MAR 20120010: SWAN HILLS

Swan Hills - A report on bentonite in the Swan Hills area, northern Alberta

Received date: May 04, 2012

Public release date: Mar 27, 2013

ASSESSMENT REPORT FOR HEADWATER MINERAL EXPLORATION AND DEVELOPMENT LTD.'S SWAN HILLS PROPERTY, ALBERTA, METALLIC MINERAL PERMITS:

9302040008, 9302040012, 9302040014, 9302040016, 9302040018, 9302040020, 9305031142, 9306011206 to 9306011210, 9306011212, 9306011215, 9306011221 to 9306011236, 9306011239, 9306011242, 9306011243, 9306011247, 9306011249 to 9306011251, 9306020546 to 9306020549, 9306050833 to 9306050836, 9307100729, 9311060877 to 9311060933, 9311110533 to 9311110563, 9312020288 to 9312020309

PROPERTY CENTRE AT APPROXIMATELY:
116°16' W AND 54°45' N
WITHIN 250K NTS MAP SHEETS:
83J, 83K, 83N AND 83O

COMPLETED FOR:
HEADWATER MINERAL EXPLORATION AND DEVELOPMENT LTD.
 # 14 RUTTON CLOSE
RED DEER, ALBERTA
CANADA, T4P 3T1

COMPLETED BY:
APEX GEOSCIENCE LTD.
SUITE 200, 9797- 45 AVENUE
EDMONTON, ALBERTA
CANADA, T6E 5V8

May 4, 2012
Edmonton, Alberta

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

ASSESSMENT REPORT FOR HEADWATER MINERAL EXPLORATION AND DEVELOPMENT LTD.'S SWAN HILLS PROPERTY, ALBERTA, METALLIC MINERAL PERMITS: 9302040008, 9302040012, 9302040014, 9302040016, 9302040018, 9302040020, 9305031142, 9306011206 to 9306011210, 9306011212, 9306011215, 9306011221 to 9306011236, 9306011239, 9306011242, 9306011243, 9306011247, 9306011249 to 9306011251, 9306020546 to 9306020549, 9306050833 to 9306050836, 9307100729, 9311060877 to 9311060933, 9311110533 to 9311110563, 9312020288 to 9312020309

Table of Contents **Page**

TABLES

FIGURES

APPENDICES

ASSESSMENT REPORT FOR HEADWATER MINERAL EXPLORATION AND DEVELOPMENT LTD.'S SWAN HILLS PROPERTY, ALBERTA, METALLIC MINERAL PERMITS: 9302040008, 9302040012, 9302040014, 9302040016, 9302040018, 9302040020, 9305031142, 9306011206 to 9306011210, 9306011212, 9306011215, 9306011221 to 9306011236, 9306011239, 9306011242, 9306011243, 9306011247, 9306011249 to 9306011251, 9306020546 to 9306020549, 9306050833 to 9306050836, 9307100729, 9311060877 to 9311060933, 9311110533 to 9311110563, 9312020288 to 9312020309

SUMMARY

APEX Geoscience Ltd. (APEX) was retained during 2011 as consultants by Headwater Mineral Exploration and Development Ltd. (Headwater) for the continuation of project management aid for Headwater's Swan Hills Property (the Property) and to prepare an independent evaluation of the potential of the Property to host bentonite deposits, based upon previously reported data. This report is written for filing toward assessment work requirements for the Swan Hills Property, owned 100% by Headwater and held in the name of Headwater Mineral Exploration and Development Ltd. and 620516 Alberta Ltd.

Headwater's Swan Hills Property is located in north-central Alberta, within the 1:250,000 scale National Topographic System (NTS) maps 83J, 83K, 83N, and 83O. The center of the Property is approximately located at 115°59' W longitude and 54°50' N latitude (or 564300 Easting/ 6077850 Northing, using the North American Datum of 1927 (NAD 27) and Universal Transverse Mercator geographic coordinate system zone 11). Using the Alberta Township System (ATS), a version of the legal Dominion Land Survey (DLS), the Property covers portions of Townships 63 to 72, Ranges 7 to 19 West of the 5th Meridian. The Property area is approximately 1,032,507 hectares (ha), and consists of 156 contiguous Metallic and Industrial Mineral Permits: 9302040008, 9302040012, 9302040014, 9302040016, 9302040018, 9302040020, 9305031142, 9306011206 to 9306011210, 9306011212, 9306011215, 9306011221 to 9306011236, 9306011239, 9306011242, 9306011243, 9306011247, 9306011249 to 9306011251, 9306020546 to 9306020549, 9306050833 to 9306050836, 9307100729, 9311060877 to 9311060933, 9311110533 to 9311110563, 9312020288 to 9312020309 as of the effective date of this report.

The Swan Hills Property lies in the northwestern part of the Western Canada Sedimentary Basin within the southern segment of the Peace River Arch. The Property is mostly underlain by Uppermost Cretaceous Wapiti Formation and the Tertiary Paskapoo Formation. The Wapiti Formation consists of sandstone and siltstone with minor mudstone, bentonite, and coal beds deposited in fluvial to lacustrine environments. The Swan Hills Property bentonitic shales that are host to the bentonite rich zones are likely part of the Upper Wapiti Formation and may be laterally or time

equivalent to the Horseshoe Canyon Formation or Battle and Whitemud formations further south in the Edmonton region.

The Horseshoe Canyon Formation was deposited in a variety of successive environments including floodplains, estuarine channels, and coalswamps. The non-marine Scollard Formation is the basal most Tertiary formation in the area of the Property. The Scollard Formation overlies the Wapiti Formation and consists of sandstone and siltstone with minor mudstone and bentonite. The youngest bedrock unit in the area of the Swan Hills mineral permits is the Tertiary Paskapoo Formation. The Paskapoo Formation is composed of cycles of thick, tabular buff coloured sandstone beds overlain by interbedded siltstone and mudstones, which are locally high in smectite. The Paskapoo Formation is approximately 300 to 400 m in thickness but mostly occupies the highlands in the south-central portion of the Property. The majority of the Swan Hills Property is covered by drift of variable thickness, ranging from a discontinuous veneer to less than 15 m.

The majority of the historical exploration conducted on the Swan Hills Property has been for non-bentonite resources, including gold, precious metals, base metals, diamonds and to a lesser extent Lithium in formation waters. The recent focus on bentonite resulted from the discovery of thick bentonite beds within the Property noted in outcrops and trenches in 2003, and was followed up by auger drilling in the spring of 2008. Sixteen auger holes, ranging from 16.4 to 31.7 m deep, and collectively totalling 445.2 m, were drilled on the Property by Refined Energy, Ltd. of Edmonton; all holes were drilled for Headwater under the supervision of APEX. The auger drilling was done within a 2.7 km x 0.9 km area of Township 69, Range 16W5, Sections 16, 17, 20, 21 and 22. A total of 624 samples were collected in the course of the 2008 auger drilling. Based on observed clay content at the time of drilling, 114 samples were selected for bulk mineralogy and cation exchange capacity analyses and shipped to Saskatchewan Research Council (SRC) laboratories in Saskatoon, Saskatchewan. Several samples were also shipped to Core Laboratories in Edmonton for bulk mineralogy and clay mineralogy analyses (including species and abundances of clays).

The auger drilling was followed up by diamond drilling in the same area later in 2008 (October to December). Seven vertical diamond drill holes were completed, totalling 1,020.5 m. After samples were selected, cores were split and half the core was shipped for analyses; the other half was archived by APEX on behalf of Headwater or Headwater at a facility in the Swan Hills. In total, 772 samples were collected, 482 of which were analyzed for their clay content (species and abundances of clays); 462 were sent to SRC Laboratories in Saskatoon, the other 20 were sent to the Alberta Research Council laboratories in Edmonton. The samples analysed for clay species were from core holes DDH08-17, DDH08-18, DDH08-20 and DDH08-23.

The SRC conducted column settling tests followed by prepared randomly oriented and oriented clay samples for X-ray diffraction to determine clay abundances and mineralogy. Analyses of the randomly oriented samples indicates that the clay fraction of the samples (grains <2 micrometres [2µm]) ranges from ~6-72%, and the majority of clay fraction is smectite or smectite-illite, with smectite being the most prominent clay species (more than half of the clay fraction in 86% of samples). Much less common (<10% of clays in all samples) were chlorite and kaolinite. The CEC work indicates the smectites show high cation exchange capacity and are predominantly Ca smectites.

The diamond drilling also provided valuable insights into the structure of the area that were not evident from surface outrcrop or auger drilling. At least two units of bentonite are present in the area, separated by a 30 m (average thickness) clay-till unit likely emplaced by glacier-induced thrusting. The thickness of the uppermost bentonite unit averages ~25 m, and the till overburden overlying all units (where present) ranges from 0-20 m.

From July 2009 to January 2010, APEX assisted Headwater personnel to complete an exploration program which consisted of trenching of potential kimberlites and prospecting and rock grab sampling. A total of three trenches were dug over two anomalies, from which 40 samples were collected. Prospecting and rock grab sampling were completed whilst assessing the feasibility of drill targets. A total of 10 rock samples were collected.

More recent work completed by APEX on behalf of Headwater includes a preliminary Inferred Resource of total bentonite in place for the Property, calculated by Michael Dufresne, M.Sc., P. Geol., a principal of APEX and a qualified person under NI 43-101, using the results of the 2008 diamond drilling program. The bentonitic clay resource was modelled in Mircromine™ as a polygon of 25.5 m thickness containing 47.1% bentonitic clay, being entirely within the Property. The model indicates a total volume of 202,085,500 cubic metres, which at a specific gravity of 2.2 tonnes per cubic metre yields 444,588,000 tonnes of material. Using the 47.1% bentonitic clay content, this results in a total resource of 209,519,000 tonnes of bentonitic clay as calculated as being in place within the modelled polygon.

In addition to the preliminary Inferred Bentonite Resource in 2012, APEX assisted Headwater and recent investor Altaben Minerals Ltd. (Altaben) to complete a trenching program in 2012. A total of three trenches were dug within the Bentonite area. Metallurgical work and bulk sampling is currently in progress in order to determine how much of the bentonitc clay can be turned into refined bentonite.

Headwater and Altaben have been working towards building a mine at the bentonite area and are currently undergoing a number of studies and investigations including, but not limited to, mining and recovery methods, project infrastructure, market studies and contracting, environmental and social/community impact studies and capital and operating cost analysis.

Headwater has spent a total of CDN$1,928,816.80 (not including GST) on the Swan Hills Property during 2010 to 2012.

The results of the potential bentonite resource estimate is that there is a significant potential bentonitic clay mineral deposit over an area 2.7 km by 4.3 km comprising an area of roughly 8 km^2 with the potential to be much larger with further work. The resource is hosted in glacially disturbed and potentially glacially thrusted Wapiti bedrock that ranges in thickness intersected in six out of the seven holes drilled ranging from 10 m to 32 m in thickness with an average thickness of 30.5 m. Beneath the disturbed bedrock, all seven drill holes intersected a brown competent (basal?) till ranging from 17 m to 55 m in thickness and averaging 31.7 m in thickness.

A wireframe of the glacialy disturbed bentonite zone outlined by the drilling to date produces over 200 million m3 which will likely yield more than 500 million tonnes at an average of about amount of 47% clay minerals with about 67% of the clay mineral species being smectite (montmorillonite).

The CEC exchange work indicates the smectite are dominantly Ca-smectite and the CEC is good in places with up to meq/100g. Ca-smectite gnereally has poorer swelling properties than Na-smectite, however the fairly good CEC properties indicate that the smectite could either be treated to substitute Na for Ca to improve its swelling capability or it could be an idea clay for its absorption properties.The preliminary results of the clay analyses indicate that the presence of a significant quantity of bentonite on the Property, which is hosted in two units under 0-20 m of overburden. It is warranted that the remainder of the clay samples be processed to gain a better understanding of the type and distribution of the bentonite present.

Clay analyses should be completed on the remaining samples and cation exchange capacity (CEC) analyses should be conducted on all the samples. More work along the lines of Altabens work with bulk sample studies and market studies should be conducted and a materials engineering specialist should be engaged to complete a scoping study of the clay potential of the Property based on the available information before any more exploration work is completed. An assessment of the clay usage and extraction processes should be included in the study. In order to get to a 43-101 inferred or indicated resource it will likely be required to drill some more closer spaced holes in the main target area of interest. In addition ground penetrating radar and shallow seismic surveys should also be conducted on the bentonite area to further delineate the geometry and stratigraphy of the potential deposit. The estimated cost to conduct the (Phase I) program is CDN$300,000.

Additional work that should be completed on the Property would include, a multi-faceted exploration program (Phase II) consisting of the following, but not limited to:

a) additional interpretation needs to be completed on the 2008 geophysical survey data to identify sand and gravel anomalies. The estimated cost to conduct part a is CDN$5,000;

b) samples should be collected from the remaining split core from the till layer of the diamond drill holes and processed for diamond indicator minerals to assess the distribution of DIMs in the basal till in the Lightbulb Lake Ridge area. The estimated cost to conduct part b is CDN$20,000;

c) a diamond indicator minerals stream sampling program should be conducted during 2012 to follow up on anomalous diamond indicator minerals, gold and platinum results identified from the 2008 stream samples, additional sampling should be completed in areas that are associated geophysical anomalies. The estimated cost to conduct part c is CDN$200,000;

d) gridding and ground geophysical surveying should be completed over additional high-moderate priority land based magnetic targets identified from the 2007 airborne geophysical survey, particularly targets associated with anomalous diamond indicator stream sample results (29 grids total). The estimated cost to conduct part d is CDN$350,000;

e) a total of six geophysical targets are at a drill ready stage and should be drilled as part of a fall or winter 2012-2013 drill program. The drilling may include 6-8 drillholes designed to test high priority geophysical targets in close proximity to high priority diamond indicator minerals or gold anomalies. The estimated cost to conduct part e is between CDN$500,000 and CDN$1,000,000;

f) additional formation water sampling should be completed to test the Lithium potential of the Property. Samples should be collected from individual oil wells rather than batteries, which should be selected to target specific formations. The estimated cost to conduct a small part f sampling program is CDN$20,000;

The estimated budget to complete the multi-faceted PART B exploration program is CDN$1.1 million to CDN$1.6 million.

INTRODUCTION

Headwater Mineral Exploration and Development Ltd. (Headwater) of Red Deer, Alberta currently owns an undivided 100% interest in a series of Metallic and Industrial Mineral (MAIM) permits in the Swan Hills area of west-central Alberta (the Swan Hills Property or the Property). Headwater is an Alberta limited company, privately owned by 40 shareholders, with three of the shareholders owning 71.5%. Headwater is managed by President Carey Hay and shareholder Neil Torry, two of the three 71.5% owners of the company. The remaining shareholders are comprised of entrepreneurs and business people generally from the Edmonton and Drayton Valley areas.

APEX Geoscience, Ltd. (APEX) of Edmonton, Alberta has been retained as independent consultants by Headwater since 2005. Since then, APEX has aided Headwater in project management, complied all available geological, geophysical and geochemical data for the Property, and have interpreted and reported on geological aspects of the Property. Although there are currently no known Mineral Resources on the Property (as defined by the CIM Definition Standards on Mineral Resources and Ore Reserves, dated November 27, 2010), the Property is considered prospective for numerous mineral resources including diamonds, gold, and bentonite.

Most Recently APEX Geoscience Ltd. (APEX) was retained specifically as consultants by Headwater Mineral Exploration and Development Ltd. (Headwater) for the continuation of project management aid for Headwater's Swan Hills Property and to prepare an independent evaluation of the potential of the Property to host a bentonite resource, based upon previously reported data. From this work, APEX has prepared a 43-101 compliant technical Report (currently unpublished) in which a "Potential Bentonite Resource" has been calculated.

Headwater has recently entered into an agreement with Altaben Minerals Ltd. (Altaben) develop a bentonite mine within the Headwater claims, subject to a royalty.

This report is written for filing toward assessment work requirements for the Swan Hills Property, owned 100% by Headwater and held in the name of Headwater Mineral Exploration and Development Ltd. and 620516 Alberta Ltd., described in which, is the work performed by APEX on behalf of Headwater to calculate the "Potential Bentonite Resource" and all other acceptable assessment work completed by Headwater and Altaben towards the near-future mining plans. All work performed, and therefore assessment expenditures calculated, were for 2010 to 2012 (cut off for the previously submitted 2010 Assessment report was January 15, 2010). Headwater has spent a total of CDN$1,928,816.80 (not including GST) on the Swan Hills Property during 2010 to 2012. A detailed breakdown of those expenditure can be found in Appendix 1.

PROPERTY DESCRIPTION AND LOCATION

Headwater currently owns an undivided 100% interest in 156 contiguous Metallic and Industrial Mineral (MAIM) permits within their Swan Hill Property, located in north-central Alberta. The Property is contained within the 1:250,000 scale National Topographic System (NTS) maps 83J, 83K, 83N, and 83O. Using the Alberta Township System (ATS), a version of the legal Dominion Land Survey (DLS), the Property covers portions of Townships 63 to 72, Ranges 7 to 19 West of the 5th Meridian. The center of the Property is approximately located at 115°59' W longitude and 54°50' N latitude (or 564300 Easting/ 6077850 Northing, using the North American Datum of 1927 (NAD 27) and Universal Transverse Mercator geographic coordinate system zone 11).

The Property area is approximately 1,032,507 hectares (ha), and consists of the 156 MAIM Permits numbered: 9302040008, 9302040012, 9302040014, 9302040016, 9302040018, 9302040020, 9305031142, 9306011206 to 9306011210, 9306011212, 9306011215, 9306011221 to 9306011236, 9306011239, 9306011242, 9306011243, 9306011247, 9306011249 to 9306011251, 9306020546 to 9306020549, 9306050833 to 9306050836, 9307100729, 9311060877 to 9311060933, 9311110533 to 9311110563, 9312020288 to 9312020309 as of the effective date of this report. The MAIM permits are held in the name of Headwater Mineral Exploration and Development Ltd. and 620516 Alberta Ltd. (Table 1; Figures 1 and 2).

Table 1. Metallic and Industrial Mineral Permit Descriptions

AGREEMENT NUMBER	AREA (ha)	DESIGNATED REPRESENTATIVE	TERM DATE	GOOD TO DATE	LEGAL LAND DISCRIPTION
9302040008	3584	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2002-04-02	2012-04-02	5-18-064: 01-6;08-11;16-17;31-32
9302040012	6656	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2002-04-02	2012-04-02	5-18-066: 09-17;20-36
9302040014	8192	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2002-04-02	2012-04-02	5-18-067: 01-5;07-30;34-36
9302040016	1024	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2002-04-02	2014-04-02	5-18-068: 16-17;20-21
9302040018	512	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2002-04-02	2012-04-02	5-18-069: 32;36
9302040020	1280	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2002-04-02	2012-04-02	5-18-070: 01-2;05;11-12
9305031142	5120	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2005-03-21	2015-03-21	5-16-068: 26-33
9306011206	1432	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-19-063: 03;10;16NWP
9306011207	1280	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-19-064: 06-7;18;20;28
9306011208	6656	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-16-065: 01-4;09-16;21-28;31-36
9306011209	1024	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-17-065: 04;34-36
9306011210	1280	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2014-01-24	5-19-065: 04;07-8;17-18
9306011212	1792	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-19-067: 13;23-24;28-29;32-33
9306011215	1280	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2014-01-24	5-15-069: 13-14;19;30-31

9306011221	2304	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2014-01-24	5-16-070: 04-8;17-20
9306011222	1536	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2014-01-24	5-17-070: 01-3;11-13
9306011223	1280	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-19-070: 25-26;30-31;36
9306011224	512	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-18-071: 05-6
9306011225	512	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2014-01-24	5-19-071: 28-29
9306011226	3328	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-18-063: 12-13;24-26;29-36
9306011227	2048	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-12-064: 29-36
9306011228	1280	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-13-064: 01-3;25;36
9306011229	512	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-14-064: 07-8
9306011230	7168	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-15-064: 01;03-10;12;15-22;27-36
9306011231	2816	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-12-065: 01-6;09-10;33-35
9306011232	1536	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-13-065: 18-19;29-32
9306011233	2304	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-14-065: 13-14;23-26;31;35-36
9306011234	3584	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-12-066: 02-5;07-11;14-18
9306011235	4352	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-13-066: 02-18
9306011236	2560	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-14-066: 03-4;06-8;12-13;18-19;31
9306011239	2560	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-14-067: 05-8;18-20;29-31
9306011242	1280	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-14-068: 06-7;18-20
9306011243	3072	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-15-068: 01-5;09-15
9306011247	1792	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-13-063: 25-27;33-36
9306011249	2304	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-15-063: 27-35
9306011250	1792	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-16-063: 13-14;16-17;20-21;36
9306011251	1280	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-01-24	2012-01-24	5-17-063: 07;18-19;30-31
9306020546	6080	620516 ALBERTA LTD.	2006-02-22	2012-02-22	5-16-064:01-3;04SE,NW,NE;09-16;21-28;33-36
9306020547	256	620516 ALBERTA LTD.	2006-02-22	2012-02-22	5-17-064:33
9306020548	8960	620516 ALBERTA LTD.	2006-02-22	2012-02-22	5-16-066:01;03-36
9306020549	512	620516 ALBERTA LTD.	2006-02-22	2014-02-22	5-17-066:29-30
9306050833	6144	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-05-16	2012-05-16	5-15-065: 01-24
9306050834	6912	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-05-16	2012-05-16	5-16-067: 25-36, 5-16-068: 03-10;15-21
9306050835	768	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-05-16	2014-05-16	5-16-069: 10;15;22
9306050836	3328	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2006-05-16	2014-05-16	5-16-069: 27-33, 5-17-069: 25-27;34-36
9307100729	1792	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2007-10-19	2013-10-19	5-15-065: 36, 5-15-066: 01;12-13;23;25;36
9311060877	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-11-063: 01-36
9311060878	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-12-063: 01-36
9311060879	7424	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-13-063: 01-24;28-32
9311060880	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-14-063: 01-36
9311060881	6912	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-15-063: 01-26;36

9311060882	7424	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-16-063: 01-12;15;18-19;22-35
9311060883	7808	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-17-063: 01-6;08-12;13SE,SW,NE;14-17;20-23;24SE,NW,NE;25-29;32-36
9311060884	5888	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-18-063: 01-11;14-23;27-28
9311060885	7672	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-19-063: 01-2;04-9;11-14;15NWP
9311060886	7168	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-12-064: 01-28
9311060887	7936	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-13-064: 04-24;26-35
9311060888	8704	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-14-064: 01-6;09-36
9311060889	2048	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-15-064: 02;11;13-14;23-26
9311060890	5696	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-16-064: 04SW;05-8;17-20;29-32, 5-16-065: 05-8;17-20;29-30
9311060891	8960	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-17-064: 01-32;34-36
9311060892	5632	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-18-064: 07;12-15;18-30;33-36
9311060893	8448	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-19-064: 01-5;08-17;19;21-27;29-36, 5-19-065: 05-6
9311060894	6656	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-12-065: 07-8;11-32;36, 5-12-066: 06
9311060895	7936	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-13-065: 01-17;20-28;33-36 5-13-066: 01
9311060896	7168	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-14-065: 01-12;15-22;27-30;32-34, 5-14-066: 05
9311060897	8192	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-17-065: 01-3;05-33
9311060898	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-18-065: 01-36
9311060899	7424	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-19-065: 01-3;09-16;19-36
9311060900	5376	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-12-066: 01;12-13;19-36
9311060901	3922	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-13-066: 19-28;29NWP
9311060902	6091	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-14-066: 01-2;09-11;14-17;20-24;25NWP
9311060903	256	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-16-066: 02
9311060904	8704	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-17-066: 01-28;31-36
9311060905	2560	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-18-066: 01-8;18-19
9311060906	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-19-066: 01-36
9311060907	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-12-067: 01-36
9311060908	8960	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-13-067: 01-5;07-36
9311060909	6656	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-14-067: 01-4;09-17;21-28;32-36
9311060910	8448	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-18-067: 06;31-33, 5-19-067: 01-12;14-22;25-27;30-31;34-36
9311060911	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-12-068: 01-36
9311060912	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-13-068: 01-36
9311060913	7936	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-14-068: 01-5;08-17;21-36
9311060914	6144	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-15-068: 06-8;16-36

9311060915	6912	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-16-068: 01-2;11-14;22-25;34-36, 5-16-069: 01-3;11-14;23-26;34-36
9311060916	8192	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-18-068: 01-15;18-19;22-36
9311060917	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-19-068: 01-36
9311060918	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-12-069: 01-36
9311060919	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-13-069: 01-36
9311060920	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-14-069: 01-36
9311060921	7936	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-15-069: 01-12;15-18;20-29;32-36
9311060922	8704	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-18-069: 01-31;33-35
9311060923	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-19-069: 01-36
9311060924	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-12-070: 01-36
9311060925	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-13-070: 01-36
9311060926	4608	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-14-070: 01-18
9311060927	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-17-069: 28-33, 5-17-070: 04-10;14-36
9311060928	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-15-070: 01-36
9311060929	6912	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-16-070: 01-3;09-16;21-36
9311060930	7936	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-18-070: 03-4;06-10;13-36
9311060931	7936	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-19-070: 01-24;27-29;32-35
9311060932	8704	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-18-071: 01-4;07-36
9311060933	8704	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-06-30	2013-06-30	5-19-071: 01-27;30-36
9311110533	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-09-063: 01-36
9311110534	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-10-063: 01-36
9311110535	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-09-064: 01-36
9311110536	9206	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-10-064: 01-25;26L14P
9311110537	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-11-064: 01-36
9311110538	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-08-065: 01-36
9311110539	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-09-065: 01-36
9311110540	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-10-065: 01-36
9311110541	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-11-065: 01-36
9311110542	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-08-066: 01-36
9311110543	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-09-066: 01-36
9311110544	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-10-066: 01-36
9311110545	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-11-066: 01-36
9311110546	9191	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-08-067: 01-7;08L4P
9311110547	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-09-067: 01-36
9311110548	9210	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-10-067: 01-12;13L16P
9311110549	9216	HEADWATER MINERAL EXPLORATION	2011-11-25	2013-11-25	5-11-067: 01-36

		& DEVELOPMENT LTD.			
9311110550	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-08-068: 01-36
9311110551	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-09-068: 01-36
9311110552	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-10-068: 01-36
9311110553	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-11-068: 01-36
9311110554	9094	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-08-069: 01-32;33NEP
9311110555	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-09-069: 01-36
9311110556	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-10-069: 01-36
9311110557	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-11-069: 01-36
9311110558	4785	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-08-070: 04SEP
9311110559	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-09-070: 01-36
9311110560	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-10-070: 01-36
9311110561	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-11-070: 01-36
9311110562	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-16-071: 01-36
9311110563	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2011-11-25	2013-11-25	5-17-071: 01-36
9312020288	8192	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-14	2014-02-14	5-15-065: 27-34
9312020289	4096	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-14	2014-02-14	5-15-067: 13-16;21-28;33-36
9312020290	6144	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-14	2014-02-14	5-16-067: 01-24
9312020291	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-14	2014-02-14	5-17-067: 01-36
9312020292	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-14	2014-02-14	5-17-068: 01-36
9312020293	6144	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-14	2014-02-14	5-17-069: 01-24
9312020294	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-14	2014-02-14	5-09-071: 01-36
9312020295	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-14	2014-02-14	5-10-071: 01-36
9312020296	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-14	2014-02-14	5-11-071: 01-36
9312020297	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-14	2014-02-14	5-12-071: 01-36
9312020298	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-14	2014-02-14	5-13-071: 01-36
9312020299	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-15	2014-02-15	5-07-072: 06-7, 5-08-072: 03-36
9312020300	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-15	2014-02-15	5-09-072: 01-36
9312020301	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-15	2014-02-15	5-10-072: 01-36
9312020302	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-15	2014-02-15	5-11-072: 01-36
9312020303	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-15	2014-02-15	5-12-072: 01-36
9312020304	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-15	2014-02-15	5-13-072: 01-36
9312020305	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-15	2014-02-15	5-14-072: 01-36
9312020306	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-15	2014-02-15	5-16-072: 01-36
9312020307	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-15	2014-02-15	5-17-072: 01-36
9312020308	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-15	2014-02-15	5-18-072: 01-36

9312020309	9216	HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.	2012-02-15	2014-02-15	5-19-072: 01-36

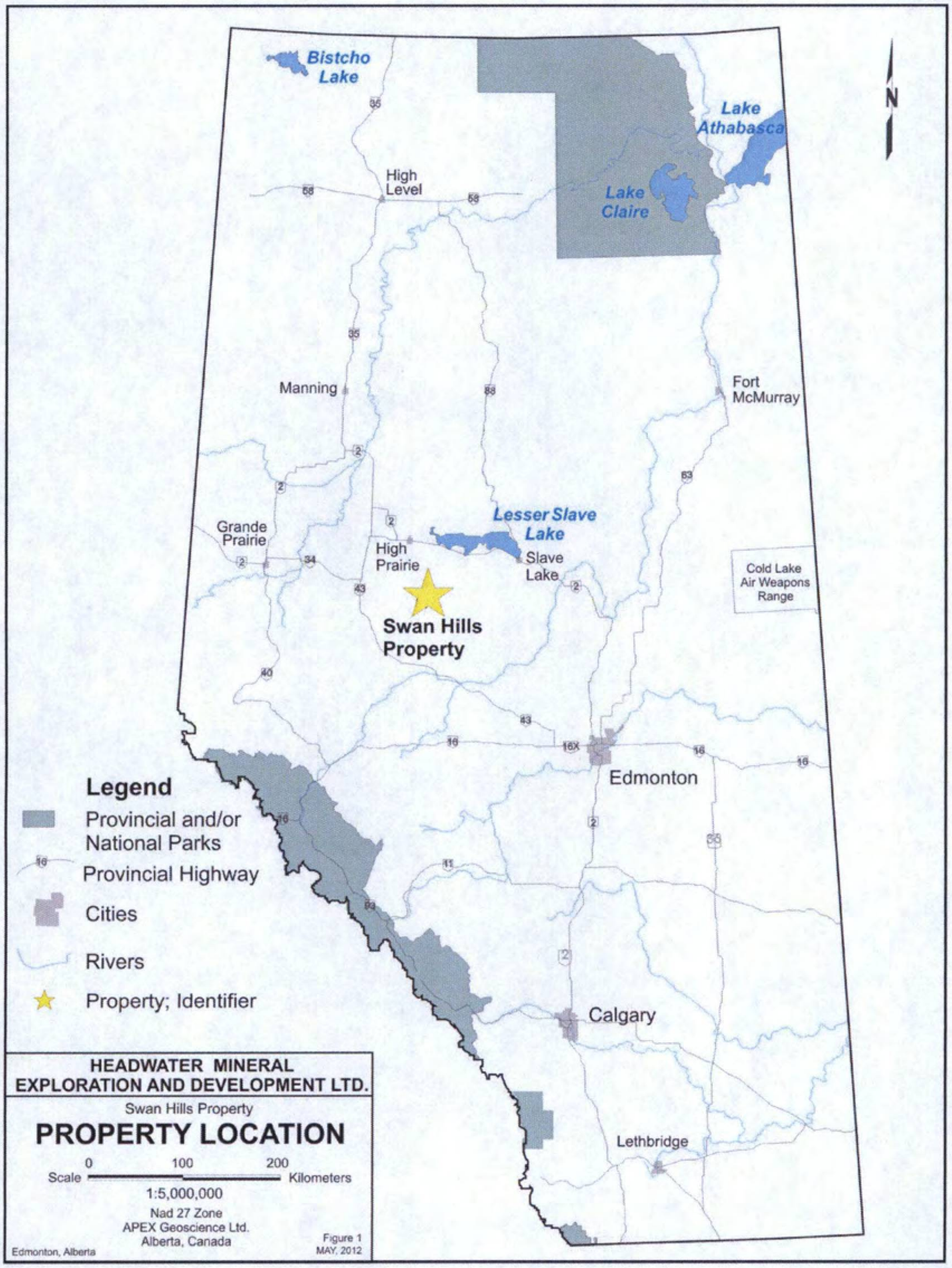
*Based on Metallic and Industrial Minerals Interactive Map search and download May 1, 2012

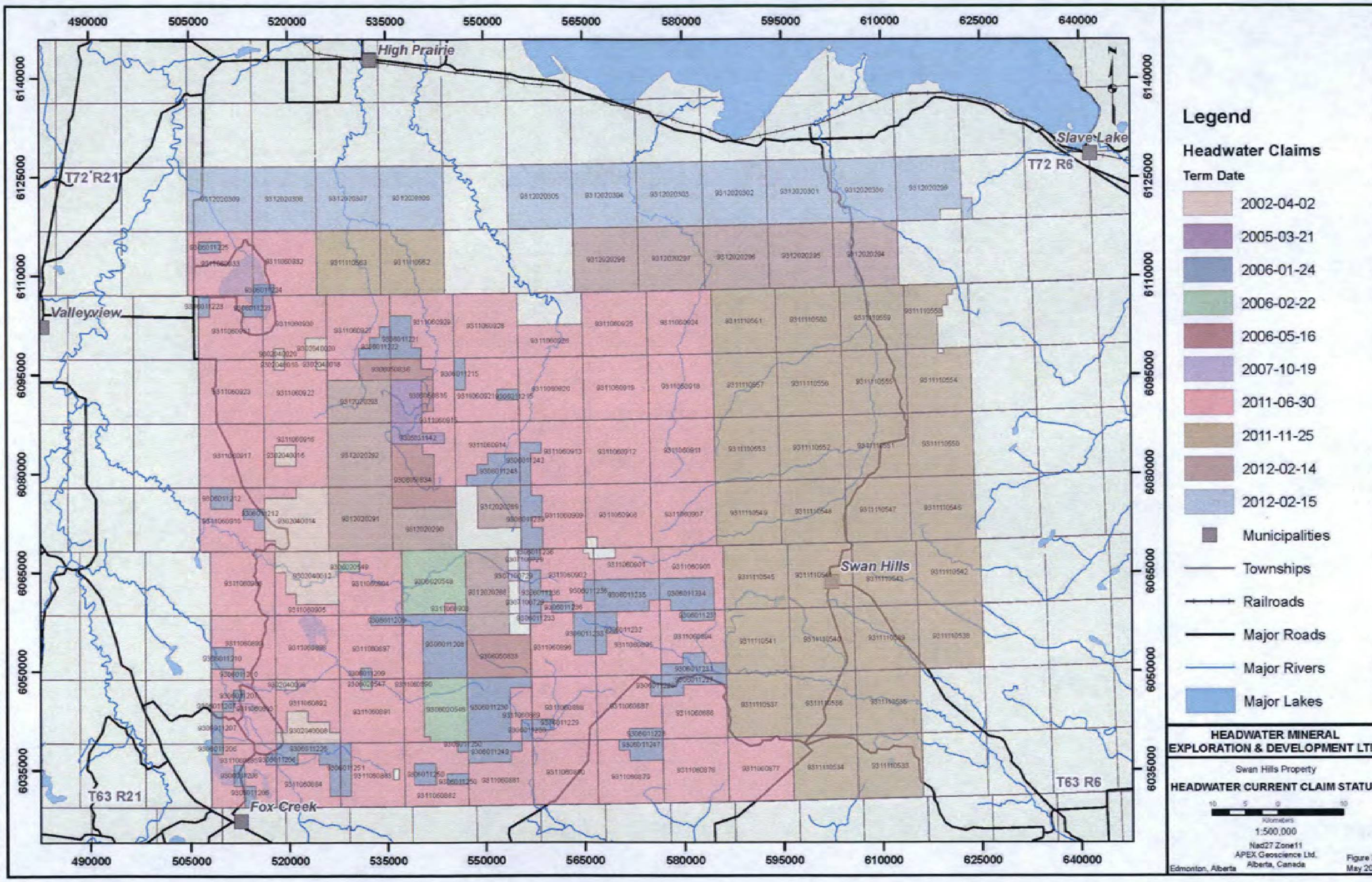
The Property consists entirely of MAIM permits, which grant Headwater the exclusive right to explore for metallic and industrial minerals for seven consecutive two-year terms (a total of fourteen years), subject to traditional assessment work performance and reporting biannually. At the end of each two-year period, a report on the assessment work done during that time must be submitted within 90 days. Work requirements for maintenance of the permits in good standing are $5/ ha for the first term, $10/ha for each of the second and third terms, and $15/ha for each the fourth, fifth, sixth and seventh terms. The Alberta Metallic and Industrial Mineral Tenure Regulation allows a permit holder to pay to the Minister an amount equivalent to the assessment that would be required to continue holding the permit, once during the permit's term. MAIM Permits must be a minimum area of 16 ha up to a maximum area of 9216 ha with lands that are contiguous.

The Alberta Mines and Minerals Act and the Alberta Metallic and Industrial Mineral Tenure Regulations provide for the accumulation of excess work in any term for filing toward subsequent terms, and also enable the reduction of permit areas during their currency. There are no statutory provisions for the renewal of permits beyond their 14 year term. The statutes also provide for conversion of Permits to Metallic Minerals Leases, after the initial two-year anniversary of the MIAM permit record date and once a mineral deposit has been identified. Leases are granted for a renewable term of 15 years, and require annual payments of $3.50/ha for rent to maintain them in good standing. There are no work requirements for the maintenance of leases and they confer rights to minerals.

In Alberta, under the Alberta Regulation 350/98 Metallic and Industrial Minerals Royalty Regulation, “quarriable minerals” such as Bentonite are subject to a royalty reserved to the Crown of a sum calculated free and clear of any and all deductions of $0.11 per tonne, which must be paid to the Minister on or before the last day of the month next following the quarter in which the quarriable mineral is obtained or produced.

Rights to metallic and industrial minerals, bitumen (oil sands), coal and/ or oil/gas within Alberta are regulated under separate statutes, which collectively make it possible for several different "rights" to coexist and be held by different grantees over the same geographic location. Oil/gas leases, coal leases and MAIM permits coexist in within the Swan Hills Property. In addition to subsurface rights, surface mining in Alberta is also regulated under a separate statute and a number of small Mineral Surface Leases (MSL) (sand and gravel) also exist within the Property.


Bistcho Lake
Lake Athabasca
Lake Claire
High Level
Manning
Fort McMurray
Grande Prairie
High Prairie
Lesser Slave Lake
Slave Lake
Cold Lake Air Weapons Range
Swan Hills Property
Edmonton
Calgary
Lethbridge
N
Legend
Provincial and/or National Parks
Provincial Highway
Cities
Rivers
Property; Identifier
HEADWATER MINERAL EXPLORATION AND DEVELOPMENT LTD.
Swan Hills Property
PROPERTY LOCATION
Scale 0 100 200 Kilometers
1:5,000,000
Nad 27 Zone
APEX Geoscience Ltd.
Alberta, Canada
Edmonton, Alberta
Figure 1
MAY, 2012


High Prairie
Slave Lake
Valleyview
Swan Hills
Fox Creek
T72 R21
T72 R6
T63 R21
T63 R6
490000
505000
520000
535000
550000
565000
580000
595000
610000
625000
640000
6140000
6125000
6110000
6095000
6080000
6065000
6050000
6035000
Legend
Headwater Claims
Term Date
2002-04-02
2005-03-21
2006-01-24
2006-02-22
2006-05-16
2007-10-19
2011-06-30
2011-11-25
2012-02-14
2012-02-15
Municipalities
Townships
Railroads
Major Roads
Major Rivers
Major Lakes
HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.
Swan Hills Property
HEADWATER CURRENT CLAIM STATUS
1:500,000
Nad27 Zone11
APEX Geoscience Ltd.
Alberta, Canada
Edmonton, Alberta
Figure 2
May 2012

The MIAM Permits grant Headwater a right to use of the surface for the purposes of conducting mineral exploration work, subject to obtaining the necessary land use permits (Exploration Approval) from the Land Administration Division of Alberta Sustainable Resource Development (SRD). Surface restrictions from the SRD can consist of minor activity restrictions, which are usually identified in the Exploration Approval granted.

Surface rights to the Swan Hills Property are held by the Crown, but grazing leases, farm development leases, forest management areas (FMA) and small municipalities exist within the Property. Exploration is permitted within the grazing leases, farm development leases and municipalities as long as written permission is acquired by the licensee for the program of exploration. There are no other surface encumbrances in the area. Compensation may be required to be paid to compensate FMA holders for timber rights over portions of the area, in the event timber is cleared during construction of drill roads and pads. In addition, compensation may be payable from time to time for access through trappers permit areas.

No environmental liabilities within the Property are known to the author.

To date the Property has not been legally surveyed.

ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

As the Property is located in the northwest part of the Swan Hills in north-central Alberta it is proximal to several towns (approximately 28 km south of High Prairie, 30 km north of Whitecourt, 25 km east of Valleyview, and 25 km west of the town of Slave Lake, encompasses the town of Swan Hills and borders the northern edge of the town of Fox Creek). Access to the Property is therefore extremely good via well-maintained paved roads, including Provincial Highways 32, 33, 747, and 749 and a number of secondary highways that allow year-round exploration. As well as the benefit of numerous nearby communities, within and surrounding the Property, are oil and gas facilities, which provide a tightly spaced network of maintained un-paved roads. In addition, extensive cutlines and seismic lines allow internal access using all-terrain vehicles and/or snowmobiles. The communities of Swan Hills, High Prairie, Fox Creek and Valleyview have limited accommodation, banking, and supply facilities. High Prairie, Slave Lake and Whitecourt are able to provide nearly all needed sources of equipment and repair, operating supplies and materials, support services, and transportation. The metropolitan city of Edmonton, to the southwest, is about 250 km from the centre of the Property.

The local landscape generally comprises rolling hills and undulating plains, with elevations ranging from 620 metres to 1,524 m (2,034 feet (ft) to 5,000 ft) above sea level (ASL), the highest elevation being the Swan Hills. A boreal forest containing mainly spruce and jack pine covers the Property, but in addition, numerous small lakes and ponds, swamps, marshes and ferns are also present. Major hydrographic features in the region include Snipe, Meekwap, Iosegun and Raspberry Lakes, as well as the Goose, East Prairie, Wallace and Driftpile Rivers. Outcrop exposure is sparse (generally less than 3%) due to a blanket of glacial overburden.

As the Property is so extensive, the climate in the area ranges from Humid Continental in the south to Boreal (or Subarctic) in the north (using the Köppen climate classification). Annual temperatures range from -40°C in January to 25°C in July. Additional climate data for the region is available from the Climate Data and Information Archive of Environment Canada (http://climate.weatheroffice.gc.ca).

HISTORY

Overview

The majority of the historical exploration conducted on the Property has been for non-bentonite resources, including gold, precious metals, base metals, diamonds and to a lesser extent Lithium in formation waters.

The recent focus on bentonite has resulted from the discovery of thick bentonite beds within the Property in outcrop within the last ten years (Dufresne, 2005) and even more recent analytical results from the 2003 to 2008 trenching and drilling programs (Dufresne, 2010).

Historic Exploration for Other Commodities

This section discusses other commodities that have been targeted at the Swan Hills Property; however because this report deals specifically with bentonite, the details of other explorations are brief and the reader is referred herein to the relevant reports.

1997: Teuton Resource Corp. (Teuton) conducted a reconnaissance till sampling program on their Swan Hills mineral permits, of which a portion is included within Headwaters current Swan Hills Property. Teuton commissioned Spectra Exploration Geoscience Corp (Spectra) to conduct a high-resolution airborne magnetic (HRAM) survey over the property (Kruchkowski, 2000), which was interpreted by APEX on behalf of Teuton (Chin, 1998).

1998: Teuton conducted ground-based geophysics on seven high priority magnetic anomalies that were prioritized based on APEX's recommendations from the

HRAM survey (Dufresne and Chin, 1998). Teuton has since relinquished all holdings in the region.

Also in 1998 Sovereign Mining and Exploration Ltd. (Sovereign) retained APEX to do a property visit on the their Swan Hills property, which at the time included only the Lightbulb Lake and Marie's Creek permits (Chin, 1998). Completion of a base level geophysics program was recommended.

1999: Based on recommendations from the property visit in 1998, a HRAM survey was done for Sovereign in March of 1999 over the Lightbulb Lake and Marie's Creek permits. Based on similar magnetic characteristics kimberlites or associated intrusive rocks in the Western Canada Sedimentary Basin (WCSB) of Alberta and Saskatchewan, a total of ten airborne magnetic anomalies from within the Lightbulb Lake permit were initially selected and ranked for follow-up exploration (Chin, 1999; Dufresne and Copeland, 2000), and with further review of the data, several other low to moderate priority anomalies were added. In addition, the HRAM data yielded a prominent east to slightly east-northeast trending magnetic lineament corresponding to a prominent ridge along the southern boundary of the Lightbulb Lake permit (Dufresne and Copeland, 2000).

In June and September of 1999, Apex conducted systematic sampling of till, stream sediments, and outcrop over the Lightbulb Lake and Marie's Creek region to assess kimberlite and base metal potential for Sovereign. As a result of the sampling, a number of DIMs discoveries over the property were located (Dufresne and Copeland, 2000). The sampling also indicated a number of concentrated element anomalies over the region. The HMC samples yielded up to 1200 particulate Au grains. The rock samples also contained anomalous concentrations of arsenic (As), antimony (Sb), and tellurium (Te) as well as ironstone. The ironstone was found along a southwest trending ridge at the south end of the Lightbulb Lake permit. The recommendation from this work was to perform further overburden and bedrock sampling, additional tightly spaced systematic soil sampling and drilling to determine the bedrock source of the anomalies (Dufresne and Copeland, 2000).

2000: Detailed ground-based geophysical work over four grids covering selected airborne magnetic anomalies was conducted within Sovereign's property by APEX. The ground-magnetic surveys were successful in delineating two of the airborne magnetic anomalies, although none were attributed to kimberlite diatremes (Dufresne and Copeland, 2000). Further work was recommended for the two magnetic anomalies.

Drilling was done by Canadian Geological Drilling Ltd. in March of 2000 for Sovereign consisting of 17 auger holes and 5 hollow-stem auger drilling; one backhoe pit also dug (Dufresne and Kim, 2002). Drill cuttings and core samples were sent to the

SRC for standard (DIM) analysis (Dufresne and Kim, 2002). A total of 132 DIMs were recovered from the drill samples, however most, if not all, of the indicator minerals recovered were derived from overburden or surficial sediments rather than the local Cretaceous bedrock.

Sovereign expanded their other exploration activities within the Sovereign Swan Hills Property in 2000 included regional till and stream sediment sampling, and prospecting. A total of 131 samples were collected during the 2000 exploration program (Dufresne and Kim, 2002).

2001- Aggressive Diamond Drilling Ltd. drilled two diamond drill holes, one of which targeted a magnetic anomaly originally identified in the 1999 Spectra HRAM survey (Dufresne and Copeland, 2000), the other targeting the prominent east-west trending ridge located in the southern portion of the Lightbulb Lake permit and the northern portion of permit 9300070004 (Dufresne and Kim, 2002).

Also in 2001, 89 stream sediment samples were collected from the headwaters of the Goose River and Atikkamek Creek (Dufresne and Kim, 2002). Several areas of anomalous DIMs and gold grain anomalies were identified from the 200-2001 sampling programs and follow-up kimberlite exploration was strongly recommended by Dufresne and Kim (2002), including sampling, prospecting and the acquisition of existing and/or new airborne geophysical data for the western portion of the Property, particularly west of the Lightbulb Lake permit, followed by targeted ground-based geophysical surveying.

2002: Sampling done by APEX within Sovereign's Swan Hills property during the fall of 2002 included 40 regional HMC creek samples, 7 HMC suction dredge samples, 4 HMC beach samples, 31 stream silt samples and 7 rock samples; prospecting was also done at the time by Sovereign. Sampling was targeted primarily along the Goose and West Prairie Rivers and the Golden, MacGowan and Atikkamek Creeks, as well as in the vicinity of Snipe and Iosegun Lakes (Dufresne, 2005). The creek sampling program yielded a number of high quality DIM anomalies in creeks north of the Goose River draining the Lightbulb Lake Ridge that trends northwest from south of Lightbulb Lake to Snipe Lake.

Detailed ground geophysical surveying over three selected priority airborne magnetic anomalies within the Property was also conducted during fall 2002 by APEX. A total of two grids with 100 m line spacing were constructed with station readings taken every 25 m. Local high intensity spike-like magnetic anomalies coincident with burnt coal rich horizons were observed (Dufresne, 2005).

2003: Exploration work done on the Sovereign's Swan Hills property during the fall of 2003 followed up on anomalous results of the 2002 program, targeting the Goose and West Prairie Rivers, the Golden, MacGowan and Atikkamek Creeks and the Snipe and Iosegun Lakes. Work included semi-detailed to reconnaissance HMC and till sampling Prospecting was also conducted by Sovereign (Dufresne, 2005). A significant amount of follow-up till sampling was conducted in the Lightbulb Lake Ridge area in order to look at the potential for concentrations of DIMs and Au grains contained within deposits of till along the ridge. A total of 163 till samples, 30 composite drill cuttings samples, 13 HMC stream samples and 31 rock grab samples from excavated trenches were collected (Dufresne, 2005). Five till lines taken across the Lightbulb Lake Ridge and northwest of Snipe Lake to test for DIMs collected 131 till samples.

A trenching program was conducted on the Sovereign Swan Hills Property between December 12 and 14, 2003. The trenching was completed by Williscroft Brothers Construction Ltd. (Williscroft) using a tracked 270 backhoe for excavating. A total of seven pits ranging from 14 to 22 ft deep were excavated. The trenching program was initiated to obtain bedrock and basal till samples for DIMs, Au and bentonite analyses. The locations for the trenches were chosen based on prior work that had identified anomalously thick bentonites in outcrop (Dufresne, 2005).

Based upon the results of the 2002 and 2003 exploration programs, a follow-up kimberlite exploration program including detailed creek and till sampling over the Lightbulb Lake Ridge and further reconnaissance sampling for DIMs in the Iosegun Lake and Atikkamek Ridge areas was strongly recommended by Dufresne (2005).

2005: During the summer 2005 Mr. Dufresne of APEX supervised the exploration on the Swan Hills Property conducted by Headwater personnel. Headwater personnel collected 17 suction dredges, 5 till and 35 rock grab samples on their newly acquired Swan Hills Property. The suction dredge and till samples were analyzed for DIMs, particulate Au grains and trace metal geochemistry.

Based upon the DIM and geochemical and particulate Au results to 2005, favorable surface and basement geology and proximity to the Mountain Lake Kimberlite, a follow-up diamond and Au exploration program for the Headwater Swan Hills Property, was strongly recommended by Dufresne (2005). The completion of a fixed wing or helicopter based time-domain electromagnetic and magnetic geophysical survey over the northwestern portion of the Property, in particular the Lightbulb Lake Ridge area was recommended. In addition, grid and ground geophysical surveying over those land based priority magnetic and electromagnetic targets, from the airborne geophysical survey was suggested. Lastly, based on the results of the grid and ground geophysical surveying, it was recommended to drill test five to 10 priority targets designed to test high priority geophysical targets in close proximity to high priority DIM or Au anomalies.

In addition, the 2002, 2003 and 2005 sampling combined with the results of previous work by Ashton Mining of Canada Inc. has resulted in the identification of other lower priority anomalous areas including the Meekwap Lake area, and an area from Iosegun Lake east to the headwaters of Atikkamek Creek, bounded by the Sakwatamau River. Work by Ashton has also resulted in the identification of a number of other potentially anomalous areas yielding possible olivine, including north of the Swan Hills Property in the vicinity of the West and East Prairie rivers, and east-southeast of the Swan Hills permits in the vicinity of Highway 32 and the Freeman River.

2006: No exploration was done on the Property during 2006.

2007: During May to August of 2007, Headwater commissioned Firefly Aviation Ltd. to perform a fixed-wing high resolution airborne magnetic (HRAM) survey on their entire Swan Hills Property. A total of 71,593 survey line-km were collected in one large block over the entire permit area (Evans, 2008; Dufresne, 2008).

2008: During August and September of 2008, the geophysical data from 2007 were reviewed and 61 near-surface, high frequency short wavelength peaks were picked as possible kimberlite targets that warranted follow-up inspection. All 61 anomalies have been inspected, though 15 anomalies are likely anthropogenic (Dufresne, 2008). A total of 14 anomalies were follow-up surveyed with ground-based geophysics during August to October of 2008, and drill targets were recommended on a number of them (Dufresne, 2008; Dufresne and Banas, 2010).

Coincident with the 2008 ground geophysical program, APEX and Headwater personnel also collected a total of 85 heavy mineral concentrate (HMC) stream samples. The samples were sent to SRC and processed for DIMs, Au and Pt grains. Results from the stream samples included the recovery of 349 DIMs. Additionally, 80% of the samples returned Au grains and 9 Pt grains were recovered from 7 samples (Dufresne and Banas, 2010).

2009/2010: From July 2009 to January 2010, APEX and Headwater personnel completed an exploration program which consisted of suction dredge sampling, trenching of potential kimberlite targets, prospecting and rock grab sampling, and formation water sampling for Li potential. One suction dredge sample was collected upstream from a high-DIM 2008 HMC stream sample and returned 16 gold grains, one platinum grain and 3 DIMs. A total of 32 formation water samples were collected from 18 sites from oil batteries and satellites.

Historic Bentonite Exploration in Alberta

Bentonite occurrences in Alberta are summarized in Byrne (1955), Babet (1966), Scafe (1975), and Dufresne et al. (1996). Babet (1966), provides the most complete list of individual bentonite occurrences, and of the 80 occurrences that are summarized, all are from Upper Cretaceous or Tertiary rocks, stratigraphically equivalent to the Wapiti or Paskapoo Formations, or from those formations themselves. Bentonite has been known in Alberta since at least the early part of the 20th century. Spence (1924), describes occurrences of bentonite near the towns of Camrose, Drumheller, Rosedale, and Dunmore. Limited quantities of bentonite were mined near Edson prior to 1930 for use in cosmetics; however commercial mining of bentonite in Alberta began in 1938 with shipment of bentonite from the Drumheller area to Calgary for use in drilling muds (Babet, 1966). Since then bentonite has been mined in Alberta at Rosalind (approximately between Lloydminster and Red Deer) and Onoway (about 25 km northwest of Edmonton) (Hamilton, 1972; Scafe, 1975). No bentonite mining is known north of Onoway, however some historical exploration has been done near Grande Prairie.

The occurrence of bentonite in the Kleskun hills near Grande Prairie was first described by Rutherford (1930, cited in Byrne (1955)). Byrne (1955) described and tested several bentonite deposits in Alberta, including the Grande Prairie deposit, which he described from a road cut in Section 27, Township 72, Range 4 west of the 6th meridian (approximately 19 km northeast of the town of Grand Prairie and 135 km to the west-northwest of the Swan Hills bentonite deposit described in this report). Further exploration of the deposit was conducted in 1956-1957 by Magnet Cove Barium Corporation, Ltd. (Carter, 1957). The Magnet Cove exploration work began with hand sampling at road cuts in 1956, at sites that were selected based on Byrne's 1955 report. Three samples were analyzed and found to be of reasonably good quality, ranging from 52 to 64 billion barrels (bbl) per ton and 0.46 to 0.85% sand, with the "bbl per ton" units refering to the number of standard barrels of mud that one ton of bentonite would yield if mixed to a viscosity of 30 centipoise (cP) (Schlumberger Oilfield Glossary). Based on these prospecting results, 25 holes were augered in early 1957 (and possibly late 1956). A thin (1 foot) bentonite bed was found in a few of the holes though most contained none. The first three holes were drilled to 30 feet, depths of the other holes were not reported but were likely similar. Based on those poor results, the project was abandoned with no further work recommended.

Historic Bentonite Exploration on the Swan Hills Property

The first bentonite exploration program on the Swan Hills Property was initiated in December 2003 by Sovereign Mining and Exploration Ltd. and 679424 Alberta Ltd. During this program seven pits were dug in an area where bentonite beds were known from outcrop exposures (Dufresne, 2005). The pits were 14 to 22 feet deep and were initially dug to test for bentonite, as well as diamond and gold potential. The 2003 pit locations are within the bentonite area currently under investigation by Headwater.

Based on the encouraging thickness of bentonite beds observed in the 2003 trenching program, auger drilling was then completed by Headwater from February to March of 2008 (Dufresne 2008). Sixteen auger holes were drilled within the area of the trenches on behalf of Headwater and under the supervision of APEX. Augered material was carefully cleaned and removed from the inside of the flights to obtain the best quality samples. In general, coherent changes in geology were easily recognized, thus the integrity of the samples is considered reasonable, although not as creditable as that provided by a coring system. A total of 445.2 m were drilled, with individual holes ranging in depth from 16.4 m to 31.7 m. A total of 624 samples were collected from the auger holes, including 112 high priority samples, 196 moderate priority samples, and 316 low priority samples that were selected based on apparent bentonite quality of the samples in the field. A total of 114 samples were shipped to the Saskatchewan Research Council in Saskatoon (SRC) for assay and 113 samples have been analyzed for bulk mineralogy by X-Ray Diffraction (XRD) Analysis and Cation Exchange Capacity analysis at the SRC Clay Mineral Laboratory. A number of samples were also analyzed at Core Laboratories in Edmonton, for bulk and clay mineralogy (see Section 10: 'Drilling'; and also Dufresne, 2008).

During the fall of 2008, a seven hole diamond drilling program was completed within the bentonite area of interest to follow up the auger drilling done earlier that year. In total 1,020.5 metres were drilled and cored. A total of 772 samples were selected, of which 462 samples were sent to the SRC for clay analysis, the other 20 were sent to the Alberta Research Council laboratories in Edmonton. The SRC conducted XRD analyses on randomly oriented and oriented subsets of the diamond drill samples to determine the clay content and clay mineralogy. A comprehensive clay content analysis has thus far been completed on 4 drill holes to determine the most prospective horizons for bentonite. Analyses of the randomly oriented samples indicate that the clay fraction (<2μm) in the samples varies from ~6-72 wt% with the majority of the clay minerals classified as smectite or illite. Further analyses of oriented sub-sets of the same samples showed that the predominant mineral in most samples was smectite comprising up to 100 wt% of the clay fraction. In 86% of the samples smectite comprised >50 wt% of the clay fraction. Illite is the second most commonly occurring clay mineral ranging in abundance up to 71 wt% of the clay fraction, but more commonly less than 40% illite is present. Chlorite and kaolinite occur in lower abundances in all samples commonly comprising <10 wt% each of the clay fraction (Dufresne and Banas, 2010).

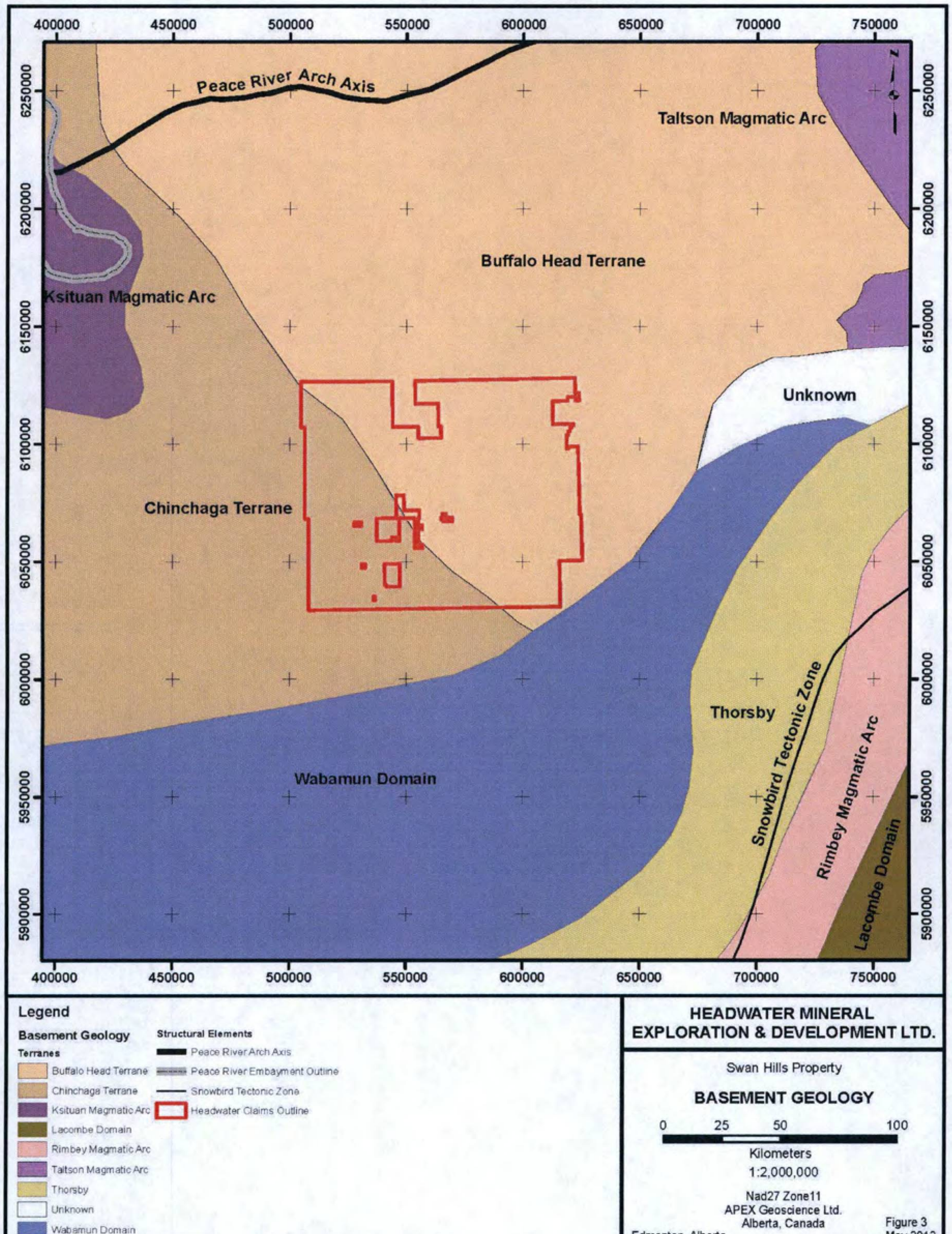
The diamond drilling provided further insight into a more complex structure for the bentonite deposit, which was unable to be determined from the auger drilling samples. Interpretation of the drill core indicates the presence of at least 2 units of bentonite within the area. The upper unit consists of thrusted sheet of bedrock with an average thickness of 25 m, which is underlain by a unit of clay-rich till averaging 30 m in thickness. The thickness of the overburden in the area varies from 0 to 20 m.

GEOLOGICAL SETTING AND MINERALIZATION

Precambrian Basement

The Swan Hills Property lies in the northwestern part of the Western Canada Sedimentary Basin within the southern segments of the Peace River Arch (PRA). Precambrian rocks are not exposed within the Property. The basement underlying the PRA includes the Buffalo Head Terrane (BHT) and the Chinchaga Low (Figure 3), both of which are thought to have been accreted to the western edge of North America between 1.8 and 2.4 billion years (Ga) ago and collectively form the Buffalo Head Craton (Ross *et al.*, 1991, 1998). Due to the presence of thick crust, potentially Archean protolith and their relatively stability since accretion, the Buffalo Head and Chinchaga terranes are currently the focus of extensive diamond exploration in northern Alberta.

The area underlying the Swan Hills permits straddles the boundary between the two basement terranes, with the BHT to the east and the Chinchaga Low to the west (Figure 3). The BHT is an area of high positive magnetic relief with a north to northeasterly trending fabric (Villeneuve *et al.,* 1993). Diamondiferous kimberlites on Ashton Mining of Canada Ltd.'s property are underlain by basement of the BHT. Part of the Churchill Structural Province (Rae Subprovince), the BHT may represent either Archean crust that has been thermally reworked during the Proterozoic Hudsonian Orogeny (Burwash *et al.*, 1962; Burwash and Culbert, 1976; Burwash *et al.*, 1994) or an accreted Proterozoic terrane that may 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). The Chinchaga Low is a prominent, curvilinear, westward convex aeromagnetic low, which is concordant with the outline of the BHT to the east (Villeneuve *et al.*, 1993). The basement in the region is known from coring to comprise metaplutonic and metasedimentary gneisses of comparable age to that of the BHT. In comparison to the BHT, the Chinchaga Low appears to be devoid of either an aeromagnetic or gravity gradient fabric. The boundaries of the Chinchaga Low show no gravity gradient from the surrounding terranes.


400000
450000
500000
550000
600000
650000
700000
750000
6250000
6200000
6150000
6100000
6050000
6000000
5950000
5900000
Peace River Arch Axis
Taltson Magmatic Arc
Buffalo Head Terrane
Ksituan Magmatic Arc
Unknown
Chinchaga Terrane
Thorsby
Snowbird Tectonic Zone
Rimbey Magmatic Arc
Wabamun Domain
Lacombe Domain
Legend
Basement Geology
Terranes
Buffalo Head Terrane
Chinchaga Terrane
Ksituan Magmatic Arc
Lacombe Domain
Rimbey Magmatic Arc
Taltson Magmatic Arc
Thorsby
Unknown
Wabamun Domain
Structural Elements
Peace River Arch Axis
Peace River Embayment Outline
Snowbird Tectonic Zone
Headwater Claims Outline
HEADWATER MINERAL
EXPLORATION & DEVELOPMENT LTD.
Swan Hills Property
BASEMENT GEOLOGY
0 25 50 100
Kilometers
1:2,000,000
Nad27 Zone11
APEX Geoscience Ltd.
Alberta, Canada
Edmonton, Alberta
Figure 3
May 2012

The presence of numerous eclogitic garnets, eclogitic pyroxenes and chromium-bearing corundum in association with kimberlites or related intrusions in northern Alberta may indicate the presence of a significant volume of accreted and subducted oceanic basalt and sedimentary protolith in the lower crust and/or upper mantle beneath the BHT and the Chinchaga Low. Seismic refraction and reflection studies indicate that the crust in the Iosegun Lake region is likely between 35 to 40 km thick (Dufresne *et al.*, 1996).

Paleozoic Units

Nonconformably overlying the basement in the Swan Hills region is a thick sequence of Phanerozoic sedimentary rocks comprised mainly of Devonian to Mississippian carbonates and evaporites and Cretaceous clastics (Table 2 and Figure 4; also see Glass, 1990; Green *et al.*, 1970; Tokarsky, 1977; Mossop and Shetson, 1994). In Alberta the Paleozoic units of the Western Canada Sedimentary Basin very broadly represent sedimentation along a tectonically inactive part of proto-North America's western continental margin, and within shallow epicontinental seaways that at times inundated the much of western Canada in response to major changes in global sea level (see Kent, 1994).

Middle Cambrian sediments directly overlie the metamorphic Precambrian basement within the Property, and are composed of mixed siliciclastics (mainly sandstone and shale) with minor dolomitized carbonates deposited in a shallow marine environment (Slind et al., 1994). Similar rocks of the Upper Cambrian occur in the southern part of the Property, but do not occur as far north as the Swan Hills bentonite deposit described in this report (in the maps of Slind et al. (1994)).

Devonian strata unfonformably overlie Cambrian strata within the Property. The Lower Devonian is represented by the Elk Point Group which in the area of the Property consists of the Contact Rapids and Watt Mountain Formations (Meijer Drees, 1994). The Contact Rapids Formation consists of immature sandstones washed off the emergent highlands to the west as well as nearshore sandstone, dolostone, and shale. The westernmost third of the Property was emergent for part of the Middle Devonian Epoch. The uppermost unit in the Elk Point Group is the Watt Mountain Formation, which consists of shale and minor sandstone deposited in a brackish to lacustrine environment. The Watt Mountain Formation unconformably overlies the Muskeg Formation, and has been grouped by some authors with the overlying Beaverhill Lake Group (e.g., Oldale and Mundy (1994))

The Beaverhill Lake Group conformably overlies the Elk Point Group in the area of the Property and consists of sediments deposited in a rising ocean (relative to shoreline) (Oldale and Mundy, 1994). Within the area of the Property, the Elk Point

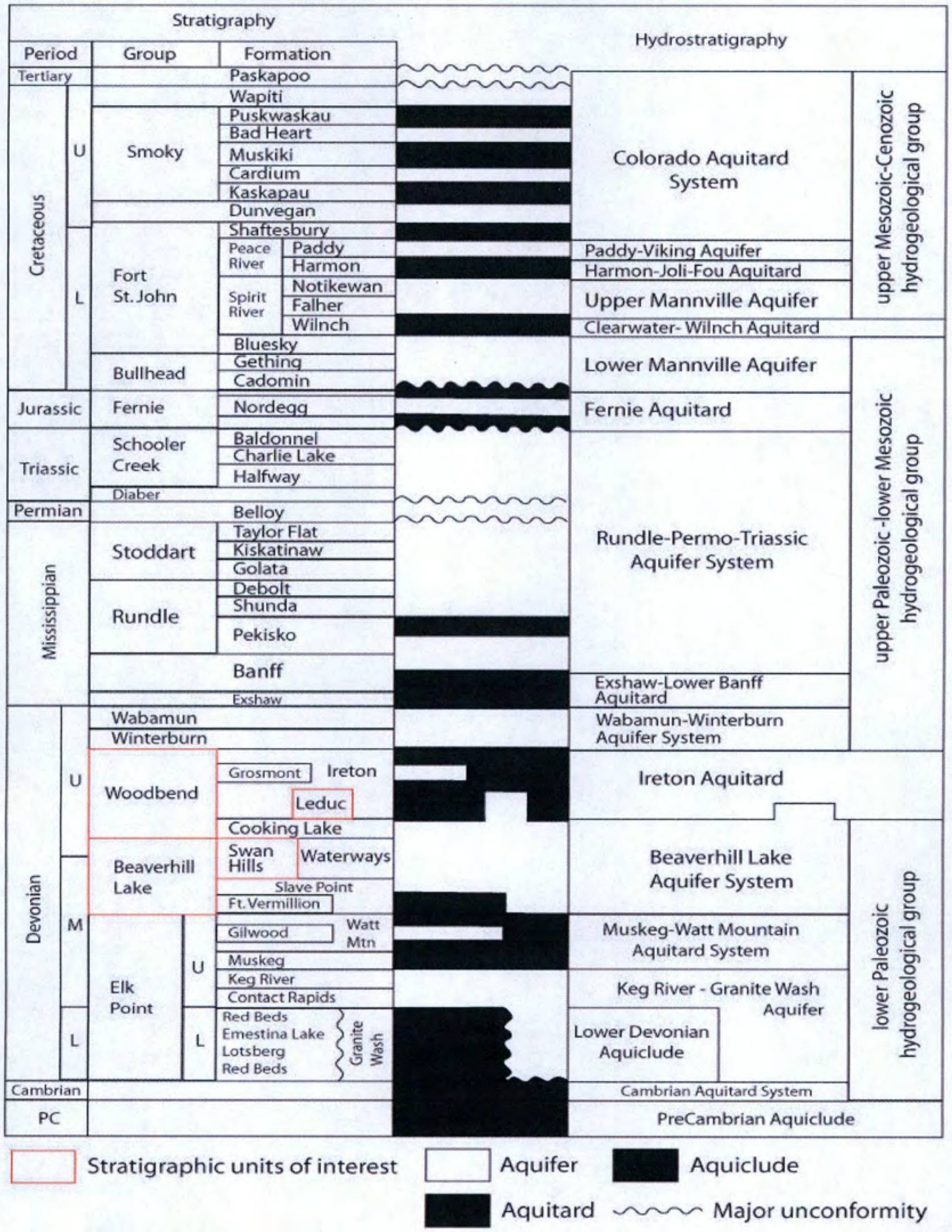
Group consists (from base to top) of The Fort Vermillion Formation, The Swan Hills Formation, the Slave Point Formation, and the Waterways Formation. The Fort Vermillion Formation consists of interbedded anhydrite, dolostone, and shales deposited in a coastal sabkha (salt plain) environment. The Fort Vermillion Formation is locally overlain by the Swan Hills formation of shallow-marine (shelf-bank) carbonates, which are surrounded by open-marine (shelf) carbonates of the Slave Point Formation; in places the Slave Point Formation directly overlies the Fort Vermillion Formation (Oldale and Mundy, 1994).The Fort Vermillion and Slave Point Formations are conformably overlain by open marine shales and carbonates of the Waterways Formation.

The Upper Devonian Woodbend Group conformably overlies the Beaverhill Lake Group. Within the Property the basal formation of the Woodbend Group is the Cooking Lake Formation, consisting of deeper water (non-shelf) carbonates (Switzer *et al.*, 1994). A series of formations (Majeau Lake, Duvernay, and Ireton), all consisting of shale (within the Property) conformably overlie the Cooking Lake carbonates. The Duvernay Formation is rich in organic carbon, and is thought to be the source of much of the conventional petroleum in the Paleozoic rocks of Alberta (Allan and Creaney, 1991).

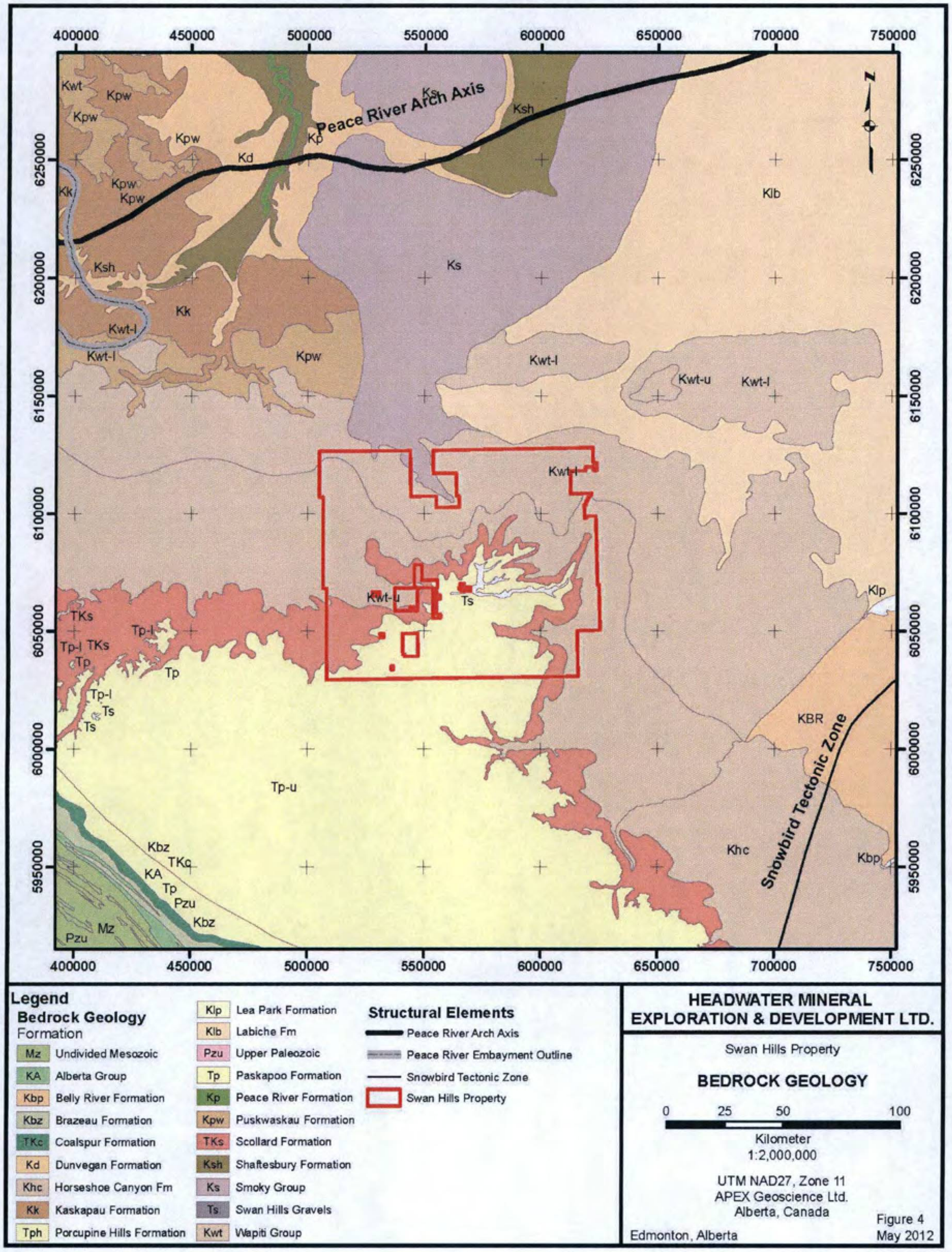
The Woodbend Group is conformably overlain by the Upper Devonian Winterburn Group, which largely infilled the WCSB with carbonate sediment following the high-water phase that deposited the Woodbed Group sediments (Switzer *et al.*, 1994). In the area of the Property, the Winterburn Group consists of the Nisku Formation (mixed fine-grained-clastics and carbonates, including limestones of the Meekwap shelf along the Cynthia Basin) and the Blue Ridge interval (dolomite and minor evaporites) (Switzer *et al.*, 1994). The Nisku Formation is overlain a thin unit of siltstone (Calmar Formation), which is overlain by the Gramina Formation. (Switzer *et al.*, 1994). The Graminia Formation consists of the Blue Ridge Member (anhydritic dolomite) and an upper unit of silt (informally called the Upper Graminia slit; Switzer *et al.* (1994)). The top of the Blue Ridge Member represents a major global extinction event (the Frasnian/Famennian mass extinction).

The contact between the underlying Winterburn Group and the overlying Wabamun Group is gradational, due to reworking of the Upper Graminia silt during the initial transgressive stage of the Wabamun (Halbertsma, 1994). Within the Property, the Wabamun Group consists of the Stettler Formation and unconformably overlying Big Valley Formations, both of which are marine carbonate units. Generally, deposition of the Wabamun Group took place during a regressive phase (shallowing of sea level) that was punctuated by several major transgressions (Halbertsma, 1994).

Table 2: Generalized Phanerozoic stratigraphy of north western Alberta



(adapted from Hitchon et al., 1990)



NOTE: Quaternary overburden units are not shown.

The Wabamun Group is unconformably overlain by the Upper Devonian / Lower Carboniferous Exshaw Formation (shale), which is overlain by the Banff Formation (mostly limestone with minor shale and other siliciclastic beds) (Richards et al., 1994). The Rundle Group conformably overlies the Banff Formation. The Rundle Group is composed of cyclic dolostone and limestone with minor shale.

Permian rocks occur in the south and northeast parts of the Property (Henderson et al., 1994). The only Permian unit within the Property is the Belloy Formation, which unconformably overlies the Rundle Group, and is composed of shelf sands and carbonates.

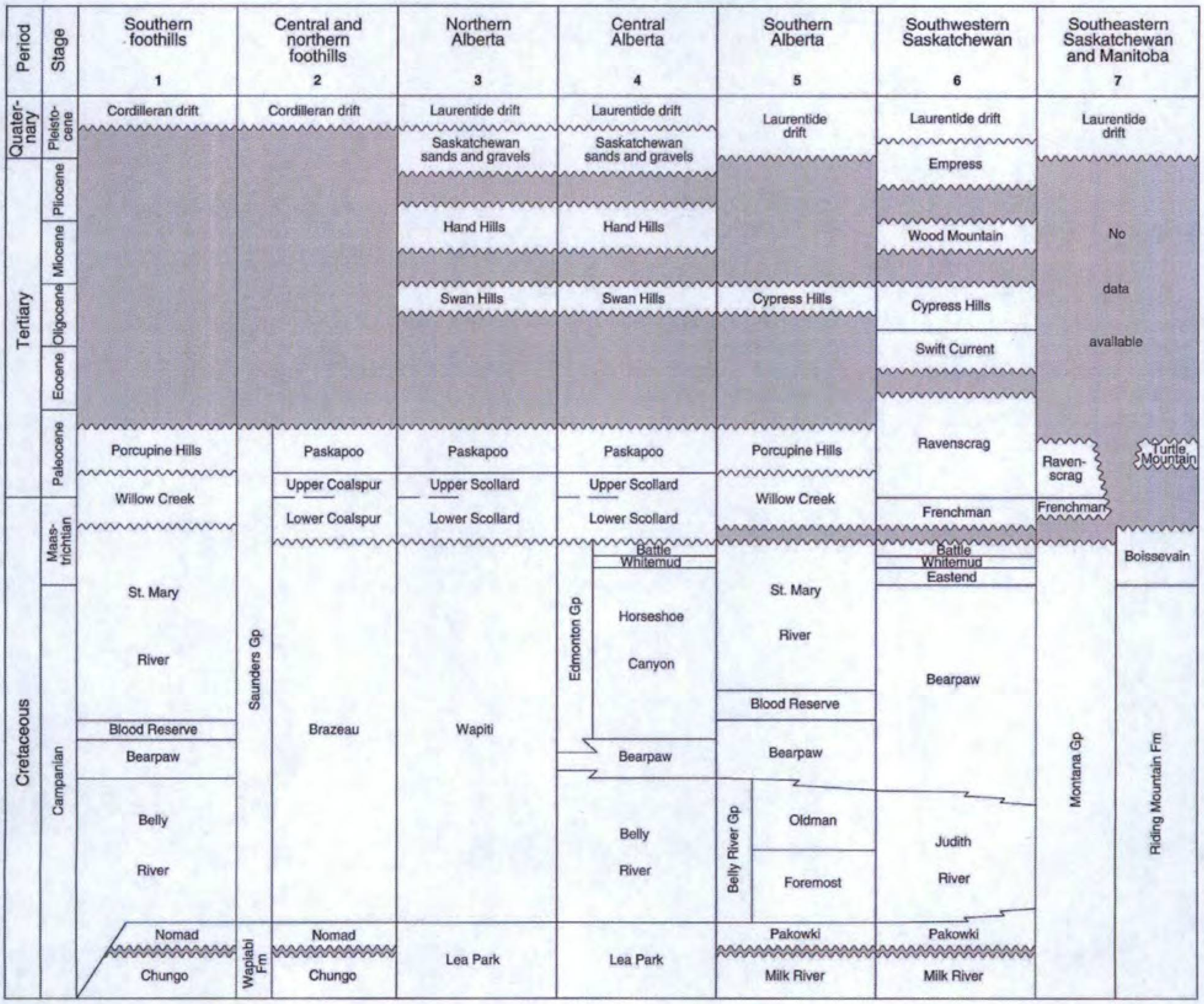
Mesozoic Units

Mesozoic strata within the Property consist of alternating units of marine and nonmarine sandstones, shales, siltstones, and mudstones, with minor carbonates (see Table 3 and Figure 5). The zero-edge of Triassic units runs roughly north-south through the middle of the Property, with no Triassic strata occurring to the east. The only Triassic unit that occurs within the Property is the Montney Formation, which is mapped by Edwards et al. (1994) as clastic rocks (sandstone, siltstone, and shale) with minor coquina (reworked shell) beds. The Montney Formation in the area of the Property is interpreted as being deposited in deltaic to inner shelf environments (Edwards et al., 1994).

Within the Property the only Jurassic strata present belong to the Fernie Formation (Poulton et al., 1994). The zero-edge of Jurassic strata runs roughly north-northwest by south-southeast through the middle of the property, approximately coincident with the zero-edge of Triassic strata, which the Jurassic sediments unconformably overlie. The Fernie Formation is up to 80 m thick within the Property, and consists of shale, sandstone, limestone, and chert.

Prior to deposition of Cretaceous sediments in the WCSB a long period of uplift and erosion of older strata occurred (Hayes et al., 1994). Cretaceous sediments unconformably overlie Carboniferous sediments (Rundle Group) in the eastern part of the Property and Jurassic sediments (Fernie Formation) in the western part of the Property. The lowermost Cretaceous rocks are considered to be those of the Bullhead Group (equivalent to Lower Mannville Group), although a unit equivalent to the Deville Member, a highly heterogenous paleosol (weathered soil) occurs locally within the Property above the pre-Cretaceous unconformity and below the Bullhead Group (Poulton et al., 1994; Hayes et al., 1994). The Deville Member is poorly dated regionally and may straddle the Jurassic/Cretaceous boundary.

Table 3: Generalized Stratigraphy of the Uppermost Cretaceous – Tertiary



*adapted from Dawson et al. 1994

The Mannville Group and its stratigraphic equivalents are very widespread throughout the WCSB, and are heterogenous on a regional scale. The Property is located on the boundary of the Central Alberta Plains and the Northern Alberta Plains, where the names of specific Mannville equivalent units differ. In this report, the nomenclature of the Northern Plains is used, with reference made to the equivalent units in the Central Plains. Manville-equivalent units are between 230 and 360 m thick within the Property, generally becoming thicker towards the west, though the gradient is by no means uniform. Within the Property, the Gething Formation of the Bullhead Group is the lowermost Cretaceous unit, and consists of interbedded shale, siltstone, and sandstone with minor coal deposited in northward-flowing fluvial to deltaic systems (Smith, 1994; Hayes et al., 1994). Open marine shale of the Wilrich Member was coevally deposited in the deep trough parallel to and adjacent to the Cordilleran highlands, and occurs locally within the Property.

The Spirit River Formation (equivalent to the Upper Mannville Group) of the Fort St. John Group consists of interbedded siliciclastics (shale, siltstone, and sandstone) with minor coal beds deposited in shoreline, deltaic, and fluvial systems (Hayes et al., 1994). Upper Mannville units contain volcanic and feldspathic minerals, indicating active tectonism in the Cordillera to the west. Generally, sediments of the Upper Manville Group record an initial transgression (landward movement of the oceanic shoreline) towards the south followed by a northward shift of the shoreline due to increased sediment supply from the uplifting Cordillera to the west.

The Middle Cretaceous Colorado Group unconformably overlies the Mannville Group / Caddotte Member (Fort St. John Group). The Joli Fou Formation is a dark grey marine shale at the base of the Colorado Group that contains minor sandstone, phosphorite, bentonite, and coquina beds. The Viking Formation overlies the Joli Fou, and consists of an extensive eastward-thinning wedge of sandstone. The Shaftsbury Formation overlies the Viking Formation, and consists of mostly of marine shale, though a prominent bed of abundant fish remains and high organic carbon (the Fish Scales Horizon) occurs within the formation; bentonite and ironstone beds also occur within the Shaftesbury. The bentonite beds in the Shaftesbury Formation provide evidence of extensive syndepositional volcanism, especially within and near the Fish Scales Horizon (Leckie et al., 1992; Bloch et al., 1993).

The Dunvegan Formation conformably overlies Shaftesbury Formation, though it is only locally present within the Property (Bhattacharya, 1994). Where the Dunvegan Formation is present it consists of southeastward-thinning wedge of deltaic sandstone deposited during a coupled fall and rise in global sea level.

The Smokey Group unconformably overlies the Fort. St. John Group (Leckie et al., 1994). The Smokey Group comprises several formations, but broadly consists of marine shales (Kaskapau, Muskiki, Puskwaskau Formations) separated by eastward-thinning sandy clastic wedges (Cardium and Badheart Formations). Minor beds of carbonates, bentonite, and fish debris as well as concretions of phosphate, calcite, and siderite are present within the formations of the Smokey Group. Exposures of the Smoky Group may be present in rivers and stream cuts within the Property.

The Wapiti Formation overlies the Smokey Group and consists of sandstone and siltstone with minor mudstone, bentonite and coal beds deposited in fluvial to lacustrine environments (Dawson et al., 1994; Fanti, 2009). The Wapiti Formation and the overlying Scollard and Paskapoo formations underlie most of the Swan Hills region. Further towards Edmonton, the Wapiti is subdivided from oldest to youngest into the

Belly River Formation, the Bearpaw Formation and the Edmonton Group, which consists of the Horseshoe Canyon, Whitemud and Battle formations (Table 3 and Figure 5). Likley, more than half and potentially as much as three quarters of the Swan Hills Property is underlain by the Wapiti Formation (Figure 4).

The lack of subdivisions in the Wapiti Formation of northern to west-central Alberta (including the Swan Hills region) versus other parts of Alberta with time equivalent rocks are likely a due to a number of factors including a slight change in the geology and with a lack of distinct marker horizons such as the Bearpaw Formation but also a lack of recent mapping and detailed geological and stratigraphic work. The Swan Hills Property bentonitic shales, siltstones and sandstones in the area of the potential bentonitic clay mineral deposit in Township 69 and Range 16W5 are likely part of the Upper Wapiti Formation and may be laterally or time equivalent to the Horseshoe Canyon Formation or Battle and Whitemud formations further south in the Edmonton region. The Horseshoe Canyon Formation was deposited in a variety of successive environments including floodplains, estuarine channels and coalswamps.

The bedrock and ice-disturbed bedrock in the area of the Swan Hills potential bentonitic clay mineral deposit of Township 69, Range 16W5 is at an elevation ranging from about 750 m to 850 m asl. Regional mapping puts the top of the Horshore Canyon (the Kneehills Tuff Zone) at about 880 to 900 m asl (Figure 4; Hathway, 2011; Hamilton et al., 1999). Approximately 15 to 20 km to the south, west of Lightbulb Lake, thick bluffs of semi-consolidated sandstone ranging from 10 to 25 m thick have been mapped. The sandstone bluffs are at an elevation ranging from 975 m to 1,025 m asl and are likely part of the Scollard Formation or the lowermost Paskapoo Formation.

The non-marine Scollard Formation overlies the Wapiti Formation and consists of sandstone and siltstone with minor mudstone and bentonite (Table 3 and Figure 5). In central Alberta the Scollard formation locally contains coal beds as thick as 12 m. The Scollard Formation is exposed in the area south of the Swan Hills potential bentonitic clay mineral deposit of Township 69, Range 16W5 along ridges and creeks. The Scollard Formation straddles the Cretaceous – Tertiary boundary with the upper Scollard Formation being the basal most Tertiary Formation in the region (Table 3 and Figure 5).

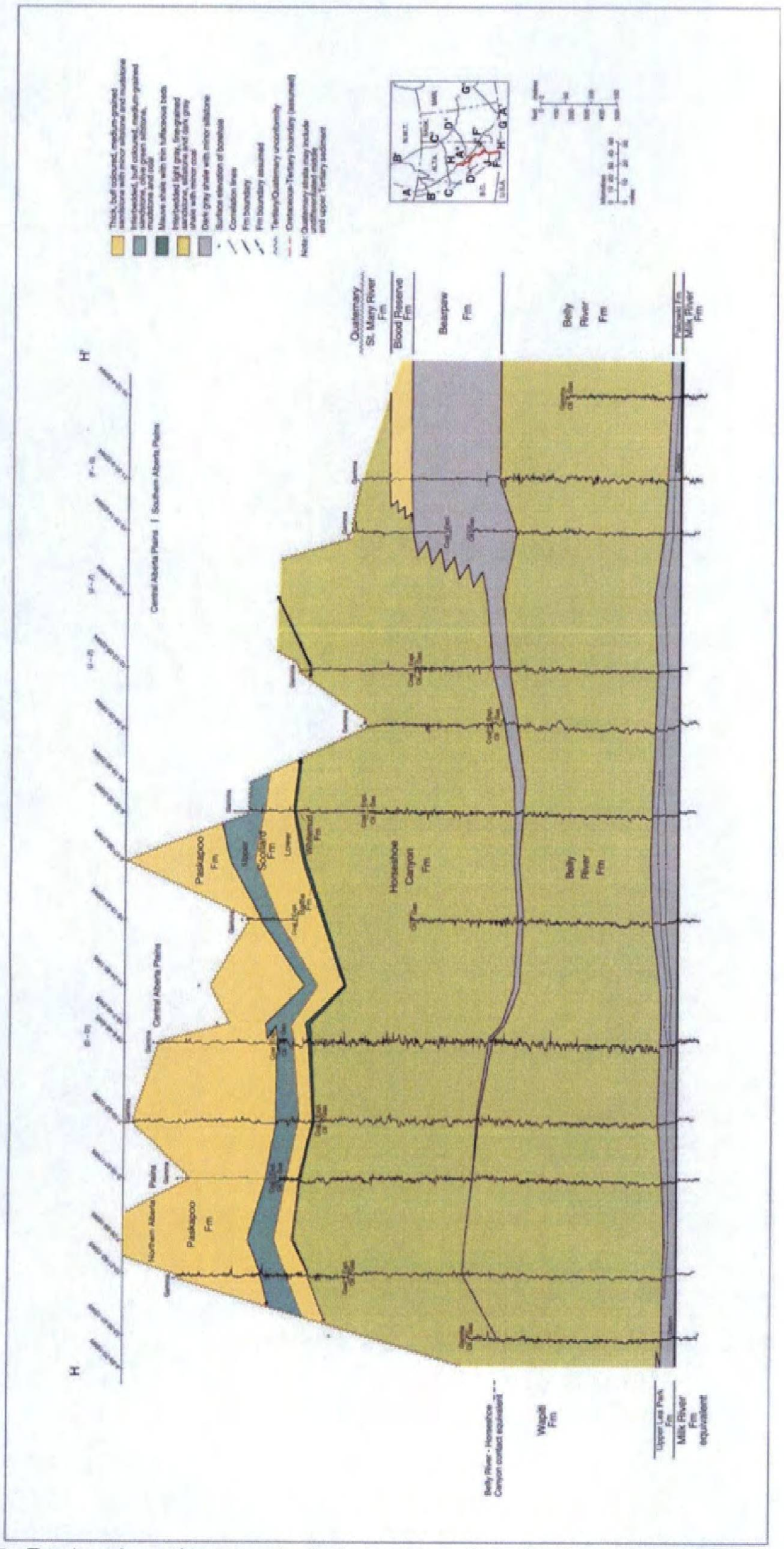


Figure 5: Regional northwest oriented cross-section for the upper most Cretaceous to Lower Tertiary formation from south to west-central Alberta (adapted from Dawson et al., 1994).

Cenozoic Units

The youngest bedrock unit in the area of the Swan Hills mineral permits is the Tertiary Paskapoo Formation (Tables 2 and 3; Figures 4 and 5). The Paskapoo Formation is composed of cycles of thick, tabular buff coloured sandstone beds overlain by interbedded siltstone and mudstones, which are locally high in smectite (Hamblin, 2004). The Paskapoo Formation increases in thickness from east to west reaching approximately 800 m in the foothills region. In the area of the Property the Formation is approximately 300 to 400 m in thickness. Outcropping Paskapoo Formation can also be found along some river and stream cuts.

The majority of the Swan Hills Property is covered by drift of variable thickness, ranging from a discontinuous veneer to less than 15 m (Pawlowicz and Fenton, 1995a, b). Bedrock may be exposed locally, in areas of higher topographic relief. Unfortunately, local drift thickness for the Property cannot be easily delineated due to the scarcity of publicly available hydrogeological 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 (Mossop and Shetson, 1994; Pawlowicz and Fenton, 1995a, b; Dufresne *et al.*, 1996).

Prior to continental glaciation during the Pleistocene, most of Alberta, including the Iosegun Lake region, had reached a mature stage of erosion. Several of the topographic highs in the Swan Hills region are capped by pre-glacial gravel deposits that likely date from the Late Tertiary, though the exact age of the unit is uncertain due to a scarcity of data (Klassen, 1989). Containing no evidence of glacial origin, this unit is comprised of fine to coarse-grained sand and quartzite pebble-gravel derived from the Cordillera. Typically thin (<10 m), and discontinuous, the sand and gravel unit may be remnants resulting from erosion and river incision associated with uplift of the PRA or some other local tectonic feature underlying the Swan Hills.

During the Pleistocene, multiple southwesterly and southerly glacial advances of the Laurentide Ice Sheet across the region resulted in the deposition of basal till and associated sediments in northern Alberta (Dufresne *et al.,* 1996). Glacial ice is believed to have receded from the area between 15,000 and 10,000 years ago. The advance of glacial ice may have resulted in the erosion of the underlying substrate and modification of existing topography. Dominant ice flow directions within the Swan Hills Property appear to be topographically controlled, following the contours of the Swan Hills. It is uncertain whether thick continental ice covered the Swan Hills completely. The presence of Tertiary gravels at topographic highs within the Swan Hills, the thinness of the drift cover, and the lack of glacial erosional features such grooves or flutes may indicate that glacial erosion was not intense in the area. Hummocky supraglacial and meltout till plains are locally present, especially at lower elevations in the Swan Hills region. Drainage regimes previously re-routed due to glaciation, reestablished pre-glaciation drainage patterns. Alluvial deposits in the form of channel bars and floodplains are present along portions of the West Prairie River. Extensive colluvial sediments accompanied post-glacial river and stream incision.

Diamond drilling during 2008 by Headwater intersected, in six out of the seven holes, ice disturbed (and possibly glacially thrusted) Wapiti bedrock ranging from 10 m to 32 m in thickness with an average thickness of 30.5 m. Beneath the disturbed bedrock, all seven drill holes intersected a brown competent (basal?) till ranging from 17 m to 55 m in thickness and averaging 31.7 m in thickness. Based upon the drilling the area of ice disturbed bedrock is laterally extensive and likely at least 8 km^2.

Structural Geology

In north-central Alberta, the PRA is a region where Phanerozoic and Cenozoic rocks, which overlie the Precambrian basement, have undergone periodic vertical and, possibly, compressive deformation from the Proterozoic to Tertiary (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, and to a lesser extent the Cenozoic, 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 also provided potential pathways for later deep-seated intrusive kimberlitic magmas.

During the mid-Cretaceous to early Tertiary, compressive deformation occurred as a result of the Cordilleran Orogony, which 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 Swan Hills Property lie along the southern edge of the PRA and are underlain by and proximal to basement faults that may also be related to the Swan Hills Reef Complex (Bloy and Hadley, 1989; Dufresne *et al.*, 1996).

Bentonite Mineralization

The term bentonite was originally used in 1898 to describe soap-like clays from the Cretaceous Fort Benton unit in Wyoming (Grim and Güven, 1978). For much of the twentieth century bentonite was defined as volcanic ash (or it's lithified equivalent, tuff) altered predominantly to montmorillonite, a definition that lingers to the present day. Bentonites are better defined as any clay of the smectite family that has physical properties defined by that clay (Grim and Güven, 1978). Other modes of bentonites genesis are known, though alteration of volcanic ash is by far the most common. Alteration of volcanic ash to bentonite takes place in a fluid environment with a high water to rock ratio (most commonly shallow marine or laccustrine; Christidis and Huff, 2009). Based on several case studies, Grim and Güven (1978) concluded that most bentonite beds form rapidly from their parent material (contemporaneous with ash accumulation). Most bentonite deposits consist of smectite-rich clay beds intercalated with shales, coals, sandstones and marls. All known economic or potentially economic occurrences of Bentonite in Alberta were formed by alteration of volcanic ash deposits, and occur with associated marine or continental sediments (Babet, 1966, Dufresne et al., 1996).

Formation of bentonite from volcanic ash essentially consists of devitrification, hydration, and crystallization (Grim and Güven, 1978). Besides smectite minerals, other alteration products in the volcanic ash include cristobalite, opaline silica, zeolites, calcite, selenite, and various iron-sulphate minerals). Altered-volcanic bentonite forms under a wide variety of environmental conditions, and from a wide variety of source-rock compositions, from ryolitic to basaltic and even kimberlitic (e.g., Grim and Güven, 1978; Eccles et al., 2009). Certain geochemical criteria, however are necessary for the formation of bentonites, namely leaching of alkali elements, a high Mg2+ / H+ ratio, and a large water to rock ratio (Christidis and Huff, 2009). Geochemically bentonite deposits are variable from one to another, and even within the same deposit (Grim and Güven, 1978; Christidis and Huff, 2009). Silicification has been observed in beds underlying some bentonite units indicating a downward migration of silica, and many bentonites appear to be enriched in magnesium compared to the likely parent material, though the source of the additional magnesium is generally not clear. (Grim and Güven, 1978).

Generally bentonites are classified as either sodium- or calcium-bentonites, depending on the dominant exchangeable cation present. Sodium bentonites are of greater economic interest because of their greater swelling and cation exchange capacities (Hora, 1999), but calcium bentonites have many applications because of their very high absorption capacity (Murray, 2007). The occurrence of sodium- vs. calcium bentonite is related to the composition of the source ash, and perhaps also by the chemistry of the water into which the ash is deposited (Grim and Güven, 1978).

Bentonite beds are widespread in Cretaceous to Miocene age rocks in Western North America (e.g., Grim and Güven, 1978; Hudson, 1982). Wapiti Group sedimentary rocks, which underlie a large portion of the Swan Hills Property, contain significant volumes of bentonites and bentonitic mudstones (e.g., Fanti, 2009). The Wapiti Group is stratigraphically equivalent to the Belly River, Bearpaw, and Horseshoe Canyon Formations of the southern and central Alberta plains, which include several well-known bentonite occurrences (e.g., Drumheller, Dorothy, Rosebud, Rosalind, Duagh and

Bullshead), some of which have been mined in the past (Hamilton, 1972; Dufresne et al., 1995, 1996).

The thickness and geometry of individual bentonite deposits varies widely, however commercial beds in Wyoming are typically 0.9 to 1.5 m thick and individual bentonite beds are continuous for several kilometers (Hora, 1999). The thickness of overburden is an important consideration in mine planning, as this may greatly affect the economic viability of a deposit. In most cases, groundwater is not an important factor in the alteration of ash to bentonite (Grim and Güven, 1978), so the presence of shallow faults and other structures is not likely to impact the quality of a bentonite deposit, though such structures may affect deposit geometry. Shallow glacially-related thrust faults are known within the Property from previous drilling (Dufresne and Banas, 2010).

Bentonite has an extremely diverse range of applications. Major uses for bentonite are in binding foundry sands and iron ore pellets, and as a constituent of pet litter, drilling muds and absorbents (Murray, 2007). Other applications include uses in food processing and as an additive for domestic animal feed, cosmetics, and pharmaceuticals, among others. The value of a bentonite product depends on a number of factors, such as the type of impurities, colour, size of clay particles, cation exchange capacity, rheological properties and structures of the clay, many of which are more or less important depending on the application (Hora, 1999; Murray, 2007). Other properties depend on specifications for particular applications. Published data on individual deposits are scarce compared to other mineral resources.

Bentonite within the Property is composed essentially of the clay mineral montmorillonite that has formed by alteration of volcanic ash. Similar bentonite beds are common in the Cretaceous and Paleocene sediments underlying much of the Alberta Plains and Foothills. Bentonitic mudstones are known to exist on the Property, but to date no Mineral Resources or Reserves (as defined by the CIM Definition Standards on Mineral Resources and Ore Reserves, dated November 27, 2010) have been identified. The ash source for the bentonite beds that occur on the Property is not known with certainty, but it is presumed that it is related to kimberlies within northern Alberta, if not within the Property itself (Dufresne and Banas, 2010; Eccles et al., 2009). The thickness of the bentonite within the Property likely precludes a volcanic source in the Cordillera of British Columbia.

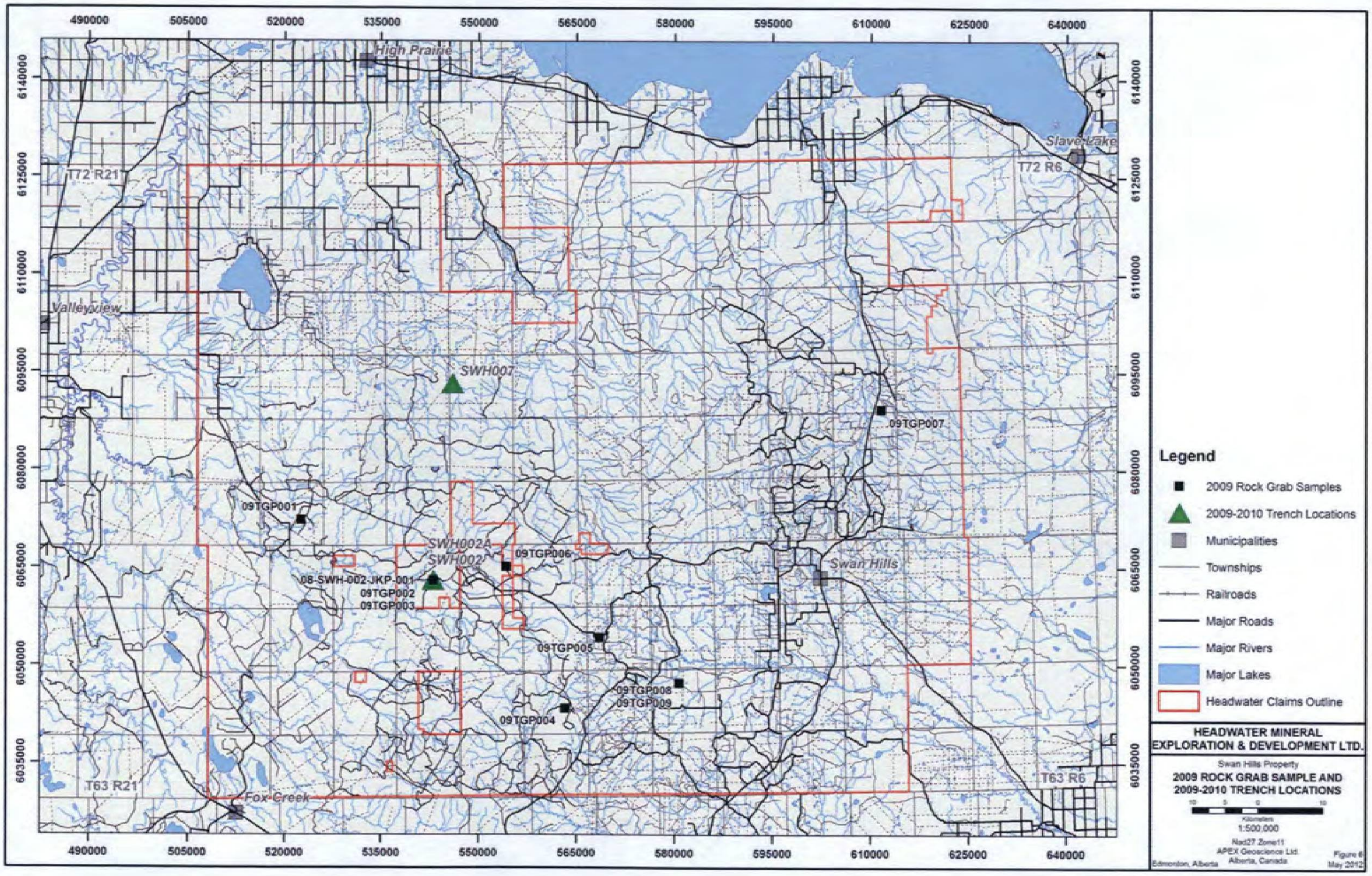
As mentioned in the Cenozoic Units subsection, drilling in the area of bentonite mineralization has revealed the presence of till below Cretaceous beds, which has been interpreted by Dufresne and Banas (2010) as evidence of local glacially-induced thrusting. As many as three units of till greater than 5 m in thickness are known to occur in a vertical sequence with Cretaceous strata (including the uppermost unit of surficial till) with the deepest till unit occurring 80-93 metres below surface (diamond drill hole

08-022). The structure of the thrust sheets will affect the mine planning of the bentonite deposit, however further work (drilling and possibly ground geophysical surveying, such as seismic refraction) will be necessary to delineate the extents and attitudes of the thrust planes. Structural measurements, taken by APEX in February of 2012, indicate that the beds of Cretaceous strata in the area of the bentonite deposit generally strike ENE-WSW and dip towards the NNW.

EXPLORATION

2009 Prospecting and Rock Grab Sampling

During the fall of 2009 a total of 10 rock grab samples were collected during the prospecting program. The rock grab samples were retained in the Headwater field office and submitted to SRC in Saskatoon with the 2009 and 2010 trench samples (see next subsection "2009-2010 Tresnching"). The rock grab samples were sent to the SRC for processing and analysis by inductively coupled plasma optical emission spectrometry (ICP-OES) and gold, Platinum and Palladium Fire Assay (FA). The locations of the 2009 rock grab samples are illustrated on Figure 6. The descriptions of the 2009 rock grab samples are located in appendix 2 and the results of the rock grab samples are combined in the laboratory certificated with the 2009 and 2010 trench samples in Appendix 3. Of particular note, one sample (08TGP005) located in the southern part of the Property, returned an ICP total digestion result of 882 ppm Mo along with elevated levels of Cu, Fe, Ni, Pb, Sn, W and Zn were also reported as 567 ppm, 68.4 wt%, 157 ppm, 115 ppm, 59 ppm, 259 ppm and 212 ppm, respectively. Additionally one sample returned an elevated Fe content at 50.3 wt% and another sample returned and elevated Zn content at 107 ppm. No significant Au, Pt or Pd contents were reported from the fire assay.



490000
505000
520000
535000
550000
565000
580000
595000
610000
625000
640000
6140000
6125000
6110000
6095000
6080000
6065000
6050000
6035000
High Prairie
Slave Lake
Valleyview
Swan Hills
Fox Creek
T72 R21
T72 R6
T63 R21
T63 R6
SWH007
SWH002A
SWH002
08-SWH-002-JKP-001
09TGP001
09TGP002
09TGP003
09TGP004
09TGP005
09TGP006
09TGP007
09TGP008
09TGP009
Legend
2009 Rock Grab Samples
2009-2010 Trench Locations
Municipalities
Townships
Railroads
Major Roads
Major Rivers
Major Lakes
Headwater Claims Outline
HEADWATER MINERAL EXPLORATION & DEVELOPMENT LTD.
Swan Hills Property
2009 ROCK GRAB SAMPLE AND 2009-2010 TRENCH LOCATIONS
Kilometers
1:500,000
Nad27 Zone11
APEX Geoscience Ltd.
Alberta, Canada
Edmonton, Alberta
Figure 6
May 2012

2009-2010 Trenching

In the winter of 2009-2010, trenching was completed on two potential kimberlite anomalies identified from a fixed-wing high resolution airborne magnetic (HRAM) survey, which was flown over the Property in 2007 (Dufresne, 2008). A total of three trenches were dug over two of the anomalies (Figure 6). Trenching and sampling was completed in January (SWH007) and December of 2009 (SWH002) by APEX personnel. Headwater personnel re-trenched and sampled at location SWH002 (also then termed SWH002A) in January, 2010 (Figure 6).

Trench SWH007 was completed in January, 2009 and one sample, 09DAP001, was collected by APEX staff. The sample was sent to the SRC for Rare Earth Element (REE)-ICP-OES and whole rock analysis. The results for the trench sample from SWH007 were typically low REE values, almost all below detection,

Trench SWH002 was completed and sampled in December, 2009, with a total of 12 samples collected by APEX staff. Then in January 2010, Headwater personnel re-trenched and sampled anomaly SWH002 (roughly 200m to the north west of the first trench) and termed this second trench SWH002A (figure 6). A total of 27 samples were collected by Headwater from SWH002A.

All 39 samples from the SWH002 anomaly were submitted for REE-ICP-OES and whole rock analysis and FA analysis to SRC. A total of four samples returned elevated Zn contents up to 133 ppm and one sample contained elevated Ni concentration of 109 ppm. No significant Au, Pt or Pd contents were reported from the fire assay. Complete results from the SWH002 and SWH002A trench sampling are presented along with the 2009 rock grab samples in Appendix 3 and the descriptions of the trench samples are located in Appendix 4.

2012 Trenching

In 2012, trenching was performed in the area of historic bentonite mineralization. The trenching was completed to provide a bulk sample for Headwater and their new investor Altaben, to process, as well as to verify the continuity of the bentonite beds. APEX staff visited the trenches to describe them and to individually sample the main lithologic units.

A total of three trenches were completed by using a 270 trackhoe from January 30th to February 4th, 2012 (Figure 7). The trenches were dug to a depth of 9.1m, 7.6m, and 6.1m (30ft, 25ft and 20ft). The locations of the trenches are listed in Table 4. The purpose of the trenches was to confirm the continuity of the bentonite layering. This continuity was confirmed as well as a consistent quality and quantity of bentonite.

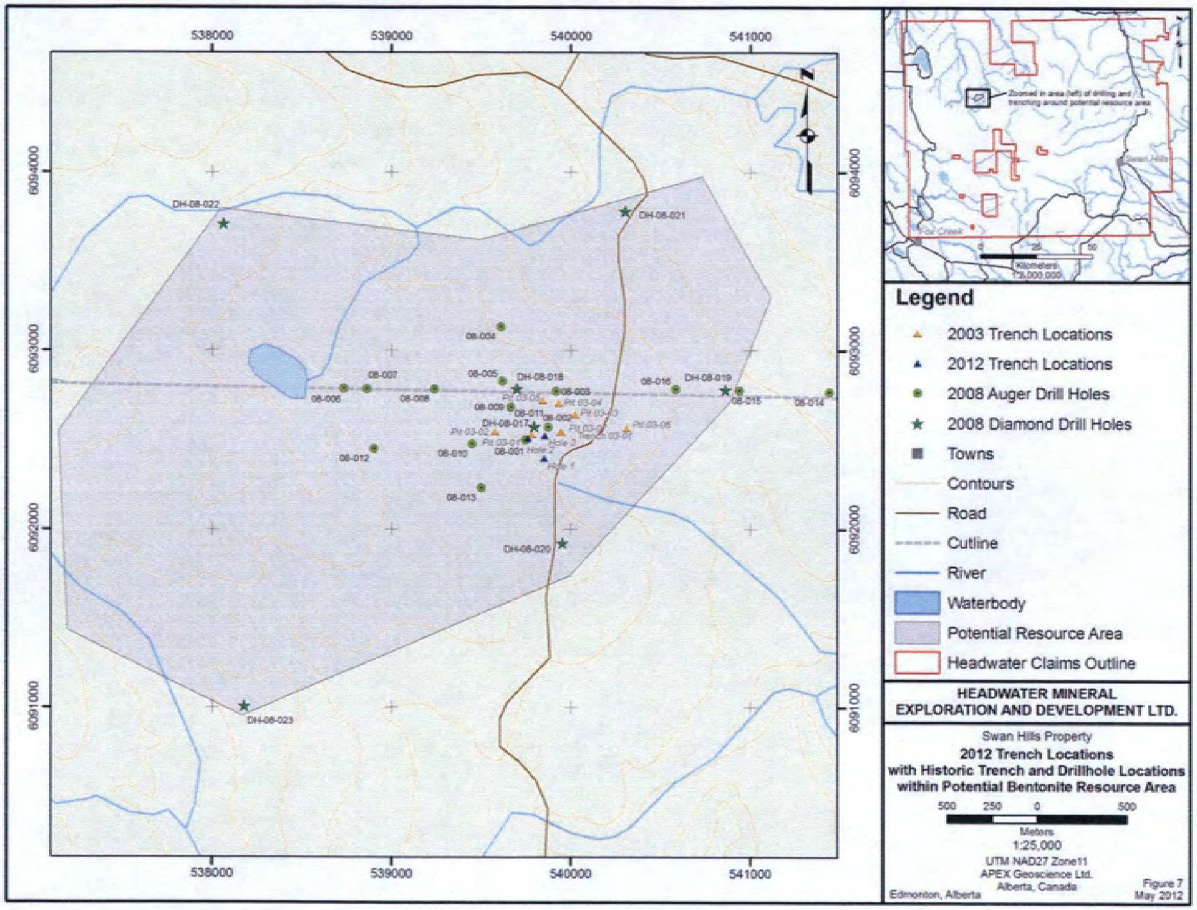

538000
539000
540000
541000
6094000
6093000
6092000
6091000
DH-08-022
DH-08-021
DH-08-020
DH-08-023
DH-08-018
DH-08-019
DH-08-017
08-004
08-005
08-007
08-006
08-008
08-003
08-009
08-011
08-002
08-010
08-001
08-012
08-013
08-016
08-015
08-014
Legend
2003 Trench Locations
2012 Trench Locations
2008 Auger Drill Holes
2008 Diamond Drill Holes
Towns
Contours
Road
Cutline
River
Waterbody
Potential Resource Area
Headwater Claims Outline
HEADWATER MINERAL
EXPLORATION AND DEVELOPMENT LTD.
Swan Hills Property
2012 Trench Locations
with Historic Trench and Drillhole Locations
within Potential Bentonite Resource Area
500 250 0 500
Meters
1:25,000
UTM NAD27 Zone11
APEX Geoscience Ltd.
Alberta, Canada
Edmonton, Alberta
Figure 7
May 2012

Table 4: 2012 Trench Locations

Trench	Easting NAD27z11	Northing NAD27z11	Latitude (Deg)	Min	Sec	Longitude (Deg)	Min	Sec
1	539850	6092398	54	58	43.8	116	22	38.6
2	539760	6092509	54	58	47.4	116	22	43.6
3	539854	6092525	54	58	47.9	116	22	38.3

APEX staff visited the site on February 6th and logged the trenches after they were dug. The general stratigraphy of the trenches was glacial till overlying bedrock, consisting of the bentonite beds. In one trench (Trench 3), this differed from this by having a fine grained silty sand layer between the overlying glacial till, and the bentonite beds. Otherwise, all three trenches followed the same general stratigraphy. All trench depths were estimated by the backhoe operator and his written notes, which are located in Appendix 5.

The bulk samples collected by Headwater and Altaben were taken from site to a nearby staging area prior to the arrival of APEX staff. APEX collected 11 small subsamples of the bulk samples at the staging area prior to being shipped to the lab. Samples were also collected by APEX staff at the trench rubble piles as well as outcrop in accessible locations (Table 5).

Table 5: 2012 Trench Sample Descriptions

Sample ID	Sample Description
Hole1-a	till
Hole1-b	light grey bentonite
Hole1-c	greenish cream-colored bentonitic silty shale; faint mm-scale lapilli, faint mm-scale laminations
Hole2-a	till (sampled outcrop (cut wall) from 1-2 m depth)
Hole2-b	bentonite (bulk grab from rubble pile)
Hole3-a	till; upper 6'; sampled from outcrop
Hole3-b	till; lower 7'; sampled from outcrop
Hole3-c	bentonite (grey to cream-colored unit); sampled from outcrop
Hole3-d	silty sand
Hole3-e	red clay
Hole3-f	steely grey bentonite

The 2012 trench samples collected by APEX were driven back to the APEX warehouse in Edmonton, Alberta by APEX staff for storage and to date have not been analyzed.

The bulk samples collected by Headwater have undergone numerous processing and testing procedures which include, but are not limited to: Physical and Aggregate Properties Testing and Laser Diffraction Particle Size analysis at Exova; Compositional Analysis by Energy Dispersive Spectroscopy (EDS) and X-Ray Diffraction (XRD) at GR Petrology Consultants; and XRF by Ron Spencer X-Ray Fluorescence. The complete results of the bulk sample analysis have not been received at the time of this report. Preliminary analysis reports from the three companies can be found in Appendix 6.

Numerous in-house analysis are currently being performed by Altaben in their office/warehouse located in Calgary. Results are still pending for the in-house sample analysis as well.

SAMPLING METHOD AND APPROACH

2009 Prospecting and Rock Grab Sampling

Rock grab samples were collected during prospecting during the 2009 field program. The rock samples identified in the field as being "of interest" were bagged in plastic rock sample bags, A sample card was filled out with pertinent data such as sample number, location in UTM Coordinates, lithology, sampler, date and a portion of the card with the sample number on it, was placed inside the bag with the sample. The bags were then sealed with zap straps and the sample number was written on the outside of the bag with permanent, waterproof marker. The locations and samples were photographed and recorded with a handheld GPS unit, with measurements reported NAD 27, UTM zone 11. A brief description of the sample and the sample location was also recorded in a field book as back up in case the sample card book was damaged or lost. The samples were submitted to SRC in Saskatoon for analysis with the trench samples taken in 2009-2010.

2009 - 2010 Trenching

APEX and Headwater personnel excavated three trenches using a 270 backhoe. The extracted material was sampled where lithologies of interest (i.e. clay, coal) were intersected. The samples were collected into plastic bags, labeled, and shipped to SRC in Saskatoon for analysis. The trench samples were collected over airborne geophysical anomalies identified from previous geophysical work. The coordinates were recorded in field books and are reported in North American Datum 1927 (NAD 27), UTM zone 11.

2012 Trenching

A D6 crawler and 270 track hoe were used to clean debris from trench site, strip the top soil and dig out steps. The trenches were dug down approximately 18 to 24 feet of clay, pushing clay away from hole as digging proceeded. When bentonite was intersected the trench would be dug roughly another I0 feet to the end of the hoe reach. Measured depths were taken with a tape measure and recorded. Directly after hitting the bentonite zones large sample bags were filled with trenched material while located on a flat deck, with the exeption of the first trench which was not sampled until the next day. A number of smaller subsample were also taken by Headwater personnel.

Smaller sub samples of the rubble piles were also later sampled by APEX staff, placed in individual plastic rock sample bags with sample identifiers written with permanent marker on the bags, sealed and then collectively placed in one large rice bag.

SAMPLE PREPARATION, ANALYSES AND SECURITY

2009 Prospecting and Rock Grab Sampling

Samples from the 2009 rock grab sample and the sample from trench SWH007 were submitted for REE ICP and whole rock analysis to SRC in Saskatoon, Saskatchewan. At the SRC the samples were dried overnight at 80ºC. The samples were then crushed to 60% <2mm and an approximately 500 g subsample was riffle split. The riffle split sample was then ground to a pulp (90% <106 micron) in a chrome steel grinding mill. For each whole rock and REE analysis a 0.1 g aliquot of the sample is put into a graphite crucible, and fused with lithium metaborate at 1000°C to form a bead. The bead is dissolved in dilute HNO3 and made up to 100ml for analysis by ICP-OES. For REE the ICP-OES analyses for 21 elements. For whole rock analysis 17 elements and oxides are analysed

2009 - 2010 Trenching

The rock samples collected in 2009 and samples collected from trenches SWH002 and SWH002A were submitted for ICP REE and Fire Assay analysis to the SRC.

The trench and rock samples were submitted for partial and total digestion followed by ICP-OES analysis. Partial digestion allows for the measurement of 16 elements and total digestion allows for the measurement of 46 elements (9 elements are analysed in both procedures). For the partial digestion a 1 g aliquot of sample pulp is digested with 2.25 ml of concentrated HNO_3:HCl for 1 hour at 95°C and then diluted to 15ml using de-ionized water. For the total digestion a 0.125 g aliquot of sample pulp is digested to dryness in a mixture of $HF/HNO_3/HClO_4$ and the residue is dissolved in dilute HNO_3.

For FA analysis a 30 g aliquot of sample pulp is mixed with standard fire assay flux in a clay crucible and a silver inquart is added prior to fusion. After fusion the melt is poured into a form which is cooled. The lead bead is recovered and cupelled until only the precious metal bead remains. The bead is parted in diluted HNO_3. The precious metals are dissolved in aqua regia and then diluted for analysis by ICP-OES.

2012 Trenching

The 2012 samples are currently being processed by a number of different facilities, including at the Altaben office/warehouse located in Calgary, and as results are still pending, definitive sample preparation and analysis are not currently known. A general description of the standard procedures known to be performed on the bentonite samples are listed as follows:

Laser Diffraction Particle Size

Laser diffraction is a widely used technique for particle size analysis. In laser diffraction particle size analysis, a representative group of particles passes through a broadened beam of laser light which scatters the incident light onto a Fourier lens. This lens focuses the scattered light onto a detector array and, using an inversion algorithm, a particle size distribution is inferred from the collected diffracted light data. Sizing particles using this technique depends upon accurate, reproducible, high resolution light scatter measurements to ensure full characterization of the sample. Diffraction particle size analysis, a representative group of particles passes through a broadened beam of laser light which scatters the incident light onto a Fourier lens. This lens focuses the scattered light onto a detector array and, using an inversion algorithm, a particle size distribution is inferred from the collected diffracted light data. Sizing particles using this technique depends upon accurate, reproducible, high resolution light scatter measurements to ensure full characterization of the sample

Light scattered by particles forms a series of concentric rings of alternating maximum and minimum intensities, often called the Airy disk. The first minimum (closest to the centre of the Airy disk) provides information to determine the mean size of the distribution. Subsequent maxima and minima contain information on the shape and width of the distribution, including any shoulders and tails. It is this series of maxima and minima that needs to be accurately measured in order to report the true shape of the particle size distribution.

EDS

Energy-Dispersive X-Ray Spectroscopy (EDS) is used to identify elemental composition of a sample or small area of interest on the sample. The technique is practically non-destructive and requirements for sample preparation are minimal. EDS is commonly integrated into either an SEM or EPMA instrument. This technique is advantageous in that it can provide a full elemental spectrum in a few seconds. In addition, EDS can be used in semi-quantitative mode to determine chemical composition by peak-height ratio relative to a standard. An EDS detector is used to separate the characteristic x-rays of different elements into an energy spectrum, and EDS system software is used to analyze the energy spectrum in order to determine the abundance of specific elements.

Positioning the sample for EDS is critical for the optimal amount of X-rays impinging on the detector and the best identification of atomic species. EDS systems include a sensitive x-ray detector, a liquid nitrogen dewar for cooling, and software to collect and analyze energy spectra. The detector is mounted in the sample chamber of the main instrument at the end of a long arm, which is itself cooled by liquid nitrogen. An EDS detector contains a crystal that absorbs the energy of incoming x-rays by ionization, yielding free electrons in the crystal that become conductive and produce an electrical charge bias. The x-ray absorption thus converts the energy of individual x-rays into electrical voltages of proportional size; the electrical pulses correspond to the characteristic x-rays of the element.

XRD

The X-ray diffraction system is a powerful tool used to characterize crystalline materials. It permits both qualitative and quantitative analysis of phases or compounds present in samples. It is an effective method for determining the bulk/clay mineralogy using random and/or oriented mounts.

Approximately 8-10 g of powder is weighed into a plastic beaker to which 50 ml of deionized water and a few milligrams of sodium hexametaphosphate (dispersant) is added. The mixture was then agitated for approximately 3 minutes using a sonic probe and allowed to settle for approximately 2 minutes. The supernatant suspension is then decanted into a centrifuge vial. The process is then repeated three more times in order to collect all of the fine particles.

The <2 μm particle size fraction is then separated from the coarser fraction by centrifugation at 1000 rpm for 2.5 min. The supernatant suspension of the four vials (containing particles < 2 μm) is decanted into four clean centrifuge vials. The settled material from the first four vials is then redispersed and centrifuged to remove any remaining clay-size particles. The clay size fraction is then concentrated by centrifugation at 3000 rpm for approximately 5 minutes. The >2 μm size fraction is recovered and kept at 90°C until completely dry. The weight percent of the <2 μm is then determined as the difference between the original sample weight and the recovered >2 μm fraction.

A second fraction of the sample is then carefully ground using an agate mortar and pestle and back-packed into 30 mm diameter Al rings for XRD analysis. Despite careful sample preparation, some preferred orientation of phyllosilicate and feldspar minerals is evident in the XRD patterns leading to larger residual errors of fit (%R) in the interpreted diffraction patterns in samples with preferred orientation.

All samples are then irradiated with Cu Kα radiation in a Rigaku Miniflex+ X-ray diffractometer. Data for randomly oriented bulk samples is collected over a 2θ range from 2 to 70° stepping 0.02° with a dwell time of 3 seconds.

Quantitative mineralogy using whole pattern fitting Rietveld analysis is then completed for the randomly oriented bulk samples and the results of peak fitting of clay-sized fraction for each sample is illustrated. Data analysis and interpretation is accomplished using algorithms in MDI Products JADE v. 8 software and reference spectra from the International Centre Diffraction Data Pattern Diffraction File 4+2007 (ICDD PDF4+2007). Quantification of the clay abundance is calculated based on the intensity of characteristic peaks referenced to the intensity of the illite (003) reflection (SRC Publication No. 10400-05C09, 2009).

XRF

X-ray fluorescence spectrometer provides one of the simplest, most accurate and economical methods for multi-element analysis as it is fast and is a non-destructive analytical method suitable for solid, liquid and powdered samples.

The quality of sample preparation for XRF analysis is at least as important as the quality of measurements, therefore samples must be: representative of the material, homogeneous, thick enough to meet the requirements of an infinitely thick sample, without surface irregularities and composed of small enough particles for the wavelengths to be measured

With XRF it is not necessary to bring solid samples into solution and then dispose of solution residues, as is the case with all wet-chemical methods. The main prerequisite for exact and reproducible analysis is a plain, homogeneous and clean analysis surface. For analysis of very light elements, e.g. beryllium, boron and carbon, the fluorescence radiation to be analyzed originates from a layer whose thickness is only a few atom layers to a few tenths of micrometer and which strongly depends on the sample material. Sample preparation is therefore extremely important for analysis of light elements. Generally an initial sample undergoes a series of crushing steps to reduce it to an average grain size of a few millimeters to a centimeter, where it can then be reduced by splitting to small representative samples of a few tens to hundreds of grams. The small sample split is then ground into a fine powder by any of a variety of techniques to create the XRF sample.

XRF uses the emission of characteristic "secondary" (or fluorescent) X-rays from a material that has been excited by bombarding it with high-energy X-rays or gamma rays. The samples are analysed by the behavior of atoms when they interact with X-radiation. As the sample is illuminated by an intense X-ray beam, known as the incident beam, some of the energy is scattered, but some is also absorbed within the sample in a manner that depends on its chemistry. When this primary X-ray beam illuminates the sample it becomes excited and in turn emits X-rays along a spectrum of wavelengths characteristic of the types of atoms present in the sample. Various types of detectors are used to measure the intensity of the emitted beam. The intensity of the energy measured by these detectors is proportional to the abundance of the element in the sample. The exact value of this proportionality for each element is derived by comparison to mineral or rock standards whose composition is known from prior analyses by other techniques.

MINERAL PROCESSING AND METALLURGICAL TESTING

The three main characteristics of bentonite for commercial viability are adsorption, swelling and thixotropy; the latter of which is the property of bentonite-water slurry that allows it to act as a liquid under shear stress, but then sets into a gel upon removal of stress. An important method to investigate the fundamental physical properties responsible for variations in adsorption, swelling and thixotropy is cation exchange capacity (CEC), which provides a measurement of the ability of the clay to absorb element, toxins, etc. More specifically, bentonite has a negative charge, which is compensated for by adsorbing a cation on either the interior or exterior of the molecule. These compensating cations may be exchanged for other cations. Hence they are called exchangeable cations. The amount of compensating cations per unit weight of the clay is the CEC measured in millequivalents per 100 grams of dry clay (meq/100g).

In general, sodium bentonite (natural swelling ability) has a high CEC whereas calcium bentonite (non-swelling ability) have very low to moderate CEC in comparison. Therefore the CEC value can be used to assess the economic potential of bentonite. The general rule is that the higher the CEC value, the better potential economic value of the bentonite particularly when being sought for their swelling properties (i.e., when in search of sodium bentonite). In addition, the CEC testing protocol provides valuable data on the elements (e.g., Ca, Na, K, Mg) usually present in the interlayer sites of these clay minerals.

The cation exchange capacity is measured by applying concentrated ammonium acetate (NH4OAc) to the sample to exchange all exchangeable cations with NH^{4+} by mass action. The extract solution is analyzed for Ca^{2+}, Mg^{2+}, K^+, Na^+, and in some cases Al to determine what was on the exchanger. At that point, one measure of CEC can be made. Then the NH^{4+} is displaced by another cation (typically Na^+ or K^+) by mass action, and NH^{4+} is measured to obtain another estimate of CEC. Exchangeable NH^{4+} is often measured separately using concentrated KCl extractant.

In general, the CEC data for the Swan Hills bentonite exhibits low to moderate CEC values (<50 meq/100g; Figure 8), which confirms that they are Ca-bentonites and contain high Ca (average 7,723 µg/g) with low amounts of Na (average 1,071 µg/g). They also contain moderate amounts of Mg (5,205 µg/g), probably due to the presence of minor amounts of chlorite mixed with the smectite.

An alternate method to NH4OAc/KCl was also used to confirm the CEC value of these bentonties where the CEC value is calculated as the sum of cations Ca^{2+}, Mg^{2+}, K^+, Na^+, and Al after extraction. A comparison between the two techniques is shown on Figure 9. The sum of cations technique generally yields higher CEC values with, for example, 29 analyses having >40 meq/100g versus only 7 analyses via the NH4OAc/KCl method.

The CEC data shows the total proportion provided by a given element. The sums of these values are less than 100% suggesting that there are some other elements (e.g., Ba) that is also present in the interlayer sites, or that the interlayer sites are not fully occupied.

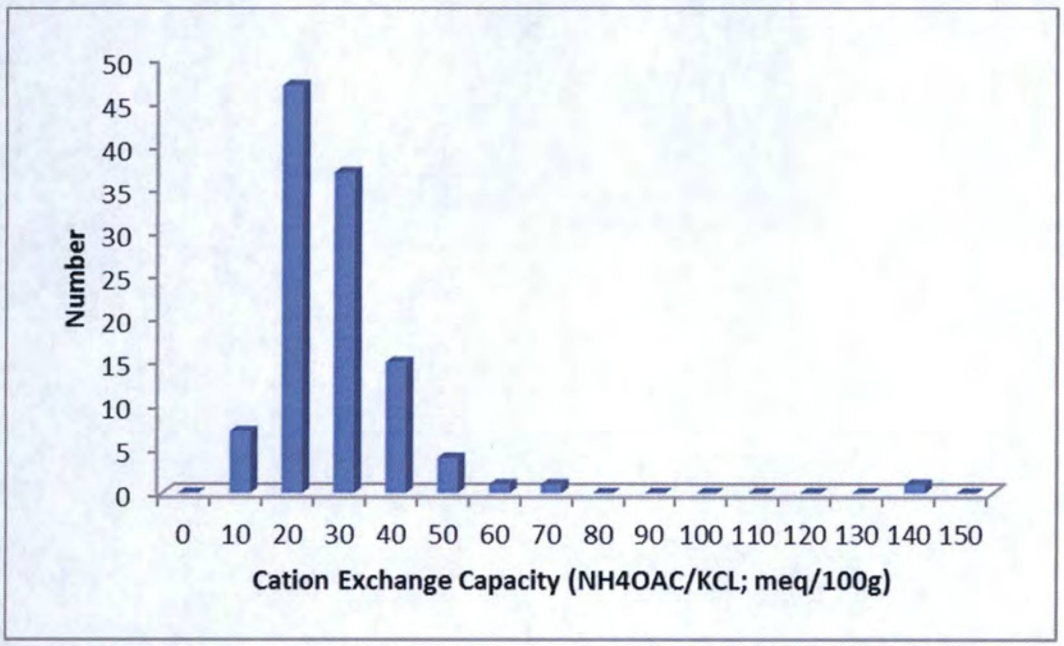


Figure 8. Histogram of the cation exchange capacity of bentonite from (n=113 analyses).

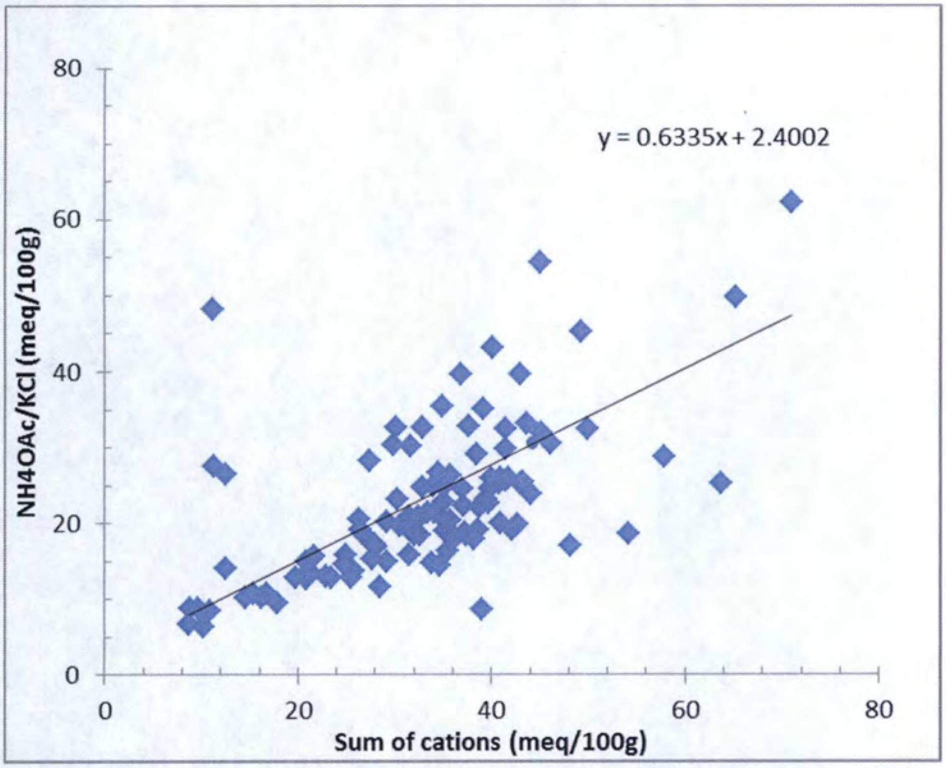


Figure 9. Comparison of cation exchange capacity between the NH4OAc/KCl and sum of cations methods (n=113 analyses).

Regardless, the CEC data from the Swan Hills bentonite is on average lower than those bentonites documented in southern Alberta, including Rosalind, Irvine, Bullshead, Dorothy, Trefoil, Drumheller and Onoway, which have CEC values of between 64 and 107 (averaging 88; n=17; Scafe, 1975).

Some Market Discussion

Bentonite is commercially available clay consisting mainly of montmorillonite and occurs in two main forms in nature: 1) sodium bentonite, which is known to swell to several times its original volume when contacted by water, and 2) calcium bentonite that swells to a much lesser degree.

High Ca-bentonites generally have poor swell test values. Subsequently, these clays are not good candidates for usage in applications requiring swelling clay. Calcium bentonite may be converted to sodium bentonite by an ion exchange process. The sodium beneficiation or sodium activation ion exchange process works by adding 5–10% of a soluble sodium salt (e.g., sodium carbonate) to wet bentonite, mixing well, and allowing time for the ion exchange to take place with the water removing the exchanged calcium. However, this is an added cost to production. In addition, inferior beneficiation can result when residual calcium carbonate forms by insufficiently removed exchanged cations.

Bentonite is currently mined, however, as calcium bentonite in Mississippi and Alabama, United States, Germany, Greece, Turkey, India, and China. The use of calcium bentonite can be traced back to 5000 BC, when bentonite was used to cleanse and thicken woolen clothes; it is from this ancient use that calcium bentonite became known as *Fuller's Earth* (Robertson, 1986; Eisenhour and Reisch, 2006). In the last century, the main uses of calcium bentonite take advantage of their natural sorptive and thixotropic properties. They are used as additions to drilling muds, in making foundry moulds, absorbents, animal feed, ceramics, fillers and extenders, foundry sand binders, iron ore pelletizing, sealants and in the manufacture of cat litter. Calcium bentonite is effective at decolorizing or 'bleaching' vegetable, animal and minerals oils; this is especially true when calcium bentonite is activated by acid to improve bleaching efficiency (Rich, 1960; Torok and Thompson, 1972). Acid-activated bentonite has grown in use especially for oils that are more difficult to bleach or when more highly refined oils are desired. Calcium bentonite is mined in Texas, Mississippi and Alabama. The primary uses for calcium bentonite in the southern U.S. is as a bonding clay for foundry sands, a refining agent for oils and fats, an additive for animal feeds and absorbents.

POTENTIAL BENTONITE RESOURCE ESTIMATES

Based upon the results of the 2008 auger and diamond drilling programs (Dufresne and Banas, 2010), both of which were supervised by Mr. Dufresne, P.Geol., Headwater retained APEX to prepare a mineral resource estimate for the Swan Hills bentonitic clay mineral zone. The model and estimate was generated using the combined drillhole data derived from the 2008 drilling campaigns. Modeling was constrained by the formational boundaries of the glacially disturbed bedrock sheet and the brown compact till sheet. Mineral resources were classified in accordance with guidelines established by the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) "Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines" dated November 23rd, 2003 and CIM "Definition Standards for Mineral Resources and Mineral Reserves" dated November 27th, 2010. Based upon the core drilling, the auger drilling and trenching the authors were able to construct a wire frame of both the upper disturbed bedrock unit and the brown compact till unit. Based upon the limited number of clay fraction (47 from 4 core holes) and clay mineral species analyses (42 from 2 core holes) that have been conducted to date that fit within the wireframe of the glacially disturbed bedrock it is not possible to define even an Inferred Mineral resource as defined by NI 43-101. However, the drilling does indicate the presence of a relatively consistent unit or sheet of glacially disturbed bedrock. This is corroborated by auger drilling and trenching data which could not be utilized in the resource model but certainly provide additional confidence in the continuity of the unit. Based upon the existing data a potential bentonite clay mineral deposit could be defined. The authors believe that with further clay mineral analysis of the existing cores and the drilling of a few key drill holes that at a minimum an inferred resource should be defineable.

The Swan Hills Property mineral resource modeling and estimation was carried out using a 3-dimensional commercial mine planning software MICROMINE (v12.0.4). A total of 7 diamond core holes were used in the estimate. Spacing between drill holes varies from 240 m to 2.5 km, with an average distance of about 1 km between drillholes. There are three drill sections that range in spacing from about 670 m to 2 km between sections. The sample file comprised 872 samples of variable length from all lithologies. Data supplied and utilized in MICROMINE included collar easting, northing and elevation coordinates, lithology, along with assay data for bulk mineral analysis, clay mineral analysis, clay mineral species analysis. All drillholes were drilled vertically and as such there was no downhole survey information collected.

Drilling of seven core holes during late 2008 consistently intersected what appears to be bedrock comprised of bentonites intercalated with bentonitic mudstone and siltstone along with some minor sandstone sitting above a distinct brown, well compacted polymicton till (Figure 7). The glacially disturbed and potentially ice-thrusted Wapiti bedrock was intersected in six out of the seven core holes drilled and ranges in thickness from 10 m to 32 m with an arithmetic average thickness of 30.5 m in the 6 holes where it was intersected. Beneath the glacially disturbed bedrock, all seven drill holes intersected a brown competent (basal?) till ranging from 17 m to 55 m in thickness and averaging 31.7 m in thickness. The auger drilling, core drilling and trenching have defined an area that is roughly 2.7 km by 4.3 km comprising an area of roughly 8 km^2, with the potential to be much larger with further work.

The SRC conducted centrifuge tests, XRD analyses on non oriented and oriented subsets of the samples of the 2008 auger drill hole samples and core samples to determine the weight percent clay mineral content, the overall mineralogy and the clay mineralogy. A semi-comprehensive mineralogical and clay content analysis has thus far been completed on a number of the 2008 auger drilling samples and a number of samples from four of the seven 2008 core holes to determine the most prospective horizons for bentonitic clay minerals.

Analyses of the randomly oriented samples indicate that the clay (<2□m) fraction in the samples varies from ~6-72 wt% with the majority of the clay minerals classified as smectite or illite. Further analyses of oriented sub-sets of the same samples showed that the predominant mineral in most samples was smectite comprising up to 100 wt% of the clay fraction. In 86% of the samples smectite comprised >50 wt% of the clay fraction. Illite is the second most commonly occurring clay mineral ranging in abundance up to 71 wt% of the clay fraction, but more commonly less than 40% illite is present. Chlorite and kaolinite occur in lower abundances, commonly comprising <10 wt% each of the clay fraction.

Resource Calculations

A potential mineral resource estimate has been calculated for the bentonite deposit described within the Property (hereafter referred to as the Bentonite Mineralized Zone or BMZ). The potential mineral resource estimate of the is a preliminary calculation to demonstrate the potential size and grade of a bentonite resource that might reasonably expected within the BMZ based on the current understanding of the geology and bentonite mineralization of the BMZ and the larger area of Property. The geology of the Property is known from drilling, trenching, surficial sampling, and compilation of geologic information (petroleum well stratigraphy, large-scale geologic maps, and existing mineral exploration data) by Headwater and APEX since 2005 (see Section 6: 'History'). The potential mineral resource estimate is based on a wireframe model of bentonitic bedrock derived from assays of diamond drill core samples collected within the BMZ in 2008; however assays of previously collected (but not yet analyzed) drill core samples and the drilling of new holes in key areas will be necessary to refine the potential resource estimate to an inferred mineral resource. The potential mineral resource described below should be considered a preliminary estimate only, and will be revised pending the acquisition of drill assay data.

The lateral area of a polygon defined by the year-2008 diamond drill holes alone is 5.2 km^2. A more realistic deposit area, extending slightly beyond the area constrained by the 2008 diamond drill holes was drawn in MicroMine™ (Fig. 6), and was used as the basis for the resource calculation presented here. The seven year-2008 drill holes were spaced 232 to 3492 m apart (average 1835 m); the lateral edge of the modeled potential bentonite resource polygon is between 55 and 1665 m from the nearest drillhole. The plan shape of the polygon is more tightly constrained in the N-S direction than the E-W direction because the extent of the deposit currently known from drilling is better constrained in the E-W direction and confidence in lateral continuity is therefore greater in the E-W direction than in the N-S direction. As noted in Section 7.4 ('Structural Geology'), the BMZ of the Property contains glacially thrusted slabs of bedrock separated by till, and the BMZ itself is bound above and below by till, which limits the vertical extent of the minable deposit. The average thickness of BMZ in the wireframed model is 25.5 m.

In addition to creating a reasonable buffer-zone around existing drill holes, landscape factors were considered in drawing the extent of the potential bentonite resource polygon. The western extent of the potential bentonite resource is based on rising topography in that direction, corresponding to greater overburden and higher expected mining costs; the eastern extent of the polygon is based on the presence of the West Prairie River, which likely limits the minable extent of the deposit in that direction. As noted above, the modeled potential resource con not be considered an inferred resource.

Table 6 shows the calculated potential bentonite resource based on the wireframed polygon described above. Representative values for total clay fraction of the ore and smectite fraction of clay were determined from the 2008 diamond drill core samples. A conservative specific gravity of 2.2 was assumed in the calculation for minable ore (based on values for clay minerals in general; industry-published densities of bentonite vary, but are generally about 2.6 g/cm^3 (kg/m^3) (e.g., http://www.halliburton.com/public/cem/contents/Chem_Compliance/web/H02088.pdf, http://www.transform-minerals.com/pdf/MSDS_Bentonite.pdf, http://www.pestell.com/msds/Bentonite%a0.pdf) and explicit testing on bentonites from within the mineralized zone of the Property will be necessary to refine the potential resource model at a later stage.

Table 6: Calculated Potential Bentonite Resource, Based on 3-Dimentional Polygon Wireframed in MicroMine.

	Symbol	Formula	Value
Total Volume of wireframed polygon (m^3):	V_{WFP}	none	202,085,462
Assumed specific gravity of ore (tonnes/m^3):	SG_{ore}	None	2.6
Total clay fraction of ore (wt%):	$wt\%_{clay}$	None	19.6
Total smectite fraction of clay:	$smec\%_{clay}$	None	67.5
Surface area of wireframed polygon (m^2):	SA_{WFP}	None	7,926,194
Total mass of smectite in wireframed polygon (kg):	m_{smec}	$= V_{WFP} * wt\%_{clay} * SG_{ore} * smec\%_{clay}$	69,513,357

*Note that clay is considered here to be the particle fraction <2μm in size.

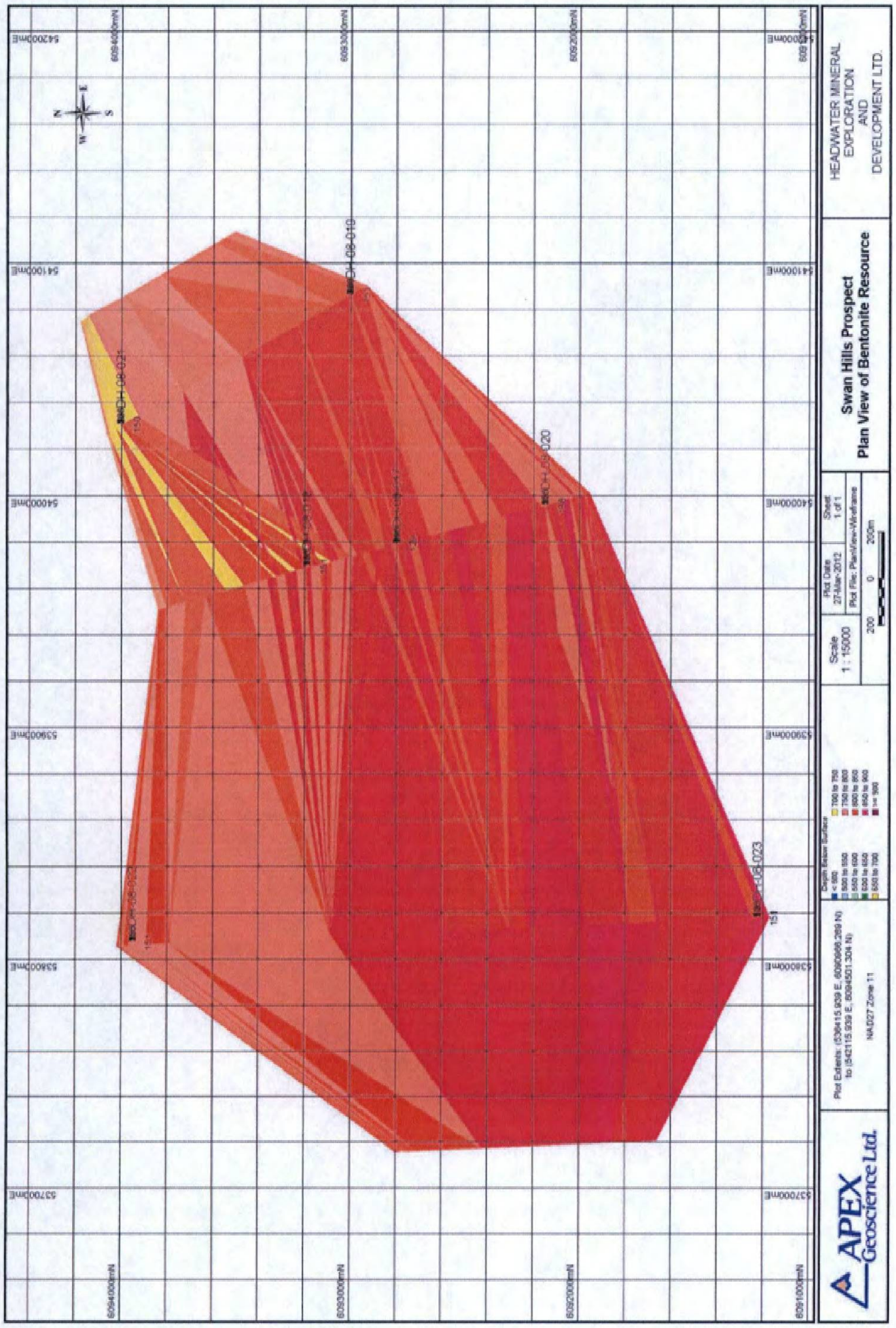


Figure 10. Plan view of wireframed bentonite potential-resource polygon created in MicroMine™.

OTHER RELEVANT DATA AND INFORMATION

In addition to the preliminary Inferred Bentonite Resource Headwater and Altaben have been working towards building a mine at the bentonite area and are currently undergoing a number of studies and investigations including, but not limited to, mining and recovery methods, project infrastructure, market studies and contracting, environmental and social/community impact studies and capital and operating cost analysis. The results of these studies are currently still pending.

INTERPRETATION AND CONCLUSIONS

In early 2008, a total of 16 auger drillholes were completed by Headwater in Township 69, Range 16 west of the 5^{th} meridian to follow up bentonitic clay mineral anomalies identified in historic surface sampling and trenching. Then in 2008, a seven hole diamond drilling program, totalling 1,020.5 m was completed to assess the bentonitic clay mineral potential of a portion of Headwater's Swan Hills Property. A total of 772 samples were collected for clay analysis, 482 of which have been processed to date for mineralogical analysis.

The clay content of the samples varies between 6-72 wt% clay. The clay fraction is mainly comprised of smectite, with 86% of the samples containing >50% smectite. Illite is the second most abundant clay comprising mostly <40% of the clay fraction. Chlorite and kaolinite commonly comprise <10% of the clay fraction. Although little information is available on current mines economic deposits tend to contain >60-80% montmorillonite (a smectite group clay). The diamond drilling has revealed that the area is underlain by a complex stratigraphy in which thrusted bedrock overlies a basal till layer. Bentonite has been recognised in the two layers: the upper layer of thrusted bedrock has an average thickness of 25 m and is underlain by a layer of clay-rich till with an average thickness of 30 m.

There is a significant potential bentonitic clay mineral deposit over an area 2.7 km by 4.3 km comprising an area of roughly 8 km2 with the potential to be much larger with further work. The resource is hosted in glacially disturbed and potentially glacially thrusted Wapiti bedrock that ranges in thickness intersected in six out of the seven holes drilled ranging from 10 m to 32 m in thickness with an average thickness of 30.5 m. Beneath the disturbed bedrock, all seven drill holes intersected a brown competent (basal?) till ranging from 17 m to 55 m in thickness and averaging 31.7 m in thickness.

A wireframe of the glacialy disturbed bentonite zone outlined by the drilling to date produces over 200 million m3 which will likely yield more than 500 million tonnes at an average of about amount of 47% clay minerals with about 67% of the clay mineral species being smectite (montmorillonite).

The CEC exchange work indicates the smectite are dominantly Ca-smectite and the CEC is good in places with up to meq/100g. Ca-smectite gnereally has poorer swelling properties than Na-smectite, however the fairly good CEC properties indicate that the smectite could either be treated to substitute Na for Ca to improve its swelling capability or it could be an idea clay for its absorption properties.

RECOMMENDATIONS

The preliminary results of the clay analyses indicate that the presence of a significant quantity of bentonite on the Property, which is hosted in two units under 0-20 m of overburden. It is warranted that the remainder of the clay samples be processed to gain a better understanding of the type and distribution of the bentonite present.

Clay analyses should be completed on the remaining samples and cation exchange capacity (CEC) analyses should be conducted on all the samples. More work along the lines of Altabens work with bulk sample studies and market studies should be conducted and a materials engineering specialist should be engaged to complete a scoping study of the clay potential of the Property based on the available information before any more exploration work is completed. An assessment of the clay usage and extraction processes should be included in the study. In order to get to a 43-101 inferred or indicated resource it will likely be required to drill some more closer spaced holes in the main target area of interest. In addition ground penetrating radar and shallow seismic surveys should also be conducted on the bentonite area to further delineate the geometry and stratigraphy of the potential deposit. The estimated cost to conduct the (Phase I) program is CDN$300,000.

Additional work that should be completed on the Property would include, a multi-faceted exploration program (Phase II) consisting of the following, but not limited to:

a) additional interpretation needs to be completed on the 2008 geophysical survey data to identify sand and gravel anomalies. The estimated cost to conduct part a is CDN$5,000;

b) samples should be collected from the remaining split core from the till layer of the diamond drill holes and processed for diamond indicator minerals to assess the distribution of DIMs in the basal till in the Lightbulb Lake Ridge area. The estimated cost to conduct part b is CDN$20,000;

c) a diamond indicator minerals stream sampling program should be conducted during 2012 to follow up on anomalous diamond indicator minerals, gold and platinum results identified from the 2008 stream samples, additional sampling should be completed in areas that are associated geophysical anomalies. The estimated cost to conduct part c is CDN$200,000;

d) gridding and ground geophysical surveying should be completed over additional high-moderate priority land based magnetic targets identified from the 2007 airborne geophysical survey, particularly targets associated with anomalous diamond indicator stream sample results (29 grids total). The estimated cost to conduct part d is CDN$350,000;

e) a total of six geophysical targets are at a drill ready stage and should be drilled as part of a fall or winter 2012-2013 drill program. The drilling may include 6-8 drillholes designed to test high priority geophysical targets in close proximity to high priority diamond indicator minerals or gold anomalies. The estimated cost to conduct part e is between CDN$500,000 and CDN$1,000,000;

f) additional formation water sampling should be completed to test the Lithium potential of the Property. Samples should be collected from individual oil wells rather than batteries, which should be selected to target specific formations. The estimated cost to conduct a small part f sampling program is CDN$20,000;

The estimated budget to complete the multi-faceted Phase II exploration program is CDN$1.1 million to CDN$1.6 million.

APEX Geoscience Ltd.

PROFESSIONAL GEOLOGIST MICHAEL B. DUFRESNE ALBERTA

May 1, 2012

Edmonton, Alberta, Canada

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

REFERENCES

Allan, J. and Creaney, S. (1991). Oil families of the Western Canada Basin. Bulletin of Canadian Petroleum Geology, vol. 39, pp. 107-122.

Babet, P.H., 1966, Some characteristics of bentonite in Alberta. Research Council of Alberta, Report 66-2, 25 p.

Bhattacharya, J.P., (1994). Cretaceous Dunvegan Formation of the Western Canada Sedimentary Basin. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4, pp. 365-373.

Bloch, J., Schroder-Adams, C., Leckie, D.A., McIntyre, D.J., Craig, J. and Staniland, M. (1993). Revised stratigraphy of the Lower Colorado Group (Albian to Turonian), Western Canada; Bulletin of Canadian Petroleum Geology, vol. 41, no. 3, pp. 325-348.

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, vol. 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.

Byrne, P.J.S., (1955). Bentonite in Alberta. Research Council of Alberta Report 71, 20 p.

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., Hiller, W.D., Hood, C.T., Pryde, R.P. and Skelton, D.N. (1998). The Buffalo Hills Kimberlite Province, North-central Alberta, Canada; unpublished abstract by Ashton Mining of Canada, April 1998.

Carter, J.S. (1957). Final Geological Report On Bentonite, Grande Prairie, Alberta. Magnet Cove Barium Corporation Limited. AGS Mineral Report MIN 19570016, 3 pp.

Chin, L. (1998). Property and exploration potential evaluation of the Sovereign Mining and Exploration Ltd. property southwest of Slave Lake; unpublished letter report for Sovereign Mining and Exploration Ltd., prepared by APEX Geoscience Ltd.

Chin, L. (1999). Preliminary report, Lightbulb Lake Township data analysis results; unpublished letter report for Sovereign Mining and Exploration Ltd., prepared by APEX Geoscience Ltd.

Christidis, G.E., and Huff, W.D., (2009). Geological aspects and genesis of bentonites. Elements, vol. 5, pp. 93-98.

Chu, M. (1978). Geology and coal resources of the Wapiti Formation of North Central Alberta. Alberta Research Council, Open File Report 1978-12.

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

Dawson, F.M., Evans, C.G., Marsh, R., Richardson, R. (1994). Uppermost Cretaceous and Tertiary strata of the Western Canada Sedimentary Basin. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4.

Dufresne, M.B. (2008). Assessment Report for Diamond, Gold and Bentonite Exploration on the Swan Hills Property, North-Central Alberta, Metallic Mineral Permits: 9302040008, 9302040010, 9302040012, 302040014, 9302040016, 9302040018, 9302040020, 9305031137 to 9305031144, 9306011206 to 9306011251, 9306020546 to 9306020549, 9306050833 to 9306050836 and 9307100729. Unpublished Assessment Report Prepared on behalf of Headwater Minerals Exploration and Development Ltd. by APEX Geoscience Ltd., 572 pp.

Dufresne, M.B. (2007). Assessment Report for Diamond and Gold Exploration on the Swan Hills Property, North-Central Alberta, Metallic Mineral Permits 9306050833 to 9306050836, 9302040008, 9302040010, 9302040012, 9302040014, 9302040016, 9302040018, 9302040020, 9305031137 to 9305031144, 9306011206 to 9306011251 and 9306020546 to 9306020549; Unpublished

Assessment Report Prepared on behalf of Headwater Minerals Exploration and Development Ltd. by APEX Geoscience Ltd., 54 pp.

Dufresne, M.B. (2005). Assessment Report, Swan Hills Property, North Central Alberta, Mineral Permits 9397120049, 9300070004 to 9300070008, 9300080009 to 9300080011 and 9302040003 to 9302040023; Unpublished Assessment Report Prepared on behalf of Sovereign Mining Ltd. by APEX Geoscience Ltd., 37 pp.

Dufresne, M.B., Banas, A. (2010). "Assessment Report For Diamond, Gold, Platinum, Bentonite and Lithium Exploration On The Swan Hills Property, North-Central Alberta, Metallic Mineral Permits: 9302040008, 9302040010, 9302040012, 9302040014, 9302040016, 9302040018, 9302040020, 9305031137 to 9305031144, 9306011206 to 9306011251, 9306020546 to 9306020549, 9306050833 to 9306050836, 9307100729, 9308050784, 9308120834 to 93081208882, 9309020198 to 9309020200. Unpublished Assessment Report Prepared on behalf of Headwater Minerals Exploration and Development Ltd. by APEX Geoscience Ltd., 1319 pp.

Dufresne, M.B. and Copeland, D. (2000). Diamond and gold potential of Sovereign Mining Ltd.'s Metallic and Industrial Mineral Permit No. 9397120049 and Lease No. 9496050002, Swan Hills Area, North-Central Alberta; Unpublished Assessment Report Prepared on behalf of Sovereign Mining Ltd. by APEX Geoscience Ltd., 29 pp.

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. and Kim, H. (2002). Assessment Report, Swan Hills Property, North Central Alberta, Mineral Permits 9300070001 to 9300070008, 9300180001 to 9300180022 and 9397120049; Unpublished Assessment Report Prepared on behalf of Sovereign Mining Ltd. by APEX Geoscience Ltd., 28 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.

Dumont, M. (2008). Canadian Minerals Yearbook 2008 Clays. Natural Resources Canada, 10 pp.

Eccles, D.R., Heaman, L.M., and Sweet, A.R., (2009). Kimberlite-sourced bentonite, it's paleoenvironment and implications for the Late Cretaceous K14 limberlite cluster, Northern Alberta. Canadian Journal of Earth Science, Vol. 45, pp. 531-547.

Eccles, D.R., Jean, G.M. (2010). Lithium Groundwater and Formation-Water Geochemical Data (tabular data, tab delimited format), Alberta Geological Survey Digital Data 2010-0001, non-paginated

Edwards, D.E., Barklay, J.E., Gibson, D.W., Kville, G.E., and Halton, E. (1994). Triassic Strata of the Western Canada Sedimentary Basin. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4., pp. 259-275.

Fanti, F., (2009). Bentonite chemical features as proxy of late Cretaceous provenance changes: A case study from the Western Interior Basin of Canada. Sedimentary Geology, Vol. 217, pp. 112-127.

Fenton, M.M., Schreiner, B.T., Nielson, E., and Pawlowicz, (1994). Quaternary geology of the western great plains. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4.

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.

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

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

Grim, R.E., and Güven, N., (1978). Bentonites: geology, mineralogy, properties and uses. Developments in Sedimentology 24. Elsevier, Amsterdam, 256 p.

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, pp. 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, pp. 147-171.

Halbertsma, H.L. (1994). Devonian Wabamun Group of the Western Canada Sedimentary Basin. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4.

Hamblin, A.P., (2004). Paskapoo-Porcupine Hills Formation of Western Alberta: synthesis of regional geology and resource potential. Geological Survey of CanadaOpen File 4679. 31 p.

Hamilton, W.N. (1972). Industrial Minerals and their Utilization in Alberta. Research Council of Alberta Open File Report 1972-19.

Hayes, B.J.R., Christopher, J.E., Rosenthal, L., Los, G., McKercher, B., Minken, D., Tremblay, Y.M., and Fennell, J. (1994). Cretaceous Mannville Group of the Western Canada Sedimentary Basin. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4, pp. 317-334.

Henderson, C.M., Richards, B.C., Barclay, J.E. (1994). Permian strata of the Western Canada Sedimentary Basin. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4.

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, pp. 3-72.

Hitchon, B., Bachu, S., Underschultz, J.R., Yuan, L.P. (1995) Industrial Mineral Potential of Alberta Formation Waters. Bulletin 62, Alberta Geological Survey, 64 pp.

Hora, Z.D. (1999): Bentonite; in Selected British Columbia Mineral Deposit Profiles, Volume 3, Industrial Minerals, G.J. Simandl, Z.D. Hora and D.V. Lefebure, Editors, British Columbia Ministry of Energy and Mines.

Hudson, J.H., (1982), ceramic clays and bentonites of the prairie provinces. In: Guillet, G.R., and Martin, W. (eds.), The geology of industrial minerals in Canada. Canadian Institute of Mining and Metallurgy Special Volume 29, pp. 184-187.

Klassen, R.W. (1989). Quaternary geology of the Southern Canadian Interior Plains; *in* Chapter 2 of the Quaternary Geology of Canada and Greenland, R.J. Fulton (*ed.)*, Geological Survey of Canada, Geology of Canada, no. 1, pp. 138-174.

Kruchkowski, E.R. (2000). Report on Swan Hills permit area; Unpublished Assessment report prepared on behalf of Teuton Resource Corp. 20 pp.

Leckie, D.A., Singh, C., Bloch, J., Wilson, M. and Wall, J. (1992). An Anoxic event at the Albian-Cenomanian Boundary: the Fish Scale Marker Bed, Northern Alberta, Canada; Palaeogeography, Palaeoclimatology, Palaeoecology, vol. 92, pp. 139-166.

Leckie, D.A., Bhattacharya, J.P., Bloch, J. Gilboy, C.F., and Norris, B., (1994). Cretaceous Colorado/Alberta Group of the Western Canada Sedimentary Basin. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4.

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.

Manning, D.A.C., (1995). Introduction to Industrial Minerals. Chapman and Hall, Cambridge, UK, 276 p.

Master, P.P. (1993). Bentonite Alberta Mineral Commodity Profile. Alberta Geological Survey Open File Report 1993-06, 58 p.

Meijer Drees, N.C. (1994). Devonian Elk Point Group of the Western Canada Sedimentary Basin. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4.

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, pp. 1-16.

Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4, 510 p.

Muehlenbachs, K., Burwash, R.A. and Chacko, T. (1993). A major oxygen isotope anomaly in the basement rocks of Alberta; *In* Ross, G.M. (ed.), *Lithoprobe* Alberta Basement Transect Workshop, Lithoprobe Secretariat, University of British Columbia, Lithoprobe Report #31, pp. 120-124.

Muehlenbachs, K., Burwash, R.A. and Chacko, T. (1994). The oxygen and hydrogen isotope composition of Alberta basement rocks: Possible implications for crustal and paleogeographic reconstructions of basement terrains; *In* Ross, G.M. (ed.), *Lithoprobe* Alberta Basement Transect Workshop, Lithoprobe Secretariat, University of British Columbia, Lithoprobe Report #37, pp. 250-253.

Murray, H.H., Applied Clay Mineralogy: occurances, processing and application of kaolines, bentonites, palygorskite-sepiolite, and common clays, (2007). Developments in Clay Science 2, Elsevier, Amsterdam, 180 p.

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.

O'Connell, S.C. (1994). Geological history of the Peace River Arch. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4, pp. 431-

Oldale, H.S., Munday, R.J. (1994). Devonian Beaverhill Lake Group of the Western Canada Sedimentary Basin. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4.

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.

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

Poulton, T.P., Christopher, J.E., Hayes, B.J.R., Losert, J., Tittemore, J., Gilchrist, R.D. (1994). Jurassic and lowermost Cretaceous strata of the Western Canada Sedimentary Basin. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4, pp. 297-316.

Richards, B.C., Barclay, J.E., Bryan, D., Hartling, A., Henderson, H.M., and Hinds, R.C. (1994). Carboniferous strata of the Western Canada Sedimentary Basin. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4.

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, pp. 19-20.

Rutherford, R.L., (1930), Geology and water resources in parts of the Peace River and Grande Prairie Districts, Alberta, Research Council of Alberta, Report 21.

Scafe, D.W., (1975), Alberta Bentonites. Alberta Research Council, Economic Geology Report 2, 19 p.

Scott Smith, B.H. (1995). Petrology and diamonds. Exploration and Mining Geology, vol. 4, no. 2, pp. 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.

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, pp. 528-544.

Slind, O.L., Andrews, G.D., Murray, D.L., Norford, B.S., Paterson, D.F., Salas, C.J., Tawardos, E.E. (1994). Middle Cambrian to Lower Ordivician strata of the Western Canada Sedimentary Basin. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4.

Smith, D.G., (1994). Paleogeographic evolution of the Western Canada Foreland Basin. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4, pp. 277-296.

Spence, H., (1924). Bentonite. Canada Dept. of Mines , Mines Branch Report 626. F.A. Acland Printers, Ottawa, 35 p.

Switzer, S.B, Holland, W.G., Christie, D.S., Graf, G.C., Hedinger, A.S., McAuley, R.J., Wierzbicki, R.A., Packard, J.J. (1994). Devonian Woodbend-Winterburn strata of the Western Canada Sedimentary Basin. In: Mossop, G.D., Shetsen, I. (compilers). Geological atlas of the Western Canada Sedimentary Basin. Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4.

Tokarsky, O. (1977). Hydrogeology of the Iosegun Lake Area, Alberta. Research Council of Alberta, Report 76-2.

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.

CERTIFICATE OF AUTHOR

I, Michael B. Dufresne, residing at [redacted] Edmonton, Alberta, Canada do hereby certify that:

1. I am a principal and President of APEX Geoscience Ltd. ("APEX"), Suite 200, 9797 – 45th Avenue, Edmonton, Alberta, Canada. I am the author of the report entitled: ASSESSMENT REPORT FOR HEADWATER MINERAL EXPLORATION AND DEVELOPMENT LTD.'S SWAN HILLS PROPERTY, ALBERTA, METALLIC MINERAL PERMITS: 9302040008, 9302040012, 9302040014, 9302040016, 9302040018, 9302040020, 9305031142, 9306011206 to 9306011210, 9306011212, 9306011215, 9306011221 to 9306011236, 9306011239, 9306011242, 9306011243, 9306011247, 9306011249 to 9306011251, 9306020546 to 9306020549, 9306050833 to 9306050836, 9307100729, 9311060877 to 9311060933, 9311110533 to 9311110563, 9312020288 to 9312020309 and am responsible for the supervision of the preparation of the entire report.

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

3. I am a Professional Geologist registered with APEGGA (Association of Professional Engineers, Geologists and Geophysicists) and a 'Qualified Person' in relation to the subject matter of this report. I have worked as a consulting geologist for more than 20 years since my graduation from university and I have conducted and directed exploration programs, property examinations and evaluations for a number of commodities and deposit types.

4. I have not received, nor do I expect to receive, any interest, directly or indirectly, in the Swan Hills Permits.

5. To the best of my knowledge, 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 would make the technical report misleading.

6. I have visited the Property and have been involved in the exploration at the Property by APEX Geoscience Ltd. for over 10 years on behalf of Headwater Minerals and Exploration Ltd. and their predecessors.

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

May 1, 2012

Edmonton, Alberta

APPENDIX 1

2010 - 2012 EXPENDITURES

Appendix 1. 2010 - 2012 Statement of Expenditures - Swan Hills Property
Headwater Minerals Exploration and Development Ltd.

CATEGORY	DESCRIPTION	COST ($)	SUBTOTAL ($)
Salary and Wages			$778,000.00
	Field Supervisor		
	[redacted] Consulting $16,000/mth x 24 mths	$384,000.00	
	Technical Support and Management - Altaben		
	[redacted]$14,545/month x 11 months	$159,995.00	
	[redacted]P.Eng. $175/hour x 585 hours	$102,375.00	
	[redacted]$130/hour x 490.7 hours	$63,790.00	
	[redacted]$53/hour x 1,280 hours	$67,840.00	
	[redacted]	$7,500.00	
Field Costs			$195,647.24
	Fuel, Food, Accommodation & Communication	$49,825.78	
	Includes accommodation, food, travel, fuel		
	and communications for fieldwork		
	Field Supplies, Equipment and Repairs	$18,391.02	
	supplies include batteries, bags, containers		
	flashlights, chainsaw and prospecting equipment		
	items, along with modifications and repairs		
	Equipment Rentals	$58,495.00	
	includes trucks, ATV's, chainsaws, generators, tralior		
	Field Office & Warehouse		
	Includes rental and utilities	$68,935.44	
Subcontracting Services			$779,822.58
	Road Preparation & Trenching Costs		
	Williscroft Serivces - Road and Drill Pad Building, Trenching	$341,250.00	
	Rig Moves, Matting, Trucking and Trailors		
	Analysis		
	Saskatchewan Research Council	$41,800.00	
	First American Scientific test & setup 7 days x $9,000/day	$63,000.00	
	Mainland Industrial setup & engineering & process 7 days x $3,800	$25,600.00	
	Hosakawa Jet Sieves Particle Sizer - Rental 19 days x $178/day	$3,382.00	
	GR Petrology Chemical Testing	$693.04	
	Exova Labs 62 tests x $112 per analysis	$6,944.00	
	Geological & Environmental Consultants		
	APEX Geoscience, includes Drilling Supervision, Fieldwork	$46,681.25	
	Geological and Reporting		
	ExPect Prospecting - [redacted] @ $10,000/month	$180,000.00	
	Lee Long Enterprises Ltd. - Field Supervisor @$10,000/month	$40,000.00	
	Lee Long Enterprises Ltd. - Fuel & travel Expenses	$15,522.29	
	[redacted] Consultant 23 days x $650/day	$14,950.00	
		TOTAL 2008 - 2010 EXPLORATION COSTS	$1,753,469.82
Office Charges, Administrative, General			$175,346.98
	Administration Costs at 10%	$175,346.98	
		TOTAL 2010 - 2012 EXPLORATION COSTS AND ALLOWABLE ADMINISTRATION	**$1,928,816.80**
[redacted]			
Headwater Mineral Exploration and Development Ltd.			
Carey Hay, President			

APPENDIX 2

2009 ROCK GRAB SAMPLES DESCRIPTIONS

Appendix 2: 2009 rock grab sample descroptions

Sample	Xnad27z11	Ynad27z11	Date_Collected	Sampler	Material	Lithology	Comments
09TGP001	522470	6072273	22-Jul-09	Tara Gunson	Boulder	Sandstone/wacke	Boulders in dugout along road of orange stained (rusty) sandstone containing clasts of iron nodules and coal fragments, highly effervescent. Pit dimensions ~ 100 x 50 x 20 ft.
09TGP002	542959	6063096	23-Jul-09	Tara Gunson	Outcrop	Sandstone	Outcrop of red stained sandstone exposed along road cut at anomaly SWH002
09TGP003	543030	6062978	23-Jul-09	Tara Gunson	Boulder/outcrop?	Silica?	Sample from a mound under a tree, on southern edge of anomaly SWH002, looks like either silicified petrified wood or highly folded/strained bedded material? Multi-coloured.
09TGP004	563202	6043460	24-Jul-09	Tara Gunson	Boulder	Sandstone	Boulders of calcified sandstone along old road cut, rounded edges, 10cm thick beds, may be outcrop as same sandstone along main roads in area
09TGP005	568493	6054333	29-Jul-09	Tara Gunson	Boulder	Gossan	Boulder of gossanous material (iron stained, highly weathered, rotten appearance) near location termed "Sulfur Spring" by headwater. Said to have been originally found as "anthill-type" formation where spring was bringing up precipitate. Right beside Meekwap lake Road, near well at 4-20-65-16W5, with tracks from machines all around and debris such as wood etc.
09TGP006	554234	6065193	29-Jul-09	Tara Gunson	Outcrop	Siltstone	Outcrop of calcified siltstone seen in water drainage beside old road on hill, just south of large metal bridge on Goose River. Highly effervescent.
09TGP007	611579	6089310	30-Jul-09	Tara Gunson	Boulder	Ironstone	Nodules of rusty coloured iron in light grey bentonitic clay on 2-2-69-9W5 lease.
09TGP008	580674	6047334	18-Aug-09	Tara Gunson	Outcrop	Sandstone	From pit along road dug to fix pipe leak, sandstone with small round clasts of siltstone, some with orange staining around them. Same location as 09TGP009 (boulders)
09TGP009	580674	6047334	18-Aug-09	Tara Gunson	Boulder	Sandstone	From pit along road dug to fix pipe leak, boulders of hard, cemented, light grey sandstone (calficied, highly effervesses). Same location as 09TGP008 (sand with silt clasts)
09TGP010	454451	6145988	19-Aug-09	Tara Gunson	Vein	Sandstone	From pit dug at 16-35-74-25W5 ~200m from MLK. Host rock is yellowish sands with white veins (looks like large scale stockwork). Sample of rock from within white veins is actually dark grey cemented sandstone (calcified, highly effervescent).

APPENDIX 3

2009 - 2010 LAB CERTIFICATES

Apex Geoscience Ltd
Attention: Michael Dufresne
PO #/Project:
Samples: 14

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

Report No: G-09-361

Date of Report: April 14, 2009

Rare Earth Element Analysis

Column Header Details

Ce by ICP in wt% (Ce)
Dy by ICP in wt% (Dy)
Er by ICP in wt% (Er)
Eu by ICP in wt% (Eu)
Ga by ICP in wt% (Ga)

Gd by ICP in wt% (Gd)
Hf by ICP in wt% (Hf)
Ho by ICP in wt% (Ho)
La by ICP in wt% (La)
Lu by ICP in wt% (Lu)

Nb by ICP in wt% (Nb)
Nd by ICP in wt% (Nd)
Pr by ICP in wt% (Pr)
Sc by ICP in wt% (Sc)
Sm by ICP in wt% (Sm)

Tb by ICP in wt% (Tb)
Th by ICP in wt% (Th)
Tm by ICP in wt% (Tm)
U by ICP in wt% (U, ICP)
Y by ICP in wt% (Y)

Yb by ICP in wt% (Yb)

Sample Number	Ce wt%	Dy wt%	Er wt%	Eu wt%	Ga wt%	Gd wt%	Hf wt%	Ho wt%	La wt%	Lu wt%	Nb wt%	Nd wt%	Pr wt%	Sc wt%	Sm wt%	Tb wt%	Th wt%	Tm wt%	U, ICP wt%
GSP2	12.6	0.173	0.072	0.235	<0.002	0.544	0.008	0.011	5.45	<0.002	<0.002	6.14	1.54	0.006	0.995	0.060	2.98	0.003	0.028
08-019-TGP-001	0.008	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	0.004	<0.002	<0.002	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
08-021-TGP-001	0.005	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
08-021-TGP-002	0.005	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
08-023-TGP-001	0.005	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
08-023-TGP-002	0.005	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
08-023-TGP-003	0.005	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
08-023-TGP-004	0.005	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
08-023-TGP-005	0.008	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	0.005	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	<0.002
08-023-TGP-006	0.004	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
08-023-TGP-007	0.005	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
08-SWH-002-JKP-001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
09DAP001	0.005	<0.002	<0.002	<0.002	0.004	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
09DAP001 R	0.006	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

Apex Geoscience Ltd
Attention: Michael Dufresne
PO #/Project:
Samples: 14

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

Report No: G-09-361

Date of Report: April 14, 2009

Rare Earth Element Analysis

Sample Number	Y wt%	Yb wt%
GSP2	0.276	0.010
08-019-TGP-001	0.003	<0.002
08-021-TGP-001	<0.002	<0.002
08-021-TGP-002	<0.002	<0.002
08-023-TGP-001	<0.002	<0.002
08-023-TGP-002	<0.002	<0.002
08-023-TGP-003	0.002	<0.002
08-023-TGP-004	<0.002	<0.002
08-023-TGP-005	<0.002	<0.002
08-023-TGP-006	<0.002	<0.002
08-023-TGP-007	0.002	<0.002
08-SWH-002-JKP-001	<0.002	<0.002
09DAP001	<0.002	<0.002
09DAP001 R	<0.002	<0.002

REE Analysis: A 0.1 gram pulp is fused at 1000 C with lithium metaborate then dissolved in dilute HNO3.

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

Apex Geoscience Ltd
Attention: Michael Dufresne
PO #/Project:
Samples: 14

Report No: G-09-361

Date of Report: April 14, 2009

ICP Whole Rock Assay

Lithium Metaborate Fusion

Column Header Details

Aluminum in wt % (Al2O3)
Calcium in wt % (CaO)
Iron in wt % (Fe2O3)
Potassium in wt % (K2O)
Magnesium in wt % (MgO)

Manganese in wt % (MnO)
Sodium in wt % (Na2O)
Phosphorus in wt % (P2O5)
Titanium in wt % (TiO2)
SiO2 by ICP in wt % (SiO2)

Barium in ppm (Ba)
Chromium in ppm (Cr)
Scandium in ppm (Sc)
Strontium in ppm (Sr)
Yttrium in ppm (Y)

Zirconium in ppm (Zr)
Loss on Ignition in wt % (LOI)
SUM (SUM)
Nickel in ppm (Ni)

Sample Number	Al2O3 wt %	CaO wt %	Fe2O3 wt %	K2O wt %	MgO wt %	MnO wt %	Na2O wt %	P2O5 wt %	TiO2 wt %	SiO2 wt %	Ba ppm	Cr ppm	Sc ppm	Sr ppm	Y ppm	Zr ppm	LOI wt %	SUM	Ni ppm
GSP2	15.1	2.23	4.92	5.53	0.99	0.04	2.78	0.33	0.67	66.5	1380	17	7	267	36	565	N/R	99.09	15
08-019-TGP-001	14.0	0.94	4.47	1.71	0.90	0.01	1.74	0.02	0.60	62.5	718	82	13	188	37	144	10.4	97.29	18
08-021-TGP-001	15.3	1.06	5.26	2.26	0.94	0.01	1.78	0.02	0.60	63.9	848	81	14	197	22	144	9.8	100.93	15
08-021-TGP-002	16.1	0.94	5.61	2.09	1.18	0.01	1.67	0.02	0.69	63.1	741	89	16	180	24	126	9.3	100.71	37
08-023-TGP-001	15.0	1.20	4.26	1.78	0.89	<0.01	1.97	<0.01	0.60	65.0	700	75	15	205	18	142	9.0	99.70	5
08-023-TGP-002	15.5	1.49	4.50	1.24	1.42	0.01	1.91	0.02	0.48	62.2	784	48	11	227	19	143	12.9	101.67	4
08-023-TGP-003	15.2	1.18	4.84	2.22	1.29	0.01	1.75	0.03	0.60	60.7	752	68	14	199	25	127	14.3	102.12	14
08-023-TGP-004	14.2	1.65	5.05	2.03	1.10	0.03	1.88	0.02	0.63	61.4	751	74	14	203	22	133	13.1	101.09	54
08-023-TGP-005	15.6	1.59	5.04	0.33	1.51	<0.01	1.39	0.04	0.17	52.8	432	6	2	178	18	123	22.5	100.97	6
08-023-TGP-006	13.3	1.17	2.97	1.19	0.85	<0.01	1.69	<0.01	0.52	59.0	1030	56	10	203	18	150	21.3	101.99	4
08-023-TGP-007	15.2	1.44	4.03	2.00	1.56	0.04	1.85	0.10	0.66	61.9	787	80	15	208	24	129	12.6	101.38	23
08-SWH-002-JKP-001	0.44	0.06	0.16	0.04	0.05	0.02	0.02	<0.01	<0.01	99.2	40	7	<2	6	<2	8	0.4	100.39	2
09DAP001	15.4	2.34	5.96	2.07	1.94	0.04	0.81	0.10	0.69	58.8	1000	87	18	173	22	147	12.0	100.15	34
09DAP001 R	15.4	2.37	5.98	2.08	1.95	0.04	0.83	0.10	0.70	59.2	1020	86	17	176	23	144	11.9	100.55	36

Whole Rock Analysis: A 0.1 gram pulp is fused at 1000 C with lithium metaborate then dissolved in dilute HNO3.

SRC Innovation Place
Attention: Steve Creighton
PO #/Project:
Samples: 51

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

Report No: G-10-235

Date of Report: March 12, 2010

ICP1 Partial Digestion

Column Header Details

Silver in ppm (Ag)
Arsenic in ppm (As)
Bismuth in ppm (Bi)
Cobalt in ppm (Co)
Copper in ppm (Cu)

Germanium in ppm (Ge)
Mercury in ppm (Hg)
Molybdenum in ppm (Mo)
Nickel in ppm (Ni)
Lead in ppm (Pb)

Antimony in ppm (Sb)
Selenium in ppm (Se)
Tellurium in ppm (Te)
Uranium in ppm (U, ICP)
Vanadium in ppm (V)

Zinc in ppm (Zn)

SRC Innovation Place
Attention: Steve Creighton
PO #/Project:
Samples: 51

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

Report No: G-10-235

Date of Report: March 12, 2010

ICP1 Partial Digestion

Sample Number	Ag ppm	As ppm	Bi ppm	Co ppm	Cu ppm	Ge ppm	Hg ppm	Mo ppm	Ni ppm	Pb ppm	Sb ppm	Se ppm	Te ppm	U, ICP ppm	V ppm	Zn ppm
CAR110	2.9	384	20	67	210	<1	<1	53	362	401	<1	4	1	3180	132	98
09-RLP-300	<0.2	1	<1	2	6	<1	<1	<1	7	24	<1	3	<1	6	20	16
09-RLP-301	<0.2	2	<1	4	5	<1	<1	<1	9	24	<1	8	<1	5	41	49
09-RLP-302	<0.2	<1	<1	1	1	<1	<1	<1	1	16	<1	4	<1	4	9	27
09-RLP-303	<0.2	1	<1	5	16	<1	<1	1	23	18	<1	11	<1	2	79	22
09-RLP-304	<0.2	<1	<1	<1	3	<1	<1	<1	2	14	<1	12	<1	3	22	26
09-RLP-305	<0.2	<1	<1	<1	<1	<1	<1	<1	1	24	<1	2	<1	5	11	33
09-RLP-306	<0.2	<1	<1	1	2	<1	<1	<1	2	26	<1	1	<1	10	17	22
09-RLP-307	<0.2	1	<1	4	9	<1	<1	<1	6	19	<1	<1	<1	5	17	17
09-RLP-308	<0.2	1	<1	2	47	<1	<1	<1	8	16	<1	<1	<1	2	19	51
09-RLP-310	<0.2	1	<1	3	24	<1	<1	<1	10	27	<1	<1	<1	5	8	86
09-RLP-311	<0.2	6	<1	8	26	<1	<1	<1	21	18	<1	<1	<1	4	12	71
09-RLP-312	<0.2	4	<1	8	11	<1	<1	<1	23	11	<1	1	<1	1	25	48
09-SWH02-A1	<0.2	<1	<1	1	6	<1	<1	2	10	2	<1	<1	<1	1	13	9
09-SWH02-A2	<0.2	1	<1	2	6	<1	<1	1	13	4	<1	<1	<1	2	24	16
09-SWH02-A3	<0.2	2	<1	1	7	<1	<1	<1	22	19	<1	7	<1	3	18	33
09-SWH02-A4	<0.2	2	<1	14	11	<1	<1	1	36	10	<1	8	<1	5	31	20
09-SWH02-A5	<0.2	<1	<1	4	8	<1	<1	<1	10	26	<1	<1	<1	5	6	24
09-SWH02-A6	<0.2	<1	<1	3	4	<1	<1	<1	6	21	<1	1	<1	5	5	41
09-SWH02-A7	<0.2	1	<1	6	5	<1	<1	<1	8	23	<1	2	<1	5	17	44
CAR110	3.1	396	20	66	217	<1	<1	59	357	406	<1	3	<1	3290	134	100
09-SWH02-A8	<0.2	2	<1	39	32	<1	<1	1	47	22	<1	3	<1	6	48	56
09-SWH02-A9	<0.2	3	<1	12	46	<1	<1	<1	43	16	<1	<1	<1	2	23	100
09-SWH02-A10	<0.2	11	<1	11	27	<1	<1	<1	41	10	<1	<1	<1	2	16	84
09-SWH02-A11	<0.2	1	<1	1	3	<1	<1	<1	3	27	<1	<1	<1	5	29	37
09-SWH02-A13	<0.2	9	<1	16	17	<1	<1	1	50	11	<1	<1	<1	3	11	88
09-SWH02-B1	<0.2	11	<1	6	8	<1	<1	1	15	8	<1	<1	<1	2	19	47
09-SWH02-B2	<0.2	9	<1	6	8	<1	<1	1	16	8	<1	<1	<1	2	21	49
09-SWH02-B2b TILL	<0.2	3	<1	6	8	<1	<1	1	17	8	<1	<1	<1	2	21	48
09-SWH02-B3	<0.2	5	<1	8	40	<1	<1	<1	35	13	<1	<1	<1	2	17	109
09-SWH02-B4	<0.2	7	<1	12	12	<1	<1	2	38	8	<1	<1	<1	3	20	45
09-SWH02-B5	<0.2	6	<1	9	37	<1	<1	1	35	12	<1	<1	<1	2	31	99
09-SWH02-B7	<0.2	3	<1	5	14	<1	<1	1	21	14	<1	1	<1	3	46	44
09-SWH02-E1	<0.2	2	<1	2	3	<1	<1	2	12	<1	<1	<1	<1	<1	6	6
09-SWH02-E2	<0.2	1	<1	1	6	<1	<1	1	7	2	<1	<1	<1	1	46	9
09-SWH02-E3	<0.2	<1	<1	<1	2	<1	<1	2	5	4	<1	<1	<1	2	9	18
09-SWH02-E4	<0.2	<1	<1	<1	5	<1	<1	<1	3	12	<1	5	<1	4	17	24
09-SWH02-E5	<0.2	1	<1	<1	2	<1	<1	<1	3	14	<1	4	<1	5	11	35
09-SWH02-E6	<0.2	<1	<1	6	26	<1	<1	<1	11	11	<1	2	<1	3	18	39
09-SWH02-E2 R	<0.2	1	<1	1	6	<1	<1	1	6	2	<1	1	<1	1	46	9

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

SRC Innovation Place
Attention: Steve Creighton
PO #/Project:
Samples: 51

Report No: G-10-235

Date of Report: March 12, 2010

ICP1 Partial Digestion

Sample Number	Ag ppm	As ppm	Bi ppm	Co ppm	Cu ppm	Ge ppm	Hg ppm	Mo ppm	Ni ppm	Pb ppm	Sb ppm	Se ppm	Te ppm	U, ICP ppm	V ppm	Zn ppm
CAR110	3.2	387	20	69	208	<1	<1	54	363	394	<1	3	<1	3140	136	99
09-SWH02-E7	<0.2	1	<1	6	50	<1	<1	<1	22	17	<1	1	<1	2	18	86
09-TGP-001	<0.2	5	<1	8	13	<1	<1	1	17	10	<1	<1	1	<1	69	62
09-TGP-002	<0.2	1	<1	2	7	<1	<1	1	8	5	<1	<1	<1	1	19	12
09-TGP-004	<0.2	5	1	5	8	<1	<1	2	16	2	<1	<1	<1	<1	33	41
09-TGP-005	<0.2	35	<1	34	491	<1	<1	378	108	75	<1	<1	19	1	28	112
09-TGP-006	<0.2	7	<1	8	30	<1	<1	5	27	6	<1	<1	<1	<1	36	61
09-TGP-007	1.2	4	<1	11	13	<1	<1	<1	17	12	<1	<1	34	2	104	79
09-TGP-008	<0.2	5	<1	14	32	<1	<1	3	73	11	<1	<1	3	1	112	87
09-TGP-009	<0.2	6	<1	19	24	<1	<1	2	39	7	<1	<1	<1	<1	54	69
09-TGP-009 R	<0.2	7	<1	19	23	<1	<1	2	39	6	<1	<1	<1	<1	53	69

Partial Digestion: A 1.00 g pulp is digested with 2.25 ml of 8:1 HNO_3:HCl for 1 hour at 95C.
The standard is CAR110.

SRC Innovation Place
Attention: Steve Creighton
PO #/Project:
Samples: 51

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

Report No: G-10-235

Date of Report: March 12, 2010

ICP1 Total Digestion

Column Header Details

Silver in ppm (Ag)
Aluminum in wt % (Al2O3)
Barium in ppm (Ba)
Beryllium in ppm (Be)
Calcium in wt % (CaO)

Cadmium in ppm (Cd)
Cerium in ppm (Ce)
Cobalt in ppm (Co)
Chromium in ppm (Cr)
Copper in ppm (Cu)

Dysprnnosium in ppm (Dy)
Erbium in ppm (Er)
Europium in ppm (Eu)
Iron in wt % (Fe2O3)
Gallium in ppm (Ga)

Gadolinium in ppm (Gd)
Hafnium in ppm (Hf)
Holmium in ppm (Ho)
Potassium in wt % (K2O)
Lanthanum in ppm (La)

Lithium in ppm (Li)
Magnesium in wt % (MgO)
Manganese in wt % (MnO)
Molybdenum in ppm (Mo)
Sodium in wt % (Na2O)

Niobium in ppm (Nb)
Neodymium in ppm (Nd)
Nickel in ppm (Ni)
Phosphorus in wt % (P2O5)
Lead in ppm (Pb)

Praseodymium in ppm (Pr)
Scandium in ppm (Sc)
Samarium in ppm (Sm)
Tin in ppm (Sn)
Strontium in ppm (Sr)

Tantalum in ppm (Ta)
Terbium in ppm (Tb)
Thorium in ppm (Th)
Titanium in wt % (TiO2)
Uranium in ppm (U, ICP)

SRC Innovation Place
Attention: Steve Creighton
PO #/Project:
Samples: 51

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

Report No: G-10-235

Date of Report: March 12, 2010

ICP1 Total Digestion

Column Header Details

Vanadium in ppm (V)
Tungsten in ppm (W)
Yttrium in ppm (Y)
Ytterbium in ppm (Yb)
Zinc in ppm (Zn)

Zirconium in ppm (Zr)

SRC Innovation Place
Attention: Steve Creighton
PO #/Project:
Samples: 51

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

Report No: G-10-235

Date of Report: March 12, 2010

ICP1 Total Digestion

Sample Number	Ag ppm	Al2O3 wt %	Ba ppm	Be ppm	CaO wt %	Cd ppm	Ce ppm	Co ppm	Cr ppm	Cu ppm	Dy ppm	Er ppm	Eu ppm	Fe2O3 wt %	Ga ppm	Gd ppm	Hf ppm
CAR110	4.5	12.9	1720	3.4	3.17	1	808	76	191	215	12.8	8.5	10.0	4.48	18	23	7
09-RLP-300	<0.2	22.5	2000	2.3	2.02	2	88	5	50	34	3.7	3.2	1.6	1.55	22	4	5
09-RLP-301	<0.2	20.6	1960	3.8	2.13	1	96	5	19	13	4.0	3.4	1.3	1.67	19	4	5
09-RLP-302	<0.2	19.9	439	0.4	2.16	1	69	3	17	3	1.8	1.3	0.6	2.36	18	2	2
09-RLP-303	<0.2	18.6	2220	2.6	6.44	1	68	6	24	18	3.0	2.3	1.1	1.58	16	3	5
09-RLP-304	<0.2	18.5	1570	1.2	1.93	1	37	1	13	6	1.3	1.0	0.4	0.81	17	1	3
09-RLP-305	<0.2	16.9	738	1.6	1.86	1	66	1	10	4	2.2	1.8	0.6	1.60	15	2	4
09-RLP-306	<0.2	16.2	955	2.4	3.20	1	119	2	10	4	3.7	2.6	1.4	1.81	15	4	3
09-RLP-307	0.3	16.6	1180	1.4	2.35	1	68	6	39	25	1.9	1.8	0.8	2.60	15	2	2
09-RLP-308	<0.2	15.6	1060	1.1	1.03	1	37	5	77	48	1.6	1.5	0.7	3.60	15	2	1
09-RLP-310	0.2	16.5	774	1.4	1.93	1	75	6	46	29	2.6	2.1	1.2	4.59	15	3	2
09-RLP-311	0.4	15.6	767	1.3	1.99	1	56	11	55	28	2.1	1.9	1.0	5.29	14	2	1
09-RLP-312	<0.2	13.4	874	1.4	1.16	1	50	11	106	25	1.7	1.6	0.8	4.66	12	2	1
09-SWH02-A1	<0.2	13.6	923	1.3	1.72	1	56	17	217	30	2.5	1.9	1.2	3.46	12	3	<1
09-SWH02-A2	<0.2	18.0	1400	2.5	2.73	1	70	13	165	27	3.2	2.7	1.3	3.35	18	4	2
09-SWH02-A3	<0.2	18.6	2120	1.4	1.28	1	50	2	25	10	2.1	1.5	0.6	1.72	19	2	4
09-SWH02-A4	<0.2	20.2	3130	3.6	3.61	1	185	21	46	17	6.7	5.1	2.6	3.47	16	9	5
09-SWH02-A5	<0.2	19.2	726	1.0	1.22	2	73	7	31	22	2.2	1.7	0.9	3.70	16	2	2
09-SWH02-A6	0.4	19.8	663	1.2	1.34	2	75	5	43	35	2.3	1.9	0.8	3.74	19	3	3
09-SWH02-A7	<0.2	20.2	823	3.8	1.48	2	132	8	26	10	5.0	3.4	1.5	4.42	19	6	5
CAR110	3.9	12.9	1660	3.6	3.13	1	779	72	187	221	12.7	8.7	9.6	4.46	18	24	7
09-SWH02-A8	0.4	15.8	3780	10.2	1.25	1	157	44	76	52	8.8	6.6	3.3	3.20	16	10	3
09-SWH02-A9	<0.2	15.2	1220	1.5	1.40	1	58	16	86	48	2.5	2.0	1.2	3.36	15	3	1
09-SWH02-A10	<0.2	14.0	938	0.9	1.80	1	53	12	81	31	2.7	2.0	1.3	2.76	13	3	1
09-SWH02-A11	<0.2	12.7	591	3.6	2.23	1	63	3	47	5	4.7	4.0	1.3	2.80	13	5	4
09-SWH02-A13	<0.2	15.2	910	1.1	2.34	1	50	17	75	17	1.9	1.8	1.0	3.04	13	2	1
09-SWH02-B1	<0.2	11.9	953	1.2	1.39	1	48	9	103	11	2.0	1.9	1.0	3.88	10	2	1
09-SWH02-B2	<0.2	11.4	941	1.2	1.31	1	55	8	115	10	2.3	1.9	1.1	4.28	11	3	1
09-SWH02-B2b TILL	<0.2	11.7	970	1.3	1.35	1	49	8	112	10	2.2	1.9	1.0	3.22	10	3	1
09-SWH02-B3	<0.2	14.7	948	1.0	1.59	1	56	9	82	42	2.6	1.9	1.2	2.94	13	3	1
09-SWH02-B4	<0.2	10.2	827	1.1	1.20	1	46	14	181	16	2.0	1.7	0.9	2.32	9	2	<1
09-SWH02-B5	<0.2	13.6	960	1.0	1.70	1	61	12	86	39	3.5	2.5	1.7	2.81	12	4	1
09-SWH02-B7	<0.2	12.1	1000	3.0	1.78	1	64	8	110	19	4.4	3.6	1.6	2.35	11	5	1
09-SWH02-E1	<0.2	14.7	987	1.1	2.31	1	46	23	245	18	2.0	1.6	1.1	2.44	12	3	<1
09-SWH02-E2	<0.2	23.8	1560	4.1	2.60	1	71	9	87	82	3.5	3.4	1.4	2.01	26	4	4
09-SWH02-E3	<0.2	23.4	1290	2.3	2.20	1	116	5	114	15	3.8	3.0	1.4	2.93	24	5	5
09-SWH02-E4	<0.2	21.9	2330	3.2	1.77	1	64	2	36	13	2.7	2.1	0.8	1.40	25	3	5
09-SWH02-E5	<0.2	20.0	675	1.2	1.73	1	110	1	28	5	3.4	2.3	1.0	2.84	20	4	5
09-SWH02-E6	<0.2	17.2	1110	2.1	1.54	1	64	9	68	38	2.9	2.4	1.1	3.30	17	3	2
09-SWH02-E2 R	<0.2	23.7	1560	4.1	2.50	1	71	7	84	82	3.5	3.4	1.4	2.08	26	4	5

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

SRC Innovation Place
Attention: Steve Creighton
PO #/Project:
Samples: 51

Report No: G-10-235

Date of Report: March 12, 2010

ICP1 Total Digestion

Sample Number	Ag ppm	Al2O3 wt %	Ba ppm	Be ppm	CaO wt %	Cd ppm	Ce ppm	Co ppm	Cr ppm	Cu ppm	Dy ppm	Er ppm	Eu ppm	Fe2O3 wt %	Ga ppm	Gd ppm	Hf ppm
CAR110	4.1	12.9	1650	3.4	3.15	1	801	77	183	213	12.5	8.6	9.9	4.50	18	24	8
09-SWH02-E7	0.3	16.5	1030	1.2	1.11	1	63	11	85	59	1.8	1.8	1.0	3.72	16	2	2
09-TGP-001	0.5	8.32	661	1.2	21.8	1	37	9	61	12	5.2	1.4	1.3	13.6	8	4	<1
09-TGP-002	<0.2	12.6	899	1.5	1.94	1	60	11	137	21	3.0	2.1	1.3	4.26	12	4	<1
09-TGP-004	0.3	7.94	771	0.8	24.7	<1	30	6	90	9	5.4	0.5	0.7	3.10	6	2	<1
09-TGP-005	2.9	0.50	78	<0.2	0.67	5	4	44	237	567	<0.2	<0.2	0.9	68.4	16	4	<1
09-TGP-006	0.3	8.95	851	1.1	28.9	1	41	9	61	42	4.4	0.8	1.1	5.80	7	3	<1
09-TGP-007	1.3	4.20	712	2.3	2.77	4	24	11	33	14	15.9	2.3	1.7	50.3	10	5	<1
09-TGP-008	0.3	13.2	1910	1.9	1.84	4	49	16	105	31	5.6	2.5	1.5	14.0	14	4	<1
09-TGP-009	<0.2	12.2	1760	1.1	9.07	1	42	22	113	24	5.1	1.8	1.1	4.39	10	3	<1
09-TGP-009 R	<0.2	12.2	1790	1.2	9.02	1	45	21	110	23	5.2	1.8	1.2	4.32	10	3	<1

SRC Innovation Place
Attention: Steve Creighton
PO #/Project:
Samples: 51

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

Report No: G-10-235
Date of Report: March 12, 2010

ICP1 Total Digestion

Sample Number	Ho ppm	K2O wt %	La ppm	Li ppm	MgO wt %	MnO wt %	Mo ppm	Na2O wt %	Nb ppm	Nd ppm	Ni ppm	P2O5 wt %	Pb ppm	Pr ppm	Sc ppm	Sm ppm	Sn ppm
CAR110	3	3.03	409	80	3.20	0.09	58	1.34	15	348	395	0.86	415	92	10	47	<1
09-RLP-300	1	0.48	45	17	1.61	0.02	4	0.26	25	37	20	0.06	43	8	14	6	1
09-RLP-301	1	0.27	55	36	1.71	0.02	2	0.18	23	36	18	0.04	40	8	9	6	2
09-RLP-302	<1	0.25	40	17	2.44	0.02	2	0.43	16	23	5	0.03	36	6	1	4	2
09-RLP-303	<1	0.23	38	27	1.58	0.04	2	0.14	20	25	26	0.03	31	5	9	5	<1
09-RLP-304	<1	0.32	22	28	0.86	<0.01	3	0.24	15	12	5	0.02	24	3	4	2	<1
09-RLP-305	<1	0.19	38	14	1.65	0.01	2	0.18	18	23	3	0.02	32	5	4	4	2
09-RLP-306	<1	0.24	65	22	1.82	0.01	2	0.13	24	43	5	0.04	35	11	4	8	2
09-RLP-307	<1	1.02	39	30	1.92	<0.01	2	0.32	17	25	14	0.03	22	6	6	4	2
09-RLP-308	<1	3.43	22	27	1.25	0.04	1	1.14	14	14	18	0.04	19	2	13	2	2
09-RLP-310	<1	1.38	42	33	1.95	0.02	3	1.72	15	30	20	0.13	29	6	9	4	1
09-RLP-311	<1	1.47	31	29	1.71	0.06	1	1.82	12	22	30	0.13	19	4	9	3	<1
09-RLP-312	<1	2.04	27	27	1.36	0.03	2	1.32	14	20	31	0.10	15	3	11	2	<1
09-SWH02-A1	<1	2.14	31	27	1.22	0.03	4	2.03	12	25	85	0.13	11	5	11	4	<1
09-SWH02-A2	1	1.47	38	37	1.33	0.04	4	2.40	18	30	65	0.12	24	6	13	5	1
09-SWH02-A3	<1	0.50	27	47	0.84	0.05	1	0.78	19	18	28	0.05	27	4	5	3	2
09-SWH02-A4	1	0.41	96	68	1.49	0.07	5	2.21	20	77	52	0.08	28	18	13	13	2
09-SWH02-A5	<1	0.67	42	39	2.38	0.06	<1	1.21	14	25	22	0.04	33	5	5	4	1
09-SWH02-A6	<1	1.10	43	39	2.49	0.03	1	0.84	22	26	16	0.04	36	6	9	4	1
09-SWH02-A7	1	0.36	73	40	2.57	0.03	<1	1.20	24	50	17	0.05	35	11	13	8	2
CAR110	3	3.15	409	82	3.21	0.07	65	1.29	16	349	407	0.87	411	88	10	45	<1
09-SWH02-A8	2	1.41	81	46	1.25	0.09	3	0.98	19	71	68	0.08	44	16	26	13	<1
09-SWH02-A9	<1	2.98	31	26	1.49	0.03	2	1.53	15	24	54	0.18	22	4	16	4	2
09-SWH02-A10	<1	2.40	28	22	1.33	0.02	2	1.83	12	24	49	0.20	14	4	12	4	2
09-SWH02-A11	1	0.30	33	20	1.28	0.02	1	0.29	12	29	11	0.04	27	5	10	5	1
09-SWH02-A13	<1	1.53	27	23	1.29	0.02	3	2.55	14	20	53	0.16	15	4	7	3	1
09-SWH02-B1	<1	2.02	24	21	0.92	0.02	3	1.78	11	21	23	0.14	12	3	8	3	<1
09-SWH02-B2	<1	2.05	29	21	0.91	0.02	2	1.63	11	25	21	0.15	13	5	8	4	1
09-SWH02-B2b TILL	<1	2.07	26	21	0.91	0.03	2	1.76	13	22	24	0.13	11	4	8	3	<1
09-SWH02-B3	<1	2.60	30	26	1.40	0.02	1	1.70	14	24	44	0.20	15	5	13	4	<1
09-SWH02-B4	<1	1.73	24	18	0.77	0.02	6	1.53	10	20	44	0.11	11	4	7	3	1
09-SWH02-B5	<1	2.23	32	26	1.34	0.02	2	1.77	13	30	44	0.18	15	5	16	5	<1
09-SWH02-B7	1	1.39	32	21	0.97	0.02	3	1.14	13	31	33	0.12	18	6	12	5	<1
09-SWH02-E1	<1	1.94	24	24	1.10	0.02	5	2.76	12	20	109	0.16	12	3	9	3	<1
09-SWH02-E2	1	1.21	40	33	1.23	0.02	3	2.04	32	28	34	0.08	42	6	12	5	2
09-SWH02-E3	1	0.39	70	46	2.12	0.01	4	1.85	21	43	23	0.05	44	10	7	7	2
09-SWH02-E4	<1	0.54	38	28	1.08	0.03	2	1.51	21	21	12	0.04	36	5	8	4	3
09-SWH02-E5	<1	0.24	66	29	2.46	0.02	2	1.53	17	39	7	0.05	41	10	4	6	4
09-SWH02-E6	<1	1.84	36	34	1.46	0.04	1	1.44	15	26	19	0.04	22	5	12	4	2
09-SWH02-E2 R	1	1.20	40	33	1.24	0.02	3	1.95	33	28	31	0.07	42	6	13	5	2

SRC Innovation Place
Attention: Steve Creighton
PO #/Project:
Samples: 51

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

Report No: G-10-235

Date of Report: March 12, 2010

ICP1 Total Digestion

Sample Number	Ho ppm	K2O wt %	La ppm	Li ppm	MgO wt %	MnO wt %	Mo ppm	Na2O wt %	Nb ppm	Nd ppm	Ni ppm	P2O5 wt %	Pb ppm	Pr ppm	Sc ppm	Sm ppm	Sn ppm
CAR110	3	3.16	419	85	3.25	0.08	57	1.30	14	350	406	0.86	402	89	10	46	<1
09-SWH02-E7	<1	3.24	34	28	1.49	0.03	3	1.45	15	26	45	0.07	29	5	15	3	<1
09-TGP-001	<1	1.44	18	17	1.18	0.50	<1	1.37	<1	16	23	0.21	12	1	8	4	<1
09-TGP-002	<1	2.19	33	30	1.25	0.06	3	1.36	12	29	36	0.13	26	5	10	4	2
09-TGP-004	<1	1.46	14	17	1.03	0.63	3	1.66	6	11	21	0.11	2	1	5	4	<1
09-TGP-005	<1	0.07	<1	1	0.08	0.18	882	0.07	<1	17	157	0.35	115	<1	<1	<1	59
09-TGP-006	<1	1.53	20	29	1.32	0.43	23	1.39	8	15	38	0.22	8	2	7	5	<1
09-TGP-007	1	0.52	12	15	0.66	2.28	<1	0.54	<1	23	28	0.67	15	<1	12	1	<1
09-TGP-008	<1	2.24	26	30	1.48	0.56	4	1.89	7	27	84	0.32	13	3	19	3	<1
09-TGP-009	<1	2.04	22	22	1.23	0.50	2	2.51	11	20	46	0.22	9	3	11	3	<1
09-TGP-009 R	<1	2.05	24	22	1.24	0.50	2	2.54	10	21	44	0.22	9	3	11	4	<1

SRC Innovation Place
Attention: Steve Creighton
PO #/Project:
Samples: 51

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

Report No: G-10-235

Date of Report: March 12, 2010

ICP1 Total Digestion

Sample Number	Sr ppm	Ta ppm	Tb ppm	Th ppm	TiO2 wt %	U, ICP ppm	V ppm	W ppm	Y ppm	Yb ppm	Zn ppm	Zr ppm
CAR110	697	<1	1	116	0.49	3270	240	1	59	4.6	113	268
09-RLP-300	236	<1	<1	17	0.94	14	84	<1	28	2.8	28	198
09-RLP-301	269	<1	<1	22	0.52	12	59	<1	33	3.5	71	212
09-RLP-302	159	<1	<1	17	0.20	11	9	<1	12	1.2	49	83
09-RLP-303	412	<1	<1	12	0.55	6	82	<1	24	2.3	23	214
09-RLP-304	295	<1	<1	11	0.37	9	28	<1	10	1.0	25	103
09-RLP-305	188	<1	<1	20	0.31	7	24	<1	16	1.7	56	141
09-RLP-306	267	<1	<1	24	0.28	10	24	<1	26	2.4	38	120
09-RLP-307	181	<1	<1	16	0.48	6	55	<1	16	1.9	28	113
09-RLP-308	174	<1	<1	7	0.69	2	100	<1	11	1.4	68	100
09-RLP-310	264	<1	<1	15	0.52	11	69	<1	20	2.1	99	120
09-RLP-311	288	<1	<1	10	0.54	5	67	<1	16	1.8	86	110
09-RLP-312	160	<1	<1	7	0.57	<2	94	<1	13	1.6	73	102
09-SWH02-A1	259	<1	<1	6	0.63	2	77	<1	16	1.7	90	71
09-SWH02-A2	362	<1	<1	12	0.77	<2	78	<1	25	2.5	68	133
09-SWH02-A3	200	<1	<1	13	0.44	4	26	<1	14	1.4	39	139
09-SWH02-A4	469	<1	<1	20	0.58	6	40	<1	50	4.8	34	228
09-SWH02-A5	152	<1	<1	21	0.49	6	38	<1	16	1.7	44	110
09-SWH02-A6	132	<1	<1	21	0.54	15	58	<1	17	2.0	71	145
09-SWH02-A7	196	<1	<1	25	0.32	9	35	<1	35	3.3	73	184
CAR110	682	<1	1	120	0.48	3360	237	<1	59	4.4	107	270
09-SWH02-A8	370	<1	<1	15	0.66	13	87	<1	55	6.6	71	167
09-SWH02-A9	219	<1	<1	8	0.74	6	114	<1	18	2.0	116	108
09-SWH02-A10	250	<1	<1	5	0.64	2	89	<1	19	1.9	100	84
09-SWH02-A11	193	<1	<1	14	0.24	12	33	<1	39	4.3	46	153
09-SWH02-A13	370	<1	<1	7	0.61	4	55	<1	15	1.6	98	85
09-SWH02-B1	239	<1	<1	6	0.53	<2	70	<1	16	1.8	66	91
09-SWH02-B2	220	<1	<1	7	0.57	5	75	<1	17	2.0	66	108
09-SWH02-B2b TILL	229	<1	<1	6	0.52	<2	76	<1	16	1.8	65	92
09-SWH02-B3	223	<1	<1	6	0.68	<2	100	<1	18	1.8	122	98
09-SWH02-B4	204	<1	<1	5	0.44	4	67	<1	15	1.6	62	70
09-SWH02-B5	241	<1	<1	5	0.63	<2	111	<1	23	2.3	110	85
09-SWH02-B7	232	<1	<1	8	0.47	4	86	<1	34	3.7	63	104
09-SWH02-E1	377	<1	<1	6	0.62	<2	60	<1	15	1.4	81	62
09-SWH02-E2	394	<1	<1	15	1.21	4	92	<1	29	2.9	51	203
09-SWH02-E3	292	<1	<1	19	0.54	6	27	<1	29	2.8	133	209
09-SWH02-E4	316	<1	<1	18	0.63	8	34	<1	22	2.2	51	183
09-SWH02-E5	222	<1	<1	24	0.24	6	13	<1	24	2.1	70	181
09-SWH02-E6	218	<1	<1	12	0.56	4	75	<1	25	2.4	63	117
09-SWH02-E2 R	376	<1	<1	15	1.20	4	90	<1	29	3.0	50	203

SRC Innovation Place
Attention: Steve Creighton
PO #/Project:
Samples: 51

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

Report No: G-10-235

Date of Report: March 12, 2010

ICP1 Total Digestion

Sample Number	Sr ppm	Ta ppm	Tb ppm	Th ppm	TiO2 wt %	U, ICP ppm	V ppm	W ppm	Y ppm	Yb ppm	Zn ppm	Zr ppm
CAR110	702	<1	1	112	0.49	3340	237	<1	60	4.4	116	290
09-SWH02-E7	201	<1	<1	11	0.80	2	115	<1	13	1.6	115	113
09-TGP-001	232	2	<1	<1	0.31	<2	83	<1	23	2.6	69	50
09-TGP-002	200	<1	<1	7	0.54	<2	73	<1	20	2.0	88	77
09-TGP-004	315	<1	<1	<1	0.28	<2	51	<1	13	1.1	48	32
09-TGP-005	<1	21	1	<1	0.02	<2	50	259	3	1.9	212	11
09-TGP-006	255	<1	<1	<1	0.38	<2	63	<1	20	1.7	73	46
09-TGP-007	81	15	1	<1	0.18	<2	107	1	40	5.7	81	42
09-TGP-008	358	<1	<1	5	0.67	<2	208	<1	25	3.1	107	90
09-TGP-009	474	<1	<1	3	0.59	<2	102	<1	19	1.8	80	62
09-TGP-009 R	488	<1	<1	3	0.60	<2	101	<1	20	1.9	81	59

Total Digestion: A 0.125 g pulp is gently heated in a mixture of HF/HNO3/HClO4 until dry and the residue is dissolved in dilute HNO3.
The standard is CAR110.

SRC Innovation Place
Attention: Steve Creighton
PO #/Project:
Samples: 51

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

Report No: G-10-235

Date of Report: March 18, 2010

Fire Assay

Column Header Details

Au Fire Assay by ICP in ppb (Au)
Pt Fire Assay by ICP in ppb (Pt)
Pd Fire Assay by ICP in ppb (Pd)

Sample Number	Au ppb	Pt ppb	Pd ppb
CAR110	N/R	N/R	N/R
09-RLP-300	3	<2	<2
09-RLP-301	<2	<2	<2
09-RLP-302	<2	<2	<2
09-RLP-303	2	<2	<2
09-RLP-304	<2	<2	<2
09-RLP-305	<2	<2	<2
09-RLP-306	<2	<2	<2
09-RLP-307	6	<2	<2
09-RLP-308	2	<2	<2
09-RLP-310	3	<2	<2
09-RLP-311	3	<2	<2
09-RLP-312	3	<2	<2
09-SWH02-A1	3	<2	<2
09-SWH02-A2	2	<2	<2
09-SWH02-A3	2	<2	<2
09-SWH02-A4	2	<2	<2
09-SWH02-A5	2	<2	<2
09-SWH02-A6	3	<2	<2
09-SWH02-A7	<2	<2	<2
CAR110	N/R	N/R	N/R
09-SWH02-A8	2	<2	<2
09-SWH02-A9	4	<2	<2
09-SWH02-A10	4	<2	<2
09-SWH02-A11	2	<2	<2
09-SWH02-A13	4	<2	<2
09-SWH02-B1	2	<2	<2
09-SWH02-B2	3	<2	<2
09-SWH02-B2b TILL	2	<2	<2
09-SWH02-B3	3	<2	<2
09-SWH02-B4	2	<2	<2
09-SWH02-B5	3	<2	<2
09-SWH02-B7	2	<2	<2
09-SWH02-E1	3	<2	<2

SRC Geoanalytical Laboratories
125 - 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8
Tel: (306) 933-8118 Fax: (306) 933-5656 Email: geolab@src.sk.ca

Report No: G-10-235

SRC Innovation Place
Attention: Steve Creighton
PO #/Project:
Samples: 51

Date of Report: March 18, 2010

Fire Assay

Sample Number	Au ppb	Pt ppb	Pd ppb
09-SWH02-E2	4	<2	<2
09-SWH02-E3	4	<2	<2
09-SWH02-E4	2	<2	<2
09-SWH02-E5	<2	<2	<2
09-SWH02-E6	4	<2	<2
09-SWH02-E2 R	4	<2	<2
CAR110	N/R	N/R	N/R
09-SWH02-E7	4	<2	<2
09-TGP-001	2	<2	<2
09-TGP-002	3	<2	<2
09-TGP-004	2	<2	<2
09-TGP-005	16	<2	2
09-TGP-006	3	<2	<2
09-TGP-007	<2	<2	<2
09-TGP-008	13	<2	<2
09-TGP-009	2	<2	<2
09-TGP-009 R	<2	<2	<2

Fire Assay: A 30 g pulp is subjected to standard fire assaying procedures.

APPENDIX 4

2009 - 2010 TRENCH SAMPLE DESCRIPTIONS

Appendix 4: Trench sample descriptions

Sample Notes For Trench SWH002, Collected In December 2011

Sample	Lithology	Sampler	Description
	OVB		0.5m of OVB - Rusty Till (No Sample)
	Sub-glacial		0.1 m Milled Layer, Sub-glacial (No Sample)
09RLP300	Coal/Clay	R. L'Heureux	0.4 m Mixed coal and brown-grey clay with organic clasts, coal dominates
09RLP301	Clay	R. L'Heureux	1.2 m Interval includes samples 301-305. White ashy clay with local sandy beds of 5-15 cm width
09RLP302	Sandstone	R. L'Heureux	1.2 m Interval includes samples 301-305. White ashy clay with local sandy beds of 5-15 cm width
09RLP303	Clay	R. L'Heureux	1.2 m Interval includes samples 301-305. White ashy clay with local sandy beds of 5-15 cm width
09RLP304	Sandstone	R. L'Heureux	1.2 m Interval includes samples 301-305. White ashy clay with local sandy beds of 5-15 cm width
09RLP305	Clay	R. L'Heureux	1.2 m Interval includes samples 301-305. White ashy clay with local sandy beds of 5-15 cm width
09RLP306	Coal	R. L'Heureux	1.0 m Coal layer that includes samples 306-307. Top (sample 306) and bottom 30 cm black coal layers with a lightly lighter brown-black 40cm middle layer (sample 307)
09RLP307	Coal	R. L'Heureux	1.0 m Coal layer that includes samples 306-307. Top (sample 306) and bottom 30 cm black coal layers with a lightly lighter brown-black 40cm middle layer (sample 307)
09RLP308	Clay	R. L'Heureux	2.5 m Medium grey unconsolidated clay with varves and fining sequences. Rusty fracture plane, tree fossils
09RLP309	Coal	R. L'Heureux	1.0 m Coal bed with very minor organics, and 15 cm light brown mud seam (sample from coal)
09RLP310	Clay	R. L'Heureux	>2 m (undetermined bottom depth) Green-grey massive clay with minor silt layer
09RLP311	Clay	R. L'Heureux	0.2 m Brown-grey clay with minor organics layer immediately below coal layer (between samples 309 and 310)

Sample Notes From SWH002, Collected In January 2010

	Depth		
Sample	To	From	Description
09-SWH02-A1			Red to red brown sand of claystone with variable clasts, minor organics
09-SWH02-A2			Angled Seam, variable textures, layered red stained to light yellow beige, flake and blocky materials, 20 cm below 09-SWH-01
09-SWH02-A3			Blocky, possibly brecciated dark brown clay or siltstone.
09-SWH02-A4			very soft variable texture, variable colour, unknown material, 15cm thick
09-SWH02-A5			Flaky, possibly brecciated clay or siltstone, med to dark olive grey with light organics and variable clasts, 10 cm thick
09-SWH02-A6			Light brown porous clay layer, variable clasts and black material, 10 cm thick
09-SWH02-A7			Black and brown interbedded soft clay layer with variable clasts, 8 cm thick.
09-SWH02-A8			Very soft intermixed light brown clay wth various clasts and interbedded material.
09-SWH02-A9			Grey, very stiff clay, varying clasts and staining., 1.5 m thick
09-SWH02-A10			Olive grey, very stiff clay, less clasts, 1 m thick
09-SWH02-A11			Black, possible coal or organic clay seam with olive green clay and variable clasts. 2.5 cm thick.
09-SWH02-A12			Very hard black coal, 25 cm thick.
09-SWH02-A13			Light grey, very stiff clay, with variable clasts and staining.
09-SWH02-BTill	0	0.5	Variable texture clay, light olive grey clasts, organics. Plastic when damp, hard when dry.
09-SWH02-B1	0.5	1.2	Soft to very soft sandy clay, varying clasts and colour.
09-SWH02-B2	1.2	1.8	Soft to very soft sandy clay, variable colours (red brown to olive grey).
09-SWH02-B3	1.8	2	Hard clay or silt stone, olive grey.
09-SWH02-B4	2	2.5	Clay or siltstone, olive grey mixed with soft sandy clay
09-SWH02-B5			very hard clay or siltstone
09-SWH02-B6			Very hard coal, 0.3m
09-SWH02-B7			Mixed clays, red clay silt stone.
09-SWH02-E1	0	1.5	vf sand to silt stone cemeneted with red brown unknown material, light yellow orange clay veins
09-SWH02-E2	1.5	1.7	seam-light coloured, possibly brecciated meaterial of varying textures. Little red stains from above material
09-SWH02-E3	1.7	2.2	Variable textured, possibly brecciated layer, consol. until disturbed, breaks into flakes and irregular blocks (fine to ~7cm), light red brown to yellow-black layer and clasting
09-SWH02-E4	2.2	3	Variable texture, possible brecciated layer of fine to larger flakes, blocks 10 cm. Darker med brown to light yellow variable colour with red material intermixed. small amount organics.
09-SWH02-E5	3	3.3	Variable texture, from creamy soft clay to harder flake/block material. Darker colour genereally but has material included from light yellow, red, olive grey, to black
09-SWH02-E6	3.3	3.8	Transition from brown variable texture clay to black unkown material of soft to hard consistency.
09-SWH02-E7	3.8	4.2	greenish grey clay of soft consistency with a wavy vertical fracture appearance

Field Notes of Trench SWH007, Taken in January 2009

overburden at top of trench is rusty orange brown Fe rich till. rich in organic material. 0 m - 4 m. Low Mag Susc readings (0-1)
from approx 4 m - 6 m, is grey clay dominated till. Observed some cobbles (quartzite, chert). Low Mag Susc readings (0-1)
From appox 6 m to 10.2 m is dark green bentonite clay. 100 % clay size grains. Very greasy, leaves black residue on hands. Observed black magnetite laminae, very magnetic. Mag susc readings range from 4-5. **Sample 09DAP001** was taken of bentonite.
The trench terminated at 10.2 m still in clay, bedrock was not reached. The Backhoe was not capable of digging any deeper.

APPENDIX 5

2012 TRENCH FIELD NOTES

General notes (all holes):

- Site was visited by KM on Feb 6, 2012 (between 3:30 and 6:00 PM); all three holes were observed and sampled at that time
- All bulk samples were already taken before KM arrived on site; KM observed and sampled each of the bulk samples back at Gerry's ranch on the evening of Feb 6 (sample names "Feb 6, 2012 Headwater Hole-1 Bulk Sample aliquot", etc.)
- There were no ladders at any of the holes on Feb 6, and all indications of hole depths and till-bentonite contacts were verbally conveyed by Gerry Williscroft at site (except as noted); KM did visually observe each hole and confirm the approximate depths
- Except where noted, all samples were collected from rubble piles of pits
- All samples are currently held in the APEX warehouse in Edmonton (in one white rice bag) as of Feb 7, 2012

Hole 1

Location:
0539851 E
6092625 N
Pit 30' deep , ~10' x 20' wide

Photos: 22

Stratigraphy:
00'-18': Clay still; Medium brown; Structure not apparent (likely massive); non-calcareous
18'-30': Bentonitic sediments (silty shale to clayey siltstone); Greenish cream colored (rarely, ~5%, light grey); Mostly laminated (mm-scale; laminar, occasionally convoluted or rippled); 1% frac-controlled brownish to bluish black strong Fe-oxide; 2-3% likely-frac-controlled moderate Fe-oxide; Non-calcareous

Samples:

Hole-1-A:	till
Hole-1-B:	light grey bentonite
Hole-1-C:	greenish cream-colored bentonitic silty shale; faint mm-scale lapilli, faint mm-scale laminations

Hole 2

Location:
0539677 E
6092723 N
Pit 25' deep, 10' x 15' wide

Photos: 10

Stratigraphy:

00'-18': Clay till; Medium brown; Massive; Non-calcareous; Soil profile in upper 5', including non-calcareous bleached A-horizon (doesn't appear to be separate bentonite unit); Till non-calcareous

- Gerry noted that the area had been logged and soil had been eroded (therefore the till may actually be 19' thick here)

18'-30': Bentonitic sediments (silty shale to clayey siltstone); Greenish to locally bluish cream colored (rarely, <5%, light grey); mostly laminated (mm-scale; laminar, occasionally convoluted or rippled); 1% frac-controlled brownish to bluish black strong Fe-oxide; 2-3% likely-frac-controlled moderate Fe-oxide; Non-calcareous

Samples:

Hole-2-A: till (sampled outcrop (cut wall) from 1-2 m depth)
Hole-2-B: bentonite (bulk grab from rubble pile)

Hole 3

Location:
0539854 E
6092525 N
Pit 20' deep, 25' x 10 ' wide, situated below 25' scarp

Photos: 24

Stratigraphy:

00'-13': Clay till; Thickness variable, lower contact convolute @ m-scale (unit 10-16' thick); Rare (<1%) coal frags; Upper 6' contains 10% bentonite frags, which are virtually absent in lower 7'
13' - 26': bentonitic shale, locally silty; Light grey to cream colored; laminated (mm-scale, planar); attitude of beds not consistent, but strikes ENE-WSW and dips 40-45 deg towards NNW; 3-4% weak to moderate frac-controlled Fe-oxide; non-calcareous
26'-35': Fine grained sand; Silty; Light brown; Depth approximated (couldn't safely measure)
35'-41': Clay; Locally silty; Red; seemingly massive; Depth approximated (couldn't safely measure); non-calcareous
41-45': Bentonitic shale; Slightly silty; Steely grey; Laminated (mm-scale, locally convoluted); non-calcareous

Samples:

Hole-3-A: till; upper 6'; sampled from outcrop
Hole-3-B: till; lower 7'; sampled from outcrop
Hole-3-C: bentonite (grey to cream-colored unit); sampled from outcrop
Hole-3-D: silty sand
Hole-3-E: red clay
Hole-3-F: steely grey bentonite

Other Notes:

Normal faulting along and roughly parallel to scarp (see pictures 2012-02-06_035 to 037) may be modern

ALTABEN Minerals Ltd./Headwater

Notes from Jan./Feb. 2012

Jan. 25th, 2012 Applied to Forestry High Prairie for TFA
Jan. 30th, 2012 Received TFA from Scott Simms of High Prairie Forestry
Feb. 1st, 2012 Hauled 270 track hoe and D6M crawler to km. 19, Buchanan road and opened access into sample hole #1, co-ordinates N 54*58'43.8", W116*22' 38.6", E-837m. Used D6 crawler and 270 track hoe to clean debris from site, strip top soil, dig out step for 270 track hoe. Dug down 18' through clay, push clay away from hoe, then hit clean bentonite, dug another 10' to end of the hoe reach through pure clean bentonite. Measured depths with a tape measure.

Feb. 2nd, 2012 Finished on hole #1 and brought in flat deck with large sample bags. Filled large sample bag with bentonite as well as some smaller sample bags.

Feb. 2nd, 2012 Snowplowed access to Hole #2, (co-ordinates N54*58' 47.4", W 116* 22' 43.6", E-847m) and cleaned off area for dig. Stripped top soil and Dug out step for the 270 trackhoe. Dug through 22 feet of clay, pushed material into stock pile, then hit pure bentonite through the remaining reach of the hoe. Approximately 10 plus feet of bentonite. Filled large sample bag on flat deck truck. Measured depths with tape measure and proceed to site of Hole #3.

Feb. 3rd, 4th, 2012 Started digging on Hole #3 at original find site on west side of 15-16 well site, (co-ordinates N45*58' 47.9", W116* 22' 38.3", E-835m) Used 270 track hoe to cut back into the face to expose height and layers, crawler pushed material away from hoe for space, dug out step for hoe to extend depth reach, went through 8 -10 ft. of till on top then 24ft. of bentonite, then 8ft. seem of sand with bentonite approximate 50/50 mix, then 6 ft. of red clay, then bentonite to the bottom of the hole. Filled large sample bag with red clay and loaded on flat deck.

Summary of Dig Results

Upon review of my notes and my observation during the dig, it is my opinion that the bentonite depth is consistent overall and appears to be of consistent quality and quantity throughout.

***I will be sending small samples from test holes by courier shortly.

APPENDIX 6

BULK SAMPLE ANALYSIS

Exova

Exova
4605-12 Street N.E.
Calgary, Alberta
T2E 4R3, Canada

T: +1 (403) 291-3024
F: +1 (403) 250-2819
E: CalgaryENS@exova.com
W: www.exova.com

Altaben
High Prairie - Raw

Analytical Report

Bill To:	156673 Alberta Ltd.	Project:		Lot ID:	**847990**
Report To:	156673 Alberta Ltd.	ID:	5 PSD + 1 moisture	Control Number:	
	1362 - 101 St. SW	Name:		Date Received:	Jan 4, 2012
	Calgary, AB, Canada	Location:		Date Reported:	Jan 10, 2012
	T3H 3Z4	LSD:		Report Number:	1665692
Attn:	Claude St-Martin	P.O.:			
Sampled By:		Acct code:			
Company:					

Jan. 04/2012 Sample

Reference Number	847990-6
Sample Date	
Sample Time	
Sample Location	
Sample Description	S.H. RAW ⇒ rename as High Prairie - Raw Jan. 04/2012
Sample Matrix	Solids

Analyte		Units	Result		Nominal Detection Limit
Physical and Aggregate Properties					
Moisture	Wet Weight	%	26.9	as received after being rained on during transport.	0.1

Claude expects 15% of natural, inplace bentonite

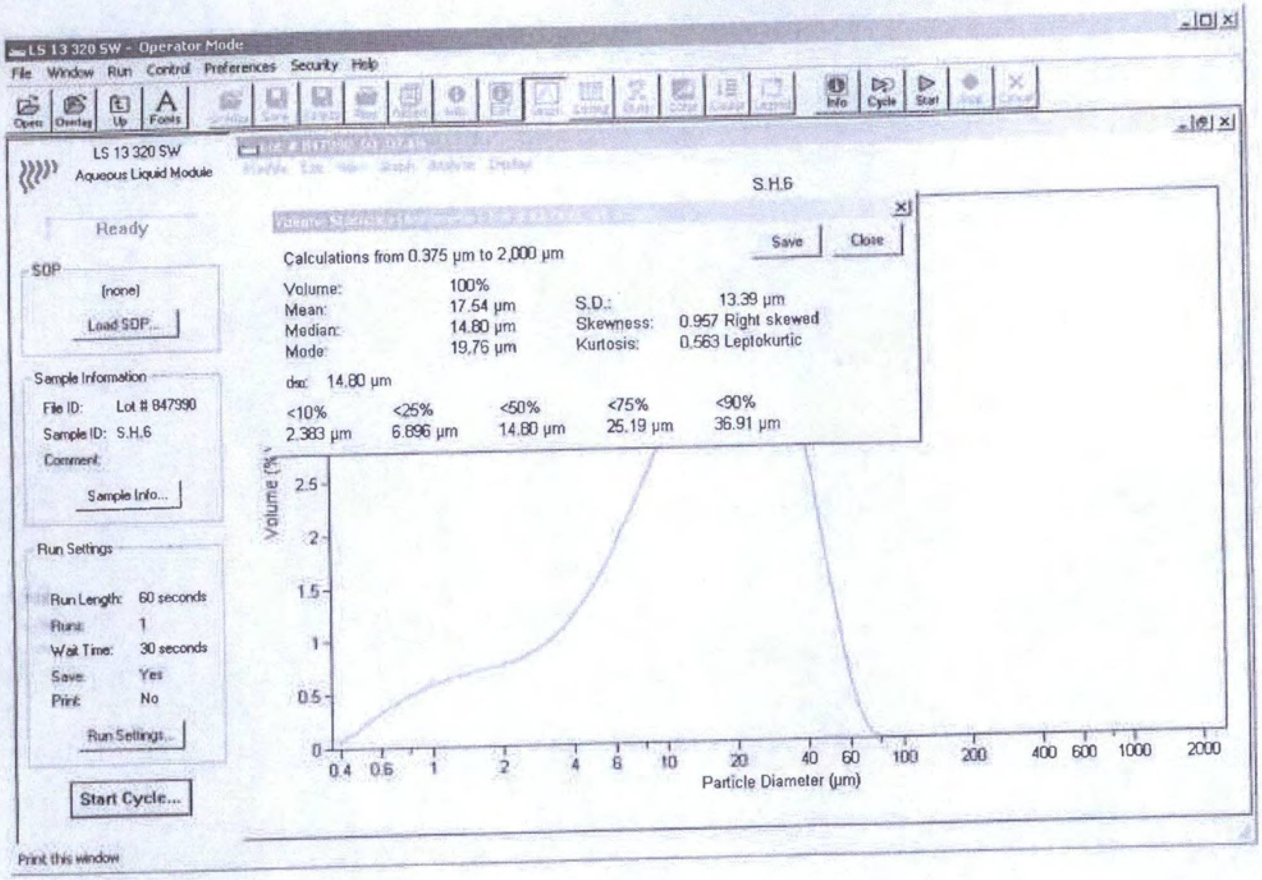
Approved by: [redacted]
Ewa Tybura
Senior Technician

Exova

Beckman Coulter LS Particle Size Analyzer

2012-01-10

Exova



XRF Analysis

Ron Spencer
Feb. 10/2012

High Prairie; Project

I have examined raw and ground samples from both Rosaline and Swann Hills by X-Ray fluorescence and examined the report from Gr Petrography. I have included a table below comparing the GR Petrograph compositional analyses to my XRF data. I have also included analyses from two laboratory standard bentonite samples for comparison. Note: both the Rosaline and Swann Hills samples have lower aluminum values than do the standards. Aluminum is a major component of bentonite.

High Prairie

sample	type	Si	Al	Fe	K	Ca	S	Na	Mg
RJS SH-6 DEC 29	ground	33.6%	7.9%	4.3%	2.7%	1.6%	0.00%		
RJS SH-6 DEC 29	ground	32.8%	8.9%	4.1%	2.6%	1.5%	0.00%		
RJS SH RAW	BULK	34.3%	7.8%	3.6%	2.6%	1.4%	0.04%		
RJS SH RAW	BULK	33.7%	8.6%	3.5%	2.6%	1.4%	0.05%		
GR Petrology	**EDS**	**24.9%**	**6.8%**	**3.7%**	**1.9%**	**1.2%**	**0.04%**	**0.7%**	**0.4%**
GR Petrology	**XRD**	**26.2%**	**19.6%**	**3.3%**	**2.6%**	**2.1%**		**1.2%**	**1.4%**
RJS ROSALINE R-2	ground	35.2%	8.1%	3.7%	0.3%	1.5%	0.04%		
RJS ROSALINE R-2	ground	35.1%	8.2%	3.7%	0.3%	1.5%	0.03%		
RJS ROSALINE RAW	BULK	34.9%	8.5%	3.4%	0.2%	1.6%	0.06%		
RJS ROSALINE RAW	BULK	34.6%	8.9%	3.4%	0.2%	1.6%	0.05%		
GR Petrology	**EDS**	**26.1%**	**6.2%**	**2.4%**	**0.3%**	**1.9%**	**0.06%**	**1.0%**	**0.3%**
GR Petrology	**XRD**	**30.0%**	**9.9%**		**1.8%**	**6.9%**		**1.0%**	
na smectite	standard	32.3%	11.6%	3.7%	0.3%	1.3%	0.06%		
ca smectite	standard	32.6%	11.2%	1.6%	0.1%	2.7%	0.04%		

I have also compared the composition in terms of some of the key oxide components with the analyses given for bentonite from BRI-CHEM supply in a second table. Again notice that both the Swann Hills and Rosaline samples are higher in silica and lower in alumina than that of the "competition."

High Prairie

sample	type	CaCO3	SiO2	Al2O3	K2O	Fe2O3
RJS SH-6 DEC 29	ground	4.0%	71.8%	14.9%	3.3%	6.1%
RJS SH-6 DEC 29	ground	3.8%	70.3%	16.9%	3.2%	5.9%
RJS SH RAW	BULK	3.5%	73.4%	14.8%	3.2%	5.1%
RJS SH RAW	BULK	3.4%	72.1%	16.3%	3.1%	5.0%
RJS ROSALINE R-2	ground	3.8%	75.2%	15.3%	0.3%	5.3%
RJS ROSALINE R-2	ground	3.8%	75.0%	15.5%	Good 0.3%	5.3%
RJS ROSALINE RAW	BULK	4.0%	74.6%	16.2%	0.2%	4.8%
RJS ROSALINE RAW	BULK	4.0%	74.1%	16.8%	0.2%	4.8%
na smectite	standard	3.3%	69.2%	21.9%	0.3%	5.2%
ca smectite	standard	6.6%	69.7%	21.2%	0.1%	2.3%
BRI-Chem	competition	0.6%	61.3%	19.8%	0.4%	3.9%

Exova

Exova
4605-12 Street N.E.
Calgary, Alberta
T2E 4R3, Canada

T: +1 (403) 291-3024
F: +1 (403) 250-2819
E: CalgaryENS@exova.com
W: www.exova.com

Altaben
High Prairie - Raw

Analytical Report

Bill To:	156673 Alberta Ltd.	Project:		Lot ID:	**847990**
Report To:	156673 Alberta Ltd.	ID:	5 PSD + 1 moisture	Control Number:	
	1362 - 101 St. SW	Name:		Date Received:	Jan 4, 2012
	Calgary, AB, Canada	Location:		Date Reported:	Jan 10, 2012
	T3H 3Z4	LSD:		Report Number:	1665692
Attn:	Claude St-Martin	P.O.:			
Sampled By:		Acct code:			
Company:					

Jan. 04/2012 Sample

Reference Number	847990-6
Sample Date	
Sample Time	
Sample Location	
Sample Description	S.H. RAW ⇒ rename as High Prairie - Raw Jan. 04/2012
Sample Matrix	Solids

Analyte		Units	Result		Nominal Detection Limit
Physical and Aggregate Properties					
Moisture	Wet Weight	%	26.9	as received after being rained on during transport.	0.1

Claude expects 15% of natural, inplace bentonite

Approved by: [redacted]

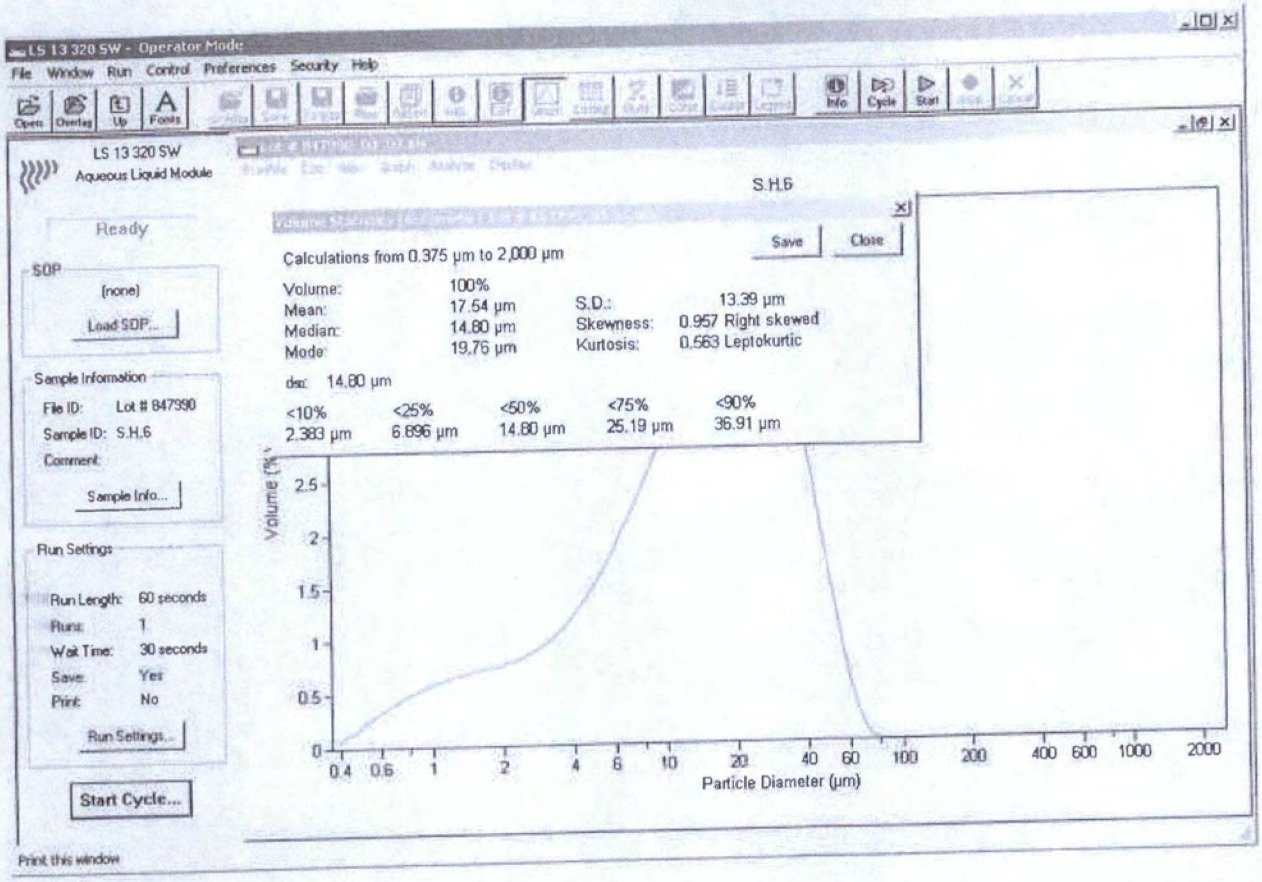
Ewa Tybura
Senior Technician

Exova

Beckman Coulter LS Particle Size Analyzer

2012-01-10

Exova



Claude St. Martin
Sample ID: Rosaline

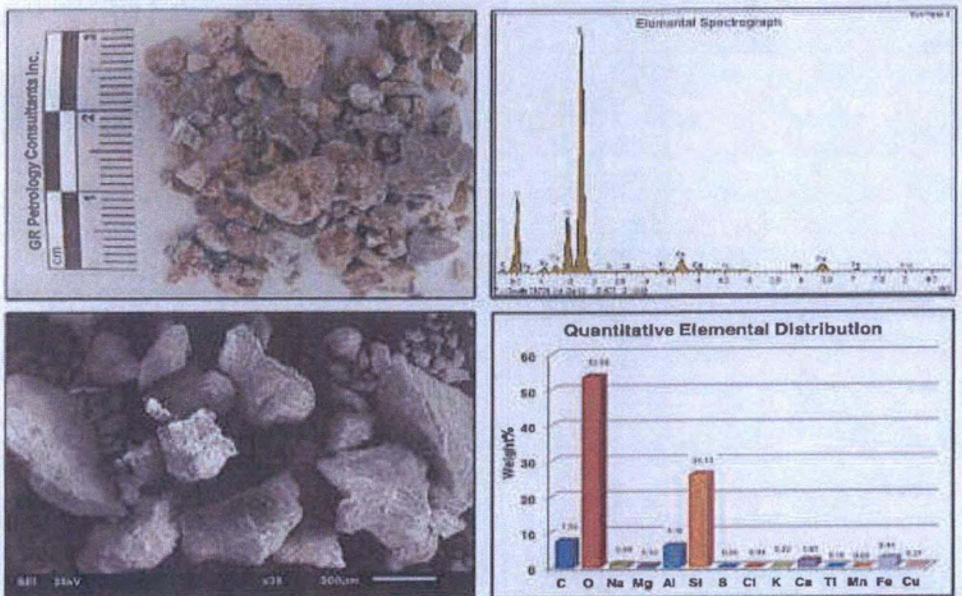


Plate 1

GR 17575-01 2011

Altaben
High Prairie - Raw Jan. 04/2012 sample

Claude St. Martin
Sample ID: Swan Hill

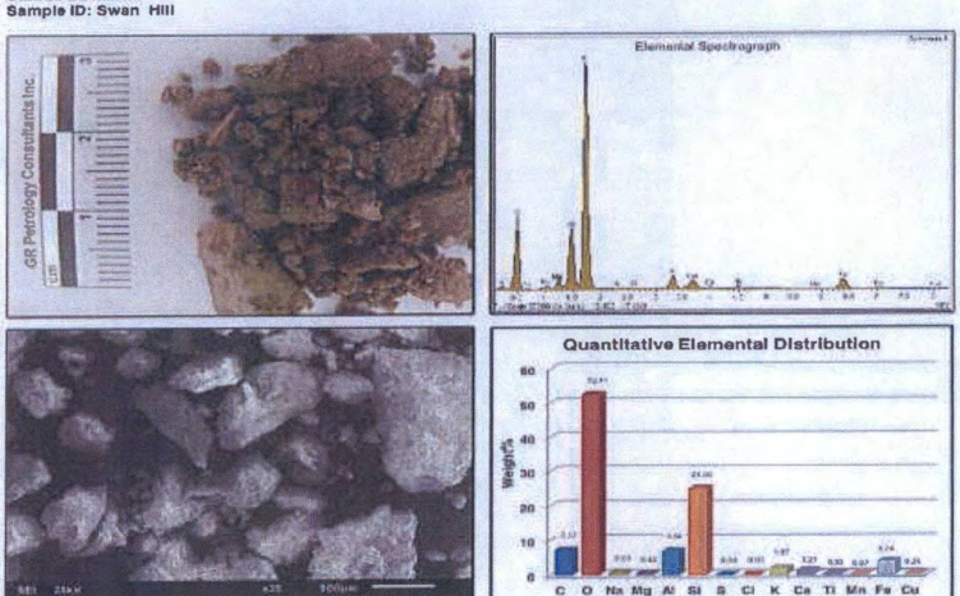


Plate 2

GR 17575-02 2011

Claude St. Martin
Sample ID: Rosaline

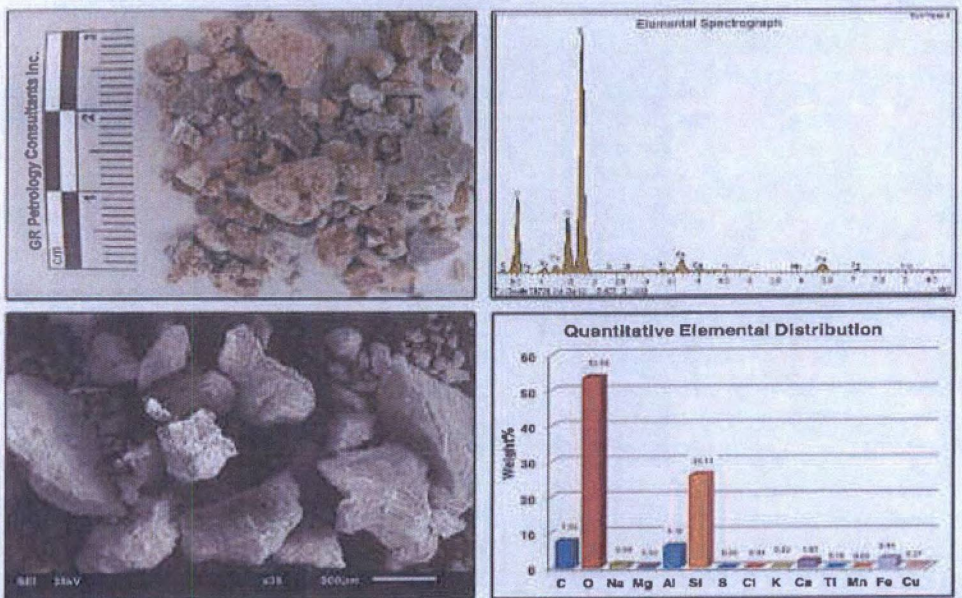


Plate 1

GR 17575-01 2011

Altaben
High Prairie - Raw Jan. 04/2012 sample

Claude St. Martin
Sample ID: Swan Hill

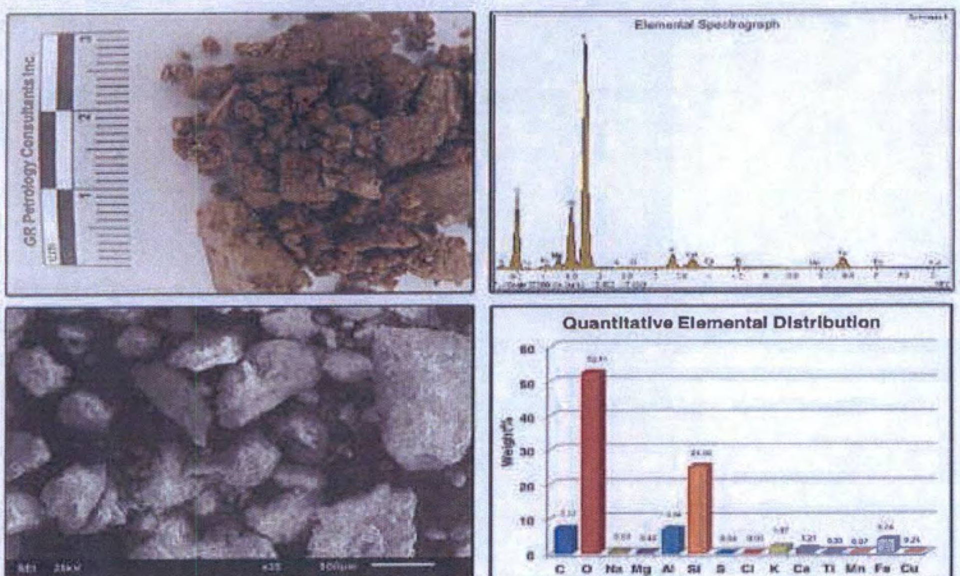


Plate 2

GR 17575-02 2011

XRF Analysis

Ron Spencer
Feb. 10/2012

High Prairie; Project

I have examined raw and ground samples from both Rosaline and Swann Hills by X-Ray fluorescence and examined the report from Gr Petrography. I have included a table below comparing the GR Petrograph compositional analyses to my XRF data. I have also included analyses from two laboratory standard bentonite samples for comparison. Note: both the Rosaline and Swann Hills samples have lower aluminum values than do the standards. Aluminum is a major component of bentonite.

sample	type	Si	Al	Fe	K	Ca	S	Na	Mg
RJS SH-6 DEC 29	ground	33.6%	7.9%	4.3%	2.7%	1.6%	0.00%		
RJS SH-6 DEC 29	ground	32.8%	8.9%	4.1%	2.6%	1.5%	0.00%		
RJS SH RAW	BULK	34.3%	7.8%	3.6%	2.6%	1.4%	0.04%		
RJS SH RAW	BULK	33.7%	8.6%	3.5%	2.6%	1.4%	0.05%		
GR Petrology	**EDS**	**24.9%**	**6.8%**	**3.7%**	**1.9%**	**1.2%**	**0.04%**	**0.7%**	**0.4%**
GR Petrology	**XRD**	**26.2%**	**19.6%**	**3.3%**	**2.6%**	**2.1%**		**1.2%**	**1.4%**
RJS ROSALINE R-2	ground	35.2%	8.1%	3.7%	0.3%	1.5%	0.04%		
RJS ROSALINE R-2	ground	35.1%	8.2%	3.7%	0.3%	1.5%	0.03%		
RJS ROSALINE RAW	BULK	34.9%	8.5%	3.4%	0.2%	1.6%	0.06%		
RJS ROSALINE RAW	BULK	34.6%	8.9%	3.4%	0.2%	1.6%	0.05%		
GR Petrology	**EDS**	**26.1%**	**6.2%**	**2.4%**	**0.3%**	**1.9%**	**0.06%**	**1.0%**	**0.3%**
GR Petrology	**XRD**	**30.0%**	**9.9%**		**1.8%**	**6.9%**		**1.0%**	
na smectite	standard	32.3%	11.6%	3.7%	0.3%	1.3%	0.06%		
ca smectite	standard	32.6%	11.2%	1.6%	0.1%	2.7%	0.04%		

High Prairie

I have also compared the composition in terms of some of the key oxide components with the analyses given for bentonite from BRI-CHEM supply in a second table. Again notice that both the Swann Hills and Rosaline samples are higher in silica and lower in alumina than that of the "competition."

sample	type	CaCO3	SiO2	Al2O3	K2O	Fe2O3
RJS SH-6 DEC 29	ground	4.0%	71.8%	14.9%	3.3%	6.1%
RJS SH-6 DEC 29	ground	3.8%	70.3%	16.9%	3.2%	5.9%
RJS SH RAW	BULK	3.5%	73.4%	14.8%	3.2%	5.1%
RJS SH RAW	BULK	3.4%	72.1%	16.3%	3.1%	5.0%
RJS ROSALINE R-2	ground	3.8%	75.2%	15.3%	0.3%	5.3%
RJS ROSALINE R-2	ground	3.8%	75.0%	15.5%	0.3%	5.3%
RJS ROSALINE RAW	BULK	4.0%	74.6%	16.2%	0.2%	4.8%
RJS ROSALINE RAW	BULK	4.0%	74.1%	16.8%	0.2%	4.8%
na smectite	standard	3.3%	69.2%	21.9%	0.3%	5.2%
ca smectite	standard	6.6%	69.7%	21.2%	0.1%	2.3%
BRI-Chem	competition	0.6%	61.3%	19.8%	0.4%	3.9%

High Prairie

Good