MAR 20110007: GRASSLAND QUARTZ

Grassland Quartz - A report assessing shale quality near Grassland, east-central Alberta.

Received date: Mar 14, 2011

Public release date: Mar 17, 2012

PART B

TECHNICAL REPORT

AND

PART C

(Appendices)

ASSESSMENT REPORT

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9309030451

GRASSLAND QUARTZ PROJECT

FOR
GARY/LAURA SWORIN

Submitted By: Laura Sworin

March 10,2011

PART B - TECHNICAL REPORT

TABLE OF CONTENTS

"BREAKDOWN STATEMENT OF PROJECT WORK"

"BREAKDOWN STATEMENT OF PROJECT WORK"

A. AUTHOR: LAURA SWORIN

QUALIFICATIONS: B.ED.

Interest in geology(self-taught)

B. INTRODUCTION

GARY AND LAURA SWORIN OWN AND OPERATE AN APPROVED GRAVEL/SAND/SHALE PIT ON THEIR QUARTER OF LAND (NE 17-68-18-W of 4)

THE PURPOSE OF ASSESSMENT WORK WAS TO DETERMINE CONTENT OF THE ORANGE AND BLACK SHALE IN THE PIT. ROAD TESTS HAD PROVEN THE SHALE TO HAVE VERY GOOD COMPACTION.

WE WERE ALSO INTERESTED IN DISCOVERING ANY POTENTIAL MINERALS/ ELEMENTS IN THE PRODUCT.

C. SUMMARY (LAB WORK)

GARY SWORIN OBTAINED SAMPLES FROM PIT, AND WE SENT SAMPLES INTO THE FOLLOWING LABS:

(1) J.R.PAINE & ASSOCIATES LTD. -FOR COMPACTION TEST

(2) AGAT LABORATORIES - WE SENT IN 2 SAMPLES (ONE OF UPPER ORANGE SHALE, AND ONE OF LOWER BLACK SHALE) FOR COMPOSITIONAL AND ELEMENT ANALYSIS.

(3) AGAT LABORATORIES - WE SENT IN SAMPLE BLACK SHALE FOR A DEAN STARK ANALYSIS, AS THE BLACK SHALE LOOKED AND SMELLED SIMILAR TO NATURAL ASPHALT. BLACK SHALE SAMPLE OBTAINED APPROX. 14 FEET DOWN IN PIT (SIDE OF PIT).

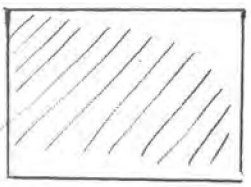
C.SUMMARY (OUR OWN ANALYSIS)

GARY AND LAURA SWORIN ALSO COLLECTED ROCK SAMPLES FROM AREA AND IDENTIFIED ROCKS (PRIMARILY IGNEOUS)

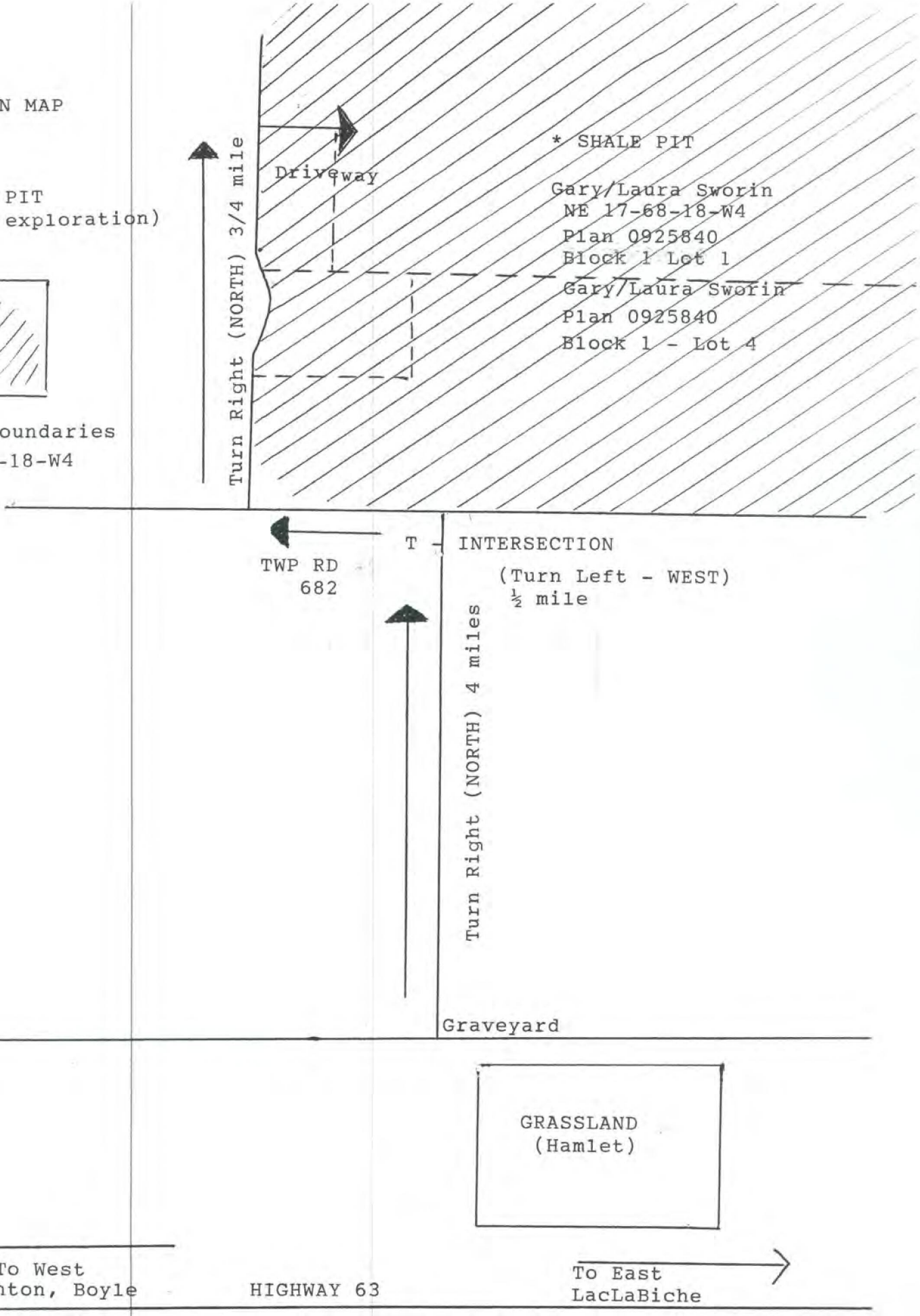
GARY AND LAURA SWORIN ALSO EXAMINED SHALE AND SAND SAMPLES UNDER A MICROSCOPE (ROUNDED).

LOCATION MAP

*SHALE PIT
(site of exploration)



Permit Boundaries
NE 17-68-18-W4



E. WORK PERFORMED

DATES: JUNE 2009

JULY 2009

SEPT. 2009

BY: GARY AND LAURA SWORIN

METHOD: 1. Gary Sworin obtained sample of orange shale from near top of pit.

2. Gary Sworin obtained samples of black shale from approx. 14 feet down side of pit.

3. Gary/Laura Sworin obtained rock samples that had been spread around in pit, but which clearly originated from a layer under top clay layer (see diagram in Part C)

F. RESULTS

RESULTS FROM LAB WORK

(1) J.R.PAINE & ASSOCIATES LTD. - COMPACTION TEST

TEST INDICATED VERY GOOD COMPACTION QUALITIES CONFIRMING ROAD TESTS.

(2) AGAT LABORATORIES -

*ORANGE SHALE - SAMPLE CONSISTS PRIMARILY OF QUARTZ (81%).← Combined (bulk and clay)

- The clay portion of XRD indicate that the clay fraction (8.04% of total weight volume) consists of illite (41%), with lesser amounts of kaolinite (29%), and smaller amounts of smeetite (18%) and mixed layer (11%) and trace quartz.

*BLACK SHALE - SAMPLE CONSISTS PRIMARILY OF QUARTZ (77%). (XRD RESULTS)

THE XES RESULTS INDICATE THAT THE SAMPLE CONSISTS MAINLY OF SILICON, WITH LESSER AMOUNTS OF ALUMINUM AND OXYGEN. MINOR AMOUNTS OF IRON, CALCIUM, POTASSIUM, PLUS TRACE SODIUM, CARBON, AND MAGNESIUM ARE ALSO DETECTED.

(3) AGAT LABORATORIES-

*BLACK SHALE - DEAN STARK ANALYSIS

The DEAN STARK ANALYSIS INDICATES

HYDROCARBON = 0.27 % wt

F. RESULTS FROM OUR OWN ANALYSIS

GARY AND LAURA SWORIN COLLECTED ROCK SAMPLES FROM PIT AREA AND IDENTIFIED ROCKS (PRIMARILY IGNEOUS)

SOME IDENTIFIED ROCKS:

ALKALINE FELDSPAR GRANITE

GRANITE

GRANITOIDS

QUARTZ , QUARTZ PORPHYRY

SYENITE

BASALT

MICA

GARNET (?)

DOLOMITE

MANY OTHER ROCKS UNIDENTIFIED

GARY AND LAURA SWORIN EXAMINED SHALE AND SAND CRYSTALS UNDER A MICROSCOPE (ROUNDED IN APPEARANCE).

G. CONCLUSIONS/REFERENCES

1. Orange and Black shale have excellent compaction qualities, as supported by lab results (J.E. Paine Standard Proctor Test), and as supported by road tests.

2. Orange and Black Shale consist primarily of quartz, as supported by lab results (AGAT LABORATORIES)
Although samples contain some clay, the clay is primarily non-swelling (illite and kaolinite), and can even retain water (illite).
** our questions have been answered as far as suitability for road repair and roadbuilding. The shale is excellent material for roadbuilding and repair.

3. The presence of oil in the black shale indicates that this product is a type of natural asphalt, and the oil would act as a binder, further enhancing compaction and hardiness under heavy transport conditions. This product would make a good sub-base under asphalt, particularly for northern roads constructed on muskeg. The low oil content falls well below environmental restrictions on oil for road use.
It is also likely that this product would be ideal for making asphalt, though a crusher might be needed.

4. "Quartz-Oil" product is an indicator of oil sands or oil deposits.

5. High quartz content may indicate further quartz exploration.
(See Rio Tinto opinion in Part C)
6. Rounded quartz may indicate exploration for "FRAC SAND"

7. Many rock samples are igneous, found in a neat 2 ft. layer under the clay, then several feet of orange shale, then undetermined amount of feet of black shale.
Igneous rocks indicate possible volcanic activity, which may have pushed oil to surface (14 ft. below ground level). Most oil deposits in this area are much deeper.

Perhaps volcanic activity might warrant diamond exploration in the Grassland area.

REFERENCES

Please see Part C for complete lab reports, and Rio Tinto opinion on quartz exploration.

BIBLIOGRAPHY

1. Internet (Rock Identification)

2. Rocks and Minerals (Simon & Shuster Guide To)
by Annibale Mottana, Rodolfo Crespi and Giuseppe Liborio

PART C

(APPENDICES AND SUPPORTING INFORMATION)

ASSESSMENT REPORT

METALLIC AND INDUSTRIAL MINERALS PERMIT #9303030451

GRASSLAND QUARTZ PROJECT

for

GARY/LAURA SWORIN

Submitted By

Laura Sworin

March 10, 2011

PART C

APPENDICES AND SUPPORTING MATERIAL

J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS
EDMONTON – GRANDE PRAIRIE – PEACE RIVER

Edmonton Office:
17505 - 106 Avenue
Edmonton, Alberta
T5S 1E7

FAX COVER SHEET

NAME: GARY SWORD
COMPANY: SWORD ENTERPRISES
FAX NO: 1.780.525-2677
THIS IS PAGE 1 OF 2 PAGES
DATE: June 24/09
TIME:
FROM: LOUIS KOFOED
OUR FAX NO: 780-489-0800
Phone: (780) 489-0700

IF YOU SHOULD EXPERIENCE ANY DIFFICULTIES, PLEASE CALL (780) 489-0700
ORIGINAL WILL FOLLOW BY MAIL ☐ ORIGINAL WILL NOT FOLLOW ☐
COMMENTS:

STANDARD PROCTOR RESULT

[redacted]

Compaction Test (Upper Orange Shale)

J.R. Paine & Associates Ltd.

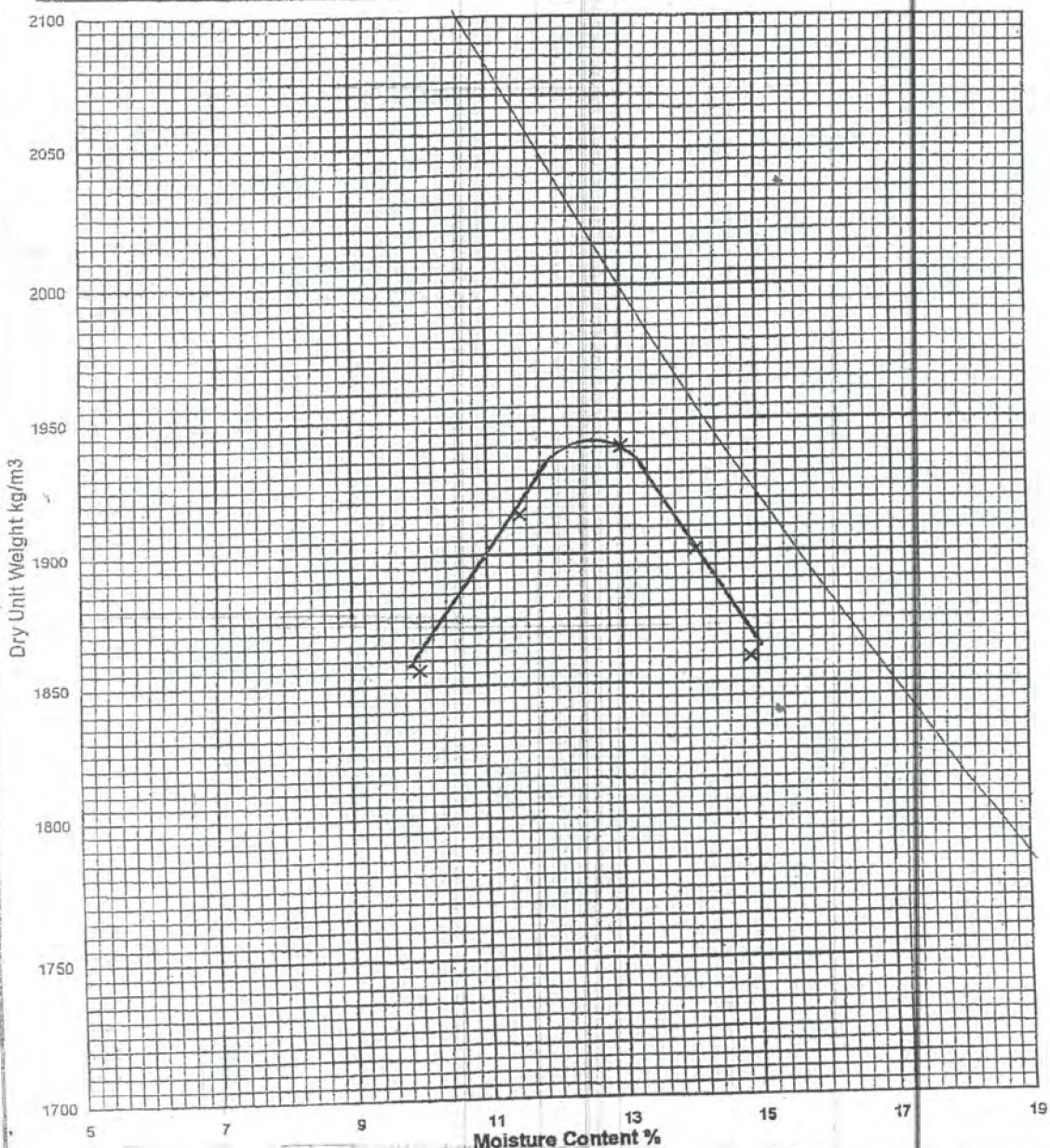
CONSULTING AND TESTING ENGINEERS
EDMONTON - GRANDE PRAIRIE - WHITEHORSE - PEACE RIVER

MOISTURE - DENSITY RELATIONSHIP

Sample: SP 157 Depth:
Location:

Client: Sworin Enterprises
Project: General Testing
Made By:
Ck'd By:
File: Edmonton General
Date: June 16, 2009

TRIAL NUMBER	1	2	3	4	5
Dry Unit Weight (kg/m3)	1856	1915	1940	1901	1860
Moisture Content (%)	10.0	11.5	13.0	14.1	14.9



MAXIMUM UNIT WEIGHT kg/m³ = 1942

OPTIMUM MOISTURE CONTENT = 12.6 %

METHOD OF COMPACTION
STANDARD ☑
MODIFIED ☐

SAMPLE DESCRIPTION
Brown Silt, Some Clay, Sand & Gravel

REMARKS
Sampled by Client

Attention: Gary Sworin

APPROVED BY:

Sample #1 (Upper Orange Shale & Some Top Clay)

AGAT® Laboratories

Gary Sworin

BULK AND CLAY X-RAY DIFFRACTION ANALYSIS OF ONE 'CLAY SAMPLE' RECOVERED FROM 'GRASSLAND' ALBERTA

Work Order A 13942

June, 2009

AGAT Laboratories Ltd.
3801 - 21 Street N.E.
Calgary, Alberta
T2E 6T5

Sample #1
Upper
(Orange Shale + Some Top Clay)

Mr. Gary Sworin
Combined XRD Analysis

Work Order No.: A 13942
June, 2009

COMBINED X-RAY DIFFRACTION ANALYSIS

One sample received from 'Mr. Gary Sworin of Grassland Alberta' and identified as 'Clay Sample' was analyzed by AGAT Laboratories Ltd. for bulk and clay XRD mineralogy. The sample was examined using XRD technique to determine its mineralogical composition. In order to separate the particles less than 3μm (clay fraction) from the bulk fraction, the sample was treated in an ultrasonic bath using sodium metaphosphate as a deflocculating agent. The material was then centrifuged at different speed, which separates the clay fraction from the bulk materials. Weight fraction was measured for both bulk and clay portions of the sample.

Combined

The combined (bulk & clay) XRD results (Table 1) indicate that the sample consists mainly of quartz [silicon dioxide (81%), SiO_2]. Minor amounts of kaolinite (6%) [aluminum silicate hydroxide, $[Al_4Si_4O_{10}(OH)_8]$], illite (3%) $[KAl_2(OH)_2(AlSi_3(O,OH)_{10})]$, plagioclase feldspar (3%) [sodium aluminum silicate, $Na(AlSi_3O_8)$], potassium feldspar (2%) (potassium aluminum silicate, $KAlSi_3O_8$), dolomite (2%) [magnesium calcium carbonate, $CaMg(CO_3)_2$], plus trace muscovite (1%) [potassium aluminum silicate hydroxide, $K_2Al_4(Si_6Al_2O_{20})\ OH)_4$], mixed layer (1%) and smectite (1%) ([1/2 Ca,Na]0.7[Al,Mg,Fe]$_4$ [Si,Al]$_8O_{20}$[OH]4.nH_2O) are also present.

Clay

The clay fraction of XRD (Table 1) is 8.04% of the total weight volume for this sample. The XRD results (Table 1) indicate that the clay fraction consist of illite (41%), with lesser amounts of kaolinite (29%), smectite (18%), and mixed layer (11%). Trace quartz (1%) is also present.

The analysis indicates that the sample consists mainly of sand/clay/silt (quartz, kaolinite, illite, plagioclase feldspar, potassium feldspar, muscovite, smectite and mixed-layer clays - formation material?). Minor amounts of calcium magnesium carbonate (dolomite – precipitated from formation material?) are also present. The Minor amounts of smectite and mixed-layer clays would swell in the presence of fresh water.

Table 1- Summary of XRD Analysis

Company: Garry Sworin
Location: Grass Land Alberta

Work Order No. A-13942
June, 2009

SAMPLE ID.	TYPE OF ANALYSIS	WEIGHT %	Qtz	Plag	K-Feld	Cal	Dol	Anhy	Pyr	Musc	Bar	Sider	CLAYS: Kaol	Chl	Ill	ML	Smec	Total Clay
	BULK FRACTION:	91.96	88	3	2	0	2	0	0	1	0	0	4	0	0	0	0	4
1	CLAY FRACTION:	8.04	1	0	0	0	0	0	0	0	0	0	29	0	41	11	18	99
	BULK & CLAY	100	81	3	2	0	2	0	0	1	0	0	6	0	3	1	1	11

AGAT Laboratories

XRD LEGEND

- XRD Analysis is semi-quantitative (approx. 10% at best) and identifies only crystalline substances; amorphous (non-crystalline) substances will not be detected.
- Bulk Fraction – greater than 3 microns size fraction.
- Clay Fraction – less than 3 micron size fraction.
- Bulk and Clay – mathematical recalculation including the bulk and clay fraction representing the whole sample.
- Total Clay – sum of the clay minerals (may include authigenic and matrix clays plus clays in rock fragments).

ABBREVIATIONS

Amp - Amphiboles	Dol - Dolomite	Musc	- Muscovite	Pr	- Pure (95 – 100%)
Ana - Analcime	Gyp - Gypsum	Plag	- Plagioclase Feldspar	NPr	- Near Pure (90 – 95%)
Anh - Anhydrite	Hatru - Hatrurite	Port	- Portlandite	Abnt	- Abundant (60 – 90%)
Ank - Ankerite	Magn - Magnetite	Pyrrh	- Pyrrhotite		
		Pyr	- Pyrite	Com	- Common (30 – 60%)
Anata- Anatase	Ill - Illite	Qtz	- Quartz	Mnr	- Minor (10 – 30%)
Cal - Calcite	Kaol - Kaolinite	Sid	- Siderite	Rre	- Rare (1 – 10%)
Chl - Chlorite	K-feld- Potassic Feldspar	Sm	- Smectite (montmorillonite)	Tr	- Trace; detectable, but not measurable (0 – 1%)
Cupr - Cuprite	Jaro - Jarosite	Goe	- Goethite		
ML - Mixed-layer clays (illite-smectite or smectite-chlorite)				Unk	- Unknown mineral

NOTE: Not all these minerals are present in this sample suite

AGAT® Laboratories

APPENDIX

BULK & CLAY PROCEDURES

1. Crush dry rock sample until grains disintegrate completely.
2. Weigh empty beaker and put sample in it. Weigh again "total weight". (≈3g of sample).
3. Add 50 mL of distilled water, plus a few drops of Sodium Metaphosphate.
4. Put in ultrasonic bath for 2 (two) hours.
5. Stir sample and pour out top portion into test tube.
6. Centrifuge for 5 minutes at 600 rpm.
7. Pour out top portion into another test tube for the clay fraction (<3μm) sample.
8. Recombine the coarser residue in the first test tube with the residue in the beaker and weight this "bulk sample" (after drying completely). Subtract this weight from the "total weight" to get the clay fraction weight.
9. Centrifuge the "clay fines" in the second test tube for 20 minutes at maximum rpms.
10. Pour out most of the water then shake test tube using Vortex Mixer.
11. Pipette onto a glass slide.
12. Put the slide on the hot plate (low) until dry then run sample in XRD.
13. Then put slide in a glycol vapour bath overnight (glycolated clay); Smectite will swell and be recognized.
14. If chlorite suspected, then treat the remaining sample in the test tube with diluted HCl and leave overnight (acidized clay). If chlorite was present in the sample this test causes it to disappear.
15. Run the "clay fraction" slide from 2-38 degrees.
16. Grind the "bulk sample" and spread the powder on an aluminum holder then run from 4-58 degrees.

AGAT® Laboratories

Sample #2 – Lower Black/Grey Shale

AGAT® Laboratories

Gary Sworin

COMPOSITIONAL ANALYSIS OF ONE 'CLAY SAMPLE' RECEIVED FROM 'GRASSLAND, ALBERTA'

Work Order A14058

September, 2009

AGAT Laboratories
3801 – 21st Street N.E.
Calgary, Alberta
T2E 6T5

Sample #2 - Lower Black/Grey Shale

COMPOSITIONAL ANALYSIS

One 'Clay Sample' received from 'Mr. Gary Sworin of Grassland Alberta' was analyzed by AGAT Laboratories Ltd. for mineral identification. The sample was analyzed by X-ray diffraction (XRD) techniques to determine its mineralogical composition. It is important to note that XRD analysis identifies crystalline material only.

The XRD results (Figure 1) show that the sample consist mainly of quartz (silicon dioxide, SiO_2), with lesser amounts of illite [$KAl_2(OH)_2(AlSi_3(O,OH)_{10})$]. Minor amounts of kaolinite [aluminum silicate hydroxide, [$Al_4Si_4O_{10}(OH)_8$)], dolomite[magnesium calcium carbonate, $CaMg(CO_3)_2$], plus trace calcite (calcium carbonate, $CaCO_3$), plagioclase feldspar [sodium aluminum silicate, $Na(AlSi_3O_8)$] and potassium feldspar (potassium aluminum silicate, $KAlSi_3O_8$) are also present.

The XES results (Figure 2) indicate that the sample consists mainly of silicon (Si), with lesser amounts of aluminum (Al) and oxygen (O). Minor amounts of iron (Fe), calcium (Ca), potassium (K), plus trace sodium (Na), carbon (C) and magnesium (Mg) are also detected.

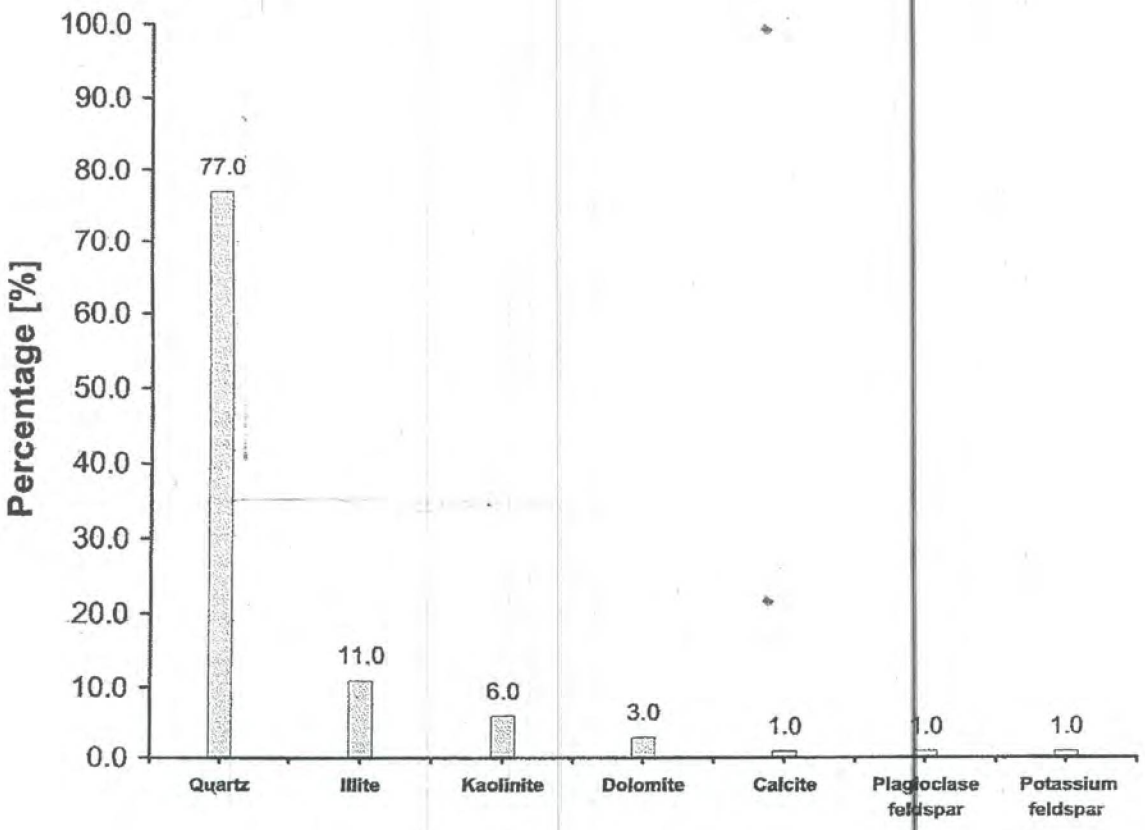
The analysis indicates that the sample consists mainly of sand/clay/silt (quartz, illite, kaolinite, plagioclase feldspar and potassium feldspar - formation material?). Minor amounts of carbonates (dolomite, calcite – formation material?) are also present. The minor presence of iron in XES analysis is possibly amorphous (non crystalline) iron compound/or associated with clays.

Sample #2 – Lower Black / Grey Shale
Minerals

Mr. Gary Sworin
Compositional Analysis

Work Order No.: A14058
September, 2009

Figure 1
X-Ray Diffraction Analysis
Sample I.D.: Clay Sample (Grass Land, Alberta)

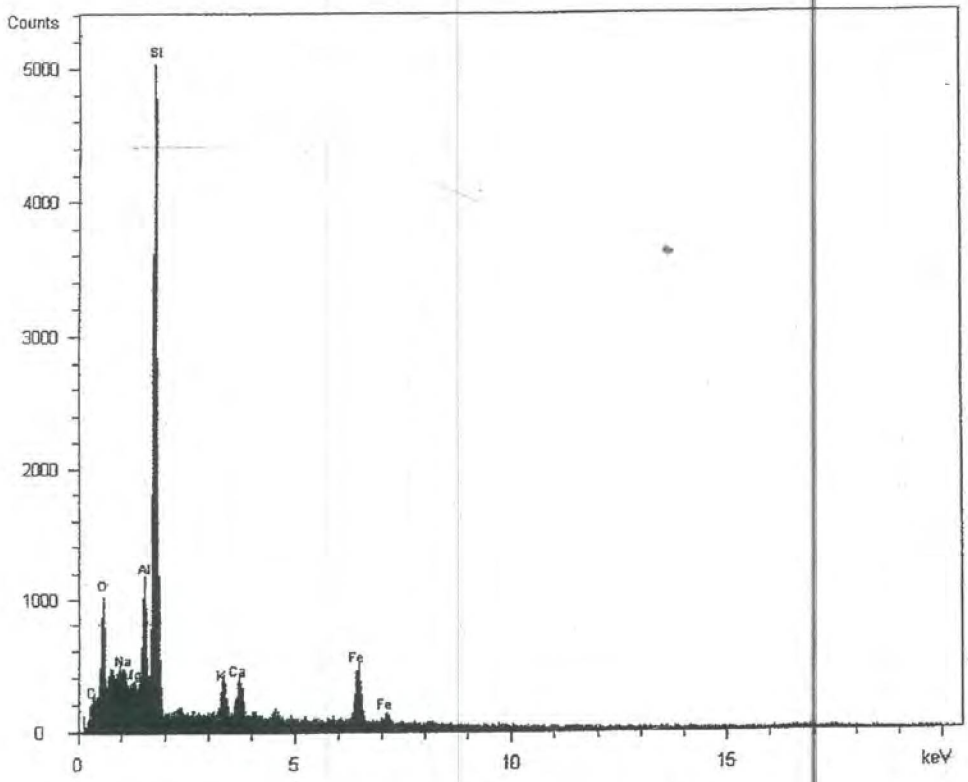


(Quantification is tentative)

Note: XRD identifies crystalline material only

Sample #2 - Lower Black/Grey Shale.
Elements

Figure 2
X-Ray Energy Spectrometry Analysis
Sample I.D.: Clay Sample



Elements
Counts – a semi-quantitative measure of the elemental abundance,
i.e. the higher the counts the more abundant the element

Sample #2 – Lower Black/Grey Shale

AGAT Laboratories 3650 - 21 Street N.E. Calgary, Alberta, T2E 6V6

AGAT Laboratories

Date: September 15, 2009

Number of pages including cover sheet: 02

To: Gary/Laura Sworin

Phone:

Fax: (780) 525-2677

CC:

From: Harvey Agustin

Phone: (403) 299-2100

Fax: (403) 299-2010

Email: agustin@agatlabs.com

REMARKS: ☐ Urgent ☒ For your review ☐ Reply ASAP ☐ Please comment

Good Afternoon,

Attached document is the Dean Stark Analysis.

Thank you very much!

Harvey Agustin

Sample #2 – Lower Black/Grey Shale

AGAT® Laboratories

OIL ANALYSIS

Container Identification
BAG1

Operator Name	Laboratory Number
MASTERCARD	09O355049A

Unique Well Identifier	Well Name	Elevation
Not Available		KB m GRD m

Field or Area	Pool or Zone	Sampler's Company
NOT AVAILABLE	NOT APPLICABLE	

Test Type	Test No.	Test Recovery	Name of Sampler

Test Interval or Perfs mKB		Sampling Point

	Separator	Reservoir	Source	Sampled	Received
Pressure (kPa)					
Temperature					

Well License	Date Sampled	Date Received	Date Reported	Entered By	Certified By
		Sep 10, 2009	Sep 15, 2009	NT	NT

Other Information

Note: Sampling Point, Unique Well Identifier and/or Pool or Zone information was unavailable at time of reporting. This information is integral to AGAT's WebFLUIDs, a comparison, history and trending analysis system.

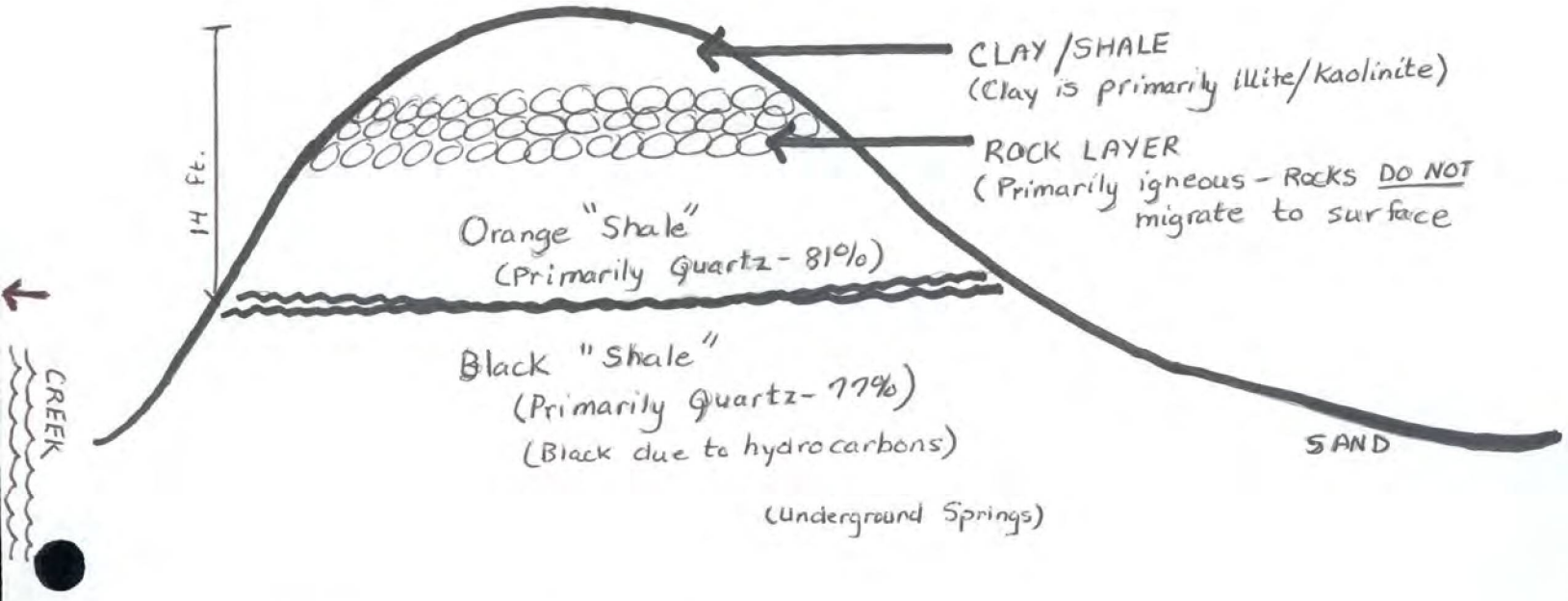
Absolute Barometric Pressure (kPa)
89.9

Room Temp (°C)
23.0

Other Comments:

Dean Stark Analysis:
Water Content = 7.74 % wt
Sediment = 91.99 % wt
Hydrocarbon = 0.27 % wt

DIAGRAM OF PRODUCT LAYERS IN PIT



LOCATION: NE-17-68-18-W of 4

Quarter is primarily a large hill.

Rio Tinto Alcan

1188 Sherbrooke Street West
Montreal Quebec H3A 3G2
Canada
T +1 (514) 848-8000
F +1 (514) 848-8115

2677

By fax: 780-525-~~9986~~

Mrs. Laura Sworin
Grossland, Alberta

November 24, 2010

Your reference: Aluminum – sample of products

Dear Mrs. Sworin,

Further to the fax that you sent us on October 18th, we have asked one of our geologists to analyze the results of sample products that you found on your farm.

He has concluded that the results reflected naturally occurred substances that do not suggest any potential for bauxite exploration. There may be a potential for quartz exploration though, but further analysis is necessary on your part.

We hope that this answers your request.

Best regards,

[redacted]

Benoît Rocheleau
Director, Corporate communications

/lt