughout mudstone (1cm max). In general, further down interval pyrite exists more along laminations & diss. throughout mudstone (~20.00m, 5cm long pyrite packet with mudstone laminations wrapping around the clast - 2 phases)

#32.00 - 33.25, laminations & x-bedding become more intense - definite disruption
Towards end of interval, minor bituminous saturated sections (15m max) are hosted in medium grained, well sorted sand. Displays local flaser bedding, ripple marks & lamination.

35.00 51.15

CARSE GRAINED BITUMEN SATURATED SANDSTONE. (42.50 - 49.00m = mudstone layer)

Dark brown-black v.g., poorly sorted, intensely oil saturated (core feels greasy).
Laminated, x-bedded with crevasse coarsening upwards sequence (sections of pits that gradually grade into fine sand - shoreline setting? fluvial?)
Common rounded - angular pits locally, up to 1.5cm wide (rip-up clasts?)

65

DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: FIREBAG RIVER

Hole No: 13-28-99-3m4

Dip Test's

Claim:

UTM Co-ordinates (NAD83)

Date Started:

Core Size: DC

Depth Angle

Bearing:

Easting (m):

Date Finished:

Casing:

Inclination:

Northing (m):

Date Logged: Jan 22/14

Total Depth: 167m

Province: AB

Elevation (m):

Logged By: [Redacted]

From To Tkns
m m m

Description

0 167

Entire interval is dk pinkish gray, dominantly being made up of angular (98%) pebbles avg. 2-4mm in diameter. Pbls are all diff. mineralogy types, but mostly Qtz + fsp (siltst). Sand that is present is brownish gray, from silt to v.c.g. Very poorly sorted, mineralogy is tough to decipher:

- 45% SiO₂
- 40% fsp
- 10% Qtz / silt
- 5% other

DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: Firebag River.

Dip Tests

Depth Angle

Claim:

UTM Co-ordinates (NAD83)

Date Started:

Hole No: 14-23-98-3W1

Core Size: DC

Bearing:

Easting (m):

Date Finished:

Casing:

Inclination:

Northing (m):

Date Logged: Jan 22/14

Total Depth: 502m

Province: AB

Elevation (m):

Logged By:

From To Tcms
m m m

Description

0 20 Very poorly sorted, rounded to angular, beige sand. Approximately 55% angular pbls, ranging from 1mm - 5mm.

Fairly high silica content overall, 80%.
10-15% fsp.
5-10% mica + accessory.

20 30 Same as above, but oil saturated & approximately 25% fsp. slightly more common pbls

30 260 c.g. - v.c.g. beige to light brown sand. Very poorly sorted, from f.g. to angular 1-5mm pbls (2-3mm avg.), occasionally pockets of bitumen saturated intervals. (100m - 110m)

concentration of silica varies intermittently throughout this hole, but overall ~70%, with 25% fsp, 5% mica + accessory.
- overall, very crystalline, and most of angular pbls have sucrosic texture.

260 502 Light brown to beige, poorly sorted, c.g. - pbl. sand. In lighter beige sections, silica content can get up to 80-85%. (i.e. 60-80m, 330-340m).

- No bitumen saturated sections
- sections where only angular pbls exist + fsp % ~ 7 SiO2%

⇒ Overall, the whole hole looks relatively the same. Cuttings, it's difficult to get a good representation of entire hole.

DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: Firebag River.

Dip Tests

Claim:

UTM Co-ordinates (NAD83)

Date Started:

Hole No: 14-28-97 3W

Core Size: DC

Depth Angle

Bearing:

Easting (m):

Date Finished:

Casing:

Inclination:

Northing (m):

Date Logged: Jan. 22/14

Total Depth: 251m

Province: AB

Elevation (m):

Logged By:

From To Tkns
m m m

Description

20m 30m med- c.g. sand (35%) with common flat angular pbls. throughout (30%)
35% very coarse sand. Grains range from rounded to angular,
65% SiO₂ overall poorly sorted.
30% fsp.
5% mica + accessory.

30 40 Same as above but 80% med- c.g. sand, 5% pbls, 15% v.c.g. sand
Mineralogy is the same

40 110 finer grained sand exists within this interval.
5-10% f.g., 15% m.g.-c.g., 15% v.c.g., 60% pbls
Color is much darker → dk. br to blk overall, only about 15% SiO₂,
the rest fsp & accessory minerals

110 251 Grades gradually in & out of light beige-pinkish med-c.g. sand into
darker feldspathic angular pbl-dominated sand

DIAMOND DRILL LOG

Page 1 of 1

Company: Declan Resources Inc.

Project: Firebag River.

Dip Tests

Depth Angle

Claim:

Bearing:

Inclination:

Province: AB

UTM Co-ordinates (NAD83)

Easting (m):

Northing (m):

Elevation (m):

Date Started:

Date Finished:

Date Logged:

Logged By:

Jan 22/14

Hole No: 15-16-99-3WH

Core Size: DC

Casing:

Total Depth: 240m

From To Tlms
m m m

Description

10 160

"sand" is mostly made up of ^{abnt} angular sandstone pebbles - Qtz, fsp, mica, clay. glacial derived? The ang. pbls actually look like those "caliche" rock
of gum

sand itself is m.g. v.c.g. poorly sorted, beige-white, sugary, clear
sand mostly SiO₂ (75%), 20% fsp, 5% clay, mica etc.

From 20m-40m interval is dk grey, but all other characteristics apply. Color attributes to increased clay content

160 240

pinkish grey v.c.g. ang-rnd poorly sorted sand with common
gy clay rich ang cobbles - Qtz + fsp too!
majority of material is v.c.g. sand.

• 65% SiO₂
• 25% fsp
• 10% clay.

APPENDIX 5: 2014 HAND AUGER PROGRAM SAMPLE DESCRIPTIONS

Sample No	Year Collected	Date	Hole_ID	Waypoint	Easting	Northing	General Location	Sample_Type	Depth (m)	Consolidated/ Unconsolidated	Sample Description	Samplers	Sent For Analysis
99901	2014	18-Aug-14	FB14-01	99901	528586.11	6380590.32	Firebag (North Ridge)	Sand	1.50	unconsolidated	m.g., rnded to sub ang grains, qtz rich, frac sand	R.M., N.S.	Yes
99902	2014	18-Aug-14	FB14-01	99902	528585.87	6380588.81	Firebag (North Ridge)	Sand	1.50	unconsolidated	m.g., rnded to sub ang grains, qtz rich, frac sand	R.M., N.S.	No
99903	2014	18-Aug-14	FB14-02	99903	528619.36	6380627.1	Firebag (North Ridge)	Sand	2.55	unconsolidated	m.g., rnded to sub ang, qtz rich, minor impurities	R.M., N.S.	No
99904	2014	18-Aug-14	FB14-03	99904	529488.96	6383010.72	Firebag (North Ridge)	Sand	3.25	unconsolidated	m.g., rnded to sub ang grains, qtz rich, minor impurities	R.M., N.S.	Yes
99905	2014	18-Aug-14	FB14-05	99905	527174.19	6378212.24	Firebag (North Ridge)	Sand	2.00	unconsolidated	f.g., rnd to sub ang, qtz rich, few impurities	R.M., N.S.	Yes
99906	2014	19-Aug-14	FB14-06	99906	531512.49	6368648.87	Firebag	Sand	0.30	unconsolidated	f.g. to m.g., rnd to sub ang, grey in color, appears nearly 100% qtz	N.S.	Yes
99907	2014	19-Aug-14	FB14-06	99907	531517.77	6368647.67	Firebag	Sand	2.50	unconsolidated	f.g. to m.g., rnd to sub ang, lt brown, qtz rich	N.S.	Yes
99908	2014	19-Aug-14	FB14-07	99908	530630.66	6368368.78	Firebag	Sand	1.30	unconsolidated	f.g. to m.g., qtz rich, rnd to sub ang, lt brown	N.S.	Yes
99909	2014	19-Aug-14	TP14-01	99909	530580.51	6362513.49	Firebag	Sand	1.00	unconsolidated	f.g. to m.g., rnd to sub ang, qtz rich, clean with minor orange coloring	N.S.	Yes
99912	2014	21-Aug-14	FB14-08	99912	528801.38	6380410.03	Firebag (North Ridge)	Sand	0.80	unconsolidated	f.g., rnd to sub ang, clean qtz rich	N.S.	No
99913	2014	21-Aug-14	FB14-09	99913	528495.05	6380392.12	Firebag (North Ridge)	Sand	2.00	unconsolidated	m.g., sub ang to rnd, qtz rich	N.S.	No
99914	2014	21-Aug-14	FB14-10	99914	528418.58	6380126.56	Firebag (North Ridge)	Sand	3.00	unconsolidated	m.g., rnd to sub ang, qtz rich, beige	N.S.	Yes
99915	2014	21-Aug-14	FB14-11	99915	528552.12	6369009.64	Firebag	Sand	0.10	unconsolidated	f.g., rnd to sub rnd, very clean, qtz rich	N.S.	Yes
99916	2014	21-Aug-14	FB14-12	99916	528660.77	6368694.82	Firebag	Sand	2.30	unconsolidated	f.g. to m.g. sand, rnd to sub ang, qtz rich	N.S.	Yes
99917	2014	21-Aug-14	TP14-02	99917	528865.04	6368679.79	Firebag	Sand	1.00	unconsolidated	f.g. to m.g., rnd to sub ang, qtz rich	N.S.	No
99918	2014	21-Aug-14	FB14-13	99918	522978	6367093.19	Firebag	Sand	2.80	unconsolidated	m.g., qtz rich, rnd to sub ang beige, minor iron staining	N.S.	Yes

**APPENDIX 6: 2014 LORING LABORATORIES SIEVE, ROUNDNESS AND
SPHERICTY TEST RESULTS**

**LORING LABORATORIES (ALBERTA) LTD.**

629 Beaverdam Road N.E. Calgary, Alberta T2K 4W7

Tel : (403) 274-2777 Fax : (403) 275-0541

ISO 9001:2008 Certified

TO: DECLAN RESOURCES
301, 1620 West 8th Avenue
Vancouver, BC
V6J 1V4

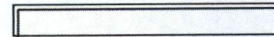
Attn: Tyson King

Sample Type: Sand

FILE # : 57657

DATE : September 09, 2014

REPORT BY : David Ko



SAMPLE ID	As Rec'd Weight Kilogram	WET SIEVE ANALYSIS					
			+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M
<u>099901</u>	5228	WEIGHT GRAMS	104	1668	2703	368	10
		% by Weight	2.1	34.4	55.7	7.6	2.0
	<u>After Desliming</u> <u>Kilogram</u> <u>5.099</u>						

SAMPLE ID	Sphericity	Roundness
<u>099901</u>		
20 x 40 Mesh	0.8	0.6
40 x 70 Mesh	0.8	0.6
70 x 140 Mesh	0.7	0.5

Note: Sand sample was deslimmed, wet sieved, dried and weighed.
Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed.
High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater.

Samples received on: August 27, 2014

ASSAYER

**LORING LABORATORIES (ALBERTA) LTD.**

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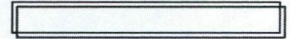
TO: DECLAN RESOURCES
 301, 1620 West 8th Avenue
 Vancouver, BC
 V6J 1V4
 Attn: Tyson King

FILE # : 5 7 6 5 7

DATE : September 09, 2014

REPORT BY : David Ko

Sample Type: Sand



SAMPLE ID	As Rec'd Weight	WET SIEVE ANALYSIS					
	Kilogram	+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M	
<u>099904</u>	4337	WEIGHT GRAMS	78	1837	1818	245	19
		% by Weight	2.0	46.0	45.5	6.1	0.5
	<u>After Desliming</u> <u>Kilogram</u> <u>4.275</u>						

SAMPLE ID	Sphericity	Roundness
<u>099904</u>		
20 x 40 Mesh	0.8	0.7
40 x 70 Mesh	0.8	0.5
70 x 140 Mesh	0.8	0.5

Note: Sand sample was deslimmed, wet sieved, dried and weighed.
Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed.
High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater.

Samples received on: August 27, 2014

 ASSAYER

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TO: DECLAN RESOURCES
301, 1620 West 8th Avenue
Vancouver, BC
V6J 1V4

Attn: Tyson King

Sample Type: Sand

FILE # : 57657

DATE : September 09, 2014

REPORT BY : David Ko



SAMPLE ID	As Rec'd Weight	WET SIEVE ANALYSIS					
	Kilogram		+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M
<u>099905</u>	3734	WEIGHT GRAMS	11	396	1542	1316	111
		% by Weight	0.3	11.7	45.7	39.0	3.3
	<u>After Desliming</u>						
	<u>Kilogram</u>						
	<u>3.625</u>						

SAMPLE ID	Sphericity	Roundness
<u>099905</u>		
20 x 40 Mesh	0.8	0.7
40 x 70 Mesh	0.8	0.8
70 x 140 Mesh	0.7	0.7

Note: Sand sample was deslimmed, wet sieved, dried and weighed.
Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed.
High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater.

Samples received on: August 27, 2014

ASSAYER

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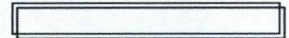
Attn: Tyson King

FILE # : 57657

DATE : September 09, 2014

REPORT BY : David Ko

Sample Type: Sand



SAMPLE ID	As Rec'd Weight	WET SIEVE ANALYSIS					
	Kilogram		+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M
<u>099906</u>	6134	WEIGHT	16	391	3764	1392	180
		GRAMS					
		% by Weight	0.3	6.8	65.5	24.2	3.1
	<u>After Desliming</u>						
	<u>Kilogram</u>						
	<u>6.053</u>						

SAMPLE ID	Sphericity	Roundness
<u>099906</u>		
20 x 40 Mesh	0.9	0.7
40 x 70 Mesh	0.9	0.6
70 x 140 Mesh	0.8	0.5

Note: Sand sample was deslimmed, wet sieved, dried and weighed.

Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed.

High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater.

Samples received on: August 27, 2014

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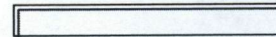
Attn: Tyson King

Sample Type: Sand

FILE # : 5 7 6 5 7

DATE : September 09, 2014

REPORT BY : David Ko



SAMPLE ID	As Rec'd Weight Kilogram	WET SIEVE ANALYSIS					
		+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M	
<u>099907</u>	6341	WEIGHT GRAMS	3	542	4630	738	39
		% by Weight	0.1	9.1	77.8	12.4	0.7
	<u>After Desliming</u> <u>Kilogram</u> <u>6.184</u>						

SAMPLE ID	Sphericity	Roundness
<u>099907</u>		
20 x 40 Mesh	0.9	0.6
40 x 70 Mesh	0.8	0.7
70 x 140 Mesh	0.8	0.5

Note: Sand sample was deslimmed, wet sieved, dried and weighed.
Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed.
High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater.

Samples received on: August 27, 2014

ASSAYER

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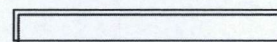
Attn: Tyson King

FILE # : 57657

DATE : September 09, 2014

REPORT BY : David Ko

Sample Type: Sand



SAMPLE ID	As Rec'd Weight Kilogram	WET SIEVE ANALYSIS					
			+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M
<u>099908</u>	4929	WEIGHT GRAMS	4	192	2792	1554	65
		% by Weight	0.1	4.2	60.6	33.7	1.4
	After Desliming <u>Kilogram</u> <u>4.848</u>						

SAMPLE ID	Sphericity	Roundness
<u>099908</u>		
20 x 40 Mesh	0.8	0.6
40 x 70 Mesh	0.8	0.6
70 x 140 Mesh	0.7	0.5

Note: Sand sample was deslimmed, wet sieved, dried and weighed.
 Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed.
 High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater.

Samples received on: August 27, 2014

 ASSAYER

**LORING LABORATORIES (ALBERTA) LTD.**

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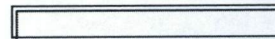
Attn: Tyson King

Sample Type: Sand

FILE # : 57657

DATE : September 09, 2014

REPORT BY : David Ko



As Rec'd Weight		WET SIEVE ANALYSIS					
SAMPLE ID	Kilogram		+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M
<u>099914</u>	5065	WEIGHT GRAMS	34	444	3001	1108	72
		% by Weight	0.7	9.5	64.4	23.8	1.5
	<u>After Desliming</u> <u>Kilogram</u> <u>4.86</u>						

SAMPLE ID	Sphericity	Roundness
<u>099914</u>		
20 x 40 Mesh	0.9	0.6
40 x 70 Mesh	0.8	0.6
70 x 140 Mesh	0.8	0.6

Note: Sand sample was deslimmed, wet sieved, dried and weighed.
Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed.
High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater.

Samples received on: August 27, 2014

ASSAYER



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Vancouver, BC
V6J 1V4

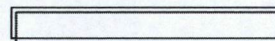
Attn: Tyson King

FILE # : 57657

DATE : September 09, 2014

REPORT BY : David Ko

Sample Type: Sand



SAMPLE ID	As Rec'd Weight	WET SIEVE ANALYSIS					
	Kilogram		+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M
<u>099915</u>	5308	WEIGHT GRAMS	4	85	1536	2878	468
		% by Weight	0.1	1.7	30.9	57.9	9.4
<u>After Desliming</u> <u>Kilogram</u>							
<u>5.158</u>							

SAMPLE ID	Sphericity	Roundness
<u>099915</u>		
20 x 40 Mesh	0.8	0.7
40 x 70 Mesh	0.8	0.7
70 x 140 Mesh	0.9	0.5

Note: Sand sample was deslimmed, wet sieved, dried and weighed.
Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed.
High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater.

Samples received on: August 27, 2014

ASSAYER

**LORING LABORATORIES (ALBERTA) LTD.**

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TO: DECLAN RESOURCES
301, 1620 West 8th Avenue
Vancouver, BC
V6J 1V4

Attn: Tyson King

FILE # : 57657

DATE : September 09, 2014

REPORT BY : David Ko

Sample Type: Sand

SAMPLE ID	As Rec'd Weight	WET SIEVE ANALYSIS					
	Kilogram		+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M
<u>099916</u>	6415	WEIGHT GRAMS	0	33	2795	2799	317
		% by Weight	0.0	0.6	47.0	47.1	5.3
	<u>After Desliming</u>						
	<u>Kilogram</u>						
	<u>6.223</u>						

SAMPLE ID	Sphericity	Roundness
<u>099916</u>		
20 x 40 Mesh	0.8	0.6
40 x 70 Mesh	0.8	0.5
70 x 140 Mesh	0.8	0.6

Note: Sand sample was deslimmed, wet sieved, dried and weighed.
Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed.
High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater.

Samples received on: August 27, 2014

ASSAYER

**LORING LABORATORIES (ALBERTA) LTD.**

629 Beaverdam Road N.E. Calgary, Alberta T2K 4W7

Tel : (403) 274-2777 Fax : (403) 275-0541

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TO: DECLAN RESOURCES
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 Vancouver, BC
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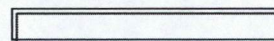
Attn: Tyson King

FILE # : 57657

DATE : September 09, 2014

REPORT BY : David Ko

Sample Type: Sand



SAMPLE ID	As Rec'd Weight Kilogram	WET SIEVE ANALYSIS					
			+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M
<u>099918</u>	4738	WEIGHT GRAMS	46	1023	2855	342	16
		% by Weight	1.1	23.9	66.7	8.0	0.4
	<u>After Desliming</u> <u>Kilogram</u> <u>4.566</u>						

SAMPLE ID	Sphericity	Roundness
<u>099918</u>		
20 x 40 Mesh	0.8	0.6
40 x 70 Mesh	0.7	0.7
70 x 140 Mesh	0.8	0.6

Note: Sand sample was deslimmed, wet sieved, dried and weighed.

Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed.

High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater.

Samples received on: August 27, 2014

 ASSAYER

**APPENDIX 7: 2014 LORING LABORATORIES WHOLE ROCK GEOCHEMISTRY
ANALYTICAL RESULTS**

**LORING LABORATORIES (ALBERTA) LTD.**

629 Beaverdam Road N.E. Calgary, Alberta T2K 4W7

Tel : (403) 274-2777 Fax : (403) 275-0541

ISO 9001:2008 Certified

TO: DECLAN RESOURCES

301, 1620 West 8th Avenue

Vancouver, BC

V6J 1V4

Attn: Tyson King

Sample Type: Sand

FILE # : 57657

DATE : September 09, 2014

REPORT BY : David Ko

WHOLE ROCK ANALYSIS

Sample ID	Al2O3	Ba	CaO	Cr	Fe2O3	K2O	MgO	MnO	Na2O	Ni	P2O5	SO3	SiO2	Sr	TiO2	V	LOI	Total
	%	ppm	%	ppm	%	%	%	%	%	ppm	%	%	%	ppm	%	ppm	%	%
099901	0.83	77	0.10	183	0.40	0.11	0.06	0.00	0.10	3	0.01	0.12	96.53	33	0.02	2	0.35	98.62
099904	0.65	39	0.08	172	0.34	0.07	0.05	0.00	0.08	1	0.01	0.01	97.04	30	0.02	2	0.37	98.71
099905	0.98	121	0.11	151	0.37	0.13	0.05	0.00	0.13	1	0.01	0.01	96.14	38	0.02	2	0.41	98.36
099906	0.33	111	0.05	134	0.22	0.04	0.02	0.00	0.03	<1	0.01	0.01	93.24	27	0.02	1	0.44	94.40
099907	0.68	43	0.07	163	0.34	0.07	0.04	0.00	0.08	1	0.01	0.00	95.22	32	0.02	2	0.39	96.93
099908	0.88	161	0.09	160	0.34	0.09	0.04	0.00	0.10	1	0.01	0.01	92.58	38	0.02	2	0.42	94.59
099914	0.89	222	0.11	157	0.36	0.11	0.05	0.00	0.11	1	0.01	0.00	93.22	46	0.02	2	0.37	95.26
099915	0.46	93	0.05	186	0.29	0.06	0.02	0.00	0.05	1	0.01	0.01	96.96	26	0.02	1	0.37	98.30
099916	0.87	139	0.10	119	0.32	0.09	0.04	0.00	0.11	1	0.01	0.00	96.77	44	0.03	2	0.30	98.65
099918	1.07	75	0.11	147	0.36	0.15	0.05	0.00	0.14	1	0.01	0.01	96.60	39	0.02	2	0.29	98.81
Ck 099901	0.80	89	0.09	170	0.39	0.10	0.05	0.00	0.12	2	0.01	0.01	96.70	32	0.02	2	0.34	98.62

Sample received on August 27, 2014

0.5 gram sample digested with multi acids for near total digestion and analyzed with ICP-AES

Silica analyzed by gravimetric analysis.

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**APPENDIX 8: CRUSH RESISTANCE, ACID SOLUBILITY AND TURBIDITY TEST
RESULTS FOR SAMPLE 99905**



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TO: DECLAN RESOURCES
301, 1620 West 8th Avenue
Vancouver, BC
V6J 1V4
Attn: Tyson King

FILE # : 57657-2

DATE : November 24, 2014

REPORT BY : David Ko

Sample Type: Sand

SAMPLE ID	As Rec'd Weight	WET SIEVE ANALYSIS					
	Kilogram		+ 20 M	20 x 40 M	40 X 70 M	70 X 140 M	-140 M
099905	3734	WEIGHT GRAMS	11	396	1542	1316	111
		% by Weight	0.3	11.7	45.7	39.0	3.3
After Desliming							
Kilogram							
3.625							
SAMPLE ID	Sphericity	Roundness	Crush Resistance % % Fines By Weight				
099905					Results	Suggested Maximum	
20 x 40 Mesh	0.8	0.7			10.3	14	4000 psi
40 x 70 Mesh	0.8	0.8			7.3	8	5000 psi
70 x 140 Mesh	0.7	0.7			3.3	6	5000 psi
	Acid Soluble % by Weight	Max Solubility * % by Weight			Turbidity FTU	Max Turbidity* FTU	
20 x 40 Mesh	1.7	2.0			180	250	
40 x 70 Mesh	3.0	3.0			310	250	
70 x 140 Mesh	3.4	3.0			220	250	
Note: Sand sample was deslimmed, wet sieved, dried and weighed. Sample after drying was wet sieved at 20, 40, 70 and 140 mesh, dried and weighed. High strength proppants should have an average sphericity of 0.7 or greater and an average roundness of 0.7 or greater. Crush test performed in accordance with ANSI/API by Tetra Tech EBA in Calgary. * Maximum value of % Solubility and Turbidity recommended by API Practice 56							

Samples received on: August 27, 2014

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