**Ministry of Energy & Mines**  
Energy & Mines Division  
Geological Survey Branch

### ASSESSMENT REPORT TITLE PAGE AND SUMMARY

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**AUTHOR(S)**  
John F. Childs, Mack S. Duncan

**SIGNATURE(S)**  
‘SIGNED AND SEALED’  
Childs and Associates LLC

**NOTICE OF WORK NUMBER(S) / DATE(S)**  
YEAR OF WORK  
2010

**STATEMENT OF WORK - CASH PAYMENT EVENT NUMBERS / DATE(S)**  
Event Number 4858640; April 30, 2011

**PROPERTY NAME**  
Ptarmigan

**CLAIM NAME(S) (on which work was done)**  
PT 1 760125, PT2 760144, PT1760145, PT 2 760422

**COMMODITIES SOUGHT**  
Quartz Silica (SiO₂)

**MINERAL INVENTORY MINFILE NUMBERS, IF KNOWN**  
093H 038

**MINING DIVISION**  
Prince George/Omineca

**LATITUDE**  
53° 40’ 10”N

**LONGITUDE**  
120° 57’ 55”W

**NORTHING**  
5948678

**EASTING**  
634420

**UTM ZONE**  
10N

**MAP DATUM**  
NAD83

**OWNER 1**  
Milton T. Braaten

**MAILING ADDRESS**  
Box 582, 9060 Loos Road  
McBride, B.C., V0J 2E0

**OWNER 2**  
Brian Jeck

**MAILING ADDRESS**  
6896 St. Francis Place  
Prince George, B.C., V2N 5A4

**OPERATORS (who paid for work)**  
The Ptarmigan Group  
c/o Childs and Associates, LLP

**MAILING ADDRESS**  
109 Sourdough Ridge Road  
Bozeman, MT 59715 USA

**PROPERTY GEOLOGY KEYWORDS** (lithology, age, stratigraphy, structure, alteration, mineralization, size, attitude)  
Quartz; quartzite; metasedimentary; silica; thick bedded; weathered; outcrop; hematite; iron oxide; Lower Silurian Nonda Formation; Proterozoic
Report on the Quartzite Silica Occurrences on the Ptarmigan Properties, British Columbia, Canada

Tenure Numbers 760125, 760144-5, 760422
Prince George-Omineca Mining Division

Latitude 53° 40' 10" Longitude -120° 57' 55"
NAD 83 Zone 10N UTM 5948678N 634420E
BCGS 093H.065, 093H.066

Report Files Pursuant to Assessment Recording Event No. 4858640

Prepared For:
Operator and Owner: The Ptarmigan Group

By
John F. Childs PhD., Registered Geologist and Qualified Person

And
Mack S. Duncan, PhD. PG

CHILDLS AND ASSOCIATES, LLC
ECONOMIC GEOLOGIST
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Email: jfchildsgeo@msn.com

November 25, 2011
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APPENDIX ‘B’ RELEVANT MINFILE DATA

1
Figure 1  Ptarmigan Property Location
INTRODUCTION

Childs and Associates conducted geologic mapping and sampling of quartzite beds on Tenure Numbers 760125, 760144-5 and 760422. Additionally, several locations were prospected on claims that were allowed to lapse at the time of the assessment filing: Tenures 781642, 781682 and 781922.

The work was conducted from 23 August – 1 September, 2010 and the field work was led by Dr. Mack S. Duncan. Little detailed mapping has been done in the area previously although the quartzite beds form prominent ridges as shown in the GoogleEarth aerial photo of Figure 6. The ridges are on the order of 20 to 40 meters in height (seen in Figure 4) and the quartzites appear to be repeated by faulting and folding. The property lies along the southwest side of Highway 16, east of the city of Prince George and west of McBride, BC, Canada.

The property is covered by the following topographic map sheets: BCGS 093H.0745, 093H.065 and 093H.066. The property is situated in the Prince George-Omineca mining division. The project operator is Childs Geoscience Inc. of Bozeman, MT on behalf of the Ptarmigan Group who are the owners. This report is submitted with reference to Assessment Recording Event 4858640, submitted on April 30 2011.

LOCATION

Large and small scale maps showing the location of the tenure relative to major topographic and cultural features are included in the following sections of the present report.

PROPERTY OWNERSHIP

The properties are owned by the Ptarmigan Group, but are held in trust by two of its members: Milton Braaten and Brian Jeck. The Ptarmigan Group consists of five individuals: Milton T. Braaten, Brian Jeck, John F. Childs, Mack S. Duncan and Frances J. Macpherson.
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*Note: Some samples were taken from tenures in Table 2*
Figure 2 Selected Mineral Occurrences in Northeast

Selected Industrial Mineral Occurrences
NE Central Region, British Columbia
- Quarry
- Developed Prospect
- Past Producer
- Prospect or Showing

PTARMIGAN GROUP

INDEX MAP

Figure 2. Selected industrial mineral occurrences in northeast-central British Columbia. Producers and developed prospects are identified by name; all others are identified by Minfile number.

Taken from Lane, B., MacDonald, K., McGrath, B., Robinson, N. and Simandl, G. (2004). Longworth claims are at location 093H 038
Figure 3  Tenure Detail & Topography

Map Locators  093H.065, 093H.066

Scale 1:35,000
PREVIOUS WORK

Figure 2 shows the approximate location of the Ptarmigan silica property in relation to other industrial mineral occurrences in eastern British Columbia.

See Appendix B for relevant MINFILE data from the area.

GENERAL GEOLOGY

The prominent quartzite layers on the Ptarmigan property are quite pure and typically weather white (See Figures 4 & 5). The sedimentary quartz grains are generally well rounded and well sorted and the rock is well indurated due to the development of secondary silica cement. Quartz grains typically average from 0.5 to 1.0 mm in diameter. The quartzites occur in a sequence that has variously been correlated with the Lower Silurian Nonda Formation and Proterozoic metasedimentary rocks. It is likely that the Ptarmigan quartzites are equivalent to the Lower Cambrian and/or Hadrynian Yanks Peak Formation in the Caribou Mountains to the west, or possibly to part of the Lower Cambrian Manto Formation in the Rocky Mountains to the east.

General strike of the quartzites is N60°W with dips typically 45° to 65° to the southwest. Where exposed, the structurally underlying unit is a phyllite. Typically there is a 3-5 meter transition zone where phyllite is interbedded with quartzite. The overlying unit is not exposed.

A highway department quarry is located along Highway 16 at sample locations 20 & 21 (Figure 4). The quarry clearly illustrates the favorable mining conditions offered by the hogback ridge nature of the deposit. The initial cost of opening a mine would be minimal as a result of the typical 20-30 meter height of the hogback ridges, very thin overburden, and proximity to the highway.

The quartzites are stained with hematite and other iron oxides on fresh surfaces where they have been quarried due to the presence of fracture coatings, veinlets and irregular masses of pyrite. As with many other industrial minerals, the natural weathering process is a good indicator of what can be done with mineral processing techniques. We are confident that this “beneficiation” can be duplicated by standard processing steps.
Figure 4  Typical quartzite exposure on the Ptarmigan property. The ridge is approximately 20 to 30 meters high and the positive relief of the quartzite layers would result in a very low stripping ratio for a quarrying operation.
Figure 5  Typical thick bedded weathered massive quartzite outcrop on the Ptarmigan property. Note the presence of several sets of white quartz veins crossing the massive quartzite.
RESULTS

Twenty three samples from throughout the property were analyzed for gold and silver for three reasons. First, the local presence of abundant pyrite associated with fault zones in the quartzite indicated the possibility of an economic gold deposit where the quartzite has been deformed by brittle deformation and emplacement of stockwork and sheeted quartz-pyrite veins. Secondly, the presence of gold in pyrite had the potential to represent a byproduct of the beneficiation of the quartzite as a source of high quality silica. It was hoped that the pyrite that might be removed from the rock could have represented a salable product. The third reason for our interest in the gold content of the rock was that if the gold was an indicator of fine grained pyrite or possibly other sulfides, the gold values might have been used as a guide to the presence of sulfides or other minerals that represented deleterious contaminants in the quartzite as a high-quality silica source.

Figure 6  Map showing the location of the 23 samples collected from ridge-forming exposures of the quartzite on the Ptarmigan Property.
Appendix ‘A’ shows the results of gold assays conducted by Eco Tech Laboratory in British Columbia. The locations of these samples are shown on Figure 7. All of the gold and silver values are below the detection limit of 0.001 opt for gold and 0.003 g/t for silver and have not been included on the map. It therefore appears that the potential for a stand-alone gold/silver deposit is very low, as is the potential for a salable gold-silver by-product from the beneficiation of the quartzite as a silica product.

The same 23 samples were also analyzed for silica content and other elements as shown in the table in Figure 7. Most of the samples are in the 97 to 98% range for silica content. Some of the samples have slightly elevated iron content and this is interpreted to be due to the presence of pyrite and other iron rich phases. Other samples are slightly enriched in potassium and aluminum and this is thought to be due to the presence of muscovite that has developed from thin bedding plain partings containing muscovite and possibly due to the presence of detrital feldspar. It is likely that both the iron and much of the muscovite can be removed as part of a beneficiation process for a silica product. It is also likely that with additional sampling it will be possible to isolate and avoid the areas where impurity levels are relatively high.
Figure 7  Sample Locations and SiO₂ Values

Sample Location

Scale 1:35,000
PRELIMINARY TONNAGE ESTIMATE

A crude tonnage calculation of quartzite has been made as determined by surface mapping and projection to a depth of 35 meters. No quality parameters were applied in the tonnage calculation and it is presented here simply to demonstrate an order-of-magnitude calculation of the near-surface tonnage. Tonnage based only on quartzite ridge exposures projected to 35 meters below the overall topographic surface (as discussed below) is estimated to be on the order of 30,000,000 metric tons.

The five factors used to estimate the quartzite tonnage were: (1) length of deposit, (2) thickness of deposit, (3) open pit mining depth, (4) specific gravity, and (5) dip. These factors are discussed below.

Length of deposit: 7500 meters
Prominent quartzite ridges were field checked and sampled by Mack Duncan and Milton Braaten during the 2010 field season. The ridges are easily discerned on aerial photos, and, consequently, a minimum strike length can be measured. Exposed length of the numerous ridges included in the calculation vary from 0.3 km to 1.6 km and average 0.8 km. Additional quartzite resource is highly likely along strike under minimal surface cover.

Specific gravity: 2.65
A specific gravity of 2.65 was used for the quartzite since SiO₂ content exceeds 97%.

Quartzite thickness: 30 meters
The best exposure of quartzite occurs in a BC Highway Department quarry immediately adjacent to Highway 16 as shown in Figure 4. Mack Duncan and Milt Braaten measured the thickness of the quartzite in the quarry using a tape measure and Brunton compass. This value is as much an estimate as it is a measurement due to the vertical quarry wall, sloping mine floor, and indistinct massive layering.

The measured/estimated quartzite layer thickness is 42 meters. Quality near the lower and upper contacts appears to be lower due to minor phyllite interbeds, although this was not tested in detail. Based upon these estimates, we decided to use a conservative thickness of 30 meters for this quartzite layer. Based on our field mapping and measurements of other quartzite ridges, this thickness appears to be representative of the quartzite ridges throughout the property.
**Mining depth: 35 meters**

The prominent ridges offer an excellent mining opportunity. The ridges are estimated to have heights of 15-30 meters above the surrounding land surface. This means that a significant portion of the deposit can be mined without digging a pit. For the purposes of the conservative estimate presented here, we used an average above ground height of 15 meters and a pit depth of 35 meters for a total of 50 vertical meters. Obviously, the ultimate mining depth will be determined by project economics and will likely exceed 35 meters.

**Dip: 55°**

An average dip of 55° is considered representative of the entire deposit.

**Mine cross-sectional area: 1,596 square meters**

A cross-sectional area of the quartzite that would be mined was determined to be 1,596 square meters. This area was arrived at using a dip of 55°, a quartzite thickness of 30 meters, and a mining depth of 35 meters.

Using these factors an approximate estimate of 31,720,500 metric tons of quartzite was calculated.

\[(7,500 \text{ meter strike length} \times 2.65 \text{ density} \times 1,596 \text{ cross sectional area})\]

This estimate is strictly speculative and significant drilling and testing will be required to determine the consistency, quality and continuity of the quartzite resource. However, the tonnage figure is thought to be both reasonable and conservative.

**PROGRAMS USED**

The following programs were employed in preparing this report: Microsoft Word, Microsoft Excel, Garmin MapSource, ARCGIS, and Google Maps.
STATEMENTS OF QUALIFICATION

Mack S. Duncan

I, Mack S. Duncan, do hereby certify that:

1. I am a consulting geologist.
   Mack S. Duncan
   2600 Lexington Rd.
   Athens, Georgia, USA  30605

2. I graduated with a PhD in Geology from Indiana University, Bloomington (1976).
   I have a BS in Geology from the University of Georgia (1968).

3. I am a member of the Geological Society of America and the Society for Mining,
   Metallurgy and Exploration, Inc.. I am a Registered Professional Geologist in the
   State of Georgia, USA.

4. I have practiced my profession in excess of 30 years.

5. My relevant experience for the purpose of this report is:
   19 years of exploration and mining experience with J. M. Huber Corporation
   including Exploration Geologist and Manager, Exploration and Mining.

6. I have not had prior involvement with the properties that are the subject of this

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

Dated November 17, 2011

_______________________________
‘Signed’ Mack S. Duncan
CERTIFICATE OF AUTHOR - John F. Childs

I, John F. Childs, do hereby certify that:

1. I am President of Childs Geoscience, Inc.
   109 Sourdough Ridge Road
   Bozeman, Montana 59715

2. I graduated with a PhD in Geology from the University of California, Santa Cruz (1982). I have an MSc from the University of British Columbia (1969) and a BSc from Syracuse University (1966).

3. I am a member of the Geological Society of America, the Geological Association of Canada, the Society of Economic Geologists, and the Association of Applied Geochemists. I am a Registered Geologist in the States of Arizona, California, and Idaho and I am a Founding Registered Member of the Society for Mining, Metallurgy and Exploration, Inc.

4. I have practiced my profession in excess of 35 years

5. I have read the definition of “qualified person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101. This report is based on my personal review of information generated by Dr. Mack S. Duncan who conducted the work reported here under my direction. My relevant experience for the purpose of this report is:

   President, Exploration, Childs Geoscience, Inc; Senior Consulting Geologist, Golden Sunlight Mine, Barrick Gold Corp.; Mine Geologist, Stillwater Mining Company, Big Timber, MT; General Manager, Exploration, Pegasus Gold Corporation, Spokane, WA; Vice President, Lupine Minerals Corporation, Denver, CO; Senior Geologist, Cyprus Georesearch Company, Los Angeles, CA; and Consulting Geologist to a variety of large and small precious metals and industrial minerals mining and exploration companies.

6. I am responsible for the preparation of this report titled “Preliminary Report, Ptarmigan Quartzite Silica Property, British Columbia, Canada” and dated November 17, 2011 related to the Ptarmigan silica property.

7. I have not had prior involvement with the properties that are the subject of this Technical Report.

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

9. I am independent of the issuer applying all the tests in Section 1.4 of National Instrument 43-101.

Signed and Sealed, Dated November 17, 2011

Signature of John F. Childs, Registered Professional Geologist in the State of Arizona, License No. 19192, License Expires June 30, 2014
## STATEMENT OF COSTS

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**Work Performed from August 23 to September 2, 2010**

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### 2010 Total Expenditures

$17,099.37

Total Person Days = 16
APPENDIX ‘A’

ANALYTICAL RESULTS
CERTIFICATE OF ASSAY  AK 2010- 0711

Mack S. Duncan  
23-Sep-10  
2600 Lexington Rd.  
Athens, GA.  
30605

No. of samples received: 23  
Sample Type: Rock  
Project: Ptarmigan  
Submitted by: Mack S. Duncan

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FA/AA Finish  
NM/nw  
XLS/10

ECO TECH LABORATORY LTD.  
Norman Monteith  
B.C. Certified Assayer
WHOLE ROCK CERTIFICATE OF ANALYSIS AK 2010-0711

Mack S. Duncan  
2600 Lexington Rd.  
Athens, GA.  
30605

No. of samples received: 23  
Sample Type: Rock  
Project: Ptarmigan  
Submitted by: Mack S. Duncan

Note: Values expressed in percent

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**EOC TECH LABORATORY LTD.**  
Norman Monteith  
B.C. Certified Assayer

**ECO TECH LABORATORY LTD.**  
Norman Monteith  
B.C. Certified Assayer
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APPENDIX ‘B’

RELEVANT MINFILE DATA
MINFILE Number: 093H 038
Name(s): LONGWORTH

NONDA QUARTZITE, SNOW, RAIN, LONG, DOLL

Status: Prospect

Regions: British Columbia

BCGS Map: 093H093

NTS Map: 093H14W

Latitude: 53 58 48 N

Longitude: 121 29 30 W

Elevation: 1554 metres

Location Accuracy: Within 1KM

Comments: Approximate center of five non-contiguous claim blocks covering quartzite showings over a distance of about 10 kilometres (Open File 1987-15).

Mineral Occurrence

Commodities: Silica

Minerals

Significant: Silica

Associated: Muscovite, Limonite, Calcite

Mineralization Age: Unknown

Deposit

Character: Stratiform

Classification: Sedimentary, Industrial Min.

Type: R07: Silica sandstone

Shape: Regular Modifier: Folded

Dimension: 400x0x0 metres

Comments: Bands of quartzite are up to 400 metres thick.

Host Rock

Dominant Host Rock: Sedimentary

Stratigraphic Age

Lower Silurian

Group: Undefined Group

Formation: Nonda

Igneous/Metamorphic/Other

-----

Isotopic Age

-----

Dating Method

-----

Material Dated

-----

Lithology: Quartzite

Geological Setting

Tectonic Belt: Foreland

Physiographic Area: Continental Ranges

Terrane: Ancestral North America

Inventory

Ore Zone: SAMPLE

Year: 1982

Category: Assay/analysis

Report On: N
Capsule Geology

The Longworth prospect is located about 80 kilometres east of Prince George. The claims were staked originally in 1974 and blasting, trenching and sampling has been completed on the property.

The prospect is hosted by a folded sequence of sedimentary and volcanic rocks which underlie Bearspaw Ridge. They are all, or in part, Lower Silurian in age and equivalent to the Nonda Formation.

At least four northwest trending bands of quartzite have been mapped along the western flank of Bearpaw Ridge. Thicknesses reach up to about 400 metres. The main quartzite band outlines a synformal structure open to the northwest. Rare bedding observed in outcrop dips 70 to 80 degrees east. The quartzite is very pure, massive and homogeneous. It is composed of extremely well-rounded and well-sorted quartz grains, averaging 0.5 millimetre in diameter, which are cemented by silica. The quartzite is pinkish white to buff on fresh surfaces and weathers grey to white. Impurities include muscovite in cavities, limonite on microfractures, minor calcite and possible hydrocarbons. Eight chip samples collected in 1982 by the Geological Survey Branch averaged 99.5 per cent silica (Open File 1987-15).

Consolidated Silver Standard Mines Ltd. evaluated the property in 1985 for the production of ferrosilicon and silicon metal. They took 42 samples of which 28 had the required chemical specifications, SiO2 was from 98.84 to 99.80 per cent and 16 samples had acceptable thermal shock results (Open File 1987-15).

Bibliography

EMPR AR 1965-274
EMPR FIELDWORK 1982, p. 196
EMPR ASS RPT *14815
EMPR OF (Consolidated Silver Standard Mines Ltd. Annual Report 1988)
EMPR EXPL 1986-C342,343
GSC P 72-35, p. 89
GSC MAP 1424A

Date Coded: 1985/07/24  Coded By: BC Geological Survey (BCGS)  Field Check: N
Date Revised: 1989/02/24  Revised By: David G. Bailey(DGB)  Field Check: Y