MAR 20130020: RICHARDSON

Richardson- A report on silica sand exploration near Firebag, north east Alberta.

Received date: Aug 13, 2013

Public release date: Jun 25, 2014

Darrell Cotterill
Parallax Resources Ltd.
Box 88 Site 270 RR2
Stony Plain, Alberta
T7Z 1X2

Telephone: 780-800-2595
Cell: 780-293-8140
Email: parallax@xplornet.com

CERTIFICATE of AUTHOR

I, Darrell Cotterill, P. Geol., do hereby certify that:

1. I am president of:
Parallax Resources Ltd.
Box 88 Site 270 RR2
Stony Plain, Alberta, Canada
T7Z 1X2

2. I graduated with a Bachelor of Science (with Distinction) degree in geology from the University of Alberta in 1989. In addition, I have obtained a technical diploma in Petroleum Technology from the Northern Institute of Technology in 1977.
3. I am a member of the Association of Professional Engineers, Geologists and Geophysicists of Alberta.
4. I have worked continuously as a geologist for a total of 24 years since my graduation from university.
5. I am not aware of any material fact or material change with respect to the subject matter of the technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical report misleading.
6. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated this 13th Day of August, 2013.

[redacted]

Darrell Cotterill, P. Geol

Darrell Cotterill
Parallax Resources Ltd.
Box 88 Site 270 RR2
Stony Plain, Alberta
T7Z 1X2

Telephone: 780-800-2595
Cell: 780-293-8140
Email: parallax@xplornet.com

CONSENT of AUTHOR

I, Darrell Cotterill, do herby consent to the filing of the written disclosure of the technical report titled "Richardson Project", dated 13 August 2013 (the "Technical Report") and any extracts from or a summary of the Technical Report in the preliminary geological investigation of Athabasca Mineral's Inc., and the filing of the Technical Report with the securities regulatory authorities referred to above.

I also certify that I have read the written disclosure being filed and do not have any reason to believe that there are any misrepresentations in the information derived from the Technical Report or that the written disclosure in the geological investigation contains any misrepresentation of the information contained in the Technical Report.

Dated this ~~13th~~ Day of August, 2013.

[redacted]

Darrell Cotterill, P.Geol

MINERAL ASSESSMENT

EXPENDITURE BREAKDOWN BY TYPE OF WORK (PART B)

Project Name: Richardson

1. Prospecting	$ 32,390.26
2. Data Compilation and Geological Mapping	$ 23,800.00
3. Geophysical Surveys	$
a. Airborne	$
b. Ground	$
4. Geochemical Surveys	$
5. Trenching and Stripping	$
6. Drilling	$ 264,614.07
7. Assaying and whole rock Analysis	$ 1687.95
8. Other Work:________________________________	
SUBTOTAL	$ 320,804.33
9. Administration (up to 10% of the subtotal)	$ 32,080.33
10. TOTAL	$352,884.76

Brian Hudson — August 13, 2013

SUBMITTED BY (print name) — DATE

Richardson Project

Athabasca Minerals Inc.

August 2013

ATHABASCA MINERALS INC.

2012-2013 EXPLORATION
RICHARDSON PROJECT, NORTHEAST ALBERTA

Mineral Assessment Report Part B

Metallic and Industrial Minerals Permits

9312070594
9312060367
9310060419
9312060388
9311070581
9310060418
9312060387
9312110408
9312100494

Geographic Coordinates
Longitude 111.15492° to 111.319133°
Latitude 57.72965° to 57.90406°

NTS 74E10, 74E11, 74E14, 74E15
Bitumount Map Area

August 2013

Completed by:

Darrell Cotterill
Parallax Resources Ltd.
Box 88 Site 270 RR2
Stony Plain, AB T7Z 1X2

Brian Hudson
VP Mineral Development
Athabasca Minerals Inc.

D. K. Cotterill, P. Geol
Parallax Resources Ltd.

Brian Hudson
Athabasca Minerals Inc.

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SUMMARY

Athabasca Minerals Inc. (AMI) holds Metallic and Industrial Mineral Permits on more than 511,000 hectares (ha) of land within the Athabasca region of northeast Alberta. AMI, a mineral exploration company based in Edmonton, was formed in April of 2006. The Richardson Property assessment report evaluates work completed on nine adjoining permits totaling over 62,000 ha. The mineral permits are located northeast of the Firebag River, about 130 km north-northeast of Fort McMurray (**Figures 1 and 2**).

This assessment report addresses exploration work conducted on the nine permits, dating back to 2012. The Richardson Property is located 35 km northeast of AMI's Firebag Property, a high-quality silica sand deposit. AMI intends to market high quality, industrial-grade sand to the frac industry. Once permission is granted by the Alberta government, Athabasca Minerals anticipates moving forward with required infrastructure and will begin mining the sand deposit.

Exploration at Richardson is focused on the mineral potential within Devonian carbonates and igneous rocks of the Precambrian Shield. Within the permit area, the two bedrock successions are present at shallow depths and, in places, exposed at the surface. The Devonian bedrock consists of dolomite within the Keg River Formation and dolomitic mudstone within the Contact Rapids Formation. At Richardson, the Devonian carbonates rest unconformably on igneous granites that form most of the Precambrian Shield in northeast Alberta. The two bedrock successions are also being assessed as a source of aggregate, a scarce commodity within the Fort McMurray region. Bedrock derived aggregate could serve as a replacement for sand and gravel now used by the oil sand industry and Municipal District of Wood Buffalo.

Geological information was compiled from existing reports within the Property and surrounding area. Geologic mapping, using published information and recently collected field data culminated in a shallow drill program that was completed in January and February of 2013. Late mineral exploration approvals from the Alberta Government combined with extreme weather conditions forced the drill program to end prematurely, but four holes were completed at Richardson. All four holes intersected the top of the Keg River Formation. Two holes recovered over 35 m of dolomite. One of the two cored the remainder of the Devonian succession (Contact Rapids Formation) and terminated 25 m into the Precambrian basement.

Fourteen samples were collected from cored intervals within the Precambrian granite and the Keg River dolomite. Whole Rock ICP was run on all samples and selected samples were analyzed for gold and rare-earth elements. Recorded gold concentrations were low. One sample showed slightly elevated concentrations of rare-earth elements compared with other samples of matching lithology. Review of the geochemical analysis is ongoing and additional sampling is likely. In addition, portions of the core from both bedrock units will be evaluated as a potential source of aggregate.

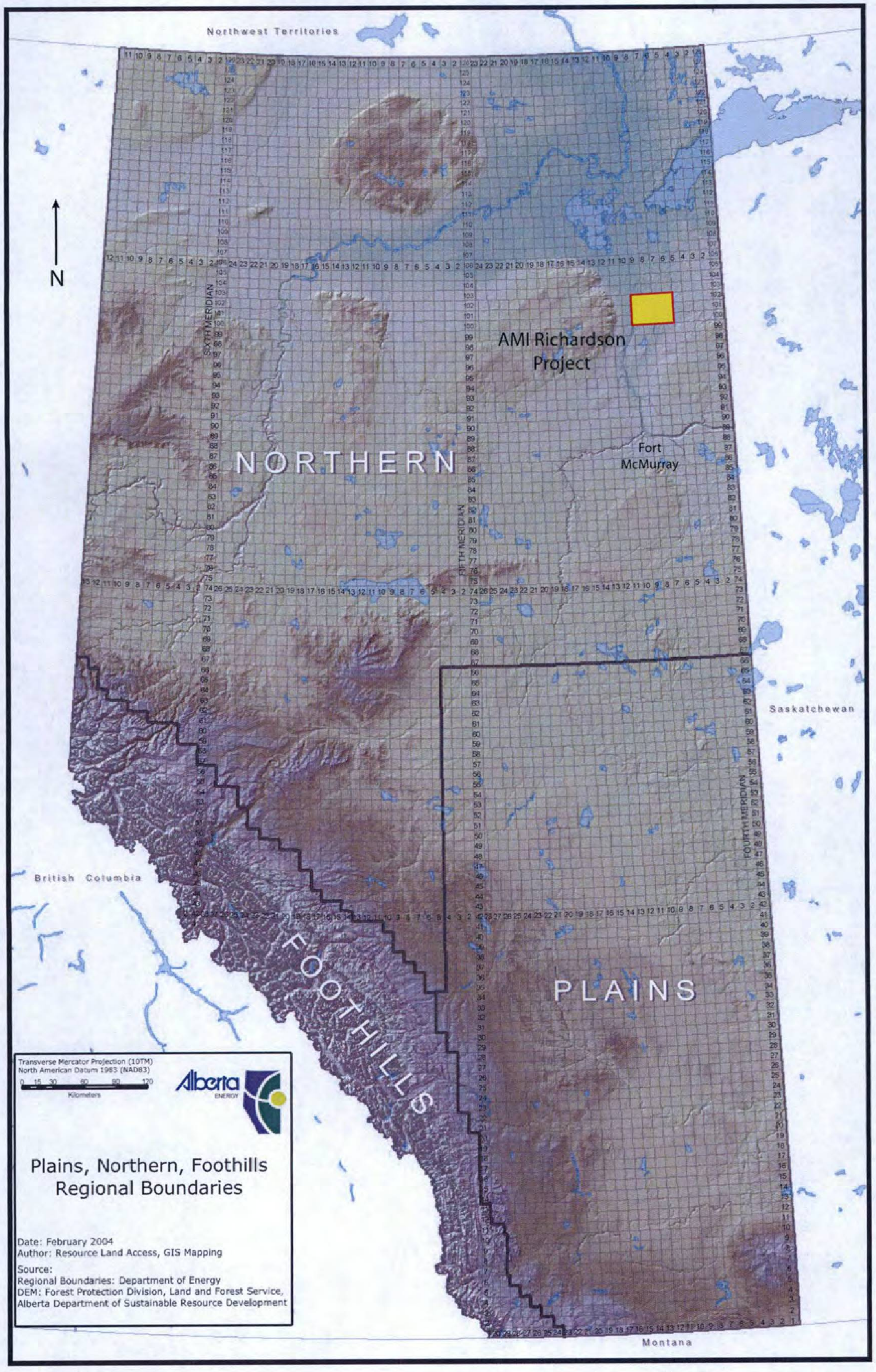

Figure 1: Surface topography of Alberta (Map Source: Alberta Energy, 2004).

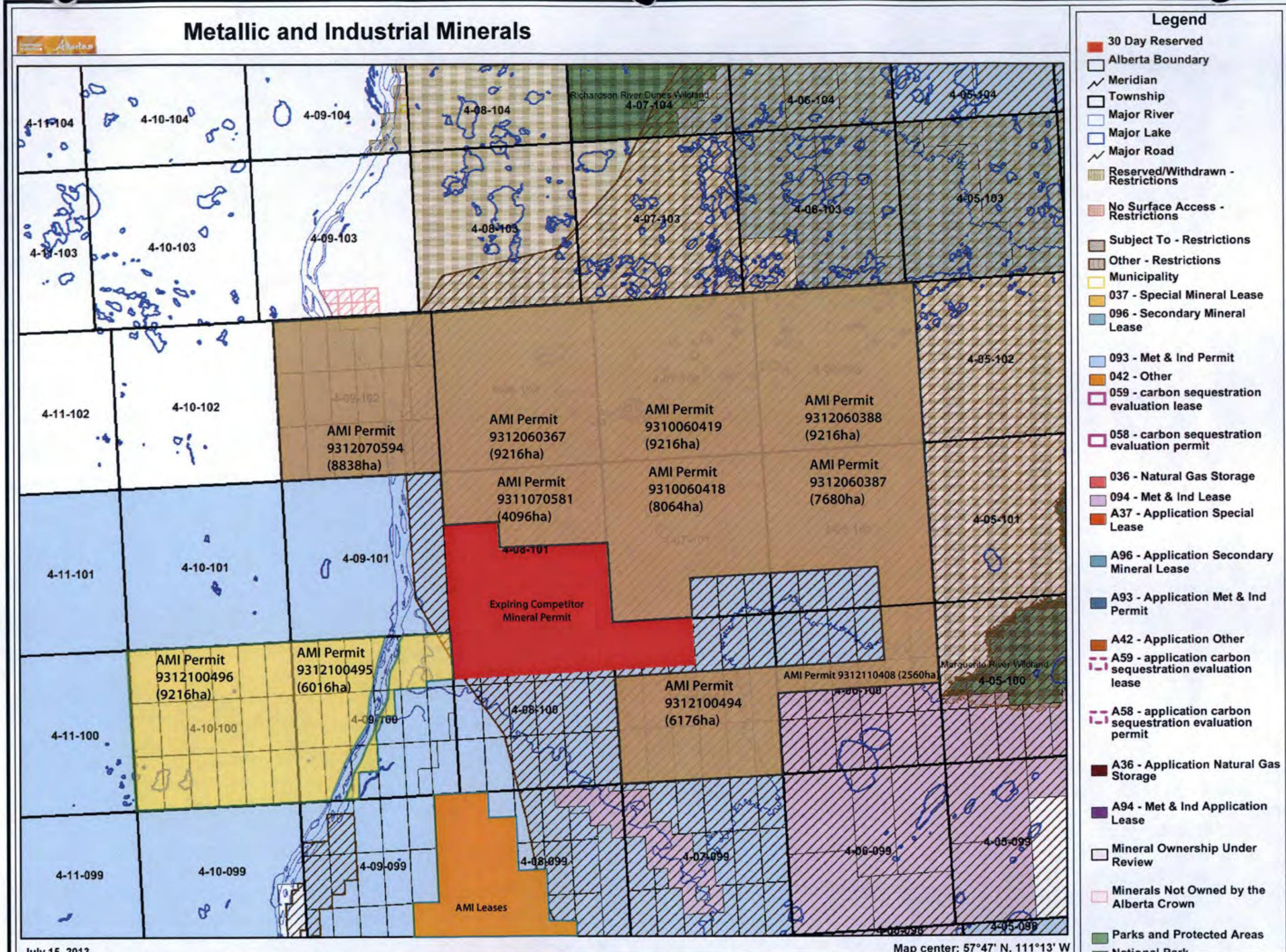

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Figure 2: Athabasca Minerals Inc.-- Metallic and Industrial Mineral Permits

1.0 INTRODUCTION

Athabasca Minerals Inc. has explored for Metallic and Industrial Minerals within the Athabasca region since 2006. The company currently retains mineral permits on over 511,000 ha of land within the Province of Alberta. Most permits are located within northeast Alberta. AMI also has over 21,000 ha of land under mineral lease. All lease holdings are located within the Athabasca area. In addition, AMI manages the Susan Lake gravel pit, north of Fort McMurray, and markets aggregate products from several of its own gravel pits south of Fort McMurray.

AMI is awaiting government approval to develop a large silica sand property located north of Fort McMurray, just south of the Firebag River. The Firebag Project consists of seven mineral leases that total 12,000 ha. The silica sand deposit has passed all the test requirements for use in the frac sand industry. North of the Firebag Project, AMI recently acquired several Metallic and Industrial Minerals Permits (Richardson Property). The company is targeting shallow Devonian and Precambrian bedrock units. The bedrock is being assessed for economic minerals that include base metals and rare-earth elements (Richardson Project, **Figure 1**). Devonian carbonate and Precambrian granite are also being evaluated as potential sources of aggregate. Sand and gravel, typically used for roadways and plant construction sites within the oilsand industry, remain in high demand. Local sources of gravel are in short supply. Extended aggregate haul distances are becoming economically prohibitive and the demand for aggregate continues to rise as more bitumen recovery projects come online.

Athabasca Minerals currently has over 80,000 ha under mineral permit, north of the Firebag River Project. Most permits were acquired in 2012. The permit holdings extend from the Athabasca River in the west to the Marguerite River Wildlands in the east. In the west, thick Quaternary sediments directly overlie Lower Cretaceous sand within the McMurray Formation or Middle Devonian carbonates. McMurray sand deposits within the local area have, in places, been removed by post-Cretaceous erosion resulting in recent Quaternary sand deposits being in direct contact with Devonian limestone and dolomite. In the east, the regional dip of the basin progressively brings Devonian carbonates (mostly dolomite) and granitic rocks from the Precambrian basement close to the present-day land surface. Assessment strategies involved exploiting areas where the bedrock units are present at shallow depths, or more preferably, exposed at the surface.

The Richardson report covers office and field-based exploration conducted in 2012 and 2013 on nine contiguous permits located along and east of the Athabasca River (**Figure 2 and Appendix 1**). Exploration work includes data compilation and mapping, several field investigations and a shallow drill program.

AMI has a vision to become a major supplier of minerals and chemicals to the oil sands industry. The Company's aim is to explore for and develop local sources of minerals and aggregate products that are essential to the economic development of northeast Alberta (i.e., minerals used in oil sand processing, construction, and in the everyday requirements of community living).

2.0 PROJECT LOCATION AND MINERAL PERMITS

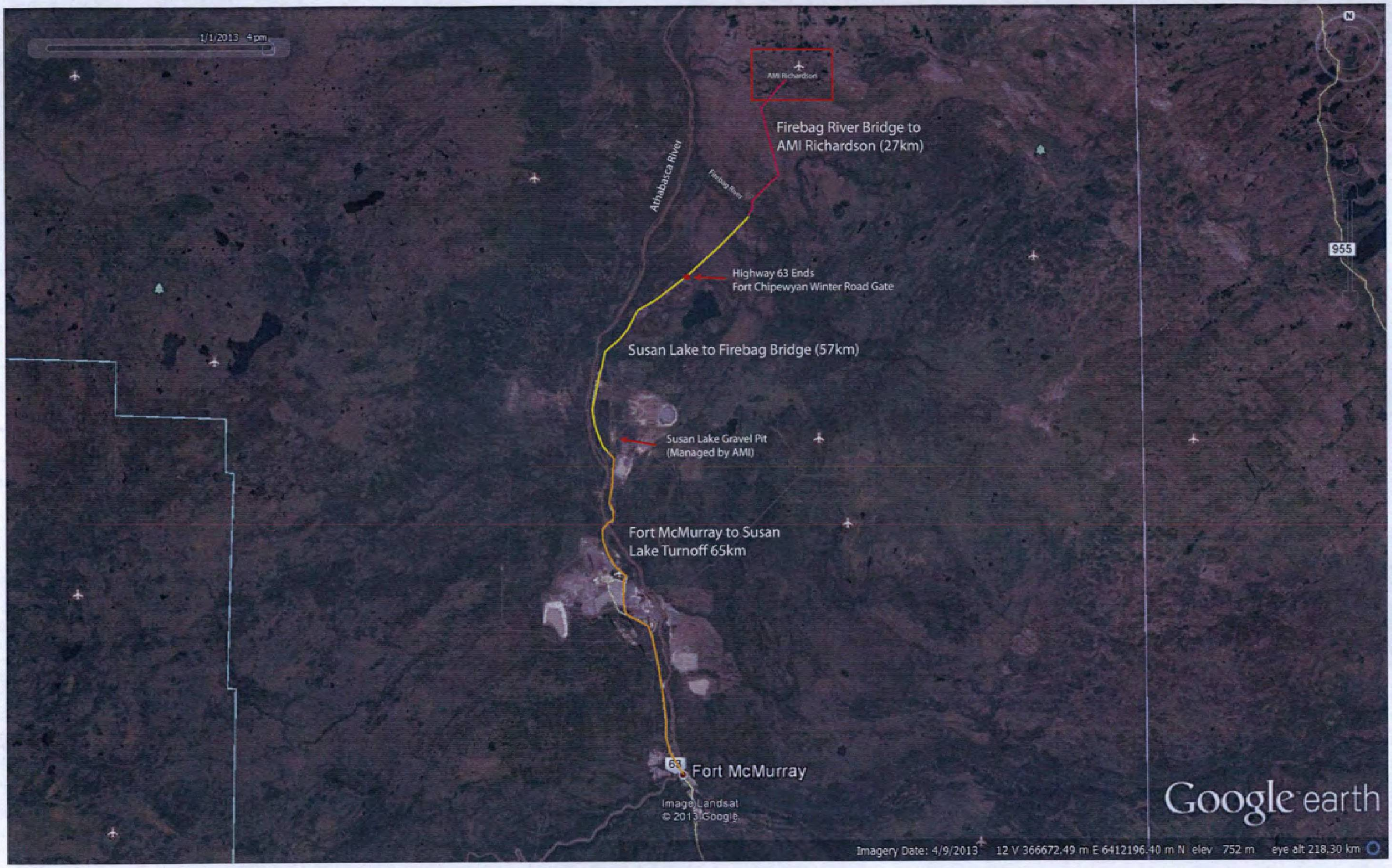
The Richardson Project is roughly 130 km north-northeast of the City of Fort McMurray (**Figures 1 and 3**). The project area consists of nine adjoining Metallic and Industrial Mineral Permits acquired in 2010 and 2012 (**Figure 4**). The exploration area includes townships 100 to 102, ranges 6 to 9, West of the Fourth Meridian. The permits evaluated in this report are shown is Figure 2 (highlighted in brown). The Athabasca River and the Marguerite Wildlands roughly define the west and east boundaries of the Project. The Firebag and Marguerite rivers mark the southern boundary and the east-west leg of Grayling Creek defines the northern limit.

Access to the property is by Highway 63, north of Fort McMurray (**Figure 3**). Highway 63 is paved to the Susan Lake/Syncrude Aurora turnoff (65 km). North of the intersection, the road continues as an all-weather gravel road for 42 km to the end of Highway 63 and the beginning of the Fort Chipewyan Winter Road. The Richardson Project is located an additional 42 km from the start of the Winter Road.

The road is open to light and heavy vehicle traffic from mid-January to mid-March and serves as the main transport route for goods and services into Fort Chipewyan. Recreational users commonly use Winter Road to access lakes for camping and fishing during the spring, summer and fall. Most of the roadway consists of thick, unconsolidated sand, making it difficult for regular light vehicle traffic during the summer months. A locked gate at the end beginning of the Winter Road prevents vehicle access to the except for recreational ATV traffic. During the winter months, maintenance crews freeze and grade the road regularly. Over 40 ice bridges are required for passage between the Firebag River and Fort Chipewyan. Year-round access is possible, but it is preferable to conduct most exploration during winter. The Fort Chipewyan Winter Road passes diagonally through the Project area.

Metallic and Industrial Mineral permits, located within and bordering the current exploration area, total 65,062 ha (**Figure 2**). Other mineral permits within the immediate region bring AMI's total holdings to more than 80,000 ha (**Figure 4**). In addition, Athabasca Minerals has over 12,000 hectares of land under mineral lease 35 km southwest of the Richardson Project (Firebag River Project).

This assessment report includes exploration work centered within mineral permits 9310060419 and 9312060388. Other contiguous mineral permits evaluated within this report include 9312060367, 9311070581, 9310060418, 9312060387, 9312110408, 9312100494 and 9312070594 (**Figure 2,** total 65,062 ha).



0 25
Scale (km)

Athabasca MINERALS INC.

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Title: Road Access to AMI Richardson			Source: Google Earth 2013	Date: August 2013
Project: Richardson Project	Drawn By: DKC	Checked By: BH	Coordinate System: NA	Figure: 3

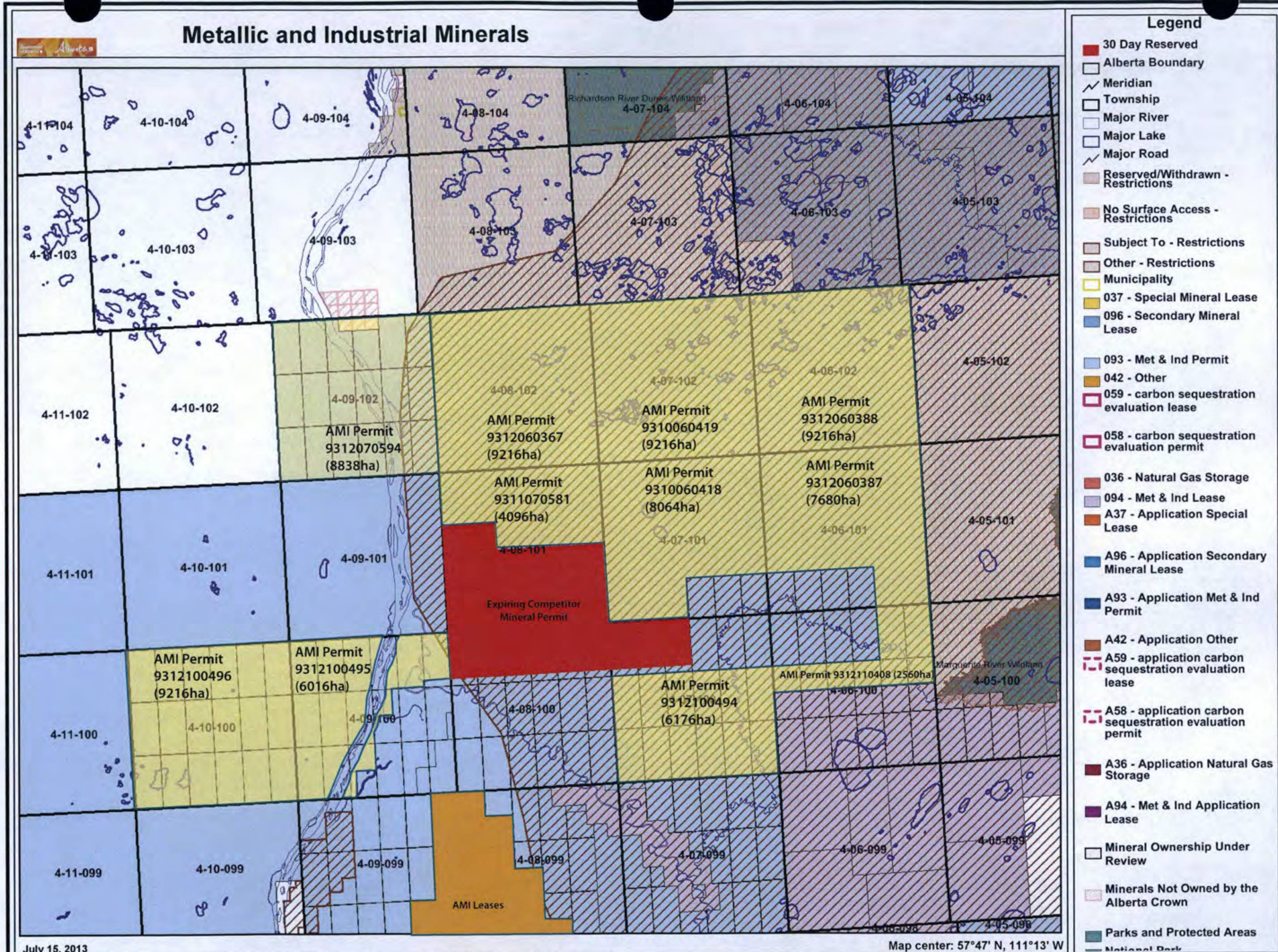

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Figure 4: Athabasca Minerals Inc.-- Metallic and Industrial Mineral Permits

3.0 REGIONAL GEOLOGY

3.1 Devonian Stratigraphy

The Western Canada Sedimentary Basin (WCSB) is an extensive northwest-southeast trending basin that covers Alberta and parts of British Columbia and Saskatchewan. The Athabasca area lies along the passive, eastward thinning margin of the basin where sedimentary successions onlap the southwest dipping Precambrian basement. Along the east margin of the basin, a thin, erosional wedge (up to 900_m thick) of Devonian strata unconformably overlies, and onlaps the Precambrian basement (Cotterill and Hamilton, 1995). The Devonian succession is, in turn, overlain by a thinner, partially preserved succession of Cretaceous sediment that exceeds 500 m thick, in places. The Devonian and Cretaceous sequences form two eastward converging sedimentary wedges separated by a long-standing erosional unconformity.

Lower, Middle and Upper Devonian strata are preserved within the region. The Precambrian basement and the sub-Cretaceous unconformity mark the erosional top and bottom the Devonian succession. The surface of the sub-Cretaceous unconformity consists of a beveled block of west dipping Middle and Upper Devonian strata. The tilted strata form a series of northwest trending subcrop belts that increase in age to the east (Cotterill and Hamilton, 1995). Lower and Middle Devonian strata have been subdivided into the Lower and Upper Elk Point subgroups. Regionally, the Lower Elk Point succession consists of the Basal Red Beds (locally referred to as the La Loche), Lotsberg, Ernestina Lake, Cold Lake and Contact Rapids (also referred to as the McLean River) formations (**Figure** 5). The Upper Elk Point succession consists of the Winnipegosis (locally referred to as the Methy), Prairie Evaporite, and Watt Mountain formations (Norris, 1973). There is growing consensus among researchers that in northern Alberta, the Winnipegosis should be referred to as the age equivalent Keg River Formation and in southern Alberta the term Winnipegosis Formation should be used. The Middle and Upper Devonian successions consist of the Fort Vermilion, Slave Point, Waterways, Cooking Lake, Ireton and Grosmont formations. The Cooking Lake, Ireton and Grosmont formations subcrop at the sub-Cretaceous unconformity west of the Project area.

3.1.1 Lower Elk Point Group

The Devonian La Loche Formation consists of arkosic, gritty sandstones of variable thickness. The sand-dominated interval forms an erosional regolith that unconformably overlies the granitic Precambrian basement. Minor lithologies include sandy dolomite, mudstone, and traces of anhydrite and gypsum (Norris, 1973). The overlying Lotsberg, Ernestina Lake and Cold Lake formations (Lower Elk Point Group) contain salt and anhydrite with minor shale and carbonate beds. Pre-Devonian paleotopography largely controlled the geographic location and the thickness evaporite deposits within both formations (Hamilton, 1971 and Grobe, 2000).

The Lotsberg Formation consists of a lower and an upper unit. Salt deposits within the Lower Lotsberg are confined to a circular sub-basin in east-central Alberta. Up to 60 m of salt is present within the confined basin. The evaporite thins to a well-defined, zero-edge around the perimeter of the basin (Hamilton, 1971 and Grobe, 2000). Salt deposits within the upper Lotsberg are similar in many aspects to the underlying lower salt. The main concentration of salt directly overlies the lower Lotsberg salt, but the upper salt accumulation covers a much larger area and reaches a thickness of up to 150 m (Hamilton, 1971 and Grobe, 2000). Thirty to seventy meters of red shale separate the two salt deposits.

Limestone and anhydrite deposits within the Ernestina Lake Formation separate the salt-bearing Cold Lake and Lotsberg formations. The formation is 10 to 20 m thick and is laterally extensive. (Hamilton, 1971). Two isolated subbasins form the primary depocenters for salt deposits within the Cold Lake Formation. In the southern basin, Cold Lake salt reaches a maximum thickness of 60 m, while in the northern basin the salt thickness locally exceeds 80 m (Grobe, 2000). Argillaceous dolomite, with minor anhydrite and gypsum overlie the Cold Lake evaporates (Contact Rapids Formation).

No Lower Elk Point formations crop out in the region because of the high solubility of most evaporites. Some of the insoluble components do crop out within the upper reaches of the Clearwater River, far to the south (in Saskatchewan).

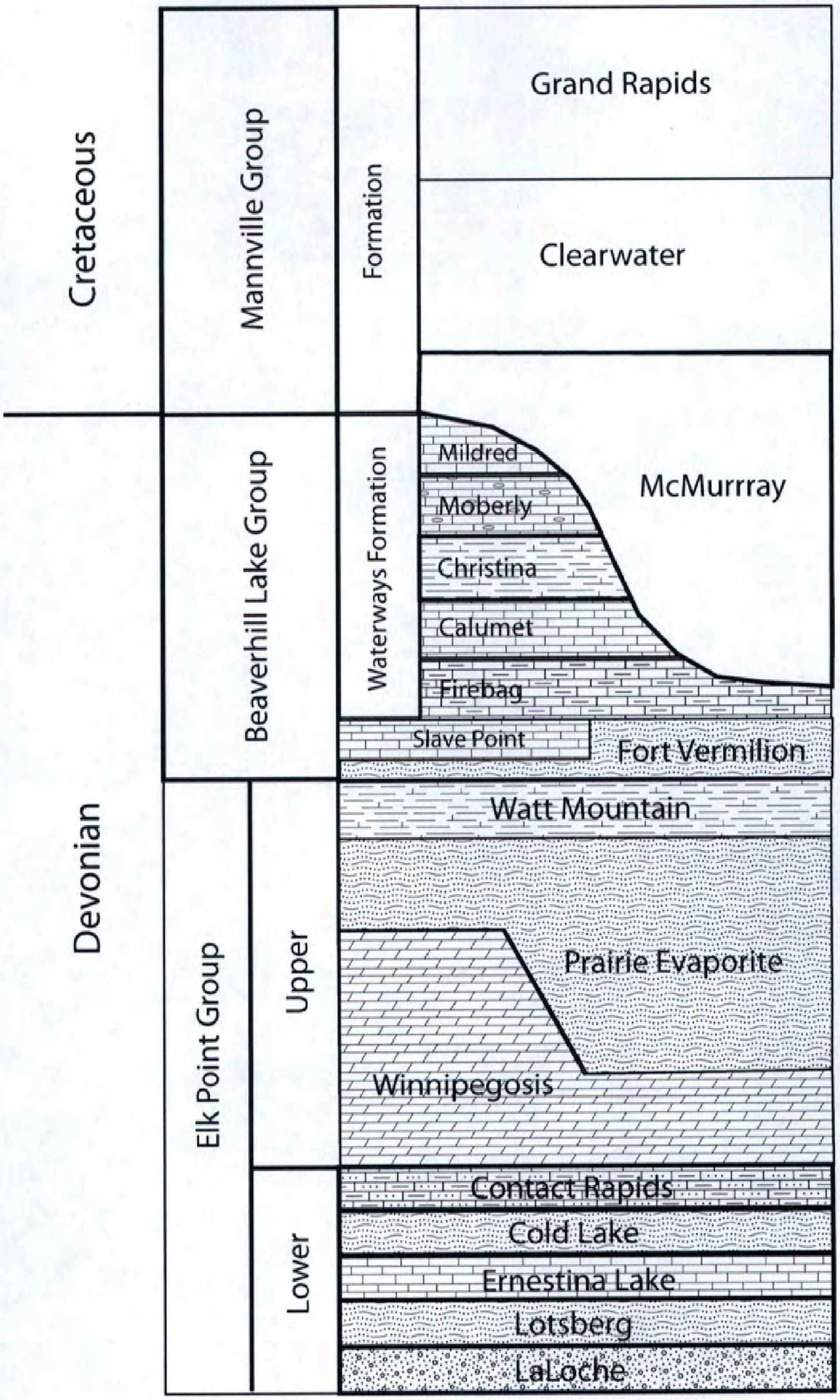


Figure 5: Regional Devonian Stratigraphy for the Athabasca Region.

3.1.2 Upper Elk Point Group

The Keg River Formation, consisting chiefly of dolomite, overlies the Contact Rapids Formation. Within the subsurface, three lithological units typically comprise the Keg River Formation. The informal members include a thin bedded basal unit, a middle unit containing reef and inter-reef deposits and an upper bedded unit generally lacking fossils (Norris, 1973). Thickness variations within the Keg River Formation are often due to the middle unit thickening in areas of reef development and thinning within inter-reef areas. The formation crops out extensively at Whitemud Falls along the upper reaches of the Clearwater River, near the Alberta-Saskatchewan border. The formation also crops out along short stretches of the Firebag River and as erosional outliers where the Precambrian basement crops out at the surface in the northeast region.

Directly overlying the Keg River is the most extensive evaporate deposit in Alberta, named the Prairie Evaporite Formation. The Prairie Evaporite succession (Upper Elk Point) is by far the thickest and regionally extensive of the Elk Point Group salt deposits (Hamilton, 1971). Thick salt deposits accumulated along a well-defined, northwest-southeast trending axis that extends from northern Alberta to southern Saskatchewan. In Alberta, the salt formation thins gradually to the west and terminates abruptly to the east along an extensive salt dissolution edge termed the Prairie Salt Scarp (Hamilton, 1971 and Grobe, 2000). The formation is thickest along the eastern boundary where salt exceeds 200 m. The same salt dissolution process forming the east margin of the Prairie salt also affected the underlying Lotsberg and Cold Lake salt deposits (Hamilton, 1971). The Prairie Evaporite Formation also contains minor shale, anhydrite, gypsum, and dolomite. These additional lithologies range from millimeters to several meters thick (Hamilton, 1971). Distinctive, grayish-green mudstones, limestone breccia and clastics cap the Elk Point Group (Watt Mountain Formation). The Watt Mountain is, in turn, overlain by (Upper Devonian) units of anhydrite, mudstone, dolomite and limestone that make up the Fort Vermilion and Slave Point formations (Cotterill and Hamilton, 1995).

3.1.3 Beaverhill Lake Group

Variably argillaceous limestones of the Waterways Formation overlie the Slave Point Formation. Five mappable, distinctive members make up the Waterways succession. These members, from oldest to youngest, include the Firebag, Calumet, Christina, Moberly and Mildred. Due to the regional dip of the basin, these members progressively subcrop at the sub-Cretaceous unconformity, covering a large geographic area in northeast Alberta. To the west, limestones and shales of the Cooking Lake, Ireton and Grosmont formations (Woodbend Group) also subcrop at the sub-Cretaceous unconformity.

3.2 Cretaceous Stratigraphy

Paleotopography developed on the long-standing erosion surface combined with post-Cretaceous erosion events resulted in varied thicknesses within the Cretaceous succession. The erosion of Devonian carbonates and widespread evaporite dissolution collapse formed an irregular surface on the unconformity that separates the Devonian and Cretaceous strata. The pre-existing topography greatly affected depositional systems in overlying Cretaceous formations.

In some local areas, thick Upper and Lower Cretaceous strata are preserved (topographic highlands) while in other areas only the lowermost Cretaceous formations are intact (high plains and lowlands). Cretaceous formations within the Mannville Group include the McMurray, Clearwater and Grand Rapids. Consecutively younger Lower Cretaceous units include the Joli Fou, Pelican and Base Fish Scales (Colorado Group). The Upper Cretaceous Labiche Formation is partially preserved within local topographic highs, an example being in the Birch Mountains (**Figure 6**).

3.2.1 Mannville Group

The basal Cretaceous McMurray Formation unconformably overlies eroded Devonian age carbonates throughout the oilsand area. The McMurray Formation typically ranges from 40 to 70 m thick, but within localized paleolows the succession can exceed 120 m. The formation contains a vast bitumen resource and is the most researched stratigraphic unit in the Cretaceous succession within the Athabasca region. Several studies focused on subdividing the heterogeneous formation into roughly defined units. Some divide the succession into three parts (lower, middle, upper) while others prefer simpler upper and lower designation. Both methods of subdivision have merit depending on where; in the Athabasca region, the stratigraphic study has taken place. The issue remains controversial. Depositional settings within the McMurray Formation include fluvial, estuarine and marginal marine.

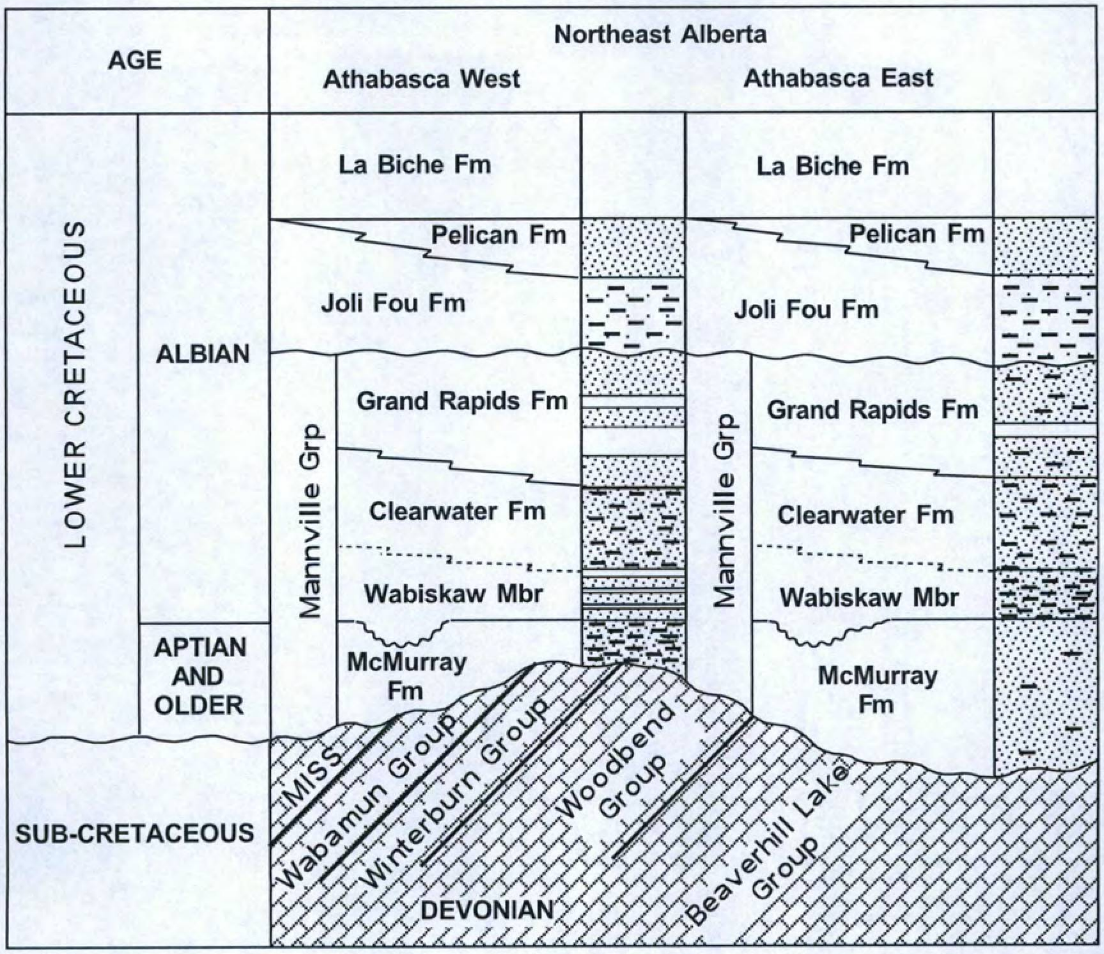


Figure 6: Schematic cross section outlining the Cretaceous stratigraphy within the Athabasca Region (modified after Wightman et. al 1995).

Unconformably overlying the McMurray Formation are the Clearwater and Grand Rapids formations. The two formations contain localized, but important bitumen resources. Muddy coarsening upward cycles characterize most of the Clearwater Formation. Local, sand-dominated shoreline cycles and incised valley fills are common near the base of the succession (Wabiskaw Member). Thick, clean sands are present within the Grand Rapids Formation in select regions. Lithic sands and shales of the Clearwater and Grand Rapids formations were deposited primarily under marine and near-marine conditions.

3.2.2 Colorado Group

A low-relief, erosion surface separates the younger Joli Fou and Pelican formations from the Grand Rapids Formation. The Joli Fou Foramtion is dominated by marine shale ranging from 0 to greater than 30 m thick. The overlying Pelican Formation consists of thick, clean, bitumen-free sand typically interbedded with shale (Cotterill and Berhane, 1992). The formation can exceed 80 m thick. The overlying Fish Scales and Labiche formations consist primarily of marine shale. These formations crop out around the upper, eroded flanks of the Birch Mountains.

3.3 Post-Cretaceous Erosion

Post-Cretaceous erosional events have progressively stripped away significant tracts of Cretaceous and Devonian bedrock from the region. Erosion combined with the regional dip of the basin exposes significant Devonian and Cretaceous bedrock at the surface. Deeply incised valleys of the Athabasca and Clearwater rivers (and associated tributaries) expose Upper Devonian carbonate units. Lower Cretaceous formations, within Mannville Group, are also commonly exposed within the valleys. Outside the major valleys, extending into the high plains and the highlands, younger Cretaceous units progressively crop out at the surface. Recent kimberlite pipe discoveries, in the Birch Mountains, provide direct evidence for local, small-scale volcanic activity in northeast Alberta. The kimberlite intrusives pierce both the Devonian and the Cretaceous successions.

Evidence for glacial reworking of exposed and near-surface bedrock is common throughout the region. Devonian and Cretaceous bedrock is typically covered by thin sand, clay and gravel deposits of Quaternary age. In local settings, sand-filled, incised valleys erode deeply into Cretaceous bedrock and, in places, downcut to the sub-Cretaceous unconformity.

3.4 Structural Elements

Structural complexities within Devonian and Cretaceous strata are obvious along the passive, inner margin of the WCSB. Structural features specific to the Devonian carbonates include regional tilting, unconformities, salt collapse, and karsting. The Prairie Salt Scarp, an extensive salt dissolution escarpment, is the main structural feature within the Athabasca regiona. Salt dissolution within the Prairie Evaporite Formation resulted in a regional, linear, northwest trending topographic low. The salt scarp progressively migrated from the northeast towards the southwest as salt was dissolved by infiltrating, fresh water moving along the Precambrian basement. Resistive carbonate formations, overlying the Prairie salt deposits, coevally collapsed as salt was removed from the system. Structural collapse features are clearly visible on the sub-Cretaceous unconformity. Sinkholes, saline lakes and local folding and faulting are other examples of smaller scale structures related to regional salt dissolution.

Salt dissolution collapse had a marked effect on the facies architecture, sediment dispersal patterns and regional thickness variations within Lower Cretaceous formations, especially the McMurray Formation. Structural deformation due to salt dissolution is evident in outcropping units within the Devonian Waterways, and the Cretaceous McMurray formations exposed along the northern leg of the Athabasca River and associated tributaries. At Fort McMurray, the Athabasca River turns from an east-west to a north-south orientation. The north-south leg roughly parallels the paleotopographic low caused by salt dissolution and the resulting collapse of resistive overlying Devonian carbonates.

Some researchers have suggested the presence of deep-seated faults on the Precambrian basement. If so, these structural features may have influenced some of the older Devonian formations, an example being reef development within the Keg River Formation. Few bore holes penetrate the Precambrian basement so proposed, deep faulting remains speculative (Cotterill and Hamilton, 1995).

4.0 PROJECT GEOLOGY

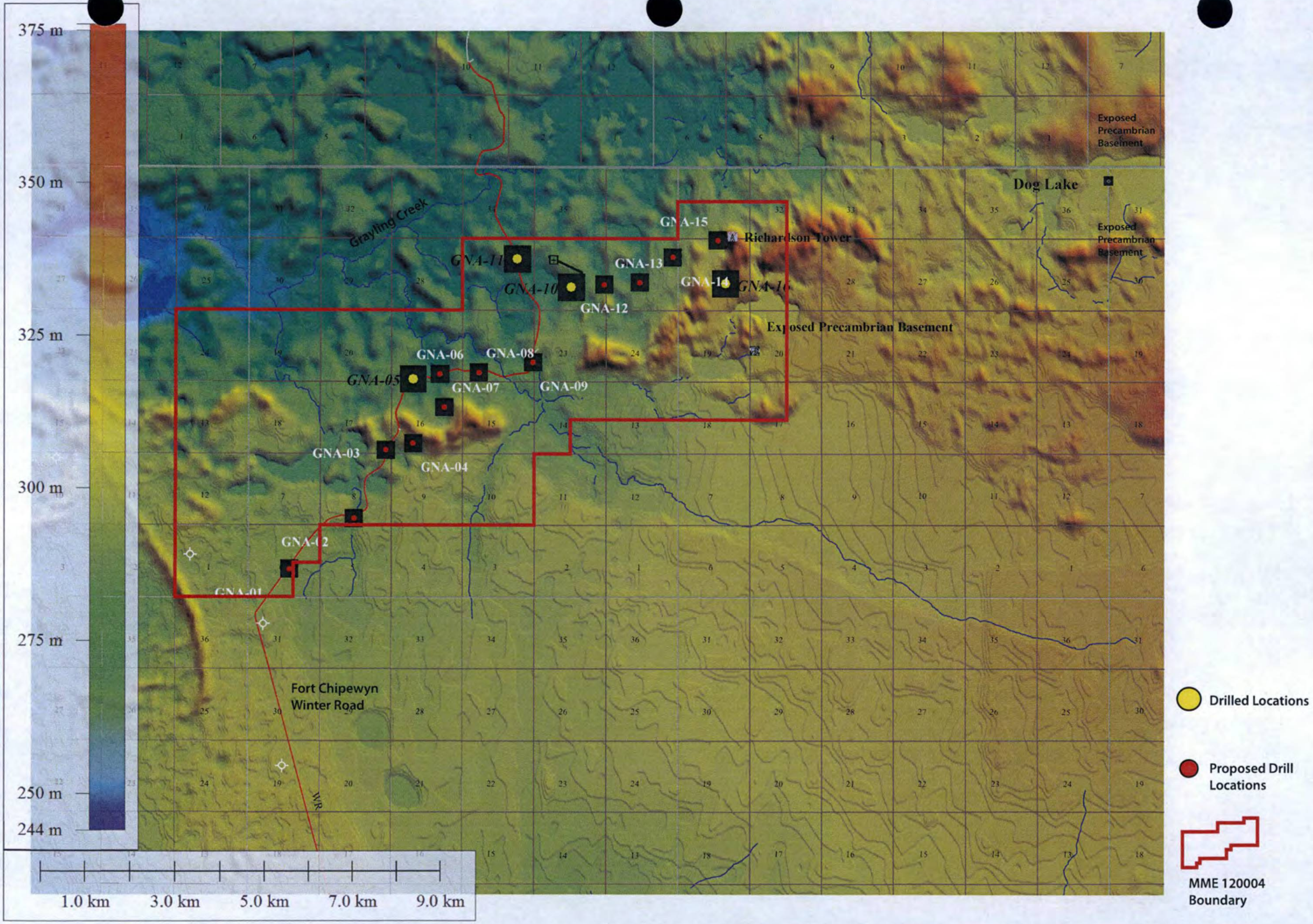
4.1 Surface Topography and Surficial Geology

Present-day topography, within the Richardson Project area, is high variably with elevations ranging from less than 250 m near the Athabasca River valley, in the east, to greater than 370 m in the northeast corner of the region (**Figure 7**). Surface mapping in the area, conducted by the Alberta Geological Survey, resulted in two published reference maps that broadly define the surficial sedimentary deposits within the Project boundary (Bayrock, 1971 and Fenton, 2013). The most recent map (**Figure 8**) characterizes the surface geology of Alberta (Fenton, 2013). The province-wide map captures information from numerous mapping projects. The Alberta Geological Survey contributed most of the surficial data. Within the Project area, the map draws heavily on work completed by Bayrock (1971).

The Richardson area can be subdivided into three terrains based on surface topography. The terrains include a dissected, low-relief region in the northwest, a rather flat region showing broad, low-frequency changes in elevation, in the south and southeast, and a variable, high relief expanse in the northeast. A discontinuous, southwest trending ridge emanates from the northeast corner of the map and continues through the Project area, towards the Athabasca River valley. The present-day surface relief is the result of recent Pleistocene and Holocene events dominated by glacial and post-glacial depositional and erosional processes.

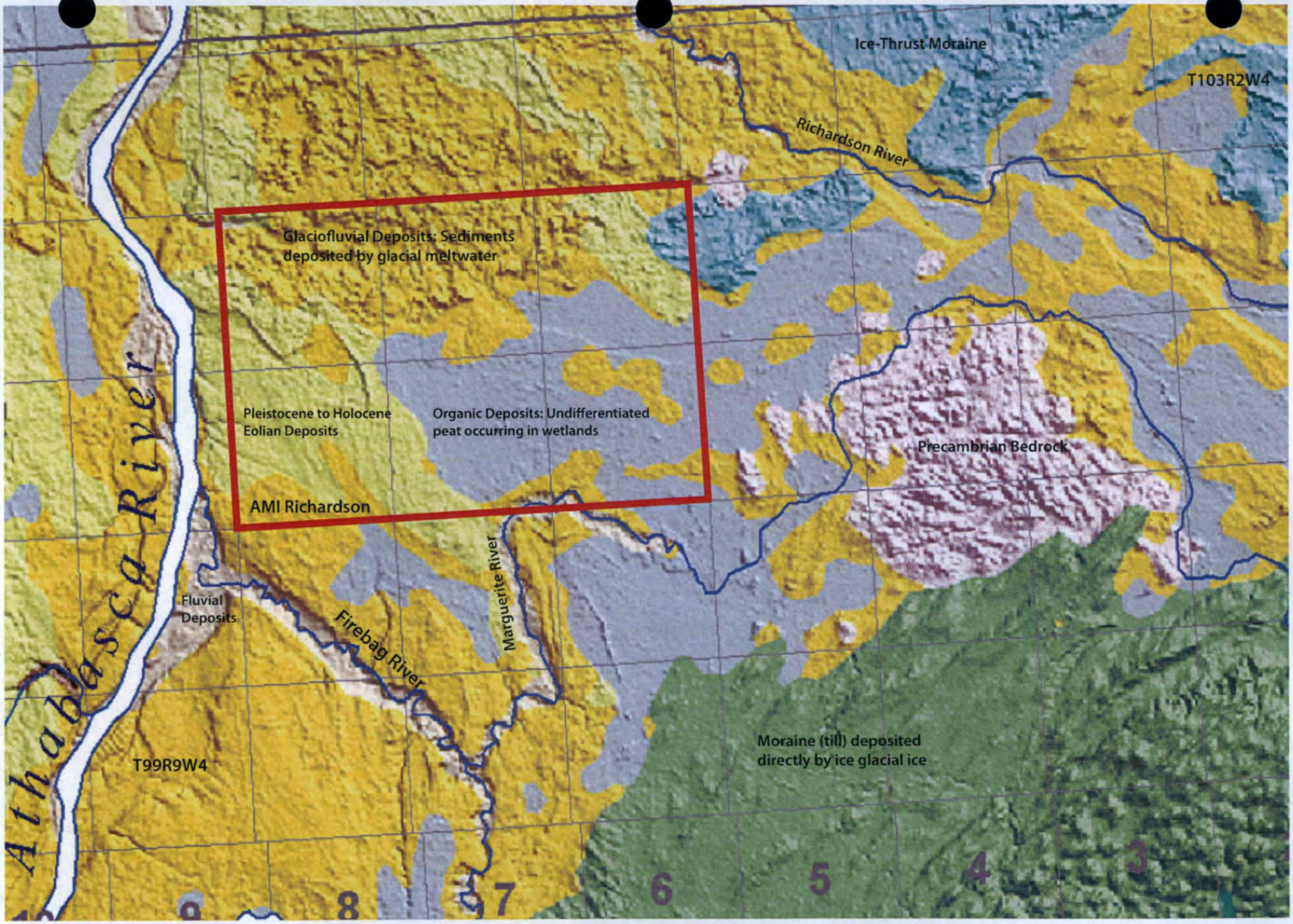
Figure 8 outlines the surficial geology into four distinct settings. Most depositional units relate directly to the topographic signature in the area. In the north, glaciofluvial sediments dominate the landscape. These deposits are commonly capped by wind-blown, eolian sediment. The topography is characterized by low rolling hills dissected by several stream networks that connect and drain a chain of small lakes. In the west and far northeast, recent surface deposits consist of eolian sand that likely blankets pre-existing glaciofluvial sediment. Sand dune forms are clearly visible on air photos and satellite imagery. The wind-blown deposits consists of fine- to medium-grained, well sorted, clean sand with silica contents expected to exceed 90%. In the central and east regions, the surficial deposits consist of undifferentiated peat, common to wetlands within the Athabasca area. Ice-thrust moraine covers a small section at the northeast corner of the Project.

It is important to understand the depositional nature and lithologic composition of the surficial deposits within the exploration area (**Figure 7**). Little is known about lateral extent and thickness of the overburden sediment. Based on limited drill data, the overburden thickness appears highly irregular. Overburden thicknesses, encountered thus far, range from 0 to 48 m. Recent drilling near the southwest corner of the Metallic and Industrial Minerals Exploration permit (MIME 120004, **Figure 7**) record overburden thicknesses ranging from 45 to 90 m. All well locations reviewed show thick Quaternary overburden in direct contact with the Keg River Formation. Detailed knowledge of the overburden thickness and lithology will be a critical factor in evaluating and developing a bedrock-sourced, aggregate deposit at Richardson.



Athabasca MINERALS INC.

Title: Surface Topography, Exploration Drill Hole Locations			Data Source: Geobase DEM, Global Mapper	Date: August 2013
Project: Richardson Project	Drawn By: DKC	Checked By: BH	Coordinate System: DLS	Figure: 7



Athabasca MINERALS INC.

Title: Surficial Geology of the Richardson Area			Source: Modified from Map 601 Fenton et al, 2013	Date: August 2013
Project: Richardson Project	Drawn By: DKC	Checked By: BH	Coordinate System: DLS	Figure: 8

4.2 Bedrock Geology

Information about the thickness and lateral distribution of bedrock units within the Richardson Project area is sparse. Surface mapping programs has identified Devonian and Precambrian bedrock that cropping out at the surface east and south of the Project boundary (Pana, 2010 and Godfrey, 1970). A regional hydrogeological study covering the Bitumount and Namur Lake map sheets (NTS 74E and 84H) broadly outlines the bedrock and surficial geology near Richardson (Ozoray, 1978).

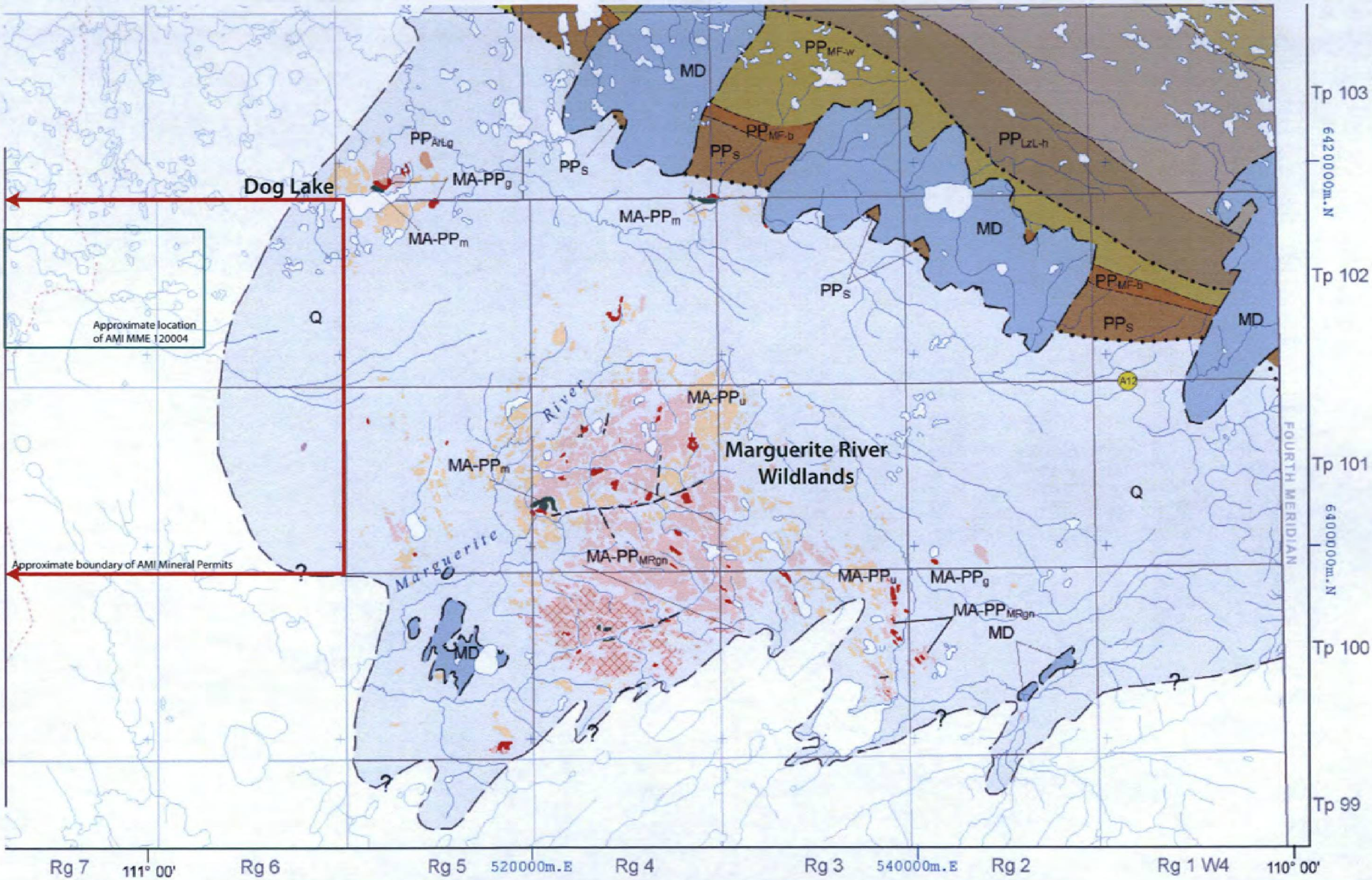
Baseline geological data, provided by regional mapping, has been supplemented with oilsand exploration data. Oilsand exploration has progressively advanced north of the defined, mineable boundary established by the Alberta Energy Regulator. The drilling tests the limit of bitumen saturated Cretaceous sand outside the mine development area. A series of uranium exploration holes were drilled north and east of the Project area (Wilson, 1985). Maps presented in this report include relevant data from the uranium testing. Deep wells, dating back to 1949, have targeted Devonian formations and the Precambrian basement throughout the Athabasca region. All available wells penetrating the Precambrian are included in the structural model depicting the basement. Data from exposed Precambrian granite east and south of the study is critical to extending the basement structure from the subsurface to the surface.

4.2.1 Precambrian Basement

The granitic basement crops out at the surface around the perimeter of Dog Lake, just northeast of the Project area and over a large area within the newly defined Marguerite River Wildlands (**Figure 9**). In 1994, the Alberta Geological Survey evaluated the mineral potential within granitic Precambrian exposures in the Marguerite River Wildlands. The Wildlands conservation area contains the largest region of exposed Precambrian bedrock south of Lake Athabasca (Dufresne, 1994). AMI collected elevation data from Precambrian outcrops around Dog Lake and within the Wildlands area. Three more granite outcrops were identified just west of the exposed limit of the Precambrian Shield shown in Figure 9. AMI discovered one of outcrop during an exploration reconnaissance flight over the Project area. This exposure and other compiled geologic data instigated the exploration program conducted during the winter of 2013.

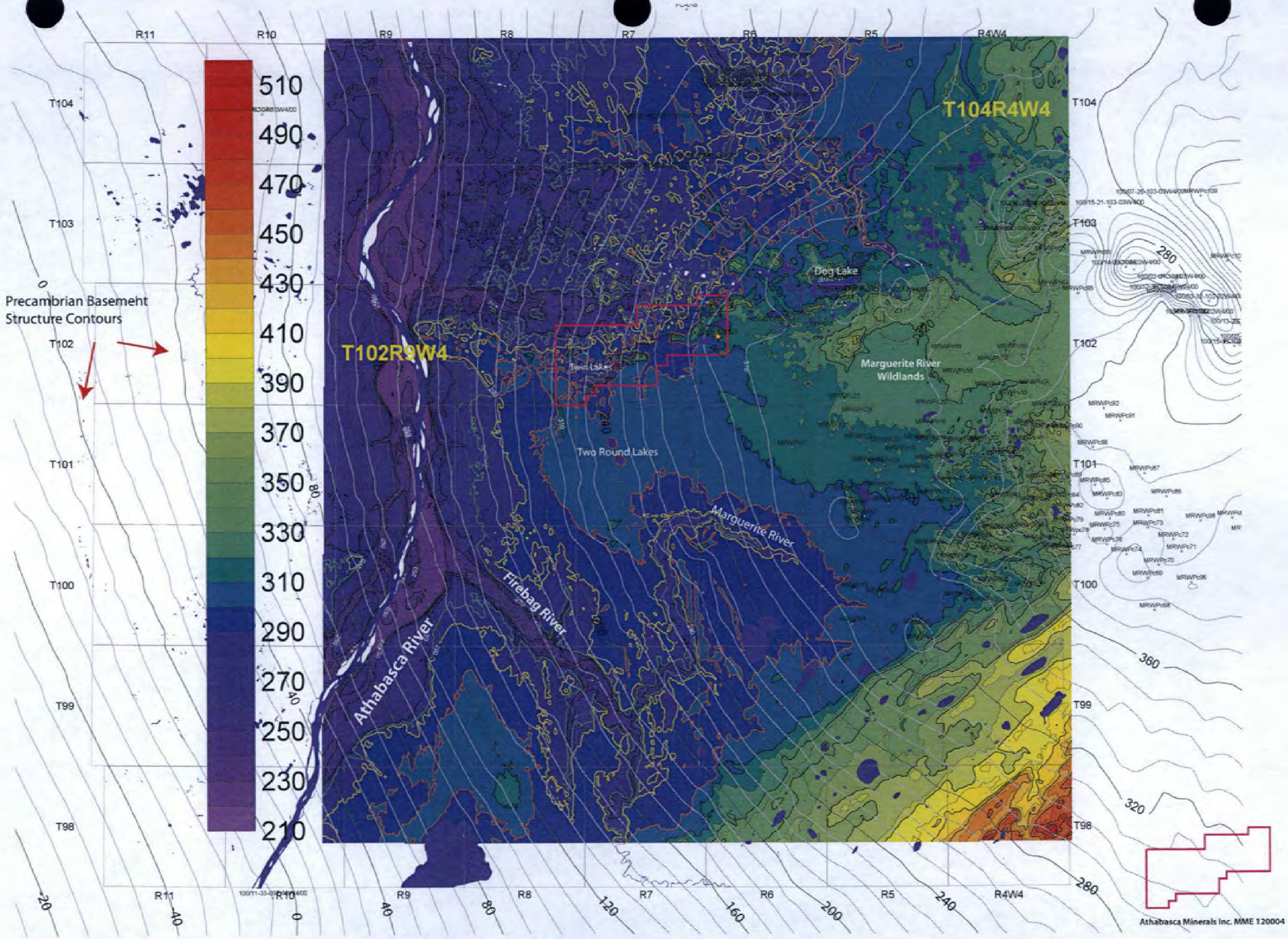
Subsurface data that penetrates Precambrian basement is rare within Athabasca region. Because of sparse subsurface data near Richardson, well data throughout the Athabasca area was used to map the basement surface. Early exploration wells searched for deep-seated hydrocarbon accumulations, but recent drilling is now focused on the waste injection potential within the La Loche or Keg River formations. The main source of waste fluid is thermal bitumen recovery projects. Other deep wells evaluated Devonian salt-bearing strata for brining operations, salt cavern storage and waste disposal (liquid and solid).

To model the structure of the Precambrian basement, subsurface data from wells and outcrop elevations from the exposed Shield were combined into a single dataset (**Figures 10A and 10B**). Within the west and central regions of the mapped area, the Precambrian basement dips uniformly to the southwest at roughly 4 m per kilometer. Although the regional dip into the



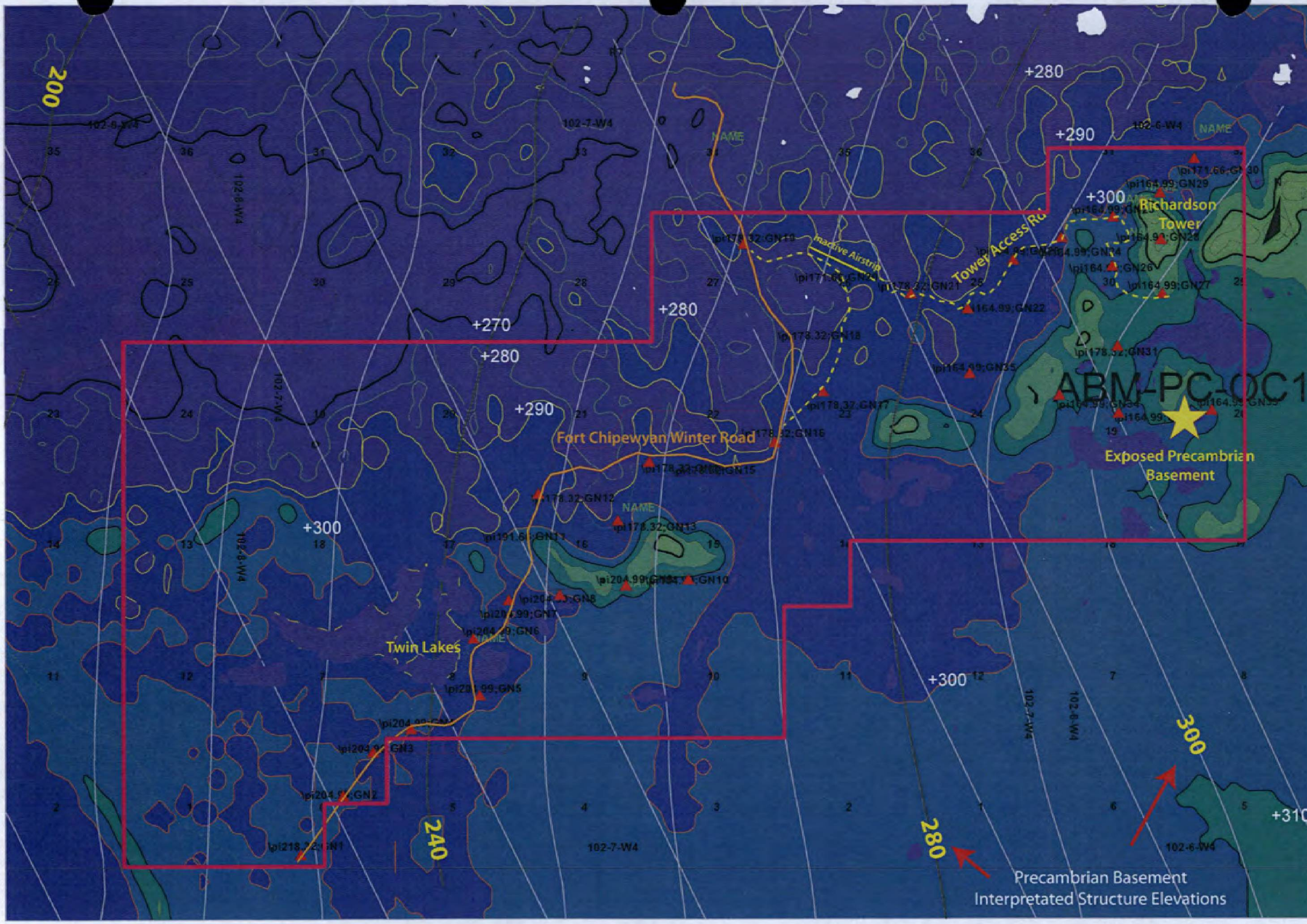
Athabasca MINERALS INC.

Title: Precambrian Geology of Northeast Alberta (clipped area)			Source: Modified from AGS Map 537 (Pana 2010)	Date: August 2013
Project: Richardson Project	Drawn By: DKC	Checked By: BH	Coordinate System: DLS	Figure: 9



Athabasca MINERALS INC.

Title: Surface Topography and Precambrian Basement Structure			Contour Interval: Surf Topo 10m, PC Str 10m	Date: August 2013
Project: Richardson Project	Drawn By: DKC	Checked By: BH	Coordinate System: DLS	Figure: 10A



Proposed Drill Location
AMI MME 120004

Scale (km): 0 – 2.5

Athabasca Minerals Inc.

Title: Surface Topography and Precambrian Basement Structure			Contour Interval: Surf Topo 10m, PC Str 10m	Date: August 2013
Project: Richardson Project	Drawn By: DKC	Checked By: BH	Coordinate System: DLS	Figure: 10B

Western Canada Sedimentary Basin is correct, the lack of subsurface data prevents identifying local, residual topography likely present on the erosional surface. Outcrop elevation data from the northeast portion of the map suggests that topography on the Precambrian Shield is highly variable. The Shield, north of Richardson, depicts a similar topographic expression.

Post-Devonian and Cretaceous erosion undoubtedly played a significant role in the present-day structure of the exposed Shield. Knowing this, it is also probable the basement, within the subsurface, is likely to be substantially more complex than the existing well data suggests. This observation is apparent, to the south, within the active oilsands development region. Closely spaced wells that intersect the basement commonly display structural irregularities that would not be detected where well control is poor. The assumed, local topographic relief on the basement likely influenced the depositional setting of the overlying Devonian units. Local highs on the basement may have enhanced the prospect of reef development within the Keg River Formation. Alternatively, lows would provide more space for deeper water sediments to collect. In either case, the Keg River strata would likely thicken relative to regional trends.

At Richardson, the structure on the Precambrian basement appears uniform because the model is influenced by sparse subsurface data (**Figure** 10B). There is only a single Precambrian exposure control point within the Project area. The single elevation roughly aligns with the regional subsurface trend, but further investigation, discussed later in this report, suggests a more irregular basement surface.

4.4.2 Devonian Stratigraphy

The Devonian sedimentary succession at Richardson is only partially complete, compared with the preserved stratigraphy to the south. All but the uppermost Lower Devonian (Contact Rapids Formation) succession is absent from the area (**Figure 5**). The primary reasons for the missing strata are the progressive pinch-out of Devonian bedrock against the Precambrian basement and erosion on the sub-Cretaceous unconformity. West of the Project area, a northern sub-basin accumulated thick salt deposits (Cold Lake Formation). The present-day configuration of the salt basin suggests the Cold Lake Formation (Grobe, 2000) did not extend to the Richardson area. If salt sub-basin was present at Richardson infiltrating fresh water likely dissolved and removed the salt from the stratigraphic record. Limited exploration conducted, thus far by AMI, does not suggest there was previously existing salt deposition within the MIME.

The Richardson exploration area lies within the Devonian erosional limit in northeast Alberta. Within this area, the Keg River and the underlying Contact Rapids formations are the only Devonian units preserved. Prolonged erosional and dissolution removed Devonian bedrock from the stratigraphic record (Waterways, Slave Point, Fort Vermilion, Watt Mountain and Prairie Evaporite formations). South of the Firebag River, well data indicates that more insoluble lithologies like anhydrite, dolomite and shale remain intact or present as collapse breccia (Firebag Assessment Report, 2010). Intervals of collapse breccia within the Prairie Evaporate and the Waterways formations are common, southwest of Richardson.

The original depositional limit of post-Keg River strata is unknown, but interpretations suggest younger Devonian bedrock existed far to the northwest. The top of the eroded Keg River

Formation, around Richardson, forms part of the sub-Cretaceous unconformity that separates Devonian carbonates from overlying Cretaceous siliciclastics. At Richardson, the Precambrian basement and sub-Cretaceous unconformities merge.

4.2.2.1 Keg River Formation

The Keg River Formation has been locally referred to as the Methy Formation and regionally the Winnipegosis Formation. The term Winnipegosis Formation is most commonly used among the oilsand industry in the region. A recent proposal suggests using the name Keg River Formation in northern Alberta and Winnipegosis Formation in southern Alberta. Fossiliferous dolomite is the most common lithology within the Keg River Formation. For this assessment report, the Keg River Formation can be subdivided into two informal members consisting of a lower, deeper water carbonate platform and an upper, shallower water carbonate that may include local reef development.

The lower unit consists of medium to dark-brown dolomite and calcareous dolomite. The dolomite commonly includes wavy to nodular textures. The unit is dominated by dolomitic mudstone and wackestone. Thin interbeds of packstone and grainstone are rare. Intervals of dark-brown dolomite are typical and thin, wavy organic-rich laminae are common. Large, open and sediment filled vugs are also common, but not pervasive. Fossils normally include well preserved crinoids remains and disarticulated to intact brachiopods. Bioturbation is likely more prevalent than observed. Post-depositional digenesis has likely altered clear evidence of sediment reworking.

The upper informal member is also typically comprised of dolomite, and calcareous dolomite that speculatively may indicate near reef environments. The dolomite is cleaner, lighter in color (light brown to buff) and intervals include a broader spectrum of carbonate classes than those observed with the lower member. Dolomitic mudstone and wackestone remain common throughout the upper member. Added carbonate textures include rudstone, boundstone, and floatstone. Local reef and near-reef development can increase the thickness of the Keg River Formation significantly.

Regional mapping, by the Alberta Geological Survey (Godfrey, 1970, Panu, 2010 and Prior et al 2013), has identified several erosional outliers composed of Keg River dolomite. The outliers lay in direct contact with exposed Precambrian granite (**Figure 9**). Large, rather continuous Keg River dolomite outliers are present about 20 km east of Dog Lake. Smaller, isolated outliers exist southwest and southeast of exposed Precambrian granite present within the Marguerite River Wildlands. The dolomite outliers are stratigraphic remnants preserved through several post-Devonian erosional events. The remnants clearly show the original depositional limit of the Keg River Formation extended a significant distance northeast of the Richardson area. The present-day Phanerozoic erosional edge (Meijer Drees, 1994) passes near the southwest corner of Lake Athabasca signaling the initial depositional limit likely existed northeast of the lake.

4.2.2.2 Contact Rapids

The Keg River Formation is underlain by the Contact Rapids Formation. Depending on the geographic location, the Contact Rapids overlies the Cold Lake Formation, the LaLoche Formation or the Precambrian basement. The northern Cold Lake salt subbasin (Grobe, 2000) is located west of Richardson. Based upon exploration at Richardson thus far, the Contact Rapids Formation directly overlies the Precambrian basement. Deeper within the subsurface (southwest), the Contact Rapids Formation is typically around 30 m thick. Early drilling at Richardson indicates the formation is roughly 10 m thick. The reduced thickness is attributed to the formation pinching out against the dipping Precambrian basement. The Contact Rapids, at Richardson, consists of dusky olive green, argillaceous, dolomitic mudstone. The carbonate mudstone contains numerous, thin evaporite beds comprised of gypsum and anhydrite. The lower part of the succession contains intermixed sand within the mudstone matrix.

The thickness of the Keg River and Contact Rapids formations, within the Project area, is poorly understood because of the lack of surface and subsurface data. Pinch outs against the basement and significant erosion at the sub-Cretaceous unconformity complicates estimating the thickness of Devonian strata.

Initial exploration drilling conducted by AMI, in early 2013, indicates the Keg River dolomite is roughly 40 m thick, and the underlying Contact Rapids Formation is around 10 m thick. The data comes from a single drill hole so more drilling is required to trace the lateral extent and thickness variation within the two formations.

5.0 AMI EXPLORATION 2012-2013

5.1 Field Data Compilation and Mapping

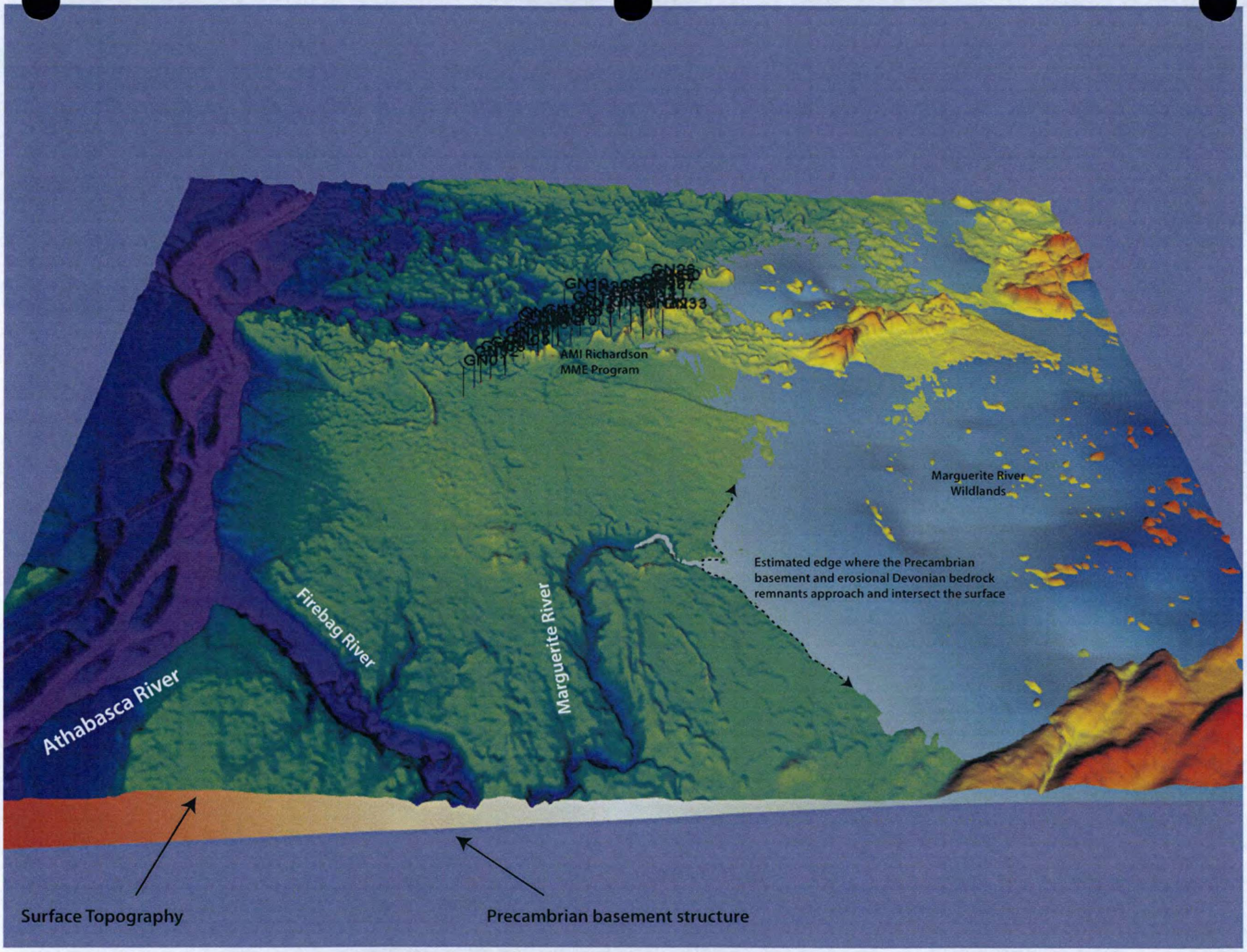
Staff from Athabasca Minerals visited the Richardson MIME site on at least four separate occasions by ATV and helicopter. The first visit involved characterizing the Quaternary overburden and identifying exposed bedrock. Property access was verified and documented. The second location visit was by helicopter out of Fort McMurray. The flight initially traversed the exposed Precambrian Shield within the Marguerite River Wildlands and the perimeter of Dog Lake. From Dog Lake, the flight continued to the Richardson Project. Two Precambrian granite outcrops, not captured within the regional government mapping, were identified by the author east of the mapped edge of the Shield in 1996 (**Figure 9**). A third granite exposure lies within the MIME boundary and was identified during the heli-flight. Following visits included mapping the perimeter of the granite outcrop, exploring for more exposed bedrock, and selecting drill locations for a proposed exploration program.

The top of the Precambrian basement was modeled using local outcrop and regional subsurface data. Digital elevation data (DEM) was used to model the present-day topography at Richardson and the surrounding area (**Figure 7**). The two resulting maps were used to estimate the depth to the top of the granitic basement and to refine drill hole locations (**Figures 10A and 10B**). Combining the two gridded surfaces resulted in a 3D map that estimates the intersection of Devonian and Precambrian bedrock with the present-day surface (**Figure 11**).

5.2 Exploration Drill Program 2013

5.2.1 MIME Application120004

Athabasca Minerals applied for an MIME permit in July of 2012 (**Figures 12 and 13**). The original exploration strategy involved coring the Precambrian basement using a heli-portable diamond drill. A diamond drill program was active in the Birch Mountains during the summer and was available for the time frame AMI had set in the MIME application. Alberta Sustainable Resource Development (ASRD) did not respond to the application until September of 2012. The late response by ASRD forced Athabasca Minerals to abandon the heli-portable drill and substitute the coring rig for a tracked auger. Athabasca Minerals intended to use an auger to drill to the top of the bedrock (Devonian or Precambrian basement) to identify the thickness of the overburden before a winter coring program. Accurately mapping the overburden thickness is critical when selecting core hole locations. A diamond drill is not well suited to drill thick, overburden so selecting drill targets with thin sediment cover is preferable. Continued approval delays forced AMI to dismiss the auger drilling and revert to just winter core hole program. Final approval from ASRD was granted in late October. Before starting the winter program (January 2013) the company scheduled a pre-drill meeting with ARSD to clarify drilling and environmental concerns. AMI considers repeated delays to approving the exploration program negatively affected the drilling results and increased costs significantly.

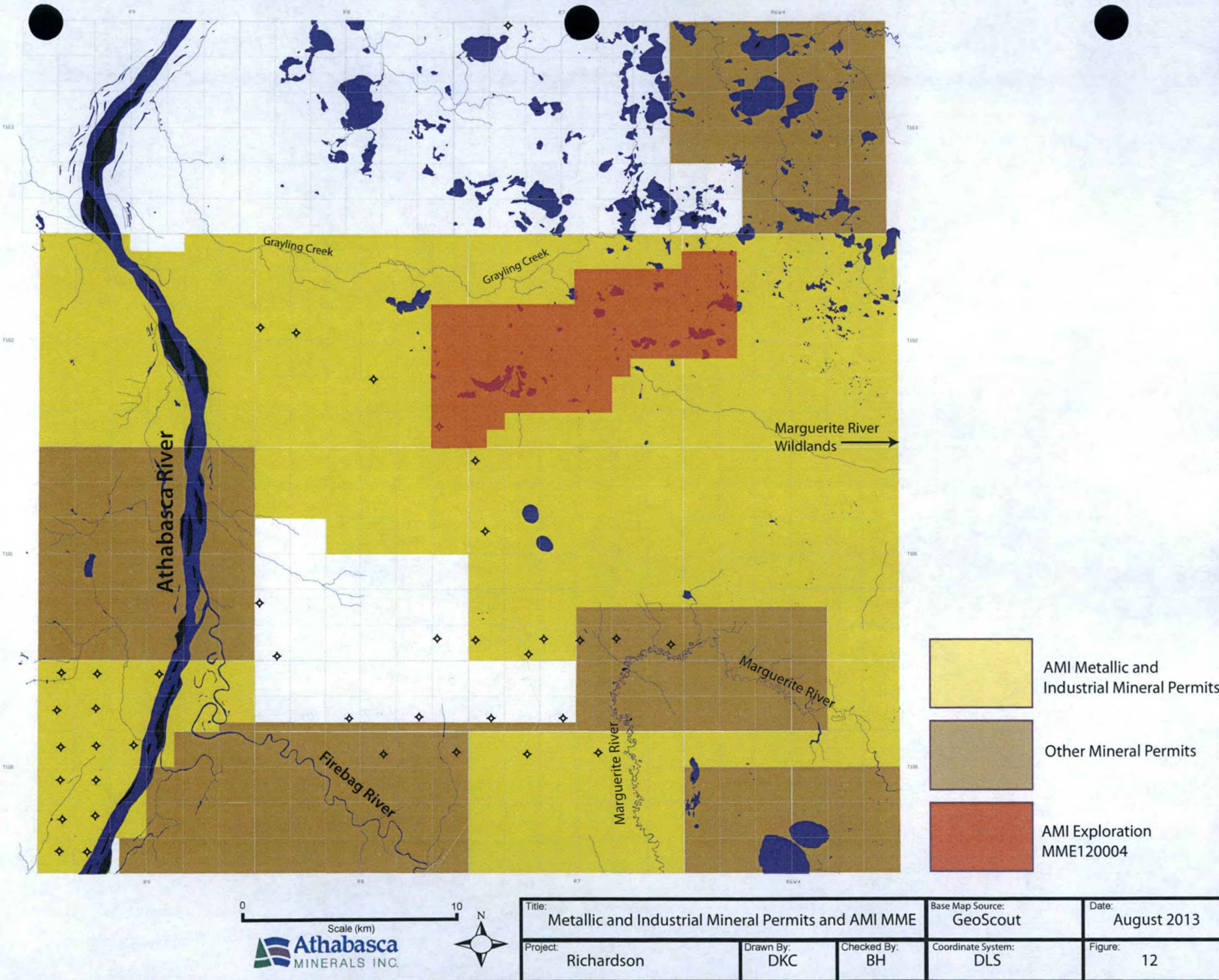


0 10
Scale (km)

Athabasca
MINERALS INC.

N

Title: Near surface/exposed limit of the Precambrian basement and Devonian bedrock			Contour Interval: NA	Date: August 2013
Project: Richardson Project	Drawn By: DKC	Checked By: BH	Coordinate System: NA	Figure: 11



Athabasca MINERALS INC.

Title: Metallic and Industrial Mineral Permits and AMI MME			Base Map Source: GeoScout	Date: August 2013
Project: Richardson	Drawn By: DKC	Checked By: BH	Coordinate System: DLS	Figure: 12

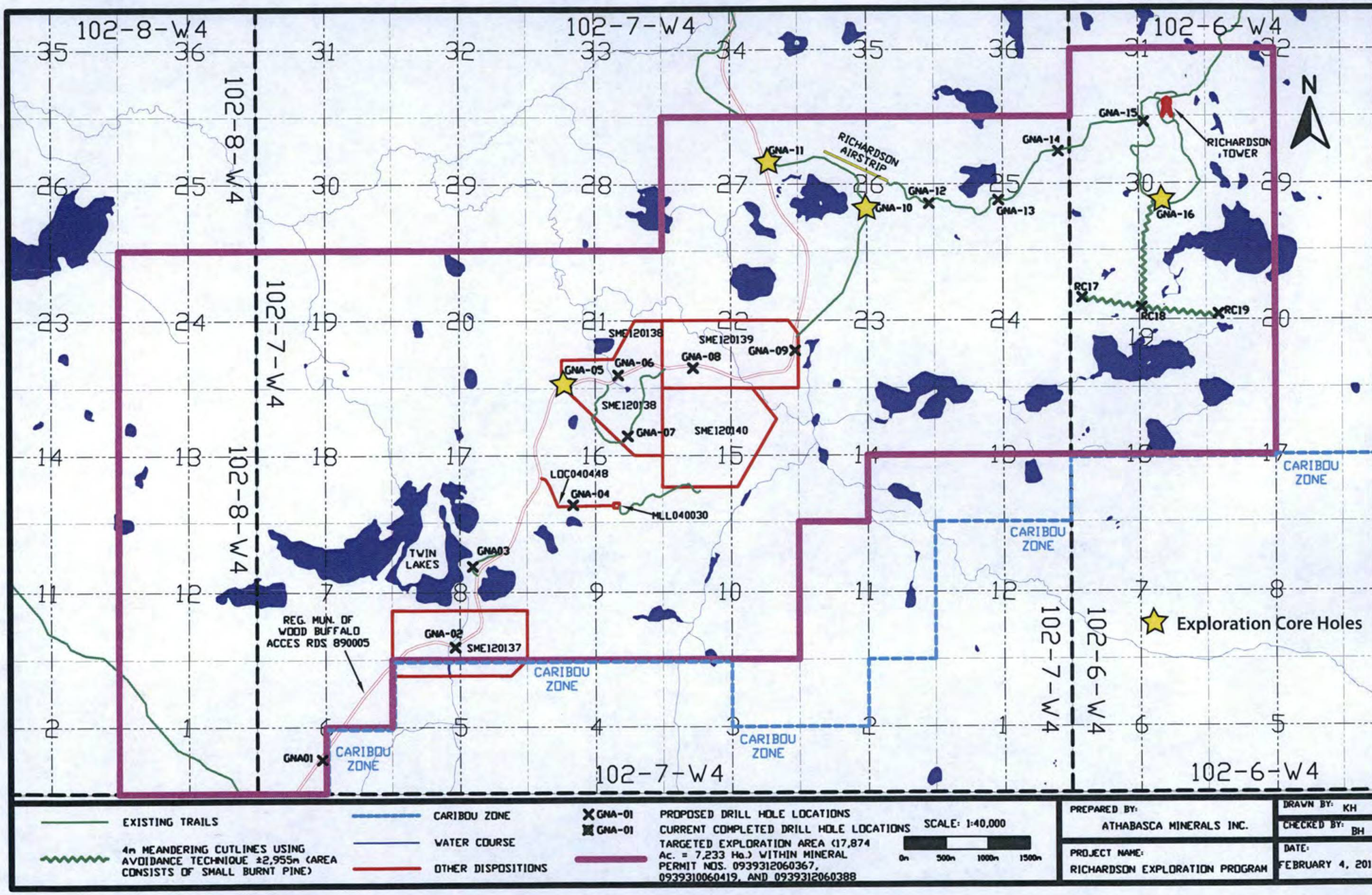


Figure 13: Revised Athabasca Minerals exploration drill plan for the Richardson Project (proposed and drilled locations).

5.2.2 Drilling Program 2013

The drill program did not start until January 2013 because of delays in approving the application. Once the ice bridge, over the Firebag River, was in place the drill and associated equipment was mobilized to Richardson. G and O Diamond Drilling was contracted to carry out the core hole program. A skid mounted diamond drill completed the exploration program, rather than the preferred heli-portable diamond drill.

Without acceptable knowledge of the overburden thickness, a decision was made to begin the drilling along the Fort Chipewyan Winter Road, in the center of the MIME (**Figure 13**). Southwest of Richardson, oilsand test holes confirmed the Quaternary overburden was a minimum of 40 m thick. A preliminary interpretation suggested the overburden should gradually thin to the northeast. The original MIME proposed 36 core holes, but with continued delays the program was reduced to 16 holes (GNA-01 to GNA-16). Drilling began on January 21, 2013 and ended, prematurely, on February 16 because of difficult drill conditions, poorly maintained drilling equipment and some inexperienced drilling personnel. Extreme winter conditions, early in the program, were also a significant contributing factor. Drilling through thick intervals of unconsolidated sand and gravelly sand was the most noteworthy issue during the drill program. Lost circulation was a common occurrence in all holes, within the overburden section and while coring the bedrock.

Of the sixteen drill holes proposed within the MIME only four were completed. Drilling was initiated at GNA-05 (**Figure 13**). The hole was drilled to a depth total depth of 28.5 m. Keg River dolomite rubble was recovered from the bottom of the hole, which confirmed the depth of the Devonian bedrock. Poor drilling conditions forced the abandonment of the hole. An estimate, based on regional data, placed the top of basement at 39 m at GNA-05. Subsequent drilling suggests the actual depth to the basement at GNA-05 is significantly deeper than originally interpreted.

The diamond drill was mobilized to GNA-11, a short-distance west of an inactive airstrip. The top of the Keg River Formation was intersected at 18 m. About 1.5 m of dolomite core was recovered from the test hole and like GNA-05, drilling conditions forced the abandonment of the hole.

From GNA-11, the rig was skidded to GNA-10. The Keg River dolomite was penetrated at 21 m. Forty-four meters of core was recovered from the Keg River Formation and eleven meters from the underlying Contact Rapid Formation. GNA-10 terminated 25 m into the Precambrian basement as planned. Unfortunately, GNA-10 was the only drill hole that penetrated the basement granite. From GNA-10, the rig was moved to the GNA-16 (**Figure 13**). GNA-16 was positioned near the only exposed granite within the MIME.

GNA-16 is located south the Richardson Fire Tower and 1.5 km due north of the exposed granite (**Figures 7 and 13**). Based on the regional structure map and the proximity to exposed granite, initial estimates placed the top of the basement at roughly 15 m deep. In actuality, the Quaternary overburden was 48 m thick (top Keg River Formation). Coring of the Keg River dolomite continued from 48 m to 83 m. Lost circulation was continuous throughout the coring process. At

83 m the core barrel became stuck, and was lost. Before this point, errors were made a the drill crew that eventually led to the loss of the bottom hole assembly. Based on previous, poor drilling results and complications encountered in GNA-16, a decision was made to end the drill program at Richardson.

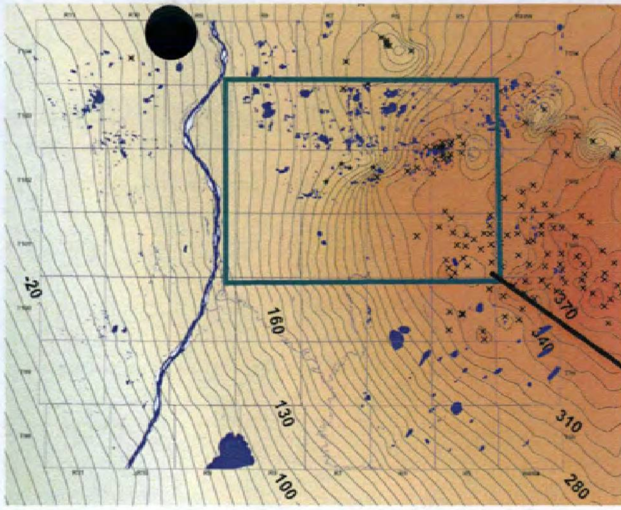
5.2.3 Post-Drilling Stratigraphic Map Revisions

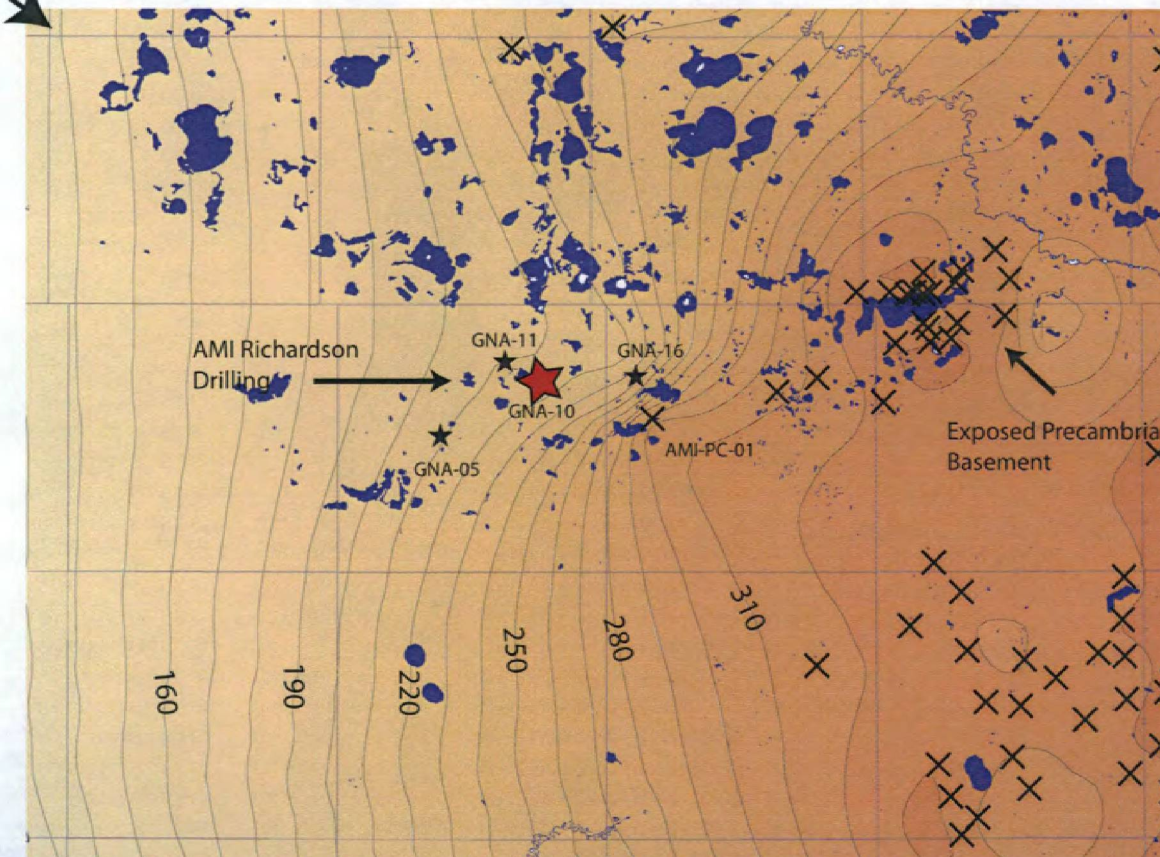
Based on drill results from GNA-05, -10, -11 and -16, clearly the top of Precambrian basement is pointedly deeper than regional subsurface data and granite outcrops indicated. In addition, the partially eroded Keg River dolomite is thick than anticipated. These results suggest there is an anomalous structural low on the Precambrian basement that was not evident on pre-drilling map compilations. The basement low provided increased accommodation space that allowed thickening the Keg River Formation.

Unfortunately, only a single drill hole penetrated the Precambrian basement. The intersection in GNA-10 does not allow for a reasonable representation of the newly interpreted structural low. To roughly model the low, estimated tops for the Precambrian basement were assigned to holes GNA-05, GNA-10 and GNA-16 based on the core recovered from GNA-10. The revised structure map crudely models the low, but additional drilling will be needed to model the actual geometry of the structure (**Figure 14**).

In contrast, the four holes did confirm the top of the eroded Devonian bedrock. Structural elevations on top of the Keg River Formation are unusually consistent, ranging from 265 to 267 m across the four widely spaced holes. The elevations suggest the erosional top of the Devonian is relatively flat at Richardson. Figure 15 consists of a composite map that shows elevations on top of the Keg River Formation (subsurface and outcrop data) and elevations on the exposed Precambrian basement. Map symbols identify the data points used and define the lithologies encountered within the subsurface and at the surface. The map combines data from the two regional unconformities into a single, mappable surface (sub-Cretaceous unconformity and the Precambrian basement). The composite structure map shows the top of the Keg River Formation within the four drilled holes to be similar in elevation. The computer-generated map does not honor the data point at GNA-16. The elevation falls within the range of GNA-05, -10 and -11. The structure contours suggest an elevation of +278 m. Estimating the thickness of the Keg River dolomite is problematic at this early stage of exploration. Because the structural nature of the Precambrian basement remains speculative, it is difficult to define the thickness of the overlying dolomite succession. GNA-10 intersected 44 m of dolomite and GNA-16 (located 7.5 km east) drilled 33 m of dolomite, so an average thickness 40 m is assumed at this time.

The thickness of the Contact Rapids Formation is also speculative, but falls within a narrower error range compared with the thicker, overlying dolomite succession. The formation likely ranges from 10 to 15 m thick throughout much of the Richardson MME. Of course, both the Keg River and Contact Rapids formations do eventually pinch-out to a zero-edge against the Precambrian basement at some point within the western part of the project area.



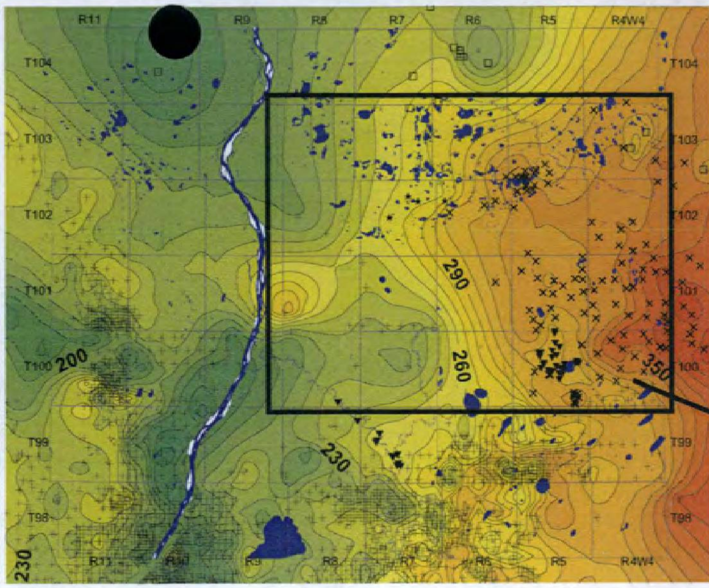


0 10
Scale (km)

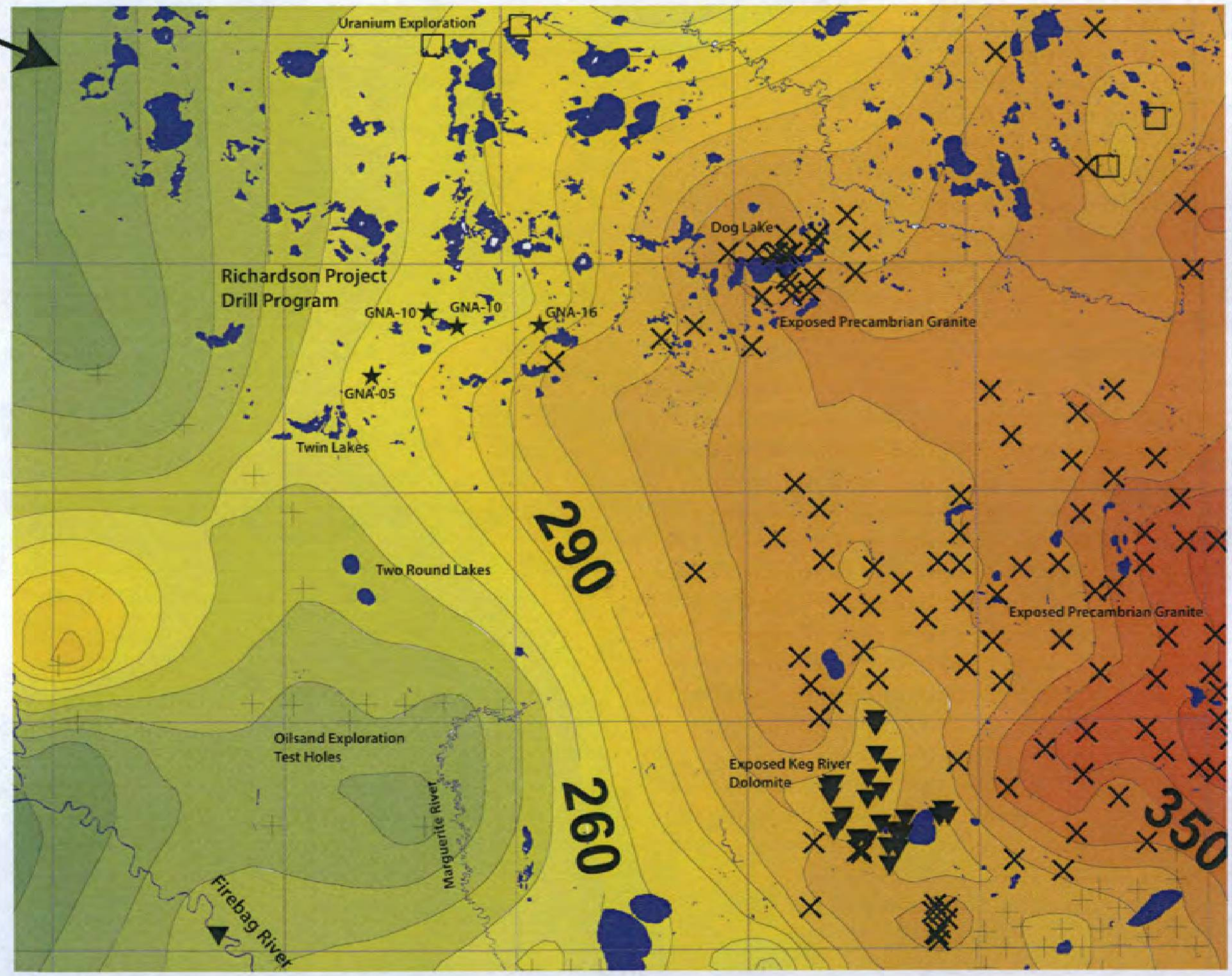
Athabasca MINERALS INC.

N

Title: Revised Precambrian Basement Structure			Contour Interval: 10m	Date: August 2013
Project: Richardson Project	Drawn By: DKC	Checked By: BH	Coordinate System: UTM NAD27 and DLS	Figure: 14



0 20
Scale (km)



0 10
Scale (km)

Athabasca
MINERALS INC.

N

Title:		Contour Interval:	Date:
Sub-Cretaceous Unconformity/Exposed Bedrock Structure (composite elevation map)		10m	August 2013
Project: Richardson Project	Drawn By: DKC / Checked By: BH	Coordinate System: DLS	Figure: 15

5.2.4 Core Sampling Results

Fourteen core samples were collected from GNA-10. Eleven of the samples were taken from the Precambrian granite interval and three from the overlying Keg River Formation. Samples collected from the granite were based on textural features, baseline mineralogy, color and the presence of sulphide. The eleven samples captured all the lithological variations observed within the granite. Specific tests were run on thin intervals of pegmatite (REE analysis) and dark grey to black, sulphide-bearing granite (30 Element ICP and Assay Analysis-Au). Whole Rock ICP was conducted on all fourteen samples (**Appendix 2**).

Dark grey, coarse-grained, sulphide bearing granite, recorded very low concentrations of Au (16-40 ppb). Coarse-grained pegmatite intervals were tested for rare-earth elements. Sample 008 showed elevated CeO_3 and La_2O_3 levels compared to Samples 007 and 009.

Results from the three Keg River dolomite samples displayed typical values for dolomite. CaO values averaged 31%, MgO values averaged 19% and SiO_2 values were very low (average 0.62%).

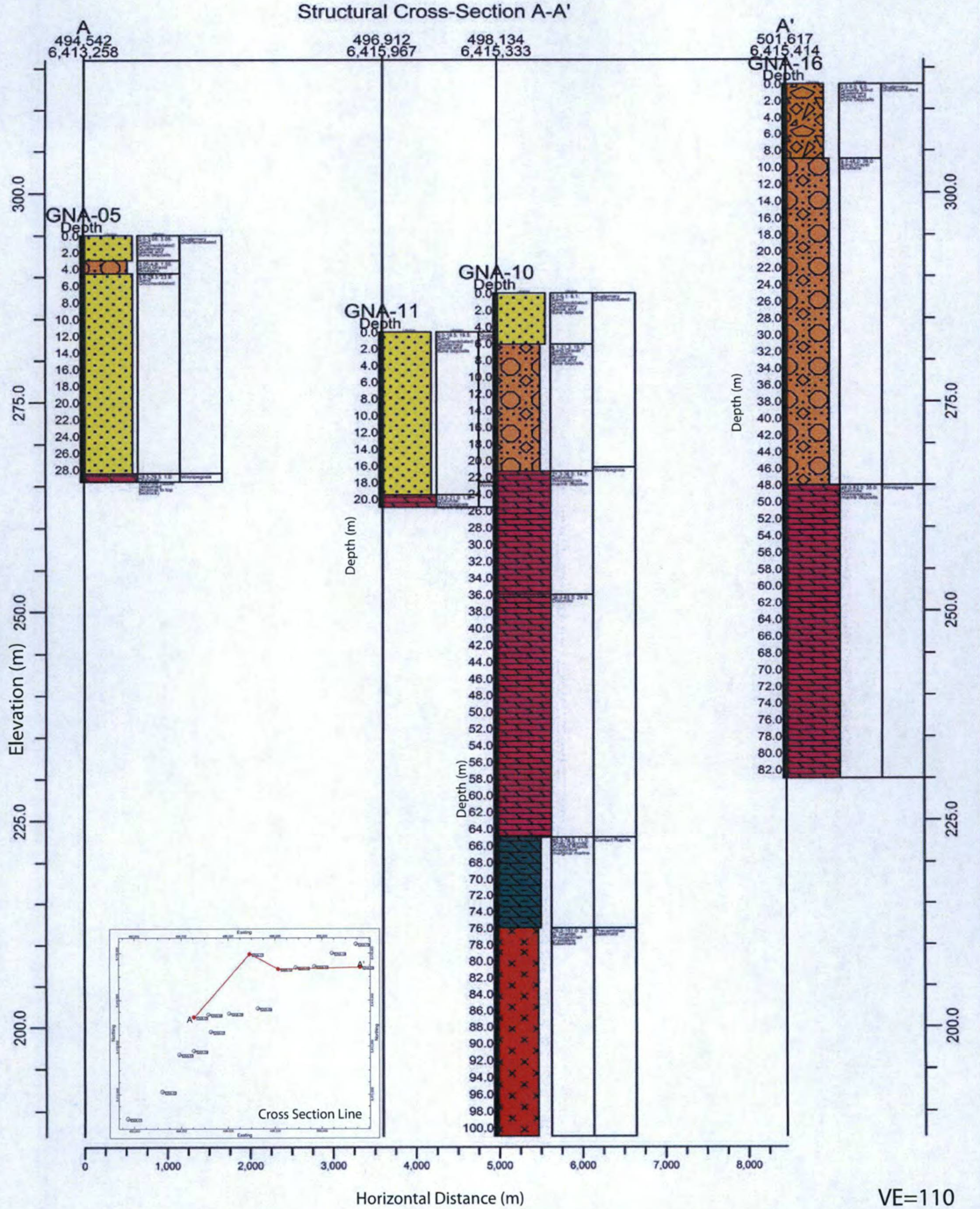
Lab Analysis	Number of Samples
Whole Rock ICP	14
30 Element ICP	3
Assay Analysis Au	3
Rare-Earth Element	3

5.2.5 Core Descriptions and Stratigraphic Logs

Core description logs were completed for GNA-11, GNA-10 and GNA-16. GNA-05 recovered minor dolomite rubble from the bottom of the hole so a log was not justified. For lithological descriptions and photographs of the three drill holes see Appendices 3 and 4.

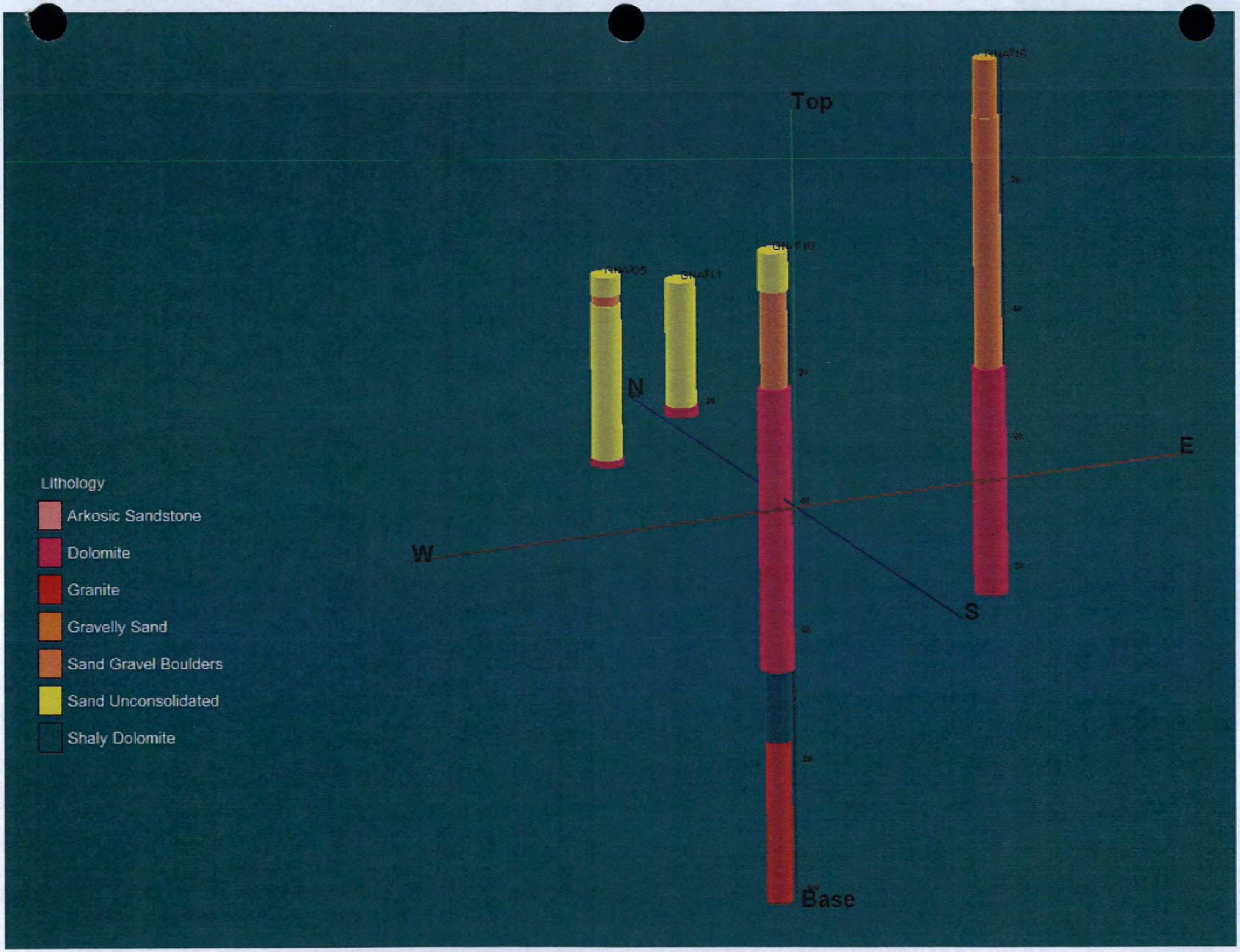
Simplified stratigraphic logs were generated within Rockworks and a 2D structural cross section was constructed through the four drill holes (**Figure 16**). The structural section illustrates the variable thickness of the overburden and roughly estimates the lithologic composition of the Quaternary sediment. The overburden was characterized by the drill crew as they drilled through the interval. Loss of circulation was a common occurrence on all drill holes. Drillers included notes on the daily drill reports if they suspected the rig was penetrating sections of gravel or boulders.

As previously mentioned, the elevations recorded on the top of Keg River Formation are relatively consistent (**Figure 16**). Thickness of the Keg River dolomite in GNA-16 is assumed to be similar in thickness to the dolomite in GNA-10. Figure 17 displays the four drill hole spatially.



Title: Structural Cross Section A-A'			Source: Rockworks	Date: August 2013
Project: Richardson Project	Drawn By: DKC	Checked By: BH	Coordinate System: UTM NAD83	Figure: 16

Athabasca MINERALS INC.



VE=100

Athabasca Minerals Inc.

Title: 3D Spatial Distribution of Drillholes			Source: Rockworks	Date: August 2013
Project: Richardson Project	Drawn By: DKC	Checked By: BH	Coordinate System: NA	Figure: 17

6.0 CONCLUSIONS

- The extended depth to the Precambrian basement and the over-thickened Keg River dolomite were not anticipated, based on local subsurface data, regional surficial mapping and granite exposed within the boundary of the MIME.
- Preliminary drilling indicates that unconsolidated, sand-dominated Quaternary overburden is thicker than expected. Bedrock intersections, ranging from 18 to 48 m, suggest the overburden thickness is quite variable. Much of the variability is assumed to be due to the local surface topography, rather than an irregular bedrock surface. The current MIME covers nearly 7200 ha, providing ample opportunity for shallower bedrock intersections within the exploration area.
- Sulphide mineralization and the presence of several thin, pegmatite layers within the Precambrian granite interval suggest the potential for base metals and rare-earth element concentrations. Additional drilling will be required to map the lateral extent and thickness of granitic facies encountered in GNA-10.
- Although the Precambrian basement was intersected deeper than expected, the additional accommodation space allowed for significant thickening of dolomite within the Keg River Formation. Dolomite is commonly used as an aggregate product in regions where sand and gravel deposits are scarce. The potential volume of dolomite encountered suggests an important potential source of aggregate for the M. D. of Wood Buffalo. The paleolow encountered on the erosional Precambrian surface will require further investigation. Additional drilling will be required to define the structural nature of the granitic basement. Delineating the basement will provide increased accuracy when estimating dolomite volumes at Richardson. Based upon GNA-10 and GNA-16 the dolomite appears to exceed 35 m over a large area.
- Granite outcrop, located within the southeast corner of the MIME, is also considered a valued potential source of aggregate. Supplementary drilling will also define where the basement rises in close proximity to the surface.

7.0 RECOMMENDATIONS

- Understanding the thickness variability and lithological composition of the Quaternary overburden is crucial to the development of any mineral resource, whether it be base metals, rare-earth elements or a simple aggregate quarry.
- The next phase of exploration should utilize a track mounted, dry auger to drill to the top of the Devonian and Precambrian bedrock. Once the Quaternary overburden can be mapped with reasonable accuracy exploration can proceed to more costly exploration methods, particularly geophysical surveys and additional diamond drilling.
- Once the overburden has been properly characterized a 2D seismic reflection survey should be considered to further determine the depth to the eroded Devonian dolomite and the Precambrian basement. Placement of the survey should be based upon subsurface data collected from the four core holes and the auger drill results.
- After reviewing results from the seismic survey and auger drilling new core hole locations can be selected. Drilling should extend into the Precambrian basement at minimum depth of 25 to 30 m to enable reasonable delineation of the granitic facies apparent within GNA-10.
- Additional field investigations should be conducted around the granite outcrop located within the current MIME. AMI should consider using a dry auger to drill radially outwards from the exposed granite to determine the near-surface, lateral extent of the basement. GNA-16 (drilled 1.5 km north of the granite outcrop) suggests a steep gradient exists on the basement between the two locations. The structural nature of the basement gradient must be established, as well as the pinch-out edge of the Keg River and Contact Rapids formations which appear to terminate over a short horizontal distance between the out crop and GNA-16.
- In addition, a Ground-Penetrating Radar (GPR) survey should be contemplated around the granite outcrop (perhaps substituted instead of auger drilling). The shallow survey may be beneficial in characterizing the structural nature of the basement provided depths remain less than 20 m and the ground conditions are optimal for GPR.
- If increased mineralization (compared to GNA-10) is observed within new core holes, a ground-based magnetic survey should be considered for parts of the current MIME area.
- A graduated exploration program should be employed to keep field expenditures within reason and to ensure more costly exploration methods are focused within areas that will provide optimum results.

8.0 REFERENCES

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APPENDICES

Appendix 1 AMI Metallic and Industrial Mineral Permits-Richardson Project

1.1 AMI Permit 9312060367

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: July 15, 2013 10:00:14 AM

Agreement Number: 093 9312060367

Status: ACTIVE
Agreement Area: 9216.0000

Term Date: 2012/06/18
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8082863
Client Name: ATHABASCA MINERALS INC.

Address: 9524 27 AVE NW

EDMONTON, AB
CANADA T6N 1B2

LAND / ZONE DESCRIPTION

4-08-102: 01-36

METALLIC AND INDUSTRIAL MINERALS

1.2 AMI Permit 9310060419

MINERAL AGREEMENT DETAIL REPORT

Report Date: July 15, 2013 10:07:58 AM

Agreement Number: 093 9310060419

Status: ACTIVE
Term Date: 2010/06/23
Agreement Area: 9216.0000
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8082863
Client Name: ATHABASCA MINERALS INC.

Address: 9524 27 AVE NW

EDMONTON, AB
CANADA T6N 1B2

LAND / ZONE DESCRIPTION

4-07-102: 01-36

METALLIC AND INDUSTRIAL MINERALS

1.3 AMI Permit 9312060388

MINERAL AGREEMENT DETAIL REPORT

Report Date: July 15, 2013 10:09:40 AM

Agreement Number: 093 9312060388

Status: ACTIVE

Term Date: 2012/06/21

Agreement Area: 9216.0000

Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8082863

Client Name: ATHABASCA MINERALS INC.

Address: 9524 27 AVE NW

EDMONTON, AB
CANADA T6N 1B2

LAND / ZONE DESCRIPTION

4-06-102: 01-36

METALLIC AND INDUSTRIAL MINERALS

1.4 AMI Permit 9311070581

MINERAL AGREEMENT DETAIL REPORT

Report Date: July 15, 2013 10:12:34 AM

Agreement Number: 093 9311070581

Status: ACTIVE
Agreement Area: 4096.0000

Term Date: 2011/07/08
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8082863
Client Name: ATHABASCA MINERALS INC.

Address: 9524 27 AVE NW

EDMONTON, AB
CANADA T6N 1B2

LAND / ZONE DESCRIPTION

4-08-101: 21-36

METALLIC AND INDUSTRIAL MINERALS

1.5 AMI Permit 9310060418

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: July 15, 2013 10:14:12 AM

Agreement Number: 093 9310060418

Status: ACTIVE
Term Date: 2010/06/23
Agreement Area: 8064.0000
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8082863
Client Name: ATHABASCA MINERALS INC.

Address: 9524 27 AVE NW

EDMONTON, AB
CANADA T6N 1B2

LAND / ZONE DESCRIPTION

4-07-101: 04-9;10NW,NE;11NW,NE;12NW,NE;13-36

METALLIC AND INDUSTRIAL MINERALS

1.6 AMI Permit 9312060387

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: July 15, 2013 10:15:29 AM

Agreement Number: 093 9312060387

Status: ACTIVE

Agreement Area: 7680.0000

Term Date: 2012/06/21

Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8082863

Client Name: ATHABASCA MINERALS INC.

Address: 9524 27 AVE NW

EDMONTON, AB
CANADA T6N 1B2

LAND / ZONE DESCRIPTION

4-06-101: 01-2;07NW,NE;08NW,NE;09NW,NE;10NW,NE;11-36

METALLIC AND INDUSTRIAL MINERALS

1.7 AMI Permit 9312070594

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: July 15, 2013 9:56:46 AM

Agreement Number: 093 9312070594

Status: ACTIVE
Agreement Area: 8838.0400

Term Date: 2012/07/19
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8082863
Client Name: ATHABASCA MINERALS INC.

Address: 9524 27 AVE NW

EDMONTON, AB
CANADA T6N 1B2

LAND / ZONE DESCRIPTION

4-09-102: 01-32;33SEP
PORTION(S) LYING OUTSIDE CHIPEWYAN INDIAN RESERVE NO. 201G.
4-09-102: 33SWP
PORTION(S) LYING OUTSIDE CHIPEWYAN INDIAN RESERVE NO. 201G.
4-09-102: 33NWP
PORTION(S) LYING OUTSIDE CHIPEWYAN INDIAN RESERVE NO. 201G.
4-09-102: 34SEP
PORTION(S) LYING OUTSIDE CHIPEWYAN INDIAN RESERVE NO. 201G.
4-09-102: 34SWP
PORTION(S) LYING OUTSIDE CHIPEWYAN INDIAN RESERVE NO. 201G.
4-09-102: 35SWP
PORTION(S) LYING OUTSIDE CHIPEWYAN INDIAN RESERVE NO. 201G.
4-09-102: 35NWP
PORTION(S) LYING OUTSIDE CHIPEWYAN INDIAN RESERVE NO. 201G.
4-09-102: 35SE,NE;36

METALLIC AND INDUSTRIAL MINERALS

1.8 AMI Permit 9312110408

MINERAL AGREEMENT DETAIL REPORT

Report Date: July 15, 2013 10:37:23 AM

Agreement Number: 093 9312110408

Status: ACTIVE
Term Date: 2012/11/26
Agreement Area: 2560.0000
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8082863
Client Name: ATHABASCA MINERALS INC.

Address: 9524 27 AVE NW

EDMONTON, AB
CANADA T6N 1B2

LAND / ZONE DESCRIPTION

4-06-100: 19-26;35-36

METALLIC AND INDUSTRIAL MINERALS

1.9 AMI Permit 9312100494

Alberta

MINERAL AGREEMENT DETAIL REPORT

Report Date: July 15, 2013 10:34:18 AM

Agreement Number: 093 9312100494

Status: ACTIVE
Term Date: 2012/10/02
Agreement Area: 6176.0000
Continuation Date:

DESIGNATED REPRESENTATIVE

Client Id: 8082863
Client Name: ATHABASCA MINERALS INC.

Address: 9524 27 AVE NW

EDMONTON, AB
CANADA T6N 1B2

LAND / ZONE DESCRIPTION

4-07-100: 01-24
4-08-099: 36L15-L16

METALLIC AND INDUSTRIAL MINERALS

Appendix 2 Loring Labs Results

2.1 GNA-10 56395 Whole Rock ICP

Loring Laboratories(Alberta) Ltd.
629 Beaverdam Road N.E.,
Calgary Alberta T2K 4W7
Tel: 403- 274-2777 Fax:403- 275-0541

ISO 9001:2008 Certified

TO: ATHABASCA MINERALS
9524 - 27 Ave
Edmonton, AB
T6W 1B2

Attn: Darrell Cotterill

FILE: 5 6 3 9 5

DATE: May 08, 2013

WHOLEROCK ICP ANALYSIS

Sample I.D.	Al_2O_3 %	Ba ppm	CaO %	Cr ppm	Fe_2O_3 %	K_2O %	MgO %	MnO %	Na_2O %	Ni ppm	P_2O_5 %	SO_3 %	SiO_2 %	Sr ppm	TiO_2 %	V ppm	LOI@1000 %	SUM %	Rock Type	Depth of Sample (m)
RG-DCBH-001-13	16.29	1962	3.28	271	3.42	7.21	2.36	0.04	2.87	8	0.17	1.94	59.44	426	0.36	39	2.51	99.89	Dark Granite	76.00
RG-DCBH-002-13	17.28	2294	2.73	220	3.47	7.37	1.71	0.04	3.60	7	0.17	0.95	60.56	519	0.35	37	0.84	99.06	Dark Granite	77.00
RG-DCBH-003-13	17.95	3166	2.35	205	3.77	10.63	0.84	0.03	3.22	4	0.70	0.29	58.50	416	0.27	42	0.61	99.15	Coarse Granite	78.10
RG-DCBH-004-13	17.08	2295	1.99	287	2.34	8.16	1.15	0.03	3.27	7	0.11	0.65	63.38	471	0.21	23	0.87	99.23	Dark Granite	80.00
RG-DCBH-005-13	17.00	1923	2.51	231	5.57	5.73	2.84	0.06	3.34	10	0.27	0.18	59.82	438	0.54	67	1.56	99.41	Coarse Granite	83.75
RG-DCBH-006-13	17.09	2546	2.23	242	2.77	6.94	1.87	0.03	3.62	6	0.15	0.37	62.94	412	0.27	27	1.20	99.48	Red Chip Granite	86.00
RG-DCBH-007-13	22.81	2950	1.39	207	0.68	15.04	0.31	0.01	3.97	2	0.29	0.27	53.66	414	0.03	4	0.51	98.96	Pegmatite	89.10
RG-DCBH-008-13	18.72	990	1.54	183	5.95	10.14	0.74	0.02	3.51	4	0.13	0.26	56.72	242	0.47	16	0.68	98.88	Pegmatite	90.70
RG-DCBH-009-13	14.31	1674	1.50	309	0.65	10.60	0.36	0.01	2.43	4	0.36	0.31	67.74	295	0.02	2	0.40	98.69	Pegmatite	92.20
RG-DCBH-010-13	17.43	2088	2.89	237	3.39	7.42	1.66	0.04	3.68	7	0.17	0.31	60.82	497	0.35	37	0.85	99.01	Coarse Granite	95.00
RG-DCBH-011-13	16.31	1988	0.98	121	4.65	10.69	3.94	0.04	0.75	7	0.21	0.28	58.84	138	0.19	43	2.69	99.58	Coarse Granite w alteration	99.30
RG-DCBH-012-13	0.67	18	31.38	10	0.10	0.16	19.41	0.01	0.61	2	0.01	0.72	0.70	54	0.00	1	46.66	100.43	Dolomite	35.00
RG-DCBH-013-13	0.79	21	30.99	16	0.16	0.17	18.75	0.02	0.64	10	0.01	0.97	0.44	58	0.01	5	46.98	99.93	Dolomite	38.00
RG-DCBH-014-13	0.87	25	30.36	17	0.25	0.19	19.31	0.02	0.61	10	0.02	0.88	0.72	45	0.01	11	45.69	98.93	Dolomite	63.20
Blank	<0.01	<1	<0.01	<1	<0.01	<0.01	<0.01	<0.01	<0.01	<1	<0.01	<0.01	<0.01	<1	<0.01	<1	<0.01			

0.5g Sample with HF, HCL, HNO3 total digestion , ICP finish.

Sample received on Apr. 24, 2013

Certified by: ____________________

2.2 GNA-10 56395 30 Element ICP

Loring Laboratories(Alberta) Ltd.

629 Beaverdam Road N.E.,
Calgary Alberta T2K 4W7
Tel: 403- 274-2777 Fax:403- 275-0541
loringlabs@telus.net

ISO9001:2008 Certified

TO: ATHABASCA MINERALS
9524 - 27 Ave
Edmonton, AB
T6W 1B2

FILE: 5 6 3 9 5

DATE: May 08, 2013

Attn: Darrell Cotterill

30 ELEMENT ICP ANALYSIS

Sample No.	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %
RG-DCBH-001-13	<0.5	8.61	1	1216	1962	2	2.33	1	<1	271	4	2.39	5.98	32	1.42
RG-DCBH-002-13	<0.5	9.12	1	1215	2294	3	1.94	1	<1	220	7	2.43	6.11	39	1.02
RG-DCBH-004-13	<0.5	9.03	<1	799	2295	1	1.43	1	<1	286	8	1.63	6.75	20	0.69
Blank	<0.5	<0.01	<1	<1	<1	<1	<1	<0.01	<1	<1	<1	<1	<0.01	<0.01	<1

Sample No.	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	Sb ppm	Sr ppm	Th ppm	Ti %	U ppm	V ppm	W ppm	Zn ppm	Zr ppm
RG-DCBH-001-13	329	4	2.12	8	0.07	40	6	426	55	0.21	<1	39	6	60	201
RG-DCBH-002-13	303	4	2.67	6	0.07	41	4	511	52	0.21	<1	37	4	44	197
RG-DCBH-004-13	200	5	2.41	7	0.05	45	5	466	30	0.11	<1	23	3	37	125
Blank	<0.01	<1	<1	<0.01	<1	<0.01	<1	<1	<1	<1	<0.01	<1	<1	<1	<1

0.500 Gram sample is total digested with HF,HNO3, HCL

Sample received on Apr. 24, 2013

Certified by: ____________________

2.3 GNA-10 56395 Assay Au

Loring Laboratories (Alberta) Ltd.
629 Beaverdam Road N.E.,
Calgary Alberta T2K 4W7
Tel: 274-2777 Fax: 275-0541
loringlabs@telus.net

ISO9001:2008 Certified

TO: ATHABASCA MINERALS
9524 - 27 Ave
Edmonton, AB
T6W 1B2

FILE: 5 6 3 9 5

DATE: May 08, 2013

Certificate of Assay

Attn: Darrell Cotterill

Sample No.	Au ppb	Rock Type	Depth of Sample (m)
"Assay Analysis"			
RG-DCBH-001-13	40	Dark Granite	76.00
RG-DCBH-002-13	16	Dark Granite	77.00
RG-DCBH-004-13	16	Dark Granite	80.00
Methodology:	Au- 30gram Fire Assay with AA finish		
Received Date:	April 24/2013		

I HEREBY CERTIFY that the above results are those assays made by me upon the herein described samples:

Assayer: Alex Tamaian

Rejects and pulps are retained for one month unless specific arrangements are made in advance.

FORM ASYC-015

2.4 GNA-10 56395 Rare Earth Elements

ISO 9001:2008 Certified

Loring Laboratories (Alber[illegible]td.
629 Beaverdam Road N.E.,
Calgary Alberta T2K 4W7
Tel: 403-274-2777 Fax: 403-275-0541

TO: ATHABASCA MINERALS
9524 - 27 Ave
Edmonton, AB
T6W 1B2

FILE: 5 6 3 9 5

DATE: May 02, 2013

Attn: Darrell Cotterill

RARE EARTH ANALYSIS

Sample I.D.	CeO_2 ppm	Dy_2O_3 ppm	Er_2O_3 ppm	Eu_2O_3 ppm	Gd_2O_3 ppm	Ho_2O_3 ppm	La_2O_3 ppm	Lu_2O_3 ppm	Nd_2O_3 ppm	Pr6O11 ppm	Sm_2O_3 ppm	Tb_4O_7 ppm	Tm_2O_3 ppm	Y_2O_3 ppm	Yb_2O_3 ppm	Rock Type	Depth of Sample (m)
RG-DCBH-007-13	63	2	<1	1	2	<1	23	<1	26	24	4	<1	1	11	1	Pegmatite	89.10
RG-DCBH-008-13	397	3	<1	1	12	<1	147	1	181	84	26	<1	4	11	1	Pegmatite	90.70
RG-DCBH-009-13	53	2	<1	1	2	<1	14	<1	24	25	5	<1	1	14	1	Pegmatite	92.20

0.3g Sample fusion with Lithium metaborate and bulk to 100 ml, ICP finish

Sample received on April 24, 2013

Certified by: ____________________

Appendix 3 Core Photos Drill Hole GNA-10

3.1 Contact Rapids Formation-Precambrian basement contact

Appendix 3.1: Contact Rapids-Precambrian basement contact (GNA-10).

3.2 Precambrian granite-upper interval

Appendix 3.2: Coarse grained, multi-colored granite (GNA-10).

3.3 Precambrian granite with pegmatite layers

Appendix 3.3: Very coarse grained granite with thin pegmatite layers (GNA-10).

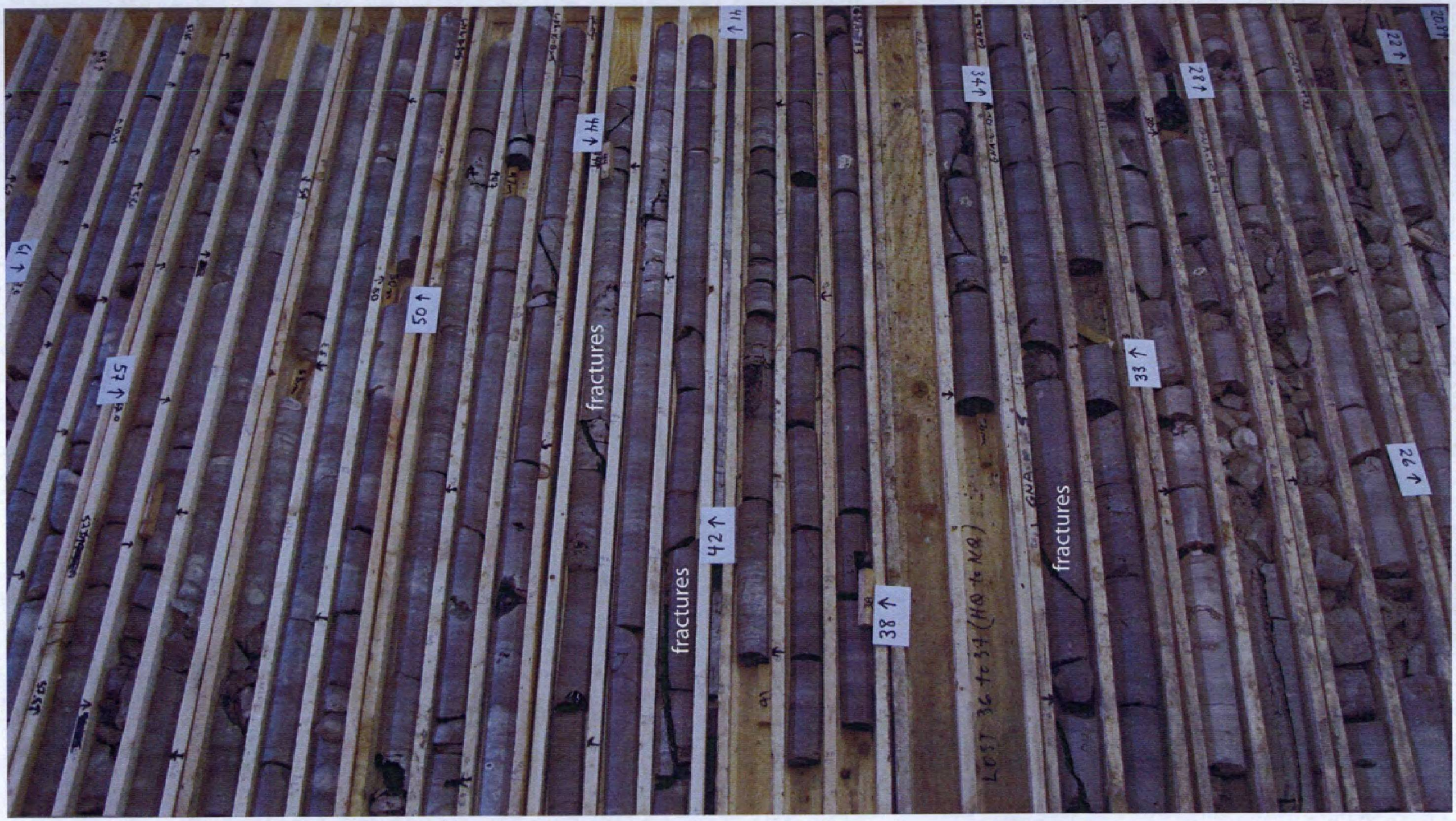
3.4 Precambrian granite with thin altered bands

Appendix 3.4: Coarse grained granite with thin altered zones (bottom of GNA-10)

3.5 Keg River Formation-upper cored interval

Appendix 3.5: Top of the Keg River dolomite (GNA-10).

3.6 Keg River Formation-middle cored interval



Appendix 3.6: Fractured Keg River dolomite. Bitumen commonly lines the fractures (GNA-10).

3.7 Keg River-Contact Rapids contact

Appendix 3.7: Base of Keg River Formation/Top Contact Rapids Formation (GNA-10).

3.8 Contact Rapids Formation

Appendix 3.8: Argillaceous dolomitic mudstone with common white interbeds of gypsum and anhydrite (Contact Rapids Formation, GNA-10).

Appendix 4 AMI Core Logs

4.1 GNA-10

Athabasca Richardson GNA-10

7-22-102-7w4 UTMN83 0498124E 6415334N

Date Logged: July 2013
Logged by: Parallax resources Ltd.
Ground: 281.00 m KB: 281.00 m
Remarks: Richardson Granite Project
Cored Formations: Winnipegosis, Contact Rapids, Precambrian
Interval Cored: 20.80-101.00m
Ground Elevation Field: +281.0m
Ground Elevation DEM: + 281.0m
Spud Date: February 1, 2013
Total Depth: 101.0m

LEGEND

LITHOLOGY

silty sand
Granite
DOLOSTONE
Dolomitic Lst
Calcareous Dolst
Dolomitic Shale
Anhydrite
Gypsum
Dolomitic breccia
Gabbro
Lost Core

CONTACTS

Sharp
Inclined
Erosional
Uncertain
Undulating

PHYSICAL STRUCTURES

Horizontal Bedding
Convolute Bedding
Low Angle Tabular Bedding
Chaotic Bedding
Wavy Parallel Bedding
Lenticular Bedding

LITHOLOGIC ACCESSORIES

Sand Lamina
Rip Up Clasts
Organic Shale Lamina
Anhydritic
Sid Siderite
Py Pyrite

FOSSILS

Brachiopods
Corals (solitary)
Crinoids
Stromatoporoids (lamellar/tabular)

FRACTURES

fracture, general
conjugate set of fractures
shear fracture

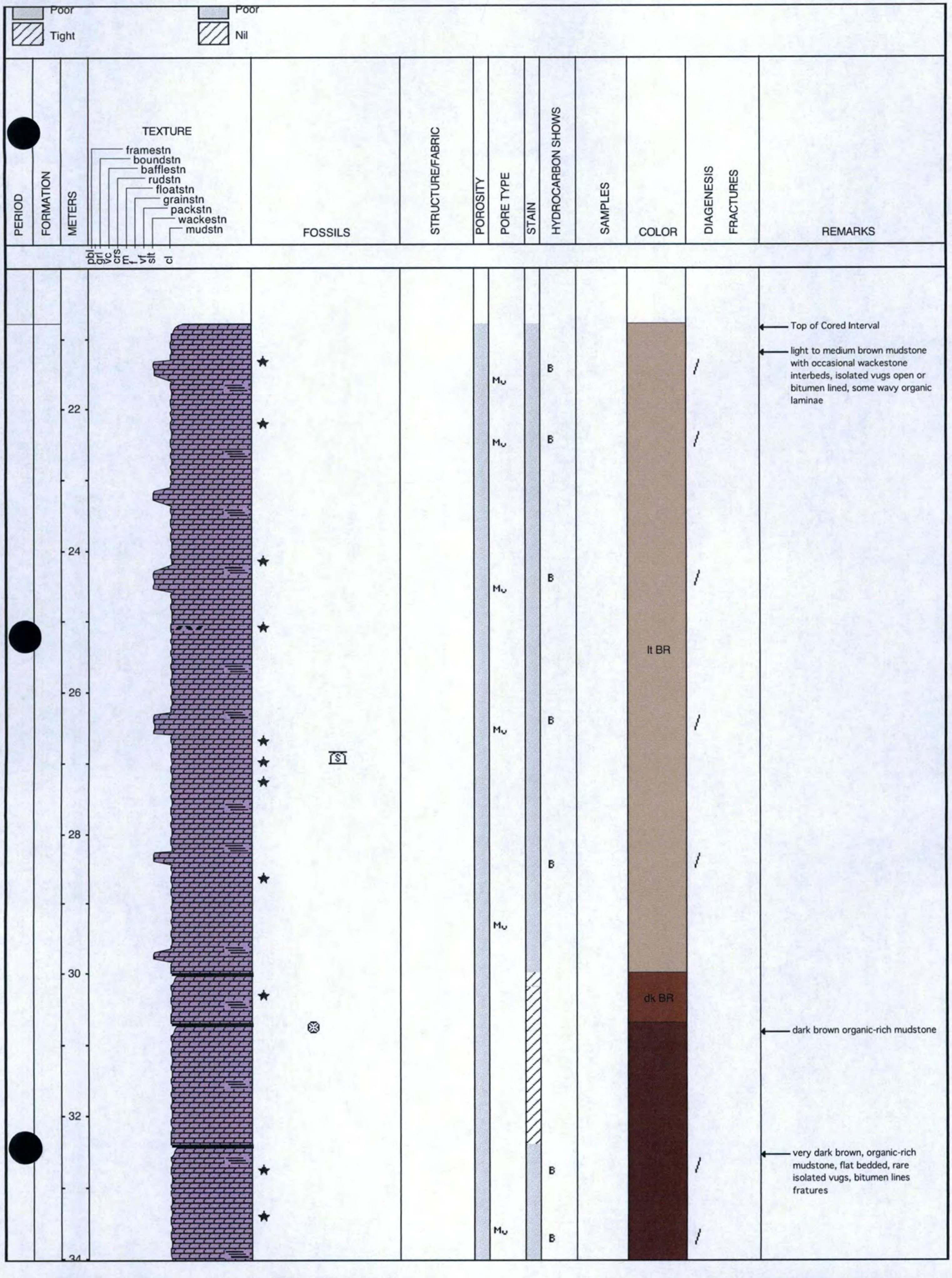
PORE TYPE

Mv mouldic / vuggy
pinpoint porosity

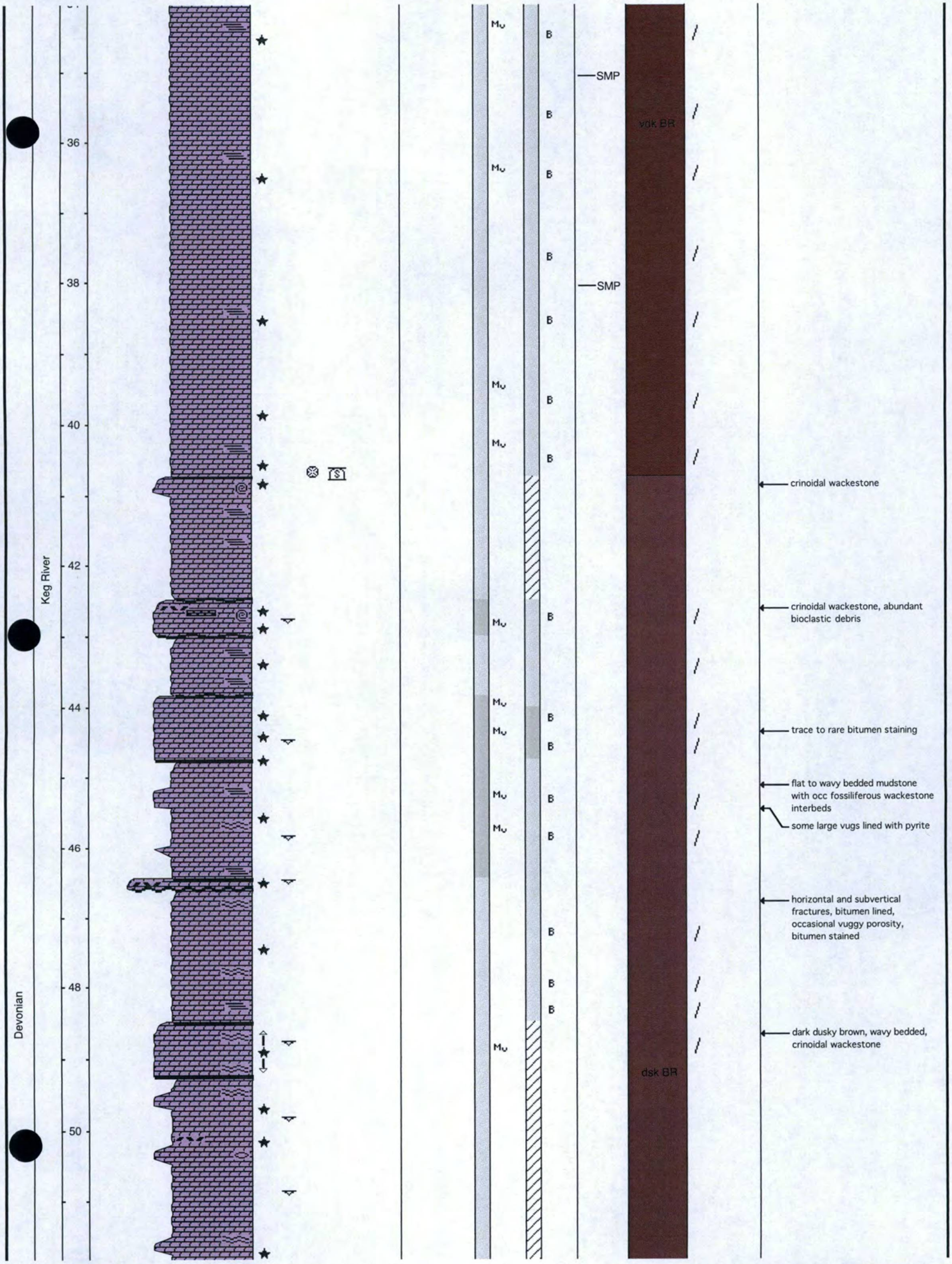
HYDROCARBON SHOWS

B bitumen

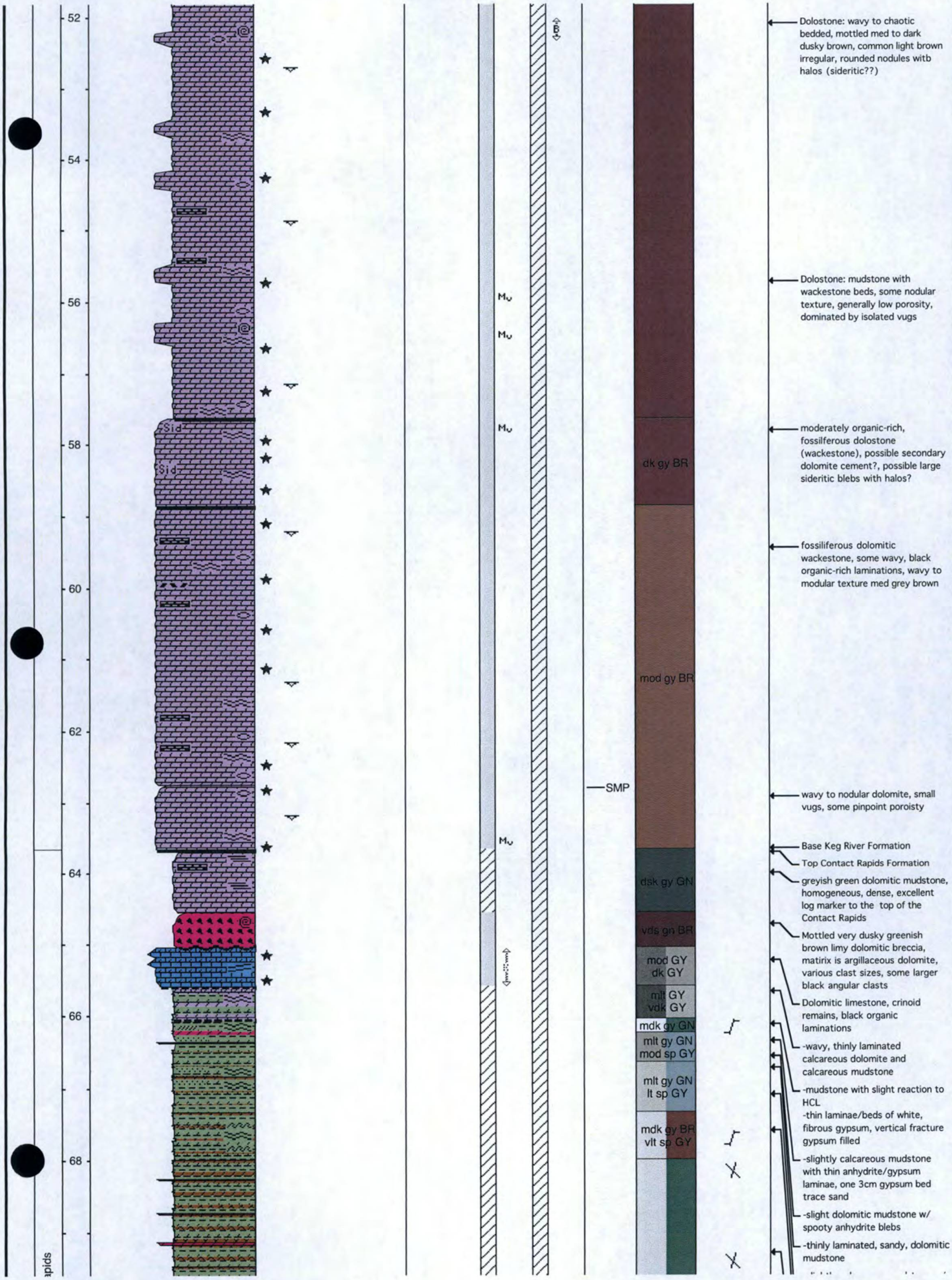
POROSITY	STAIN
Excellent	Excellent
Very Good	Very Good
Good	Good
Fair	Fair



Poor
Tight
Poor
Nil
PERIOD
FORMATION
METERS
TEXTURE
framestn
boundstn
bafflestn
rudstn
floatstn
grainstn
packstn
wackestn
mudstn
pbl grl vc crs m f vf slt cl
FOSSILS
STRUCTURE/FABRIC
POROSITY
PORE TYPE
STAIN
HYDROCARBON SHOWS
SAMPLES
COLOR
DIAGENESIS
FRACTURES
REMARKS
22
24
26
28
30
32
34
Mv
B
lt BR
dk BR
Top of Cored Interval
light to medium brown mudstone with occasional wackestone interbeds, isolated vugs open or bitumen lined, some wavy organic laminae
dark brown organic-rich mudstone
very dark brown, organic-rich mudstone, flat bedded, rare isolated vugs, bitumen lines fratures



Devonian
Keg River
36
38
40
42
44
46
48
50
Mv
B
SMP
SMP
vdk BR
dsk BR
crinoidal wackestone
crinoidal wackestone, abundant bioclastic debris
trace to rare bitumen staining
flat to wavy bedded mudstone with occ fossiliferous wackestone interbeds
some large vugs lined with pyrite
horizontal and subvertical fractures, bitumen lined, occasional vuggy porosity, bitumen stained
dark dusky brown, wavy bedded, crinoidal wackestone



52
54
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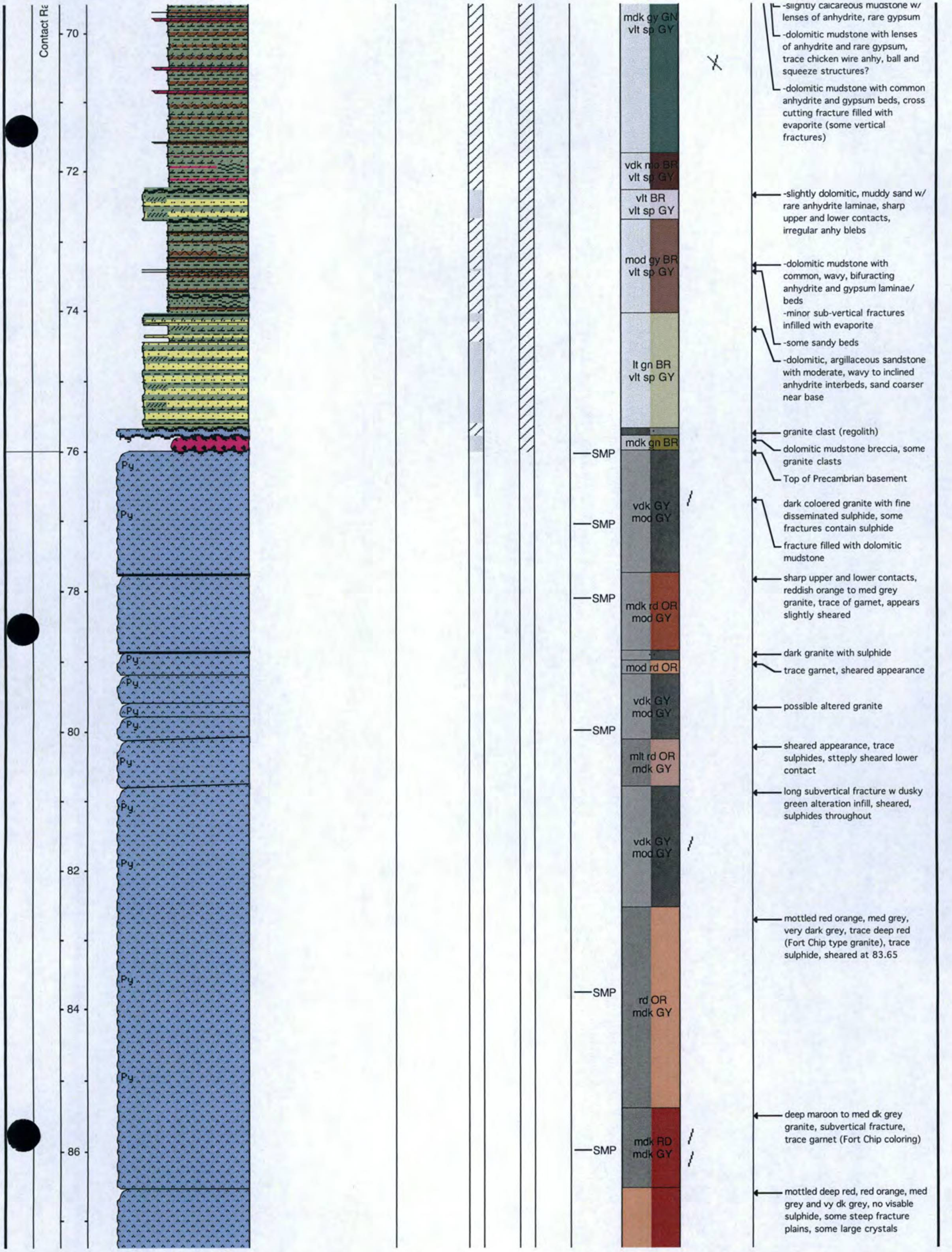
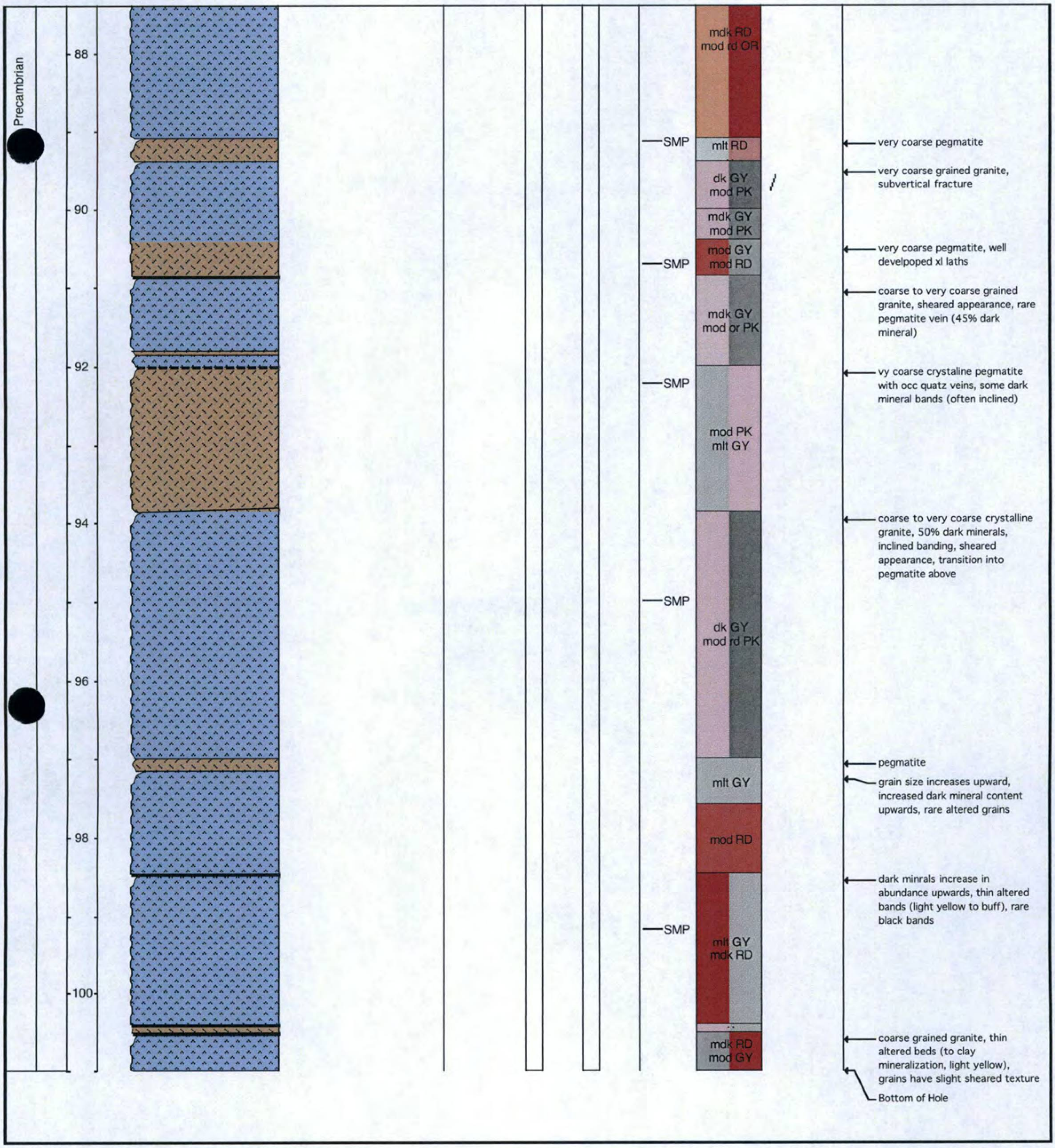
apids
Sid
Sid
Mᵥ
Mᵥ
Mᵥ
Mᵥ
SMP
dk gy BR
mod gy BR
dsk gy GN
vds gn BR
mod GY
dk GY
mlt GY
vdk GY
mdk gy GN
mlt gy GN
mod sp GY
mlt gy GN
lt sp GY
mdk gy BR
vlt sp GY
Dolostone: wavy to chaotic bedded, mottled med to dark dusky brown, common light brown irregular, rounded nodules witb halos (sideritic??)
Dolostone: mudstone with wackestone beds, some nodular texture, generally low porosity, dominated by isolated vugs
moderately organic-rich, fossilferous dolostone (wackestone), possible secondary dolomite cement?, possible large sideritic blebs with halos?
fossiliferous dolomitic wackestone, some wavy, black organic-rich laminations, wavy to modular texture med grey brown
wavy to nodular dolomite, small vugs, some pinpoint porosity
Base Keg River Formation
Top Contact Rapids Formation
greyish green dolomitic mudstone, homogeneous, dense, excellent log marker to the top of the Contact Rapids
Mottled very dusky greenish brown limy dolomitic breccia, matirix is argillaceous dolomite, various clast sizes, some larger black angular clasts
Dolomitic limestone, crinoid remains, black organic laminations
-wavy, thinly laminated calcareous dolomite and calcareous mudstone
-mudstone with slight reaction to HCL
-thin laminae/beds of white, fibrous gypsum, vertical fracture gypsum filled
-slightly calcareous mudstone with thin anhydrite/gypsum laminae, one 3cm gypsum bed trace sand
-slight dolomitic mudstone w/ spooty anhydrite blebs
-thinly laminated, sandy, dolomitic mudstone



Contact Ra
70
72
74
76
78
80
82
84
86
Py
SMP
SMP
SMP
SMP
SMP
SMP
mdk gy GN
vlt sp GY
vdk mo BR
vlt sp GY
vlt BR
vlt sp GY
mod gy BR
vlt sp GY
lt gn BR
vlt sp GY
mdk gn BR
vdk GY
mod GY
mdk rd OR
mod GY
mod rd OR
vdk GY
mod GY
mlt rd OR
mdk GY
vdk GY
mod GY
rd OR
mdk GY
mdk RD
mdk GY
-slightly calcareous mudstone w/ lenses of anhydrite, rare gypsum
-dolomitic mudstone with lenses of anhydrite and rare gypsum, trace chicken wire anhy, ball and squeeze structures?
-dolomitic mudstone with common anhydrite and gypsum beds, cross cutting fracture filled with evaporite (some vertical fractures)
-slightly dolomitic, muddy sand w/ rare anhydrite laminae, sharp upper and lower contacts, irregular anhy blebs
-dolomitic mudstone with common, wavy, bifuracting anhydrite and gypsum laminae/ beds
-minor sub-vertical fractures infilled with evaporite
-some sandy beds
-dolomitic, argillaceous sandstone with moderate, wavy to inclined anhydrite interbeds, sand coarser near base
granite clast (regolith)
dolomitic mudstone breccia, some granite clasts
Top of Precambrian basement
dark coloered granite with fine disseminated sulphide, some fractures contain sulphide
fracture filled with dolomitic mudstone
sharp upper and lower contacts, reddish orange to med grey granite, trace of garnet, appears slightly sheared
dark granite with sulphide
trace garnet, sheared appearance
possible altered granite
sheared appearance, trace sulphides, stteply sheared lower contact
long subvertical fracture w dusky green alteration infill, sheared, sulphides throughout
mottled red orange, med grey, very dark grey, trace deep red (Fort Chip type granite), trace sulphide, sheared at 83.65
deep maroon to med dk grey granite, subvertical fracture, trace garnet (Fort Chip coloring)
mottled deep red, red orange, med grey and vy dk grey, no visable sulphide, some steep fracture plains, some large crystals


Precambrian
88
90
92
94
96
98
100
SMP
SMP
SMP
SMP
SMP
mdk RD
mod rd OR
mlt RD
dk GY
mod PK
mdk GY
mod PK
mod GY
mod RD
mdk GY
mod or PK
mod PK
mlt GY
dk GY
mod rd PK
mlt GY
mod RD
mlt GY
mdk RD
mdk RD
mod GY
very coarse pegmatite
very coarse grained granite, subvertical fracture
very coarse pegmatite, well develpoped xl laths
coarse to very coarse grained granite, sheared appearance, rare pegmatite vein (45% dark mineral)
vy coarse crystaline pegmatite with occ quatz veins, some dark mineral bands (often inclined)
coarse to very coarse crystalline granite, 50% dark minerals, inclined banding, sheared appearance, transition into pegmatite above
pegmatite
grain size increases upward, increased dark mineral content upwards, rare altered grains
dark minrals increase in abundance upwards, thin altered bands (light yellow to buff), rare black bands
coarse grained granite, thin altered beds (to clay mineralization, light yellow), grains have slight sheared texture
Bottom of Hole

4.2 GNA-16

Athabasca Richardson GNA-16

7-3-30-102-6w4 0501616E 6415401N UTMN83

Date Logged: April 19, 2013
Logged by: Parallax Resources Ltd.
Ground: 309.00 m KB: 309.00 m
Remarks: Richardson Granite Project
Formations Cored: Winnipegosis-Contact Rapids
Interval Cored: 47.80-86.60m
Ground Elevation GPS: 309.0m
Ground Elevation DEM: 309.0m
Spud Date: February 5, 2013
Total depth:XXX

LEGEND

LITHOLOGY

DOLOSTONE | Dolomitic Lst | Lost Core

CONTACTS

Sharp | Erosional | Uncertain

PHYSICAL STRUCTURES

Horizontal Bedding | Low Angle Tabular Bedding | Wavy Parallel Bedding | Lenticular Bedding | Chaotic Bedding

LITHOLOGIC ACCESSORIES

Organic Shale Lamina | Rip Up Clasts

FOSSILS

Brachiopods | Corals (solitary) | Crinoids | Stromatoporoids (lamellar/tabular) | Stromatoporoids (hemispherical/ massive) | Stromatoporoids (branching/ Stachyodes)

FRACTURES

fracture, general

PORE TYPE

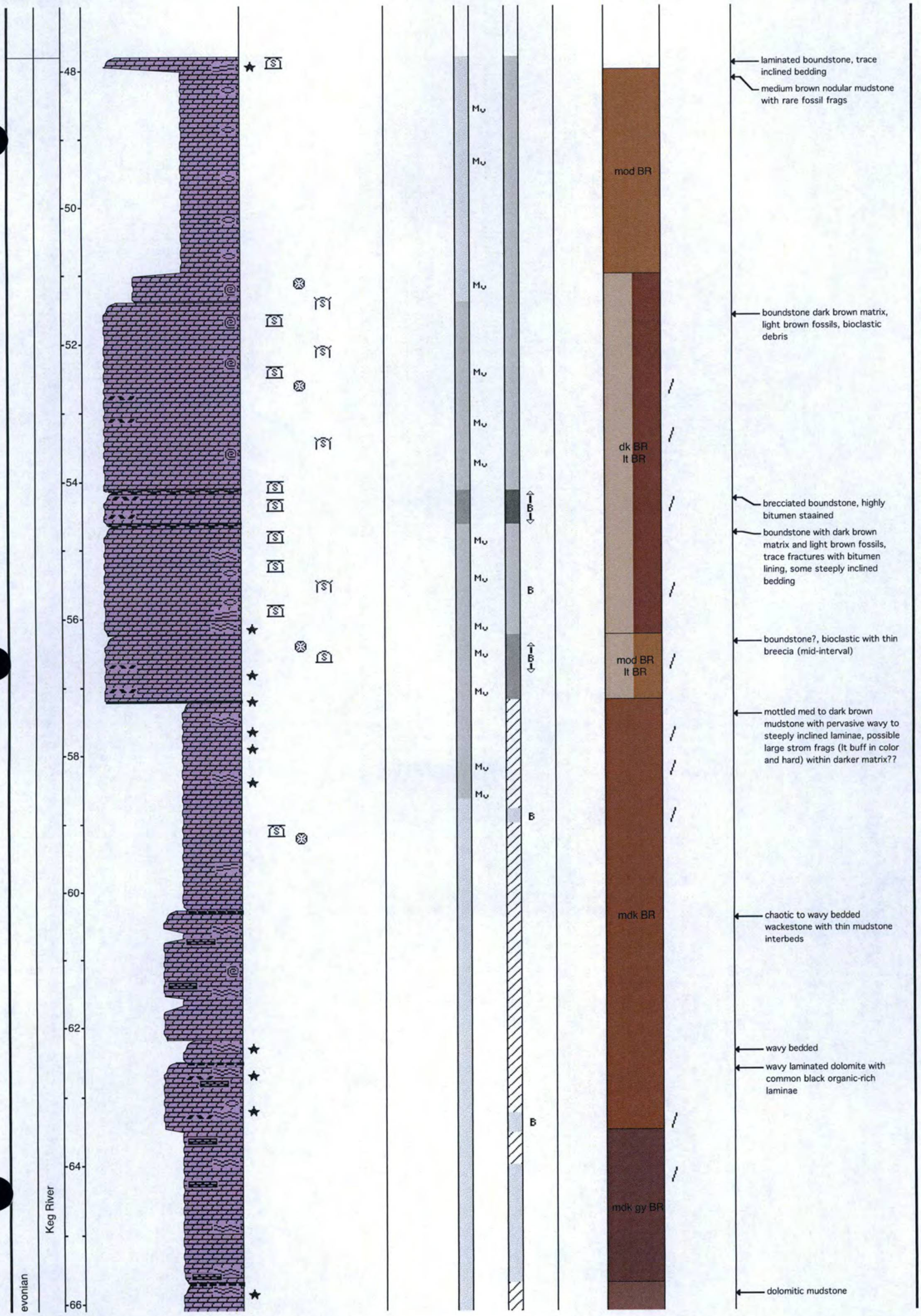
Mv mouldic / vuggy

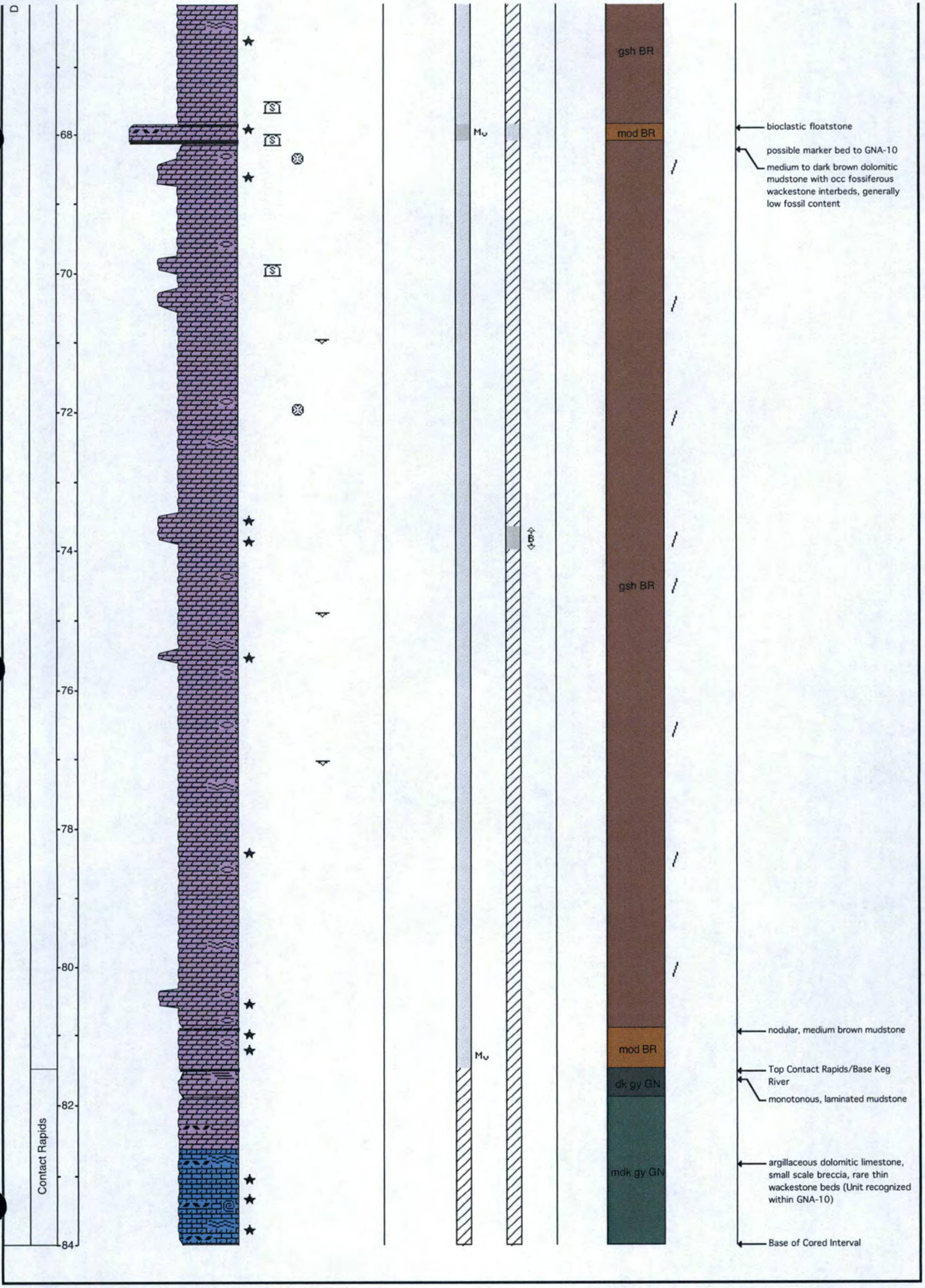
HYDROCARBON SHOWS

B bitumen

POROSITY	STAIN
Excellent	Excellent
Very Good	Very Good
Good	Good
Fair	Fair
Poor	Poor
Tight	Nil

PERIOD	FORMATION	METERS	TEXTURE (framestn, boundstn, bafflestn, rudstn, floatstn, grainstn, packstn, wackestn, mudstn; pbl, grl, vc, crs, m, f, vf, slt, cl)	FOSSILS	STRUCTURE/FABRIC	POROSITY	PORE TYPE	STAIN	HYDROCARBON SHOWS	SAMPLES	COLOR	DIAGENESIS	FRACTURES	REMARKS


evonian
Keg River
48
50
52
54
56
58
60
62
64
66
Mv
B
mod BR
dk BR
lt BR
mod BR
lt BR
mdk BR
mdk gy BR
laminated boundstone, trace inclined bedding
medium brown nodular mudstone with rare fossil frags
boundstone dark brown matrix, light brown fossils, bioclastic debris
brecciated boundstone, highly bitumen staained
boundstone with dark brown matrix and light brown fossils, trace fractures with bitumen lining, some steeply inclined bedding
boundstone?, bioclastic with thin breccia (mid-interval)
mottled med to dark brown mudstone with pervasive wavy to steeply inclined laminae, possible large strom frags (lt buff in color and hard) within darker matrix??
chaotic to wavy bedded wackestone with thin mudstone interbeds
wavy bedded
wavy laminated dolomite with common black organic-rich laminae
dolomitic mudstone


D
Contact Rapids
68
70
72
74
76
78
80
82
84
Mu
Mu
B
gsh BR
mod BR
gsh BR
mod BR
dk gy GN
mdk gy GN
bioclastic floatstone
possible marker bed to GNA-10
medium to dark brown dolomitic mudstone with occ fossiferous wackestone interbeds, generally low fossil content
nodular, medium brown mudstone
Top Contact Rapids/Base Keg River
monotonous, laminated mudstone
argillaceous dolomitic limestone, small scale breccia, rare thin wackestone beds (Unit recognized within GNA-10)
Base of Cored Interval

4.3 GNA-11

Athabasca Richardson GNA-11

9-27-102-7w4 UTMN83 0496917E 6415956N

Date Logged: July 2013
Logged by: Parallax Resources Ltd.
Ground: 263.80 m KB: 263.80 m
Remarks: Formation Cored: Winnipegosis
Interval Cored: 18.0 - 19.5m
Ground Elevation GPS: 264.0m
Ground Elevation DEM: 263.8m
Spud Date: Jan 27, 2013
Total Depth: 19.5m

LEGEND

LITHOLOGY

DOLOSTONE — Dolomitic breccia — Lost Core

CONTACTS

Sharp

PHYSICAL STRUCTURES

Low Angle Tabular Bedding — Wavy Parallel Bedding — Chaotic Bedding

LITHOLOGIC ACCESSORIES

Rip Up Clasts — Carbonate Interclasts

FOSSILS

Crinoids — Stromatoporoids (undifferentiated) — Stromatoporoids (spherical/nodular) — Stromatoporoids (branching/ Stachyodes) — Stromatoporoids (Amphipora, lamellar)

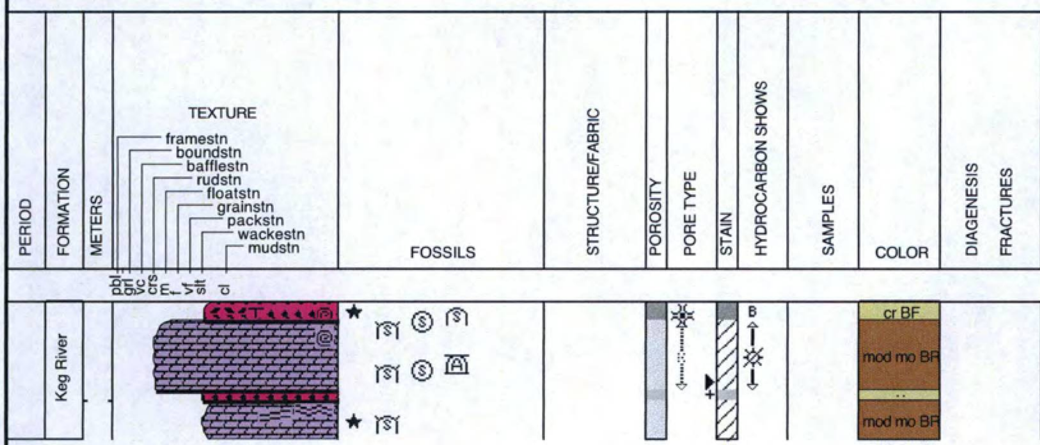
PORE TYPE

interparticle — interparticle (primary) — pinpoint porosity

HYDROCARBON SHOWS

B bitumen — no hydrocarbon indications

POROSITY	STAIN
Excellent	Excellent
Very Good	Very Good
Good	Good
Fair	Fair
Poor	Poor
Tight	Nil



REMARKS

- Dolomite breccia, stromatoporoid, thamnapora?, crinoid remains, intraclast pore space bitumen stained, some clasts display vuggy porosity
- Dolomite, rudstone to bafflestone,finger stroms, Amphipora, minor porosity, vertical oriented texture
- dolomite brreccia as above, this piece of core does not appear to be in place, looks very similar to breccia at top of core, although the lithologies above and below are diffrent texturally (but the same color)
- dolomite, very fossiliferous wackestone, vertical texture, thin, wavy organice rich laminae, possible bioturbation