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To whom it may concern:

Birch Mountain Resources Ltd. hereby authorizes the Government of Alberta to reproduce or copy the attached Assessment Report at the end of the 1 year confidentiality period.

Sincerely,

BIRCH MOUNTAIN RESOURCES

[redacted]

Hugh J. Abercrombie
Vice President Exploration

BIRCH MOUNTAIN RESOURCES LTD.

ASSESSMENT REPORT:
August 31, 2004, Grouping

Athabasca Metallic and Industrial Minerals Permits, Northeastern Alberta

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Table of Contents

List of Tables

List of Maps

List of Appendices

SUMMARY

This assessment report documents some of the mineral exploration work conducted on Birch Mountain Resources Ltd's Metallic and Industrial Mineral permits on the Athabasca property in northeastern Alberta, for the period April 1, 2002, to August 31, 2004. A total of **$ 859,404.38** is claimed for assessment on eight permits. All of the work described here was directed at industrial mineral exploration on the Athabasca property; not all work conducted during this period is reported.

Exploration activities described in this report include:

- Diamond drill program Winter 2002-2003
- Diamond drill program February 2004
- July 2003 mapping and sampling program
- September 2003 mapping and sampling program
- Drill core re-logging and re-sampling program December 2003

The assessment expenditures are organized and reported by appendix in Appendix J.2. and are summarized in Table 7.1.

1.0 INTRODUCTION

This document is organized into two main parts: a report describing the activities of the Company during the period of assessment (this document), and all relevant supporting data, including maps, drill logs, assay certificates, etc. in a series of appendices. The expenditures claimed for assessment purposes are presented in section 7.0, and are organized and reported by appendix in Table 7.1. Detailed expenditure tables are presented in Appendix J.2.

1.1 Previous Work

Previous exploration by Birch Mountain Resources Ltd. within the Athabasca permit area is documented in previous assessment reports prepared and submitted by Birch Mountain. Additional geological information can be found in Dufresne et al. (1994) and Olson et al. (1994).

2.0 LOCATION AND ACCESS

The Athabasca permits area located in the Fort McMurray-Fort McKay region of northeastern Alberta (NTS 74D, E & L; Appendix A.2). Much of this area is underlain by the McMurray Formation oil sand deposits. Near the Athabasca River between Fort McMurray and Fort McKay, road access is good; once away from the river and further north, the number and condition of the roads decreases. A winter road exists from Fort McKay to Fort Chipewyan. The Athabasca permits are generally accessible by road with some of the more remote locations requiring the use of a helicopter. During exploration activities on the Athabasca permits, accommodation, food, supplies and fuel are available in Fort McMurray.

The regional physiography in the immediate vicinity of the Athabasca permits is generally low lying (from 300 to 350m above sea level), with open and spruce-forested swampy ground. In the northern section of the mineral permits, the swampy areas are separated by well defined pine-forested sand flats. Spruce-forested swampy ground in this area gives way to the south and southwest to ground that is well drained and densely forested, with a mix of deciduous and coniferous trees on the northern side of a roughly circular elevated area called Muskeg Mountain (with elevations of up to 580 m above sea level). The best outcrop exposures occur in the river valleys; in elevated areas swamps are almost ubiquitous and outcrop is absent. Therefore, much of the information on the geology and structure of the area is from drill core examination.

Infrastructure in the area is centered on the major community of Fort McMurray, which is

serviced by regular passenger air service. Several major highways including Highway 63 to Fort McMurray provide Road access to the area.

3.0 EXPLORATION PERMIT GROUPING, AUGUST 31, 2004

A listing of metallic and industrial mineral permits in the Athabasca region of Alberta grouped for this assessment report are given in Appendix A.1., along with assessment expenditures for the groupings. A map showing the locations of these exploration permits and leases may be found in Appendix A.2.

4.0 CO-DEVELOPMENT AGREEMENT

4.1 Syncrude Canada Ltd.

Birch Mountain Resources Ltd. entered into a Co-Development agreement with Syncrude Canada Ltd. in 1997. The objectives and terms of this agreement and a map showing the areas affected under this agreement are summarized in Appendix B.1.

5.0 REGIONAL GEOLOGY

A geological map for the Athabasca Property area is included in Appendix C. A generalized stratigraphic column for the Athabasca permit area is shown in Table 5.1. The Athabasca permit area is underlain by Precambrian Basement and Phanerozoic rocks of the Western Canada Sedimentary Basin. The Precambrian basement is exposed in the extreme northeast of the permit area and is overlain by a southwest thickening wedge of gently westward dipping Phanerozoic sedimentary rocks. The information summarized here is from Dufresne et al. (1994), Cotterill and Hamilton (1995) and Birch Mountain Resources Ltd. lithological core logs of drill holes in the study area.

5.1 Precambrian Basement

Precambrian basement underlies all of the Athabasca permit area and outcrops at surface in the northeastern part of the province. Crystalline basement comprises both an Archean craton to the east (Rae Sub-province) and an Early Proterozoic mobile belt in the west (Taltson Magmatic Zone); the subdivision of these is based primarily on government aeromagnetic data. The Taltson Magmatic Zone has been dated to between 1.932 to 1.975 Ga (Ross et al., 1989; McNicholl et al., 1993; Villeneuve et al., 1993).

Precambrian rocks outcrop at the Paterson High in the Marguerite River area and further to the northeast; these rocks include Archean granite, gneiss and mafic igneous rocks (Appendix B) and Paleoproterozoic metasediments. At least three Archean lithological subdivisions can be made (Dufresne et al., 1994): (1) granitoid rocks; (2) mafic meta-igneous rocks; and (3) strongly mylonitic rocks. Paleoproterozoic age metasediments are found only in drill core obtained from the northeastern part of the study area; similar rocks are exposed in northwestern Saskatchewan (Tremblay, 1961). These have been metamorphosed to granulite grade with superimposed retrograde amphibolite to greenschist facies metamorphism (Abercrombie, 1996).

Middle Proterozoic metasediments of the Athabasca Basin are exposed to the northeast of the map area. The Athabasca Basin is 400 km long, east to west, and 200 km wide, north to south, and occupies an area of 80,000 km^2 in Saskatchewan and Alberta (Wilson, 1985). It comprises flat-lying Athabasca Group sediments up to 1255 m thick that unconformably overlie crystalline basement (Wilson, 1985). The Athabasca Group consists of poorly to well sorted, clay-rich sandstones, siltstones and mudstones intercalated with conglomerates; conglomerates are more common at the base of the section (Hoeve et al., 1980). These units were deposited in predominantly fluvial environments, with minor nearshore marine facies rocks (Wilson, 1985).

Period	Deposition Interval	Group	Formation	Member	Lithology
Quaternary	Present to 1.6 Ma				unconsolidated sediments
Upper Cretaceous	74.5 Ma	Smoky			silty shales
		La Biche	La Biche		shales
	97.5 Ma		Shaftesbury		shales
Lower Cretaceous	103 Ma	Mannville	Grand Rapids		lithic sands
			Clearwater		shales, glauconitic sandstones
	119 Ma		McMurray		quartzose sandstones
Upper Devonian	372 Ma	Beaverhill Lake	Waterways	Mildred	lime mudstones & shales
				Moberly	mudstone & limestone
				Christina	shale
				Calumet	limestone
				Firebag	lime mudstone
			Slave Point		limestone
	374 Ma		Fort Vermilion		limestone, shale, dolostone
Middle Devonian	374 Ma	Upper Elk Point	Watt Mountain		shales
			Prairie		salt/anhydrite
			Methy		dolostone
	401 Ma	Lower Elk Point	La Loche/ McLean River		sandstone & shales
Precambrian	>570 Ma				Granite and granitic and mafic gneiss

Table 5.1. Generalized stratigraphic column for the Athabasca permit area (modified after Carrigy, 1959; 1973; Norris, 1963; 1973; Hamilton 1971; Dufresne et al., 1994). The depositional interval indicates the ages represented by preserved sediments.

5.2 Phanerozoic Rocks

In general, Phanerozoic sedimentary rocks are poorly exposed within the study area; most outcrops occur along river valleys. As a result, most of the information on the sedimentary succession is from drill hole logs. The sedimentary rocks range in age from Middle Devonian to Cretaceous and are capped by a succession of glacially-derived Quaternary sediments of variably thickness; locally the thickness of Quaternary sediments exceeds 200

metres to a zero edge against the Precambrian basement in the northeast. The Devonian rocks form an unconformity-bounded wedge of predominantly carbonate, evaporite and clastic sediments that include the Elk Point and Beaverhill Lake groups.

5.2.1 Devonian Rocks

Within the Athabasca permit area, Devonian age rocks are up to 350 m thick but thin to a zero edge against the Precambrian basement in the northeast. The Devonian rocks form an unconformity-bounded wedge of predominantly carbonate, evaporitic and clastic sediments that include the Elk Point and Beaverhill Lake groups.

5.2.1.1 Elk Point Group

The oldest Devonian unit in the permit area is the Lower to Middle Devonian Elk Point Group which has been subdivided into Lower and Upper subgroups. The Lower Elk Point Group is represented in the study area by the La Loche/McLean River Formation; this unit consists of a fining upwards sequence of red sandstone, red and green sandy shales and green shale with anhydrite/gypsum. Sediment thickness and facies were controlled by the Peace River Arch suggesting that it was active and elevated at Lower Elk Point time (Abercrombie and Feng, 1997).

The Upper Elk Point Group conformably overlies the McLean River Formation and contains the Methy (or equivalents Winnipegosis and Keg River) Formation, the Prairie Formation and the Watt Mountain Formation, the youngest Middle Devonian unit. The Methy Formation comprises reef to non-reefal, massive to bedded dolostone, dolomitic limestone and minor anhydrite and gypsum (Cotterill and Hamilton, 1995). The Prairie Formation comprises salt and gypsum/anhydrite with thin beds of shale and dolostone and occur only to the west of the salt dissolution front (Cotterill and Hamilton, 1995). The dolomitic shales of the Watt Mountain Formation disconformably overlie the salt sequence and may be more properly included in the overlying Beaverhill Lake sequence.

5.2.1.2 Beaverhill Lake Group

Upper Devonian Beaverhill Lake Group rocks disconformably overlie the Upper Elk Point Group. These rocks include the Fort Vermilion, Slave Point and Waterways formations.

The Fort Vermilion Formation comprises interbedded (50-100 cm) and finely laminated anhydrite, green to brown shale, gray and cream coloured limestone and light brown dolostone. A 1.4 metre dark green silty shale is found at the base of the formation; a 10-20

cm thick brown to gray shale, often desiccated, marks the top of the Fort Vermilion Formation.

The Slave Point Formation is characterized by light brown laminated to nodular limestone with thin, dark brown, bituminous, carbonaceous shale beds. The base of the formation is marked by a fine-grained calcareous quartz sandstone, 70 to 90 cm thick, that grades upwards into the limestone. Locally, coarse gravels consisting of angular clasts of Proterozoic orthogneisses are observed within the Slave Point succession in the northeastern part of the permit area.

The Waterways Formation has been subdivided into 5 members. The lowermost Firebag Member consists of a basal green limey shale unit that is overlain by repeated sequences of shales grading upwards into interbedded limestone and shale then grading into nodular limestone; it is up to 50 m thick. The Calumet Member comprises fossiliferous, light green to brown nodular limestone with shaly intervals, with a maximum thickness of 32 m. The Christina Member is up to 26 m thick and consists of a lower unit of green-gray calcareous shale with rare fossils and limestone lamina and an upper unit of interbedded limestone and shale with abundant intraformational conglomerates and hardground surfaces. The Moberly Member is composed primarily of brown nodular limestone overlain by a porous, bitumen-stained, bioclastic limestone; the maximum thickness attained is 60 m. The Mildred Member is the youngest Waterways Formation unit and contains variably argillaceous nodular lime mudstones and calcareous shales; it is up to 45 m thick (Cotterill and Hamilton, 1995).

The top of the Devonian is marked by an erosional unconformity; it is postulated that several periods of subaerial erosion and karsting have affected the limestone at the unconformity (Dufresne et al., 1994).

5.2.2 Cretaceous Rocks

Cretaceous rocks in the Athabasca permit area are predominantly siliciclastic sediments. They have a variable thickness due to post-depositional erosion but can be up to 500 m thick. Cretaceous rocks include the Mannville, La Biche and Smoky Groups.

5.2.2.1 Mannville Group

The Lower Cretaceous sediments of the Mannville Group overlie the post-Devonian unconformity. In the Athabasca permit area, the Mannville Group comprises the McMurray, Clearwater and Grand Rapids formations.

The McMurray Formation, which hosts the oil sands deposits in this region, comprises interbedded sandstone, siltstone and shale deposited in fluvial to deltaic to shallow marine environments (Dufresne et al., 1994); it is up to 50 m thick. The McMurray Formation is conformably overlain by Clearwater Formation shale and glauconitic sandstone, up to 100 m thick (Dufresne et al., 1994). The Grand Rapids Formation comprises lithic sandstone, laminated siltstone and silty shale with thin coal beds deposited in nearshore to marine environments with a maximum thickness of 100 m (Dufresne et al., 1994).

5.2.2.2 Upper Cretaceous Units

The Mannville Group is conformably overlain by sediments of the Upper Cretaceous La Biche Group, including the Shaftesbury and La Biche formations. The Shaftesbury Formation, 250-300 m thick, contains fossiliferous marine shales with local thin interbeds of siltstones and sandstones. Numerous bentonitic horizons within the shale may be interpreted to indicate regional late Lower to early Upper Cretaceous volcanic activity (Dufresne et al., 1994).

The Upper Cretaceous La Biche Formation directly overlies the Shaftesbury Formation in most of the Athabasca permit area, but in the extreme northwest, it overlies the Smoky Group. The La Biche Formation consists of marine shale and silty shale; the Smoky Group comprises silty shale also deposited in a marine environment (Dufresne et al., 1994).

5.2.3 Quaternary Sediments

Quaternary sediments in the Athabasca permit area consist of tills, outwash deposits, lacustrine and eolian sediments. Regional mapping has divided the Quaternary sediments into 11 units (Dufresne et al., 1994). In general, accumulations are thickest on elevated areas and thinnest on lowlands and along rivers.

Sandy till units, composed largely of eroded Athabasca Formation, are found on high ground east and west of the Athabasca River, including the Birch Mountains and Muskeg Mountain. Flutings on these sandy tills indicate ice flow from the north-northeast and north-northwest. Glacial striations on bedrock near the Marguerite River also indicate ice flow from the north-northwest.

Outwash sands and gravels as well as lacustrine and eolian sediments are found mainly along river valleys and adjacent lowlands. Drilling in 1998 by Birch Mountain Resources

intersected two distinct units: (1) an upper outwash/eolian sand unit exposed at surface; and (2) a lower lacustrine mud unit. The upper unit averages 25 m thick and consists of medium to coarse grained sand, previously mapped as a glacial outwash deposit (Dufresne et al., 1994). Dune forms exposed north of McClelland Lake indicate eolian reworking and transport of this unit. The lower unit averages 23 m thick and consists of pink to dark brown mud with scattered white and red quartzite dropstones and occasional centimetre scale varves. Boulder till lenses, one to 10 m thick, are found within both the pink and brown muds. The pink mud is likely derived from red sandstones of the Athabasca Sedimentary Basin while the brown lacustrine mud may be derived from Clearwater Formation shales.

Other Quaternary units in the area include meltwater sand and gravel along the Athabasca River and alluvial fan and slump sediment along the eastern slope of the Birch Mountains.

6.0. 2002-2004 EXPLORATION PROGRAM

Work reported here includes two drilling programs, a core relogging program and three field mapping and sampling programs. No analytical testing on any samples collected is included. Work conducted on the Athabasca property that is not reported here but is available for future assessment reports includes an additional field mapping and sampling program and all data related to our Analytical Methods and Development work.

6.1 Drill Core Programs

6.1.1. Winter Drilling 2002-2003

In December, 2002 to January, 2003, Birch Mountain conducted a nine hole drilling program on its Athabasca property in northeastern Alberta. The purpose of the drilling was to delineate Devonian stratigraphy of the Moberly Member of the Waterways Formation within an area prospective for industrial minerals. Six drill locations were selected, but it was necessary to re-drill two of them in order to collect sufficient material for sampling; the final drill hole locations are shown in Appendix D.1.

The drilling was contracted to Layne Christensen Direct Drilling Ltd. Recovered core was boxed on site and taken to MRRT in Fort McMurray to be split. The split core was then shipped to Calgary to be logged and sampled by Birch Mountain staff at its core logging facility in northeast Calgary.

Detailed logging of the 2002 drill cores was carried out in January, 2003, at Birch Mountain's core logging facility. The objectives of the logging were to characterize the stratigraphy within the drill cores, measure the thickness of the subsurface units, determine the lateral variability, rate their potential industrial mineral quality and collect samples for geochemical and calcine testing. Core logs are included in Appendix D.2.; drill core BM96-04 was also logged as it was drilled near the 2002 drill hole locations. During the logging, two units of potentially calcinable limestone (informally named Middle and Upper Quarry units) and two intervals of potential aggregate were identified.

The cores were sampled during logging; sample descriptions are included as Appendix D.3. No analytical work is reported here. The 2002 drill cores are currently stored at Birch Mountain's northeast Calgary logging facility.

6.1.2. Core Re-logging December 2003

In December, 2003, Birch Mountain re-examined all drill cores located in the Fort McKay region in order to ensure consistency and accuracy in the logging of the subsurface units and to determine unit correlation between these drill holes. Cores from Birch Mountain's 1996, 1998 and 2002 drill programs were included (Appendix E.1.). A new system of core description and industrial mineral potential ranking was used and new prospective intervals were identified (Appendix E.2.). It was decided to obtain a complete set of photographs of the cores so that if an entire core interval was sampled, a complete visual record of the core would be available. The photos are included in Appendix E.3.

All core is currently being stored at Birch Mountain's core logging facility.

6.1.3. Drilling February 2004

In February, 2004, Birch Mountain conducted a ten hole drilling program on the Athabasca property; drill hole locations are shown in Appendix F.1. This program was designed to improve Birch Mountain's knowledge and understanding of the stratigraphy of the Moberly Member and to provide additional material for industrial minerals and calcine testing.

The drilling of the cores was contracted to Cora Lynn Drilling Company Ltd. Only nine of the 10 drill holes were successfully completed to target depth. Recovered core was boxed on site and taken to MRRT in Fort McMurray to be split. The split core was then shipped to Calgary to be logged and sampled by Birch Mountain staff at its core logging facility.

In March, 2004, the core was logged and sampled by Birch Mountain staff. To ensure consistency in unit descriptions and characterization, the method developed during the December 2003 re-logging program was followed; core logs are included in Appendix F.2.

The 2002 drill cores are currently stored at Birch Mountain's Calgary logging facility.

6.2. Field Mapping and Sampling Programs

6.2.1. July 2003

In July, 2003, Birch Mountain carried out a field program on its Athabasca property in the Fort McKay region in order to map the thickness and extent of limestone previously

observed at surface. Locations for future bulk sample pits and drill locations in the Fort McKay region were also identified.

Eighteen limestone samples were collected from outcrops; the locations of the GDP03 series are shown in Appendix G.1. and the descriptions are included in Appendix G.2. The samples were shipped to Birch Mountain's storage facility in Calgary where they remain. The samples were not sent for geochemical analysis as samples collected in 2001 from many of the same locations had already been tested.

6.2.2. September 2003

In September, 2003, a mapping and sampling program was conducted on the Athabasca property in order to: (1) further delineate the extent of a competent limestone unit observed at surface during the July 2003 mapping; (2) describe the stratigraphy and collect samples from limestone outcrops exposed along the southern Muskeg River; (3) collect samples of dolomitized limestone reported along the Firebag River to determine its aggregate potential; and (4) collect samples of limestone and shale exposed in Syncrude's Aurora Mine pit to determine their industrial potential.

In the Fort MacKay region, thirty-one samples of the competent limestone were collected from previously unmapped and unsampled outcrops; the locations of the KAR03 series are shown in Appendix H.1. and descriptions in Appendix H.2. The samples were not sent for analysis and are currently stored at Birch Mountain's storage facility in Calgary.

A helicopter was used to access outcrops of dolomite along the Firebag River. Although four different outcrops of the dolomite were mapped, it was only possible to collect samples from two of these locations (Appendix H.1.). Three samples were collected from outcrops along the Muskeg River (Appendix H.1.). Sample descriptions are listed in Appendix H.2. None of these samples has been sent for testing and they are currently being stored at Birch Mountain's storage facility in Calgary.

Access to Syncrude's Aurora mine site was provided through the Co-Development Agreement that exists between Syncrude and Birch Mountain. Six samples of shaly limestone were collected from Devonian rocks exposed in the base of the mine pit during excavation for aggregate quality testing (appendices H.1. and H.2.). The samples have not been sent for testing and are being being stored at Birch Mountain's storage facility in Calgary.

6.2.3. February 2004

In February, 2004, Birch Mountain collected six 100 lb samples of limestone from outcrops in the Fort McKay region to provide additional material for aggregate and calcine testing. The locations of the GKR04 series samples are shown in Appendix I.1. and the descriptions are included in Appendix I.2. No testing results are reported here.

7.0 EXPLORATION EXPENDITURES

Detailed expenditures are presented in Appendix J, organized by Appendix. The costs listed in "Table 7.1. Exploration Expenditures" are correct and were incurred in carrying out the assessment work detailed in this report.

Table 7.1. Assessment Expenditures by Appendix. Expenditures for period April 1, 2002, to August 31, 2004.

Appendix	Title	Expenditures
D	Winter Drilling 2002-2003	$ 203,248.77
E	Core Re-logging December 2003	$ 51,169.20
F	Drilling February 2004	$ 413,852.5
G	July 2003 Field Mapping and Sampling	$ 49,932.20
H	September 2003 Field Mapping and Sampling	$ 63,074.04
I	February 2004 Field Mapping and Sampling	$0
	Subtotal	**$781,276.71**
	Overhead (10%)	$78,127.67
	Total Assessment Expenditure Claimed	**$ 859,404.38**

8.0 Conclusions

Birch Mountain has conducted mineral exploration on its Athabasca-Birch Mountains permit area since 1994. Target commodities have included industrial minerals and precious metals. In 2002-2004, Birch Mountain's exploration of its northeast Alberta properties has been directed primarily towards industrial minerals exploration.

Birch Mountain has conducted extensive field and drilling programs over the last two years that have allowed advancement of its industrial minerals program. Additional programs to advance the current project as well as identifying new areas for development are being planned for the immediate future.

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ASSESSMENT REPORT:

August 31, 2004, Filing

Athabasca Metallic and Industrial Minerals Permits,
Northeastern Alberta

APPENDICES

Birch Mountain Resources Ltd.
300, 250 Sixth Ave S.W.
Calgary, Alberta
T2P 3H7

Appendix A. 2004 Permit Grouping

A.1. Permit Grouping

Appendix A.1.

Permit	Area (ha)	Period	Anniversary Date	Previous Credit	Expenditure Assigned
9396060019	4608	4	18-Jun-04	$0.00	$69,120.00
9396060018	6656	4	18-Jun-04	$0.00	$99,840.00
9398070347	2304	3	31-Jul-04	$0.00	$92,160.00
9396080029	5376	4	14-Aug-04	$0.00	$80,640.00
9396080028	7936	4	14-Aug-04	$0.00	$156,684.38
9396080027	7680	4	14-Aug-04	$0.00	$115,200.00
9398080087	6144	3	28-Aug-04	$0.00	$245,760.00
				Total:	**$859,404.38**

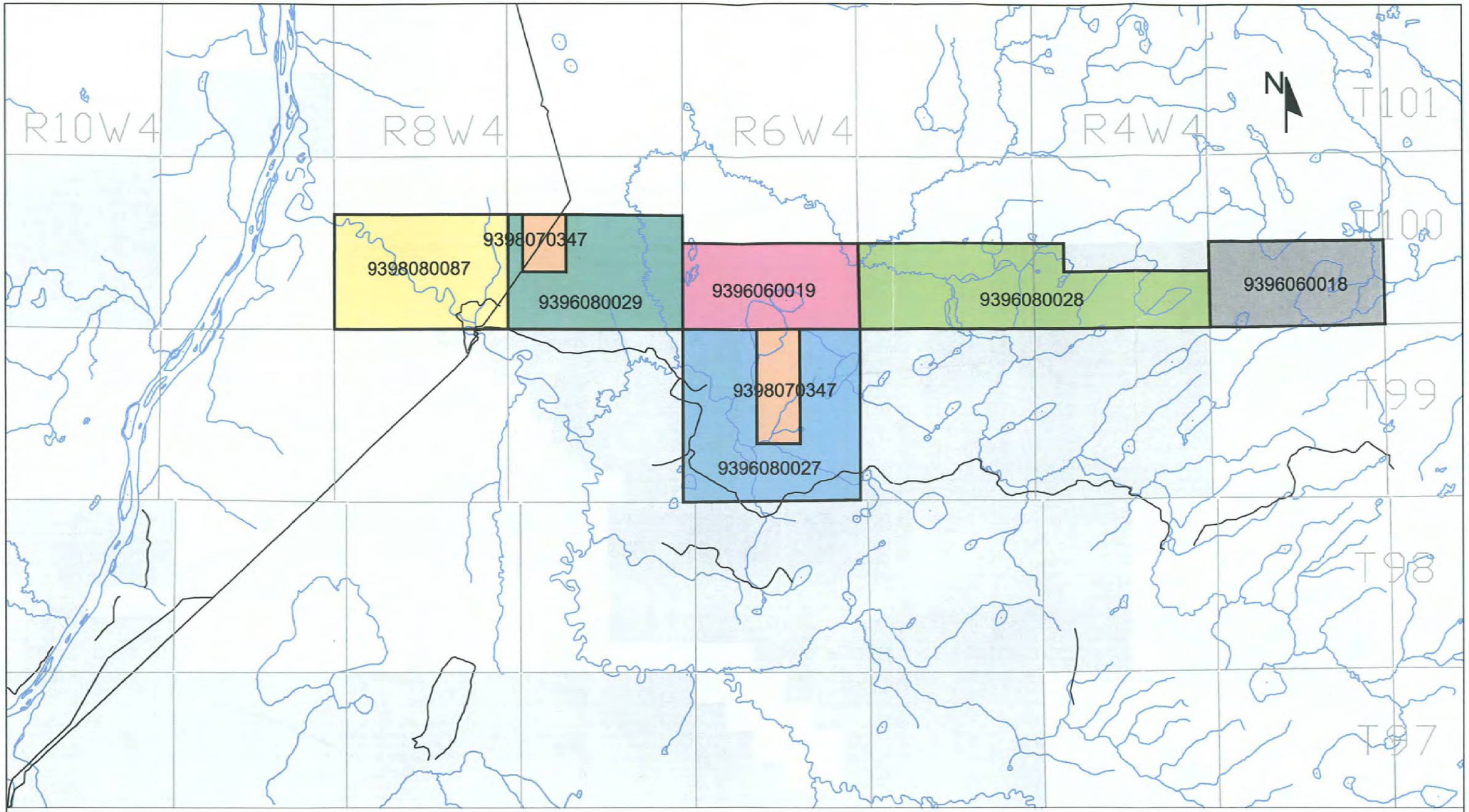
Total Expenditure Available: $859,404.38

Appendix A. 2004 Permit Grouping

A.2. Athabasca Permit Map

(Pocket)

74 E/9,10,11



LEGEND

Lakes and Rivers

Roads

Birch Mountain Resources Ltd. August 31, 2004, Permit Grouping

Birch Mountain Resources Ltd. Athabasca Property (as of August 31, 2004)

km
0 2.5 5 7.5 10

Scale: 1:250,000

UTM NAD 83

BIRCH MOUNTAIN RESOURCES LTD

Appendix A.2. August 31, 2004, Assessment Grouping, Northeastern Alberta

August 31, 2004	KMA

APPENDIX B

Appendix B. Co-Development Agreement

B.1. Syncrude Canada Ltd. Agreement

Co-Development Agreement
May 13, 1997

COPY

Between:

Syncrude Canada, Ltd., a corporation incorporated pursuant to the laws of Canada ("Syncrude")

- and -

Birch Mountain Resources Ltd., a corporation incorporated pursuant to the laws of Alberta ("Birch Mountain")

Recitals

A. Syncrude is the owner of and desires to produce, bitumen and synthetic crude oil from certain lands located in the Athabasca region of Northern Alberta (sometimes referred to as the "Aurora Project").

B. Birch Mountain is or is entitled to be the owner of and is in the business of exploring for and producing precious, non-precious, base metals and industrial minerals from lands which overlap and underlie Syncrude's Aurora Project.

C. Syncrude and Birch Mountain recognize that there may be savings and economies to be enjoyed by each through cooperative regulatory, exploration, development, extraction and production activities.

D. The parties wish to cooperate for the purposes of enhancing and maximizing their respective resource development, and to agree upon the business basis by which the parties will work together.

E. The parties wish to collaborate on environmental planning and management to ensure that all cooperative activities on the Aurora Project lands comply fully with the environmental policies of both parties, and at all times, comply with applicable government Environmental Acts and regulations.

The parties agree as follows.

Article 1
Co-Development Area

1.1 The co-development area for the purposes of this Agreement shall be those lands legally described on Schedule A attached hereto and forming a part of this Agreement (the "Lands").

1.2 If either party hereto shall acquire any further lands in which they have the same or substantially the same interest as in the existing Lands and such additional lands overlap those owned by the other party hereto, they will notify the other party and such lands will be, without more, included within the definition of Lands.

1.3 In the event either party shall at any time surrender, abandon or otherwise transfer or convey their interest in and to the Lands or should their interest otherwise expire or terminate, whether by way of effluxion or time or operation of law, then in such event that party shall immediately notify the other and such portion of the Lands shall immediately be removed from and will cease to be part of the co-development Lands.

1.4 Notwithstanding the foregoing, to the extent reasonably practicable, each party shall give to the other not less than 60 days written notice prior to the date upon which any such disposition, expiration, termination or other transfer of any portion of the Lands is intended or anticipated to occur.

Article 2
Steering Committee

2.1 In order to effectively arrange for the necessary exchange of information (whether confidential or otherwise) and an orderly decision-making process in respect of the co-development of the Lands, the parties hereto agree to immediately create a steering committee consisting of 4 members. Syncrude shall be entitled to appoint 2 members and Birch Mountain shall appoint 2 members. The committee members shall themselves select a chairman and vice-chairman of the steering committee and each member shall hold a position on the committee until such time as they are removed by the party appointing them or upon dissolution of the committee as hereinafter provided.

2.2 Neither the chairman, vice-chairman nor any other member of the steering committee shall have a second deciding or casting vote in respect of any matter.

2.3 Should either of Syncrude or Birch Mountain object to an appointee of the other to the steering committee it shall immediately notify the corporation in writing of its objection and the grounds therefore and each party agrees to act reasonably in respect of resolving such objection and, if necessary, replacing such appointee with an alternate acceptable person.

2.4 Either of Syncrude or Birch Mountain may remove and replace their respective nominees from the steering committee from time to time provided

always that written notice of such removal and the name and position or office held by the new appointee shall be promptly given to the other party.

2.5 Members of the steering committee may, with the consent of the others, invite such additional employees, consultants or advisors as may be necessary to properly consider matters coming before the committee.

2.6 Meetings of the steering committee shall be held as frequently as may be necessary and shall be called by either party, except in the case of emergency, on not less than 7 days notice. Meetings of the steering committee shall, in any event, be held not less often than annually.

Article 3
Confidentiality

3.1 Each member of the steering committee shall be afforded full and complete access to all pertinent or relevant information relating to the Lands, the petroleum or mineral interest of each party in respect of the Lands and any regulatory, exploration, development, production or extraction initiatives of each party as they may relate to the Lands.

3.2 Each party hereby agrees that they shall hold all such information as confidential information and trade secrets and will not divulge same to any other party save and except:

(a) with the consent of both parties hereto first had and obtained; or

(b) the information having become public domain; or

(c) the information having been disclosed by a party other than another member of the steering committee and who is not in breach of a confidentiality undertaking.

3.3 Notwithstanding Article 3.2, either party shall have the right, upon request, to restrict access to certain identified information to the steering committee only.

Article 4
Conflict of Interest

4.1 Subject to the requirements with respect to confidentiality as aforesaid, no committee member shall, by virtue of being a committee member, be deemed to be in a conflict of interest.

Article 5
Mandate of Steering Committee

5.1 The steering committee shall:

(a) agree upon and formulate for each of Syncrude and Birch Mountain periodic status reports for circulation to the board of directors or Executive Committee of each of Syncrude and Birch Mountain as applicable; provided always that such reports shall be full and complete but shall not be obliged to contain any confidential information or trade secrets;

(b) confirm the nature, extent and term of the existing joint drilling and data exchange program between Birch Mountain and Syncrude and continue to develop and circulate a plan for further recommended technology and data sharing and co-operation between each of Syncrude and Birch Mountain;

(c) agree upon regulatory application procedures, including the timing, anticipated experts, interveners and other information in order to ensure such processes shall be complementary as between Syncrude and Birch Mountain and will not be in conflict or adverse in interest in any material respect;

(d) create a plan for the identification, delineation, extraction and production of the resources to which each party is entitled in a fashion which will minimize time, cost and expense for each party in allowing them to develop their respective resources from and within the Lands and not unreasonably interfere with the operations of each other on the Lands;

(e) create a plan in respect of orderly exploration, excavation, drilling, mining and processing of resources and the reclamation and remediation consistent with the extraction and development plan referred to above and in compliance with all statutory and regulatory requirements with respect to such reclamation or remediation;

(f) consider proposals for extraction of minerals from beneath the Lands (in any zone) provided always that any affected party shall be compensated for any additional costs or expenses incurred as a result of any such co-production and shall also be compensated in a mutually agreed fashion for the value of their minerals so produced;

(g) determine a budget for the foregoing matters, including those items upon which a cost should be shared between each of Syncrude and

Birch Mountain with an allocation of such costs on a fair and equitable basis.

Article 6
Approval by Boards of Directors and AEUB/NRCB

6.1 No report, plan, proposal or other communication provided pursuant to the terms hereof shall be binding upon either of Syncrude or Birch Mountain until such time as it shall have received approval by the board of directors or executive committee of each respective corporation as applicable and such approval shall have been communicated to all members of the steering committee.

6.2 Any plans or proposals where the Alberta Energy and Utility Board ("AEUB") and the National Resources Conservation Board ("NRCB"), or either of them, have jurisdiction shall be submitted to the AEUB and NRCB, as applicable, for approval and adjudication.

Article 7
Dispute Resolution

7.1 The members of the steering committee shall utilize their reasonable efforts to negotiate, agree upon and resolve differences and disputes as between the parties in relation to the matters contained in this Agreement.

7.2 In the event the members of the steering committee are unable to resolve any dispute as among themselves it will be referred to arbitration to a panel of three arbitrators, one of which shall be appointed by each party and the third of which shall be appointed by the previous two appointees. The costs of arbitration shall be divided by the parties equally, unless such arbitrators make an award as to costs in which case the arbitrators' award shall govern. Each of the parties acknowledge and agree that no such arbitration proceeding shall have the effect of precluding the authority of the AEUB or the NRCB to the extent they may have jurisdiction over matters in dispute whether alone or jointly.

7.3 Notwithstanding the foregoing in the event that either party refuses to appoint an arbitrator in respect of any dispute and neither the steering committee nor arbitration can or is capable of resolving such dispute then the steering committee shall forthwith notify the board of directors or executive committee, as applicable, of each of the parties hereto and, effective upon receipt of such notice, the steering committee shall dissolve and this Agreement, save and except those provisions as to confidentiality contained in Article 3, shall immediately cease and determine. Notwithstanding the

foregoing, each party shall continue to be bound by any contracts, agreements or other arrangements made prior to the date of such dissolution and, subject to the terms of such contracts, agreements and arrangements, each party shall be entitled to pursue resource development within and from the Land independently and without consideration of the other party's interest.

Article 8
Independent Party

8.1 Notwithstanding any other provisions set forth herein, no party shall, at any time during the term hereof or thereafter, hold out to any person or represent that they shall have been joint venturers or that there shall be any endorsement or support of either party's resource development activities by the other in any manner whatsoever. For all purposes this Agreement shall deal with issues of co-development and shall not create a joint venture, partnership or other relationship.

Article 9
Miscellaneous

9.1 **Notices.** All communications required or permitted to be given hereunder shall be in writing and shall be deemed to have been duly given when delivered personally or by fax transmissions, or one business day after being sent by overnight commercial courier service for next business day delivery, or five days after being deposited in the Canada Post mail, for certified or registered delivery, return receipt requested, postage prepared. Notice to Syncrude shall be addressed to:

Syncrude Canada Ltd.
200, 9911 MacDonald Avenue
Post Office Bag 4023, M.D. 2800
Ft. McMurray, Alberta T9H 3H5
Attention: Barry Wolsey
Fax: (403) 790-6295

Notice to Birch Mountain shall be addressed to:

Birch Mountain Resources Ltd.
3100, 205 - 5th Avenue S.W.
Calgary, Alberta T2P 2V7
Attention: Doug Rowe
Fax: (403) 263-9888

COPY TO: John R. Houghton
MacKimmie Matthews
700, 401 - 9th Avenue S.W.
P.O. Box 2010
Calgary, Alberta T2P 2M2
Fax: (403) 232-0888

Either party may designate another address at any time by written notice to the other.

9.2 **Proper Law.** Alberta law is the proper law of this Agreement.

9.3 **Successors and Assigns.** Either party to this Agreement shall be entitled to assign all or a portion of its interest with the consent of the other party, not to be unreasonably witheld, provided always that such assignee or transferee agrees, in writing, to observe and perform each and every of the covenants set forth herein and any and all other contracts, agreements or arrangements which may have been reached between the parties up to and including the date of such assignment or transfer. This Agreement enures to and binds the parties and their successors and permitted assigns.

Executed and delivered.

APPROVED	
AS TO	
FORM	
AS TO	
TERMS	

Syncrude Canada Ltd.

Per: [redacted]

Birch Mountain Resources Ltd.

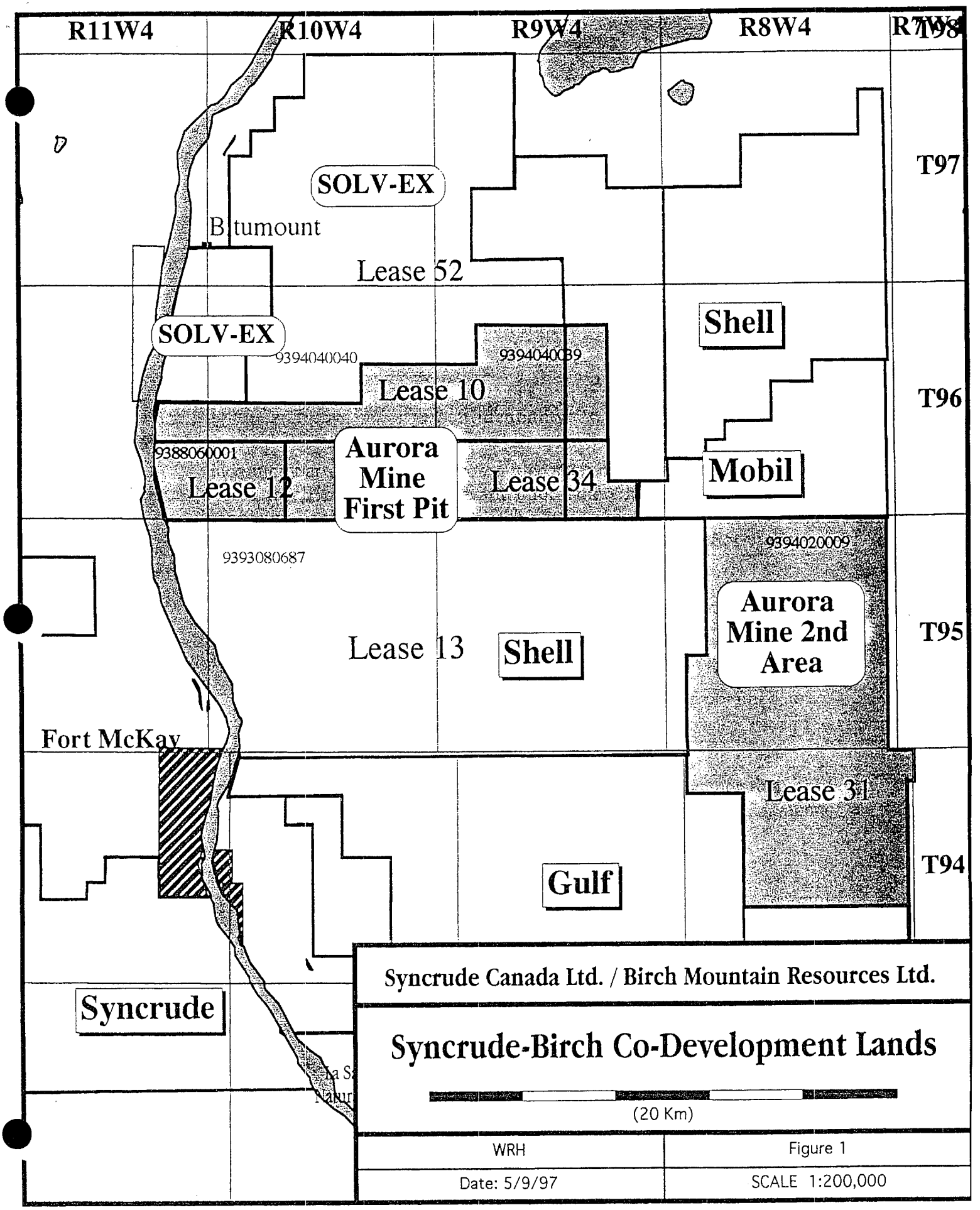
Per: [redacted]

SCHEDULE A

LANDS

OIL SANDS LEASE NO.	TWP-RGE	METALLIC AND INDUSTRIAL MINERAL PERMIT NO.
7276050T10	96-9	9394040039
7276050T10	96-10	9394040040
7276050T10	96-11	9393080687
7276050T12	96-10	9393080687
7276050T12	96-11	9393080687
7280110T34	96-9	9394040039
7280110T34	96-10	9394040040
7280100T31	95-8	9394020009
7280100T31	94-8	No permit held by Birch Mountain

Figure 1 illustrates the Oil Sands Leases and Metallic and Industrial Mineral Exploration Permits

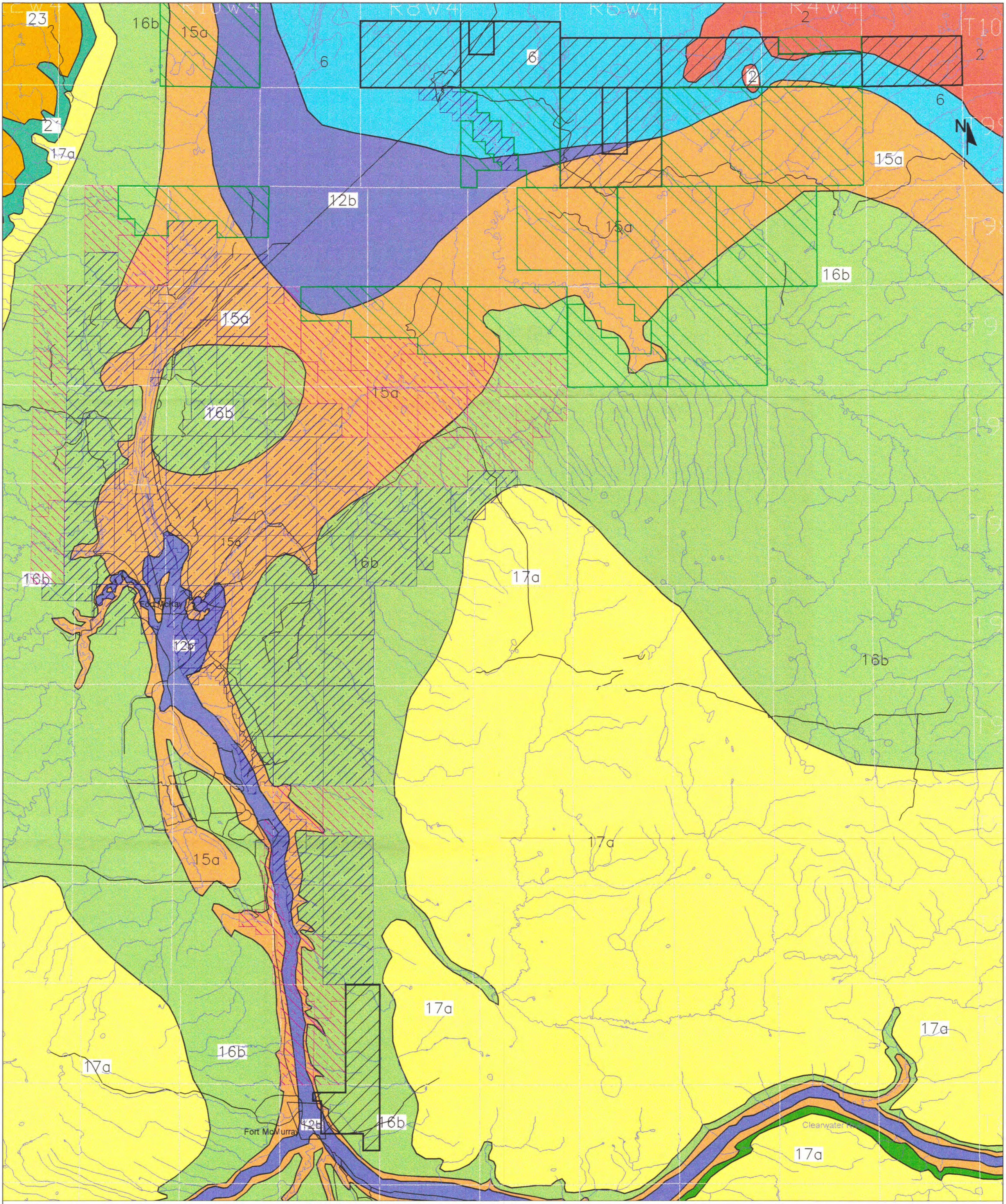

R11W4
R10W4
R9W4
R8W4
T98
T97
T96
T95
T94
SOLV-EX
Bitumount
Lease 52
SOLV-EX
Shell
9394040040
9394040039
Lease 10
Aurora Mine First Pit
9388060001
Lease 12
Lease 34
Mobil
9394020009
9393080687
Aurora Mine 2nd Area
Lease 13
Shell
Fort McKay
Lease 31
Gulf
Syncrude
Syncrude Canada Ltd. / Birch Mountain Resources Ltd.
Syncrude-Birch Co-Development Lands
(20 Km)
WRH
Figure 1
Date: 5/9/97
SCALE 1:200,000

APPENDIX C

Appendix C. Regional Geological Map

Scale: 1:1,000,000

(pocket)



LEGEND

- Lakes and Rivers
- Roads
- Birch Mountain Resources Ltd. Metallic and Industrial Mineral permits
- Birch Mountain Resources Ltd. Metallic and Industrial Mineral leases
- Birch Mountain Resources Ltd. Metallic and Industrial Mineral permit to lease conversions
- Birch Mountain Resources Ltd. Metallic and Industrial Mineral permit applications

23 — LaBiche Formation: dark grey shale and silty shale, ironstone partings and concretions; thin fish scale-bearing silty beds in lower part; marine

21 — Shaftesbury Formation: dark grey fish scale-bearing shale, silty in upper part; numerous nodules and thin beds of concretionary ironstone; bentonite partings; interbedded locally in lower part with thin silty and sandy intervals; marine

17a — Grand Rapids Formation: fine grained quartzose and feldspathic sandstone, laminated siltstone and silty shale; thin coaly beds, deltaic to marine

16b — Clearwater Formation: dark fossiliferous silty shale, laminated siltstone, fine grained cherty sandstone; glauconitic sandstone (Wabiskaw Member) near base; marine

15a — McMurray Formation: cross-bedded quartzose sandstone and siltstone; oil-impregnated; grey silty shale interbeds in upper part; deltaic

12b — Waterways Formation: grey and greenish-grey shale and argillaceous limestone units alternating with grey and greyish-brown fine grained and clastic limestone units; marine

6 — Middle Devonian (undivided) includes La Loche/McLean River Formation: sandstone and shales; Methy Formation: brown and buff massive porous dolomite, brown to grey thin-bedded dolomite, dolomitic limestone, minor anhydrite and gypsum; Prairie Formation: gypsum, anhydrite, grey-green silty and dolomitic shale, minor dolomite; and Watt Mountain Formation: shales; marine to evaporitic

2 — Undivided Granitic Plutonic Rocks: including biotite granite, porphyroblastic and porphyritic granites; some granite gneiss and metasedimentary rocks

Scale: 1:250,000

UTM NAD 83

BIRCH MOUNTAIN RESOURCES LTD

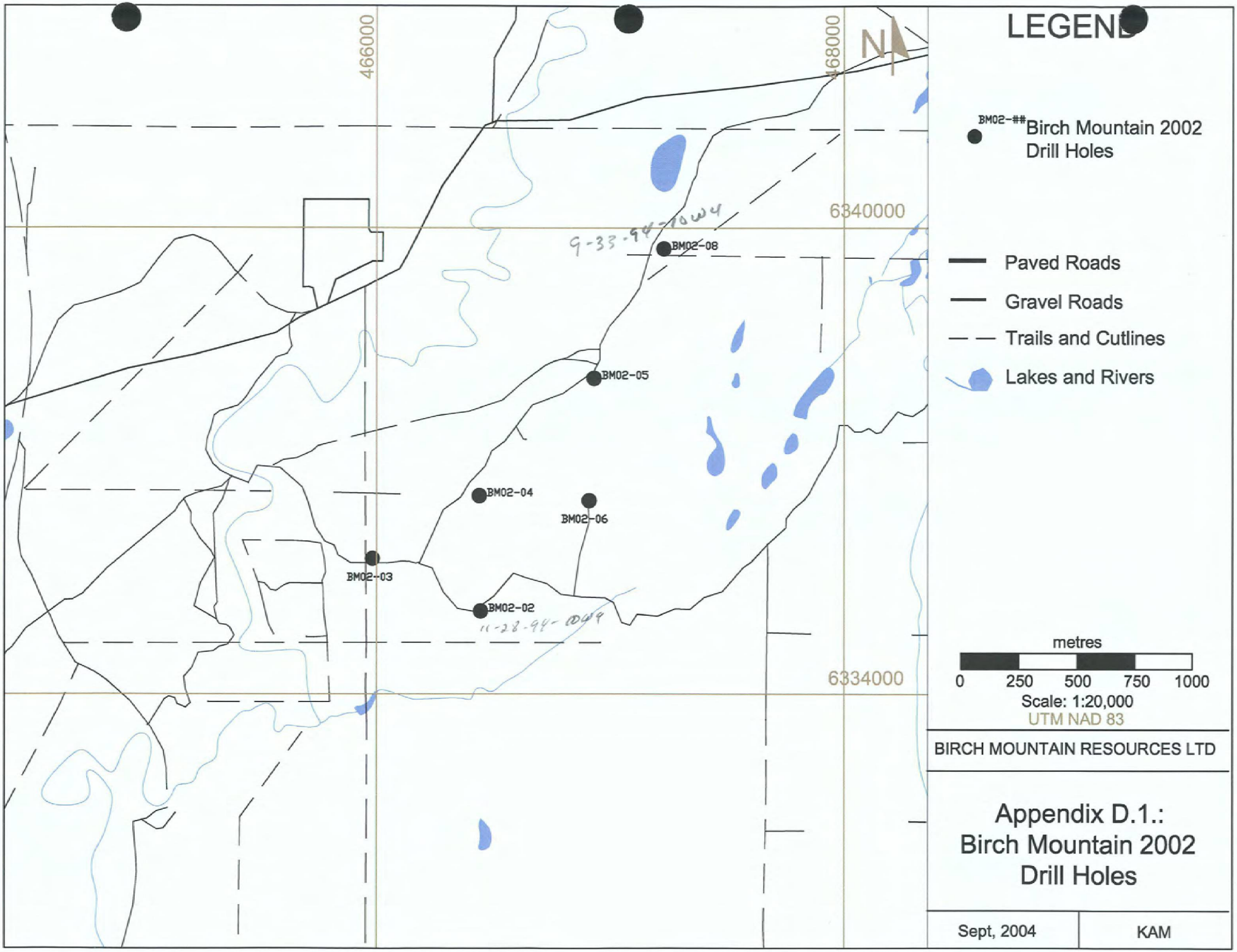
Appendix C. Regional Geology and Birch Mountain Land Holdings, Northeastern Alberta

August 31, 2004 | KMA

APPENDIX D

Appendix D. Winter Drilling 2002-2003

D.1. Drill Core Location Map

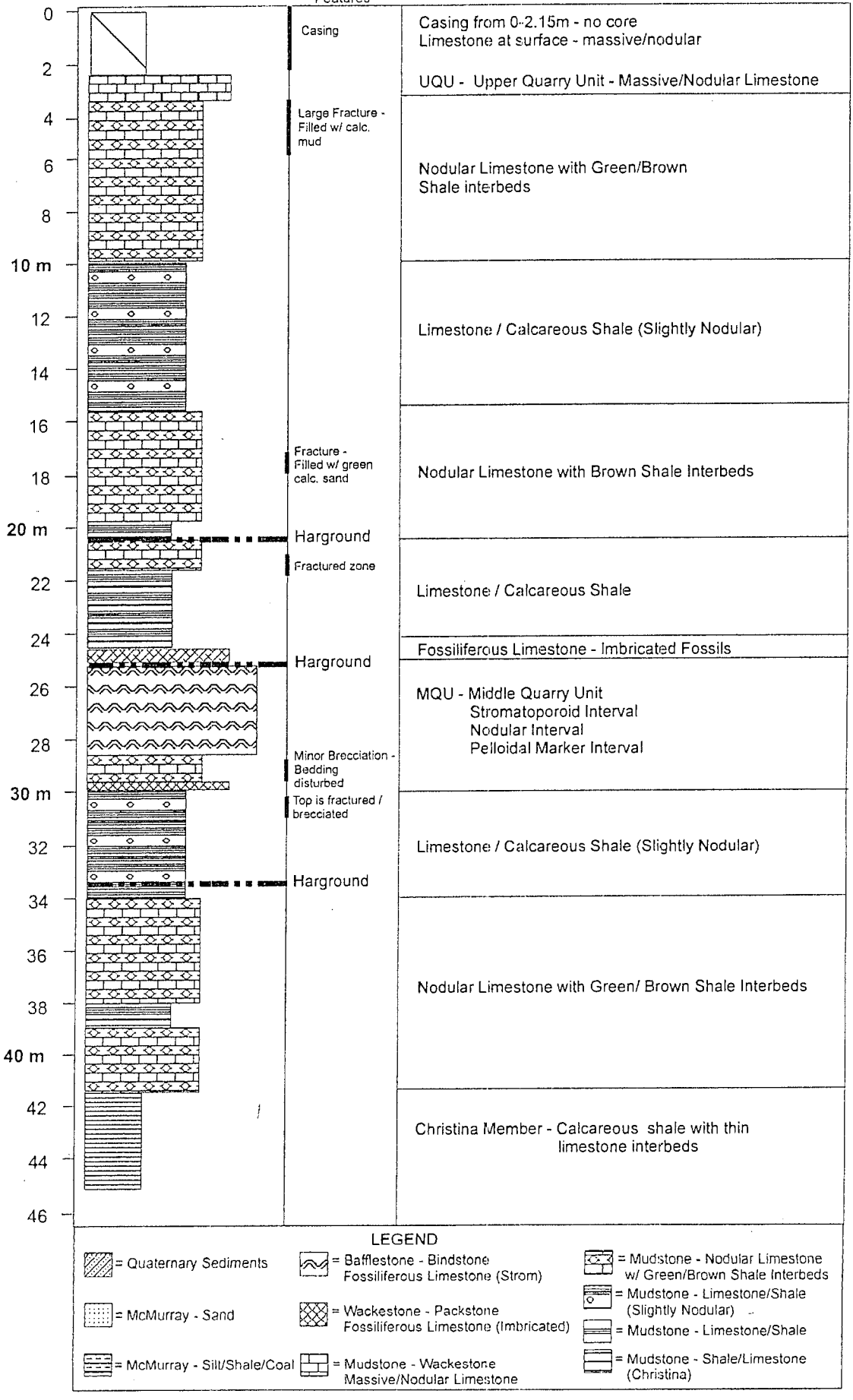

466000
468000
N
6340000
6334000
9-33-94-10W4
11-28-94-10W4
BM02-08
BM02-05
BM02-04
BM02-06
BM02-03
BM02-02
LEGEND
BM02-## Birch Mountain 2002 Drill Holes
Paved Roads
Gravel Roads
Trails and Cutlines
Lakes and Rivers
metres
0 250 500 750 1000
Scale: 1:20,000
UTM NAD 83
BIRCH MOUNTAIN RESOURCES LTD
Appendix D.1.:
Birch Mountain 2002
Drill Holes
Sept, 2004
KAM

11-28-94 - 10W4

Birch Mountain Resources Ltd - Muskeg Valley Quarry Drill Program 2002

BM02-02

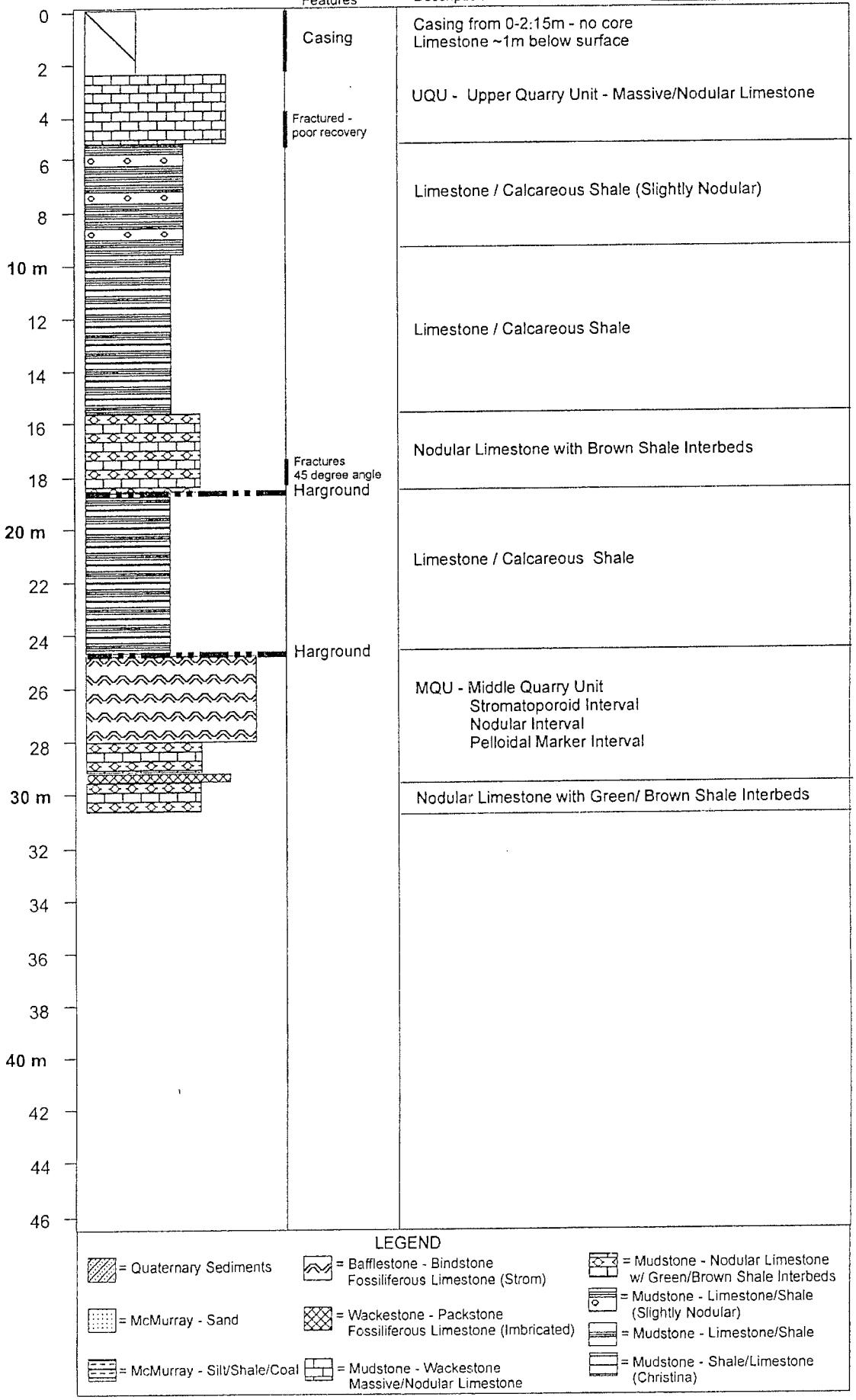
Collar Elev.	UTM (NAD 27)
280m	466504 E
	6338129 N



Birch Mountain Resources Ltd - Muskeg Valley Quarry Drill Program 2002

BM02-03

Collar Elev.	UTM (NAD 27)
276m	466037 E
	6338355 N



Birch Mountain Resources Ltd - Muskeg Valley Quarry Drill Program 2002

BM02-04

Collar Elev.	UTM (NAD 27)
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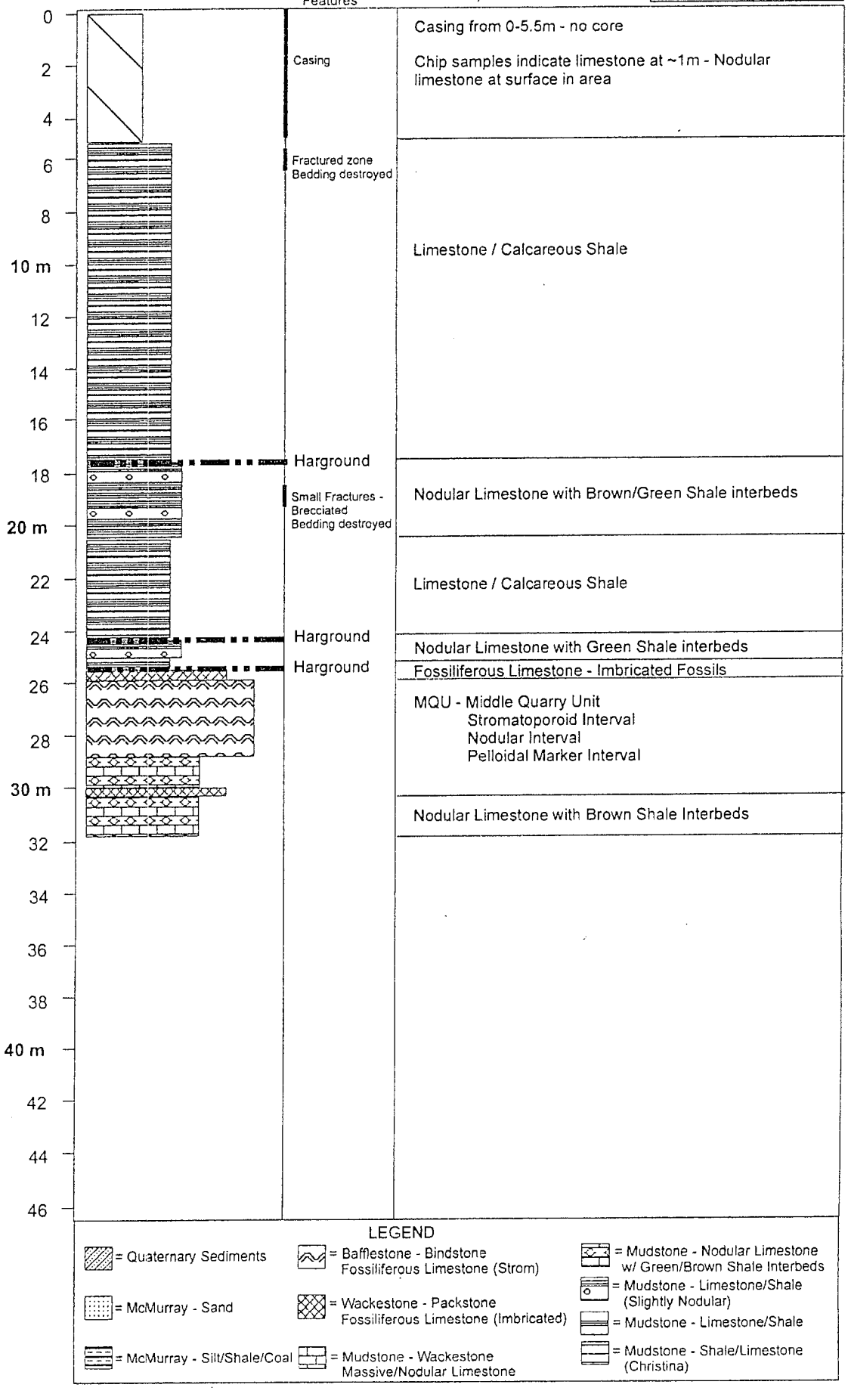
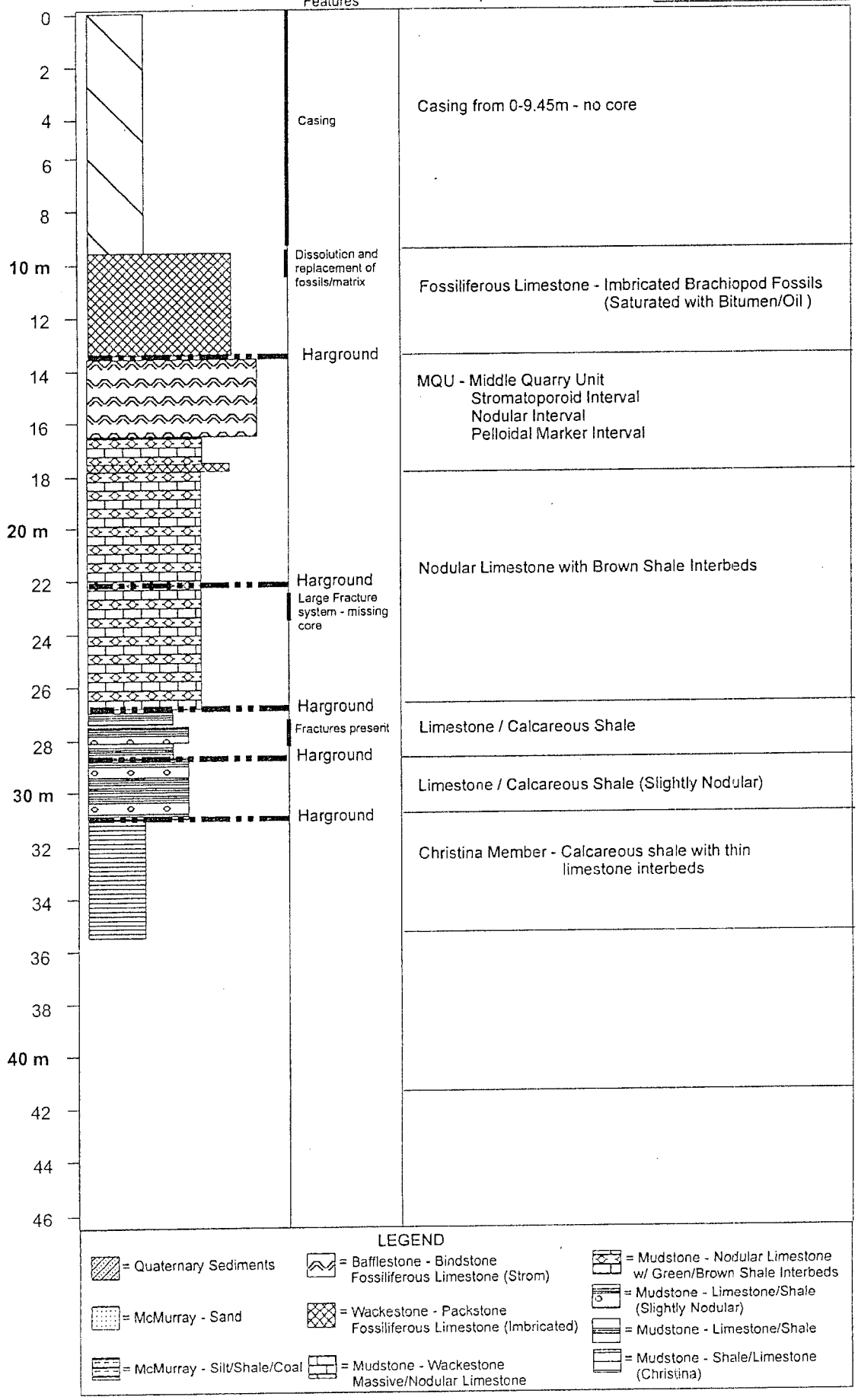
	6338625 N



Birch Mountain Resources Ltd - Muskeg Valley Quarry Drill Program 2002

BM02-05B

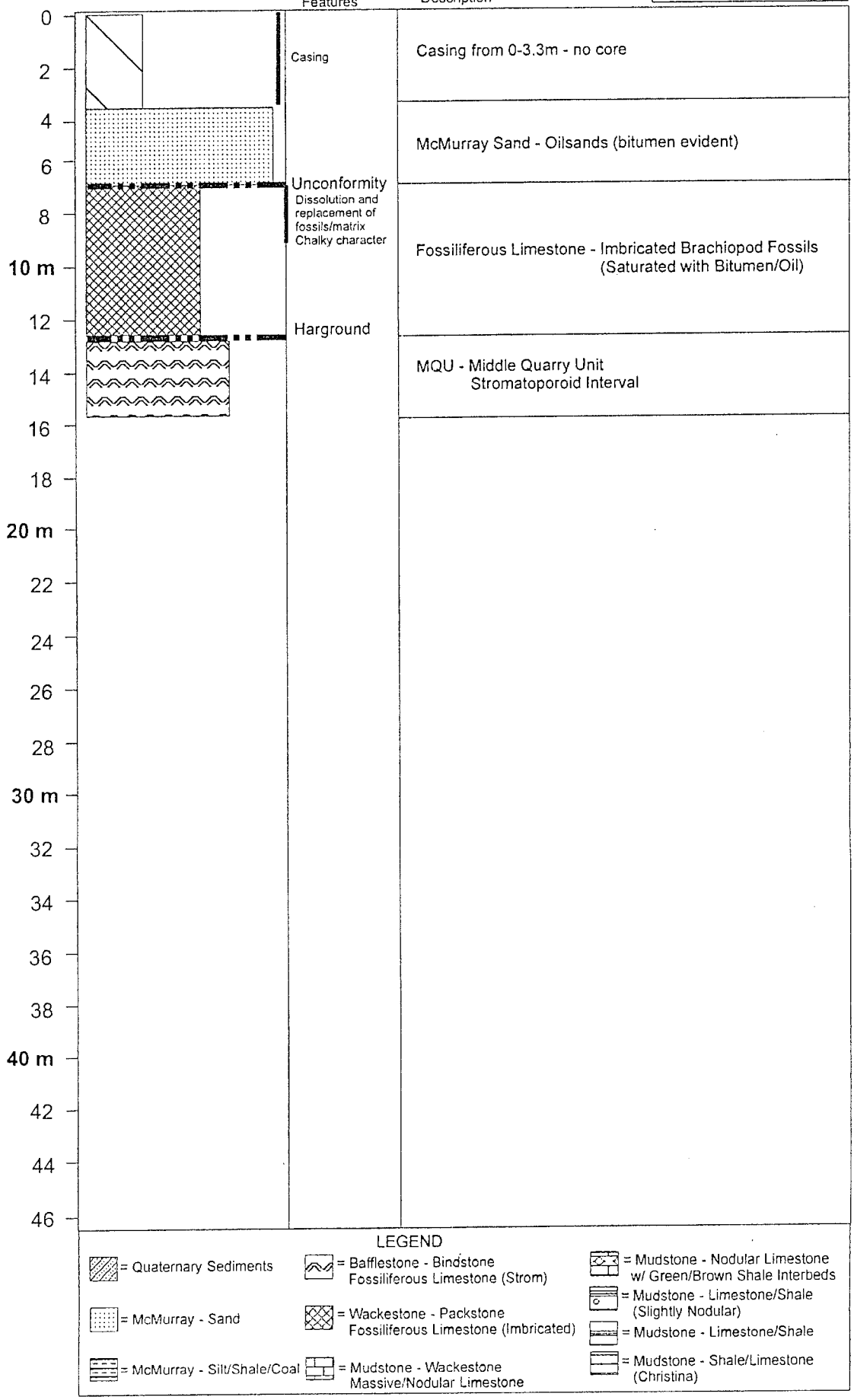
Collar Elev.	UTM (NAD 27)
280m	466989 E
	6339130 N



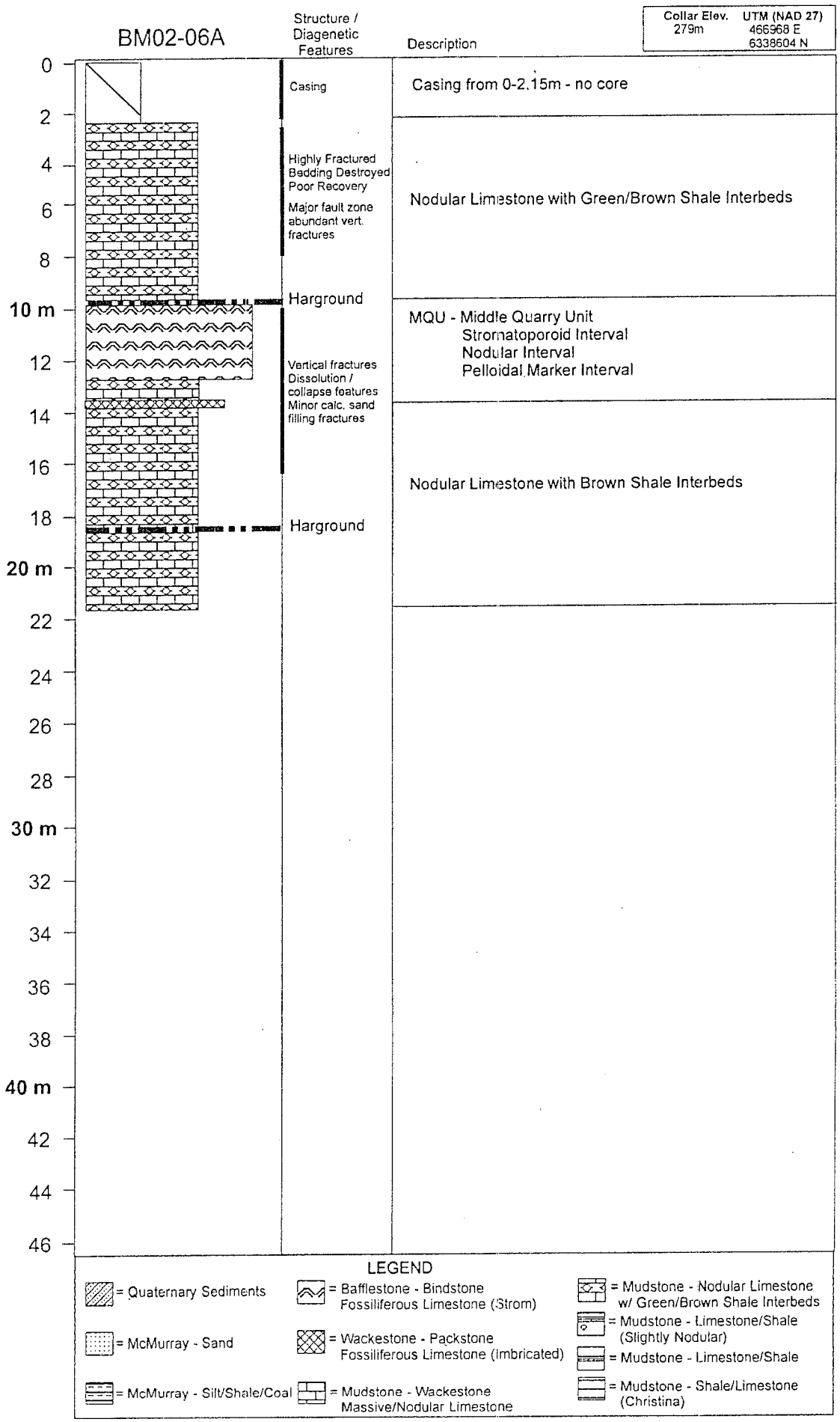
Birch Mountain Resources Ltd - Muskeg Valley Quarry Drill Program 2002

BM02-05C

Collar Elev.	UTM (NAD 27)
280m	466989 E
	6339130 N



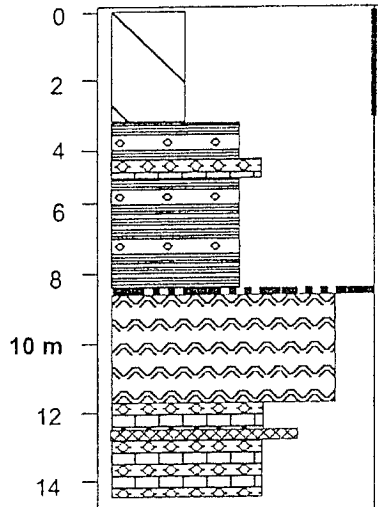
Birch Mountain Resources Ltd - Muskeg Valley Quarry Drill Program 2002



Birch Mountain Resources Ltd - Muskeg Valley Quarry Drill Program 2002

BM02-06B

Collar Elev.	UTM (NAD 27)
279m	466968 E
	6338604 N



Structure / Diagenetic Features	Description
Casing	Casing from 0-3.05m - no core
	Limestone / Calcareous Shale (Slightly Nodular)
Hardground	MQU - Middle Quarry Unit Stromatoporoid Interval Nodular Interval Pelloidal Marker Interval
	Nodular Limestone with Brown Shale Interbeds

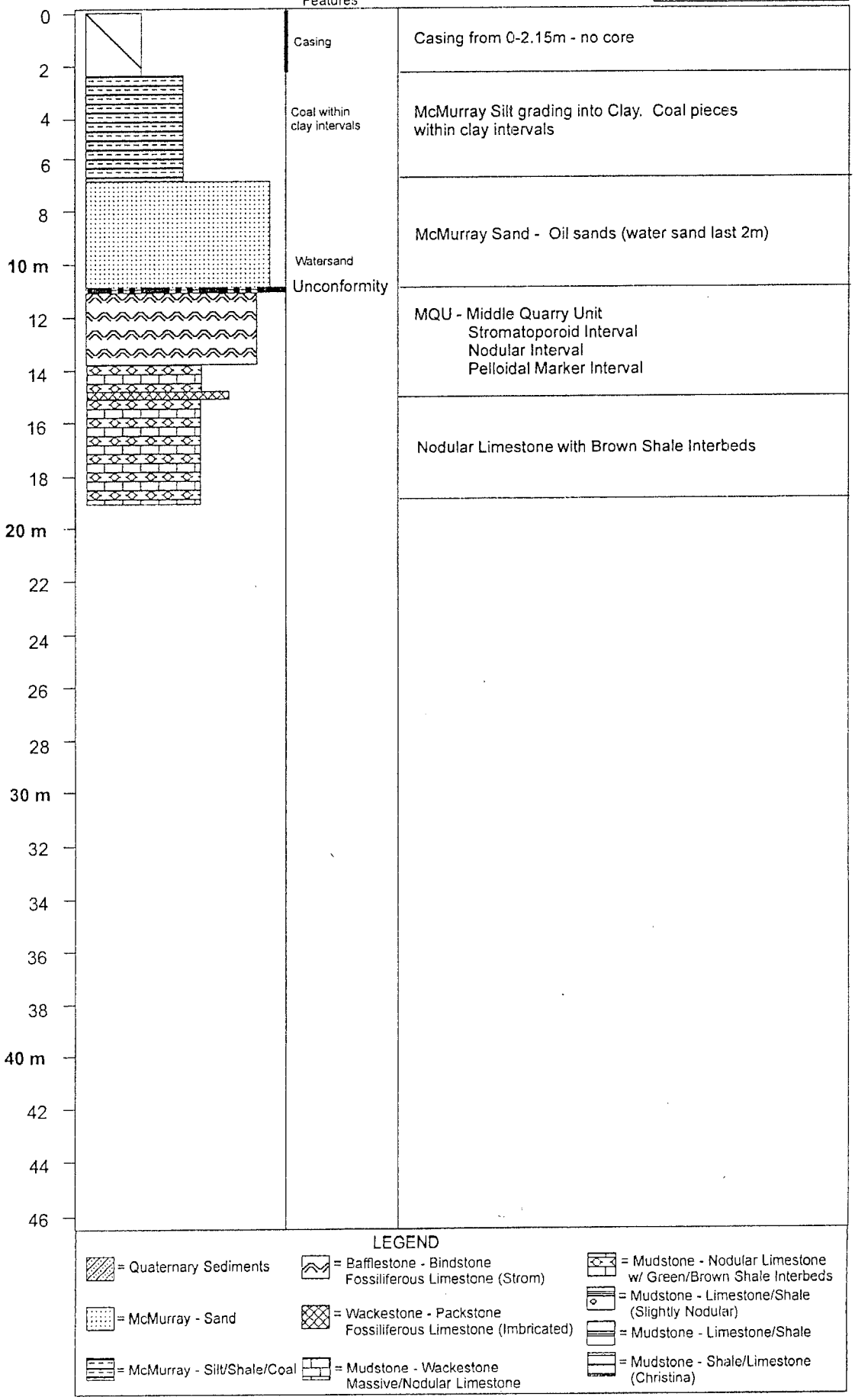
LEGEND

- = Quaternary Sediments
- = McMurray - Sand
- = McMurray - Silt/Shale/Coal
- = Bafflestone - Bindstone Fossiliferous Limestone (Strom)
- = Wackestone - Packstone Fossiliferous Limestone (Imbricated)
- = Mudstone - Wackestone Massive/Nodular Limestone
- = Mudstone - Nodular Limestone w/ Green/Brown Shale Interbeds
- = Mudstone - Limestone/Shale (Slightly Nodular)
- = Mudstone - Limestone/Shale
- = Mudstone - Shale/Limestone (Christina)

Birch Mountain Resources Ltd - Muskeg Valley Quarry Drill Program 2002

BM02-08

Collar Elev.	UTM (NAD 27)
279m	466285 E
	6339685 N



Birch Mountain Resources Ltd.

Date Drilled:	7/1/03	Collar Elev:	280	Date Logged:	1/3/15
Project:	Limestone - Muskeg Valley Quarry	UTM N:	6338129	Core Size:	HQ	Logged By:	Scott Rose
Drill Hole # :	BMD02-02	UTM E:	466504	Depth:	45	Sampled By:	Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-001	0	2.15	2.15	0	0.0%	From: 1 To: 1	n/a	n/a	n/a

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
		Casing - no core	n/a	n/a	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Casing - Limestone ~0.5 m below surface. Overburden is coarse brown sand/till.	N/A	N/A		N/A	This interval was not recovered. Chip samples were analyzed. Limestone was encountered at ~0.5m depth. Chips were brown-grey limestone.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-002	2.15	3.66	1.51	1.2	7950.0%	From: 1 To: 1	brown-tan	trace (1-5%)	n/a

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Massive Limestone	mudstone-wackestone	absent	massive / structureless	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
calcite cement replacement of fossil fragments. Cement fills voids / openings.	Lithographic limestone. Brach and crinoid fragments.	N/A	No insitu faunal assemblages. Minor crinoidal / brach debris.	Massive. Very minor calcareous shale interbeds indicating subhorizontal bedding.	N/A	very pure limestone. Possible calcinable unit.

Birch Mountain Resources Ltd. | Date Drilled: 7/1/03 | Collar Elev: 280 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338129 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-02 | UTM E: 466504 | Depth: 45 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-003	3.66	6.2	2.54	1.6	6300.0%	From: 1 To: 1	green	frac-fill (>50%)	n/a

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Easily Friable Shale/Mud	Carbonate Mud	mudstone	absent	planar bedding	large single fracture evide	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Arg Carbonate Mud filling a large void / fracture. Clasts of limestone with arg mud.	May be a result of karsting or large fracture system. No geopedal	N/A	fracture fill arg has a slight bedding angle of about 3 degrees.	karsting or fracture fill.	very poor recovery in arg carbonate mud. Lost over 50% of core.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-004	6.2	9.9	3.7	2.18	5890.0%	From: 1 To: 2	tan	shale (10-25%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	normal, not diverse (2-4)	lenticular / discont. Layers	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Nodular Limestone. Minor brachiopod fragments. Shale interbeds are green calcareous mud.	N/A	Minor fauna present. Brachiopods with crinoidal debris evident		N/A	

Birch Mountain Resources Ltd. | Date Drilled: 7/1/03 | Collar Elev: 280 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338129 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-02 | UTM E: 466504 | Depth: 45 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-005	9.9	15.62	5.72	5	0.0%	From: 2 To: 4	green	shale (50-75%)	n/a

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Easily Friable Shale/Lst	Limestone / Calc. Shale	mudstone	absent	planar to lenticular / discont. Laye	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Limestone interbedded with green calcareous shale. At least 50% shale.		no fauna present. Very fine shaley limey shale interbeds. Limestone interval are absent of fauna or fossil fragments.	discontinuous limestone beds. Dominated by planar shale beds	N/A	

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-006	15.62	19.65	4.03	4	0.0%	From: 4 To: 5	light green	shale (25-50%)	

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Friable With Competent In	Nodular Limestone	mudstone	restrict., not diverse (2-4)	lenticular / discont. Layers	large single fracture evide	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Dissolution / fracture fill from 16.7m-17.55m	Nodular limestone with green calcareous shale interbeds.	N/A	Very few fauna present. Pelecypod, brachiopods and crinoidal debris evident in nodular limestone intervals. Pelloids sporadic within nodular beds.	Limestone nodular interbeds range in size from 2cm - 20cm. Calcareous shale interbeds range in size from 1cm - 5 cm. Discontinuous nodular intervals. Interbeds become thinner lower in interval.	Large single fracture running vertical from 16.7m - 17.55m. Fracture filled with green arg sand. Bitumen stained.	Fractured interval is stained with bitumen (2-5%). Lithology become more argilleous and thinner interbeds lower in interval.

Birch Mountain Resources Ltd. Date Drilled: 7/1/03 Collar Elev: 280 Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry UTM N: 6338129 Core Size: HQ Logged By: Scott Rose

Drill Hole # : **BMD02-02** UTM E: 466504 Depth: 45 Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-007	19.65	20.35	0.7	1	0.0%	From: 5 To: 5	dark green	shale (75%-90%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Easily Friable Shale	Limestone / Calc. Shale	mudstone	absent	planar bedding	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Very fine calcareous shale beds with thin limestone interbeds. Fossil debris within limestone intervals.	N/A	N/A	horizontal bedded fine shale/limestone intervals. Lst beds from 0.5cm to 2cm. Shale beds from 0.2cm to 2 cm. Mostley shale beds. Minor bioturbation at base of interval.	N/A	

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-008	20.35	21.4	1.05	1	0.0%	From: 5 To: 5	green	shale (25-50%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Friable With Competent In [illegible]	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	n/a	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
A hardground is evident at topo of interval. Dark cherty lst. Just below hardground is a brecciated interval (~7cm) that may be a result of dissolution (drill mud with lst clasts).	Nodular limestone with hardground at top of interval. Interbeds are gree calc. shale. Shale with fossil hash interbeds more prominent at base.	N/A	no insitu fauna. Fossil debris includes brachs, pelecypods, and crinoinds.	Discontinuous nodluar limestone beds. Shaly interbeds at base more planar.	N/A	

Birch Mountain Resources Ltd. | Date Drilled: 7/1/03 | Collar Elev: 280 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338129 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-02 | UTM E: 466504 | Depth: 45 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-009	21.4	24.7	3.3	3	0.0%	From: 5 To: 6	green	shale (50-75%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Easily Friable Shale	Limestone / Calc. Shale	mudstone	absent	planar - lenticular / discont. Layer	highly fractured, bedding destroyed	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Limestone beds (1-3cm) with green calcareous shale interbeds (0.3-2cm). Minor bioturbation in middle of interval.	N/A	No fauna present. Minor crinoidal and brachiopod debris in limestone intervals.	Mostly planar beds with some intervals showing lenticular bedding.	top of interval is heavily fracture and bedding is destroyed.	

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-010	24.7	25.2	0.5	0.5	10000.0	From: 6 To: 6	tan-white	trace (1-5%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Fossiliferous Limestone	packstone	restrict., one dom. (+2-4)	imbricated fossil frags	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Abundant fossil debris (coquina-like).	shoal facies on slope	No insitu fossils. Abundant debris from brachs, crinoids. Brown ooids (sideritized?) interspersed in fossil hash.	Brach fossil frags imbricated with crinoid and ooid/pelloid debris	N/A	

Birch Mountain Resources Ltd. | Date Drilled: 7/1/03 | Collar Elev: 280 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338129 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-02 | UTM E: 466504 | Depth: 45 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-011	25.2	28.52	3.32	3		From: 6 To: 8	tan-white	trace (1-5%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Fossiliferous Limestone	bafflestone-framestone	normal, not diverse (2-4)	massive / structureless	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Stromatoporoid interval with abundant fossils evident	Upper Slope - below storm wb	Bulbous / Binding stromatoporoids, amphipora, crinoids, brachiopods, pelecypods.	massive fossil bindstone with sub horizontal bedding evident.	N/A	Strom Unit - Top of Middle Quarry Unit Minor bitumen staining in pore space (seeps out of micropores)

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-012	28.52	29.1	0.58	1	0.0%	From: 8 To: 8	brown-tan	shale (10-25%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	numerous small fractures	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Nodular limestone with fine brown shale interbeds. Shale interbeds around 0.2cm - 0.8cm.	Nodular Limestone - mid-upper slope	Minor crinoidal/brach debris.	nodular beds pinch out. Draped in brown shale.	Interval is brecciated and bedding is partially destroyed. No inidcation of fracture angle or character.	Nodular - Mid portion of Middle Quarry Unit

Birch Mountain Resources Ltd. | Date Drilled: 7/1/03 | Collar Elev: 280 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338129 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-02 | UTM E: 466504 | Depth: 45 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-013	29.1	29.4	0.3	0.3	10000.0	From: 8 To: 8	tan-white	trace (1-5%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Fossiliferous Limestone	wackestone	absent	massive / structureless	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Pelloidal dominated (>60%) limestone.	pelloidal shoal	pelloids		N/A	Pelloidal Marker - Base of Middle Quarry Unit

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-014	29.4	34	4.6	4	0.0%	From: 8 To: 9	light green	shale (10-25%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	numerous small fractures	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Hardground at 33.34m depth	Nodular limestone with wispy brown-green shale interbeds.	N/A	no insitu fauna. Fossil debris in nodular intervals - brachs, pelecyps, crinoids.	Irregular / lenticular bedding.	top of interval is fractured / brecciated. No indication of angle or extent.	minor bitumen staining in fractures and micropores.

Birch Mountain Resources Ltd.

Date Drilled: 7/1/03 | Collar Elev: 280 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338129 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-02 | UTM E: 466504 | Depth: 45 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-015	34	38	4	3	0.0%	From: 9 To: 10	brown-tan	wispy (5-10%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Massive Limestone	mudstone	absent	massive / lenticular	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
some minor replacement of burrows by calcite.	Mostly massive limestone with green-brown shale interbeds. Limestone beds 0.5cm - 10cm thick. Shale interbeds are ~0.5-1cm.	N/A	Fauna mostly absent. Brach shells evident sporadically.	Mostly massive with lenticular shaley interbeds	N/A	Highly competent interval with minor shale at the top. The base becomes more shaley with fossil fragments. Minor bitumen seeps out of fractures and micropores.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-016	38	38.82	0.82	1	0.0%	From: 10 To: 11	green	shale (50-75%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Easily Friable Shale	Limestone / Calc. Shale	mudstone	absent	planar / lenticular bedding	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Thin limestone beds with green shale interbeds	N/A	no insitu fauna evident. Minor fossil frags - crinoid debris.	Thin interbeds of shale and limestone. Limestone beds ~0.5cm - 1cm. Green shale interbeds 0.5cm -2cm.	N/A	

Birch Mountain Resources Ltd. | Date Drilled: 7/1/03 | Collar Elev: 280 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338129 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-02 | UTM E: 466504 | Depth: 45 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-017	38.82	41.5	2.68	2	0.0%	From: 11 To: 12	tan	shale (10-25%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Nodular limestone with irregular wispy brown-green shale interbeds	N/A	Nodular intervals contain fossil debris - brachs, pelecyps, and crinoids. More abundant at base.	Nodular beds 1cm-8cm thick. Shale interbeds are irregular 0.2cm - 2cm.	N/A	Fairly competent unit with minor fossil / pelloid debris at base. Minor bitumen staining sporadic.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-02-018	41.5	45.11	3.61	0	0.0%	From: 12 To: 13	dark green	shale (>90%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Easily Friable Shale	Calc. Shale	mudstone	absent	planar bedding	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	#Deleted	N/A	Minor fossil interbeds with crinoid / brach debris	Thin beds (0.2-1cm) of green shale and limestone	N/A	End of hole at 45.11m

Birch Mountain Resources Ltd.

Date Drilled:	1/6/03	Collar Elev:	276	Date Logged:	1/3/15
Project:	Limestone - Muskeg Valley Quarry	UTM N:	6338355	Core Size:	HQ	Logged By:	Scott Rose
Drill Hole # :	BMD02-03	UTM E:	466037	Depth:	30	Sampled By:	Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-03-001	0	2.15	2.15	0	0.0%	From: 1 To: 1	N/A	N/A	

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
	Limestone	Casing - no core		N/A	N/A	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Casing - Limestone evident in chip from ~0.5-1m. Overburden is brown sand/till.	N/A	N/A		N/A	The first 2 m were not recovered due to casing. Chip samples were taken every foot. Limestone evident at ~0.5m depth.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-03-002	2.15	5.13	2.98	2	0.0%	From: 1 To: 1	tan-white	trace (1-5%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Massive Limestone	mudstone-wackestone	absent	massive / structureless	numerous small fractures	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Calcite cement filling micropores and small fractures.	Lithographic limestone. Minor crinoid and pelecypod fragments.	N/A	No insitu faunal assemblages. Minor crinoidal / brach debris.		Fractured interval 3.7 - 6.4 m. Brecciated, poor recovering.	Very pure limestone, low shale component. Possible calcinable unit.

Birch Mountain Resources Ltd. | Date Drilled: 1/6/03 | Collar Elev: 276 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338355 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-03 | UTM E: 466037 | Depth: 30 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-03-003	5.13	9.55	4.42	2	0.0%	From: 1 To: 2	green	shale (25-50%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Friable With Competent In	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Nodular limestone with abundant green shale interbeds	N/A	minor fossil debris in nodular intervals	Nodular interval 0.5 - 4cm thick. Discontinuous with numerous green shale interbeds.	N/A	This interval is border-line Nod Lst and Arg shale / lst interbeds. Abundant shale, easily friable.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-03-004	9.55	15.2	5.65	6	0.0%	From: 2 To: 4	dark green	shale (50-75%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Friable With Competent In	Limestone / Calc. Shale	mudstone	absent	planar bedding	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Limestone with green calcareous shale interbeds. Becoming more nodular (green) at base of interval.	N/A	minor fossil debris in limestone intervals	Mostly planar bedding with lenticular / nodular beds at base of interval.	N/A	

Birch Mountain Resources Ltd. | Date Drilled: 1/6/03 | Collar Elev: 276 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338355 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-03 | UTM E: 466037 | Depth: 30 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-03-005	15.2	18.5	3.3	3	0.0%	From: 4 To: 5	tan-green	shale (25-50%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Friable With Competent In [illegible]	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	numerous small fractures	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
solution collapse and calcite cement filling voids.	Nodular Limestone with brown-green shale interbeds. Lithology changes colour from previous interval from green to brown-green.	N/A	N/A	bedding disturbed by fracturing.	Middle of interval is fractured with solution collapse features. Large 45 degree fault at ~18m. Some fractures filled with bitumen.	small amount of bitumen at 16.25m within fractured zones.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-03-006	18.5	24.6	6.1	5	0.0%	From: 5 To: 7	dark green	shale (75%-90%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Easily Friable Shale	Limestone / Calc. Shale	mudstone	absent	planar bedding	numerous small fractures	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
hardground evident at 19.65m	Limestone with dark green shale interbeds. There are small nodular intervals closer to the base.	N/A	No insitu fauna. Minor fossil debris in lst intervals	Limestone (0.5-3cm thick) and green shale interbeds (0.2 - 4cm thick)	fractures from 21.4-21.6.	

Birch Mountain Resources Ltd. Date Drilled: 1/6/03 Collar Elev: 276 Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry UTM N: 6338355 Core Size: HQ Logged By: Scott Rose

Drill Hole # : BMD02-03 UTM E: 466037 Depth: 30 Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-03-007	24.6	28	3.4	3	0.0%	From: 7 To: 8	tan-white	wispy (5-10%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Fossiliferous Limestone	bafflestone-framestone	restrict., one dom. (+2-4)	massive / structureless	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Stromotoporoid fossil rich interval	Upper slope - below wb	N/A		N/A	Strom Unit - Top of Middle Quarry Unit

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-03-008	28	29	1	1	0.0%	From: 8 To: 8	tan-white	shale (10-25%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Nodular limestone with brown shale interbeds	N/A	N/A		N/A	Nodular Limestone

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-03-009	29	29.2	0.2		0.0%	From: 8 To: 8	tan-white	trace (1-5%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Fossiliferous Limestone	wackestone	restrict., one dom. (+2-4)	massive / structureless	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Fossil and pelloidal debris	Pelloidal shoal - hardground?	Pelloids (40%) with brach and crinoid debris.		N/A	Pelloidal Marker

Birch Mountain Resources Ltd.

Date Drilled: 1/6/03 | Collar Elev: 276 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338355 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-03 | UTM E: 466037 | Depth: 30 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-03-010	29.2	30.5	1.3	1	0.0%	From: 8 To: 9	tan-white	shale (10-25%)	

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	N/A	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	#Deleted	N/A	N/A		N/A	#Deleted

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-04-001	0	5.5	0	0	0.0%	From: 1 To: 1	N/A	N/A	

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
		Casing - no core		N/A	N/A	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Casing - no core	N/A	N/A		N/A	Casing - no core

Birch Mountain Resources Ltd.

Date Drilled:	12/21/02	Collar Elev:	277	Date Logged:	1/3/15
Project:	Limestone - Muskeg Valley Quarry	UTM N:	6338625	Core Size:	HQ	Logged By:	Scott Rose
Drill Hole # :	BMD02-04	UTM E:	466498	Depth:	32	Sampled By:	Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-04-002	5.5	24.5	0	13	0.0%	From: 1 To: 5	green	shale (50-75%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Friable With Competent In	Limestone / Calc. Shale	mudstone	absent	planar bedding	highly fractured, bedding	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Top of interval is fractured and weathered.	Grey Limestone with dark green calcareous shale interbeds	N/A	N/A	Limestone beds 0.5 - 3cm thick. Green shale interbeds 0.2 - 3 cm thick. Planar to Lenticular beds. Limestone beds pinch out.	At top of interval there is very poor recovery. The top 7 m is fractured and stained with bitumen.	Bitumen within fractures from 5.5m to 9.6m. Recovery is good after 11.5m.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-04-003	24.5	25.43	0.93	1	0.0%	From: 5 To: 5	green	shale (25-50%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Friable With Competent In	Limestone / Calc. Shale	mudstone	absent	planar / lenticular bedding	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Hardground at top of interval. Dark grey limestone with fossil debris and rip clasts.Sutures show evidence of exposure.	Grey Limestone with thinner gree calcareous shale interbeds. Limestone becoming thicker towards top.	N/A	no insitu fauna. At top there is hardeound with fossil debris present - brachs, crinoids, pelloids.	Thin limestone beds at base (~0.5cm) becoming thicker towards top of interval (~3-4cm). Shale interbeds are thicker and more numerous at base (0.2-2cm) and thinner at top (0.2-0.5cm)	This interval shows a shallowing upwards sequence topped by hardground.	Harground at top ~4cm thick.

Birch Mountain Resources Ltd.		Date Drilled:	12/21/02	Collar Elev:	277	Date Logged:	1/3/15
Project:	Limestone - Muskeg Valley Quarry	UTM N:	6338625	Core Size:	HQ	Logged By:	Scott Rose
Drill Hole # :	BMD02-04	UTM E:	466498	Depth:	32	Sampled By:	Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-04-004	25.43	25.8	0.37		0.0%	From: 5 To: 5	tan - dark grey	shale (10-25%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Fossiliferous Limestone	packstone	absent	imbricated fossil frags	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Cherty/phospatic replacement at hardground surface.	fossiliferous limestone with abundant brach / crinoid debris. Fossil hash. Hardground at top of interval.	Fossil shoal bounded by two hardground exposures.	No insitu fauna. Abundant brach / crinoid debris	brach and crinoid debris within a muddy micritic matrix with abundant cherty hardground clasts. At base there is small shale interbeds between fossil debris.	N/A	Hardground at top is ~4cm thick. Whole interval is affected by hardgound alteration.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-04-005	25.8	28.9	3.1	3	0.0%	From: 5 To: 6	tan-white	trace (1-5%)	Bitumen stained (5-10%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Fossiliferous Limestone	bafflestone-bindstone	restrict., one dom. (+2-4)	massive / structureless	numerous small fractures	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Stromatoporoid with brachs and crinoids present	Stromatoporoids within upper foreslope within photic zone and accomodation space for growth.	Bulbous, binding, and branching stromatoporoids dominate interval. Brach and crinoid debris within branching fillspace. Micritic mud fills porespace.	Massive bedding. Planar strom binding growth layers evident.	Numerous intervals within Strom unit are fractured. Minor fractures with small displacement. Bitumen within micropores and fracture seams	Bitumen within fracture seams, along strom growth bands and within micropores.

Birch Mountain Resources Ltd. | Date Drilled: 12/21/02 | Collar Elev: 277 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338625 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-04 | UTM E: 466498 | Depth: 32 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-04-006	28.9	30	1.1	1	0.0%	From: 5 To: 6	tan-white	shale (10-25%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	numerous small fractures	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Tan nodular limestone with minor brown shale interbeds.	N/A	no insitu fauna	nodular limestone beds 1-5cm thick. Brown shale interbeds 0.2-0.5cm thick.	minor small fractures within nodular intervals. Bitumen staining along fractures.	Bitumen staining within fractures and micropores.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-04-007	30	30.2	0.2		0.0%	From: 6 To: 6	tan-white	clean (<1%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Limestone	wackestone	absent	massive / structureless	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Pelloidal limestone.	pelloidal shoal on upper slope	No insitu fauna present. Abundant pelloids >60%) with minor crinoids and brach fragments.		N/A	Pelloidal marker unit for base of middle quarry unit.

Birch Mountain Resources Ltd.

Date Drilled:	12/21/02	Collar Elev:	277	Date Logged:	1/3/15
Project:	Limestone - Muskeg Valley Quarry	UTM N:	6338625	Core Size:	HQ	Logged By:	Scott Rose
Drill Hole # :	BMD02-04	UTM E:	466498	Depth:	32	Sampled By:	Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-04-008	30.2	31.85	0	1	0.0%	From: 6 To: 7	tan-white	shale (10-25%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	numerous small fractures	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Hardground at top of interval (Below Strom)	Nodular limestone with green shale interbeds	N/A	N/A	Lenticular bedded limestone with irregular green shale interbeds. Limestone beds 0.5-4cm. Shale interbeds 0.2-1cm	Small vertical and horizontal fractures. Minor bitumen staining within fractures.	End of Hole at 31.85

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05A-00	0	15.2	15.2	0	0.0%	From: 1 To: 1	N/A	N/A	

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
		Casing - no core		N/A	N/A	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Casing - no core	N/A	N/A		N/A	

Birch Mountain Resources Ltd.		Date Drilled:	1/4/03	Collar Elev:	280	Date Logged:	1/3/15
Project:	Limestone - Muskeg Valley Quarry	UTM N:	6339130	Core Size:	HQ	Logged By:	Scott Rose
Drill Hole # :	BMD02-05A	UTM E:	466989	Depth:	22	Sampled By:	Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05A-002	15.2	17.15	1.95	2	0.0%	From: 1 To: 1	tan-white	trace (1-5%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Fossiliferous Limestone	bafflestone-bindstone	restrict., one dom. (+2-4)	massive / structureless	numerous small fractures	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Fossil limestone - stromatoporoid	Stromatoporoid below wave base high on slope.	Bulbous, binding, and branching stromatoporoids dominate interval. Brachs and crinoidal debris and mictritic mud fill in accomodation space within branching strom intervals	growth bands of binding stroms are planar to subplanar.	small fractures within strom. Fractures bitumen stained.	

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05A-003	17.15	18.2	1.05	1	0.0%	From: 1 To: 1	tan-white	wispy (5-10%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Nodular limestone with fine brown shale interbeds.	Nodular limestone on lower foreslope	N/A	Limestone shows lenticular bedding with discontinuous bands. Fine brown shaly interbeds 0.2-0.5cm.	N/A	

Birch Mountain Resources Ltd. | Date Drilled: 1/4/03 | Collar Elev: 280 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6339130 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-05A | UTM E: 466989 | Depth: 22 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05A-00	18.2	18.4	0.2		0.0%	From: 1 To: 2	tan - grey	clean (<1%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Limestone	wackestone	absent	massive / structureless	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Pelloidal interval is altered. Cherty/phosphatic replacement of pelloids.	Pelloidal limestone with brach and crinoid debris. Pelloids are drak grey in colour	pelliodal shoal (may represent hardground surface)	Pelloidal interval with brach and crinoid debris.		N/A	Pelloidal marker bed

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05A-00	18.4	22.5	4.1	4	0.0%	From: 2 To: 3	tan-white	shale (10-25%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Possible hardground interval at 22.4m	Grey-Brown nodular limestone with brown shaly interbeds	nodular limestone on mid slope.	N/A	Nodular limestone beds 0.2 - 2cm thick. Brown shale interbeds 0.1 - 0.5cm.	N/A	Imbircated fossil hash at ~21.75m. May be associated with hardground surface. Hardground may be at 22.4m. End of hole at 22.5m

Birch Mountain Resources Ltd | Date Drilled: 1/4/03 | Collar Elev: 280 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6339130 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : **BMD02-05B** | UTM E: 466989 | Depth: 35 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05B-001	0	9.45	9.45	0	0.0%	From: 0 To: 0	N/A	N/A	

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
		Casing - no core		N/A	N/A	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Casing - no core	N/A	N/A		N/A	

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05B-002	9.45	13.1	3.65	0	0.0%	From: 1 To: 2	white	shale (10-25%)	Bitumen stained (25-50%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Fossiliferous Limestone	packstone	restrict., one dom. (+0-1)	imbricated fossil frags	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Dissolution and replacement within brach shells. Micritic matrix saturated with bitumen.	Bitumen / oil saturated fossiliferous limestone	Brachiopod shoal facies on upper slope.	no insitu fauna. Brachiopods dominates this interval. Minor crinoidal debris present.	Massive deposit of brachiopod shells and fragments	N/A	Saturated with bitumen. Oil seeps from large vugs at the base of interval.

Birch Mountain Resources Ltd		Date Drilled:	1/4/03	Collar Elev:	280	Date Logged:	1/3/15
Project:	Limestone - Muskeg Valley Quarry	UTM N:	6339130	Core Size:	HQ	Logged By:	Scott Rose
Drill Hole # :	BMD02-05B	UTM E:	466989	Depth:	35	Sampled By:	Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05B-003	13.1	16.75	3.65	4	0.0%	From: 2 To: 3	tan-white	trace (1-5%)	Bitumen stained (5-10%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Fossiliferous Limestone	bafflestone-bindstone	restrict., one dom. (+0-1)	massive / structureless	numerous small fractures	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Fossiliferous limestone - stromatoporoid dominates this interval	Stromatoporoid below wavebase in upper slope	Bulbous, binding, and branching stromatoporoids dominate. Brachs and crinoid within micritic mud in branching strom intervals	growth bands of binding stroms planar to sub-planar	fractures stained with bitumen.	Strom Unit

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05B-004	16.75	17.62	0.87	1	0.0%	From: 3 To: 3	tan-white	wispy (5-10%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Hardground at top of interval ~3cm thick.	Nodular limestone with fine brown shale interbeds	Nodular limestone - mid-upper slope	N/A	Nodular limestone 0.2-2cm thick. Brown shale interbeds 0.2-1cm thick.		Hardground at top of interval.

Birch Mountain Resources Ltd | Date Drilled: 1/4/03 | Collar Elev: 280 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6339130 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-05B | UTM E: 466989 | Depth: 35 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05B-005	17.42	17.82	0.4		0.0%	From: 3 To: 3	tan-white	clean (<1%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Limestone	wackestone	restrict., one dom. (+0-1)	imbricated fossil frags	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Pelloids are dark grey may be replaced my chert/phosphe.	Pelloidal limestone.	Pelloidal shoal in mid -upper slope	Pelloids with crinoid and brach debris within a micritic mud matrix.	Pelloids imbricated within a micritic matrix	N/A	Pelloidal marker bed

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05B-006	17.82	26.75	8.93	9	0.0%	From: 3 To: 5	tan-white	shale (25-50%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	highly fractured, bedding destroyed	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Hardground with fossil debris is at 22.4 - 22.34m	Nodular limestone with green calcareous shale interbeds	Nodular Limestone - mid - upper slope	N/A	Nodular bedding with limestone intervals 0.2 - 3cm thick. Green - brown shale interbeds 0.1-1cm thick.	At base of interval there is a large fracture with missing core (at 22.7m). Poor recovery and bitumen staining limestone pieces are evident	Hardground in middle of interval with abundant fossil debris

Birch Mountain Resources Ltd | Date Drilled: 1/4/03 | Collar Elev: 280 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6339130 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-05B | UTM E: 466989 | Depth: 35 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05B-007	26.75	26.95	0.2		0.0%	From: 6 To: 6	green	shale (50-75%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Easily Friable Shale	Limestone / Calc. Shale	mudstone	absent	planar/lenticular bedding	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Thin beds of limestone and green calcareous shale.	Lower Foreslope	N/A	Thin beds of limestone and green argillaceous shale. Beds are 0.1 - 1cm thick. Minor nodular limstone present.	N/A	

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05B-008	26.95	27.9	0	1	0.0%	From: 6 To: 6	tan-white	shale (10-25%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	large single fracture evide	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Hardground at top of interval ~3cm.	Nodular Limestone with thin brown interbeds	Nodular Limestone - mid-upper slope	N/A	Nodular limestone beds 0.2-2cm thick. Shale interbeds 0.1-0.5cm thick.	Fault zone at 27.1. There is about 30% of core missing - poor recovery. Argillaceous mud present in fracture zone.	Hardground at top of interval.

Birch Mountain Resources Ltd		Date Drilled:	1/4/03	Collar Elev:	280	Date Logged:	1/3/15
Project:	Limestone - Muskeg Valley Quarry	UTM N:	6339130	Core Size:	HQ	Logged By:	Scott Rose
Drill Hole # :	BMD02-05B	UTM E:	466989	Depth:	35	Sampled By:	Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05B-009	27.9	30.7	2.8		0.0%	From: 6 To: 6	green	shale (50-75%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Easily Friable Shale	Limestone / Calc. Shale	mudstone	absent	planar / lenticular bedding	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Thin limestone with interbedded green calcareous shale.	Lower foreslope - restricted.	N/A	Thin beds of limestone 0.2-1cm thick. Green calcareous shale 0.1-1cm thick.	N/A	grades abruptly into nodular limestone above.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05B-010	28.05	30.78	2.73	3	0.0%	From: 6 To: 7	tan-white	shale (10-25%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Hardground at top of interval. 28.05-28.15m Fossil fragments evident.	Nodular limestone with irregular brown shale interbeds	Nodular limestone - mid-upper slope	N/A	Nodular limestone 0.2-3cm thick. Shale interbeds 0.1-1cm.	N/A	Hardground at top of interval.

Birch Mountain Resources Ltd | Date Drilled: 1/4/03 | Collar Elev: 280 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6339130 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-05B | UTM E: 466989 | Depth: 35 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05B-011	30.78	35.4	4.62	4	0.0%	From: 7 To: 8	green	shale (75%-90%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Easily Friable Shale	Limestone / Calc. Shale	N/A	absent	planar bedding	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Hardground at top of interval ~20cm thick. Another hardground within Christina at 33.32 - 33.65m. Goes back into shale/limestone interbeds.	Argillaceous shale thinly bedded with limestone interbeds.	lower slope	N/A	planar bedded shale/limestone.	N/A	Into Christina Member. End of hole 35.4m

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05C-00	0	3.3	3.3	0	0.0%	From: 1 To: 1	N/A	N/A	

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
		Casing - no core		N/A	N/A	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Casing - no core	N/A	N/A		N/A	

Birch Mountain Resources Ltd.

Date Drilled:	1/4/03	Collar Elev:	280	Date Logged:	1/3/15
Project:	Limestone - Muskeg Valley Quarry	UTM N:	6339130	Core Size:	HQ	Logged By:	Scott Rose
Drill Hole # :	BMD02-05C	UTM E:	466989	Depth:	16	Sampled By:	Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05C-00 2	3.3	6.65	3.35	3	0.0%	From: 1 To: 1	brown - grey	n/a	Bitumen stained (5-10%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Friable With Competent In tervals	Sand	McMurray	absent	planar bedding	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Fine - medium Sand with shaly intervals	Deltaic - braided stream deposit	N/A		N/A	McMurray sands with bitumen staining,

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05C-00 3	6.65	12.5	5.85	6	0.0%	From: 1 To: 3	tan-white	shale (10-25%)	Bitumen stained (25-50%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Fossiliferous Limestone	packstone-grainstone	restrict., one dom. (+0-1)	imbricated fossil frags	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Top 1m of interval is weathered chalky.	Fossiliferous Limestone - Brachipod dominates this interval. Fossil lag.	Brach shoal - upper foreslope	Brachiopod shoal deposit.	Brach fossils imbricated.	N/A	Brach Shoal

Birch Mountain Resources Ltd. | Date Drilled: 1/4/03 | Collar Elev: 280 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6339130 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-05C | UTM E: 466989 | Depth: 16 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-05C-00	12.5	15.85	3.35	3	0.0%	From: 3 To: 0	tan-white	trace (1-5%)	Bitumen stained (5-10%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Fossiliferous Limestone	bafflestone-bindstone	restrict., one dom. (+0-1)	massive / structureless	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Fossiliferous Limestone - Stromatoporoids dominate	Stromatoporoid - below wavebase - upper slope	Bulbous, binding and branching stromatoporoids	growth bands in binding stroms are planar - subplanar.	N/A	End of hole 15.85

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-06A-00	0	2.15	2.15	0	0.0%	From: 1 To: 1	N/A	N/A	

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
		Casing - no core		N/A	N/A	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Casing - no core	N/A	N/A		N/A	

Birch Mountain Resources Ltd. | Date Drilled: 1/7/02 | Collar Elev: 279 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338604 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-06A | UTM E: 466968 | Depth: 22 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-06A-00 2	2.15	9.7	7.55	2	0.0%	From: 1 To: 2	tan	shale (25-50%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
	Nodular Limestone	mudstone	absent	n/a	highly fractured, bedding destroyed	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Fracture nodular limestone	Nodular - upper slope	N/A	Bedding not clear. Fractures destroy bedding.	major fracture zone. 45 - 90 angle fractures. Bedding is completely destroyed. Brecciated nodular limestone.	Very poor recovery. Major fault zone.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-06A-00 3	9.7	12.35	2.65	1	0.0%	From: 2 To: 0	tan-white	trace (1-5%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Fossiliferous Limestone	bafflestone-bindstone	restrict., one dom. (+0-1)	massive / structureless	highly fractured, bedding destroyed	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
dissolution occurred within fractured zones.	Stromatoporoid unit	Stromatoporoid - below wavebase - upper slope	Bulbous, binding, and branching stromatoporoids. Crinoid and brach debris within branching micritic fill.		Major fractures - 90degrees. Faults are filled with argillaceous sand.	Most of strom is missing. Within fault zone.

Birch Mountain Resources Ltd. | Date Drilled: 1/7/02 | Collar Elev: 279 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338604 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-06A | UTM E: 466968 | Depth: 22 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-06A-00	12.35	13.46	1.11	1	0.0%	From: 2 To: 2	tan-white	shale (10-25%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	large single fracture evide	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Dissolution features due to exposure may have caused karsting and introduction of arg sand within fractures.	Nodular Limestone with fine brown shale interbeds	Nodular Limestone - mid-upper slope	N/A	Bedding is discontinuous. Destroyed by fractures	Large fratures (~3cm thick) within interval. Fractures run 90 degrees and are filled with green argillaceous sand.	Major faults present.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-06A-00	13.46	13.64	0.18		0.0%	From: 2 To: 2	N/A	N/A	

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Fossiliferous Limestone	packstone		N/A	N/A	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Pelloidal Marker	N/A	N/A		N/A	

Birch Mountain Resources Ltd.

Date Drilled:	1/7/02	Collar Elev:	279	Date Logged:	1/3/15
Project:	Limestone - Muskeg Valley Quarry	UTM N:	6338604	Core Size:	HQ	Logged By:	Scott Rose
Drill Hole # :	BMD02-06A	UTM E:	466968	Depth:	22	Sampled By:	Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-06A-00	13.64	21.7	8.06	8	0.0%	From: 2 To: 5	tan-white	shale (10-25%)	

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	large single fracture evide	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Hard ground evident at 18.45m	Nodular limestone with thin brown shale interbeds	N/A	N/A		fractured zone at 18.6 (just below hardground)	End of hole at 21.7

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-06B-001	0	3.05	3.05	0	0.0%	From: 0 To: 0	N/A	N/A	

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
		Casing - no core		N/A	N/A	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Casing - no core	N/A	N/A		N/A	

Birch Mountain Resources Ltd.

Date Drilled: 1/7/03 | Collar Elev: 279 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338604 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-06B | UTM E: 466968 | Depth: 14 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-06B-002	3.05	4.06	1.01	0	0.0%	From: 1 To: 1	green	shale (50-75%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Friable With Competent In	Limestone / Calc. Shale	mudstone	absent	planar bedding	highly fractured, bedding	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Limestone with calcareous shale interbeds. Poor recovery, no clear bedding evident.	Lower foreslope	N/A	Planar to lenticular bedding. Very unclear due to poor recovery and fractured core.	Numerous fractures, bedding destroyed. No sense of fracture orientation	Highly fractured - poor recovery.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-06B-003	4.06	4.9	0.84	0	0.0%	From: 1 To: 1	tan-white	shale (25-50%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	highly fractured, bedding	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Nodular Limestone with brown shale interbeds	Nodular limestone - mid-upper slope	N/A	Nodular limestone beds 02.-2cm thick. Irregular brown shale interbeds 0.2-1cm thick.	Bedding destroyed small fractures throughout interval.	Minor bitumen staining small fractures.

Birch Mountain Resources Ltd. | Date Drilled: 1/7/03 | Collar Elev: 279 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338604 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-06B | UTM E: 466968 | Depth: 14 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-06B-004	4.9	8.5	3.6	2	0.0%	From: 1 To: 2	green	shale (50-75%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Friable With Competent In [illegible]	Limestone / Calc. Shale	mudstone	absent	planar bedding	highly fractured, bedding [illegible]	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Hardground at 8.5m (just above strom unit)	Limestone with green calcareous shale interbeds	Lower foreslope	N/A	Planar - lenticular bedding . Very poor recovery due to fracturing.	Highly fractured interval. Poor recovery.	Hardground at base of interval.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-06B-005	8.5	11.7	3.2	2	0.0%	From: 2 To: 3	tan-white	trace (1-5%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Fossiliferous Limestone	bafflestone-bindstone	restrict., one dom. (+2-4)	massive / structureless	numerous small fractures	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Stromatoporiod unit	Stromatoporoid - below wavebase - upper slope	Bulbous, binding, and branching stroms dominate interval. Brachs and crinoid debris within micritic mud in branching strom intervals.		Fractures throughout interval. Fractures bitumen stained.	Strom unit

Birch Mountain Resources Ltd.

Date Drilled: 1/7/03 | Collar Elev: 279 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338604 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-06B | UTM E: 466968 | Depth: 14 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-06B-006	11.7	12.75	1.05	1	0.0%	From: 3 To: 3	tan-white	shale (10-25%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Nodular limestone with brown shale interbeds	Nodular limestone - mid - upper slope.	N/A	Nodular limestone beds 0.2-2cm thick. Brown shale interbeds 0.1-1cm thick.	N/A	Harground at top of interval. ~5cm thick.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-06B-007	12.75	12.95	0.2		0.0%	From: 3 To: 3	tan-white	clean (<1%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Fossiliferous Limestone	wackestone	restrict., one dom. (+2-4)	massive / structureless	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Pelloidal limestone	Pelloidal shoal - upper slope	Pelloids, crinoids, and brach debris.		N/A	Pelloidal Marker

Birch Mountain Resources Ltd. | Date Drilled: 1/7/03 | Collar Elev: 279 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6338604 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-06B | UTM E: 466968 | Depth: 14 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-06B-008	12.95	14.33	1.38	1	0.0%	From: 3 To: 4	tan-white	shale (10-25%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	large single fracture evide	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Hardground at 13.45m (just below fracture zone). ~5cm thick	Nodular limestone with brown shale interbeds	Nodular limestone - upper foreslope	N/A	Nodular limestone beds 0.2-2cm thick. Shale interbeds 0.1-1cm.	Large fracture at 13.23m. Bitumen staing along fractures. ~25cm thick	End of hole at 14.33m

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-08-001	0	2.15	2.15	0	0.0%	From: 0 To: 0	N/A	N/A	

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
		Casing - no core		N/A	N/A	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Casing - no core	N/A	N/A		N/A	

Birch Mountain Resources Ltd.

Date Drilled:	1/7/03	Collar Elev:	279	Date Logged:	1/3/15
Project:	Limestone - Muskeg Valley Quarry	UTM N:	6339685	Core Size:	HQ	Logged By:	Scott Rose
Drill Hole # :	BMD02-08	UTM E:	467285	Depth:	16	Sampled By:	Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-08-002	2.15	5.79	3.64	0	0.0%	From: 1 To: 2	black	shale (>90%)	n/a

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Easily Friable Shale	Coal shale/clay	Coal bearing slay-silt		planar bedding	N/A	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Dark black coal bearing silt-clay.	N/A	coal beds	planar bedded	N/A	Boulder of Strom unit at 3.05 m ~30cm boulder.

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-08-003	5.79	6.64	0.85	1	0.0%	From: 2 To: 2	gray	shale (50-75%)	

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Friable With Competent In	Silt - Clay	Siltstone - claystone	n/a	planar bedding	N/A	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
N/A	Transition from base of silt to clay dominant at top of interval.	N/A	N/A	planar gradational bedding. Grades from silt to clay.	N/A	

Birch Mountain Resources Ltd. | Date Drilled: 1/7/03 | Collar Elev: 279 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6339685 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-08 | UTM E: 467285 | Depth: 16 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-08-004	6.64	11.2	4.56	4	0.0%	From: 2 To: 3	gray - black	N/A	Bitumen stained (25-50%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
	Sand	McMurray sand		cross bedded - low angle	N/A	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Water sands 6.62 - 7.32m Oil sands 7.32 - 9.4m Water sands 9.4 - 11.2m	McMurray oils sands and water sands.	N/A	N/A	McMurray sands	N/A	Water sands and oil sands Base of

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-08-005	11.2	13.9	2.7	2	0.0%	From: 3 To: 3	tan-white	trace (1-5%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Highly Competent	Fossiliferous Limestone	bafflestone-bindstone	restrict., one dom. (+2-4)	massive / structureless	large single fracture evide	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Oil sand filling in karst or fracture at 12.8m. ~20cm thick. Graded bedding, bitumen saturated. Top of interval altered.	Stromatoporoid unit	Stromatoporoid - below wavebase - upper slope	Bulbous, binding, and branching stromatoporoids.		Large fault - may be karst influenced. Filled with McMurray sands.	Interval was exposed and eroded. Top of strom missing. Top of interval altered (15cm) - sideritized? Strom stained with bitumen

Birch Mountain Resources Ltd.

Date Drilled:	1/7/03	Collar Elev:	279	Date Logged:	1/3/15
Project:	Limestone - Muskeg Valley Quarry	UTM N:	6339685	Core Size:	HQ	Logged By:	Scott Rose
Drill Hole # :	BMD02-08	UTM E:	467285	Depth:	16	Sampled By:	Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-08-006	13.9	15.05	1.15	1	0.0%	From: 4 To: 4	tan-white	shale (10-25%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Hardground at top of interval. ~5cm thick.	Nodular limestone with brown shale interbeds	Nodular Limestone - mid-upper slope	N/A	Nodular limestone beds 0.2-2cm. Brown shale interbeds 0.1-1cm.	N/A	Hardground at top of interval

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-08-007	15.05	15.25	0.2		0.0%	From: 4 To: 4	tan-white	clean (<1%)	No Bitumen Evident

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Fossiliferous Limestone	packstone	restrict., one dom. (+2-4)	imbricated fossil frags	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
	Pelloidal Limestone	Pelloidal shoal - upper slope	Pelloids, crinoids and brachs.	pelloids	N/A	Pelloidal Marker

Birch Mountain Resources Ltd.

Date Drilled: 1/7/03 | Collar Elev: 279 | Date Logged: 1/3/15

Project: Limestone - Muskeg Valley Quarry | UTM N: 6339685 | Core Size: HQ | Logged By: Scott Rose

Drill Hole # : BMD02-08 | UTM E: 467285 | Depth: 16 | Sampled By: Scott Rose

Interval #	From (m):	To (m):	Length (m):	Recovered (m):	% Rec.	Core Box	Colour	Argillaceous Content	Bitumen / Hydrocarbons
BMD02-08-008	15.25	15.85	0.6	0	0.0%	From: 4 To: 4	tan-white	shale (10-25%)	Bitumen stained (<5%)

Litho Competency	Lithology	Classification	Faunal Assemblage	Bedding Type	Fracture Frequency	Other Deformation
Mostly Competent	Nodular Limestone	mudstone	absent	lenticular / discont. Layers	nonexistent	N/A

Diagenetic Features	Lithology Description	Facies Description	Faunal Description	Bedding Description	Fracture Description	Comments
Harground at top of interval ~3cm	Nodular Limestone with brown shale interbeds	Nodular limestone - mid-upper slope	N/A	Nodular limestone beds 0.2-2cm thick. Brown shale interbeds 0.1-1cm.	N/A	End of hole 15.85

Appendix D. Winter Drilling 2002-2003

D.3. Sample Descriptions

APPENDIX: D3 - January 2003 Sample Descriptions

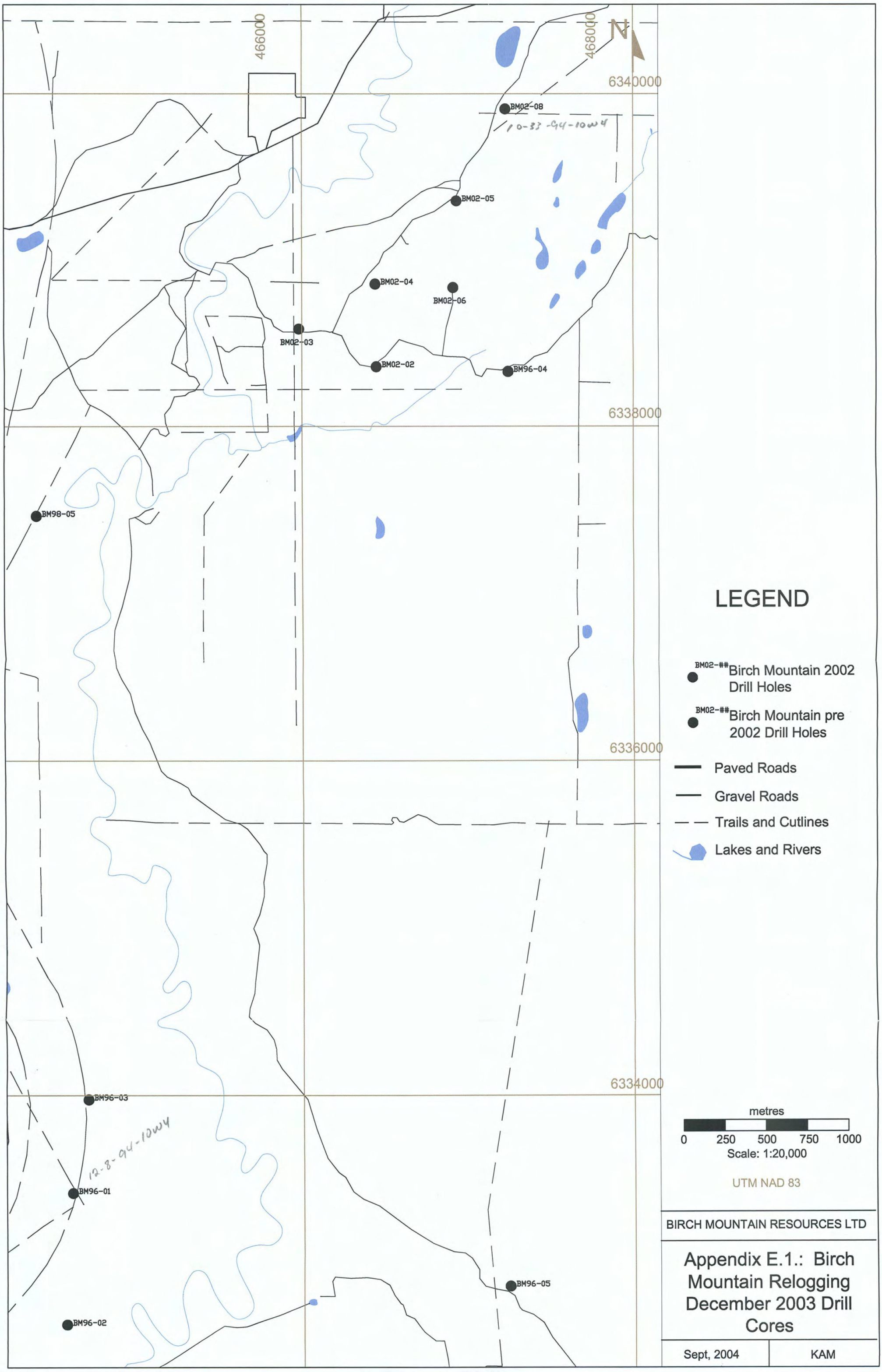
Sample Number	Drill Hole	From (m)	To (m)	Width (m)	Lithology *
BMQCS02-1	BM02-02	25.25	28.40	3.15	Stromatoporoid Limestone
BMQCS02-2	BM02-02	28.40	29.15	0.75	Nodular Limestone
BMQCS02-3	BM02-02	29.15	29.38	0.23	Pelloidal Limestone (Packstone)
BMQCS02-4	BM02-02	21.70	24.75	3.05	Interbedded Limestone and Calcareous Green Shale
BMQCS02-5	BM02-02	24.75	25.25	0.50	Fossiliferous Limestone (Packstone)
BMQCS02-6	BM02-02	29.40	32.60	3.20	Nodular Limestone
BMQCS02-7	BM02-02	2.15	3.66	1.51	Massive Limestone
BMQCS03-1	BM02-03	24.60	28.00	3.40	Stromatoporoid Limestone
BMQCS03-2	BM02-03	28.00	29.00	1.00	Nodular Limestone
BMQCS03-3	BM02-03	29.00	29.20	0.20	Pelloidal Limestone
BMQCS03-4	BM02-03	18.50	24.60	6.10	Interbedded Limestone with Calcareous Green Shale
BMQCS03-5	BM02-03	29.20	30.50	1.30	Nodular Limestone
BMQCS04-1	BM02-04	25.60	29.30	3.70	Stromatoporoid Limestone
BMQCS04-2	BM02-04	29.30	30.00	0.70	Nodular Limestone
BMQCS04-3	BM02-04	30.00	30.25	0.25	Pelloidal Limestone
BMQCS04-4	BM02-04	22.50	25.60	3.10	Interbedded Limestone with Calcareous Green Shale
BMQCS04-5	BM02-04	30.25	31.85	1.60	Nodular Limestone
BMQCS05-1	BM02-05	13.10	16.80	3.70	Stromatoporoid Limestone
BMQCS05-2	BM02-05	16.80	18.00	1.20	Nodular Limestone
BMQCS05-3	BM02-05	18.00	18.25	0.25	Pelloidal Limestone
BMQCS05-4	BM02-05	18.25	22.00	3.75	Nodular Limestone
BMQCS06-1	BM02-06	8.70	11.85	3.15	Stromatoporoid Limestone
BMQCS06-2	BM02-06	11.85	12.80	0.95	Nodular Limestone
BMQCS06-3	BM02-06	12.80	13.05	0.25	Pelloidal Limestone
BMQCS06-4	BM02-06	13.05	14.33	1.28	Nodular Limestone
BMQCS06-5	BM02-06	5.07	8.70	3.63	Interbedded Limestone with Calcalcareous Green Shale
BMQCS08-1	BM02-08	11.20	13.90	2.70	Stromatoporoid Limestone
BMQCS08-2	BM02-08	13.90	15.30	1.40	Nodular Limestone
BMQCS08-3	BM02-08	15.30	15.50	0.20	Pelloidal Limestone

*** Lithologies are taken from January 2003 logging of 2002 drill core.**

APPENDIX E

Appendix E. Core Relogging December 2003

E.1. Drill Core Location Map


466000
468000
N
6340000
BM02-08
10-33-94-10W4
BM02-05
BM02-04
BM02-06
BM02-03
BM02-02
BM96-04
6338000
BM98-05
6336000
6334000
BM96-03
12-8-94-10W4
BM96-01
BM96-02
BM96-05
LEGEND
BM02-## Birch Mountain 2002 Drill Holes
BM02-## Birch Mountain pre 2002 Drill Holes
Paved Roads
Gravel Roads
Trails and Cutlines
Lakes and Rivers
metres
0 250 500 750 1000
Scale: 1:20,000
UTM NAD 83
BIRCH MOUNTAIN RESOURCES LTD
Appendix E.1.: Birch Mountain Relogging December 2003 Drill Cores
Sept, 2004
KAM

Appendix E. Core Relogging December 2003

E.2. Drill Core Logs

Drill Core: *BM96-01*

Easting: 464597
Northing: 6333415 NAD: 83
Elevation: 266.54

Max depth: 86.3

Logged by: GFK

Date Logged: 12/15/2003

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	5.4	5.4	0	Casing		0							Glacial - fluvial gravel, Cobbles recovered include granite, limestone (some iron-stained), green mud

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
5.4	6.2	0.8	100	Nodular limestone with wispy shale	U4 (UQU)	10	< 1 cm	Tan	1-3 cm	Pink	1	None	UQU - limestone is more nodular than in 96-03 but has distinctive pink color and occurs 23.4 m above MQU; Hardground at bottom of unit@6.2m. The entire interval appears to be a hardground interval with numerous blackened clasts (not seen in 96-03).
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
6.2	6.5	0.3	100	Nodular limestone with wispy shale	U3	10	< 1 cm	Grey	1-3 cm	Grey	2	None	Some green lime mud around the limestone nodules; Rare crinoid and brach; Bitumen stained.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
6.5	9	2.5	100	Altered - none given	U3	65	1-3 cm	Green	1-3 cm	White	3	ilky decalcificat	Decalcification of green shale from 6.7-9.0m; Some large limestone nodules have a weathered /altered appearance - porous and chalky; Some minor biutmen staining; ***Chalky white lms nodules to 5 cm hosted in green shale matrix; Shale matrix de-calcified, slight reaction to HCl at top and bottom of interval; Scattered quartz grains throughout shale; Core completely disaggregated; Minor bitumen staining.
				Mudstone									

Drill Core: *BM96-01*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
9	12.1	3.1	75	Nodular limestone in shale matrix	U3	15	1-3 cm	Dark grey	1-3 cm	Grey	3	None	Upper section is significantly fractured, bitumen staining in fractures; Rare fossils.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
12.1	12.95	0.85	90	Shaley nodular limestone	U3	50	< 1 cm	Dark grey	< 1 cm	Light grey	3	Sideritization	Moderate sideritization from 12.5-12.7m; Crinoids in same interval; Minor green mud in fracture zone immediately below siderite alteration.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
12.95	15	2.05	100	Nodular limestone in shale matrix	U3	25	< 1 cm	Dark grey	1-3 cm	Light grey	2	None	Hardground @13.08m, blackened clasts and crinoids; Rare crinoids in shale throughout interval.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
15	16	1	100	Nodular limestone in shale matrix	U3	35	1-3 cm	Dark grey	1-3 cm	Light grey	3	None	Vertical fracturing common in limestone nodules, two regions of extensive fracturing; Crinoids and brachs occur towards bottom of interval; Less competent than overlying unit.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
16	26	10	100	Nodular limestone in shale matrix	U3	25	1-3 cm	Dark grey	1-3 cm	Light grey	3	Sideritization	Several hardground intervals @ 16.0-17.0m, 18.1-18.4m, 20.85-21.2m. Hardground intervals contain blackened clasts, crinoids and brachs; Moderate sideritization interval from 24.70 - 25.00m; Rare crinoids in shale and rare brachs in limestone rest of the interval.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
26	27	1	100	Bioclastic limestone	U3	15	< 1 cm	Tan	1-3 cm	Light grey	3	None	Bioclastic limestone containing crinoids and brachs; Hardground interval from 26.15-26.30m, blackened clasts; Vertical fracturing throughout bottom half of interval, bitumen staining in fractures.
				Rudstone									

Drill Core: *BM96-01*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
27	27.45	0.45	100	Limestone in a shale matrix	U3	15	1-3 cm	Grey	1-3 cm	Grey	2	None	Crinoids and brachs occur in both shale and limestone; Bitumen staining in fractures.
				Wackestone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
27.45	29	1.55	100	Shale with limestone nodules	U3	45	1-3 cm	Grey	1-3 cm	Grey	2	None	Blackened clasts in limestone nodules @ 27.75m; Shale content increases downsection. Limestone nodule size decreases downsection. Shale bed thickness increases downsection. Shallowing sequence.
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
29	30	1	100	Interbedded limestone and shale	U3	10	1-3 cm	Dark grey	> 5 cm	Grey	1	None	Shale beds thicken downsection.Shallowing sequence; Brachs and crinoids.
				Rudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30	32	2	100	Fossiliferous limestone	U2 (MQU)	1	< 1 cm	Tan	> 5 cm	Tan	3	None	Stromatoporoid unit. Large vertical fracturing throughout most of unit; Bitumen staining throughout.
				Boundstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
32	32.7	0.7	100	Nodular limestone with wispy shale	U2 (MQU)	10	< 1 cm	Tan	1-3 cm	Pink	2	None	Nodular Unit. Unit more brecciated than usual; Appears to have had some fluid dissolution.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
32.7	33	0.3	100	Bioclastic limestone	U2 (MQU)	5	< 1 cm	Tan	1-3 cm	Pink	1	None	Peloidal unit. Hardground at 32.7m; Brachs at bottom of interval.
				Floatstone									

Drill Core: *BM96-01*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
33	37.4	4.4	100	Nodular limestone in shale matrix	U1	15	< 1 cm	Tan	1-3 cm	Light grey	3	None	Hardground interval from 36.1 - 36.6m. Contains brachs, crinoids and blackened clasts; Limestone is a pinkish rudstone in this section; A second hardground interval from 37.1-37.4m with a hardground surface at 37.4m. Section has blackened clasts, few crinoids; Fossils are sparse in the remainder of interval.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
37.4	38.9	1.5	100	Shaley nodular limestone	U1	40	1-3 cm	Grey	1-3 cm	Grey	3	None	Hardground surface @ 37.4m. Hardground interval from 37.65m - 37.76m, fractured. Hardground interval contains blackened clasts and has bitumen-filled vertical fracture.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
38.9	41.7	2.8	100	Nodular limestone in shale matrix	U1	15	1-3 cm	Grey	1-3 cm	Light grey	1	None	Rare brachs in limestone, more common towards bottom of interval; Rare crinoids in shale.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
41.7	43.15	1.45	90	Shaley nodular limestone	U1	40	< 1 cm	Grey	< 1 cm	Light grey	3	None	Limestone nodules become larger downsection.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
43.15	44.8	1.65	100	Nodular limestone in shale matrix	U1	15	< 1 cm	Grey	1-3 cm	Light grey	1	None	Decreasing shale down section. Deepening environment. Rare amphipora.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
44.8	45.8	1	100	Nodular limestone in shale matrix	U1	20	< 1 cm	Dark grey	1-3 cm	Light grey	1	None	Hardground surface @ 44.80m, brachs at surface. Hardground interval from 44.60m - 45.80m; Hardground interval contains blackened clasts and peloids; Crinoids and brachs above hardground interval.
				Mudstone									

Drill Core: *BM96-01*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
45.8	0	0	0			0						None	Christina - End of logging, drill hole continues.

Drill Core: *BM96-02*

Easting: 464560 Max depth: 161.6 Logged by: GK

Northing: 6332624 NAD: 83 Date Logged: 1/13/2004

Elevation: 266.07

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	4.58	4.58	4.3	Till		0						None	Cased through Quaternary tills and Cretateous sediments.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
4.58	18.75	14.17	100	n/a		0						None	Post McMurray muds and shales. Considerable number of slickenslides and fracturing throughout.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
18.75	23	4.25	100			0						None	McMurray silt and sand.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
23	23.5	0.5	100	Calcareous shale	U3	90	> 5 cm	Dark grey	< 1 cm	Tan	4	Decalcification	Contains a great deal of slickenslides throughout interval. Fractures and slickenslides occur at ~65deg to axis of core. Shale beds 35deg to axis of core. Decalcification throughout interval.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
23.5	24	0.5	100	Nodular limestone in shale matrix	U3	15	< 1 cm	Green	3-5 cm	Tan	2	Chalky	Limestone is likely all broken up due to hammering of drill. Core is quite brittle due to chalky alteration. This may be the UQU, but it is difficult to be sure. Interval sits 23m above MQU.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
24	25.1	1.1	62	Nodular limestone in shale matrix	U3	20	1-3 cm	Dark grey	1-3 cm	Light grey	2	None	Clean Limestone; Bitumen staining in fractures throughout interval.
				Mudstone									

Drill Core: *BM96-02*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
25.1	29.3	4.2	100	Shaley nodular limestone	U3	30	1-3 cm	Dark grey	1-3 cm	Light grey	2	None	Hardground contact @ 25.10m; Crinoids & Amphipora occur at top of interval. Amphipora dissappear @ 25.70m; Shales decrease downsection. Deepening environment; Shales increase further downsection and Amphipora return @ 27.65m. Shallowing environment; Blackened clasts at hardgrounds; Intense fracturing at 26.00m & 26.25m.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
29.3	38.3	9	100	Nodular limestone in shale matrix	U3	20	< 1 cm	Dark grey	1-3 cm	Light grey	1	None	Hardgrounds @ 29.30m , 30.30m, 30.85m & 32.80. All hardgrounds contain blackened clasts & crinoids; Brachs in hardground @ 29.30m & 30.30m; Rare crinoids in shales and limestones in remainder of interval; Limestone and shales become quite interbedded from 35.05m to 36.25m; Shale thins out at bottom of interval. Deepening environment.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
38.3	39.3	1	100	Fossiliferous limestone	U3	7	< 1 cm	Brown	3-5 cm	Tan	1	None	Fossiliferous interval composed of brachs, crinoids; Some blackening of clasts up towards the top of the interval.

Boundstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
39.3	41.85	2.55	100	Nodular limestone in shale matrix	U3	30	1-3 cm	Dark grey	1-3 cm	Grey	2	None	Some large nodules of limestone with thick shale interbeds. Nodules with brachs and crinoids at top of interval; Brachs at base of interval; Broken granite cobble at 41.35m.; Intense structure from 40.65m to 41.25m.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
41.85	42.5	0.65	100	Bioclastic limestone	U3	5	1-3 cm	Brown	3-5 cm	Tan	1	None	Thick competent fossil rich unit above stromatoporoid unit; Occasional thick shale bed. Shales become less frequent down section. Deepening environment; Occasional stroms in lower part of section; Lots of brachs and crinoid ossicles throughout; Bitumen and some pyrite mineralization along fractures and in vugs.

Boundstone

Drill Core: *BM96-02*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
42.5	44.8	2.3	100	Massive limestone	U2 (MQU)	1	< 1 cm	Brown	> 5 cm	Tan	1	None	Stromatoporoid Unit; bitumen staining in vugs and fractures; Brachs and crinoids in lower part of section.
				Boundstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
44.8	45.5	0.7	100	Nodular limestone with wispy shale	U2 (MQU)	5	< 1 cm	Light grey	1-3 cm	Tan	1	None	Nodular Unit; rare crinoids; Shales becoming thinner towards bottom of interval.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
45.5	45.9	0.4	50	Bioclastic limestone	U2 (MQU)	1	< 1 cm	Light grey	> 5 cm	Tan	1	None	Pelloidal Unit; Hardground @ 45.80m; Bioclastic debris below hardground including brach & crinoid frags.
				Wackestone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
45.9	50	4.1	100	Nodular limestone in shale matrix	U1	20	< 1 cm	Grey	1-3 cm	Light grey	1	None	Occassional brachs at top of interval; Hardground @ 49.00m with 30cm thick section of brach fossil hash below; Hardground @ 49.65m & 49.75m.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
50	54.1	4.1	0	Nodular limestone in shale matrix	U1	20	1-3 cm	Grey	1-3 cm	Light grey	2	None	Major hardground interval at top of section @ 50.00m. Contains blackened clasts; Thick shales (10cm) immediately below; Intensively structured region (45cm thick) beneath shales.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
54.1	55.15	1.05	100	Shale with limestone nodules	U1	45	1-3 cm	Dark grey	1-3 cm	Grey	2	None	Hardground @ 54.10m, blackened clasts, brachs, crinoids,
				Mudstone									

Drill Core: *BM96-02*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
55.15	57.9	2.75	100	Nodular limestone in shale matrix	U1	20	1-3 cm	Grey	1-3 cm	Grey	1	None	Hardground at top of interval @ 55.15m, blackened clasts, a few brachs & crinoids; Brachs and crinoids at 55.60m to base of interval, Live oil oozing from fracture at 56.4m

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
57.9	58.1	0.2	0	Nodular limestone in shale matrix	U1	10	< 1 cm	Grey	1-3 cm	Tan	2	None	Hardground at top of interval @ 58.10m. Usually top of pink limestone above Christina. (should be~40cm thick)

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
58.1	0	0	0			0						None	Top of Christina Unit - End of logging, hole continues

Drill Core: *BM96-03*

Easting: 464694
Northing: 6333975 NAD: 83
Elevation: 268.83

Max depth: 47.25

Logged by: GFK

Date Logged:

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	4.6	4.6	0	n/a	n/a	0						None	Casing was set to 4.6m; Lithology uncertain, but not McMurray sands. Likely Devonian to surface.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
4.6	7.35	2.75	80	Massive limestone	U4 (UQU)	3	< 1 cm	Tan	> 5 cm	Pink	3	None	Massive Limestone - UQU equivalent; Limestone is slightly more nodular and more brecciated from 5.60m to 6.75m.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
7.35	9.5	2.15	90	Shaley nodular limestone	U3	40	1-3 cm	Dark grey	1-3 cm	Light grey	2	None	Gradational increases in shale downsection; Crinoids and brachs in both shale and limestone; Shale beds are broken up from core cutting.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
9.5	14	4.5	100	Nodular limestone in shale matrix	U3	20	1-3 cm	Dark grey	1-3 cm	Grey	1	None	Minor bitumen staining between the carbonaceous shale/lst boundaries.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
14	14.8	0.8	100	Shale with limestone nodules	U3	60	1-3 cm	Dark grey	< 1 cm	Grey	2	Sideritization	Calcareous shale interbedded with nodular limestone; Deepening sequence topped by an Amphipora wackestone; Hardground surface @ 14.80m.; Crinoids above hardground; Minor sideritization from 14.25m to 14.55m.
				Mudstone									

Drill Core: BM96-03

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
14.8	17	2.2	100	Nodular limestone in shale matrix	U3	25	1-3 cm	Dark grey	1-3 cm	Light grey	3	None	Vertical fracturing thoughout most of the interval; A few crinoids in the shale, with a concentration of crinoids near the top of the interval.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
17	18.3	1.3	100	Shaley nodular limestone	U3	40	1-3 cm	Dark grey	1-3 cm	Light grey	1	None	Crinoids occur thoughout shale and limestone.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
18.3	19.15	0.85	100	Nodular limestone in shale matrix	U3	20	< 1 cm	Dark grey	1-3 cm	Pink	1	None	Hardground interval. Blackened clasts and nodules thoughout; Nodular fossiliferous limestone containing crinoids and brachs; Limestone goes from dark grey to pink from top to bottom of interval; No discernable hardground.
				Wackestone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
19.15	20	0.85	100	Shaley nodular limestone	U3	40	1-3 cm	Dark grey	1-3 cm	Grey	1	None	Hardground interval from 19.80m - 20.00m.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
20	27.6	7.6	100	Nodular limestone in shale matrix	U3	25	1-3 cm	Dark grey	1-3 cm	Grey	3	None	Hardgound interval from 23.25m to 23.50m, contains brachs & crinoids; Vertical fracturing common; Sparse crinoids in shale towards bottom of interval.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
27.6	28.3	0.7	50	Massive limestone	U3	3	< 1 cm	Tan		Pink	1	None	Massive pink fossiliferous limestone, crinoids, brachs; 35cm total thickness.
				Rudstone									

Drill Core: *BM96-03*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
28.3	29.1	0.8	100	Nodular limestone in shale matrix	U3	15	< 1 cm	Dark grey	3-5 cm	Dark grey	1	None	Nodular limestone with minor calcareous shale. Scoured surface @ 28.60m. Shale at scour surface has abundance of crinoids and brachs.
				Floatstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
29.1	29.5	0.4	100	Calcareous shale	U3	80	> 5 cm	Dark Green	< 1 cm	Grey	ND	None	Calcareous shale with occassional limestone nodules; Core is too disrupted to determine structure.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
29.5	30.5	1	65	Nodular limestone with wispy shale	U3	7	< 1 cm	Tan	> 5 cm	Tan	2	None	Nodular limestone; Brachs @ 30.05m but otherwise very few fossils; Very little mud or shale; Some bitumen staining.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30.5	33.4	2.9	80	Fossiliferous limestone	U2 (MQU)	1	< 1 cm	Tan	> 5 cm	Tan	1	None	Stromatoporoid Unit; bitumen staining throughout.
				Rudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
33.4	34	0.6	45	Nodular limestone with wispy shale	U2 (MQU)	10	< 1 cm	Tan	> 5 cm	Tan	3	None	Nodular Unit; Hardground @ 33.40m
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
34	34.3	0.3	100	Bioclastic limestone	U2 (MQU)	5	< 1 cm	Tan	> 5 cm	Tan	1	None	Peloidal Unit;
				Wackestone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
34.3	38.8	4.5	100	Nodular limestone in shale matrix	U1	5	< 1 cm	Tan	> 5 cm	Tan	1	None	Hardgrounds @ 38.05m and 38.70m; 10cm fossiliferous limestone @ 36.30m (brachs); Minor crinoids though remainder of interval.
				Wackestone									

Drill Core: *BM96-03*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
38.8	43.2	4.4	100	Nodular limestone in shale matrix	U1	20	1-3 cm	Dark grey	1-3 cm	Light grey	2	None	Hardground @ 39.05m and 43.20m; Minor bitumen staining in fractures; Rare crinoids and brachs; 10cm fossilbed @ 43.20m (brachs & crinoids).
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
43.2	44.1	0.9	100	Shale with limestone nodules	U1	65	> 5 cm	Dark grey	1-3 cm	Grey	2	None	Muddy shale with rare large limestone nodules
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
44.1	47.25	3.15	100	Nodular limestone in shale matrix	U1	15	< 1 cm	Dark grey	1-3 cm	Light grey	1	None	Hardground @ 46.73m and 47.15m; Interval fossil poor with exception of brach and crinoid beds @ 46.30m and 47.15m; There is a scoured surface @ 45.75m.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
47.25	0	0	0			0						None	Christina - End of logging, hole continues

Drill Core: *BM96-04*

Easting: 467245 Max depth: 47.25 Logged by: gk

Northing: 6338346 NAD: 83 Date Logged:

Elevation: 280.9

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	13.7	0	0	Casing		0						None	Casing; Lithology not logged.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
13.7	16.8	3.1	95	Nodular limestone in shale matrix	U3	20	1-3 cm	Light grey	1-3 cm	Pink	3	None	Intense fracturing from 13.70m to 14.55m; Bitumen staining throughout fractures; Blackened clasts @ 14.90m, not a hardground; Thin dark brown layer @ 15.00m (???); Shale increases downsection, shallowing environment; Hardground @ 15.75m; 20cm interval of mud/shale with small lst clasts below hardground which rests above nodular limestone interval; Occassional crinoids and brachs in shales;
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
16.8	20.2	3.4	90	Shaley nodular limestone	U3	35	1-3 cm	Dark Green	1-3 cm	Grey	3	Sideritization	Hardground @ 16.80m, blackened clasts, brachs; Major fracturing from 17.50m to 18.50m; Shale increases, then decreases downsection; Lenticular crinoid iron (sideritization) rich lst beds in shales from 19.25m to 19.50m.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
20.2	24.1	3.9	100	Fossiliferous limestone	U2 (MQU)						0	None	Stromatoporoid Unit; Interval missing - sent for analysis.
				n/a									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
24.1	25.1	1	100	Nodular limestone with wispy shale	U2 (MQU)	5	< 1 cm	Tan	1-3 cm	Pink	1	None	Nodular Unit;
				Mudstone									

Drill Core: *BM96-04*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
25.1	25.3	0.2	100	Bioclastic limestone	U2 (MQU)	1	< 1 cm	Tan	> 5 cm	Pink	0	None	Peloidal Unit; Hardground towards top of peloidal unit; Brach and crinoid fossil hash; Quite grey from exposure.
				Wackestone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
25.3	30.35	5.05	100	Nodular limestone in shale matrix	U1	15	< 1 cm	Dark grey	1-3 cm	Grey	2	None	Major fracture/fault @ 25.90m, 26.40m, 27.20m and 29.35m; Pink alteration of lst occurs at 27.20m and from 27.40m to 29.30m; (***This has finally been concluded to be an alteration. It is not a depositional feature, as becomes evident in this section of core. This section of core can and should be sampled to determine what the alteration is, since it runs vertically down the middle of the core in this interval. This alteration may be of great importance as it exists over the entire quarry.) ; Bitumen staining along fractures; Large brachs at top and bottom of interval; Occassional crinoids in limestone and shales; Fossiliferous unit from 29.00m to 29.30m.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30.35	34.4	4.05	100	Nodular limestone in shale matrix	U1	15	1-3 cm	Dark grey	1-3 cm	Grey	2	None	Hardground at 30.35m, blackened clasts. Sits above 1m thick highly fractured interval; Very clean limestone; Very rare large brachs in limestone.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
34.4	35.25	0.85	100	Shaley nodular limestone	U1	35	1-3 cm	Dark grey	< 1 cm	Grey	1	None	Hardground @ 34.40m, blackened clasts.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
35.25	37.95	2.7	100	Nodular limestone in shale matrix	U1	15	1-3 cm	Dark grey	1-3 cm	Grey	1	None	Hardground @ 35.25m, blackened clasts; Lower section is altered to a pink color, increases downsection; Shale decreases downsection, deepening sequence; Rare crinoids in limestone ; Bitumen staining along fractures.
				Boundstone									

Drill Core: *BM96-04*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
37.95	0	0	0			0						None	Christina - End of logging, core continues.

Drill Core: *BM96-05*

Easting: 467245 Max depth: 69.3 Logged by: GK

Northing: 6332858 NAD: [redacted] Date Logged:

Elevation: 302.89

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	32	32	0	n/a	n/a	0						None	Casing; Lithology not logged, but interval will be primarily bitumen saturated sands.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
32	35.9	3.9	100	Nodular limestone in shale matrix	U3	15	< 1 cm	Dark grey	1-3 cm	Light grey	2	None	Bitumen staining in fracturing.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
35.9	37.2	1.3	100	Nodular limestone in shale matrix	U3	30	< 1 cm	Grey	< 1 cm	Light grey	3	None	Crinoid and brach hash at top of interval, evidence of exposure; Few crinoids in shale in lower interval; Fracture along face of core at bottom of interval..
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
37.2	39.1	1.9	100	Nodular limestone in shale matrix	U3	25	1-3 cm	Dark grey	1-3 cm	Light grey	2	None	Rare crinoids; Limestone nodules becoming smaller and shale becoming thicker towards bottom of interval; Shallowing environment.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
39.1	39.75	0.65	100	Shaley nodular limestone	U3	40	< 1 cm	Dark grey	< 1 cm	Light grey	1	None	Amphipora common throughout interval; Deeper water environment.
				Mudstone									

Drill Core: *BM96-05*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
39.75	40.5	0.75	100	Nodular limestone in shale matrix	U3	20	< 1 cm	Dark grey	1-3 cm	Pink	2	None	Hardground interval from 39.75m to 40.15m (occurs in both 96-01 & 96-03); Contains crinoids and blackened clasts; Remainder of unit is pink nodular limestone.

Wackestone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
40.5	44.2	3.7	100	Shaley nodular limestone	U3	35	1-3 cm	Dark grey	1-3 cm	Light grey	2	None	Hardground surface @ 40.50m; Hardground interval from 41.30m to 41.60m. Contains crinoids and blackened clasts; Blackened clasts @ 42.15m and a few crinoids. Minor hardground; Remainder of interval has a few crinoids within shale.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
44.2	47.65	3.45	100	Nodular limestone in shale matrix	U3	25	1-3 cm	Dark grey	1-3 cm	Light grey	1	None	Hardground interval from 42.40m to 42.85m. Blackened clasts,fossil hash including brachs and crinoids; Fossils are common through most of interval; Hardground surface @ 48.40m to 42.85m. Blackened clasts and a few crinoids. Region did not experience extensive exposure; Amphipora towards top of interval. Deepening environment.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
47.65	48.45	0.8	100	Shaley nodular limestone	U3	15	< 1 cm	Grey	1-3 cm	Pink	1	None	Hardground surface @ 47.95m. Blackened clasts, fossil hash including brachs and crinoids; Fossils are common throughout most of the interval; Hardground surface @ 48.40m

Wackestone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
48.45	52.5	4.05	100	Shaley nodular limestone	U3	40	1-3 cm	Dark grey	1-3 cm	Grey	3	None	Thick fossiliferous limestone beds separated by shale beds. Shale beds become thicker and limestone becomes more nodular and smaller down interval. Shallowing environment; Fossils in upper part of interval include brachs and crinoids; Middle part of interval has amphipora; Lower part of interval has brachs, crinoids and amphipora.

Mudstone

Drill Core: *BM96-05*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
52.5	55.3	2.8	100	Fossiliferous limestone	U2 (MQU)	1	< 1 cm	Tan	> 5 cm	Tan	3	None	Stromatoporoid Unit; Bitumen staining throughout.
				Boundstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
55.3	55.8	0.5	100	Nodular limestone with wispy shale	U2 (MQU)	10	< 1 cm	Tan	1-3 cm	Tan	1	None	Nodular Unit; Hardground surface @ 55.40m, blackened clasts near hardground surface.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
55.8	56	0.2	100	Bioclastic limestone	U2 (MQU)	3	< 1 cm	Tan	> 5 cm	Tan	2	None	Peloidal Unit; Hardground surface @ 55.90m, brachs occur throughout unit.
				Wackestone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
56	60.2	4.2	100	Nodular limestone in shale matrix	U1	20	< 1 cm	Grey	1-3 cm	Light grey	2	None	Hardground interval from 56.20m to 56.80m. Blackened clasts, crinoids and large brach; Brach fossil bed from 59.40m to 59.95m.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
60.2	61.75	1.55	100	Nodular limestone with wispy shale	U1	10	< 1 cm	Grey	1-3 cm	Grey	3	None	Hardground surface @ 60.20m and 60.65m; Pink fossiliferous limestone from 60.20m to 60.65m; Hardground at 60.65m has blackened clasts.; Limestone is broken up below hardground.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
61.75	65.2	3.45	100	Nodular limestone in shale matrix	U1	20	1-3 cm	Grey	1-3 cm	Grey	2	None	Occasional brachs and amphipora in upper section of limestone; Bitumen staining along fractures; Crinoids and large brachs in shale midway down interval; Hardground surface @ 63.45, blackened clasts.
				Mudstone									

Drill Core: BM96-05

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
65.2	65.95	0.75	100	Shale with limestone nodules	U1	60	1-3 cm	Grey	1-3 cm	Grey	1	None	Shale beds thicken down section. Goes from shale with limestone nodules to shaley nodular limestone. Limestone nodule size decreases down section. Shallowing environment.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
65.95	69	3.05	100	Nodular limestone in shale matrix	U1	20	< 1 cm	Grey	1-3 cm	Grey	2	None	Hardground interval from 65.95m to 66.15m, blackened clasts, brachs; Bitumen stained vertical fractures throughout hardground interval; Large bitumen stained fracture @ 68.40m.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
69	69.3	0.3	100	Nodular limestone in shale matrix	U1	15	< 1 cm	Tan	1-3 cm	Pink	3	None	Hardground interval from 69.00m to 69.40m, blackened clasts, brachs, rare crinoids.

Wackestone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
69.3	0	0	0			0						None	Christina Formation - End of logging, core continues

Drill Core: *BM02-02*

Easting: 466441.9
Northing: 6338346
NAD: [redacted]
Elevation: 281.523

Max depth: 45.11

Logged by: GK
Date Logged: 1/15/2004

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	2.15	2.15	0	n/a	n/a	0						None	Casing; Devonian limestone at surface.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
2.15	3.66	1.51	80	Massive limestone Mudstone	U4 (UQU)	2	< 1 cm	Light grey	> 5 cm	Pink	1	None	UQU - occasional crinoid. (Correlates to UQU in BM96-3)

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
3.66	6.85	3.19	35	Calcareous mud	U4 (UQU)								Green calcareous mud (fracture fill); Bedding @ 25deg from horizontal; Fracture occuring @ 3.90m; Limestone fragments becoming frequent towards base of section.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
6.85	9.75	2.9	65	Nodular limestone in shale matrix Mudstone	U3	15	< 1 cm	Grey	1-3 cm	Light grey	3	None	Occasionl crinoids in shale and limestone; Intense fracturing from 6.85m - 7.62m; 0.30m of core missing from interval; Intense fracturing from 8.10m - 9.75m; 0.70m of core missing from interval; Dark grey limestone unit from 7.01m - 7.62m; Same shale content to remainder of interval.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
9.75	11.3	6.3	75	Nodular limestone in shale matrix Mudstone	U3	20	< 1 cm	Dark grey	1-3 cm	Grey	1	None	Interval quite nodular at top, then becomes more bedded down section.

Drill Core: *BM02-02*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
11.3	11.8	0.5	100	Shaley nodular limestone	U3	50	< 1 cm	Dark grey	< 1 cm	Grey	0	None	Thinly bedded limestone/shale. May be interbedded, but cannot determine with only a 1/4 core.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
11.8	15.85	4.05	100	Nodular limestone in shale matrix	U3	30	< 1 cm	Dark grey	1-3 cm	Grey	1	None	Occasional crinoids; Shale content increases down section. Shallowing environment; Shale rich intervals from 12.50m - 12.85m & 14.25m - 14.65m.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
15.85	19.8	3.95	85	Nodular limestone in shale matrix	U3	20	1-3 cm	Dark grey	1-3 cm	Grey	3	None	Large vertical bitumen sand stained fracture from 17.30m - 18.30m. 2cm - 5cm wide; Limestone goes from pink to grey down section; Shale content increases downsection (15%-25%) and goes from tan to dark grey; Limestone nodules become smaller downsection; Limestone/shale interface becomes more bedded downsection.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
19.8	20.35	0.55	100	Interbedded or lamellar limestone/shale	U3	35	< 1 cm	Dark grey	< 1 cm	Light grey	1	None	Hardground at top of interval (19.80m). Blackened clasts, crinoid ossicles; Limestone/shale is bedded, then becomes nodular at the base of section.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
20.35	20.9	0.55	100	Nodular limestone in shale matrix	U3	15	< 1 cm	Tan	1-3 cm	Pink	1	None	Hardground interval at top of section from 20.35m - 20.42m. Contains blackened clasts, crinoids and brachs; Below the hardgound is a 5cm thick section of shale (70%) with <1cm limestone nodules.
				Mudstone									

Drill Core: *BM02-02*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
20.9	23.2	2.3	90	Nodular limestone in shale matrix	U3	35	1-3 cm	Dark grey	1-3 cm	Grey	2	None	Interval is fairly bedded, but still classifies as being nodular. Indications of hardground at top of interval (20.90m - 21.20m), but not clearly defined. Blackened limestone clasts, fossil hash (brachs, crinoids); Crinoids and brachs occur sporadiacally throughout rest of interval.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
23.2	24.65	1.45	100	Nodular limestone in shale matrix	U3	35	1-3 cm	yellow-green	1-3 cm	Grey	2	Sideritization	Shale becomes a yellow-green color at top of interval. Yellow color due to minor sideritization. This is a chemical alteration and not a depositional effect. Fracture @ 23.80m, brecciation at fracture. The alteration is above and below the fracture; Unit becomes more nodular.towards bottom of interval.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
24.65	25.2	0.55	100	Bioclastic limestone	U3	1	< 1 cm	Grey	> 5 cm	Grey	1	Sideritization	Brachs and crinoids throughout. Top 20cm contains about 15% fossils, bottom 30cm is a framestone and contains about 80%fossils; Crinoids in bottom section have minor sidieritization. Bitumen in fractures
				Boundstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
25.2	28.52	3.3	0	Massive limestone	U2 (MQU)	5	< 1 cm	Grey	> 5 cm	Pink	2	None	Stromatoporoid Unit; bitumen stained in fractures and in vugs.
				Boundstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
28.52	29.1	0.58	100	Nodular limestone with wispy shale	U2 (MQU)	7	< 1 cm	Light grey	1-3 cm	Pink	2	None	Nodular Unit: Minor bitumen staining in a few fractures. Unit is more shaley and less competent then usual.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
29.1	29.4	0.3	100	Bioclastic limestone	U2 (MQU)	3	< 1 cm	Tan	> 5 cm	Pink	1	None	Peloidal Unit; Peloids and brachs; Fractures are filled with bitumen
				Mudstone									

Drill Core: *BM02-02*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
29.4	31.2	1.8	100	Nodular limestone in shale matrix	U1	15	1-3 cm	Light grey	1-3 cm	Pink	3	None	Shale contains several fine (~1mm) calcareous grains generating a weak structural matrix; Fracturing throughout interval; Bitumen staining along fractured edges of limestone; 5cm thick brach bed @ 29.75cm; Occassional crinoids in shale at top of interval; Structure increases down section..
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
31.2	32.6	1.4	100	Nodular limestone in shale matrix	U1	15	< 1 cm	Grey	1-3 cm	Light grey	4	None	Small brachs in shale; Rare crinoid ossicles in shales; Bitumen staining along fractures, more dominant towards bottom of interval.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
32.6	33.3	0.7	100	Nodular limestone in shale matrix	U1	10	< 1 cm	Tan	1-3 cm	Tan	1	None	Top 35cm of interval is fossil rich with small and large brachs, and a few crinoids; Very little shale in this part of the interval; Shale increases down section; Brachs, crinoids occur in lower section but in fewer numbers.
				Wackestone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
33.3	37.3	4	75	Nodular limestone in shale matrix	U1	10	< 1 cm	Tan	1-3 cm	Dark Pink	2	None	Hardground zone at top of interval from 33.30m.- 33.50m. Blackened clasts, brachs and crinoids; Brecciation from 33.60m - 35.36m; Fracture @ 35.80m; Bitumen staining in limestone fractures; Yellow staining 1-2 cm along fractures; Very competent unit, bedding somewhat obscured, possibly due to ?calcification?.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
37.3	37.8	0.5	100	Nodular limestone in shale matrix	U1	15	1-3 cm	Grey	1-3 cm	Tan	1	None	Color change between upper unit is at 45 degrees; Brachs in limestone and shales; Bitumen in fractures.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
37.8	38.7	0.9	40	Shaley nodular limestone	U1	50	< 1 cm	Grey	< 1 cm	Grey	1	None	Hardground at top of interval @ 37.80m. Blackened clasts,;
				Mudstone									

Drill Core: *BM02-02*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
38.7	41.5	2.8	100	Nodular limestone in shale matrix	U1	10	< 1 cm	Tan	1-3 cm	Dark Pink	2	None	Hardground at top of interval @ 38.70m, few brachs and crinoids; Bitumen in fractures; Large pyrite filled vug @ 41.00m; Interval has similar ?calcification? alteration as interval 33.30m to 37.30m.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
41.5	45.11	3.6	100			0						None	Christina@ 41.50 - EOH

Drill Core: ***BM02-03***

Easting: 465969.9 Max depth: 30.48 Logged by: GK

Northing: 6338567 NAD: 83 Date Logged:

Elevation: 277.183

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	2.15	2.15	0			0						None	Casing; 0 - 1m mud; Limestone encountered at 1m.(Devonian)

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
2.15	5.13	2.98	65	Massive limestone	U4 (UQU)	10	< 1 cm	Grey	3-5 cm	Tan	3	None	Sections of massive to nodular texture due to structure; Major fracture above 5.10m; Crinoid fragments.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
5.13	6.05	0.92	25	Nodular limestone in shale matrix	U3	15	< 1 cm	Grey	1-3 cm	Grey	3	Sideritization	Crinoids; Orange sideritization within parts of limestone @ 5.15m; Major fracture @ 5.20m.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
6.05	7	0.95	100	Nodular limestone in shale matrix	U3	15	< 1 cm	Dark grey	1-3 cm	Grey	2	None	Shale becomes a lighter color down section (6.70m) and becomes more expanding when wet.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
7	9.45	2.45	55	Nodular limestone in shale matrix	U3	10	< 1 cm	Grey	1-3 cm	Light grey	3	None	Unit would be very competent if there was no structure. Extensive structure from 8.20m - 9.45m.
				Mudstone									

Drill Core: *BM02-03*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
9.45	15.25	5	100	Shaley nodular limestone	U3	35	1-3 cm	Dark grey	1-3 cm	Grey	2	None	Shale interval from 10.10m - 10.50m; Fractured from 11.00m - 11.25m; 5cm thick calcite mineralization @ 12.95m; Occassional crinoids throughout shale.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
15.25	18.7	3.45	100	Nodular limestone in shale matrix	U3	25	1-3 cm	Dark grey	1-3 cm	Grey	2	None	Shale increases towards bottom of section. Shallowing interval; Crinoid bed at top of interval; Rare crinoids throughout remainder of interval; Calcite filled vugs and vertical fractures throughout interval; Bitumen staining in fractures; Bedding offset at 18.35m from fracture/fault.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
18.7	23.75	5.05	100	Shaley nodular limestone	U3	40	1-3 cm	Grey	1-3 cm	Light grey	3	None	Major fracture with brecciation @ 19.80m; 0.30m thick 20% shale unit @ 20.15m; Hardground at base of interval. Blackened clasts and crinoids; Hardground @ 20.80m, blackened clasts and brachs; Occasional amphipora near top of section; Brecciation and fracturing, 45cm thick @ 23.45m. Bedding at 60deg. to horizontal from base of brecciation down to bottom of section; Occassional crinoids throughout section.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
23.75	24.6	0.85	100	Nodular limestone in shale matrix	U3	30	1-3 cm	Green	1-3 cm	Dark grey	4	None	Bedding is at 60 deg to horizontal; Limestone clasts have sharp pointy edges and corners suggesting fracturing;

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
24.6	28	3.4	90	Massive limestone	U2 (MQU)	1	< 1 cm	Tan	> 5 cm	Pink	3	None	Stromatoporoid Unit; Laminar and branching stroms throughout unit; Vertical fracturing from 26.10m - 26.75m; Missing core (0.14m) @ 26.10m;

Boundstone

Drill Core: BM02-03

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
28	29	1	90	Nodular limestone with wispy shale	U2 (MQU)	10	< 1 cm	Tan	1-3 cm	Pink	2		Nodular Unit;There is an a minor "calcification alteration?" starting on the bottom part of the interval @ 28.95m, similar to what is described in BM02-02 below the MQU.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
29	29.2	0.2	100	Bioclastic limestone	U2 (MQU)	1	< 1 cm	Tan	> 5 cm	Pink	0	None	Peloidal Unit; Hardground @ 29.12m; Brachs below hardground; There is an apparent "calcification alteration" within the peloidal unit above the harground similar to what is seen in BM02-02 below the MQU; The peloids are not very visible in this region.
				Wackestone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
29.2	30.5	1.3	100	Nodular limestone in shale matrix	U1	15	< 1 cm	Grey	1-3 cm	Light grey	1	None	Nodular limestone; Top 45cm of interval is very muddy (25%mud/shale) with small nodules. Nodules are darkened. This is an exposed surface; The interval becomes very clean and much less shaley towards the bottom.
				Mudstone									

Drill Core: *BM02-04*

Easting: 466443.7
Northing: 6338841
Elevation: 277.453

NAD: 83

Max depth: 31.85

Logged by:

Date Logged:

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	5.5	5.5	0	Casing		0						None	Casing; Till and likely some large glacial boulders. (From rock chips)

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
5.5	8.6	3.1	30	Shaley nodular limestone	U3	35	1-3 cm	Green	1-3 cm	Tan	3	None	Major fractures @ 5.75m & 6.15m; Bitumen along fractures; Mud filled intervals along major fractures.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
8.6	11.5	2.9	45	Nodular limestone in shale matrix	U3	15	1-3 cm	Green	1-3 cm	Tan	2	None	Major fracture @ 11.45, fracture filled with mud; Bitumen along fractures in rock; Rare large brachs in limestone.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
11.5	17.45	5.95	90	Shale with limestone nodules	U3	55	> 5 cm	Grey	1-3 cm	Light grey	1	None	Shale color changes from green to grey at top of interval; 10cm thick limestone interval at 16.95m; Green shale beds at 15.00m.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
17.45	19.95	2.5	60	Nodular limestone in shale matrix	U3	20	1-3 cm	Green	1-3 cm	Tan	3	Silicification?	Silica cemented quartz sandstone filling sub-horizontal fractures to 10cm at 18m. Limestone 45 cm above and 80 cm below the qtz sandstone-filled fractures show tan coloured alteration (silicification?), decreasing in intensity outward. Pyrite nodules to 5 mm in sandstone.
				Mudstone									

Drill Core: *BM02-04*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
19.95	21.55	1.6	80	Shale with limestone nodules	U3	35	1-3 cm	Grey	1-3 cm	Light grey	1	None	Hardground @ 20.55m. Hardened clasts and thickened limestone at hardground; Rare crinoids in shale throughout interval;
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
21.55	22.85	1.3	90	Nodular limestone in shale matrix	U3	50	3-5 cm	Dark grey	< 1 cm	Grey	2	None	Minor fine grained pyrite at top of interval above major (15cm) fracture/fault. Fracture/fault is filled with green calcareaous muds containing tiny (<1cm) angular clasts of limestone and siliceous sands. Below the fracture/fault is a 23cm section of nodular limestone. This rests above the remaining section of calcareous shale. The shale changes from a geenish-grey to a dark green @ 22.38m; Limestone nodules increase down section in the shale, deepening sequence; Occasional crinoids throughout the shales.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
22.85	24.4	1.55	100	Nodular limestone in shale matrix	U3	25	1-3 cm	Dark grey	1-3 cm	Grey	2	None	Scattered brachs, crinoids; Fracture @ 24.00m
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
24.4	25.43	1.03	75	Nodular limestone in shale matrix	U3	15	< 1 cm	Dark grey	1-3 cm	Light grey	1	None	Hardground interval from 24.40m - 24.65m at top of section. Becomes more shaley towards bottom. Shallowing interval.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
25.43	25.8	0.37	100	Fossiliferous limestone	U3	20	< 1 cm	Grey	< 1 cm	Dark grey	1	None	Hardground interval. Abundant brach and crinoids, darkened clasts; Larger brachs at base of interval; Upper part of interval consists more of fossil debris; Fossils are intact in lower part of interval; Higher energy and more exposure in later deposition.
				Packstone									

Drill Core: *BM02-04*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
25.8	28.9	3.1	100	Fossiliferous limestone	U2 (MQU)	3	< 1 cm	Tan	> 5 cm	Pink	2	None	Stromatoporoid Unit; Fractures are bitumen coated/filled; Fracturing more common in the upper interval; Brachs also occuring with stroms. Mostly branching stroms, occassional laminar stroms; Large fracture @ 26.60m.
				Boundstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
28.9	30	1.1	70	Nodular limestone with wispy shale	U2 (MQU)	10	< 1 cm	Grey	1-3 cm	Light grey	ND	None	Nodular Unit;; Core has been too cut up and sampled to determine structure acurately. Is at least a 1"bitmen staining along occassional fractures".
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30	30.2	0.2	100	Bioclastic limestone	U2 (MQU)	1	< 1 cm	Light grey	> 5 cm	Pink	1	None	Peloidal Unit; Very definitive in core.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30.2	31.85	1.65	95	Nodular limestone in shale matrix	U1	15	< 1 cm	Green	1-3 cm	Pink	2	None	Important pink nodular unit below MQU. Bitumen stained along fractures; Major fracture at top of interval @ 30.25m; Rare crinoids in limestone near top of interval. EOH at 31.85.
				Mudstone									

Drill Core: ***BM02-05A***

Easting: 466925.7
Northing: 6339346
NAD: 83
Elevation: 281.129

Max depth: 22.5

Logged by: GK
Date Logged: 2/5/2004

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	15.2	15.2	0	n/a	n/a	0						None	Casing; Sand with medium and coarse gravels. (From rock chips)

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
15.2	17.15	1.95	100	Fossiliferous limestone	U2 (MQU)	3	< 1 cm	Tan	> 5 cm	Pink	1	None	Stromatoporoid Unit; Fractures are bitumen stained.
				Boundstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
17.15	18.2	1.05	95	Nodular limestone with wispy shale	U2 (MQU)	10	< 1 cm	Grey	1-3 cm	Tan	2	None	Nodular Unit: Considerably fractured; Rare crinoid ossicles.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
18.2	18.4	0.2	100	Bioclastic limestone	U2 (MQU)	3	< 1 cm	Tan	> 5 cm	Grey	1	None	Peloidal Unit; Peloids and brachs are blackened; (oxidized???) Some minor vertical fracturing with bitumen staining within it.
				Wackestone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
18.4	22.5	4.1	100	Nodular limestone in shale matrix	U1	15	< 1 cm	Dark grey	1-3 cm	Light grey	1	None	Limestone color changes from a light grey to a pink down interval; Brach fossil bed from 21.75m to 21.95m; Hardground @ 22.00m, blackened clasts; Hardground @ 22.40; Fracture @ 22.25m. EOH
				Mudstone									

Drill Core: ***BM02-05B***

Easting: 466925.7 Max depth: 35.4 Logged by: GK

Northing: 6339346 NAD: 83 Date Logged: 2/5/2004

Elevation: 281.129

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	9.45	9.45	0	n/a	n/a	0						None	Casing; Lithology not recorded.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
9.45	13.1	3.65	85	Fossiliferous limestone	U3	15	< 1 cm	Grey	1-3 cm	White	1	None	Small brachs; Bitumen and live oil saturated;
				Framestone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
13.1	16.75	3.65	100	Fossiliferous limestone	U2 (MQU)	3	< 1 cm	Tan	1-3 cm	Pink	1	None	Stromatoporoid Unit; Open vugs. Others vugs/fractures filled with bitumen.
				Boundstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
16.75	17.62	0.87	90	Nodular limestone with wispy shale	U2 (MQU)	10	< 1 cm	Grey	1-3 cm	Pink	2	None	Nodular Unit; Hardground at the top of interval @ 16.75m, blackened clasts and a few crinoids; Major fracture @ 17.45m; Bitumen stained along fractures.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
17.62	17.82	0.2	100	Bioclastic limestone	U2 (MQU)	3	< 1 cm	Tan	> 5 cm	Pink	1	None	Peloidal Unit;; Hardground from 17.72m to 17.82m. Blackened clasts, crinoids and brachs.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
17.82	21.85	4.03	85	Nodular limestone in shale matrix	U1	15	< 1 cm	Grey	1-3 cm	Light grey	2	None	Major facture at top on interval @ 17.82m; Bitumen staining on limestone cobbles in fracture; Rare crinoids in shale.
				Mudstone									

Drill Core: *BM02-05B*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
21.85	26.8	4.95	55	Nodular limestone in shale matrix	U1	15	< 1 cm	Grey	3-5 cm	Light grey	2	None	Series of hardgrounds @ 21.85m, 22.25m, 22.35m. & 23.72m. Blackened clasts, brachs and crinoids; Major fault/fracture @ 23.90m, bituman staining on limestone cobbles. Signnificant core lost at fault/fracture; Sulphides @ 22.75m, 23.00m, 25.50m, 25.60m, 25.75m & 26.30m. (Galena?)

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
26.8	28.1	1.3	90	Shaley nodular limestone	U1	45	1-3 cm	Dark grey	< 1 cm	Grey	2	None	Hardground @ 27.00m, blackened clasts and crinoids; Major mud filled fault/fracture from 27.40m to 27.60m; Competant limestone unit from 27.60m to 27.85m. (20% shale), brach shells at base; A few crinoids in shale throughout interval.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
28.1	30.85	2.75	100	Nodular limestone in shale matrix	U1	15	< 1 cm	Dark grey	1-3 cm	Light grey	2	None	Hardground at top of interval @ 28.10m, blackened clasts and crinoids; Fracture/fault @ 29.05m, no bitumen staining; Limestone goes from a grey to a pink towrads the bottom of the interval @ 29.95m. Hardground at bottom of interval. (above Christina)

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30.85	35.4	4.55	0			0						None	Christina @ 30.85m - EOH

Drill Core: ***BM02-05c***

Easting: 466925.7
Northing: 6339346
NAD: 83
Elevation: 281.129

Max depth: 15.85

Logged by: GFK
Date Logged: 2/5/2004

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	3.3	3.3	0	n/a	n/a	0						None	Casing; 0 - 2m Sand and gravel at surface; 2 - 3m quartz, shale, limestone. No bitumen. (From chip samples)

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
3.3	6.65	3.35	70	n/a	n/a	0						None	McMurray Formation; 3 - 3.30 Bitumous limestone; 3.30 - 6.65 McMurray sand, bitumen saturated.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
6.65	12.5	5.85	100	Bioclastic limestone	U3	15	< 1 cm	Green	1-3 cm	White	1	Chalky	Fossiliferous framestone deposited on top on stromatoporoid unit; Saturated with bitumen and live oil; Top 50 cm has undergone chalky alteration from weathering; Major fracturing @ 10.70m & 12.50m.
				Framestone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
12.5	15.85	3.35	90	Fossiliferous limestone	U2 (MQU)	5	< 1 cm	Tan	> 5 cm	Tan	1	None	Check top of Strom Unit (I would put it @ 13.05m); Large vertical fracture from 15.30m to 15.45m; Bitumen staining along fractures; Very few stroms in upper section. Occasional crinoids;
				Boundstone									

Drill Core: *BM02-06A*

Easting: 466903.1
Northing: 6338816
NAD: 83
Elevation: 279.753

Max depth: 21.7

Logged by: GK

Date Logged:

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	2.15		0	n/a	n/a	0						None	Casing; 0 - 0.50m of glacial-fluvial sand and gravel; 0.50 - 2.15m Limestone.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
2.15	3.65	1.5	10	Nodular limestone in shale matrix	U3	25	1-3 cm	Dark grey	1-3 cm	Dark grey	3	None	10% RECOVERY - Crinoids in core fragments, Bitumen staining within core and along fractures.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
3.65	4.25	0.6	70	Nodular limestone in shale matrix	U3	10	< 1 cm	Grey	3-5 cm	Light grey	3	None	Rare crinoids; Very fractured.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
4.25	6.1	1.85	10	Fossiliferous limestone	U3	20	1-3 cm	Dark grey	1-3 cm	Dark grey	3	None	10% Recovery - Micritic cemented limestone has large brachs and crinoids; Live oil and bitumen staining along fractures.
				Rudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
6.1	7.6	1.5	35	Nodular limestone in shale matrix	U3	25	1-3 cm	Dark grey	1-3 cm	Dark grey	3	None	35% RECOVERY - Nodular limestone in a shale matrix, very disrupted by structure.
				Mudstone									

Drill Core: *BM02-06A*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
7.6	9.7	2.1	50	Fossiliferous limestone	U3	20	< 1 cm	Tan	1-3 cm	Pink	3	None	Extensive fracturing, large fracture at top of interval, grey mud filled fracture with angular edged limestone nodules; Fossiliferous brach limestone with large fracture filled with grey mud and small limestone clasts; Bottom of interval consists of pink micritic limestone above mud filled fracture.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
9.7	12.35	2.65	40	Fossiliferous limestone	U2 (MQU)	1	< 1 cm	Tan	> 5 cm	Tan	3	None	40% RECOVERY - Stromatoporoid Unit; Extensive fracturing/faulting; Bitumen and sand filling within fractures/faults; Vertical fractures evident @ 11.30 to 11.90m; Dissolution of strom unit is apparent in fault/fractured regions.

Boundstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
12.35	13.45	1.1	90	Nodular limestone with wispy shale	U2 (MQU)	10	< 1 cm	Grey	1-3 cm	Pink	2	None	Nodular Unit; Large vertical fractures filled with grey sands & muds.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
13.45	13.65	0.2	100	Bioclastic limestone	U2 (MQU)	1	< 1 cm	Tan	> 5 cm	Pink	0	None	Peloidal Unit; Hardground throughout bottom half of unit, blackened clasts.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
13.65	21.5	7.85	100	Nodular limestone in shale matrix	U1	20	1-3 cm	Dark grey	1-3 cm	Light grey	2	None	40cm thick brach and crinoid fossil bed from 17.30m to 17.70m; Hardground interval @ 18.45m (15cm thick), overlying mud and limestone clast debris in fracture zone @ 18.60m. (40cm thick); Vertical fracture @ 20.20m; Bitumen along fractures. EOH.

Mudstone

Drill Core: ***BM02-06B***

Easting: 466903.1 Max depth: 14.33 Logged by: GFK

Northing: 6338816 NAD: 83 Date Logged: 2/4/2004

Elevation: 279.753

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	3.05	3.05	0	n/a	n/a	0						None	Casing;0 - 0.50m glacial - fluvial sand and gravel; 0.50 - 3.05m limestone.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
3.05	4.05	1	30	Nodular limestone in shale matrix	U3	25	< 1 cm	Grey	1-3 cm	Tan	3	None	30% RECOVERY - Intense structure/weathering affecting recovery; Bedding not clearly defined.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
4.05	4.9	0.85	55	Nodular limestone in shale matrix	U3	15	< 1 cm	Dark grey	1-3 cm	Grey	3	None	55% RECOVERY - Hardground surface at top of interval @ 4.05m; Fracturing throughout interval; Bitumen staining along fractures.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
4.9	8.5	3.6	50	Nodular limestone in shale matrix	U3	15	< 1 cm	Light grey	1-3 cm	Dark grey	3	None	50% RECOVERY; Large 1m thick (4.90m to 5.80m.) mud filled fracture at top of interval; Large brachs occuring in limestone in lower interval; Hardground at base of interval, immediately above stromatoporoid unit, blackened clasts, large brachs.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
8.5	11.7	3.2	65	Fossiliferous limestone	U2 (MQU)	1	< 1 cm	Tan	> 5 cm	Tan	2	None	Stromatoporoid Unit; Considerable fracturing; Bitumen stained along fractures;
				Boundstone									

Drill Core: ***BM02-06B***

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
11.7	12.75	1.05	95	Nodular limestone with wispy shale	U2 (MQU)	10	< 1 cm	Grey	1-3 cm	Tan	1	None	Nodular Unit; Hardground at top of interval; Blackened clasts (appears as a lens);
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
12.75	12.95	0.2	100	Bioclastic limestone	U2 (MQU)	1	< 1 cm	Tan	> 5 cm	Tan	0	None	Peloidal Unit; Contains brachs and crinoids.
				Wackestone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
12.95	14.33	1.38	100	Nodular limestone in shale matrix	U1	15	< 1 cm	Dark grey	1-3 cm	Grey	2	None	Major fracture from 13.25 to 13.45m; Bitumen staining along fractures; Hardground @ 13.45m and @ 14.15m; 3cm interval of bitumen stained fossiliferous micritic limestone; EOH.
				Mudstone									

Drill Core: ***BM02-08***

Easting: 467220.6
Northing: 6339899 NAD: [redacted]
Elevation: 279.134

Max depth: 15.85

Logged by: GFK

Date Logged: 1/20/2004

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	2.15	2.15	0			0						None	Casing; Lithology unknown.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
2.15	5.8	3.65	55	Coal	n/a	0						None	55% RECOVERY - Stromatoporoid boulder from 3.05m - 3.32m; Coals are mostly lignite, small intervals are sub-bitumous.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
5.8	11.2	5.4	90			0						None	Transition from silt to sand @ 6.60m; McMurray has small interval of lignite coal in it at 7.60m, other small bits of coal can be seen throughout McMurray; Watersands begin at 9.40m; Very coarse watersand at base of interval.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
11.2	13.9	2.7	75	Massive limestone Wackestone	U2 (MQU)	1	< 1 cm	Grey	> 5 cm	Tan	2	None	Stromatoporoid unit; Bitumen saturated in fractures and along stroms, particularly at top of interval. (high permeability); Major 20cm thick, bitumen saturated, McMurray filled fracture at 12.80m.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
13.9	15.05	1.15	100	Nodular limestone with wispy shale Mudstone	U2 (MQU)	10	< 1 cm	Grey	1-3 cm	Tan	1	None	Nodular Unit; Rare brachs and crinoids in shale.

Drill Core: *BM02-08*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
15.05	15.25	0.2	100	Bioclastic limestone	U2 (MQU)	1	< 1 cm	Grey	1-3 cm	Tan	0	None	Peloidal unit; Brachs, crinoids throughout interval.
				Wackestone									

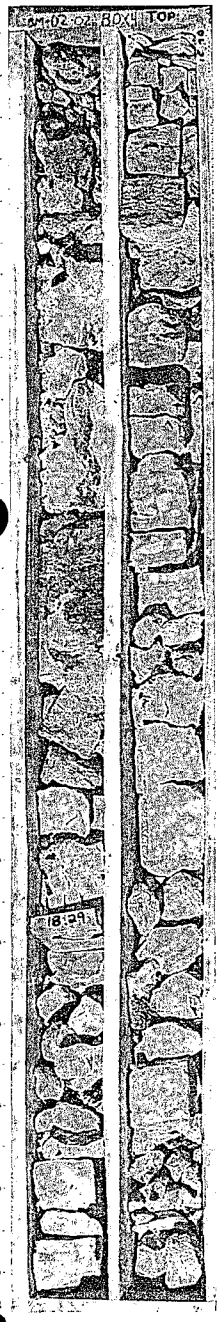
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
15.5	15.85	0.35	100	Nodular limestone in shale matrix	U1	15	< 1 cm	Dark grey	1-3 cm	Grey	1	None	Hardground at top of interval @ 15.25m. Fossil hash of brachs and crinoids Blackened clasts; Remainder of interval has brachs and crinoid ossicles in shale and crinoids in limestone nodules; Bottom of interval has crinoid rich section.(15.85m)
				Mudstone									

Appendix E. Core Relogging December 2003

E.3. Drill Core Photographs

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

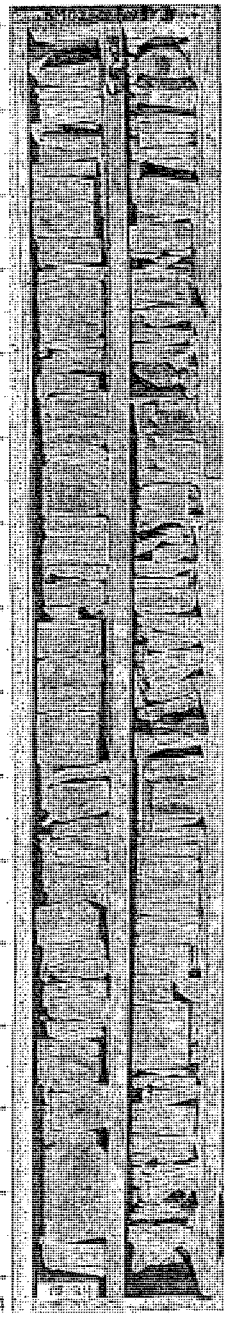
BM02-02 BOX 4



15.24

8.84

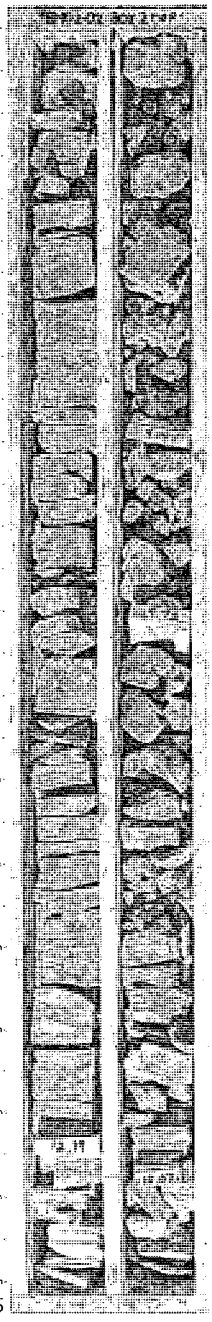
BM02-02 BOX 3



12.35

15.24

BM02-02 BOX 2



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12.35

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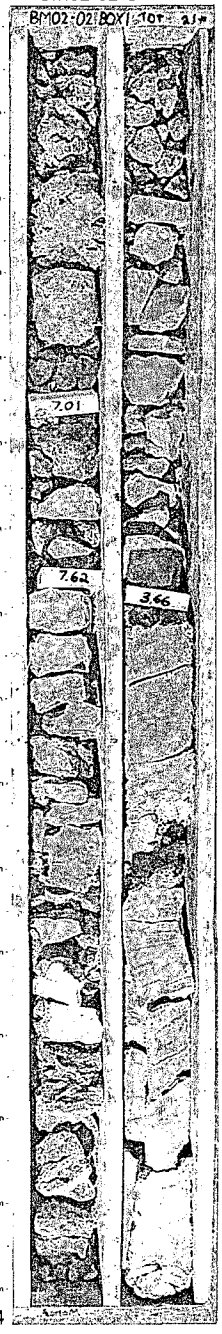


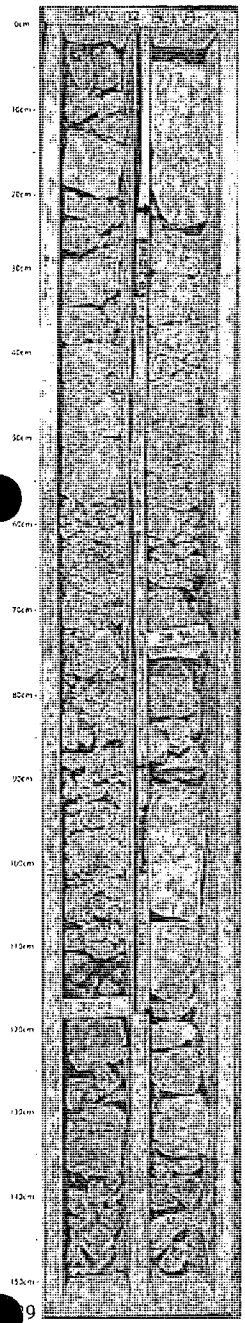
2.10

8.44

02-02 Boxs 1-4

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

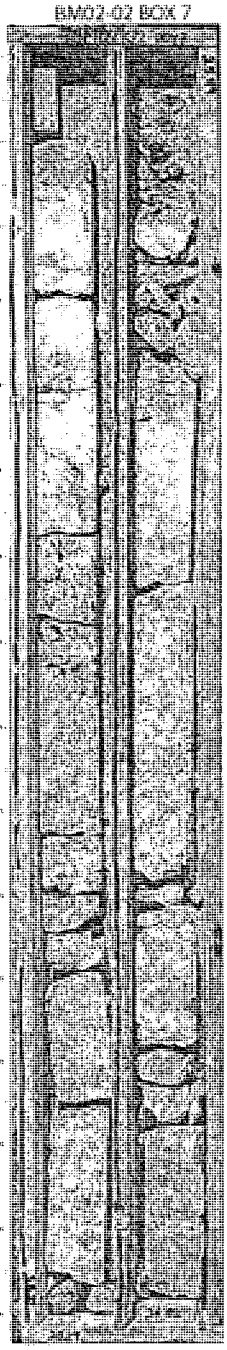
BM02-02 BOX 8



28.24

9

BM02-02 BOX 7



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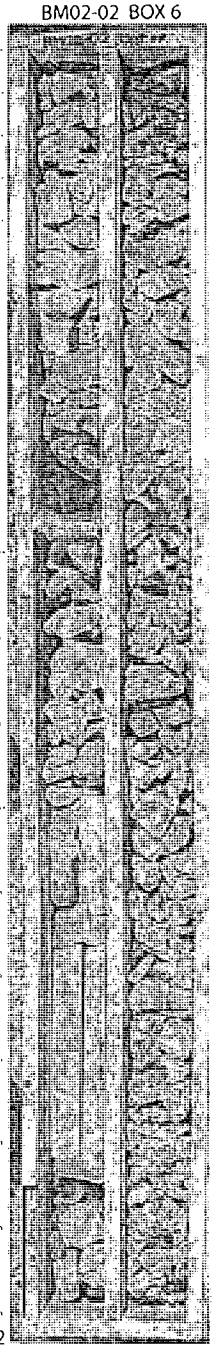
28.20

BM02-02 BOX 6



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25.32

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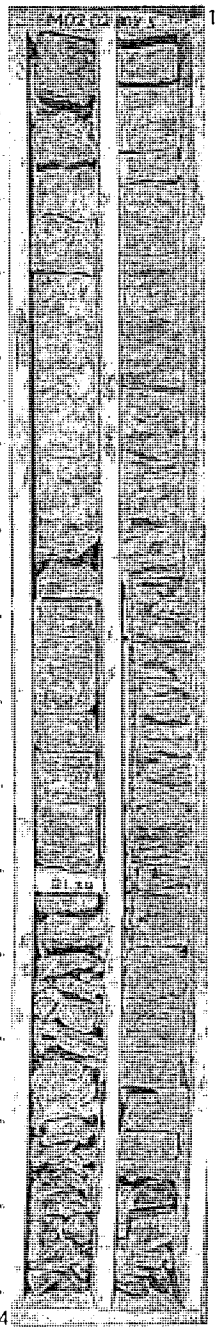


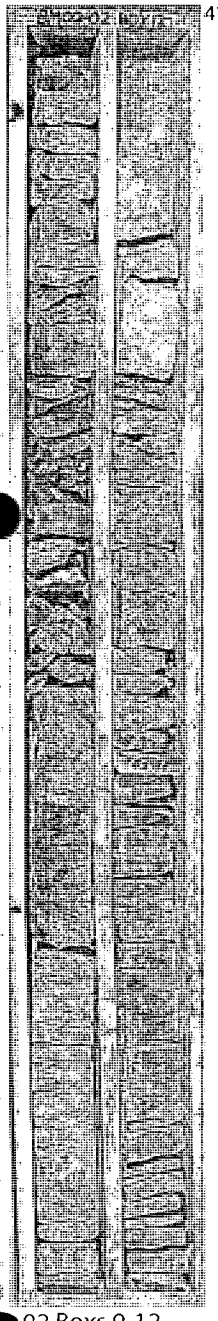
18.84

21.84

BM02-02 Boxes 5-8

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

BM02-02 BOX 12



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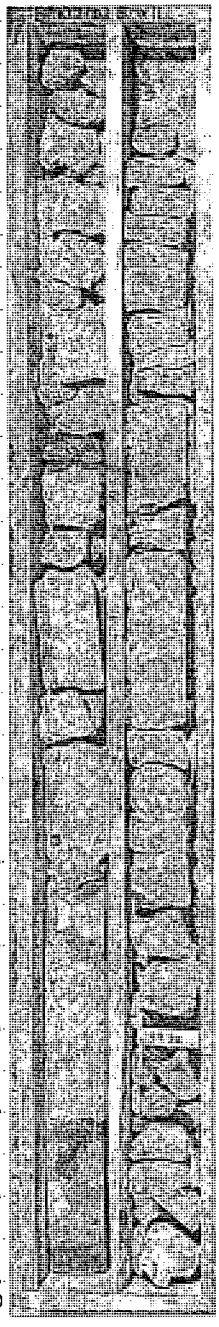
BM02-02 Boxs 9-12

BM02-02 BOX 11



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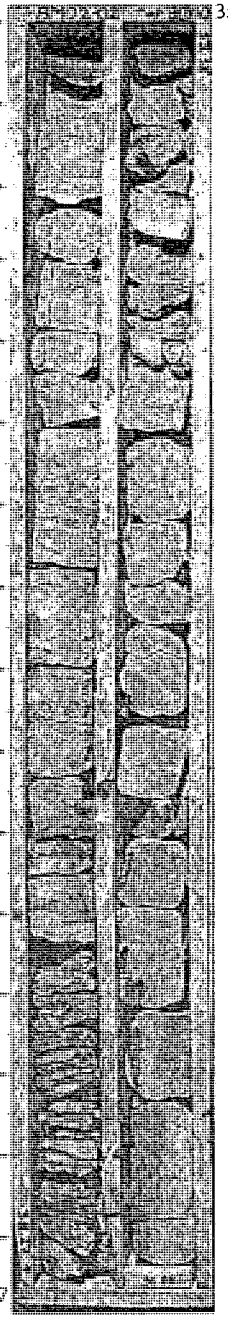

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38.27

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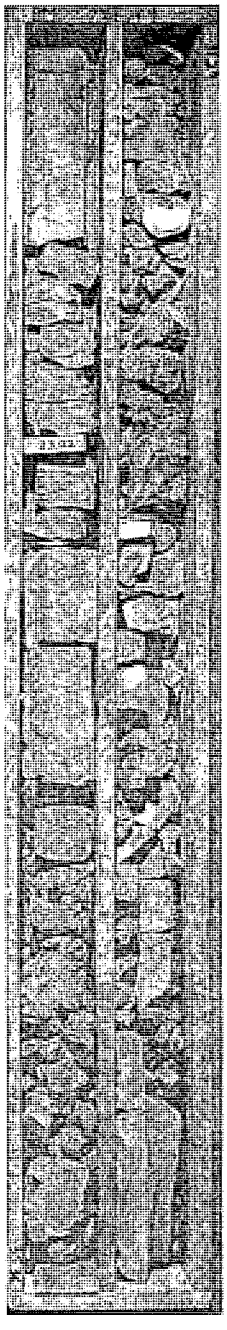
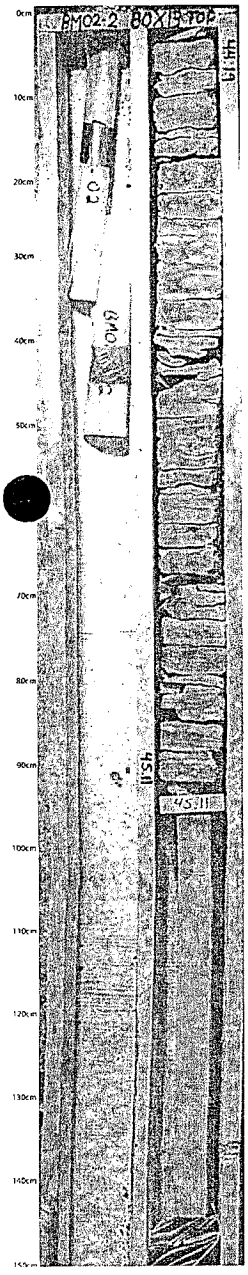


31.

35.36

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

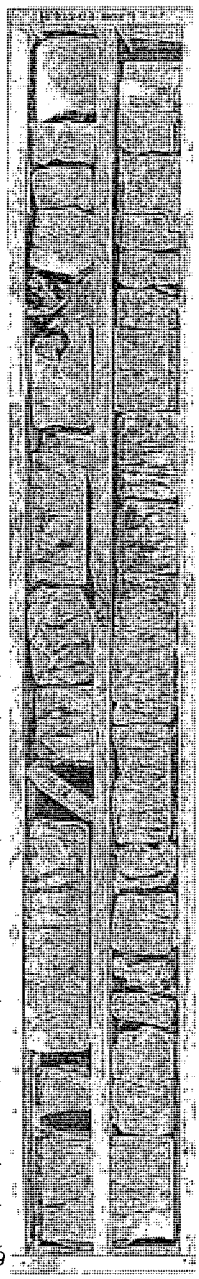
BM02-02 BOX 13



BM02-02 Box 13

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

BM02-03 BOX 4



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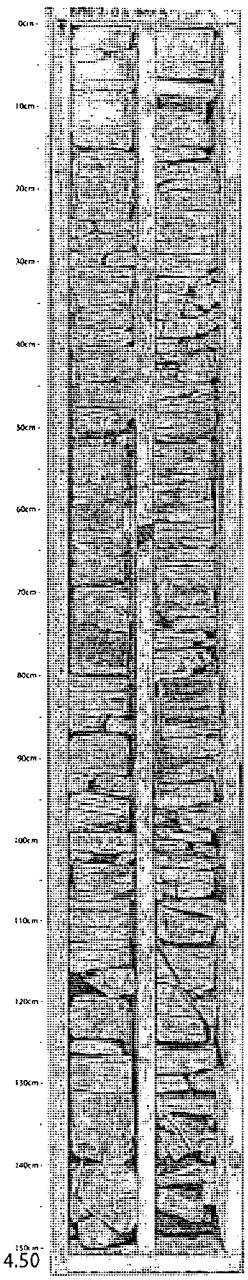

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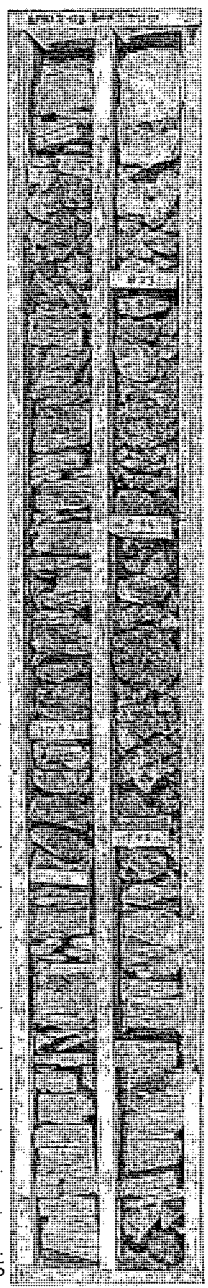

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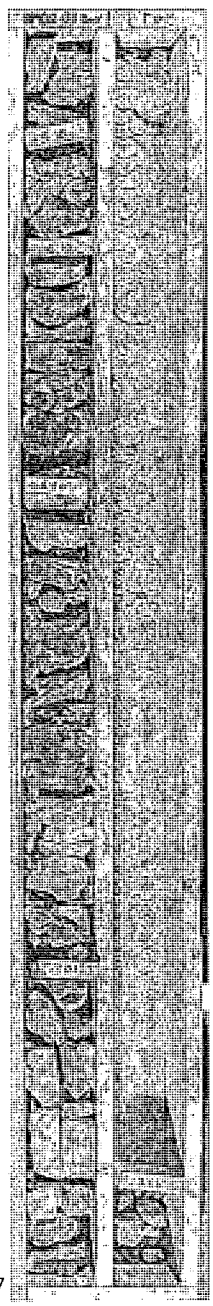


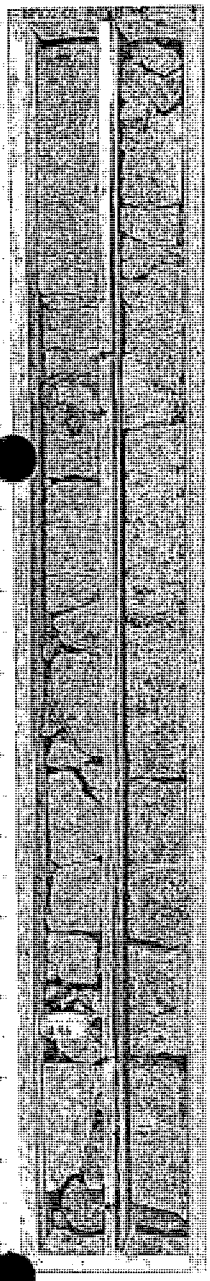
2.13

7.37

2-03 Boxes 1 to 4

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

BM02-03 BOX 8



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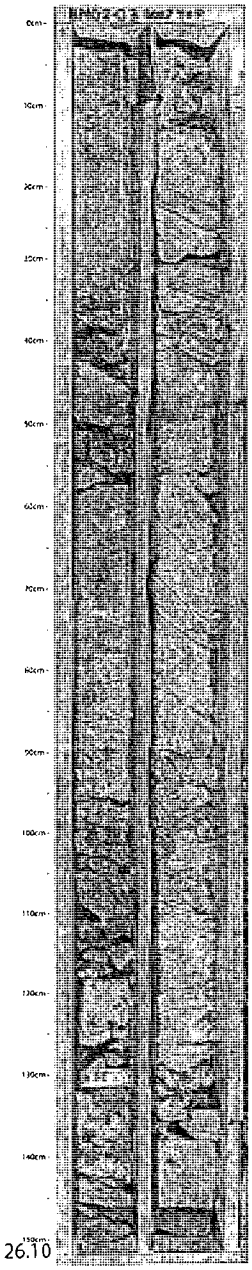

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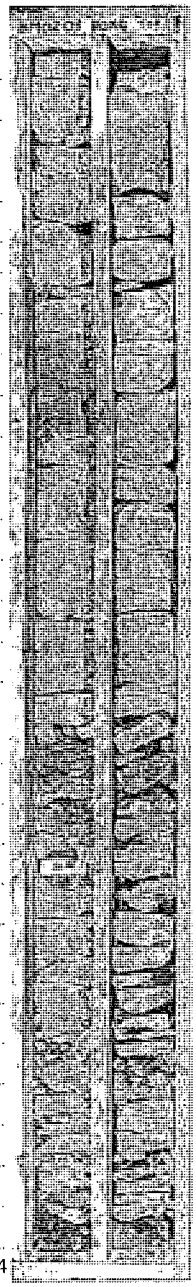

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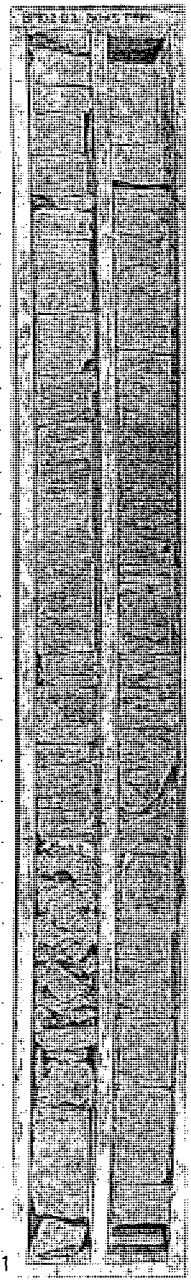

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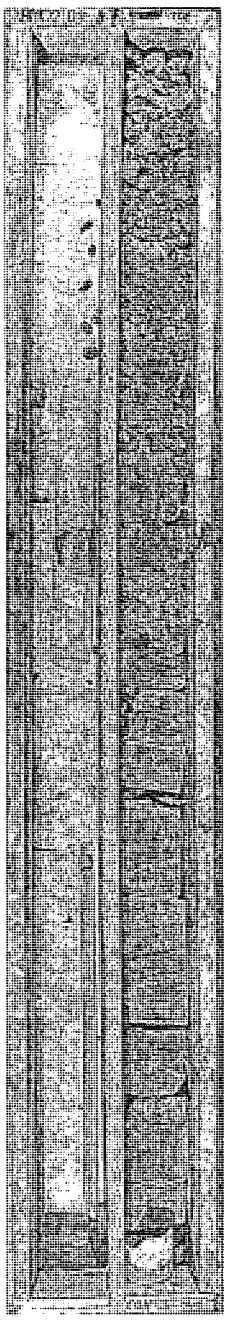
BM02-03 Boxes 5 to 8

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

BM02-03 BOX 9



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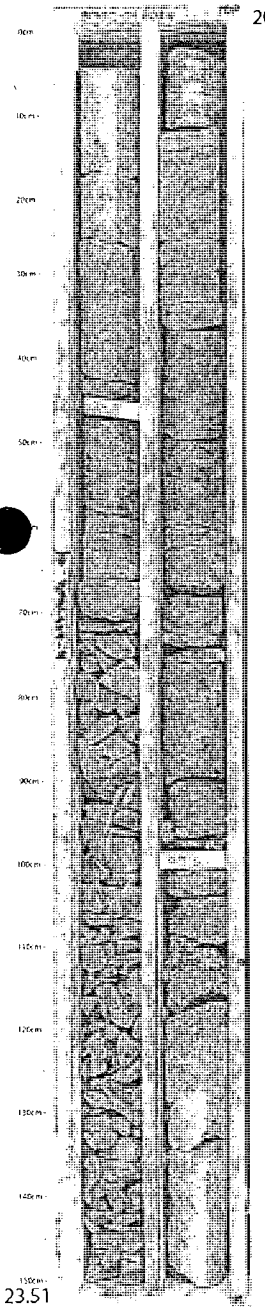
BM02-03 Box 9

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

BM02-04 BOX 4



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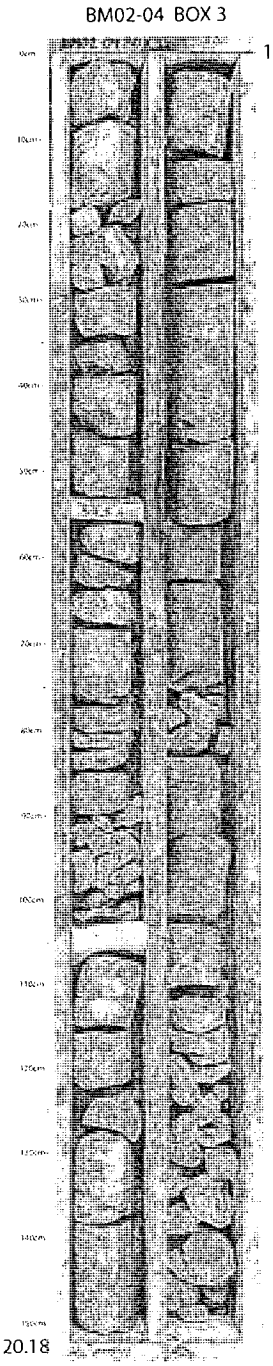

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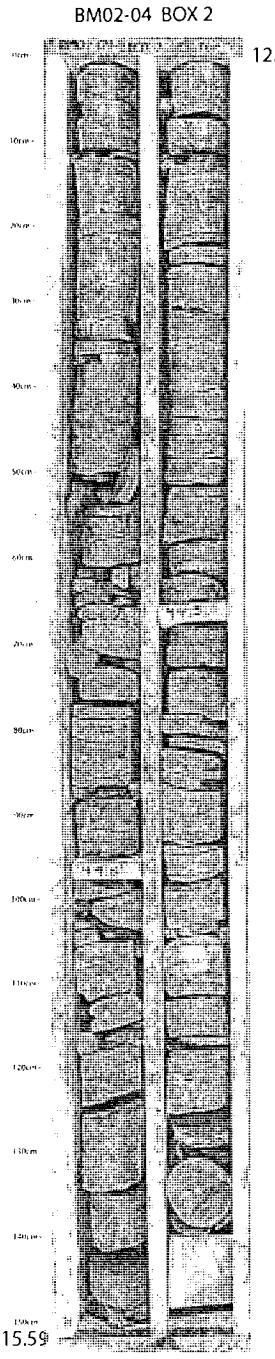

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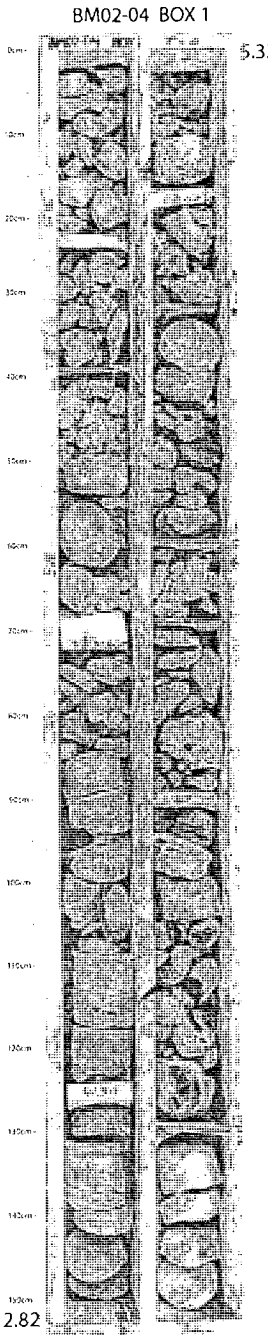
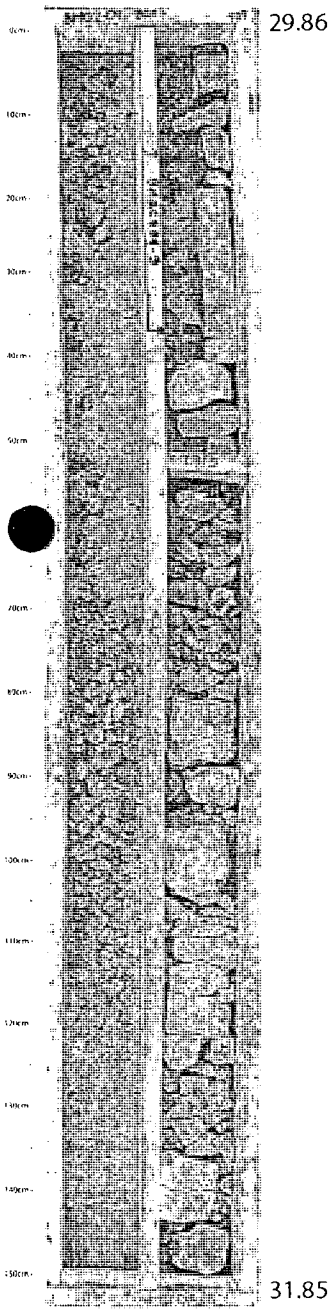


M02-04 Boxes 1 to 4

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

BM02-04 BOX 7



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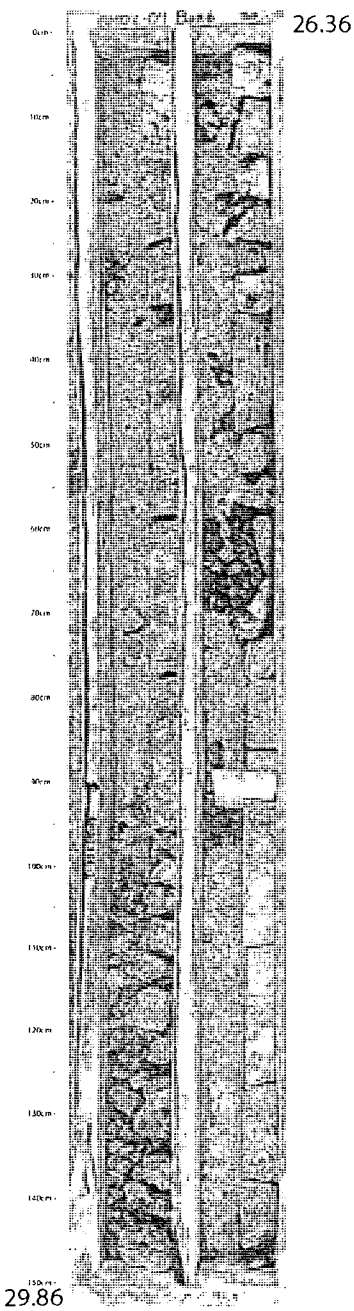

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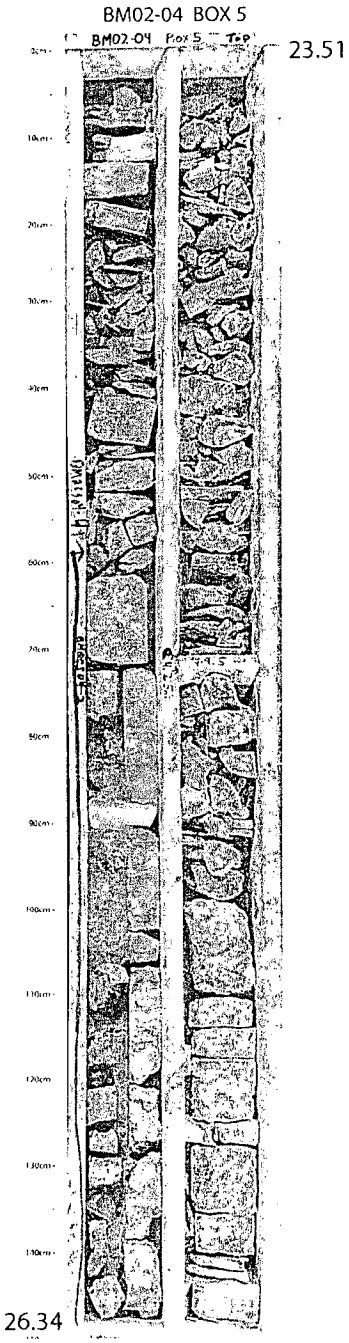
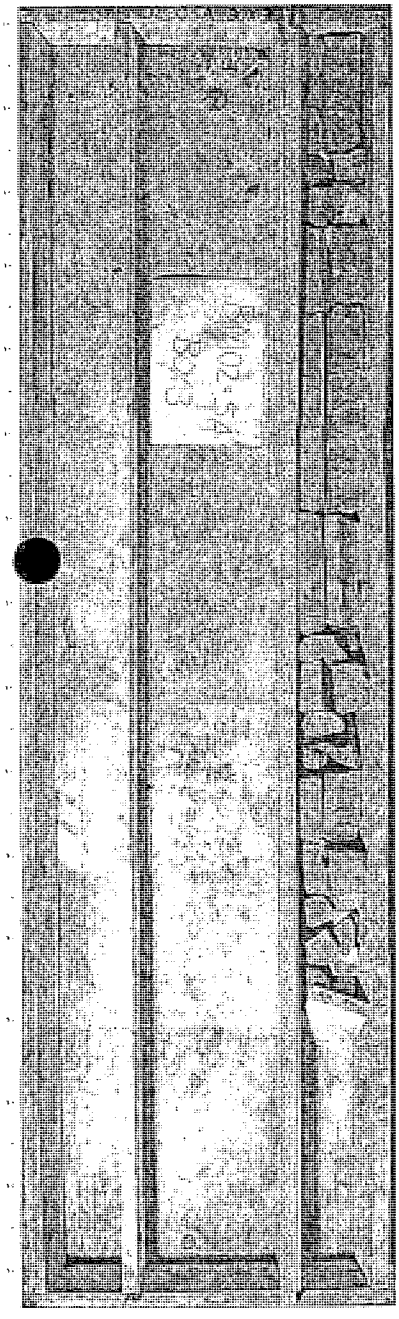


BM02-04 Boxes 5 to 7

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

BM02-05A BOX 3



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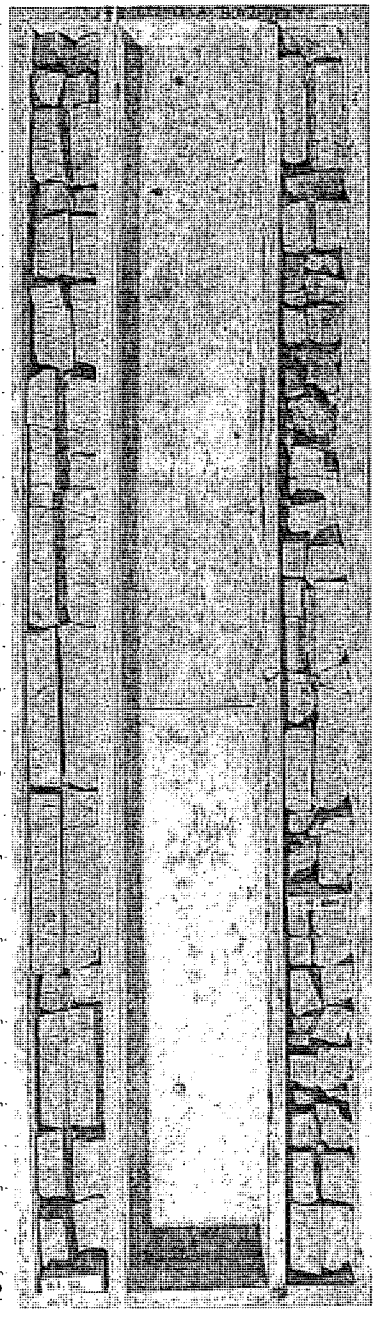
BM02-5A BOX 2



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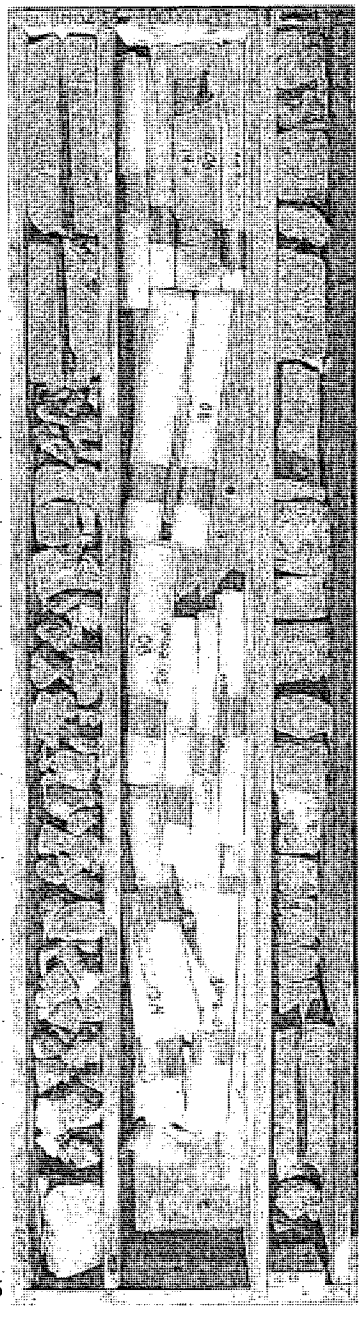

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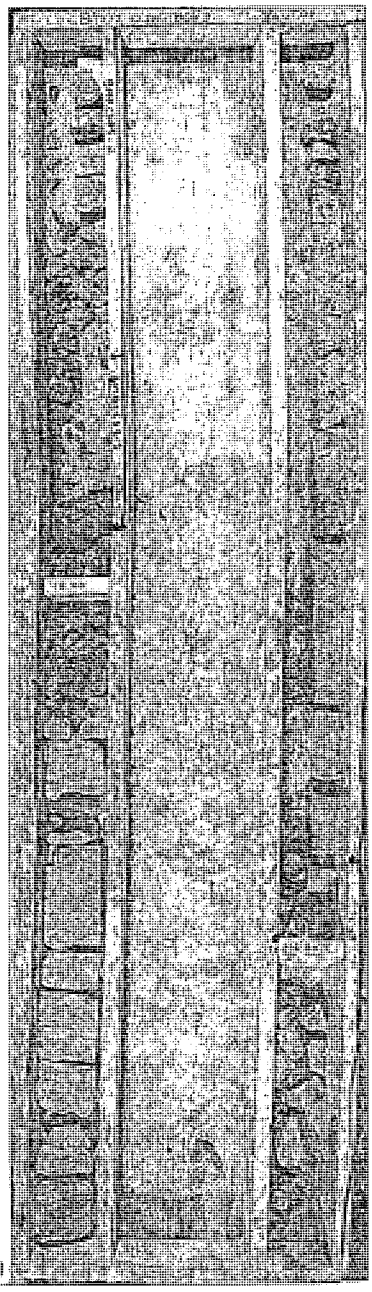
Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

BM02-05B BOX 3



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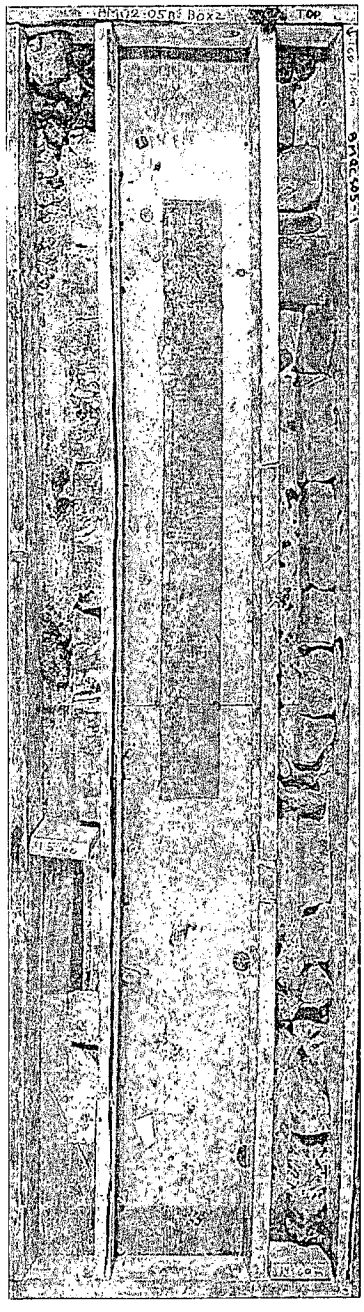

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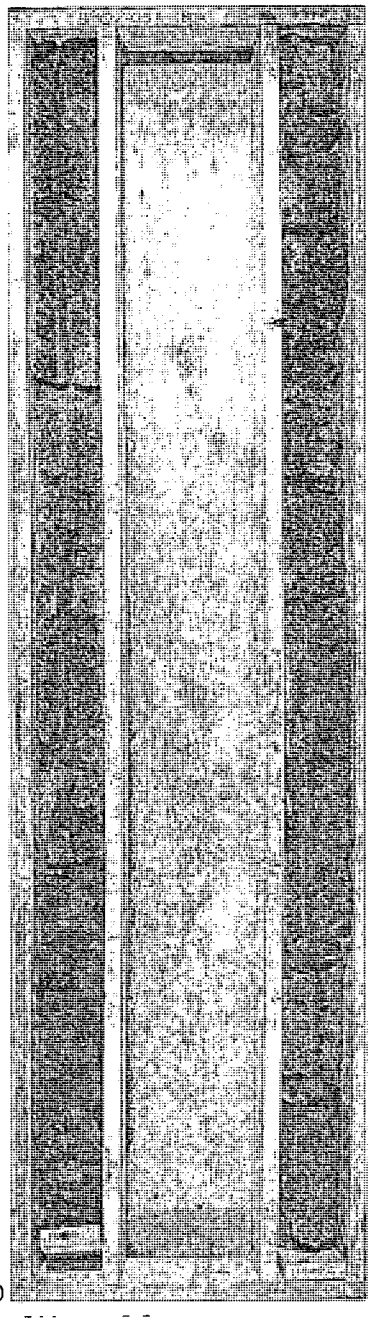

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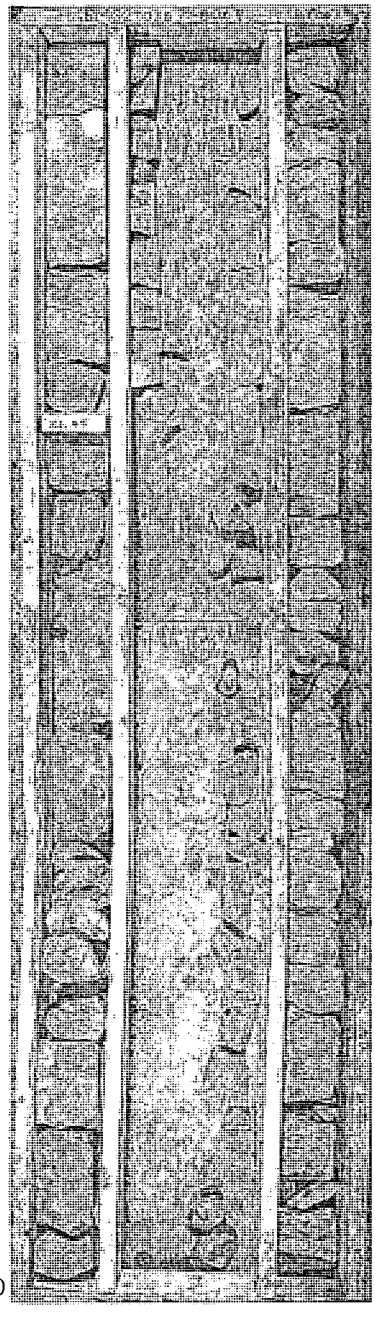
BM02-05B Boxes 1 to 3

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

BM02-05B BOX 4



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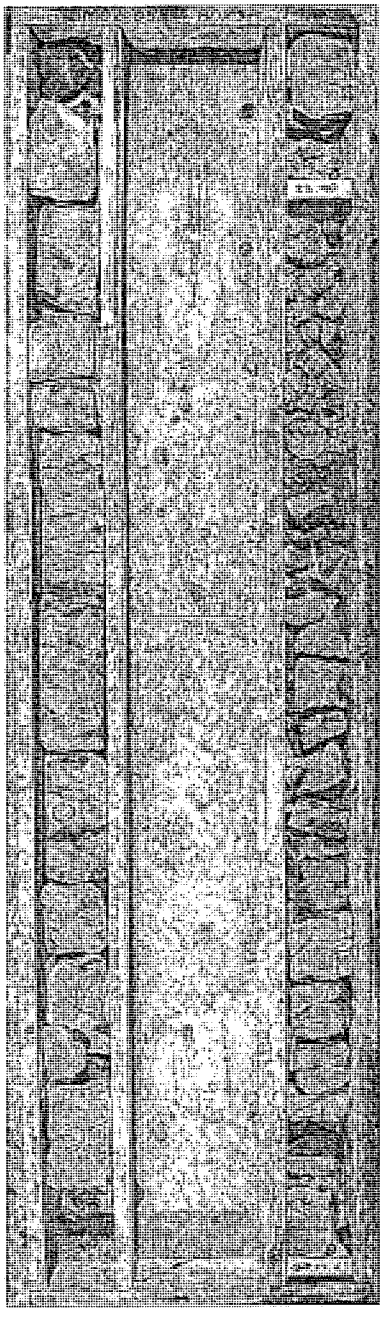

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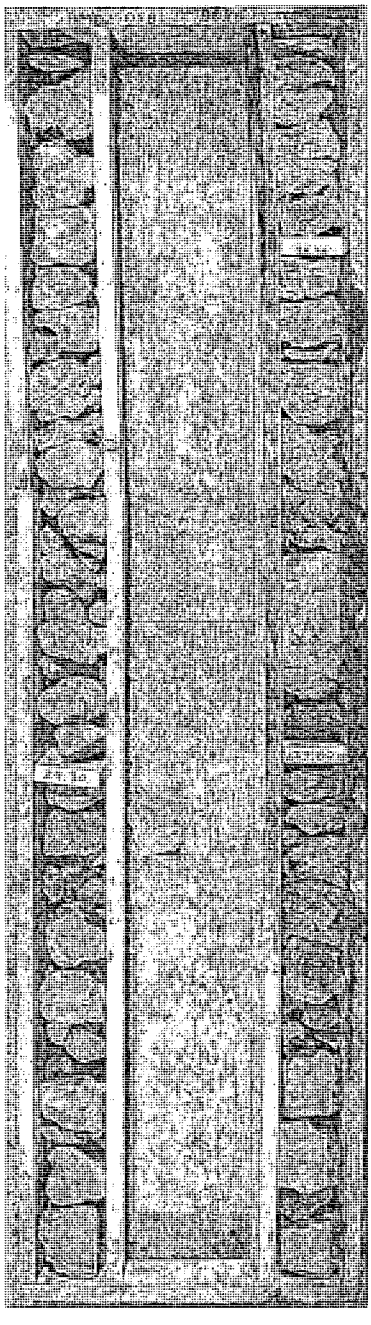

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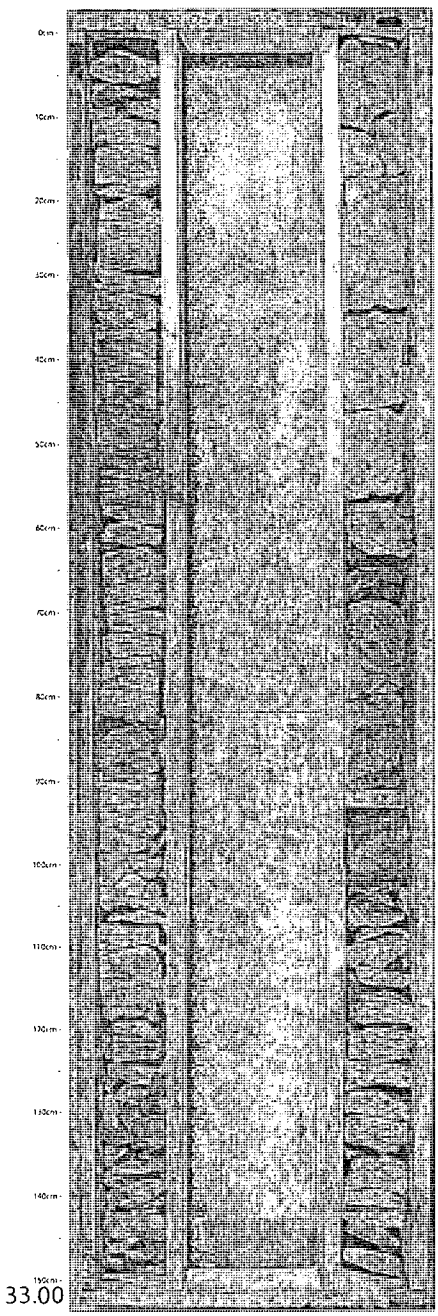
BM02-05B Boxes 4 to 6

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

BM02-05B BOX 7



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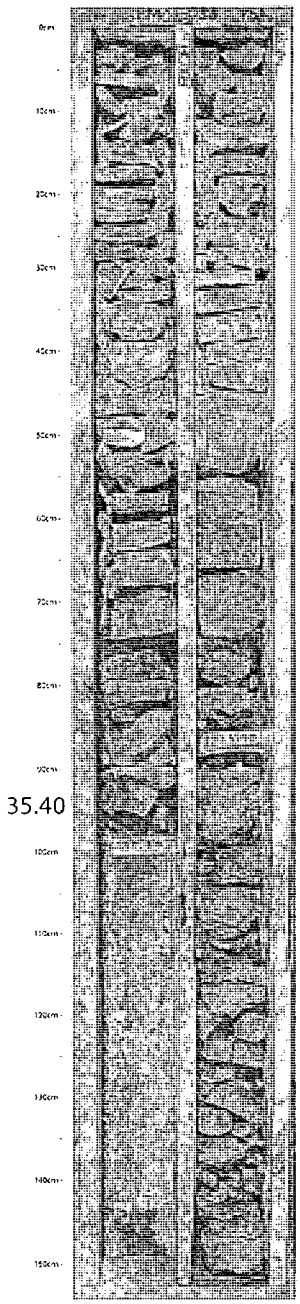
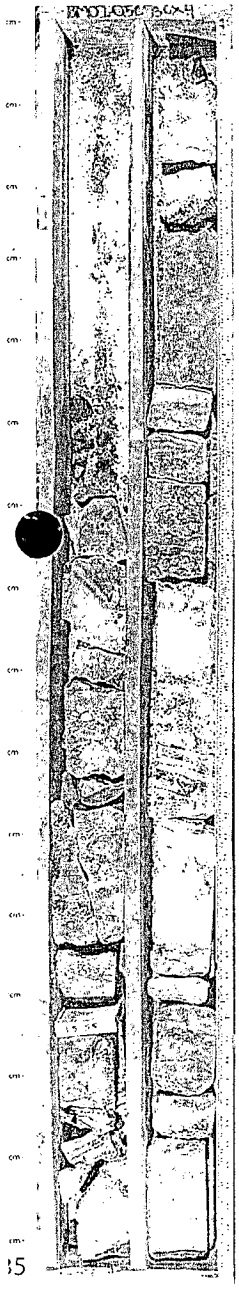


BM02-05B Boxes 7 to 8

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

BM02-05C BOX 4



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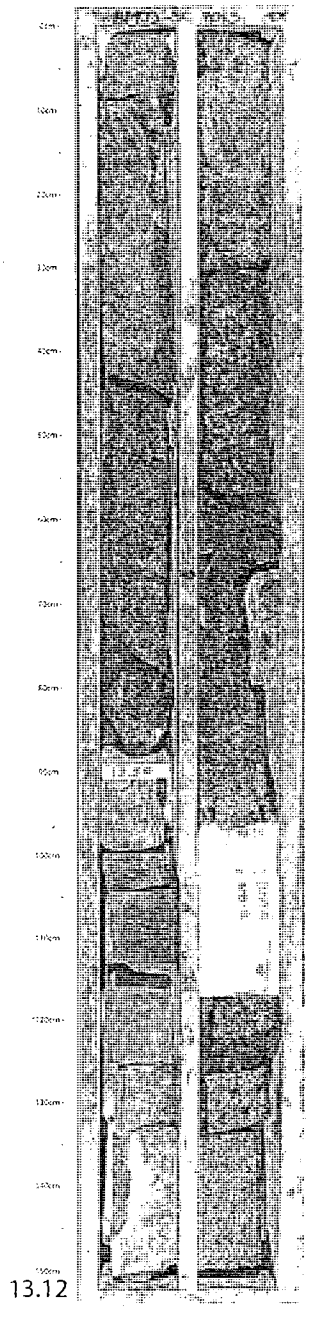

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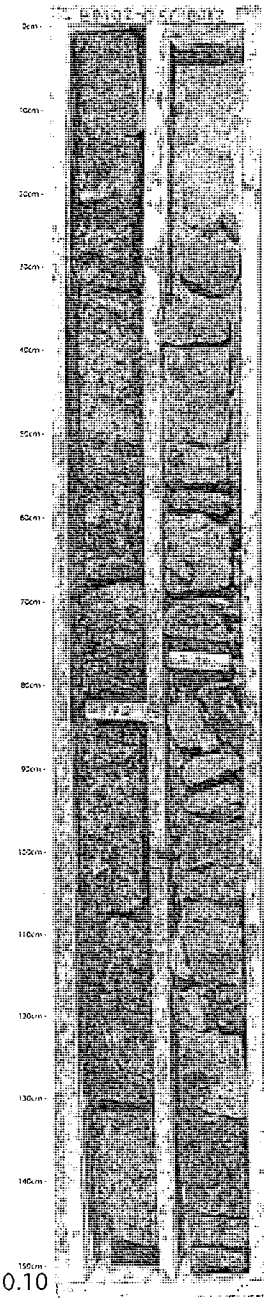

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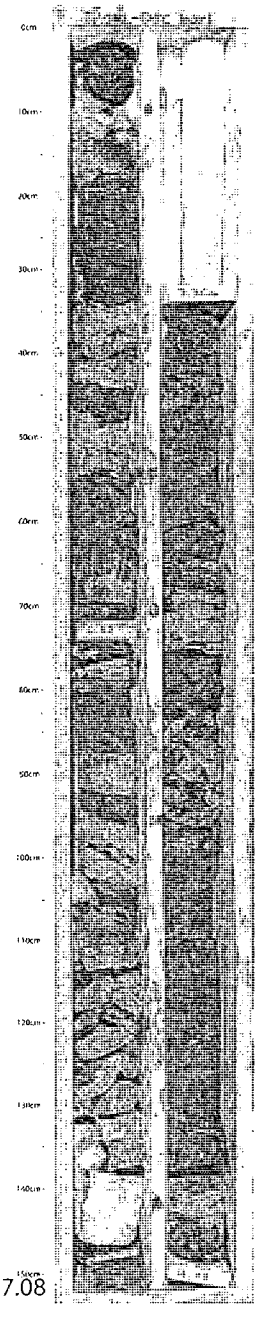

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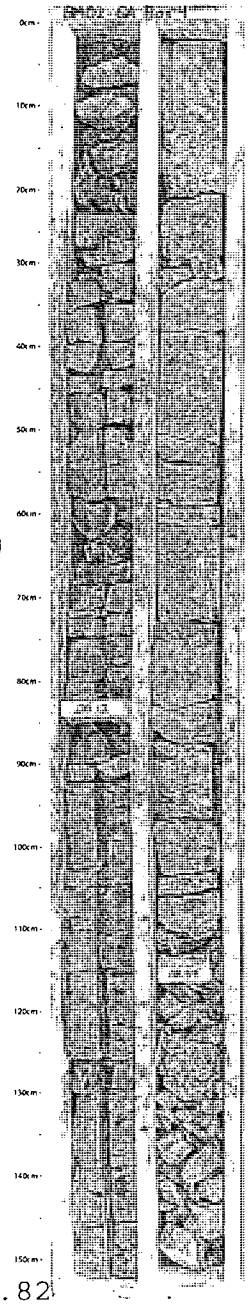
BM02-05C Boxes 1 to 4

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

BM02-06A BOX 4



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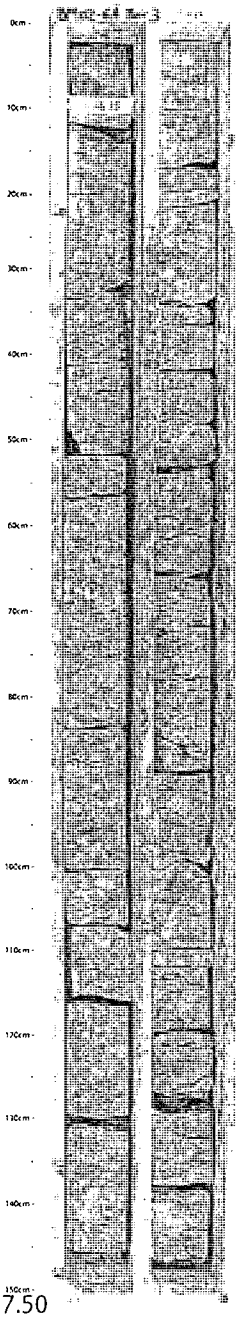

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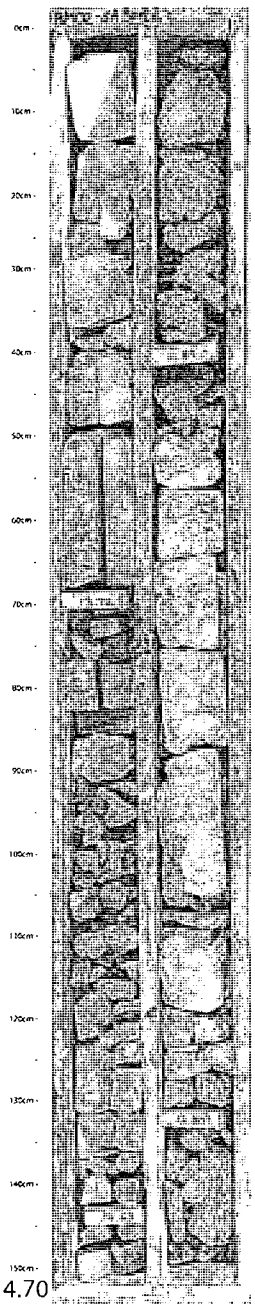

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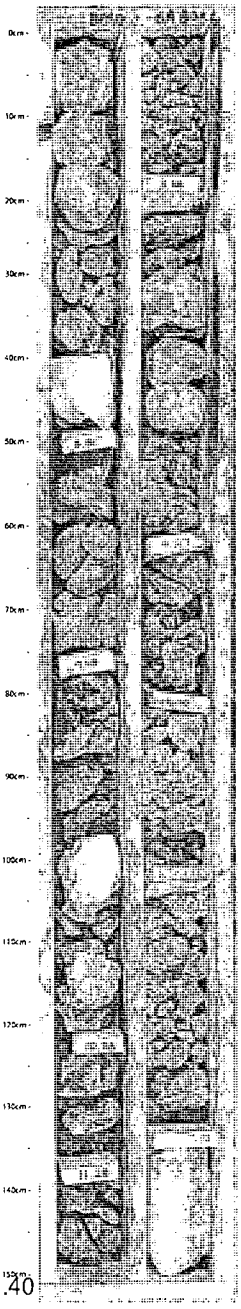

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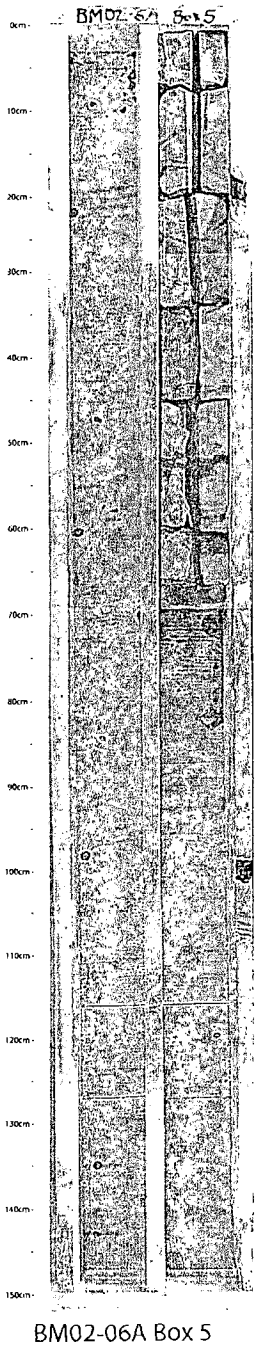
BM02-06A Boxes 1 to 4

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

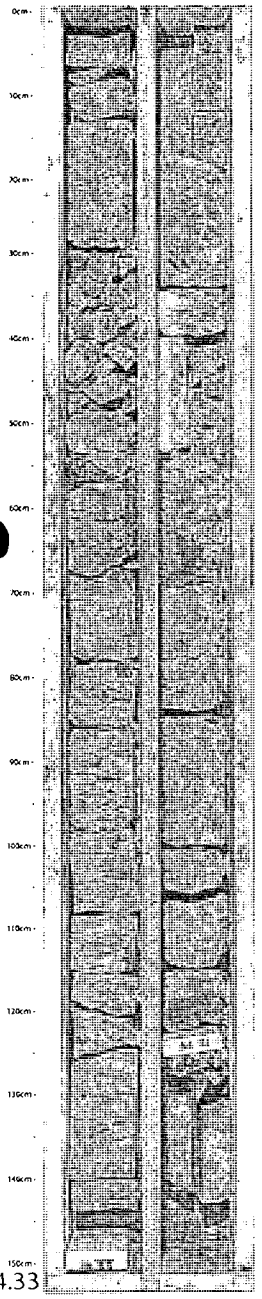
BM02-06A BOX 5



BM02-06A Box 5

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

BM02-06B BOX 3



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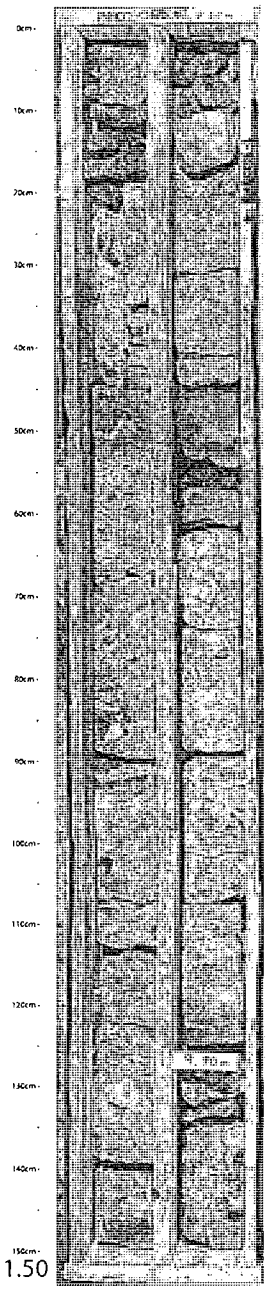

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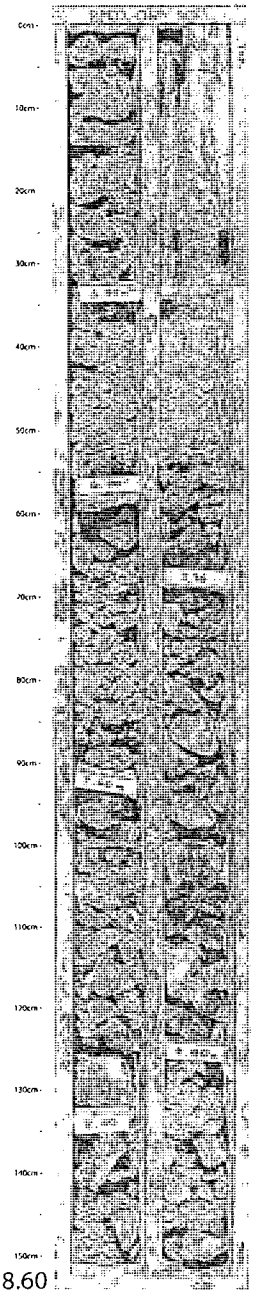

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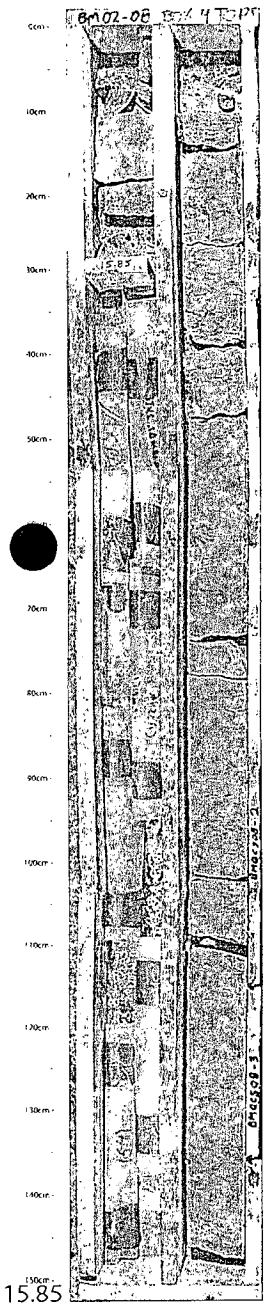
BM02-06B Boxes 1 to 3

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
2002 Drill Program

BM02-08 BOX 4



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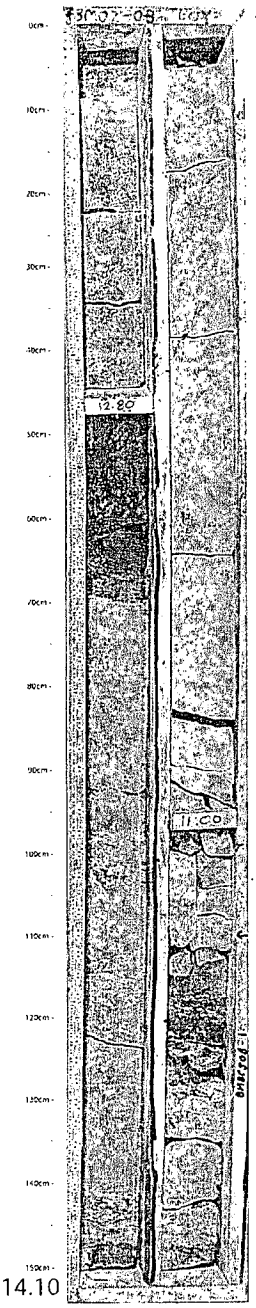

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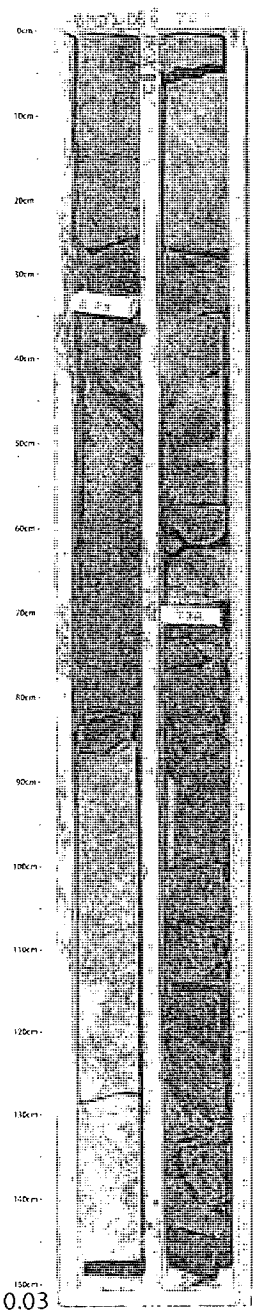

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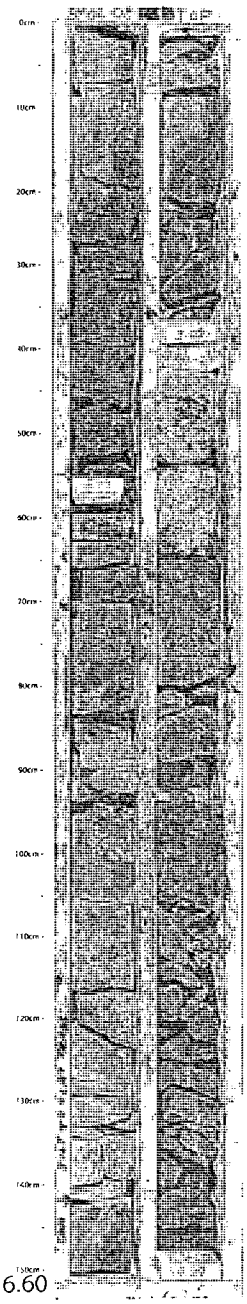

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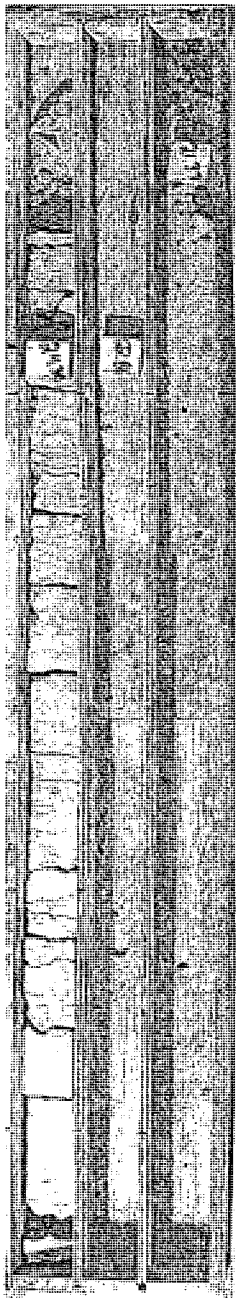
BM02-08 Boxes 1 to 4

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
1996 Drill Program

BM96-04 BOX 3



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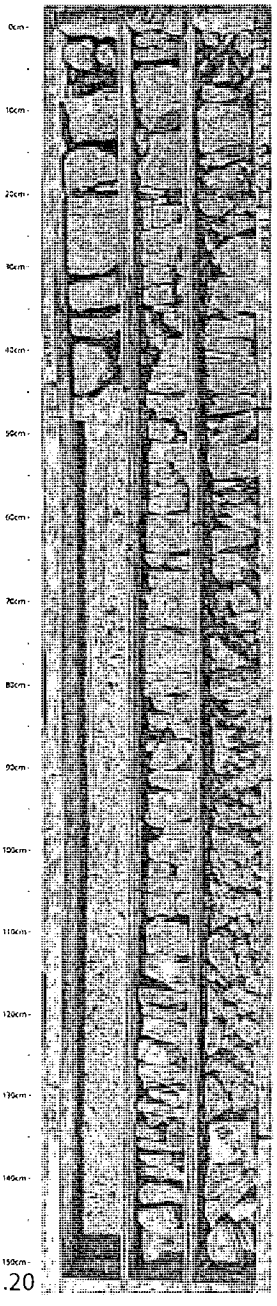

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21.20

BM96-04 BOX 1

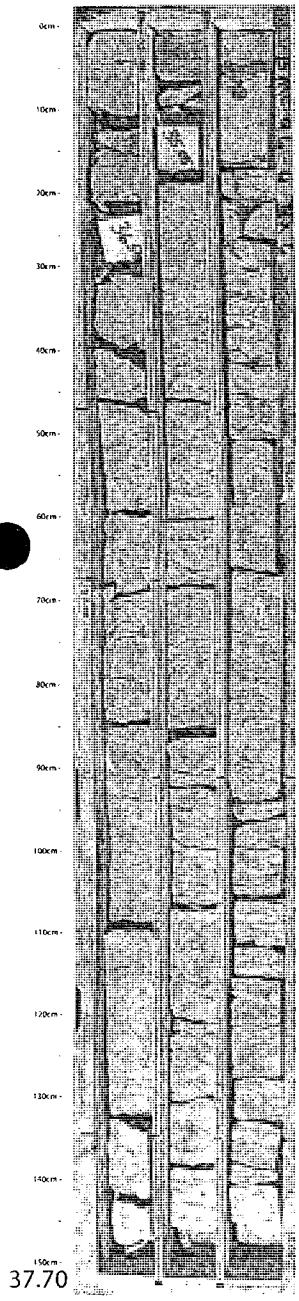
13.7(

16.76

BM96-04 Boxes 1 to 3

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
1996 Drill Program

BM96-04 BOX 6



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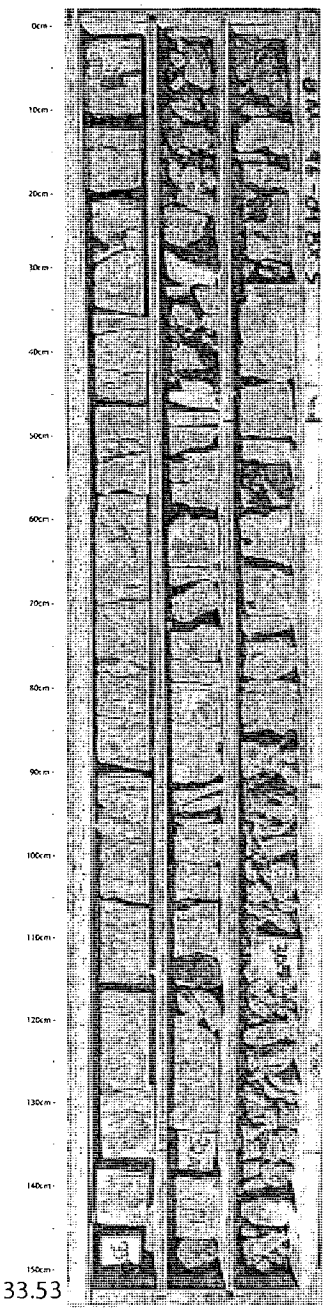

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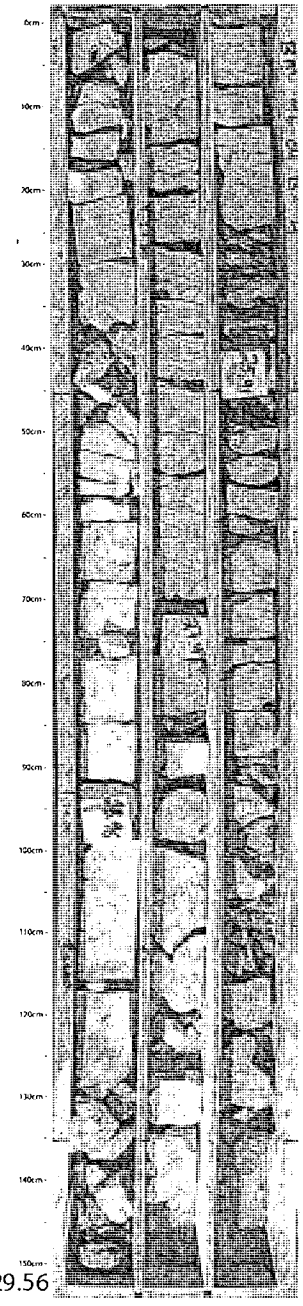

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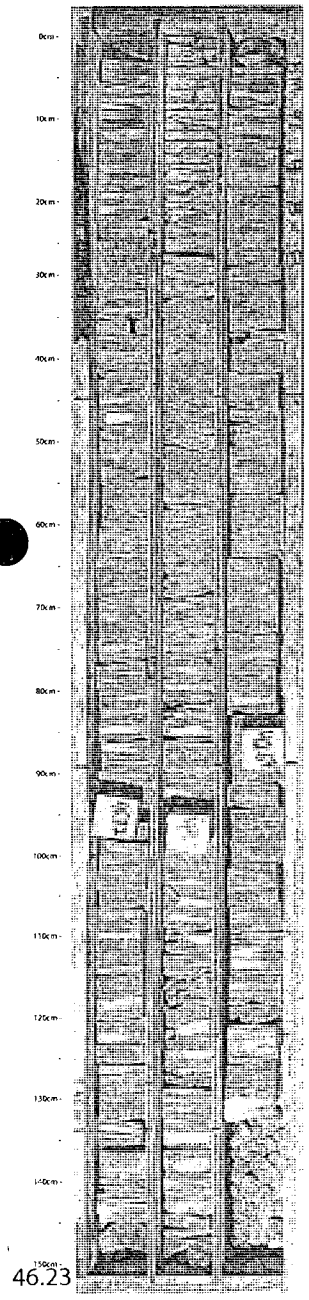
BM96-04 Boxes 4 to 6

Birch Mountain Resources Ltd. - Muskeg Valley Drill Program
1996 Drill Program

BM96-04 BOX 8



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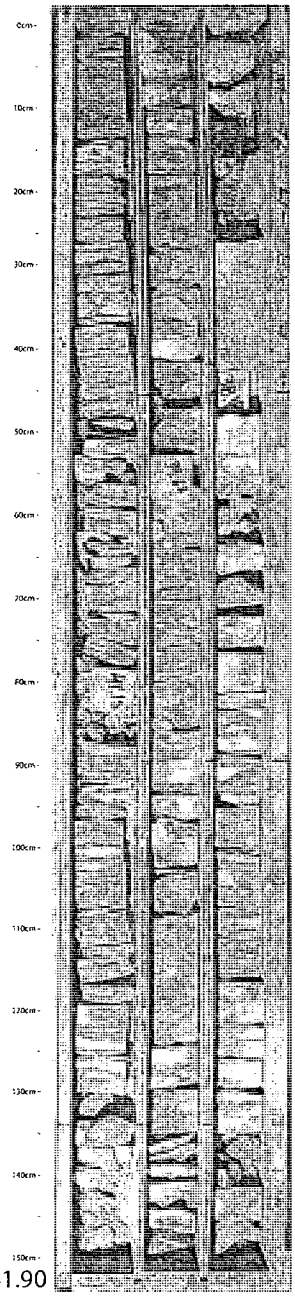

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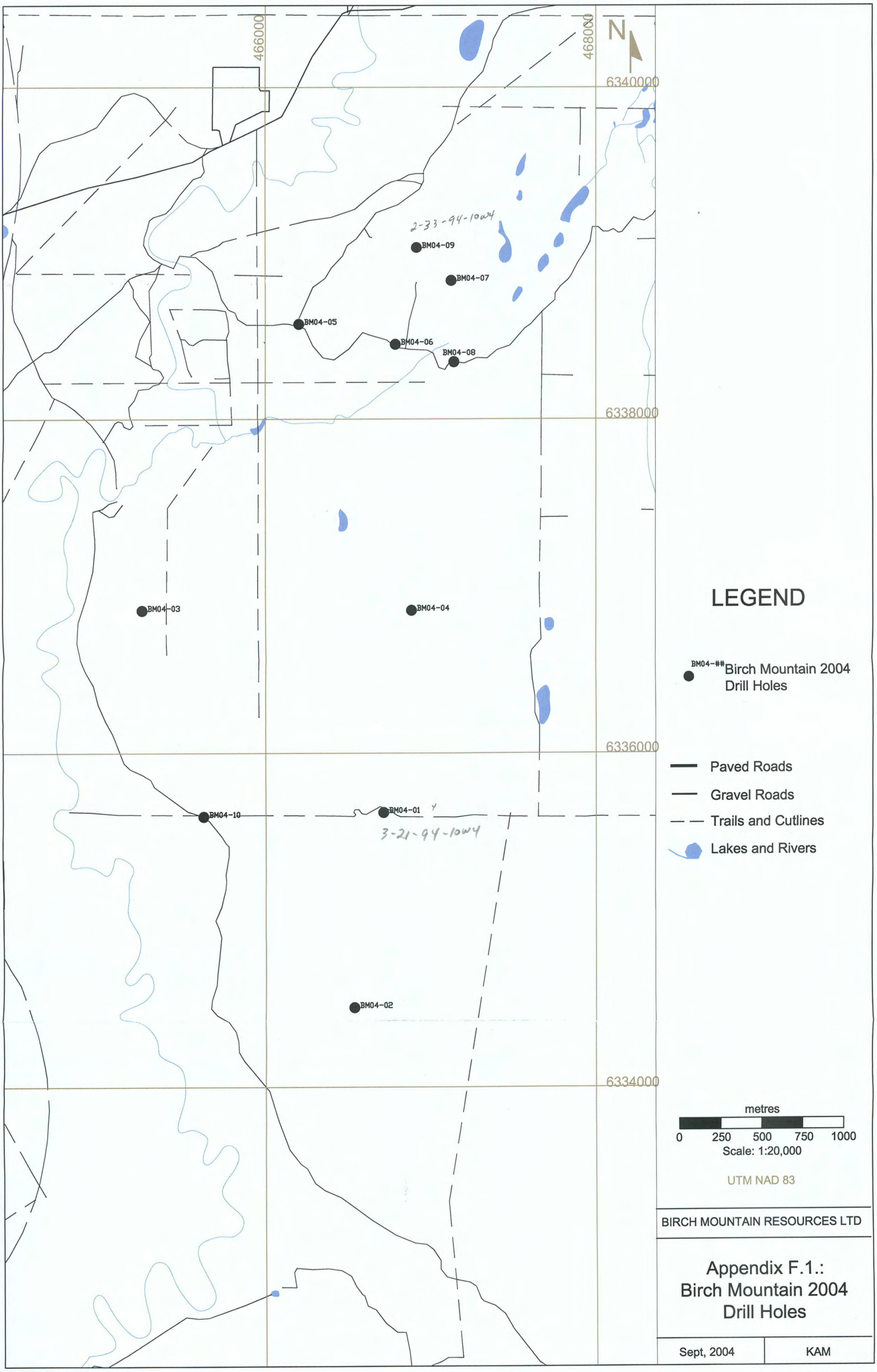
BM96-04 Boxes 7 to 8

Appendix F. Drilling February 2004

F.1. Drill Core Location Map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468000
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6334000
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BM04-09
BM04-07
BM04-05
BM04-06
BM04-08
BM04-03
BM04-04
BM04-10
BM04-01
3-21-94-10W4
BM04-02
LEGEND
BM04-## Birch Mountain 2004 Drill Holes
Paved Roads
Gravel Roads
Trails and Cutlines
Lakes and Rivers
metres
0 250 500 750 1000
Scale: 1:20,000
UTM NAD 83
BIRCH MOUNTAIN RESOURCES LTD
Appendix F.1.:
Birch Mountain 2004
Drill Holes
Sept, 2004
KAM

Appendix F. Drilling February 2004

F.2. Drill Core Logs

Drill Core: *BM04-01*

Easting: 466704.6
Northing: 6335638
Elevation: 279.211

NAD: 83

Max depth: 44.5

Logged by: GK

Date Logged: 3/18/2004

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	8.6	8.6	5			0						Sideritization	5% Recovery - Siderite clasts mixed with poorly sorted sand. Clast diameters range from 1cm to 6cm and ranges from high to low sphericity. Bitumen stained. Rounded edges on clasts except where freshly broken from drill; Shield clasts recovered range in diameter from 1cm to 5cm, medium sphericity; 0.20cm of medium - coarse grained sand at bottom of interval; Hole was not cased and sand likely collected at bottom of hole from above..

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
8.6	9.6	1	100	Nodular limestone in shale matrix	U3	30	< 1 cm	Dark grey	1-3 cm	Grey	2	None	Considerable fracturing from 8.90m to 9.40m as well as at bottom of interval.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
9.6	10.4	0.8	35	Nodular limestone in shale matrix	U3	25	< 1 cm	Dark grey	< 1 cm	Grey	1	None	35% Recovery - Hole not cased; Sand on outside of core; Recovered core is 17cm of nodular limestone in a shale matrix above 10cm of calcareous mud; 1 cm granite clasts found in mud; Drill logs suggest that hole had slumped and sanded in. Core logging supports this. Except mud with clasts should be above the limestone/shale. Was the mud from the shoe put in the core box backwards?;

Mudstone

Drill Core: BM04-01

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
10.4	12.4	2	55	Shale with limestone nodules	U3	50	1-3 cm	Dark grey	< 1 cm	Grey	2	Sideritization	55% Recovery - No Casing in hole; 10cm of grey slightly calcareous mud containing sand and a large 6cm granitic clast at top of recovered core, followed by 100cm of bedded shale with limestone nodules; There Is slight sideritization from the 65cm to 75cm interval section of this bedded shale; The bottom 20cm has extensive bitumen staining and was likely quite fractured. (Can't tell - was in shoe)

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
12.4	14.4	2	5	Not determined	U3			Grey	1-3 cm	Grey	ND	None	5% Recovery - Hole still not cased; Total core recovery 10cm; Large limestone nodules recovered above a mud containing a small shield clast. Nodules are angular unless rounded by drilling. Slight bitumen staining.The mud is a mix of green calcareous mud and drilling mud. Bitumen mixed in with muds; Structure, shale thicknesses and percent not determined due to poor core recovery

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
14.4	15.7	1.3										None	Casing - NO CORE

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
15.7	17.7	2	5	Not determined		0						None	5% Recovery - Grey drilling mud contains a 1 cm shield clast. Unable to make determinations of core characteristics.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
17.7	18.4	0.7	0			0						None	NO CORE RECOVERED.

Drill Core: BM04-01

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
18.4	19.4	1	20	Shale with limestone nodules	U3	50	> 5 cm	Grey	< 1 cm	Light grey	ND	None	20% Recovery - 15cm of soft shale recovered. Very few limestone clasts within recovered shale. (Shale content may be higher). Found 1cm brach in shale; 5cm of fairly competent, thinly bedded, muddy, limestone/shale at bottom of recovered core. 50% shale; Bitumen stained; Quite dense.(still wet)

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
19.4	20.4	1	100	Nodular limestone in shale matrix	U3	30	< 1 cm	Grey	1-3 cm	Light grey	2	None	Bitumen stained along fracturing.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
20.4	23.4	3	30	Nodular limestone in shale matrix	U3	20	< 1 cm	Grey	1-3 cm	Light grey	4	None	30% Recovery - 35 cm of fractured nodular limestone; Bitumen staining along fractured edges; 25cm of nodular limestone in a shale matrix; Considerable fracturing causing brecciation; 30cm of a fossiliferous limestone unit containing brachs and crinoids at base of interval; Hardground at top and bottom of unit, but is not a hardground interval; 5cm Nodular limestone unit in a shale matrix.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
23.4	25.2	1.8	100	Fossiliferous limestone	U2 (MQU)	1	< 1 cm	Light grey	> 5 cm	Pink	1	None	Stromatoporoid Unit - Rare brachs; Minor bitumen staining in fractures and vugs

Boundstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
25.2	25.85	0.65	70	Nodular limestone with wispy shale	U2 (MQU)	7	< 1 cm	Brown	1-3 cm	White	2	None	Nodular Unit - Brecciated from extensive fracturing; Bitumen staining throughout; Core likely lost during drilling due to structure.

Mudstone

Drill Core: *BM04-01*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
25.85	26.1	0.25	100	Bioclastic limestone	U2 (MQU)	5	< 1 cm	Light grey	3-5 cm	Pink	1	None	Peloidal Unit - Bitumen filled stylolite at top of unit; Other fractures are bitumen filled/stained.
				Wackestone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
26.1	26.4	0.3	100	Nodular limestone in shale matrix	U1	15	< 1 cm	Dark grey	1-3 cm	Grey	1	None	Crinoids. Bitumen and bitumen staining along fractures.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
26.4	30	3.6	85	Nodular limestone in shale matrix	U1	10	< 1 cm	Dark grey	1-3 cm	Grey	2	None	0.30m major fracture/fault at top of interval 26.40m - 26.70m; 0.25m long major fracture/fault from interval 27.10m - 27.35m; Shale beds become thinner and less frequent downsection; Brach lag deposit from 29.20m - 29.55m.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30	32.4	2.4	75	Nodular limestone in shale matrix	U1	10	< 1 cm	Dark grey	3-5 cm	Light grey	2	None	Brecciated, high structure interval at approx. 30.40m. +/- 0.60m., lots of bitumen staining; Fracture/fault zone 0.15m below this, bitumen staining; Bitumen staining in fractures in core below this region.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
32.4	35.4	3	5	Nodular limestone in shale matrix	U1	15	< 1 cm	Grey	1-3 cm	Light grey	ND	None	5% RECOVERY; Bitumen and bitumen staining in fractures; Fine fractures throughout interval.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
35.4	37.4	2	7.5	Nodular limestone in shale matrix	U1	5	< 1 cm	Tan	3-5 cm	Pink	ND	None	7.5% RECOVERY; Bitumen filled fracture; Rare crinoid in shale.
				Mudstone									

Drill Core: BM04-01

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
37.4	41.4	4	0			0						None	NO CORE

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
41.4	41.7	0.3	100	Nodular limestone with wispy shale Mudstone	U1	3	< 1 cm	Brown	3-5 cm	Pink	1	None	Bitumen staining along fractures; 41.70m - Bottom of Moberly

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
41.7	44.5	2.7	0	Calcareous shale Mudstone		75	> 5 cm	Green	< 1 cm	Light grey	3	None	Christina; EOH

Drill Core: ***BM04-02***

Easting: 4665536 Max depth: 42 Logged by: GDP

Northing: 6334476 NAD: 83 Date Logged: 3/22/2004

Elevation: 277.54

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	4	4	0	Casing		0						None	0 - 2.5m Quaternary beach sand and gravel at surface; Devonian limestone encountered at 2.5m.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
4	6.5	2.5	5	Undetermined		0					ND	None	Core consists of rounded pieces of light grey limestone to 7 cm along with light brown to light green calcareous mud - looks more like ground up fractured bedrock rather than quaternary. Several of the smaller, more rounded lms pieces have a rusty coating but still react to HCl. The largest (7cm) limestone piece has the UQU charcteristics of light tan colour and conchoidal fracture.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
6.5	9	2.5	70	Nodular limestone in shale matrix	U3	30	1-3 cm	Grey	1-3 cm	Light grey	2	None	1.50 metres of apperantly continuous core, top 20cm consists of similar material to interval above; Very minor bitumen on fractures.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
9	13	4	10	Shaley nodular limestone	U3	40		Green		Light grey	ND	None	Very poor recovery; Abundant ground-up core; Core consists of a few 5 to 15 cm long pieces of light green calcareous shale and a few 2 - 4cm pieces of light grey lms; Interpreting a shale % of 40%.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
13	15.8	2.8	70	Shaley nodular limestone	U3	35	1-3 cm	Dark grey	1-3 cm	Light grey	2	None	20 cm hardground between 14 and 15 metres (14.50?); Recovery improves with depth.
				Mudstone									

Drill Core: BM04-02

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
15.8	21	5.2	100	Nodular limestone in shale matrix	U3	25	1-3 cm	Dark grey	1-3 cm	Light grey	1	None	Blackened clasts at: 15.80-16.00,16.35 and 20.00. NOTE: no 18m depth marker.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
21	24.6	3.6	50	Fossiliferous limestone	U3	20	1-3 cm	Tan	3-5 cm	Pink	5	None	Breccia-filled fracture cutting core at high angle over top 15 cm of core. Interpreting 1.8m lost core to be in this interval as the remaining 1.5m of core is quite competent. Abundant whole brachs and crinoid pieces to 1cm over top 30 cm, hardground at base (at 23.40). Nodular limestone with 30% shale 23.40 - 24.10. Scattered brachs to 2 cm 24.10 - 24.60. NOTE: the bottom 50cm could be incorporated into the calcineable interval of the MQU.

Floatstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
24.6	29.5	4.9	100	Fossiliferous limestone	U2 (MQU)	0		Tan		Pink	2	None	Abundant bitumen staining and live oil. Scattered fractures cut core at 20 to 30 degrees to core axis.

Bindstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
29.5	30	0.5	100	Nodular limestone with wispy shale	U2 (MQU)	5	1-3 cm	Grey	3-5 cm	Light grey	1	None	NOTE: Peloidal bed missing in this core, see interval below.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30	30.7	0.7	100	Mud and oilsand		0						None	Void fill. Green calcareous to slightly de-calcified shale, bitumen saturated sand and minor chalky limestone fragments to 4 cm; finely bedded (mm-scale); showing soft sediment deformation. Top of interval is at top of coring run. NOTE: the peloidal bed should be at approximately 30.00 - 30.20 - base of MQU would be at 30.20.

Drill Core: *BM04-02*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30.7	37.1	6.4	85	Nodular limestone in shale matrix	U1	15	1-3 cm	Light brown	3-5 cm	Light grey	1	None	Fossiliferous interval 31.10 - 32.90 with 10% shale. Hardground at 32.70, blackened clasts at 30.00 and hardground at 36.00.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
37.1	38	0.9	100	Shale with limestone nodules	U1	50	3-5 cm	light green	1-3 cm	Light grey	2	None	
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
38	41.2	3.2	100	Nodular limestone in shale matrix	U1	15	1-3 cm	light brown	3-5 cm	Light grey	1	None	Limestone has slight tan color over bottom metre; Blackened clasts at 38.00 and over bottom 30 cm. Hardground at 40.60; Concentration of small (1-2mm) marcasite nodules at top and bottom of interval.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
41.2	42	0.8	100	Calcareous shale		80	> 5 cm	light green	< 1 cm	Light grey	1	None	Christina Member at 41.20. Very minor disseminted marcasite, some may be after pyrrhotite. E.O.H. at 42.00.
				Mudstone									

Drill Core: *BM04-03*

Easting: 465346.1 Max depth: 45 Logged by: GDP

Northing: 6336845 NAD: 83 Date Logged: 3/22/2004

Elevation: 275.68

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	2.2	2.2	0	No core		0						None	no core recovered; 0 - 1.2m Quaternary beach sand; Devonian limestone encountered at 1.2m.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
2.2	3	0.8	25	Massive limestone	U4 (UQU)	0			> 5 cm	Tan		None	UQU - Clasts of bitumen stained tan lms to 5cm. Clasts have been moderately rounded by drilling. Conchoidal fracture apparent. No Quaternary or McMurray cave observed.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
3	4.7	1.7	10	Not determined	U4 (UQU)	0						None	Interval comprises tan and light grey clasts of lms to 5 cm moderately rounded by drilling along with small (<1cm) chips of light green calcareous shale. Interpretation is that there is a more nodular interval than usually seen in the UQU through this interval.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
4.7	6	0	85	Massive limestone	U4 (UQU)	5	1-3 cm	Light grey	> 5 cm	Tan	1	None	Massive to nodular limestone. Interval 4.80 - 5.00 consists of nodular limestone with 10% shale; light grey nodules, light grey shale. Remainder of core is massive UQU-looking but slightly more tan-grey than the distinct tan of the interval 2.20 - 3.00.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
6	7.6	1.6	10	Shale with limestone nodules	U3	50		Dark grey				None	Only calcareous shale recovered with a 10% recovery indicates this interval must be quite shaley. Shale% reported here is speculative.

Mudstone

Drill Core: BM04-03

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
7.6	9.6	2	100	Nodular limestone in shale matrix	U3	15	1-3 cm	Dark grey	3-5 cm	Light grey	1	None	
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
9.6	13.5	4	100	Shaley nodular limestone	U3	50	1-3 cm	Dark grey	1-3 cm	Light grey	2	None	
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
13.5	17.5	5	100	Nodular limestone in shale matrix	U3	25	1-3 cm	Dark grey	1-3 cm	Light grey	1	None	Gradational lower contact over approximatly 50 cm.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
17.5	21	2.5	90	Shaley nodular limestone	U3	35	1-3 cm	Dark grey	1-3 cm	Light grey	1	None	Blackened clasts at 18.05- 18.15, 18.35-18.40, 20.10-20.20
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
21	24.8	3	90	Nodular limestone in shale matrix	U3	25	1-3 cm	Dark grey	1-3 cm	Light grey	3	None	Becoming interbedded over bottom metre.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
24.8	26	1.2	40	Nodular limestone in shale matrix	U3	25	1-3 cm	Grey	1-3 cm	Tan	5	see description	Shale matrix has been altered to a bright green color. Lms nodules may have been altered from grey to tan color as well.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
26	30	4	100	Fossiliferous limestone	U2 (MQU)	0	< 1 cm	Tan	> 5 cm	Pink	3	None	Stromatoporoid - Several bitumen-stained fractures cut core at 20 - 30 degrees to core axis.
				Bindstone									

Drill Core: *BM04-03*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30	30.3	0.3	50	Nodular limestone with wispy shale	U2 (MQU)	5	< 1 cm	Tan	> 5 cm	Tan	ND	None	Poor recovery.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30.3	30.6	0.3	100	Bioclastic limestone	U2 (MQU)	0	< 1 cm	Tan	> 5 cm	Pink	0	None	Hardground surface near base.
				Wackestone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30.6	36	5.3	90	Nodular limestone with wispy shale	U1	10	< 1 cm	Tan	> 5 cm	Pink	2	ıer, see descript	Core 32.0 - 33.0 shows a light grey shade along one half (alteration?). Brachiopod-rich interval 33.90 - 34.30. 10cm hardground at base

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
36	39.6	3.6	90	Nodular limestone in shale matrix	U1	15	1-3 cm	Dark grey	3-5 cm	Light grey	2	None	Brachiopod bioclastic bed 37.00 - 37.100.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
39.6	40.3	0.7	100	Shaley nodular limestone	U1	50	> 5 cm	Grey	< 1 cm	Light grey	3	None	
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
40.3	43.4	3.1	100	Nodular limestone in shale matrix	U1	15	3-5 cm	Tan	3-5 cm	Light grey	3	None	Several bitumen-stained fractures cut core at 20 - 10 degrees to core axis. Hardground at 43.00 and at base of interval. Abundant marcasite nodules to 2 cm within hardground at base of interval.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
43.3	45	1.7	100	Calcareous shale		70	> 5 cm	Green	1-3 cm	Grey	2	None	Scattered marcasite (1%) in nodules to 1 cm and lining small vertical fractures. E.O.H. at 45.00
				Mudstone									

Drill Core: *BM04-04*

Easting: 466874.8 Max depth: 46 Logged by: GK

Northing: 6336845 NAD: 83 Date Logged: 3/23/2004

Elevation: 279.468

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	3.8	3.8	0	n/a		0						None	No Core - Backhoe pit revealed 1m of organic rich muskeg followed by 2.8m of well sorted Quaternary beach sand.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
3.8	6.8	3	15	Calcareous shale	U3	80	1-3 cm	Grey	< 1 cm	Light grey	3	None	15% RECOVERY - Upper 20 cm broken up due to removal from drill shoe.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
6.8	9	2.2	35			0						None	Cave fill - Bitumen stained white limestone nodules and McMurray sands in large void. Some green muds mixed in with McMurray. Very fractured and ground up.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
9	12	3	10	Not Determined	U3	0						None	10% RECOVERY - Mostly drilling mud, but there is some green mud or shale that was recovered from the interval.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
12	13	1	20	Not Determined	U3	0						None	20% RECOVERY - 5 cm of large rounded white limestone nodules in drilling mud above 15cm of green mud/shale mixed in with drilling mud. This interval is speculative to be quite shaley due to poor recovery. Some fresh bitumen on limestone nodule.

Drill Core: BM04-04

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
13	17.75	4.75	85	Nodular limestone in shale matrix	U3	15	< 1 cm	Grey	1-3 cm	Light grey	2	None	Several fractures - all fractures are bitumen filled with some live oil. Large scale fractures from 13.20m - 13.30m; 13.60m - 14.10m and 15.70m - 15.90m; Bitumen filled and stained. Some live oil.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
17.75	18	0.25	100	Nodular limestone in shale matrix	U3	20	< 1 cm	Tan	< 1 cm	Light grey	2	None	Bitumen staining along fractures.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
18	21	3	50	Shaley nodular limestone	U3	30	< 1 cm	Grey	< 1 cm	Light grey	2	None	50% RECOVERY - 20cm bitumen, live oil fracture 10cm down from top of recovered core. (depths uncertain due to recovery)
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
21	23.35	2.35	80	Cave fill	U3							None	Green mud deposited varying from high angle at base of karst hole to horizontal at top of hole. Several bitumen filled McMurray clasts within mud. McMurray with bitumen and live oil at top of interval.
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
23.35	24.4	1.05	100	Nodular limestone in shale matrix	U3	15	< 1 cm	Brown	1-3 cm	Tan	2	None	Nodule size increases down interval; Bioclastic interval from 23.55m to 23.90m. Contains brach shell fragments and crinoids; Some small fractures throughout interval and a large fracture/fault from 24.30m to 24.40m. Bitumen staining along fractures.
				Wackestone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
24.4	27.6	3.2	100	Fossiliferous limestone	U2 (MQU)	3	< 1 cm	Tan	> 5 cm	Pink	1	None	MQU - Stromatoporoid Unit; Bitumen and bitumen staining within permeable regions and minor fractures in strom.
				Boundstone									

Drill Core: BM04-04

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
27.6	28.05	0.45	75	Nodular limestone with wispy shale	U2 (MQU)	5	< 1 cm	Brown	1-3 cm	Pink	3	None	MQU - Nodular Unit - Extensive fracturing in nodular unit; Bitumen staining and bitumen along fractures. Part of nodular unit is likely missing due to structure.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
28.05	28.1	0.05	100	Bioclastic limestone	U2 (MQU)	5	< 1 cm	Grey	3-5 cm	Tan	2	None	MQU - Peloidal Unit; Only 5cm recovered, remaining peloidal unit likely lost due to structure. Bitumen along fractures.

Wackestone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
28.1	30	1.9	0			0						None	No Core-Not recovered in drilling

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30	32.75	2.75	90	Nodular limestone in shale matrix	U1	20	< 1 cm	Dark grey	1-3 cm	Grey	3	None	Fracturing sigificant throughout interval. Major fault/fracture at top of interval, sand and mud. Other major fractures from: 30.10m - 30.20m and 31.10m - 31.50m, Bitumen staining along fractures. Limestone nodules in shale become smaller downsection; Brachs at bottom of interval from 31.95m - . 32.55m and 32.70m to 32.75m.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
32.75	37.35	4.6	80	Nodular limestone in shale matrix	U1	15	< 1 cm	Dark grey	3-5 cm	Grey	3	None	Clean 20cm pink limestone unit at top of interval. Contains some brachs. Major 40cm long fault/fracture beneath with bitumen and live oil; Fault/ fracture from 34.20m - 34.45m, bitumen staining/live oil; Occassional large brachs in shale.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
37.35	38.6	1.25	25	Shale with limestone nodules	U1	55	< 1 cm	Grey	< 1 cm	Grey	3	None	25% RECOVERY - small rounded and angular limestone clasts in shale

Mudstone

Drill Core: *BM04-04*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
38.6	41.65	3.05	75	Nodular limestone in shale matrix	U1	15	< 1 cm	Dark grey	1-3 cm	Grey	2	None	Hardground at top of interval. Brachs in shale at base of hardground; Major fault/fracture @ 39.00m. Mud and small clasts; Bitumen staining along other minor fracture surfaces; Rare sulphides in limestone; Hardground at base of interval. (Contact with Christina)

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
41.65	42	0.35	100	Calcareous shale		0						None	Christina - *EOH*

Drill Core: *BM04-05*

Easting: 466203
Northing: 6338567 NAD: 83
Elevation: 282.68

Max depth: 46

Logged by: GDP

Date Logged: 3/25/2004

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	6	6	15	Massive limestone	U4 (UQU)	5	< 1 cm	Tan	> 5 cm	Pink	3	None	UQU at surface at this location. Rusty weathering and soil/roots along fracture at 2.8m; Bitumen staining on fractures throughout; Bottom UQU contact is at end of drill run.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
6	9	3	30	Not determined, see description	U3	0						None	40 cm of fault gouge with pink and grey lms clasts on a calcareous mud matrix; 40 cm shale with lms nodules, 60% shale; 20 cm of nodular lms in shale matrix, similar properties to underlying interval.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
9	12	3	5	Not determined, see description	U3	0						None	5% RECOVERY - Core consists of tan lms nodules to 3 cm with very minor green calcareous shale. This interval is likely a relatively shale-poor nodular limestone.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
12	12.5	0.5	75	Not determined, see description		0						None	50 cm interval was drilled without a core barrel, and therefore the core consists of small chips of rock to 2 cm. Majority of chips are green calcareous shale indicating the interval is relatively shale-rich, perhaps 50%.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
12.5	17	4.5	70	Shaley nodular limestone	U3	40	1-3 cm	Dark grey	1-3 cm	Grey	2	None	
				Mudstone									

Drill Core: *BM04-05*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
17	20.6	3.6	85	Nodular limestone in shale matrix	U3	25	1-3 cm	Dark grey	1-3 cm	Grey	3	None	Increase in shale % downward. 5 cm bracciated zone at top of interval
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
20.6	26.1	5.5	70	Shaley nodular limestone	U3	35	1-3 cm	Dark grey	1-3 cm	Grey	4	None	Interval is interbedded/nodular in places; Blackened clasts 20.65-20.70, blackened clasts and hardground 25.30 - 25.40; Highly fractured core with 5cm thick brecciated sections scattered throughout roughly every meter.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
26.1	26.5	0.4	100	Nodular limestone in shale matrix	U3	20	1-3 cm	Grey	1-3 cm	Grey	2	None	Hardground with blackened clasts 26.10 - 26.25. Abundant brachiopods throughout. Lower contact shows an erosional "embayment" cutting 10cm down into the strom unit.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
26.5	29.6	3.1	100	Fossiliferous limestone	U2 (MQU)	3	< 1 cm	Tan	> 5 cm	Pink	1	None	Small (3cm) pocket of brachiopod hash with light brown speckles at the top of the interval, similar to that seen in BM02-02 above the MQU.
				Bindstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
29.6	30.35	0.75	100	Nodular limestone with wispy shale	U2 (MQU)	10	< 1 cm	Brown	> 5 cm	Tan	2	None	
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30.35	30.5	0.15	100	Bioclastic limestone	U2 (MQU)	3	< 1 cm	Tan	> 5 cm	Pink	0	None	Peloidal unit.
				grainstrone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30.5	33.8	3.3	65	Nodular limestone in shale matrix	U1	15	1-3 cm	Dark grey	1-3 cm	Grey	2	None	
				Mudstone									

Drill Core: *BM04-05*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
33.8	36	2.2	60	Nodular limestone with wispy shale	U1	10	< 1 cm	Brown	> 5 cm	Pink	2	None	Brachiopod-rich interval 34.30m - 34.60m; Hardground at 35.70m and 35.90m.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
36	40.6	4.6	75	Nodular limestone in shale matrix	U1	15	1-3 cm	Dark grey	> 5 cm	Light grey	2	None	50% recovery over top 2 metres, 100% recovery below. Blackened clasts 40.55m - 40.60m.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
40.6	41.4	0.8	90	Shale with limestone nodules	U1	70	> 5 cm	Green	< 1 cm	Grey	3	None	
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
41.4	44.5	3.1	90	Nodular limestone in shale matrix	U1	10	1-3 cm	Brown	> 5 cm	Tan	2	None	Hardground with blackened clasts and 5% pyrite/marcasite (1-3 mm aggregates) 41.40m - 41.60m. Hardground 44.30m - 44.50m. Base of Moberly at 44.50m.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
44.5	46	1.5	100	Shale with limestone nodules		60	> 5 cm	Green	< 1 cm	Grey	2	None	Christina Fm. at 44.50m. E.O.H. at 46.00m
				Mudstone									

Drill Core: *BM04-06*

Easting: 466786.5 Max depth: 45 Logged by: GDP

Northing: 6338446 NAD: 83 Date Logged: 3/24/2004

Elevation: 284.31

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	2	2	0			0						None	Approximatly 2 metres of quaternary till overlying limestone exposed by backhoe at surface.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
2	2.4	0.4	40	Massive limestone	U4 (UQU)	5	< 1 cm	Tan	> 5 cm	Tan	ND	None	40% RECOVERY - Core consists of a handfull of rounded tan qtzite and crystaline rocks to 3 cm overlying angular UQU clasts to 7 cm (full core width). NOTE: no casing used down to 9 m resulting in quaternary cave at top of drill runs 2.0 - 2.4, 2.4 - 4.4, 4.4 - 6.4, 6.4 - 9.0.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
2.4	4.4	2	15	Massive limestone	U4 (UQU)	5	< 1 cm	Tan	> 5 cm	Tan	ND	None	15% RECOVERY - One sub-rounded 5cm piece of sideritized lms at top of interval underlain by UQU clasts to 10cm long (full core width). Base of UQU interpreted to be at 4.40.

Mudstone

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
4.4	6.4	2	5	Not determined, see description	U3	0						None	5% RECOVERY - Core consists of well rounded clasts of crystaline rocks, tan qtzite and siderite to 7 cm along with angular chips of calcareous green shale. Interval is likely quite shaley.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
6.4	9	2.6	15	Not determined, see description	U3	0						None	15% RECOVERY - Core consists of well rounded clasts of crystaline rocks, tan qtzite and siderite to 7 cm along with angular chips of calcareous green shale. Bottom 20 cm is nodular lms with 15% shale.

Drill Core: *BM04-06*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
9	17.4	8.4	80	Shaley nodular limestone	U3	50	1-3 cm	Green	1-3 cm	Grey	3	None	40% recovery 9.0 - 12.0, 100% 12.0 - 17.4.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
17.4	22	4.6	40	Nodular limestone in shale matrix	U3	20	1-3 cm	Light grey	1-3 cm	Grey	5	None	Abundant fracturing and localized brecciation throughout. Moderate bitumen staining on fractures.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
22	25.6	3.6	80	Shaley nodular limestone	U3	35	1-3 cm	Green	1-3 cm	Grey	3	None	Moderate bitumen staining on fractures.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
25.6	29.3	3.7	100	Fossiliferous limestone	U2 (MQU)	5	< 1 cm	Tan	> 5 cm	Pink	1	None	Top 30 cm contains distinct light grey "spicules", 1mm x 2 cm. Hardground at 25.60.
				Bindstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
29.3	30.05	0.75	90	Nodular limestone with wispy shale	U2 (MQU)	10	< 1 cm	Tan	1-3 cm	Tan	1	None	
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30.05	30.3	0.25	100	Bioclastic limestone	U2 (MQU)	5	< 1 cm	Tan	> 5 cm	Pink	0	None	1% disseminated pyrite/marcasite in aggregates to 3 mm.
				grainstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
30.3	39.6	9.3	75	Nodular limestone in shale matrix	U1	15	< 1 cm	Light grey	3-5 cm	Grey	3	None	15% recovery 36.0 - 39.0, 100% elsewhere. Consistent lithology. Abundant sub-vertical fractures throughout. Brachiopod-rich interval 34.10 - 34.20. Hardground at 35.60 - 36.00 and 39.55 - 39.60
				Mudstone									

Drill Core: ***BM04-06***

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
39.6	40.3	0.7	90	Shale with limestone nodules	U1	60	> 5 cm	Green	< 1 cm	Grey	3	None	
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
40.3	43.3	3	90	Nodular limestone in shale matrix	U1	15	1-3 cm	Tan	> 5 cm	Tan	4	None	Gradual transition downward in both lms and shale color from grey to tan.Brecciated interval 40.80 - 40.90. Hardground 40.30 - 40.35 and 43.25 - 43.30. Base of Moberly at 43.30
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
43.3	45	1.7	100	Shale with limestone nodules		60	> 5 cm	Green	< 1 cm	Grey	2	None	Top of Christina at 43.30. E.O.H. at 45.
				Mudstone									

Drill Core: *BM04-07*

Easting: 467125
Northing: 6338830 NAD: 83
Elevation: 280.1

Max depth: 27

Logged by: GK

Date Logged: 2/24/2004

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	4	4	0			0						None	Casing - NO CORE - 1m of muskeg and 3m of limestone. Suspect that the limestone is crystalline fossil rich high calcium.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
4	5.35	1.35	25	Bioclastic limestone grainstone	U3	5	< 1 cm	Light grey	> 5 cm	Tan	1	None	Brach rich fossiliferous limestone.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
5.35	5.75	0.4	100	Bioclastic limestone Rudstone	U3	1	< 1 cm	Light grey	> 5 cm	Grey	1	None	Large brach fragments (1-2cm) and crinoids (0.75cm). Lag deposit. Lots of live oil, bitumen and bitumen staining in interval.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
5.75	6.5	1.75	100	Bioclastic limestone Rudstone	U3	1	< 1 cm	Light grey	> 5 cm	Grey	1	None	Brach fragments 0.2cm - 2cm; Some bitumen staining, very little bitumen and live oil.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
6.5	6.95	0.45	100	Bioclastic limestone Rudstone	U3	5	< 1 cm	Tan	> 5 cm	Grey	0	None	Brachs from 0.2cm to 1.5cm. 1-2mm crinoids.

Drill Core: BM04-07

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
6.95	10.05	3.1	100	Fossiliferous limestone	U2 (MQU)	1	< 1 cm	Dark grey	> 5 cm	Pink	1	None	MQU - Stromatoporoid Unit; Large vugs, no btumen or bitumen staining in some vugs. Other fractures and vugs are bitumen stained, and full of bitumen and live oil. Generally core is very low in bitumen content relative to others cores.
				Boundstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
10.05	11	0.95	100	Nodular limestone with wispy shale	U2 (MQU)	5	< 1 cm	Brown	1-3 cm	Grey	1	None	MQU - Nodular ; Fractured from drilling.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
11	11.25	0.25	100	Bioclastic limestone	U2 (MQU)	3	< 1 cm	Brown	> 5 cm	Grey	1	None	MQU - Peloidal; Rare crinoids.
				Wackestone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
11.25	15.6	4.35	95	Nodular limestone in shale matrix	U1	15	< 1 cm	Dark grey	< 1 cm	Light grey	1	None	Occasional large brachs, 1cm - 1..5cm from 14.75 m to 14.90m. Minor vertical fracturing @15.00m, filled with grey mud.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
15.6	21.4	5.8	60	Nodular limestone in shale matrix	U1	15	< 1 cm	Dark grey	1-3 cm	Light grey	3	None	Large vertical fault/fracture from: 15.75m - 17.35m (cave - missing core, has 10cm of calcareous mud with small limestone clasts), 18.05m - 18.10m (bitumen staining), 19.75m -19.95m, 20.25m - 21.40m (missing core - cave, with 55cm of calcareous mud and small rounded limestone clasts).
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
21.4	24	2.6	100	Nodular limestone in shale matrix	U1	10	< 1 cm	Brown	1-3 cm	Pink	2	None	Major fracture from 21.50m to 21.60m, bitumen staining on fracture edge., Sulphides @ 23.20m; Minor fracturing in upper part of interval, was broken up by drill; Minor brachs bottom 50cm of interval.
				Mudstone									

Drill Core: *BM04-07*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
24	27	3	100	Shale with limestone nodules		0						None	Christina Formation - EOH

Drill Core: *BM04-08*

Easting: 467141 Max depth: 39 Logged by: GDP

Northing: 6338341 NAD: 83 Date Logged: 3/26/2004

Elevation: 280.58

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	2	2	0	Organic material		0						None	Casing to 9.70m, no core. Approximatly 2 metres of organic matrial.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
2	9.7	7.7	0	Till		0						None	Casing to 9.70m, no core; 2 - 9.70m Crystaline rock cuttings interpreted to be glacial - fluvial gravel returned to surface while setting casing.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
9.7	14	4.3	60	Mud and sand		0						None	Green non-calcareous mud (slight HCl reacation over top 40cm). Disseminated sand grains throughout. Scattered sub-horizontal lenses of bituminous and non-bituminous sand to 2 cm. Occasional sub-rounded clast of grey lms, sideritized lms and oilsand to 5 cm, concentrated at base of interval. Faint sub-horizontal bedding, often disrupted by larger lms and oilsand clasts. Phyllitic sheen on fracture surfaces.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
14	18	4	30	Shaley nodular limestone	U3	40	1-3 cm	Green	1-3 cm	Grey	ND	None	Core badly broken up but original horizontal bedding and sedimentary characteristics still observable. No de-calcification observed. NOTE: top 30 cm of core is nodular lms with 25% shale.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
18	18.4	0.4	100	Bioclastic limestone	U3	0	< 1 cm	Tan	> 5 cm	Pink	0	None	Brachiopod hash, some whole brachs to 1.5cm. Very minor bitumen staining.
				Rudstone									

Drill Core: BM04-08

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
18.4	22.1	3.7	100	Fossiliferous limestone	U2 (MQU)	5	< 1 cm	Tan	> 5 cm	Pink	1	None	Strom. Unit. Minor bitumen staining, less than observed in 2002 drill cores. Abundant laminated stroms. Slightly shaley (10%) interval 20.30 - 20.40. Hardground at 22.05 - 22.10.
				Bindstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
22.1	22.55	0.45	100	Nodular limestone with wispy shale	U2 (MQU)	10	1-3 cm	Brown	1-3 cm	Tan	2	None	Minor bitumen staining.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
22.55	22.8	0.25	100	Bioclastic limestone	U2 (MQU)	0			> 5 cm	Pink	1	None	Peloidal unit.
				grainstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
22.8	26.9	4.1	80	Nodular limestone in shale matrix	U1	15	1-3 cm	Dark grey	1-3 cm	Grey	2	None	Minor brachiopods.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
26.9	29.7	2.8	60	Nodular limestone in shale matrix	U1	10	< 1 cm	Tan	> 5 cm	Tan	5	None	Brachiopod-rich nodular limestone. Intense fracturing/bracciation 27.30 - 27.40 and 27.60-27.70. Poor recovery (50%) below 27.70. 1% disseminated fine grained pyrite/marcasite. Hardground at 27.15.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
29.7	32.7	3	100	Nodular limestone in shale matrix	U1	15	1-3 cm	Grey	> 5 cm	Grey	1	None	Scattered brachiopods. Blackened clasts 32.60 - 32.70. 1% disseminated fine grained pyrite/marcasite.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
32.7	33.1	0.4	70	Shale with limestone nodules	U1	60	> 5 cm	Grey	< 1 cm	Grey	4	None	Poor recovery due to fracturing.
				Mudstone									

Drill Core: *BM04-08*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
33.1	36	2.9	100	Nodular limestone in shale matrix	U1	15	1-3 cm	Brown	> 5 cm	Tan	2	None	Hardground at 35.65 and 35.90-36.00. Abundant crinoid and pelloids between hardgrounds. BASE Moberly @ 36.00.
				Mudstone									

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
36	39	3	100	Shale with limestone nodules		60	> 5 cm	Green	< 1 cm	Grey	2	None	1-2% disseminated fine grained pyrite/marcasite. E.O.H. @ 39.00.
				Mudstone									

Drill Core: *BM04-09*

Easting: 466915
Northing: 6339030 NAD: 83
Elevation: 279.47

Max depth: 27

Logged by: GDP

Date Logged: 3/26/2004

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	3	3	0	Till		0						None	Casing to 4.0 metres. Limestone reported at 3.0 metres. No record of lithology 0 - 3m.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
3	4	1	0	Not determined, see description	U3	0						None	Casing to 4.0 metres. Limestone encountered at 3.0 metres, no record of lms lithology.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
4	5.9	1.9	8	Not determined, see description	U3	0						None	Core consists of angular chips of green calcareous shale and grey limestone to 3 cm. Interval is possibly quite shaley.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
5.9	6.6	0.7	90	Fossiliferous limestone Rudstone	U3	30	1-3 cm	Green	< 1 cm	Grey	2	None	Brachipods to 2cm (some whole) and abundant crinoid fragments. Blackened clasts to 1 cm throughout. Minor bitumen staining. Unit apears to be a more shaley facies of correlative fossiliferous unit overlying MQU observed in other holes (BM02-05, BM04-07 and others).

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
6.6	10.4	3.8	90	Fossiliferous limestone Bindstone	U2 (MQU)	5	< 1 cm	Tan	> 5 cm	Pink	1	None	Strom. Unit. Very minor bitumen staining.

Drill Core: *BM04-09*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
10.4	11.5	1.1	100	Nodular limestone with wispy shale	U2 (MQU)	10	< 1 cm	Tan	> 5 cm	Tan	1	None	
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
11.5	11.7	0.2	100	Bioclastic limestone	U2 (MQU)	5	< 1 cm	Tan	> 5 cm	Pink	1	None	Peloidal Unit. Minor sulphides along fractures.
				grainstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
11.7	15.2	3.5	100	Nodular limestone in shale matrix	U1	15	1-3 cm	Dark grey	1-3 cm	Grey	3	None	3-4 cm wide fracture 14.00 - 14.20, filled with green calcareous mud, sand and subrounded lms fragments to 1 cm, cuts core at 30 degrees to core axis. Gradational change downward in lms and shl color from grey to tan. 1% disseminated fine grained sulphides.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
15.2	17.8	2.6	100	Nodular limestone in shale matrix	U1	10	< 1 cm	Tan	> 5 cm	Tan	1	None	Fossiliferous nodular limestone, 10% brachiopods - concentrated at top of interval. Hardgrounds at 17.50 and 17.75. Blackened clasts throughout.
				Floatstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
17.8	20.9	3.1	100	Nodular limestone in shale matrix	U1	15	1-3 cm	Dark grey	> 5 cm	Grey	1	None	Scattered brachiopods and crinoid fragments. Blackened clasts over bottom 5 cm.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
20.9	22.1	1.2	40	Nodular limestone in shale matrix	U1	60	> 5 cm	Green	< 1 cm	Grey	4	None	Core very brocken up. Odd rounded piece of crystaline rock = cave.
				Mudstone									
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
22.1	24.6	2.5	100	Nodular limestone in shale matrix	U1	15	1-3 cm	Tan	1-3 cm	Tan	1	None	Hardground @ 24.35 and 24.50. BASE Moberly @ 24.60.
				Mudstone									

Drill Core: *BM04-09*

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
24.6	27	2.4	100	Shale with limestone nodules Mudstone		70	> 5 cm	Green	< 1 cm	Grey	2	None	1% disseminated fine grained sulphides. E.O.H. @ 27.00.

Drill Core: *BM04-10*

Easting: 465625
Northing: 6335620
NAD: [redacted]
Elevation: 271.51

Max depth: 8.5

Logged by: GDP

Date Logged: 3/26/2004

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
0	4.5	4.5	20	Not determined, see description		0						None	Core consists of: 40cm organic material; 25cm rounded clasts of crystaline rock, siderite, tan qtzite; 20 cm tan nodular lms with 10% shale (UQU-looking). NOTE: no depth marker above 4.5m. UQU-looking material is not a clast, has no rounding on any faces and shows horizontal bedding = not transported. Interpretation is UQU cored in second run with quaternary cave recovered above it. UQU at 4.0?

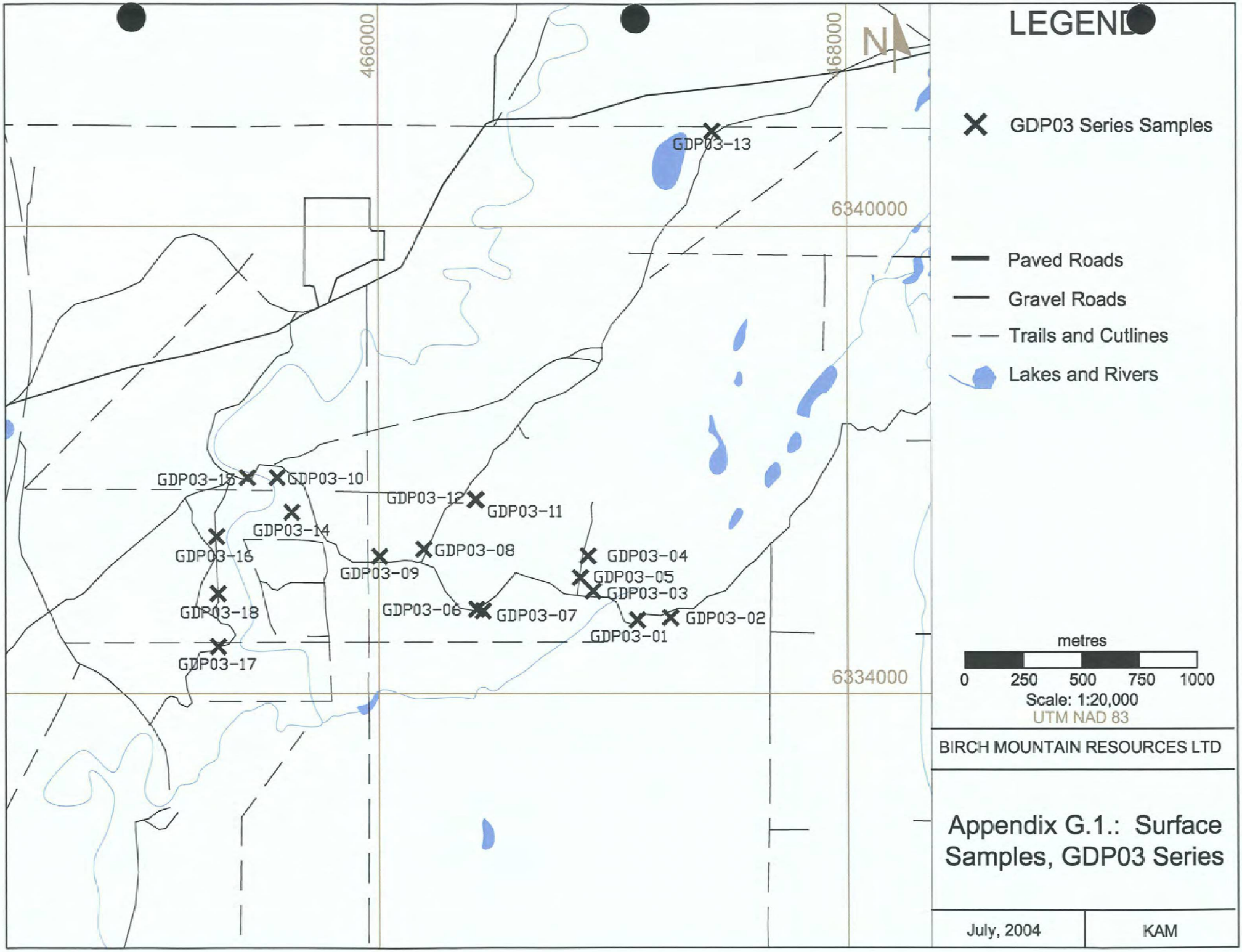
From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
4.5	5.5	1	40	Not determined, see description		0						None	Core consists of: couple of 5 cm rounded clasts of bituminous sandstone; 10cm green calcareous mud; 20 cm of tan nodular lms with 10% shale. Likely quaternary cave on UQU. NOTE: in both this and the overlying interval the UQU-looking material is not a clast, has no rounding on any faces and shows horizontal bedding = not transported.

From	To	Thickness	Recovery	Lithology	Unit	Shale%	Shale Thickness	Shale Colour	Lms Nodule Size	Lms Colour	Structure	Alteration	Description
5.5	8.5	3	0	Not determined, see description		0						None	rounded boulders to 5 cm of crystaline rock, oilsand, tan qtzite. Rare angular clast of UQU-looking lms to 2 cm. Hole abandonded at 8.5 m.

APPENDIX G

Appendix G. Field Mapping and Sampling July 2003

G.1. Sample Location Map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6340000
6334000
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GDP03-15
GDP03-10
GDP03-12
GDP03-11
GDP03-14
GDP03-16
GDP03-08
GDP03-09
GDP03-04
GDP03-05
GDP03-03
GDP03-18
GDP03-06
GDP03-07
GDP03-02
GDP03-01
GDP03-17
LEGEND
GDP03 Series Samples
Paved Roads
Gravel Roads
Trails and Cutlines
Lakes and Rivers
metres
0 250 500 750 1000
Scale: 1:20,000
UTM NAD 83
BIRCH MOUNTAIN RESOURCES LTD
Appendix G.1.: Surface Samples, GDP03 Series
July, 2004
KAM

Appendix G. Field Mapping and Sampling July 2003

G.2. Sample Descriptions

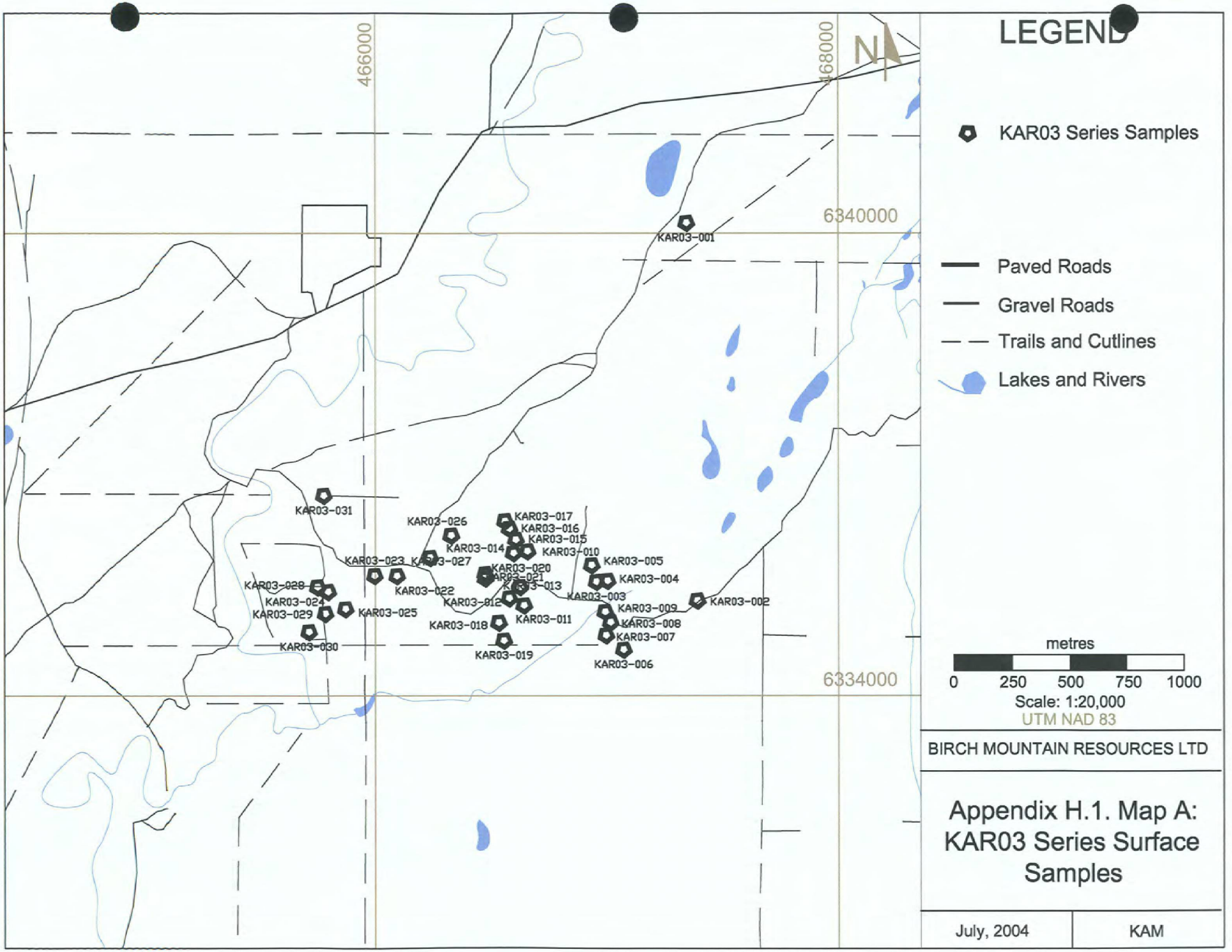
APPENDIX: G2 - SAMPLE DESCRIPTIONS

Sample Number	UTM Easting (NAD 83)	UTM Northing (NAD 83)	Lithology
GDP03-01	467104.9735	6338315.173	Tan-coloured, clean, massive to nodular limestone
GDP03-02	467244.9845	6338325.167	Tan-coluored, clean, massive to nodular limestone
GDP03-03	466916.9754	6338439.173	Grey nod limestone likely represents unit below Upper Quarry Unit
GDP03-04	466894.9921	6338589.164	Grey nodular limestone
GDP03-05	466861.9785	6338496.171	Sideritized limestone
GDP03-06	466420.9314	6338361.196	Tan-coloured, clean, massive to nodular limestone
GDP03-07	466448.9325	6338354.195	Tan-coloured, clean, massive to nodular limestone
GDP03-08	466195.9474	6338618.188	Tan-coloured, clean, massive to nodular limestone
GDP03-09	466002.9303	6338587.197	Tan-coloured, clean, massive to nodular limestone
GDP03-10	465559.942	6338925.191	Tan-coloured, clean, massive to nodular limestone
GDP03-11	466418.9888	6338830.166	Tan-coloured, clean, massive to nodular limestone
GDP03-12	466414.9885	6338830.166	Tan-coloured, clean, massive to nodular limestone
GDP03-13	467427.2468	6340410.032	Grey-brown nodular limestone
GDP03-14	465623.9277	6338776.199	Tan-coloured, clean, massive to nodular limestone
GDP03-15	465432.9333	6338925.196	Light green shaley nodular limestone
GDP03-16	465301.8926	6338672.217	Light green-grey shaley nodular limestone
GDP03-17	465308.8338	6338201.248	Light green shaley nodular limestone
GDP03-18	465307.8623	6338428.233	Tan-coloured, clean, massive to nodular limestone

APPENDIX H

Appendix H. Field Mapping and Sampling September 2003

H.1. Sample Location Map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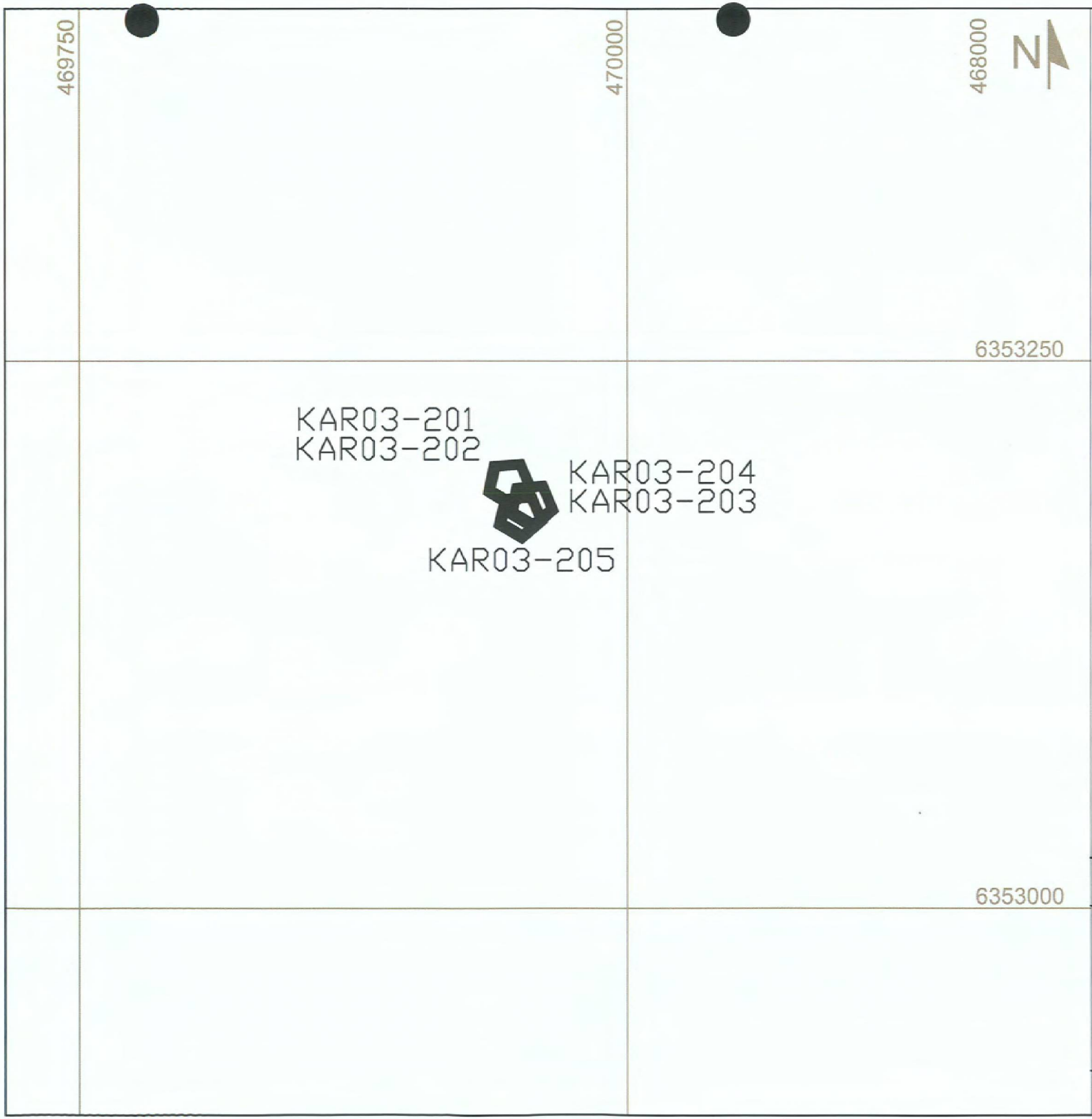
KAR03-026
KAR03-017
KAR03-016
KAR03-015
KAR03-014
KAR03-010
KAR03-005
KAR03-023
KAR03-027
KAR03-020
KAR03-004
KAR03-028
KAR03-022
KAR03-013
KAR03-003
KAR03-024
KAR03-012
KAR03-009
KAR03-002
KAR03-029
KAR03-025
KAR03-018
KAR03-011
KAR03-008
KAR03-007
KAR03-030
KAR03-019
KAR03-006
LEGEND
KAR03 Series Samples
Paved Roads
Gravel Roads
Trails and Cutlines
Lakes and Rivers
metres
0 250 500 750 1000
Scale: 1:20,000
UTM NAD 83
BIRCH MOUNTAIN RESOURCES LTD
Appendix H.1. Map A: KAR03 Series Surface Samples
July, 2004
KAM



LEGEND

- KAR03 Series Samples
- Paved Roads
- Gravel Roads
- Trails and Cutlines
- Lakes and Rivers

metres

0 50 100 125

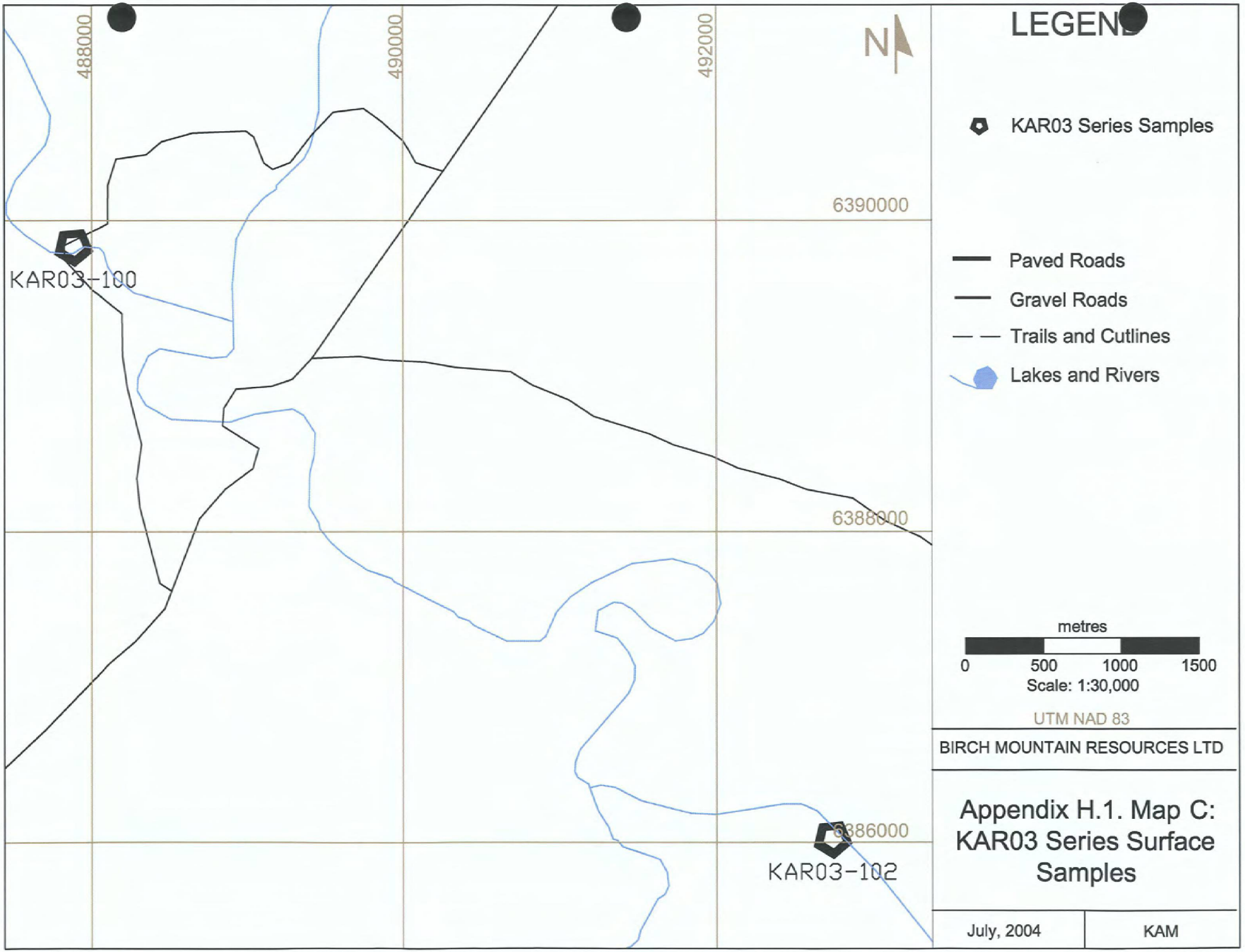
Scale: 1:2500

UTM NAD 83

BIRCH MOUNTAIN RESOURCES LTD

Appendix H.1. Map B: KAR03 Series Surface Samples

July, 2004	KAM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492000
N
6390000
6388000
6386000
KAR03-100
KAR03-102
LEGEND
KAR03 Series Samples
Paved Roads
Gravel Roads
Trails and Cutlines
Lakes and Rivers
metres
0
500
1000
1500
Scale: 1:30,000
UTM NAD 83
BIRCH MOUNTAIN RESOURCES LTD
Appendix H.1. Map C: KAR03 Series Surface Samples
July, 2004
KAM

Appendix H. Field Mapping and Sampling September 2003

H.2. Sample Descriptions

APPENDIX: H2 - SAMPLE DESCRIPTIONS

Sample Number	UTM Easting (NAD 83)	UTM Northing (NAD 83)	Lithology
KAR03-001	467345.1978	6340045.057	Siliceous limestone from small outcrop 50m north and 100 m east of KAR01-002
KAR03-002	467392.0052	6338412.157	Cruddy tan-brown limestone, massive; fossiliferous with brachiopods and crinoids; probably rubbly UQU
KAR03-003	466956.9848	6338493.168	Small subcrop of UQU with brachiopods, crinoids, brown-grey colour
KAR03-004	467004.9886	6338497.166	Fossiliferous nodular limestone; chalky and nodular
KAR03-005	466935.992	6338565.164	Small outcrop of nodular tan limestone, some iron alteration, chalky.
KAR03-006	467074.9574	6338199.182	Small o/c 10x5m, massive tan-caramel colour limestone, probably UQU with instinct bedding, only <<1% crinoid fossils
KAR03-007	466998.9597	6338262.181	Small o/c, just past 6, very similar to 6, caramel-tan limestone, non-fossil, no bedding, collected over 20 m lat from 4 sites; not chalky
KAR03-008	467017.9678	6338318.176	S-shaped outcrop system, at SE end. Caramel massive nod of limestone with crinoid fractures to 2 mm, not common; oil staining" in nods; collected from 3 locations over 10 m; some limestone has lots of crinoids and brachiopods with white massive unbedded nods with orange tan matrix
KAR03-009	466994.9717	6338363.174	Next portion of S o/c at N end, small valley between 8 & 9; limestone is caramel, slightly nod weathering, minor crinoid fossils, nods unbedded, massive with conchoidal fracture
KAR03-010	466659.9803	6338625.17	Sample is caramel-tan, very slightly fossiliferous UQU, nodular in places, conchoidal fracture, with some bit staining?
KAR03-011	466645.9508	6338391.186	Long N-S ridge of UQU, with tan-caramel yellowish colour, no bending, no nodular texture, conchoidal fracture, crinoid and brach fossils, massive. Sampled over 20 m along ridge from3 sites.
KAR03-012	466581.9501	6338422.186	15x10m o/c with massive limestone, caramel tan colour, no bedding, rare crinoids, nod weathering with cm sized samples, very hard limestone.
KAR03-013	466628.9594	6338471.181	N end of ridge of 012, limestone is massive, caramel coloured, only 1 1mmbrach, small 50 cm high cliff at edge of ridge, probably nod UQU
KAR03-014	466599.9752	6338617.173	Small vegetation covered mound with caramel-toffee limestone with conchoidal fracture, white weathering, <1% white crinoids and lots of brachiopods, probably UQU, sampled from 2 sep o/cs 5 m apart.
KAR03-015	466609.9829	6338675.169	Edge of large outcrop, ridge 50 cm high; massive white weathering limestone with crinoids, rubbly weathering, caramel-tan colour; about 40 m south of centre of o/c
KAR03-016	466581.9869	6338723.167	About 20 m north of centre on large outcrop; limestone is no, no fossils, some bit staining? Rubble only, grubby sample

Sample Number	UTM Easting (NAD 83)	UTM Northing (NAD 83)	Lithology
KAR03-017	466562.9895	6338755.166	From E end of ridge at north end of large outcrop; limestone is white weathering, tan caramel colour; nodular weathering, lots of brachiopods, nods are massive
KAR03-018	466536.9341	6338317.194	Low 1-1.5 m relief outcrop with massive limestone w/o bedding, caramel-tan colour, conchoidal fracture, crinoids and brachiopods, probably UQU., from 30 cm high exposure.
KAR03-019	466558.9262	6338239.198	Small slope at edge of outcrop; sample collected from 25 cm deep pit through soil; limestone is similar to 018, with minor crinoids, tan-caramel colour, massive nods with conchoidal fracture
KAR03-020	466477.9557	6338527.183	Very hard massive crystalline-textured dolostone? Limestone beneath thin 20 cm layer of normal nod UQU, med tan, no fossils, no bedding
KAR03-021	466478.9535	6338508.184	Same o/c as 020 but of normal UQU, caramel tan limestone with nod weathering, no fossils
KAR03-022	466094.9281	6338518.198	From large cliff 5 m high with exposure 1 m high; limestone is UQU with crinoids to 3 mm, massive, no nods, no bedding.
KAR03-023	465996.9215	6338519.201	Small o/c of limestone at e edge of swamp; from 1 m high cliff; limestone is UQU, massive, nod weathering, no clay, no fossils
KAR03-024	465793.8988	6338450.213	L-shaped o/c with crappy exp of white-cream weathering limestone, massive, nod weathering, caramel fresh colour, no bedding, no fossils
KAR03-025	465869.8948	6338375.215	5x5 m o/c with massive nod weathering limestone, crinoid fossils, tan-caramel coloured
KAR03-026	466331.966	6338693.178	Massive fossil brown-tan nod weathering limestone with white crinoids to 2-3 mm, 1 m rise in elevation
KAR03-027	466241.948	6338597.187	1 m high slope covered in moss; Limestone is brown caramel colour, not nod weathering nods, more massive blocks, brach fossils, probably massive UQU
KAR03-028	465747.8981	6338470.214	1m slope/cliff with brown-caramel massive nod weathering limestone with no bedding, lots of 1-2 mm crinoids
KAR03-029	465781.8862	6338355.22	Low bush-covered o/c with nod UQU, white weathering, lots of crinoids and brachiopods, nod weathering, tan-caramel fresh colour
KAR03-030	465709.8713	6338276.228	Large cliff - sampled from top to 3 m; limestone is nod weathering, massive tan-caramel limestone with brachiopods and crinoids;
KAR03-031	465774.9492	6338865.187	Vegetation covered o/c high with mottle brown and tan caramel massive nod-weathering limestone with abundant brachiopods and minor crinoids

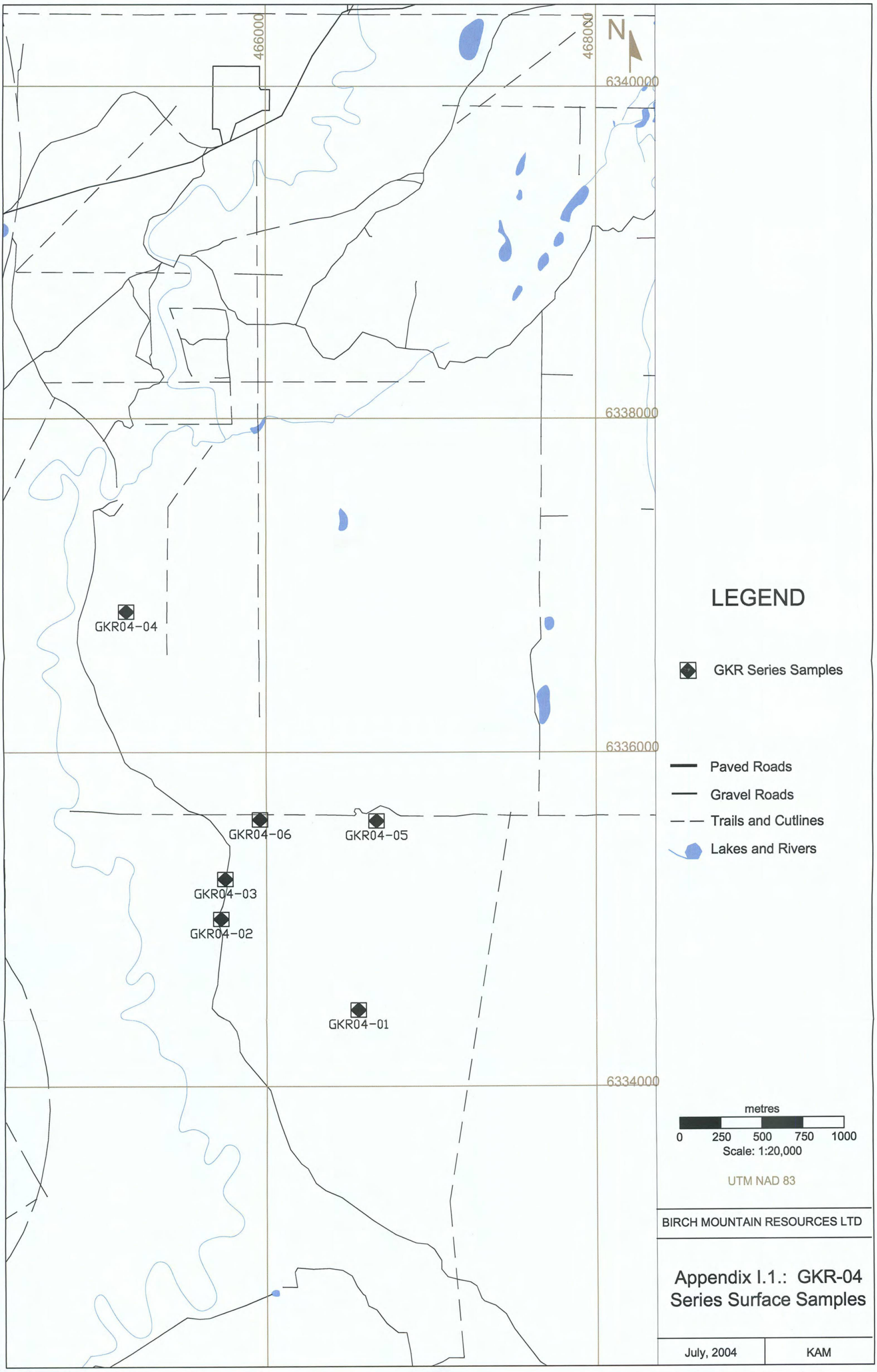
Sample Number	UTM Easting (NAD 83)	UTM Northing (NAD 83)	Lithology
KAR03-100	487881.7164	6389832.962	Series of four outcrops exposed on NW bank of Firebag: laminated (mm-1/2 cm) tan to light tan dolostone with crystalline, sugary texture. Undulations with dips to 38°, amplitudes >4 m and wavelengths 10-15m. Outcrop is to 2 m high and 6 m deep with ~5m of sand on top. Strong sulphur smell.
			Bucket 1 from first o/c at westernmost end; random samples from 1.5 m high outcrop
			Bucket 2 from next out to east; thin darker brown laminations < 1 mm, oil staining more prevalent in top portion; sampled over same 1.5-2m vertical interval and 5 m laterally
			Bucket 3 from next outcrop; same unit, more massive at base of section with more laminations apparent in weathered dolostone above; sampled 1.5 m vertical interval
			Bucket 4 from easternmost outcrop with helicopter; vertically sampled 2-2.5 m, 10 m upstream from 3; laminated and massive weathering dolostone; med grey to white weathering
KAR03-101	465626.3773	6333738.444	Sample collected from section on top of cliff o/c along Muskeg River. 3 buckets
			Collected from top of cliff: collected 2 lithologies over 2 m vertical. Top of section is green grey clay with nods of grey limestone with brachiopods and crinoids, with side alteration in clay. Second lithology lies beneath with sharp contact and is more massive with yellow weathering nod limestone with hardened purple side alteration - highly altered. Top lithology is 1m with top contact erosional; 2nd is 1.5m
			From Base of second lithology (massive lm) to top of next massive lms (unit 4), includes 2, 3 which is 50 cm of green grey clay. Base contact of unit 2 is friable brown nod limestone over 15 cm with sharp contact with clay
			From top of unit 4 (1.5m)which is massive limestone, layered, brach with crinoid fossil fragments, some layers have brown tan caramel nods with green interstices into green grey clay with nods over 2 m.
KAR03-102	492736.923	6386023.846	Sm o/c at rapids in river; 1 m high, 30-40 m2, 20 m long along river. Sampled over 1 m vertical and 15 m lat; tan brown crystalline sucrose dolostone; laminations not as prominent on fresh surf but <1 cm on weathered; sparks when hit with hammer.
KAR03-103	465626.3773	6333738.444	Geochemical sample of Unit 2, first massive nod limestone, vertical sampled 1.5 m
KAR03-104	465626.3773	6333738.444	Geochemical sample of Unit 4, second massive nod limestone, 1.5 m vertical
KAR03-201	469946.136	6353194.544	Collected in small hole about 30 m from excavated trench - 30 cm vertical, 50 cm lateral sample, dark green shale
KAR03-202	469946.136	6353194.544	Show and Tell sample: Pyritized unconformity with McMurray oil sands over decal grey-green shale from same pit as 201

Sample Number	UTM Easting (NAD 83)	UTM Northing (NAD 83)	Lithology
KAR03-203	469956.1359	6353184.543	80 cm vertical sample from top of excavated trench; med-light grey shale with rare pyrite nods to 4 cm; thin barite veinlets to 1 mm wide, rare, Bedded laminations defined by weathering, ~10°dip of laminations to SW
KAR03-204	469956.1359	6353184.543	55 cm vertical sample immediately beneath 203, med grey shale, very rare barite veinlet to 1 mm
KAR03-205	469951.1357	6353179.544	50 cm vertical sample, collected almost immediately below 204 stratigraphically but 10 m away laterally; med-light grey shale, slightly more resistant and harder than 202 or 203
KAR03-206	469951.1356	6353174.544	90 cm vertical sample, collected stratigraphically beneath 205 but 5 m away laterally; med grey shale, slightly resistant, minor >1 % pyrite nods, fissile but no bedding defined except by weathering.

APPENDIX I

Appendix I. Field Mapping and Sampling February 2004

I.1. Sample Location Map


466000
468000
N
6340000
6338000
6336000
6334000
GKR04-04
GKR04-06
GKR04-05
GKR04-03
GKR04-02
GKR04-01
LEGEND
GKR Series Samples
Paved Roads
Gravel Roads
Trails and Cutlines
Lakes and Rivers
metres
0 250 500 750 1000
Scale: 1:20,000
UTM NAD 83
BIRCH MOUNTAIN RESOURCES LTD
Appendix I.1.: GKR-04 Series Surface Samples
July, 2004
KAM

Appendix I. Field Mapping and Sampling February 2004

I.2. Sample Descriptions

APPENDIX: I2 - SAMPLE DESCRIPTIONS

Sample Number	UTM Easting (NAD 83)	UTM Northing (NAD 83)	Elevation (m)	Lithology
GKR04-01	466556.2872	6334480.467	280	Brown nodular limestone
GKR04-02	465723.5015	6335024.402	275	Nodular limestone
GKR04-03	465748.5253	6335263.393	275	Nodular limestone
GKR04-04	465153.654	6336863.342	276	Brown nodular micritic limestone
GKR04-05	466667.4089	6335610.426	280	Nodular limestone
GKR04-06	465960.5732	6335617.374	275	Bitumen stained brown micritic nodular limestone, no shale.

APPENDIX J

Appendix J.: Assessment Expenditures

J.1. Statement of Truth of Expenditures

Statement of Expenditures

The expenditures listed below apply to Metallic and Industrial Minerals Permits as indicated in Appendix A.1. and as shown in Appendix A.2. Expenditures are grouped by Appendix as in Table 7.1.

CERTIFIED STATEMENT

CANADA)
)
PROVINCE OF ALBERTA)
)
TO WIT:)

I, HIGH J. ABERCROMBIE, of the City of Calgary in the Province of Alberta,

DO SOLEMNLY DECLARE AS FOLLOWS:

1. That I am the Vice-President Exploration of Birch Mountain Resources Ltd. ("Birch") have have been authorized on behalf of Birch to make this Certified Statement.

2. The costs listed in "Table 7.1. Assessment Expenditures by Appendix. Expenditures for period April 1, 2002, to August 31, 2004." Are correct and were incurred in carrying out the assessment work detailed in this report.

Table 7.1. Assessment Expenditures by Appendix. Expenditures for period April 1, 2002, to August 31, 2004.

Appendix	Title	Expenditures
D	Winter Drilling 2002-2003	$ 203,248.77
E	Core Re-logging December 2003	$ 51,169.20
F	Drilling February 2004	$ 413,852.5
G	July 2003 Field Mapping and Sampling	$ 49,932.20
H	September 2003 Field Mapping and Sampling	$ 63,074.04
I	February 2004 Field Mapping and Sampling	$0
	Subtotal	**$781,276.71**
	Overhead (10%)	$78,127.67
	Total Assessment Expenditure Claimed	**$ 859,404.38**

AND I make this certified statement, conscientiously believing it to be true.

DECLARED before me at the City of Calgary, in the Province of Alberta, this 14th day of October, 2004.

A NOTARY PUBLIC IN AND FOR THE PROVINCE OF ALBERTA

SUZANNE L. LOOV
BARRISTER & SOLICITOR

[redacted]

HUGH J. ABERCROMBIE

Appendix J: Assessment Expenditures

J.2. Detailed Expenditure Statements

Appendix D: Winter Drilling 2002-2003

Description	Expenditures	Total Expenditures
Equipment Costs		$0.00
Maintentance		
Rent and Leases		
General Costs		$11,486.88
Accommodation/Meals/Groceries		
Office Supplies	$2,340.55	
Rent/Utilities	$9,146.33	
Training/References		
Geochemistry and Assay		$0.00
Assay Lab Outsource		
Geochemistry Outsource		
Material and Supplies	$1,400.30	$1,400.30
Consulting Fees		$0.00
Geological Consultants		
IT Fees		
Drilling and Core Handling		$103,320.81
Drilling Contractors	$103,320.81	
Core Contractors		
Transportation		$6,392.72
Freight	$916.16	
Personnel - Air	$2,314.37	
Personnel - Mileage/Gas	$3,162.19	
Vehicle Rental		
Salaries		$80,648.06
V.P. Exploration - Supervision	$12,439.70	
Project Geologist	$61,996.03	
Geologist	$6,212.33	
Drafting/Clerical		
TOTAL APPENDIX EXPENDITURE		**$203,248.77**

Appendix E: Core Relogging December 2003

Description	Expenditures	Total Expenditures
Equipment Costs		$0.00
Maintentance		
Rent and Leases		
General Costs		$11,275.65
Accommodation/Meals/Groceries	$439.78	
Office Supplies	$3,766.42	
Rent/Utilities	$7,069.45	
Training/References		
Geochemistry and Assay		$0.00
Assay Lab Outsource		
Geochemistry Outsource		
Material and Supplies		$0.00
Consulting Fees		$0.00
Geological Consultants		
IT Fees		
Drilling and Core Handling		$0.00
Drilling Contractors		
Core Contractors		
Transportation		$2,582.11
Freight	$955.52	
Personnel - Air		
Personnel - Mileage/Gas	$1,626.59	
Vehicle Rental		
Salaries		$37,311.44
V.P. Exploration - Supervision		
Project Geologist	$18,486.95	
Geologist	$9,999.99	
Drafting/Clerical	$8,824.50	
TOTAL APPENDIX EXPENDITURE		**$51,169.20**

Appendix F: Drilling February 2004

Description	Expenditures	Total Expenditures
Equipment Costs		$0.00
Maintentance		
Rent and Leases		
General Costs		$27,408.08
Accommodation/Meals/Groceries	$13,056.52	
Office Supplies	$325.39	
Rent/Utilities	$14,026.17	
Training/References		
Geochemistry and Assay		$0.00
Assay Lab Outsource		
Geochemistry Outsource		
Material and Supplies	$567.42	$567.42
Consulting Fees		$0.00
Geological Consultants		
IT Fees		
Drilling and Core Handling		$259,611.04
Drilling Contractors	$256,971.04	
Core Contractors	$2,640.00	
Transportation		$10,085.36
Freight	$2,279.44	
Personnel - Air	$1,477.45	
Personnel - Mileage/Gas	$3,268.42	
Vehicle Rental	$3,060.05	
Salaries		$116,180.60
V.P. Exploration - Supervision	$36,090.98	
Project Geologist	$66,089.62	
Geologist	$14,000.00	
Drafting/Clerical		
TOTAL APPENDIX EXPENDITURE		**$413,852.50**

Costs from the Field Mappng and Sampling February 2004 program are included here.

Appendix G: Field Mapping and Sampling July 2003

Description	Expenditures	Total Expenditures
Equipment Costs		$0.00
Maintentance		
Rent and Leases		
General Costs		$7,095.66
Accommodation/Meals/Groceries	$3,541.26	
Office Supplies		
Rent/Utilities	$3,554.40	
Training/References		
Geochemistry and Assay		$0.00
Assay Lab Outsource		
Geochemistry Outsource		
Material and Supplies	$2,332.14	$2,332.14
Consulting Fees		$0.00
Geological Consultants		
IT Fees		
Drilling and Core Handling		$0.00
Drilling Contractors		
Core Contractors		
Transportation		$8,912.04
Freight	$3,146.59	
Personnel - Air	$3,932.90	
Personnel - Mileage/Gas	$1,686.22	
Vehicle Rental	$146.33	
Salaries		$31,592.36
V.P. Exploration - Supervision		
Project Geologist	$28,576.49	
Geologist	$3,015.87	
Drafting/Clerical		
TOTAL APPENDIX EXPENDITURE		**$49,932.20**

Appendix H: Field Mapping and Sampling September 2003

Description	Expenditures	Total Expenditures
Equipment Costs		$23,187.33
Maintentance		
Rent and Leases*	$23,187.33	
General Costs		$9,816.03
Accommodation/Meals/Groceries	$3,602.40	
Office Supplies	$173.24	
Rent/Utilities	$1,521.39	
Training/References	$4,519.00	
Geochemistry and Assay		$0.00
Assay Lab Outsource		
Geochemistry Outsource		
Material and Supplies	$286.00	$286.00
Consulting Fees		$0.00
Geological Consultants		
IT Fees		
Drilling and Core Handling		$0.00
Drilling Contractors		
Core Contractors		
Transportation		$324.78
Freight	$324.78	
Personnel - Air		
Personnel - Mileage/Gas		
Vehicle Rental		
Salaries		$29,459.90
V.P. Exploration - Supervision	$9,291.67	
Project Geologist	$16,834.90	
Geologist	$3,333.33	
Drafting/Clerical		
TOTAL APPENDIX EXPENDITURE		**$63,074.04**

*All software rental costs are reported here.

Appendix I: Field Mapping and Sampling February 2004

Description	Expenditures	Total Expenditures
Equipment Costs Maintentance Rent and Leases		$0.00
General Costs Accommodation/Meals/Groceries Office Supplies Rent/Utilities Training/References		$0.00
Geochemistry and Assay Assay Lab Outsource Geochemistry Outsource		$0.00
Material and Supplies		$0.00
Consulting Fees Geological Consultants IT Fees		$0.00
Drilling and Core Handling Drilling Contractors Core Contractors		$0.00
Transportation Freight Personnel - Air Personnel - Mileage/Gas Vehicle Rental		$0.00
Salaries V.P. Exploration - Supervision Project Geologist Geologist Drafting/Clerical		$0.00
TOTAL APPENDIX EXPENDITURE		**$0.00**

No costs are claimed here as the work was done in conjuction with the Drilling February 2004 program. Costs are incorporated into Appendix F.

APPENDIX K

Appendix K

Statements of Qualifications

Statement of Qualifications

Gerald F. Kozdial, B.Sc.

I, Gerald F. Kozdial, certify and declare that I am a graduate of the University of Calgary, Calgary, Alberta, with a B.Sc. in Geology (2002).

My experience from 1995-2002 includes:

- Experience in digital mapping
- Involved in geochemical field programs
- Experience in planning and conducting geochemical research projects
- Experience in field mapping projects
- Certified knowledge of mining software (Surpac Quarry)

From May 1, 1997 to April 30, 2002, I was employed as a part-time Geologist with Birch Mountain Resources Ltd. Since May 1, 2002, I have been employed as a full-time Geologist with Birch Mountain Resources Ltd.

I reside at:

[redacted]

I HEREBY CERTIFY:

1. That I have visited the properties discussed in this report;
2. That I have participated in the production of this report.

Dated at Calgary, Alberta, this 14th day of October 2004.

[redacted]

Gerald Kozdial, B.Sc.

STATEMENT OF QUALIFICATIONS

Kyla M. Arden-Maki, B.Sc., M.Sc.

I, Kyla M. Arden-Maki, certify and declare that I am a graduate of the University of Manitoba, Winnipeg, Manitoba, with a B.Sc. in Geology (1993) and an M.Sc. in Geochemistry (1995).

My experience from 1991 to 2004 includes:

- conducting field geological and geochemical surveys
- planning and supervising field mineral exploration programs involving geological and geochemical programs
- planning and conducting scientific research, including publishing and presentation of results in peer-reviewed journals
- preparing government assessment reports

Since May, 1997, I have been employed as Project Geologist, Birch Mountain Resources Ltd.

I reside at:

[redacted]

I HEREBY CERTIFY:

1. That I have visited the property described in this report;
2. That I participated in the production of this report.

Dated at Calgary, Alberta, this 14th day of October, 2004.

[redacted]

Kyla Arden-Maki, M.Sc.