MAR 20140009: BRAZEAU RANGE

Brazeau Range - A report on limestone exploration near Brazeau, Western Alberta.

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GRAYMONT WESTERN CANADA INC.

2014 EXPLORATION AND FIELDWORK WITHIN THE BRAZEAU RANGE METALLIC AND INDUSTRIAL MINERALS PERMIT, WEST-CENTRAL ALBERTA

PART B

Metallic and Industrial Minerals Permit
9302090596

Geographic Coordinates

52° 20' N to 52° 30' N
115° 44' W to 116° 01' W

NTS Sheets 83 B/5, C/8

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1. SUMMARY

During July and August 2014, the southern parts of Brazeau Range, south of Nordegg and within Metallic and Industrial Minerals (MAIM) Permit 9302090596, were explored for high-quality carbonate rocks. Exploration conducted in 2014 was a follow-up to previous exploration conducted along Brazeau Range during the summers of 2002-2004, 2006-2010 and 2012.

A total of 110 locations were mapped in detail and 109 rock samples were collected within the Brazeau Range Permit, representing approximately 315 m of stratigraphy. Samples were sent to a laboratory for whole-rock analysis.

Throughout this report 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 (right-hand rule). A magnetic declination of 16°17' east was used. Where bedding was not evident, stratigraphic thicknesses were calculated using orientations from adjacent units. Where more than one bedding orientation was measured, the mean orientation is used.

2. INTRODUCTION

The 2014 exploration within the Brazeau Range Permit was conducted by Dahrouge Geological Consulting Ltd. (Dahrouge), on behalf of Graymont Western Canada Inc. (Graymont). This assessment report describes the exploration conducted within MAIM Permit 9302090596, which encompasses southern parts of Brazeau Range of the Alberta Foothills. The 2014 exploration was authorized by Darren Anderson of Graymont Western Canada Inc.

The objectives of the 2014 exploration were to expand on the previously explored areas, and to locate and better define carbonate units throughout the property. This report includes information on the geology and quality of carbonates encountered while mapping and sampling outcrops within the permit area.

3. GEOGRAPHIC SETTING AND ACCESS

3.1 LOCATION AND ACCESS

MAIM Permit 9302090596 encompasses the southern part of Brazeau Range south of North Saskatchewan River and parts of the northeast side of Brazeau Range north of North Saskatchewan River, near Nordegg, Alberta (Fig. 3.2).

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.

3.2 INFRASTRUCTURE

Accommodations, food, fuel and other necessary services are available in Rocky Mountain House or Nordegg. The local economy is primarily based on agriculture, forestry, and energy-based industries.

Rocky Mountain House, with a population of about 7,000, is accessed by traveling 67 km west of Red Deer along the David Thompson Highway (Highway 11), and then 12 km north along Highway 22.

The Hamlet of Nordegg is about 85 km west of Rocky Mountain House, along Highway 11 (Fig. 3.2). Nordegg has a population of about 100.

3.3 TOPOGRAPHY, VEGETATION AND CLIMATE

The Brazeau Range Permit is included in the Eastern-Slope Montane Forest Ecological Region, and lies within the Rocky-Clearwater District of the Alberta Forest Reserve. In the subalpine zone, vegetation consists of stunted subalpine fir and Englemann Spruce, and alpine foliage above the treeline. Vegetation in areas of rugged limestone outcroppings is generally sparse, and commonly consists of junipers, other low brush, and grasses. Below the treeline, vegetation consists of dense stands of Aspen, Lodgepole Pine, White Spruce, and less frequent stands of Douglas Fir.

The property is comprised of northwest-trending ridges cut by northeast-trending valleys and drainages. Elevations range from approximately 1,160 m at 'The Gap' along North Saskatchewan River to about 2,130 m atop Spider Mountain. The property is cut by a number of drainages, including Dizzy Creek, Lundine Creek, Storm Creek, Trout Creek, and most notably, North Saskatchewan River, which cuts through the middle of the property.

Climate is sub-alpine with average summer temperatures of 20° to 25°C and winter temperatures of -15° to -20°C, with extremes of 35°C and -40°C. Rainfall averages about 40 cm per year; snowfall averages about 180 cm with the majority falling in December and January.

3.4 FIELD OPERATIONS

Field operations were conducted by a four-person geological crew from Dahrouge Geological Consulting Ltd., based in a hotel in Rocky Mountain House.

Transportation to and from the property was by helicopter, based out of the Rocky Mountain House Airport.

Garmin GPSmap 60CSx instruments were used to mark outcrop locations and record access information. Compasses were set at a magnetic declination of 16°17' east.

4. PROPERTY, EXPLORATION AND EXPENDITURES

4.1 PROPERTY SUMMARY

Graymont Western Canada Inc. acquired MAIM Permit 9302090596 (Brazeau Range) in 2002 to cover Paleozoic limestones along the eastern flank of Brazeau Range north of North Saskatchewan River and the southern part of Brazeau Range, south of North Saskatchewan River (Fig. 1.2). The Brazeau Range Permit encompasses 5,056 hectares and is contiguous to the Nordegg South MAIM Lease (9410010456).

Based on the 2014 exploration, the entirety of the Brazeau Range Permit will be retained (Section 4.3, Fig. 4.1).

4.2 2014 EXPLORATION SUMMARY

From July 28 to August 5, 2014, Dahrouge Geological Consulting Ltd., on behalf of Graymont Western Canada Inc., conducted exploration for carbonate lithotypes within west-central Alberta. The work was undertaken to determine the location, quality and extent of carbonate units in the permit area.

A total of 110 mapping stations were examined and 109 rock samples were collected (Fig.'s 4.2 & 4.3). Geological observations were recorded, including lithologic information, measurements of structural elements, and other pertinent details (Appendices 2 & 3). A solution of 10% HCl was used to assess carbonate quality in the field, and rock samples were shipped to Central Lab of Graymont Western U.S. Inc. in Utah for analyses (Appendix 4). In some instances, interval thicknesses were determined by measuring outcrops perpendicular to bedding, where it could be identified. Field maps were completed on 1:10,000 and 1:30,000 scale map sheets and concentrated on areas along Brazeau Range south of North Saskatchewan River.

4.3 EXPLORATION EXPENDITURES

Expenditures for 2014 totaled $66,502.24 (Appendix 1). The entirety of the Brazeau Range Permit (MAIM Permit 9302090596) will be retained. Excess expenditures are to be assigned to a future exploration period of the Brazeau Range Permit. The current permit area includes:

Land Description (Mer-Rg-Twp)	Current Size (Ha)
5-13-39: 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	
5-14-39: 24L15, L16; 25N, SE, L6; 36NW, L1-L3, L8; and	
5-14-40: 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.	5,056

Expenditures are allocated to MAIM Permit 9302090596 as follows:

Assessment Period MAIM Permit 9302090596	Expiry Date	Required Expenditures	Assigned Expenditures
Years 11 and 12	Sept. 04, 2014	$58,949.76*	$58,949.76
Years 13 and 14	Sept. 04, 2016	$75,840.00	$7,552.48

* Calculated from $75,840-16,890 excess expenditures from previous term

5. REGIONAL GEOLOGY

In west-central Alberta, Paleozoic limestones are known to occur within the Middle Cambrian Eldon Formation, the Upper Devonian Mount Hawk Formation, the Upper Devonian Palliser Formation, the Upper Devonian to Lower Carboniferous Banff Assemblage and the Lower Carboniferous Rundle Assemblage (Table 5.1, Fig. 4.2).

Descriptions of the stratigraphy of the Mount Hawk, Palliser Formation, Banff Assemblage and Rundle Assemblage, are from a prior assessment report by Pana and Dahrouge (1998). A detailed review of the regional stratigraphy is provided by Stott and Aitken (1993), Mossop and Shetsen (1994), Halbertsma (1994), and Richards et al. (1994).

5.1 STRATIGRAPHY

5.1.1 Mount Hawk Formation

Along the Front Ranges of the Rocky Mountains, the Upper Devonian Fairholme Group was transgressivelly deposited on eroded Upper Cambrian strata, and consists of two carbonate reef formations, the Cairn and the overlying Southesk formations (Table 5.1). Both are replaced basinward by the laterally equivalent argillaceous beds of the Flume, Maligne, Perdrix, and Mount Hawk formations (Mountjoy et al., 1992).

The Upper Devonian Southesk Formation at its type section on Mount Dalhousie, near the confluence of Southesk and Brazeau rivers, is 161 m thick and divided into the Peechee, Grotto, and Arcs members (MacKenzie, 1966; Mountjoy et al., 1992). To the west it thins into argillaceous dolomites and dolomitic shales of the Mount Hawk Formation. Where Highway 11 crosses Brazeau Range, the upper part of the Mount Hawk Formation, consists of cryptocrystalline, black, medium-bedded, argillaceous limestone (Douglas, 1956).

5.1.2 Palliser Formation

In west-central Alberta, the Upper Devonian Palliser Formation consists mainly of outer shelf and basinal carbonates of the Sassenach Basin (Halbertsma, 1994). The Palliser Formation is divisible into the Morro and overlying Costigan members, which are separated by an unconformity. The Morro Member comprises a lithologic suite dominated by carbonates with significant lateral facies variations. The Costigan Member consists of open-marine fossiliferous limestones and shales, with local evaporitic sedimentation. Within Foothills and Front Ranges of Alberta, limestones of the Palliser Formation vary from less than 180 m to more than 270 m in thickness (Holter, 1976).

The Palliser Formation is overlain by shales of the Exshaw Formation, and siliciclastics and carbonates of the Banff Assemblage.

5.1.3 Banff Assemblage

In west-central Alberta, the Exshaw, Banff and Yohin formations comprise the Banff Assemblage (Richards et al. 1994). The Upper Famennian to Lowermost Tournaisian Exshaw Formation is dominated by fine-grained siliciclastics deposited in euxinic basin to shallow-neritic environment. In general, it is unconformably overlain by the Lower to Upper Tournaisian Banff Formation, which is a heterogeneous association of carbonates and fine-grained siliciclastics

deposited on poorly differentiated carbonate platforms. Westward, the uppermost Banff Formation grades laterally into the Rundle Assemblage.

5.1.4 Rundle Assemblage

The Lower Carboniferous Rundle Assemblage extends from MacKenzie Mountains in the Arctic south through the Peace River Embayment to southeastern British Columbia. In west-central Alberta, it comprises shallow-marine platform and ramp carbonates which prograded westward over deeper water shales and carbonates of the Banff Assemblage. The lower Rundle Assemblage is subdivided into the transgressive carbonate Pekisko Formation, and two regressive successions of restricted-marine carbonates and subordinate anhydrite assigned to the Shunda and Turner Valley formations (Richards et al. 1994). In southern Alberta the Pekisko grades laterally into the uppermost Banff Formation. The Turner Valley Formation extends from east-central British Columbia to southwest Alberta. According to Richards et al. (1994), the Turner Valley Formation thickens to the southwest and for most of its length is 50 m to 120 m thick. The type section near Turner Valley is 152 m thick and divisible into four beds.

Earlier work by Douglas (1958), and MacQueen and Bamber (1968) indicate that the eastern peritidal sequences of the uppermost Pekisko, Shunda and lower Turner Valley grade south and southwestward into the more open-marine sequence of the Livingstone Formation (Table 5.1).

The upper Rundle Assemblage includes the transgressive Mount Head Formation.

5.2 STRUCTURE

In Front Ranges and Foothills of west-central Alberta, Paleozoic and Mesozoic strata have been repeated along several major thrust faults. Displacements along these faults are interpreted to be tens of kilometres. Within individual thrust sheets, regional-scale folds exhibit a spatial relation to their leading edges. Near Nordegg, the main structural discontinuity is the northwest to southeast trending Brazeau Thrust. The leading edge of the thrust sheet is folded into the asymmetrical to recumbent Brazeau Anticline.

TABLE 5.1 GENERALIZED PALEOZOIC STRATIGRAPHY OF FOOTHILLS AND FRONT RANGES, WEST-CENTRAL ALBERTA*

System or Subsystem	Stratigraphic Unit		
	Assemblage / Group	Formation	
		S	N
Lower Carboniferous	Rundle Assemblage	Mount Head	
			Turner Valley
		[1] Livingstone	Shunda
			Pekisko
	Banff Assemblage	Banff	
		Exshaw	
		[1] Palliser	
Upper Devonian	Fairholme Group[°]	Alexo	
		Southesk	Mount Hawk
		Cairn	
~~			
Cambrian		Pika	
		Eldon	
		Stephen	
		Cathedral	

*Compiled from MacKenzie (1969), Richards et al. (1994), Switzer et al. (1994), and Holter (1994).
[°] Fairholme Group of MacKenzie (1969) is partly equivalent to the Woodbend Group (Switzer et al., 1994).
[1] Current limestone production (*from* Holter, 1994)

6. RESULTS

Nine days were spent mapping and sampling carbonate outcrops in detail. The 2014 exploration concentrated on defining stratigraphic unit locations and contacts within previously under-explored areas of the property.

Carbonate lithologies of the Palliser and Pekisko formations were examined and sampled within Brazeau Range, north of North Saskatchewan River (Fig. 4.2). A total of 109 intervals were examined and sampled, representing approximately 315 m of stratigraphy (Appendix 2). Where bedding could not be identified, stratigraphic measurements were based on the previously determined regional trend or deduced from surrounding measurements where possible.

Three outcrops of the Palliser Formation were examined in 2014, to test the potential for high-calcium limestone in the upper part of the unit and high-quality dolomite in the lower part of the unit (Fig. 4.2). Section 2014-12, located along a ridge northwest of the Brazeau Fire Tower and south of North Saskatchewan River, tested the lower part of the formation (Morro Member) and averaged 54.41% $CaCO_3$, 44.38% $MgCO_3$ and 0.74% SiO_2 over 77 m. Section 2014-02, located west of the Brazeau Fire Tower, tested the upper part of the formation (the Costigan Member) and averaged 88.09% $CaCO_3$, 8.36% $MgCO_3$ and 2.76% SiO_2 over 12.5 m. The lower part of the formation generally consists of medium- to dark-grey, variably dolomitic mudstones. The upper part of the formation consists of weakly dolomitic, medium- to dark-brownish-grey lime mudstone to wackestone. The Palliser Formation continues to display highly variable composition and further work is required before a conclusion can be made regarding its potential for high-calcium limestone or high-quality dolomite.

Significant intervals of the Banff Formation were mapped in 2014 along traverses, but no samples were collected. The Banff Formation consists of tan weathered, medium-brownish-grey fresh, micritic to fine-grained (with minor coarse-grained bioclasts) lime mudstone to wackestone. The Banff Formation is not considered a unit of interest due to its low $CaCO_3$ values and high SiO_2 content.

The majority of the outcrops visited in 2014 were within the Pekisko Formation. Analytical results were variable, presumably due to the fact that different members within the formation were sampled. The best sample section was 2014-03, which averaged 98.55% $CaCO_3$, 0.78% $MgCO_3$ and 0.26% SiO_2 over approximately 45 m, and was collected from a resistant limestone cliff located south of North Saskatchewan River and west of Brazeau Fire Tower (Fig. 4.2). Several other sample sections and isolated intervals returned values in excess of 95% $CaCO_3$ over several metres, however $MgCO_3$, and less commonly SiO_2, impurities were common in many

of these sections. The high-quality Pekisko intervals generally consist of resistant and massive, light- to medium-brownish-grey, fine- to coarse-grained crinoidal lime wackestone to grainstone. Lower quality intervals generally consist of less resistant, medium- to dark-brownish-grey, micritic to fine-grained lime mudstone to packstone. Overall, the Pekisko Formation has the greatest high-calcium limestone potential in the area.

Several outcrops of Turner Valley Formation were mapped in 2014 during traverses, but no samples were collected. Outcrops generally consisted of vuggy, medium-brown to medium-grey, moderately to strongly dolomitic mudstone to wackestone. The Turner Valley Formation has the greatest potential for high-quality dolomite in the permit area, although more work is required to constrain the extent and overall quality.

7. CONCLUSIONS

Carbonate units of the Palliser and Pekisko formations were examined and sampled along Brazeau Range north of North Saskatchewan River. A total of 109 discrete intervals were sampled and described in detail. Additionally, 110 mapping stations were completed to define stratigraphic contacts and structures. Based on the samples collected and units mapped during the 2014 exploration and overall property assessment, the entirety of the permit will be retained.

Access roads and trails were noted, which provide limited access to the exterior of the property. Extensive hiking and/or helicopter support are required to reach much of the property.

Future exploration will expand on previously conducted work in the area, confirming or redefining past geological interpretations and determining the potential for high-calcium limestone and/or high-quality dolomite within the permit area.

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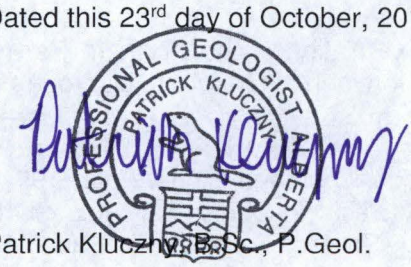
9. STATEMENT OF QUALIFICATIONS

I, Patrick Kluczny, residing at [redacted] Edmonton, 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 2006 graduate of the University of Alberta, Edmonton, Alberta with a B.Sc. in Geology.
- I have practiced my profession as a geologist continuously since 2006.
- I am a registered Professional Geologist with the Association of Professional Engineers and Geoscientists of Alberta, member M81985.
- I hereby consent to the copying or reproduction of this Assessment Report following the one-year confidentiality period.
- I am the author of the report entitled "2014 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 23rd day of October, 2014.



Patrick Kluczny, B.Sc., P.Geol.

APEGA M81985

APPENDIX 1: COST STATEMENT FOR THE 2014 EXPLORATION AT THE BRAZEAU RANGE PERMIT

a) **Personnel**		$ 20,317.43
b) **Food and Accommodation**		$ 7,136.01
c) **Transportation**		$ 28,819.20
d) **Instrument Rental**		$ 438.88
e) **Drilling**	n/a	
f) **Analyses**		$ 3,215.00
h) **Other** (Misc. supplies, Software rental, Field maps)		$ 530.07
Total		$ 60,456.58
Administration (10%)		$ 6,045.66
Total + Administration		**$ 66,502.24**

[redacted]

P. Kluczny, B.Sc., P.Geol.

Edmonton, Alberta
October 23, 2014

APPENDIX 2: 2014 SAMPLE DESCRIPTIONS AND ASSAY RESULTS FROM BRAZEAU RANGE

DAHROUGE GEOLOGICAL CONSULTING LTD.

GRAYMONT

Notes: Stratigraphic thicknesses are based on measured attitudes of bedding listed below, with appropriate interpolations. Attitudes are strike and dip (right-hand rule). Sections are listed in numerical order of samples, which does not necessarily represent stratigraphic order. Most samples consist of chips at 30 cm intervals. UTM coordinates are NAD83, Zone 11N. Section locations are shown in Figure 4.2. Stratigraphy Abbreviations: Dpa - Devonian Palliser Formation; Mbf - Mississippian Banff Formation; Mpk - Mississippian Pekisko Formation; Msh - Mississippian Shunda Formation; Mtv - Mississippian Turner Valley Formation

Sample	Strat Unit	Strat Tkns (m)	Description	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	SrO (ppm)	MnO (ppm)	P_2O_5 (ppm)
Isolated Samples											
120380	Mpk	2	**Lime Packstone**, medium grey weathered and fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant, thinly-bedded, strong HCl reaction, structure(s): bedding (definite) 108/40 SW	98.82	0.71	0.20	0.067	0.076	235	36	50
Section 2014-01 (UTM 581143E, 5802055N)											
120351	Dpal	2.5	**Dolomitic Mudstone**, light brown to tan weathered, light brown fresh, very fine-grained, thinly-bedded, resistant, weak fetid odour, weak HCl reaction, structure(s): calcite veinlet very weak; bedding (definite) 90/16 S	55.49	42.51	1.54	0.226	0.166	109	70	50
120352	Dpal	0.75	**Dolomitic Mudstone**, light brown to tan weathered, light brown fresh, very fine-grained, slightly resistant, weak fetid odour, structure(s): calcite veinlet very weak; bedding (definite) 90/16 S	54.35	43.85	1.38	0.185	0.129	106	61	50
120353	Dpal	1.5	**Dolomitic Mudstone**, light brown to tan weathered, light brown fresh, very fine-grained, slightly resistant, weak fetid odour, weak HCl reaction, structure(s): calcite veinlet very weak; bedding (definite) 120/20 SW	54.86	43.51	0.99	0.190	0.134	117	70	50
Section 2014-02 (UTM 581078E, 5802012N)											
120354	Dpal	1	**Dolomitic Mudstone**, light grey to tan weathered and fresh, laminated to thinly-bedded, slightly resistant, fissile, weak fetid odour, weak HCl reaction, structure(s): bedding (definite) 164/16 SW	62.31	33.41	2.99	0.582	0.404	141	200	50
120355	Dpau	0.5	**Dolomitic Mudstone**, light grey to tan weathered and fresh, very fine-grained, resistant, alteration: oxide, fracture-related, weak intensity, weak fetid odour, strong HCl reaction, structure(s): bedding (definite) 164/16 SW	80.57	15.82	2.63	0.333	0.324	278	157	50
120356	Dpau	6.75	**Dolomitic Lime Mudstone**, tan weathered, tan to light grey fresh, cryptocrystalline to micritic, alteration: oxide, weak intensity, strong HCl reaction	83.28	12.97	3.06	0.313	0.173	259	133	50
120357	Dpau	3.25	**Lime Mudstone**, tan weathered, tan to light grey fresh, cryptocrystalline to micritic, alteration: oxide, weak intensity, strong HCl reaction, structure(s): bedding (definite) 125/24 SW	96.66	1.53	1.05	0.190	0.136	442	82	50
120358	Dpau	2	**Lime Mudstone**, tan weathered, tan to light grey fresh, cryptocrystalline to micritic, alteration: oxide, weak intensity, strong HCl reaction	92.29	2.03	4.58	0.351	0.264	371	162	50
Section 2014-03 (UTM 580546E, 5801612N)											
120359	Mpk	3	**Lime Grainstone**, very-light grey weathered and fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant, resistant, homogeneous, weak fetid odour, strong HCl reaction, structure(s): bedding (definite) 99/33 S	97.93	1.00	0.64	0.080	0.108	339	53	50

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Sample	Strat Unit	Strat Tkns (m)	Description	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	SrO (ppm)	MnO (ppm)	P_2O_5 (ppm)
120360	Mpk	2	**Lime Grainstone**, very-light grey weathered and fresh, fine-grained to medium-grained, fossils: crinoid ossicle, resistant, homogeneous, weak fetid odour, strong HCl reaction, structure(s): bedding (definite) 99/33 S	98.59	0.88	0.29	0.063	0.077	260	46	50
120361	Mpk	2.25	**Lime Grainstone**, very-light grey weathered and fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant, resistant, homogeneous, weak fetid odour, strong HCl reaction, structure(s): bedding (definite) 99/33 S	98.63	0.75	0.26	0.065	0.073	230	41	50
120362	Mpk	2	**Lime Grainstone**, very-light grey weathered and fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant, resistant, homogeneous, weak fetid odour, strong HCl reaction, structure(s): bedding (definite) 99/33 S	98.97	0.71	0.31	0.062	0.074	217	40	50
120363	Mpk	3	**Lime Grainstone**, very-light grey weathered and fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant, resistant, homogeneous, weak fetid odour, strong HCl reaction, structure(s): bedding (definite) 98/30 S	98.81	0.75	0.18	0.060	0.068	225	36	50
120364	Mpk	1.5	**Lime Grainstone**, very-light grey weathered and fresh, medium-grained to coarse-grained, fossils: crinoid ossicle, abundant, resistant, homogeneous, weak fetid odour, strong HCl reaction, structure(s): bedding (definite) 99/33 S	98.84	0.75	0.30	0.069	0.072	253	33	50
120365	Mpk	0.75	**Lime Grainstone**, very-light grey weathered and fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant, resistant, homogeneous, weak fetid odour, strong HCl reaction, structure(s): bedding (definite) 99/33 S	98.50	0.86	0.26	0.074	0.054	256	30	50
120366	Mpk	0.5	**Lime Grainstone**, very-light grey weathered and fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant, resistant, homogeneous, weak fetid odour, strong HCl reaction, structure(s): bedding (definite) 99/33 S	98.61	0.84	0.46	0.084	0.066	269	28	50
120367	Mpk	1.5	**Lime Grainstone**, very-light grey weathered and fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant, resistant, homogeneous, weak fetid odour, strong HCl reaction, structure(s): bedding (definite) 99/33 S	98.63	0.82	0.29	0.077	0.056	253	27	50
120368	Mpk	0.5	**Lime Grainstone**, very-light grey weathered and fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant, resistant, homogeneous, weak fetid odour, strong HCl reaction, structure(s): bedding (definite) 99/33 S	98.68	0.75	0.31	0.073	0.117	251	47	50
120369	Mpk	2.75	**Lime Grainstone**, very-light grey weathered and fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant, resistant, homogeneous, weak fetid odour, strong HCl reaction, structure(s): bedding (definite) 99/33 S	98.57	0.73	0.22	0.064	0.083	230	37	50
120370	Mpk	1	**Lime Grainstone**, very-light grey weathered and fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant, resistant, homogeneous, weak fetid odour, strong HCl reaction, structure(s): bedding (definite) 99/33 S	98.66	0.73	0.20	0.063	0.067	230	30	50
120371	Mpk	1.5	**Lime Grainstone**, very-light grey weathered, very-light grey to very-light brown fresh, medium-grained to coarse-grained, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction	98.54	0.77	0.33	0.061	0.148	231	52	50
120372	Mpk	5.75	**Lime Grainstone**, very-light grey weathered, very-light grey to very-light brown fresh, fine-grained to medium-grained, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction	98.43	0.79	0.26	0.062	0.069	225	35	50
120373	Mpk	2.25	**Lime Grainstone**, very-light grey weathered, very-light grey to very-light brown fresh, medium-grained to coarse-grained, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction	98.57	0.82	0.30	0.068	0.099	232	43	50

Sample	Strat Unit	Strat Tkns (m)	Description	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	SrO (ppm)	MnO (ppm)	P_2O_5 (ppm)
120374	Mpk	0.5	**Lime Grainstone**, very-light grey weathered, very-light grey to very-light brown fresh, medium-grained to coarse-grained, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction, structure(s): bedding (undulatory) 133/21 SW; bedding (undulatory) 128/37 SW	98.36	0.77	0.17	0.066	0.090	232	39	50
120375	Mpk	2	**Lime Grainstone**, very-light grey weathered, very-light grey to very-light brown fresh, medium-grained to coarse-grained, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction	98.49	0.71	0.25	0.060	0.098	233	45	50
120376	Mpk	1.5	**Lime Grainstone**, very-light grey weathered, very-light grey to very-light brown fresh, medium-grained to coarse-grained, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction, structure(s): 94/37 S	98.63	0.71	0.18	0.066	0.076	234	37	50
120377	Mpk	9	**Lime Grainstone**, very-light grey weathered, very-light grey to very-light brown fresh, medium-grained to coarse-grained, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction	98.47	0.73	0.18	0.067	0.098	234	43	50
120378	Mpk	2.5	**Lime Grainstone to Lime Packstone**, very-light grey weathered, very-light grey to very-light brown fresh, medium-grained to coarse-grained, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction	98.75	0.73	0.18	0.070	0.142	233	54	50
Section 2014-04 (UTM 580225E, 5801538N)											
120381	Mpk	1	**Lime Packstone**, medium grey weathered and fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant, thinly-bedded, strong HCl reaction, structure(s): bedding (undulatory) 121/37 SW	98.81	0.75	0.19	0.074	0.162	231	36	50
120382	Mpk	4.75	**Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to coarse-grained, fossils: solitary rugose coral, rare; crinoid ossicle, abundant, thinly-bedded, very strong HCl reaction, structure(s): bedding (undulatory) 112/25 SW	98.86	0.79	0.23	0.061	0.061	238	30	50
120383	Mpk	10	**Lime Wackestone**, light grey weathered, medium grey fresh, fine-grained to very coarse-grained, fossils: solitary rugose coral, rare; crinoid ossicle, common, thinly-bedded, strong HCl reaction, structure(s): bedding (undulatory) 133/30	98.07	1.05	0.48	0.087	0.048	302	17	50
120384	Mpk	3	**Lime Wackestone**, light grey weathered, medium grey fresh, medium-grained, fossils: crinoid ossicle, rare, thinly-bedded, very strong HCl reaction, structure(s): bedding (definite) 108/19 SW	98.04	0.96	0.65	0.094	0.049	301	18	50
120385	Mpk	6	**Lime Wackestone**, light grey weathered, medium grey fresh, medium-grained to coarse-grained, fossils: solitary rugose coral, rare; crinoid ossicle, rare, thinly-bedded, very strong HCl reaction, structure(s): bedding (undulatory) 114/23 SW	98.36	0.94	0.54	0.104	0.074	304	18	50
120386	Mpk	10	**Lime Wackestone**, light grey weathered, medium grey to medium brown fresh, medium-grained, fossils: crinoid ossicle, common, thinly-bedded, very strong HCl reaction	98.38	0.98	0.57	0.083	0.062	294	19	50
120387	Mpk	8	**Lime Wackestone**, light grey weathered, medium grey to medium brown fresh, medium-grained, fossils: crinoid ossicle, common, thinly-bedded, very strong HCl reaction	97.99	1.07	0.47	0.094	0.053	281	18	50
120388	Mpk	8	**Lime Wackestone**, light grey weathered, medium grey to medium brown fresh, medium-grained, fossils: crinoid ossicle, common, thinly-bedded, very strong HCl reaction	97.81	1.15	0.70	0.155	0.082	315	21	50
Section 2014-05 (UTM 580421E, 5801088N)											
120458	Mpk	2.25	**Lime Wackestone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: crinoid ossicle, common, moderately-bedded, strong HCl reaction, structure(s): bedding (definite) 141/16 SW	98.13	1.23	0.26	0.090	0.120	249	36	50

Sample	Strat Unit	Strat Tkns (m)	Description	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	SrO (ppm)	MnO (ppm)	P_2O_5 (ppm)
120459	Mpk	2.25	**Lime Wackestone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: peloid, rare; ooid, rare; crinoid ossicle, abundant, moderately-bedded, strong HCl reaction, structure(s): bedding (definite) 141/16 SW	98.06	1.30	0.29	0.085	0.090	250	31	50
120460	Mpk	1	**Lime Wackestone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: peloid, rare; ooid, rare; crinoid ossicle, abundant, moderately-bedded, strong HCl reaction, structure(s): bedding (definite) 141/16 SW	98.70	0.82	0.18	0.066	0.110	239	40	50
120461	Mpk	2	**Dolomitic Lime Wackestone**, light grey weathered, medium grey fresh, fine-grained, fossils: crinoid ossicle, rare, moderately-bedded, very strong HCl reaction, structure(s): bedding (possible) 141/16 SW	92.88	6.17	0.58	0.091	0.108	239	42	50
120462	Mpk	6.5	**Lime Wackestone**, light grey weathered, medium grey fresh, fine-grained, fossils: crinoid ossicle, rare, moderately-bedded, very strong HCl reaction, structure(s): bedding (possible) 141/16 SW	96.97	2.47	0.41	0.079	0.090	271	36	50
120463	Mpk	2	**Lime Wackestone**, light grey weathered, medium grey fresh, fine-grained, fossils: crinoid ossicle, rare, moderately-bedded, very strong HCl reaction, structure(s): bedding (possible) 141/16 SW	97.99	1.32	0.30	0.077	0.069	277	29	50
120464	Mpk	0.75	**Lime Wackestone**, light grey weathered, medium grey fresh, fine-grained, fossils: crinoid ossicle, rare, moderately-bedded, very strong HCl reaction, structure(s): bedding (possible) 139/18 SW	97.56	1.40	0.50	0.082	0.089	318	38	50
120465	Mpk	1.5	**Dolomitic Lime Wackestone**, light grey weathered, medium grey fresh, fine-grained, fossils: crinoid ossicle, rare, moderately-bedded, very strong HCl reaction, structure(s): bedding (possible) 141/16 SW	93.63	5.19	0.76	0.073	0.085	272	31	50
120466	Mpk	2.5	**Dolomitic Lime Wackestone**, light grey weathered, medium grey fresh, fine-grained, fossils: crinoid ossicle, rare, moderately-bedded, strong HCl reaction, structure(s): bedding (possible) 141/16 SW	88.88	9.48	1.07	0.177	0.147	317	46	50
Section 2014-06 (UTM 578764E, 5802130N)											
120424	Mpk	3	**Lime Wackestone**, very-light grey weathered, very-light grey to light grey fresh, micritic to medium-grained, fossils: crinoid stem; crinoid ossicle;, thickly-bedded to massively-bedded, resistant, strong HCl reaction, structure(s): bedding (undulatory) 110/45 SW	98.13	1.05	0.23	0.081	0.127	299	30	50
120425	Mpk	3	**Lime Wackestone**, very-light grey weathered, very-light grey to light grey fresh, micritic to medium-grained, fossils: crinoid stem; crinoid ossicle;, thickly-bedded to massively-bedded, resistant, strong HCl reaction, structure(s): bedding (undulatory) 110/45 SW	98.61	0.79	0.11	0.060	0.060	252	28	50
120426	Mpk	3	**Lime Wackestone**, very-light grey weathered, very-light grey to light grey fresh, micritic to coarse-grained, fossils: crinoid stem;, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction, structure(s): bedding (undulatory) 130/64 SW	98.31	1.11	0.20	0.063	0.059	289	28	50
Section 2014-07 (UTM 578867E, 5802066N)											
120427	Mpk	3	**Lime Wackestone to Lime Packstone**, very-light grey weathered, light grey fresh, medium-grained to coarse-grained, fossils: crinoid stem; crinoid ossicle, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction, structure(s): bedding (undulatory) 138/42 SW	98.50	0.90	0.15	0.062	0.062	281	30	50
120428	Mpk	3	**Lime Packstone**, very-light grey weathered, light grey to medium grey fresh, medium-grained to coarse-grained, fossils: crinoid stem; crinoid ossicle, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction, structure(s): bedding (undulatory) 138/42 SW	98.75	0.86	0.06	0.056	0.062	298	24	50

Sample	Strat Unit	Strat Tkns (m)	Description	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	SrO (ppm)	MnO (ppm)	P_2O_5 (ppm)
120429	Mpk	3	**Lime Packstone**, very-light grey weathered, light grey to medium grey fresh, medium-grained to coarse-grained, fossils: crinoid stem; crinoid ossicle, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction, structure(s): bedding (undulatory) 138/42 SW	98.84	0.71	0.11	0.059	0.071	238	31	50
120430	Mpk	3	**Lime Packstone**, very-light grey weathered, light grey to medium grey fresh, medium-grained to coarse-grained, fossils: crinoid stem; crinoid ossicle, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction, structure(s): bedding (undulatory) 138/42 SW	98.99	0.84	0.18	0.058	0.068	264	29	50
Section 2014-08 (UTM 578832E, 5801963N)											
120431	Mpk	2.5	**Lime Packstone**, very-light grey weathered, light grey to medium grey fresh, medium-grained to coarse-grained, fossils: crinoid stem; crinoid ossicle, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction, structure(s): bedding (undulatory) 138/42 SW	97.18	2.07	0.35	0.082	0.052	297	22	50
120432	Mpk	2	**Dolomitic Lime Packstone**, very-light grey weathered, light grey to medium grey fresh, medium-grained to coarse-grained, fossils: crinoid stem; crinoid ossicle, thickly-bedded to massively-bedded, resistant, weak fetid odour, strong HCl reaction, structure(s): bedding (undulatory) 138/42 SW	74.80	18.20	6.27	0.121	0.084	217	44	50
Section 2014-09 (UTM 581308E, 5803782N)											
120390	Mpk	3.75	**Lime Grainstone**, light grey weathered, medium grey fresh, medium-grained to coarse-grained, fossils: solitary rugose coral, rare; crinoid ossicle, very abundant;, massive, resistant, very strong HCl reaction	97.54	1.44	0.42	0.068	0.081	283	35	50
120391	Mpk	3	**Lime Grainstone**, light grey weathered, medium grey fresh, medium-grained to coarse-grained, fossils: crinoid ossicle, very abundant;, massive, resistant, very strong HCl reaction	97.84	1.49	0.20	0.061	0.099	275	38	50
120392	Mpk	2	**Lime Grainstone**, light grey weathered, medium grey fresh, medium-grained to coarse-grained, fossils: crinoid ossicle, very abundant; brachiopod, common;, massive, resistant, very strong HCl reaction	98.04	1.49	0.20	0.076	0.145	280	27	50
120393	Mpk	2.25	**Lime Grainstone**, light grey weathered, medium grey fresh, medium-grained to coarse-grained, fossils: crinoid ossicle, very abundant;, massive, resistant, very strong HCl reaction	97.77	1.46	0.44	0.066	0.066	276	32	50
120394	Mpk	3.25	**Lime Grainstone**, light grey weathered, medium grey fresh, fine-grained to coarse-grained, fossils: crinoid ossicle, very abundant;, massive, resistant, very strong HCl reaction	97.99	1.38	0.36	0.060	0.100	283	37	50
120395	Mpk	3	**Lime Grainstone**, light grey weathered, medium grey fresh, fine-grained to very coarse-grained, fossils: crinoid ossicle, very abundant; brachiopod;, massive, resistant, very strong HCl reaction	98.24	1.32	0.18	0.058	0.059	282	25	50
120396	Mpk	2.75	**Lime Grainstone**, light grey weathered, medium grey fresh, fine-grained to coarse-grained, fossils: solitary rugose coral, rare; crinoid ossicle, very abundant;, massive, resistant, very strong HCl reaction	97.86	1.28	0.21	0.058	0.061	285	24	50
120397	Mpk	2	**Lime Packstone**, light grey weathered, medium grey to light grey fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant; abundant, massive, resistant, very strong HCl reaction, structure(s): calcite veinlet weak	98.18	1.21	0.20	0.055	0.064	294	24	50
120398	Mpk	2.5	**Lime Packstone**, light grey weathered, medium grey to light grey fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant; abundant, massive, resistant, very strong HCl reaction, structure(s): calcite veinlet weak	98.09	1.26	0.51	0.059	0.065	288	26	50

Sample	Strat Unit	Strat Tkns (m)	Description	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	SrO (ppm)	MnO (ppm)	P_2O_5 (ppm)
120399	Mpk	2.5	**Lime Packstone to Lime Grainstone**, light grey weathered, medium grey to light grey fresh, fine-grained to coarse-grained, fossils: crinoid ossicle, abundant; abundant, massive, resistant, very strong HCl reaction, structure(s): calcite veinlet weak	97.97	1.26	0.22	0.058	0.067	285	26	50
120400	Mpk	2.5	**Lime Packstone to Lime Grainstone**, light grey weathered, medium grey to light grey fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant; abundant, massive, resistant, very strong HCl reaction, structure(s): calcite veinlet weak	97.84	1.34	0.29	0.062	0.083	286	29	50
120401	Mpk	3	**Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to coarse-grained, fossils: crinoid ossicle, abundant; abundant, massive, resistant, strong HCl reaction, structure(s): bedding (possible) 188/57 W	98.16	1.32	0.18	0.068	0.111	284	29	50
120402	Mpk	3	**Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to coarse-grained, fossils: crinoid ossicle, abundant; abundant, massive, resistant, strong HCl reaction, structure(s): bedding (possible) 188/57 W	97.72	1.30	0.16	0.062	0.091	285	25	50
120403	Mpk	2.75	**Dolomitic Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to coarse-grained, fossils: peloid, rare; crinoid ossicle, abundant; abundant, massive, recessive, very strong HCl reaction, structure(s): bedding (possible) 188/57 W	83.31	15.73	0.50	0.096	0.180	233	37	119
120404	Mpk	1.5	**Dolomitic Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant; abundant, recessive, strong HCl reaction, structure(s): bedding (possible) 139/30 SW	86.53	12.61	0.64	0.079	0.088	236	34	162
120405	Mpk	2.5	**Dolomitic Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant; abundant, recessive, strong HCl reaction, structure(s): bedding (possible) 139/30 SW	85.21	13.10	0.85	0.076	0.072	247	32	109
Section 2014-10 (UTM 581344E, 5803683N)											
120406	Mpk	2	**Dolomitic Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant; common, moderately-bedded, strong HCl reaction, structure(s): joint strong; bedding (possible) 152/47 SW	94.74	4.10	0.67	0.089	0.113	271	39	50
120407	Mpk	2	**Dolomitic Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant; common, moderately-bedded, very strong HCl reaction, structure(s): joint strong; bedding (possible) 152/47 SW	89.90	8.79	0.78	0.100	0.080	211	54	112
120408	Mpk	2	**Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant; common, moderately-bedded, strong HCl reaction, structure(s): joint strong; bedding (possible) 152/47 SW	96.18	3.22	0.48	0.076	0.081	252	47	50
120409	Mpk	2.25	**Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: crinoid ossicle, abundant; common, moderately-bedded, strong HCl reaction, structure(s): joint strong; bedding (possible) 114/38 SW	97.99	0.94	0.55	0.063	0.065	245	43	50
Section 2014-11 (UTM 582775E, 5803074N)											
120452	Mpk	4	**Dolomitic Lime Wackestone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: solitary rugose coral, rare; peloid, rare; crinoid ossicle, common, massive, strong HCl reaction	94.31	4.54	0.47	0.078	0.112	304	29	50
120453	Mpk	3.25	**Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: peloid, rare; crinoid ossicle, abundant, massive, strong HCl reaction	97.74	1.49	0.50	0.064	0.072	326	35	50
120454	Mpk	3	**Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: peloid, rare; crinoid ossicle, abundant, massive, strong HCl reaction	97.77	1.23	0.51	0.057	0.093	333	40	50

Sample	Strat Unit	Strat Tkns (m)	Description	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	SrO (ppm)	MnO (ppm)	P_2O_5 (ppm)
120455	Mpk	6	**Dolomitic Lime Packstone to Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: peloid, rare; crinoid ossicle, abundant, massive, very strong HCl reaction	93.02	5.46	1.28	0.072	0.068	290	33	50
120456	Mpk	3	**Dolomitic Lime Packstone to Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: peloid, rare; ooid, common; crinoid ossicle, abundant, massive, strong HCl reaction	94.15	5.15	0.61	0.064	0.067	288	33	50
120457	Mpk	2.25	**Lime Packstone**, light grey weathered, medium grey fresh, fine-grained to medium-grained, fossils: peloid, rare; ooid, common; crinoid ossicle, abundant, massive, strong HCl reaction	97.00	1.74	0.78	0.072	0.125	319	56	50
Section 2014-12 (UTM 580799E, 5802748N)											
120433	Dpal	1.25	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, weak HCl reaction	54.58	43.14	1.80	0.234	0.148	107	57	50
120434	Dpal	2.75	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, weak HCl reaction	54.49	44.18	1.07	0.228	0.167	95	64	50
120435	Dpal	2	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, weak HCl reaction	54.97	43.79	0.75	0.188	0.172	86	66	50
120436	Dpal	1	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, weak HCl reaction	54.70	43.79	0.72	0.214	0.148	95	58	50
120437	Dpal	2.5	**Calcareous Dolomitic Mudstone**, very-light grey weathered and fresh, micritic to very fine-grained, resistant, pockety, weak fetid odour, strong HCl reaction, structure(s): calcite veinlet weak	54.83	43.51	0.85	0.216	0.191	90	67	50
120438	Dpal	3	**Calcareous Dolomitic Mudstone**, very-light grey weathered and fresh, micritic to very fine-grained, resistant, pockety, weak fetid odour, strong HCl reaction, structure(s): calcite veinlet weak	54.92	44.43	0.60	0.179	0.206	79	72	50
120439	Dpal	2.5	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, weak HCl reaction	54.51	44.33	0.69	0.201	0.216	85	75	50
120440	Dpal	2.25	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, weak HCl reaction	54.19	44.02	0.72	0.207	0.162	82	59	50
120441	Dpal	2.25	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, weak HCl reaction	55.51	43.01	0.93	0.279	0.188	90	61	50
120442	Dpal	2	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, weak HCl reaction	53.83	45.06	0.70	0.190	0.146	75	53	50
120443	Dpal	2.75	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, weak HCl reaction	54.63	44.10	0.71	0.214	0.160	78	65	50
120444	Dpal	2.5	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, weak HCl reaction	54.58	44.20	0.80	0.229	0.178	87	54	50
120445	Dpal	2.25	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, weak HCl reaction	54.61	44.14	0.80	0.194	0.129	85	55	50
120446	Dpal	3	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, weak HCl reaction	54.76	42.89	1.41	0.361	0.182	106	54	50

Sample	Strat Unit	Strat Tkns (m)	Description	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	SrO (ppm)	MnO (ppm)	P_2O_5 (ppm)
120447	Dpal	4.75	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, weak HCl reaction	54.58	44.87	0.42	0.158	0.150	95	71	50
120448	Dpal	6.5	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, weak HCl reaction	53.69	46.13	0.24	0.090	0.121	104	66	50
120449	Dpal	3	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, moderate HCl reaction	55.56	43.03	1.05	0.246	0.144	101	53	50
120450	Dpal	4.5	**Calcareous Dolomitic Mudstone**, tan to light grey weathered, tan fresh, micritic to very fine-grained, resistant, sucrosic, weak fetid odour, moderate HCl reaction	54.35	44.60	0.60	0.198	0.123	91	55	50
120467	Dpal	3.25	**Calcareous Dolomitic Mudstone**, tan to very-light grey weathered, tan to light brown fresh, micritic to very fine-grained, resistant, vuggy (open), weak HCl reaction, structure(s): calcite veinlet weak; bedding (undulatory) 58/2 SE	54.40	44.22	1.10	0.173	0.189	75	55	50
120468	Dpal	3	**Calcareous Dolomitic Mudstone**, tan to very-light grey weathered, tan to light brown fresh, micritic to very fine-grained, resistant, vuggy (open), moderate HCl reaction, structure(s): calcite veinlet weak; bedding (undulatory) 338/4 NE	52.78	44.25	2.08	0.615	0.257	87	53	50
120469	Dpal	2.5	**Calcareous Dolomitic Mudstone**, tan to very-light grey weathered, tan to light brown fresh, micritic to very fine-grained, resistant, vuggy (open), weak HCl reaction, structure(s): calcite veinlet weak; bedding (undulatory) 58/2 SE	54.61	43.97	0.67	0.257	0.143	82	46	50
120470	Dpal	3	**Calcareous Dolomitic Mudstone**, tan to very-light grey weathered, tan to light brown fresh, micritic to very fine-grained, resistant, vuggy (open), weak HCl reaction, structure(s): calcite veinlet weak; bedding (undulatory) 58/2 SE	53.51	45.63	0.51	0.212	0.121	87	47	50
120471	Dpal	6	**Calcareous Dolomitic Mudstone**, tan to very-light grey weathered, tan to light brown fresh, micritic to very fine-grained, resistant, vuggy (open), moderate HCl reaction, structure(s): calcite veinlet weak; bedding (undulatory) 58/2 SE	53.70	45.00	0.74	0.260	0.142	85	44	50
120472	Dpal	1.75	**Calcareous Dolomitic Mudstone**, tan to very-light grey weathered, tan to light brown fresh, micritic to very fine-grained, resistant, vuggy (open), weak HCl reaction, structure(s): calcite veinlet weak; bedding (undulatory) 58/2 SE	54.86	43.62	0.39	0.160	0.110	93	53	50
120473	Dpal	2.5	**Calcareous Dolomitic Mudstone**, tan to very-light grey weathered, tan to light brown fresh, micritic to very fine-grained, resistant, vuggy (open), weak HCl reaction, structure(s): calcite veinlet weak; bedding (undulatory) 58/2 SE	54.65	44.71	0.27	0.130	0.121	102	57	50
120474	Dpal	2.5	**Calcareous Dolomitic Mudstone**, tan to very-light grey weathered, tan to light brown fresh, micritic to very fine-grained, resistant, vuggy (open), weak HCl reaction, structure(s): calcite veinlet weak; bedding (undulatory) 58/2 SE	55.49	44.20	0.14	0.073	0.098	95	72	50
120475	Dpal	2.5	**Calcareous Dolomitic Mudstone**, tan to very-light grey weathered, tan to light brown fresh, micritic to very fine-grained, resistant, vuggy (open), weak HCl reaction, structure(s): calcite veinlet weak; bedding (undulatory) 58/2 SE	54.60	44.31	0.46	0.119	0.143	114	63	50
120476	Dpau	3	**Lime Grainstone**, light grey to medium grey weathered and fresh, fine-grained to medium-grained, fossils: solitary rugose coral, rare; peloid, abundant; crinoid ossicle, common, moderately-bedded, weak fetid odour, moderate HCl reaction, structure(s): bedding (definite) 334/38 NE	97.58	1.97	0.25	0.079	0.086	319	36	50

APPENDIX 3: 2014 MAPPING STATION DESCRIPTIONS

Notes: Bedding attitudes are strike and dip, right-hand rule. Traverses and traverse points are listed chronologically.
Traverse locations are shown on Fig. 4.3.

Abbreviations: HCl - Hydrochloric Acid, E - to the east, W - to the west

Fer - Fernie Formation; Mh - Mount Hawk Formation; Al - Alexo Formation
Pal - Palliser Formation; Ex - Exshaw Formation; Bff - Banff Formation; Pek - Pekisko Formation; Sh - Shunda Formation; Tv - Turner Valley Formation

Location	Unit	Type	Description
Traverse 2014-A SE of the Gap			
AA	Bff-Pek	contact	**Crinoidal Lime Grainstone (W) vs Dolomitic Lime Mudstone (E),** Grst: light-grey weathered, light-grey fresh, medium-coarse-grained, moderately sorted, crinoid-rich, massive, resistant; Mdst: tan weathered, light brown-grey fresh, micritic, shaly, recessive
AB	Bff	outcrop	**Dolomitic Lime Mudstone:** tan weathered, light brown-grey fresh, micritic, strongly weathered, shaly, recessive, weak reaction with HCl, definite bedding: 148°/38° SW
AC	Pal-Bff	contact	**Dolomitic Lime Mudstone (W) vs Lime Mudstone to Wackestone (E),** Mdst: tan weathered, light brown-grey fresh, micritic, shaly, recessive; Mdst to Wkst: light brown-grey weathered, light brown-grey fresh, medium-coarse-grained, moderately sorted, pockety weathering, bioclasts include crinoids, thickly bedded to massive, moderately vuggy throughout, sucrosic, resistant, definite bedding: 154°/28° SW, contact trend: 154°
AD	Pal	outcrop	**Lime Mudstone to Wackestone:** light brown-grey weathered, light brown-grey fresh, medium-coarse-grained, moderately sorted, pockety weathering, bioclasts include crinoids, thickly bedded to massive, moderately vuggy throughout, sucrosic, resistant
AE	Pal	outcrop	**Lime Mudstone to Wackestone:** light brown-grey weathered, light brown-grey fresh, medium-coarse-grained, moderately sorted, pockety weathering, bioclasts include crinoids, thickly bedded to massive, moderately vuggy throughout, sucrosic, resistant
AF	Pal	outcrop	**Lime Mudstone to Wackestone:** light brown-grey weathered, light brown-grey fresh, medium-coarse-grained, moderately sorted, pockety weathering, bioclasts include rare crinoids, thickly bedded to massive, moderately vuggy throughout, sucrosic, resistant, definite bedding: 144°/26° SW
AG	Pal	outcrop	**Lime Mudstone to Wackestone:** light grey to tan weathered, light brown-grey fresh, medium-coarse-grained, moderately sorted, pockety weathering, bioclasts include crinoids, thickly bedded to massive, blocky, moderately vuggy throughout, sucrosic, resistant, weak reaction with HCl, top of large cliff, wavy bedding: 147°/20° SW
AH	Pal	outcrop	**Lime Mudstone to Wackestone:** light grey to tan weathered, light brown-grey fresh, medium-coarse-grained, pockety weathering, bioclasts include crinoids, thickly bedded to massive, blocky, moderately vuggy throughout, sucrosic, resistant, bench-forming, weak reaction with HCl, wavy bedding: 137°/16° SW
AI	Pal	outcrop	**Lime Mudstone:** light brown-grey weathered, medium to dark-grey fresh, cliff-forming, moderately to thickly-bedded, resistant, very strong reaction with HCl, bedding: 160°/30° SW

Location	Unit	Type	Description
AJ	Pal	outcrop	**Dolomitic Lime Mudstone:** tan weathered, light brown-grey fresh, micritic, strongly weathered, shaly, recessive, weak reaction with HCl
AK	Pal	outcrop	**Dolomitic Lime Mudstone:** tan weathered, light brown-grey fresh, micritic, strongly weathered, shaly, recessive, base of cliff, may be contact, weak reaction with HCl
AL	Pal	outcrop	**Lime Mudstone:** medium-grey to brown weathered, medium to dark-grey fresh, micritic, moderately-bedded, minor calcite veinlets, strong reaction with HCl, possible bedding: 128°/36° SW
AM	Pal	outcrop	**Lime Mudstone:** medium-grey to brown weathered, medium to dark-grey fresh, micritic, moderately-bedded, minor calcite veinlets, strong reaction with HCl
AN	Pal	outcrop	**Dolomitic Lime Mudstone:** medium-grey to brown weathered, medium-grey to brown fresh, micritic, moderately-bedded, minor calcite veinlets, pockety surface weathering, sucrosic, massive, weak reaction with HCl
AO	Pal	outcrop	**Dolomitic Lime Mudstone:** same as AN, possible bedding 292°/29° NE
AP	Pek	outcrop	**Lime Mudstone to Wackestone:** light-grey weathered, light grey fresh, micritic to fg, bioclasts include minor shell fragments, stromatoporoids, crinoids, moderately bedded, very strong reaction with HCl, possible bedding 288°/26° NE
AQ	Bff	outcrop	**Dolomitic Lime Mudstone:** light-grey weathered, medium-grey to tan fresh, micritic, strongly weathered, argillaceous, shaly, recessive, moderate to strong reaction with HCl
AR	Bff-Pek	contact	**Dolomitic Lime Mudstone (W) vs Lime Packstone (E),** Mdst: tan weathered, light brown-grey fresh, micritic, shaly, recessive; Pkst: light-grey weathered, light to medium-grey fresh, fine to coarse-grained, moderately sorted, crinoid-rich, moderate shell fragments, massive, resistant; contact trend: 127°
Traverse 2014-B SE of The Gap			
BA	Pek	outcrop	**Lime Packstone:** very light-grey weathered, light-grey to medium-grey fresh, medium-grained to coarse grained bioclasts, bioclasts include crinoid ossicles and crinoid stems, thickly-bedded to massive, resistant, weak fetid odour, good reaction with HCl, wavy bedding: 128°/37° SW
BB	Bff-Pek	contact	**Lime Packstone (W) vs Dolomitic Mudstone (E):** Pkst: very light-grey weathered, light-grey to medium-grey fresh, medium-grained to coarse grained bioclasts, bioclasts include crinoid ossicles and crinoid stems, thickly-bedded to massive, resistant, weak fetid odour, good reaction with HCl; Mdst: tan weathered, light brown-grey fresh, shaly, fissile, recessive, moderate reaction with HCl
BC	Pek	outcrop	**Dolomitic Mudstone to Lime Packstone:** very light-grey weathered, light-grey to medium-grey fresh, medium-grained to coarse grained bioclasts, bioclasts include crinoid ossicles and crinoid stems, thickly-bedded to massive, resistant, weak fetid odour, good reaction with HCl
BD	Pek	outcrop	**Lime Packstone**: very light-grey weathered, light-grey to medium-grey fresh, medium-grained to coarse grained bioclasts, bioclasts include crinoid ossicles and crinoid stems, thickly-bedded to massive, resistant, weak fetid odour, good reaction with HCl
BE	Pek	outcrop	**Lime Packstone:** same as BD, definite bedding: 132°/48° SW

Location	Unit	Type	Description
BF	Pek-Bff	contact	**Lime Packstone (W) vs Dolomitic Mudstone(E):** Pkst: very light-grey weathered, light-grey to medium-grey fresh, medium-grained to coarse grained bioclasts, bioclasts include crinoid ossicles and crinoid stems, thickly-bedded to massive, resistant, weak fetid odour, good reaction with HCl; Mdst: tan weathered, light brown-grey fresh, shaly, fissile, recessive, moderate reaction with HCl; bedding: 131°/38° SW; contact trend: 131°
BG	Bff-Pal	contact	**Dolomitic Mudstone (W) vs Lime Mudstone (E):** Dolo Mdst: same as BF; Lm Mdst: medium-grey to brown weathered, medium to dark-grey fresh, micritic, moderately-bedded, minor calcite veinlets, strong reaction with HCl, possible bedding: 118°/42° SW
BH	Ex	float	**Shale:** black weathered, black fresh, fissile, strongly carbonaceous, no reaction with HCl, float is approx. 30 cm diametre
BI	Pal	outcrop	**Lime Mudstone:** same as BG, definite bedding: 130°/48° SW
BJ	Pal	outcrop	**Lime Mudstone:** same as BG, definite bedding: 134°/40° SW
BK	Pal	outcrop	**Lime Mudstone:** same as BG, possible bedding: 292°/26° NE
BL	Pal	outcrop	**Lime Mudstone:** same as BG, definite bedding: 226°/15° SW
BM	Pal	outcrop	**Lime Mudstone:** same as BG, definite bedding: 220°/32° SW
BN	Pal	outcrop	**Lime Mudstone:** , medium-grey to brown weathered, medium to dark-grey fresh, micritic, thickly-bedded, minor calcite veinlets, pockety weathering, resistent, strong reaction with HCl, possible bedding: 196°/37° W
BO	Pal-Bff	contact	**Lime Mudstone (W) vs Dolomitic Mudstone (E):** Lm Mdst: medium-grey to brown weathered, medium to dark-grey fresh, micritic, moderately-bedded, minor calcite veinlets, pockety weathering, strong reaction with HCl, possible bedding: 174°/25° W; Dolo Mdst: same as BF
BP	Bff	outcrop	**Dolomitic Lime Mudstone:** tan weathered, tan to light-grey fresh, shaly, well-bedded, recessive, wavy bedding: 169°/27° W
BQ	Bff	outcrop	**Dolomitic Lime Mudstone**: same as BP, bedding: 174°/38° W
BR	Pek-Bff	contact	**Dolomitic Mudstone (W) vs Lime Packstone (E):** Mdst: tan weathered, light brown-grey fresh, shaly, fissile, recessive, moderate reaction with HCl; bedding: 316°/64° NE; Pkst: very light-grey weathered, light-grey to medium-grey fresh, medium-grained to coarse grained bioclasts, bioclasts include crinoid ossicles and crinoid stems, thickly-bedded to massive, resistant, weak fetid odour, good reaction with HCl, bedding: 030°/42° SE; contact trend: 033°, possible fault at contact
BS	Bff	outcrop	**Dolomitic Lime Mudstone:** tan weathered, tan to light-grey fresh, shaly, well-bedded, recessive, bedding: 316°/64° NE
BT	Bff	outcrop	**Dolomitic Lime Mudstone:** tan weathered, tan to light-grey fresh, shaly, well-bedded, recessive, possibly close to local-scale fold hinge
BU	Bff	outcrop	**Dolomitic Lime Mudstone:** same as BS, bedding: 300°/47° NE
BV	Pek-Bff	contact	**Lime Packstone (W) vs Dolomitic Mudstone(E):** Pkst: same as BF; Mdst: same as BG; possible contact trend: 300°
BW	Pek-Bff	contact	**Lime Packstone (W) vs Dolomitic Mudstone(E):** Pkst: same as BF; Mdst: same as BG
BX	Pek	outcrop	**Lime Packstone:** same as BD, wavy bedding: 300°/60° NE
BY	Pek	outcrop	**Lime Packstone:** same as BF
BZ	Pek-Sh?	contact	**Lime Packstone (W) vs Covered Interval (E):** Pkst: very light-grey weathered, light-grey to medium-grey fresh, medium-grained to coarse grained bioclasts, bioclasts include crinoid ossicles and crinoid stems, thickly-bedded to massive, resistant, weak fetid odour, good reaction with HCl, wavy bedding 290°/72° NE

Location	Unit	Type	Description
BAA	Sh	outcrop	**Limestone Breccia:** carbonaceous lime mudstone matrix with dolomitic mudstone clasts, very soft, clasts range in size from 1 cm to 5 cm, very angular clasts, thickly-bedded to massive, wavy bedding, matrix has moderate reaction with HCL, clasts have good reaction with HCl
BBB	Sh-Bff	contact	**Limestone Breccia (W) vs Dolomitic Mudstone (E):** Breccia: same as BAA, Mdst: same as BG; unconformable contact trend: 305°
BCC	Bff-Pek	contact	**Dolomitic Mudstone (W) vs Lime Packstone (E):** Mdst: same as BR; bedding: 282°/24° NE; Pkst: same as BR, bedding: 340°/30° NE; contact trend: 300°
BDD	Pek-Sh	contact	**Lime Wackestone to Packstone (W) vs Covered Interval (E):** Wkst to Pkst: same as BR
BEE	TV	outcrop	**Strongly Dolomitic Mudstone:** tan weathered, tan fresh, locally well-bedded to massive, heterogeneous, rusty oxide alteration common along fractures, weak reaction with HCl, definite bedding: 110°/80° SW
BFF	Fernie	outcrop	**Shale:** tan to black weathered, tan to black fresh, well-bedded, fissile, carbonaceous, no reaction with HCl, bedding: 274°/48° N
BGG	TV	outcrop	**Strongly Dolomitic Mudstone:** same as BEE, bedding: 220°/08° NE
BHH	TV	outcrop	**Strongly Dolomitic Mudstone:** same as BEE, definite bedding: 150°/18° SW
BII	TV	outcrop	**Dolomitic Mudstone:** same as BEE, bedding: 270°/50° N, black shales approx. 20 m to the north
Traverse 2014-C NNW of Spider Mountain			
CA	Pal	outcrop	**Dolomitic Mudstone:** tan to light-grey weathered, tan fresh, micritic to very fine-grained, sucrosic, minor open vugs, thickly-bedded to massive, pockety weathering, resistant, fetid odour, minor light-grey chert nodules, weak reaction with HCl, wavy bedding 301°/12° NE
CB	Pal	outcrop	**Calcareous Dolomitic Mudstone:** light-brown weathered, light-brown fresh, very fine-grained, homogeneous, minor open vugs, thickly-bedded, resistant, fetid odour, minor light-grey chert nodules, weak reaction with HCl, wavy bedding 310°/22° NE
CC	Pal	outcrop	**Calcareous Dolomitic Mudstone:** same as CB, wavy bedding 270°/12° N and 254°/12° NW
CD	Pal	outcrop	**Calcareous Dolomitic Mudstone:** same as CB, vuggy, sucrosic, wavy bedding: 152°/08° SW
CE	Pal	outcrop	**Calcareous Dolomitic Mudstone:** same as CB
CF	Pal	outcrop	**Dolomitic Mudstone:** tan weathered, tan fresh, shaly, recessive, somewhat covered interval, definite bedding 172°/19° W
CG	Pal	outcrop	**Covered Interval**
CH	Pal	outcrop	**Calcareous Dolomitic Mudstone:** same as CB, wavy bedding: 170°/10° W
CI	Pal	outcrop	**Calcareous Dolomitic Mudstone:** same as CB, wavy bedding 260°/13° N and 254°/17° N
CJ	Pal	outcrop	**Calcareous Dolomitic Mudstone:** same as CB, wavy bedding 312°/16° NE and 310°/30° NE
CK	Bff	outcrop	**Dolomitic Mudstone:** tan weathered, tan fresh, shaly, recessive, bedding 190°/40° W
CL	Bff-Pek	contact	**Dolomitic Mudstone (W) vs Lime Packstone to Grainstone (E):** Mdst: same as CF, Pkst to Grst: light-grey weathered, light-grey fresh, very fine-grained to coarse-grained, bioclasts include crinoids, shell fragments, massive, resistant, strong reaction with HCl; contact trend 350°
CM	Pek	outcrop	**Lime Packstone to Grainstone:** same as CL, bedding 128°/34° SW

Location	Unit	Type	Description
CN	Pek-Bff	contact	**Lime Packstone to Grainstone (W) vs Dolomitic Mudstone (E):** Pkst to Grst: same as CL; Mdst: same as CF, contact trend 150°, may be a fault zone
CO	Bff	covered	**Covered Interval**
CP	Bff	outcrop	**Dolomitic Mudstone:** tan weathered, tan fresh, shaly, recessive, weak reaction with HCl, definite bedding 120°/82° SW
CQ	Bff-Pek	contact	**Dolomitic Mudstone (W) vs Lime Packstone to Grainstone (E):** Mdst: same as CF, Pkst to Grst: light-grey weathered, light-grey fresh, very fine-grained to coarse-grained, bioclasts include crinoids, shell fragments, massive, resistant, strong reaction with HCl; sharp contact trend 120°
CR	Pek-Sh?	contact	**Lime Packstone to Grainstone (W) vs Covered Interval (E):** Pkst to Grst: same as CL; contact trend 120°
CS	TV?	covered	**Covered Interval**
CT	TV	outcrop	**Lime Mudstone:** medium-grey weathered, light-grey to medium-grey fresh, micritic, moderately fractured, good reaction with HCl, indeterminate bedding 160°/21° SW
Traverse 2014-D N of Spider Mountain			
DA	Pal	outcrop	**Calcareous Dolomitic Mudstone:** very light-grey weathered, tan fresh, very fine-grained to medium-grained, thickly-bedded, vuggy throughout, sucrosic,pockety weathering, resistant, minor chert nodules up to 5 cm diametre, wavy bedding: 100°/10° SW and 103°/15° SW
DB	Pal	outcrop	**Calcareous Dolomitic Mudstone:** same as DA
DC	Pal	outcrop	**Calcareous Dolomitic Mudstone:** same as DA, wavy bedding: 302°/18° NE
DD	Pal	outcrop	**Calcareous Dolomitic Mudstone:** same as DA, wavy bedding: 307°/18° NE
DE	Pal	outcrop	**Calcareous Dolomitic Mudstone:** same as DA, massive, good reaction with HCl, wavy bedding: 130°/16° SW
DF	Pal	outcrop	**Calcareous Dolomitic Mudstone:** same as DA, massive, good reaction with HCl, wavy bedding: 191°/15° W
DG	Bff-Pek	contact	**Dolomitic Mudstone (W) vs Lime Grainstone (E):** Mdst: tan weathered, tan fresh, shaly, dolomitic, fossiliferous, recessive, rubbly; Grst: light-grey weathered, light-grey fresh, very fine-grained to coarse-grained, bioclasts include crinoids, shell fragments, massive, resistant, strong reaction with HCl; contact trend 125°
DH	Pek	outcrop	**Lime Grainstone:** light-grey weathered, light-grey fresh, very fine-grained to coarse-grained, bioclasts include crinoids, shell fragments, massive, resistant, strong reaction with HCl
DI	Pek	outcrop	**Lime Grainstone:** light-grey weathered, light-grey fresh, very fine-grained to coarse-grained, bioclasts include crinoids, shell fragments, massive, resistant, strong reaction with HCl, strongly fractured interval, possible fault zone?
DJ	Pek-Bff	contact	**Lime Packstone to Grainstone (W) vs Dolomitic Mudstone (E):** Pkst to Grst: same as DG; Mdst: same as DG, definite bedding: 125°/82° SW; contact trend 310°
DK	Pek-Bff	contact	**Lime Wackestone to Grainstone (W) vs Dolomitic Mudstone (E):** Wkst to Grst: light-grey weathered, medium-grey to dark-grey fresh, minor vugs, moderate calcite veins, rare brachiopods, moderate crinoids, resistant, massive, very strong reaction with HCl; Mdst: same as DG, definite bedding: 130°/80° SW; contact trend 310°
DL	Bff	outcrop	Dolomitic Lime Mudstone: light-grey to brown weathered, medium-grey fresh, finely-bedded, fissile, moderate to strong HCl reaction, bedding: 304°/89° NE

Location	Unit	Type	Description
DM	Pek	outcrop	**Lime Wackestone to Grainstone:** medium-grey weathered, medium-grey to tan fresh, fine-grained to medium-grained, moderate crinoids and shell fragments, sponges and rare rugose corals, well-bedded, possibly dolomitic, moderate to strong HCl reaction; definite bedding: 230°/79° SW
DN	Pek?	covered	**Covered Interval**
DO	Pek	outcrop	**Lime Packstone to Grainstone:** light-grey weathered, medium-grey fresh, fine-grained to medium-grained, abundant crinoids and shell fragments, sponges and rare rugose corals, very small black concretions (pisoids?), well-bedded to moderately-bedded, possibly dolomitic, strong HCl reaction; definite bedding: 324°/87° NE
DP	Sh?	covered	**Covered Interval**
DQ	TV	outcrop	**Lime Mudstone:** light-grey weathered, medium-grey fresh, minor rugose corals, stromatoporoids, thin to moderately-bedded, bedding: 310°/82° NE
DR	TV?	covered	**Covered Interval**
DS	TV	outcrop	**Lime Mudstone:** light-grey weathered, medium-grey fresh, minor rugose corals, stromatoporoids, thin to moderately-bedded, bedding: 140°/29° SW
Traverse 2014-E S of Spider Mountain			
EA	Pek	outcrop	**Lime Wackestone:** light-grey weathered, medium-grey frsh, fine-grained, minor crinoids, moderately-bedded, very strong reaction with HCl, bedding: 140°/16° SW
EB	TV	outcrop	**Lime Mudstone:** light-grey weathered, medium-grey fresh, minor rugose corals, stromatoporoids, thin to moderately-bedded, possible bedding: 180°/39° W
EC	Sh	covered	**Covered Interval**
ED	Pek	outcrop	**Lime Grainstone:** very light-grey weathered, very light-grey to very light brown-grey fresh, medium-grained to coarse-grained, bioclasts include abundant crinoids, thickly-bedded to massive, homogeneous, weak fetid odour, resistant, strong reaction with HCl
EE	Pek	outcrop	**Lime Grainstone:** same as ED
EF	Pek	outcrop	**Lime Grainstone:** very light-grey weathered, very light-grey fresh, fine-grained to medium-grained, bioclasts include abundant crinoids, thickly-bedded to massive, homogeneous, weak fetid odour, resistant, strong reaction with HCl
EG	Bff	outcrop	**Dolomitic Mudstone:** tan weathered, dark brown fresh, shaly, fissile, recessive, weak reaction with HCl, bedding: 119°/23° SW and 127°/34° SW
EH	Pal	outcrop	**Dolomitic Lime Mudstone:** tan weathered, tan to light-grey fresh, cryptocrystalline to micritic, minor oxide alteration, well-bedded, good reaction with HCl
EI	Pal	outcrop	**Dolomitic Mudstone:** light brown to tan weathered, light brown fresh, very fine-grained, well-bedded, very minor calcite veinlets, weak fetid odour, somewhat resistant, weak reaction with HCl; definite bedding: 090°/16° S

Location	Unit	Type	Description
Traverse 2014-F			
Short traverse NE of Spider Mountain			
FA	Pal-Bff	contact	Contact trend: 124°
FB	Pek?	covered	**Covered Interval**
FC	Pek	covered	**Covered Interval**
FD	Pek	outcrop	**Lime Wackestone**: light-grey weathered, medium-grey fresh, fine-grained to medium-grained, abundant crinoids, minor pisoids, minor rugose corals, massive, strong reaction with HCl
FE	Pek	float	**Lime Grainstone:** very light-grey weathered, very light-grey fresh, fine-grained to medium-grained, bioclasts include abundant crinoids, thickly-bedded to massive, homogeneous, weak fetid odour, resistant, strong reaction with HCl
FF	TV?	covered	**Covered Interval**
FG	TV	outcrop	**Lime Breccia:** bedding: 060°/12° SE
FH	Sh	outcrop	**Dolomitic Mudstone:** tan weathered, brown fresh, fine-grained to medium-grained, moderate crinoids, dolomitic, shaly, weak to moderate reaction with HCl, possible bedding: 348°/12° NE
FI	TV?	covered	**Covered Interval**

APPENDIX 4: ANALYTICAL LABORATORY INFORMATION AND TECHNIQUES

Name and Address of the Lab:

Graymont Western US Inc., Central Laboratory.
670 East 3900 South, Suite 200
Salt Lake City, Utah, 84107

Statement of Qualifications:

Jared Leikam obtained a B.S. in Chemistry from the University of Utah in the class of 2003. Jared started working for Graymont in February of 2004 and has been working with the ICP Spectrometer for two and a half years, under the direct supervision of Carl Paystrup (Lab Supervisor).

Vonda Stuart obtained a B.S. in Chemistry from Weber State University in 2004. Vonda started with Graymont in August of 2007 and started working in the ICP Lab the following September.

Sample Preparation, Procedures, Reagents, Equipment, etc.:

For the ICP sample preparation, 0.5 grams of the sample is mixed with 3 g of lithium carbonate. The sample and the lithium carbonate are then fused together in a muffle furnace at 850°C. Following the fusion process, the samples are dissolved in 1:1 HCl; a total of 40 mL 1:1 HCl is used in the dissolving process. The samples are then diluted to 200 mL and spiked with 10 ppm Co. Cobalt is used as an internal standard. At this point the samples are ready for analysis on the Perkin Elmer, Optima 7300V.

Mesh Size Fraction, Split and Weight of Sample:

Upon receiving the samples, the prep room technician riffles and then splits the stone down to a manageable size (roughly 200 g). The stone is then dried in an oven at 120ºC. Once the samples have been dried they get pulverized to a -200 mesh size. A split of this pulverized material is then sent for testing in the main part of the lab.

Quality Control Procedures:

The ICP spectrometer is calibrated with two certified reference materials prior to analyzing a batch of samples. A batch typically contains 96 samples. Every 12th sample in a batch is a certified limestone reference sample. In addition to the 8 reference samples imbedded in the batch, there are 2 limestone reference samples analyzed at the beginning and at the end of the batch to ensure the accuracy of our Na and P numbers. Every element being analyzed in a sample is backed up by data from the certified reference materials. We also use an internal standard (10 ppm Co) to further ensure the quality and accuracy of the analysis.

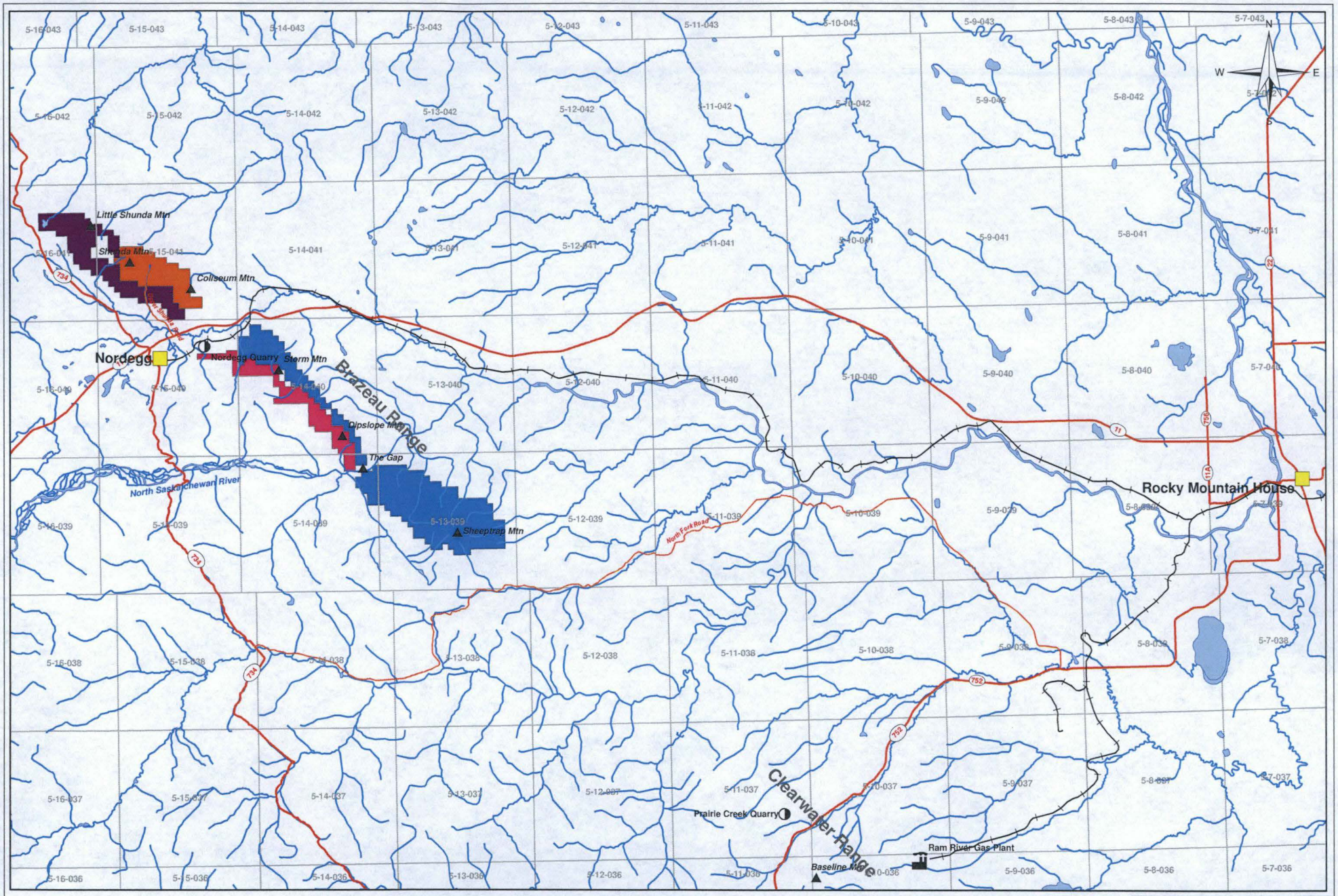
GRAYMONT WESTERN CANADA INC.

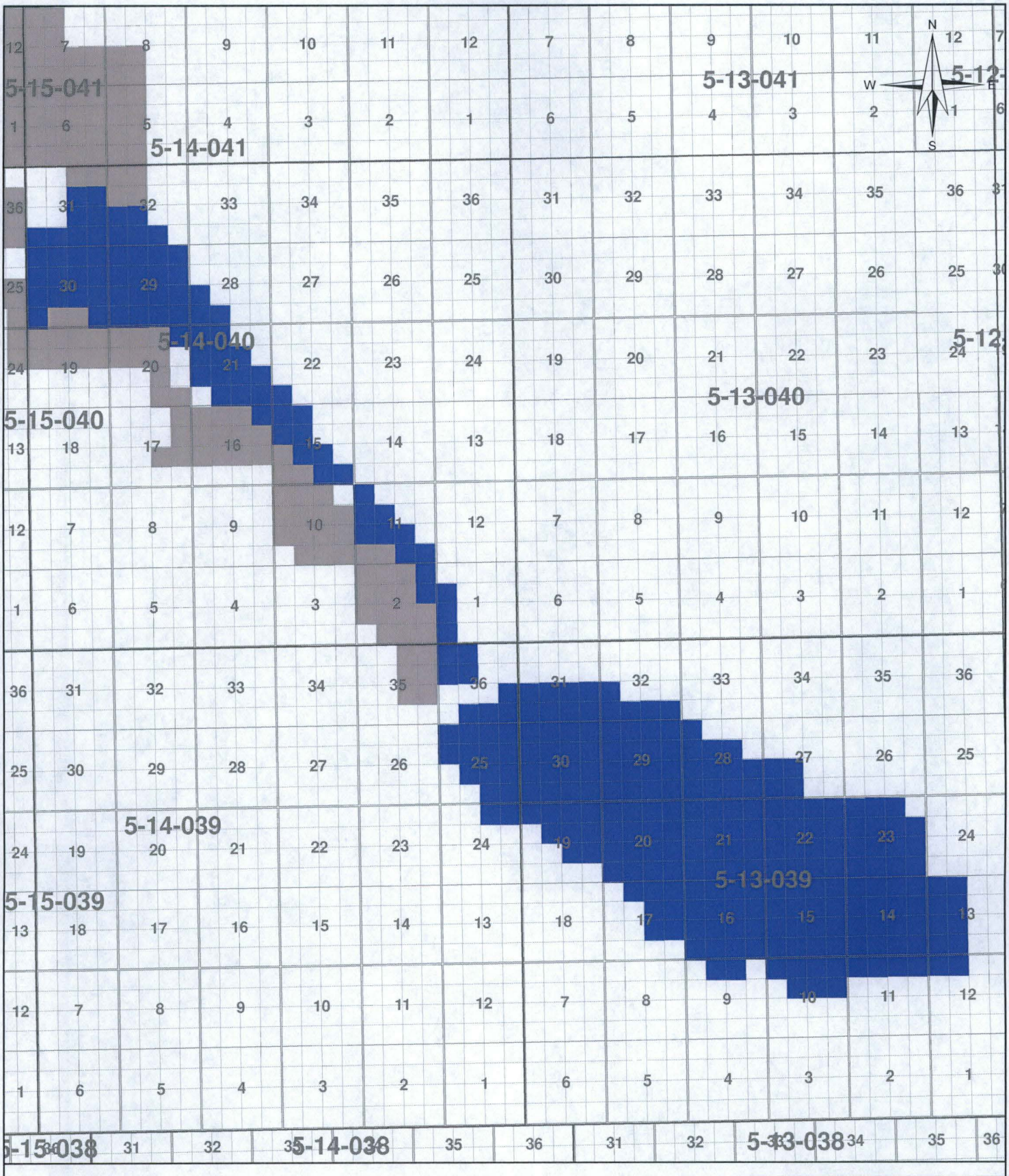
Dahrouge Geological Consulting Ltd.
Edmonton, Alberta

BRAZEAU RANGE,
WEST-CENTRAL ALBERTA

Fig. 3.1
Property Location

WM 2014.09


Little Shunda Mtn
Shunda Mtn
Coliseum Mtn
Nordegg
Nordegg Quarry
Storm Mtn
Brazeau Range
Dipslope Mtn
The Gap
North Saskatchewan River
Sheeptrap Mtn
North Fork Road
Rocky Mountain House
Prairie Creek Quarry
Clearwater Range
Ram River Gas Plant
Baseline Mtn
N
W
E
S
734
752
11
11A
Legend
Highway
Secondary Road
Railway
Provincial Park
National Park
Graymont Land Holdings
Brazeau Range
Shunda Mountain
Nordegg South Leae
Nordegg North Lease
Kilometres
0 2.5 5 10 15 20
1:350,000
Coordinate System: UTM NAD83, Zone 11N
GRAYMONT WESTERN CANADA INC.
Dahrouge Geological Consulting Ltd.
Edmonton, Alberta
BRAZEAU RANGE,
WEST-CENTRAL ALBERTA
Fig 3.2
Access Map
PK
2014.09



Legend

Land Holdings

- Permit # 9302090596 (5,056 Ha)
- Other Claims

Kilometres

0 1 2 3 4

1:100,000

Coordinate System: UTM NAD83, Zone 11N

GRAYMONT WESTERN CANADA INC.

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Edmonton, Alberta

BRAZEAU RANGE,
WEST-CENTRAL ALBERTA

Figure 4.1
Permit Map

WM 2014.09

579000 580000 581000 582000

5804000 5803000 5802000 5801000

N W E S

120390-120405
120406
120407-120409
120452-120457
120433-120451
120467-120479
120424-120426
120427-120429
120430
120431-120432
120353
120352
120351
120354-120358
120375-120377
120374
120369-120372
120368
120365
120359-120363
120378
120373
120367
120366
120364
120380
120381
120382
120383
120384
120385
120386
120387
120388
120458-120460
120461-120466

South Brazeau
9302090596

Brazeau
Fire Tower

SPIDER MTN

Legend

2014 Samples
% $CaCO_3$
- 97 - 100
- 95 - 97
- 90 - 95
- < 90

Roads
- Highway
- Secondary Road
- Residential Road
- Minor road/trail
- Contours (10 m)
- Creek/stream
- River/lake

Structure
- Anticline
- Faults

MAIM Permits
- Brazeau Range
- Other

Bedrock Geology
- Alexo
- Mt Hawk
- Fernie
- Turner Valley
- Shunda
- Pekisko
- Banff
- Palliser

Kilometres
0 1 2
1:5,000
Coordinate System: UTM NAD83, Zone 11N

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Edmonton, Alberta

BRAZEAU RANGE
WEST-CENTRAL ALBERTA

Fig. 4.2
Geology & Sample Locations

KK 2014.10

N

W E

S

THE GAP

Traverse 2014-A

South Brazeau
9302090596

Traverse 2014-C

Traverse 2014-D

Traverse 2014-F

Traverse 2014-B

Traverse 2014-E

SPIDER MTN

Fire Lookout

SHEEPTRAP MTN

North Saskatchewan River

Elbow River

Elbow Creek

Legend

- 2014 Traverse Points
- Anticline
- Faults
- Contours (10 m)
- Creek/stream
- River/lake

MAIM Permits

- Brazeau Range
- Other

Bedrock Geology

- Alexo
- Mt Hawk
- Fernie
- Turner Valley
- Shunda
- Pekisko
- Banff
- Palliser

Kilometres

0 1 2 3

1:10,000

Coordinate System: UTM NAD83, Zone 11N

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Edmonton, Alberta

BRAZEAU RANGE
WEST-CENTRAL ALBERTA

Fig. 4.3
Geology & Mapping Station Locations

PK 2013.03