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ASSESSMENT REPORT FOR THE PICHE LAKE PROPERTY, NORTHERN ALBERTA: MINERAL PERMITS 9304060627-9304060628, 9304060630 – 9304060632, 9304060634-9304060635

Approximate Property Location
Latitude: 55° 03' N
Longitude: 111° 36' W
200 Km Northeast of Edmonton, North-Central Alberta

Completed By:

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

And

Marmac Mines Ltd.
#2, 135 – 12th Avenue N.W.
Calgary, Alberta, Canada
T2M 0C4

July 23, 2008
Edmonton, Alberta Canada

P. D. Strand, M.Sc., P.Geol

ASSESSMENT REPORT FOR THE PICHE LAKE PROPERTY, NORTHERN ALBERTA: MINERAL PERMITS 9304060627-9304060628, 9304060630 – 9304060632, 9304060634-9304060635

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SUMMARY

APEX Geoscience Ltd. (APEX) was retained during 2006 as consultants by Shear Minerals Ltd. (Shear) on behalf of Shear and Marmac Mines Ltd. (Marmac) to compile all existing geological and geophysical data for the Piche Lake Property and for the preparation of an independent evaluation of the potential of the properties to host diamondiferous kimberlites (Dufrense, 2006). Shear has an option to earn into the Piche Lake Property, currently owned and registered in then name of by Marmac. The property is comprised of 7 mineral permits in the name of Marmac and totaling approx. 42,000 and is 200 km northeast of Edmonton. The Piche Lake Property cover portions of Townships 69 to 71, Ranges 10 to 12, west of the 4th meridian. During the 2007-2008 program, Shear spent a total of \$ 58,651.61 (not including administration or GST) on exploration on the Piche Lake Property, the subject of this report. Exploration on the Piche Lake property during 2007-2008 consisted of completing target checks on the ground of all anomalies suggestive of kimberlite from the 2006 fixed-wing airborne geophysical survey, along and two ground magnetometer surveys and one ground gravity survey.

The regional setting in the Lac La Biche area is considered favourable for the presence of diamondiferous kimberlites. The Piche Lake permits are underlain by Early Proterozoic to Archean basement of the Rimbey Domain as well as a prominent gravity low. The local bedrock geology and the underlying Archean to Proterozoic crystalline basement in association with deep seated, penetrative structures, such as the Snowbird Tectonic Zone, likely provided a favourable environment for the ascent of kimberlitic magmas in the Lac La Biche 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 Snowbird Tectonic Zone.

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 Piche Lake Property have yielded some indicator minerals including olivine, pyrope garnet, chromite and picroilmenite. Therefore, there is a good likelihood that undiscovered kimberlites exist on or in the vicinity

of the Piche Lake Property. The diamond potential of the Piche Lake property cannot be fully assessed with the limited amount of sampling and geophysics that has been conducted to date. However, a recent airborne magnetic survey as well as acquired seismic data have yielded a number of subtle or water covered geophysical targets that warrant follow-up exploration and in particular one high priority drill target referred to as the BAM seismic target.

INTRODUCTION AND TERMS OF REFERENCES

Shear Minerals Ltd. (Shear) has been exploring the Piche Lake Property since 2006. In 2006 contracted APEX Geoscience Ltd. of Edmonton to compile all existing geological, geophysical and geochemical data for the Piche Lake Property and to prepare an independent evaluation of the potential of the property to host diamondiferous kimberlites (Dufresne, 2006). During 2006, APEX oversaw the completion of a fixed-wing airborne magnetic survey over the Piche Lake Property. In the spring of 2006, APEX visited and evaluated a number of the identified airborne anomalies. Since 2006 Shear has been the operator of the exploration activities. This assessment report documents the results of the 2007 and 2008 work completed by Shear. During the last year, Shear Minerals Ltd. spent a total of CAN$ 58,651.61 (not including administration or GST) on exploration on the Piche Lake Property for target checking and ground geophysical surveying (Appendix 1).

As a result of a high resolution airborne magnetic (HRAM) fixed-wing survey completed over the Piche Lake Property in 2006, a number of magnetic anomalies (60 initial and 13 additional) were picked by APEX and Mr. Kit Campbell, a geophysical consultant with Intrepid Geophysics of North Vancouver, BC. These anomalies were visited by Shear personnel during 2007 in order to eliminate those anomalies that are the result of well head, well casing and/or other man-made culture. As a result three anomalies were selected to be possible kimberlite candidates and a total of two ground magnetic surveys were completed as well as one ground gravity survey completed by Quadra Surveys, of Barriere, BC. As a result one priority drill target is proposed for drill follow up.

DISCLAIMER

The author, in writing this report, used sources of information as listed in the references. The report, written by Ms. Pamela Strand, M.Sc., P.Geol., a Qualified Person, is a compilation of proprietary and publicly available information as well as information obtained during Shear's property visits. The author has not visited the property personally. 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 Piche Lake Property is situated approximately 40 km (25 miles) northeast of the town of Lac La Biche, Alberta and approximately 200 km (120 miles) northeast of Edmonton, Alberta (Figure 1). The property is located in East Central Alberta within 1:250 000 scale National Topographic System (NTS) map sheets 73L and 73M at 55° 03' N latitude and 111° 36' W longitude. The Piche Lake Property consists of 7 metallic and industrial mineral permits totalling 42,100 hectare. A list of legal descriptions for the Piche Lake Property is provided in Table 1 and shown on Figure 2. Copies of the mineral permit agreements and the land titles are included in Appendix 2.

TABLE 1
LEGAL PERMIT DESCRIPTIONS*

Permit Number	Record Date	Term Period	Legal Description	Permit Holder	Area (ha)
Piche Lake Property					
9304060627	15-Jun-04	10 years	T69-R10W4	Marmac Mines Ltd.	9216
9304060628	15-Jun-04	10 years	T69-R11W4	Marmac Mines Ltd.	3599
9304060630	15-Jun-04	10 years	T70-R10W4	Marmac Mines Ltd.	7352
9304060631	15-Jun-04	10 years	T70-R11W4	Marmac Mines Ltd.	7728
9304060632	15-Jun-04	10 years	T70-R12W4	Marmac Mines Ltd.	2815
9304060634	15-Jun-04	10 years	T71-R11W4	Marmac Mines Ltd.	6795
9304060635	15-Jun-04	10 years	T71-R12W4	Marmac Mines Ltd.	4608
				Property Total	**42,110 ha**

*based on land titles search

Legend

Piche Lake Property
Major Towns and Cities
Roads
Drainage
Alberta NTS Outline
National and Provincial Parks
Alberta Boundary

SHEAR MINERALS LTD.

Piche Lake Property

PROPERTY LOCATION

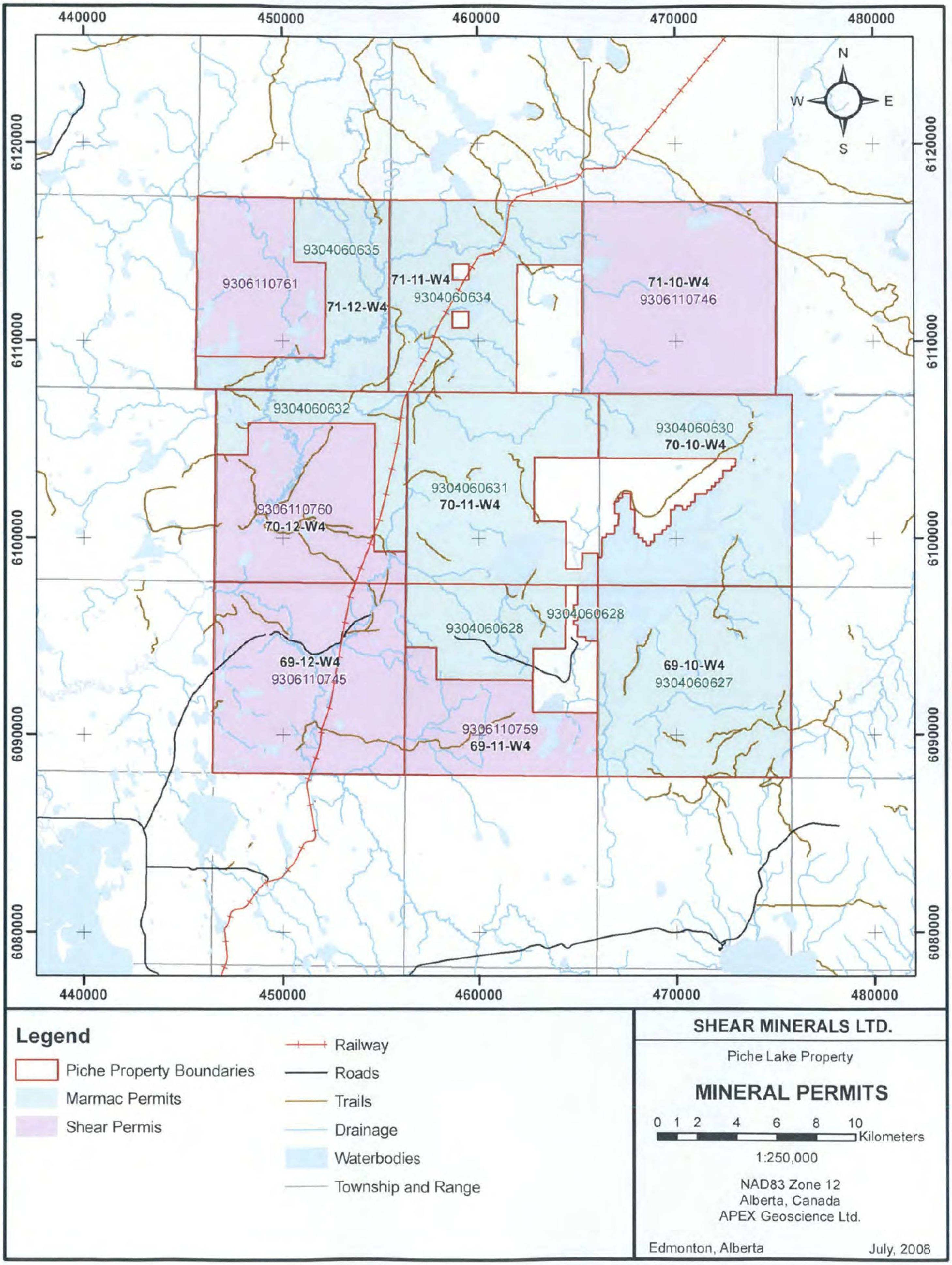
0 20 40 80 120 160 200 km

1:5,000,000

Alberta, Canada
APEX Geoscience Ltd.

Edmonton, Alberta July, 2008

FIGURE 1



440000
450000
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470000
480000
6120000
6110000
6100000
6090000
6080000
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9306110761
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71-12-W4
71-11-W4
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71-10-W4
9306110746
9304060632
9304060630
70-10-W4
9304060631
70-11-W4
9306110760
70-12-W4
9304060628
9304060628
69-12-W4
9306110745
69-10-W4
9304060627
9306110759
69-11-W4
Legend
Piche Property Boundaries
Marmac Permits
Shear Permis
Railway
Roads
Trails
Drainage
Waterbodies
Township and Range
SHEAR MINERALS LTD.
Piche Lake Property
MINERAL PERMITS
0 1 2 4 6 8 10
Kilometers
1:250,000
NAD83 Zone 12
Alberta, Canada
APEX Geoscience Ltd.
Edmonton, Alberta
July, 2008

FIGURE 2

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 the permittee 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.

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 Piche Lake Property is located 200 km northeast of Edmonton and 40 km northeast of the town of Lac La Biche and may be accessed via Provincial Highways 63 and 55, all weather and dry weather gravel roads, cart trails and seismic lines (Figures 1 and 2). 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 Lac La Biche. Accommodation, food, fuel, and supplies are best obtained in the town of Lac La Biche.

The Piche Lake 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 Hills 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 Piche Lake 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. The joint venture ownership has changed, in 2007 Stornoway Diamond Corp acquired Ashton Mining and therefore took control of their respective interest in the BHHJV (see news release dated). Subsequently Stornoway Diamond Corp. has vended 45% of their interest for a total of $17.5 Million cash to Diamondex Recources Inc and Shore Gold Corp. (see news release dated July 24, 2007 www.stornowaydiamonds.com). Diamondex and Shore are currently active with a $7.0 Million delineation drilling program on known kimberlites (see Feb 20, 2008 news release www.diamondex.net).

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).

In 2008 two new kimberlites were discovered by drilling by Grizzly Diamonds Ltd (see news releases dated Feb 19 and 25, 2008; www.grizzlydiamonds.com) in the BHH. A total of 54 diamonds was recovered from 56.6 kg of the BE-02 (see news release www.grizzlydiamonds.com dated May 6, 2008). Future drilling of the BE-02 and additional targets is planned.

Previous Exploration by Marmac Mines and Shear on the Piche Lake Property (2004-2006)

Marmac Mines Ltd. (Marmac) acquired the Piche Lake Permits in 2004 based on information of the possibility of diamondiferous kimberlites in the area and the presence of an interesting seismic anomaly. Marmac conducted preliminary exploration work on the properties including the acquisition and reinterpretation of seismic data for kimberlites, prospecting and indicator mineral sampling.

Marmac conducted work on the property based on the results of seismic reflection surveys and drilling by a number of oil and gas explorers, in particular Paramount. Seismic surveys are not a primary tool for diamond exploration, however, in a sedimentary environment the tool cab be useful in identifying kimberlite diatremes through the sedimentary layering by interruptions and/or disruptions in seismic reflections (Cavey and LeBel, 2003; Atkinson and Pryde, 2006). 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 in the Buffalo Head Hills region west of the Piche Lake Properties. A number of the seismic signatures of the Buffalo Head Hills Kimberlites are shown by Atkinson and Pryde (2006). They compare favourably to the signature observed on Line BAM 12755 (Bam Anomaly) on the Piche Lake Property (Appendix 4). Seismic reflection surveys also aids in the identification of the geometry and structure of kimberlites (Cavey and LeBel, 2003; Atkinson and Pryde, 2006). The seismic signatures of the Buffalo Head Hills' kimberlites is very similar to the interrupted seismic reflections of the BAM anomaly on the Piche Lake Property, and even though the recently flown airborne geophysical survey and ground geophysical surveys have not identified a distinct geophysical anomaly, the BAM seismic anomaly likely warrants further work.

As well as the seismic work conducted during 2004, Marmac hired two prospectors to collect fifteen indicator mineral samples on the property of from which six samples were anomalous with picked kimberlite indicator mineral grains. The most anomalous sample contained more than 50 picroilmenites. Other kimberlite indicator minerals recovered included pyrope, chrome diopside, and olivine. The locations and the results of all seven samples are given in Appendix 5. Further work needs to be done on the samples and possible re-sampling these sites as follow-up.

There are no publicly available records of any other companies performing diamond exploration in and around the Piche Lake region. This includes a review of all other assessment reports available at the AGS. Active diamond exploration is currently being performed in the Calling Lake region about 100 km to the west and in the St. Paul to Cold Lake region about 100 km to the south on the basis of historic exploration that has yielded favourable results. However, the discovery of beach sands with excellent diamond indicator minerals in both regions (Turnbull, 2002; Rich, 2003) has yet to lead to the discovery of kimberlites.

In 2005 Shear signed an agreement with Marmac whereby Shear could earn into a majority interest of the Piche Lake Property from Marmac Mines by incurring $1,500,000 in exploration expenditures over time. APEX was retained during 2006 by Shear to compile all the available geological, geophysical and mineralogical data for the Piche Lake Property and evaluate the potential of the property to host kimberlites and, possibly, diamonds. Based upon the recommendations that resulted from the data compilation and review, a program consisting of a fixed-wing airborne geophysical survey totalling 14,864 line km was completed by Firefly Aviation Ltd. and followed up with prospecting, ground checking of anomalies and limited ground geophysical surveys. The airborne magnetic survey was flown over the Piche Lake Property in spring 2006 (Dufresne, 2006)

Preliminary data from the property was reviewed and potential targets were then selected for future fieldwork by APEX and Kit Campbell of Intrepid Geophysics (North Vancouver, BC), during April and May, 2006. The data was contoured using Geosoft Oasis Montaj 6.0. 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 number of interesting high frequency magnetic anomalies (greater than 10 nT) were identified during the review of the data.

As a result of ongoing interpretation of the airborne geophysical survey, a total 60 targets chosen from the airborne magnetics were ground checked by Saq Yaqzan, a consultant to Shear. Of the 60 targets ground checked, 54 were shown to be well heads, well casings, or culture. A further 13 targets were chosen and still need to be ground checked. In summary, there were two interesting anomalies that warranted ground geophysics.

A total of two high priority geophysical anomalies identified from the 2006 aeromagnetic survey (Targets 10 and 11), and that were deemed not to be the result of culture, by ground truthing, were selected and surveyed by detailed ground magnetics in 2006. Neither target resulted in a drill target (Dufresne, 2006).

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 GSC in 1992 and AGS in 1993 (Fenton *et al*, 1994; Dufresne *et al*., 1996). These initial surveys 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 Piche Lake region has yielded a few diamond indicator minerals within the "Vermillion Trend", which was defined as a northerly belt of sites yielding anomalous diamond indicator minerals centered around the town of Vermillion (Dufresne *et al*., 1996). However, in general there is a lack of diamond indicator mineral anomalies in the Piche Lake region that is really a function of a lack of sampling rather than poor results.

GEOLOGICAL SETTING

Precambrian Geology

The Piche Lake Property lies near the northeastern to eastern edge of the Western Canadian Sedimentary basin within the central segments of the Peace River Arch (Figure 3). Precambrian rocks are not exposed within the Buffalo Head Hills to Piche Lake 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 3) 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 (Figures 3 and 4). To date, 26 of the 38 kimberlites, discovered in the region by the Buffalo Head Hills Joint Venture, have yielded diamonds.

The Piche Lake Property is underlain by basement comprised of the Rimbey Terrane (Figure 3). The Rimbey Terrane is an area of high positive magnetic relief with a northeasterly fabric (Villeneuve *et al.,* 1993). The Rimbey Terrane is classified as part of the Churchill Structural Province but may represent either Archean crust (that was part of the Hearne Province) 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). The Rimbey Terrane is classified as being derived from a 1.8 to 2.0 Ga Magmatic Arc similar to the Taltson Magmatic Zone, a region not considered favourable for the preservation of diamonds in the upper mantle due to thermal reworking. However, the magnetic signature of the Rimbery Terrane is significantly different (much less magnetic) to that of the Taltson Magmatic Zone and its origin is enigmatic and is interpreted on the basis of not a lot of data. The Rimbey Terrane could easily be part of the Hearne Structural Province and therefore have an Archean component to it, a more favourable setting for the preservation of diamonds in the upper mantle. Seismic refraction and reflection studies indicate that the crust beneath the Rimbey Terrane 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).

It should also be noted that the Piche Lake Property sits over top of an apparent and prominent Bougeur gravity low that straddles or is spatially associated with the Snowbird Tectonic Zone (Figures 3 and 5). The Buffalo Head Hills area and associated diamondiferous kimberlites are underlain by a prominent gravity low, which is purported to be the result of thickened crust and perhaps, which in turn may reflect a deep and cool mantle root. These type of crust-mantle conditions would be considered favourable for the formation and preservation of diamonds in the upper mantle in the area.

Phanerozoic Geology

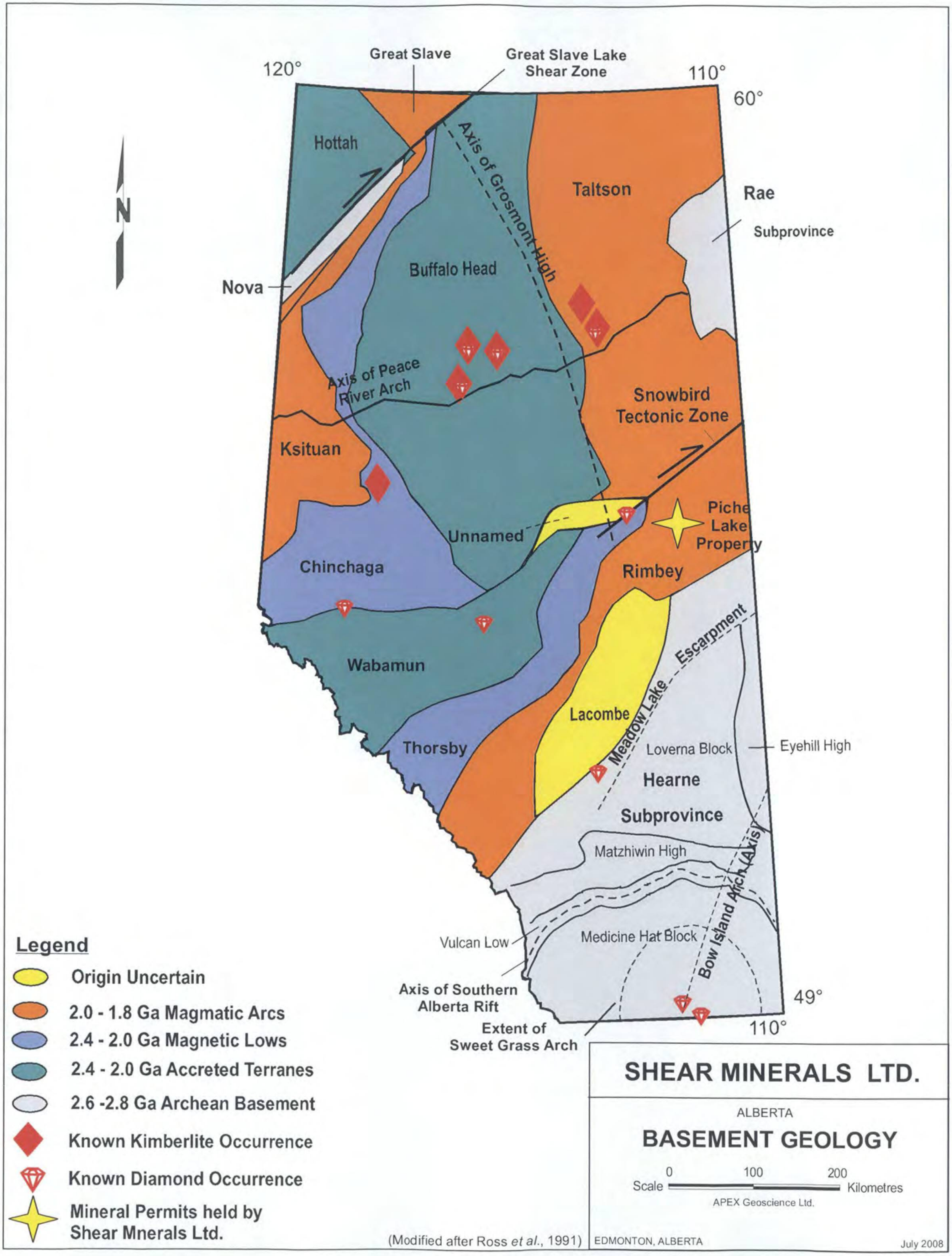
Overlying the basement in the Piche Lake region is a thick sequence of Phanerozoic rocks comprised mainly of Cretaceous sandstones and shales near surface and Mississippian to Devonian carbonates and salts at depth (Glass, 1990). Bedrock exposure within the permit block is limited primarily to river and stream cuts and topographic highs. Table 2 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 Piche Lake 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.

TABLE 2
GENERALIZED STRATIGRAPHY
PICHE LAKE 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).*



Great Slave
Great Slave Lake
Shear Zone
120°
110°
60°
Hottah
Axis of Grosmont High
Taltson
Rae
Subprovince
N
Buffalo Head
Nova
Axis of Peace River Arch
Snowbird
Tectonic Zone
Ksituan
Piche Lake Property
Unnamed
Chinchaga
Rimbey
Escarpment
Wabamun
Meadow Lake
Lacombe
Loverna Block
Eyehill High
Thorsby
Hearne
Subprovince
Matzhiwin High
Bow Island Arch (Axis)
Vulcan Low
Medicine Hat Block
Axis of Southern
Alberta Rift
49°
Extent of
Sweet Grass Arch
110°
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
BASEMENT GEOLOGY
0
100
200
Scale
Kilometres
APEX Geoscience Ltd.
EDMONTON, ALBERTA
July 2008

FIGURE 3.

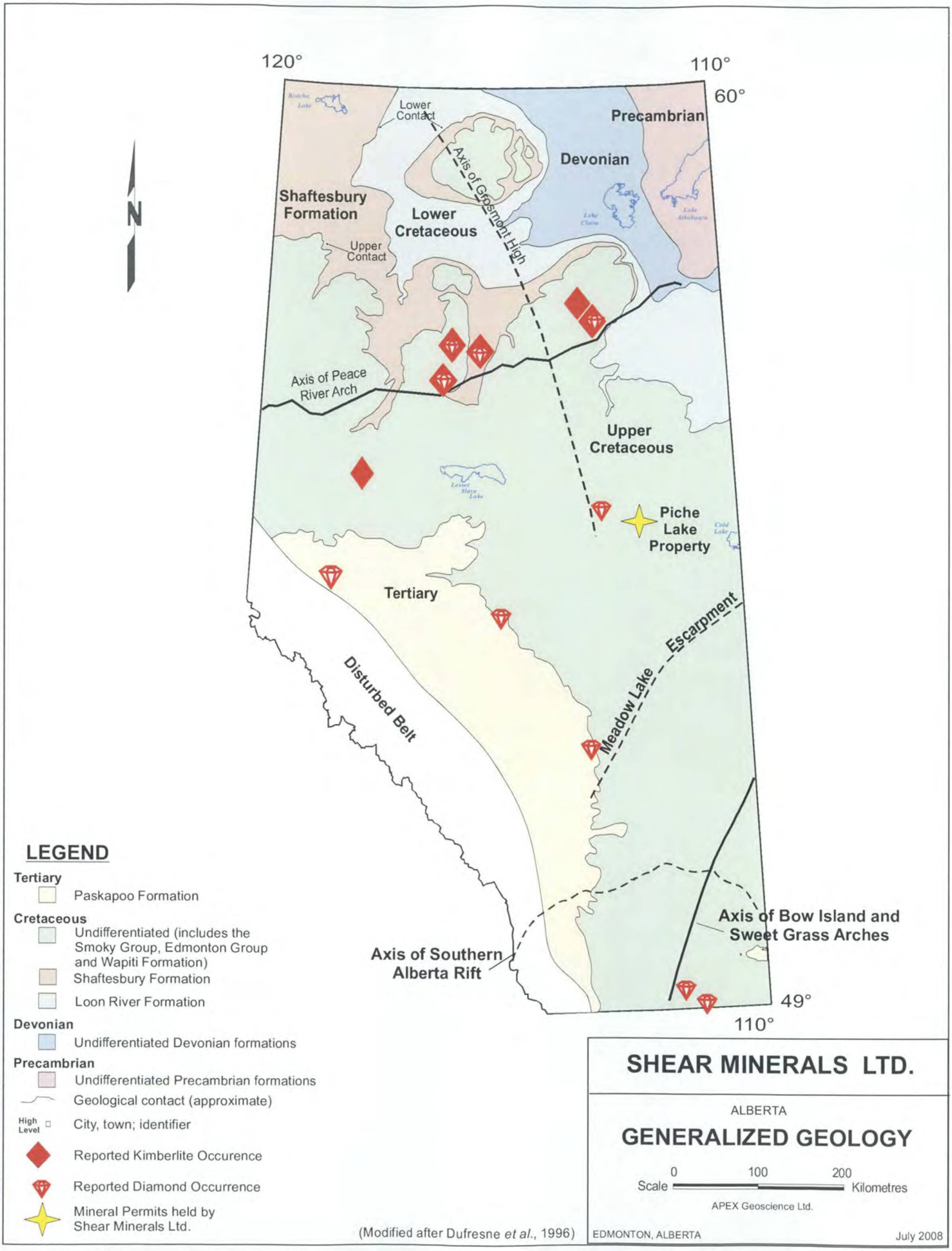
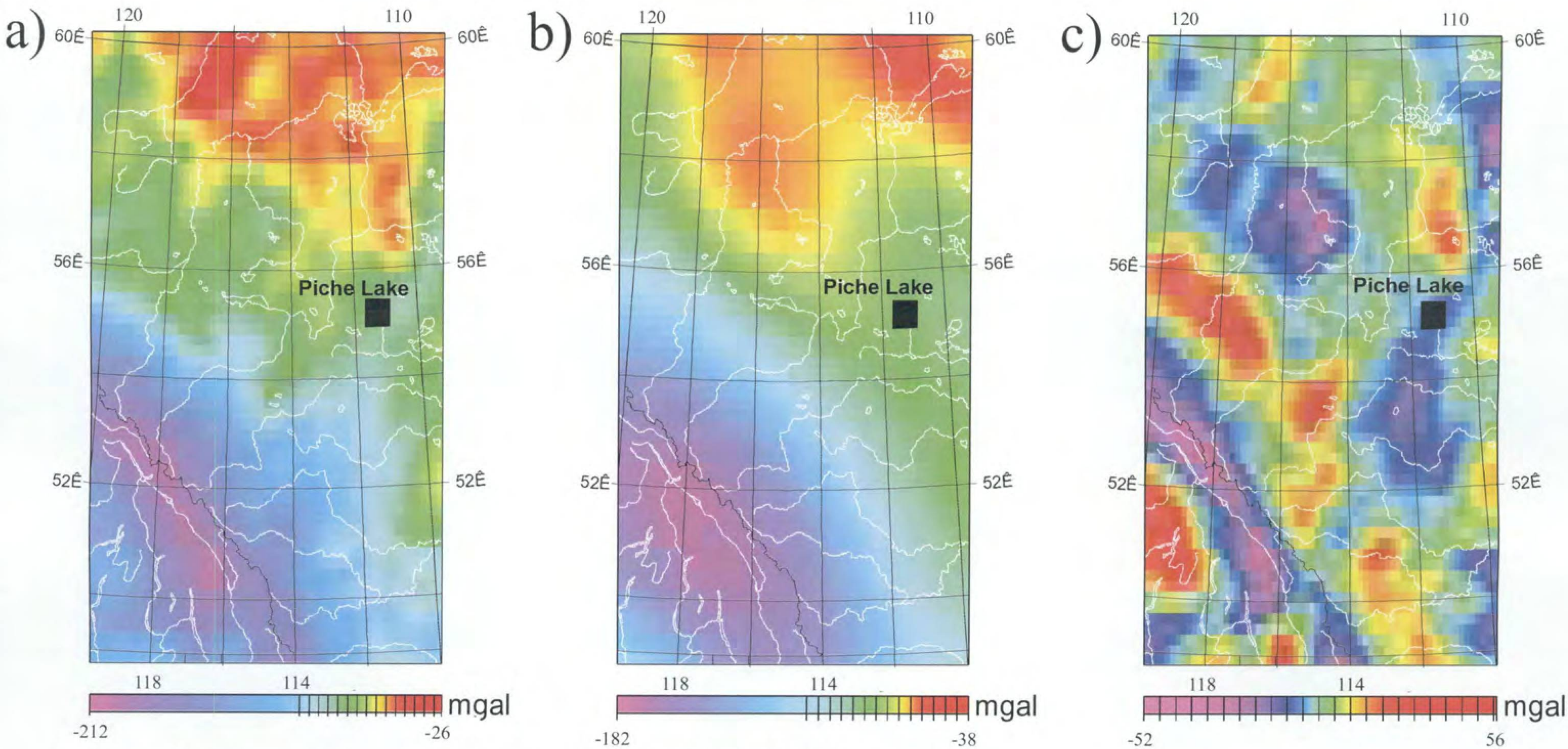

120°
110°
60°
Lower Contact
Precambrian
Devonian
Axis of Grosmont High
Shaftesbury Formation
Lower Cretaceous
Upper Contact
Axis of Peace River Arch
Upper Cretaceous
Piche Lake Property
Tertiary
Disturbed Belt
Meadow Lake Escarpment
Axis of Bow Island and Sweet Grass Arches
Axis of Southern Alberta Rift
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
0 100 200
Scale Kilometres
APEX Geoscience Ltd.
EDMONTON, ALBERTA
July 2008

FIGURE 4.

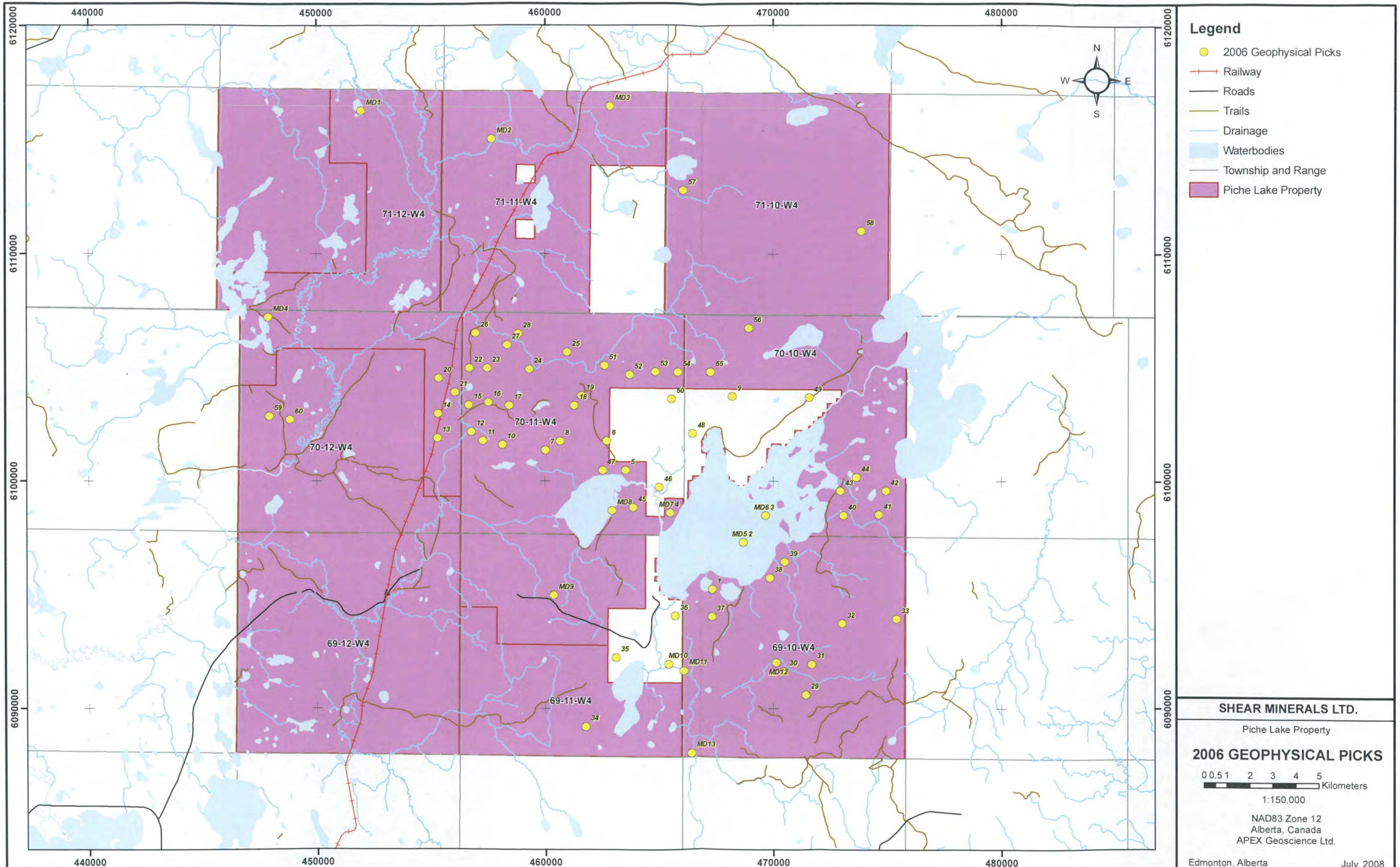


A) Observed Bougeur Gravity: purple to red represent variations in Bougeur gravity from -21mgal to -3.1 mgal.

B) Regional Trend of Bougeur Gravity: purple to red represent variations in Bougeur gravity from -20mgal to -46.7mgal.

C) Residual Bougeur Gravity: purple to red represents increasing Bougeur residual gravity (difference between 5a and 5b).

Figure 5. Bouger gravity maps for Alberta



440000
450000
460000
470000
480000
6120000
6110000
6100000
6090000
71-12-W4
71-11-W4
71-10-W4
70-12-W4
70-11-W4
70-10-W4
69-12-W4
69-11-W4
69-10-W4
N
W
E
S
Legend
2006 Geophysical Picks
Railway
Roads
Trails
Drainage
Waterbodies
Township and Range
Piche Lake Property
SHEAR MINERALS LTD.
Piche Lake Property
2006 GEOPHYSICAL PICKS
0 0.5 1 2 3 4 5 Kilometers
1:150,000
NAD83 Zone 12
Alberta, Canada
APEX Geoscience Ltd.
Edmonton, Alberta
July, 2008

FIGURE 6

In general, the Cretaceous strata underlying the Piche Lake 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, 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 upland areas such as the Buffalo Head Hills and the Birch Mountains. 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 Piche Lake 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. Localized pockets of deposits from glacial meltwater and proglacial lakes likely infilled areas of low relief (Fenton and Pawlowicz, 2000).

The majority of the Piche Lake 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 Piche Lake Property 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 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 to STZ 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 Piche Lake region lie along the axis of the STZ, and are underlain by and proximal to basement faults related to the eastern edge of 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 (Dufresne *et al.*, 1996; Leckie *et al.*, 1997; Eccles *et al.*, 2000). Similar structures observed on the Piche Lake Property could have resulted from tectonic activity associated with movement along the STZ or the Grosmont High and therefore could have provided pathways for kimberlitic volcanism.

DEPOSIT MODEL: DIAMONDIFEROUS KIMBERLITES

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).

Diamond Indicator Minerals

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).

EXPLORATION

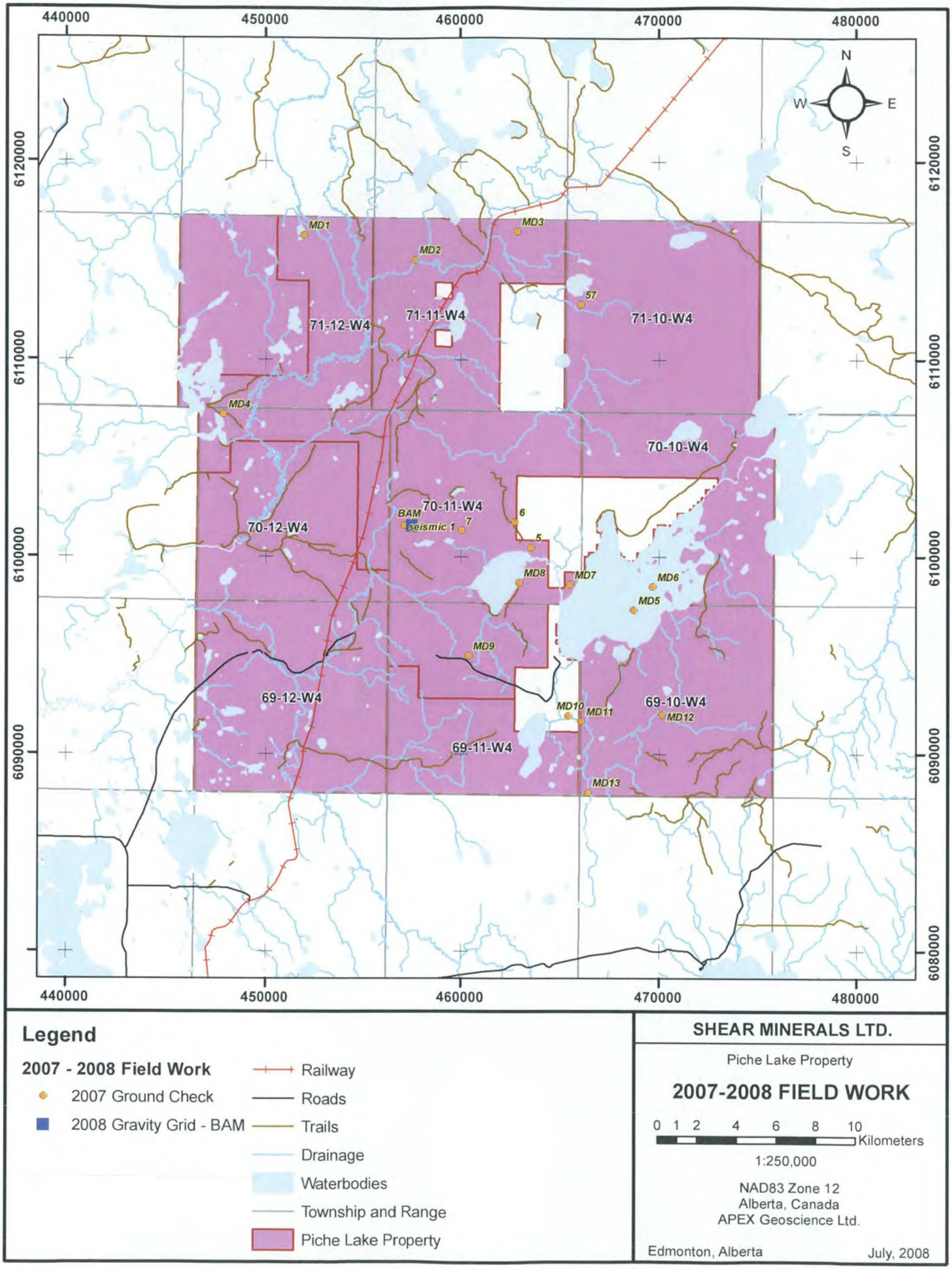
2007 Ground Checks

A re-interpretation of the geophysics by Mike Dufrense of APEX Geoscience Ltd. in 2006 resulted in the selection of an additional 13 geophysical targets for follow up (labeled MB1 to MD13)(Appendix 3). In total 13 airborne geophysical targets were ground truthed in 2007 by Saz Yaqzan of Shear Minerals Ltd. Airborne magnetic anomalies that were determined to be caused by man-made culture, such as drill collars used in oil and gas exploration will not be investigated any further. Several targets that could not be explained by ground checking warrant follow-up work with ground geophysical surveys. These are listed in Appendix 3. A number of targets (6) are located under lakes or creeks and therefore unexplained.

2008 Exploration: Gravity

Of note is that the BAM seismic anomaly does not appear to yield any associated magnetic signatures indicative of kimberlite, however not all kimberlites yield magnetic anomalies. It was decided that ground gravity would be a suitable follow up technique to further explore this target prior to drill testing the anomaly due to the seismic anomaly alone.

A ground gravity survey was completed over the BAM seismic anomaly (Seismic 2, Figure 7, Appendix 4). The gravity survey was conducted by Quadra Surveys in Spring 2008, using LaCoste & Romberg gravity meters and Trimble Real Time DGPS 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 spacing of 100 m and with a



440000
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6100000
6090000
6080000
N
S
W
E
MD1
MD2
MD3
57
71-12-W4
71-11-W4
71-10-W4
MD4
70-10-W4
BAM
70-11-W4
seismic 1
7
6
5
70-12-W4
MD8
MD7
MD6
MD5
MD9
69-12-W4
MD10
MD11
69-10-W4
MD12
69-11-W4
MD13
Legend
2007 - 2008 Field Work
2007 Ground Check
2008 Gravity Grid - BAM
Railway
Roads
Trails
Drainage
Waterbodies
Township and Range
Piche Lake Property
SHEAR MINERALS LTD.
Piche Lake Property
2007-2008 FIELD WORK
0 1 2 4 6 8 10
Kilometers
1:250,000
NAD83 Zone 12
Alberta, Canada
APEX Geoscience Ltd.
Edmonton, Alberta
July, 2008

FIGURE 7

station interval of 100 m. The final report from Quadra Surveys is presented in Appendix 4. A second internal memo is also presented in Appendix 4.

EXPLORATION EXPENDITURES

The cost to conduct the 2007-2008 exploration program within the Piche Lake Property was CAN$ 58,651.61 (not including GST). A detailed breakdown of the expenses is presented in Appendix 1.

CONCLUSION AND DISCUSSION

The regional setting of the Piche Lake Property is considered moderately favourable for the presence of diamondiferous kimberlites. The permits are predominantly underlain by Early Proterozoic to Archean basement of the Rimbey Terrane and a prominent gravity low. The local bedrock geology and the underlying Archean and Proterozoic crystalline basement in association with Phanerozoic structures, such as the Snowbird Tectonic Zone, may have provided a favourable environment for the formation and ascent of kimberlitic magmas in the Piche Lake area. This regional geological and structural setting (significant crustal thickness of 35 to 40 km) underlying the area 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 Snowbird Tectonic Zone and/or the Grosmont High.

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 northern Alberta that has been intruded by kimberlites. The glacial history for the Piche Lake 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 Piche Lake 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.

A review of all the existing and available magnetic data for Shear's property resulted in the identification of a number of magnetic anomalies that warranted follow-up exploration for kimberlites. To date none of these have resulted in targets for drill testing. Other geophysical anomalies of interest, such as the BAM seismic anomaly, identified from past exploration have not shown up on the airborne magnetic surveys. As a last resort, a ground gravity survey was completed of the BAM target and resulted in a coherent gravity high target measuring 250 m by 300 m. This target is a priority drill target and should be modelled and then consideration should be give to its drill testing.

A number of targets are located under lakes and wet areas a day unexplained.

RECOMMENDATIONS

The Piche Lake property is still in the early stages of exploration, with relatively little past exploration with the exception of what has been summarized in this report. In addition, the results of current exploration completed by Shear Minerals Ltd. have shown the one priority target on the Piche Lake Property warrants further investigation. A follow-up exploration program focused on drilling is warranted to test the BAM Seismic anomaly. The estimated cost to complete this program is $225,000 (3 drill holes @ $75,000 each). Additionally ground geophysical surveys should be completed over the lake and water targets estimated to be $50,000 (5 targets @ $10,000/target).

Should the BAM Target prove to be a kimberlite, further work would need to be assessed at that time and may include re interpretation of the airborne geophysics, additional ground gravity surveys over the lower priority subtle magnetic targets and potential airborne gravity surveys. This budget would need to be determined once the scope is defined.

Shear Minerals Ltd.

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

Edmonton, Alberta
July 23, 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 Piche Lake 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 .

Pamela Strand

Pamela Strand, M.Sc., P. Geol.
Edmonton, Alberta
July 23, 2008

MARMAC MINES LTD.

#2, 135 12 Avenue N.W. Calgary Alberta T2M 0C4 403-466-5577

July 23, 2008 Rush

Brian Hudson
Alberta Energy Mineral Development Division
7th Floor North Tower, Petroleum Plaza
9945 – 108 Street
Edmonton, AB T5K 2G6
Fax: 780-422-5447

Dear Brian and Hazel,

Re: 1) Statement of Intent to File
2) Work Assessment Report
3) Appointee to File
4) Grouping
Marmac Mines Ltd.
Mineral Permits 9304060627/ 28/ 30, 31/ 32/ 34/ 35
Twp. 69-71 Rge. 9-13 W4M
Piche Area, Alberta

Marmac hereby appoints Shear Minerals Ltd. as the mineral assessment appointee, for the current assessment period pursuant to Clause 9(1) of the Metallic and Industrial Minerals Tenure Regulation on all matters relating to the grouping, mineral assessment reporting, filings and extension/ continuation requests for the referenced Mineral Permits dated June 15, 2004.

Thank you for your cooperation and encouragement in our telephone conversation today regarding our forthcoming request pursuant to Section 8 of the Mines and Minerals Act

Please contact us should you have any concerns or questions.

Yours,

[redacted]

David B. Savage
Vice President

cc: a) Marmac: Bruce McIntyre, President
b) Shear Minerals Ltd.
Attn: Pamela Strand, P. Geol.
President and CEO

APPENDIX 1
PICHE LAKE EXPLORATION EXPENDITURES

No.	ITEM		Piche 2007-2008	SUBTOTAL	TOTAL
1. Shear Geological Staff Costs					
	Principals directly involved	P. Strand	[redacted]		
	Geological Staff - Office Work	S. Yaqzan (Geologist_			
	Clerical (Aid Report Preparation)			$8,492.50	
2. Consultants Fees			$8,038.25	$8,038.25	
3. Ground Geophysical Surveying					
	Quadra Surveys - Geophysical Surveying		$22,789.65	$22,789.65	
4. Shear Minerals Direct Costs	Principles directly involved		$1,200.00		
	Geological Staff - Field Work		$3,112.50		
	Frieght		$500.00		
	Field Supplies		$2,300.00		
	Communications		$1,013.26		
	Field Travel	Canadian Helicopters	$1,425.38		
	Helicopter		$4,014.71		
	Software and Rentals		$72.44	$13,638.29	
4. Allowable Administration Costs	Subtotal			$52,958.69	
	10% Allowable Administration Cost			$5,295.87	
					$58,254.56

APPENDIX 2
PICHE LAKE PERMIT DESCRIPTIONS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: May 28, 2008 9:10:59 AM

Agreement Number: 093 9306110761

Status: ACTIVE
Agreement Area: 4608

Term Date: 2006-11-10
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8052066
Client Name: SHEAR MINERALS LTD.
Address: 9797 45 AVE NW SUITE 100
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

4-12-071: 07-10;15-22;28-33

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: May 28, 2008 9:11:33 AM

Agreement Number: 093 9304060635

Status: ACTIVE
Agreement Area: 4608

Term Date: 2004-06-15
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8076627
Client Name: MARMAC MINES LTD.
Address: 135 12 AVE NW SUITE 2
CALGARY, AB
CANADA T2M 0C4

LAND / ZONE DESCRIPTION

4-12-071: 01-06;11-14;23-27;34-36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: May 28, 2008 9:11:53 AM

Agreement Number: 093 9304060634

Status: ACTIVE
Agreement Area: 6795

Term Date: 2004-06-15
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8076627
Client Name: MARMAC MINES LTD.
Address: 135 12 AVE NW SUITE 2
CALGARY, AB
CANADA T2M 0C4

LAND / ZONE DESCRIPTION

4-11-071: 03-10;15;16SEP
PORTION(S) LYING OUTSIDE PROPOSED FOREST RECREATION AREA.
4-11-071: 16NWP
PORTION(S) LYING OUTSIDE PROPOSED FOREST RECREATION AREA.
4-11-071: 16NEP
PORTION(S) LYING OUTSIDE PROPOSED FOREST RECREATION AREA.
4-11-071: 17-20;21SEP
PORTION(S) LYING OUTSIDE PROPOSED FOREST RECREATION AREA.
4-11-071: 21SWP
PORTION(S) LYING OUTSIDE PROPOSED FOREST RECREATION AREA.
4-11-071: 21NEP
PORTION(S) LYING OUTSIDE PROPOSED FOREST RECREATION AREA.
4-11-071: 22;25-36
METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: May 28, 2008 9:12:15 AM

Agreement Number: 093 9306110746

Status: ACTIVE
Agreement Area: 9216

Term Date: 2006-11-07
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8052066
Client Name: SHEAR MINERALS LTD.
Address: 9797 45 AVE NW SUITE 100
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

4-10-071: 01-36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: May 28, 2008 9:12:36 AM

Agreement Number: 093 9306110760

Status: ACTIVE
Agreement Area: 6400

Term Date: 2006-11-10
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8052066
Client Name: SHEAR MINERALS LTD.
Address: 9797 45 AVE NW SUITE 100
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

4-12-070: 01-11;14-23;26-29

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: May 28, 2008 9:12:58 AM

Agreement Number: 093 9304060632

Status: ACTIVE
Agreement Area: 2816
Term Date: 2004-06-15
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8076627
Client Name: MARMAC MINES LTD.
Address: 135 12 AVE NW SUITE 2
CALGARY, AB
CANADA T2M 0C4

LAND / ZONE DESCRIPTION

4-12-070: 12;13;24;25;30-36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: May 28, 2008 9:13:26 AM

Agreement Number: 093 9304060631

Status: ACTIVE
Agreement Area: 7728

Term Date: 2004-06-15
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8076627
Client Name: MARMAC MINES LTD.
Address: 135 12 AVE NW SUITE 2
CALGARY, AB
CANADA T2M 0C4

LAND / ZONE DESCRIPTION

4-11-070: 01SP,NEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-11-070: 02-11;15-22;25-36
METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: May 28, 2008 9:13:49 AM

Agreement Number: 093 9304060630

Status: ACTIVE   Term Date: 2004-06-15
Agreement Area: 7352   Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8076627
Client Name: MARMAC MINES LTD.
Address: 135 12 AVE NW SUITE 2
CALGARY, AB
CANADA T2M 0C4

LAND / ZONE DESCRIPTION

4-10-070: 01-05;06S,NE,L11,L12,L13SE,L13SWP,L13NEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 06L14;07SE,L3,L4EP,L5EP

4-10-070: 07L6S,L6NWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 07L6NE,L9,L10S,L10NWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 07L10NE,L11SP

4-10-070: 07L15E,L15SWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 07L16;08L1-L5,L6SEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 08L6SW,L6NWP,L7SEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 08L8S,L8NWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 08L8NE,L9SE,L9SWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 08L12W,L12SEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 08L13W;09S,NE,L11,L12,L13SEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 09L14;10-14;15S,NE,L11,L12S,L12NWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.

4-10-070: 15L12NE,L13SE,L13SWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 15L14S,L14NEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 16L1,L2,L3E,L3WP

4-10-070: 16L6SE,L6SWP,L6NEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 16L7S,L7NWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 16L8S,L8NWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 16L8NE,L9SEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 17L4SW,L4NWP,L5SWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 18L1,L2SE,L2NEP,L7SP,L7NWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 18L7NE,L8,L9,L10SE,L10SWP,L10NEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 18L16S;22L1,L2SE,L2SWP,L2NEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 22L8SE,L8SWP,L8NEP,L9SEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 23S,L9-L11,L12S,L12NEP,L14NP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 23L14SE,L14SWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 23L15S,L15NP

4-10-070: 23L16S,L16NWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-10-070: 23L16NE;24-36
METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: May 28, 2008 9:14:16 AM

Agreement Number: 093 9306110745

Status: ACTIVE
Agreement Area: 9216

Term Date: 2006-11-07
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8052066
Client Name: SHEAR MINERALS LTD.
Address: 9797 45 AVE NW SUITE 100
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

4-12-069: 01-36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: May 28, 2008 9:14:38 AM

Agreement Number: 093 9306110759

Status: ACTIVE
Agreement Area: 4352

Term Date: 2006-11-10
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8052066
Client Name: SHEAR MINERALS LTD.
Address: 9797 45 AVE NW SUITE 100
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

4-11-069: 01-12;15-19

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: May 28, 2008 9:15:00 AM

Agreement Number: 093 9304060628

Status: ACTIVE
Agreement Area: 3599

Term Date: 2004-06-15
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8076627
Client Name: MARMAC MINES LTD.
Address: 135 12 AVE NW SUITE 2
CALGARY, AB
CANADA T2M 0C4

LAND / ZONE DESCRIPTION

4-11-069: 20-22;25NE,L6NEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-11-069: 25L7N,L7SEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-11-069: 25L8N,L8SEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-11-069: 25L8SWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-11-069: 25L11SEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-11-069: 25L11NEP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-11-069: 25L14E,L14SWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-11-069: 26-35;36E,L3SWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-11-069: 36L3NWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-11-069: 36L3E,L6E,L6SWP
PORTION(S) LYING OUTSIDE HEART LAKE INDIAN RESERVE NO. 167.
4-11-069: 36L11E,L14E
METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: May 28, 2008 9:15:19 AM

Agreement Number: 093 9304060627

Status: ACTIVE
Agreement Area: 9216

Term Date: 2004-06-15
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8076627
Client Name: MARMAC MINES LTD.
Address: 135 12 AVE NW SUITE 2
CALGARY, AB
CANADA T2M 0C4

LAND / ZONE DESCRIPTION

4-10-069: 01-36

METALLIC AND INDUSTRIAL MINERALS

APPENDIX 3
PICHE LAKE TARGETS AND GROUND CHECKS

Target	Easting nad27z12	Northing nad27z12	Comment
Targets Picked and Evaluated			
1	467391	6095006	well head
2	468761	6097077	targets are in middle of Heart lake (winter grids)
3	469719	6098265	targets are in middle of Heart lake (winter grids)
4	465536	6098374	tower in middle of built up area
5	463590	6100251	possible mag target, forested area, only got to within 400m
6	462766	6101549	possible mag target, swampy good winter grid, suspected abandon well head
7	460077	6101138	possible mag target, partially in a swamp, good winter grid, suspected abandon well head
8	460722	6101538	well head
9	468277	6103516	abandon well head
10	458189	6101382	possible target, large clearing may be an abandon well
11	457322	6101560	possible target, centered on a large knoll, drops off all sides
12	456833	6101960	well head
13	455344	6101671	well head
14	455367	6102760	well head
15	456722	6103138	well head
16	457566	6103249	well head
17	458478	6103116	well head
18	461344	6103114	well head
19	461655	6103538	abandon well head
20	455389	6104316	well head
21	456100	6103693	well head
22	456744	6104760	well head
23	457522	6104758	well head
24	459366	6104716	well head
25	461023	6105455	well head
26	457011	6106293	well head
27	458389	6105782	well head
28	458878	6106271	well head
29	471486	6090369	abandon well head
30	470538	6091385	abandon well head
31	471743	6091701	well head
32	473075	6093504	abandon well head
33	475459	6093709	well head
34	461824	6088988	abandon well head
35	463149	6092009	abandon well head
36	465751	6093845	well head
37	467378	6093798	well head
38	469909	6095519	well head
39	470562	6096217	abandon well head
40	473137	6098265	well head
41	474689	6098298	well head
42	474999	6099351	well head
43	472998	6099335	well head
44	473709	6099948	abandon well head
45	463918	6098596	well head
46	465065	6099508	abandon well head
47	462579	6100253	abandon well head
48	466525	6101880	well head
49	471633	6103470	abandon well head
50	465604	6103408	well head
51	462653	6104873	abandon well head
52	463762	6104475	well head
53	464893	6104601	abandon well head

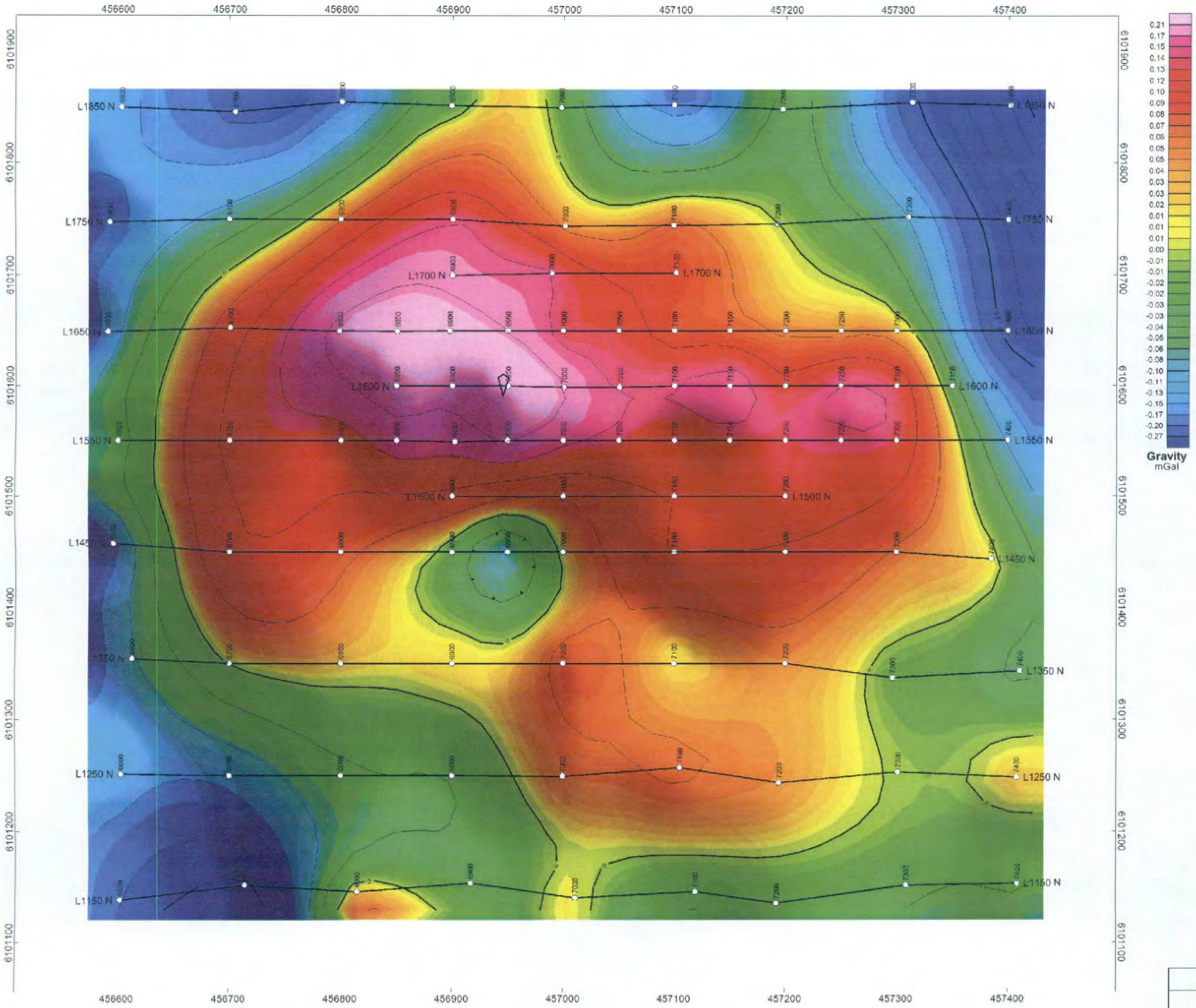
Target	Easting nad27z12	Northing nad27z12	Comment
Targets Picked and Evaluated			
54	465876	6104580	well head
55	467321	6104580	well head
56	468995	6106526	well head
57	466107	6112575	suspected abandon well (got within 300m) winter grid if not
58	473914	6110775	abandon well head with pipe line riser
59	447978	6102624	well head
60	448886	6102476	well head
Additional Targets Picked			
MD1	452000	6116051	Small Lake edge
MD2	457710	6114823	Well head shown nearby but complex anomaly
MD3	462898	6116253	
MD4	447922	6106987	On a trail
MD5	468761	6097077	Same as 2 above, under lake
MD6	469719	6098265	Same as 3 above, under lake
MD7	465536	6098374	Same as 4 above, well and tower nearby
MD8	462984	6098471	Lake edge
MD9	460420	6094756	Beside pipeline and road
MD10	465465	6091715	Between trail and creek
MD11	466125	6091425	Between trail and creek
MD12	470193	6091778	Under a creek
MD13	466453	6087824	Under a creek

Xnad83	Ynad83	target	rank	comments
468709.1	6097314.6	P02a	3	targets are in middle of Heart lake (winter grids)
468841.3	6097314.9	P02b	3	targets are in middle of Heart lake (winter grids)
469767.3	6098512.8	P03	3	targets are in middle of Heart lake (winter grids)
462790.2	6101661.7	P06	3	possible mag target, swampy good winter grid. Suspected abandoned wellhead
457198.8	6101814.7	P11a	3	possible target; centered on a large knoll, drops off all sides
457298.3	6101510.9	P11b	3	approx. corresponds to Seismic-2 target; no real magnetic anomaly
451947.6	6116212.6	P61	3	(MD1) mag high at SE corner lake, offset from NW-trend
447901.9	6107212.8	P64	3	(MD4) Isolated mag high on trail (culture?); anomalous magnetic b/g
466071.0	6091613.4	P68	3	(MD11) Localized mag high with N-S orientation; intersecting trends? Close road
470133.0	6091914.1	P69	3	(MD12) Localized high in anomalous b/g
462813.2	6116510.4	P63	4	(MD3) No discernible magnetic anomaly
462924.6	6098663.0	P65	4	(MD8) Semi-isolated high close to end of trail (culture?)
465426.4	6091913.9	P67	4	(MD10) Semi-isolated high on WNW trending geology; fairly close to road
466426.4	6088011.5	P70	4	(MD13) Localized mag high in anomalous b/g; north-south linear pattern suggested
467315.9	6095209.8	P01	5	wellhead
465502.7	6098513.2	P04	5	tower in middle of built-up area
463522.0	6100465.5	P05	5	? mag target ? ...forested area; only got to within 400m. Wellhead indicated!
460040.7	6101359.7	P07	5	? mag target ? ...partially in swamp, good winter grid. Indicated wellhead!
460645.8	6101665.8	P08	5	wellhead
468215.3	6103765.2	P09	5	abandoned wellhead
458140.0	6101665.3	P10	5	abandoned wellhead
456739.0	6102262.3	P12	5	wellhead
455286.4	6101813.1	P13	5	indicated wellhead
455305.1	6102863.0	P14	5	wellhead
456672.7	6103315.1	P15	5	wellhead
457531.7	6103461.1	P16	5	wellhead
458407.7	6103316.3	P17	5	wellhead
461316.6	6103315.2	P18	5	wellhead
461562.4	6103763.1	P19	5	abandoned wellhead
455330.3	6104512.4	P20	5	wellhead
456017.8	6103912.6	P21	5	wellhead
456705.8	6104964.5	P22	5	wellhead
457408.5	6104964.2	P23	5	wellhead
459289.7	6104960.2	P24	5	wellhead
460929.5	6105714.3	P25	5	wellhead
456947.5	6106463.6	P26	5	wellhead
458328.2	6106013.1	P27	5	wellhead

Xnad83	Ynad83	target	rank	comments
458810.0	6106463.2	P28	5	wellhead
471447.6	6090562.7	P29	5	indicated wellhead
470459.7	6091615.9	P30	5	abandoned wellhead
471687.0	6091914.6	P31	5	indicated wellhead
473009.9	6093714.7	P32	5	abandoned wellhead
475392.1	6093872.4	P33	5	indicated wellhead
461749.6	6089214.5	P34	5	abandoned wellhead
463096.9	6092213.1	P35	5	indicated wellhead
465648.5	6094015.7	P36	5	wellhead
467300.5	6094014.7	P37	5	indicated wellhead
469849.1	6095670.3	P38	5	wellhead
470467.0	6096414.0	P39	5	indicated wellhead
473086.8	6098513.3	P40	5	wellhead
474611.9	6098512.4	P41	5	wellhead
474918.0	6099561.5	P42	5	wellhead
472930.6	6099562.6	P43	5	wellhead
473636.5	6100166.5	P44	5	abandoned wellhead
463830.7	6098812.0	P45	5	wellhead
464971.7	6099713.1	P46	5	abandoned wellhead
462500.0	6100462.8	P47	5	abandoned wellhead
466430.2	6102115.8	P48	5	wellhead
471531.9	6103615.7	P49	5	abandoned wellhead
465540.2	6103612.2	P50	5	wellhead
462599.2	6105113.8	P51	5	abandoned wellhead
463665.5	6104662.7	P52	5	wellhead
464811.6	6104812.1	P53	5	abandoned wellhead
465788.6	6104813.4	P54	5	wellhead
467243.4	6104815.1	P55	5	wellhead
468895.4	6106762.5	P56	5	wellhead
466063.3	6112757.3	P57	5	suspected abandoned well (only got to within 300m) ...winter grid?
473814.9	6110959.3	P58	5	abandoned wellhead with pipe line riser
447871.8	6102859.6	P59	5	wellhead
448792.1	6102711.3	P60	5	wellhead
457652.5	6115012.6	P62	5	(MD2) Indicated wellhead
460348.0	6094950.1	P66	5	(MD9) Very sharp, high-freq. mag high (culture?)

Xnad83	Ynad83	target	rank	comments
				Ranking
				Highest (1) to Lowest (5)

APPENDIX 4
PICHE LAKE GROUND GRAVITY DATA AND REPORTS



SURVEY SPECIFICATIONS

Station Interval: 50m, 100m

Line Separation: 50m, 100m

Datum NAD83, Zone 12W

DATA PRESENTATION

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

Terrain correction to 450m

Contour Interval: 0.05 mGal

Bouguer Density 1.5 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 2

Residual of Bouguer Gravity Map

Fort McMurray, Alberta

February 27, 2008

Quadra Surveys Ltd.

....Memorandum...

SHEAR MINERALS LTD.

Date: July 15, 2008	Ref: Project Update
To: Marmac Mines (Bruce McIntyre & Dave Savage)	cc: SY
From: Pamela Strand	

CONFIDENTIAL

Piche Lake Summary 2008

Spring 2008

A crew from Quadra Surveys, based out of Barriere, BC surveyed target Seismic 2 between January 13 and February 2, 2008. The crew was based in Lac La Biche and accessed the area using by truck and snowmobile.

The gravity anomaly more or less corresponds to the Seismic 2 anomaly. There is no corresponding magnetic anomaly in the airborne magnetic survey data. The target will be modelled in 3D by Kit Campbelll of Intrepid Geophysics.

Comments from Kit Campbell, Intrepid Geophysics Ltd, of North Vancouver, BC on Gravity survey on the Seismic 2 target:

We're basing these comments on the assumption that densities for kimberlite in the Buffalo Hills area ranges between 2.4 g/cc and 2.6 g/cc. Past modeling exercises in the Alberta have used positive density contrasts between 0.2 g/cc and 0.5 g/cc for kimberlite sources.

The gravity is reduced by Quadra at varying Bouguer correction densities; however, the data presented at 1.5 gm/cc appears to have the least topographic correlation. This Bouguer correction of 1.5gm/cc is definitely less dense than would be expected from past experience (normally, we might use a density of 1.7 gm/cc or even 1.8 gm/cc in this region). Note as well that the terrain corrections have been extended out to 450 m based on the surveyed elevations and an extrapolated elevation map in order to get an optimum fit.

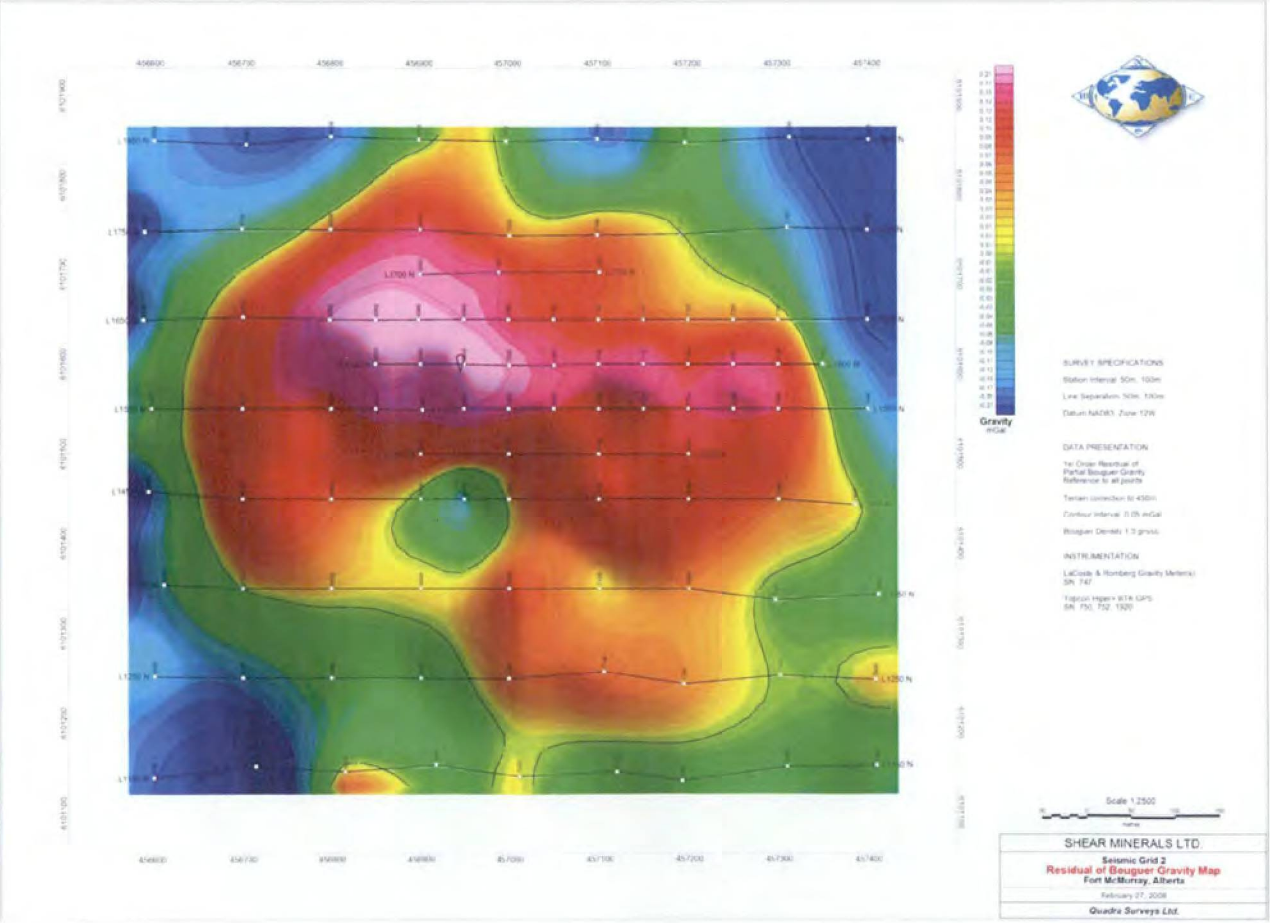
I note that there is slight topography in the area, but none which in itself seems to explain the residual gravity anomaly that has been mapped using the 1.5 g/cm3 correction density.

....Memorandum...

Therefore we are left with a residual gravity anomaly providing a positive ~0.2 mgal relief over ~7.5 --> 10 hectares. Of course, this gravity anomaly more or less corresponds to the previously identified 'seismic 2' anomaly. We have no ground magnetic data over this target, but the airborne data indicates a lack of any identifiable magnetic anomaly.

Recommendations: Barring some development arising from the model this anomaly should be drill tested for possible kimberlite emplacement.

Below: Ground Gravity Anomaly over Piche Seismic 2.



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

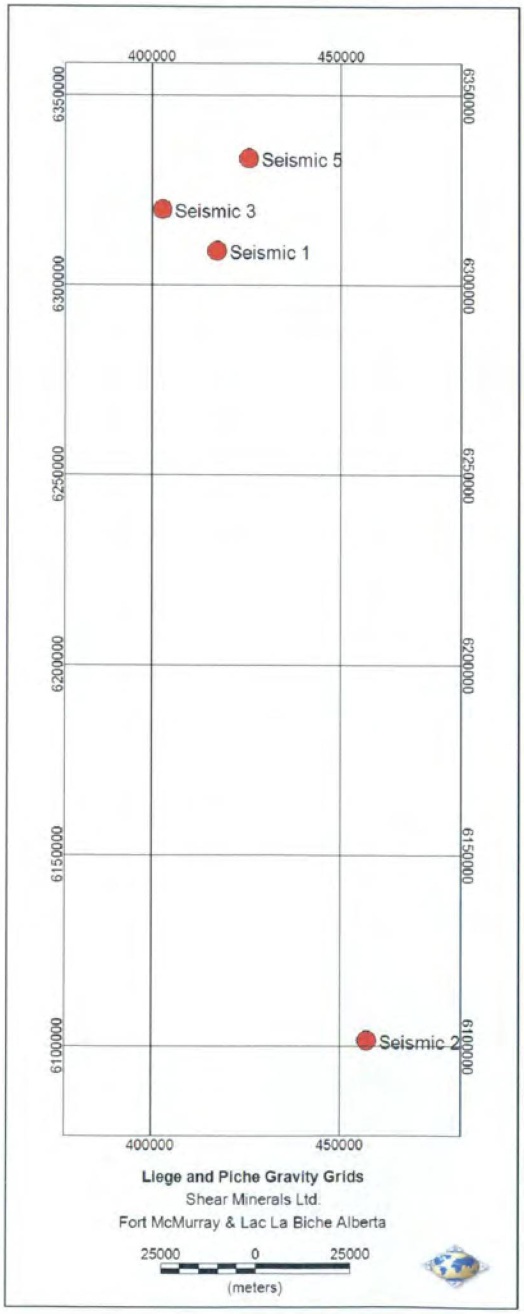


Figure 2: Map Location of the Liege & Piche Gravity Grids

2. SURVEY DETAILS

3.1 Production Log

• Gravity Survey Duration:	Liege: December 9th to December 22nd, 2008 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 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

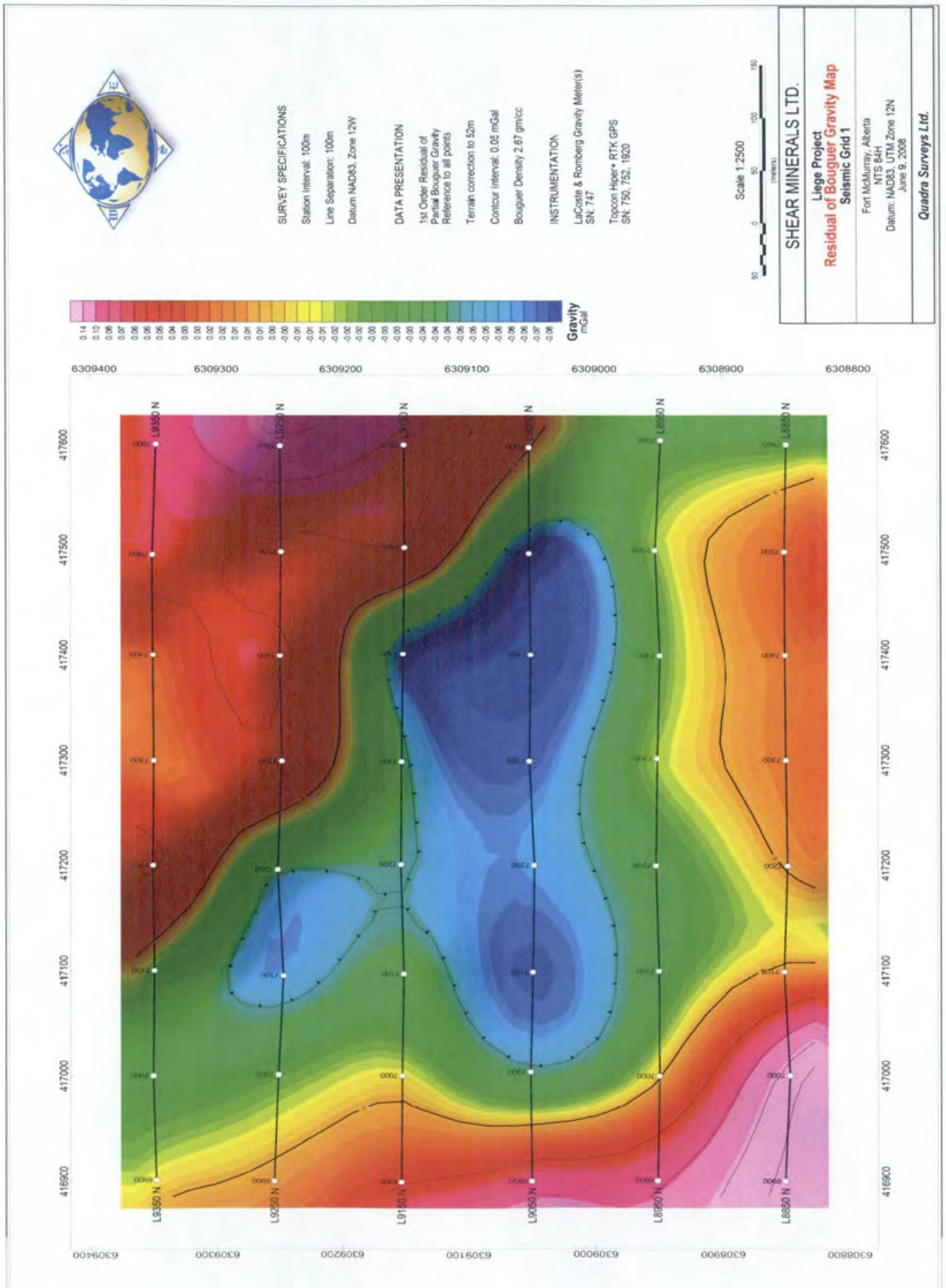


Figure 4: Seismic 1 Bouguer Gravity Map

b) Seismic Grid 2

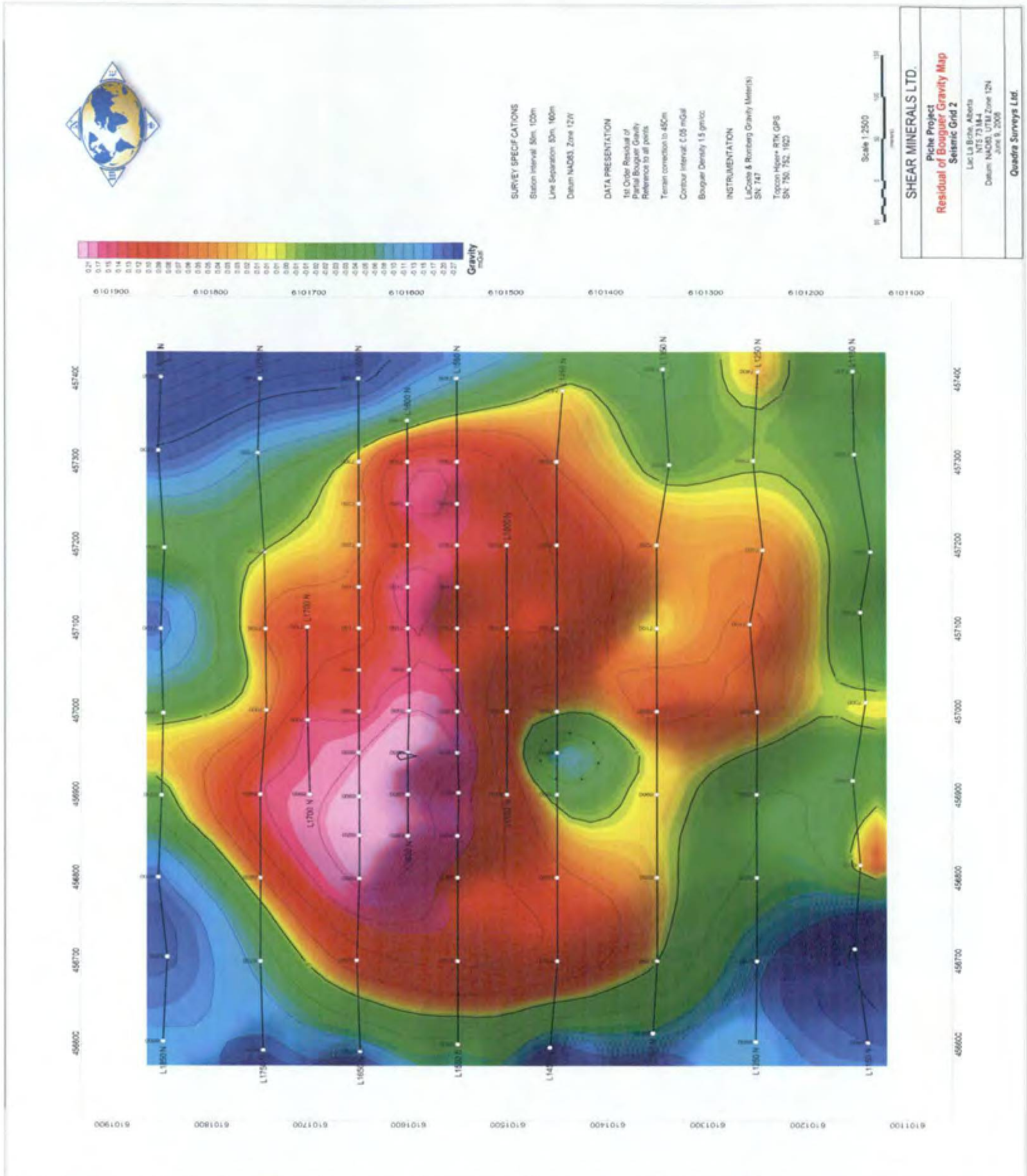


Figure 5: Seismic 2 Residual of Partial Bouguer Gravity Map

c) Seismic Grid 3

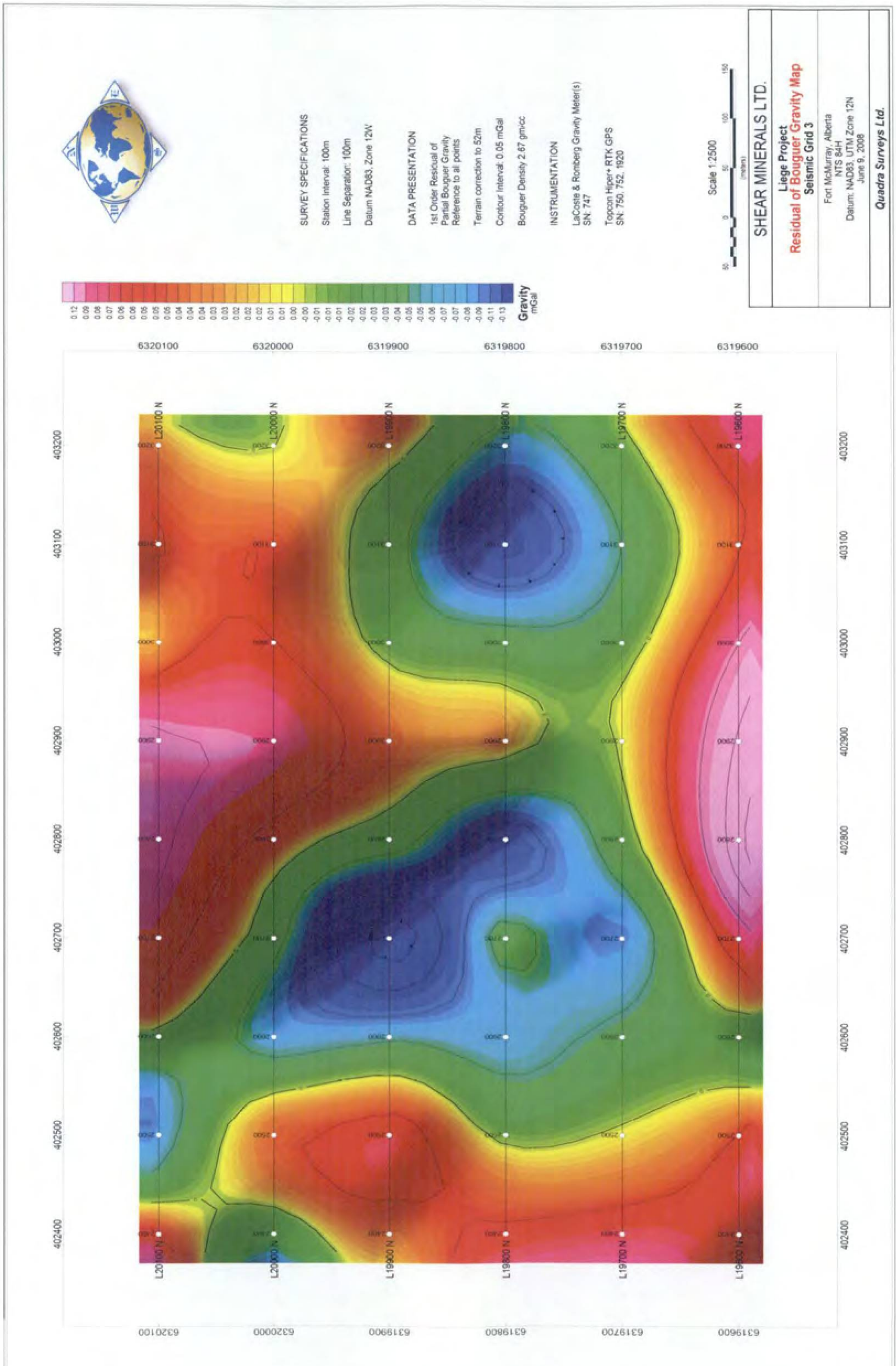


Figure 6: Seismic 3 Residual of Partial Bouguer Gravity Map

d) Seismic Grid 5

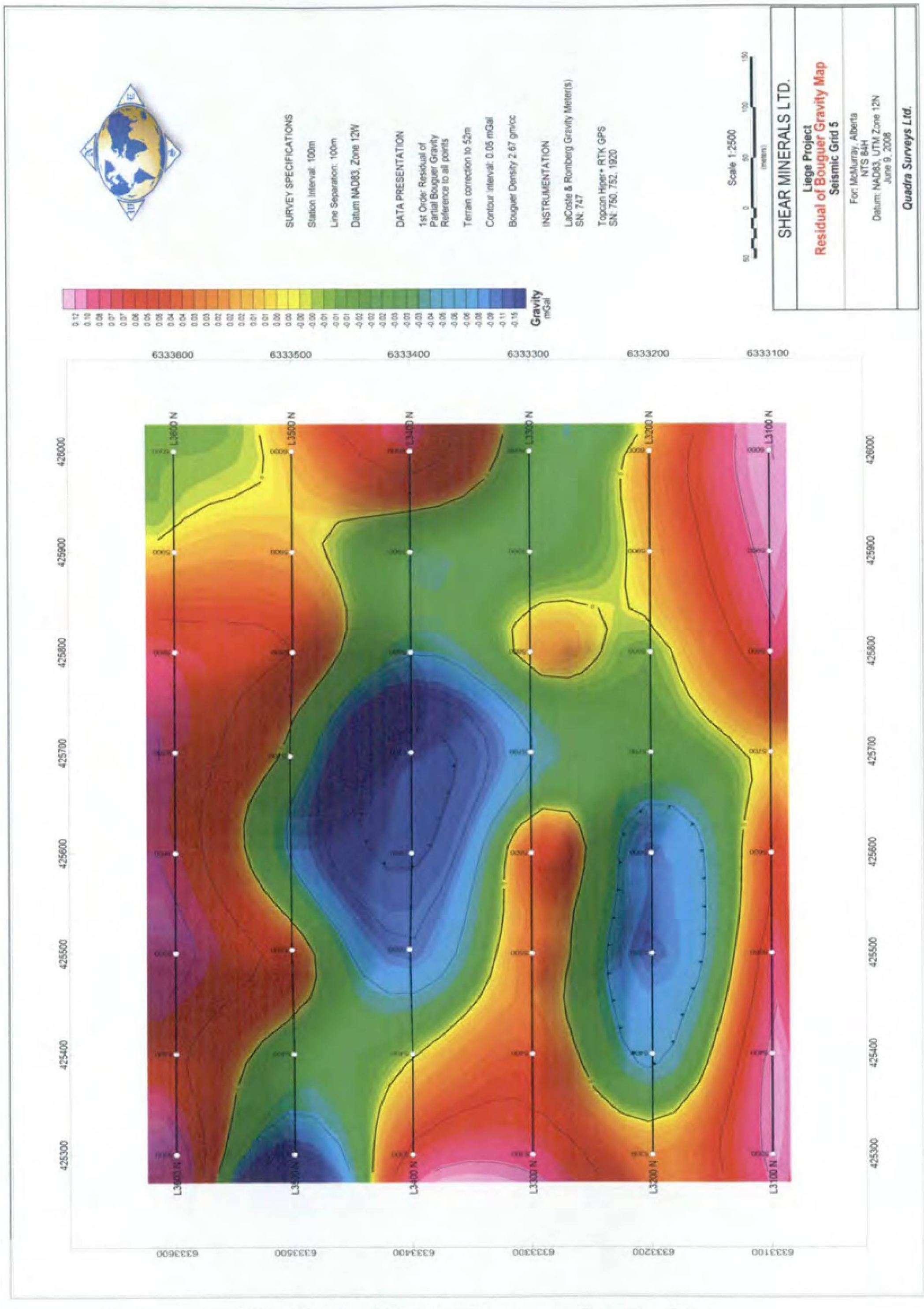


Figure 7: Seismic 5 Residual of Partial Bouguer Gravity Map

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.

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 σ = 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.
$\alpha = 0.005278895$
$\beta = -0.000023462$
θ = 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 Φ = Sector angle (B = 90°, C = 90°)
τ = gravitational constant = 0.00667
σ = 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