

MAR 20060028: BRAZEAU RANGE

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GRAYMONT WESTERN CANADA INC.
2006 EXPLORATION AND FIELDWORK
WITHIN THE BRAZEAU RANGE
METALLIC AND INDUSTRIAL MINERALS PERMIT,
WEST-CENTRAL ALBERTA

PART B

Metallic and Industrial Mineral Permit
9302090596

Geographic Coordinates

52°19' N to 52°30' N
115°43' W to 116°03' W

NTS Sheets 83 B/5, C/8 and C/9

Owner and Operator: MAIM Permit 9302090596
Graymont Western Canada Inc.
Lime Divisional Office
190, 3025 - 12 Street N.E.
Calgary, AB, T2E 7J2

Consultant: Dahrouge Geological Consulting Ltd.
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Date Submitted: November 3, 2006

TABLE OF CONTENTS

	<u>Page</u>
1. Summary	4
2. Introduction	5
3. Location and Access	5
4. Work Performed	6
5. Results	7
6. Conclusions	8
7. References	9
Statement of Author	10

LIST OF TABLES

Table 1 Expenditures Allocated to MAIM Permit 9302090596	4
Table 2 Description of Metallic and Industrial Minerals Permit 9302090596	5
Table 3 Locations Examined in 2006	7

PART C**LIST OF FIGURES**

	<u>Page</u>
Fig. 1.1 Location Map	F1
Fig. 1.2 Location of MAIM Permit 9302090596	F2
Fig. 4.1 Geology and Location of Sections Along the Southern Part of Brazeau Range	(in pocket)

LIST OF APPENDICES

Appendix 1: Statement of Expenditures	C1
Appendix 2: Descriptions of the 2006 Stratigraphic Sections within MAIM Permit 9302090596, Brazeau Range	C2

1. SUMMARY

During June, July, and September, 2006, parts of Brazeau Range, within Metallic and Industrial Mineral (MAIM) Permit 9302090596, were explored for high-quality carbonate rocks. Paleozoic carbonate units were examined and measured at more than 13 locations along Brazeau Range south of North Saskatchewan River (Fig. 1.1). The 2006 exploration was a follow-up to previous exploration conducted along Brazeau Range during the summers of 2002, 2003, and 2004. The 2006 exploration expanded upon previously explored sections and located additional outcrops with the use of ATV's and helicopter.

As a previous assessment report (Pana and Dahrouge, 1998) includes detailed descriptions of geographic setting, history and previous investigations for Brazeau Range, the majority of that information is not repeated herein. Structural measurements were obtained at stations throughout the property. Attitudes of bedding and other planar features are given as A°/B° SW, where A° is the azimuth of the strike and B° is the amount of dip in the direction indicated. A magnetic declination of 17¼° east was used. Where bedding has been obscured by structure, stratigraphic thicknesses were calculated using orientations from adjacent units. Where more than one bedding orientation was measured, the mean orientation was used.

From 2002 to 2004, exploration expenditures in the first assessment period totaled \$39,330.00, which resulted in an excess credit of \$2,715, allocated to assessment period 'Years 3 and 4', for MAIM Permit 9302090596. Expenditures of \$69,750.80 (Appendix 1) were incurred in 2006; hence, available assessment credits for the current assessment period total \$72,465.80.

The assessment credits are not enough to keep the entire permit in good standing; therefore, parts of the permit will be surrendered (Fig. 1.2). Expenditures are allocated to MAIM permit 9302090596 (table 1):

TABLE 1 **EXPENDITURES ALLOCATED TO MAIM**
PERMIT 9302090596

Assessment Period	Expiry Date	Required Expenditures	Assigned Expenditures
Years 3 and 4	Sept. 04, 2006	\$51,200.00	\$51,200.00
Years 5 and 6	Sept. 04, 2008	\$51,200.00	\$21,265.80

*Based on the revised permit area of 5120 ha

As a result of the above expenditures, MAIM permit lands have been reduced to 5120 ha. (Table 4.1).

TABLE 2 DESCRIPTION OF METALLIC AND INDUSTRIAL MINERALS PERMIT 9302090596

Record Date	Expiry Date	Land Description (Tp-RW5)	Size (Ha)
Permit Area (Fig. 1.2)			
Sept. 4, 2002	Sept. 4, 2008	39-13 W5: 9L14, L15; 10NE, L11, L13, L14; 11L13-L16; 12L13, L14; 13W; 14-16; 17NE, L7, L8, L14; 19NE, L7, L8, L11, L13, L14; 20-22; 23S, NW, L9, L10, L15; 27SW; 28S, L10-L13; 29; 30; 31S; 32L1-L5; and 39-14 W5: 24L15, L16; 25N, SE, L6; 36NW, L1-L3, L8; and 40-14 W5: 1L4, L5, L12; 2L9, L16; 11L1, L2, L5-L7, L11-L13; 15NW, L1, L2, L6, L7; 16L16; 20L16; 21NW, SE, L3, L5, L6, L10; 22L4; 28L3-L5; 29; 30N, L1, L4-L8; 31SE, L3, L4, L9, L10; 32SW, L2.	5120

2.

INTRODUCTION

The work on the Brazeau Range Permit was conducted by Dahrouge Geological Consulting Ltd. on behalf of Graymont Western Canada Inc. (Graymont). This assessment report describes the exploration conducted within metallic and industrial minerals permit 9302090596, which encompasses the southern and eastern parts of Brazeau Range of the Alberta Foothills. It includes information on the geology and structure of more than 13 stratigraphic sections examined during June and July, and late September 2006, as well as an interpretation of the results. Bob Robison, exploration manager for Graymont Western U.S. Inc., authorized this work.

The objectives of the 2006 exploration were to expand on the previously explored areas to locate high-quality carbonate rocks throughout and within the permit area. To achieve the objectives, two visits to the property were conducted. The summer program utilized ATV's for access, while the fall program used a helicopter to reach less accessible areas.

3.

LOCATION AND ACCESS

MAIM Permit 9302090596 encompasses the southern part of Brazeau Range south of North Saskatchewan River and parts of the east side of Brazeau Range north of North Saskatchewan River, near Nordegg, Alberta (Fig.'s 1.1 and 1.2). Nordegg, with year-round facilities, is located

85 km west of Rocky Mountain House on Highway 11.

The southern portion of MAIM Permit 9302090596 is accessible via Highway 752, which branches southwest from Rocky Mountain House and North Fork Road 3 km west of Strachan, or 23 km east on a secondary road branching from Forestry Trunk Road about 28 km south of Highway 11. Access to and throughout the property is by all-terrain vehicle or helicopter, and extensive hiking.

Several creeks, mountains, and other features presently without names on published maps have been assigned informal names in this report to facilitate references to geographic locations.

4. WORK PERFORMED

During the summer and fall of 2006, Dahrouge Geological Consulting Ltd. on behalf of Graymont Western Canada Inc. conducted exploration for high-quality carbonate lithotypes within west-central Alberta. The work described herein was undertaken to determine and identify the location and extent of high quality carbonate units throughout the area.

Transportation between Rocky Mountain House and the property was by a rented four-wheel-drive truck. Access throughout the property was by truck and ATV's where possible, and otherwise by helicopter, and extensive hiking and climbing.

From June 26 to July 7, ATV's were utilized to access areas of interest in the southeastern part of the permit, surrounding Sheeptrap Mountain and the Ram Fire Tower forestry look-out, east of Dizzy Creek. Due to an unexpected forest fire in the Nordegg area, the helicopter portion of the project was held off until September 24 to 27, when a few days were spent accessing ridge tops west of Dizzy Creek, south of North Saskatchewan River.

Carbonate outcrops were visited at more than 13 locations. A total of 94 intervals were examined, representing a total stratigraphic thickness of about 281½ m (Table 4.1, Appendix 2, Fig. 4.1).

TABLE 3 LOCATIONS EXAMINED IN 2006 (Fig. 4.1)

Section Number	Location	Measured Intervals	Strat. Thick. (m)*	Measured Thick. (m) ^o
2006-01	NE Flank of Brazeau Range	5	16½	16½
Isolated	NE Flank of Brazeau Range	1	1	1
2006-02	NE Flank of Brazeau Range	8	34	34
2006-03	NE Flank of Brazeau Range	4	9	16
2006-04	NE Flank of Brazeau Range	6	16	20½
Isolated	NE Flank of Brazeau Range	3	4½	4½
2006-05	Southwest Flank, Brazeau Range	10	22	63½
2006-06	NE Flank of Brazeau Range	9	28½	33½
2006-07	NE Flank of Brazeau Range	3	11	11
2006-08	NE Flank of Brazeau Range	3	13	13
2006-09	NE Flank of Brazeau Range	6	26½	26½
2006-10	NE Flank of Brazeau Range	11	27	27
2006-11	NE Flank of Brazeau Range	12	39	39
2006-12	350m NNE of Fire Lookout on Brazeau Range	2	3¾	4
2006-13	Main Ridge ~1.2km WNW of Fire Lookout	11	30	30
TOTALS:		94	281½	339½

* Stratigraphic thicknesses are examined thicknesses.

^o Measured thicknesses are total investigated thicknesses, including covered and inaccessible intervals.

5.

RESULTS

Within MAIM Permit 9302090596, exposures of the Palliser Formation, Banff Assemblage and Rundle Assemblage were examined along the southern part of Brazeau Range, south of North Saskatchewan River. A total of 94 discrete intervals were measured and described in detail, representing a total stratigraphic thickness of 281½ (Figure 4.1, Appendix 2).

Field maps were completed on 1:20,000 scale map sheets and concentrated on areas north and northeast of Ram Fire Tower, northwest of Spider Mountain, east of Dizzy Creek along the northeast flank of Brazeau Range, and along the southwest flank of Brazeau Range ~1½ km west of Dizzy Creek (Fig. 4.1).

Geological observations were recorded, including lithologic information, measurements of structural elements, and other pertinent details (Appendix 2). In some instances, interval thicknesses were determined by measuring outcrops perpendicular to bedding. Where bedding could not be identified, stratigraphic measurements were taken based on the previously determined regional trend or deduced from other measurements where possible. A solution of 6% HCl was used to assess carbonate quality in the field.

6.**CONCLUSIONS**

Within MAIM Permit 9302090596, exposures of the Palliser Formation, Banff Assemblage and Rundle Assemblage were examined along the southern part of Brazeau Range, south of North Saskatchewan River. A total of 94 discrete intervals were measured and described in detail at the locations listed in Table 4.1, representing approximately 281½ m of stratigraphy out of a total investigated thickness of more than 339¾ m.

Carbonate intervals within the Palliser Formation were examined along the northeast flank of Brazeau Range, east of Dizzy Creek. The examined Palliser consists of very-fine-grained, generally dark-grey-brown, massive and well-bedded dolomitic mudstones, with lime mudstone interbeds. The lower part of the Rundle Assemblage generally consists of fossiliferous, medium- to coarse-grained, massive limestone to grainstone. The middle part of the Rundle Assemblage is comprised of fine-grained lime mudstone to wackestone with chert nodules. Locally, rapid facies changes result in interbeds of variably dolomitic limestone and dolomite.

7.

REFERENCES

- Dahrouge, J.R. (2003) 2003 Exploration and Fieldwork within the Nordegg Metallic and Industrial Minerals Permit, West Central Alberta; ass. rept. for MAIM Permit 9396010038, Graymont Western Canada Inc., Dahrouge Geological Consulting Ltd., 12 p., 3 app., 4 fig., 3 tables.
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- Stott, D.F. and Aitken, J.D. (1993) Sedimentary Cover of the Craton in Canada, D.F. Stott and J.D. Aitken (ed.); Geol. Surv. Can. Geology of Canada, no. 5., pp. 202 - 271.

STATEMENT OF AUTHOR

I, Jody Dahrouge, residing at 11 Country Lane, Stony Plain, Alberta, do hereby certify that:

- I am a geologist of Dahrouge Geological Consulting Ltd., Suite 18, 10509 - 81 Ave., Edmonton, Alberta, T6E 1X7.
- I am a graduate of the University of Alberta, Edmonton, Alberta with a B.Sc. in Geology, 1988 and a Special Certificate (Sp.C.) in Computing Science in 1994.
- I have practiced my profession as a geologist intermittently from 1988 to 1994, and continuously since 1994.
- I am a registered professional geologist with the Association of Professional Engineers, Geologists and Geophysicists of Alberta, member M48123.
- I hereby consent to the copying or reproduction of this Technical Report following the one-year confidentiality period.
- I am the author of the report entitled "2006 Exploration and Fieldwork within the Brazeau Range Metallic and Industrial Minerals Permit, West-Central Alberta" and accept responsibility for the veracity of technical data and results.

Dated this 3rd day of November, 2006.



Jody Dahrouge, BSc, PGeol
APEGGA M48123

APPENDIX 1: 2006 STATEMENT OF EXPENDITURES, MAIM PERMIT 9302090596

a) <u>Personnel</u>		\$ 35,226.60
b) <u>Food and Accommodation</u>		\$ 8,829.89
c) <u>Transportation</u>	Truck, bus, ATV's, helicopter	\$ 17,633.31
d) <u>Instrument Rental</u>	Radio rentals	\$ 641.30
e) <u>Drilling</u>	n/a	
f) <u>Analyses</u>	n/a	
g) <u>Report</u>	Reproductions and assembly	\$ 93.50
h) <u>Other</u>		\$ 985.22
<u>Total</u>		<u>\$ 63,409.82</u>
<u>Administration (10%)</u>		\$ 6,340.98
<u>Total + Administration</u>		\$ 69,750.80



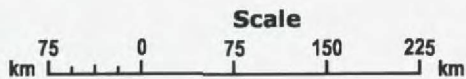
BRITISH COLUMBIA

SASKATCHEWAN

Location of
MAM Permit
9302090596



- LEGEND**
- * Provincial capital
 - Other populated places
 - *— Trans-Canada Highway
 - Major road
 - - - - International boundary
 - - - - Provincial boundary



GRAYMONT WESTERN CANADA INC.
DAHROUGE GEOLOGICAL CONSULTING LTD.
Edmonton, Alberta

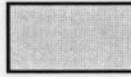

BRAZEAU RANGE,
WEST-CENTRAL ALBERTA

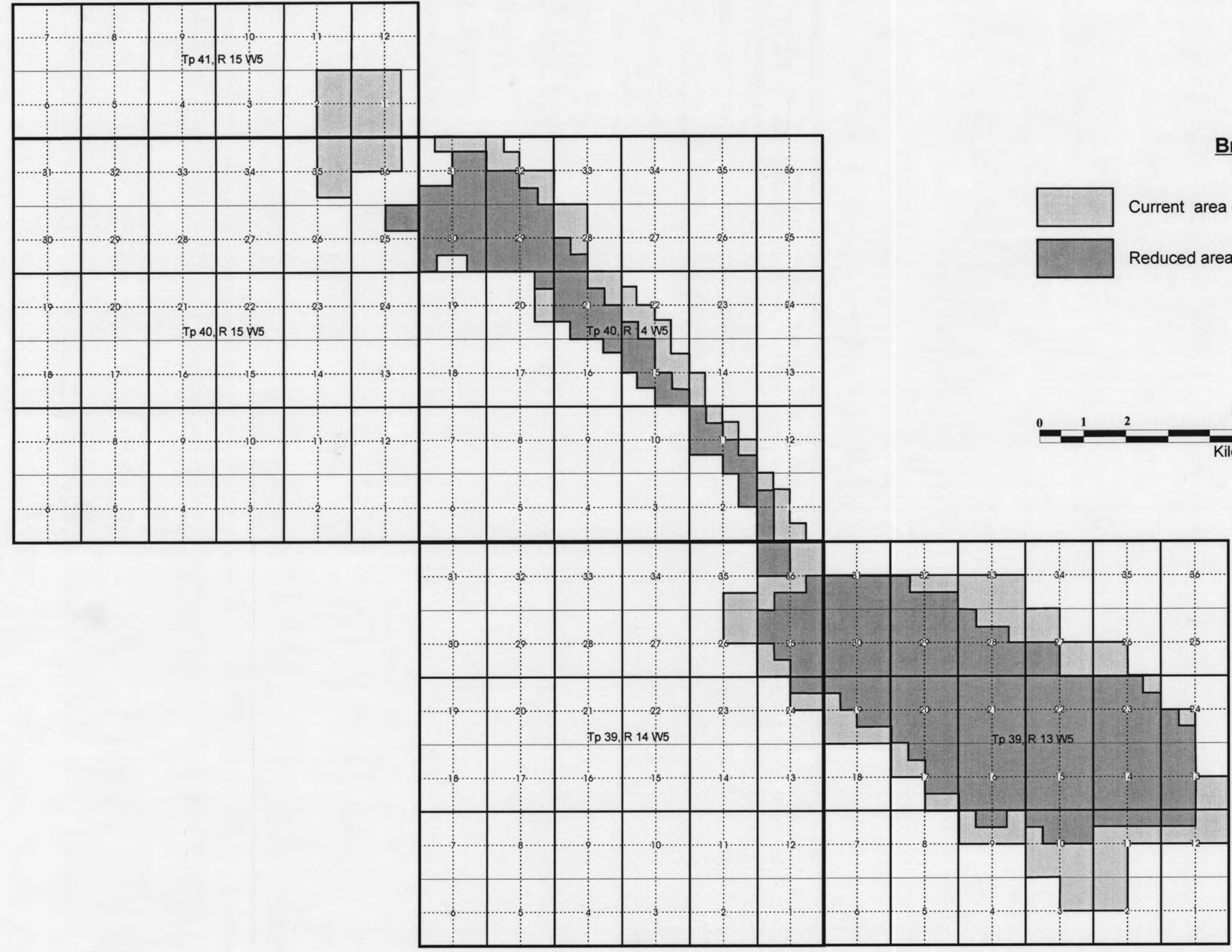
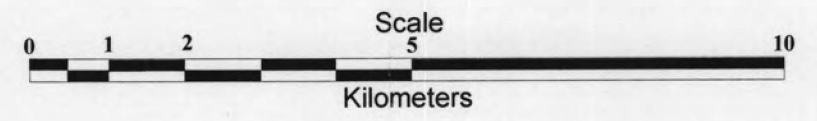
Fig. 1.1 Location Map

20060028



Brazeau area Permits

-  Current area of MAIM Permit # 9302090596 (7866 ha.)
-  Reduced area of MAIM Permit # 9302090596 (5120 ha.)



<p>GRAYMONT WESTERN CANADA INC. DAHROUGE GEOLOGICAL CONSULTING LTD. Edmonton, Alberta WEST CENTRAL ALBERTA</p>
<p>Fig. 1.2 Location of MAIM Permit 9302090596</p>
<p>JT 2006.09</p>

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**APPENDIX 2: DESCRIPTIONS OF THE 2006 STRATIGRAPHIC SECTIONS
WITHIN MAIM PERMIT 9302090596 AT BRAZEAU RANGE**

Notes: Stratigraphic thicknesses are based on measured attitudes of bedding listed below, with appropriate interpolations. Attitudes are strike and dip. Measured sections are listed in order from stratigraphic top to bottom. UTM coordinates are NAD83. Section locations are shown on Fig. 4.1.

Abbreviations: Pal - Palliser Formation; Banff - Banff Assemblage; RA - Rundle Assemblage; Fernie - Fernie Formation

Interval	Formation Member	Strat. Thick. (m)	Description
Section 2006-01: NE Flank of Brazeau Range (UTM 580968E, 5804968N)			
28086	RA	3	Dolomitic Mudstone , dark-grey brown fresh, very fine- to fine-grained, well-bedded, beds 5-10 cm thick, no fossils, very uniform color and composition, resistant, no reaction with HCl, attitude of bedding 120°/24° SW, 126°/40° SW, 120°/38° SW, and 110°/26° SW
28087	RA	3.3	Dolomitic Mudstone , dark brown weathered and fresh, very fine-grained, beds 1-30 cm thick, jointed, fractures filled with calcite >3 mm thick, some reaction with HCl along veins, attitude of bedding 127°/24° SW
28088	RA	3	Dolomitic Mudstone , laminated dark and light brown-grey weathered, interbedded very dark grey-brown and brown-grey fresh, very fine-grained, beds 1-30 cm thick, very fractured, very brittle and crumbly, no HCl reaction, attitude of closely spaced fractures 035°/90°, attitude of bedding 111°/26° SW
28089	RA	3	Dolomitic Mudstone , as 28088, attitude of bedding 137°/38° SW
28090	RA	4.2	Interbedded Dolomitic Mudstone and Lime Mudstone , dolomitic mudstone is very dark-grey to black, lime mudstone is dark brown-grey, very fine-grained, laminated, competent beds up to 20 cm thick, brecciated beds 1-10 cm thick, some cross-bedding, reaction with HCl varies from moderate to absent, attitude of bedding 122°/38° SW
Isolated Station: NE Flank of Brazeau Range (UTM 580763E, 5804685N)			
28091	RA	1	Dolomitic Mudstone , light-brown weathered and fresh, fine-grained, beds up to 20 cm thick, unit is generally platy and thinly bedded, attitude of overturned bedding 123°/54° SW
Section 2006-02: NE Flank of Brazeau Range (UTM 580711E, 5804645N)			
28099	RA	6	Crinoidal Grainstone , as 28096, Pekisko-Banff Formation contact, iron oxide nodules up to 7 mm in diameter, iron oxide-filled fractures, attitude of overturned bedding 131°/68° SW
28098	RA	3	Crinoidal Grainstone , as 28096, medium brown-grey weathered and fresh
28097	RA	10	Crinoidal Grainstone , as 28096, slightly recessive, fossil-rich, good reaction with HCl
28096	RA	4	Crinoidal Grainstone , med-grey weathered and fresh, coarse-grained with grains up to 3 mm in diameter, calcite crystals up to 3 mm in diameter, attitude of jointing 012°/42° S, attitude of overturned bedding 122°/70° SW
28095	RA	3¼	Lime Mudstone , medium brown-grey weathered, medium grey-brown fresh, fine- to medium-grained, beds 30-75 cm thick, contains crinoid ossicles up to 2 mm in diameter, some calcite crystals up to 5 mm across, clay-altered?
28094	RA	1½	Dolomitic Mudstone , light brown-grey weathered and fresh, very fine-grained, beds up to 60 cm thick, rubbly, rusty veins, well jointed, no reaction to HCl
28093	RA	3¼	Lime Mudstone , as 28093, massive beds up to 1 m thick, fine-grained, fetid odor, abundant calcite crystals up to 1 mm long, few rusty blebs
28092	RA	3	Lime Mudstone , light brown-grey weathered, light-grey fresh, beds 30-100 cm thick, vuggy in lowest 75 cm, fine grained calcite-beds up to 3 m, good reaction with HCl, attitude of overturned bedding 124°/74° SW and 123°/69° SW

Interval	Formation Member	Strat. Thick. (m)	Description
Section 2006-03: NE Flank of Brazeau Range (UTM 581757E, 5804062N)			
28058	RA	2½	Crinoidal Packstone , light-grey weathered, med-greyish brown fresh, beds 5-25 cm thick, resistant but rubbly, contains crinoids, shell fragments, rugose coral and bryozoans, strong fetid odor, moderate to very good reaction with HCl, bedding may be slightly slumped, attitude of bedding 310°/64° NE
-	RA	7	covered
28059	RA	2	Lime Mudstone and Packstone , light-grey weathered, med-brownish grey fresh, mudstone is micritic to fine-grained, packstone is med-grained, beds <5 cm thick, rubbly and well fractured, weak to moderate reaction with HCl, attitude of bedding 308°/76° NE
28060	RA	2	Lime Mudstone , light-grey weathered, tan fresh, micritic to fine-grained, weathering looks crater-like, occasional med-grained bioclasts, likely crinoids, weak but prolonged reaction with HCl, fine voids may be weathered out bioclasts
28061	RA	2½	Lime Mudstone , as 28060
Section 2006-04: NE Flank of Brazeau Range (UTM 581610E, 5803676N)			
28051	RA	3	Lime Mudstone , light- to med-grey weathered, med-brown fresh, micritic to very fine-grained, homogenous, massive beds 0.2-1.0 m thick, fetid odor, minor white calcite veins up to 3 mm, weak to moderate reaction with HCl, attitude of bedding 128°/82° SW
28052	RA	3	Lime Mudstone , as 28051, except small area of strong white calcite veining, beds 2-25 cm thick, 70% of interval laminated along bedding, occasional bioclastic beds <2 cm thick with indeterminate clasts, rare chert nodules
28053	RA	2½	Lime Mudstone , as 28051, except some laminated intervals, micritic with coarse- to med-grained bioclasts of crinoids and indeterminate, beds 10-50 cm thick, minor large brachiopods up to 2 cm, undulose bedding planes, rusty alteration along fractures, abundant calcite veinlets, moderate to good reaction with HCl, attitude of bedding 127°/83° SW
-	RA	1¼	covered
28054	RA	2½	Lime Mudstone , minor wackestone to packstone, light-grey weathered, dark-brownish grey fresh, cryptocrystalline to very fine-grained, thin undulose beds 5-20 mm thick, bioclasts include crinoids, brachiopods, bryozoans; moderate to very good reaction with HCl
-	RA	2¾	covered
28055	RA	3	Packstone and Lime Mudstone , as 28054, except 1-15 cm thick bed at top, 60% packstone, abundant fossils including crinoids, brachiopods and bryozoans; moderate white calcite veining, white calcite crystals in voids and along fractures
28056	RA	2	Wackestone and Packstone , med-grey weathered and fresh, lower 1 m is brachiopod wackestone, micritic to med-grained, upper 1 m is "oozy" chert, silicified trace fossils, moderate to good reaction with HCl
Isolated Stations: NE Flank of Brazeau Range (near Section 2006-03)			
28057	RA	2	Crinoidal Packstone and Grainstone , med-brownish grey weathered, light- to med-brown fresh, massive beds, 5-25 cm thick, majority of bioclasts indeterminate, mostly crinoids, rare brachiopods, moderately fractured, attitude of bedding 298°/78° NE
28062	RA	1	Silicified Lime Mudstone , light-brownish grey weathered and fresh, very hard, slight to absent reaction with HCl, cryptocrystalline to micritic, indeterminate bedding but attitude of ridge 276°/20° S

Interval	Formation Member	Strat. Thick. (m)	Description
28063	RA	1½	Silicified Lime Mudstone , light brown weathered and fresh, micritic to very fine-grained, very hard, very weak to absent reaction with HCl, fetid odor, attitude of thinly spaced joint (?) set 026°/65° SE, attitude of possible bedding 252°/39° N
Section 2006-05: SW Flank of Brazeau Range (UTM 577688E, 5803288N)			
28085	RA	3¼	Packstone and Grainstone , light-grey weathered and fresh, fine- to coarse-grained, abundant crinoids, well-jointed, attitude of bedding 159°/46° SW and 150°/48° SW
-	RA	8	covered
28084	RA	1	Packstone , light-grey weathered, med-brownish grey fresh, very fine- to coarse-grained, some brecciated fragments
-	RA	2	offset
28083	RA	?	Packstone and Grainstone , as 28082, some intervals with fossils up to 5 mm
-	RA	4½	offset
28082	RA	3½	Packstone and Grainstone , as 28081, contains brachiopods
28081	RA	3¼	Packstone and Grainstone , light-grey weathered, med-brownish grey fresh, massive beds, fossiliferous, contains ooids and crinoids, well-jointed, excellent reaction with HCl, attitude of bedding 132°/55° SW
-	RA	½	offset
28080	RA	2½	Packstone , as 28079, joint attitude same as 28078, attitude of bedding 150°/36° SW
28079	RA	3	Packstone , light-grey weathered and fresh, coarse-grained, beds 4-40cm thick, contains predominantly crinoids
28078	RA	3	Packstone , light- to med-grey weathered, med-brownish grey fresh, fine- to med-grained, contains ooids, crinoids and rugose corals, fetid odor, very good reaction with HCl, well jointed with 2-5 cm spacing, attitude of wavy joint 055°/90°, attitude of bedding 138°/48° SW
-	Banff	3½	covered
28077	Banff	2	Lime Mudstone , as 28076, except upper ½ m is very platy, attitude of bedding 152°/42° SW
-	Banff	~23	covered
28076	Banff	½	Lime Mudstone , light-brownish grey weathered, med- to dark brownish grey fresh, micritic to cryptocrystalline, beds 1-10 cm thick, fissile, moderately to well fractured, fractures undulose, minor fine white calcite veins, some limonite along fracture surfaces, good but slow reaction with HCl, attitude of joints 299°/46° NE and 044°/80° SE, attitude of bedding 139°/47° SW
Section 2006-06: NE Flank of Brazeau Range (UTM 583443E, 5802946N)			
21111	RA	2	Lime Mudstone , med-brown weathered, med-brownish grey to dark-grey fresh, micritic, top ½ m is massive, bottom has cm-scale beds, weakly fractured, some calcite veinlets, good reaction with HCl, attitude of bedding 156°/17° W
21110	RA	3	Grainstone , as 21108, some wackestone sections/beds
21109	RA	3	Grainstone , as 21107
21108	RA	3	Grainstone , as 21107
21107	RA	4	Grainstone , mottled tan- and med-grey weathered, med- to dark-grey fresh, fine- to med-grained, contains crinoids, highly resistant, moderately fractured, minor calcite veinlets, good reaction to HCl, attitude of joint 214°/72° NW, attitude of bedding 087°/18° S
21106	RA	4	Lime Mudstone and Wackestone , mottled tan- and med-grey weathered, light- to med-brownish grey fresh, limestone is very fine-grained to micritic, wackestone is fine- to med-grained and contains crinoid ossicles and colonial coral, moderately to highly fractured, minor calcite veinlets, good reaction with HCl

Interval	Formation Member	Strat. Thick. (m)	Description
21105	RA	5¼	Lime Mudstone and Crinoidal Grainstone , mottled tan and med-grey weathered, light- to med-brownish grey fresh, limestone is fine-grained to micritic, grainstone is med-grained, beds 1-10 cm thick, fossiliferous grainstone contains crinoid ossicles and stems and shell fragments, highly fractured, minor calcite veinlets that follow bedding and jointing, very good reaction with HCl, attitude of joint 212°/85° NW, attitude of bedding 048°/13° SE?
21104	RA	1½	Lime Mudstone and Crinoidal Grainstone , mottled med-grey weathered, med-grey and tan-grey fresh, limestone is very fine-grained to micritic, grainstone is fine- to coarse-grained, beds up to 0.5 m thick, rare colonial coral in float, moderately fractured, minor calcite veinlets, good reaction with HCl, attitude of bedding 192°/52° W
-	RA	5	covered
21103	RA	2½	Wackestone , mottled med-grey weathered, light- to med-brownish grey fresh, med- to coarse-grained, beds up to 1 m thick, occasional rugose coral, moderately fractured, minor calcite veinlets, resistant, fine-grained interval at top of unit, attitude of bedding 194°/36° W

Section 2006-07: NE Flank of Brazeau Range (UTM 583247E, 5802713N)

21376	RA	4	Wackestone and Grainstone , mottled tan and light-grey weathered, brownish med-grey fresh, wackestone is fine- to med-grained, grainstone is med- to coarse-grained, fossiliferous unit containing crinoid ossicles and stems, bryozoans and colonial coral, beds up to 3 m thick, very resistant, moderately to highly fractured, minor random calcite veinlets, very good reaction with HCl, section is part of west limb of large anticline
21377	RA	4	Wackestone and Grainstone , as 21377, except several intervals of colonial coral framestone, attitude of bedding 130°/27° SW
21378	RA	3	Wackestone and Grainstone , as 21377, except less grainstone and no framestone

Section 2006-08: NE Flank of Brazeau Range (UTM 582979E, 5802597N)

21379	RA	4	Lime Mudstone and Wackestone , mottled light-grey and tan weathered, brownish med-grey fresh, med-grained to micritic, bottom 2.5 m has bedding up to 1 m thick, top 1.5 m has laminated bedding 1-10 cm thick, very resistant, heavily fractured and jointed, moderate calcite veinlets, near-vertical bedding, stratigraphic "way up" to the southwest?
21380	RA	4	Lime Mudstone and Wackestone , mottled brown and light-grey weathered, brownish light-grey fresh, mudstone is very fine-grained to micritic; wackestone is coarse- to med-grained, fossiliferous, and contains crinoid ossicles, ooids and brachiopods; minor zones of colonial coral framestone, bedding up to 0.75 m thick, moderately fractured, rare calcite veinlets, very good reaction with HCl, attitude of bedding 119°/77° SW
21381	RA	5	Lime Mudstone and Wackestone , as 21380, except more colonial coral, hematite staining, highly fractured, attitude of bedding 130°/78° SW

Section 2006-09: NE Flank of Brazeau Range (UTM 582736E, 5802655N)

21382	RA	4	Lime Mudstone , mottled tan and light-grey weathered, brownish med-grey fresh, very fine-grained to micritic, no obvious bioclasts, bedding up to 0.5 m thick, highly fractured, minor calcite veinlets, near vertical bedding with attitude 112°/78° SW
21383	RA	4½	Lime Mudstone , as 21382, except dark-brownish grey fresh, fine- to very fine-grained, good reaction with HCl
21384	RA	5	Lime Mudstone , as 21382, except slightly wavy, shallower bedding, moderated reaction with HCl
21385	RA	4½	Lime Mudstone , as 21382, except wavy bedding, poor reaction with HCl
21386	RA	4	Lime Mudstone , as 21382, except bedding 1-10cm thick, fissile, poor reaction with HCl

Interval	Formation Member	Strat. Thick. (m)	Description
21387	RA	4½	<u>Lime Mudstone</u> , as 21386, except variable bedding orientation
Section 2006-10: NE Flank of Brazeau Range (UTM 582960E, 5802292N)			
21124	Pal	4	<u>Shaley Limestone</u> , tan/greenish-brown and med-grey weathered, med-brownish grey and dark grey fresh, micritic, well folded, pinched/boudinage layers, well laminated, beds up to 5 cm thick, well fractured, weak and rapid reaction with HC
21125	Pal	?	<u>Shaley Limestone</u> , as 21124, very folded, darker; becomes dominantly dark-grey to brownish grey fresh
21401	Pal	3¼	<u>Shaley Limestone</u> , as 21125, less folded, undulose fractures, random milky white calcite veining throughout, more consistent bedding with attitude 119°/77° SW
21402	Pal	?	<u>Shaley Limestone</u> , as 21401, gently folded bedding, some irregular tan beds that have a poor reaction with HCl
21403	Pal	3	<u>Lime Mudstone and Wackestone</u> , light-grey and tan-grey weathered, light- to med-greyish brown fresh, cryptocrystalline to micritic, thin bedded for bottom 0.5 m, bedding up to 0.75 m near top, vuggy calcite, minor random calcite veinlets, wackestone contains brachiopods, bivalves and crinoids, moderate reaction with HCl, attitude of bedding near-horizontal
21404	Pal	3	<u>Lime Mudstone and Wackestone</u> , as 21403, med- to dark-brownish grey fresh, minor grainstone intervals, fine- to med-grained, abundant calcite veinlets, good reaction with HCl
21405	Pal	2¼	<u>Lime Mudstone and Wackestone</u> , as 21404, except contains 3-5 cm interbeds of fine-grained, calcareous shale/thinly bedded limestone, dark-grey weathered and fresh, very good reaction with HCl, attitude of bedding 159°/18° W
21406	Pal	3	<u>Lime Mudstone and Grainstone</u> , as 21404, except grainstone more common (40%), mottled bedding surface, rusty blebs throughout, calcite along fracture surfaces
21407	Pal	3	<u>Grainstone and Lime Mudstone</u> , as 21406, except grainstone now 70% and contains ooids, crinoids and brachiopods, some yellowish staining in unit
21408	Pal	3	<u>Lime Mudstone</u> , light-grey weathered, dark-grey fresh, cryptocrystalline to micritic, minor fine-grained intervals, well bedded up to 30 cm thick, resistant, random calcite veinlets, moderate to very good reaction with HCl, attitude of bedding 104°/05° S
21409	Pal	2½	<u>Lime Mudstone</u> , as 21408, except thinly bedded up to 10 cm, vuggy calcite, mottled, minor limonite alteration?
Section 2006-11: NE Flank of Brazeau Range (UTM 584627E, 5802609N)			
21112	RA	4½	<u>Interbedded Shale and Lime Mudstone</u> , mottled tan- and med-grey weathered, light- to dark brownish-grey fresh, micritic, laminated in places, one bed 40 cm thick, moderately fractured, abundant calcite veinlets, moderate to no reaction with HCl, attitude of bedding 026°/20° SE
21113	RA	4½	<u>Interbedded Shale and Lime Mudstone</u> , as 21113, thick beds absent
21114	RA	3	<u>Interbedded Shale and Wackestone</u> , mottled brown- and med-grey weathered, brown- to med-grey fresh, med-grained to micritic, thinly bedded, moderately fractured, minor calcite veinlets, minor hematite blebs <1 cm in size, good reaction with HCl
21115	RA	5	<u>Grainstone</u> , mottled brown- and med-grey weathered, light-grey to tan fresh, medium- to coarse-grained, thickly bedded, contains crinoid ossicles and ooids, resistant, moderately fractured, minor calcite veinlets, very good reaction with HCl
21116	RA	2¼	<u>Wackestone and Grainstone</u> , light-grey weathered, light- to med-brownish grey fresh, wackestone is fine-grained to micritic and contains solitary rugose and colonial corals, grainstone is fine to med-grained and contains crinoids and other indeterminate bioclasts, beds 2-20 cm thick, moderately fractured, minor chert nodules up to 8 cm long, moderate reaction with HCl, attitude of bedding 024°/33° SE?

Interval	Formation Member	Strat. Thick. (m)	Description
21117	RA	4	Crinoidal Oolitic Grainstone , light grey weathered, med-greyish brown fresh, fine- to coarse-grained, contains crinoid ossicles and stems, ooids and other indeterminate bioclasts, moderately to well fractured, moderated calcite veinlets up to 3 mm, no chert, good reaction with HCl
21118	RA	3	Crinoidal Oolitic Grainstone , as 21117, abundant crinoids and ooids, bedding difficult to measure
21119	RA	3	Crinoidal Oolitic Grainstone , as 21117, minor very fine-grained intervals
21120	RA	2¼	Crinoidal Oolitic Grainstone , as 21117, except ooids >> crinoids, fine- to med-grained, bottom 1/3 m is brown weathered, moderate reaction with HCl
21121	RA	2	Crinoidal Oolitic Grainstone , as 21118, except ooids >> crinoids, very minor tan fresh, micritic interval, majority is coarse grainstone
21122	RA	4	Grainstone , light-grey weathered, med-grey and brownish grey fresh, fine-grained, contains ooids and minor crinoids, beds 3-15 cm thick, minor dark-brownish grey, micritic interval, moderately fractured, attitude of joints 181°/78° W and 139°/80° SW, attitude of bedding 027°/10° SE
21123	RA	?	offset
	RA	1½	Lime Mudstone , light-grey and brownish grey weathered, tan- and med-grey fresh, very fine-grained to micritic, moderately to well fractured, attitude of very wavy bedding 023°/27° SE

Section 2006-12: 350m NNE of Fire Lookout on Brazeau Range (UTM 582642E, 5801651N)

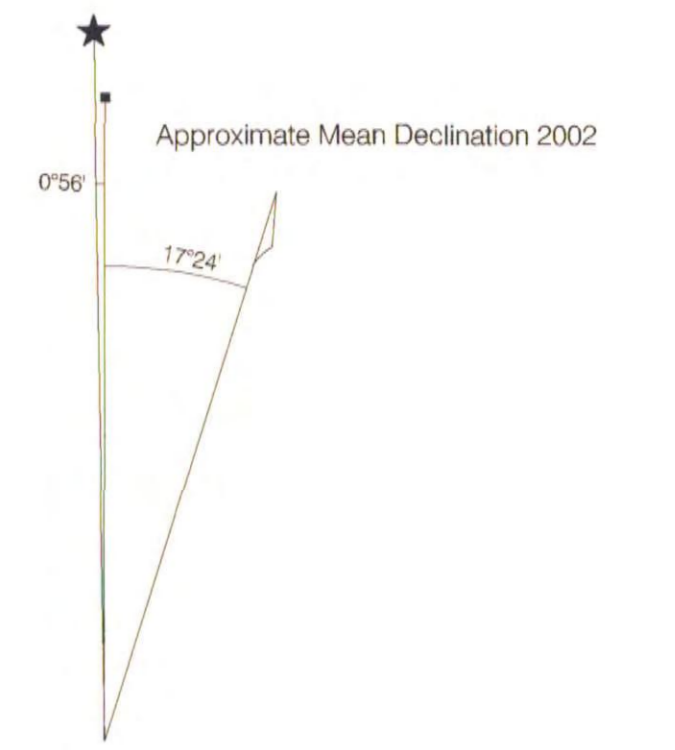
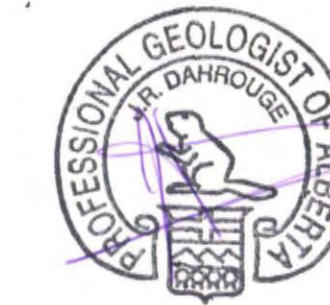
21102	Banff	¼	Wackestone and Dolomitic Limestone , tan-grey weathered, med- to dark-grey fresh, very fine- to medium-grained, beds < 3cm thick, chert nodules up to 10 cm in diameter, fossiliferous intervals containing crinoids, solitary rugose and colonial corals, brachiopods, bryozoans and ooids, minor calcite veinlets, minor grainstone intervals, attitude of bedding 325°/20° NE
-	Banff	¼	offset
21101	Banff	3¼	Dolomitic Lime Mudstone , tan-grey weathered, med- to dark-grey fresh, fine-grained to micritic, laminated beds 3 - 10 cm thick; chert nodules, black fossiliferous intervals containing crinoids, bryozoans, brachiopods, and colonial corals, weakly to moderately fractured, minor calcite veinlets, uppermost ½ m is wackestone

Section 2006-13: On Main Ridge ~1.2 km WNW of Fire Lookout on Brazeau Range (UTM 581232E, 5801584N)

21420	Banff	2	Lime Mudstone and Grainstone/Wackestone , as 21417, attitude of bedding 128°/28° SW
21419	Banff	3	Lime Mudstone and Grainstone/Wackestone , as 21417, except 2 m section of dark-grey lime mudstone at base
21418	Banff	3	Lime Mudstone and Grainstone/Wackestone , as 21417
21417	Banff	3½	Lime Mudstone and Grainstone/Wackestone , mottled tan and light-grey weathered, tan and light-brownish grey fresh, mudstone is very fine-grained to micritic and laminated; wackestone/grainstone intervals are fine to med-grained and contain brachiopods and crinoids; beds up to 2 cm thick, moderately fractured, minor calcite veinlets, good reaction with HCl, attitude of bedding 119°/25° SW
21416	Banff	2½	Lime Mudstone and Grainstone , as 21415, except 25 cm section of very thinly bedded, very fine- to coarse-grained grainstone, contains gastropods, brachiopods, crinoids and bryozoans
21415	Banff	1½	Lime Mudstone , as 21414, except highly fractured in places
21414	Banff	2	Lime Mudstone , as 21413, except med-brownish grey fresh, grainstone absent, beds <1-5 cm thick, minor calcite veinlets, attitude of bedding 130°/27° SW
21413	Banff	3¼	Lime Mudstone and Crinoidal Grainstone , tan and light-grey weathered, med- to dark-grey fresh, mudstone is micritic, grainstone is med- to coarse-grained, bedding up to 10 cm thick, contains crinoids and brachiopods, rusty weathering, rubbly, moderately to highly fractured, good reaction with HCl, attitude of joint 222°/80° NW

C8

Interval	Formation Member	Strat. Thick. (m)	Description
21412	Banff	1¼	Crinoidal Grainstone and Lime Mudstone , as 21411, except major grainstone and minor mudstone, light-grey weathered, grainstone contains crinoids, brachiopods, solitary rugose coral, bryozoans and ooids, attitude of bedding 122°/23° SW
21411	Banff	3½	Lime Mudstone and Grainstone , as 21410, except grainstone more common, mottled tan and med-grey weathered
21410	Banff	4½	Wackestone and Lime Mudstone , mottled tan and light-grey weathered, brownish med-grey fresh, wackestone is coarse- to fine-grained and contains brachiopods, bryozoans and crinoid ossicles; mudstone is very fine-grained to micritic; laminated with beds 1-5 cm thick, minor amount of grainstone, chert nodules, heavily fractured, abundant calcite veinlets, good reaction with HCl



LEGEND AND SYMBOLS

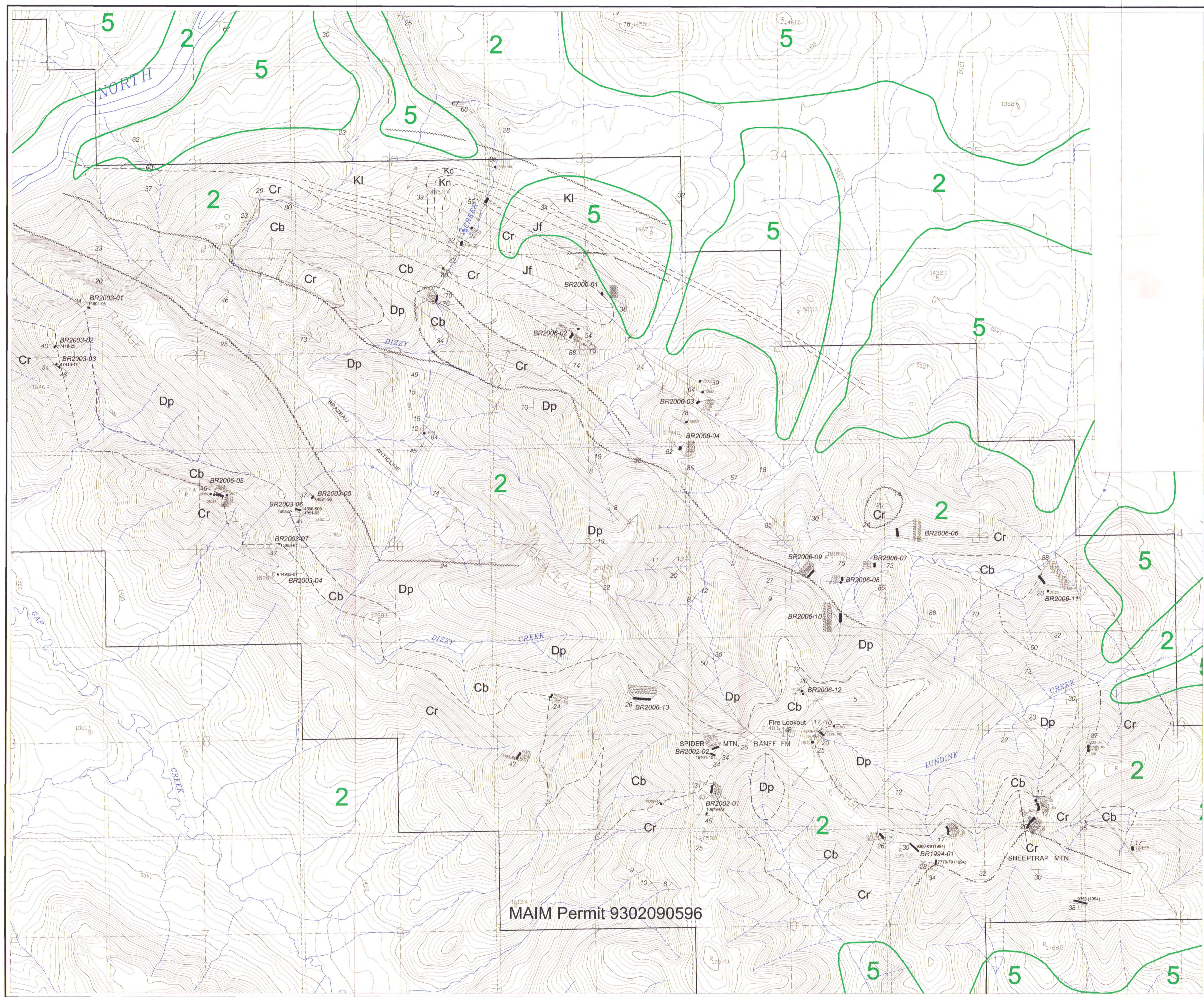
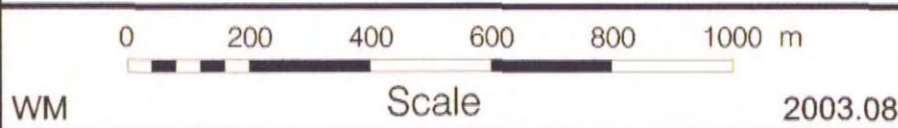
- LOWER CRETACEOUS**
- KI Luscar Formation: carbonaceous shale, sandstone, coal seams
 - Kc Cadomin Formation: chert and quartz-pebble conglomerate
 - Kn Nikanassin Formation: light-grey and black sandstone, shale; coal stringers
- JURASSIC**
- Jf Fernie Formation: shale, sandstone, carbonates
- CARBONIFEROUS**
Rundle Group
- Cr Turner Valley, Shunda, and Pekisko formations: Undivided
- DEVONIAN**
- Cb Banff Formation: argillaceous and cherty limestone, fissile and calcareous shale
 - Dp Paliser Formation: massive mottled limestone and dolomite, porous and vuggy dolomite, argillaceous limestone
 - Da Alexo Formation: silty dolomite, sandstone, dolomite breccia
 - Dm Mount Hawk Formation: brown cherty dolomite, dark grey argillaceous limestone

- Geological boundary
- Bedding (inclined, vertical, overturned, horizontal)
- Fault
- Synclinal axis (arrow indicates plunge)
- Anticlinal axis (arrow indicates plunge)
- Sample section with sample numbers
- Isolated sample with sample number
- Location of cross-section
- Elevation contour (interval: 10 m)
- Highway with number
- Gravel road
- Trail or cut line
- MAIM Permit
- Land Use Zone Boundary; Zone Number
- 2 Critical Wildlife
 - 4 General Recreation
 - 5 Multiple Use
 - 8 Facility

NOTES

- 1) Base map compiled from 1 : 20 000 scale digital base maps 83B/5NW,SW, and SE supplied by Spatial Data Warehouse Ltd., Calgary, Alberta.
- 2) Geology modified after Erdman (1950), Douglas (1956, 1958), and Hofer (1976).
- 3) UTM grid is based on North American Datum, 1983 (NAD83); UTM grid zone: 11U.
- 4) To accompany Assessment Report entitled "2006 Exploration and Fieldwork at the Brazeau Range Metallic and Industrial Minerals Permit, West-Central Alberta" by J.R. Dahrouge and J. Tanton (2006/11/03).

REVISIONS		GRAYMONT WESTERN CANADA INC.	
BY	DATE	DAHROUGE GEOLOGICAL CONSULTING LTD.	
WM	2003.09	Edmonton, Alberta	
WM	2004.03	WEST-CENTRAL ALBERTA	
WM	2004.06	Fig. 4.1 Geology and Locations of Sections Along the Southern Part of Brazeau Range	
WM	2004.12		
WM	2006.11		



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