MAR 20130014: FOLDING MOUNTAIN

Folding Mountain- A report on Carbonate exploration near Hinton, West-Central Alberta.

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GRAYMONT WESTERN CANADA INC.

2012 AND 2013 EXPLORATION AND DIAMOND DRILLING WITHIN THE FOLDING MOUNTAIN METALLIC AND INDUSTRIAL MINERALS PERMIT, WEST-CENTRAL ALBERTA

PART B

Metallic and Industrial Minerals Permit
9304050869

Geographic Coordinates

53°14' to 53°16' N
117°45' to 117°51' W

NTS Sheets 83 F/4 and F/5

Owner and Operator: Graymont Western Canada Inc.
260, 4311 - 12 Street N.E.
Calgary, Alberta T2E 4P9

Consultant: Dahrouge Geological Consulting Ltd.
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Date Submitted: March 27, 2013

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PART C

1. SUMMARY

During 2012 and 2013, exploration within Metallic and Industrial Minerals (MAIM) Permit 9304050869 of Graymont Western Canada Inc. near Folding Mountain, included the examination of 18 discrete stratigraphic intervals exceeding 37 m thickness, and the completion of five NQ diamond-drill holes totalling 768.40 m.

Outcrop and core samples were obtained and sent to a laboratory for whole-rock analysis. Exploration results show that the property is underlain by low-quality, variably dolomitic or argillaceous limestone, dolomitic grainstone, and shale of the Banff Formation, and moderate-quality lime mudstone and packstone of the Rundle Assemblage and upper Palliser Formation.

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 17°49' 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 2012 and 2013 exploration programs within the Folding Mountain Permit were 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 9304050869, which encompasses land north of the Yellowhead Highway (Hwy 16) and opposite Folding Mountain of West-Central Alberta. It includes information on the geology and quality of carbonates sampled in 18 discrete intervals from June 18 to 22, 2012 and a summary of 5 diamond drill holes completed from January 14 to 30, 2013. Bob Robison, exploration manager for Graymont Western U.S. Inc., authorized this work.

The objectives of the 2012 field exploration were to expand on previously explored areas, and to locate and better define carbonate units throughout the property.

The 2013 drill holes were located in order to test the thickness and quality of carbonate rocks within Devonian to Carboniferous stratigraphic units of the Folding Mountain area. The target formations of this drill program were the Devonian Palliser Formation and the Mississippian Pekisko Formation.

3. GEOGRAPHIC SETTING AND ACCESS

3.1 LOCATION AND ACCESS

MAIM Permit 9304050869 encompasses 2,413 hectares bordering Hwy 16 near Folding Mountain, approximately 25 km southwest of Hinton, Alberta (Fig. 3.1). Hinton is 290 km west of Edmonton on Hwy 16 and is serviced by the main line of Canadian National Railways.

Folding Mountain is within Athabasca River Valley (Entrance Corridor) about 5 km east of Jasper National Park.

Access to the permit area is via Hwy 16 from Edmonton or Jasper, Alberta. All-weather gravel roads, trails and cut lines that branch northerly from Hwy 16 provide additional access (Fig. 3.2).

3.2 INFRASTRUCTURE

Accommodations, food, fuel and other necessary services are available in Hinton. The local economy is primarily based on forestry and energy-based industries.

Hinton, with a population of about 9,600, is accessed by traveling either 290 km west of Edmonton or 80 km northeast of Jasper, via Hwy 16.

3.3 TOPOGRAPHY, VEGETATION AND CLIMATE

Opposite Folding Mountain, a topographically subdued ridge (FM Ridge) continues for more than 2.5 km north-westerly from Highway 16 and terminates southeast of Brûlé Lake. The area is part of the eastern-slope montane forest ecological region.

Below timberline, vegetation consists of dense stands of aspen, Lodgepole pine, white spruce, and less frequent stands of Douglas fir. Areas of lowest relief are covered with dense stands of black spruce and thick undergrowth, with local muskegs and swamps. Windblown soils and active aeolian dunes along the east shore of Brûlé Lake support shrubs, stunted balsam, poplar, and aspen. The region, including the northwest extension of FM Ridge is covered by a dense stand of second growth deciduous forest from prior logging.

3.4 ENVIRONMENTAL CONSIDERATIONS

Folding Mountain and its north-westerly continuation are within the Brûlé Lake Resource Management Area (RMA, Appendix 1) of the Coal Branch Sub-Regional Integrated Resource Plan (Alberta Forestry, Lands and Wildlife, 1990). From the Coal

Branch Sub-Regional Integrated Resource Plan, broad resource management objectives for quarriable minerals include the following guidelines (Alberta Forestry, Lands and Wildlife, 1990; p. 10):

> "... Exploration and development of mineral resources will be permitted in Zone 2 under the existing approval processes provided the value of the area to wildlife can be maintained. Mineral activities should attempt to avoid important habitat areas as much as possible. Where avoidance is not possible, the project must be designed to minimize disturbance of wildlife habitat and undertake mitigative measures to maintain habitat capability in or adjacent to the project area. Reclamation will have wildlife habitat as a high priority in Zone 2...."

The south-eastern 1 km of FM Ridge is within an access-controlled Critical Wildlife (Zone 2) Land Use Zone (LUZ) and the north-western part is within a General Recreation (Zone 4) LUZ.

The general intent of the Integrated Resource Plan for the Brûlé Lake RMA is to maintain the high visual qualities of the area, protect habitat for elk, mule deer, and the rare long-toed salamander population near Kinky Lake; allow intensive commercial recreation and tourism developments; and allow a limited range of multiple use activities (Alberta Forestry, Lands and Wildlife, 1990). On the southeastern shore of Wildhorse Lake, Wildhorse Lake Provincial Forest Recreation Area provides day and overnight camping facilities. Kinky and Wildhorse lakes are approximately 1.5 km and 200 m from the northernmost edge of the Folding Mountain MAIM Permit boundary.

The northern part of FM Ridge is of low visibility from Hwy 16. Recreational and industrial activity within the immediate vicinity of FM Ridge includes a large sewage lagoon to its southwest, near Jasper Park border; a refuse dump about 2 km to the northeast; and Folding Mountain Campground to the south of Highway 16 (Fig. 4.2).

3.5 FIELD OPERATIONS

The 2012 field operations were conducted by a four-person geological crew from Dahrouge, based in a hotel in Hinton. Transportation to and from the property was by four-wheel-drive truck. Access throughout the permit was by truck and hiking.

The 2013 diamond drilling was supervised by a one to three-person geological crew from Dahrouge, based in a hotel in Hinton. Transportation to and from the property was by four-wheel-drive truck.

The drill equipment was delivered to the site on a flat deck trailer, and was unloaded and positioned at drill sites by a D6 Bulldozer.

Garmin GPSmap 60Cx instruments were used to mark outcrop and collar locations and record access information. Compasses were set at a magnetic declination of 17°49' east.

4. PROPERTY, EXPLORATION AND EXPENDITURES

4.1 PROPERTY SUMMARY

Examination of the Entrance Corridor for high-calcium limestone, on behalf of Graymont, commenced in 1997 by Halferdahl & Associates Ltd. Exploration during 1997 and 1998 included a compilation of existing information and reconnaissance scale mapping, sampling at Nikanassin Range near Cadomin, and within Foothills and Front Ranges west of Hinton, Alberta.

In 2000, carbonate exposures north of Hwy 16, northwest of Folding Mountain, were examined and sampled. The approximately 2.5 km long by 700 m wide FM Ridge was prospected and outcropping limestone were sampled.

In 2004, Graymont acquired MAIM Permit 9304050869 to cover Paleozoic carbonate units located within the Entrance Corridor near Folding Mountain, west of Hinton, Alberta.

In 2005, exploration within the Folding Mountain MAIM Permit consisted of surface mapping, sampling, and diamond drilling.

The Folding Mountain MAIM Permit encompasses 2,413 ha. Based on the 2012 exploration and 2013 drill program, the entirety of the Folding Mountain MAIM Permit will be retained (Section 4.3, Fig. 4.1).

4.2 EXPLORATION SUMMARY

The work described herein was undertaken to determine the thickness and quality of carbonate units within easily accessible areas of MAIM Permit 9304050869.

From June 18 to 22, 2012, Dahrouge, on behalf of Graymont, conducted exploration for carbonate lithotypes within western Alberta. Carbonate outcrops were examined and a total of 18 samples were collected (Fig. 4.2). Stratigraphic thicknesses were determined by measuring outcrops perpendicular to bedding. Geological observations were recorded, including lithologic information, measurements of structural elements, and other pertinent details (Appendix 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).

From January 14 to 30, 2013, Dahrouge supervised the completion of 768.40 m of NQ drilling in five holes (Fig. 4.2). The locations and details of each drill hole are presented in Table 4.1. Glen Shaw Drilling of Logan Lake, British Columbia completed the diamond drilling using a skid-mounted Longyear 38 diamond drill rig. Due to environmental concerns and winter conditions, water was trucked from Hinton to the nearest access point, stored in tanks and pumped to the drill.

Geological observations of the drill core were recorded in diamond drill logs, including lithologic information, measurements of structural elements, and other pertinent details (Appendix 5). The core was split and a total of 126 samples were collected and sent for analyses. Assays were completed by the Central Analytical Laboratory of Graymont Western U.S. Inc. based out of Salt Lake City, Utah, USA; details of the analytical procedure are provided in Appendix 4. The drill core is currently stored at a private warehouse in Fort Saskatchewan, Alberta.

TABLE 4.1 2013 DIAMOND DRILL HOLE LOCATIONS

Drill Hole	Easting*	Northing*	Elevation (m)	Casing Depth (m)	Total Depth (m)
FM13-01	447673	5899759	1122.63	41.15	200.25
FM13-02	447217	5899718	1132.40	3.05	198.12
FM13-03	447359	5900114	1160.65	15.24	200.25
FM13-04	447185	5899973	1152.95	6.71	88.09
FM13-05	447252	5900028	1143.47	10.36	81.69

* Coordinates are UTM NAD83 (Zone 11N)

4.3 EXPLORATION EXPENDITURES

The 2012 and 2013 exploration expenditures for MAIM Permit 9304050869 totaled $284,963.76 (Appendix 1). The expenditures are to be applied towards work period years 11-12 and 13-14, which will fulfill the assessment requirements of the permit up to its term expiry of May 8, 2018.

Expenditures are allocated to MAIM permit 9304050869 as follows:

Assessment Period MAIM Permit 9304050869	Expiry Date	Required Expenditures	Assigned Expenditures
Years 11 and 12	May 11, 2016	$3,658.36	$3,658.36
Years 13 and 14	May 8, 2018*	$36,195.00	$36,195.00

*Term Expiry

5. REGIONAL GEOLOGY

5.1 STRATIGRAPHY

In the northern part of the Rocky Mountain Foothills and Front Ranges of Alberta, carbonate rocks are known to occur within both Paleozoic and Triassic sequences. Paleozoic limestones are described in the Upper Devonian Fairholme Group and Palliser Formation, Upper Devonian to Lower Carboniferous Banff Formation, and Lower Carboniferous Rundle Assemblage. As a prior report (Pana and Dahrouge, 1999) contains information on the regional structure and stratigraphy, most of that information is not repeated herein; however, information pertinent to the Folding Mountain area is included.

5.1.1 Palliser Formation

Paleozoic limestones of the Palliser and Banff Formations, and the Rundle Assemblage are exposed by the symmetrical Folding Mountain Anticline (Mountjoy, 1959). Within the core of Folding Mountain Anticline, the Palliser Formation is 180-240 m thick and consists of massive dark-grey and dark-brown, fine- to medium-grained limestone with thin intervals of dolomitic limestone, dolomite, calcareous shale and chert (Irish, 1965). The Palliser can be subdivided into the upper Costigan Member and lower Morro Member (DeWit and McLaren, 1950). The Costigan Member generally consists of fine-grained, dark-grey to black, bioclast-rich lime mudstone to grainstone 3-35 m thick. The underlying Morro Member is composed of grey-brown, thickly bedded to massive, mottled dolomitic mudstone to calcareous dolomitic mudstone.

5.1.2 Banff Assemblage

In west-central Alberta, the Exshaw, Banff and Yohin formations comprise the Banff Assemblage (Richards et al. 1994). Only exposures of the Banff Formation appear within the Folding Mountain Permit. The Banff Formation is a heterogeneous association of carbonates and fine-grained siliciclastics deposited on poorly differentiated carbonate platforms. The Banff Formation is about 167.75 m thick and divisible, from bottom to top, into four units: a recessive unit about 121 m thick; a unit of interbedded crinoidal and silty limestone up to 15 m thick; a middle-upper unit of argillaceous limestone up to 45.75 m thick; and an upper unit of siltstone and silty limestone up to 9.25 metres thick (Mountjoy, 1959). Westward, the uppermost Banff Formation grades laterally into the Rundle Assemblage.

5.1.3 Rundle Assemblage

The Lower Carboniferous Rundle Assemblage extends from Mackenzie Mountains in the Arctic, south through the Peace River Embayment to south-eastern 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). 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 50-120 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 southwest into the more open-marine sequence of the Livingstone Formation.

The upper Rundle Assemblage includes the transgressive Mount Head Formation.

5.1.4 Spray River Group

Mesozoic rocks exposed within Folding Mountain Anticline include strata of the Spray River Group. The Spray River Group is divisible into the lower Sulphur Mountain Formation and upper Whitehorse Formation. The Sulphur Mountain Formation is up to 305 m thick and consists of shale and silty shale which grade upward into thin-bedded siltstone and fine-grained sandstone. The Whitehorse Formation consists of dolomite and limestone, with quartzose sandstone and calcareous to dolomitic shale interbeds (Irish, 1965).

5.2 STRUCTURE

East of Brûlé Lake, the northwest plunging Folding Mountain Anticline exposes Paleozoic rocks with dips ranging from 30° to 45° within the western limb and from 30° to 60° in the eastern limb (Fig. 4.2). Folding Mountain Thrust marks the eastern boundary of Folding Mountain Anticline; its surface trace is about 1.5 km northeast of Folding Mountain.

6. PERMIT GEOLOGY

6.1 DRILLHOLE SUMMARY

Carbonate lithologies of the Palliser Formation, Banff Assemblage and Rundle Assemblage were intersected during the 2013 drill program, which was located northwest of Highway 16 (Fig. 4.2). All five holes were drilled at approximately 60° inclination to the east or northeast in order to intersect the underlying strata at near perpendicular angles.

The following intersections are approximate due to variations in the inferred bedding orientations. Hole FM13-01 intersected the lowermost 2 metres of Banff Formation, 32 m of the Upper Palliser (Costigan Member), and the uppermost 124 m of the Lower Palliser (Morro Member). Hole FM13-02 intersected the lowermost 127 m of the Sulphur Mountain Formation, the entire 20 m of the Turner Valley Formation, the entire 18 m of the Pekisko Formation and the uppermost 28 m of the Banff Formation. Hole FM13-03 intersected the lowermost 32 m of the Upper Palliser (Costigan Member) and the uppermost 152 m of the Lower Palliser (Morro Member). Hole FM13-04 intersected the lowermost 45 m of Turner Valley Formation, the entire 18 m of Pekisko Formation and the uppermost 18 m of Banff Formation. Hole FM13-05 intersected 71 m of the Banff Formation.

6.2 STRATIGRAPHY

The Palliser Formation was intersected in Holes FM13-01 and FM13-03. The upper Costigan Member consisted of fine-grained, fossiliferous dark-grey lime mudstone to wackestone, which was locally dolomitic. This was underlain by variably rubbly/poorly consolidated, vuggy, calcareous dolomitic mudstone of the lower Morro Member.

The Palliser Formation was overlain by the Banff Formation, which was intersected in holes FM13-01, FM13-02, FM13-04 and FM13-05. In Hole FM13-01, 2 metres of Banff Formation was intersected at the beginning of the hole; it consisted of interbedded dolomitic lime mudstone to wackestone. In Hole FM13-05, the 71 m thick interval of Banff Formation consisted of argillaceous dolomitic mudstone and calcareous dolomitic mudstone. According to Pana and Dahrouge (1998), the Banff Formation consists of a lower recessive unit of calcareous shales and cherty argillaceous limestone and an upper resistant unit of fine-grained, medium-bedded, limestone and dolomite with crinoid remnants (Douglas, 1953).

Two of the three formations within the overlying Rundle Assemblage were intersected during the drill program. The full 18-19 m thickness of the basal unit, the Pekisko Formation, was intersected in Holes FM13-02 and FM13-04. It consisted of a competent, medium-grey lime mudstone to wackestone with local secondary dolomitization. The Shunda Formation, which was absent in the 2013 drill holes, is overlain by the Turner Valley Formation, which was identified in Holes FM13-02 and FM13-04. The 65 m thick interval of Turner Valley Formation encountered consisted of weakly calcareous, vuggy dolomitic mudstone with local siliceous intervals.

The Turner Valley Formation is disconformably overlain by the Sulphur Mountain Formation, which was intersected at the top of Hole FM13-02. The 127 m interval of Sulphur Mountain Formation consisted of rusty brown siltstone, mudstone and weakly calcareous shale, which was locally carbonaceous.

7. RESULTS

Analytical results of outcrops and drill core samples revealed significant amounts of secondary dolomitization in otherwise high-quality limestone intervals within the permit (Appendix 5). Complete drill logs are provided in Appendix 5, and summarized in Table 7.1.

In total, approximately 2 metres of the Palliser Formation were sampled from outcrop and 126 m sampled from core. Analytical results of the Palliser Formation were highly variable, ranging from 59-98% $CaCO_3$, 1-36% $MgCO_3$, and 1-23% SiO_2 in the upper Costigan Member. The dolomite content was greater than expected and appeared to be a secondary feature. The best interval was from Hole FM13-03, which averaged 93.75% $CaCO_3$, 2.56% $MgCO_3$ and 3.36% SiO_2 over 21.2 m. Due to the variable contents of $MgCO_3$ and $CaCO_3$, the Palliser Formation has limited potential for high-calcium limestone.

Samples from the Banff Formation were generally high in silica and/or dolomite, with low to moderate $CaCO_3$ values. The Banff Formation has low potential for either high-calcium limestone or high-quality dolomite.

Samples from the Rundle Assemblage varied greatly in quality. In total, approximately 2 metres from outcrop and 38 m from core were sampled. The analytical results of the Pekisko Formation ranged from 59-94% $CaCO_3$, 1-28% $MgCO_3$ and 1-9% SiO_2. The variability in $MgCO_3$ is likely caused by secondary dolomitization. No outcrops or drill core intercepts of the overlying Shunda Formation were identified during the 2012 or 2013 exploration programs. The uppermost unit, the Turner Valley Formation, has low potential for high-calcium limestone, but has consistently high dolomite content, and therefore has some potential for high-quality dolomite. In total, approximately 30 m of Turner Valley were sampled from outcrop and 12 m sampled from core. Results ranged from 28-45% $MgCO_3$ over the entire thickness.

The Sulphur Mountain Formation, which disconformably overlies the Rundle Assemblage, consisted of primarily clastic rocks, and therefore is not a unit of interest.

TABLE 7.1 2013 DRILL HOLE SUMMARY

Drill Hole	From (m)	To (m)	Interval (m)	Formation
FM13-01	0.00	41.15	41.15	Overburden
FM13-01	41.15	43.50	2.35	Banff
FM13-01	43.50	45.03	1.53	Upper Palliser
FM13-01	45.03	48.69	3.66	Upper Palliser
FM13-01	48.69	51.26	2.57	Upper Palliser
FM13-01	51.26	75.66	24.40	Upper Palliser
FM13-01	75.66	95.63	19.97	Lower Palliser
FM13-01	95.63	200.25	104.62	Lower Palliser
FM13-02	0.00	3.05	3.05	Overburden
FM13-02	3.05	15.52	12.47	Sulphur Mountain
FM13-02	15.52	37.35	21.83	Sulphur Mountain
FM13-02	37.35	129.97	92.62	Sulphur Mountain
FM13-02	129.97	150.11	20.14	Turner Valley
FM13-02	150.11	169.85	19.74	Pekisko
FM13-02	169.85	198.12	28.27	Banff
FM13-03	0.00	15.24	15.24	Overburden
FM13-03	15.24	28.40	13.16	Upper Palliser
FM13-03	28.40	37.59	9.19	Upper Palliser
FM13-03	37.59	47.85	10.26	Upper Palliser
FM13-03	47.85	200.25	152.40	Lower Palliser
FM13-04	0.00	6.71	6.71	Overburden
FM13-04	6.71	51.95	45.24	Turner Valley
FM13-04	51.95	69.95	18.00	Pekisko
FM13-04	69.95	75.12	5.17	Banff
FM13-04	75.12	88.09	12.97	Banff
FM13-05	0.00	10.36	10.36	Overburden
FM13-05	10.36	23.70	13.34	Banff
FM13-05	23.70	38.16	14.46	Banff
FM13-05	38.16	51.57	13.41	Banff
FM13-05	51.57	81.69	30.12	Banff

8. CONCLUSIONS

Carbonate units of the Palliser, Banff, Pekisko and Turner Valley formations were examined during the summer of 2012 and drill tested in early 2013. A total of 18 discrete stratigraphic intervals exceeding 37 m thickness and five NQ diamond-drill holes totalling 768.40 m were examined. Overall, the analytical results were highly variable, partially due to secondary dolomitization.

Based on the results of the 2012 and 2013 exploration, the entirety of the Folding Mountain Property will be retained. Overall, no significant intercepts of high-calcium limestone were identified during the 2013 drill program. It is possible that this is partially due to the structure (and/or alteration) of the area, and that future drilling may yield different results.

Future exploration should consist of additional drilling, which will assist in the identification of structural features and possibly undisturbed high-calcium limestone intervals.

9. REFERENCES

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10. STATEMENT OF QUALIFICATIONS

I, Patrick Kluczny, residing at [redacted] 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 "2012 and 2013 Exploration and Diamond Drilling within the Folding Mountain Metallic and Industrial Minerals Permit, West-Central Alberta" and accept responsibility for the veracity of technical data and results.

Dated this 27th day of March, 2013.

Patrick Kluczny, B.Sc., P.Geol.
APEGA M81985

APPENDIX 1: COST STATEMENT

a) Personnel	$ 90,242.80
b) Food and Accommodation	$ 5,701.52
c) Transportation	$ 5,667.33
d) Instrument Rental	$ 158.40
e) Drilling	$ 147,050.84
f) Analyses	$ 4,248.00
h) Other (Software Rental, Data, Field maps, Courier & Shipping)	$ 5,989.08
Total	$ 259,057.97
Administration (10%)	$ 25,905.80
Total + Administration	**$ 284,963.76**

C

APPENDIX 2: BRULE LAKE RESOURCE MANAGEMENT AREA GUIDELINES

Alberta Forestry, Lands and Wildlife (1990) Coal Branch, Sub-regional integrated resource plan

3.6 Brule Lake Resource Management Area

The Brule Lake RMA is an area of approximately 64 km^2 (25 sq. mi.), forming the northwestern planning area boundary (Figure 9).

The area is within the Montane Ecoregion. Characteristic montane features include forest stands and grasslands, although Douglas fir, a major montane feature, is lacking. A main feature of the area is the windblown soil derived from the shores of Brule Lake. White spruce and balsam poplar, which are tolerant to such conditions, are common throughout the area. Active eolian dunes along the east shore of Brule Lake support patchy shrub communities, stunted balsam poplar and aspen.

Topography in the RMA is relatively flat. The dominant features are the sand dunes on the east shores of Brule Lake. This RMA's montane influence results in warmer winter temperatures and variable snow cover compared to the adjacent foothills and mountainous areas.

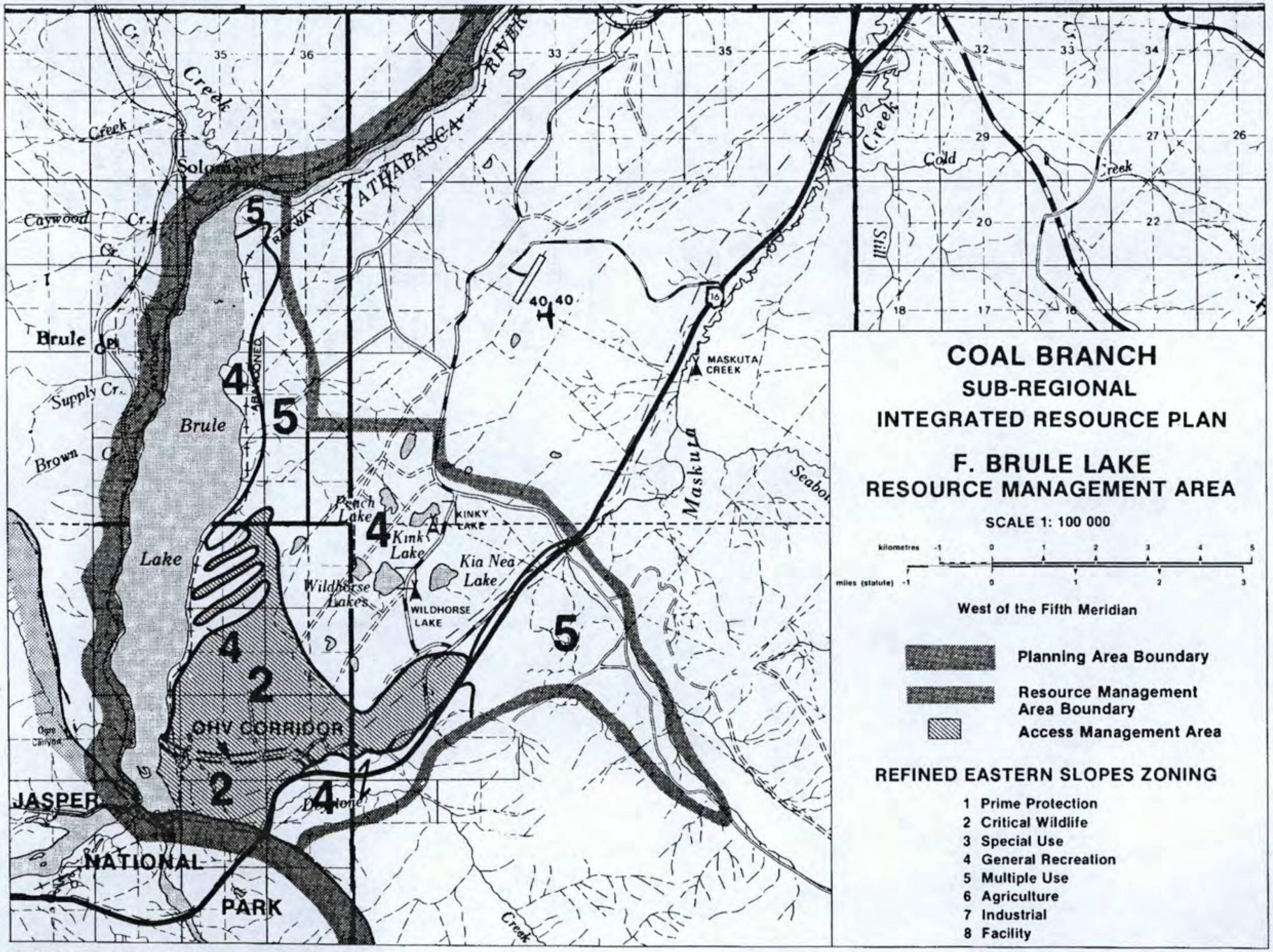

Figure 9: Brule Lake Resource Management Area.

APPENDIX 2: CONTINUED

The management intent for Brule Lake RMA is to retain the high visual qualities and protect the high wildlife, fisheries, recreational, tourism and historical resource values and sensitive soils. In addition, opportunities for intensive commercial recreation and tourism development will be provided while allowing for a limited range of multiple use activities.

In response to the various public interests for recreation and tourism resources, as well as other resources, a local integrated resource plan is recommended for the Yellowhead Corridor.

Water and Watershed

The RMA is drained by the Athabasca River and several creeks. The major drainages are Drystone Creek and a part of Maskuta Creek. These creeks generally exhibit steep gradients in the headwater areas and relatively stable channels. The area's eolian deposits, when combined with the relatively arid and windy climate, are prone to wind erosion when vegetation is removed or disturbed. Vegetation is also difficult to re-establish after disturbance. The non-vegetated sand dunes are more subject to displacement by the wind.

There are several lakes in this RMA, of which Brule Lake is the largest. Others include Peach, Kinky, Kia Nea and Wildhorse lakes.

Objectives

1. To protect eolian soils east of Brule Lake from wind and water erosion by minimizing impacts on the area's sensitive eolian deposits.

2. To preserve the water resources by minimizing negative impacts on the quality or quantity.

Guideline

1. Land and resource use activities will be subject to site specific guidelines regarding location, intensity and season of operation so as to minimize impacts on both the water resources and the sensitive eolian areas.

Minerals

Coal-bearing strata underlies 32 percent of this RMA. Only one coal deposit (Wildhorse Lakes) has been designated with remaining in-place reserves of two megatonnes of coal. Leases covering the deposit have been cancelled and the coal rights withdrawn from disposition.

Petroleum or natural gas fields have yet to be discovered here.

Objective

1. To provide opportunities for mineral exploration and development.

Guideline

1. The broad minerals management guidelines apply.

Timber

This RMA is within FMU E4N, and timber resources are harvested and managed by Weldwood of Canada Ltd.

Objectives

1. To ensure Weldwood of Canada Ltd. manages that portion of the FMA in the FMU E4N to provide a sustained yield of coniferous timber.

2. To ensure that the visual resources are protected along Highway 16 and the Athabasca River.

Guidelines

1. The detailed forest management plan for Weldwood of Canada Ltd. will be followed.

APPENDIX 2: CONTINUED

2. Timber harvesting within the line of sight of Highway 16 and Athabasca River will be planned according to the Forest Landscape Management Strategies for Alberta (Alberta, 1988c).

Wildlife

An important overwintering area for elk is located east of Brule Lake. Approximately 40 elk use the area. The rolling dune topography and associated vegetation provides good mule deer habitat. A long-toed salamander population is present near Kinky Lake. This is one of two known populations in Alberta outside the national parks. Hunting and wildlife viewing are both important recreation uses in the RMA.

Objectives

1. To manage the elk population to increase numbers from 40 to 50 animals.

2. To manage the mule deer population for a general increase in numbers.

3. To protect the rare long-toed salamander population near Kinky Lake from disturbance.

Guidelines

1. An access management area will apply to the Brule Lake Zone 2 area to prohibit year-round motorized recreational access and to promote use of forage areas by elk. However, a designated motorized recreation route will be provided through this Zone 2 area. This area is proposed for bow hunting only.

2. Critical thermal cover for elk will be retained within and adjacent to the Brule Lake Zone 2.

3. The spawning, hibernation and movement areas for long-toed salamanders in the Kinky Lake area will be protected from disturbance by protective reservation.

Fisheries

Kinky and Wildhorse lakes provide regionally significant rainbow trout and brook trout fisheries. Several other lakes in the area have potential for stocking as demand warrants. Brule Lake is generally too shallow and silt-laden to provide any recreational fishing potential. Mountain whitefish, rainbow trout and bull trout are present in the Athabasca River.

Objectives

1. To manage the fisheries resource of Kinky and Wildhorse lakes as stocked lake fisheries capable of providing an average catch rate of 0.5 fish per angler hour.

2. To stock the other lakes surrounding Kinky and Wildhorse lakes as demand warrants and where compatible with other resource values.

Guideline

1. Stocking of Kinky and Wildhorse lakes will continue at a level that allows an average catch rate of 0.5 fish per angler hour.

Recreation and Tourism

This RMA is adjacent to Jasper National Park and includes the Yellowhead Highway's gateway access to the park. A Jasper National Park management plan has been prepared that places restrictions on developments within the park. Therefore, potential exists in this RMA (including the corridor portion along Highway 16 in the Yellowhead RMA from Hinton west) to expand existing tourism operations and provide additional tourist services and facilities. These could cater to visitors using both Jasper National Park and the Coal Branch area, as well as the general travelling public. Currently, two private sector accommodations are located along Highway 16. They act as staging areas for recreation activities in the region.

The Brule Lake RMA offers excellent scenic views. The public expressed interest in

APPENDIX 2: CONTINUED

maintaining the visual landscape qualities along Highway 16.

Wildhorse and Kinky lakes, both popular fisheries, are the focal points for recreation use. Two Alberta Forest Service recreation areas are located here. These areas have a combined capacity of 23 campsites and 14 day use sites. The Department of Recreation and Parks has long-term intentions to develop the recreational potential of the Wildhorse-Kinky Lakes area. No detailed development plans have been prepared. However, the intent is to recognize the need for recreational facilities with a high level of servicing to accommodate travellers on the Yellowhead Highway (e.g., family vacation destination resort development). The area is intended for public recreational use, and the private sector will be encouraged to participate in the provision of services and facilities to accommodate and support this use.

The non-vegetated Brule sand dunes are regionally and locally popular for OHV recreation use. A portion of the Grand Trunk Pacific railway was located at one time along the east shore of Brule Lake. Some evidence of this remains on the dunes (e.g., telegraph poles, partial remains of a train station). The vegetated dunes are susceptible to disturbance and are thus better suited to extensive forms of non-motorized recreation.

Objectives

1. To maintain current public recreational facilities at Wildhorse and Kinky lakes.

2. To maintain the capability for future recreation development in the Wildhorse-Kinky lakes area (Zone 4).

3. To recognize touring opportunities along Highway 16 and the potential for associated facility developments (e.g., pull-off viewing areas, signs).

4. To recognize the Brule Lake sand dunes significance as a natural feature through interpretive signs and facilities.

5. To allow OHV recreation use on the Brule Lake non-vegetated sand dunes (Zone 4).

6. To manage the scenic landscape qualities along the Yellowhead Highway (i.e., to the line of sight), especially near the Jasper National Park entrance (Zone 4).

7. To support expansion of existing tourism facilities and services, as demand warrants.

8. To provide opportunities for commercial tourism developments and associated recreation activity developments.

9. To retain public access to public land along lakes, rivers and streams.

Guidelines

1. Timber harvesting and other developments within the line of sight of Highway 16 and the Athabasca River will be planned in an aesthetic manner.

2. Business counselling will be provided by the Department of Tourism to existing and potential tourism operators interested in expanding their operations or developing new tourist services or facilities.

3. The Department of Recreation and Parks, in conjunction with other agencies such as the Department of Tourism and the Department of Forestry, Lands and Wildlife, will work with any potential private sector operator interested in developing tourism and recreation opportunities on lands reserved by the Department of Recreation and Parks.

4. Development of scenic viewing or interpretive pull-off areas will be considered within the Highway 16 twinning program (from Edmonton to the junction of Highway 40). If found to be feasible, the departments of Tourism and Culture and Multicul-

turalism, as well as other interested agencies, will assist the Department of Transportation and Utilities in identifying sites along Highway 16 that have potential for development of pull-off areas.

5. The Department of Tourism will assist, where possible, in any endeavours by other government agencies or local groups interested in developing interpretive facilities and signs that are appropriate for the Brule Lake sand dunes area.

6. Dispositions that preclude public access along lakes (particularly the Kinky-Wildhorse lakes complex), rivers and major streams will not be issued.

Historical Resources

Archaeological - The Brule Lake RMA, the smallest RMA within the Coal Branch, consists of a broad flat valley initially carved by the Athabasca lobe of the Cordilleran ice sheet and later filled by glacial Lake Athabasca. This broad, open area was probably a major wintering zone for ungulates from adjacent areas that are now a part of Jasper National Park. The presence of these animals in Brule Lake undoubtedly provided a major attraction for prehistoric peoples. The fact that the Athabasca valley is a major corridor between interior British Columbia and Alberta is also a factor for consideration in determining the area's potential for prehistoric occupation.

A large number of sites have been identified on the shores of Brule Lake immediately west of the planning area boundary (one older than 8000 years), demonstrating the frequent use of this area during prehistoric times. Although possibly to a lesser extent, similar occurrences may be present along the shores of the lake within this RMA.

Elsewhere in the Brule Lake RMA, several sites have been recorded along smaller drainages (Maskuta and Drystone creeks). It is expected that additional finds could be made along these creeks. Sites identified on the shores of Wildhorse Lakes demonstrate the use of aquatic and wetland species in this area. It is also expected that the other small lakes and wetlands within the RMA will contain sites relating to exploitation of these resources around their margins. Finally, the alluvial gravels along the shores of the lake may have provided useable materials for stone tool manufacture and may suggest the presence of workshop sites nearby.

The possibility of very significant stratified sites exists in this area. Unlike many other portions of the planning area, soil deposition, which could have resulted in the geological separation of repeated occupations of the same landform, is an important feature of this region. The source of this soil deposition is windblown loess derived from glacial action up the valley. Sand dunes in this area are the most likely locations for such sites.

Palaeontological - To date, very little palaeontological investigation has occurred in this RMA, and there are no known fossil-producing sites in the area. However, the RMA is representative of the foothills physiographic region, which has produced fish and dinosaur remains in RMAs to the east. Exposures are present in river valleys, road-end railway cuts, abandoned mine sites and along ridges throughout the RMA, and the area is considered to have high potential for the discovery of fossil remains.

Historic Period - Historically, evidences of a past railway bed are still present in this RMA.

Objective

1. The broad historical management objectives apply.

Guidelines

1. Any major development in the RMA, such as coal-mining, limestone quarrying or road construction activities, should be preceded by a palaeontological impact assessment.

2. The Archaeological Survey of Alberta will participate in the land use referral process to review developments proposed in areas of the RMA

APPENDIX 2: CONTINUED

considered to have historical resource potential. The historical resources sensitivity map will outline areas of historical resources potential for which the Department of Culture and Multiculturalism will request referral of proposed development projects.

Rangeland

The demand for more rangeland for horse use will coincide with Hinton's increasing population and with the tourist industry's needs. At present, some horse-holding areas and limited grazing opportunities are provided.

Objectives

1. To encourage the expansion opportunities for grazing where compatible with other resource uses.

2. To encourage intensified management of forage resources and grazing opportunities in order to meet local need.

3. To ensure that good range condition is maintained.

Guidelines

1. Range management plans must recognize the need for intensive management of vegetation on eolian soils.

2. Grazing opportunities will be provided on a need basis and in consideration of wildlife, recreation and tourist values.

3. Authorized horse use of the forage resources will be monitored and managed.

Settlement

The Drystone Subdivision is within this RMA. This subdivision is for recreational-type developments.

Objectives

1. To encourage further recreational developments to occur within the Drystone Subdivision.

2. To encourage consideration of the area's visual aesthetic quality in all further developments.

Guideline

1. Resource management agencies will consult with the Improvement District of Yellowhead, No. 14 when determining land uses on a site-specific basis.

Access

Gateway access to Jasper National Park is provided through this RMA. The Department of Transportation and Utilities is currently twinning Highway 16 (up to the junction of Highway 40). It is recognized that access routes for developments along the highway will be extremely limited west of the Drystone Subdivision. Reasons for this access limitation are topography and safety.

An access management area will apply to the Brule Lake Zone 2 area. An OHV access corridor will be provided through this area to the Brule Lake non-vegetated sand dunes area.

Objectives

1. To protect the visual qualities along the Yellowhead Highway (to line of sight).

2. To recognize the limited opportunities for roadway intersections onto Highway 16, west of the Drystone Subdivision.

3. To provide an OHV access corridor through the Brule Lake Zone 2 access management area.

Guidelines

1. Motorized vehicle access requests along Highway 16 will be reviewed by all interested agencies.

APPENDIX 2: CONTINUED

2. The maintenance of a scenic landscape quality along Highway 16 will be considered for all resource developments that are visible from the Yellowhead Highway.

3. An access management area restricting motorized recreation use will apply to the Brule Lake Zone 2. However, a motorized recreation access corridor will be provided through this Zone 2 area. The corridor will provide access from Highway 16 and the Overlander Lodge to the Brule Lake non-vegetated sand dunes area.

3.7 Mountain Park-Folding Mountain Resource Management Area

The Mountain Park-Folding Mountain RMA is an area of approximately 583 km^2 (225 sq. mi.) in the western portion of the planning area (Figure 10).

Ecoregions represented include Boreal Uplands, Subalpine and Alpine with the Subalpine and Alpine ecoregions covering the greatest area. In the subalpine areas, Engelmann spruce and subalpine fir are co-dominant. However, because of past fire history, a young lodgepole pine forest is more extensive. In Alpine areas, the vegetation varies depending on a number of factors including type of substrate, exposure to winds and insolation, slope steepness, moisture conditions and snow accumulation. Tree growth is restricted to scattered stunted subalpine fir and Engelmann spruce, which occur at lower elevations in depressional and less exposed sites. Heather communities are the dominant ground cover on gently sloped north aspects often associated with stunted tree growth. Lodgepole pine with subdominant white spruce and black spruce are the common tree species in the Boreal Uplands Ecoregion, which is found at elevations lower than the Subalpine Ecoregion.

Terrain in the Mountain Park-Folding Mountain RMA is variable and rugged, ranging from steeply sloped, forest-covered foothills to the high, barren mountain peaks characteristic of the Rocky Mountains front ranges with its rugged, sharply peaked northwesterly trending ranges and valleys.

The management intent for the Mountain Park-Folding Mountain RMA is to recognize a varied range of provincially significant resources such as coal, wildlife, extensive recreation, tourism and historical resources. A limited range of other multiple use activities will also be provided, while recognizing the importance of watershed protection.

Water and Watershed

Being mainly within the Alpine and Subalpine ecoregions, this RMA produces relatively high volumes of clean water. The headwaters of the McLeod River are in the Mountain Park and Cardinal Divide area. Streams in these headwaters have high gradients, low drainage density and high runoff efficiency. This results in a quick initial response to storms. The stream channels have low banks and coarse, gravelly beds. Major tributary creeks in the McLeod River headwaters include Whitehorse, Harlequin, Drummond, Cadomin, Prospect, Thornton and Cheviot.

Drinnan, Sphinx and Berrys creeks are tributaries of the Gregg River which also starts in the northern portion of this RMA. They flow through rugged, mountainous terrain.

Slope steepness is a concern in watersheds throughout the RMA. However, because the soils are generally shallow, coarse and often calcareous, erosion and water quality concerns are minor. Soil conservation practices will be required to maintain the productivity of the area because of the shallowness of the soil resources. Overall, extensive resource developments are less of a concern than the larger intensive developments that can be difficult to reclaim and have a potentially negative impact on both water quality and quantity.

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APPENDIX 3: SAMPLE DESCRIPTIONS AND ASSAY RESULTS FROM THE FOLDING MOUNTAIN PROPERTY

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: Mpk - Mississippian Pekisko Formation; Mtv - Mississippian Turner Valley Formation; Tw - Triassic Whitehorse 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											
49876	Tw	3.5	**Sandstone**, light grey to white weathered, light grey fresh, fine-grained to medium-grained, fossils: solitary rugose coral, massive, alteration: oxide, localized, strong fetid odour, no HCl reaction, structure(s): joint, outcrop-scale, 37/71 SE; joint, outcrop-scale, 128/35 SW; bedding (definite) 302/40 NE	0.82	0.23	27.77	1.036	0.701	55	34	1213
49877	Mtv		**Dolomitic Mudstone**, tan to light grey weathered, light tan-grey to tan-grey fresh, micritic, resistant, vuggy, weak HCl reaction, structure(s): joint 310/89; joint 214/89 NW; bedding (possible) 128/38 SW	54.51	43.51	1.47	0.143	0.199	160	500	50
49878	Mtv	2	**Dolomitic Mudstone**, tan to medium grey weathered, light tan-grey to tan-grey fresh, micritic, resistant, nodular, weak HCl reaction, structure(s): joint, outcrop-scale, 20/60 E; bedding (definite) 146/32 SW	54.44	44.12	0.95	0.105	0.207	96	851	50
49879	Mtv		**Dolomitic Mudstone**, tan to medium grey weathered, light tan-grey to tan-grey fresh, micritic, resistant, nodular, alteration: oxide, fracture-related, weak HCl reaction, structure(s): fracture, outcrop-scale; calcite veinlet, outcrop-scale; bedding (undulatory) 144/45 SW	54.45	42.63	2.03	0.305	0.320	86	548	110
49880	Mtv	0.5	**Dolomitic Mudstone**, tan to dark grey weathered, medium grey to dark grey fresh, micritic, pockety, nodular, weak HCl reaction, structure(s): bedding (undulatory) 136/32 SW	50.67	40.86	6.06	1.012	0.581	97	740	50
49881	Mtv		**Dolomitic Mudstone**, tan to medium grey weathered, light tan-grey to tan-grey fresh, micritic, resistant, nodular, vuggy, alteration: oxide; limonite, strong fetid odour, strong HCl reaction	56.02	42.17	0.99	0.157	0.428	115	226	375
49882	Mpk		**Lime Mudstone**, light grey to medium grey weathered and fresh, micritic, resistant, strong HCl reaction, structure(s): calcite veinlet, outcrop-scale, weak; bedding (definite) 128/22 SW	96.45	1.86	1.08	0.200	0.096	379	24	50
49977	Mtv	1	**Dolomitic Mudstone**, tan weathered, fresh, fine-grained to fine-grained, massive, vuggy, weak HCl reaction, structure(s): bedding (undulatory), outcrop-scale, 128/36 SW	53.42	41.65	3.84	0.277	0.484	92	396	50
49978	Mtv	3	**Dolomitic Mudstone**, white to tan weathered, medium grey fresh, fine-grained to fine-grained, moderately-bedded, vuggy, alteration: oxide, localized, 20-40% intensity, weak (powder) HCl reaction, structure(s): joint, outcrop-scale, 222/90; calcite veinlet, outcrop-scale; bedding (definite), outcrop-scale, 128/36 SW	54.61	43.49	1.29	0.234	0.137	99	272	50
49979	Mtv	0.25	**Argillaceous Dolomitic Mudstone**, light tan-grey weathered, medium grey to light grey fresh, very fine-grained to very fine-grained, thickly-bedded, weak (powder) HCl reaction, structure(s): fracture, outcrop-scale; calcite veinlet, outcrop-scale, very weak; bedding (definite), outcrop-scale, 143/29	50.92	40.50	6.82	0.650	0.497	86	484	50
49980	Mtv	3	**Dolomitic Wackestone**, medium brown-grey weathered, fresh, fine-grained to coarse-grained, fossils: solitary rugose coral, very rare; crinoid ossicle, common; bivalve, common, vuggy, strong fetid odour, very strong HCl reaction, structure(s): fracture weak	57.70	41.34	0.58	0.096	0.145	71	134	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)
49981	Mtv	5	**Argillaceous Dolomitic Mudstone**, tan-grey to medium brown weathered, medium grey fresh, cryptocrystalline to fine-grained, moderately-bedded, alteration: silica, 40-60% intensity, strong fetid odour, weak (powder) HCl reaction, structure(s): fracture; bedding (definite), outcrop-scale, 136/40 SW	52.72	41.86	3.72	0.685	0.467	97	476	50
49982	Mtv	2	**Dolomitic Mudstone**, orange-brown weathered, light tan-grey fresh, micritic to very fine-grained, moderately-bedded, alteration: silica, strong fetid odour, weak (powder) HCl reaction, structure(s): joint, outcrop-scale, 240/80; fracture, outcrop-scale, weak; bedding (definite), outcrop-scale, 130/34 SW	50.55	40.23	6.63	0.906	0.776	102	1212	282
49983	Tw	4.5	**Dolomitic Lime Mudstone**, orange-brown weathered, light grey to medium grey fresh, very fine-grained to very fine-grained, moderately-bedded, alteration: silica; oxide, banded, strong fetid odour, weak (powder) HCl reaction, structure(s): bedding (definite), outcrop-scale, 130/28 SW	12.42	8.10	41.23	3.288	0.904	58	2977	3307
49984	Mtv	4	**Dolomitic Mudstone**, medium grey weathered, light tan-grey fresh, micritic to micritic, vuggy, alteration: oxide, strong fetid odour, moderate HCl reaction, structure(s): calcite veinlet, outcrop-scale, weak	54.38	42.57	2.28	0.200	0.297	92	418	50
49985	Mtv	3	**Dolomitic Mudstone**, white to tan weathered, medium grey fresh, fine-grained to fine-grained, thinly-bedded, resistant, vuggy, strong fetid odour, weak (powder) HCl reaction, structure(s): joint, outcrop-scale, 287/46 N; calcite veinlet, outcrop-scale; bedding (definite), outcrop-scale, 124/40 SW	47.83	38.18	12.46	0.277	0.439	92	1093	135
49986	Mtv	3	**Dolomitic Mudstone to Clastic**, white to tan weathered, medium grey fresh, fine-grained to fine-grained, resistant, nodular, alteration: oxide, 40-60% intensity, strong fetid odour, weak (powder) HCl reaction, structure(s): joint, outcrop-scale, 352/58 E; bedding (definite), outcrop-scale, 120/40 SW	54.37	42.70	1.94	0.286	0.339	100	1312	100
49987	Mtv	2.5	**Dolomitic Mudstone to Clastic**, white to tan weathered, medium grey fresh, fine-grained to fine-grained, resistant, nodular, alteration: oxide, 40-60% intensity, strong fetid odour, weak (powder) HCl reaction, structure(s): bedding (definite), outcrop-scale, 128/35 SW	51.33	40.27	6.87	0.534	0.397	100	439	122

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 12^{th} 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.

APPENDIX 5: DIAMOND DRILL LOG

Company:	***GRAYMONT WESTERN CANADA INC.***						
Project:	***Folding Mountain 2013***					**Hole No:**	***FM13-01***
Dip Tests	**Permit:**	***9304050869***	**UTM Co-ordinates (NAD83)**		**Date Started:**	***Jan. 15/13***	**Core Size:** ***NQ***
Depth / Angle	**Bearing:**	***089°***	**Easting (m):**	***447673.0***	**Date Finished:**	***Jan. 18/13***	**Casing:** ***41.15 m***
93 / *57.6°*	**Inclination:**	***-60°***	**Northing (m):**	***5899758.7***	**Date Logged:**	***Jan. 24/13***	**Total Depth:** ***200.25 m***
170 / *57.3°*	**Province:**	***AB***	**Elevation (m):**	***1122.63***	**Logged By:**	***P. Kluczny, K. Krueger***	

From m	To m	Tkns m	Description	Sample #	From m	To m	Length m	$CaCO_3$ %	$MgCO_3$ %	SiO_2 %	Fe_2O_3 %	Al_2O_3 %	SrO ppm	S %	MnO ppm
0.00	41.15	41.15	CASING: Overburden												
41.15	43.50	2.35	CALCAREOUS DOLOMITIC MUDSTONE TO DOLOMITIC LIME MUDSTONE TO WACKESTONE (Banff)	80351	41.83	43.50	1.67	58.43	36.36	4.30	0.33	0.86	299	0.13	79
			medium-grey to dark-grey, fg to mg, shell fragments, overall dolomite: 60-70% present as finely disseminated throughout, overall calcite: <5% present as veinlets, well to moderately bedded, b. 75-80° to CA, wackestone is well to moderately sorted, locally stylolitic, weakly fractured, competent, weak to moderate reaction with HCl												
			lower contact is sharp, stylolitic, ~89° to CA												
43.50	45.03	1.53	LIME MUDSTONE TO WACKESTONE (Upper Palliser)	80352	43.50	45.03	1.53	94.79	3.05	1.51	0.19	0.34	370	0.05	47
			medium-grey (dark-grey etched), fg, shell fragments, overall calcite: <5% present in vugs and veinlets, moderately bedded, wackestone is well to moderately sorted, moderately to strongly vuggy throughout (mostly open vugs), moderately fractured throughout, strong reaction with HCl												
			lower contact is sharp, broken												
45.03	48.69	3.66	CALCAREOUS DOLOMITIC MUDSTONE TO DOLOMITIC LIME MUDSTONE TO	80353	45.03	46.53	1.50	67.88	29.81	1.46	0.16	0.26	369	0.03	62
			PACKESTONE (Upper Palliser)	80354	46.53	48.03	1.50	59.04	35.90	3.72	0.34	0.89	345	0.18	65
			light-grey to dark-grey, micritic to fg, shell fragments, overall dolomite: 30-80% present as mottles and bands, overall calcite: <5% present in rare vugs and rare veinlets, well to moderately bedded, b. 66° to CA, packstone is moderately sorted, weakly stylolitic, weakly fractured throughout, competent, weak to moderate reaction with HCl	80355	48.03	48.69	0.66	80.55	16.65	1.53	0.15	0.35	408	0.09	47
			lower contact is sharp, ~87° to CA												
48.69	51.26	2.57	ARGILLACEOUS DOLOMITIC MUDSTONE (Upper Palliser)	80356	48.69	50.19	1.50	60.17	28.12	7.48	0.89	2.40	420	0.05	123
			light-grey to light brown-grey, vfg, overall dolomite: ~80% present as finely overall calcite: <5% present in veinlets, well bedded, moderately fractured, locally brecciated with vfg dolomite matrix, clay intervals up to 10 cm throughout, locally vuggy (mostly open vugs), very weak to weak reaction with HCl	80357	50.19	51.26	1.07	78.41	17.59	2.78	0.27	0.62	383	0.06	79
			lower contact is sharp, ~82° to CA												
51.26	75.66	24.40	LIME MUDSTONE (Upper Palliser)	80358	51.26	52.76	1.50	71.07	26.51	1.93	0.12	0.18	611	0.07	40
			medium-grey to dark-grey, micritic to fg, rare rugose corals and colonial corals, overall	80359	52.76	54.26	1.50	85.67	12.38	1.40	0.09	0.16	382	0.05	36
			dolomite: <5% present as localized mottles, well to moderately bedded, wackestone is	80360	54.26	55.76	1.50	93.81	4.58	1.33	0.09	0.19	360	0.09	26
			well sorted, weakly fractured, competent, locally brecciated with dolomite matrix, weakly	80361	55.76	57.26	1.50	94.92	3.51	1.36	0.07	0.21	343	0.06	19
			stylolitic, locally hard, upper 5 m has moderate dolomite mottling	80362	57.26	58.76	1.50	91.11	5.94	1.97	0.10	0.28	358	0.09	24
			53.15-53.22: orange-brown clay (fault zone?)	80363	58.76	60.26	1.50	95.43	1.65	1.56	0.08	0.26	418	0.09	29
				80364	60.26	61.76	1.50	93.95	4.90	0.70	0.08	0.11	392	0.06	29

DIAMOND DRILL LOG

Company: *GRAYMONT WESTERN CANADA INC.*

Project: *Folding Mountain 2013* **HOLE No:** *FM13-01*

From m	To m	Tkns m	Description	Sample #	From m	To m	Length m	$CaCO_3$ %	$MgCO_3$ %	SiO_2 %	Fe_2O_3 %	Al_2O_3 %	SrO ppm	S %	MnO ppm
				80365	61.76	63.26	1.50	96.50	2.07	0.64	0.07	0.08	445	0.07	27
				80366	63.26	64.76	1.50	90.20	8.81	0.72	0.11	0.08	591	0.11	30
				80367	64.76	66.26	1.50	69.48	8.03	22.26	0.14	0.07	308	0.11	36
				80368	66.26	67.76	1.50	92.36	1.46	5.79	0.07	0.04	480	0.04	36
				80369	67.76	69.26	1.50	97.56	1.03	0.68	0.18	0.14	1892	0.13	48
				80370	69.26	70.76	1.50	96.58	1.07	1.34	0.36	0.29	368	0.17	74
				80371	70.76	72.26	1.50	73.37	0.86	23.05	0.22	0.08	298	0.03	68
				80372	72.26	73.76	1.50	97.65	1.15	0.49	0.15	0.05	401	0.03	62
				80373	73.76	74.76	1.00	97.81	1.74	0.55	0.10	0.06	457	0.05	58
				80374	74.76	75.66	0.90	76.78	19.77	2.43	0.39	0.44	1	0.53	126
75.66	95.63	19.97	DOLOMITIC MUDSTONE (Lower Palliser)	80375	75.66	77.16	1.50	42.26	29.71	19.41	1.68	4.17	884	1.01	212
			medium-grey to light brown-grey, micritic to vfg, overall dolomite: 50% present as finely	80376	77.16	78.66	1.50	41.26	28.91	20.01	1.74	4.39	460	1.09	293
			disseminated throughout and mottles, overall calcite: <5% present in veinlets, well to	80377	78.66	80.16	1.50	45.03	32.11	15.00	1.65	3.41	204	0.76	386
			moderately bedded, b. ~70° to CA, rare open vugs, competent, rare stylolites, very weak	80378	80.16	81.66	1.50	45.80	25.33	20.41	1.56	4.26	225	0.81	292
			reaction with HCl (powder fizz)	80379	81.66	83.16	1.50	75.89	12.78	7.34	0.70	1.36	4611	0.58	194
			76.80-77.30: finely disseminated pyrite	80380	83.16	84.66	1.50	41.84	28.74	18.38	1.30	3.40	175	0.71	333
			81.47-81.57: isolated large open vug (10 cm diam.)	80381	84.66	86.16	1.50	32.59	22.80	27.75	1.55	3.74	129	0.67	271
			86.24-86.63: less competent and highly fractured	80382	86.16	87.66	1.50	25.67	16.19	43.78	0.95	2.33	108	0.19	234
				80383	87.66	89.16	1.50	36.66	25.50	26.50	1.42	3.13	142	0.77	374
				80384	89.16	90.66	1.50	30.93	22.47	31.59	2.09	3.78	135	1.10	347
				80385	90.66	92.16	1.50	29.56	23.72	25.63	2.61	4.71	177	1.01	339
				80386	92.16	93.66	1.50	37.45	27.93	21.82	1.89	3.96	244	0.69	371
				80387	93.66	95.16	1.50	35.55	21.97	21.92	2.16	4.01	158	0.90	320
			lower contact is gradational	80388	95.16	95.63	0.47	42.71	21.44	21.79	1.83	4.37	180	0.59	306
95.63	200.25	104.62	INTERBEDDED LIME MUDSTONE TO PACKSTONE w/ DOLOMITIC MUDSTONE	80389	95.63	97.13	1.50	85.44	5.46	6.16	0.65	1.27	333	0.23	147
			medium-grey to dark-grey, micritic to cg, brachiopods, crinoid stems, rare gastropods,	80390	97.13	98.63	1.50	63.66	12.95	17.16	1.30	3.30	267	0.70	229
			shell fragments, crinoid ossicles, rugose corals and colonial corals, overall dolomite:	80391	98.63	100.13	1.50	49.96	25.08	17.81	1.40	3.27	186	0.72	296
			~30-80% present as mottles and finely disseminated, overall calcite: <5% present in veins	80392	100.13	101.63	1.50	72.50	14.87	8.53	0.88	1.93	318	0.34	201
			and veinlets, well to moderately bedded, b. 74° to CA, rare graphitic stylolites, isolated	80393	101.63	103.13	1.50	70.18	16.07	9.76	0.88	1.88	362	0.27	194
			brown mottles, minor localized carbonaceous stringers, wackestone is poorly sorted,	80394	103.13	104.63	1.50	55.27	25.08	14.31	1.10	2.72	223	0.37	227
			local vugs (mostly open), lesser bioclasts in top 5 m and bottom 17 m, weak to strong	80395	104.63	106.13	1.50	52.10	26.65	14.99	1.29	3.15	217	0.33	237
			reaction with HCl	80396	106.13	107.63	1.50	61.50	20.46	13.03	1.02	2.67	284	0.26	199
			99.62: rare large open vug (2 cm)	80397	107.63	109.13	1.50	68.39	13.41	12.99	1.02	2.41	416	0.32	169
			130.23-130.72: moderate oxide alteration along fractures, less competent	80398	109.13	110.63	1.50	67.14	13.62	14.16	1.05	2.63	395	0.35	182
			139.11-139.15: large open vug (2 cm)	80399	110.63	112.13	1.50	67.46	12.80	14.00	1.15	2.73	412	0.42	182
			139.51-139.58: orange-brown clay (fault zone?)	80400	112.13	113.63	1.50	60.18	14.87	17.12	1.71	3.58	373	0.79	347
			144.80: pyrite band (follows bedding)	80401	113.63	115.13	1.50	27.15	14.90	29.54	3.00	4.12	244	1.13	359
			145.92: disseminated pyrite	80402	115.13	116.63	1.50	63.31	13.77	16.43	1.34	3.20	501	0.45	278
			150.95: graphite-filled vein	80403	116.63	118.13	1.50	51.99	16.97	18.87	1.74	3.45	397	0.59	244
			155.52-155.64: very well-sorted, crinoidal packstone	80404	118.13	119.63	1.50	53.97	18.54	17.62	1.69	3.40	311	0.44	265
			158.40-158.64: strong calcite veining	80405	119.63	121.13	1.50	67.39	15.04	13.17	1.16	2.35	378	0.28	225
			160.63-160.65: strong mottling/soft sediment deformation	80406	121.13	122.63	1.50	73.68	10.42	11.94	0.95	2.16	392	0.31	220
			164.20: pyrite bleb (2 cm)	80407	122.63	124.13	1.50	72.37	5.56	18.13	1.11	2.40	539	0.48	194
			165.98: large calcite-filled vug (4 cm diam.)	80408	124.13	125.63	1.50	59.31	9.12	19.52	1.23	2.72	559	0.45	226
			179.95: large calcite vein (2 cm wide, ~19° to CA)	80409	125.63	127.13	1.50	61.36	10.36	18.21	1.20	2.82	574	0.38	221
			183.45-183.52: large calcite vein (~18° to CA)	80410	127.13	128.63	1.50	68.59	10.96	11.73	0.92	1.85	488	0.30	222
				80411	128.63	130.13	1.50	77.08	8.43	10.38	1.04	1.89	472	0.37	229
			EOH = 200.25 m	80412	130.13	131.63	1.50	77.44	8.60	10.65	0.89	1.67	570	0.23	236

DIAMOND DRILL LOG

Company:	*GRAYMONT WESTERN CANADA INC.*							
Project:	*Folding Mountain 2013*						**Hole No:**	*FM13-02*
Dip Tests		**Claim:**	*9304050869*	**UTM Co-ordinates (NAD83)**		**Date Started:** *Jan. 18/13*	**Core Size:**	*NQ*
Depth	Angle	**Bearing:**	*041°*	**Easting (m):**	*447217.3*	**Date Finished:** *Jan. 22/13*	**Casing:**	*3.05 m*
84	*63.6°*	**Inclination:**	*-65°*	**Northing (m):**	*5899717.7*	**Date Logged:** *Jan. 29/13*	**Total Depth:**	*198.12 m*
145	*64.3°*	**Province:**	*AB*	**Elevation (m):**	*1132.4*	**Logged By:** *K. Krueger*		

From m	To m	Tkns m	Description	Sample #	From m	To m	Length m	$CaCO_3$ %	$MgCO_3$ %	SiO_2 %	Fe_2O_3 %	Al_2O_3 %	SrO ppm	S %	MnO ppm
0.00	3.05	3.05	CASING: Overburden												
3.05	15.52	12.47	SILTSTONE (Sulphur Mountain)	80413	14.02	15.52	1.50	15.60	10.48	35.97	1.29	4.01	79	0.49	3715
			medium-grey to medium-brown (oxidized?), vfg, overall calcite: <2% present as rare												
			veinlets, moderately bedded, b. ~55° to CA, minor isolated carbonaceous stringers,												
			hard, competent, no reaction with HCl												
			11.55-12.12: strong oxide alteration, strongly fractured												
			lower contact is sharp												
15.52	37.35	21.83	WEAKLY CALCAREOUS SHALE (Sulphur Mountain)	80414	15.52	17.02	1.50	12.67	6.80	40.49	1.47	2.99	72	0.45	2189
			medium-grey to light tan-brown (oxidized?), vfg, well-bedded (shaley), b. ~70° to CA,												
			very weak to weak reaction (in lighter colored beds), weaker reaction in top 5 m												
			36.71-36.85: orange-brown clay (fault?)												
			lower contact is sharp, stylolitic												
37.35	129.97	92.62	SILICIFIED DOLOMITIC MUDSTONE (Sulphur Mountain)	80415	128.47	129.97	1.50	47.94	37.43	8.99	1.56	1.90	57	0.19	325
			light-grey to light brown, micritic to vfg, overall dolomite: ~20-30% mottled and finely												
			disseminated throughout, overall calcite: <5% in veinlets and rare vugs, moderately												
			bedded, locally silicified, locally strongly vuggy (open, rusty and calcite-filled), local												
			carbonaceous stringers and along fractures, highly fractured, competent, hard, local												
			graphitic stylolites, minor oxide alteration along fractures, powder fizz reaction												
			39.99-40.03, 45.39-47.85, 57.83-57.86, 61.30-64.43, 81.38-81.49, 92.82-92.84:												
			orange clay (fault zone?), strongly fractured												
			42.70: large black chert nodule (7 cm diam.)												
			54.03: large calcite-filled vug (4 cm diam.)												
			66.26: small pyrite nodules (< 1 cm)												
			100.88: pyrite-filled stylolite												
			108.15-108.25, 123.64-124.72: highly fractured intervals												
			lower contact is gradational												
129.97	150.11	20.14	DOLOMITIC MUDSTONE (Turner Valley)	80416	129.97	131.47	1.50	62.77	28.64	7.42	0.42	0.28	91	0.05	205
			light-grey to tan (dark-brown etched), top 5 m is medium-grey limey interval, vfg to	80417	131.47	132.97	1.50	78.26	21.00	0.49	0.44	0.04	136	0.02	247
			mg, shell fragments, crinoid ossicles, colonial corals, overall dolomite: 30-60%	80418	132.97	134.77	1.80	58.74	39.50	1.16	0.12	0.26	75	0.00	137
			in mottles and finely disseminated throughout, overall calcite: <5% infilling vugs,	80419	134.77	135.97	1.20	54.61	45.69	0.43	0.09	0.05	66	0.00	212
			moderately-bedded, competent, moderately vuggy (open and calcite-filled)	80420	135.97	137.47	1.50	54.15	45.15	0.78	0.11	0.09	63	0.00	284
			139.87: large open vug (~4 cm diam.)	80421	148.61	150.11	1.50	47.89	35.10	13.51	0.55	1.93	64	0.16	207
			143.96: large rare colonial coral (~9 cm), locally fossiliferous												
			149.66-149.71: large rare calcite-filled vug												
			lower contact is sharp												

DIAMOND DRILL LOG

Company: *GRAYMONT WESTERN CANADA INC.*

Project: *Folding Mountain 2013* **HOLE No:** *FM13-02*

From m	To m	Tkns m	Description	Sample #	From m	To m	Length m	$CaCO_3$ %	$MgCO_3$ %	SiO_2 %	Fe_2O_3 %	Al_2O_3 %	SrO ppm	S %	MnO ppm
150.11	169.85	19.74	LIME MUDSTONE TO WACKESTONE (Pekisko)	80422	150.11	151.61	1.50	62.82	26.48	8.16	0.67	1.52	173	0.20	152
			light-grey to dark-grey, micritic to cg, rugose corals, shell fragments and crinoid	80423	151.61	153.11	1.50	88.56	5.04	4.08	0.55	1.08	361	0.28	97
			ossicles, overall calcite: <5% present in vugs and rare veinlets, well bedded to	80424	153.11	154.61	1.50	89.42	6.30	4.60	0.18	0.25	377	0.17	65
			moderately bedded, b. ~77° to CA, weakly stylolitic throughout, rare oxide alteration	80425	154.61	156.11	1.50	83.80	11.99	2.91	0.39	0.69	249	0.21	97
			along fractures, locally dolomitic, competent, moderate to strong reaction with HCl	80426	156.11	157.61	1.50	82.73	15.48	1.45	0.23	0.20	199	0.07	66
			160.37: large rare fossil (coral?) (3 cm diam.)	80427	157.61	159.11	1.50	78.60	20.08	1.28	0.19	0.23	229	0.08	72
			161.10: large black chert nodule (3 cm diam.)	80428	159.11	160.61	1.50	73.48	22.28	3.13	0.24	0.40	195	0.18	80
			168.25: fault zone (missing core)	80429	160.61	162.11	1.50	65.75	27.68	6.02	0.29	0.51	130	0.08	87
				80430	162.11	163.61	1.50	74.98	15.44	8.89	0.26	0.33	223	0.16	64
				80431	163.61	165.11	1.50	87.29	1.44	9.38	0.40	0.55	258	0.34	67
				80432	165.11	166.61	1.50	88.15	9.06	2.38	0.13	0.12	247	0.11	52
				80433	166.61	167.30	0.69	81.10	16.97	1.40	0.19	0.33	272	0.08	68
				80434	168.25	169.85	1.60	69.20	27.78	2.21	0.23	0.50	175	0.12	73
			lower contact is gradational												
169.85	198.12	28.27	INTERBEDDED DOLOMITIC LIME MUDSTONE (50%) w/ ARGILLACEOUS	80435	169.85	171.00	1.15	60.06	35.79	3.13	0.26	0.65	207	0.09	81
			DOLOMITIC MUDSTONE (50%) (Banff)	80436	171.00	172.82	1.82	61.43	36.88	1.42	0.20	0.21	220	0.02	83
			Dolomitic Lime Mudstone: medium-grey to light-brown grey, vfg, overall dolomite:												
			30-50% in mottles and finely disseminated, overall calcite: <5% in rare vugs and												
			veinlets, well bedded, locally fossiliferous (bioclasts include shell fragments and												
			crinoid ossicles), competent, moderate to locally strong reaction with HCl												
			Argillaceous Dolomitic Mudstone: dark-grey to very dark-grey, vfg, well to moderately												
			bedded, b. ~75° to CA, local carbonaceous stringers, hard, powder fizz												
			reaction with HCl												
			171.00: fault zone (missing core)												
			172.56-172.82: highly fractured, moderately vuggy												
			173.72-174.34: clay-rich, argillaceous												
			175.75-176.65, 185.18-185.50, 186.50-187.90, 197.21-197.57: highly brecciated,												
			clay-rich, argillaceous												
			EOH = 198.12 m												

DIAMOND DRILL LOG

Company:	*GRAYMONT WESTERN CANADA INC.*							
Project:	*Folding Mountain 2013*						**Hole No:**	*FM13-03*
Dip Tests		**Claim:**	*9304050869*	**UTM Co-ordinates (NAD83)**		**Date Started:** *Jan. 22/13*	**Core Size:**	*NQ*
Depth / Angle		**Bearing:**	*050°*	**Easting (m):**	*447359.5*	**Date Finished:** *Jan. 25/13*	**Casing:**	*15.24 m*
93 / *60°*		**Inclination:**	*-60°*	**Northing (m):**	*5900113.7*	**Date Logged:** *Feb. 1/13*	**Total Depth:**	*200.25 m*
163.7 / *52.7°*		**Province:**	*AB*	**Elevation (m):**	*1160.65*	**Logged By:** *K. Krueger*		

From m	To m	Tkns m	Description	Sample #	From m	To m	Length m	$CaCO_3$ %	$MgCO_3$ %	SiO_2 %	Fe_2O_3 %	Al_2O_3 %	SrO ppm	S %	MnO ppm
0.00	15.24	15.24	CASING: Overburden												
15.24	28.40	13.16	CALCAREOUS DOLOMITIC MUDSTONE TO DOLOMITIC LIME MUDSTONE TO	76722	15.24	16.74	1.50	85.63	8.35	5.06	0.25	0.47	323	0.03	119
			WACKESTONE (Upper Palliser)	76723	16.74	18.24	1.50	66.39	30.69	1.79	0.17	0.36	369	0.01	69
			light-grey to medium-grey to light-brown tan (dark-brown to black etched), fg to mg,	76724	18.24	19.74	1.50	73.43	24.33	1.82	0.19	0.40	361	0.05	58
			shell fragments, overall dolomite: ~20-40% in mottles and disseminated, strongly	76725	19.74	21.24	1.50	73.30	23.12	2.79	0.24	0.63	356	0.03	75
			dolomitic in isolated intervals, overall calcite: <5% present in veinlets, well to	76726	21.24	22.74	1.50	74.55	22.99	1.95	0.14	0.26	318	0.05	51
			moderately bedded, b. 89° to CA, minor calcite veins, locally vuggy (small vugs),	76727	22.74	24.24	1.50	78.60	19.14	1.74	0.10	0.16	405	0.05	36
			locally brecciated, minor oxide alteration along rare fractures, weakly stylolitic	76728	24.24	25.40	1.16	81.99	16.72	1.28	0.09	0.13	384	0.02	40
			throughout, competent, weak reaction with HCl	80437	25.40	26.90	1.50	93.10	5.65	1.16	0.08	0.14	405	0.06	25
			15.24-15.63: broken up from drill, rounded pebbles and cobbles	80438	26.90	28.40	1.50	94.70	3.54	1.21	0.09	0.16	364	0.05	25
			21.12: fault zone (missing core)												
			lower contact is gradational												
28.40	37.59	9.19	INTERBEDDED LIME MUDSTONE TO PACKSTONE w/ DOLOMITIC MUDSTONE	80439	28.40	29.90	1.50	96.45	1.53	1.41	0.08	0.21	375	0.05	22
			(Upper Palliser)	80440	29.90	31.40	1.50	95.17	2.62	1.65	0.16	0.28	379	0.09	25
			light-grey to medium-grey, micritic to fg, colonial corals, rugose corals, crinoid	80441	31.40	32.90	1.50	95.86	1.53	1.84	0.11	0.28	395	0.12	33
			ossicles, shell fragments, overall dolomite: 50-80% in dolo mdst, overall calcite:	80442	32.90	34.40	1.50	96.75	1.88	1.16	0.10	0.21	431	0.15	32
			<5% present in rare vugs and veinlets, locally vuggy, packstone is very poorly sorted,	80443	34.40	35.90	1.50	93.97	4.96	0.73	0.08	0.10	501	0.08	28
			interbeds are rarely thicker than 7 cm, weak HCl reaction in dolomitic interbeds,	80444	35.90	37.59	1.69	84.69	6.44	8.77	0.15	0.05	347	0.12	38
			strong HCl reaction in lime mudstone interbeds												
			32.60-34.70: fossiliferous interval												
			lower contact is gradational												
37.59	47.85	10.26	LIME MUDSTONE TO WACKESTONE (Upper Palliser)	80445	37.59	39.09	1.50	90.83	1.49	7.34	0.05	0.04	429	0.05	32
			light-grey to medium-grey, micritic to cg, shell fragments, colonial corals, rugose	80446	39.09	40.59	1.50	97.88	1.03	0.74	0.13	0.12	601	0.06	49
			corals, overall calcite: <5% present in rare veinlets, well to moderately bedded,	80447	40.59	42.09	1.50	92.83	1.03	5.43	0.28	0.33	404	0.18	55
			weakly stylolitic, strong reaction with HCl	80448	42.09	43.59	1.50	86.35	0.90	13.24	0.07	0.07	286	0.02	40
			41.76-41.81: rare rugose coral beds (5 cm thick)	80449	43.59	45.09	1.50	97.88	1.15	0.71	0.08	0.05	383	0.05	47
			41.86: large open vug (3 cm diam.)	80450	45.09	46.59	1.50	97.22	1.72	0.63	0.09	0.07	398	0.06	51
				76701	46.59	47.85	1.26	89.67	2.74	6.16	0.39	0.84	449	0.26	61
			lower contact is sharp												
47.85	200.25	152.40	INTERBEDDED LIME MUDSTONE TO PACKSTONE w/ CALCAREOUS DOLOMITIC	76702	47.85	49.35	1.50	34.09	26.90	21.29	1.95	5.03	175	1.13	295
			MUDSTONE TO DOLOMITIC LIME MUDSTONE (Lower Palliser)	76703	49.35	50.85	1.50	46.98	32.89	13.53	1.25	2.84	495	0.67	277
			Lime Mudstone to Packstone: light-grey to dark-grey, micritic to cg, shell fragments,	76704	50.85	52.35	1.50	37.03	27.91	20.05	1.71	4.09	232	0.95	299
			crinoid ossicles, crinoid stems and brachiopods, overall calcite: <5% present in rare vugs	76705	52.35	53.85	1.50	66.02	19.75	9.21	0.77	1.76	4820	0.58	222
			and veinlets, overall silica: 5% present as chert nodules, well to moderately bedded,												
			b. ~80° to CA, locally vuggy, local wavy bedding, wackestone and packstone are												
			poorly sorted, moderate to strong reaction with HCl												

DIAMOND DRILL LOG

Company: *GRAYMONT WESTERN CANADA INC.*

Project: *Folding Mountain 2013* **HOLE No:** *FM13-03*

From m	To m	Tkns m	Description	Sample #	From m	To m	Length m	$CaCO_3$ %	$MgCO_3$ %	SiO_2 %	Fe_2O_3 %	Al_2O_3 %	SrO ppm	S %	MnO ppm
			Dolomitic Mudstone: light-grey to medium tan-brown to dark-grey, overall dolomite: ~30-70% present as mottles, bands and finely disseminated, well to moderately bedded, soft sediment deformation (mottles?) throughout (flame structures? pillows?), moderately stylolitic, competent, locally siliceous, powder fizz with rare weak reaction with HCl												
			47.85-52.51, 54.15-64.78: dolomitic mudstone												
			52.51-54.15, 64.78-77.95: lime mudstone to packstone												
			77.95: below this point, interbedded more finely (cm-scale), well-bedded and increasingly more fossiliferous												
			52.51, 64.84: large rare calcite-filled vugs (3 cm diam.)												
			83.82-84.12, 86.00-86.18, 87.08-87.43, 88.29-88.51, 90.18-91.16: crinoidal grainstone very strong reaction with HCl												
			87.00-87.04: large grey chert nodule (4 cm diam.)												
			127.72: below this point, mostly lime mudstone, no more wackestone or packstone interbeds, less grainy												
			131.23: large black chert nodule (3 cm diam.)												
			140.46: thick calcite vein (3 cm diam.)												
			157.10, 157.60, 191.00: large calcite-filled vug (3 cm diam.)												
			184.50: interbeds get progressively finer, mudstones are dark-grey to very dark-grey												
			EOH = 200.25 m												

DIAMOND DRILL LOG

Company:	*GRAYMONT WESTERN CANADA INC.*						
Project:	*Folding Mountain 2013*					**Hole No:**	*FM13-04*
Dip Tests	**Claim:**	*9304050869*	**UTM Co-ordinates (NAD83)**		**Date Started:** *Jan. 25/13*	**Core Size:**	*NQ*
Depth / Angle	**Bearing:**	*050°*	**Easting (m):**	*447185.5*	**Date Finished:** *Jan. 27/13*	**Casing:**	*6.71 m*
	Inclination:	*-60°*	**Northing (m):**	*5899973.5*	**Date Logged:** *Feb. 6/13*	**Total Depth:**	*88.09 m*
	Province:	*AB*	**Elevation (m):**	*1152.95*	**Logged By:** *K. Krueger*		

From m	To m	Tkns m	Description	Sample #	From m	To m	Length m	$CaCO_3$ %	$MgCO_3$ %	SiO_2 %	Fe_2O_3 %	Al_2O_3 %	SrO ppm	S %	MnO ppm
0.00	6.71	6.71	CASING: Overburden												
6.71	51.95	45.24	DOLOMITIC MUDSTONE TO CALCAREOUS DOLOMITIC MUDSTONE (Turner Valley)	76706	48.95	50.45	1.50	50.42	36.71	9.16	0.62	1.80	80	0.07	268
			light-brown to medium-grey with dark-grey last 2 m, cryptocrystalline to vfg, overall	76707	50.45	51.95	1.50	48.47	36.46	11.14	0.75	1.93	64	0.16	282
			dolomite: 20-60% present as mottles and finetly disseminated throughout, overall calcite:												
			<5% present in veinlets and infiling vugs, shell fragments, crinoid ossicles and rare												
			rugose corals, mod. bedded, well bedded near top and bottom of interval, b. 78° to CA,												
			locally vuggy, weak to strongly fractured, minor oxide alteration along fractures, locally												
			siliceous (hard), locally limey, local rare stylolites, weak to moderate reaction with HCl												
			11.35-14.75: Calcareous dolomitic mdst (moderate reaction with HCl)												
			14.71-14.74: large open vug (3 cm diam.)												
			20.99-21.11: highly fractured												
			24.30: orange-brown clay (fault?)												
			26.83: large calcite-filled vug (3 cm diam.)												
			29.85-34.50: moderate to highly fractured, clay infilling fractures, fossiliferous												
			33.90: large rare colonial coral bed (~4 cm thick)												
			37.90: large rare rugose coral (2 cm diam.)												
			38.74-41.78: Calcareous dolomitic mdst, with crinoid ossicles and shell fragments												
			43.41-48.59: large rare rugose corals (3 cm diam.)												
			44.81-47.85: highly fractured, broken with clay infilling fractures												
			lower contact is sharp, beginning of highly fractured interval												
51.95	69.95	18.00	LIME MUDSTONE TO WACKESTONE (Pekisko)	76708	51.95	53.45	1.50	62.38	26.00	8.64	0.72	1.53	177	0.05	180
			medium-grey to very dark-grey (locally dark-brown), micritic to cg, overall calcite: <5%	76709	53.45	54.95	1.50	93.81	3.66	1.76	0.28	0.44	411	0.10	72
			present in veinlets and vugs, brachiopods, colonial corals, rugose corals, shell fragments,	76710	54.95	56.45	1.50	91.22	4.87	3.39	0.20	0.24	399	0.13	67
			well to moderately bedded, locally stylolitic, wackestone is very poorly sorted, locally	76711	56.45	57.95	1.50	84.76	11.82	2.02	0.27	0.41	268	0.08	79
			vuggy, few large 3 cm open vugs, rugose corals between 6-10 cm, competent overall,	76712	57.95	59.45	1.50	85.46	12.82	1.02	0.18	0.17	270	0.04	60
			locally dolomitic, minor calcite veining throughout	76713	59.45	60.95	1.50	91.77	5.61	1.65	0.28	0.39	372	0.09	66
			51.95-52.15: highly fractured zone	76714	60.95	62.45	1.50	76.69	17.55	4.16	0.80	0.40	233	0.09	128
			52.15-53.07, 63.09-63.90: dolomitized, ~30-70% from etching	76715	62.45	63.95	1.50	59.45	28.24	7.38	0.77	1.87	170	0.36	107
			54.50-54.53, 54.60-54.69, 57.11-57.15, 65.48-65.51: intense oxide alteration	76716	63.95	65.45	1.50	88.06	2.95	5.74	0.86	1.13	268	0.76	110
			60.90-66.70: large rugose and colonial corals (3-12 cm)	76717	65.45	66.95	1.50	86.49	4.16	6.70	1.82	0.10	270	0.09	244
				76718	66.95	68.45	1.50	85.42	12.28	2.02	0.24	0.27	289	0.15	64
			lower contact is gradational	76719	68.45	69.95	1.50	82.31	15.52	1.78	0.24	0.24	303	0.16	64
69.95	75.12	5.17	DOLOMITIC MUDSTONE TO DOLOMITIC LIME MUDSTONE (Banff)												
			light-brown grey to medium grey, cryptocrystalline to vfg, overall dolomite: ~40-50%												
			present as finely disseminated, overall calcite: <5% in vugs and rare veinlets, well to												
			moderately bedded, b. ~86° to CA, weak to moderately fractured, rare stylolites,												
			locally vuggy, competent, very weak to moderate reaction with HCl												
			71.32-71.38: clay-rich zone (fault?)												
			72.54-72.69: large rare colonial coral bed (14 cm thick)												

DIAMOND DRILL LOG

Company: *GRAYMONT WESTERN CANADA INC.*

Project: *Folding Mountain 2013* **HOLE No:** *FM13-04*

From m	To m	Tkns m	Description	Sample #	From m	To m	Length m	$CaCO_3$ %	$MgCO_3$ %	SiO_2 %	Fe_2O_3 %	Al_2O_3 %	SrO ppm	S %	MnO ppm
			73.10: large calcite-filled vug (2 cm diam.)												
			73.50-73.70: strongly vuggy (open)												
			lower contact is sharp, beginning of argillaceous zone												
75.12	88.09	12.97	ARGILLACEOUS DOLOMITIC LIME MUDSTONE TO DOLOMITIC MUDSTONE (Banff)												
			medium-brown to very dark-grey, micritic to vfg, overall dolomite: 50-60% present as bands, finely disseminated and mottles, overall calcite: <5% present in veinlets, increased amount of calcite veins near bottom, well-bedded, locally vuggy (open), local oxide alteration, locally brecciated, local carbonaceous stringers, dolomite content decrease with depth, very weak (powder fizz) to strong reaction with HCl												
			76.11: fault, clay-rich zone												
			78.33: fault												
			80.30-80.61: black, carbonaceous, good reaction with HCl												
			81.38-84.77: argillaceous dolomitic lime mdst												
			82.30-88.09: highly broken, fractured, clay-rich zone												
			87.22-87.30: rare colonial coral bed (8 cm thick)												
			EOH = 88.09 m												

DIAMOND DRILL LOG

Company:	*GRAYMONT WESTERN CANADA INC.*						
Project:	*Folding Mountain 2013*					**Hole No:**	*FM13-05*
Dip Tests	**Claim:**	*9304050869*	**UTM Co-ordinates (NAD83)**		**Date Started:** *Jan. 27/13*	**Core Size:**	*NQ*
Depth / Angle	**Bearing:**	*047°*	**Easting (m):**	*447252.4*	**Date Finished:** *Jan. 30/13*	**Casing:**	*10.36 m*
	Inclination:	*-60°*	**Northing (m):**	*5900028.0*	**Date Logged:** *Feb. 5/13*	**Total Depth:**	*81.69 m*
	Province:	*AB*	**Elevation (m):**	*1143.47*	**Logged By:** *K. Krueger*		

From m	To m	Tkns m	Description	Sample #	From m	To m	Length m	$CaCO_3$ %	$MgCO_3$ %	SiO_2 %	Fe_2O_3 %	Al_2O_3 %	SrO ppm	S %	MnO ppm
0.00	10.36	10.36	CASING: Overburden												
10.36	23.70	13.34	CALCAREOUS DOLOMITIC MUDSTONE TO DOLOMITIC LIME MUDSTONE (Banff)												
			light-grey to medium-grey, vfg to cg, overall dolomite: 40-70% present as finely												
			disseminated and banded, overall calcite: <5% present in vugs, well to moderately												
			bedded, b. ~90° to CA, moderate to strongly fractured, clay infilling fractures, locally												
			argillaceous, locally brecciated and vuggy, shell fragments, bivalves, rugose corals,												
			crinoid ossicles, moderate to strong reaction with HCl												
			11.28-17.37: argillaceous interval												
			13.53-13.62: strong oxide alteration (rusty-orange), weaker reaction with HCl												
			lower contact is sharp, beginning of clay-rich interval												
23.70	38.16	14.46	ARGILLACEOUS SILTY DOLOMITIC MUDSTONE (Banff)												
			light-grey to medium brown, vfg, overall dolomite: 20-30% finely disseminated, overall												
			calcite: <5% in rare veinlets and vugs, well to moderately bedded, local vugs, weak to												
			strongly fractured, clay infilling fractures, oxide alteration in rare vugs, local graphitic												
			stylolites, locally brecciated with fine dolomite matrix, moderate reaction with HCl												
			28.90-29.46: black, argillaceous, carbonaceous mudstone/shale (no HCl reaction)												
			31.09-31.16: rare large colonial coral (~3 cm)												
			lower contact is sharp, beginning of clay-rich interval												
38.16	51.57	13.41	CALCAREOUS DOLOMITIC MUDSTONE TO DOLOMITIC LIME MUDSTONE (Banff)												
			medium-grey to tan, overall dolomite: 20-70% banded and finely disseminated,												
			overall calcite: <5% present in veinlets and rare vugs, well to moderately bedded, local												
			graphitic stylolites, locally brecciated, moderately to highly fractured, local open vugs,												
			minor local oxide alteration along fractures, locally carbonaceous black beds, locally												
			argillaceous, moderate reaction with HCl												
			44.81-44.87, 45.92-46.12: orange-brown clay (fault?)												
			46.14-46.40: highly brecciated and fractured												
			48.82: large calcite-filled vug (3 cm diam.)												
51.57	81.69	30.12	ARGILLACEOUS DOLOMITIC LIME MUDSTONE TO WACKESTONE (Banff)												
			medium-grey to dark-grey with local brown beds (staining), overall dolomite: 20-70%												
			present as mottles, bands and disseminated, overall calcite: <5% present in rare												
			veinlets, well to moderately bedded, b. 86° to CA, local oxide alteration along												
			fractures, locally carbonaceous, locally stylolitic, locally vuggy, crinoid ossicles,												
			colonial corals, rugose corals, brachipods, shell fragments, very weak calcite veining,												
			locally shaley, clay increase near end of hole, very weak to strong reaction with HCl												
			55.37-55.99, 58.99-59.87, 72.24-72.50: clay-rich (orange-brown) zone (fault?)												
			57.27-57.50: highly fractured and brecciated												
			59.87-67.10: zone of less argillaceous mudstone to wackestone												

DIAMOND DRILL LOG

Company: *GRAYMONT WESTERN CANADA INC.*

Project: *Folding Mountain 2013* **HOLE No:** *FM13-05*

From m	To m	Tkns m	Description	Sample #	From m	To m	Length m	$CaCO_3$ %	$MgCO_3$ %	SiO_2 %	Fe_2O_3 %	Al_2O_3 %	SrO ppm	S %	MnO ppm
			66.73-67.04: brachipodal packstone interval												
			68.67-69.19, 87.12-87.62: highly brecciated and broken, clay-rich												
			EOH = 81.69 m												

LEGEND

- o **Provincial capital**
- • **Other populated places**
- **Trans-Canada Highway**
- **Major road**
- **International boundary**
- **Provincial boundary**

Scale

km 75 0 75 150 225 km

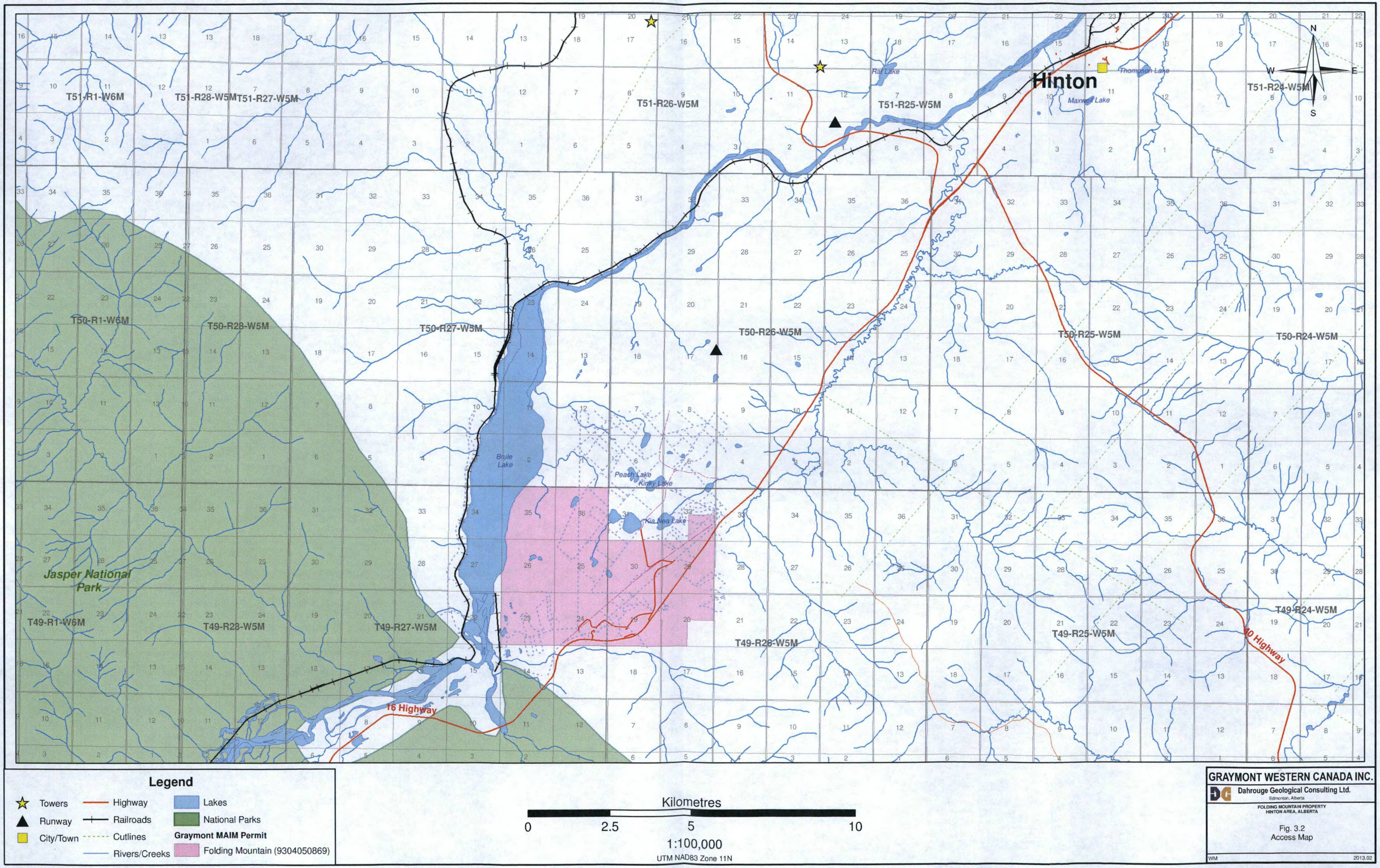
GRAYMONT WESTERN CANADA INC.

Dahrouge Geological Consulting Ltd.
Edmonton, Alberta

FOLDING MOUNTAIN, HINTON AREA, ALBERTA

Fig. 3.1
Location Map

PK 2013.03



GRAYMONT WESTERN CANADA INC.

Dahrouge Geological Consulting Ltd.
Edmonton, Alberta

FOLDING MOUNTAIN PROPERTY
HINTON AREA, ALBERTA

Fig. 3.2
Access Map

WM

2013.02

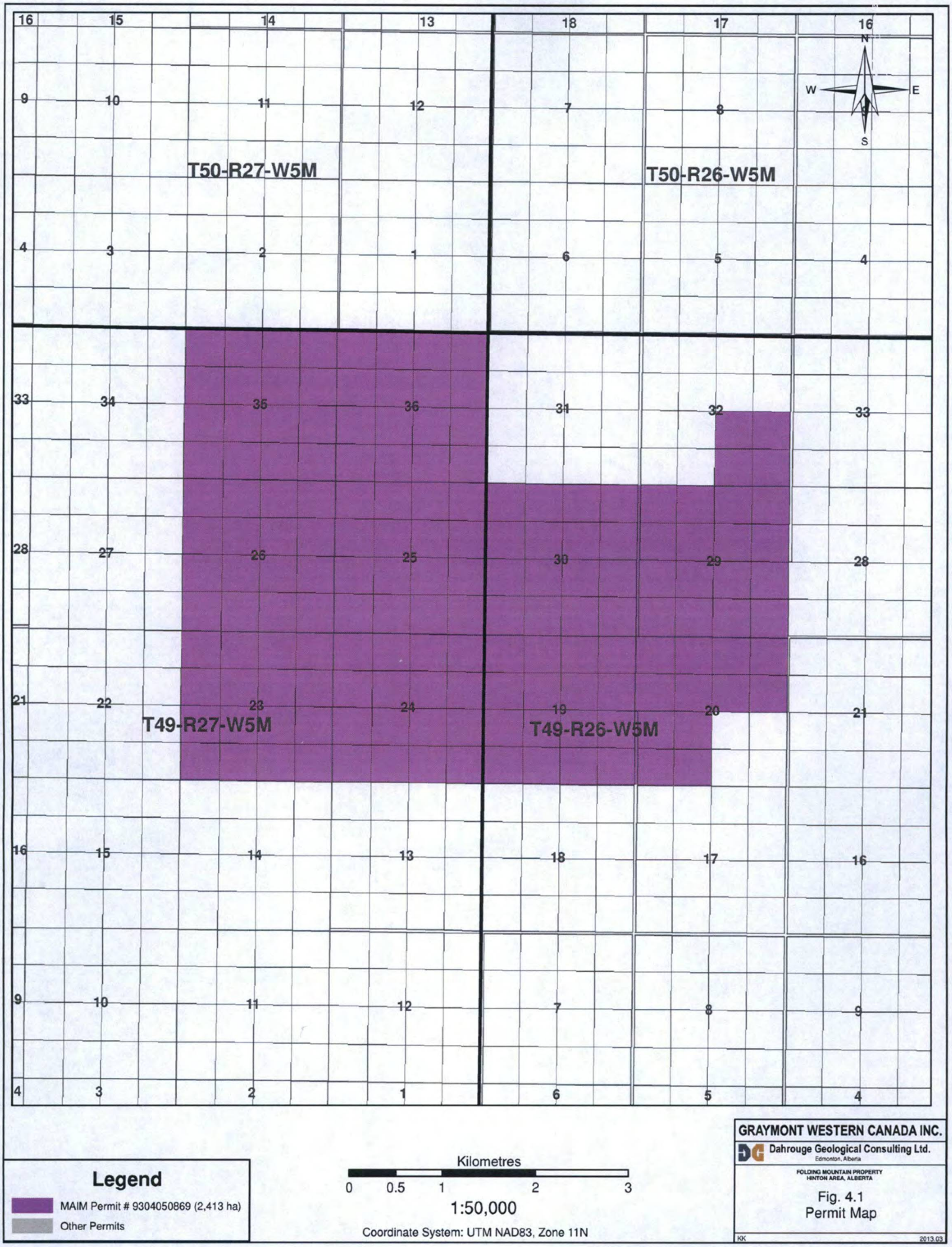


Fig. 4.1
Permit Map

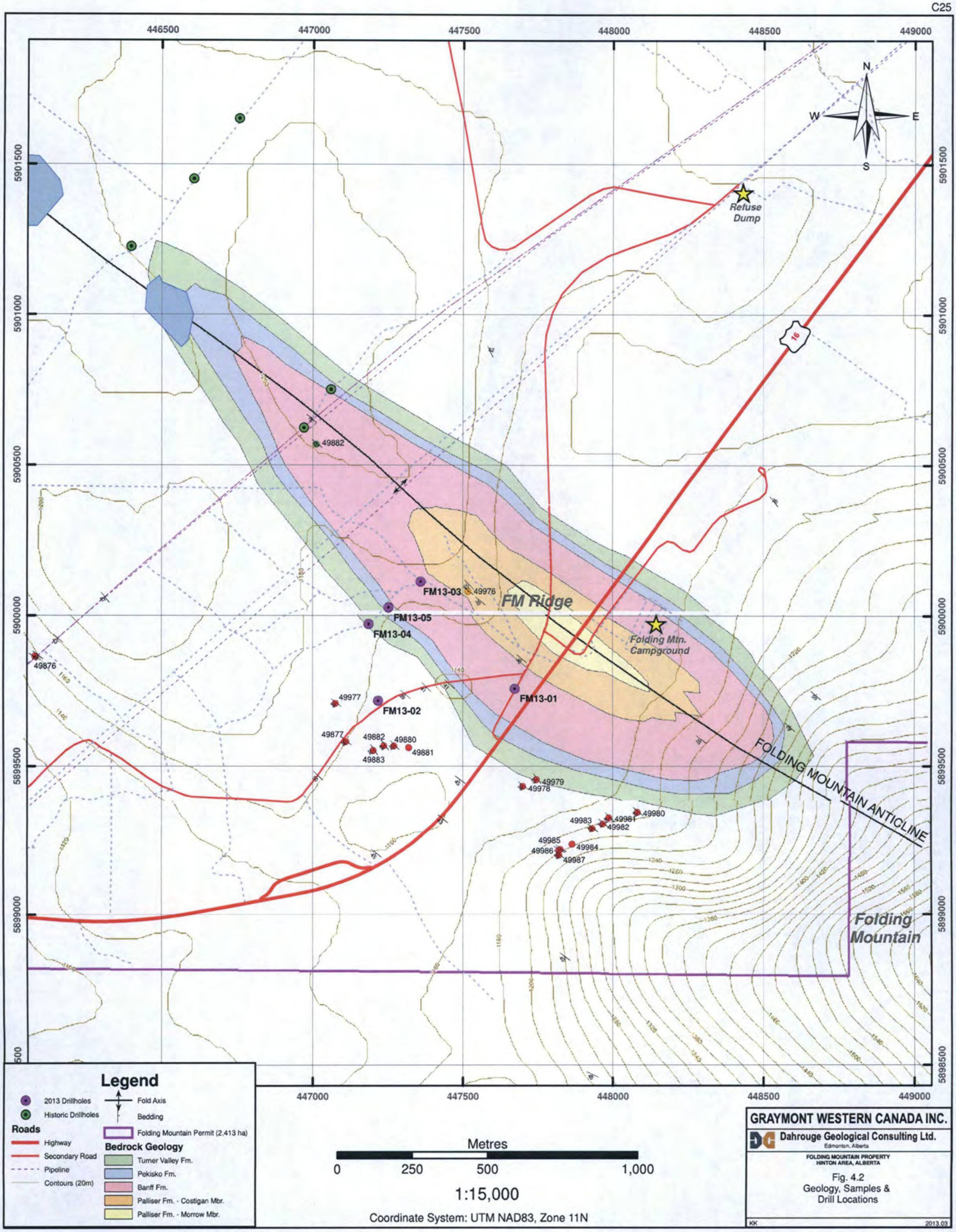


Fig. 4.2
Geology, Samples & Drill Locations