MAR 20070002: SMOKY THE BEAR

Received date: Feb 21, 2007

Public release date: Mar 06, 2008

DISCLAIMER

By accessing and using the Alberta Energy website to download or otherwise obtain a scanned mineral assessment report, you ("User") agree to be bound by the following terms and conditions:

a) Each scanned mineral assessment report that is downloaded or otherwise obtained from Alberta Energy is provided "AS IS", with no warranties or representations of any kind whatsoever from Her Majesty the Queen in Right of Alberta, as represented by the Minister of Energy ("Minister"), expressed or implied, including, but not limited to, no warranties or other representations from the Minister, regarding the content, accuracy, reliability, use or results from the use of or the integrity, completeness, quality or legibility of each such scanned mineral assessment report;
b) To the fullest extent permitted by applicable laws, the Minister hereby expressly disclaims, and is released from, liability and responsibility for all warranties and conditions, expressed or implied, in relation to each scanned mineral assessment report shown or displayed on the Alberta Energy website including but not limited to warranties as to the satisfactory quality of or the fitness of the scanned mineral assessment report for a particular purpose and warranties as to the non-infringement or other non-violation of the proprietary rights held by any third party in respect of the scanned mineral assessment report;
c) To the fullest extent permitted by applicable law, the Minister, and the Minister's employees and agents, exclude and disclaim liability to the User for losses and damages of whatsoever nature and howsoever arising including, without limitation, any direct, indirect, special, consequential, punitive or incidental damages, loss of use, loss of data, loss caused by a virus, loss of income or profit, claims of third parties, even if Alberta Energy have been advised of the possibility of such damages or losses, arising out of or in connection with the use of the Alberta Energy website, including the accessing or downloading of the scanned mineral assessment report and the use for any purpose of the scanned mineral assessment report so downloaded or retrieved.
d) User agrees to indemnify and hold harmless the Minister, and the Minister's employees and agents against and from any and all third party claims, losses, liabilities, demands, actions or proceedings related to the downloading, distribution, transmissions, storage, redistribution, reproduction or exploitation of each scanned mineral assessment report obtained by the User from Alberta Energy.

NTS 84B,C

ASSESSMENT REPORT FOR THE SMOKY THE BEAR PROPERTY, BUFFALO HEAD HILLS PERMITS 9303031149, to 9303031152-55, 9305010837-38, 9305031116-18, 9306020525-30, 9306020545, 9306110739-42 And 9307010942-45

Approximate Property Location
Latitude: 56°, 31.5' N
Longitude: 115°, 42.0' W
Near The Town of Red Earth Creek,
120 km North of Slave Lake, North-Central Alberta (NTS 84B/11)

Completed By :
APEX Geoscience Ltd.
Suite 200, 9797 – 45 Avenue
Edmonton, Alberta, Canada
T6E 5V8

56°56' 56.9333
116°13' 116.2166
ATS 5/91/14

Completed For:
Grizzly Gold Inc.
Comp 2, Site 17,
Peers, Alberta
T0E 1W0

And

Grizzly Diamonds Ltd.
Suite 220, 9797 – 45 Avenue
Edmonton, Alberta, Canada
T6E 5V8

56°35'
114°49'

56.5833
114.7333
ATS 5/07/5

February 20, 2007
Edmonton, Alberta

M.B. Dufresne, M.Sc. PGeol.

TABLE OF CONTENTS

SUMMARY..... 1
INTRODUCTION AND TERMS OF REFERENCE..... 2
DISCLAIMER..... 3
PROPERTY DESCRIPTION AND LOCATION..... 3
ACCESSIBILITY, CLIMATE AND LOCAL RESOURCES..... 7
GEOLOGICAL SETTING..... 8
PRECAMBRIAN GEOLOGY..... 8
PHANEROZOIC GEOLOGY. 11
STRUCTURAL GEOLOGY..... 13
QUATERNARY GEOLOGY..... 14
DEPOSIT MODEL: DIAMONDIFEROUS KIMBERLITES..... 15
KIMBERLITES..... 15
DIAMOND INDICATOR MINERALS..... 16
EXPLORATION..... 17
HISTORY: PREVIOUS EXPLORATION..... 18
PREVIOUS EXPLORATION BUFFALO HEAD HILLS REGION..... 18
PREVIOUS EXPLORATION GRIZZLYS BUFFALO HEAD HILLS PROPERTIES.....20
GOVERNMENT DIAMOND INDICATOR MINERAL AND OTHER SCIENTIFIC SURVEYS..... 23
APEX EXPLORATION 2004..... 23
PUBLICLY AVAILABLE GEOPHYSICAL DATA..... 24
PRIOR GOVERNMENT AND INDUSTRY DIAMOND INDICATOR MINERAL SAMPLING..... 26
2004 AIRBORNE MAGNETIC SURVEY WHITE BEAR PROPERTY..... 28
APEX EXPLORATION 2005..... 30
WHITE BEAR..... 30
SMOKY THE BEAR..... 31
MANIPULATION OF GROUND MAGNETICS DATA..... 33

EXPLORATION 2006 34
EXPLORATION EXPENDITURES 34
CONCLUSIONS AND DISCUSSION 34
RECOMMENDATIONS 38
REFERENCES 40
CERTIFICATION 48

LIST OF TABLES

1 Legal Permit Description 6

2 Generalized Stratigraphy: Buffalo head Hills Region 11

3 Drill Collar Information for 2006 Drilling Program 34

4 Recommended 2007- 2008 program and Budget, Buffalo Head Hills Properties 38

LIST OF FIGURES

1 Property Location 4

2 Detailed Mineral Permits Claims 5

3 Generalized Geology 9

4 Basement Geology 10

5 2006 Drillhole Locations 35

APPENDICES

1 Exploration Expenditures and Personnel ..... AT END

2 Metallic Mineral Agreements ..... AT END

3 Addendum Report – Petrography of Kimberlite Float ..... AT END

EXPLORATION 2006 34
EXPLORATION EXPENDITURES 34
CONCLUSIONS AND DISCUSSION 34
RECOMMENDATIONS 38
REFERENCES 40
CERTIFICATION 48

LIST OF TABLES

1 Legal Permit Description 6

2 Generalized Stratigraphy: Buffalo head Hills Region 11

3 Drill Collar Information for 2006 Drilling Program 34

4 Recommended 2007- 2008 program and Budget, Buffalo Head Hills Properties 38

LIST OF FIGURES

1 Property Location 4

2 Detailed Mineral Permits Claims 5

3 Generalized Geology 9

4 Basement Geology 10

5 2006 Drillhole Locations 35

APPENDICES

1 ~~Exploration Expenditures and Personnel~~ Removed (SC) Apr. 18/07 ..... AT END

2 Metallic Mineral Agreements ..... AT END

ASSESSMENT REPORT FOR THE SMOKY THE BEAR PROPERTY, BUFFALO HEAD HILLS PERMITS 9303031149, to 9303031152-55, 9305010837-38, 9305031116-18, 9306020525-30, 9306020545, 9306110739-42 And 9307010942-45

SUMMARY

APEX Geoscience Ltd. (APEX) was retained during April 2004 as consultants by Grizzly Gold Inc. and Grizzly Diamonds (Collectively known as Grizzly) to compile all existing geological, geophysical and geochemical data for Grizzly's Buffalo Head Hills diamond properties and to prepare an independent evaluation of the potential of the properties to host diamondiferous kimberlites. APEX recently conducted an exploration program during winter 2005-2006 that consisted of diamond drill testing two electromagnetic targets on Grizzly's Smoky The Bear Property. The Smoky The Bear Property is a contiguous block of metallic mineral permits jointly held by Grizzly Gold Inc. and Grizzly Diamonds Ltd., which are all located in the Buffalo Head Hills covering portions of Townships 88 to 91, Ranges 5 to14 west of the 5th meridian. Grizzly's Buffalo Head Hills Smoky The Bear Property encompass 25 mineral permits totaling approximately 175,033 hectares (432,516 acres) and are situated adjacent to Ashton Mining of Canada Inc.'s (Ashton) main Buffalo Head Hills property about 330 km northwest of Edmonton. Although diamond exploration at the property is still in the early stages, the potential for discovery of diamondiferous kimberlites on Grizzly's Smoky The Bear permits are considered high based upon the regional geological setting in conjunction with the positive results of exploration conducted to date. Grizzly has spent in excess of $184,531.50 (not including GST) on exploration on the Smoky The Bear Property since mid 2004. Exploration during the winter of 2004 – 2005 consisted of ground magnetic and ground electromagnetic surveys over 7 airborne targets on 4 separate grids, as well as a field check of more than 37 airborne geophysical anomalies.

The regional setting for Grizzly's Buffalo Head Hills properties is considered favourable for the presence of diamondiferous kimberlites. The permits are underlain by Early Proterozoic to Archean basement of the Buffalo Head Craton. The local bedrock geology and the underlying Archean to Proterozoic crystalline basement in association with deep seated, penetrative structures, such as the Peace River Arch, likely provided a favourable environment for the ascent of kimberlitic magmas in the Buffalo Head Hills. The regional cratonic setting is also considered favourable for the formation and preservation of diamonds in the upper mantle and their transport to surface in kimberlitic magma during periodic tectonic activity associated with movement along the Peace River Arch. This has been confirmed with discovery of 38 kimberlite pipes, of which 26 are diamondiferous, in the Buffalo Head Hills area. At least three of the Buffalo Head Hills kimberlite pipes exist within 1.5 to 5 km of the northern boundary of Grizzly's Smoky The Bear diamond property.

To date, a number of diamond indicator minerals have been recovered from limited sampling of glacial outwash gravel, recent fluvial gravel and till on all of Grizzly's Buffalo

Head Hills diamond properties. The importance of these indicator minerals and potential source areas are unknown due to the presence of variable thicknesses of glacial drift and the poor sampling density. A number of samples collected from the Preston, Smoky The Bear and Grand Cub Aidan properties and immediately south by government agencies and industry have yielded significant numbers of indicator minerals including olivine, pyrope garnet, chromite and picroilmenite. A number of these sample sites are not explained by known Buffalo Head Hills kimberlites, therefore there is a strong likelihood that undiscovered kimberlites exist on or in close proximity to these properties. The diamond potential of Grizzly's Buffalo Head Hills properties cannot be fully assessed with the limited amount of sampling that has been conducted to date. However, it is expected that further systematic sampling will lead to a better understanding of the diamond potential of the properties.

A review of all the existing and available airborne magnetic and electromagnetic data for Grizzly's Buffalo Head Hills properties resulted in the identification of a number of magnetic anomalies that warrant follow-up exploration for kimberlites. In particular, anomalies WB-068, WB-130, within the White Bear Property and TQ-108 and SMB-01a,b,c and d within the southeast portion of the Smoky The Bear Property were targeted for ground geophysical surveys. A total of 71.35 line-kms of magnetic surveys and 8.8 line-kms of horizontal loop electromagnetic (HLEM) surveys were completed over the 4 grids. The grid for SMB01a, b, c and d was cut by hand using local line-cutters. In addition, a total of 37 other airborne geophysical anomalies of interest from the White Bear and Smoky The Bear properties were visited and checked for culture. The SMB01 was drill tested with two drillholes. Both drillholes were unsuccessful in intersecting either kimberlite or the local Cretaceous bedrock due to losing each hole because of flowing sand.

INTRODUCTION AND TERMS OF REFERENCE

APEX Geoscience Ltd. (APEX) was retained during early 2004 as consultants by Grizzly Gold Inc. (Grizzly) to compile all existing geological, geophysical and geochemical data for Grizzly's Buffalo Head Hills diamond properties and to prepare an independent evaluation of the potential of the properties to host diamondiferous kimberlites. During March 2004, APEX was retained by Grizzly to oversee a fixed-wing airborne magnetic survey over Grizzly's White Bear property. APEX was subsequently retained by Grizzly during late April to complete an independent review of the diamond potential of all of Grizzly's Buffalo Head Hills diamond properties. This assessment report documents the results of the data review and winter field exploration, including diamond drilling, performed by Grizzly and others to date on the Smoky The Bear Property. Mr. M.B. Dufresne, M.Sc., P.Geol., a Qualified Person, has visited all three Buffalo Head Hills properties on a number of occasions while performing exploration and scientific related work on behalf of the Alberta Geological Survey. Mr. Dufresne's most recent visits to the properties were during December, 2001 and November, 2003, and a brief visit in March 2005 to both the Smoky The Bear and White Bear properties. During the last year, Grizzly has spent a total of $156,919.26 (not including GST) on exploration on the Smoky The Bear Property, during the last year (Appendix 1). A total of 85 field man-days of exploration were performed by

APEX personnel during November 2005 prospecting and between February 13 and March 14, 2006 conducting the diamond drilling program and checking airborne geophysical anomalies. Other contract personnel were used for line-cutting and gridding services.

DISCLAIMER

The author, in writing this report, use sources of information as listed in the references. The report written by Mr. M. B. Dufresne, M.Sc., P.Geol., a Qualified Person, is a compilation of proprietary and publicly available information as well as information obtained during a number of property visits, and the exploration program undertaken in 2005 - 2006. 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. Grizzly's Buffalo Head Hills diamond properties are considered early stage exploration properties and do not contain any diamond or kimberlite discoveries to date.

PROPERTY DESCRIPTION AND LOCATION

Grizzly Gold Inc.'s Buffalo Head Hills diamond properties, comprised of the Grand Cub Aidan, the White Bear and the Smoky The Bear properties are all located in the Buffalo Head Hills west and north of the town of Red Earth Creek in north-central Alberta, roughly covering portions of Townships 87 to 90, Ranges 7 to19, and Townships 96 to 98, Ranges 10 to 14 west of the 5th meridian (Figures 1 and 2). Grizzly's Buffalo Head Hills diamond properties encompass more than 40 mineral permits totalling approximately 338,000 ha (835,000 acres) and are situated adjacent to Ashton Mining of Canada Inc.'s (Ashton) main Buffalo Head Hills Property along the north and south flanks of the Buffalo Head Hills. The southernmost property, the Smoky The Bear Property, is situated about 120 km (75 miles) north of the town of Slave Lake and 330 km (205 miles) northwest of Edmonton. The properties are located within 1:250,000 scale National Topographic System (NTS) map sheets 84B, 84C, 84F and 84G (Peerless Lake, Peace River, Bison Lake and Wadlin Lake Map Sheets) and, more specifically, 1:50,000 scale NTS map sheets 84B/10,11,12, 84C/9,10, 15, 84F/8, 9, 84G/5, 6 and F/12. A list of legal descriptions for the current assessment report on the Smoky The Bear Property is provided in Table 1. The Smoky The Bear Property consists of just over 175,000 ha in 25 metallic mineral permits. Copies of the mineral permit agreements are included in Appendix 2.

The mineral permits are currently held in the name of Grizzly Diamonds Ltd. and Grizzly Gold Inc. (Table 1), which has optioned the properties to Grizzly Diamonds Ltd. (Dufresne and Kupsch, 2004; Dufresne and Atkinson, 2005). This assessment report is for work conducted on Mineral Permits 9303031149, to 9303031152-55, 9305010837-38, 9305031116-18, 9306020525-30, 9306020545, 9306110739-42 and 9307010942-45, highlighted in Table 1 and on Figure 2.

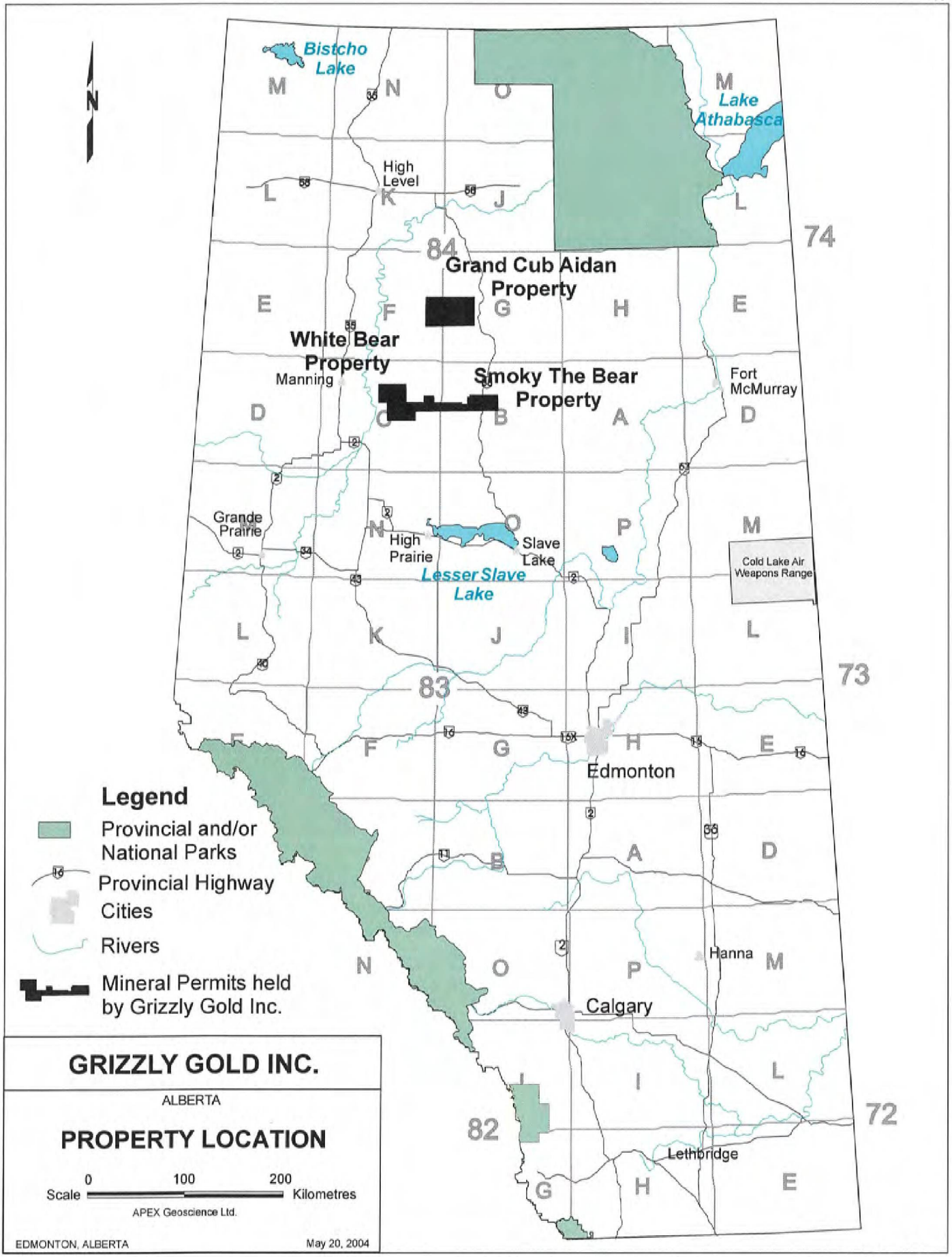

Bistcho Lake
Lake Athabasca
High Level
Grand Cub Aidan Property
White Bear Property
Smoky The Bear Property
Manning
Fort McMurray
Grande Prairie
High Prairie
Slave Lake
Lesser Slave Lake
Cold Lake Air Weapons Range
Edmonton
Calgary
Hanna
Lethbridge
Legend
Provincial and/or National Parks
Provincial Highway
Cities
Rivers
Mineral Permits held by Grizzly Gold Inc.
GRIZZLY GOLD INC.
ALBERTA
PROPERTY LOCATION
0 100 200
Scale
Kilometres
APEX Geoscience Ltd.
EDMONTON, ALBERTA
May 20, 2004

FIGURE 1.

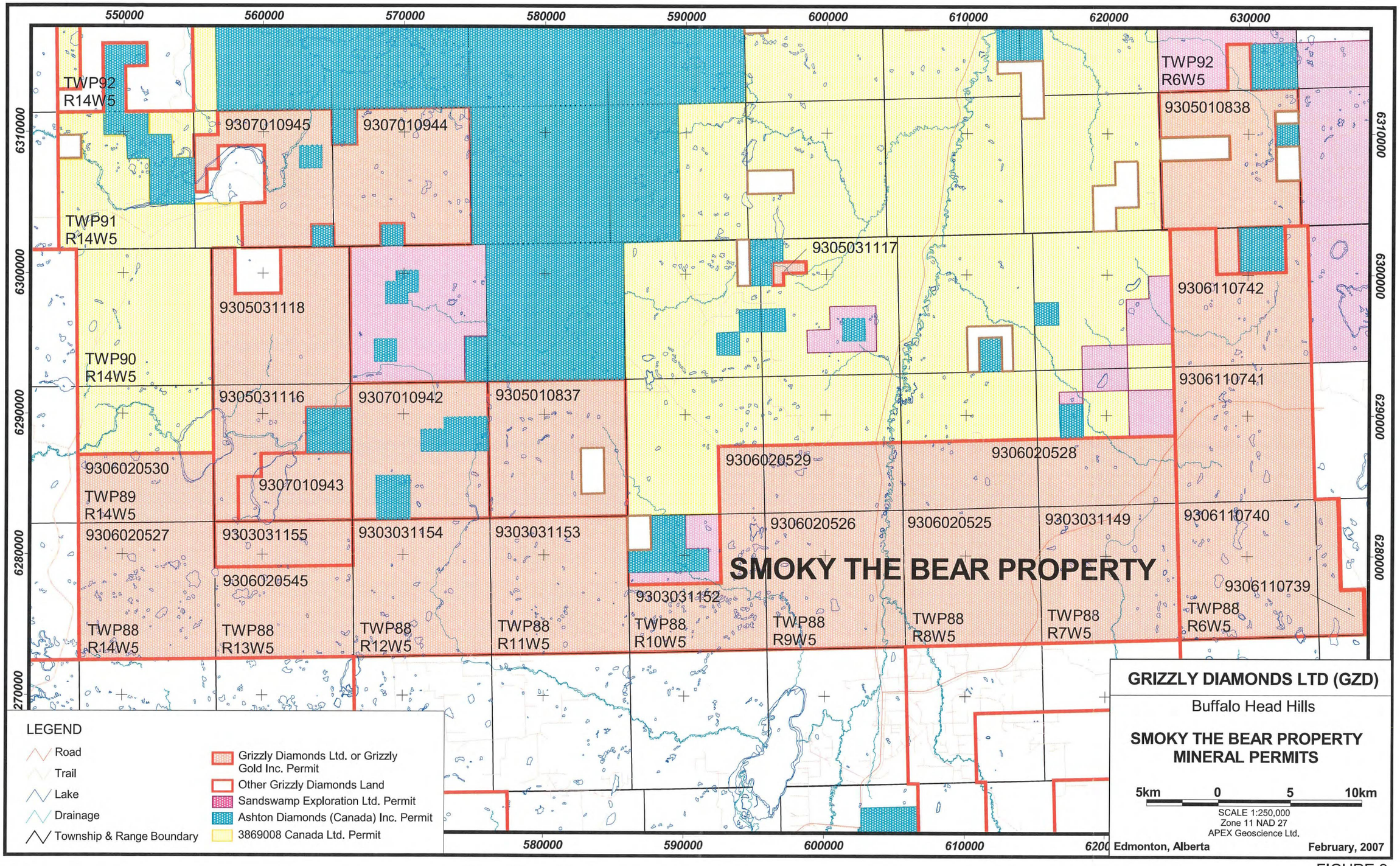


FIGURE 2.

20070002

TABLE 1
LEGAL PERMIT DESCRIPTIONS*

Permit Number*	Record Date*	Term Period*	Legal Description	Permit Holder*	Area (Ha)*
Smoky The Bear Property					
9303031149	4-Mar-2003	10 Years	**5-07-088:** 1-36	Grizzly Gold Inc.	9216
9303031152	4-Mar-2003	10 Years	**5-10-088:** 1-18; 23-26; 35; 36	Grizzly Gold Inc.	6144
9303031153	4-Mar-2003	10 Years	**5-11-088:** 1-36	Grizzly Gold Inc.	9216
9303031154	4-Mar-2003	10 Years	**5-12-088:** 1-36	Grizzly Gold Inc.	9216
9303031155	4-Mar-2003	10 Years	**5-13-088:** 25-36	Grizzly Gold Inc.	3072
9305010837	19-Jan-2005	10 Years	**5-11-089:** 1-10,12,13,15-36	Grizzly Gold Inc.	8704
9305010838	19-Jan-2005	10 Years	**5-06-090:** 28,33;**05-06-091:** 1-12,14-18,22,23,26-36;**05-06-92**:3,10	Grizzly Gold Inc.	8704
9305031116	17-Mar-2005	10 Years	**5-13-089:** 6,7,17-22,27-36	Grizzly Gold Inc.	4608
9305031117	17-Mar-2005	10 Years	**5-09-090:** 29N,30E	Grizzly Gold Inc.	256
9305031118	17-Mar-2005	10 Years	**5-13-090:** 1-27,30,31,34,36	Grizzly Gold Inc.	8192
9306020525	7-Feb-2006	10 Years	**5-08-088:** 1-36	Grizzly Diamonds Ltd	9216
9306020526	7-Feb-2006	10 Years	**5-09-088:** 1-36	Grizzly Diamonds Ltd	9216
9306020527	7-Feb-2006	10 Years	**5-14-088:** 1-36	Grizzly Diamonds Ltd	9216
9306020528	7-Feb-2006	10 Years	**5-07-089:** 1-18;**5-08-089:** 1-18	Grizzly Diamonds Ltd	9216
9306020529	7-Feb-2006	10 Years	**5-09-089:** 1-18;**5-10-089:** 1-2,11-14	Grizzly Diamonds Ltd	6144
9306020530	7-Feb-2006	10 Years	**5-14-089:** 1-18	Grizzly Diamonds Ltd	4608
9306020545	21-Feb-2006	10 Years	**5-13-088:** 1-24	Grizzly Diamonds Ltd	6144
9306110739	7-Nov-2006	10 Years	**5-05-088:** 5-8,18,19,30,31	Grizzly Diamonds Ltd	2048
9306110740	7-Nov-2006	10 Years	**5-06-088:** 1-36	Grizzly Diamonds Ltd	9216
9306110741	7-Nov-2006	10 Years	**5-06-089:** 1-36	Grizzly Diamonds Ltd	9216
9306110742	7-Nov-2006	10 Years	**5-06-090:** 1-25,29-32,36	Grizzly Diamonds Ltd	7680
9307010942	25-Jan-2007	10 Years	**5-12-089:** 1-3,4E,6,7,9E,10-21,25N,26N,27-36	Grizzly Diamonds Ltd	7424
9307010943	25-Jan-2007	10 Years	**5-13-089:** 1-5,8-16	Grizzly Diamonds Ltd	3584
9307010944	25-Jan-2007	10 Years	**5-12-091:** 1-3,5-29,30S,32-36	Grizzly Diamonds Ltd	8576
9307010945	25-Jan-2007	10 Years	**5-13-091:** 02-04,09-15,18SP,18NW,NEP, 19N,SEP,19SW;20WP,21NEP,22,23S,NW; 24S,NE;25N,SE;26N,SW;27;28SP,28N;29S P;PORTION(S) LYING OUTSIDE LUBICON LAKE INDIAN LAND CLAIM.;29N;30;32-36	Grizzly Diamonds Ltd	6201
25 Permits			**GRAND TOTAL**	**175,033.0**	**Ha**

Alberta Mining regulations grant metallic mineral permits to the permittee for 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 for 15 year terms and may be renewed. A

metallic mineral permit gives Grizzly the exclusive right to explore for and develop economic deposits of minerals, including diamonds, within the boundaries of the permit. The exclusive right to explore is subject to ALBERTA REGULATION 66/93 of the Alberta Mines and Minerals Act and the contained Metallic and Industrial Minerals Regulations within the act. The Standard Terms and Conditions for the permits are described in detail on Alberta Energy's website at http://www.qp.gov.ab.ca/Documents/REGS/1993_066.CFM.

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 Buffalo Head Hills properties may be accessed via Provincial Highways 88 and 686, all weather and dry weather gravel roads, cart trails and seismic lines. Most portions of the three mineral permit areas may be accessed by four-wheel drive vehicles or all terrain vehicles (ATV's) during the summer and winter months. Accommodation, food, fuel, and supplies are best obtained in the towns of Red Earth Creek, Peace River and Slave Lake.

The Buffalo Head Hills properties are situated within the Eastern Alberta Plains along the southern edge of the Buffalo Head Hills Upland. Relief generally comprises rolling hills and undulating plains. Elevation in the region varies from 450 m to 825 m (1,475 ft to 2,700 ft) above sea level (asl). Major topographic features in the region include Cadotte, Lubicon, Loon and Peerless lakes, as well as Red Earth Creek and the Loon and Lubicon rivers. In addition to the numerous small lakes and ponds, much of the properties are covered by swamps, marshes and fens. A boreal forest containing mainly spruce and jack pine covers the property. Annual temperatures range from -40°C in January to 25°C in July.

GEOLOGICAL SETTING

Precambrian Geology

Grizzly Gold Inc.'s Buffalo Head Hills mineral permits lie 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 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 (Figure 4). To date, a total of 26 of the 38 kimberlites discovered by the joint venture in the Buffalo Head Hills region have yielded diamonds. All 38 kimberlite pipes exist from about 1.6 km (1 mile) to a maximum distance of 50 km (30 miles) from the boundary of Grizzly's Buffalo Head Hills properties (Figures 3 and 4).

Grizzly's Buffalo Head Hills properties are underlain by basement comprised of the Buffalo Head Terrane (BHT). The BHT is an area of high positive magnetic relief with a north to northeasterly fabric (Villeneuve *et al.,* 1993). The diamondiferous Buffalo Head Hills Kimberlites and Grizzly's properties lie near the geographic center of the Buffalo Head Craton (Figure 4). Part of the Churchill Structural Province (Rae Subprovince), the Buffalo Head Craton may represent either Archean crust that has been thermally reworked during the Hudsonian (Proterozoic) Orogeny (Burwash *et al.*, 1962; Burwash and Culbert, 1976; Burwash *et al.*, 1994) or an accreted Early Proterozoic terrane that may or may not have an Archean component (Ross and Stephenson, 1989; Ross *et al.*, 1991; Villeneuve *et al.*, 1993). Precambrian rocks intersected in drill core from the BHT comprise felsic to intermediate metaplutonic rocks, felsic metavolcanic rocks and high-grade gneisses (Villeneuve *et al.*, 1993). Even though Hood and McCandless (2003) suggest that the paucity of subcalcic pyrope garnets in the Buffalo Head Hills is consistent with Proterozoic crust and mantle, recent work by Aulbach *et al.* (2003), indicates that a number of geochemical aspects of the xenoliths from the kimberlites is indicative of the presence of Archean mantle beneath the Buffalo Head Terrane which was likely reworked during Proterozoic crust formation from 2.3 to 2.0 Ga. Seismic refraction and reflection studies indicate that the crust beneath the Buffalo Head Craton is likely between 35 to 40 km (21 to 24 miles) thick, a trait favourable for the formation and preservation of diamonds in the upper mantle (Dufresne *et al.,* 1996). The favourable nature of the Buffalo Head Craton has been confirmed by the discovery of 26 diamondiferous kimberlite pipes near the center of the craton.

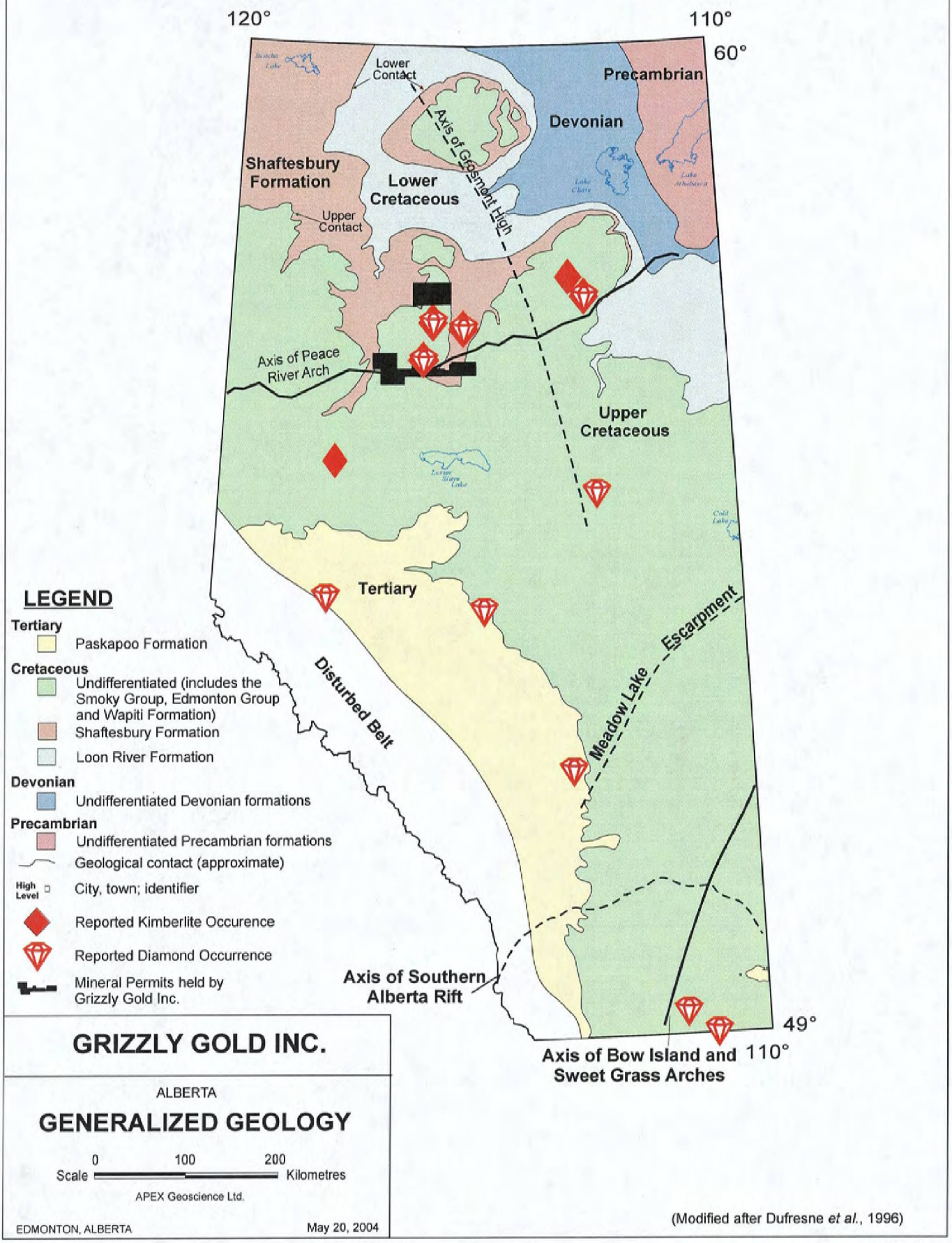

120°
110°
60°
Lower Contact
Precambrian
Devonian
Axis of Grosmont High
Shaftesbury Formation
Lower Cretaceous
Upper Contact
Axis of Peace River Arch
Upper Cretaceous
Tertiary
Disturbed Belt
Meadow Lake Escarpment
Axis of Southern Alberta Rift
Axis of Bow Island and Sweet Grass Arches
49°
110°
LEGEND
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 Grizzly Gold Inc.
GRIZZLY GOLD INC.
ALBERTA
GENERALIZED GEOLOGY
0
100
200
Scale
Kilometres
APEX Geoscience Ltd.
EDMONTON, ALBERTA
May 20, 2004
(Modified after Dufresne et al., 1996)

FIGURE 3.

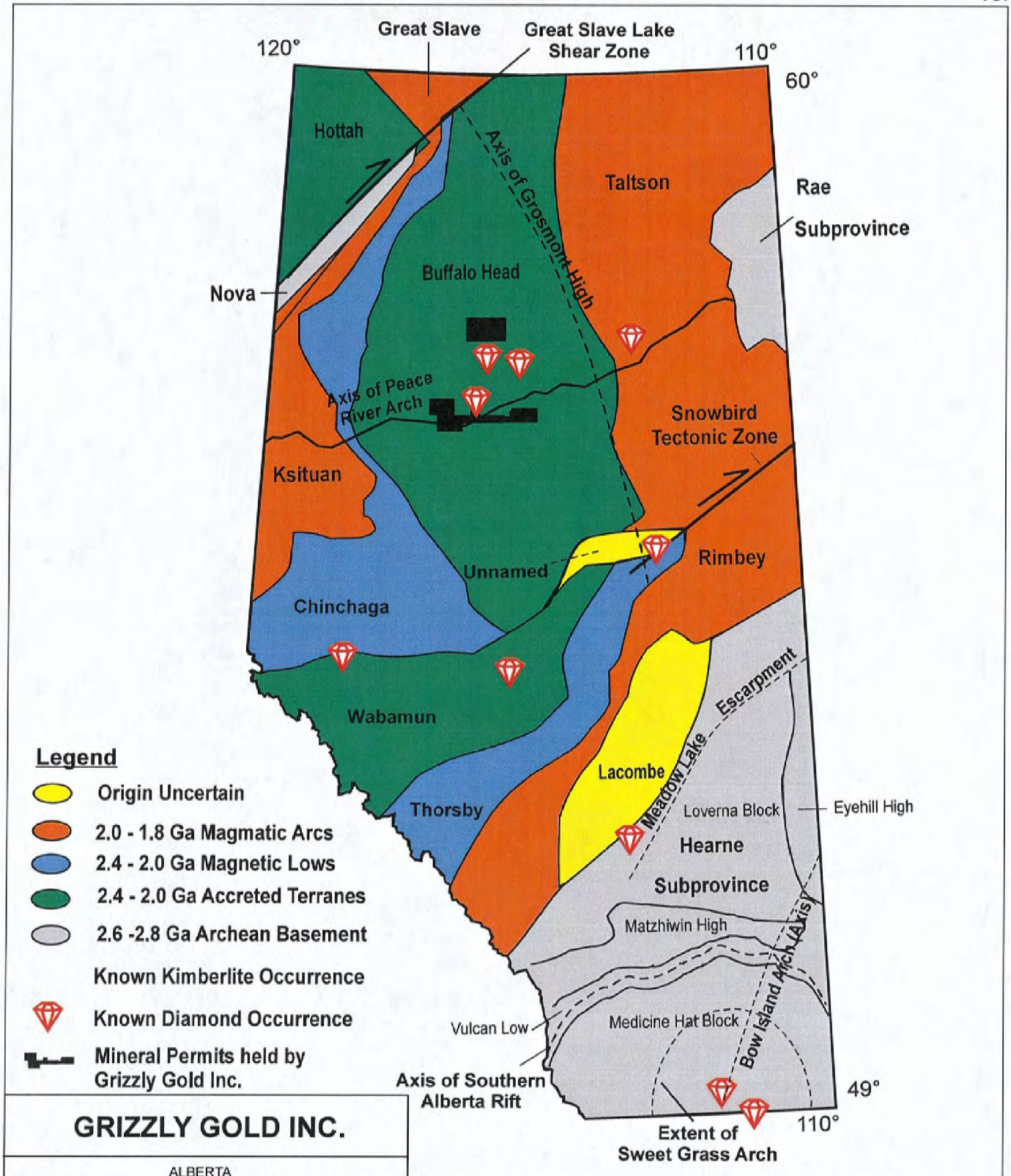

Great Slave
Great Slave Lake Shear Zone
120°
110°
60°
Hottah
Axis of Grosmont High
Taltson
Rae
Subprovince
Buffalo Head
Nova
Axis of Peace River Arch
Snowbird Tectonic Zone
Ksituan
Rimbey
Unnamed
Chinchaga
Wabamun
Escarpment
Meadow Lake
Lacombe
Thorsby
Loverna Block
Eyehill High
Hearne
Subprovince
Matzhiwin High
Bow Island Arch (Axis)
Vulcan Low
Medicine Hat Block
Axis of Southern Alberta Rift
49°
110°
Extent of Sweet Grass Arch
Legend
Origin Uncertain
2.0 - 1.8 Ga Magmatic Arcs
2.4 - 2.0 Ga Magnetic Lows
2.4 - 2.0 Ga Accreted Terranes
2.6 -2.8 Ga Archean Basement
Known Kimberlite Occurrence
Known Diamond Occurrence
Mineral Permits held by Grizzly Gold Inc.
GRIZZLY GOLD INC.
ALBERTA
BASEMENT GEOLOGY
0 100 200
Scale Kilometres
APEX Geoscience Ltd.
EDMONTON, ALBERTA
May 20, 2004
(Modified after Ross et al., 1991)

FIGURE 4.

Phanerozoic Geology

Overlying the basement in the Buffalo Head Hills region is a thick sequence of Phanerozoic rocks comprised mainly of Cretaceous sandstones and shales near surface and Mississippian to Devonian carbonates and salts at depth (Glass, 1990). Bedrock exposure within the permit block is limited primarily to river and stream cuts and topographic highs. Table 2 shows the upper units found in the region. Further information pertaining to the distribution and character of these and older units can be obtained from well log data in government databases and various geological and hydrogeological reports (Green *et al.*, 1970; Tokarsky, 1972; Vogwill, 1978; Ceroici, 1979; Glass, 1990; Mossop and Shetson, 1994).

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

TABLE 2
GENERALIZED STRATIGRAPHY
BUFFALO HEAD HILLS REGION

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

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

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

Deltaic to marine, feldspathic sandstones, silty shales and laminated carbonaceous siltstones, characterise the Dunvegan Formation (Glass, 1990). Thin beds of shelly material, coal, siltstone and bentonite may be present. The formation is rich in shallow-water fauna, including abundant molluscs. The Dunvegan Formation becomes more

arenaceous and thinner eastwards, where it grades into the LaBiche Formation. The upper contact of the unit is conformable and transitional with the shales of the Kaskapau Formation of the Smoky Group. The Ashton pipes exist just above or near the contact between the Kaskapau and the Dunvegan formations (Dufresne *et al.*, 2001).

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

Structural Geology

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

During the mid-Cretaceous and Early Tertiary, compressive deformation occurred as a result of the orogenic event that eventually led to the formation of the Rocky Mountains. The PRA was emergent during this period resulting in the reactivation of many prominent basement faults. The Phanerozoic rocks beneath the Red Earth Creek region lie along the axis of the PRA, and are underlain by and proximal to basement faults related to the Grosmont Reef Complex, which formed over the Grosmont High (Bloy and Hadley, 1989; Dufresne *et al.*, 1996). There is strong evidence that basement faults that have manifested themselves in the overlying Phanerozoic sedimentary succession may have controlled the

emplacement of the Buffalo Head Hills kimberlites proximal to Grizzly's Buffalo Head Hills properties (Dufresne *et al.*, 1996; Leckie *et al.*, 1997; Eccles *et al.*, 2000). Similar structures observed on Girzzly's Buffalo Head Hills properties could have resulted from tectonic activity associated with movement along the PRA or the Grosmont High and therefore could have provided pathways for kimberlitic volcanism.

Quaternary Geology

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

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

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

The K6 Kimberlite is one of a number of kimberlites in the Buffalo Head Hills that display this relationship. The implications of this are that in areas where the overburden is estimated to be 75 to 150 m, there is still a chance that any kimberlites found could be covered by substantially less overburden.

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

DEPOSIT MODEL: DIAMONIFEROUS KIMBERLITES

To understand the significance of diamond indicator minerals (DIMs), it is important to understand the type of igneous rocks from which primary diamond deposits are mined. The most common rock type from which diamonds are mined are kimberlites and, to a lesser extent, lamproites and orangeites. Diamond indicator minerals (DIMs) describe minerals that are common constituents of these three rock types, some of which are phenocrysts and others that are xenocrysts. For the purposes of this discussion, DIMs will refer to minerals that are both characteristic and diagnostic of 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 eruption 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 magnetic 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).

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 the determination of hydrogeological and geothermal regimes (Hackbarth and Nastasa, 1979; Mandryk and Richardson, 1988; Bachu *et al.*, 1993; Edwards *et al.*, 1994). Only recently has the focus of exploration been redirected towards diamonds (Dufresne *et al.*, 1996).

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

During 1950 to 1952, the 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, 1989a,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 18 km (11 miles) north of Grizzly's Smoky the Bear 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 the 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. The initial 2 drillholes, located on anomalies identified as 7B and 7C, penetrated olivine-dominated fragmental and tuffaceous volcanic materials 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 from the basement through a thick column of overlying younger sedimentary rocks to 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 are diamondiferous; more significantly, 3 samples totalling 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 yield euhedral to subhedral xenocrystic (mantle derived) garnet and clinopyroxene suggesting that resorption has 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.

More recent results indicate that the Buffalo Head Hills kimberlite field does contain kimberlites that have excellent potential to host a population of commercial-sized diamonds and are approaching the threshold of being economic. As an example, Ashton Mining of Canada Inc. (2001a) have recently reported that a 22.8 tonne mini-bulk sample collected from the K252 Kimberlite (which is located approximately 21 km or 13 miles north of Grizzly's Smoky The Bear property) has yielded a grade of 55 carats per hundred tonnes (cpht). The mini-bulk sample results also indicate that the deeper breccia phase of the pipe yielded a grade of 85.4 cpht. If these grades and the quality of the stones persist through larger bulk sampling programs the K252 Kimberlite could be the first in a series of economic kimberlite pipes in the Buffalo Head Hills. As a result, Ashton and its joint venture partners have approved further drilling of other kimberlite targets and the collection of a 200 to 400 tonne bulk sample from the K252 Kimberlite during 2002 (Ashton Mining of Canada Inc., 2001b).

Previous Exploration Grizzly's Buffalo Head Hills Properties

Exploration by the BHHJV commenced on its main Buffalo Head Hills property in earnest during 1997 with the drilling of a number of kimberlites and a fixed wing HRAM survey (Skelton and Bursey, 1998). The survey was flown by Sanders Geophysics Ltd. (Sanders), using a Cessna 402B aircraft and a flight line spacing of 250 m (820 ft). Grizzly's entire Smoky The Bear property, which at the time represented the southernmost portion of the BHHJV's Buffalo Head Hills main property, was flown as part of the HRAM survey (Skelton and Bursey, 1998). Subsequently, high priority magnetic targets, believed to be kimberlite, were chosen by Ashton and were follow up surveyed with either 100 m (325 ft) line-spaced helicopter magnetic surveys or helicopter magnetic-electromagnetic (EM) surveys during the summer of 1998 (Skelton and Bursey, 1998 and 1999). The helicopter magnetic and magnetic-EM surveys were completed by High-Sense Geophysics Ltd. (High-Sense) and Geoterrex-Dighem (Dighem) at 52 blocks encompassing numerous magnetic anomalies across the Buffalo Head Hills main property. A total of 8 of the 52 High Sense or Dighem Helicopter Survey blocks encompassing about 31 magnetic targets, which generally range from 1 to 2 km (0.6 to 1.2 miles) in diameter, now exist on Grizzly's Smoky The Bear property. A few of the magnetic anomalies on these blocks within the Smoky The Bear property warrant further exploration. The remaining survey blocks are presently over lands retained by the BHHJV or lands that have been dropped by the joint venture and have been recently staked by competitors.

Exploration by the BHHJV commenced on the Loon Lake property during the spring of 1998. Between April 29 and June 12, 1998, a fixed-wing HRAM survey was flown by Sanders, using a Cessna 402B aircraft and a flight line spacing of 250 m (820 ft). In total, 24,650 line-kms (14,790 miles) of fixed-wing magnetic data were captured by Sanders for the joint venture's Loon Lake block. Part of this survey was conducted over Grizzly's current White Bear property as part of the Loon Lake block survey (Skelton and Bursey, 1999; Skelton and Willis, 2001). Subsequently, high priority magnetic targets, believed to be kimberlite, were chosen by Ashton and were follow up surveyed with 100 m (325 ft) line-spaced helicopter magnetic surveys by High-Sense during the summer of 1998 and 1999 (Skelton and Bursey, 1999; Skelton and Willis, 2001). A total of 13 blocks, encompassing

21 magnetic targets and 802.7 line-km (482 line-miles) of data were flown during the fall program. At least one of these survey blocks yielding one magnetic target presently exists within Grizzly's White Bear property. The remaining survey blocks are presently over lands retained by the BHHJV or lands that have been dropped by the joint venture and have been recently staked by competitors.

Exploration on the Muddy River block commenced during the spring of 1998 with a fixed wing HRAM survey flown by Sanders (Skelton and Bursey, 1999; Skelton and Willis, 2001). A large portion of this survey was conducted over Grizzly's Grand Cub Aidan property. In addition, at least seven helicopter magnetic surveys and eight ground geophysical surveys were conducted on ground now part of Grizzly's Grand Cub Aidan property (Skelton and Bursey, 1999; Skelton and Willis, 2001). A number of these surveys have yielded geophysical anomalies that warrant follow-up exploration. Exploration was also conducted by Monopros Limited (Monopros) on behalf of Troymin Resources Ltd. (Troymin) over the southern portion (T96, R10-14) of Grizzly's Grand Cub Aidan property during 1997 to 1999 (Wood, 1999). A number of priority geophysical anomalies and diamond indicator mineral anomalies of interest were identified on and in the vicinity of the Grand Cub Aidan property. Many of the anomalies were not followed up. Wood (1999) reports the presence of a large number of anomalous stream sediment samples with up to 137 and 66 kimberlite indicator minerals in two separate drainages along the southern boundary of the Grand Cub Aidan property. Although the bulk of the kimberlite indicator minerals recovered by Monopros were chromite and ilmenite with a few pyrope garnets, Wood (1999) suggests that the grains are likely locally derived due to thin overburden and the limited drainage basin that most of the indicator was recovered from. Wood (1999) also suggests that a number of geophysical anomalies detected on the property could be kimberlites and be responsible for the indicator minerals in the drainages. The vast majority of these targets were not ground surveyed or drill tested.

Exploration and drilling during 1997 to 1999 by the BHHJV has resulted in the discovery of no less than 10 kimberlites less than 15 km north of the northern property boundary of Grizzly's Smoky The Bear property, and no less than 3 of the 10 kimberlites within 5 km of the northern boundary (Skelton and Bursey, 1998 and 1999; Skelton and Willis, 2001). Confirmed kimberlites K1 and K160, discovered by the joint venture on their main Buffalo Head Hills block during 1997 and 1998, exist approximately 2.2 km (about 1.3 miles) and 1.6 km (1 mile) north of the central portion of the Smoky The Bear property. At least one suspected kimberlite, magnetic anomaly TQ108, exists on Grizzly's Smoky The Bear property in the southeast corner of the property (Skelton and Bursey, 1998 and 1999). The BHHJV attempted to drill magnetic anomaly TQ108, which has a signature almost identical to a number of the Buffalo Head Hills kimberlites and were unsuccessful in penetrating the overburden due to wet flowing sand. The drillhole reached a maximum depth of 91m before it was abandoned (Skelton and Bursey, 1999; Skelton and Willis, 2001)

The BHHJV has performed a number of diamond indicator mineral surveys for which data is available from assessment records (Skelton and Bursey, 1998 and 1999; Skelton and Willis 2001). In general, diamond indicator mineral data (picked minerals only) are

present in assessment records for areas covered formerly by the BHHJV's Loon Lake, Muddy River, Birch Mountain, Caribou Mountain, Athabasca, Rabbit Lake and Whitemud blocks. A number of the samples, some of which yielded indicator minerals, were collected on ground now part of Grizzly's Grand Cub Aidan and White Bear properties. No indicator minerals results are reported for the BHHJV's main Buffalo Head Hills block in the assessment records, therefore no BHHJV data is available for Grizzly's Smoky The Bear property. The BHHJV collected approximately 11 samples from the White Bear property, 4 samples from the Grand Cub Aidan property and an unknown amount of samples from the Smoky The Bear property. At least five diamond indicator samples were collected from the BHHJV's Loon Lake block and are less than 10 km south of and down-ice of the Smoky The Bear property (Skelton and Bursey, 1998 and 1999; Skelton and Willis, 2001). In the available assessment reports, no mineral chemistry is available for the Ashton samples. However, recent papers by Carlson *et al.* (1999), Aulbach *et al.* (2003), Creighton and Eccles (2003), Davies *et al.* (2003) and Hood and McCandless (2003), indicate that the indicator mineral assemblage for the Buffalo Head Hills kimberlites is dominated by xenocrystic olivine with lesser amounts of pyrope garnet, chromite, eclogitic garnet, chromium diopside, titanian pyrope, picroilmenite and phlogopite. Carlson *et al.* (1999) and Hood and McCandless (2003) indicate that although Gurney G10 pyrope garnets and high chromium chromites, which are often associated with diamonds, are present in a number of kimberlites and regionally in the Buffalo Head Hills, to date, there is no direct association of these minerals in kimberlites with better diamond counts. In addition, Hood and McCandless (2003) indicate that some of the highly diamondiferous kimberlites such as K252 and K6 contain relatively few xenocrystic indicator minerals, while some kimberlite with abundant mantle xenocrysts such as K2 and K95 are only weakly diamondiferous. Carlson *et al.* (1999) and Hood and McCandless (2003) indicate that the northern cluster of kimberlites tend to be more diamondiferous and yield a number of pyrope garnets and chromites that yield very high concentrations of chromium, in the case of pyrope garnets from 16 to 18 weight percent (wt.%) Cr_2O_3. In addition, the northern cluster of kimberlites yield few titanian pyrope garnets and low concentrations of picroilmenite, and when picroilmenite is present, it usually contains low concentrations of niobium. In contrast, the southern cluster of kimberlites yield lower chromium pyrope garnets often with high concentrations of calcium, in some cases likely derived from wehrlite, high titanian pyrope garnets, chromites with lower overall chromium concentrations, picroilmenites with high concentrations of niobium and few if any eclogitic garnets (Carlson *et al.*, 1999; Hood and McCandless, 2003). Davies *et al.* (2003), indicates that diamond inclusions in diamonds studied from the K10 and K14 kimberlites consist of roughly equal amounts of peridotitic and eclogitic suite of inclusions, with the peridotitic inclusions indicative of both harzburgite and lherzolite derivation. Davies *et al.* (2003), also point out the presence of rare ferropericlase and marjorite in some of the diamonds, which are generally indicative of ultradeep mineral assemblages and diamonds formed at depths greater than 400 km. Eccles *et al.* (2003), suggest that the most highly diamondiferous Buffalo Hills kimberlites tend to be the more primitive kimberlites with the highest amount of olivine (indicated by overall bulk magnesium number) and the highest concentrations of chromium and nickel, in conjunction with the lowest concentrations of titanium, niobium, silicon and aluminum.

Based upon assessment records (Skelton and Bursey, 1998 and 1999; Skelton and

Willis, 2001), and the author's knowledge of exploration costs in Alberta, approximately $1,655,000 was spent by the BHHJV on exploration for kimberlites on Grizzly's Grand Cub Aidan, White Bear and Smoky The Bear properties. A large portion of this expenditure was incurred on the Smoky The Bear property ($1,297,500) with smaller expenditures on the White Bear ($133,500) and Grand Cub Aidan properties ($224,000). These costs are based upon assuming an overall cost of $10 per line-km for fixed wing magnetic surveys, $10,000 per 1 km^2 helicopter or ground geophysics grid and about $1,000 per indicator mineral sample. Ground truthing of a number of prospective magnetic anomalies identified from Ashton's recently released assessment reports (Skelton and Bursey, 1999; Skelton and Willis, 2001) indicates that further work was warranted and recommended by the joint venture, however, assessment requirements and a lack of adequate expenditures forced the BHHJV to drop large portions of the lands surrounding their main Buffalo Head Hills block.

Government Diamond Indicator Mineral And Other Scientific Surveys

Diamond indicator mineral studies in the search for kimberlites were first conducted in the region by the AGS in 1993 (Fenton *et al*, 1994; Dufresne *et al.*, 1996). This initial survey and all of the early reconnaissance work prior to the discovery of the Buffalo Head Hills kimberlites are reviewed in Dufresne *et al.* (1996). The Buffalo Head Hills area yielded a few diamond indicator minerals within the "Wabasca River Trend", which was defined as a northerly belt of sites yielding anomalous diamond indicator minerals centered around the Wabasca and Loon rivers in the vicinity of Red Earth Creek (Dufresne *et al.*, 1996). The first indication that the region may host diamondiferous kimberlites came from sampling conducted by the AGS during September 1995, when a single till sample from a road cut in close proximity to the BHHJV's K4 Kimberlite yielded 152 possible pyrope garnets (Fenton and Pawlowicz, 1997). A number of surveys have been conducted in the region since then (Fenton and Pawlowicz, 1998a,b; Pawlowicz *et al.*, 1998a,b; Pawlowicz and Fenton, 2001), with varying degrees of success since the initial 1993 survey. A recent multidisciplinary study included the collection of 338 samples in the Peerless Lake, Peace River, Bison Lake and Wadlin Lake Map areas (NTS84B, 84C, 84F and 84G) by Eccles *et al.* (2001) and by Friske *et al.* (2003). These surveys have resulted in the discovery of a number of diamond indicator mineral anomalies that potentially indicate the presence of a number of undiscovered kimberlites in the region.

APEX Exploration 2004

APEX was retained during early 2004 by Grizzly to compile all the available geological, geophysical and mineralogical data for the Grand Cub Aidan, White Bear and Smoky The Bear diamond properties and evaluate the potential of the properties to host kimberlites and, possibly, diamonds. Based upon the recommendations that resulted from the data compilation and review, a program of fixed-wing airborne geophysics was initiated and completed over the White Bear property during April, 2004 (Evans, 2004; Dufresne and Atkinson, 2005).

During March to May, 2004, personnel from APEX reviewed and compiled the following data: (1) the detailed fixed-wing, helicopter and ground geophysical data from a number of the BHHJV's assessment reports (Skelton and Bursey, 1998, 1999; Skelton and Willis, 2001; Willis and Skelton, 2002), (2) the 600 m (2,000 ft) line spaced proprietary Utikuma magnetic data covering much of the Buffalo Head Hills region, (3) all available public and proprietary diamond indicator mineral data for samples collected on and down ice of Grizzly's three Buffalo Head Hills diamond properties, and (4) all available public and proprietary petroleum, hydrogeological and other types of well data in order to construct a drift thickness picture for the Buffalo Head Hills region.

Exploration and drilling during 1997 to 2001 by the BHHJV has resulted in the discovery of no less than 10 kimberlites less than 15 km from the northern property boundary of Grizzly's Smoky The Bear property, and no less than 3 of the 10 kimberlites within 5 km of the northern boundary (Skelton and Bursey, 1998 and 1999; Skelton and Willis, 2001). Confirmed kimberlite K160, discovered by the BHHJV on their main Buffalo Head Hills block during 1999, exists approximately 1.5 km (about 1mile) north of the central portion of the Smoky The Bear property. Ashton (2001a) have recently reported that a 22.8 tonne mini-bulk sample collected from the K252 Kimberlite (which is located approximately 21 km or 13 miles north of Grizzly's Smoky The Bear property) has yielded a grade of 55 carats per hundred tonnes (cpht), demonstrating the economic potential of the Buffalo Head Hills kimberlites.

Publicly Available Geophysical Data

The bulk of the review was focussed on the available magnetic data in order to evaluate whether any untested quality magnetic targets that warrant follow-up exploration could be identified. Detailed helicopter, fixed wing or ground based geophysical grids that Ashton has completed to date as part of prior assessment work but that are now on Grizzly's Buffalo Head Hills properties are shown on Figures 5 and 6. In addition, Troymin and Monopros (Wood, 1999) identified at least 22 priority 1 and 2 magnetic anomalies on the Bison Lake block townships that now represent the southernmost five townships of Grizzly's Grand Cub Aidan property (Dufresne and Atkinson, 2005).

Ashton identified two tier 1 strongly magnetic circular anomalies during 1998 or 1999 on their Loon Lake block, anomalies LL-07 and LL-08 (Skelton and Willis, 2001). These magnetic anomalies are both characterized as circular anomalies roughly 200 to 300 m (650 to 1,000 ft) in diameter and 100 to 200 nanoteslas (nT) in magnetic amplitude with ground geophysical surveys. Both anomalies yielded kimberlites (both of which the BHHJV retain today), LL-07 at a depth of 114 m (374 ft) below surface and LL-08 at a depth of about 75 m (246 ft) below surface. These two kimberlites yield magnetic anomalies comparable to the three or four of the highest strength anomalies associated with kimberlites K4, K5, K7 and K19 on the main Buffalo Head Hills block. Anomaly TQ-108 in the southeast corner of Grizzly's Smoky The Bear property is almost an identical magnetic anomaly to LL-07 and LL-08 and is likely the result of a buried kimberlite. Ashton attempted to drill magnetic anomaly TQ108 during 1998 and were unsuccessful in penetrating the overburden below 91 m due to wet flowing sand. A different drilling

technique will have to be employed, such as using a water well drilling rig and employing significant lengths of casing, in order to test this target with any chance of success.

To date, of the highly magnetic kimberlites that the BHHJV has drilled, only K5 yielded more than five microdiamonds and was mini-bulk sampled. The better diamond counts have come from the less magnetic kimberlite pipes including K91 and K252. The K252, which exists 500 m northwest of the highly magnetic K6 Kimberlite, is not visible on any of the airborne magnetic survey data and was found by the BHHJV by using gravity and EM techniques (Mr. B. Clements, *personal communication*, 2002; Willis and Skelton, 2002). Some scientific literature, particularly from Russia, indicates that many of the producing diamondiferous kimberlites in Russia are associated with only weak to non-existent magnetic signatures, and that the highly magnetic kimberlites tend to yield sub-economic concentrations of diamonds. The Russians suggest that the highly magnetic kimberlites are indicative of what was a highly oxidized kimberlitic magma, which in turn would result in absorption and destruction of any contained diamonds during ascent of the kimberlitic magma. The draw back of exploring for the tier 2 to 4 magnetic strength anomalies is that the success ratio for the discovery of kimberlites drops off dramatically with the lower amplitude magnetic anomalies. The drop in success ratio can be mitigated if a number of good quality tier 2 or tier 3 strength magnetic anomalies can be identified that hold together with ground geophysics or with other techniques such as electromagnetic or gravity surveys. In the end, these lower amplitude anomalies may yield a better opportunity for diamonds than the high amplitude tier 1 magnetic kimberlites hence justifying the added risk.

A review of all of the existing BHHJV fixed-wing magnetic data yields a few magnetic anomalies on Grizzly's Buffalo Head Hills properties, which is most likely the result of the quality of data in the assessment records as opposed to a lack of anomalies. The fixed wing magnetic data provided by the BHHJV in its assessment reports consists of coarse 5 to 10 nT contoured total magnetic field large scale maps for which only the most highly magnetic kimberlites such as LL-07 and LL-08 are visible. As an example, no significant magnetic anomalies are visible on the magnetic maps for the BHHJV's Loon Lake block where it overlaps the White Bear property, yet a large number of significant anomalies are visible on Grizzly's recent White Bear property magnetic survey. It appears that only a few closely spaced helicopter or ground geophysical surveys appear to have been completed by the BHHJV over Grizzly's Buffalo Head Hills properties, in particular, three large grids and a couple of small grids over the Smoky The Bear property, one grid over the White Bear property and seven grids over the Grand Cub Aidan property (Dufresne and Atkinson, 2005). It should also be noted that Ashton on behalf of the BHHJV has recently restaked roughly eight townships of their former Loon Lake block to the south of and adjoining Grizzly's Smoky The Bear property. This supports the observation that the BHHJV was forced to relinquish land before they had completed exploration due to assessment requirements. The BHHJV's helicopter magnetic surveys over the Smoky The Bear property yield a number of magnetic anomalies ranging in priority from high priority down to very low priority. A total of 31 magnetic anomalies exist on Grizzly's Smoky The Bear property based upon the work of the BHHJV (Skelton and Bursey, 1998 and 1999). Based upon the follow-up helicopter magnetic-electromagnetic

surveys that the BHHJV performed, a few of the magnetic anomalies on the Smoky The Bear property rank as priority 1 and priority 2 anomalies for kimberlite exploration. In particular, magnetic anomaly TQ108 is a four line 300 to 400 m diameter circular magnetic anomaly that is almost identical in signature to anomalies LL-07 and LL-08 and is most likely a buried kimberlite(Dufresne and Atkinson, 2005). Ashton attempted to drill the anomaly during 1998 and was unsuccessful in penetrating the overburden due to wet flowing sand. The drillhole reached a maximum depth of 91m before it was abandoned (Skelton and Bursey, 1999; Skelton and Willis, 2001). The BHHJV helicopter grids over the Smoky The Bear property yield a number of other magnetic and electromagnetic anomalies of interest. All of these anomalies warrant a ground check followed by ground geophysical surveying if the anomaly is unexplained by culture or was not recently drill tested by the BHHJV.

A single magnetic anomaly was identified with a helicopter magnetic survey on the White Bear property (Dufresne and Atkinson, 2005). No apparent ground geophysical grids have been completed. However, a number of additional prospective magnetic anomalies have been identified with Grizzly's recent White Bear magnetic survey and these are discussed below. The BHHJV completed at least seven helicopter magnetic surveys and eight ground geophysical surveys over ground now part of Grizzly's Grand Cub Aidan property (Skelton and Bursey, 1999; Skelton and Willis, 2001). Although the helicopter data was not immediately available, a few of the ground geophysical surveys have yielded geophysical anomalies that warrant follow-up exploration (Skelton and Bursey, 1999; Skelton and Willis, 2001).

Prior Government And Industry Diamond Indicator Mineral Sampling

Recent surface sampling in the Peerless Lake and Wadlin Lake map sheets (NTS84B and 84G) by the AGS and GSC has resulted in the collection of 37 samples from the Grand Cub Aidan and Smoky The Bear properties for diamond indicator mineral analysis (Eccles *et al.*, 2001 and Friske *et al.*, 2003). In addition, more than 60 samples were collected by Eccles *et al.* (2001) and Friske *et al.* (2003) within 20 km (12 miles) of and down-ice (south to southwest) of these two properties (Figures 7 and 8). Microprobe chemistry for individual mineral grains is available for all of the government data. Assessment records indicate that the BHHJV also conducted limited DIM sampling on the Grand Cub Aidan property (4 samples) and the White Bear property (8 samples) during 1997 to 1999 (Skelton and Bursey, 1998 and 1999; Skelton and Willis, 2001). Picked DIM data is available for these samples but no microprobe data is available. It also appears that Ashton collected about 35 DIM samples on the Smoky The Bear property but the bulk of this data is still confidential. Monopros appears to have collected about 182 DIM samples within or immediately down-ice of the Grand Cub Aidan property (Dufresne and Atkinson, 2005). Picked indicator mineral results are available for these samples but no microprobe data for individual mineral grains is available.

In summary, a large number of the samples collected from within the boundaries of or down-ice of Grizzly's Buffalo Head Hills properties have yielded a large number of anomalous samples with indicator minerals (Dufresne and Atkinson, 2005). Predominant

ice-direction was from north to south, in particular for the Grand Cub Aidan and the Smoky The Bear Properties (Pawlowicz and Fenton, 1995,a,b, [*in press*]a, [*in press*]b; Fenton *et al.*, 2003a,b,c; Paulen *et al.*, 2003). Ice direction for the White Bear property was from north to south and from northwest to southeast with a lobe of ice coming out of the Peace River valley and flowing southeast to almost easterly around the southwest portion of the Buffalo Head Hills (Pawlowicz and Fenton, 1995,a,b, [*in press*]a, [*in press*]b; Fenton *et al.*, 2003a,b,c; Paulen *et al.*, 2003). Indicator results for samples from all three Grizzly properties are highly anomalous in terms of the number of samples with indicator minerals and the number of indicator minerals in some of the samples. The sample results to date are suggestive of the presence of possible kimberlites on all three properties.

The DIM sampling that has been conducted to date works out to about one sample per square kilometre or about 6 samples per township with the vast majority of the samples collected by Monopros in the southernmost five townships of the Grand Cub Aidan property (Dufresne and Atkinson, 2005). Several of the kimberlites on the BHHJV's Buffalo Head Hills block yield strong DIM anomalies down-ice or down drainage from kimberlites (within about 5 to 10 km), however, the drift thickness in the area of the indicator mineral anomalies ranges from less than 10 m up to about 70 m (Dufresne and Atkinson, 2005). Most of the joint venture's kimberlites in areas of deeper drift appear to yield sporadic amounts of DIM's in the tills down-ice of the kimberlites. The drift thickness on Grizzly's Buffalo Head Hills properties likely ranges from a minimum of 10 m to more than 150 in some areas underlain by preglacial channels. In addition, the drift likely consists of multiple till sheets. The behaviour and dispersion patterns of indicator minerals derived from deeply buried kimberlites is poorly understood in areas of thick drift and multiple till sheets. However, It should be noted that a number of the creeks within 5 to 10 km (6 miles), and on rare occasion up to 20 km (12 miles), of nearby kimberlites yield stream sediment sample sites with multiple DIMs (Dufresne and Atkinson, 2005).

Based upon the results of indicator minerals sampling conducted to date a few important observations can be made. On the Grand Cub Aidan property, the sampling conducted by the AGS and GSC in combination with Monopros has yielded a significant number of samples with anomalous amounts of indicator minerals, in some cases more than a hundred grains (Dufresne and Atkinson, 2005). These highly anomalous sample results are indicative of undiscovered kimberlites as these samples have all been collected north of the northernmost known Buffalo Head Hills kimberlite. In addition, the mineralogy seen in these samples with abundant picroilmenite is significantly different than the results of DIM sampling down-ice of the Buffalo Head Hills kimberlites, which are reported to be picroilmenite poor kimberlites (Carlson *et al.*,1999; Aulbach *et al.*, 2003; Creighton and Eccles, 2003; Davies *et al.*, 2003; Hood and McCandless, 2003). This further supports the conclusion that undiscovered kimberlites remain to be discovered in the north portion of the Buffalo Head Hills beyond the kimberlites that have been discovered to date (potentially on Grizzly's Grand Cub Aidan property) and that these kimberlites are likely different mineralogically to the kimberlites found to date.

A number of indicator mineral rich samples were recovered by Ashton from the White Bear property (Dufresne and Atkinson, 2005). Skelton and Bursey (1999) and

Skelton and Willis (2001) conclude that the indicator minerals are likely derived from the Buffalo Head Hills kimberlites that have been discovered on the BHHJV's main property. However, ice direction for the White Bear property was from north to south and from northwest to southeast with a lobe of ice coming out of the Peace River valley and flowing southeast to almost easterly around the southwest portion of the Buffalo Head Hills (Pawlowicz and Fenton, 1995,a,b, [*in press*]a, [*in press*]b; Fenton *et al.*, 2003a,b,c; Paulen *et al.*, 2003). This indicates that the indicator minerals found in samples collected form the White Bear property were most likely not derived from the known Buffalo Head Hills kimberlites. In addition, the indicators discovered to date are olivine rich with only a few pyrope garnets. The plume of indicator minerals coming from the main cluster of kimberlites in the Buffalo Head Hills looks to be pyrope and chromite rich hence the White Bear property samples show a difference mineralogically, supporting a conclusion that undiscovered kimberlites may exist on the White Bear property or to the north or northwest of the White Bear property.

Although only a few government sample indicator results are available from the Smoky The Bear property, there appear to be a significant plume of anomalous samples down-ice of the eastern half of the Smoky The Bear property (Dufresne and Atkinson, 2005). The indicator minerals recovered are predominantly olivine, picroilmenite, chromite and minor pyrope garnet. The assemblage is distinct spatially and mineralogically from the indicator plume associated with the Buffalo Head Hills kimberlites and is highly suggestive that undiscovered kimberlites may exist in the eastern portion of the Grizzly's Smoky The Bear property. This conclusion is supported by the presence of geophysical anomaly TQ108 in the southeast portion of the Smoky The Bear property, which is most likely a result of a kimberlite (Skelton and Willis, 2001).

2004 Airborne Magnetic Survey White Bear Property

During March 2004, a high-resolution airborne magnetic (HRAM) survey was commissioned for Grizzly's White Bear property in order to satisfy assessment requirements and to identify potential targets for future fieldwork at the property. The HRAM survey was conducted at the White Bear Project out of the town of Peace River between April 5 and April 27, 2004 (Evans, 2004; Dufresne and Kupsch, 2004;Dufresne and Atkinson, 2005). The survey was conducted using a 60 meter drape mode elevation, 150 meter spaced line intervals and with data sample stations at 7 meters along the lines. Tie lines were spaced at 1000 meters. A high sensitivity base magnetic station recorded the diurnal activity throughout the survey and a base GPS station was used to correct range errors in the GPS flight path recovery. The survey was carried out using a Piper Navajo PA-31 aircraft, configured with a specially designed rigid-mount tail boom for geophysical survey operations. The aircraft is equipped with a high sensitivity magnetometer and a full on-board real time compensation recording computer, and related equipment. It is a single engine aircraft with full avionics, including real time differential 3D GPS navigation. The aircraft has been modified to conduct airborne geophysical surveys. Considerable effort has been made to remove all ferruginous materials near the sensor and to ensure that the aircraft electrical systems do not create any noise. Airborne recorded

data included total field magnetic data, radar altimeter and all attendant GPS data. The magnetic data were processed, gridded and provided on CD-ROM.

The survey area exists in the southwest portion of the Buffalo Head Hills region, approximately 50 kilometres northeast of the town of Peace River, Alberta. The survey was conducted over all but one of the White Bear property permits and included 8,364 line kilometres of survey data (Dufresne and Atkinson, 2005). The area of the survey is shown in Dufresne and Atkinson (2005) and in an operational report (Evans, 2004; Dufresne and Kupsch, 2004).

APEX conducted a thorough review of the airborne magnetic data during May, 2004. The data was contoured using Geosoft Oasis Montaj 5.1.6 and ERMapper 6.3. Using Geosoft, 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 large number of interesting high frequency magnetic anomalies (greater than 300nT) were identified during the review of the data (Dufresne and Atkinson, 2005). A total of 23 priority 1 and 32 priority 2 magnetic anomalies were identified in the dataset and are prospective for kimberlites (Dufresne and Atkinson, 2005). Screen dumps of the magnetic profile for each of the priority 1 and 2 anomalies are provided in Dufresne and Kupsch (2004). In summary, a large number of magnetic anomalies are present in the survey that are the result of man-made culture or are part of linear arrays that are most likely related to magnetic sands in the overburden. The anomalies most likely related to man-made culture commonly yield very sharp spike like peaks often with an associated adjacent magnetic low on the maps termed a dipole anomaly. A number of these types of anomalies have been identified and have been placed in the lower priority rankings (Dufresne and Atkinson, 2005). Magnetic anomalies that are part of linear and sinusoidal arrays are generally related to placer accumulations of magnetite in the overburden and, therefore, these anomalies have also been ranked in the lower priority rankings. Priority 1 and 2 anomalies represent isolated high frequency magnetic anomalies that are likely related to near surface geological features and require follow-up exploration.

Based upon the review of the 2004 HRAM survey for the White Bear property, a large number of unexplained high priority (priority 1 and 2) magnetic anomalies exist on the property. These anomalies require ground checking for man-made culture. If these anomalies remain unexplained after ground truthing, then ground geophysical surveys should be considered as part of the next phase of exploration along with diamond indicator mineral sampling.

Based on these results, an aggressive follow-up property-scale exploration program is warranted for all three of Grizzly's Buffalo Head Hills properties including detailed sampling in conjunction with airborne and ground geophysical surveys, followed by drilling of high priority targets. A detailed structural interpretation that includes the acquisition and interpretation of RadarSat and digital elevation data should be completed in conjunction with the sampling program. An airborne geophysical survey utilizing magnetic and electromagnetic surveys should be conducted over all or a large portion of the Grand

Cub Aidan property during the fall of 2004 based upon the recent successful discovery of kimberlites in the Buffalo Head Hills using electromagnetic methods.

APEX Exploration 2005

During the period of January 15, 2005 to March 8, 2005 APEX completed a field program on behalf of Grizzly on the Smoky The Bear property and a few adjoining mineral permits from the White Bear property (Dufresne and Atkinson, 2005). A total of 53 field crew days and a total of 135 man-days of checking airborne geophysical anomalies along with conducting ground geophysical surveys was conducted by APEX personnel (Dufresne and Atkinson, 2005). More than 40 man-days of line-cutting was also conducted for the 2004 – 2005 winter exploration program. The exploration program consisted of ground checking priority geophysical anomalies identified from airborne fixed wing magnetic survey flown during the spring of 2004 by Grizzly and historic airborne magnetic and electromagnetic surveys flown by Ashton. Anomalies left unexplained after ground checking were then gridded and ground geophysics was then completed over the anomaly. A list of the anomalies checked and the field observations is provided in Dufresne and Atkinson (2005). Gridded and contoured ground data are provided as maps in (Dufresne and Atkinson, 2005). Raw ground geophysical data is provided in Dufresne and Atkinson (2005). An overview of the geophysical equipment employed for both the ground magnetic and the surface horizontal loop electromagnetic (HLEM) surveys is provided in Dufresne and Atkinson (2005).

White Bear

Exploration on the White Bear Property was based out of Peace River and Red Earth Creek, Alberta. A total of 23 priority one and 32 priority two anomalies were identified on the White Bear Property from the previous airborne magnetics survey flown over the property in 2004. Of these 55 anomalies 37 were ground truthed in 2005, four of which were deemed prospective for ground geophysics (Dufresne and Atkinson, 2005). Of the 55 original anomalies identified 11 remain to be ground truthed as 7 were deemed to not have a signature representative of known kimberlites upon further review. A total of two ground magnetic surveys were completed over two of the prospective anomalies (Dufresne and Atkinson, 2005) including WB-130 and WB-068, leaving anomalies WB-282 and WB-128 unexplained to date. The survey over anomaly WB-130 was redone on a subsequent day as there was some question as to the quality of the data collected the initial survey due to diurnal magnetic fluctuations indicated by the base station.

Survey grids of 500 x 500m were established first with Garmin®12-XL handheld GPS to locate the anomaly centre, then gridding was completed using a compass and Hip-Chain. Lines were spaced at 50m intervals and data readings were collected every 12.5m. Data was collected using two Gem Systems GSM-19 magnetometers with one of the magnetometers acting as a base station recording diurnal magnetic fluctuations for alter correcting the mobile magnetometer. An overview of the GSM-19 magnetometers used during the 2005 ground geophysical surveys is presented in Dufresne and Atkinson (2005). Total field magnetic data was collected from each of the 2 geophysical grids.

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

Anomaly WB-068

Anomaly WB-068 was identified as a weak magnetic low of 4 to 5 nT magnitude from the 2004 airborne magnetics survey. The ground geophysical survey identified a few weak magnetically low spikes, but nothing likely indicative of a buried kimberlite. No further work is required on this anomaly (Dufresne and Atkinson, 2005).

Anomaly WB-130

Anomaly WB-130 was identified as a broad well formed positive magnetic anomaly from the 2004 airborne survey with a magnitude of about 15 nT (Dufresne and Kupsch, 2004). Upon completion of the ground magnetics survey, no anomaly was identified (Dufresne and Atkinson, 2005). It is unclear why no ground geophysical anomaly was obtained at the location for the airborne anomaly as a positive 15 nT airborne anomaly should be seen on the ground geophysical data even if the source is not a kimberlite (Dufresne and Atkinson, 2005). It is recommended that if a crew are conducting ground geophysical surveys on the property next year that the anomaly location be checked and the anomaly perhaps resurveyed.

Smoky The Bear

Exploration on the Smoky The Bear Property was conducted from Red Earth Creek and Slave Lake, Alberta. A total of three magnetic anomalies (TQ-108, SMB-01c and SMB-01d) and two electromagnetic anomalies (SMB-01a and SMB-01b) were investigated using three large ground grids, for which a number of survey lines had to by hand cut by local subcontractors (Dufresne and Atkinson, 2005). Horizontal Loop Electromagnetic (HLEM) geophysical surveys were completed over the two priority airborne electromagnetic anomalies identified from Ashton airborne data (Dufresne and Atkinson, 2005).

Due to the size of the anomalies standard magnetic ground grids could not be established, therefore grids of 700 x 700m, 800 x 600m and 800 x 500m were established over individual anomalies. Grids were first established using a Garmin®12-XL handheld GPS to locate the anomaly centre, then gridding was completed using a compass and Hip-Chain. Lines were spaced at 50m intervals and data readings were collected every 12.5m. Ground magnetic data was collected using two Gem Systems GSM-19 magnetometers (Dufresne and Atkinson, 2005). Ground electromagnetic data was collected using a Terraplus MaxMin II Horizontal Loop Electromagnetic (HLEM) system. Overviews of the GSM-19 magnetometers, and the MaxMin II HLEM unit used during the 2005 ground geophysical surveys are presented in Dufresne and Atkinson (2005). Total field magnetic data was collected from each of the 3 geophysical grids, whereas HLEM data was collected

from only one of the grids.

Manipulation of ground magnetics data was limited to diurnal correction and levelling of data when a single survey was completed over multiple days. Both methods are described in detail in Dufresne and Atkinson (2005). No processing of the HLEM data was required.

Anomaly TQ-108

Anomaly TQ-108 was a large circular magnetic high previously identified by Ashton from airborne magnetic surveys (Dufresne and Atkinson, 2005). Ashton had in the past completed a ground magnetics grid over the area and drilled the anomaly. The drill hole was abandoned due to drilling difficulties encountered with flowing wet sand in the overburden. The purpose of this years grid and magnetic survey was to identify a likely location for a drill collar in order to retest the anomaly. A 700 x 700 m grid oriented north – south was established over TQ-108 and ground magnetics was completed over three days. A 375 x 350m circular weak magnetic high with a slightly higher internal curvilinear magnetic feature was identified with the ground magnetics survey (Appendix 4). The over all shape and geometry of the anomaly, which appeared to be excellent and indicative of a kimberlite based upon the prior Ashton surveys, deteriorated with the ground geophysical survey (Dufresne and Atkinson, 2005). On this basis, the anomaly was down-graded from a high priority drill target to a medium priority target. Within the context of a larger drilling campaign further exploration, including drill testing, to identify the nature of this anomaly is warranted.

Anomaly SMB-01a and SMB-01b

Anomaly SMB-01a and SMB-01b were identified as interesting low frequency resistive anomalies from a prior helicopter borne electromagnetic survey flown by Ashton (Dufresne and Atkinson, 2005). A 800 x 500m grid was established over the two anomalies, and ground HLEM and magnetic data were collected over the two anomalies. Due to the nature of the HLEM survey it was necessary to cut gridlines through the brush to facilitate the survey. Survey lines were cut by Loon River Contractors using two crews of four people plus one foreman over a period of about 5 days.

HLEM data was collected from the 440, 880, 1760, and 7040 Hz frequencies. Higher frequencies were tested as well but were deemed ineffective due to the conductive nature of the overburden and overlying swampy ground. The focus of the survey were two unusual low frequency resistive bodies identified on prior airborne electromagnetic maps. Two well formed circular resistive anomalies were defined by the ground HLEM survey (Dufresne and Atkinson, 2005). Both anomalies show up on all frequencies and for the most part both the In-Phase and Out-Of-Phase channels display the anomalies as well as the calculated conductivity. The two anomalies represent a two intriguing resistive bodies that are buried beneath conductive overburden and require further follow up to explain their source. Likely the source is bedrock and either kimberlite or a resistive block of competent bedrock such as and isolated pinnacle of sandstone.

A ground magnetics survey was undertaken over anomalies SMB-01a and SMB01b subsequent to the HLEM survey. No magnetic anomalies were defined by the ground magnetics survey (Dufresne and Atkinson, 2005).

Anomalies SMB-01cb and SMB-01d

Anomalies SMB-01c and SMB-01d are magnetic anomalies, northwest of but close to the two EM anomalies SMB-01a and b, first identified from Ashton's airborne magnetic survey. The grid for SMB-01c and d share line 1750E for anomalies SMB-01 a and b as a common grid line. A 800 x 600m grid was put in over the two magnetic anomalies using a compass and Hip-Chain off of the SMB-01a and b grid.

Several magnetic highs were defined by the ground magnetic survey, the most intriguing of which lies in the northwest corner of the grid (Dufresne and Atkinson, 2005). This anomaly is a nice 150 x 75m oblong high approximately 55 nT above background. This magnetic anomaly lies approximately 750m west and 300m north of the EM anomalies SMB-01a and b. The proximity of this magnetic high to two other slightly lower amplitude highs and its spatial association with a curvilinear channel like feature result in a slight down grading of the target but it is still classified as a moderate priority drill target.

Manipulation of Ground Magnetics Data

Total field magnetic data measured by the GSM-19 is the sum of two vector components: the earth's magnetic field and the magnetic field generated by a geologic body beneath the instrument. The earth's magnetic field is not constant therefore correction of total field data is necessary to remove effects of temporal fluctuations in the earth's magnetic field. During collection of ground magnetic data a stationary base magnetometer was set up at a location off the survey grid to allow diurnal correction of survey data. Both the mobile and base station magnetometers were time synchronized and set to collect survey reading every 3 seconds. This ensures that the time of each mobile magnetometer reading corresponds with the collection of a reading by the base station magnetometer. Diurnal correction of total field magnetic field data using a base station is completed in the following manner:

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

Where: B_{t1} = base magnetometer reading "B" at time t_1
D = base magnetometer datum = 58,000 nT
C_{t1} = Diurnal Correction "C" at time t_1
M_t = mobile magnetometer reading "M" at time t_1
$M_{t1\ corrected}$ = corrected mobile magnetometer reading

In some cases a survey grid was completed over a number of days. In these cases levelling of data from different days was required before merging the data files and

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

EXPLORATION 2006

During February – March 2006, the SMB01 Target grid was recovered and reconstructed. Two collars were designed to test the electromagnetic targets identified during the course of ground EM conducted during January – February 2005 (Dufresne and Atkinson, 2005). Drilling of SMB01, the two EM lobes, yielded no kimberlite and in fact the drillholes were abandoned due to extreme drilling difficulties encountered due to flowing sand in the overburder. The drill hole details are included in the table below. The drillhole locations are shown on Figure

TABLE 3. Drill Collar Information for 2006 Drilling Program

Drillhole ID	*UTM Easting NAD1927 (Z11)*	*UTM ~~Easting~~ Northing (TM) NAD1927 (Z11)*	*Hole Attitude*	*Recovery*	*Hole Depth (m)*
06SMB01	619574	6277236	Vertical	None	67.06
06SMB02	619628	6277420	Vertical	None	06.32

EXPLORATION EXPENDITURES

Exploration expenditures by APEX at Grizzly's Smoky The Bear diamond property, total $149,919.26 to date, plus GST (Appendix 1). Personnel from Grizzly contributed supervision and assisted with some of the fieldwork to which Grizzly Diamonds Ltd. reports additional property related exploration expenditures of $7,000, plus GST (Appendix 1). This yields a total of $156,919.26 (plus GST) of exploration related expenditures for Grizzly's Smoky The Bear property during the period of July 2005 to January 2007.

CONCLUSIONS AND DISCUSSION

The regional setting for Grizzly's Buffalo Head Hills diamond properties is considered highly favourable for the presence of diamondiferous kimberlites. The permits

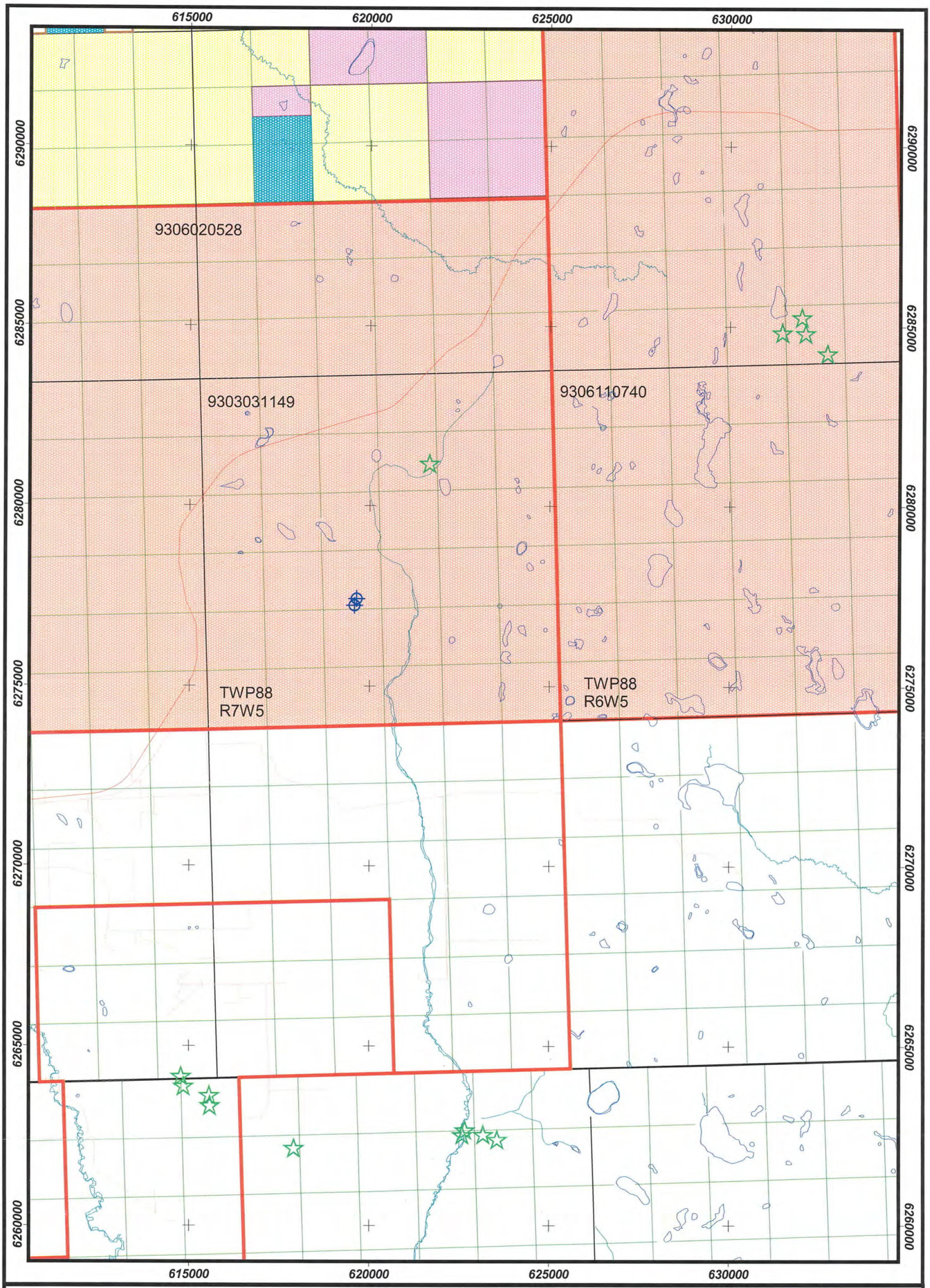

615000
620000
625000
630000
6290000
6285000
6280000
6275000
6270000
6265000
6260000
9306020528
9303031149
9306110740
TWP88
R7W5
TWP88
R6W5
LEGEND
Road
Trail
Lake
Drainage
Township & Range Boundary
Geophyscial targets
Grizzly Diamonds Ltd. or Grizzly Gold Inc. Permit
Other Grizzly Diamonds Land
Sandswamp Exploration Ltd. Permit
Ashton Diamonds (Canada) Inc. Permit
3869008 Canada Ltd. Permit
Smoky The Bear 2006 Drillhole
Grizzly Gold Inc &
Grizzly Diamonds Ltd.
Smoky The Bear Property
2006 Drillhole Locations
2km 0 2 4km
SCALE 1:100,000
Zone 11 NAD 27
APEX Geoscience Ltd.
Edmonton, Alberta
February, 2007

FIGURE 5

are predominantly underlain by Early Proterozoic to Archean basement of the Buffalo Head Craton. The local bedrock geology and the underlying Archean and Proterozoic crystalline basement in association with Phanerozoic structures, such as the Peace River Arch, likely provided a favourable environment for the formation and ascent of kimberlitic magmas in the Buffalo Head Hills area. This regional geological and structural setting is also considered favourable for the formation of kimberlitic magma in the upper mantle and its ascent to surface during periodic tectonic activity associated with movement along the Peace River Arch and the Grosmont High. Significant crustal thickness (35 to 40) underlying the area in combination with a number of important Gurney (1984) G10 subcalcic pyrope garnets are a strong indication that the area was underlain by upper mantle suitable for the formation and preservation of diamonds. This is confirmed with the discovery of at least 26 diamondiferous kimberlite pipes to date in the Buffalo Head Hills area by the BHHJV. Exploration and drilling during 1997 to 2001 by the BHHJV has resulted in the discovery of no less than 10 kimberlites less than 15 km north of the northern property boundary of Grizzly's Smoky The Bear property, and no less than 3 of the 10 kimberlites within 5 km of the northern boundary (Skelton and Bursey, 1998 and 1999; Skelton and Willis, 2001). The highly diamondiferous K252 Kimberlite is located approximately 21 km north of Grizzly's Smoky The Bear property and has yielded a grade of 55 carats per hundred tonnes, demonstrating the economic potential of the Buffalo Head Hills kimberlites and the region.

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

To date, a number of diamond indicator minerals have been recovered from limited sampling of outwash glacial gravel, recent fluvial gravel and till on all of three of Grizzly's Buffalo Head Hills diamond properties. The importance of these indicator minerals and potential source areas are unknown due to the presence of variable drift thickness and the poor sampling density. However, a number of samples collected from various Grizzly Buffalo Head Hills properties have yielded significant numbers of indicator minerals including olivine, pyrope garnet, chromite and picroilmenite. Most of these anomalous sites are not explained by known kimberlite, therefore there is a strong likelihood that undiscovered kimberlites exist on or near a number of Grizzly's propert-iesy. The diamond potential of these aresa cannot be fully assessed with the limited amount of sampling that

has been conducted to date. It is expected that further systematic sampling will lead to a better understanding of the diamond potential of the properties.

A review of all the existing and available magnetic data for Grizzly's Buffalo Head Hills properties resulted in the identification of a number of magnetic anomalies that warrant follow-up exploration for kimberlites. In particular, anomaly TQ-108, within the southeast portion of the Smoky The Bear property, is possibly representative of a buried kimberlite. Ashton tested the target to a depth of 91 m but encountered flowing wet sand and was unable to complete the drilling. This anomaly should be retested with a water well type reverse circulation drill rig in order to combat the wet flowing sand in overburden. Other geophysical anomalies of interest from past exploration have bee identified on both the Grand Cub Aidan and the Smoky The Bear properties. These anomalies in conjunction with the presence of nearby kimberlites indicate that these properties are high priority target areas for kimberlite exploration.

The winter 2004 – 2005 ground geophysical program for the Smoky The Bear yielded two prospective magnetic targets and two prospective electromagnetic resistors that are unexplained and that warrant future drill testing. Further airborne magnetic and electromagnetic targets exist based upon prior airborne geophysical surveys. These targets should be ground checked and if not explained by man-made culture should be ground geophysically surveyed.

Based on these results, an aggressive follow-up property-scale exploration program is warranted for all three of Grizzly's Buffalo Head Hills properties including detailed sampling in conjunction with airborne and ground geophysical surveys, followed by drilling of high priority targets. The detailed sampling program should be planned for the upcoming summer and fall months and should include all three properties. Alternatively, an auger overburden drilling program for diamond indicator minerals could be commenced during late fall or early winter. In conjunction with the sampling program, a detailed structural interpretation that includes the acquisition and interpretation of RadarSat and digital elevation (DEM) data should be given strong consideration. RadarSat data in combination with detailed digital elevation data and airborne magnetic data shows a number of the Buffalo Head Hills kimberlites at the intersections of lineaments (Eccles *et al.*, 2000). An airborne geophysical survey should be conducted over the entire Grand Cub Aidan property during the fall of 2004. In light of the overall thin overburden, the large numbers of indicator minerals and the success the BHHJV has had the last two years with finding kimberlites using EM methods, a helicopter magnetic-EM survey or the fixed-wing GEOTEM system should be considered for the property.

For existing targets identified out of previous exploration programs over the Grand Cub Aidan and Smoky the Bear properties, as well as for newly identified geophysical targets at the White Bear property, a detailed ground geophysical program followed by drill testing should be considered during next winter after all of the targets have been ground checked. Consideration should also be given to testing some of the targets prior to drilling using deep penetrating electromagnetic techniques and/or gravity, based upon new discoveries of additional kimberlites using these techniques by the BHHJV.

RECOMMENDATIONS

Based upon the favourable regional geological setting and the positive results of exploration conducted to date within Grizzly's Buffalo Head hills diamond properties, an aggressive, systematic follow-up exploration program, including diamond indicator mineral sampling, airborne and ground geophysical surveys and drilling, is warranted to search for diamondiferous kimberlites.

The potential for discovery of diamondiferous kimberlites within Grizzly's Buffalo Head Hills diamond properties is considered high based upon the regional geological setting in conjunction with the positive results of limited diamond indicator mineral sampling and, the presence of medium to high priority airborne and ground magnetic targets.

For Grizzly's Buffalo Head Hills properties, future exploration should be conducted in three stages (Table 4) and consist of the following:

Stage 1: Conduct an aggressive late summer to fall sampling program for diamond indicator minerals with the planned collection of about 400 samples. The sampling program should be accompanied by or followed with a ground geophysical program to evaluate the existing medium to high priority geophysical anomalies. The estimated cost of the Stage 1 program including the data compilation, fieldwork, sampling, data collection, processing and interpretation is **$600,000**, plus GST (Table 4).

TABLE 4
RECOMMENDED 2007-2008 PROGRAM AND BUDGET
BUFFALO HEAD HILLS PROPERTIES

ITEM	DESCRIPTION	COST
Stage 1		
1	Full data compilation and structural interpretation; including LandSat, RadarSat, DEM and available all geophysical data	$30,000
2	Ground truthing existing geophysical anomalies ($20,000) and 15 ground geophysical surveys at $10,000 per target	$170,000
3	Collection of 400 till samples (@$1000/sample all-up; Includes accommodation, travel, taxis, camp and field equipment and supplies, analytical, sample freight, etc.)	$400,000
	Total Stage 1 Project Costs, Excluding GST	**$600,000**
Stage 2		
1	Helicopter magnetic-electromagnetic survey of about 8500 line-km over Grand Cub Aidan property at all up cost of about $100 per line-km including fuel, accommodation, processing etc.	$850,000
2	Helicopter and/or ground geophysical surveys over additional targets identified during stage 1 work and during stage 2 helicopter survey	$150,000

	Total Stage 2 Project Costs, Excluding GST	**$1,000,000**
	Total Stage 1 and 2 Project Costs, Excluding GST	**$1,600,000**
Stage 3		
1	Conduct a six hole reverse circulation drilling program at an estimated cost of $50,000 per drillhole; if six holes are not drilled cost per drillhole will increase	$300,000
	Total Stages 1, 2 and 3 Project Costs, Excluding GST	**$1,900,000**

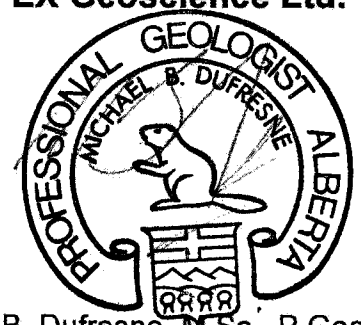
Stage 2: Conduct a helicopter magnetic-electromagnetic survey or a fixed wing GEOTEM survey over all or a portion of the Grand Cub Aidan property in conjunction with pointed surveys over portions of the White Bear and Smoky The Bear property. The estimated cost to conduct the warranted airborne geophysical surveys is **$1,000,000,** plus GST (Table 4).

Stage 3: Conduct a water well or reverse circulation drilling program of six kimberlite targets within Grizzly's three Buffalo Head Hills diamond properties. At least four medium priority drill targets are presently ready to drill. The development of other targets will depend upon the Stage 1 and 2 exploration programs. The estimated cost to conduct a six hole reverse circulation Stage 3 drilling program is **$300,000** plus GST (Table 4).

The total estimated cost of the recommended first two stages of exploration for Grizzly Gold Inc.'s Buffalo Head Hills properties, not including any drilling, is **$1,600,000**, plus GST.

PERMIT TO PRACTICE
APEX Geoscience Ltd.
Signature
Date February 21, 2007
PERMIT NUMBER: P-5824
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

APEX Geoscience Ltd.



M. B. Dufresne, M.Sc., P.Geol.

February 21, 2007
Edmonton, Alberta, Canada

REFERENCES

Ashton Mining of Canada, Inc. (1997a). Ashton discovers kimberlitic pipes in Alberta. News release transmitted by Canadian Corporate News. January 27, 1997.

Ashton Mining of Canada, Inc. (1997b). Ashton discovers two more kimberlites in Alberta. News release transmitted by Canadian Corporate News. February 14, 1997.

Ashton Mining of Canada, Inc. (1997c). Total of eleven kimberlites discovered. News release transmitted by Canadian Corporate News. March 4, 1997.

Ashton Mining of Canada, Inc. (1997d). Ashton find diamonds in Alberta kimberlites. News release transmitted by Canadian Corporate News. April 25, 1997.

Ashton Mining of Canada, Inc. (1999). Ashton reports microdiamond results from kimberlites in Alberta. News release transmitted by Canadian Corporate News. April 28, 1999.

Ashton Mining of Canada, Inc. (2001a). K252 Mini-bulk sample return 55.0 cpht. News release transmitted by Canadian Corporate News. May 24, 2001.

Ashton Mining of Canada, Inc. (2001b). Buffalo Hills exploration program approved. News release transmitted by Canadian Corporate News. August 2, 2001.

Aulbach, S., Griffin, W.L., O'Reilly, Y.O. and McCandless, T.E. (2003). The lithospheric mantle beneath the Buffalo Head Hills Terrane, Alberta: Xenoliths from the Buffalo Head Hills Kimberlites. 8th International Kimberlite Conference, Victoria, B.C., Canada, June 22-27th, Extended Abstracts.

Auston, J. (1998). Discovery and Exploration of the Buffalo Hills Kimberlites, North-central Alberta; Mineral Exploration Group, 7th Calgary Mining Forum, April 8-9, 1998, p. 24.

Bachu, S., Undershultz, J.R., Hitchon, B. and Cotterill, D. (1993). Regional-scale subsurface hydrogeology in Northeast Alberta; Alberta Geological Survey, Energy and Utilities Board, Bulletin 061.

Balzer, S.A. and Durfresne, M.B. (1999). Overburden – Bedrock interpretation for target areas. Unpublished report prepared on behalf of Monopros Limited.

Bloy, G.R. and Hadley, M.G. (1989). The development of porosity in carbonate reservoirs; Canadian Society of Petroleum Geologists Continuing Education Short Course.

Burwash, R.A., Baadsgaard, H., and Peterman, Z.E. (1962). Precambrian K - Ar dates from the western Canada Sedimentary Basin. Journal of Geophysical Research, 67, pp. 1617-1625.

Burwash, R.A. and Culbert, R.R. (1976). Multivariate geochemical and mineral patterns in the Precambrian basement of Western Canada. Tectonophysics. vol. 20, pp. 193-201.

Burwash, R.A., McGregor, C.R. and Wilson, J.A. (1994). Precambrian basement beneath the Western Canada Sedimentary Basin; *In* G.D. Mossop and I. Shetsen (eds.), *Geological Atlas of the Western Canada Sedimentary Basin*, Published Jointly by the Canadian Society of Petroleum Geologists and the Alberta Research Council, Chapter 5, pp. 49-56.

Cant, D.J. (1988). Regional structure and development of the Peace River Arch, Alberta: A Paleozoic failed-rift system? Bulletin of Canadian Petroleum Geology, 36:284-295.

Carlson, S.M., Hillier, W.D., Hood, C.T., Pryde, R.P. and Skelton, D.N. (1999). The Buffalo Hills Kimberlites: A newly discovered diamondiferous kimberlite province in north-central Alberta, Canada *In* The J.B. Dawson Volume, Proceedings of the VIIth International Kimberlite Conference, Volume 1, pp. 109-116.

Ceroici, W. (1979). Hydrogeology of the Peerless Lake area, Alberta. Alberta Research Council, Alberta Geological Survey, Earth Sciences Report 79-05, 10 p.

Chin, L. and Dufresne, M.B. (1997) Metallic and industrial mineral assessment report on the fieldwork and sampling program for the Cadotte Lake area, Alberta. Unpublished assessment report prepared on behalf of Ultrasonic Industrial Ltd.

Creighton, S. and Eccles, D.R. (2003). A preliminary study of the mineral chemistry of selected Alberta Kimberlites. 8th International Kimberlite Conference, Victoria, B.C., Canada, June 22-27th, Extended Abstracts.

Dawson, J.B., and Stephens, W.E. (1975). Statistical classification of garnets from kimberlite and associated xenoliths. Journal of Geology, Vol. 83, p. 589-607.

Davies, R.M., Griffin, W.L., O'Reilly, S.Y. and McCandless, T.E. (2003). Inclusions in diamonds from the K10 and K14 Kimbelrites, Buffalo Hills, Alberta, Canada: Diamond growth in a plume. 8th International Kimberlite Conference, Victoria, B.C., Canada, June 22-27th, Extended Abstracts.

Dufresne, M.B. and Atkinson, B., 2005. Assessment Report For The Smoky The Bear Property, Buffalo Head Hills, Permits 9303031149 to 9303031161. An unpublished assessment report prepared on behalf of Grizzly Gold Inc., 57 Pages.

Dufresne, M.B. and Besserer, D.J., 2002a. Evaluation of the diamond potential of Red Earth Creek Diamond Mines Inc's Red Earth Creek Property, North-Central Alberta; An unpublished internal summary report prepared on behalf of Red Earth Creek Diamond Mines Inc.

Dufresne, M.B. and Besserer, D.J., 2002b. Evaluation of the diamond potential of Red Earth Creek Diamond Mines Exp. Inc's Peerless Lake Property, North-Central Alberta; An unpublished internal summary report prepared on behalf of Red Earth Creek Diamond Mines Exp. Inc.

Dufresne, M.B. and Kupsch, B.G., 2004. Assessment report for Grizzly Gold Inc.'s White Bear Property, Northern Alberta: Metallic Mineral Permits 9302030046 to 53 and 9302030096. Unpublished assessment report prepared on behalf of Grizzly Gold Inc., 52 pages plus appendices.

Dufresne, M.B., Eccles, D.R.and Leckie, D.A., 2001. The geological and geochemical setting of the Mid-Cretaceous Shaftesbury Formation and other Colorado Group sedimentary Units in northern Alberta; Alberta Geological Survey Special Report 9.

Dufresne, M.B., Eccles, D.R., McKinstry, B., Schmitt, D.R., Fenton, M.M., Pawlowicz, J.G. and Edwards, W.A.D. (1996). The Diamond Potential of Alberta; Alberta Geological Survey, Bulletin No. 63, 158 pp.

Dufresne, M.B., Olson, R.A., Schmitt, D.R., McKinstry, B., Eccles, D.R., Fenton, M.M., Pawlowicz, J.G., Edwards, W.A.D. and Richardson, R.J.H. (1995). The Diamond Potential of Alberta: A Regional Synthesis of the Structural and Stratigraphic Setting, and Other Preliminary Indications of Diamond Potential. MDA Project M93-04-037, Alberta Research Council Open File Report 1994-10.

Eccles, D.R., Dufresne, M.B., Copeland, D., Csanyi, W. and Creighton, S. (2002). Alberta Kimberlite Indicator Mineral Geochemical Compilation, Alberta Geological Survey , Earth Sciences Report 2001-20.

Eccles, D.R., Grunsky, E.C., Grobe, M., and Weiss, J. (2000). Structural emplacement model for kimberlitic diatremes in northern Alberta. Alberta Energy and Utilities Board, Alberta Geological Survey, Earth Science Report 2000-01, 116 p.

Eccles, D.R., Haynes, M. and Csanyi, W. (2001). Diamond and metallic-mineral potential of the Peerless Lake map area, North-Central Alberta. Alberta Energy and Utilities Board, Alberta Geological Survey, Earth Science Report 2000-08, 67 p.

Eccles, D.R., Heaman, L.M., Luth, R.W. and Creaser, R.A. (2003). Petrogenetic considerations for the Late Cretaceous Northern Alberta Kimberlite Province. 8th International Kimberlite Conference, Victoria, B.C., Canada, June 22-27th, Extended Abstracts.

Edwards, D., Scafe, D., Eccles, R., Miller, S., Berezniuk, T. and Boisvert, D. (1994). Mapping and resource evaluation of the Tertiary and preglacial sand and gravel formations of Alberta; Alberta Geological Survey; Energy and Utilities Board, Open File Report 94-06.

Fenton, M.M., and Pawlowicz, J.G. (1997). Diamond indicator mineral anomaly from till sample site NAT95-134. Alberta Energy and Utilities Board, Alberta Geological Survey. Geo-Note 1997-1, 4 p.

Fenton, M.M. and Pawlowicz, J.G. (1998a). Reconnaissance mineral and geochemical survey with emphasis on Northern Alberta; Report for the end fiscal year 1994-1995 till geochemistry, Northeastern Alberta. Alberta Geological Survey Open File Report 95-12.

Fenton, M.M., and Pawlowicz, J.G. (1998b). Reconnaissance till mineral and geochemical survey with emphasis on Northern Alberta. Alberta Geological Survey, Open File Report 96-07.

Fenton, M.M., Paulen, R.C., and Pawlowicz, J.G. (2003a). Surficial Geology of the Lubicon Lake Area, Alberta (NTS 84B/SW). Alberta Geological Survey MAP 266.

Fenton, M.M., Paulen, R.C., and Pawlowicz, J.G. (2003b). Surficial Geology of the Peerless Highlands Area, Alberta (NTS 84B/NE). Alberta Geological Survey MAP 267.

Fenton, M.M., Paulen, R.C., and Pawlowicz, J.G. (2003c). Surficial Geology of the Trout River Area, Alberta (NTS 84B/SE). Alberta Geological Survey MAP 268.

Fenton, M.M., Pawlowicz, J.G. and Dufresne, M.B. (1994). Reconnaissance Mineral and Geochemical Survey With Emphasis on Northern Alberta. Canada-Alberta MDA Project M92-04-006, Alberta Geological Survey, Open File Report 94-21.

Fipke, C.E., Gurney, J.J. and Moore, R.O. (1995). Diamond exploration techniques emphasising indicator mineral geochemistry and Canadian examples; Geological Survey of Canada, Bulletin 423, 86 pp.

Friske, P.W.B., Prior, G.J., McNeil, R.J., McCurdy, M.W. and ,Day, S.J.A. (2003). National Geochemical Reconnaissance (NGR); Stream sediment and water survey in the Buffalo Head Hills Area, Northern Alberta. Geological Survey of Canada Open File 1790.

Geological Survey of Canada (1989a). Aeromagnetic total field, Peerless Lake (NTS 84B), Alberta Geological Survey of Canada Map 7242G.

Geological Survey of Canada (1989a). Aeromagnetic total field, Peace River (NTS 84C), Alberta Geological Survey of Canada Map 7773G.

Glass, D.J. Editor (1990). Lexicon of Canadian Stratigraphy, Volume 4. Western Canada, including Eastern British Columbia, Alberta, Saskatchewan and Southern Manitoba; Canadian Society of Petroleum Geologists.

Gurney, J.J., 1984. A correlation between garnets and diamonds in kimberlite. *In* Kimberlite Occurrence and Origin: A basis for conceptual models in exploration, J.E. Glover and P.G. Harris (eds.). Geology Department and University Extension, University of Western Australia, Publication No. 8, p. 143-166.

Gurney, J.J. and Moore, R.O. (1993). Geochemical correlations between kimberlitic indicator minerals and diamonds; *In* Diamonds: Exploration, Sampling And Evaluation; Proceedings of a short course presented by the Prospectors and Developers Association of Canada, March 27, 1993, Toronto, Ontario, p. 147-171.

Grayston, L.D., Sherwin, D.F., and Allan, J.F. (1964). Middle Devonian. *In:* R.G. McGrossan and R.P. Glaiser (eds.), Geological History of Western Canada. Alberta Society of Petroleum Geologists, pp. 49-59.

Green, R., Mellon, G.B. and Carrigy, M.A. (1970). Bedrock Geology of Northern Alberta. Alberta Research Council, Unnumbered Map (scale 1:500,000).

Greenwalt, W.A. Jr. (1956). Granite Wash of the Peace River area. Journal of Alberta Society of Petroleum Geologists, v. 4, pp. 204-205.

Hackbarth, D.A. and Nastasa, N. (1979). The hydrogeology of the Athabasca Oil Sands area, Alberta; Alberta Geological Survey, Energy and Utilities Board, Bulletin 038.

Hood, C. and McCandless, T.E. (2003). Systematic variations in xenoxcryst mineral composition at the province scale, Buffalo Hills Kimberlites, Alberta, Canada. 8th International Kimberlite Conference, Victoria, B.C., Canada, June 22-27th, Extended Abstracts.

Helmstaedt, H.H. (1993). Natural diamond occurrences and tectonic setting of "primary" diamond deposits; *In* Proceedings of a short course presented by the Prospectors and Developers Association of Canada; March 27, 1993, Toronto, Ontario, p. 3-72.

Leckie, D.A., Kjarsgaard, B.A., Peirce, J.W., Grist, A.M., Collins, M., Sweet, A., Stasiuk, L., Tomica, M.A., Eccles, R., Dufresne, M.B., Fenton, M.M., Pawlowicz, J.G., Balzer, S.A., McIntyre, D.J. and McNeil, D.H. (1997). Geology of a Late Cretaceous Possible Kimberlite at Mountain Lake, Alberta – Chemistry, Petrology, Indicator Minerals, Aeromagnetic Signature, Age, Stratigraphic Position and Setting; Geological Survey of Canada, Open file 3441, 202 p.

Lehnert-Thiel, K., Loewer, R., Orr, R.G. and Robertshaw, P. (1992). Diamond-bearing kimberlites in Saskatchewan, Canada: The Fort à la Corne case history; Exploration Mining Geology, Journal of the Geological Society of CIM, vol. 1, pp. 391-403.

Mandryk, G.B. and Richardson, R.J.H. (1988). Coal resource data in the plains area of Alberta; Alberta Geological Survey, Energy and Utilities Board, Open File Report 88-07.

McBride, P.J. (2002). Unpublished letter verifying the expenditures to date and ownership of the Red Earth Creek property. Dated May 30, 2002

Mitchell, R.H. (1986). Kimberlite: Mineralogy, Geochemistry and Petrology. Plenum Press, New York, 442 pp.

Mitchell, R.H. (1989). Aspects of the petrology of kimberlites and lamproites: some definitions and distinctions; *In* Kimberlites and Related Rocks, Volume 1, Their Composition, Occurrence and Emplacement; Geological Society of Australia, Special Publication No. 14, pp. 7-46.

Mitchell, R.H. (1991). Kimberlites and lamproites: Primary sources of diamond. Geoscience Canada, vol. 18, p. 1-16.

Mossop, G. and Shetsen, I. (eds.) (1994). Geological Atlas of the Western Canada Sedimentary Basin. Calgary, Canadian Society of Petroleum Geologists and Alberta Research Council, 510 pp.

O'Connell, S.C., Dix, G.R. and Barclay, J.E. (1990).The origin, history and regional structural development of the Peace River Arch, Western Canada; Bulletin of Canadian Petroleum Geology, 38A:4-24.

Olson, R.A., Dufresne, M.B., Freeman, M.E., Eccles, D.R., and Richardson, R.J.H. (1994). Regional Metallogenic Evaluation of Alberta; Alberta Geological Survey, Open File Report 1994-08.

Paulen, R.C., Fenton, M.M., Pawlowicz, J.G. and Campbell, J.E. 2003. Surficial Geology of the Southeast Buffalo Head Hills Area, Alberta (NTS 84B/NW). Alberta Geological Survey MAP 265

Pawlowicz, J.G., Dufresne M.B. and Fenton, M.M. (1998a). Diamond indicator minerals from till, Northern Alberta; 1995-1997 data from electron probe analysis. Alberta Geological Survey, Alberta Energy and Utilities Board, Geo-Note 1998-01, 18 p.

Pawlowicz, J.G., Dufresne M.B. and Fenton, M.M. (1998b). Diamond indicator minerals, auger core holes, Peerless Lake map area 84B. Alberta Geological Survey, Alberta Energy and Utilities Board, Geo-Note 1998-02, 8 p.

Pawlowicz, J.G. and Fenton, M.M. (1995a). Bedrock topography of Alberta. Alberta Geological Survey, Energy and Utilities Board, Map 226, scale 1:2,000,000.

Pawlowicz, J.G. and Fenton, M.M. (1995b). Drift thickness of Alberta. Alberta Geological Survey, Energy and Utilities Board, Map 227, scale 1:2,000,000.

Pawlowicz, J.G. and Fenton, M.M. (In Press[a]). Drift thickness map, Peerless Lake map

area (84B), Alberta Energy and Utilities Board, Alberta Geological Survey.

Pawlowicz, J.G. and Fenton, M.M. (In Press[b]). Bedrock surface topography map, Peerless Lake map area (84B), Alberta Energy and Utilities Board, Alberta Geological Survey.

Pawlowicz, J.G. and Fenton, M.M. (2001). Peerless Lake area (NTS 84B) update on diamond indicator minerals and geochemistry. *In* AGS and Selected Industry Contributions from the 2002, 11th Annual Calgary Mining Forum and Alberta Geological Survey Minerals Section Open House. Alberta Energy and Utilities Board/Alberta Geological Survey Information Series Report 125.

Ross, G.M. and Stephenson, R.A. (1989). Crystalline Basement: The Foundation of Western Canada Sedimentary Basin; *In* B.D. Ricketts (ed.) Western Canada Sedimentary Basin, A Case History; Canadian Society of Petroleum Geologists, Calgary, Alberta, pp. 33-45.

Ross, G.M., Parrish, R.R., Villeneuve, M.E. and Bowring, S.A. (1991). Geophysics and geochronology of the crystalline basement of the Alberta Basin, western Canada; Canadian Journal of Earth Sciences, vol. 28, pp. 512-522.

Ross, G.M., Theriault, R. and Villeneuve, M. (1998). Buffalo Head Terrane and Buffalo Head Craton; What's the difference and does it matter?; Calgary Mineral Exploration Group, 7th Annual Calgary Mining Forum, p. 19-20.

Scott Smith, B.H. (1995). Petrology and diamonds. Exploration and Mining Geology , vol. 4, no. 2, p. 127-140.

Scott Smith, B.H., Orr, R.G., Robertshaw, P. and Avery, R.W. (1994). Geology of the Fort à la Corne kimberlites, Saskatchewan; Extended Abstract, The Sixteenth CIM Annual General Meeting, Vancouver, British Columbia, October 11 to 15, 1994, Paper No. 68.

Shetson, I. (1990). Quaternary Geology, Central Alberta; Alberta Geological Survey, Energy and Utilities Board, Map 213, scale 1:500,000.

Skelton, D. and Bursey, T. (1998). Assessment report: Buffalo Head Hills property (AL01), Ashton Mining of Canada Inc. Assessment File 19980015, Alberta Geological Survey, 19 p.

Skelton, D. and Bursey, T. (1999). Assessment report: Buffalo Head Hills property (AL01), Ashton Mining of Canada Inc. Assessment File 19990011, Alberta Geological Survey, p.

Skelton, D. and Willis, D. (2001). Assessment Report for the Loon Lake, Birch Mountain, Rabbit Lake, and Muddy River Properties. Assessment File 20010007, Alberta

Geological Survey.

Skinner, E.M.W. (1989). Contrasting Group I and Group II kimberlite petrology: towards a genetic model for kimberlites. *In* J. Ross (ed.) Kimberlites and Related rocks, Vol. 1, Their Composition, Occurrence, Origin and Emplacement, Proceedings of the Fourth Kimberlite Conference, Perth, 1986, Geological Society of Australia, Special Publication No. 14, p. 528-544.

Tokarsky, O. (1972). Hydrogeology of the Bison Lake area, Alberta. Alberta Research Council, Alberta Geological Survey, Earth Sciences Report 72-02, 10 p.

Villeneuve, M.E., Ross, G.M., Theriault, R.J., Miles, W., Parrish, R.R. and Broome, J. (1993). Tectonic subdivision and U-Pb geochronology of the crystalline basement of the Alberta basin, western Canada; Geological Survey of Canada, Bulletin 447.

Willis, D. and Skelton, D. (2002). .Assessment Report for the: Buffalo Hills Property. Assessment File 20020010, Alberta Geological Survey, 20p.

Wood, B.D. (1999). Geological assessment report, Troymin prospect, sediment sampling, geophysics and exploration drilling. Assessment File 19990017, Alberta Geological Survey.

Vogwill, R.I.J. (1978). Hydrogeology of the Lesser Slave Lake area, Alberta. Alberta Research Council, Alberta Geological Survey, Earth Sciences Report 77-01, 10 p.

CERTIFICATE of AUTHOR

I, Michael B. Dufresne, M.Sc., P.Geol., do hereby certify that:

1. I am President of: APEX Geoscience Ltd.
Suite 200, 9797 – 45th Avenue
Edmonton, Alberta T6E 5V8
Phone: 780-439-5380

2. I graduated with a B.Sc. Degree in Geology from the University of North Carolina at Wilmington in 1983 and with a M.Sc. Degree in Economic Geology from the University of Alberta in 1987.

3. I am and have been registered as a Professional Geologist with the Association of Professional Engineers, Geologists and Geophysicists of Alberta since 1989.

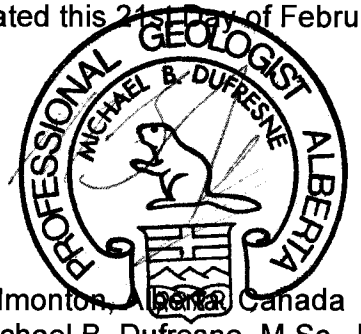
4. I have worked as a geologist for a total of 20 years since my graduation from university.

5. I have read the definition of "Qualified Person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101.

6. I am responsible for, or directly supervised, the preparation of all sections of the Technical Report titled **"Assessment Report For The Smoky The Bear Property, Buffalo Head Hills, Permits 9303031149, to 9303031152-55, 9305010837-38, 9305031116-18, 9306020525-30, 9306020545, 9306110739-42 and 9307010942-45"**, and dated February 21, 2007 (the "Technical Report"). I have visited the properties on several occasions with the last visit during November, 2005.

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

Dated this 21st Day of February, 2007.



Edmonton, Alberta, Canada
Michael B. Dufresne, M.Sc., P.Geol.

APPENDIX 2

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:09:44 AM

Agreement Number: 093 9303031149

Status: ACTIVE
Agreement Area: 9216
Term Date: 2003-03-04
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8037596
Client Name: GRIZZLY GOLD INC.
Address: COMP 2 SITE 17
PEERS, AB
CANADA T0E 1W0

LAND / ZONE DESCRIPTION

5-07-088: 01-36

METALLIC AND INDUSTRIAL MINERALS

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:04:44 AM

Agreement Number: 093 9303031152

Status: ACTIVE
Agreement Area: 6144
Term Date: 2003-03-04
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8037596
Client Name: GRIZZLY GOLD INC.
Address: COMP 2 SITE 17
PEERS, AB
CANADA T0E 1W0

LAND / ZONE DESCRIPTION

5-10-088: 01-18;23-26;35;36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:02:45 AM

Agreement Number: 093 9303031153

Status: ACTIVE
Agreement Area: 9216
Term Date: 2003-03-04
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8037596
Client Name: GRIZZLY GOLD INC.
Address: COMP 2 SITE 17
PEERS, AB
CANADA T0E 1W0

LAND / ZONE DESCRIPTION

5-11-088: 01-36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 12:57:24 AM

Agreement Number: 093 9303031154

Status: ACTIVE
Agreement Area: 9216
Term Date: 2003-03-04
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8037596
Client Name: GRIZZLY GOLD INC.
Address: COMP 2 SITE 17
PEERS, AB
CANADA T0E 1W0

LAND / ZONE DESCRIPTION

5-12-088: 01-36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 3:54:07 AM

Agreement Number: 093 9303031155

Status: ACTIVE
Agreement Area: 3072
Term Date: 2003-03-04
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8037596
Client Name: GRIZZLY GOLD INC.
Address: COMP 2 SITE 17
PEERS, AB
CANADA T0E 1W0

LAND / ZONE DESCRIPTION

5-13-088: 25-36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:03:41 AM

Agreement Number: 093 9305010837

Status: ACTIVE
Agreement Area: 8704

Term Date: 2005-01-19
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8037596
Client Name: GRIZZLY GOLD INC.
Address: COMP 2 SITE 17
PEERS, AB
CANADA T0E 1W0

LAND / ZONE DESCRIPTION

5-11-089: 01-10;12;13;15-36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:13:53 AM

Agreement Number: 093 9305010838

Status: ACTIVE
Agreement Area: 8704
Term Date: 2005-01-19
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8037596
Client Name: GRIZZLY GOLD INC.
Address: COMP 2 SITE 17
PEERS, AB
CANADA T0E 1W0

LAND / ZONE DESCRIPTION

5-06-090: 28;33
5-06-091: 01-12;14-18;22;23;26-36
5-06-092: 03;10

METALLIC AND INDUSTRIAL MINERALS

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 12:53:14 AM

Agreement Number: 093 9305031116

Status: ACTIVE
Agreement Area: 4608
Term Date: 2005-03-17
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8037596
Client Name: GRIZZLY GOLD INC.
Address: COMP 2 SITE 17
PEERS, AB
CANADA T0E 1W0

LAND / ZONE DESCRIPTION

5-13-089: 06;07;17-22;27-36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:16:33 AM

Agreement Number: 093 9305031117

Status: ACTIVE
Agreement Area: 256
Term Date: 2005-03-17
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8037596
Client Name: GRIZZLY GOLD INC.
Address: COMP 2 SITE 17
PEERS, AB
CANADA T0E 1W0

LAND / ZONE DESCRIPTION

5-09-090: 29N;30E

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 12:55:39 AM

Agreement Number: 093 9305031118

Status: ACTIVE
Agreement Area: 8192
Term Date: 2005-03-17
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8037596
Client Name: GRIZZLY GOLD INC.
Address: COMP 2 SITE 17
PEERS, AB
CANADA T0E 1W0

LAND / ZONE DESCRIPTION

5-13-090: 01-27;30;31;34-36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:08:18 AM

Agreement Number: 093 9306020525

Status: ACTIVE
Agreement Area: 9216
Term Date: 2006-02-07
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-08-088: 01-36

METALLIC AND INDUSTRIAL MINERALS

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:05:31 AM

Agreement Number: 093 9306020526

Status: ACTIVE
Agreement Area: 9216
Term Date: 2006-02-07
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-09-088: 01-36

METALLIC AND INDUSTRIAL MINERALS

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 12:48:34 AM

Agreement Number: 093 9306020527

Status: ACTIVE
Agreement Area: 9216
Term Date: 2006-02-07
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-14-088: 01-36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:08:53 AM

Agreement Number: 093 9306020528

Status: ACTIVE
Agreement Area: 9216
Term Date: 2006-02-07
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-07-089: 01-18
5-08-089: 01-18

METALLIC AND INDUSTRIAL MINERALS

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:06:55 AM

Agreement Number: 093 9306020529

Status: ACTIVE
Agreement Area: 6144
Term Date: 2006-02-07
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-09-089: 01-18
5-10-089: 01;02;11-14

METALLIC AND INDUSTRIAL MINERALS

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 12:51:14 AM

Agreement Number: 093 9306020530

Status: ACTIVE
Agreement Area: 4608
Term Date: 2006-02-07
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-14-089: 01-18

METALLIC AND INDUSTRIAL MINERALS

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 12:52:02 AM

Agreement Number: 093 9306020545

Status: ACTIVE
Agreement Area: 6144
Term Date: 2006-02-21
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-13-088: 01-24

METALLIC AND INDUSTRIAL MINERALS

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:14:43 AM

Agreement Number: 093 9306110739

Status: ACTIVE
Agreement Area: 2048
Term Date: 2006-11-07
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-05-088: 05-08;18;19;30;31

METALLIC AND INDUSTRIAL MINERALS

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:10:34 AM

Agreement Number: 093 9306110740

Status: ACTIVE
Agreement Area: 9216
Term Date: 2006-11-07
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-06-088: 01-36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:11:27 AM

Agreement Number: 093 9306110741

Status: ACTIVE
Agreement Area: 9216

Term Date: 2006-11-07
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-06-089: 01-36

METALLIC AND INDUSTRIAL MINERALS

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:13:04 AM

Agreement Number: 093 9306110742

Status: ACTIVE
Agreement Area: 7680
Term Date: 2006-11-07
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-06-090: 01-25;29-32;36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 12:58:33 AM

Agreement Number: 093 9307010942

Status: ACTIVE
Agreement Area: 7424
Term Date: 2007-01-25
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-12-089: 01-03;04E;06;07;09E;10-21;25N;26N;27-36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 12:54:11 AM

Agreement Number: 093 9307010943

Status: ACTIVE
Agreement Area: 3584

Term Date: 2007-01-25
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-13-089: 01-05;08-16

METALLIC AND INDUSTRIAL MINERALS

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 1:01:41 AM

Agreement Number: 093 9307010944

Status: ACTIVE
Agreement Area: 8576
Term Date: 2007-01-25
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-12-091: 01-03;05-29;30S;32-36

METALLIC AND INDUSTRIAL MINERALS

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: February 21, 2007 12:56:47 AM

Agreement Number: 093 9307010945

Status: ACTIVE
Agreement Area: 6201

Term Date: 2007-01-25
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8078830
Client Name: GRIZZLY DIAMONDS LTD.
Address: 9797 45 AVE NW SUITE 200
EDMONTON, AB
CANADA T6E 5V8

LAND / ZONE DESCRIPTION

5-13-091: 02-04;09-15;18SP
PORTION(S) LYING OUTSIDE LUBICON LAKE INDIAN LAND CLAIM.

5-13-091: 18NW,NEP
PORTION(S) LYING OUTSIDE LUBICON LAKE INDIAN LAND CLAIM.

5-13-091: 19N,SEP
PORTION(S) LYING OUTSIDE LUBICON LAKE INDIAN LAND CLAIM.

5-13-091: 19SW;20WP
PORTION(S) LYING OUTSIDE LUBICON LAKE INDIAN LAND CLAIM.

5-13-091: 21NEP
PORTION(S) LYING OUTSIDE LUBICON LAKE INDIAN LAND CLAIM.

5-13-091: 22;23S,NW;24S,NE;25N,SE;26N,SW;27;28SP
PORTION(S) LYING OUTSIDE LUBICON LAKE INDIAN LAND CLAIM.

5-13-091: 28N;29SP
PORTION(S) LYING OUTSIDE LUBICON LAKE INDIAN LAND CLAIM.

5-13-091: 29N;30;32-36
METALLIC AND INDUSTRIAL MINERALS

APPENDIX 3

ADDENDUM REPORT
PETROGRAPHY OF KIMBERLITE FLOAT
SMOKEY THE BEAR PROPERTY

Enclosed as Appendix 3 is a petrographic report provided by Minerals Services Canada Inc. for two specimens of kimberlite float found on the Smokey The Bear Property during prospecting during October and November 2005. Also enclosed as separate attachments in this appendix is a map showing the location of the two pieces of kimberlite float along with a picture of each of the two pieces of hand size specimens.

580000 585000 590000 595000

6280000

6275000

GRZ002GRZ003

Township 88, Range 10 West of 5

Legend

- Kimberlite Float
- Drainage_major1_z11n27
- Drainage_minor1_z11n27
- water_bodies_z11n27
- Grizzly Diamonds Somkey The Bear Property
- 3869008 Canada Ltd. Property
- Ashton Mining of Canada Inc. Property
- Sandswamp Exploration Property

GRIZZLY DIAMONDS LTD.

Buffalo Head Hills Area

LOCATION OF KIMBERLITE SAMPLES COLLECTED 2005

0 250 500 1,000 1,500 2,000 Meters

Scale 1:50,000
NTS 84B, ZONE 11, NAD1927
APEX Geoscience Ltd.

Edmonton, Alberta June 6, 2007

Kimberlite Float
05GRZ002

Kimberlite Float
05GRZ003

MINERAL SERVICES

CANADA

REPORT NO. MSC06/001R

RAPID PETROGRAPHY OF 2 HAND SPECIMENS SUBMITTED BY APEX GEOSCIENCE, DECEMBER 2005.

Prepared for

Apex Geoscience

By

Mineral Services Canada Inc.

25 January 2006

205 – 930 Harbourside Drive, North Vancouver, B.C., V7P 3S7, Canada
ph: +604 980-6771 – fax: +604 980-6751

RAPID PETRPGRAPHY OF 2 HAND SPECIMENS SUBMITTED BY APEX GEOSCIENCE, DECEMBER 2005.

1. INTRODUCTION

This report documents the petrography of 2 hand specimen samples submitted by Apex Geoscience in December 2005. Summary petrography descriptions and photomicrographs are presented in Section 2. Key petrographic criteria for each of the samples are summarized in Table 1.

2. PETROGRAPHIC OBSERVATIONS

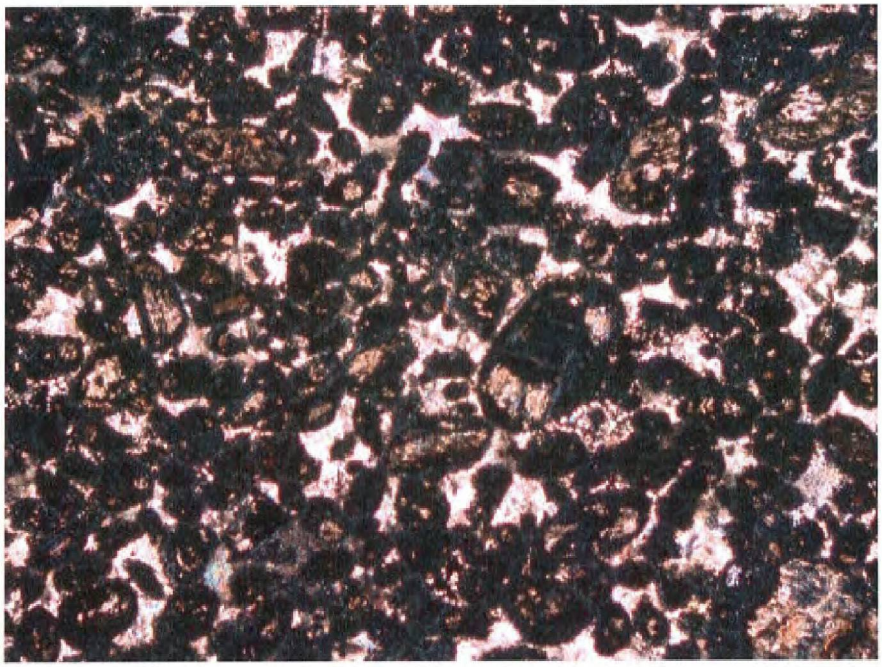
05GRZ002

Rock Type:	kimberlite
Textural Classification:	segregationary, aphanitic
Facies:	hypabyssal
Diamond Carrying Capacity:	low

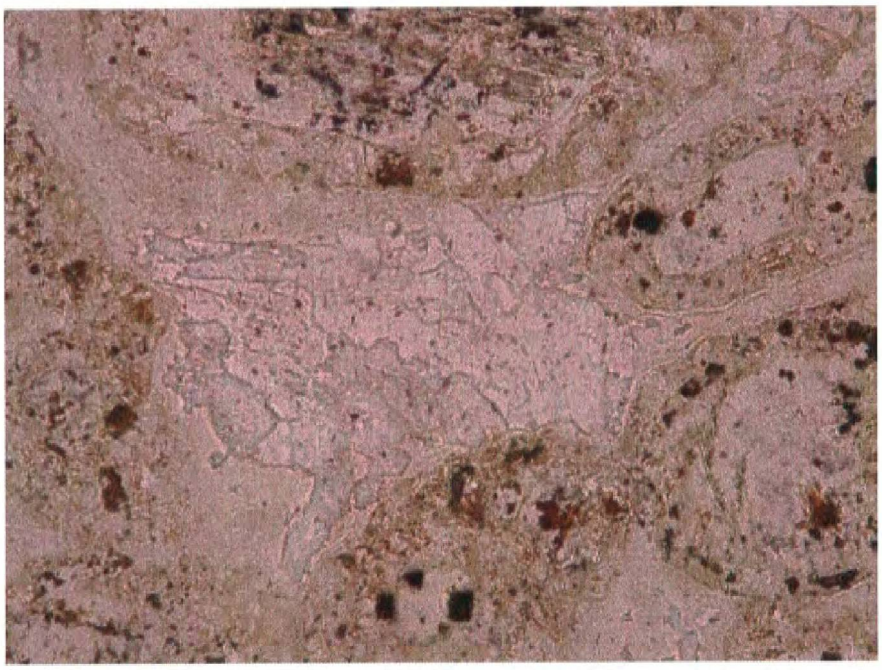
Macroscopic:
Light grey-green rock containing rare, altered olivine macrocrysts and abundant possible altered olivine phenocrysts in a pale carbonate matrix. Country rock fragments and mantle derived xenocrysts are not apparent in the small hand specimen provided.

Microscopic:
In thin section, the rock has an aphanitic texture and olivine macrocrysts are rare. Abundant altered olivine phenocrysts are set in a segregated serpentine and carbonate matrix, and the phenocrysts are surrounded by thin rims of magmatic material containing fine-grained opaques and perovskite. The other phases present are indistinguishable on account of their severe alteration.

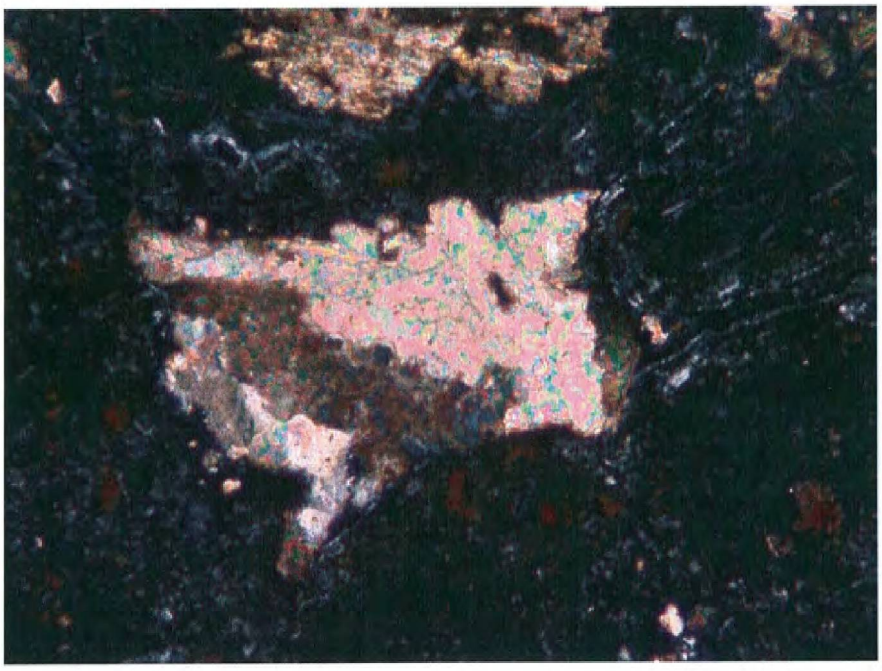
Sample: 05GRZ002. 2x magnification. Field of View = 7mm. Plane polarised light.
Abundant euhedral olivine phenocrysts surrounded by thin margins of magmatic material are set in a segregated carbonate dominated matrix with minor serpentine.



Sample: 05GRZ002. 2x magnification. Field of View = 7mm. Cross polarised light.
As above in crossed nichols. Note the carbonate dominated matrix.



Sample: 05GRZ002. 20x magnification. Field of View = 0.7mm. Plane polarised light.
Highly magnified view of the segregated carbonate matrix surrounded by euhedral olivine phenocrysts with thin rims of magmatic material containing dark brown perovskite and black oxides (spinel).



Sample: 05GRZ002. 20x magnification. Field of View = 0.7mm. Cross polarised light.
As above in cross nichols. Note the extensively serpentinised nature of the olivine.

05GRZ003

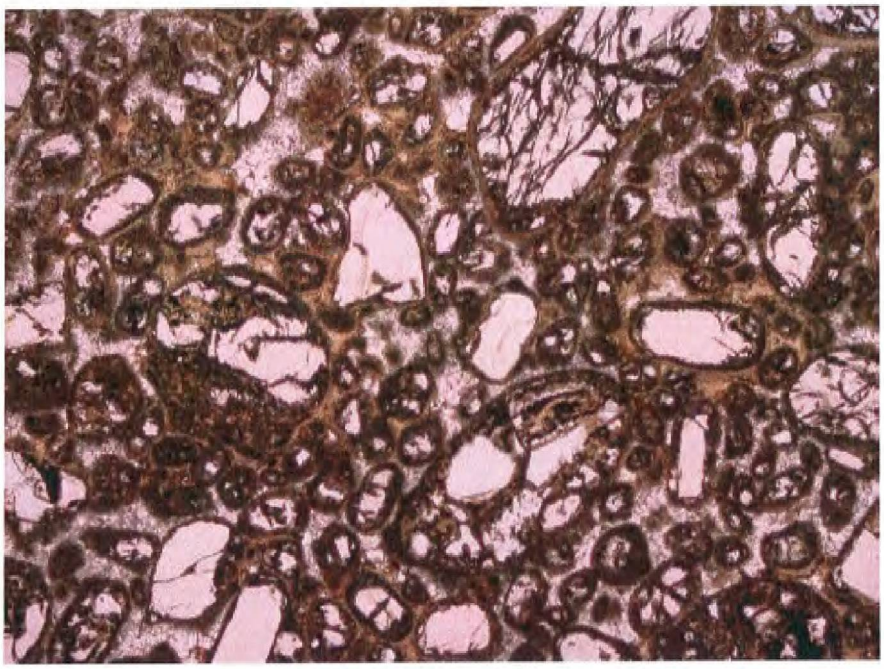
Rock Type:	kimberlite
Textural Classification:	segregationary, macrocrystic
Facies:	hypabyssal
Diamond Carrying Capacity:	low-moderate

Macroscopic:

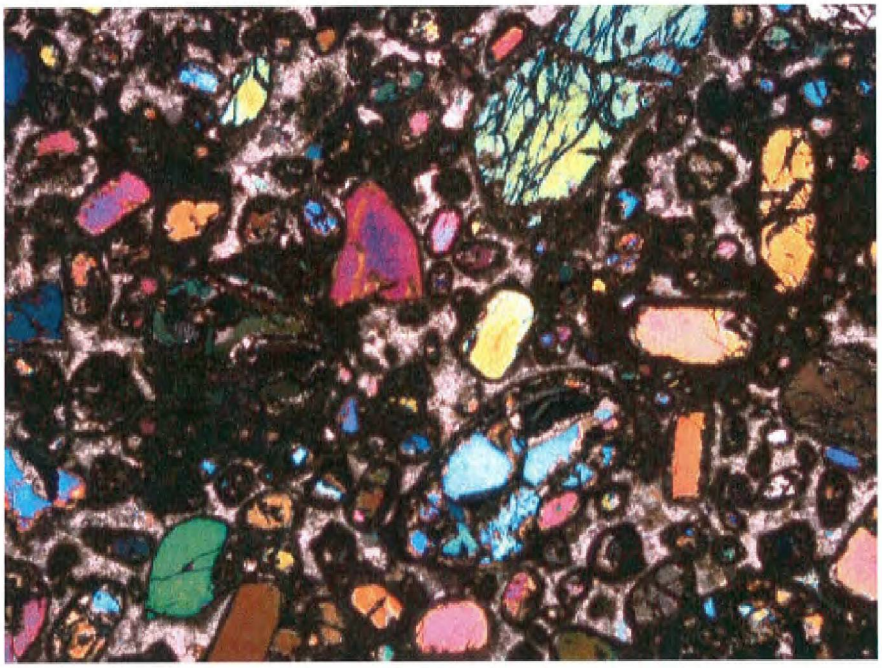
Dark grey-green rock containing erratically distributed olivine macrocrysts and moderately abundant possible altered olivine phenocrysts in a paler carbonate dominated matrix. Country rock fragments and mantle derived xenocrysts are not apparent in the hand specimen provided.

Microscopic:

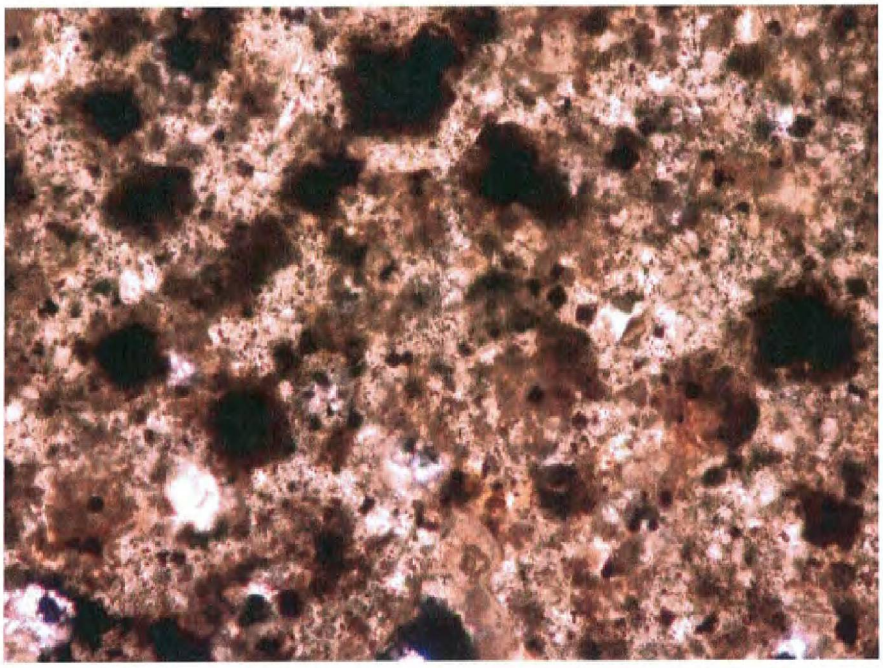
In thin section, the rock has a macrocrystic, classic globular segregationary texture with distinctive rounded globules set in a segregated matrix of mainly carbonate with minor serpentine. Almost every single coarse olivine in the rock is surrounded by a circular margin of magmatic material which varies from a thin rind to thicker rim up to 2 mm in diameter. Isolated globules up to 5 mm in diameter comprising predominantly magmatic material with a small olivine core are also present. The magmatic rims contain 2 generations of abundant fine and coarser grained opaques (spinel) with minor perovskite. The other phases present are indistinguishable on account of their severe alteration.



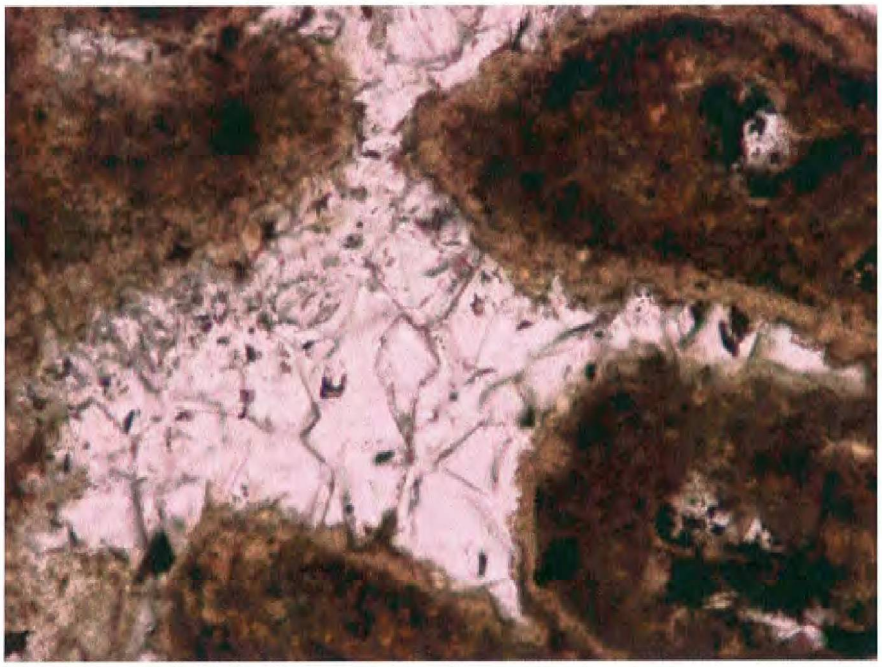
Sample: 05GRZ003. 2x magnification. Field of View = 7mm. Plane polarised light.
Scattered olivine macrocrysts and abundant euhedral olivine phenocrysts, both surrounded by variable thickness rims of magmatic material are set in a segregated carbonate dominated matrix with minor serpentine.



Sample: 05GRZ003. 2x magnification. Field of View = 7mm. Cross polarised light.
As above in crossed nichols. Note the fresh nature of the olivines as demonstrated by their high birefringence. The matrix is dominated by carbonate (pale grey-pink birefringence).



Sample: 05GRZ003. 20x magnification. Field of View = 0.7mm. Plane polarised light.
Magnified view of the magmatic material in one of the larger globules. Note the two distinct sizes of opaque minerals present. The altered brown minerals are likely perovskite.



Sample: 05GRZ003. 20x magnification. Field of View = 7mm. Cross polarised light.
Magnified view of the segregated carbonate matrix between a number of small olivine phenocrysts.

3. SUMMARY AND RECOMMENDATIONS

Both hand specimens described here are classified as segregationary textured magmatic kimberlites dominated by olivine in a matrix of mainly carbonate, with accessory spinel and perovskite. The key difference between the two samples is that one of these has a very low macrocryst olivine content and an aphanitic texture, while the other contains erratically distributed olivine macrocrysts and distinctive globules. The segregationary and globular segregationary textures suggest that these magmatic rocks were in the process of degassing during the later stages of intrusion. Similar mineralogical and textural features have been observed in dyke and sill intrusions in the Kimberley area of South Africa, and it is possible that the samples described here are derived from similar sheet-like intrusions.

Overall these rocks have a low and low-moderate diamond carrying capacity respectively. Nonetheless, it is recommended that additional material from the macrocrystic variety be collected and submitted for indicator mineral abundance and composition analysis in order to confirm the petrographic classification.

Table 1: *Summary of key petrographic criteria 2 hand specimens submitted by Apex Geoscience, December 2005.*

Sample Number	Rock Type	Mineralogical Classification	Textural classification	Facies	Olivine macrocryst abundance (%)	Diamond Carrying Capacity
05GRZ 002	Kimberlite	Carbonate	aphanitic	hypabyssal	Trace.	Low
05GRZ 003	Kimberlite	Carbonate	macrocrystic	hypabyssal	15-20	Low-moderate