# MAR 20080018: LIEGE EAST

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# ASSESSMENT REPORT FOR SHEAR MINERALS LTD.'S LIEGE EAST PROPERTY, NORTHERN CENTRAL ALBERTA: MINERAL PERMIT # 9302050136, 9302050137, 9302050141, and 9302050143

**Approximate Property Location**
**Latitude: 56°54' N**
**Longitude: 112°32' W**
**60 Km West of Fort McMurray, North-Central Alberta**

**Shear Minerals Ltd.**
**Suite 100, 9797 – 45th Avenue**
**Edmonton, Alberta, Canada**
**T6E 5V8**

**And**

**977554 Alberta Ltd.**
**Suite 4700, 888 – 3rd Street SW**
**Calgary, Alberta, Canada**
**T2P 5C5**

June 27, 2008
Edmonton, Alberta Canada

Pamela Strand, M.Sc., P.Geol.

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## SUMMARY

APEX Geoscience Ltd. (APEX) was retained during 2006 as consultants by Shear Minerals Ltd. (Shear) on behalf of 977554 Alberta Ltd. to compile all existing geological and geophysical data for the Liege East (previously referred to as the Legend Property) and Liege West properties and for the preparation of an independent evaluation of the potential of the properties to host diamondiferous kimberlites. The Liege East property, currently held by Shear, 977554 Alberta Ltd., and Geolink Exploration Ltd., is comprised of 16 mineral permits encompassing 92,160 hectares (227 732 acres) and is located 370 km northeast of Edmonton. Shear's property covers portions of Townships 90 to 92, Ranges 14 to 18 and Townships 93 to 94, Range 14, west of the 4$^{th}$ meridian. During the fall of 2006 to the spring of 2008 exploration program Shear spent a total of $91.922.52 (not including GST) on exploration on the Liege East Property, the subject of this report. The report covers only four of the permits. Exploration conducted on the Liege East property by Shear in 2006 and 2007 consisted of ground checking 2 geophysical anomalies chosen from the airborne geophysical program and from a seismic survey (Dufresne and Mann, 2006).

The regional setting in the Buffalo Head Hills area is considered favourable for the presence of diamondiferous kimberlites. The Liege East permits are underlain by Early Proterozoic to Archean basement of the Buffalo Head Craton. The local bedrock geology and the underlying Archean to Proterozoic crystalline basement in association with deep seated, penetrative structures, such as the Peace River Arch, likely provided a favourable environment for the ascent of kimberlitic magmas in the Buffalo Head Hills region. The regional cratonic setting is also considered favourable for the formation and preservation of diamonds in the upper mantle and their transport to surface in kimberlitic magma during periodic tectonic activity associated with movement along the Peace River Arch.

To date, previous exploration work by other companies recovered a number of diamond indicator minerals from glacial outwash gravel, recent fluvial gravel and till on and around Shear's properties. The importance of these indicator minerals is unknown due to the presence of variable thicknesses of glacial drift and the poor sampling density. A limited number of samples collected from and around the Liege property have yielded significant numbers of indicator minerals including olivine, pyrope garnet, chromite and picroilmenite. Therefore there is a strong likelihood that undiscovered kimberlites exist on or to the north of the Liege East property. The diamond potential of the property

cannot be fully assessed with the limited amount of sampling that has been conducted to date. However, several airborne surveys were conducted and have delineated five targets in total on both the Liege East and Liege West properties.

Previous exploration by Shear Minerals includes a fixed wing HRAM survey was conducted over the property in 2006 from which a total of 1 magnetic anomaly (LD010) was identified on the Property and recommended for further follow-up. The three seismic anomalies (Seismic-3, Seismic-4, and Seismic-5) did not have corresponding magnetic anomalies from the airborne survey. In regards to the seismic anomalies, alternative geophysical methods such as ground gravity or electromagnetics should be investigated to explain the reason for the seismic discontinuities.

In the fall of 2006, ground truthing of the 1 high priority airborne geophysical anomaly was competed. Ground geophysical surveys were conducted over the anomaly which could not be explained by cultural features and over a seismic target. Additionally, ground gravity surveys were completed over 2 seismic targets.

## INTRODUCTION AND TERMS OF REFERENCES

APEX Geoscience Ltd. (APEX) was retained during 2006 as ongoing consultants by Shear Minerals Ltd. (Shear) to compile all existing geological, geophysical and geochemical data for the Liege East property and to assist in the ongoing evaluation of the potential of the property to host diamondiferous kimberlites.

This assessment report documents the results of the work completed on the Liege East property between fall 2006 to the spring of 2008 by Shear Minerals Ltd.. During the last year, Shear Minerals Ltd. spent a total of CAN$91,922.52 (not including GST) on exploration on the c977554 Alberta Ltd. claims found on the Liege East Property for the ground truthing, ground magnetics and ground gravity surveys.

## DISCLAIMER

The author, in writing this report, use sources of information as listed in the references. The report, written by Anetta Banas, G.I.T. and Pamela Strand, M.Sc., P.Geol., a Qualified Person, is a compilation of proprietary and publicly available information as well as information obtained during a number of property visits. The government reports were prepared by a person or persons holding post secondary geology, or related university degree(s), prior to the implementation of the standards relating to National Instrument 43-101. The information in those reports is therefore assumed to be accurate. Those reports written by other geologists are also assumed to be accurate based on the property visits and data review conducted by the author, however are not the basis for this report.

## PROPERTY DESCRIPTION AND LOCATION

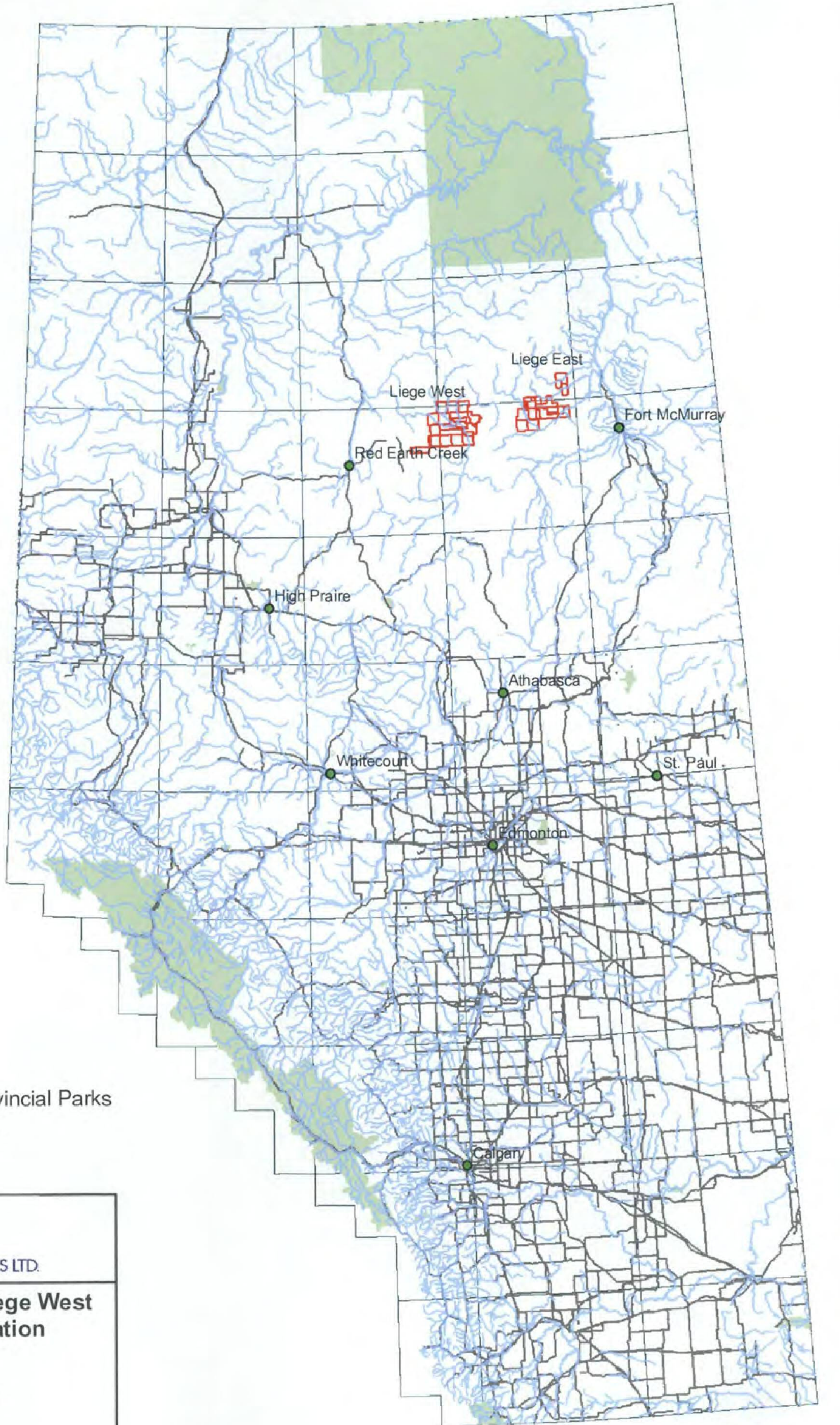
The centre of the Liege East property is situated approximately 60 km (34.2 miles) west of Fort McMurray, Alberta and approximately 370 km (230 miles) northeast of Edmonton, Alberta (Figure 1). The property is located in North Central Alberta within 1:250 000 scale National Topographic System (NTS) map sheet 84A at 56°54' N latitude and 112°32' W longitude. The report concerns a part of the Liege East property which consists of 5 metallic and industrial mineral permits totalling 16,896 Ha (Figure 2). A list of legal descriptions for the 5 permits of the Liege East property is provided in Table 1. The Legal Description column is Meridian, Range, Township and Section respectively. Copies of the mineral permit agreements and the land titles are included in Appendix 1.

**TABLE 1**
**LEGAL PERMIT DESCRIPTIONS***

| Permit Number | Record Date | Term Period | Legal Description | Permit Holder | Area (Ha) |
|---|---|---|---|---|---|
| **Liege Property** | | | | | |
| 9302050136 | 05/24/2002 | 10 years | 91-14W4:16-21;28-33 | 977554 Alberta Ltd. | 3072 |
| 9302050137 | 05/24/2002 | 10 years | 91-15W4:13-18 | 977554 Alberta Ltd. | 1536 |
| 9302050141 | 05/24/2002 | 10 years | 92-17W4:05;06;08; 19;20;25;26;35;36 | 977554 Alberta Ltd. | 2304 |
| 9302050143 | 05/24/2002 | 10 years | 93-14W4:28-33; 94-14W4:04-09 | 977554 Alberta Ltd | 3072 |
| | | | | Total | 9,984 |

*based on land titles search

Alberta Mining regulations grant metallic mineral permits to the permittee in 10 year terms, during which at any time after the initial two year term, the mineral permit may be converted into a lease. Leases are granted in 15 year terms and may be renewed. A metallic mineral permit gives APEX the exclusive right to explore for and develop economic deposits of minerals, including diamonds, within the boundaries of the permit. The exclusive right to explore is subject to ALBERTA REGULATION 66/93 of the Alberta Mines and Minerals Act and the contained Metallic and Industrial Minerals Regulations within the act. The Standard Terms and Conditions for the permits are described in detail on Alberta Energy's website at http://www.qp.gov.ab.ca/Documents/REGS/1993_066.CFM.




## Legend

- Major Cities
- Drainage
- Roads
- National and Provincial Parks
- Alberta Boundary
- Permits

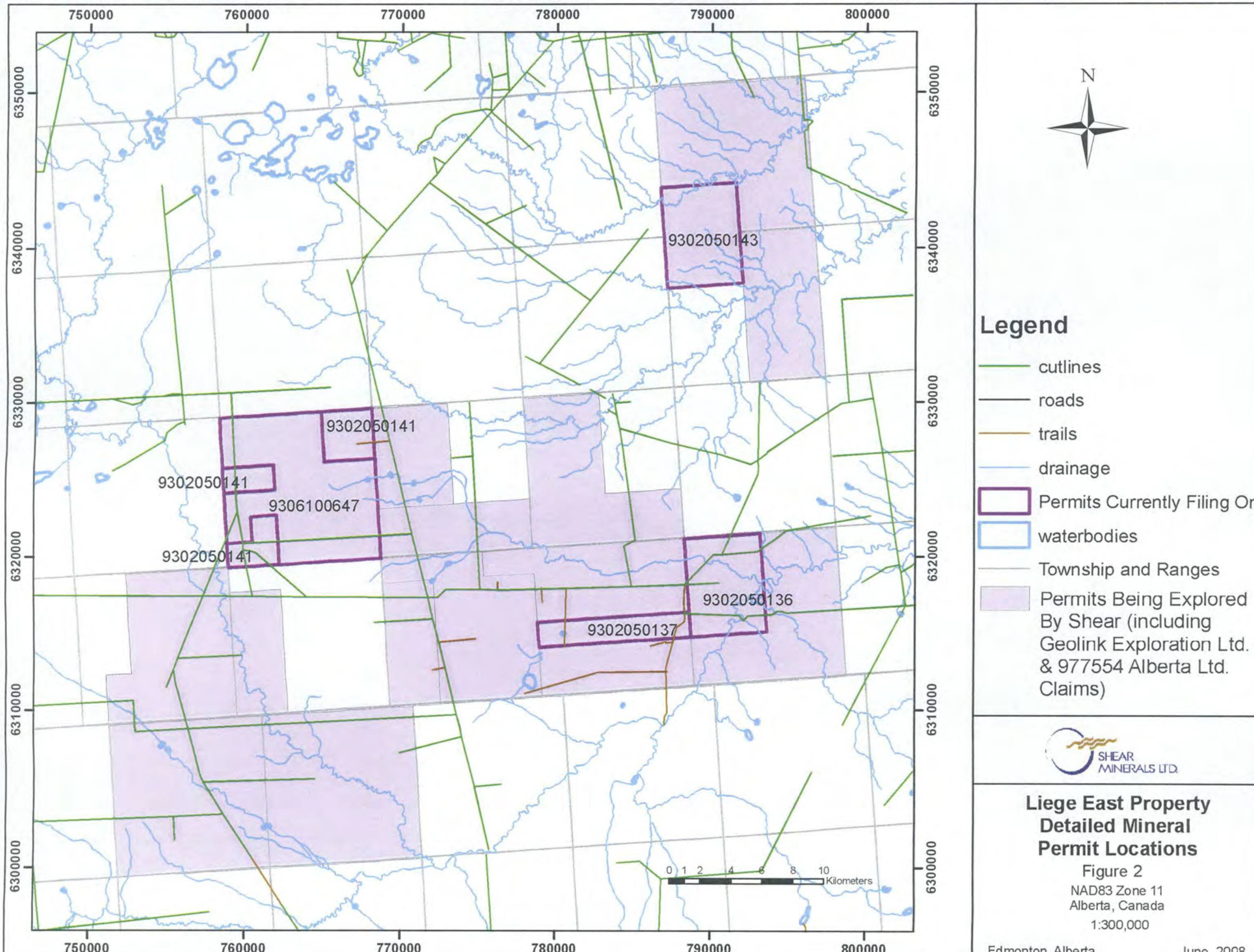
SHEAR MINERALS LTD.

**Liege East and Liege West Property Location**

Figure 1

NAD 83 Zone 11
Alberta, Canada
1:4,800,000

Edmonton, Alberta June 2008




**Liege East Property Detailed Mineral Permit Locations**

Figure 2

NAD83 Zone 11
Alberta, Canada
1:300,000

Edmonton, Alberta — June, 2008

A permit holder shall spend or cause to be spent with respect to the location of his mineral permit on assessment work an amount equal to \$5 for each hectare in the location during the first two year period; an amount equal to \$10 per hectare for each of the second and third two year periods; and an amount equal to \$15 per hectare for each of the fourth and fifth two year periods. Mineral permits may be grouped and excess expenditures may be carried into the next two year period.

In addition to the financial commitment, a metallic mineral permit holder is required to file an assessment report that documents all of the work conducted as well as the results of the work to Alberta Energy. The assessment report must be filed within 90 days after the record date after each two year period.

## ACCESSIBILITY, CLIMATE AND LOCAL RESOURCES

The Liege East property is located 370 km north of Edmonton and 60 km west of Fort McMurray and may be accessed via Provincial Highways 813 and 63, all weather and dry weather gravel roads, cart trails and seismic lines. Most portions of the mineral permits area may be accessed by four-wheel drive vehicles or all terrain vehicles (ATV's) during the summer and winter months. There are several airstrips in the area including one at Chipewyan Lake situated on the Liege property. Accommodation, food, fuel, and supplies are best obtained in the town of Fort McMurray.

The Liege East property is located within a forest containing mainly mixed poplar, spruce and birch trees on a flat lying plateau with numerous small lakes and ponds, meandering rivers and creeks as well as swamps and marshes. . Elevation in the region varies from 400 m to 600 m (1312 ft to 1969 ft) above sea level (asl). Climate is typically long cold winters and short hot summers with annual temperatures ranging from -40°C in January to 25°C in July.

## HISTORY: PREVIOUS EXPLORATION

### Previous Exploration Buffalo Head Hills Region

Previous exploration in the Buffalo Head Hills region has focussed primarily on the search for hydrocarbon and aggregate deposits and for the determination of hydrogeological and geothermal regimes (Hackbarth and Nastasa, 1979; Mandryk and Richardson, 1988; Bachu *et al.*, 1993; Edwards *et al.*, 1994). Only recently has the focus of exploration been redirected towards diamonds (Dufresne *et al.*, 1996).

The Buffalo Head Hill region is well known for its wealth of energy resources. The primary established reserves are 47,196.4 x $10^3$ $m^3$ of oil in 12 conventional fields and 808 x $10^6$ $m^3$ of gas in 3 fields (Eccles *et al.*, 2001). The geology of the Utikuma Lake Keg River Sandstone A and Red Earth Granite Wash A oil pools, the largest pools in the area, was outlined by Angus *et al.* (1989), who suggested that the pools are hosted by Granite Wash sandstone reservoirs. The Granite Wash Formation is composed of interbedded sandstone, siltstone, and shale, with minor amounts of dolostone and anhydrite (Greenwalt, 1956), and is thought to resemble a diachronous basal nonmarine to shallow marine clastic unit, deposited farther from the Peace River Arch (Grayston *et al.*, 1964). The oil is trapped in Granite Wash sandstone reservoirs that pinch out against or drape over numerous paleotopographic features on the Precambrian surface and are sealed by the overlying Muskeg Formation anhydrite.

During 1950 to 1952, the Geological Survey of Canada (GSC) conducted aeromagnetic surveys of the Peerless Lake (NTS 84B) and Peace River (NTS 84C) map areas as part of a regional survey (Geological Survey of Canada, 1989 a, b). The surveys were flown at an altitude of 305 m (1,000 ft) with flight lines spaced every 1 mile (1.6 km) and cross-lines every 15 miles (24 km). Closer examination of the 1:250,000 scale aeromagnetic map for the Peerless Lake area indicates a predominance of north to northwest trending basement magnetic highs. These highs parallel the trend of the boundaries of the Buffalo Head Terrane. Unfortunately, the flight lines from the 1950 to 1952 surveys are too widely spaced to be useful for locating possible kimberlites. In addition, the digital data derived from these surveys is the result of manual digitization of the old maps and is not the true raw data, which would be required as part of any search for kimberlites.

The first strong indication that the region could host diamondiferous kimberlites came during September 1995, from sampling conducted by the Alberta Geological Survey (AGS). A single sample from a road cut yielded 152 possible pyrope garnets from 25 kg (60 lbs) of dark greyish brown, silty clay till. The sample was collected from a site about 45 km (28 miles) northwest of Red Earth Creek and about 127 km (78.9 miles) west of the center of Liege property (Fenton and Pawlowicz, 1997). A total of 35 garnet grains were analyzed by electron microprobe; 27 were classified as Group 9 (G9) garnets according to Gurney's (1984) CaO versus $Cr_2O_3$ discrimination scatter plot. The same site was resampled in August 1996 and yielded 176 possible pyrope garnets, thus duplicating the high number of pyrope garnets initially recovered by the AGS (Pawlowicz *et al.*, 1998a). Based on later work conducted by the Buffalo Head Hills Joint Venture (BHHJV), a joint venture between Ashton Mining of Canada Inc. (Ashton), Alberta Energy Company (AEC) and Pure Gold Minerals Inc. (Pure Gold), it was determined that this till site is less than one kilometre (0.6 miles) southwest of their K4 Kimberlite. A number of other government surface and auger drillhole samples have also yielded high counts of Diamond Indicator Minerals (DIMs) in the Buffalo Head Hills (Pawlowicz *et al.*, 1998a,b; Eccles *et al.*, 2001).

Alberta Energy Company Ltd. (now known as EnCana Corporation) conducted a wide spaced (600 m or 2,000 ft line-spaced) high resolution, fixed-wing aeromagnetic (HRAM) survey in the search for oil and gas deposits over the Buffalo Head Hills during 1995. The survey identified several shallow based, short-wavelength, high frequency magnetic anomalies that also corresponded to areas of very strong diffraction's in seismic profiles (Rob Pryde, *personal communication*, 1998; Carlson *et al.*, 1999; Skelton and Bursey, 1999)). As a result, during October 1996 a joint venture option agreement, the Buffalo Head Hills Joint Venture (BHHJV), was signed by Ashton, AEC, and Pure Gold to investigate these anomalies.

In January 1997, Ashton announced a drill program to test 10 isolated geophysical anomalies in the Buffalo Head Hills area, approximately 35 to 45 km (21 to 27 miles) northwest of the town of Red Earth Creek. An initial two drillholes, located on Ashtons anomalies 7B and 7C, penetrated olivine-dominated fragmental and tuffaceous volcanic rocks underlying glacial overburden at depths of 34.0 m (111.5 ft) and 36.6 m (120 ft), respectively. The rock types were interpreted by Ashton to represent kimberlite pipes (diatremes) that intruded the basement into a thick column of overlying younger sedimentary rocks and the preglacial surface (Ashton Mining of Canada Inc., 1997a). Petrographic studies of core from K7B and K7C confirmed that the drillholes intersected kimberlites and yielded indicator minerals such as chromite, eclogitic garnet and peridotitic garnet (Ashton Mining of Canada Inc., 1997b). By March 1997, a total of 11 kimberlites within a 100 $km^2$ area (36 square miles) had been discovered, 10 by drilling and 1 by bulldozer, including kimberlites K2, K4A, K4B, K4C, K5A, K5B, K6, K7A, K7B, K7C, and K14 (Ashton Mining of Canada Inc., 1997c). The first microdiamond analyses of samples collected from kimberlites K2, K4, and K14 were released in April 1997 and confirmed that the pipes were diamondiferous and more significantly, 3 samples totaling 152.5 kg (387 lbs) from kimberlite K14 yielded significant numbers of diamonds, including 139 microdiamonds and 11 macrodiamonds (Ashton Mining of Canada Inc., 1997d). Mineralogical analysis of indicator minerals from the Buffalo Head Hills kimberlites indicates that although they are not abundant, a significant number of favourable G10 pyrope garnets, some with exceptionally high chromium contents (up to 17.8 wt% $Cr_2O_3$), along with abundant diamond inclusion quality chromites, have been obtained from several of the kimberlites in the central and northern portion of the cluster (Carlson *et al.*, 1999; Hood and McCandless, 2003). In addition, a large number of the kimberlites yielded euhedral to subhedral xenocrystic (mantle derived) garnet and clinopyroxene suggesting that resorption had been limited, therefore, the potential to preserve any carried diamonds may be considered high (Carlson *et al.*, 1999). These results ushered in a new era in the history of resource development in Alberta. To date, 38 kimberlites were found on the joint venture property, 26 of which are diamondiferous. Seven kimberlites, referred to as Legend kimberlites, were discovered north and northwest of the Liege and Legend properties by junior resource companies but none of these kimberlites are diamondiferous (Cavey and LeBel, 2003).

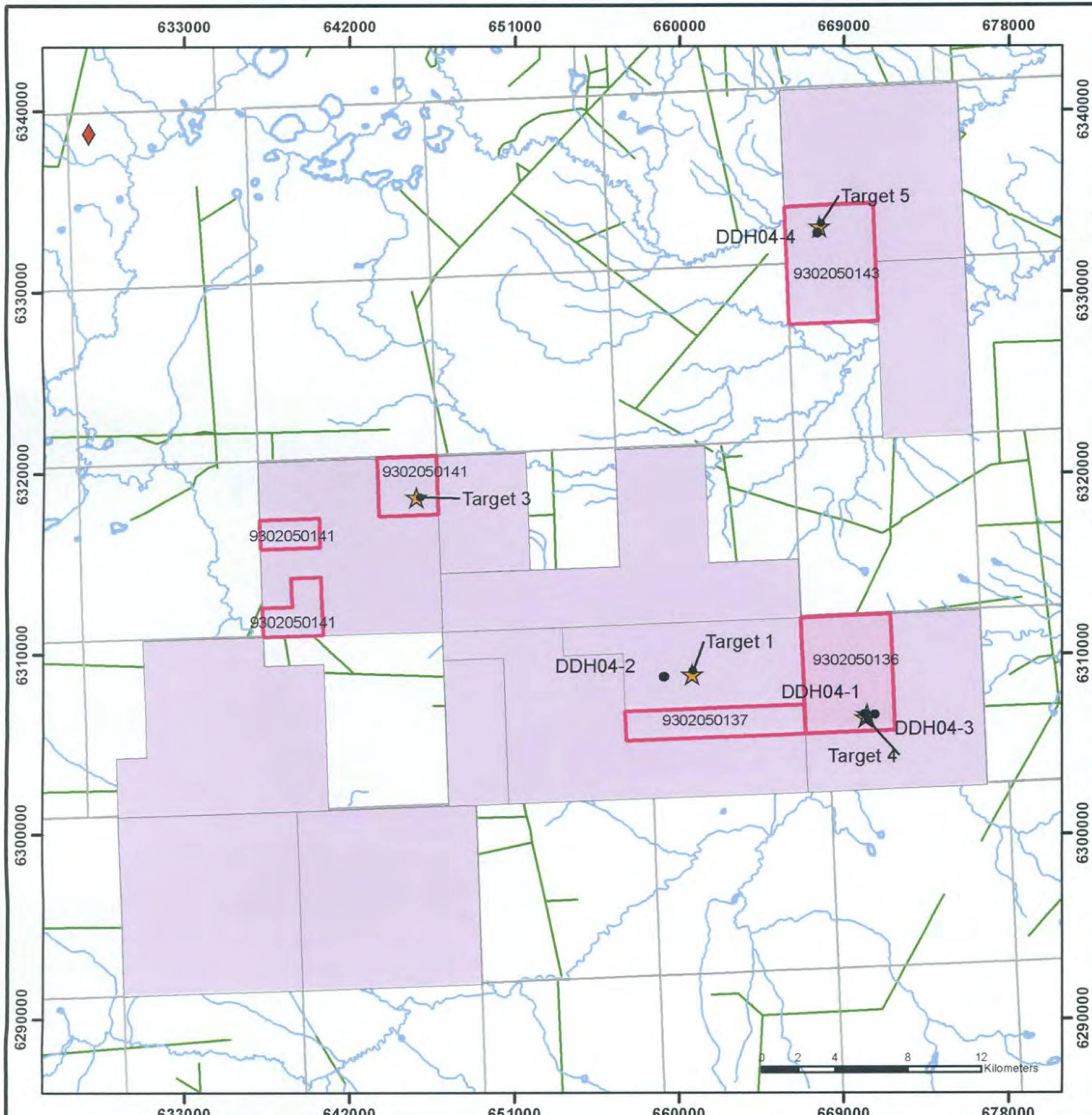
## Previous Exploration: Shear's Liege and Legend Properties

Between 1997 and 2000, Ashton Mining of Canada Ltd. (Ashton) did exploration work on the former Rabbit Lake property which is now the Liege property and one-third of Legend property. Exploration work included several airborne and ground geophysical programs as well as diamond drilling of one target and a heavy mineral, kimberlite indicator mineral sampling program (Skelton and Willis, 2001; Ryziuk, 2004).

The geophysics exploration program on the former Rabbit Lake property included a fixed wing aeromagnetic survey, two detailed helicopter aeromagnetic surveys of selected anomalies, both conducted by High Sense Geophysics Ltd. and ground magnetic surveys on 18 targets (Skelton and Willis, 2001; Cavey and LeBel, 2003). The fixed wing aeromagnetic survey was flown with a terrain clearance of 100m and a 250m spacing, totaling 30,863 line-kms (Skelton and Bursey, 1999). The detailed helicopter aeromagnetic surveys were flown in 1998 with a terrain clearance of 50m and a 100m spacing over the property totaling in 2,079.48 line-kms covering 47 targets on 36 blocks (Skelton and Bursey, 1999). Ground magnetic surveys were conducted on the property between 1999 and 2000 on 18 selected targets using GEM System GSM-19 with two second measurement intervals and 50m station spacing (Skelton and Bursey, 1999; Skelton and Willis, 2001).

Ashton also conducted a sampling program on and around the properties, collecting 108 indicator minerals samples. Thirty-six (36) of these samples were collected on the Liege property of which eight (8) samples were anomalous, including three adjacent samples (AL04-0138, 0139, 0140) with 6, 11 and 29 indicator mineral grains (Cavey and LeBel, 2003) and two (2) anomalous samples (A104-137, 0138) with a total of 15 indicator mineral grains were collected from the Legend property (Skelton and Willis, 2001; Cavey and LeBel, 2003). The complete list of these samples' results is shown in one of Ashton's assessment reports (Ashton, 2001). Regional glacial ice direction in the area is from northeast of the Liege East property and with the known kimberlites (Figure 3) located northwest to north of the property could be the source responsible for the anomalous samples (Skelton and Willis, 2001).

Ashton only drilled one hole, DDHRL1-01, on one target on the Liege East property to test an aeromagnetic anomaly in February of 2000 (Skelton and Willis, 2001; Cavey and LeBel, 2003). The drillhole failed to intersect kimberlite to a depth of 94.5 metres resulting in termination of further work to be completed on the property and allowing the permits to expire in 2001.




**Liege East Property**
**Prior Drillholes and Targets**

Figure 3

NAD83 Zone 11
Alberta, Canada
1:300,000

Edmonton, Alberta June, 2008

977554 Alberta Ltd. (Alberta Ltd.) then acquired the Liege and Legend claims in 2002 based on information of the possibility of diamondiferous kimberlites in the area. Alberta Ltd. conducted several exploration work on the properties including indicator minerals sampling, airborne geophysics and diamond drilling.

Alberta Ltd. conducted work on the properties based on the results of seismic reflection surveys and drilling by Paramount Resources Ltd. (Paramount) who used the area for natural gas exploration (Cavey and LeBel, 2003). Seismic surveys are not a primary tool for diamond exploration, however, in a sedimentary environment the tool is useful in identifying a kimberlite diatreme through the sedimentary layering by interruptions and/or disruptions in seismic reflections (Cavey and LeBel, 2003). According to Skelton and Bursey (1999a) these seismic reflection surveys resulted in the identification of the K2, K4, K5, K6, K7, K32 and K92 kimberlites on the Buffalo Head Hills region west of the properties. The results from the surveys over the Liege and Legend properties revealed two seismic anomalies (Target A and B) on the Liege property and five seismic anomalies (1, 2, 3, 4 and 5) on the Legend property, which indicated kimberlite bodies (Cavey and LeBel, 2003; Figure 3). Seismic reflection surveys also aided in the geometry and structure of kimberlites (Cavey and LeBel, 2003) which determined the seismic signatures of the Buffalo Head Hills' kimberlites which are similar to the interrupted seismic reflections of the anomalies on both the properties. Seismic results from anomaly A bears resemblance to the K5 pipe in the Buffalo Head Hills region (Skelton and Bursey, 1999a) based on the appearance of a "bed" (Cavey and LeBel, 2003). Prior drilling on the Buffalo Head Hills region which intersected kimberlites revealed that some of the kimberlites appeared to be beds rather than pipes therefore anomaly A could be a kimberlite bed or a pipe with a shallow root (Cavey and LeBel, 2003).

Alberta Ltd. collected seven indicator mineral sampling on the property of which only two samples were anomalous with more than two indicator mineral grains with a total of six diamond indicator minerals, five G1-G10 garnets and one chrome diopside (Ryziuk, 2004). Results of all seven samples are shown in Table 2.

Fugro Airborne Surveys Corp. (Fugro) was contracted by Alberta Ltd. to conduct a helicopter borne magnetic and electromagnetic survey over the two targets on the Liege property and a third known kimberlite target for seismic recognition (Ryziuk, 2004). A total of 29.2 line-kms was completed and results revealed target B to be a large pipe-like resistor (Cain, 2004) and two drillholes were drilled to test the target. The drillholes (DDH04-5 and DDH04-6) were drilled to a depth of 103.6 metres and no bedrock were intersected, recovering only unconsolidated till with no core recovery (Ryziuk, 2004) and no explanation for the seismic anomalies. The locations of the drillholes are listed in Table 3 and shown on Figure 3.

## TABLE 2

## 2003 Picked Results*

| Sample Number | NTS Map | Possible Pyrope | Possible Chrome Diopside | Possible Olivine | Possible Ilmenite/ Chromite | Total | Other |
|---|---|---|---|---|---|---|---|
| LW03-1 | 84A/5 | 1 | 0 | 0 | 3 | 4 | |
| LW03-2 | 84A/13 | 3 | 1 | 0 | 0 | 4 | |
| LW03-3 | 84A/13 | 0 | 2 | 0 | 1 | 3 | |
| LW03-4 | 84A/13 | 0 | 0 | 0 | 0 | 0 | |
| LW03-5 | 84A/13 | 1 | 1 | 0 | 1 | 3 | |
| LW03-6 | 84A/13 | 2 | 2 | 3 | 0 | 7 | 4 |
| LWT03-1 | 84A/12 | 0 | 0 | 0 | 0 | 0 | |
| **TOTAL** | | | | | | 21 | |

*based on information provided by Ryziuk (2004) and C.F.Mineral Research Ltd.

## TABLE 3

## Liege's Drillhole Locations

| DDH Number | Easting (NAD27/Zone12) | Northing (NAD27/Zone12) | NTS | Depth Drilled (metres) |
|---|---|---|---|---|
| DHH04-5 | 337886 | 6304239 | 84 A/13 | 103.6 |
| DDH04-6 | 338220 | 6304263 | 84 A/13 | 103.6 |

Despite poor results on Alberta Ltd.'s work, a number of priority geophysical anomalies and diamond indicator mineral anomalies were identified on and in the vicinity of the Liege and Legend properties. Many of these anomalies were not followed up. Wood (1999) reported the presence of a large number of anomalous stream sediment samples with up to 137 and 66 kimberlite indicator minerals in two separate drainages along the north-western boundary of the Liege property.

Although the bulk of the kimberlite indicator minerals recovered by Monopros were chromite and ilmenite with a few pyrope garnets, Wood (1999) suggested that the grains were likely locally derived due to thin overburden and the limited drainage basin that most of the indicator was recovered from. Wood (1999) also suggested that a number of geophysical anomalies detected on the property could be kimberlites and be responsible for the indicator minerals in the drainages. The vast majority of these targets have not been ground surveyed or drill tested.

## Government Diamond Indicator Mineral And Other Scientific Surveys

Diamond indicator mineral studies in the search for kimberlites were first conducted in the region by the AGS in 1993 (Fenton *et al*, 1994; Dufresne *et al.*, 1996). This initial survey and all of the early reconnaissance work prior to the discovery of the Buffalo Head Hills kimberlites are reviewed in Dufresne *et al.* (1996). The Buffalo Head Hills area yielded a few diamond indicator minerals within the "Wabasca River Trend", which was defined as a northerly belt of sites yielding anomalous diamond indicator minerals centered around the Wabasca and Loon rivers in the vicinity of Red Earth Creek and the Liege and Legend properties (Dufresne *et al.*, 1996). The first indication that the region may host diamondiferous kimberlites came from sampling conducted by the AGS during September 1995, when a single till sample from a road cut in close proximity to the BHHJV's K4 Kimberlite yielded 152 possible pyrope garnets (Fenton and Pawlowicz, 1997). A number of surveys have been conducted in the region since then (Fenton and Pawlowicz, 1998a,b; Pawlowicz *et al.*, 1998a,b; Pawlowicz and Fenton, 2001), with varying degrees of success since the initial 1993 survey. A recent multidisciplinary study included the collection of 338 samples in the Peerless Lake, Peace River, Bison Lake and Wadlin Lake Map areas (NTS 84B, 84C, 84F and 84G) by Eccles *et al.* (2001) and by Friske *et al.* (2003). These surveys have resulted in the discovery of a number of diamond indicator mineral anomalies that potentially indicate the presence of a number of undiscovered kimberlites in the region.

## Previous Exploration by Shear Minerals

Between February 17 and March 26, 2006, Firefly Aviation Ltd. completed a 3,898 line-km fixed wing high resolution airborne magnetic (HRAM) survey over the Liege West property. The survey was carried out using a Cessna U206G aircraft, equipped with a rigid-mount tail boom, specially designed for geophysical survey operations, a high sensitivity magnetometer, a full on-board real time compensation recording computer, and related equipment.

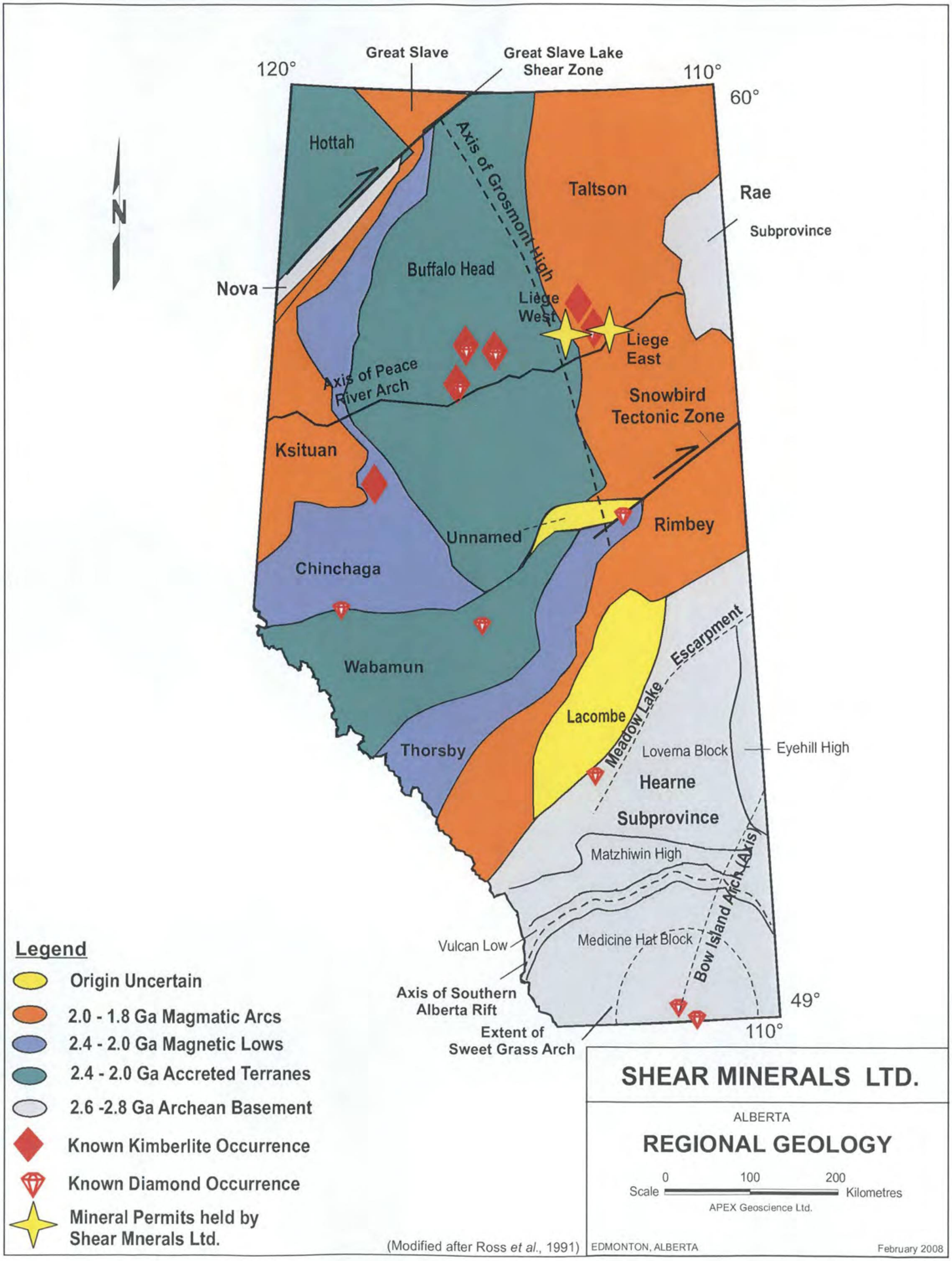
The high resolution airborne magnetic survey was flown using parallel flight lines in a traverse line direction of 270 degrees with 150 meter spaced line intervals flown at a height of best-fit 60-meter drape mode elevation. A number of interesting high frequency magnetic anomalies (greater than 30 nT) were identified during the review of the preliminary data by APEX and Kit Campbell of Intrepid Geophysics (North Vancouver, BC). Using Geosoft Oasis Montaj 6.0 and ERMapper 6.3, the data was reviewed on a line by line profile basis to look for high frequency, short wavelength magnetic anomalies that reflect small, shallow source magnetic anomalies potentially related to geological features such as kimberlites. A total of 11 magnetic targets were identified on the Liege property in the dataset and reviewed for kimberlite genesis potential. A number of the magnetic anomalies present in the survey were identified to be the result of man-made culture or part of linear arrays, most likely related to pipelines or oil and gas wells in the area The two seismic anomalies (Target A and Target B) did not have corresponding magnetic anomalies from the airborne survey. These anomalies require ground checking for man-made culture, and those that remain unexplained after ground truthing, should be followed-up with gridding and ground magnetic surveys and, if required, drilling. In regards to the seismic anomalies, alternative geophysical methods such as ground gravity or electromagnetics should be investigated to explain the reason for the seismic discontinuities.

## GEOLOGICAL SETTING

### Precambrian Geology

The Liege property lies near the northeastern to eastern edge of the Western Canadian Sedimentary basin within the central segments of the Peace River Arch (Figure 4). Precambrian rocks are not exposed within the Buffalo Head Hills region. The basement underlying the Peace River Arch (PRA) is comprised of several terranes, including the Buffalo Head and the Chinchaga, both of which were accreted between 1.8 and 2.4 billion years (Ga) ago and collectively form the Buffalo Head Craton (Ross *et al.*, 1991, 1998). Due to their relatively stable history since accretion, the Buffalo Head and Chinchaga terranes (Figure 4) have been and are currently the focus of extensive diamond exploration in northern Alberta. Ashton along with EnCana and Pure Gold have discovered at least 38 kimberlite pipes proximal to the center of the proposed Buffalo Head Craton (Figure 5). To date, 26 of the 38 kimberlites, discovered in the region by the Buffalo Head Hills Joint Venture, have yielded diamonds.

The Liege property is underlain by basement comprised of the Buffalo Head Terrane (BHT). The BHT is an area of high positive magnetic relief with a north to northeasterly fabric (Villeneuve *et al.,* 1993). The diamondiferous Buffalo Head Hills Kimberlites and Grizzly's property lie near the geographic center of the Buffalo Head Craton (Figure 5). Part of the Churchill Structural Province (Rae Subprovince), the Buffalo Head Craton may represent either Archean crust that has been thermally reworked during the Hudsonian (Proterozoic) Orogeny (Burwash *et al.*, 1962; Burwash and Culbert, 1976; Burwash *et al.*, 1994) or an accreted Early Proterozoic terrane that may or may not have an Archean component (Ross and Stephenson, 1989; Ross *et al.*, 1991; Villeneuve *et al.*, 1993). Precambrian rocks intersected in drill core from the BHT comprise felsic to intermediate metaplutonic rocks, felsic metavolcanic rocks and high-grade gneisses (Villeneuve *et al.*, 1993). Even though Hood and McCandless (2003) suggest that the paucity of subcalcic pyrope garnets in the Buffalo Head Hills is consistent with Proterozoic crust and mantle, recent work by Aulbach *et al.* (2003), indicates that a number of geochemical aspects of the xenoliths from the kimberlites is indicative of the presence of Archean mantle beneath the Buffalo Head Terrane which was likely reworked during Proterozoic



Great Slave
Great Slave Lake Shear Zone
120°
110°
60°
Hottah
Axis of Grosmont High
Taltson
Rae
Subprovince
N
Buffalo Head
Nova
Liege West
Liege East
Axis of Peace River Arch
Snowbird Tectonic Zone
Ksituan
Unnamed
Rimbey
Chinchaga
Escarpment
Wabamun
Meadow Lake
Lacombe
Thorsby
Loverna Block
Eyehill High
Hearne
Subprovince
Matzhiwin High
Bow Island Arch (Axis)
Vulcan Low
Medicine Hat Block
Axis of Southern Alberta Rift
49°
110°
Extent of Sweet Grass Arch
Legend
Origin Uncertain
2.0 - 1.8 Ga Magmatic Arcs
2.4 - 2.0 Ga Magnetic Lows
2.4 - 2.0 Ga Accreted Terranes
2.6 -2.8 Ga Archean Basement
Known Kimberlite Occurrence
Known Diamond Occurrence
Mineral Permits held by Shear Mnerals Ltd.
(Modified after Ross et al., 1991)
SHEAR MINERALS LTD.
ALBERTA
REGIONAL GEOLOGY
Scale 0 100 200 Kilometres
APEX Geoscience Ltd.
EDMONTON, ALBERTA
February 2008


FIGURE 4.

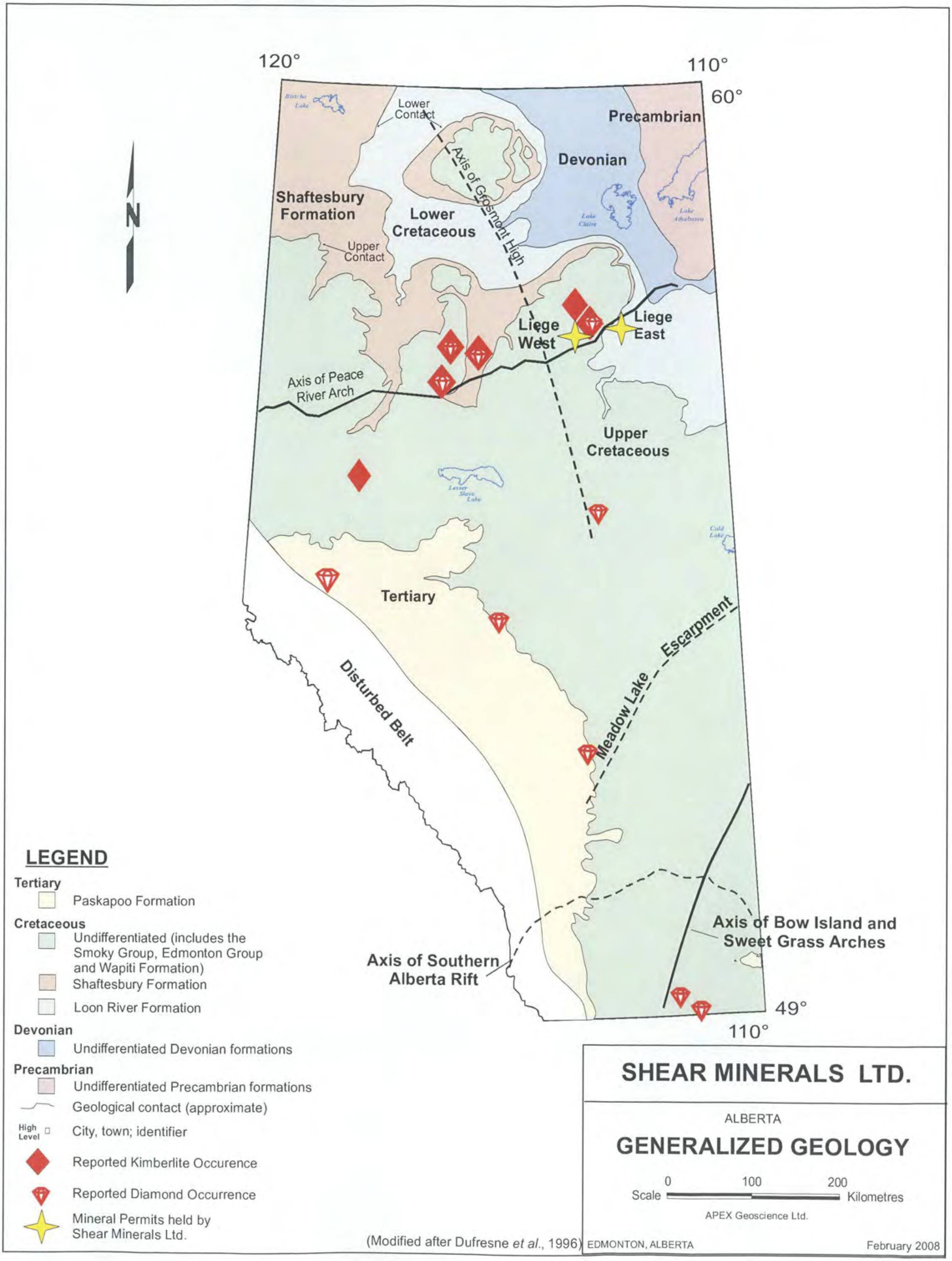

120°
110°
60°
Lower Contact
Precambrian
Devonian
Axis of Grosmont High
Shaftesbury Formation
Lower Cretaceous
Upper Contact
Liege West
Liege East
Axis of Peace River Arch
Upper Cretaceous
Tertiary
Disturbed Belt
Meadow Lake Escarpment
Axis of Bow Island and Sweet Grass Arches
Axis of Southern Alberta Rift
49°
110°
N
LEGEND
Tertiary
Paskapoo Formation
Cretaceous
Undifferentiated (includes the Smoky Group, Edmonton Group and Wapiti Formation)
Shaftesbury Formation
Loon River Formation
Devonian
Undifferentiated Devonian formations
Precambrian
Undifferentiated Precambrian formations
Geological contact (approximate)
High Level
City, town; identifier
Reported Kimberlite Occurence
Reported Diamond Occurrence
Mineral Permits held by Shear Minerals Ltd.
(Modified after Dufresne et al., 1996)
SHEAR MINERALS LTD.
ALBERTA
GENERALIZED GEOLOGY
Scale
0
100
200
Kilometres
APEX Geoscience Ltd.
EDMONTON, ALBERTA
February 2008

FIGURE 5.

crust formation from 2.3 to 2.0 Ga. Seismic refraction and reflection studies indicate that the crust beneath the Buffalo Head Craton is likely between 35 to 40 km (21 to 24 miles) thick, a trait favourable for the formation and preservation of diamonds in the upper mantle (Dufresne *et al.,* 1996). The favourable nature of the Buffalo Head Craton has been confirmed by the discovery of 26 diamondiferous kimberlite pipes near the center of the craton.

**Phanerozoic Geology**

Overlying the basement in the Buffalo Head Hills region is a thick sequence of Phanerozoic rocks comprised mainly of Cretaceous sandstones and shales near surface and Mississippian to Devonian carbonates and salts at depth (Glass, 1990). Bedrock exposure within the permit block is limited primarily to river and stream cuts and topographic highs. Table 4 describes the upper units found in the region. Further information pertaining to the distribution and character of these and older units can be obtained from well log data in government databases and various geological and hydrogeological reports (Green *et al.*, 1970; Tokarsky, 1972; Vogwill, 1978; Ceroici, 1979; Glass, 1990; Mossop and Shetson, 1994).

Underlying the near surface Cretaceous units in the Buffalo Head Hills area is a thick succession of Devonian to Mississippian carbonates, calcareous shales and salt horizons (Mossop and Shetson, 1994). Several of the Devonian carbonate units are part of the Grosmont Reef Complex, a large structure that extends in a northwesterly direction from east of Lesser Slave Lake to the N.W.T. (Bloy and Hadley, 1989). The Grosmont Reef Complex is likely the result of tectonic uplift along this trend during the Devonian. This structure, in conjunction with the PRA, may have played a significant role in the localization of faults and other structures that could have provided favourable pathways for kimberlite volcanism.

In general, the Cretaceous strata underlying the Liege property is composed of alternating units of marine and nonmarine sandstones, shales, siltstones, mudstones and bentonites. The oldest documented units exposed in the permit area belong to the Shaftesbury Formation, a sequence of Upper Cretaceous shales. However, older units from the base of the Fort St. John Group, such as the Peace River and Loon River formations, may be exposed in river and stream cuts.

Part of the Fort St. John Group, the Loon River Formation is Lower Cretaceous in age and is comprised of marine, dark grey, fossiliferous silty-shale and laminated siltstone. Nodules and thin beds of concretionary ironstone may be present within the unit. The Loon River Formation is correlative with the Spirit River Formation. The upper contact is abrupt, but conformable with the Peace River Formation.

The Peace River Formation is Lower Cretaceous in age and comprises three members, Cadotte, Harmon and Paddy. Correlative with the Pelican and Joli Fou formations, the unit averages 60 m in thickness and contains abundant graptolites and starfish. The lowermost member, the Cadotte, comprises massive, clean, fine-grained quartzose sandstone with alternating bands of thin sandstone and shale. Concretions ranging from 3 to 5 m in diameter are common. The middle member, the Harmon, comprises a fissile, non-calcareous,

**TABLE 4**
**GENERALIZED STRATIGRAPHY**
**BUFFALO HEAD HILLS REGION**

| SYSTEM | GROUP | FORMATION | AGE* (MA) | DOMINANT LITHOLOGY |
|---|---|---|---|---|
| PLEISTOCENE | | | Recent | Glacial till and associated sediments |
| TERTIARY | | | 6.5 to Recent | Preglacial sand and gravels |
| UPPER CRETACEOUS | Smoky | Kaskapau | 88 to 92 | Shale, silty-shale and ironstone; includes the Second White Specks unit |
| | | Dunvegan | 92 to 95 | Sandstone and siltstone |
| | Fort St. John | Shaftesbury | 95 to 98 | Shale, bentonites, Fish-Scale Member |
| LOWER CRETACEOUS | Fort St. John | Peace River | >98 to <105 | Quartzose and glauconitic sandstones and silty shale. |
| | | Loon River | 98 to 105 | Shale, siltstone and glauconitic sandstone |

*Ages approximated from Green *et al.* (1970), Glass (1990), Dufresne *et al.* (1996) and Leckie *et al.* (1997).

dark grey silty-shale with thin interbeds of bentonite and siltstone. Both the Cadotte and the Harmon members are laterally extensive, relatively thick and marine in origin. The third member, the Paddy, is comprised of fine-grained glauconitic sandstone with silty interbeds in the lower portions. Thin coal beds and marine fossils may be present. The Paddy is laterally discontinuous and varies from marine to continental (deltaic) in origin. If the Paddy unit is intact, the upper contact is conformable, but abrupt with the Shaftesbury Formation. In many regions, the upper contact of the Peace River Formation is an abrupt hiatus.

The Shaftesbury Formation is lower Upper Cretaceous in age and is comprised of marine shales with fish-scale marker bed bearing silts, thin bentonitic streaks and ironstones. The upper contact is conformable and transitional with the Dunvegan Formation. The Shaftesbury Formation may be exposed along river and stream cuts. Evidence of extensive volcanism during deposition of the Shaftesbury Formation exists in the form of numerous bentonitic horizons throughout the formation, especially within and near the Fish Scales horizon (Leckie *et al.*, 1992; Bloch *et al.*, 1993). The deposition of the Shaftesbury Formation is also chronologically correlative with the deposition of the Crowsnest Formation volcanics of southwest Alberta (Olson *et al.*, 1994; Dufresne *et al.*, 1995) and with kimberlitic volcanism near Fort á la Corne in Saskatchewan (Lehnert –Thiel *et al.*, 1992; Scott Smith *et al.*, 1994). In many cases, the Ashton kimberlite pipes contain extensive volumes of Cretaceous mudstone, most of which is likely derived from the Shaftesbury Formation.

Deltaic to marine, feldspathic sandstones, silty shales and laminated carbonaceous siltstones, characterise the Dunvegan Formation (Glass, 1990). Thin beds of shelly material, coal, siltstone and bentonite may be present. The formation is rich in shallow-water fauna, including abundant molluscs. The Dunvegan Formation becomes more arenaceous and thinner eastwards, where it grades into the LaBiche Formation. The upper contact of the unit is conformable and transitional with the shales of the Kaskapau Formation of the Smoky Group. The Ashton pipes exist just above or near the contact between the Kaskapau and the Dunvegan formations (Dufresne *et al.*, 2001).

The youngest bedrock units belong to the Smoky Group (Glass, 1990). The Smoky Group is Upper Cretaceous in age and is comprised of thinly bedded, marine, silty shale with occasional ironstone and claystone nodules and thin bentonite streaks. The group is divided into three formations: (a) a lower shale unit, Kaskapau, which includes the Second White Specks marker unit (SWS); (b) a middle sandstone, named the Bad Heart; and, (c) an upper shale, Puskwaskau, which contains the First White Specks marker unit. Bedrock exposures in the "Bison Lake" Property are likely comprised of the Kaskapau Formation, in particular, the SWS or lower. Most of the upper portions of the Smoky Group have been eroded away during tectonic uplift, possibly associated with uplift of the PRA. The Kaskapau Formation contains abundant ammonite fossils and concretions. In addition, foraminifera are present in the lower arenaceous units (Glass, 1990). Exposures of the Smoky Group are generally limited to topographic highs and stream cuts within the Buffalo Head Hills. There is strong evidence of volcanism associated within the depositional time span of the Smoky Group around the PRA (Auston, 1998; Carlson *et al.*, 1999). The BHHJV's recently discovered Buffalo Head Hills kimberlites yield emplacement ages of 86 to 88 Ma (Auston, 1998; Carlson *et al.*, 1999).

## Quaternary Geology

Data and information about the surficial geology in central to northern Alberta is sparse and regional in nature. Prior to continental glaciation during the Pleistocene, most of Alberta, including the Buffalo Head Hills region, had reached a mature stage of erosion. Large, broad paleochannels and their tributaries drained much of the region, flowing in an east to northeasterly direction (Dufresne *et al.*, 1996). In addition, fluvial sand and gravel was deposited preglacially in these channels.

During the Pleistocene, multiple southeasterly and southerly glacial advances of the Laurentide Ice Sheet across the region resulted in the deposition of ground moraine and associated sediments (Figure 5 in Dufresne *et al.,* 1996). The advance of glacial ice may have resulted in the erosion of the underlying substrate and modification of bedrock topography. Dominant ice flow directions within the Buffalo Head Hills region appear to be topographically controlled, following the south-southwest trend of the BHH (Fenton and Pawlowicz, 2000). In addition, topographic variations may have locally channelled ice flow towards the south to south-southeast east of the BHH. Glacial sediments infilled low-lying and depressional areas, draped topographic highs and covered much of the area as veneers and/or blankets of till and diamict. Localised pockets of deposits from glacial meltwater and proglacial lakes likely infilled areas of low relief (Fenton and Pawlowicz, 2000).

The majority of the Buffalo Head Hills area is covered by drift of variable thickness, ranging from 15 m to over 250 m (Pawlowicz and Fenton, 1995a, 1995b, 2005a, 2005b and Balzer and Dufresne, 1999). The vast majority of the property is thought to be covered with drift ranging from about 75 m to 150 m thick. Drift thickness may be thinner locally, in areas of higher topographic relief. Unfortunately, local drift thickness for Grizzly's Buffalo Head Hills properties can not be easily delineated due to the paucity of publicly available data for the region. Limited general information regarding bedrock topography and drift thickness in northern Alberta is available from the logs of holes drilled for petroleum, coal or groundwater exploration and from regional government compilations (Tokarsky, 1972; Mossop and Shetson, 1994; Pawlowicz and Fenton, 1995a, 1995b, 2005a, 2005b; Dufresne *et al.*, 1996). It should be noted that the drift thickness over the Buffalo Head Hills Kimberlites is extremely variable ranging from more than 120 m to kimberlites that outcrop or subcrop. Several of the kimberlites intersected in drilling to date exist as positive topographic features relative to the local bedrock surface beneath the glacial overburden. For example, the BHHJV's K6 Kimberlite was initially intersected beneath 13 m of overburden (Ashton Mining of Canada Inc., 1997c). The K6 Kimberlite yields depths of overburden of more than 70 m at the margins of the pipe and even thicker depths of overburden over the mudstone bedrock surrounding the pipe (Mr. B. Clements, *personal communication*, 2002). The K6 Kimberlite is one of a number of kimberlites in the Buffalo Head Hills that display this relationship. The implications of this are that in areas where the overburden is estimated to be 75 to 150 m, there is still a chance that any kimberlites found could be covered by substantially less overburden.

Glacial ice is believed to have receded from the BHH region between 15,000 and 10,000 years ago. After the final glacial retreat, lacustrine clays and silts were deposited in low-lying regions along with organic sediments. Rivers previously re-routed due to glaciation, re-established easterly to northeasterly drainage regimes similar to that of the pre-Pleistocene. Extensive colluvial and alluvial sediments accompanied post-glacial river and stream incision.

### Structural Geology

In north-central Alberta, the PRA is a region where the younger Phanerozoic rocks, which overlie the Precambrian basement, have undergone periodic vertical and, possibly, compressive deformation from the Proterozoic into Tertiary time (Cant, 1988; O'Connell *et al.*, 1990; Dufresne *et al.*, 1995, 1996). This pattern of long-lived, periodic uplift and subsidence has imposed a structural control on the deposition patterns of the Phanerozoic strata in northern Alberta. In addition, this periodic movement has resulted in a rectilinear pattern of faults that not only is responsible for structurally controlled oil and gas pools, but may have provided potential pathways for later deep-seated intrusive kimberlitic magmas. Eccles *et al.* (2000) show that several of the Buffalo Head Hills kimberlites occur at the intersection of north and east-northeast trending lineaments likely related to underlying faults that have been reactivated during periodic tectonic activity associated with the Peace River Arch. Eccles *at al.* (2000) used a combination of very detailed digital elevation data and RadarSat data to identify the intersecting lineaments.

During the mid-Cretaceous and Early Tertiary, compressive deformation occurred as a result of the orogenic event that eventually led to the formation of the Rocky Mountains. The PRA was emergent during this period resulting in the reactivation of many prominent basement faults. The Phanerozoic rocks beneath the Red Earth Creek region lie along the axis of the PRA, and are underlain by and proximal to basement faults related to the Grosmont Reef Complex, which formed over the Grosmont High (Bloy and Hadley, 1989; Dufresne *et al.*, 1996). There is strong evidence that basement faults that have manifested themselves in the overlying Phanerozoic sedimentary succession may have controlled the emplacement of the Buffalo Head Hills kimberlites west-northwest from the Liege property (Dufresne *et al.*, 1996; Leckie *et al.*, 1997; Eccles *et al.*, 2000). Similar structures observed on the property could have resulted from tectonic activity associated with movement along the PRA or the Grosmont High and therefore could have provided pathways for kimberlitic volcanism.

## DEPOSIT MODEL

### Kimberlites

Kimberlite is best described as a hybrid igneous rock (Mitchell, 1986, 1989, 1991; Skinner, 1989; Scott Smith, 1995). Kimberlites are igneous in nature since they have crystallised from a molten liquid (kimberlitic magma) originating from the earth's upper mantle. Kimberlite magma contains volatile gases and is relatively buoyant with respect to the upper mantle. As a result, pockets of kimberlitic magma will begin to ascend upward through the upper mantle and along a path of least resistance to the earth's surface. As the kimberlitic magma ascends, the volatile gases within the magma expand, fracturing the overlying rock, continually creating and expanding its own conduit to the earth's surface. As a kimberlitic magma begins to ascend to the earth's surface it rips up and incorporates fragments or xenoliths of the various rock types the magma passes through on its way to surface. As the magma breaks down and incorporates these xenoliths, the chemistry and mineralogy of the original magma becomes altered or hybridised. The amount and type of foreign rock types a kimberlite may assimilate during its ascent will determine what types of minerals are present in the kimberlite when it erupts at surface.

When kimberlitic magma reaches or erupts at the earth's surface, the resulting volcanic event is typically violent, creating a broad shallow crater surrounded by a ring of kimberlitic volcanic ash and debris ("tuffaceous kimberlite"). The geological feature created by the emplacement of a kimberlite is referred to as a diatreme or kimberlite pipe (Mitchell, 1986, 1989, 1991). In a simplified cross section a kimberlite diatreme appears as a near vertical, roughly "carrot shaped" body of solidified kimberlite magma capped by a broad shallow crater on surface that is both ringed and filled with tuffaceous kimberlite and country rock fragments (Mitchell, 1986, 1989, 1991).

**<u>Diamond Indicator Minerals</u>**

Diamonds do not crystallise from a kimberlitic magma: they crystallise within a variety of diamond bearing igneous rocks in the upper mantle called peridotites and eclogites. Peridotites and eclogites are each made up of a diagnostic assemblage of minerals that crystallise under specific pressure and temperature conditions similar to those conditions necessary to form and preserve diamonds ("diamond stability field"). Diamond bearing peridotite can be further broken down into three varieties which are, in order of greatest diamond bearing significance, garnet harzburgite, chromite harzburgite, and, to a lesser extent, garnet lherzolite. For a kimberlite to be diamond bearing, the primary kimberlitic magma must disaggregate and incorporate some amount of diamond bearing peridotite or eclogite during its ascent to the earth's surface. The type and amount of diamond bearing peridotite or eclogite the kimberlitic magma incorporates during its ascent will determine the diamond content or grade of that specific kimberlite as well as the size and quality of diamonds. Diamond bearing peridotite and eclogite occur as discontinuous pods and horizons in the upper mantle, typically underlying the thickest, most stable regions of Archean continental crust or cratons (Helmstaedt, 1993). As a result, almost all of the economic diamond bearing kimberlites worldwide occur in the middle of stable Precambrian (typically Archean) cratons. The Buffalo Head Hills Craton is an example of such a craton.

Diamond indicator minerals (DIMs) include minerals that have crystallised directly from a kimberlitic magma (phenocrysts), or mantle derived minerals (xenocrysts) that have been incorporated into the kimberlitic magma as it ascends to the earth's surface. Examples of DIMs are picroilmenite, titanium and magnesium rich chromite, chrome diopside, magnesium rich olivine, pyropic and eclogitic garnets. Varieties of garnet include G1, G2, G9, G10, G11, G12 pyropes as defined by Dawson and Stephens (1975), G9 and G10 pyropes as defined by Gurney (1984) and Gurney and Moore (1993) and G3, G4, G5, and G6 eclogitic garnets as defined by Dawson and Stephens (1975). From this paragraph on, reference to G1, G2, G3, G4, G5, G6, G11 and G12 pyrope garnets refers to Dawson and Stephens' (1975) classification and G9 and G10 refers to Gurney's (1984) G9 and G10 pyrope garnets of lherzolitic and harzburgitic origin, respectively.

DIMs are used not only to assess the presence of kimberlites in regional exploration programs but also to assess whether the kimberlites have the potential to contain diamonds. There are a limited variety of DIMs from which information pertaining to the diamond bearing potential of the host kimberlite can be gained. Typically, these are DIMs which have been derived from diamond bearing peridotite and eclogite in the upper mantle (Mitchell, 1989). The most common examples of these would include sub-calcic, G10 Cr-pyrope garnets (harzburgitic), G9 pyrope garnets (lherzolitic), Cr- and Mg-rich chromite (diamond inclusion quality or "DIF" chromite from chromite or spinel harzburgite), diamond inclusion quality "DIF" eclogitic garnets and chemically distinct jadeite clinopyroxene (diagnostic of diamond bearing eclogites).

Other indicator minerals that have crystallised from a kimberlitic magma can provide information as to how well the diamonds in a given kimberlite have been preserved during their ascent to surface. For instance, the presence of low iron and high magnesium picroilmenites in a kimberlite is a positive indication that the oxidising conditions of a kimberlitic magma were favourable for the preservation of diamonds during their ascent to surface in the kimberlitic magma.

## Exploration

Due to the unique geometry of a kimberlite pipe and the manner in which the kimberlite has intruded a pre-existing host rock type, there are often differences in the physical characteristics of a kimberlite and the host rock. Sometimes these contrasting physical characteristics are significant enough to be detected by airborne or ground geophysical surveys. Two of the most commonly used geophysical techniques are airborne or ground magnetic surveys and electromagnetic (EM) surveys. A magnetic survey measures the magnetic susceptibility and EM surveys measure the electrical conductivity (or resistivity) of the material at or near the earth's surface. When magnetic or resistivity measurements are collected at regular spaced intervals along parallel lines, the data can be plotted on a map and individual values can be compared. If a geophysical survey is conducted over an area where the bedrock and overburden geology is constant and there are no prominent structures or faults, there will be little variation in magnetic or resistivity response. However, when a kimberlite intrudes a homogenous geologic unit and erupts on surface, there is often a detectable change in the geophysical signature or anomalous magnetic or resistivity response over the kimberlite diatreme. When the data are contoured the anomalous results often occur as a circular or oval anomaly outlining the surface or near surface expression of the diatreme.

The effectiveness of geophysical methods in kimberlite exploration is dependent on the assumption that the difference between the geophysical signature of the hosting rock unit and a potential kimberlite is significant enough to be recognised by the geophysical techniques available. There are many examples of economic kimberlites that produce very subtle, unrecognisable geophysical responses as well as non kimberlite geologic features and man made structures (referred to as "cultural interference") such as oil wells, fences, bridges, buildings which can produce kimberlite like anomalies. In addition, in areas of thick overburden, such as the Buffalo Head Hills region, sand and gravel with water and placer accumulations of heavy oxide minerals, can yield both 2magnetic and EM anomalies that are easily confused with those due to kimberlite. For these reasons, it is extremely important that other information such as DIM surveys be used in tandem with geophysical evidence to confirm whether there is other information to support the presence of a kimberlite pipe (Fipke *et al.*, 1995).

## 2006-2007 EXPLORATION

In 2006, Shear Minerals Ltd. conducted ground geophysical surveys and ground truthing of airborne geophysical targets. In 2007, Quadra Surveys conducted the ground gravity survey on the Liege East property. Table 5 shows the target locations.

**TABLE 5**
**LIEGE EAST TARGET LOCATION**

| Targets | Easting Zone 12 Nad 1927 | Northing Zone 12 Nad 1927 |
|---|---|---|
| LD010 | 394974.1 | 6318810.1 |
| S3 | 402773.8 | 6319817.3 |
| S4 | 426683.8 | 6306317.3 |
| S5 | 425633.8 | 6333352.3 |

## 2006 and 2007 Target Ground Checking

In total 1 airborne geophysical target was ground truthed in November, 2006, by Saz Yaqzan of Shear Minerals Ltd. (Figure 6, Table 6). It was determined that the airborne magnetic target was not caused by man-made culture, such as drill collars used in oil and gas exploration. The target was not explained by ground checking warranting follow-up work with a ground geophysical survey. If the target is found to be promising, it may be prioritized for drilling. In 2007 the 3 seismic targets were visited by Saz Yaqzan of Shear Minerals Ltd. (Figure 6, Table 6)

The 1 priority airborne magnetic target (Table 6) and the 3 seismic targets were were visited by helicopter and given a preliminary evaluation as to first whether there was culture present and then secondly, if not, the quality of the target based upon topography, the presence of any vegetation anomalies and thirdly whether the anomaly should have ground geophysics or DIM sampling performed. The target airborne targets was given a priority ranking of 3 meaning that it was a low priority target or a target not liked (Table 6).

The seismic targets require further investigation before being ranked.

**Table 6**
**Ground Check Summary**

| Liege East | X_NAD 27 | Y_NAD 27 | Observations | Vegetation Anomaly |
|---|---|---|---|---|
| LD010 | 395037.4 | 6318597.32 | Near winter road. Heavily treed area, flat | no |
| S3 | 402773.8 | 6319817.3 | Swampy area with trees in the middle. | yes |
| S4 | 426683.8 | 6306317.3 | Moderately to heavily treed area with no obvious anomaly | no |
| S5 | 425633.8 | 6333352.3 | Heavily treed area, no obvious anomaly | no |

## 2006 Ground Geophysical Surveys

The 1 high priority geophysical anomaly identified from the 2006 aeromagnetic survey that was deemed not to be the result of culture, by ground truthing, was selected to be surveyed by detailed ground magnetics. As well, 1 target identified from a seismic survey was also chosen to be surveyed by detailed ground magnetics (Figure 6). Between November 28 and December 11, 2006 Shear Minerals Ltd. conducted the ground geophysical using GSM-19 Overhauser magnetometers. The geophysical grids ranged in size from approximately 250 m by 250 m to 300 m by 400 m, with lines spaced 50 m apart along the baseline, and 2.5 m stations along each line. The ground grid summaries and contoured grid maps are presented in Appendix 4.

GSM-19 Overhauser magnetometers were used to measure the Earth's magnetic field with 0.01 nT resolution, and 0.2 nT absolute accuracy. The units employed are 'walking magnetometers' with Canadian Differential GPS (CDGPS) capability, providing sub-meter X-Y positional accuracy. Readings were automatically taken every 0.5 seconds, yielding an effective ground sampling rate of 1 reading every 2.5 metres. Time synchronization of the roving or field units with a stationery base station unit provided automatic corrections for diurnal variations of the Earth's magnetic field.

Manipulation of ground magnetics data was limited to diurnal correction and levelling of data when a single survey was completed over multiple days. Both methods are described in detail below.

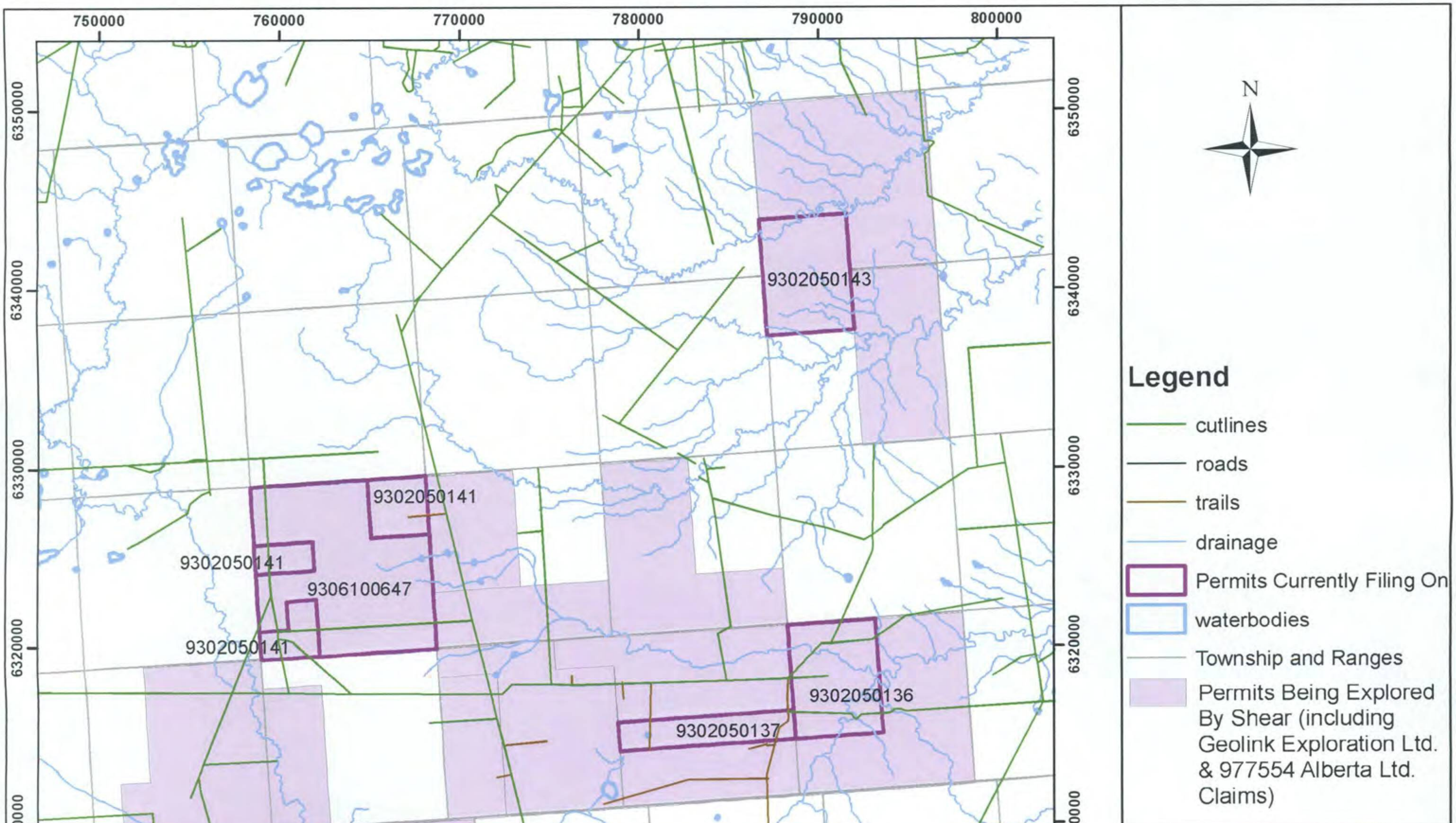
Manipulation of ground magnetic data included diurnal correction. Total field magnetic data measured by the GSM-19 is the sum of two vector components: the Earth's magnetic field and the induced magnetic field generated by a geologic body beneath the instrument. The Earth's magnetic field is not constant therefore a correction of total field data is necessary to remove effects of temporal fluctuations in the Earth's magnetic field. During collection of ground magnetic data a stationery base magnetometer was set up at a location just outside main base camp to allow diurnal correction of survey data. Both the mobile and base station magnetometers were time-synchronized off the satellites to GMT; the base station magnetometer was set to collect survey readings every 1 second. This ensures that the time of each mobile magnetometer reading corresponds with the collection of a reading by the base station magnetometer; in the case of 0.5 second sampling by the field magnetometer unit, a simple interpolation is carried out assuming a linear drift between base station readings.

The diurnal correction of total field magnetic field data is then completed in the following manner:

$$B_{t1} - D = C_{t1}$$
$$M_t - C_{t1} = M_{t1\ \mathrm{corrected}}$$

Where: $B_{t1}$ = base magnetometer reading B" at time $t_1$
D = base magnetometer datum = 59,300 nT
$C_{t1}$ = Diurnal Correction C at time $t_1$
$M_t$ = mobile magnetometer reading M at time $t_1$
$M_{t1\ \mathrm{corrected}}$ = corrected mobile magnetometer reading

In some cases a survey grid was completed over a number of days. In these cases levelling of data from different days was required before merging the data files and producing a colour contour plot of the anomaly. Levelling of data between multiple days is necessary due to daily fluctuations in the earth's magnetic field. To facilitate levelling of ground magnetic data a minimum 100 metres of survey overlap was completed between each day. The average difference of duplicate data readings between the 1$^{st}$ and 2$^{nd}$ days was then calculated. This produces a correction factor that can be applied to one of the data sets. It is important to realize that the absolute value of each magnetic reading is less important than the magnitude of the anomaly. In other words, the correction factor (be it positive or negative) can be subtracted from the 1st data set or added to the 2nd data set and in fact has no effect on the magnitude of the anomaly. In practice, the correction factor is many orders of magnitude less than a given magnetic reading. No other levelling or processing of data was necessary.




**Liege East Property**
**Detailed Mineral**
**Permit Locations**

Figure 2

NAD83 Zone 11
Alberta, Canada
1:300,000

Edmonton, Alberta June, 2008

## 2007 Ground Gravity Surveys

A ground gravity survey was completed over 2 seismic anomalies (Seismic 3 and Seismic 5, Figure 6). The gravity survey was conducted by Quadra Surveys in December 2007, using LaCoste & Romberg gravity meters and Topcon Hiper Plus GPS receivers. The L&R gravity meters have a reading resolution of 0.01 mGal with a very low daily drift rate. The ground gravity grid was approximately 500 m x 700 m, conducted at a line spacings of 100 m and 50 m with a station intervals of 100 m and 50m. The final report from Quadra Surveys, and the contoured grid maps are presented in Appendix 3.

## EXPLORATION EXPENDITURES

The cost to conduct 2007 exploration program within the Liege East Property was CAN$ 91,922.52 (not including GST). A detailed breakdown of the expenses is presented in Appendix 4.

## CONCLUSION AND DISCUSSIONS

The regional setting for Shear's Liege property is considered highly favorable for the presence of diamondiferous kimberlites. The permits are predominantly underlain by Early Proterozoic to Archean basement of the Buffalo Head Craton. The local bedrock geology and the underlying Archean and Proterozoic crystalline basement in association with Phanerozoic structures, such as the Peace River Arch, likely provided a favorable environment for the formation and ascent of kimberlitic magmas in the Buffalo Head Hills area. This regional geological and structural setting is also considered favorable for the formation of kimberlitic magma in the upper mantle and its ascent to surface during periodic tectonic activity associated with movement along the Peace River Arch and the Grosmont High. Significant crustal thickness (35 to 40) underlying the area in combination with a number of important Gurney (1984) G10 subcalcic pyrope garnets are a strong indication that the area was underlain by upper mantle suitable for the formation and preservation of diamonds. This is confirmed with the discovery of at least 26 diamondiferous kimberlite pipes to date in the Buffalo Head Hills area by the BHHJV.

Limited bedrock exposures have been observed and reported within the area due to presence of extensive glacial deposits. Local bedrock exposed in the area or intersected in near surface drilling is age correlative to bedrock in other parts of the Buffalo Head Hills that has been intruded by kimberlites. The glacial history for the Buffalo Head Hills region is very complex with regions of thick glacial drift, extensive glacial gravel and evidence of extensive glacial tectonism. Drift thickness is known to range from less than 25 m (80 ft) to greater than 250 m (820 ft) with multiple layers of till and glacial outwash. The complex glacial deposits and glacial history can be a serious impediment to exploration for kimberlites. Future exploration programs for kimberlites and diamonds in the Buffalo Head Hills area should include a full compilation of the glacial deposits and drift thickness. Areas of thin drift and less glacial complexity should be the focus of any future exploration programs. Those areas underlain by thick drift in preglacial paleo-river channels should be omitted from future exploration.

Ground truthing of the 1 priority target identified from the 2006 fixed wing HRAM survey resulted in the need for follow-up work. Detailed ground magnetics surveys were conducted over the 1 high priority airborne anomaly and one seismic target using GSM-19 Overhauser magnetometers. Ground gravity was conducted on 2 seismic targets. Based on the ground truthing, ground geophysics and ground gravity three targets are recommended for drilling (Table 7).

**Table 7**
**Drill Target Recommendations**

| Drill Target | airborne Xnad83 | airborne Ynad83 | Vegetation Anomaly | Intrepid Geophysics - Description of Ground Geophysics | Final Rank |
|---|---|---|---|---|---|
| LD010 | 394974.1 | 6318810.1 | no | strong, double-peaked magnetic high, sub-circular in shape | 2 |
| Seismic 3 | 402773.8 | 6319817.3 | - | - | - |
| Seismic-5 | 425633.8 | 6333352.3 | - | - | - |

## RECOMMENDATIONS

Although historically there has been extensive oil exploration in the area, with respect to diamond potential, the Liege East property is still in the early stages of exploration. In addition, the results of current exploration completed by Shear Minerals Ltd. have shown the Liege East Property contains a number of geophysical targets that warrant further investigation. This illustrates the significant potential of Buffalo Head Craton and the Liege East property to host kimberlites. A follow-up exploration program focused on drilling is warranted to search for diamondiferous kimberlites. For the Liege East property, future exploration should consist of the following:

Conduct an aggressive spring drilling program on the recommended targets from ground geophysical grids. In conjunction a reinterpretation of the airborne geophysical survey should be completed to determine if there are any remaining targets for ground follow-up. If drilling of "seismic 1" target results in kimberlite then ground gravity should be completed on remaining non to weakly magnetic targets. The estimated cost to complete this program is $300,000 (6 drill holes x $50,000) for drilling and $15, 000 for geophysical reinterpretation. The cost of the ground gravity program is to be determined. The total cost to complete the drilling and geophysical reinterpretion is CAN$315,000 (plus GST).

Shear Minerals Ltd.

Pamela Strand, M. Sc., P. Geol.

Edmonton, Alberta
June 27, 2008

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# CERTIFICATE OF AUTHOR

I, Pamela D. Strand, Residing at 10828-126 Street, Edmonton, Alberta, Canada do hereby certify that:

1. I am the President and CEO and Director of Shear Minerals Ltd, Suite 100 ,9797-45 Ave, Edmonton, Alberta, Canada.

2. I am a graduate of the University of Toronto with a B.Sc. Degree in Geology (1988) and a graduate of the University of Western Ontario, London, Ontario with a M.Sc. in Geology (1993) and have practiced my profession continuously since 1986.

3. I am a Professional Geologist registered with APEGGA (Association of Professional Engineers, Geologists and Geophysicists), and NAPEGG and a 'Qualified Person' in relation to the subject matter of this report. I am also the Responsible Member under Shear's Permit to Practice and Professional Practice Management Plan.

4. I have not received, nor do I expect to receive, any interest directly or indirectly, in the Liege West Diamond Property, Alberta.

5. I currently have an interest in Shear Minerals Ltd in the form of securities.

6. I am not aware of any material fact or material change with respect to the subject matter of the Report that is not reflected in the Report of the omission to disclose which makes the Report misleading.

7. I have not visited the property that is the subject of this report.

8. I hereby consent to the use of this Report and my name in the preparation of a prospectus for the submission to any Provincial or Federal regulatory authority and for assessment reporting purposes .

PROFESSIONAL GEOLOGIST PAMELA D. STRAND ALBERTA

Pamela Strand, M.Sc., P. Geol.
Edmonton, Alberta
June 27, 2008

# APPENDIX 1

METALLIC MINERAL AGREEMENTS

Alberta

## MINERAL AGREEMENT DETAIL REPORT

Report Date: June 10, 2008 3:16:11 PM

**Agreement Number:** 093 9302050136

Status: ACTIVE
Agreement Area: 3072

Term Date: 2002-05-24
Continuation Date:

### DESIGNATED REPRESENTATIVE

Client Id: 8065185
Client Name: 977554 ALBERTA LTD.
Address: 888 3 ST SW SUITE 4700
CALGARY, AB
CANADA T2P 5C5

### LAND / ZONE DESCRIPTION

**4-14-091:** 16-21;28-33

METALLIC AND INDUSTRIAL MINERALS

Alberta

# MINERAL AGREEMENT DETAIL REPORT

Report Date: June 10, 2008 3:17:12 PM

**Agreement Number:** 093 9302050137

Status: ACTIVE
Agreement Area: 1536

Term Date: 2002-05-24
Continuation Date:

## DESIGNATED REPRESENTATIVE

Client Id: 8065185
Client Name: 977554 ALBERTA LTD.
Address: 888 3 ST SW SUITE 4700
CALGARY, AB
CANADA T2P 5C5

## LAND / ZONE DESCRIPTION

**4-15-091:** 13-18

METALLIC AND INDUSTRIAL MINERALS

Alberta

# MINERAL AGREEMENT DETAIL REPORT

Report Date: June 10, 2008 3:10:12 PM

**Agreement Number:** 093 9302050141

Status: ACTIVE
Agreement Area: 2304

Term Date: 2002-05-24
Continuation Date:

## DESIGNATED REPRESENTATIVE

Client Id: 8065185
Client Name: 977554 ALBERTA LTD.
Address: 888 3 ST SW SUITE 4700
CALGARY, AB
CANADA T2P 5C5

## LAND / ZONE DESCRIPTION

**4-17-092:** 05;06;08;19;20;25;26;35;36

METALLIC AND INDUSTRIAL MINERALS

Alberta

# MINERAL AGREEMENT DETAIL REPORT

Report Date: June 10, 2008 3:19:36 PM

**Agreement Number:** 093 9302050143

Status: ACTIVE
Agreement Area: 3072

Term Date: 2002-05-24
Continuation Date:

## DESIGNATED REPRESENTATIVE

Client Id: 8065185
Client Name: 977554 ALBERTA LTD.
Address: 888 3 ST SW SUITE 4700
CALGARY, AB
CANADA T2P 5C5

## LAND / ZONE DESCRIPTION

**4-14-093:** 28-33
**4-14-094:** 04-09

METALLIC AND INDUSTRIAL MINERALS

## APPENDIX 2

AIRBORNE GEOPHYSICAL TARGET CHECKS

| Observations of Liege East Anomalies | | Date |
|---|---|---|
| Site | Observation | |
| LD010 | Near winter road.Heavily treed area, flat | November-06 |
| S 3 | Swampy area with trees in middle | September-07 |
| S 4 | Moderately to heavily treed area with no obvious anomaly | September-07 |
| S 5 | Heavily treed area, no obvious anomaly | September-07 |

Liege East

Ground checked target

LD010

**Liege East**

**Ground checked target**

**S3**

Liege East

Ground checked target

S4

**Liege East**

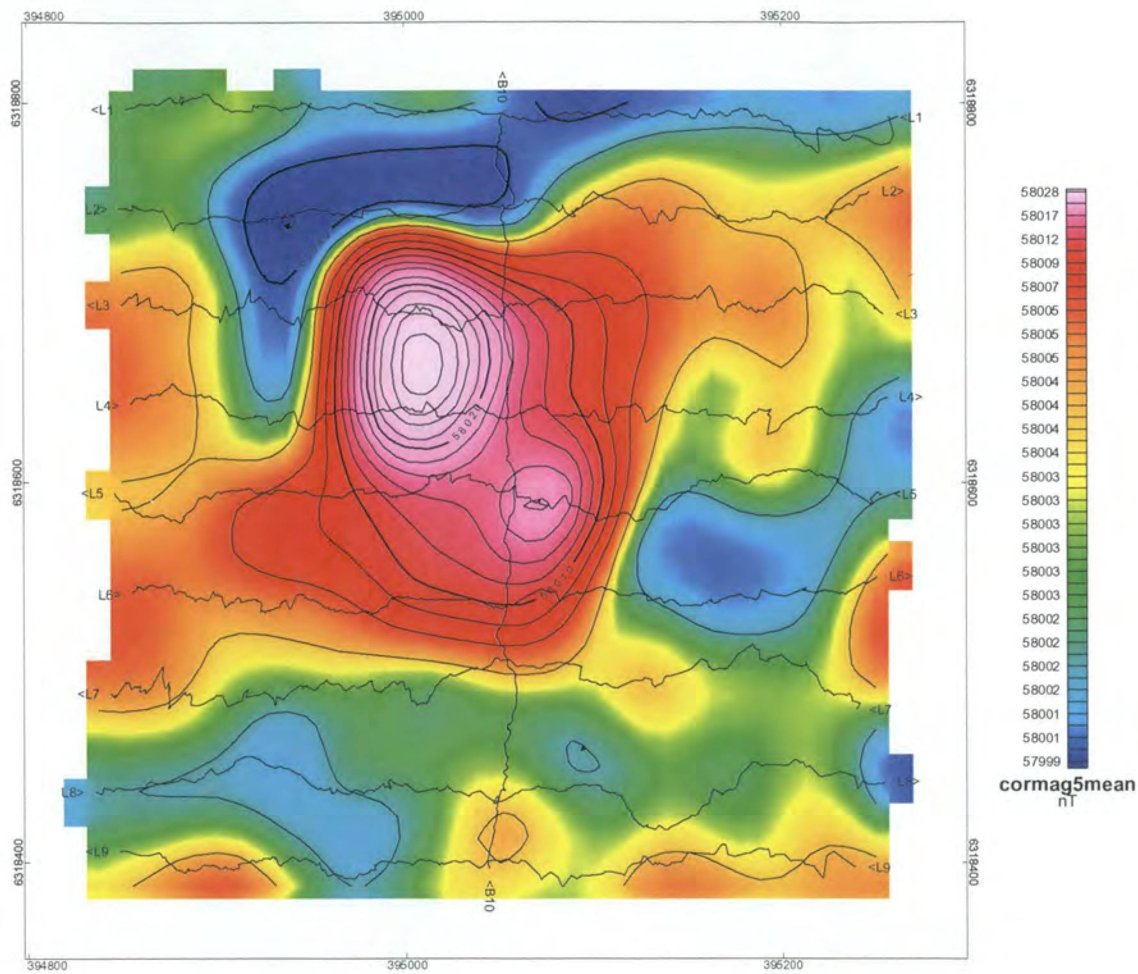
**Ground checked target**

**S5**

## APPENDIX 3

GROUND GEOPHYSICAL GRIDS

| Target | Property | Airborne Xnad83 | Airborne Ynad83 | Observation | Vegetation Anomaly | Intrepid Geophysics - Description of Ground Geophysics | Drilling Recomendation | Modelled |
|---|---|---|---|---|---|---|---|---|
| LD010 | Liege East | 394974.1 | 6318810.1 | Near winter road.Heavily treed area, flat | no | strong, double-peaked magnetic high, sub-circular in shape | Yes | Yes |
| S4 | Liege East | 426683.8 | 6306317.3 | - | - | strong, high-frequency mag high; shallow point source indicated; culture, well-casing? | No. | No |

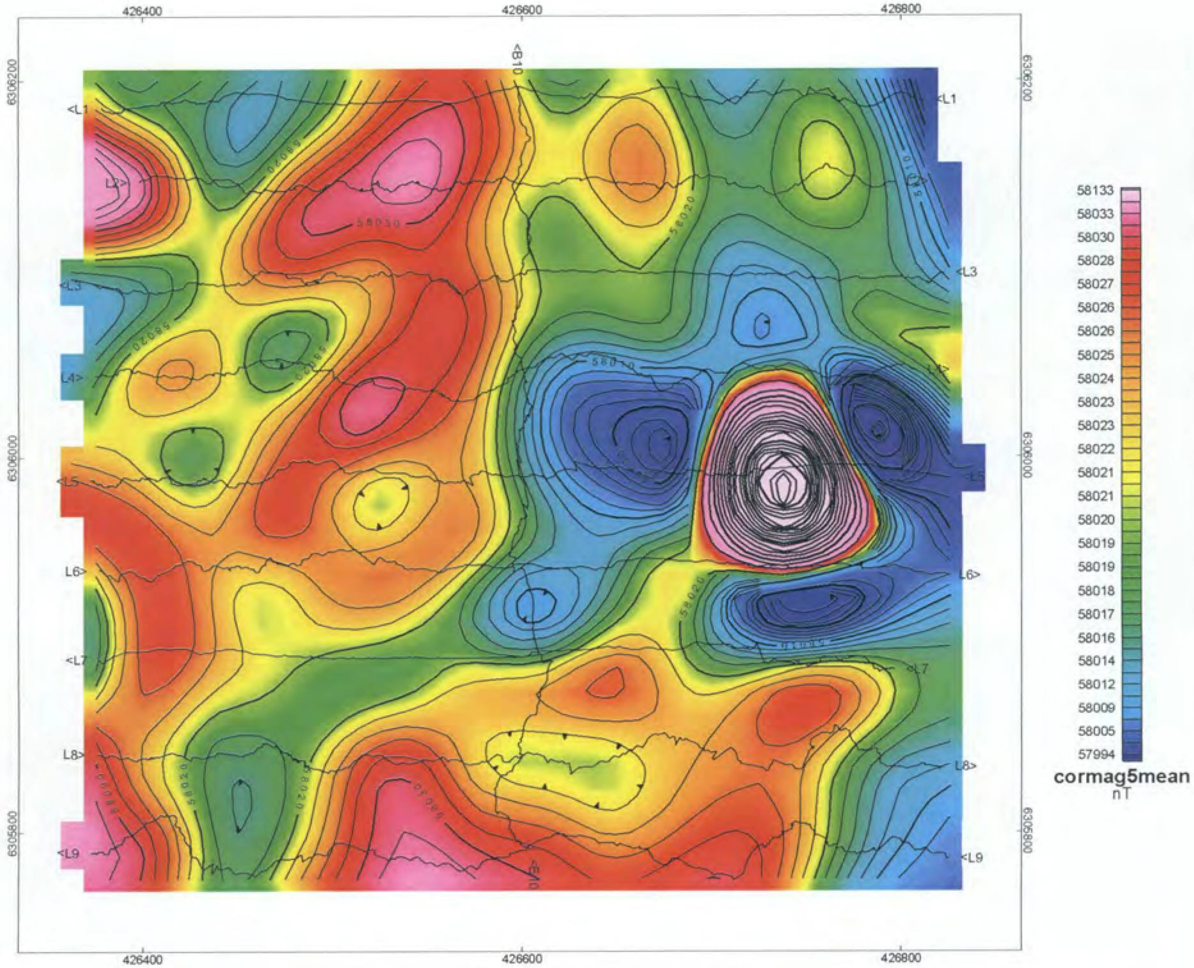



Contour Interval 2, 10, 50 nT

25 0 25 50 75
(meters)
NAD27 / UTM zone 12N

**Shear Minerals Ltd.**
Liege East Project - Target LD010
Ground Magnetic Survey

December 10, 2006




Contour interval 2, 10, 50 nT

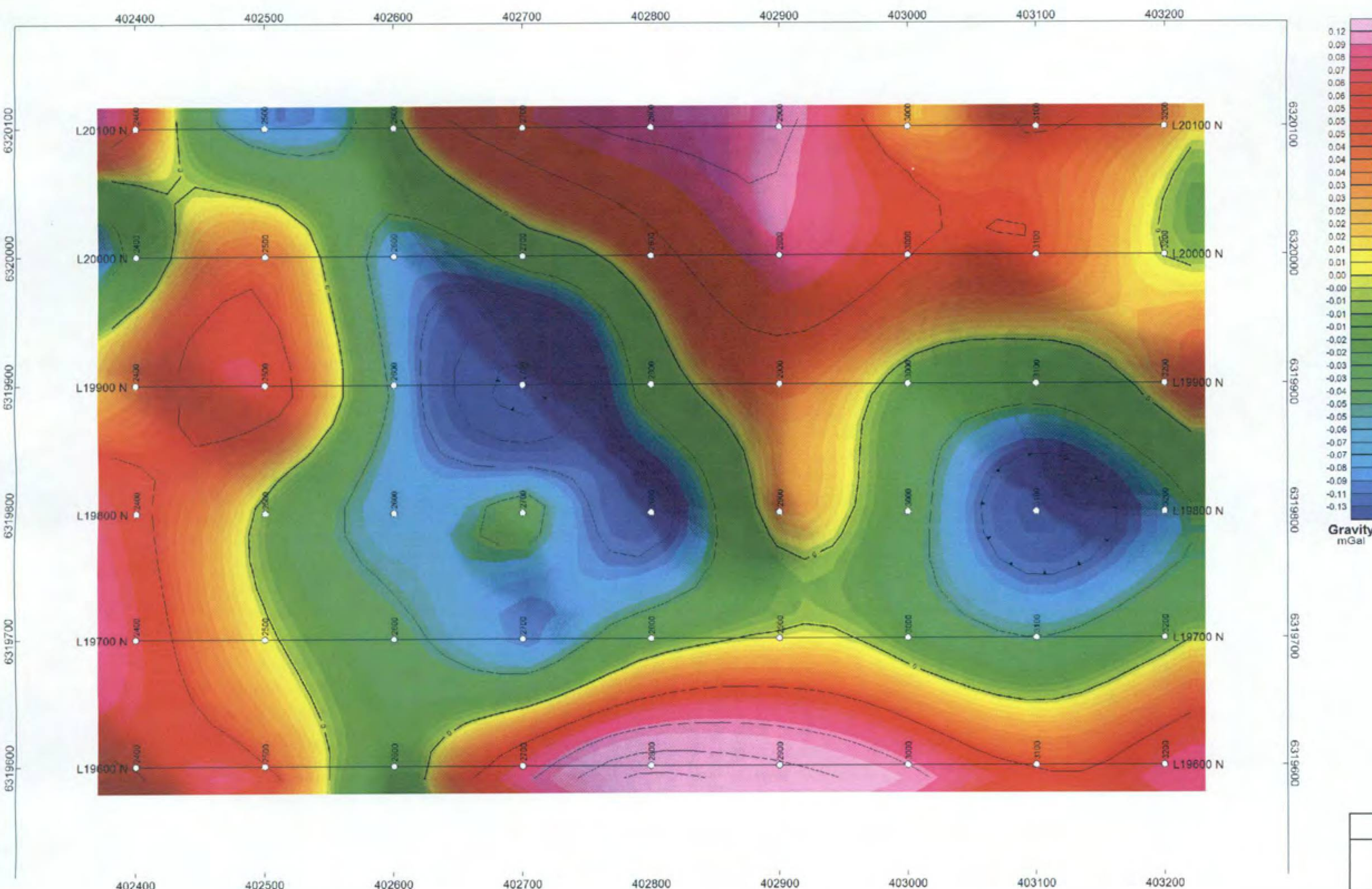
25 0 25 50 75
(meters)
NAD27 / UTM zone 12N

**Shear Minerals Ltd.**
Liege East Project - Seismic 4B
Ground Magnetic Survey

December 11, 2006

# APPENDIX 4

GROUND GRAVITY GRIDS




SURVEY SPECIFICATIONS

Station Interval: 100m

Line Separation: 100m

Datum NAD83, Zone 12W

DATA PRESENTATION

1st Order Residual of
Partial Bouguer Gravity
Reference to all points

Terrain correction to 52m

Contour Interval: 0.05 mGal

Bouguer Density 2.67 gm/cc

INSTRUMENTATION

LaCoste & Romberg Gravity Meter(s)
SN: 747

Topcon Hiper+ RTK GPS
SN: 750, 752, 1920

Scale 1:2500

50 0 50 100 150

metres

SHEAR MINERALS LTD.

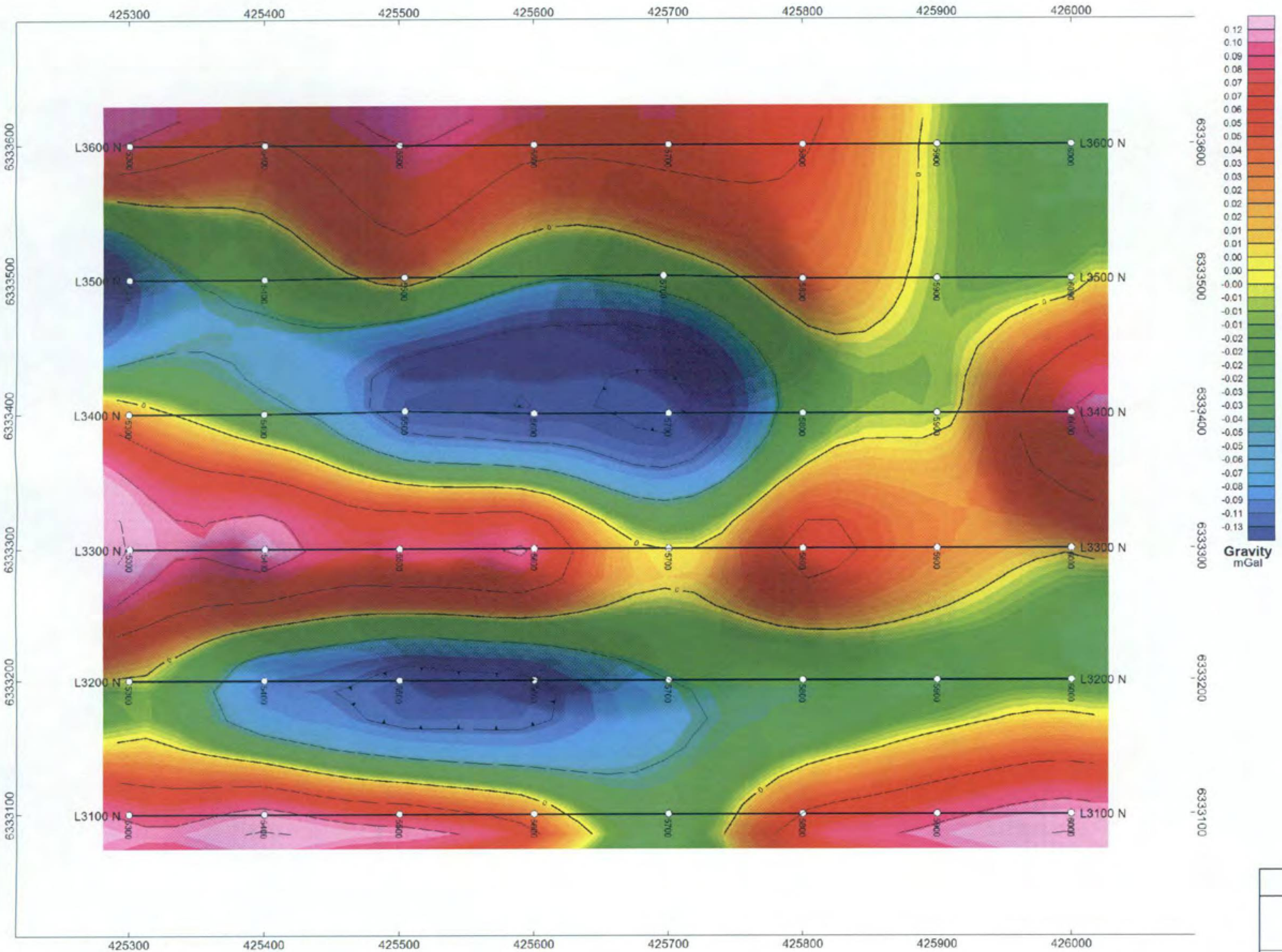
Seismic Grid 3

**Residual of Bouguer Gravity Map**

**Fort McMurray, Alberta**

December 20, 2007

***Quadra Surveys Ltd.***




SURVEY SPECIFICATIONS

Station Interval: 100m

Line Separation: 100m

Datum NAD83, Zone 12W

DATA PRESENTATION

1st Order Residual of
Partial Bouguer Gravity
Reference to all points

Terrain correction to 52m

Contour Interval: 0.05 mGal

Bouguer Density 2.67 gm/cc

INSTRUMENTATION

LaCoste & Romberg Gravity Meter(s)
SN: 747

Topcon Hiper+ RTK GPS
SN: 750, 752, 1920

Scale 1:2500

50 0 50 100 150

metres

| SHEAR MINERALS LTD. |
| --- |
| Seismic Grid 5 (Revision Required)<br>**Residual of Bouguer Gravity Map**<br>Fort McMurray, Alberta |
| January 17, 2008 |
| ***Quadra Surveys Ltd.*** |

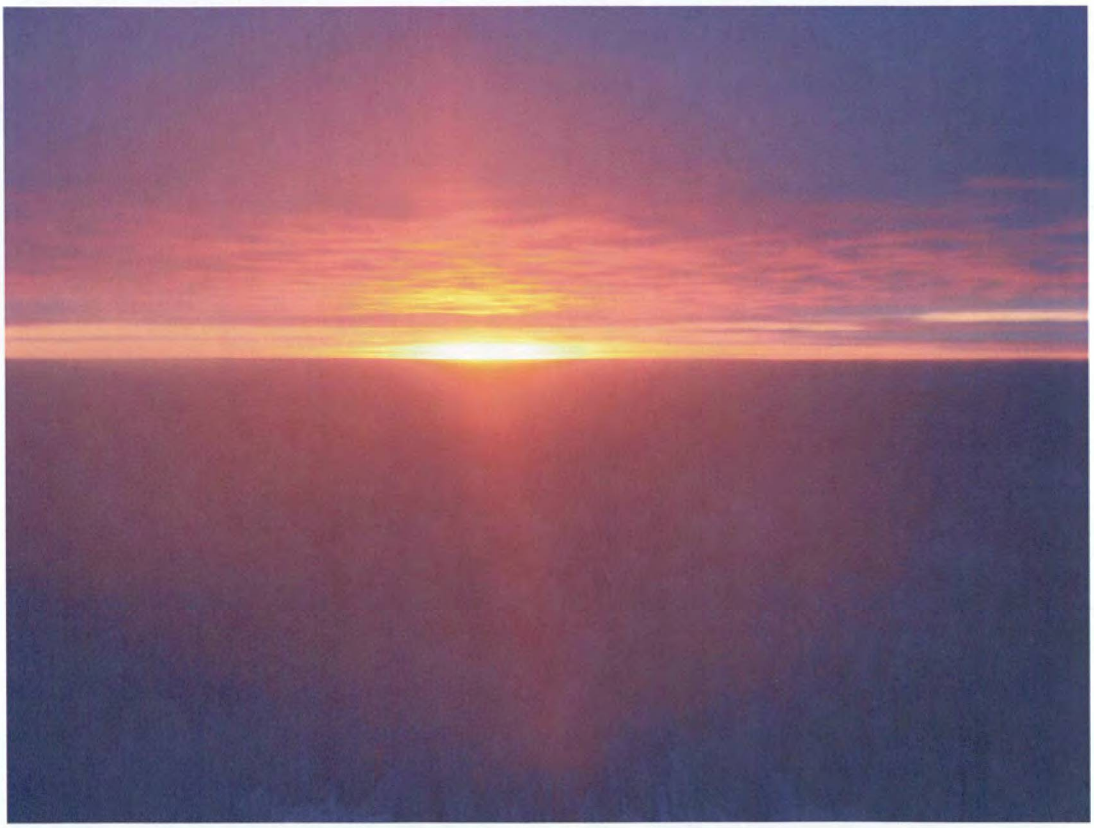
# QUADRA SURVEYS LTD.

QUALITY YOU CAN DEPEND ON

# Gravity and GPS Survey

## SHEAR MINERALS LTD.

Suite 200, 9797- 45th Avenue, Edmonton, AB T6E 5V8



## Liege & Piche Projects: Logistical Report

Fort McMurray & Lac La Biche, AB
June 9, 2008

Written by:
Tam Mitchell, AScT

Box 846
Barriere, BC V0E 1E0

# INTRODUCTION

- **Client Name:** Shear Minerals Ltd.
  Suite 200, 9797 45th Avenue
  Edmonton, AB T6E 5V8
  Ph: (780) 435-0045
- **Project Name:** Afridi Lake Project
- **Survey Period:** Liege: December 9th to December 22nd, 2008
  Piche: January 13th to February 2nd, 2008
- **Survey Type:** Gravity and GPS
- **Client Rep:** Saz Yakzan
- **Survey Objective:** To better understand the geologic formations in the area by identifying areas of differing density contrasts by means of gravity and GPS surveys, and to identify potentially mineralized zones.
- **Report Type:** Logistics

# 1. PROJECT DETAILS

## 2.1 Location

- General Area: Liege: Fort McMurray, AB
  Piche: Lac La Biche, AB
- Access: Liege: Road access to Fort McMurray. Helicopter access to grids.
  Piche: Road access near Lac La Biche.
- Province: AB
- Country: Canada
- NTS Map Reference: 73M04 & 84H


*Figure 1: Map Location of the Liege and Piche Projects*

## 2.2 Access

- The Liege Crew stayed in Fort McMurray and the grids were accessed by helicopter.
- The Piche Crew stayed in Lac La Biche and accessed the grids by truck, snowmobile, and foot.

## 2.3 Survey Grid(s)

- Coordinate System: NAD83, Zone 12N
- Line Direction: 90°
- Station Spacing: 100m, 50m
- Line Spacing: 100m, 50m
- Line length: up to 800m
- Survey Control: Real Time Kinematic

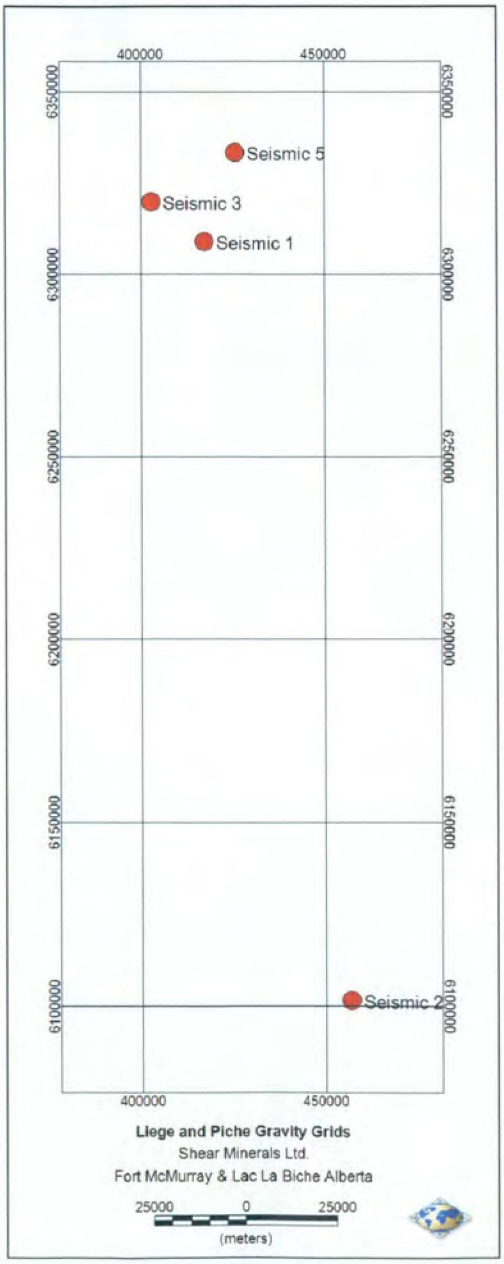



*Figure 2: Map Location of the Liege & Piche Gravity Grids*

# 2. SURVEY DETAILS

## 3.1 Production Log

| | |
|---|---|
| • Gravity Survey Duration: | Liege: December 9th to December 22nd, 2008<br>Piche: January 13th to February 2nd, 2008 |
| • Survey Days: | 19 Crew Days |
| • Mob - Demob Days: | 4 Crew Days |
| • Rest / Sick Days: | 1 Crew Day |
| • Re-Surveying Data: | 1 Crew Days |
| • Equipment Down Days: | 6 Crew Days (4 due to Hydrostatic Level) |
| • Approximate Production Rate: | 13 Stations per Crew Surveying per Day |
| • Total Production: | 251 Stations plus 16 repeat Stations |

## 3.2 Personnel

| | |
|---|---|
| • Supervisor, Gravity, GPS: | Robert Cipriano, Sierra Madre, CA |
| • Gravity, GPS: | Sean Mitchell, Barriere, BC |
| • Gravity, GPS: | Scott Smith, Yellowknife, NWT |
| • GPS: | Justin Pierre, New Hazelton, BC |
| • GPS: | Laurie Post, Hollywood, CA |
| • GPS: | George Vienne, La Ronge, AB |
| • GPS: | Jeff McKay, La Ronge, AB |

## 3.3 Survey Coverage

| Grid: Seismic 1 | | | | |
|---|---|---|---|---|
| Production Summary: 48 Stations | | | | |
| StartNorth | StartEast | EndNorth | EndEast | Distance |
| 8850 | 6900 | 8850 | 7600 | 700 |
| 8950 | 6900 | 8950 | 7600 | 700 |
| 9050 | 6900 | 9050 | 7600 | 700 |
| 9150 | 6900 | 9150 | 7600 | 700 |
| 9250 | 6900 | 9250 | 7600 | 700 |
| 9350 | 6900 | 9350 | 7600 | 700 |

*Table 1: Seismic 1 Grid Survey Coverage*

| Grid: Seismic 2 | | | | |
|---|---|---|---|---|
| Production Summary: 101 Stations | | | | |
| StartNorth | StartEast | EndNorth | EndEast | Distance |
| 1150 | 6600 | 1150 | 7400 | 800 |
| 1250 | 6600 | 1250 | 7400 | 800 |
| 1350 | 6600 | 1350 | 7400 | 800 |
| 1450 | 6600 | 1450 | 7400 | 800 |
| 1500 | 6900 | 1500 | 7200 | 300 |
| 1550 | 6600 | 1550 | 7400 | 800 |
| 1600 | 6850 | 1600 | 7350 | 500 |
| 1650 | 6600 | 1650 | 7400 | 800 |
| 1700 | 6900 | 1700 | 7100 | 200 |
| 1750 | 6600 | 1750 | 7400 | 800 |
| 1850 | 6600 | 1850 | 7400 | 800 |

*Table 2: Seismic 2 Grid Survey Coverage*

| Grid: Seismic 3 | | | | |
|---|---|---|---|---|
| Production Summary: 54 Stations | | | | |
| StartNorth | StartEast | EndNorth | EndEast | Distance |
| 19600 | 2400 | 19600 | 3200 | 800 |
| 19700 | 2400 | 19700 | 3200 | 800 |
| 19800 | 2400 | 19800 | 3200 | 800 |
| 19900 | 2400 | 19900 | 3200 | 800 |
| 20000 | 2400 | 20000 | 3200 | 800 |
| 20100 | 2400 | 20100 | 3200 | 800 |

*Table 3: Seismic 3 Grid Survey Coverage*

| Grid: Seismic 5 | | | | |
|---|---|---|---|---|
| Production Summary: 48 Stations | | | | |
| StartNorth | StartEast | EndNorth | EndEast | Distance |
| 3100 | 5300 | 3100 | 6000 | 700 |
| 3200 | 5300 | 3200 | 6000 | 700 |
| 3300 | 5300 | 3300 | 6000 | 700 |
| 3400 | 5300 | 3400 | 6000 | 700 |
| 3500 | 5300 | 3500 | 6000 | 700 |
| 3600 | 5300 | 3600 | 6000 | 700 |

*Table 4: Seismic 5 Grid Survey Coverage*

## 3.4 Survey Specifications

### 3.4.1 Gravity Survey:

- Technique: Line Profiles on closed loop traverses.
- Station Spacing: 100m, 50m
- Line Spacing: 100m, 50m
- Line Lengths to 800m
- Repeat Frequency: Minimum 5% randomly collected.
- Maximum Repeat Accuracy: 0.05 mGal Maximum
- Maximum Loop Tie: 0.05 mGal Maximum

### 3.4.2 GPS Survey:

- Datum: NAD83 Zone 12N
- Method: Real Time Dual Frequency GPS with GPS (American) and Glonass (Russian) Constellation.
- Station Location: Digital file supplied by client. Physical locations established by GPS operator during survey.
- Accuracy: +/- 5cm (X, Y, Z)

## 3.5 Instrumentation

- Gravity Meters: LaCoste & Romberg Model G. (SN: 747)
- GPS Receivers: Topcon Hiper Plus (SN: 570, 572, 1921)
- RTK Radio Modem: Pacific Crest 35 Watt

## 3.6 Survey Parameters

### 3.6.1 Gravity Survey

- Data Output Units: L&R Instrument Units (≅ milligals)
- G Meter Calibration: See Gravity Meter Scale Factors - Appendix B
- Gravity Formula: 1967
- GMT Difference: 7 hours
- Gravity Base Station Locations:


*Figure 3: Gravity Base -5, at the Almac Motor Hotel*

| Name | Abs G | NAD83 North | NAD83 East | Elevation |
|---|---|---|---|---|
| -1 | 982000.000 | 6287121.000 | 476807.000 | 251.000 |
| -2 | 981968.227 | 6319970.073 | 402550.426 | 510.194 |
| -3 | 981966.685 | 6309343.658 | 417140.094 | 470.693 |
| -4 | 981993.028 | 6333488.315 | 425613.154 | 434.196 |
| -5 | 982000.000 | 6069204.233 | 436487.591 | 551.691 |
| -6 | 982021.623 | 6102201.977 | 456760.826 | 597.331 |

*Table 5: Gravity Base Stations*

3.6.2 GPS Survey

- Projection: UTM NAD83, Zone 12 N
- Geoid: Canada HT2-0
- Spheroid: GRS 1980
- Location of Measurement: Ground Level
- GPS Base Station(s):

| Station | NAD83 Northing | Easting | Elevation | WGS84 Latitude | Longitude | Ellipsoid |
|---|---|---|---|---|---|---|
| 3 | 6309343.658 | 417140.094 | 470.693 | 56.92035000 | -112.3611576 | 446.545 |
| 4 | 6333488.315 | 425613.154 | 434.196 | 57.13864022 | -112.2291462 | 409.599 |
| 5 | 6069204.233 | 436487.591 | 551.691 | 54.76604927 | -111.9871653 | 528.35 |
| 6 | 6102201.977 | 456760.826 | 597.331 | 55.06471921 | -111.6770550 | 573.696 |

*Table 6: GPS Base Stations*

The coordinates for the GPS Bases were derived by autonomous occupations of the bases.

## 3.7 Measurement Accuracy and Repeatability

3.7.1 Gravity Survey

- 20 Gravity Loop Ties:

| Grid | Loop Duration | Loop Tie | Meter | Date |
|---|---|---|---|---|
| Seismic 3 | 4:47 | -0.06 | 747 | 11/12/2007 |
| Seismic 3 | 5:41 | -0.06 | 747 | 14/12/2007 |
| Seismic 3 | 5:46 | -0.07 | 747 | 15/12/2007 |
| Seismic 3 | 5:58 | -0.05 | 747 | 16/12/2007 |
| Seismic 3 | 2:38 | 0.01 | 747 | 17/12/2007 |
| Seismic 1 | 2:00 | 0.02 | 747 | 17/12/2007 |
| Seismic 1 | 4:34 | -0.03 | 747 | 18/12/2007 |
| Seismic 5 | 4:55 | -0.03 | 747 | 19/12/2007 |
| Seismic 5 | 6:55 | -0.03 | 747 | 20/12/2007 |
| Seismic 5 | 6:06 | -0.01 | 747 | 21/12/2007 |
| Seismic 2 | 4:36 | -0.06 | 747 | 15/01/2008 |
| Seismic 2 | 5:53 | -0.04 | 747 | 16/01/2008 |
| Seismic 2 | 7:08 | -0.03 | 747 | 18/01/2008 |
| Seismic 2 | 7:25 | -0.05 | 747 | 19/01/2008 |
| Seismic 2 | 8:00 | -0.05 | 747 | 23/01/2008 |
| Seismic 2 | 7:28 | 0 | 747 | 24/01/2008 |
| Seismic 2 | 7:14 | -0.03 | 747 | 27/01/2008 |
| Seismic 2 | 6:17 | -0.06 | 747 | 30/01/2008 |
| Seismic 2 | 5:34 | -0.04 | 747 | 01/02/2008 |
| Seismic 2 | 4:35 | -0.02 | 747 | 02/02/2008 |

*Table 7: Gravity Loop Ties*

- 16 Repeated Stations, 6.4% of 251 total Gravity Stations:

| Grid | North | East | Rep Abs G |
|---|---|---|---|
| Seismic 1 | 9150 | 7100 | -0.03 |
| Seismic 1 | 9250 | 7100 | -0.01 |
| Seismic 2 | 1650 | 6900 | -0.01 |
| Seismic 2 | 1750 | 6900 | 0 |
| Seismic 2 | 1350 | 7300 | 0.01 |
| Seismic 2 | 1850 | 6700 | 0.01 |
| Seismic 2 | 1600 | 7150 | 0.01 |
| Seismic 3 | 20000 | 3000 | -0.04 |
| Seismic 3 | 20000 | 3200 | -0.04 |
| Seismic 3 | 20000 | 2900 | -0.03 |
| Seismic 3 | 20000 | 3100 | -0.01 |
| Seismic 3 | 20000 | 3200 | 0.01 |
| Seismic 3 | 19600 | 2800 | 0.02 |
| Seismic 5 | 3400 | 5500 | -0.09 |
| Seismic 5 | 3500 | 5600 | -0.02 |
| Seismic 5 | 3300 | 5600 | 0.03 |

*Table 8: Gravity Repeat Stations*

### 3.7.2 GPS Survey

Approximately 130 GPS Measurements including repeats (please see digital data listing for point by point error analysis)

| GPS Quality Control: Predicted Error as Std. Dev. | |
|---|---|
| | Std Deviation (m) |
| Maximum | 0.028 |
| Minimum | 0.005 |
| Average | 0.011 |

*Table 9: GPS error analysis*

## 3.8 Data Reduction

### 3.8.1 Gravity Survey

| | |
|---|---|
| Gravity Reduction: | Quadra Surveys Proprietary Software |
| Gravity Formulae: | 1967 Formulae |
| Terrain Corrections: | By Suunto inclinometer to 52m |
| Earth Density: | (1.5, 1.6, 1.7, 1.8, 1.9, 2.0, 2.1, 2,2) gm/cc & 2.67 gm/cc |
| Final Reduction: | In Milligals to Partial Bouguer Gravity<br>See Appendix C |

### 3.8.2 GPS Survey

| | |
|---|---|
| RTK Reductions: | Topcon Tools RTK Software |

## 3.9 Data Presentation

### 3.9.1 Plan Maps

a) Seismic Grid 1

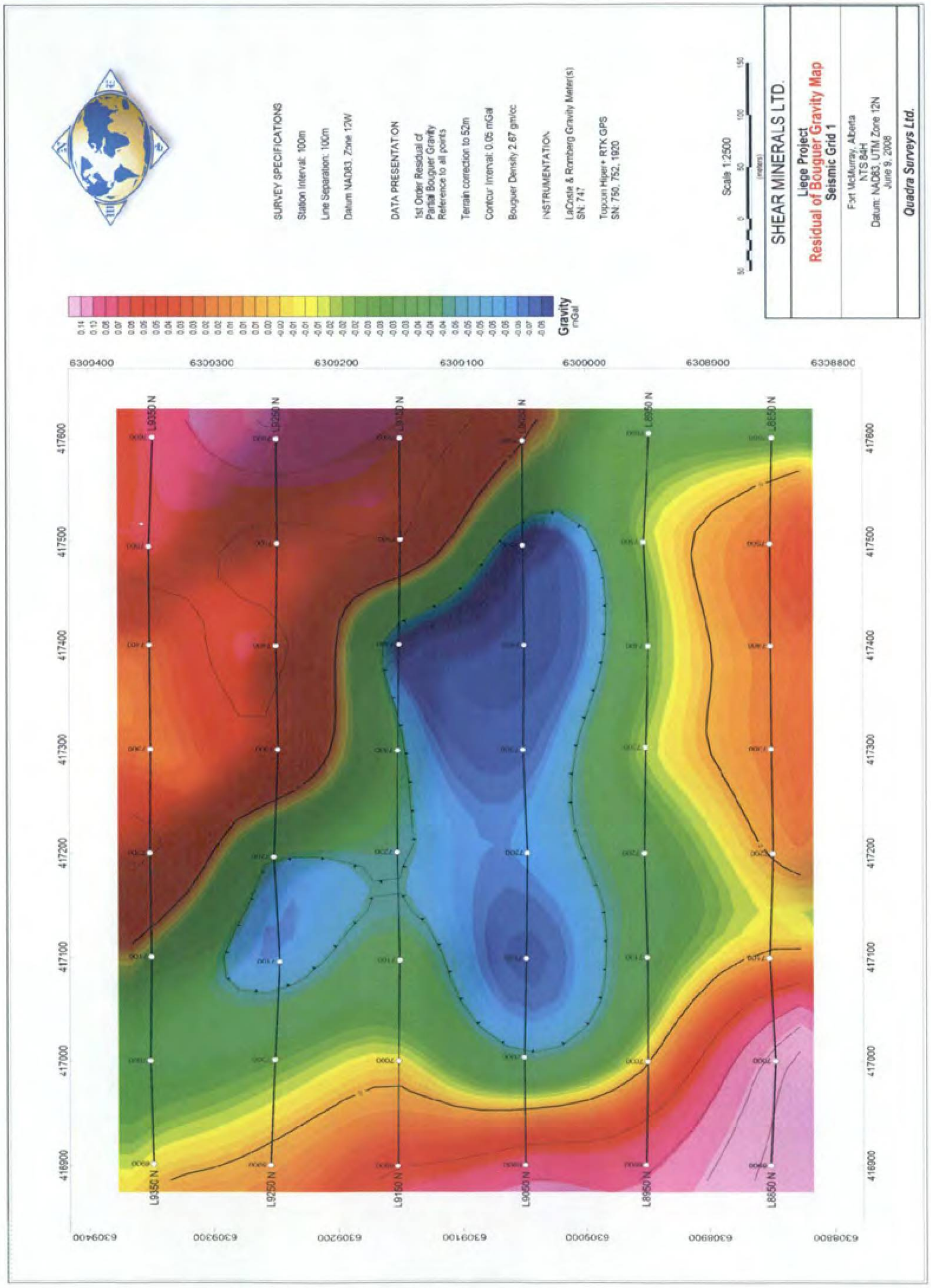


*Figure 4: Seismic 1 Bouguer Gravity Map*

b) Seismic Grid 2

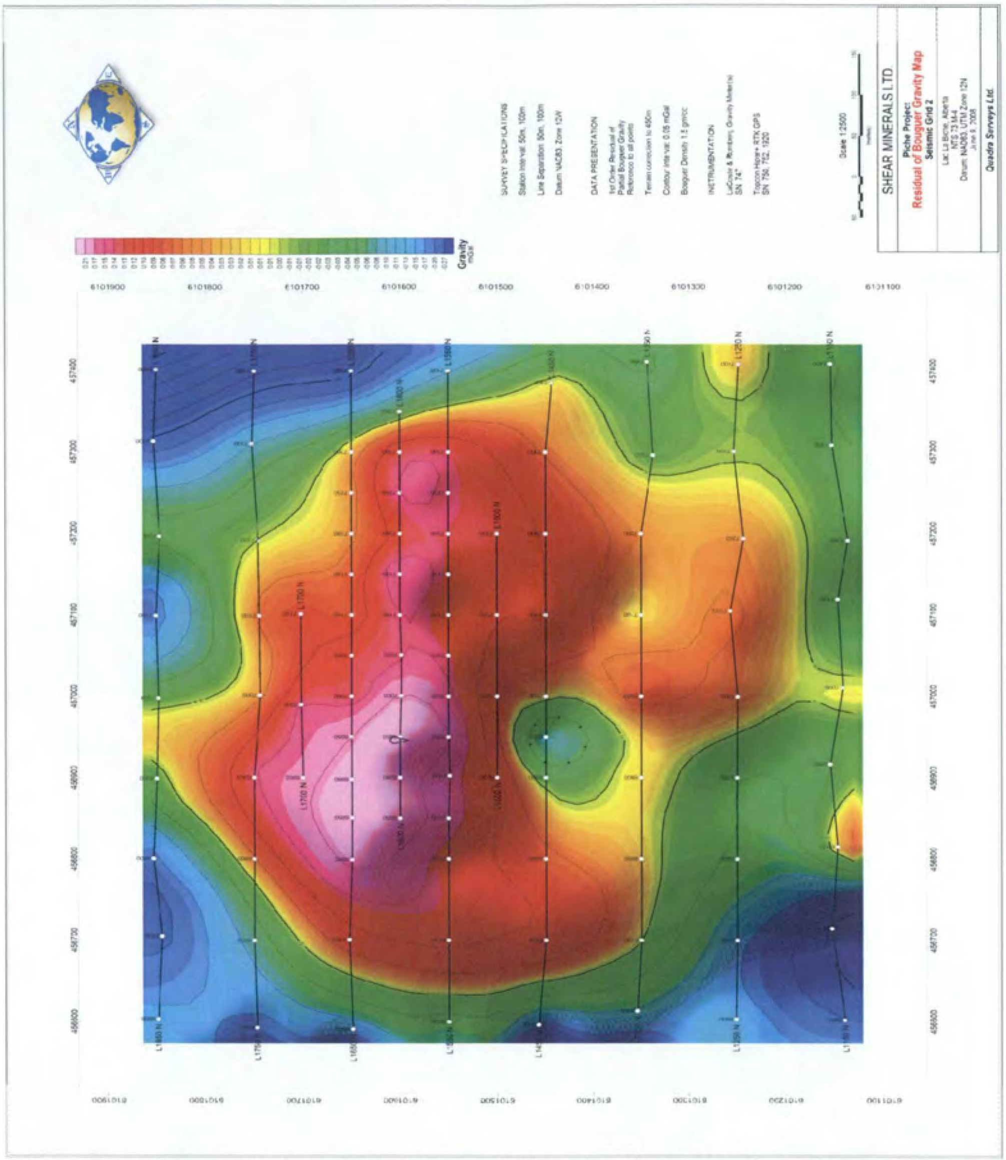


*Figure 5: Seismic 2 Residual of Partial Bouguer Gravity Map*

c) Seismic Grid 3

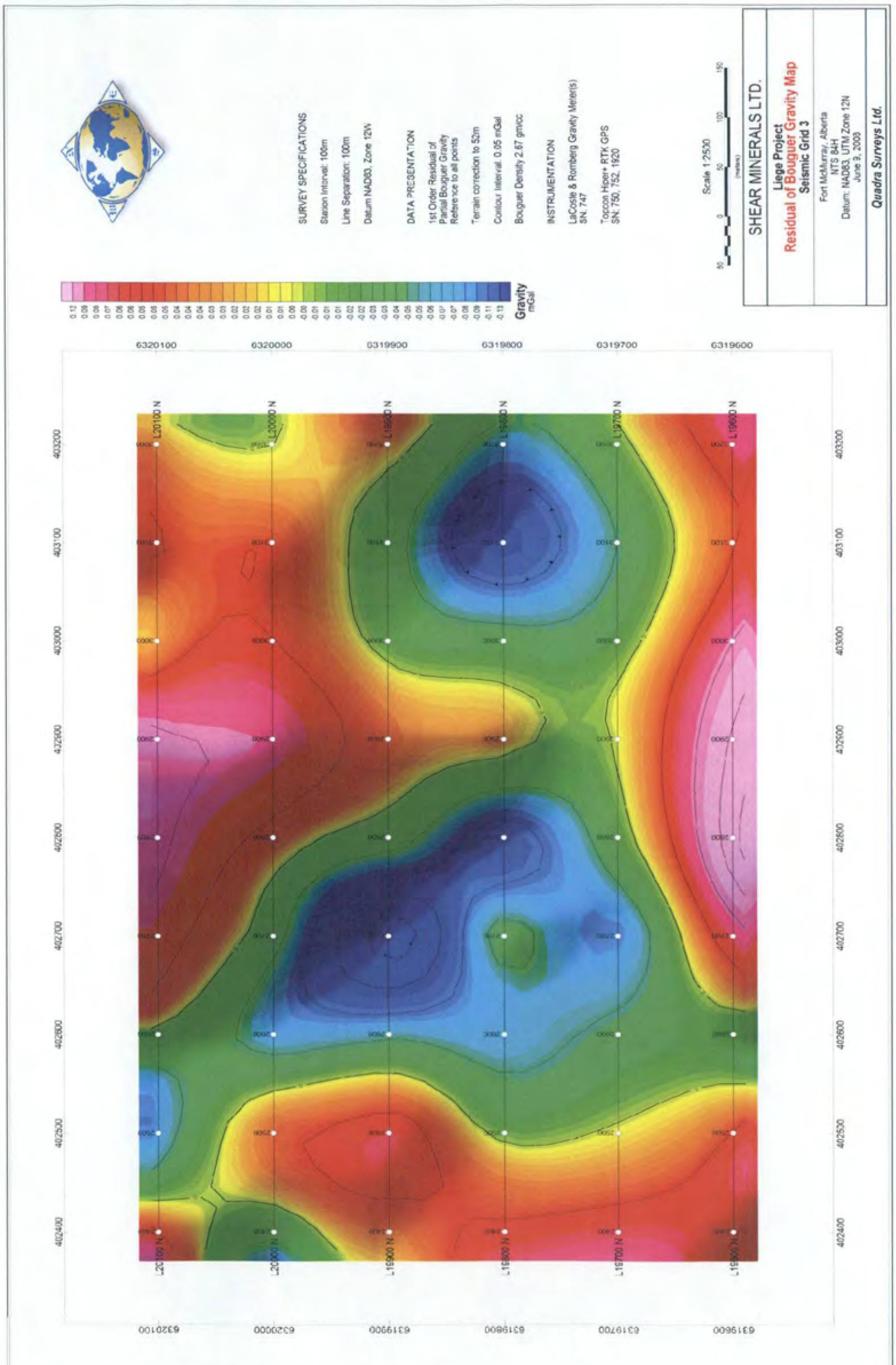



*Figure 6: Seismic 3 Residual of Partial Bouguer Gravity Map*

d) Seismic Grid 5

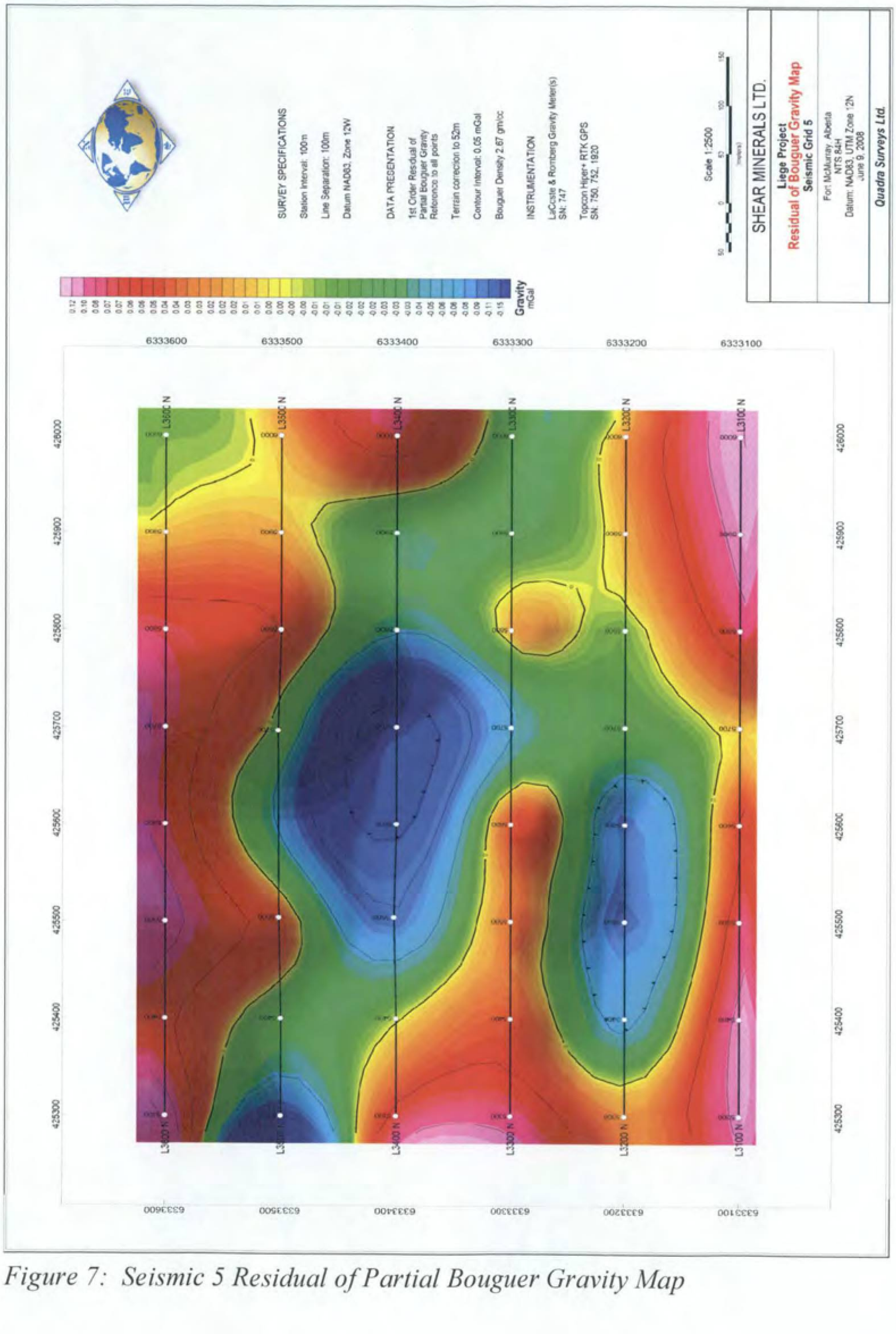



*Figure 7: Seismic 5 Residual of Partial Bouguer Gravity Map*

### 3.9.1 Digital Data

a) daily text files outlining gravity coverage, loop tie/duration and repeats (mmdd.txt)

b) Geosoft Oasis database containing gravity data; GPS data (local grid, UTM, Lat., Long., and elevation); reading date and time; snow and water depths

c) Comma Delimited Text File with all reduced data.

# 4 SURVEY DISCUSSION

The lines were surveyed with Topcon's Hiper + RTK GPS and GDD Instrumentation's Hydrostatic Level. Approximately half of the grid points were surveyed with the GPS system and the other half were surveyed with the Hydrostatic Level. Bases were placed in clearings of land central to the areas being surveyed. A 35 watt Pacific Crest radio modem was connected to the base to transmit correction signals to the roving GPS units. This system was configured to use the GPS (American) and Glonass (Russian) satellites. A larger constellation of satellites can speed initialization times and reduces down time in difficult areas.

Prior to the commencement of gravity survey measurements, the following steps were performed to stabilize and check the gravimeters:

1. The instrument was connected to battery power and heated for more than 72 hours to attain a stable operating temperature (50 C).
2. Transverse and longitudinal bubble levels were checked and adjusted according to the procedure outlined in the instrument manual.
3. Reading line was checked and adjusted.

All readings were taken with the instrument mounted on an aluminum dish placed over the marked areas where the surveyors had recorded their elevation measurements to an accuracy of 2 cm. On Seismic 5 Grid there was a tare of approximately .015 mGal/cc affecting lines 3300N and 3400N. The tare was repaired based on speculative information derived from two repeated stations, L3400 5500E and L3300N 5600E.

The data presented is at 2.67 gm/cc for the Liege projects, which is the average earth crustal density. The data presented on the Piche project is at the unusually low density of 1.5 gm/cc, which appeared to give the least topographic response.

Respectfully Submitted,

[redacted]

Tam Mitchell, AScT

Quadra Surveys Ltd.

## APPENDIX A: STATEMENT OF QUALIFICATIONS

### STATEMENT OF QUALIFICATIONS

I Thomas L. Mitchell, AScT, of the city of Barriere, Province of British Columbia, DO HEREBY CERTIFY THAT:

1. I am the owner of Quadra Surveys Ltd. with office at 4832 Hwy 5, PO Box 846, Barriere, British Columbia, V0E 1E0.

2. I am a graduate of BCIT, with a diploma in Surveying Technology (1977).

3. I am registered with the Association of Applied Science Technologists and Technicians of British Columbia.

4. I have practiced my profession in N. and S. America, Japan and Africa for 30 years.

5. This report is based on a gravity survey which I conducted.

1. I have no direct or indirect interest in the properties or securities of Shear Minerals Ltd. nor do I expect to receive any.

Applied Science Technologists and Technicians of British Columbia
10166
Thomas L. Mitchell
AScT

Dated at Barriere, BC, this 9th day of June, 2008.

## APPENDIX B: METER FACTOR

Lacoste & Romberg Model G Meter SN: 747:

| Dial Reading | Value in mGal | Scale Factor | Dial Reading | Value in mGal | Scale Factor |
|---|---|---|---|---|---|
| 0 | 0 | 1.02526 | 3600 | 3690.345 | 1.02611 |
| 100 | 102.526 | 1.02514 | 3700 | 3792.956 | 1.02619 |
| 200 | 205.04 | 1.02506 | 3800 | 3895.575 | 1.02626 |
| 300 | 307.546 | 1.02499 | 3900 | 3998.201 | 1.02633 |
| 400 | 410.045 | 1.02492 | 4000 | 4100.834 | 1.02639 |
| 500 | 512.537 | 1.02487 | 4100 | 4203.473 | 1.02645 |
| 600 | 615.024 | 1.02483 | 4200 | 4306.118 | 1.02649 |
| 700 | 717.507 | 1.0248 | 4300 | 4408.767 | 1.02652 |
| 800 | 819.987 | 1.02477 | 4400 | 4511.419 | 1.02655 |
| 900 | 922.464 | 1.02474 | 4500 | 4614.074 | 1.02656 |
| 1000 | 1024.938 | 1.02472 | 4600 | 4716.73 | 1.02656 |
| 1100 | 1127.41 | 1.02472 | 4700 | 4819.386 | 1.02654 |
| 1200 | 1229.882 | 1.02471 | 4800 | 4922.04 | 1.0265 |
| 1300 | 1332.353 | 1.02471 | 4900 | 5024.69 | 1.02647 |
| 1400 | 1434.824 | 1.02471 | 5000 | 5127.337 | 1.02643 |
| 1500 | 1537.295 | 1.02471 | 5100 | 5229.98 | 1.02638 |
| 1600 | 1639.766 | 1.02472 | 5200 | 5332.618 | 1.02632 |
| 1700 | 1742.238 | 1.02474 | 5300 | 5435.25 | 1.02626 |
| 1800 | 1844.712 | 1.02477 | 5400 | 5537.876 | 1.0262 |
| 1900 | 1947.189 | 1.02482 | 5500 | 5640.496 | 1.02611 |
| 2000 | 2049.671 | 1.02487 | 5600 | 5743.107 | 1.02603 |
| 2100 | 2152.158 | 1.02492 | 5700 | 5845.71 | 1.02592 |
| 2200 | 2254.65 | 1.02498 | 5800 | 5948.302 | 1.02581 |
| 2300 | 2357.148 | 1.02505 | 5900 | 6050.883 | 1.02568 |
| 2400 | 2459.653 | 1.02513 | 6000 | 6153.451 | 1.02552 |
| 2500 | 2562.166 | 1.0252 | 6100 | 6256.003 | 1.02532 |
| 2600 | 2664.686 | 1.02528 | 6200 | 6358.535 | 1.02513 |
| 2700 | 2767.214 | 1.02536 | 6300 | 6461.048 | 1.02492 |
| 2800 | 2869.75 | 1.02545 | 6400 | 6563.54 | 1.0247 |
| 2900 | 2972.295 | 1.02553 | 6500 | 6666.01 | 1.02446 |
| 3000 | 3074.848 | 1.02562 | 6600 | 6768.456 | 1.0242 |
| 3100 | 3177.41 | 1.02571 | 6700 | 6870.876 | 1.02396 |
| 3200 | 3279.981 | 1.0258 | 6800 | 6973.272 | 1.02368 |
| 3300 | 3382.561 | 1.02587 | 6900 | 7075.64 | 1.0234 |
| 3400 | 3485.148 | 1.02595 | 7000 | 7177.98 | 1.02312 |
| 3500 | 3587.743 | 1.02602 | | | |

## APPENDIX C: GRAVITY DATA REDUCTION

The data was reduced to partial Bouguer gravity anomaly values. Terrain corrections have been applied to 53.3 meters using inclinometer field shots. A density of 2.67 gm/cc is used to calculate the Bouguer anomaly. This value was assumed to be the appropriate density in calculations for the Bouguer correction.

$g_o$ **Observed Gravity-** field observations corrected for earth tides and long term instrument drift were transcribed from field notebooks and corrections made for instrument height and residual instrument drift. These values were not tied to the National Gravity Net.

$g_{fa}$ **Free Air Effect-** Correction for relative distances of observation points from the centre of mass (earth). This calculation moves all stations to a common elevation datum and corrects for relative distances in distance from the source mass. The elevation datum used was mean sea level. The formula used was:

$$g_{fa} = -0.3086 \text{ mgal/m}$$

$g_{bs}$ **Bouguer Slab Effect** - Correction for the relative differences in amounts of surface rock below gravity stations. This calculation requires that a mean density or rock type between the lowest and highest grid elevations be established. All stations are shifted to a common datum as in the free air effect except that the vertical change is through an assumed slab of the derived density. The elevation datum used was mean sea level.

$$g_{bs} = 2 * PI * .00667 * \sigma \text{ mgal/m}$$

Where $\sigma$ = slab density (gm/cc)

$g_l$ **Theoretical Gravity** - Yields correction for change of observed gravity with change in (WGS84) latitude which is due primarily to the rotation of the earth and the difference in earth's radius between the poles and the equator.

$$g_l = g_e(1 + \alpha \sin^2 \theta + \beta \sin^2 2\theta)$$

Where $g_e$ = equatorial gravity = 978,031.85 mgal.
$\alpha = 0.005278895$
$\beta = -0.000023462$
$\theta$ = Latitude

gt **Terrain Correction-** corrections for variations caused by local terrain. The vertical component of the gravitational effect exerted by nearby hills, or not exerted by nearby valleys or gullies, will affect the net reading obtained on any one station. The overall effect on a given line profile or area will be a function of the station spacing relative to the frequency of terrain undulations. Areas were segmented using circular sectors in zones developed by Hammer (1939). Corrections for the inner zones B and C (covering an area from 2 to 53.3 meters from the station) were calculated from the following expression:

$$g_t = \Sigma \Phi \tau \sigma [r_o - r_i + (r_i^2 + z^2)^{1/2} - (r_o^2 + z^2)^{1/2}]$$

Where $\Phi$ = Sector angle (B = 90°, C = 90 °)
$\tau$ = gravitational constant = 0.00667
$\sigma$ = average density (gm/cc)
$r_o$ = outer sector radius (B=16.6, C=53.3)
$r_i$ = inner sector radius (B=2, C=16.6)
z = elevation difference between sector and station.

$g_{faa}$ **Free Air Anomaly:** is derived from the following formulae:

$$g_{faa} = g_o - (g_l - 0.3086 * E) = \text{Free Air Anomaly}$$

Where $g_o$ = observed gravity
$g_l$ = theoretical gravity
E = elevation

$g_{ba}$ **Bouguer Anomaly:** was derived from the following formulae:

$$g_{ba} = g_b + g_{faa} + g_t = \text{Bouguer Gravity}$$

Where $g_b$ = Bouguer gravity
$g_{faa}$ = free air anomaly
$g_t$ = terrain corrections

## APPENDIX 5

EXPENDITURES

| **Liege East expenditures** | **Fall 2006-Spring 2008** |
|---|---|
| | |
| Exploration Salaries | $22,061.40 |
| Field Travel Costs | $9,192.25 |
| Consultant Fees | $16,546.05 |
| Field Supplies | $367.69 |
| Helicopter | $41,365.13 |
| Office support and communications | $2,390.00 |
| Total including 10% administration cost | **$91,922.52** |