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CONTINENTAL LIME LTD.

EXPLORATION FOR HIGH-CALCIUM LIMESTONE AT CLEARWATER AND LIMESTONE RANGES OF WEST-CENTRAL ALBERTA

Metallic and Industrial Minerals Permits
9396020019 and 9398100125

Geographic Coordinates

51°58' N to 52°15' N
115°15' W to 115°35' W

NTS Sheets 82 O/13, O/14, 83 B/3, B/4 and B/5

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by

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1. SUMMARY

During July and September, 1999 the southern parts of Clearwater Range and Limestone Range, west of Caroline, Alberta and within Metallic and Industrial Minerals permits 9396020019 and 9398100125 were explored for high-calcium limestone. Palaeozoic and Mesozoic carbonate units were examined, measured and sampled at 18 locations and 166 samples were collected and analysed for whole rock constituents and LOI. A total sampled length of approximately 401¼ m was collected from more than 642 m normal thickness of strata examined. This worked was conducted as a follow-up to exploration conducted in 1997, which included the collection of 73 samples from carbonate outcrops at Baseline Ridge, Corkscrew Mountain and Idlewilde Mountain.

The 1997 and 1999 exploration identified an approximately 7-m interval of medium- to coarse-grained calcarenite within the upper part of the Banff Formation. It contained about 97 per cent $CaCO_3$, up to 1½ per cent $MgCO_3$, and up to 1¼ per cent SiO_2. Carbonate units within the Rundle Assemblage generally contain between 55 and 98 per cent $CaCO_3$. Several high-calcium intervals were identified; however their continuity was not definitively established. Two sections within the lower part of the Rundle Formation, along the southwest flank of Limestone Mountain, contained significant thickness of high-calcium limestone.

2. INTRODUCTION

In early 1996 and in the later part of 1998, Continental Lime Ltd. acquired Metallic and Industrial Minerals permits (MAIM) to cover Palaeozoic limestone at two contiguous locations: one on and near Corkscrew Mountain (MAIM permit 9396020019) and one on and near Limestone Mountain (MAIM permit 9398100125). Both are within Foothills of west-central Alberta.

During July and September, 1999 Dahrouge Geological Consulting Ltd. on behalf of Continental Lime Ltd. conducted exploration for high-calcium limestone at Corkscrew Mountain and Marble Mountain of Clearwater Range; and along Limestone Range at Idlewilde Mountain, Limestone Mountain and Simon Ridge. This assessment report describes the exploration of MAIM permits 9396020019 and 9398100125. This report contains analytical data from the 166 samples collected in 1999, as well as geologic observations made while collecting these samples and an interpretation of the results. As a prior report (Pana and Dahrouge, 1998) provides detailed accounts of the 1997 exploration most of that information is not repeated herein. Peter Darbyshire, General Manager of Continental Lime Ltd. authorized this work.

3. GEOGRAPHIC SETTING

Palaeozoic carbonate units were examined at Corkscrew, Idlewilde, Limestone and Marble mountains west of Caroline, Alberta (Fig. 2.1). These Palaeozoic limestones outcrop along two roughly parallel northwest trending ridges, within Clearwater River Basin of the Alberta Foothills. Limestone Range, to the southwest, is about 25 km long and encompasses Limestone Mountain, Idlewilde Mountain, and Simon Ridge. Clearwater Range, to the northeast, encompasses Baseline Ridge, Corkscrew Mountain, Oradea Ridge and Marble Mountain. It extends from Ram River in the north to Teepee Pole Creek in the south, a distance of approximately 45 km.

The area is part of 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, above timberline of alpine foliage. Vegetation in areas of rugged limestone outcroppings is generally sparse. 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.

Throughout this report informal names have been applied to previously unnamed creeks, ridges, and other topographic features to facilitate reference to geographic locations. The north-westerly trending ridge immediately east of Corkscrew Mountain was named Oradea Ridge; the divide between Limestone and Rocky creeks was named Simon Ridge; and an east tributary of Limestone Creek, with headwaters near the main peak of Limestone Mountain, was named Olleren Creek. Two southern tributaries of Clearwater River, south of Limestone Creek were named South Seven Mile Creek and Pine Creek.

4. PROPERTY, EXPLORATION AND EXPENDITURES

4.1 MAIM PERMITS OF CONTINENTAL LIME LTD.

In 1996 and 1998, Continental Lime Ltd. acquired MAIM permits 9396020019 and 9398100125 respectively, west of Caroline Alberta (Fig. 3.1). MAIM permit 9396020019 was acquired to cover Palaeozoic limestone along the southern part of Baseline Ridge and on and near Corkscrew and Idlewilde Mountains, while MAIM permit 9398100125 was acquired to cover Palaeozoic limestone at Limestone and Marble mountains (Fig's. 2.1 and 3.1).

TABLE 4.1 INFORMATION ON MAIM PERMITS 9396020019 AND 9398100125 OF CONTINENTAL LIME LTD. (Fig. 3.1)

Permit	Comm. Date	Expiry Date	Land Description (Tp-RW5)	Size (Ha)
Corkscrew Mountain MAIM Permit 9396020019				
9396020019 (Original)	Feb. 29, 1996	March 1, 1998*	35-9W5 (Sections: 5W,L2; 6SE; 7S,NW,L9,L10; 18SW) 35-10W5 (Sections: 1N; 2NE; 11; 12; 13; 14; 15; 16; 17; 18; 22; 23; 27; 34) 35-11W5 (Sections: 2; 3; 10; 11; 12; 13; 14; 15; 22; 23; 24W; 26W; 27; 28E; 33SE; 34) 36-10W5 (Sections: 3;4;9;10SW;16S,NW;17NE;19NE;20;21SW;29SE)	8,816
9396020019 (Current)	Feb. 29, 1996	Feb. 28, 2000*	35-9W5 (Sections: 5W,L2; 6SE; 7S,NW,L9,L10;18SW) 35-10W5 (Sections: 1N; 2NE; 11; 12; 13; 14;15,L1,L8,L9, L16; 23) 35-11W5 (Sections: 2; 3; 10; 11S,L12,L13; 12S,L13,L14; 13SW, L12,L13; 14E,L11,L13,L14; 15W,SE,L9,L10,L15; 22SW,L2,L7,L12 to 16; 23W,SE,L10,L15; 26SW,L12; 27S,L9 to 12; 28L1, L7, L8)	4,368
9396020019 (Reduced)	Feb. 29, 1996	Feb. 28, 2002	35-9W5 (Sections: 5L5,L6,L12,L13; 6NE,L1,L8; 7SE,L3,L6) 35-10W5 (Sections: 1N; 2NE; 11; 12SW,L2,L7,L11-13; 14S,NWL9,L10, L15; 15L1,L8) 35-11W5 (Sections: 2W,L7,L10,L15,L16; 3; 10SE,L3,L6,L9,L10,L11,L16; 11L4,L5,L12,L13; 12SE,L3,L4,L6,L13,L14; 13L4,L5; 14NE,L1,L8; 15L1, L5-12,L14,L15; 22L2,L3,L5-7,L12-14; 23L2,L3,L6,L7,L11,L13,L14; 26L4,L5; 27SW,L2,L7,L8,L11,L12; 28L1,L7,L8)	2,720
Limestone Mountain MAIM Permit 9398100125				
9398100125 (Current)	Oct. 30, 1998	Oct. 30, 2000 °	34-9W5 (Sections: 3S, NE, L11, L14; 4; 9; 10N, SE, L3, L5, L6; 15SW; 16; 17;19E; 20;21; 29-32 34-10W5 (Sections: 7L8, L9, L16; 8N, SW, L2, L7, L8; 9N, L5 - L8; 16W, L1, L2; 17; 18N, L1, L5-L8; 19; 20; 21W;25NE, L13, L14; 26L13 - L16; 27L13 - L16; 28L4, L5, L12 - L16; 29-31; 32W; 36SE) 35-10W5 (Sections: 6L1 - L3, L8, L9, L13 - L16) 34-11W5 (Sections: 13N; 14L15, L16; 23 - 26; 28N; 33; 34W; 35E; 36) 35-11W5 (Section: 1NW, L9, L15, L16)	8,592
9398100125 (Reduced)	Oct. 30, 1998	Oct. 30, 2002	34-9W5 (Sections: 3L6,L7,L10,L11,L14,L15; 9NE; 10L3,L5,L6,L12,L13; 16SE,NW,L3,L6,L10,L15; 17L6-11,L14,L15; 20NE,L1,L8; 21W; 29SE,NW,L6,L10,L15; 30L10,L14,L15; 31L1-4,L6-10; 32SW,L11,L12) 34-10W5 (Sections: 18L9-11,L14,L15; 19SW,L12,L13; 29S,NW,L9,L10, L15; 30NE,L1,L8,L12,L13; 31SE,NW,L4-6,L9,L10,L15; 32L3-5; 36L1) 34-11W5 (Sections: 13L10, L11, L14, L15; 23NE,L8,L13,L14; 25E,L3,L11, L14, 26SW; 33L15,L16; 34L13,L14; 36E,L3,L4,L6) 35-10W5 (Sections: 6L1-3, L8, L9, L13-16) 35-11W5 (Sections: 1L9,L15,L16)	3,040

* Report deadline is May 28, 2000 plus 30 days.
° Report deadline is January 21, 2001.

Corkscrew Mountain MAIM Permit 9396020019 of Continental Lime Ltd. includes those lands to the northwest of Limeco Quarry on Corkscrew Mountain; most of Oradea Ridge to the east and northeast; and west to Idlewilde Mountain and Simon Ridge (Table 4.1). Limestone Mountain MAIM Permit 9398100125 encompasses Marble Mountain to the east, Limestone Mountain and the southern parts of Simon Ridge. Enclosed within the permit area are two leases of Big Horn Cement Inc. (Fig. 3.1). One is located along Limestone Creek and the other near the south end of Marble Mountain.

The original area of the Corkscrew Mountain MAIM permit totalled 8,816 hectares and included lands along the southern part of Baseline Ridge. Based upon exploration conducted in 1997 this

permit was reduced to 4,368 hectares (Pana and Dahrouge, 1998). Based upon the 1999 exploration this permit will be reduced to 2,720 hectares (Table 4.1; Fig. 3.1). The Limestone Mountain MAIM permit totals 8,592 hectares; however, it will be reduced to 3,040 hectares.

4.2 PRIOR RECONNAISSANCE FOR CONTINENTAL LIME LTD.

Prior exploration of Clearwater Range and Limestone Range by Continental Lime Ltd. began prior to 1988 when Halferdahl & Associates Ltd. investigated several sites in west-central Alberta. After reporting in July 1990 (Halferdahl and Gorham, 1990a) work continued in the fall of 1990 (Halferdahl and Gorham, 1990b). Further examinations were conducted in 1995 (Dahrouge and Halferdahl, 1995). Specific sites included:

Formation	Location
Fernie (Nordegg Member)	Limestone Mountain
Rundle Assemblage	Baseline Ridge and Prairie Creek; Cutoff and Rocky Creeks; Corkscrew Mountain; Marble Mountain; and Limestone Mountain
Banff Formation	Corkscrew Mountain

4.3 1999 EXPLORATION

Some 166 samples were collected in 1999 (Appendices 2 and 3) by chipping outcrops perpendicular to bedding. Where bedding could not be identified, chips were taken in directions appropriate to topography with stratigraphic thickness deduced from other measurements where possible. Samples were collected at locations listed in Table 4.2, over a total stratigraphic thickness of about 401¼ m from an investigated stratigraphic thickness that exceeds 642 m.

The Quality Assurance Laboratory of Continental Lime Inc. at Salt Lake City, Utah analyzed by standard ICP techniques, the 166 samples collected in 1999 (Appendix 2).

TABLE 4.2 LOCATIONS EXAMINED AND SAMPLED IN 1997 AND 1999 (Fig. 5.1)

Section Number	Location	UTM (m) Easting	UTM (m) Northing	Samples	Strat. Thick. (m)	Sampled length (m)
	CLEARWATER RANGE - 1997					
Baseline Ridge						
97-1	Southeastern flank	610557	5773865	2	> 25	2
			Sub-Total (s):	2	>25	2
Corkscrew Mountain						
97-7	West flank of Corkscrew anticline	614580	5761704	4	8	7
97-8	West flank of Corkscrew anticline	614580	5761704	5	7¼	6
97-9	West flank of Corkscrew anticline	615040	5761120	12	35¼	24¾
97-10	West flank of Corkscrew anticline	615500	5760700	18	91	74
			Sub-Total (s):	39	141½	111¾
	LIMESTONE RANGE - 1997					
Idlewilde Mountain						
97-2	Southwestern flank	603050	5764750	6	38	14
97-3	Southwestern flank	-	-	7	29½	19
97-4	Southwestern flank	-	-	3	25	8½
97-5	South Bank of Clearwater River	-	-	12	95½	36
97-6	East limb of Idlewilde Mountain anticline	606410	5761840	4	15¼	12¾
			Sub-Total (s):	32	203¼	54¼
			1997 Total(s):	73	369¾	90¼
	CLEARWATER RANGE - 1999					
Corkscrew Mountain						
99-12	Northwestern slope	615303	5762561	9	30¼	23¼
99-13	South end, east limb of Marble anticline	619455	5759939	11	26¾	26¾
			Sub-Total (s):	20	57	50
Marble Mountain						
99-14	Northern part, east limb of Marble anticline	620515	5757939	1	1½	1½
99-15	Northern part, west limb of the Marble anticline	620348	5755455	5	11½	10
99-16	Moose Creek, east limb of the Marble anticline	622050	5755208	3	6¼	6¼
99-17	Crest of Marble Mountain – southern part, apex of Marble anticline	623106	5752455	8	21½	16¼
99-18	Southern part, along the trunk road, east limb of Marble anticline	624151	5750848	4	147	27½
99-18'	Southern part, along the trunk road, west limb of Marble anticline	623788	5750576	7	66¼	16½
			Sub-Total (s):	28	254	78
	LIMESTONE RANGE -1999					
Limestone Mountain						
99-1	High cliff on west side of Rocky Creek	603455	5759455	11	58¾	46¼
99-2	Cliffs on east side of Rocky Creek, 400 m upstream from Shell gas well	603379	5759061	9	25½	23½
99-3	Simon Creek - north side	604909	5760152	6	19	19
99-4	Simon Creek south side	605136	5759955	5	18	14¾
99-5	100 m south of Simon Peak	605667	5759697	5	11¼	11¼
99-6	Southeast slope of Simon Ridge	604894	5758894	10	30½	26¾
99-7	West side of Limestone Creek	604848	5756667	14	57¼	43¼
99-7'	North side of Limestone Creek	608152	5759818	19	63¼	45
99-8	North side of Limestone Mountain	607939	5755697	3	7¾	7
99-9	North side of Oleren Creek	607545	5755394	21	57½	47
99-10	South side of Oleren Creek	607606	5754606	8	42	42
99-11	East side of Pine Creek	610875	5757178	7	24½	17¼
			Sub-Total (s):	118	~331	~273¼
			1999 Total (s):	166	> 642	401¼

4.4 1999 EXPLORATION EXPENDITURES

MAIM Permits issued under the Alberta Mines and Minerals Act grant the right to explore for metallic and industrial minerals for terms of up to 10 years. Individual permits may not be less than 16 ha nor greater than 9216 ha. Assessment work requirements are $5/ha for the period of years 1 and 2, $10/ha for the period of years 3 and 4, $10/ha for the period of years 5 and 6, $15/ha for the period of years 7 and 8, and $15/ha for the period of years 9 and 10.

During 1999 and 2000, exploration expenditures for MAIM permits 9396020019 and 9398100125 totalled $46,560.24 (Appendix 1). In addition, prior expenditures of $10,372.00 were assigned to MAIM Permit 9396020019 for the assessment period years 3 and 4 (Pana and Dahrouge, 1998). Combined expenditures of $56,932.24 for the two permits are assigned as follows:

Permit	Assessment Period	Expiry Date	Permit Area *	Required Expenditures*	Assigned Expenditures*
9396020019	Years 3 & 4	2000-02-29	2,720	$ 27,200.00	$ 27,200.00
	Years 5 & 6	2002-02-29	2,720	27,200.00	-
9398100125	Years 1 & 2	2000-10-30	3,040	15,200.00	15,200.00
	Years 3 & 4	2002-10-30	3,040	30,400.00	-
				Permits 9396020019 and 9398100125 Expenditures Carried Over:	14,532.24
				Total:	$ 56,932.24

* Based upon the reduced Permit areas of Section 4.1

5. REGIONAL GEOLOGY

Clearwater and Limestone Ranges of the Alberta Foothills, were previously mapped according to NTS map sheets by the following officers of the Geological Survey of Canada:

NTS Map Sheet	Reference
82 O/14 W½ (Limestone Mountain)	Ollerenshaw (1968)
82 O/14 E½ (Marble Mountain)	Ollerenshaw (1965)
83 B/3 W½ (Tay River)	Henderson (1944); (1945a)
83 B/4 E½ (Fall Creek)	Henderson (1945b); (1946)
83 B/5 E½ (Saunders)	Erdman (1950)

At Clearwater and Limestone ranges, carbonate lithologies are known to occur within both Palaeozoic and Mesozoic sequences. Palaeozoic limestones are described in the Upper Devonian Palliser Formation, Upper Devonian to Lower Carboniferous Banff Formation and the Lower Carboniferous Rundle Assemblage. Limited quantities of limestone are produced from the upper part of the Banff Formation and the lower part of the Rundle Assemblage at the Limeco Quarry at the

south end of Corkscrew Mountain. Mesozoic carbonate rocks are known in the Nordegg Member of the Fernie Group.

Only the regional lithostratigraphic relationships of the aforementioned limestone bearing units are discussed herein. Detailed accounts of regional stratigraphy are available in Stott and Aitken (1993), Mossop and Shetsen (1994), Halbertsma (1994), and Richards et al. (1994).

5.1 STRUCTURE

The main structural elements within the region include, from southwest to northeast, McConnell Thrust, Burnt Timber Thrust and Fallentimber Thrust (Fig. 4.1). Displacements on these faults are interpreted to be tens of kilometres to the northeast. Within Clearwater River basin, Fallentimber Thrust is apparent as a series of minor splays that converge several kilometres to the northwest, west of Baseline Ridge. Fallentimber thrust-sheet is divided into three structural units, from southwest to northeast these are: Limestone Mountain Anticlinorium, Bread Creek Synclinorium and Marble Mountain Anticlinorium (Ollerenshaw, 1968). Fold axes within these structures are arranged en echelon and fold profiles vary from symmetrical to asymmetrical, and overturned.

Palaeozoic limestone units are exposed along Limestone Mountain Anticlinorium in the southwest and Marble Mountain Anticlinorium to the northeast.

5.2 STRATIGRAPHY

5.2.1 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 about 180 to 270 m in thickness (Holter, 1976).

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

System or Subsystem	Stratigraphic Unit: Assemblage / Group	Formation		
	S			**N**
Jurassic	Fernie Group			
Lower Carboniferous	Rundle Assemblage	Etherington		
		Mount Head		
		Livingstone [1]	Turner Valley	
			Shunda	
			Pekisko	
	Banff Assemblage	Banff		
		Exshaw		
	Wabamun Group	Palliser [1]		
Upper Devonian	Winterburn Group	Sassenach (Alexo) [2]		
		Southesk	Arcs	
			Grotto	Mount Hawk
			Peechee	
	Fairholme Group°	Cairn		Perdix
				Flume, Maligne
Cambrian		Pika		
		Eldon		
		Stephen		
		Cathedral		

*Compiled from MacKenzie (1969), Mountjoy et al. (1992); Richards et al. (1994); Switzer et al. (1994); and Holter (1994).

° Fairholme Group of MacKenzie (1969) and Mountjoy et al. (1992) is partly equivalent to the Woodbend Group of Switzer et al., 1994.

[1] Current limestone production (Holter, 1994)

[2] Sassenach and Alexo formations are partly equivalent (McLaren and Mountjoy, 1962)

Within Clearwater River basin the Palliser Formation is exposed: within the core of Prairie Creek Anticline at Fall and Prairie Creeks; as limited inlyers along Clearwater River within the core of Marble and Corkscrew anticlines (Fig. 5.1); and as kilometre-long belts within the core of Idlewilde and Limestone anticlines. Ollerenshaw (1968) estimates that the Palliser Formation is about 195 m thick at Limestone Creek. Within the Limestone Mountain area the Palliser Formation is (Ollerenshaw, 1968; p. 10)

> "more recessive and contains a greater proportion of dolomite and less mottled dolomitic limestone than is the case farther south in the Bow River valley."

5.2.2 Banff Formation

At Clearwater and Limestone Ranges, the Banff Formation comprises a heterogeneous association of carbonates and fine-grained siliciclastics deposited on poorly differentiated carbonate platforms. The mostly dolomitic Banff succession of the Alberta Foothills becomes increasingly limy

westward. Within McConnell Thrust Sheet to the southwest the upper part of the Banff Formation includes limestone interbeds up to 10 m thick (Ollerenshaw, 1968; p. 12),

> "The resistant limestones are commonly coarse-grained and crinoidal, light grey-weathering, with a 2- to 6-inch separation and reflect a transition to the carbonate deposition in the overlying Rundle Group."

Limestone interbeds, to 7-m thick, within the upper part of the Banff Formation along Clearwater River (Pana and Dahrouge, 1998), confirm the transition from the open marine sequences of the Banff Formation to the peritidal sequences of the overlying Rundle Assemblage.

On the northwest side of Limestone Mountain the Banff Formation is up to 246 m thick and is represented by thin-bedded, argillaceous and silty limestone, black chert layers, and crinoidal limestone and dolomite. Within the dolomites local mud-cracks indicate shallow-water deposition. The upper Banff Formation grades laterally westward into the overlying Rundle Assemblage (Richards et al., 1994).

5.2.3 Rundle Assemblage

The Rundle Assemblage is subdivided into the transgressive carbonate Rundle Assemblage, and two regressive successions of restricted-marine carbonates and subordinate anhydrite assigned to the Shunda and Turner Valley Formations (Richards et al., 1994). The uppermost part of the Rundle Assemblage is assigned to the Mount Head Formation.

Ollerenshaw (1968) described all four formations of the Rundle Assemblage for Clearwater and Limestone Ranges, but could only separate two map units: the lower one included the Pekisko and Shunda formations and the upper one included the Turner Valley and Mount Head formations.

According to Ollerenshaw (1968) the lowermost Pekisko Formation is up to 61 m thick at Limestone Mountain and is commonly crinoidal, light-grey weathering, cliff-forming limestones separated by recessive dolomitic units. Chert layers may occur throughout the succession.

Within Fallentimber Thrust Sheet the Shunda Formation is an approximately 47¼ m thick sequence of recessive dolomite, dolomite breccia, limestone and minor shaly dolomite (Ollerenshaw, 1968). It is overlain by more than 30 m of light-grey crinoidal limestone and dolomitic limestone of the Turner Valley Formation. The uppermost part of the Rundle Assemblage consists of 37 to 70 m of dolomite, dolomitic limestone, minor chert, sandstone, and limestone assigned to the Mount Head Formation. The uppermost Rundle Assemblage is eroded and unconformably overlain by the Jurassic Fernie Group.

5.2.4. Nordegg Member of the Fernie Group

The Fernie Group includes all but the uppermost Jurassic strata of western Alberta and eastern British Columbia. Although treated as a 'group', the Fernie is divided into a number of members and informal units with uncertain mutual relations and continuity. The Fernie Group thickens gently and

irregularly west and southwest.

Near the base of the Fernie Group, the Nordegg Member consists of a thin radioactive shale-limestone unit, overlain by a massive, light-grey chert and limestone unit (Poulton et al., 1994). The Nordegg Member thins to the west and also to the east, in part due to deposition and in part due to subsequent erosion. Within Clearwater River Basin, the Fernie Group has an estimated thickness of 61 to 76 m. It was subdivided into the Nordegg Member at the base and a collection of units informally designated the "upper members", above (Ollerenshaw, 1968). At Limestone Mountain it is about 27½ m thick and one half mile upstream from the bridge on Clearwater River it reaches 32 m. It consists of three sub-units: the basal unit is 1 m thick soft, medium brown shale and ½ m platy argillaceous siltstone; the middle unit is between 7 to 19 m of black chert with subordinate platy, argillaceous, silty and cherty limestone; while the uppermost unit is between 7 and 7½ m thick and consists of platy, commonly oolitic limestones with minor lenses of chert. The original ooliths are replaced by spherulitic chert (Ollerenshaw, 1968).

6. CORKSCREW MOUNTAIN

Corkscrew Mountain and Oradea Ridge are within the Ram-Clearwater Resource Management Area (Alberta Forestry and Wildlife, 1988). Sensitive regions, defined as "access controlled" or "ecologically significant", are generally absent from the area of interest. Parts of the southwest flank of Corkscrew Mountain along Clearwater River are included within a Critical Wildlife LUZ. The area containing the Limeco Quarry is classified as Industrial, and the area to the north as Multiple Use. Significant portions of the western flank of Oradea Ridge are within a Critical Wildlife LUZ (Fig. 5.1)

In 1997 and 1999 the Palaeozoic Rundle Assemblage was examined and sampled at five locations on the southwest flank of Corkscrew Mountain and at one location near the south end of Oradea Ridge.

6.1 LOCATION AND ACCESS

Corkscrew Mountain is within the central part of the northwest trending Clearwater Range; which includes Baseline Ridge to the north, Oradea Ridge to the east and Marble Mountain to the south (Fig. 2.1). Corkscrew Mountain is about 8½ km long and 3 km wide, and attains a maximum elevation of about 1900 m. Clearwater River, along its western and southern flanks is at about 1290 to 1310 m elevation. The Limeco Quarry of Highwood Resources Ltd. is at the southeast end of Corkscrew Mountain.

Access to Limeco Quarry is from Innisfail on Alberta Highway 2, 70 km westerly on Highway 54 to Caroline, and another 34 km westerly on secondary road 591 and Forestry Trunk Road 40 (Fig. 2.1).

The last 11 km are not paved. A locked gate bars the quarry site and the quarry face is 300 to 400 m from the gate.

From Limeco Quarry, Forestry Trunk Road 40 continues northwest for about 5 km along the southwest flank of Corkscrew Mountain. There it turns westerly and continues on to Idlewilde Mountain. The northern parts of Corkscrew Mountain are about 13 km south of the CNR spur line east of Baseline Ridge. Two potential access routes from the north end of Corkscrew Mountain to the CNR spur line have grades of less than 8 per cent (Fig. 5.2), these routes are about 16½ and 18 km. An existing route is about 36 km long; it starts at the south end of Corkscrew Mountain and continues east on secondary road 591 for about 10 km and continues north along gravel roads to the CNR spur line.

6.2 PRIOR EXPLORATION

In the winter of 1985, Halferdahl (Halferdahl and Gorham, 1990a) sampled strata of the Mississippian Banff Formation exposed at the Limeco Quarry at the south end of Corkscrew Mountain and found them to be too impure for the manufacture of lime. The quarry had supplied stone for riprap at the Dickson Dam and was supplying stone for incorporation into cattle feed at a plant in Rocky Mountain House.

In 1986 Erdmer (*cited* Holter, 1994) estimated extractable reserves of at least 1 Mt in beds at least 45 m thick in the Rundle Assemblage at the Limeco Quarry on Corkscrew Mountain. Samples ranged from 53.45 to 55.04 per cent CaO, 0.68 to 1.24 per cent MgO, 0.49 to 0.98 per cent SiO_2, and ~0.30 per cent R_2O_3. Holter (1990) collected a sample (CSM-89-1) of limestone from the lower part of the Rundle Assemblage at this quarry, but omitted the exact sample location, length, and description. This sample was apparently a follow-up to a sample (WH-88-6) collected by Hamilton in 1988 (Hamilton, 1993). Both samples contain more than 97½ per cent $CaCO_3$.

6.3 STRUCTURE

At Corkscrew Mountain and Oradea Ridge are a series of northwest trending anticlines and synclines, from southwest to northeast: Corkscrew Mountain Anticline, Corkscrew Mountain Syncline, and Marble Mountain Anticline (Ollerenshaw, 1968; Fig. 4.1). The southwest limb of Corkscrew Mountain Anticline is cut by the southwest dipping Corkscrew Mountain Thrust; and its east limb is cut by an east-dipping backthrust (Fig's. 4.1 and 5.1). As unit contacts appear to be only slightly affected, displacements on these thrusts are likely limited to a few tens of meters. The northern termination of Marble Mountain Anticline is approximately 5 km north of Clearwater River at the northwestern end of Oradea Ridge.

Prominent dip-slopes and partial dip-slopes are present along the southwest flank of Corkscrew Mountain, with dips of between 10° to 40° SW. Along the northeastern flank they vary from 25° to 85° NE. The Limeco Quarry, at the south end of Corkscrew Mountain, is developed within a partial dip-slope, of between 30° to 40° SW. In the northern termination of the Marble Mountain anticline, along Oradea Ridge, dips vary from 20° to 80°.

6.4 STRATIGRAPHY AND COMPOSITION OF LIMESTONE

Palaeozoic limestones of the Mississippian Banff Formation and the Rundle Assemblage are exposed on Corkscrew Mountain and Oradea Ridge (Fig. 5.1). The Banff Formation consists of thin-bedded argillaceous and calcareous siltstone, and silty limestone. It is more than 200 m thick. Samples from the Carboniferous Banff Formation exposed at the Limeco Quarry were previously found to be too impure for the manufacture of lime (Section 5.2).

Along the southwest flank of Corkscrew Mountain (Section 97-10) the lower part of the Rundle Assemblage exceeds 65 m (Fig. 5.1; Appendix 3). It is probable that structural complications within the upper parts of the examined section have reproduced stratigraphy, which may hinder correlation. The lowermost limestone unit examined consists of a light-grey, coarse-grained calcarenite between 10 and 15 m thick with between 95¼ and 99 per cent $CaCO_3$, up to 3½ per cent $MgCO_3$, and less than ½ per cent SiO_2 (Table 6.1). Overlying limestone intervals within the Rundle Assemblage are between 4½ to 6¾ m thick, and generally resistant, fine- to medium-grained, dark-grey limestone, with between 92¾ to 98 per cent $CaCO_3$.

TABLE 6.1 **SECTIONS WITH HIGH-CALCIUM LIMESTONE AT CORKSCREW MOUNTAIN AND ORADEA RIDGE** (Fig. 5.1)

Section	Thick. (m)	Quality (%)		
		$CaCO_3$	$MgCO_3$	SiO_2
97-10*	~ 4½	92¾ - 97	1¼ - 6¼	< 1
97-10*	~ 5¾	94 - 95¾	< 3½	½ - 1
97-10*	~ 14¼	97½ - 99	¾ - 1¼	< ¼
99-12	5¾	~ 95	~3¼	< 1
99-12	12¼	~97½	< 1¼	< ½
99-13	~ 6¾	93 - 98	¾ - 5½	~ ½
99-13	> 12	> 97¼	< 1	< ¼

* After Pana and Dahrouge, 1998

7. MARBLE MOUNTAIN

Marble Mountain lies within the Ram-Clearwater Resource Management Area (Alberta Forestry and Wildlife, 1988). Sensitive regions, defined as "access controlled" or "ecologically significant", are generally absent from the area of interest. Parts of Marble Mountain along Clearwater River in the north and parts along Teepee Pole Creek to the south are within Critical Wildlife LUZ's. Approximately $^1/_3$ of the lease of Big Horn Cement Inc., on the southern flank of Marble Mountain, is within a Critical Wildlife LUZ along Teepee Pole Creek (Fig. 5.1).

In 1988, Halferdahl (Halferdahl and Gorham, 1990a) briefly examined Marble Mountain by helicopter. During 1999 the Rundle Assemblage was examined and sampled at six locations along the flanks of Marble Mountain.

7.1 LOCATION AND ACCESS

Marble Mountain is the 10 to 11 km long southeast extension of Clearwater Range south of Clearwater River. Its direct continuation north of Clearwater River is Oradea Ridge. Marble Mountain attains a maximum elevation of approximately 1830 m.

Access to Marble Mountain is from Innisfail on Alberta Highway 2, 70 km westerly on Highway 54 to Caroline, then about 30 km westerly on secondary road 591 to a southerly branch (James River Section) of Forestry Trunk Road 40 (Fig. 2.1). This branch of the Forestry Trunk Road is about 4 km east of Limeco Quarry. It continues southerly and is approximately parallel to Marble Mountain at a distance of about 3 km. Approximately 11 km along a gravel road branches to the west along Teepee Pole Creek and continues beyond the Lease of Big Horn Cement Inc. at the south end of Marble Mountain to a gas installation on its western flank. Several seismic lines passable by either ATV or by foot cross Marble Mountain.

7.2 STRUCTURE

The main structural elements at Marble Mountain, from west to east, include: Corkscrew Mountain Anticline, Corkscrew Mountain Syncline and Marble Mountain Anticline. The northwesterly trending Marble Mountain Anticline exposes Palaeozoic strata on both flanks of Marble Mountain over a distance of about 11 km (Fig. 6.1). Marble Mountain Anticline is approximately symmetrical with dips of between 55° and 70°. Near its south end, at Teepee Pole Creek, dips shallow to between 15° and 40°. Immediately south of Clearwater River and near the headwaters of Moose Creek, Palaeozoic strata are exposed along the axial trace of the Corkscrew Mountain Anticline.

7.3 STRATIGRAPHY AND COMPOSITION OF LIMESTONE

In 1999, the Rundle Assemblage was examined at six locations on Marble Mountain: one on the southwest flank; two on the northeast flank; and three at the south end. Sections 99-16, 99-18 and 99-18' varied in thickness from 5 to 9 m, with between 91¼ and 98½ per cent $CaCO_3$, up to 7¾ per cent $MgCO_3$ and about ½ per cent SiO_2. Sparse exposure prevented detailed examination of the entire Rundle Assemblage; however, at the northwest end of Marble Mountain, approximately 7½ m within its middle to upper parts contain 96½ to 98½ per cent $CaCO_3$ (Section 99-15, Appendix 3). Near the south end of Marble Mountain, an isolated interval within the middle to upper parts of the Rundle Assemblage is up 5½ m thick with about 94 per cent $CaCO_3$ (Section 99-17, Appendix 3).

8. IDLEWILDE MOUNTAIN

Idlewilde Mountain lies within the Ram-Clearwater Resource Management Area (Alberta Forestry and Wildlife, 1988). Sensitive regions, defined as "access controlled" or "ecologically significant", are generally absent from the area of interest. However, significant portions along Clearwater River and Cutoff Creek are within Critical Wildlife LUZ's (Fig. 5.1).

During 1997 (Pana and Dahrouge, 1998) and 1999 Palaeozoic limestones of the Banff Formation and Rundle Assemblage were examined and sampled at Idlewilde Mountain and near Cutoff Creek to the southwest.

8.1 LOCATION AND ACCESS

Idlewilde Mountain and Limestone Mountain form part of the northwest trending Limestone Range, about 10 km west of Corkscrew Mountain. Idlewilde Mountain encompasses those parts north of Clearwater River, for a distance of about 10 km. It reaches a maximum elevation of 1945 m; Clearwater River at its southern end is at about 1360 m elevation.

Access is from the northwest flank of Corkscrew Mountain where Forestry Trunk Road 40 continues west and north along Seven Mile Creek for approximately 10 km to the northwest end of Idlewilde Mountain (Fig. 2.1). Access to Cutoff and Rocky Creeks is via a spur of the Forestry Trunk Road which branches to the west about 4 km from the north end of Corkscrew Mountain. Limestone units along the west side of Clearwater River, opposite Idlewilde Mountain, can be reached along a rough road that continues 2½ km north from Cutoff Creek. The central portions of Idlewilde Mountain are reached via a cut line suitable for ATV, which leads southwesterly from the Forestry Trunk Road. Gas-well service roads provide access to those parts of MAIM Permit 9396020019 south and west of Clearwater River.

The northern parts of Idlewilde Mountain are about 15 km directly southwest of the CNR spur line

east of Baseline Ridge. An existing route via the Forestry Trunk Road to the CNR spur line is about 25 km long.

8.2 STRUCTURE

The main structural elements at and near Idlewilde Mountain from west to east include: the northern terminations of the Limestone Mountain Anticline and Limestone Mountain Syncline at Cutoff Creek and along Clearwater River respectively; and the Idlewilde Mountain Anticline with its axis along the crest of Idlewilde Mountain (Fig. 7.1). The northerly plunging Idlewilde Mountain Anticline is an asymmetrical frontal anticline with dips from 5° to 35°W on the west flank and dips from 65° to 80° E on the east flank (Fig. 7.1). Along the base of its eastern slope is the southwest dipping Pineneedle Thrust.

8.3 STRATIGRAPHY AND COMPOSITION OF LIMESTONE

Along Clearwater River, the Devonian Palliser Formation is exposed within the core of Idlewilde Mountain Anticline. It was not examined in 1997 nor in 1999, and is not discussed further here. The lowest stratigraphic unit examined was within the upper part of the Banff Formation. Along the southwest flank of Idlewilde Mountain, a 7-m interval of medium- to coarse-grained calcarenite within the upper Banff Formation contained 97 to 98 per cent $CaCO_3$, about 1½ per cent $MgCO_3$ and less than 1¼ per cent SiO_2 (Pana and Dahrouge, 1998). It is overlain by more than 17 m of fossiliferous shale (brachiopods and crinoids), calcareous shale and argillaceous limestone.

Along the east limb of Idlewilde Mountain Anticline the Rundle Assemblage is northwest striking and near-vertical to overturned (Fig. 5.1). It extends from Clearwater River to the northwest along the east flank and crest of Idlewilde Mountain. Near the crest of Idlewilde Mountain, dips are shallow to subhorizontal. On the west flank of Idlewilde Mountain the Rundle Assemblage strikes oblique to topography forming partial dip slopes of about 20° to 30° W. Cliff-forming limestone beds of the Banff Formation and the overlying Rundle Assemblage are typically separated by poorly exposed dolomitic and argillaceous limestone (Pana and Dahrouge, 1998). Immediately south of the confluence of Clearwater River and Cutoff Creek Pana and Dahrouge (1998) previously examined and sampled an approximately 100-m section of the Rundle Assemblage. The lower-most parts consist of poor-quality micritic limestone and thin-bedded shale, which are overlain by about 50 m of interbedded crinoidal calcarenite and limestone. Limestone intervals within lower 26½ m of the upper interval contain between 80 to 93 per cent $CaCO_3$. The uppermost Rundle Assemblage is primarily interbedded shaly limestone, calcareous siltstone and dolomitc limestone.

9. LIMESTONE MOUNTAIN AND SIMON RIDGE

Limestone Mountain and Simon Ridge are within Ram-Clearwater Resource Management Area (Alberta Forestry and Wildlife, 1988). Sensitive regions, defined as "access controlled" or "ecologically significant", are generally absent from the area of interest. Parts of Limestone Mountain and Simon Ridge; along Clearwater River, Rocky Creek and Limestone Creek; are within Critical Wildlife LUZ's. Lands along Limestone Creek within 34-11W5 (Sec. 27, 34E, 35W) and 35-11W5 (Sec. 1SW) were withheld from the Limestone Mountain MAIM Permit (9398100125) pending future development as a park, natural area or ecological reserve (Fig. 5.1). Approximately one-half of the lease of Bighorn Cement Inc. along Limestone Creek, on the northern flank of Limestone Mountain, is within the Critical Wildlife LUZ.

During 1999 the Rundle Assemblage was examined at 11 locations at and near Limestone Mountain: one at Rocky Creek, four at Simon Ridge, five at Limestone Mountain and one near the lease of Bighorn Cement Inc. (Fig. 5.1; Appendix 3).

9.1 LOCATION AND ACCESS

Limestone Mountain is south of Clearwater River about 10 km west of Clearwater Range. It consists of a south-easterly trending ridge that is about 12 km long and reaches a maximum elevation of 2230 m. Limestone Creek flows east past its northern end between 1360 and 1460 m elevation.

The northern parts of Limestone Mountain are accessible via the same spur of the Forestry Trunk Road that provides access to the southern parts of Idlewilde Mountain. This improved gravel road branches south from the road along Clearwater River and Cutoff Creek and follows Rocky Creek for about 3 km to a Shell gas well. It provides access to the northwest flank of Simon Ridge.

Access to Limestone Mountain is via the James River Section of the Forestry Trunk Road that parallels the eastern flank of Marble Mountain. About 37 km south along the Forestry Trunk Road and about 9 km past the campground at Wilson Creek, a 29 km long gravel road branches north-westerly along the western flank of Limestone Mountain to a Shell Gas Plant on the west bank of Limestone Creek. About 14 km along this road, from its junction with the Forestry Trunk Road, a second road branches north up the west flank of a long ridge, which culminates at a radio tower on the southern peak of Limestone Mountain. From the radio tower an ATV trail continues northerly for about 3 km to a Forestry Lookout Tower on the main peak of Limestone Mountain. In addition, a network of gravel roads connects numerous wells along the southern and western slopes of Limestone Mountain. A recently constructed bridge across Clearwater River, just downstream from Limestone Creek, provides access to the MAIM lease of Big Horn Cement Inc.

Simon Ridge and the northern parts of Limestone Mountain are about 20 km southwest of the CNR spur line at the Husky Oil Ram River gas plant near Baseline Ridge. An existing route along the Forestry Trunk Road to the north end of Idlewilde Mountain, thence easterly to the CNR spur line is about 50 km long.

9.2 PRIOR EXPLORATION

During 1988 Halferdahl and Gorham (1990a) conducted a brief examination of Limestone Mountain by helicopter. Samples of the Rundle Assemblage were collected from a west-central spur of Limestone Mountain, north of Olleren Creek. Two areas were recommended for additional exploration. The first forms a dip-slope between Limestone Creek and Rocky Creek (Simon Ridge) and the second forms a westerly facing dip-slope on the ridge between Limestone Mountain Thrust and Pineneedle Creek Anticline.

9.3 STRUCTURE

The main structure of Limestone Mountain is Limestone Mountain anticlinorium, which consists of a composite sequence of *en echelon* folds and thrust faults (Fig. 8.1). Palaeozoic and Mesozoic rocks are exposed from west to east by: Limestone Mountain Anticline, Limestone Mountain Syncline and Idlewilde Mountain Anticline. Limestone Mountain is within the western limb of the overturned Limestone Mountain Anticline, with southwest dipping beds of about 35° along its western flank, sub-horizontal at the crest, and near vertical to overturned along its eastern flank (Fig. 8.1).

The northerly plunging Limestone Mountain anticline-syncline pair follows the crest of Simon Ridge. On the west flank of Simon Ridge the Rundle Assemblage forms an extensive, shallow (15° to 25°) west facing partial dip slope and a less extensive partial dip-slope on the northeast flank. Between Limestone Mountain Anticline and Idlewilde Mountain Anticline is the southwest dipping Limestone Mountain Thrust. Near Limestone Creek, Idlewilde Mountain Anticline is approximately symmetrical with its southwest limb cut by Limestone Mountain Thrust.

9.4 STRATIGRAPHY AND COMPOSITION OF LIMESTONE

Palaeozoic limestone within the upper part of the Banff Formation and the Rundle Assemblage; and Mesozoic carbonates of the Nordegg Member of the Fernie Group were examined at Simon Ridge, Limestone Mountain and Rocky Creek during the later part of 1999.

The uppermost few meters of the Banff Formation consist of recessive, buff-weathered interbeds of calcareous shale and dolomitic limestone, with a few thin intervals of micritic limestone or calcarenite. All litho-types contain elevated concentrations of $MgCO_3$ and up to 10 per cent SiO_2.

Within those parts of Limestone Range south of Clearwater River, the Rundle Assemblage includes several intervals of high-calcium limestone. However, continuity and thickness of the individual limestone beds was not established. Two sections (99-9 and 99-10) within the southern part of MAIM Permit 9398100125 contained significant thicknesses of high-calcium limestone (Table 9.1).

TABLE 9.1 **SECTIONS WITH HIGH-CALCIUM LIMESTONE AT LIMESTONE MOUNTAIN**

Location	Thick. (m)	Quality (%)		
		$CaCO_3$	$MgCO_3$	SiO_2
	ROCKY CREEK (West)			
99-1	12.50	97.45	1.69	0.21
99-2	10.75	96.78	2.40	0.25
	SIMON RIDGE (Northwest)			
99-3	6.00	98.24	1.33	0.18
99-4	> 5.25	97.43	1.95	0.16
99-6	> 5.75	97.80	1.57	0.14
99-5	> 9.50	97.80	1.57	0.14
99-6	9.25	96.20	2.89	0.19
	LIMESTONE MOUNTAIN (Northeast)			
99-7'	9.25	96.00	2.56	0.83
99-7'	> 16.25	97.19	1.80	0.43
	LIMESTONE MOUNTAIN (South)			
99-8	> 6.75	95.31	2.87	0.84
99-7	> 4.25	96.29	2.25	0.38
99-9	> 4.50	97.68	1.17	0.28
99-10	5.25	97.91	1.31	0.59
99-7	12.00	97.22	1.77	0.19
99-9	19.75	98.17	0.86	0.22
99-10	21.75	97.31	1.58	0.37
99-11	> 9.25	96.79	2.40	0.33

Along the southwest flank of Limestone Mountain, at sections 99-9 and 99-10, resistant, light-grey to grey, medium- to coarse-grained, crinoidal calcarenites obtain a maximum thickness of about 21¾ m and thin to the north and northwest. Most sections along Simon Ridge were of partial exposures; hence the underlying unit(s) were not ascertained with certainty. As indicated in Table 9.1 some intervals of the Rundle Assemblage are of sufficient quality for the manufacture of high-calcium lime, but in places they may have been dolomitized.

10. CONCLUSIONS

Within MAIM Permits 9396020019 and 9398100125, exposures of the Banff Formation, Rundle Assemblage and Nordegg Member of the Fernie Group were examined at Clearwater Range and at Limestone Range, west of Caroline, Alberta. A total of 166 samples were collected, representing approximately 401¼ m of stratigraphy out of a total investigated thickness of more than 642 m.

Limestone intervals within the upper part of the Banff Formation were examined at three locations. A total of 19 samples were collected from about 50 m normal thickness of strata. Most were of argillaceous or dolomitic limestone; however, along the southwest flank of Idlewilde Mountain a 7-m interval of medium- to coarse-grained calcarenite contained about 97 per cent $CaCO_3$, up to 1½ per cent $MgCO_3$, and up to 1¼ per cent SiO_2 (Pana and Dahrouge, 1998).

Within Clearwater and Limestone Ranges the Rundle Assemblage contains several intervals of high-calcium limestone. The most significant intervals of high-calcium limestone were noted along the southwest flank of Limestone Mountain. Here, high-calcium limestone units of the Rundle Assemblage are up to 21¾ m thick and generally contain between 96 and 98 per cent $CaCO_3$. Continuity of individual beds of limestone were not established. Aberrations in thickness and quality may be due, in part, to local structural complications.

Where sampled, the Nordegg Member of the Fernie Group is primarily argillaceous or cherty dolomite.

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Edmonton, Alberta
2000 06 22

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PROFESSIONAL GEOLOGIST OF ALBERTA
DAHROUGE

17 16 15 14 13 12 11 10 9 8 7 6 5 42 41 40 39 38 37 36 35 34 33

BAPTISTE RIVER
MEDICINE R.
BRAZEAU RANGE
NORDEGG
SASKATCHEWAN RIVER
NORTH RIVER
I.R. 144A
FORESTRY
JOYCE RIVER
TRUNK ROAD
LAKE
ABRAHAM
NORTH RAM RIVER
SIFFLEUR RIVER
RAM RIVER
CLEARWATER RIVER
CRIMSON LAKE PROVINCIAL PARK
ROCKY MOUNTAIN HOUSE
COW LAKE
CEMETERY
Husky Oil Ltd.
RAM River Gas Plant
CLEARWATER RIVER
RAVEN RIVER
CLEARWATER RIVER
RIVER
JAMES RIVER
SUNDRE
DEER R.
RED

30P
31L
32L to 34L
36P
35L

INTERSTONE RANGE

53 22 761 12 11 756 11A 598 752 591 54 584 587 27

PROPERTIES

CORKSCREW, LIMESTONE, AND MARBLE MOUNTAINS

30P - Continental Lime Ltd. (MAIM Permit 9396020019)
31L - Big Horn Cement Inc. (MAIM Lease 9498050001)
32L - Highwood Resources Ltd. (MAIM Lease 9497070001)
33L - Highwood Resources Ltd. (MAIM Lease 9497070002)
34L* - Highwood Resources Ltd. (MAIM Lease 9498040001)
35L - Big Horn Cement Inc. (MAIM Lease 9498010001)
36P° - Continental Lime Ltd. (MAIM Permit 9398100125)

* Locations approximate.
° Lease or Permit application.

LEGEND AND SYMBOLS

Paved highway
Secondary road
Railway
Continental Lime property with number (L - Lease; P - Permit) — 36P
Other property with number (L - Lease; P - Permit) — 12L
Paleozoic limestone-bearing units (location approximate)

CONTINENTAL LIME LTD.

DAHROUGE GEOLOGICAL CONSULTING LTD.
EDMONTON, ALBERTA

WEST-CENTRAL ALBERTA

Fig 2.1 Location Map

0 25 50
WM Scale (km) 2000.04

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N

LEGEND

Corkscrew Mountain Permit

- Original area of MAIM Permit 9396020019 (8816 ha.) Continental Lime Ltd.
- Current area of MAIM Permit 9396020019 (4,400 ha.) Continental Lime Ltd. (Pana and Dahrouge, 1998)
- Reduced area of MAIM Permit 9396020019 (2,720 ha.) Continental Lime Ltd. (This Report)

Limestone Mountain Permit

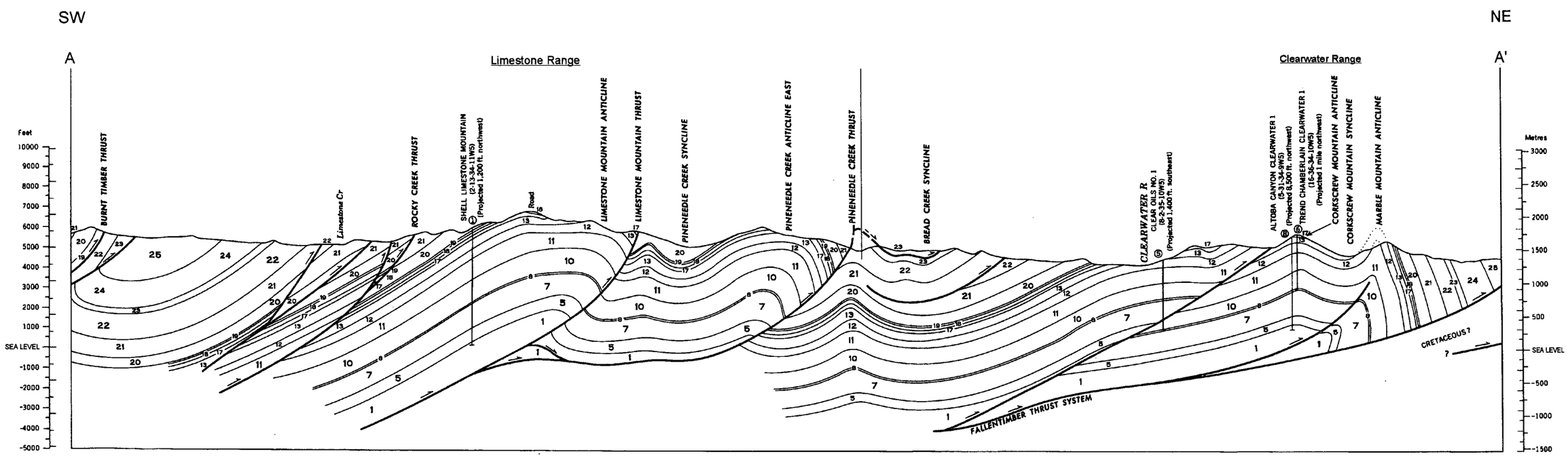
- Original area of MAIM Permit 9398100125 (8,592 ha.) Continental Lime Ltd.
- Reduced area of MAIM Permit 9398100125 (3,040 ha.) Continental Lime Ltd. (this Report)

- Leases of Highwood Resources Ltd.
- Leases of Bighorn Cement Inc.

CONTINENTAL LIME LTD.
Dahrouge Geological Consulting Ltd. Edmonton, Alberta
WEST-CENTRAL ALBERTA
Fig. 3.1 Location of Metallic and Industrial Minerals Permits 9396020019 and 9398100125.
JD 2000.05

Scale 0 1 2 5 10 Kilometers

F2



LEGEND

MESOZOIC

UPPER CRETACEOUS
- 25 Brazeau Formation

ALBERTA GROUP
- 24 Wapiabi Formation
- 23 Cardium Formation
- 22 Blackstone Formation

LOWER CRETACEOUS
BLAIRMORE GROUP
- 21 Beaver Mines Formation
- 20 Lower Blairmore Group

LOWER CRETACEOUS AND JURASSIC
- 19 Kootenay Formation

JURASSIC
FERNIE GROUP
- 18 Upper Members
- 17 Nordegg Member

TRIASSIC
- 16 Sulphur Mountain Formation

PALEOZOIC

PENNSYLVANIAN AND (?) PERMIAN
- 15 Rocky Mountain Quartzite

CARBONIFEROUS
RUNDLE ASSEMBLAGE
- 14 Etherington Formation (above McConnell thrust only)
- 13 Turner Valley and Mount Head Formations
- 12 Pekisko and Shunda Formations
- 11 Banff Formation

DEVONIAN
- 10 Palliser Formation
- 9 Alexo Formation (above McConnell thrust only)
- 8 Sassenach Formation (below McConnell thrust)

FAIRHOLME GROUP
- 7 Mount Hawk Formation
- 6 Southesk Formation
- 5 Caim Formation

CAMBRIAN
UPPER CAMBRIAN
- 4 Lynx Formation

MIDDLE CAMBRIAN
- 3 Arctomys Formation
- 2 Pika Formation
- 1 Cambrian (undivided)

NOTES

1) See Fig. 5.1 for location of section.
2) Geology after Ollerenshaw (1968).

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N. DAHROUGE

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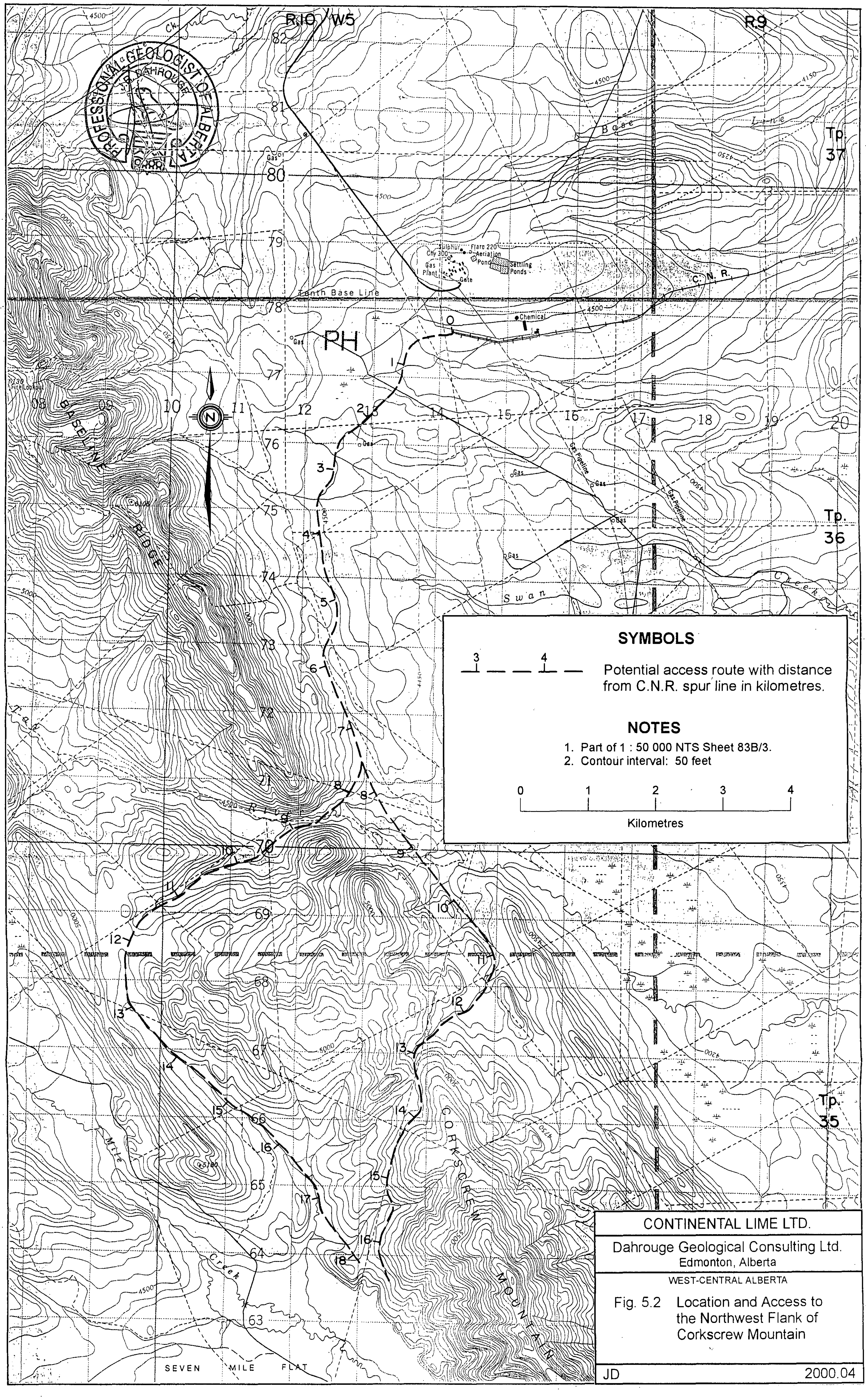
WEST-CENTRAL ALBERTA

Fig. 4.1 Schematic Cross-Section Through Limestone and Clearwater Ranges

WM 2000.06



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Edmonton, Alberta

WEST-CENTRAL ALBERTA

Fig. 5.2 Location and Access to the Northwest Flank of Corkscrew Mountain

JD 2000.04

F4

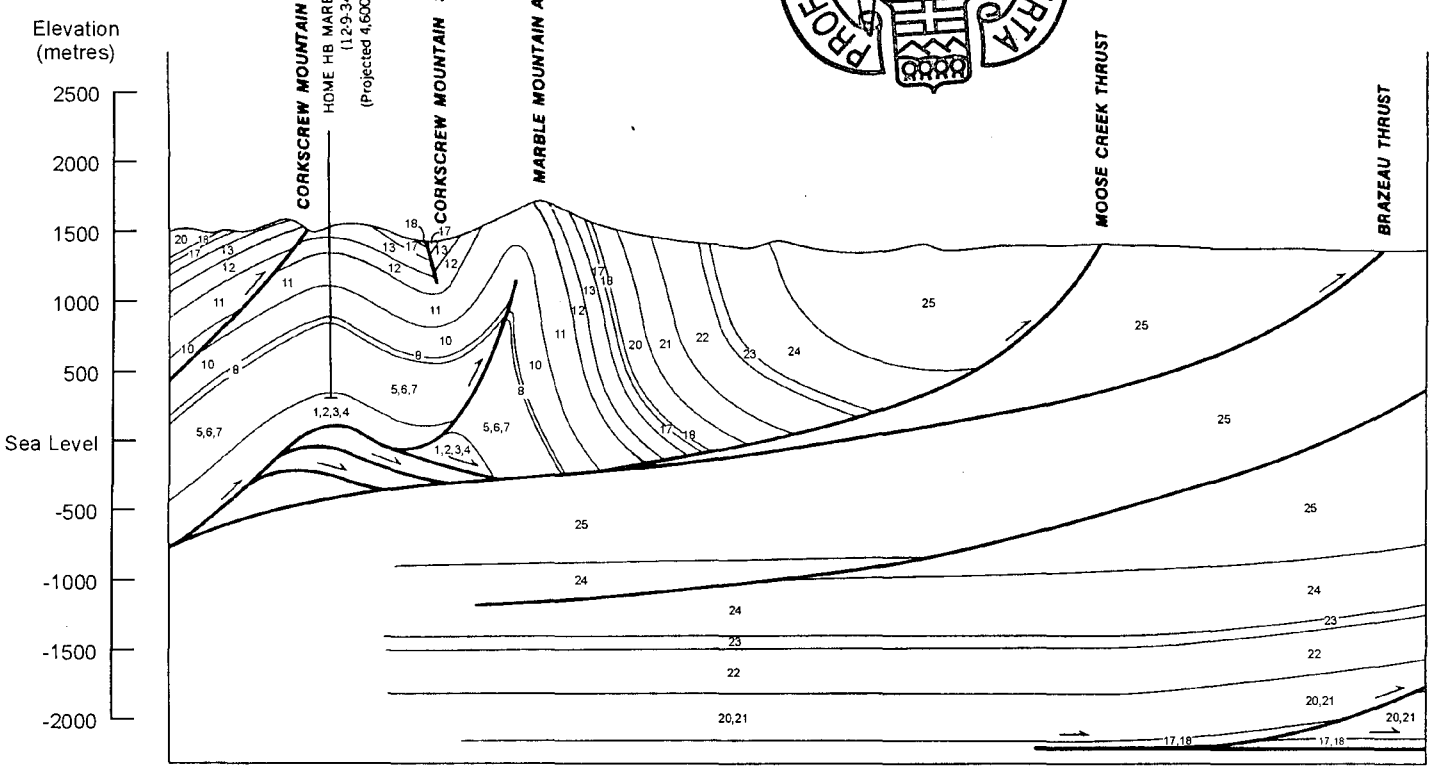
SW

B

Marble Mountain

NE

B'



LEGEND

MESOZOIC

UPPER CRETACEOUS
- 25 Brazeau Formation

ALBERTA GROUP
- 24 Wapiabi Formation
- 23 Cardium Formation
- 22 Blackstone Formation

LOWER CRETACEOUS
BLAIRMORE GROUP
- 21 Beaver Mines Formation
- 20 Lower Blairmore Group

LOWER CRETACEOUS AND JURASSIC
- 19 Kootenay Formation

JURASSIC
FERNIE GROUP
- 18 Upper Members
- 17 Nordegg Member

TRIASSIC
- 16 Sulphur Mountain Formation

PALEOZOIC

PENNSYLVANIAN AND (?) PERMIAN
- 15 Rocky Mountain Quartzite

CARBONIFEROUS
RUNDLE ASSEMBLAGE
- 14 Etherington Formation (above McConnell thrust only)
- 13 Turner Valley and Mount Head Formations
- 12 Pekisko and Shunda Formations
- 11 Banff Formation

DEVONIAN
- 10 Palliser Formation
- 9 Alexo Formation (above McConnell thrust only)
- 8 Sassenach Formation (below McConnell thrust)

FAIRHOLME GROUP
- 7 Mount Hawk Formation
- 6 Southesk Formation
- 5 Cairn Formation

CAMBRIAN
UPPER CAMBRIAN
- 4 Lynx Formation

MIDDLE CAMBRIAN
- 3 Arctomys Formation
- 2 Pika Formation
- 1 Cambrian (undivided)

Notes
1) See Fig. 5.1 for location of cross-section.
2) Section is about 6000 m southeast of Clearwater River.
3) Geology after Ollerenshaw (1965).

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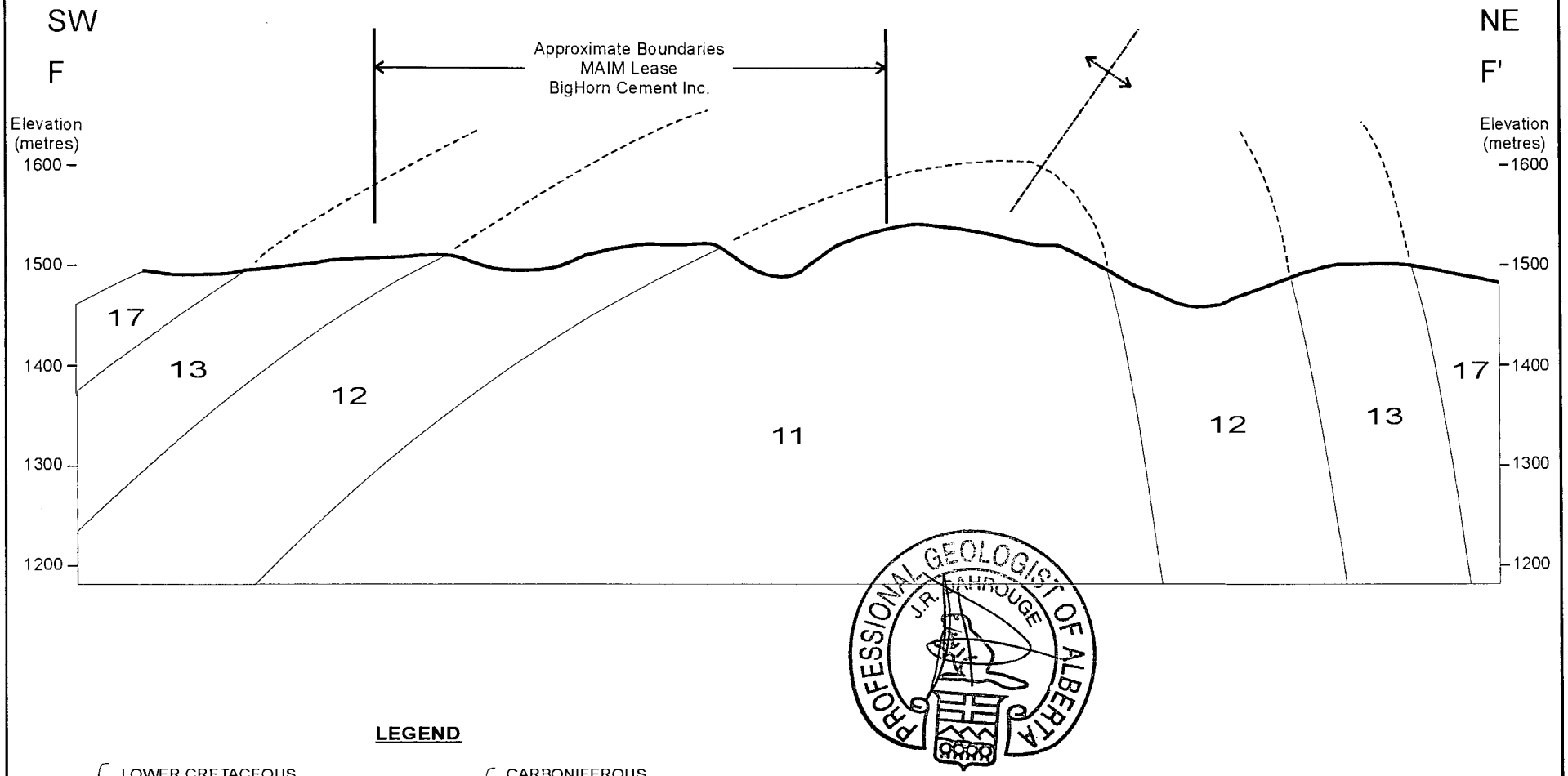
WEST-CENTRAL ALBERTA

Fig. 6.1 Schematic Cross-Section Through Southern Part of Clearwater Range at North End of Marble Mountain.

WM 2000.06



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J.R. DAHROUGE

LEGEND

MESOZOIC

LOWER CRETACEOUS
BLAIRMORE GROUP
- 21 Beaver Mines Formation
- 20 Lower Blairmore Group

LOWER CRETACEOUS AND JURASSIC
- 19 Kootenay Formation

JURASSIC
FERNIE GROUP
- 18 Upper Members
- 17 Nordegg Member

PALEOZOIC

CARBONIFEROUS
RUNDLE ASSEMBLAGE
- 13 Turner Valley and Mount Head Formations
- 12 Pekisko and Shunda Formations
- 11 Banff Formation

DEVONIAN
- 10 Palliser Formation
- 8 Sassenach Formation (below McConnell thrust)

FAIRHOLME GROUP
- 7 Mount Hawk Formation
- 5 Cairn Formation

NOTES

1) See Fig. 5.1 for location of section.
2) Geology modified after Henderson (1943, 1944).

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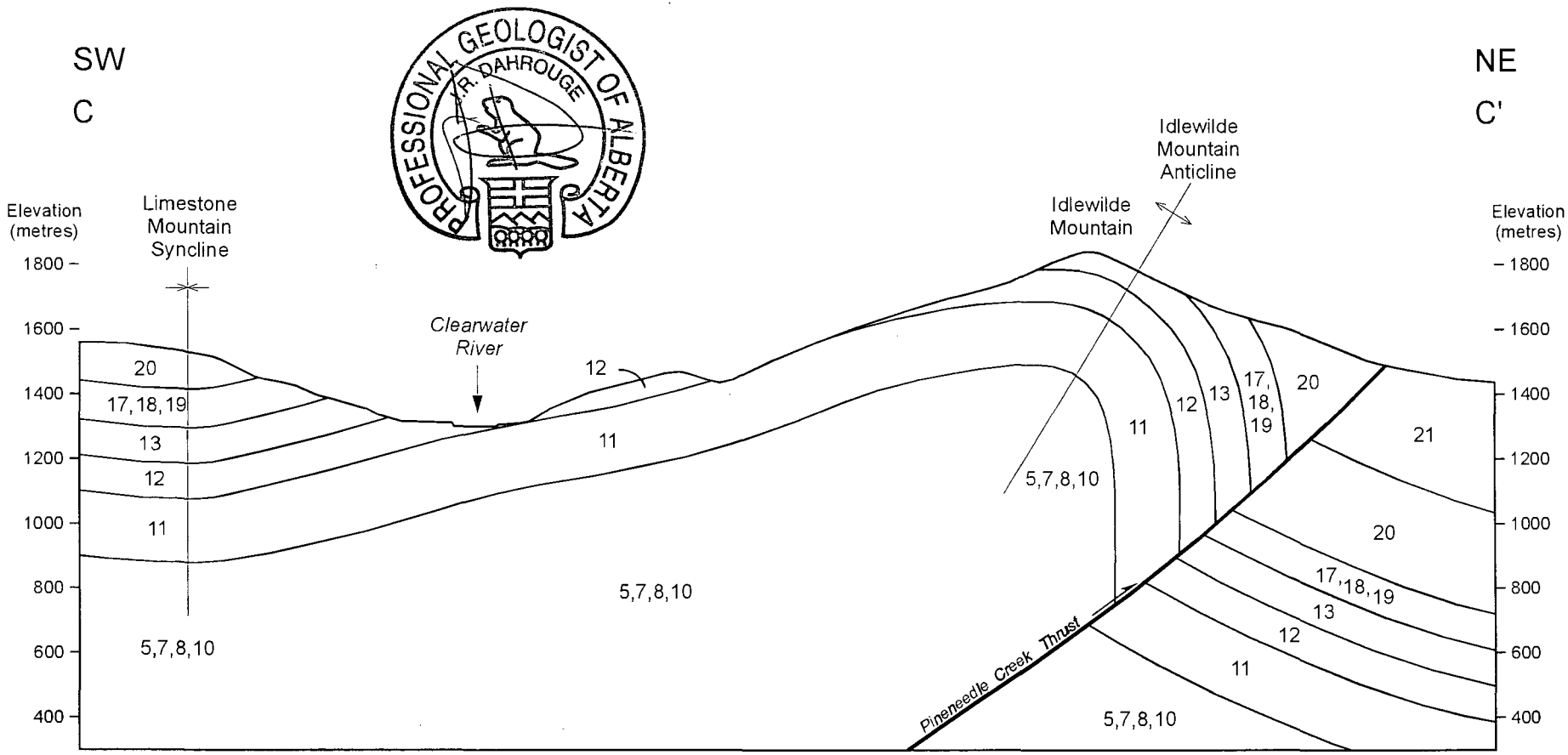
WEST-CENTRAL ALBERTA

Fig. 6.2 Cross-Section Through Lease of BigHorn Cement Inc. at the South End Marble Mountain

JD 2000.02

F6



LEGEND

MESOZOIC

LOWER CRETACEOUS
BLAIRMORE GROUP
21 Beaver Mines Formation
20 Lower Blairmore Group

LOWER CRETACEOUS AND JURASSIC
19 Kootenay Formation

JURASSIC
FERNIE GROUP
18 Upper Members
17 Nordegg Member

PALEOZOIC

CARBONIFEROUS
RUNDLE ASSEMBLAGE
13 Turner Valley and Mount Head Formations
12 Pekisko and Shunda Formations
11 Banff Formation

DEVONIAN
10 Palliser Formation
8 Sassenach Formation (below McConnell thrust)

FAIRHOLME GROUP
7 Mount Hawk Formation
5 Cairn Formation

NOTES

1) See Fig. 5.1 for location of section.
2) Geology modified after Henderson (1943, 1944).

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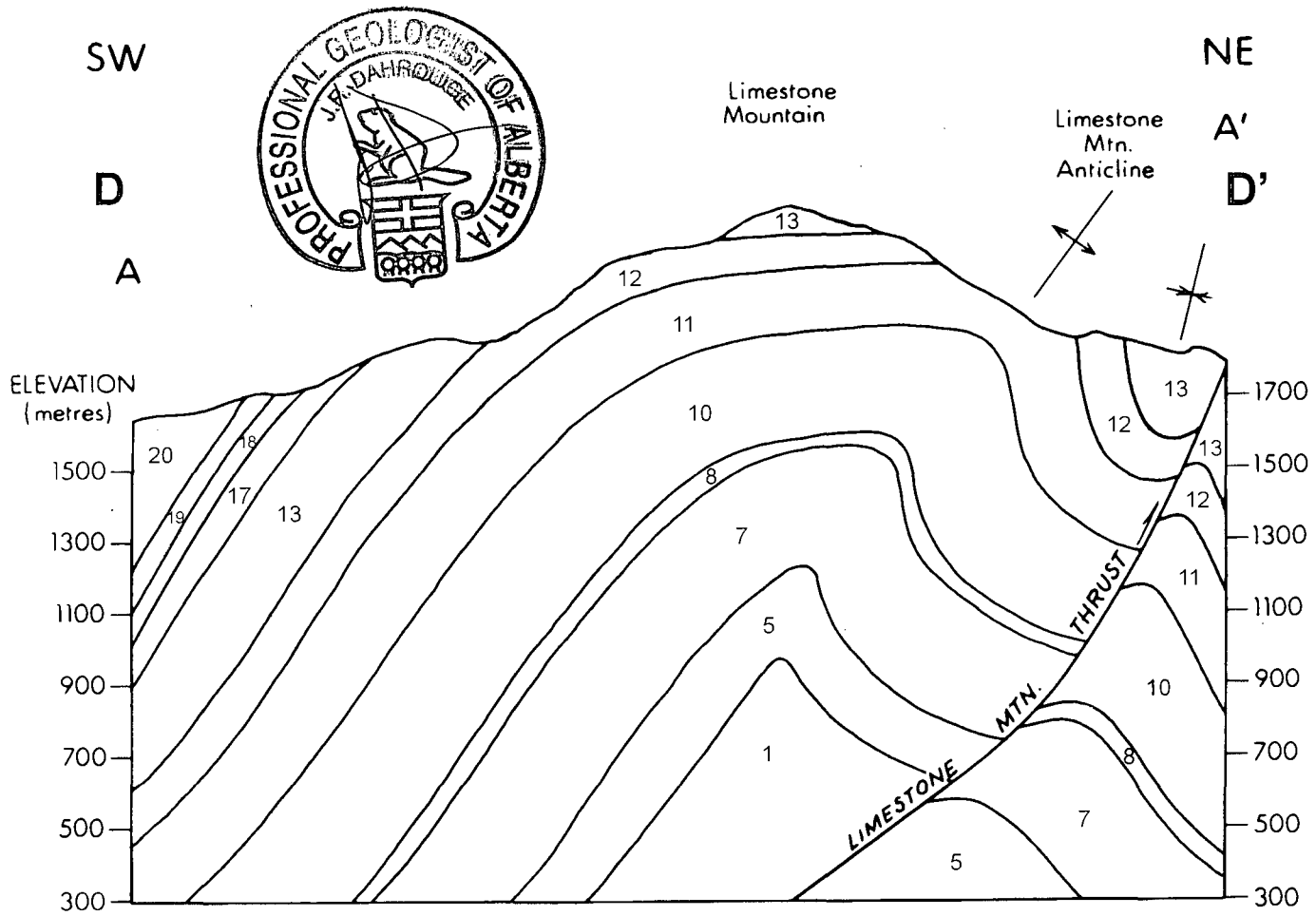
WEST-CENTRAL ALBERTA

Fig. 7.1 Cross-Section Through Idlewilde Mountain

JD 2000.06

F7



PROFESSIONAL GEOLOGIST OF ALBERTA J.R. DAHROUGE

LEGEND

MESOZOIC

LOWER CRETACEOUS
BLAIRMORE GROUP
20 Lower Blairmore Group

LOWER CRETACEOUS AND JURASSIC
19 Kootenay Formation

JURASSIC
FERNIE GROUP
18 Upper Members
17 Nordegg Member

TRIASSIC
16 Sulphur Mountain Formation

PALEOZOIC

CARBONIFEROUS
RUNDLE ASSEMBLAGE
13 Turner Valley and Mount Head Formations
12 Pekisko and Shunda Formations
11 Banff Formation

DEVONIAN
10 Palliser Formation
8 Sassenach Formation (below McConnell thrust)
FAIRHOLME GROUP
7 Mount Hawk Formation
5 Cairn Formation

CAMBRIAN
1 Cambrian (undivided)

Notes
1) See Fig. 5.1 for location of cross-section.
2) Geology after Ollerenshaw (1968).

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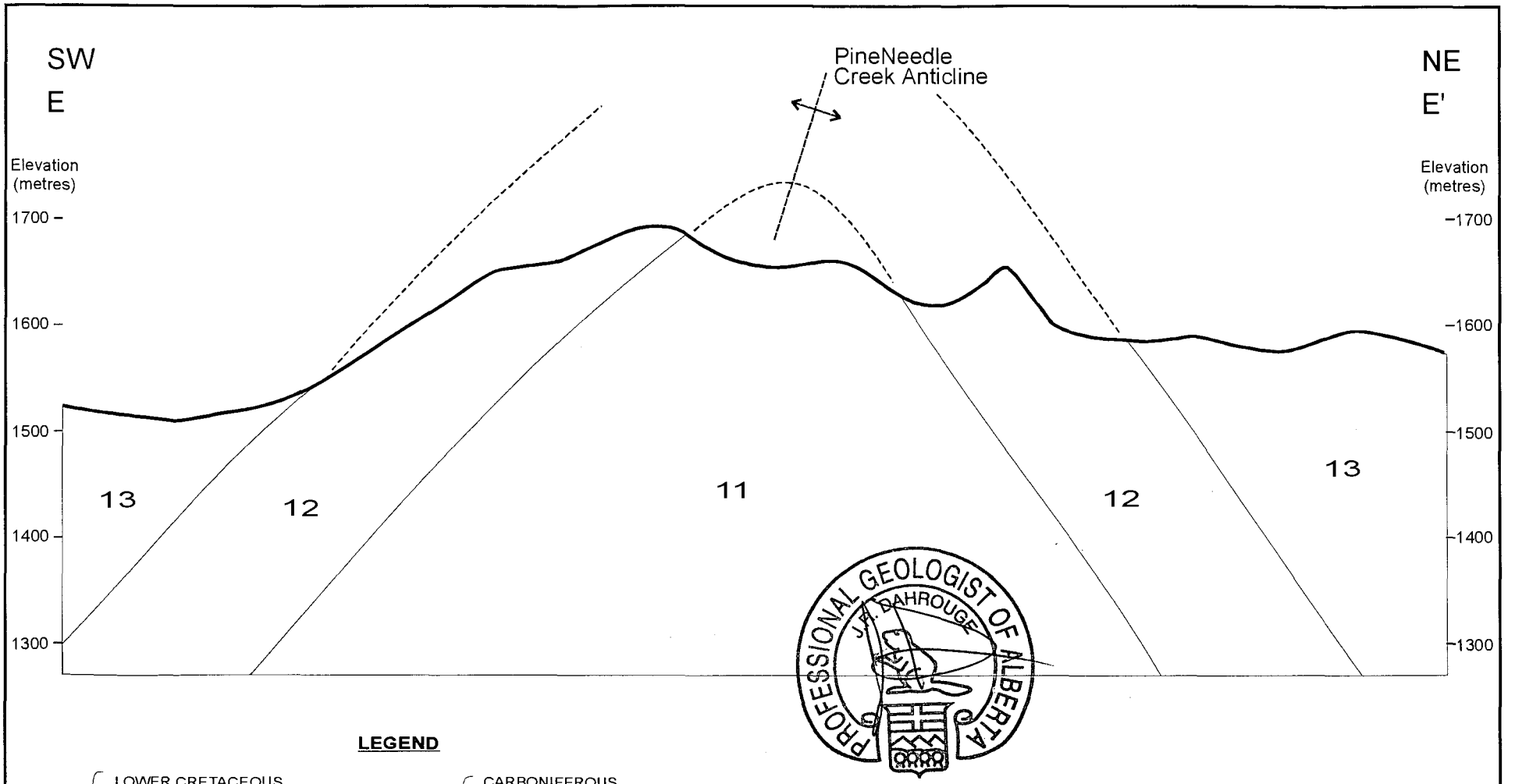
WEST-CENTRAL ALBERTA

Fig. 8.1 Schematic Cross-Section Through Limestone Mountain

WM 2000.06



LEGEND

MESOZOIC

LOWER CRETACEOUS
BLAIRMORE GROUP
21 Beaver Mines Formation
20 Lower Blairmore Group

LOWER CRETACEOUS AND JURASSIC
19 Kootenay Formation

JURASSIC
FERNIE GROUP
18 Upper Members
17 Nordegg Member

PALEOZOIC

CARBONIFEROUS
RUNDLE ASSEMBLAGE
13 Turner Valley and Mount Head Formations
12 Pekisko and Shunda Formations
11 Banff Formation

DEVONIAN
10 Palliser Formation
8 Sassenach Formation (below McConnell thrust)

FAIRHOLME GROUP
7 Mount Hawk Formation
5 Cairn Formation

NOTES

1) See Fig. 7.1 for location of section.
2) Geology modified after Henderson (1943, 1944).

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J.A. DAHROUGE

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WEST-CENTRAL ALBERTA

Fig. 8.2 Cross-Section Through PineNeedle Creek Anticline

J.D. 2000.02

F9

APPENDIX 1: ITEMIZED COST STATEMENT FOR METALLIC AND INDUSTRIAL MINERALS PERMITS 9396020019 AND 9398100125 OF CONTINENTAL LIME LTD.

a) Personnel

J. Dahrouge, B.Sc., P.Geol.

13.3	days	supervising and preparing report	[redacted]
13.3	days	[redacted]	

D. Pana, Ph.D. (Geologist)

11.0	days	field work and travel between June 26 to 30, 1999; and between September 20 to 25, 1999	
25.7	days	planning and preparing for field work, organizing, preparing and describing samples; compiling field data; preparing maps and report	
36.7	days	[redacted]	[redacted]

P. Kleespies, M.Sc. (Geologist)

8.0	days	field work and travel between September 15 to 22, 1999; and	
0.9		preparing for field work	
8.9	days	[redacted]	[redacted]

S. Fraser, M.Sc., P. Geol.

6.0	days	field work and travel between September 20 to 25, 1999	
6.0	days	[redacted]	[redacted]

W. McGuire, assistant

13.0	days	field work and travel between June 26 to 30, 1999; and between September 15 to 22, 1999	
16.5	days	compiling field data; drafting; preparing figures and maps	
29.5	days	[redacted]	[redacted]

$ 37,308.23

b) Food and Accommodation

32 man-days @	$ 27.08	accommodations (motel)	$ 866.60
38 man-days @	$ 28.93	groceries and restaurants	$ 1,099.46
			$ 1,966.06

c) Transportation

Vehicles:	Quad Rental	$ 859.15
	4x4 sports utility truck 3286 km @ 0.38½	$ 1,265.11
	4x4 truck 1229 km @ 0.38½	$ 473.17
		$ 2,597.43

d) Instrument Rental

n/a

e) Drilling

n/a

APPENDIX 1: CONTINUED

f) Analyses				
166 samples @ $ 22.50	sample preparation and analysis for 12 constituents by ICP (Salt Lake City)			$ 3,735.00
g) Report	Reproduction and assembly	$ 178.10		
				$ 178.10
h) Other				
	Base map(s) and map reproductions	$ 583.55		
	Courier and Shipping	$ 122.10		
	Field Supplies	$ 62.95		
	Long distance telephone	$ 6.83		
				$ 775.42
Total				$ 46,560.24

I, Jody R. Dahrouge, hereby certify that the costs outlined above were expended for the assessment of metallic and industrial minerals permits 9396020019 and 9398100125.

PROFESSIONAL GEOLOGIST OF ALBERTA J.R. DAHROUGE

Jody R. Dahrouge, B.Sc., Sp.C., P.Geol.

APPENDIX 2: ANALYTICAL REPORTS FOR ICP ANALYSES OF THE 1999 SAMPLES FROM THE QUALITY ASSURANCE LABORATORY OF CONTINENTAL LIME INC.*

Sample	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%
	LOI	CaCO3	MgCO3	SiO2	Al2O3	Fe2O3	SrCO3	MnO	P2O5	BaO	K2O	Na2O	TiO2	Total
13726	43.79	97.77	1.05	0.19	0.039	0.037	464	26	<100	6	140	98	32	99.17
13727	43.85	96.43	2.59	0.25	0.053	0.14	402	22	<100	9	209	107	28	99.54
13728	43.73	97.73	1.66	0.19	0.032	0.031	349	25	118	7	119	94	9	99.71
13729	43.8	97.98	1.47	0.21	0.035	0.171	376	23	<100	9	139	103	17	99.94
13730	44.75	83.22	15.97	0.38	0.063	0.055	297	37	<100	7	281	135	27	99.77
13731	44.3	89.33	9.93	0.38	0.06	0.042	330	32	<100	8	266	128	24	99.82
13732	46.32	63.11	35.69	0.42	0.083	0.085	208	57	101	7	365	148	36	99.48
13733	44.77	80.47	18.41	0.77	0.131	0.079	262	40	131	8	601	150	67	99.99
13734	43.83	96.66	2.11	0.42	0.082	0.17	469	24	<100	10	241	116	33	99.53
13735	44.03	89.83	8.32	0.95	0.121	0.057	405	25	158	9	568	146	58	99.41
13736	44.24	80.52	17.31	1.53	0.146	0.078	296	30	124	9	758	150	71	99.73
13737	44.28	89.69	9.63	0.28	0.07	0.181	314	35	202	9	264	129	66	99.95
13738	43.9	96.59	2.97	0.1	0.033	0.219	309	26	<100	8	92	102	37	99.97
13739	43.76	97.97	0.98	0.12	0.033	0.027	242	27	<100	4	91	114	9	99.18
13740	43.72	98.39	1.22	0.15	0.04	0.105	271	31	<100	7	124	123	12	99.96
13741	43.65	98.74	0.81	0.18	0.04	0.137	362	24	<100	9	125	92	18	99.97
13742	44.06	95.67	3.24	0.22	0.094	0.051	311	29	142	10	156	110	17	99.35
13743	43.77	98.45	0.98	0.14	0.05	0.039	339	23	119	8	109	92	14	99.73
13744	44.1	94.22	4.80	0.22	0.043	0.062	335	28	138	6	158	120	16	99.43
13745	44.06	92.34	6.30	0.53	0.075	0.052	450	30	<100	9	304	130	32	99.39
13746	43.9	93.91	4.96	0.63	0.107	0.166	607	26	124	11	467	113	92	99.92
13747	44.83	75.9	22.55	1.14	0.122	0.095	305	39	199	10	548	130	63	99.94
13748	44.08	94.35	4.49	0.55	0.066	0.094	448	22	<100	8	293	109	25	99.64
13749	44.24	87.58	10.86	0.96	0.114	0.256	439	32	128	11	509	147	62	99.9
13750	43.88	97.98	1.31	0.19	0.025	0.036	438	17	<100	6	94	114	8	99.61
13751	43.92	98.41	1.14	0.19	0.02	0.143	494	20	<100	9	73	99	11	99.98
13752	44.31	88.7	10.19	0.23	0.055	0.056	321	34	117	7	203	133	26	99.32
13753	43.96	93.75	5.75	0.24	0.048	0.066	310	27	<100	8	155	122	52	99.91
13754	43.82	97.58	2.04	0.14	0.032	0.047	302	23	111	7	104	96	76	99.92
13755	43.8	97.03	1.82	0.19	0.026	0.024	321	20	<100	5	94	102	7	99.15
13756	43.75	97.09	2.35	0.33	0.059	0.05	414	18	<100	9	183	91	15	99.96
13757	44.06	98.26	1.36	0.18	0.029	0.084	454	19	<100	8	85	131	53	99.99

* As received by electronic mail.

APPENDIX 2: CONTINUED

Sample	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%
	LOI	CaCO3	MgCO3	SiO2	Al2O3	Fe2O3	SrCO3	MnO	P2O5	BaO	K2O	Na2O	TiO2	Total
13758	43.86	98.32	1.30	0.17	0.022	0.088	488	18	<100	8	79	129	7	99.98
13759	44.2	91.7	7.57	0.48	0.054	0.086	422	27	136	8	245	128	22	99.98
13760	44.28	78.22	19.18	1.84	0.266	0.114	422	38	<100	14	1440	131	130	99.82
13761	44.04	93.7	5.31	0.66	0.108	0.048	531	26	215	10	511	150	43	99.98
13762	44.06	94.18	4.89	0.56	0.085	0.077	728	22	<100	11	424	140	37	99.93
13763	43.67	94.98	3.30	1.05	0.188	0.22	471	41	<100	12	779	121	110	99.9
13764	43.96	98.31	0.83	0.23	0.041	0.027	368	25	131	8	125	97	11	99.51
13765	43.86	98.17	1.08	0.24	0.036	0.024	344	21	<100	6	126	108	9	99.62
13766	43.85	96.52	2.17	0.34	0.046	0.026	372	21	<100	6	193	110	17	99.16
13767	45.07	78.11	20.52	0.74	0.105	0.067	297	32	172	10	485	111	47	99.66
13768	43.79	97.91	1.31	0.59	0.033	0.056	543	17	<100	8	126	98	11	99.98
13769	44.95	64.42	32.05	2.09	0.254	0.237	276	54	151	14	1329	128	131	99.27
13770	44.3	89.94	8.92	0.6	0.094	0.275	393	25	<100	12	467	94	52	99.94
13776	37.48	55.2	27.22	9.37	1.382	3.935	263	462	<100	45	7516	323	781	98.05
13777	44.04	84.75	12.24	1.4	0.333	0.181	313	53	139	16	1471	165	174	99.13
13778	44.06	95.33	3.38	0.31	0.072	0.059	348	26	127	14	277	120	27	99.24
13779	43.76	98.38	0.85	0.23	0.044	0.154	377	20	<100	8	151	110	15	99.73
13780	43.76	98.61	0.91	0.21	0.037	0.092	377	20	111	7	141	99	13	99.94
13781	43.8	97.2	1.75	0.24	0.043	0.095	370	27	<100	7	159	117	15	99.4
13782	45.03	78.31	20.84	0.59	0.07	0.068	236	37	137	7	280	159	36	99.97
13783	44.15	93.03	5.84	0.48	0.06	0.042	407	21	<100	7	267	152	22	99.54
13784	44.18	89.95	8.44	0.54	0.079	0.113	369	23	220	10	345	138	32	99.24
13785	40.48	78.29	12.62	6.18	0.118	1.21	361	126	<100	12	520	125	56	98.53
13786	43.96	96.29	2.25	0.38	0.033	0.049	488	22	<100	9	130	125	14	99.08
13787	43.83	91.48	7.30	0.63	0.046	0.074	362	25	172	14	244	142	20	99.63
13788	42.97	74.57	19.80	4.49	0.148	0.122	282	36	441	14	753	133	79	99.3
13789	44.23	88.77	9.39	0.5	0.095	0.08	420	28	129	8	341	120	35	98.94
13790	43.85	91.8	6.99	0.79	0.146	0.102	472	38	<100	10	688	137	67	99.98
13791	43.8	97.26	1.80	0.27	0.074	0.193	371	25	<100	9	167	119	14	99.67
13792	43.74	98.42	0.95	0.21	0.031	0.025	369	21	<100	6	117	133	10	99.71
13793	43.95	94.8	4.44	0.29	0.042	0.261	352	25	121	9	176	130	43	99.92
13794	45.82	63.79	34.65	0.95	0.164	0.184	230	43	155	14	769	151	173	99.9
13795	44.73	78.29	20.35	0.85	0.169	0.114	297	31	211	11	852	157	109	99.94
13796	43.97	90.36	8.18	0.7	0.115	0.094	379	27	153	12	532	142	91	99.59
13797	43.76	93.37	4.61	0.74	0.12	0.053	416	21	134	8	498	130	46	99.02
13798	44.03	85.72	12.74	1.14	0.129	0.054	392	22	<100	10	626	147	62	99.9

APPENDIX 2: CONTINUED

Sample	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%
	LOI	CaCO3	MgCO3	SiO2	Al2O3	Fe2O3	SrCO3	MnO	P2O5	BaO	K2O	Na2O	TiO2	Total
13799	43.67	98.36	0.93	0.31	0.06	0.096	370	37	<100	8	235	132	41	99.83
13800	44.25	90.17	8.41	0.53	0.06	0.047	414	23	147	7	270	137	25	99.32
13801	43.8	94.18	4.26	0.78	0.097	0.031	854	21	<100	10	476	145	47	99.5
13802	43.68	98.04	0.94	0.21	0.041	0.056	409	21	152	6	119	160	14	99.37
13803	43.85	98.38	1.00	0.18	0.037	0.056	325	28	<100	6	126	168	10	99.72
13804	44.11	97.9	0.85	0.25	0.039	0.05	333	24	<100	6	127	177	10	99.15
13805	44.26	91.43	7.76	0.53	0.083	0.084	334	26	86	8	326	182	33	99.98
13806	43.48	96.12	1.88	1.25	0.141	0.13	439	20	<100	13	695	118	78	99.66
13807	44.58	85.96	12.73	0.41	0.069	0.061	301	28	<100	13	266	101	28	99.3
13808	44	92.33	5.10	0.59	0.093	0.075	377	21	157	16	421	119	42	98.31
13809	27	56.45	5.88	32.41	0.719	1.902	458	231	2713	131	2810	426	383	98.08
13810	43.02	86.21	9.38	2.21	0.067	0.065	366	27	230	6	236	168	30	98.04
13811	43.7	97.34	1.18	0.81	0.038	0.044	420	21	<100	8	158	137	15	99.5
13812	43.91	93.57	4.45	0.81	0.071	0.038	421	20	249	8	319	138	30	99.06
13813	44.3	89.88	8.83	0.54	0.059	0.191	309	30	<100	9	236	157	26	99.58
13814	43.84	97.55	1.09	0.31	0.035	0.031	358	22	<100	5	145	143	12	99.09
13815	43.83	98.14	0.88	0.3	0.039	0.036	385	21	<100	9	157	138	13	99.48
13816	43.73	95.82	2.18	0.41	0.085	0.056	345	28	122	8	344	143	43	98.64
13817	43.72	97.92	0.80	0.2	0.068	0.031	344	30	<100	7	101	105	7	99.08
13818	43.79	97.42	0.91	0.19	0.024	0.025	375	24	158	6	137	109	6	98.65
13819	44.03	93.15	5.52	0.5	0.059	0.165	411	30	<100	8	277	119	30	99.48
13820	43.58	98.05	0.84	0.44	0.046	0.06	449	24	<100	3	169	87	15	99.5
13821	43.67	95.41	2.95	0.5	0.08	0.056	423	22	204	7	342	111	32	99.11
13822	45.89	67.02	31.35	0.66	0.126	0.258	168	44	<100	10	576	150	73	99.51
13823	43.81	95.04	3.27	0.43	0.07	0.046	368	23	128	6	312	120	33	98.95
13824	45.29	72.67	25.37	0.55	0.099	0.094	191	43	317	7	460	161	51	98.91
13825	43.72	92.06	5.52	0.46	0.041	0.049	265	26	<100	6	174	121	20	98.19
13826	43.49	98.34	0.97	0.25	0.031	0.143	328	21	<100	6	130	128	14	99.79
13827	43.89	97.77	0.79	0.22	0.032	0.176	350	23	<100	7	131	118	16	99.05
13828	43.97	97.21	0.87	0.13	0.027	0.093	418	20	<100	7	104	126	13	98.41
13929	43.92	98.16	0.86	0.15	0.034	0.037	417	22	<100	4	140	102	58	99.31
14226	43.74	97.16	1.18	0.79	0.089	0.053	446	21	<100	13	483	93	57	99.38
14227	43.92	93.56	4.57	0.84	0.112	0.066	511	26	<100	17	579	94	68	99.28
14228	43.7	96.07	2.18	0.95	0.106	0.128	577	24	<100	13	582	104	73	99.57
14229	44.48	80.05	17.16	1.5	0.231	0.155	386	44	<100	14	1238	164	155	99.29
14230	44.2	86.77	10.20	0.99	0.153	0.149	447	32	<100	15	812	135	94	98.42

APPENDIX 2: CONTINUED

Sample	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%
	LOI	CaCO3	MgCO3	SiO2	Al2O3	Fe2O3	SrCO3	MnO	P2O5	BaO	K2O	Na2O	TiO2	Total
14231	43.39	95.85	1.81	1.37	0.136	0.061	563	23	<100	47	778	100	95	99.39
14232	43.58	97.27	1.26	1.05	0.094	0.12	455	24	<100	14	536	110	71	99.91
14233	44.01	94.53	4.20	0.5	0.06	0.078	417	31	<100	8	324	94	34	99.46
14234	44.13	92.59	5.98	0.61	0.078	0.068	369	31	<100	11	414	110	41	99.42
14235	46.04	66.09	33.14	0.44	0.073	0.12	211	59	<100	6	297	156	34	99.94
14236	45.48	70.85	28.31	0.58	0.069	0.07	289	41	108	7	351	124	32	99.97
14237	43.79	98.33	0.98	0.21	0.039	0.037	485	37	<100	5	140	70	16	99.66
14238	43.78	97.65	0.84	0.24	0.039	0.026	388	22	<100	4	174	116	12	98.87
14239	44.03	98.24	0.75	0.2	0.039	0.038	321	34	<100	7	144	134	18	99.33
14240	43.79	98.28	0.74	0.22	0.032	0.032	381	26	<100	5	115	114	13	99.38
14241	43.83	98.79	0.66	0.25	0.044	0.047	319	33	<100	6	117	100	11	99.85
14242	43.84	98.38	0.67	0.17	0.05	0.043	384	27	<100	7	109	82	11	99.37
14243	43.81	98.65	0.73	0.23	0.03	0.051	402	27	<100	7	113	89	9	99.76
14244	43.85	96.82	2.21	0.27	0.045	0.036	373	25	<100	4	162	130	21	99.45
14245	44.88	76.77	22.30	0.47	0.06	0.078	258	41	<100	9	266	141	30	99.76
14246	38.47	90.03	1.70	6.69	0.049	0.594	473	56	<100	10	189	116	29	99.15
14247	43.71	97.49	1.16	0.34	0.03	0.075	468	20	<100	9	142	106	13	99.16
14248	43.85	97.97	1.19	0.21	0.021	0.179	551	18	<100	11	84	125	14	99.65
14249	44.84	77.81	20.78	1.13	0.05	0.141	362	41	<100	11	232	108	29	99.99
14301	43.7	98.3	0.96	0.24	0.022	0.059	448	28	<100	7	77	105	8	99.65
14302	43.8	97.9	0.93	0.35	0.033	0.119	419	27	<100	11	131	105	13	99.4
14303	43.85	96.78	2.25	0.36	0.039	0.096	391	29	<100	8	151	122	15	99.59
14304	44.93	79.63	19.60	0.46	0.056	0.103	259	45	<100	9	246	129	25	99.92
14305	43.85	97.57	1.06	0.46	0.052	0.037	516	23	<100	6	257	107	27	99.27
14306	44	95.2	4.00	0.46	0.059	0.051	455	27	<100	7	284	118	28	99.86
14307	43.83	97.14	1.05	0.44	0.068	0.053	517	23	154	9	279	97	48	98.86
14308	43.63	98.43	0.94	0.36	0.063	0.05	500	21	<100	8	237	103	20	99.93
14309	43.86	96.15	2.89	0.62	0.076	0.064	564	23	106	9	369	128	46	99.93
14310	43.72	98.19	1.02	0.4	0.054	0.041	677	18	<100	9	208	87	20	99.8
14311	43.8	98.5	0.88	0.31	0.027	0.023	673	17	<100	7	109	104	9	99.82
14312	44.04	91.73	7.16	0.65	0.081	0.095	827	24	152	10	454	123	38	99.88
14313	44.24	88.06	10.40	0.82	0.091	0.069	785	29	<100	11	520	131	44	99.6
14314	44.21	76.91	19.31	2.21	0.241	0.173	798	51	<100	18	1322	158	175	99.1
14315	43.79	93.35	4.79	1.04	0.105	0.071	483	25	<100	9	595	121	71	99.49
14316	43.58	97.5	1.31	0.82	0.101	0.085	428	28	<100	11	567	131	60	99.93
14317	43.59	97.25	1.60	0.68	0.095	0.058	417	27	<100	14	516	106	55	99.8

APPENDIX 2: CONTINUED

Sample	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%
	LOI	CaCO3	MgCO3	SiO2	Al2O3	Fe2O3	SrCO3	MnO	P2O5	BaO	K2O	Na2O	TiO2	Total
14318	41.67	94.48	0.85	4.43	0.031	0.033	552	22	129	7	140	96	10	99.92
14319	42.27	85.62	8.25	3.97	0.51	0.264	497	74	<100	21	3036	154	363	99.02
14320	43.83	97.99	1.43	0.29	0.044	0.033	399	26	<100	6	231	126	20	99.86
14321	43.86	97.02	2.45	0.33	0.056	0.043	355	29	<100	11	224	120	21	99.98
14322	43.75	98.75	0.73	0.21	0.034	0.038	375	26	<100	6	118	101	9	99.83
14323	44.12	92.79	5.65	0.55	0.056	0.055	371	33	<100	7	248	127	23	99.18
14324	44.88	75.59	22.28	1.01	0.131	0.165	277	36	126	11	659	152	71	99.3
14325	35.29	72.66	8.11	13.15	0.187	1.588	508	155	<100	12	914	141	105	95.88
14326	44.31	86.15	12.37	1.13	0.082	0.08	366	28	488	9	422	144	42	99.96
14327	43.58	92.95	5.10	1.49	0.134	0.078	931	31	<100	14	690	144	86	99.94
14328	44.26	81.96	16.22	1.32	0.166	0.131	451	56	<100	11	778	145	102	99.95
14329	42.87	89.76	7.22	2.5	0.213	0.086	372	29	<100	11	1195	132	155	99.97
14330	43.66	94.18	5.13	0.42	0.074	0.071	327	27	<100	7	315	94	34	99.95
14331	43.69	93.91	4.61	1.08	0.132	0.045	570	26	<100	7	715	144	77	99.93
14332	44.24	69.51	26.65	2.55	0.353	0.193	509	67	<100	21	1665	163	212	99.52
14333	43.27	93.93	3.90	1.58	0.168	0.111	475	38	<100	10	875	175	110	99.85
14334	43.44	92.59	5.30	1.52	0.157	0.084	626	34	<100	12	872	166	105	99.83
14335	43.54	97.29	2.07	0.44	0.044	0.024	348	22	<100	4	193	129	17	99.94
14336	43.72	98.47	0.97	0.32	0.049	0.046	358	30	<100	6	174	140	18	99.93
14337	43.75	98.57	0.89	0.3	0.036	0.067	376	25	<100	6	146	133	14	99.93
14338	43.16	87.85	8.88	2.38	0.371	0.223	400	67	<100	15	2056	146	196	99.99
14339	43.16	96.69	1.36	1.41	0.188	0.115	450	72	<100	10	1049	138	108	99.96
14340	43.5	98.62	0.97	0.18	0.027	0.035	394	32	<100	6	104	133	10	99.91
14341	43.56	98.44	0.97	0.33	0.062	0.037	408	27	<100	6	188	121	41	99.93
14342	43.53	98.54	0.97	0.24	0.044	0.055	439	18	<100	7	161	113	16	99.93
14343	43.58	98.75	0.77	0.25	0.042	0.049	362	28	<100	6	151	112	22	99.93

APPENDIX 3: DESCRIPTIONS AND COMPOSITIONS OF THE 1999 SAMPLES FROM CORKSCREW MOUNTAIN, MARBLE MOUNTAIN AND LIMESTONE MOUNTAIN (Fig. 5.1)

Note: Stratigraphic thicknesses are based on measured attitudes of bedding as listed below with appropriate interpolations. UTM coordinates are NAD83. Samples are listed in order from stratigraphic top to bottom. Most samples consist of chips at 30 cm intervals. Samples denoted with an asterisks are grab samples.

Abbreviations: Banff - Banff Formation; RA - Rundle Assemblage; Fernie Group - F, NM - Nordegg Member

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
Section 99-1: Cliffs on west side of Rocky Creek opposite Shell gas well (UTM 5759455N, 603455E)											
-	RA	9½	Limestone, inaccessible, uppermost part of cliff section, more massive beds	-	-	-	-	-	-	-	-
-	RA	9½	Limestone, medium to dark-grey fresh, dark-grey weathered, finely-laminated beds 15 cm to 1 m thick separated by 1 to 30-cm thick fissile shaly partings; forms step-like outcrop, attitude of bedding 50°/8°W, 80°/7°N	-	-	-	-	-	-	-	-
-	RA	11¾	covered, more recessive	-	-	-	-	-	-	-	-
13736	RA	2½	Wackestone to mudstone, medium brownish-grey fresh and weathered, jointed	80.48	17.31	1.53	0.146	0.078	208	30	124
13735	RA	2¾	Wackestone, medium-grey fresh, brownish-grey weathered, intense jointing, more resistant	89.78	8.32	0.95	0.121	0.057	284	25	158
13734	RA	2¼	Calcarenite, light-grey, massive, fossil fragments, jointed	96.61	2.11	0.42	0.082	0.17	329	24	<100
-	RA	¼	covered, offset 6 m @ 60°, level	-	-	-	-	-	-	-	-
13733	RA	4¼	Dolostone and wackestone intervals 30 to 60 cm thick, buff to medium-grey fresh, brownish-grey weathered, massive, jointed, attitude of bedding 56°/10°NW	80.43	18.41	0.77	0.131	0.079	184	40	131
13732	RA	1	Dolomitic wackestone, medium-grey, fine-grained, a few fossil fragments, vugs partly filled with secondary calcite crystals	63.08	35.68	0.42	0.083	0.085	146	57	101
13731	RA	1¼	Wackestone, pale buff-grey fresh, medium-grey weathered, vugs up to 7 cm diameter	89.28	9.93	0.38	0.06	0.042	232	32	<100
-	RA	½	covered, offset 15 m @ 65°, level	-	-	-	-	-	-	-	-

APPENDIX 3: CONTINUED

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
Section 99-1 (continued)											
13730	RA	4½	Wackestone to mudstone, light- to medium brownish-grey fresh, light-grey weathered, numerous vugs up to 4 cm diameter	83.18	15.97	0.38	0.063	0.055	208	37	<100
-	RA	¼	vuggy layer	-	-	-	-	-	-	-	-
13729	RA	3¾	Calcarenite, light-grey, coarse-grained, crinoidal, massive, 50 cm layer with purplish-pink anhydrite stains	97.93	1.47	0.21	0.035	0.171	264	23	<100
13728	RA	3	Calcarenite, light brownish-grey, coarse-grained, crinoidal, crumbly, massive	97.68	1.66	0.19	0.032	0.031	245	25	118
13727	RA	3	Calcarenite, light-grey, coarse-grained, massive, fossiliferous, patches of calcite up to 4 mm across with grains up to 2 mm; bottom 30 cm is fine-grained wackestone to mudstone; attitude of joints 155°/76°NE, 155°/82°NE	96.38	2.59	0.25	0.053	0.14	282	22	<100
13726	RA	2¾	Calcarenite, medium-grey at base and lighter grey up section, coarse grained, massive, attitude of bedding 54°/9° NW, 42°/5°NW.	97.72	1.05	0.19	0.039	0.037	326	26	<100
-	Banff	-	Dolomitic Limestone, dark-grey, fine-grained, thinly bedded to massive, with 4 to 10 cm shaly interbeds, more abundant away from contact, bedding orientation 70°/16°NW, 30°/18°NW, and 16°/8°W, joints orientation 84°/80°S, 110°/84°S, cleavage orientation	-	-	-	-	-	-	-	-
Section 99-2: Cliffs on east side of Rocky Creek, 400 m upstream from Shell gas well (UTM 5759061N, 603379E)											
13798	RA	2	Wackestone, medium- to dark-grey fresh, medium-grey weathered, medium-sized grains in a fine-grained matrix	85.68	12.74	1.14	0.129	0.054	275	22	<100
-	RA	1	covered	-	-	-	-	-	-	-	-
13797	RA	1¾	Calcarenite, light brownish-grey fresh and weathered, coarse-grained	93.32	4.61	0.74	0.12	0.053	292	21	134
	RA	1	covered	-	-	-	-	-	-	-	-
13796	RA	~¾	Calcarenite, light brownish-grey fresh, medium-grey weathered, coarse- to very coarse-grained	90.31	8.18	0.7	0.115	0.094	266	27	153

APPENDIX 3: CONTINUED

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
Section 99-2 (continued)											
-	RA	~½	covered	-	-	-	-	-	-	-	-
13795	RA	~½	Calcarenite, medium-grey fresh and weathered, medium-grained	78.25	20.34	0.85	0.169	0.114	208	31	211
13794	RA	4¾	Dolomite, light-brown, buff weathered, very fine-grained matrix with clasts up to 5 mm, includes a ½ m covered interval near the base	63.76	34.64	0.95	0.164	0.184	161	43	155
13793	RA	3¾	Wackestone, medium- to light brownish-grey fresh, massive	94.75	4.44	0.29	0.042	0.261	247	25	121
13792	RA	4	Calcarenite, medium-grey fresh and weathered, coarse-grained, thick-bedded to massive	98.37	0.95	0.21	0.031	0.025	259	21	<100
13791	RA	3	Calcarenite, medium- to dark greyish-brown fresh, medium-grey weathered, coarse-grained, massive	97.21	1.80	0.27	0.074	0.193	260	25	<100
13790	RA	3	Calcarenite, light brownish-grey fresh, medium-grey weathered, medium- to coarse-grained, thick-bedded to massive; lowermost 15 cm fine-grained, attitude of bedding 20°/5° W	91.75	6.99	0.79	0.146	0.102	331	38	<100
-	Banff	-	Dolostone, thin-bedded	-	-	-	-	-	-	-	-
Section 99-3: Vertical cliffs on north side of tributary to Simon Creek (UTM 5760152N, 604909E)											
-	RA	-	Dolomite, light tan-brown, micritic, finely-laminated, well-bedded	-	-	-	-	-	-	-	-
13762	RA	4	Calcarenite, dark-grey, micritic, fractured, attitude of bedding 132°/22°NE	94.13	4.89	0.56	0.085	0.077	511	22	<100
13761	RA	3	Limestone, light-grey to brownish-grey, fine-grained, beds 2 to 30 cm thick, slightly recessive	93.65	5.31	0.66	0.108	0.048	373	26	215
13760	RA	3	Wackestone, dark-grey, coarse-grained, grading upward into light brownish-grey, fine-grained dolomitic limestone	78.18	19.17	1.84	0.266	0.114	296	38	<100
13759	RA	3	Calcarenite to wackestone, medium brownish-grey to grey, coarse-grained, massive	91.65	7.57	0.48	0.054	0.086	296	27	136
13758	RA	3	Calcarenite, as above, massive	98.27	1.30	0.17	0.022	0.088	343	18	<100
13757	RA	3	Calcarenite, as above, massive, attitude of bedding 130°/30°NE, 130°/34°NE	98.21	1.36	0.18	0.029	0.084	319	19	<100

APPENDIX 3: CONTINUED

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
Section 99-4: Cliffs west of Simon Creek south of the main tributary, in hinge of Limestone Mountain Syncline (UTM 5759955N, 605136E)											
13756	RA(?)	3¼	Wackestone, mottled appearance, tectonized, possible attitude of bedding 19°/34°W	97.04	2.35	0.33	0.059	0.05	291	18	<100
-	RA(?)	7¾	covered, offset 18 m @286° slope -8°	-	-	-	-	-	-	-	-
13755	RA(?)	2¼	Wackestone, light-grey fresh and weathered, massive, attitude of possible bedding 50°/36°SE	96.98	1.82	0.19	0.026	0.024	225	20	<100
13754	RA(?)	3	Wackestone, as above, attitude of possible bedding 64°/8°NW	97.53	2.04	0.14	0.032	0.047	212	23	111
13753	RA(?)	3	Wackestone, as above	93.70	5.75	0.24	0.048	0.066	218	27	<100
13752	RA(?)	3	Wackestone, as above, attitudes of bedding 90°/15°N, 70°/26°NW	88.65	10.19	0.23	0.055	0.056	225	34	117
Section 99-5: 1 km northeast of Simon Peak, on main ridge north of Limestone Creek (UTM 5759697N, 605667E)											
13741	RA	2¼	Calcarenite, light-grey fresh and weathered, coarse-grained, thick-bedded to massive	98.69	0.81	0.18	0.04	0.137	254	24	<100
13740	RA	2¼	Calcarenite, as above	98.34	1.22	0.15	0.04	0.105	190	31	<100
13739	RA	2¼	Calcarenite, as above	97.92	0.98	0.12	0.033	0.027	170	27	<100
13738	RA	2¾	Calcarenite light-grey fresh and weathered, very coarse-grained, attitude of bedding 146°/40°SW	96.54	2.97	0.1	0.033	0.219	217	26	<100
13737	RA	1¾	Calcarenite medium- to light-grey, coarse-grained, massive; upper ¼ m is dolomitic, brownish-grey, fine-grained	89.64	9.63	0.28	0.07	0.181	220	35	202
Section 99-6: 200 m south of Simon Peak (UTM 5758894N, 604894E)											
13751	RA	2¾	Wackestone to mudstone, medium- to dark brownish-grey, well-bedded, beds 1 to 15 cm thick, attitude of bedding 150°/21°SW	98.36	1.14	0.19	0.02	0.143	347	20	<100
13750	RA	3	Wackestone to mudstone, medium-grey fresh, brownish-grey weathered, beds 5 to 30 cm thick, attitude of bedding 166°/21°SW, attitude of joints 165°/85°NE	97.93	1.31	0.19	0.025	0.036	307	17	<100
-	RA	3¼	covered	-	-	-	-	-	-	-	-
13749	RA	1¾	Wackestone, medium-grey, beds up to 30 cm thick, poorly-exposed within 40° hillside	87.54	10.86	0.96	0.114	0.256	308	32	128
-	RA	½	covered	-	-	-	-	-	-	-	-

APPENDIX 3: CONTINUED

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
Section 99-6 (continued)											
13748	RA	1¾	Wackestone, light buff-grey fresh, exposed in vertical cliff	94.30	4.49	0.55	0.066	0.094	314	22	<100
13747	RA	3¾	Dolomitic limestone, poorly-exposed, brownish-grey, fine-grained; uppermost 1 m is wackestone to mudstone, light-grey, grains to 3 mm; 1½ covered within interval	75.86	22.54	1.14	0.122	0.095	214	39	199
13746	RA	1½	Wackestone, medium-grey fresh, buff-grey weathered, with calcite crystals up to 2 mm; exposed in step-like outcrops	93.86	4.96	0.63	0.107	0.166	426	26	124
13745	RA	3	Calcarenite, light-grey fresh and weathered, coarse-grained at base grading upward into lighter-grey wackestone; exposed in step-like outcrops	92.29	6.30	0.53	0.075	0.052	316	30	<100
13744	RA	3	Calcarenite, light-grey fresh and weathered, coarse-grained, thick-bedded to massive	94.17	4.80	0.22	0.043	0.062	235	28	138
13743	RA	3½	Calcarenite, as above, massive	98.40	0.98	0.14	0.05	0.039	238	23	119
13742	RA	2¾	Calcarenite, as above, massive	95.62	3.24	0.22	0.094	0.051	218	29	142
Section 99-7: West of Limestone Creek, 2.4 km due south of Simon Peak (UTM 5756667N, 604848E)											
-	RA(?)	1¾	Limestone, dark-grey, micritic, thin-bedded	-	-	-	-	-	-	-	-
-	RA(?)	1	recessive unit	-	-	-	-	-	-	-	-
-	RA(?)	1¾	Limestone, dark-grey, micritic, thin-bedded	-	-	-	-	-	-	-	-
-	RA(?)	1	recessive unit	-	-	-	-	-	-	-	-
13789	RA	5¼	Limestone, dark-grey, micritic, beds 5 to 25 cm thick, attitude of bedding 115°/20° SW, attitude of joints 160°/75° E, 80°/87° S, joints spaced 2 to 10 cm apart	88.72	9.39	0.5	0.095	0.08	295	28	129
13788	RA	2½	Limestone, dark-grey to black, fine-grained to cryptocrystalline, attitude of bedding 148°/20° SW, fault 90°/87° S	74.53	19.79	4.49	0.148	0.122	198	36	441
13787	RA	2¼	Limestone, medium dark -grey, fine-grained, thin-bedded, resistant, attitude of bedding 150°/20° SW	91.43	7.30	0.63	0.046	0.074	254	25	172
-	RA	1¼	Limestone, as above (not sampled)	-	-	-	-	-	-	-	-
-	RA	3½	covered, recessive unit	-	-	-	-	-	-	-	-

APPENDIX 3: CONTINUED

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
Section 99-7 (continued)											
13786	RA	4¼	Calcarenite, medium- to dark-grey fresh, medium-grey weathered, medium- to coarse-grained, resistant, beds 30 to 50 cm thick	96.24	2.25	0.38	0.033	0.049	343	22	<100
13785	RA	5¼	Wackestone, medium- to dark greyish-brown fresh, light brownish-grey weathered, fine- to medium-grained, recessive interval on cliff face	78.25	12.62	6.18	0.118	1.21	253	126	<100
13784	RA	2¾	Calcarenite, light brownish-grey fresh, medium-grey weathered, fine- to medium-grained with few black crystals, thin-bedded, recessive, abundant joints	89.90	8.44	0.54	0.079	0.113	259	23	220
13783	RA	1½	Calcarenite, light-grey fresh, coarse-grained, attitude of bedding 160°/22° SW	92.98	5.84	0.48	0.06	0.042	286	21	<100
-	RA	5	covered	-	-	-	-	-	-	-	-
13782	RA	1½	Limestone, light tan-grey fresh, medium- to fine-grained, a few thin layers of calcarenite, beds 15 to 50 cm thick, abundant joints	78.27	20.83	0.59	0.07	0.068	166	37	137
13781	RA	6½	Calcarenite, very light brownish-grey fresh, coarse-grained, massive, abundant joints spaced 20-30 cm apart, attitude of bedding 150°/20° SW	97.15	1.75	0.24	0.043	0.095	260	27	<100
13780	RA	1¾	Calcarenite, light-grey fresh, coarse-grained, massive to thick-bedded, crumbly, attitude of bedding 130°/20° SW	98.56	0.91	0.21	0.037	0.092	265	20	111
13779	RA	1¾	Calcarenite, light brownish-grey fresh, very coarse-grained, massive, fossiliferous, attitude of bedding 140°/15° SW, attitudes of closely-spaced joints 115°/65° NE, 125°/55° NE, 28°/80° SE	98.33	0.85	0.23	0.044	0.154	265	20	<100
13778	RA	2	Calcarenite, very light-grey fresh, coarse-grained, crumbly, massive	95.28	3.38	0.31	0.072	0.059	244	26	127
13777	RA	2	Calcarenite, light-grey fresh and weathered, coarse to very coarse-grained, massive, slightly crumbly	84.71	12.24	1.4	0.333	0.181	220	53	139
13776	Banff	3	Dolomitic Limestone, medium brownish-grey fresh, white to light-grey weathered, fine- to very fine-grained, sharp upper contact	55.17	27.21	9.37	1.382	3.935	185	462	<100

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
Section 99-7': North side of Limestone Creek 1.8 km upstream of its confluence with Limestone Creek (UTM 5759818N, 608152E)											
-	-	~1	mostly-covered, ledge at top of cliff section	-	-	-	-	-	-	-	-
14317	RA	4	Limestone, dark-grey fresh, light- to medium-grey weathered, fine-grained to cryptocrystalline matrix, abundant white calcite blebs give a characteristic spotty appearance, slightly recessive, attitude of bedding 165°/25° SW	97.20	1.60	0.68	0.095	0.058	293	27	<100
14316	RA	2¼	Limestone, as above, more resistant cliff-forming, attitude of joints 70°/87° NW	97.45	1.31	0.82	0.101	0.085	300	28	<100
14315	RA	3	Limestone, as above, vertical cliff face, joints spaced from 1 to 20 cm, attitude of joints 70°/87° NW	93.30	4.79	1.04	0.105	0.071	339	25	<100
-	RA	1	Dolostone, blocks and fragments	-	-	-	-	-	-	-	-
14314	RA	2¾	Limestone, medium- to dark-grey fresh, light- to medium-grey weathered, fine-grained, beds ~40 cm thick with 3 to 7 cm thick laminated intervals, attitude of bedding 12°/23° W	76.87	19.30	2.21	0.241	0.173	560	51	<100
-	RA	5½	covered, recessive	-	-	-	-	-	-	-	-
14313	RA	3	Limestone, medium- to dark-grey fresh, light-grey weathering, fine-grained to cryptocrystalline, finely-laminated intervals, attitude of bedding 20°/17° W	88.01	10.40	0.82	0.091	0.069	551	29	<100
14312	RA	2	Limestone, as above	91.68	7.16	0.65	0.081	0.095	581	24	152
-	RA	6¾	covered, recessive, blocks of vuggy dolostone	-	-	-	-	-	-	-	-
14311	RA	3	Calcarenite, light- to medium-grey fresh and weathered, medium-grained to cryptocrystalline, partly covered outcrop, attitude of bedding 30°/20° NW	98.45	0.88	0.31	0.027	0.023	472	17	<100
14310	RA	2	Calcarenite, light-grey, cryptocrystalline with very coarse-grained interlayers, massive	98.14	1.02	0.4	0.054	0.041	475	18	<100
14309	RA	2¼	Calcarenite, medium-grey, fine- to medium-grained, highly tectonized	96.10	2.89	0.62	0.076	0.064	396	23	106
14308	RA	2	Calcarenite, medium-grey, fine- to medium-grained, vertical cliff-face, highly-tectonized, attitude of bedding 130°/18°NE, attitude of joints 55°/85°NW, and 140°/70°SE	98.38	0.94	0.36	0.063	0.05	351	21	<100

Section 99-7' (continued)

APPENDIX 3: CONTINUED

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
14307	RA	2	Calcarenite, medium-grey fresh, pale-grey to buff weathered, fine- to medium-grained, crumbly, no definite bedding, vertical cliff-face	97.09	1.05	0.44	0.068	0.053	363	23	154
14306	RA	3	Calcarenite, light- to medium-grey, fine- to medium-grained, highly-tectonized, vertical cliff-face, crumbly	95.15	4.00	0.46	0.059	0.051	319	27	<100
14305	RA	2	Calcarenite, light- to medium-grey, fine- to medium-grained, very tectonized, vertical cliff-face, crumbly	97.52	1.06	0.46	0.052	0.037	362	23	<100
-	RA	1½	covered, possible fault zone	-	-	-	-	-	-	-	-
14304	RA	1½	Calcarenite, light-grey fresh and weathered, coarse-grained with medium- and fine-grained interlayers, partly-covered, tectonized	79.59	19.59	0.46	0.056	0.103	182	45	<100
14303	RA	2¼	Calcarenite, light- to medium-grey fresh, buff weathered, coarse-grained, very tectonized, slightly recessive, attitude of bedding 167°/10°NE	96.73	2.25	0.36	0.039	0.096	274	29	<100
14302	RA	2	Calcarenite, as above	97.85	0.93	0.35	0.033	0.119	294	27	<100
14301	RA	2	Calcarenite, medium-grey fresh, buff weathered, coarse-grained, very tectonized, fetid odor, no definite bedding, friable, the bottom 1 m less tectonized, typical sandy superficial alteration	98.25	0.96	0.24	0.022	0.059	314	28	<100
-	Banff	2	covered	-	-	-	-	-	-	-	-
14318	Banff	2	Calcarenite to wackestone, medium-grey fresh, buff weathered, medium-grained, tectonized	94.43	0.85	4.43	0.031	0.033	388	22	129
-	Banff	~4	covered	-	-	-	-	-	-	-	-
14319	Banff	1½	Calcarenite to wackestone, light- to medium-grey fresh, buff weathered, fine- to medium-grained, sugary texture, less tectonized, attitude of bedding 133°/30°SW	85.58	8.25	3.97	0.51	0.264	349	74	<100

Section 99-8: Along ridge of Limestone Mountain 630 m southwest of fire lookout tower at peak (UTM 5754606N, 607606E)

APPENDIX 3: CONTINUED

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
-	RA	-	covered, recessive	-	-	-	-	-	-	-	-
14226	RA	2½	Limestone, medium- to dark-grey fresh, light-grey weathered, very fine-grained to cryptocrystalline matrix with numerous small blebs 2 to 7 mm in size giving spotty appearance, isolated larger blebs 2 and 3 cm across, beds 12 to 40 cm thick, joints spaced 1 to 10 cm apart, attitude of bedding 130°/15° SW, attitude of joints 30°/87° NW	97.11	1.18	0.79	0.089	0.053	313	21	<100
14227	RA	3	Limestone, as above	93.51	4.57	0.84	0.112	0.066	359	26	<100
-	RA	¾	covered	-	-	-	-	-	-	-	-
14228	RA	1¼	Limestone, as above, light- to medium-grey	96.02	2.18	0.95	0.106	0.128	405	24	<100
Section 99-9: Along ridge of Limestone Mountain 425 - 640 m west from fire lookout tower at peak (UTM 5755394N, 607545E)											
14234	RA	1¾	Limestone, attitude of bedding 52°/10°SE, attitude of strong cleavage 110°/90°	92.54	5.98	0.61	0.078	0.068	259	31	<100
14233	RA	2	Limestone, attitude of bedding 75°/10°SE	94.48	4.20	0.5	0.06	0.078	293	31	<100
14232	RA	2	Limestone, spotty white calcite blebs to 7 cm, bedding orientation 68°/11°SE	97.22	1.26	1.05	0.094	0.12	319	24	<100
14231	RA	2	Limestone, attitude of bedding 77°/10°SE	95.80	1.81	1.37	0.136	0.061	395	23	<100
14230	RA	2	Limestone, attitude of bedding 70°/10°SE	86.73	10.20	0.99	0.153	0.149	314	32	<100
14229	RA	2	Limestone, base of uppermost resistant cliff within Pekisko Formation	80.01	17.16	1.5	0.231	0.155	271	44	<100
14235	RA	1½	Dolostone	66.06	33.13	0.44	0.073	0.12	148	59	<100
14236	RA	2½	Dolomitic limestone, layered	70.81	28.30	0.58	0.069	0.07	203	41	108
-	RA	2	covered	-	-	-	-	-	-	-	-
14249	RA	1½	Limestone, medium- to dark-grey, fine-grained	77.77	20.77	1.13	0.05	0.141	254	41	<100
-	RA	4¼	covered, same strata as cliffs of thin-bedded dolostone farther south	-	-	-	-	-	-	-	-
14248	RA	2¼	Calcarenite, medium- to fine grained; fine-grained, very dark-grey at top, attitude of bedding 122°/15° SW; top of middle resistant cliff within Pekisko Formation	97.92	1.19	0.21	0.021	0.179	387	18	<100
14247	RA	2¼	Calcarenite, medium-grey, medium-grained	97.44	1.16	0.34	0.03	0.075	329	20	<100

Section 99-9 (continued)

APPENDIX 3: CONTINUED

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
14246	RA	4	Limestone, medium-grey, medium- to fine-grained, very fossiliferous, attitude of bedding 70°/7° SE; base of middle resistant cliff within Pekisko Formation	89.98	1.70	6.69	0.049	0.594	332	56	<100
-	RA	1¼	covered, vuggy dolostone blocks and fragments	-	-	-	-	-	-	-	-
14245	RA	1½	Dolomitic limestone, light-grey, coarse-grained, vuggy	76.73	22.29	0.47	0.06	0.078	181	41	<100
14244	RA	1½	Calcarenite, light-grey, very coarse-grained, massive	96.77	2.21	0.27	0.045	0.036	262	25	<100
14243	RA	3	Calcarenite, light-grey, very coarse-grained, massive	98.60	0.73	0.23	0.03	0.051	282	27	<100
14242	RA	3	Calcarenite, light-grey, very coarse-grained, massive	98.33	0.67	0.17	0.05	0.043	270	27	<100
14241	RA	3	Calcarenite, light-grey, coarse-grained, massive, attitude of bedding 50°/10° SE	98.74	0.66	0.25	0.044	0.047	224	33	<100
14240	RA	3	Calcarenite, light-grey, coarse-grained, locally oolitic, massive	98.23	0.74	0.22	0.032	0.032	267	26	<100
14239	RA	2¼	Calcarenite, light-grey, very coarse-grained, massive	98.19	0.75	0.2	0.039	0.038	225	34	<100
14238	RA	3	Calcarenite, light-grey, coarse-grained, massive	97.60	0.84	0.24	0.039	0.026	272	22	<100
14237	RA	1	Calcarenite, light-grey, coarse-grained, tectonized, base of lowermost cliff within Pekisko Formation	98.28	0.98	0.21	0.039	0.037	340	37	<100
-	Banff	-	Limestone, dark-grey, micritic, bioclasts of white calcite	-	-	-	-	-	-	-	-
Section 99-10: Along ridge of Limestone Mountain 410 - 560 m north of fire lookout tower at peak (UTM 5755697N, 607939E)											
13770	RA	3	Limestone, buff- to dark-grey fresh and weathered, micritic, finely-laminated, beds to ¾ m thick	89.89	8.92	0.6	0.094	0.275	276	25	<100
13769	RA	6	Limestone, dark greyish-brown fresh, medium brownish-grey weathered, micritic, recessive, platy, rubbly, few finely-laminated beds	64.39	32.04	2.09	0.254	0.237	194	54	151
-	RA	-	offset 30 m @ 170° down 10° slope (along bedding surface)	-	-	-	-	-	-	-	-
13768	RA	5¼	Wackestone, medium-grey fresh, light-grey weathered; top of middle resistant unit within Pekisko Formation	97.86	1.31	0.59	0.033	0.056	381	17	<100

Section 99-10 (continued)

APPENDIX 3: CONTINUED

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
13767	RA	7¼	Calcarenite, light-buff-grey weathered and fresh, fine-grained, somewhat recessive; lower ½-m is light-grey weathered and fresh, medium- to coarse-grained	78.07	20.51	0.74	0.105	0.067	208	32	172
13766	RA	5¼	Calcarenite, light-grey weathered and fresh, grains to 3 mm, massive, abundant shell fragments, bedding obscure	96.47	2.17	0.34	0.046	0.026	261	21	<100
13765	RA	6¼	Calcarenite, as above	98.12	1.08	0.24	0.036	0.024	241	21	<100
13764	RA	6¼	Calcarenite, light-grey weathered and fresh, medium-grained, massive, abundant shell fragments; outcrop extremely fractured and broken up	98.26	0.83	0.23	0.041	0.027	258	25	131
13763	RA	3	Wackestone, light-grey weathered and fresh, fine-grained, beds to 1 m thick, abundant horn corals in lower part	94.93	3.30	1.05	0.188	0.22	331	41	<100
-	Banff	-	Limestone, platy, dark-grey, micritic	-	-	-	-	-	-	-	-
Section 99-11: East side of Pine Creek (UTM 610875, 5757178)											
14326	RA	2½	Calcarenite, medium- to dark-grey, coarse-grained, attitude of bedding 147°/77°NE	86.11	12.37	1.13	0.082	0.08	257	28	488
-	RA	1¼	mostly covered, dolomite boulders where exposed	-	-	-	-	-	-	-	-
14325	RA	2¼	Limestone, medium-grey fresh and weathered, fine- to medium-grained, with isolated calcite crystals up to 7 mm, attitude of bedding 155°/70° NE	72.62	8.11	13.15	0.187	1.588	357	155	<100
-	RA	4½	covered	-	-	-	-	-	-	-	-
14324	RA	3¼	Limestone, light- to brownish-grey fresh, buff weathered, fine- to medium-grained, locally coarse-grained, attitude of bedding 145°/67°NE	75.55	22.27	1.01	0.131	0.165	194	36	126
-	RA	1½	covered, offset upslope approx. 7 m	-	-	-	-	-	-	-	-
14323	RA	2	Calcarenite, light-grey fresh, medium grey weathered, partly covered	92.74	5.65	0.55	0.056	0.055	260	33	<100
14322	RA	2½	Calcarenite, light-grey fresh and weathered, coarse-grained, attitude of bedding 142°/75° NE, attitude of joints 45°/55° NW	98.70	0.73	0.21	0.034	0.038	263	26	<100
14321	RA	2¼	Calcarenite, as above	96.97	2.45	0.33	0.056	0.043	249	29	<100

Section 99-11 (continued)

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
14320	Pek-GM	2½	Calcarenite, as above	97.94	1.43	0.29	0.044	0.033	280	26	<100
-	Banff	-	covered, limestone blocks and fragments	-	-	-	-	-	-	-	-
Section 99-12: Southern flank of westerly-trending ridge near northwest end of Corkscrew Mountain (UTM 5762630N, 615362E)											
13810	RA	2¼	Calcarenite, medium brownish-grey fresh, medium-grey weathered, coarse-grained, fossiliferous	86.17	9.38	2.21	0.067	0.065	257	27	230
13811	RA	2¼	Calcarenite, light-grey fresh, medium-grey weathered, coarse-grained, thick-bedded to massive, attitude of bedding 175°/10° W	97.29	1.18	0.81	0.038	0.044	295	21	<100
13812	RA	3½	Calcarenite, light-grey fresh, medium-grey weathered, coarse-grained, thick-bedded; ¼ m at top is fine- to medium-grained limestone; 1-m thick vuggy interval 2 m up from base	93.52	4.45	0.81	0.071	0.038	296	20	249
-	RA	~8¼	covered	-	-	-	-	-	-	-	-
13813	RA	3	Calcarenite, light brownish-grey fresh, medium-grey weathered, coarse-grained, massive, crumbly, attitude of bedding 95°/5° N	89.83	8.83	0.54	0.059	0.191	217	30	<100
13814	RA	2½	Calcarenite, light-grey fresh, coarse-grained, massive, attitude of bedding 175°/10° W	97.50	1.09	0.31	0.035	0.031	251	22	<100
13815	RA	2½	Calcarenite, light-grey fresh, coarse-grained, beds 5-15 cm thick, attitude of joints 70°/87° N	98.09	0.88	0.3	0.039	0.036	270	21	<100
13816	RA	2	Calcarenite, light-grey fresh, coarse-grained, numerous stylolites, attitude of bedding 70°/15° N	95.77	2.18	0.41	0.085	0.056	242	28	122
13817	RA	2½	Calcarenite, light-grey fresh, coarse-grained, massive, attitude of bedding 68°/7° N	97.87	0.80	0.2	0.068	0.031	241	30	<100
13818	RA	2¾	Calcarenite, as above, crumbly, slightly recessive	97.37	0.91	0.19	0.024	0.025	263	24	158
-	Banff	-	covered	-	-	-	-	-	-	-	-

Section 99 - 13: South end of Corkscrew Mountain, east limb of Marble Mountain Anticline (UTM 5759954N, 619523E)

APPENDIX 3: CONTINUED

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
-	RA	-	Dolomite, fine-grained, recessive	-	-	-	-	-	-	-	-
13819	RA	1	Wackestone, light brownish-grey fresh, buff weathered, crumbly, attitude of bedding 152°/58° NE	93.10	5.52	0.5	0.059	0.165	289	30	<100
13820	RA	2½	Calcarenite, light brownish-grey fresh, light-grey weathered, coarse-grained, fossiliferous, massive	98.00	0.84	0.44	0.046	0.06	315	24	<100
13821	RA	3¼	Calcarenite, light brownish-grey, light-grey weathered, massive, attitude of bedding 150°/65° NE	95.36	2.95	0.5	0.08	0.056	297	22	204
13822	RA	4	Dolostone, light-brown fresh and weathered, coarse-grained, vugs up to 8 cm, attitude of bedding 152°/57° NE	66.99	31.34	0.66	0.126	0.258	118	44	<100
13823	RA	1¼	Calcarenite, light brownish-grey, light-grey weathered, coarse-grained	94.99	3.27	0.43	0.07	0.046	258	23	128
13824	RA	2	Dolostone, light-brown fresh and weathered, fine-grained matrix with isolated clasts up to 7 mm, vuggy	72.63	25.36	0.55	0.099	0.094	134	43	317
13825	RA	½	Dolomitic wackestone, light-brown fresh and weathered	92.01	5.52	0.46	0.041	0.049	186	26	<100
13826	RA	3	Calcarenite, light brownish-grey fresh, light-grey weathered, medium- to coarse-grained, attitude of bedding 153°/56° NE	98.29	0.97	0.25	0.031	0.143	230	21	<100
13827	RA	3	Calcarenite, light brownish-grey, light-grey weathered, coarse-grained, massive, fossiliferous	97.72	0.79	0.22	0.032	0.176	246	23	<100
13828	RA	5	Calcarenite, light brownish-grey, light-grey weathered, coarse-grained, fossiliferous, attitude of bedding 160°/55° NE	97.16	0.87	0.13	0.027	0.093	293	20	<100
13829	RA	1	Calcarenite, as above	98.11	0.86	0.15	0.034	0.037	293	22	<100
-	Banff	-	covered	-	-	-	-	-	-	-	-
Section 99-14: North end of Marble Mountain, east limb of Marble Mountain Anticline (UTM 5757670N, 620626E)											
14343	RA	1½	Calcarenite, light-grey fresh, light- to medium-grey weathering, coarse-grained, attitude of bedding 160°/75° NE	98.70	0.77	0.25	0.042	0.049	254	28	<100
Section 99-15: North end of Marble Mountain, west limb of Marble Mountain Anticline (UTM 5757393N, 620364E)											

APPENDIX 3: CONTINUED

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
-	RA	-	covered	-	-	-	-	-	-	-	-
14342	RA	2	Calcarenite, light brownish-grey, medium-grained with coarse-grained interlayers, locally oolitic, 4-m high cliff face parallel to bedding, attitude of bedding 157°/67°SW	98.49	0.97	0.24	0.044	0.055	308	18	<100
14341	RA	1¾	Calcarenite, light brownish-grey, medium-grained, attitude of bedding 150°/65°SW, attitude of joints 55°/50°SE	98.39	0.97	0.33	0.062	0.037	286	27	<100
-	RA	1½	covered	-	-	-	-	-	-	-	-
14340	RA	¾	Calcarenite, light brownish-grey fresh, medium-grained	98.57	0.97	0.18	0.027	0.035	277	32	<100
-	RA	1¾	covered, few dolomitic limestone blocks	-	-	-	-	-	-	-	-
14339	RA	1¾	Limestone, dark-grey, fine-grained to cryptocrystalline matrix with white calcite blebs giving spotty appearance	96.64	1.36	1.41	0.188	0.115	316	72	<100
14338	Banff	2	partly-covered, dolomitic limestone, light brownish-grey fresh, medium-grey weathered, fine- to medium-grained	87.81	8.88	2.38	0.371	0.223	281	67	<100
Section 99-16: Moose Creek, east limb of Marble Mountain Anticline (UTM 5755208N, 622050E)											
-	RA	-	covered, recessive								
14335	RA	2	Calcarenite, light-grey fresh, coarse-grained, 3-4 m high cliff parallel to bedding, attitude of bedding 150°/67°NE, joints spaced 5 to 10 cm apart with very consistent orientation at 150°/25°SW	97.24	2.07	0.44	0.044	0.024	244	22	<100
14336	RA	2	Calcarenite, as above	98.42	0.97	0.32	0.049	0.046	251	30	<100
14337	RA	2¼	Calcarenite, as above, partly-covered	98.52	0.89	0.3	0.036	0.067	264	25	<100
-	RA	-	covered, recessive								

Section 99-17: Crest of Marble Mountain north of southernmost peak, east limb of Marble Anticline

APPENDIX 3: CONTINUED

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
14327	RA	3	Pisolitic limestone, medium-grey fresh and weathered, attitude of bedding, 148°/50°NE	92.90	5.10	1.49	0.134	0.078	654	31	<100
14328	RA	½	Limestone, alternating light brownish-grey and medium-grey layers approx. 10 cm thick, attitude of bedding 140°/43° NE	81.92	16.22	1.32	0.166	0.131	317	56	<100
-	RA	1½	partly-covered, dolostone, recessive	-	-	-	-	-	-	-	-
14329	RA	1	Limestone, alternating light brownish-grey and medium-grey layers approx. 10 cm thick	89.71	7.22	2.5	0.213	0.086	261	29	<100
-	RA	¾	covered	-	-	-	-	-	-	-	-
14330	RA	2½	Limestone, medium-grey fresh and weathered, fine-grained	94.13	5.13	0.42	0.074	0.071	230	27	<100
-	RA	1	covered	-	-	-	-	-	-	-	-
14331	RA	2	Limestone, as above, massive	93.86	4.61	1.08	0.132	0.045	400	26	<100
-	RA	1	covered	-	-	-	-	-	-	-	-
14332	RA	2	Limestone, as above, attitude of bedding 180°/30° E	69.47	26.64	2.55	0.353	0.193	357	67	<100
-	RA	2½	covered	-	-	-	-	-	-	-	-
14333	RA	2	Limestone, as above, massive	93.88	3.90	1.58	0.168	0.111	333	38	<100
14334	RA	2¼	Limestone, as above, with white diaclase, massive	92.54	5.30	1.52	0.157	0.084	439	34	<100
Section 99-18: South end of Marble Mountain, east limb of Marble Mountain Anticline along the road											
13809*	F-NM	5	Limestone, black fresh, light-grey to white weathered, very fine-grained to cryptocrystalline, platy, very hard	56.42	5.88	32.41	0.719	1.902	322	231	2713
-	RA / F	~99	covered	-	-	-	-	-	-	-	-
13801*	RA	9	Calcarenite, blocks and fragments, dark-grey fresh, medium-grey weathered, coarse-grained	94.13	4.26	0.78	0.097	0.031	600	21	<100
13800*	RA	8½	Calcarenite (75%), dark-grey fresh, medium-grey weathered, coarse-grained; dolomite (25%), light brown fresh, buff weathered, micritic	90.12	8.41	0.53	0.06	0.047	291	23	147
-	RA	~33	covered	-	-	-	-	-	-	-	-

Section 99-18 (Continued)

Sample	Unit	Strat. Thick. (m)	Description	$CaCO_3$ %	MgCO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	SrO ppm	MnO ppm	P_2O_5 ppm
13799	RA	5	Calcarenite, light- to medium-grey fresh, medium-grey weathered, coarse-grained, beds 15 to 40 cm thick, attitude of bedding 170°/87° E, consistent set of joints spaced 2-15 cm apart with attitude 58°/50-90° NW	98.31	0.93	0.31	0.06	0.096	260	37	<100
Section 99 - 18': South end of Marble Mountain, west limb of Marble Mountain Anticline along the road											
-	RA	-	Limy Chert, black, cryptocrystalline	-	-	-	-	-	-	-	-
-	RA	~11¾	covered, not sampled	-	-	-	-	-	-	-	-
13806	RA	1½	Limestone, light-grey, fine-grained, white calcite stringers; dark-grey, micritic at base with white calcite patches, attitude of bedding 140°/28° SW	96.07	1.88	1.25	0.141	0.13	308	20	<100
-	RA	2	covered	-	-	-	-	-	-	-	-
13807	RA	2	Limestone, light-grey fresh, buff to white weathered, numerous dark clasts in a cryptocrystalline matrix	85.92	12.73	0.41	0.069	0.061	211	28	<100
-	RA	~5	covered	-	-	-	-	-	-	-	-
13808	RA	1½	Limestone, medium-grey, fine-grained, partly-mottled, white blebs of secondary calcite up to 5 cm diameter, attitude of bedding 130°/35° SW	92.28	5.10	0.59	0.093	0.075	265	21	157
-	RA	~31	covered	-	-	-	-	-	-	-	-
13805	RA	1	Wackestone, medium to dark-grey fresh, medium-grey weathered, vuggy	91.38	7.76	0.53	0.083	0.084	234	26	86
13804	RA	3	Calcarenite, medium-grey fresh and weathered, coarse-grained, beds 15 to 40 cm thick	97.85	0.85	0.25	0.039	0.05	234	24	<100
13803	RA	3	Calcarenite, light-grey fresh, medium-grey weathered, very coarse-grained, thick-bedded to massive	98.33	1.00	0.18	0.037	0.056	228	28	<100
13802	RA	3	Calcarenite, light-grey fresh, medium-grey weathered, medium- to coarse-grained, thick-bedded to massive, attitude of bedding 120°/25° SW	97.99	0.94	0.21	0.041	0.056	287	21	152
-	RA	~1 - 2	covered	-	-	-	-	-	-	-	-
-	Banff	-	covered	-	-	-	-	-	-	-	-

APPENDIX 4: CONCENTRATIONS OF CHEMICAL CONSTITUENTS IN THE 1997 AND 1999 SAMPLES FROM CLEARWATER AND LIMESTONE RANGES

Note: Samples are listed in order from stratigraphic top to bottom. They generally consist of chips at ¼- to ½-m intervals.
Abbreviations: Banff - Banff Formation; RA - Rundle Assemblage; F - Fernie Group, NM Nordegg Member

Section	Project Year	Sample	Formation Member	Strat. Thick. (m	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	$SrCO_3$ (ppm)	MnO (ppm)	P_2O_5 (ppm)	BaO (ppm)	K_2O (ppm)	Na_2O (ppm)	TiO_2 (ppm)	Cr_2O_3 (%)	LOI (%)	Total (%)
PRAIRIE CREEK - BASELINE RIDGE																			
97-1	1997	12278	RA(?)	~1¼	89.86	8.91	0.72	0.13	0.23	456	76	<70	30	561	131	67	-	43.98	99.98
97-2	1997	12279	RA(?)	~¾	87.45	10.61	1.31	0.29	0.15	409	78	<70	12	657	130	80	-	43.87	99.95
CORKSCREW MOUNTAIN (Fig. 5.1)																			
Southern Part of Oradea Ridge																			
99-13	1999	13819	RA	1	93.15	5.52	0.50	0.06	0.17	411	30	<100	8	277	119	30	-	44.03	99.48
99-13	1999	13820	RA	2½	98.05	0.84	0.44	0.05	0.06	449	24	<100	3	169	87	15	-	43.58	99.50
99-13	1999	13821	RA	3¼	95.41	2.95	0.50	0.08	0.06	423	22	204	7	342	111	32	-	43.67	99.11
99-13	1999	13822	RA	4	67.02	31.35	0.66	0.13	0.26	168	44	<100	10	576	150	73	-	45.89	99.51
99-13	1999	13823	RA	1¼	95.04	3.27	0.43	0.07	0.05	368	23	128	6	312	120	33	-	43.81	98.95
99-13	1999	13824	RA	2	72.67	25.37	0.55	0.10	0.09	191	43	317	7	460	161	51	-	45.29	98.91
99-13	1999	13825	RA	½	92.06	5.52	0.46	0.04	0.05	265	26	<100	6	174	121	20	-	43.72	98.19
99-13	1999	13826	RA	3	98.34	0.97	0.25	0.03	0.14	328	21	<100	6	130	128	14	-	43.49	99.79
99-13	1999	13827	RA	3	97.77	0.79	0.22	0.03	0.18	350	23	<100	7	131	118	16	-	43.89	99.05
99-13	1999	13828	RA	5	97.21	0.87	0.13	0.03	0.09	418	20	<100	7	104	126	13	-	43.97	98.41
99-13	1999	13829	RA	1	98.16	0.86	0.15	0.03	0.04	417	22	<100	4	140	102	58	-	43.92	99.31
Southwest Flank of Corkscrew Mountain																			
97-7	1997	12313	RA	2½	90.67	6.91	0.85	0.05	0.06	375	25	173	13	190	189	59	-	44.11	98.65
97-7	1997	12314	RA	1	83.82	13.20	0.96	0.11	0.06	332	29	236	13	532	152	199	-	44.00	98.31
97-7	1997	12315	RA	1½	83.71	15.04	0.84	0.11	0.06	315	25	183	22	507	169	246	-	44.38	99.90
97-7	1997	12316	RA	2	95.89	2.68	0.48	0.06	0.05	457	19	<70	14	257	140	39	-	43.47	99.25
97-8	1997	12321	RA	1	95.10	2.71	0.40	0.05	0.04	421	19	<70	18	209	182	28	-	44.28	98.40
97-8	1997	12320	RA	1½	94.37	4.79	0.53	0.06	0.04	421	19	294	16	233	164	43	-	44.08	99.91
97-8	1997	12319	RA	1¼	77.77	19.34	0.78	0.13	0.11	240	31	207	15	583	205	82	-	44.68	98.26
97-8	1997	12318	RA	1½	74.45	23.23	1.25	0.13	0.11	214	38	181	20	625	201	107	-	44.71	99.31
97-8	1997	12317	RA	¾	73.98	24.17	0.82	0.13	0.11	229	36	<70	16	554	199	95	-	44.96	99.30

APPENDIX 4: CONTINUED

Section	Project Year	Sample	Formation Member	Strat. Thick. (m	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	$SrCO_3$ (ppm)	MnO (ppm)	P_2O_5 (ppm)	BaO (ppm)	K_2O (ppm)	Na_2O (ppm)	TiO_2 (ppm)	Cr_2O_3 (%)	LOI (%)	Total (%)
CORKSCREW MOUNTAIN (Continued)																			
Southwest Flank of Corkscrew Mountain																			
97-9	1997	12322	RA	2	87.47	11.39	0.73	0.07	0.05	359	27	476	14	286	181	60	-	44.43	99.86
97-9	1997	12323	RA	¼	81.71	15.83	0.62	0.12	0.08	367	28	608	19	538	159	80	-	44.29	98.53
97-9	1997	12324	RA	3½	95.70	3.29	0.56	0.07	0.04	393	19	147	13	293	165	48	-	43.94	99.77
97-9	1997	12325	RA	3	96.11	2.98	0.34	0.05	0.06	383	22	73	14	206	176	30	-	44.09	99.64
97-9	1997	12326	RA	1½	91.73	7.42	0.38	0.06	0.09	326	23	<70	18	262	192	35	-	44.75	99.77
97-9	1997	12327	RA	¾	80.36	17.58	0.62	0.08	0.09	213	42	210	15	355	181	68	-	44.70	98.84
97-9	1997	12328	RA	3¾	97.13	2.23	0.31	0.05	0.06	354	24	<70	13	158	167	21	-	43.77	99.85
97-9	1997	12329	RA	3	98.51	0.99	0.25	0.05	0.05	376	24	<70	16	175	165	34	-	43.72	99.92
97-9	1997	12330	RA	3	97.41	2.12	0.25	0.06	0.04	358	29	<70	13	212	167	47	-	43.65	99.95
97-9	1997	12331	RA	1¾	96.67	2.87	0.24	0.06	0.08	356	36	<70	14	212	154	26	-	43.57	99.98
97-9	1997	12332	RA	1½	98.59	0.95	0.18	0.04	0.09	387	41	193	18	126	134	26	-	43.47	99.95
97-9	1997	12333	Banff	½	64.78	25.51	5.10	1.08	0.91	291	128	399	29	5461	294	440	-	42.20	98.08
97-10	1997	12334	RA	2	96.48	2.14	0.85	0.07	0.05	824	21	<70	48	357	130	62	-	43.56	99.72
97-10	1997	12335	RA	1 (nil)	96.99	1.24	0.45	0.05	0.03	499	19	108	28	240	119	201	-	43.46	98.88
97-10	1997	12336	RA	1½	96.93	1.95	0.79	0.11	0.07	442	22	188	23	522	123	61	-	43.47	99.99
97-10	1997	12337	RA	1	92.75	6.15	0.77	0.09	0.10	472	22	139	21	389	119	45	-	43.77	99.98
97-10	1997	12338	RA	2½	73.21	22.81	1.97	0.28	0.11	351	42	81	17	1409	218	205	-	44.19	98.61
97-10	1997	12339	RA	1½	85.46	12.84	1.29	0.13	0.08	408	26	137	28	703	145	77	-	44.17	99.96
97-10	1997	12340	RA	1	88.80	9.56	0.93	0.07	0.14	385	25	<70	24	231	169	50	-	43.74	99.59
97-10	1997	12341	RA	1¼	85.91	12.59	1.09	0.10	0.09	377	25	362	19	440	134	55	-	44.16	99.92
97-10	1997	12342	RA	1¾	93.92	3.23	1.03	0.07	0.05	429	18	283	17	305	162	62	-	43.71	98.43
97-10	1997	12343	RA	3½	95.71	3.37	0.45	0.06	0.07	412	23	160	15	228	170	30	-	43.93	99.77
97-10	1997	12344	RA	1½	68.84	29.34	0.56	0.10	0.09	185	40	96	18	409	182	58	-	45.36	99.02
97-10	1997	12345	RA	1¾	63.71	33.91	1.57	0.33	0.13	364	43	<70	23	1705	280	155	-	45.15	99.90
97-10	1997	12346	RA	4¼	90.18	8.94	0.55	0.06	0.05	309	29	165	24	260	181	229	-	43.85	99.90
97-10	1997	12347	RA	3½	98.50	0.99	0.23	0.05	0.09	375	46	<70	11	147	160	21	-	43.69	99.92
97-10	1997	12348	RA	4¾	98.78	0.83	0.09	0.03	0.11	370	42	191	18	85	155	14	-	43.96	99.93
97-10	1997	12349	RA	2	98.73	1.07	0.08	0.03	0.02	346	24	<70	25	70	130	31	-	43.44	99.99
97-10	1997	12350	RA	1	97.49	0.93	0.10	0.04	0.03	404	19	123	10	105	146	42	-	43.87	98.68
97-10	1997	12351	RA	3	98.81	0.91	0.11	0.03	0.06	487	21	<70	19	79	160	16	-	44.12	99.99

APPENDIX 4: CONTINUED

Section	Project Year	Sample	Formation Member	Strat. Thick. (m	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	$SrCO_3$ (ppm)	MnO (ppm)	P_2O_5 (ppm)	BaO (ppm)	K_2O (ppm)	Na_2O (ppm)	TiO_2 (ppm)	Cr_2O_3 (%)	LOI (%)	Total (%)
CORKSCREW MOUNTAIN (Continued)																			
99-12	1999	13810	RA	2¼	86.21	9.38	2.21	0.07	0.07	366	27	230	6	236	168	30	-	43.02	98.04
99-12	1999	13811	RA	2¼	97.34	1.18	0.81	0.04	0.04	420	21	<100	8	158	137	15	-	43.70	99.50
99-12	1999	13812	RA	3½	93.57	4.45	0.81	0.07	0.04	421	20	249	8	319	138	30	-	43.91	99.06
99-12	1999	13813	RA	3	89.88	8.83	0.54	0.06	0.19	309	30	<100	9	236	157	26	-	44.30	99.58
99-12	1999	13814	RA	~2½	97.55	1.09	0.31	0.04	0.03	358	22	<100	5	145	143	12	-	43.84	99.09
99-12	1999	13815	RA	2½	98.14	0.88	0.30	0.04	0.04	385	21	<100	9	157	138	13	-	43.83	99.48
99-12	1999	13816	RA	2	95.82	2.18	0.41	0.09	0.06	345	28	122	8	344	143	43	-	43.73	98.64
99-12	1999	13817	RA	2½	97.92	0.80	0.20	0.07	0.03	344	30	<100	7	101	105	7	-	43.72	99.08
99-12	1999	13818	RA	~2¾	97.42	0.91	0.19	0.02	0.03	375	24	158	6	137	109	6	-	43.79	98.65
MARBLE MOUNTAIN (Fig. 5.1)																			
99-14	1999	14343	RA	1½	98.75	0.77	0.25	0.04	0.05	362	28	<100	6	151	112	22		43.58	99.93
99-15	1999	14342	RA	2	98.54	0.97	0.24	0.04	0.06	439	18	<100	7	161	113	16		43.53	99.93
99-15	1999	14341	RA	1¾	98.44	0.97	0.33	0.06	0.04	408	27	<100	6	188	121	41		43.56	99.93
99-15	1999	14340	RA	¾	98.62	0.97	0.18	0.03	0.04	394	32	<100	6	104	133	10		43.50	99.91
99-15	1999	14339	RA	1¾	96.69	1.36	1.41	0.19	0.12	450	72	<100	10	1049	138	108		43.16	99.96
99-15	1999	14338	Banff	2	87.85	8.88	2.38	0.37	0.22	400	67	<100	15	2056	146	196		43.16	99.99
99-16	1999	14335	RA	2	97.29	2.07	0.44	0.04	0.02	348	22	<100	4	193	129	17		43.54	99.94
99-16	1999	14336	RA	2	98.47	0.97	0.32	0.05	0.05	358	30	<100	6	174	140	18		43.72	99.93
99-16	1999	14337	RA	2¼	98.57	0.89	0.30	0.04	0.07	376	25	<100	6	146	133	14		43.75	99.93
99-17	1999	14327	RA	3	92.95	5.10	1.49	0.13	0.08	931	31	<100	14	690	144	86		43.58	99.94
99-17	1999	14328	RA	½	81.96	16.22	1.32	0.17	0.13	451	56	<100	11	778	145	102		44.26	99.95
99-17	1999	14329	RA	1	89.76	7.22	2.50	0.21	0.09	372	29	<100	11	1195	132	155		42.87	99.97
99-17	1999	14330	RA	2½	94.18	5.13	0.42	0.07	0.07	327	27	<100	7	315	94	34		43.66	99.95
99-17	1999	14331	RA	2	93.91	4.61	1.08	0.13	0.05	570	26	<100	7	715	144	77		43.69	99.93
99-17	1999	14332	RA	2	69.51	26.65	2.55	0.35	0.19	509	67	<100	21	1665	163	212		44.24	99.52
99-17	1999	14333	RA	2	93.93	3.90	1.58	0.17	0.11	475	38	<100	10	875	175	110		43.27	99.85
99-17	1999	14334	RA	2¼	92.59	5.30	1.52	0.16	0.08	626	34	<100	12	872	166	105		43.44	99.83

APPENDIX 4: CONTINUED

Section	Project Year	Sample	Formation Member	Strat. Thick. (m	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	$SrCO_3$ (ppm)	MnO (ppm)	P_2O_5 (ppm)	BaO (ppm)	K_2O (ppm)	Na_2O (ppm)	TiO_2 (ppm)	Cr_2O_3 (%)	LOI (%)	Total (%)
MARBLE MOUNTAIN (Continued)																			
99-18	1999	13809	F - NM	5	56.45	5.88	32.41	0.72	1.90	458	231	2713	131	2810	426	383		27.00	98.08
99-18	1999	13801	RA	8¾	94.18	4.26	0.78	0.10	0.03	854	21	<100	10	476	145	47		43.80	99.50
99-18	1999	13800	RA	8½	90.17	8.41	0.53	0.06	0.05	414	23	147	7	270	137	25		44.25	99.32
99-18	1999	13799	RA	5	98.36	0.93	0.31	0.06	0.10	370	37	<100	8	235	132	41		43.67	99.83
99-18'	1999	13806	RA	1½	96.12	1.88	1.25	0.14	0.13	439	20	<100	13	695	118	78	-	43.48	99.66
99-18'	1999	13807	RA	2	85.96	12.73	0.41	0.07	0.06	301	28	<100	13	266	101	28	-	44.58	99.30
99-18'	1999	13808	RA	1½	92.33	5.10	0.59	0.09	0.08	377	21	157	16	421	119	42	-	44.00	98.31
99-18'	1999	13805	RA	1	91.43	7.76	0.53	0.08	0.08	334	26	86	8	326	182	33	-	44.26	99.98
99-18'	1999	13804	RA	3	97.90	0.85	0.25	0.04	0.05	333	24	<100	6	127	177	10	-	44.11	99.15
99-18'	1999	13803	RA	3	98.38	1.00	0.18	0.04	0.06	325	28	<100	6	126	168	10	-	43.85	99.72
99-18'	1999	13802	RA	3	98.04	0.94	0.21	0.04	0.06	409	21	152	6	119	160	14	-	43.68	99.37
IDLEWILDE MOUNTAIN (Fig. 7.1)																			
Cutoff Creek																			
97-5	1997	12307	RA	4½	63.33	28.49	5.01	0.52	0.30	387	48	269	51	2955	179	298	-	43.16	98.07
97-5	1997	12306	RA	3	76.10	11.02	12.46	0.08	0.20	366	30	410	11	374	166	36	-	38.61	99.99
97-5	1997	12305	RA	6	76.77	21.30	1.48	0.16	0.05	306	24	413	8	885	185	78	-	44.56	99.95
97-5	1997	12304	RA	3	87.26	11.49	0.89	0.10	0.04	351	21	181	6	465	155	39	-	43.95	99.90
97-5	1997	12303	RA	3½	69.05	29.52	1.01	0.15	0.08	208	35	<70	21	843	178	77	-	45.15	99.95
97-5	1997	12302	RA	¾	69.08	29.50	1.01	0.14	0.06	205	38	<70	12	724	165	66	-	45.21	99.91
97-5	1997	12301	RA	4½	92.92	5.88	0.83	0.11	0.05	326	30	<70	13	265	137	27	-	43.87	99.88
97-5	1997	12300	RA	2	81.07	17.78	0.77	0.11	0.09	219	47	285	12	529	160	50	-	44.21	99.94
97-5	1997	12299	RA	2½	92.41	6.04	0.86	0.20	0.11	319	40	205	9	901	135	116	-	43.73	99.78
97-5	1997	12298	RA	3	89.97	1.18	6.87	0.80	0.50	608	104	<70	62	5090	155	556	-	40.05	99.97
97-5	1997	12297	RA	2	54.05	26.40	11.65	1.69	1.09	298	179	177	53	10212	312	1038	-	38.22	96.12
97-5	1997	12296	RA	1¼	84.54	5.80	7.80	0.47	0.53	1112	114	212	47	2709	147	247	-	40.00	99.59
West Flank of Idlewilde Mountain																			
97-2	1997	12285	Banff	2¾	90.08	4.60	4.00	0.49	0.27	805	109	218	17	2805	301	304	-	41.85	99.90
97-2	1997	12284	Banff	1¼	97.02	1.30	1.25	0.08	0.15	532	148	99	10	298	143	40	-	43.52	99.92
97-2	1997	12283	Banff	4¾	96.97	1.41	1.00	0.14	0.16	580	154	544	15	709	170	73	-	43.53	99.90
97-2	1997	12282	Banff	1	97.91	1.00	0.63	0.08	0.10	394	266	832	8	260	113	38	-	43.63	99.91
97-2	1997	12281	Banff	1¼	70.26	8.19	15.70	1.05	1.36	431	473	249	98	5172	1426	1080	-	35.41	97.46
97-2	1997	12280	Banff	3	43.04	8.53	31.88	1.53	5.36	636	905	553	82	8820	1748	1661	-	22.87	91.78

APPENDIX 4: CONTINUED

Section	Project Year	Sample	Formation Member	Strat. Thick. (m	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	$SrCO_3$ (ppm)	MnO (ppm)	P_2O_5 (ppm)	BaO (ppm)	K_2O (ppm)	Na_2O (ppm)	TiO_2 (ppm)	Cr_2O_3 (%)	LOI (%)	Total (%)
IDLEWILDE MOUNTAIN (Continued)																			
West Flank of Idlewilde Mountain																			
97-3	1997	12286	RA	4½	91.32	7.73	0.65	0.11	0.04	368	21	107	7	473	154	46	-	43.89	99.97
97-3	1997	12287	RA	4	94.86	4.32	0.53	0.08	0.03	392	18	222	12	303	147	28	-	43.94	99.92
97-3	1997	12288	RA	1½	93.75	5.14	0.38	0.05	0.03	316	24	<70	6	176	126	18	-	43.88	99.42
97-3	1997	12289	RA	½	81.95	16.99	0.66	0.10	0.06	242	36	387	6	494	166	44	-	44.71	99.90
97-3	1997	12290	RA	5	98.43	1.09	0.24	0.05	0.02	367	21	373	6	136	101	14	-	43.69	99.92
97-3	1997	12291	RA	2¾	98.65	0.91	0.21	0.05	0.02	366	22	<70	7	144	120	12	-	43.74	99.91
97-3	1997	12292	Banff	¾	95.30	1.49	2.31	0.34	0.23	496	68	<70	14	1848	155	184	-	42.74	99.93
97-4	1997	12293	RA	1½	97.07	1.81	0.94	0.05	0.02	424	16	<70	7	177	134	23	-	43.53	99.97
97-4	1997	12294	RA	1½	88.01	10.94	0.77	0.09	0.04	413	21	367	8	430	155	36	-	44.18	99.99
97-4	1997	12295	RA	5½	97.87	1.57	0.32	0.05	0.03	364	21	<70	4	161	138	16	-	43.53	99.92
East Flank of Idlewilde Mountain																			
97-6	1997	12312	RA	2½	(Missing Sample)														
97-6	1997	12311	RA	4¾	98.91	0.78	0.14	0.03	0.06	365	24	<70	12	97	105	21	-	43.17	99.99
97-6	1997	12310	RA	1¾	97.18	0.68	0.08	0.03	0.03	322	42	216	12	68	89	149	-	43.16	98.10
97-6	1997	12309	RA	2¼	98.11	0.84	0.11	0.03	0.06	336	31	105	16	72	92	15	-	43.35	99.21
97-6	1997	12308	RA	4	97.12	0.95	0.17	0.03	0.04	456	20	<70	13	118	100	24	-	43.52	98.38
LIMESTONE MOUNTAIN (Fig. 5.1)																			
Rocky Creek																			
99-1	1999	13736	RA	2½	80.52	17.31	1.53	0.15	0.08	296	30	124	9	758	150	71	-	44.24	99.73
99-1	1999	13735	RA	2¾	89.83	8.32	0.95	0.12	0.06	405	25	158	9	568	146	58	-	44.03	99.41
99-1	1999	13734	RA	2¼	96.66	2.11	0.42	0.08	0.17	469	24	<100	10	241	116	33	-	43.83	99.53
99-1	1999	13733	RA	4¼	80.47	18.41	0.77	0.13	0.08	262	40	131	8	601	150	67	-	44.77	99.99
99-1	1999	13732	RA	1	63.11	35.69	0.42	0.08	0.09	208	57	101	7	365	148	36	-	46.32	99.48
99-1	1999	13731	RA	1¼	89.33	9.93	0.38	0.06	0.04	330	32	<100	8	266	128	24	-	44.30	99.82
99-1	1999	13730	RA	4½	83.22	15.97	0.38	0.06	0.06	297	37	<100	7	281	135	27	-	44.75	99.77
99-1	1999	13729	RA	3¾	97.98	1.47	0.21	0.04	0.17	376	23	<100	9	139	103	17	-	43.80	99.94
99-1	1999	13728	RA	3	97.73	1.66	0.19	0.03	0.03	349	25	118	7	119	94	9	-	43.73	99.71
99-1	1999	13727	RA	3	96.43	2.59	0.25	0.05	0.14	402	22	<100	9	209	107	28	-	43.85	99.54
99-1	1999	13726	RA	2¾	97.77	1.05	0.19	0.04	0.04	464	26	<100	6	140	98	32	-	43.79	99.17

APPENDIX 4: CONTINUED

Section	Project Year	Sample	Formation Member	Strat. Thick. (m	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	$SrCO_3$ (ppm)	MnO (ppm)	P_2O_5 (ppm)	BaO (ppm)	K_2O (ppm)	Na_2O (ppm)	TiO_2 (ppm)	Cr_2O_3 (%)	LOI (%)	Total (%)
								LIMESTONE MOUNTAIN (Continued)											
99-2	1999	13798	RA	2	85.72	12.74	1.14	0.13	0.05	392	22	<100	10	626	147	62	-	44.03	99.90
99-2	1999	13797	RA	1¾	93.37	4.61	0.74	0.12	0.05	416	21	134	8	498	130	46	-	43.76	99.02
99-2	1999	13796	RA	~¾	90.36	8.18	0.70	0.12	0.09	379	27	153	12	532	142	91	-	43.97	99.59
99-2	1999	13795	RA	~½	78.29	20.35	0.85	0.17	0.11	297	31	211	11	852	157	109	-	44.73	99.94
99-2	1999	13794	RA	4¾	63.79	34.65	0.95	0.16	0.18	230	43	155	14	769	151	173	-	45.82	99.90
99-2	1999	13793	RA	3¾	94.80	4.44	0.29	0.04	0.26	352	25	121	9	176	130	43	-	43.95	99.92
99-2	1999	13792	RA	4	98.42	0.95	0.21	0.03	0.03	369	21	<100	6	117	133	10	-	43.74	99.71
99-2	1999	13791	RA	3	97.26	1.80	0.27	0.07	0.19	371	25	<100	9	167	119	14	-	43.80	99.67
99-2	1999	13790	RA	3	91.80	6.99	0.79	0.15	0.10	472	38	<100	10	688	137	67	-	43.85	99.98
Simon Ridge																			
99-3	1999	13762	RA	4	94.18	4.89	0.56	0.09	0.08	728	22	<100	11	424	140	37	-	44.06	99.93
99-3	1999	13761	RA	3	93.70	5.31	0.66	0.11	0.05	531	26	215	10	511	150	43	-	44.04	99.98
99-3	1999	13760	RA	3	78.22	19.18	1.84	0.27	0.11	422	38	<100	14	1440	131	130	-	44.28	99.82
99-3	1999	13759	RA	3	91.70	7.57	0.48	0.05	0.09	422	27	136	8	245	128	22	-	44.20	99.98
99-3	1999	13758	RA	3	98.32	1.30	0.17	0.02	0.09	488	18	<100	8	79	129	7	-	43.86	99.98
99-3	1999	13757	RA	3	98.26	1.36	0.18	0.03	0.08	454	19	<100	8	85	131	53	-	44.06	99.99
99-4	1999	13756	RA	3¼	97.09	2.35	0.33	0.06	0.05	414	18	<100	9	183	91	15	-	43.75	99.96
99-4	1999	13755	RA	2¼	97.03	1.82	0.19	0.03	0.02	321	20	<100	5	94	102	7	-	43.80	99.15
99-4	1999	13754	RA	3	97.58	2.04	0.14	0.03	0.05	302	23	111	7	104	96	76	-	43.82	99.92
99-4	1999	13753	RA	3	93.75	5.75	0.24	0.05	0.07	310	27	<100	8	155	122	52	-	43.96	99.91
99-4	1999	13752	RA	3	88.70	10.19	0.23	0.06	0.06	321	34	117	7	203	133	26	-	44.31	99.32
99-5	1999	13741	RA	2¼	98.74	0.81	0.18	0.04	0.14	362	24	<100	9	125	92	18	-	43.65	99.97
99-5	1999	13740	RA	2¼	98.39	1.22	0.15	0.04	0.11	271	31	<100	7	124	123	12	-	43.72	99.96
99-5	1999	13739	RA	2¼	97.97	0.98	0.12	0.03	0.03	242	27	<100	4	91	114	9	-	43.76	99.18
99-5	1999	13738	RA	2¾	96.59	2.97	0.10	0.03	0.22	309	26	<100	8	92	102	37	-	43.90	99.97
99-5	1999	13737	RA	1¾	89.69	9.63	0.28	0.07	0.18	314	35	202	9	264	129	66	-	44.28	99.95

APPENDIX 4: CONTINUED

Section	Project Year	Sample	Formation Member	Strat. Thick. (m	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	$SrCO_3$ (ppm)	MnO (ppm)	P_2O_5 (ppm)	BaO (ppm)	K_2O (ppm)	Na_2O (ppm)	TiO_2 (ppm)	Cr_2O_3 (%)	LOI (%)	Total (%)
LIMESTONE MOUNTAIN (Continued)																			
Simon Ridge																			
99-6	1999	13751	RA	2¾	98.41	1.14	0.19	0.02	0.14	494	20	<100	9	73	99	11	-	43.92	99.98
99-6	1999	13750	RA	3	97.98	1.31	0.19	0.03	0.04	438	17	<100	6	94	114	8	-	43.88	99.61
99-6	1999	13749	RA	1¾	87.58	10.86	0.96	0.11	0.26	439	32	128	11	509	147	62	-	44.24	99.90
99-6	1999	13748	RA	1¾	94.35	4.49	0.55	0.07	0.09	448	22	<100	8	293	109	25	-	44.08	99.64
99-6	1999	13747	RA	3¾	75.90	22.55	1.14	0.12	0.10	305	39	199	10	548	130	63	-	44.83	99.94
99-6	1999	13746	RA	1½	93.91	4.96	0.63	0.11	0.17	607	26	124	11	467	113	92	-	43.90	99.92
99-6	1999	13745	RA	3	92.34	6.30	0.53	0.08	0.05	450	30	<100	9	304	130	32	-	44.06	99.39
99-6	1999	13744	RA	3	94.22	4.80	0.22	0.04	0.06	335	28	138	6	158	120	16	-	44.10	99.43
99-6	1999	13743	RA	3½	98.45	0.98	0.14	0.05	0.04	339	23	119	8	109	92	14	-	43.77	99.73
99-6	1999	13742	RA	2¾	95.67	3.24	0.22	0.09	0.05	311	29	142	10	156	110	17	-	44.06	99.35
Limestone Mountain - Northeast																			
99-7'	1999	14317	RA	4	97.25	1.60	0.68	0.10	0.06	417	27	<100	14	516	106	55	-	43.59	99.80
99-7'	1999	14316	RA	2¼	97.50	1.31	0.82	0.10	0.09	428	28	<100	11	567	131	60	-	43.58	99.93
99-7'	1999	14315	RA	3	93.35	4.79	1.04	0.11	0.07	483	25	<100	9	595	121	71	-	43.79	99.49
99-7'	1999	14314	RA	2¾	76.91	19.31	2.21	0.24	0.17	798	51	<100	18	1322	158	175	-	44.21	99.10
99-7'	1999	14313	RA	3	88.06	10.40	0.82	0.09	0.07	785	29	<100	11	520	131	44	-	44.24	99.60
99-7'	1999	14312	RA	2	91.73	7.16	0.65	0.08	0.10	827	24	152	10	454	123	38	-	44.04	99.88
99-7'	1999	14311	RA	3	98.50	0.88	0.31	0.03	0.02	673	17	<100	7	109	104	9	-	43.80	99.82
99-7'	1999	14310	RA	2	98.19	1.02	0.40	0.05	0.04	677	18	<100	9	208	87	20	-	43.72	99.80
99-7'	1999	14309	RA	2¼	96.15	2.89	0.62	0.08	0.06	564	23	106	9	369	128	46	-	43.86	99.93
99-7'	1999	14308	RA	2	98.43	0.94	0.36	0.06	0.05	500	21	<100	8	237	103	20	-	43.63	99.93
99-7'	1999	14307	RA	2	97.14	1.05	0.44	0.07	0.05	517	23	154	9	279	97	48	-	43.83	98.86
99-7'	1999	14306	RA	3	95.20	4.00	0.46	0.06	0.05	455	27	<100	7	284	118	28	-	44.00	99.86
99-7'	1999	14305	RA	2	97.57	1.06	0.46	0.05	0.04	516	23	<100	6	257	107	27	-	43.85	99.27
99-7'	1999	14304	RA	1½	79.63	19.60	0.46	0.06	0.10	259	45	<100	9	246	129	25	-	44.93	99.92
99-7'	1999	14303	RA	2¼	96.78	2.25	0.36	0.04	0.10	391	29	<100	8	151	122	15	-	43.85	99.59
99-7'	1999	14302	RA	2	97.90	0.93	0.35	0.03	0.12	419	27	<100	11	131	105	13	-	43.80	99.40
99-7'	1999	14301	RA	2	98.30	0.96	0.24	0.02	0.06	448	28	<100	7	77	105	8	-	43.70	99.65
99-7'	1999	14318	Banff	2	94.48	0.85	4.43	0.03	0.03	552	22	129	7	140	96	10	-	41.67	99.92
99-7'	1999	14319	Banff	1½	85.62	8.25	3.97	0.51	0.26	497	74	<100	21	3036	154	363	-	42.27	99.02

APPENDIX 4: CONTINUED

Section	Project Year	Sample	Formation Member	Strat. Thick. (m	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	$SrCO_3$ (ppm)	MnO (ppm)	P_2O_5 (ppm)	BaO (ppm)	K_2O (ppm)	Na_2O (ppm)	TiO_2 (ppm)	Cr_2O_3 (%)	LOI (%)	Total (%)
LIMESTONE MOUNTAIN (Continued)																			
Limestone Mountain																			
99-7	1999	13789	RA	5¼	88.77	9.39	0.50	0.10	0.08	420	28	129	8	341	120	35	-	44.23	98.94
99-7	1999	13788	RA	2½	74.57	19.80	4.49	0.15	0.12	282	36	441	14	753	133	79	-	42.97	99.30
99-7	1999	13787	RA	2¼	91.48	7.30	0.63	0.05	0.07	362	25	172	14	244	142	20	-	43.83	99.63
99-7	1999	13786	RA	4¼	96.29	2.25	0.38	0.03	0.05	488	22	<100	9	130	125	14	-	43.96	99.08
99-7	1999	13785	RA	5¼	78.29	12.62	6.18	0.12	1.21	361	126	<100	12	520	125	56	-	40.48	98.53
99-7	1999	13784	RA	2¾	89.95	8.44	0.54	0.08	0.11	369	23	220	10	345	138	32	-	44.18	99.24
99-7	1999	13783	RA	1½	93.03	5.84	0.48	0.06	0.04	407	21	<100	7	267	152	22	-	44.15	99.54
99-7	1999	13782	RA	1½	78.31	20.84	0.59	0.07	0.07	236	37	137	7	280	159	36	-	45.03	99.97
99-7	1999	13781	RA	6½	97.20	1.75	0.24	0.04	0.10	370	27	<100	7	159	117	15	-	43.80	99.40
99-7	1999	13780	RA	1¾	98.61	0.91	0.21	0.04	0.09	377	20	111	7	141	99	13	-	43.76	99.94
99-7	1999	13779	RA	1¾	98.38	0.85	0.23	0.04	0.15	377	20	<100	8	151	110	15	-	43.76	99.73
99-7	1999	13778	RA	2	95.33	3.38	0.31	0.07	0.06	348	26	127	14	277	120	27	-	44.06	99.24
99-7	1999	13777	RA	2	84.75	12.24	1.40	0.33	0.18	313	53	139	16	1471	165	174	-	44.04	99.13
99-7	1999	13776	Banff	3	55.20	27.22	9.37	1.38	3.94	263	462	<100	45	7516	323	781	-	37.48	98.05
99-8	1999	14226	RA	2½	97.16	1.18	0.79	0.09	0.05	446	21	<100	13	483	93	57	-	43.74	99.38
99-8	1999	14227	RA	3	93.56	4.57	0.84	0.11	0.07	511	26	<100	17	579	94	68	-	43.92	99.28
99-8	1999	14228	RA	1¼	96.07	2.18	0.95	0.11	0.13	577	24	<100	13	582	104	73	-	43.70	99.57
99-9	1999	14234	RA	1¾	92.59	5.98	0.61	0.08	0.07	369	31	<100	11	414	110	41	-	44.13	99.42
99-9	1999	14233	RA	2	94.53	4.20	0.50	0.06	0.08	417	31	<100	8	324	94	34	-	44.01	99.46
99-9	1999	14232	RA	2	97.27	1.26	1.05	0.09	0.12	455	24	<100	14	536	110	71	-	43.58	99.91
99-9	1999	14231	RA	2	95.85	1.81	1.37	0.14	0.06	563	23	<100	47	778	100	95	-	43.39	99.39
99-9	1999	14230	RA	2	86.77	10.20	0.99	0.15	0.15	447	32	<100	15	812	135	94	-	44.20	98.42
99-9	1999	14229	RA	2	80.05	17.16	1.50	0.23	0.16	386	44	<100	14	1238	164	155	-	44.48	99.29
99-9	1999	14235	RA	1½	66.09	33.14	0.44	0.07	0.12	211	59	<100	6	297	156	34	-	46.04	99.94
99-9	1999	14236	RA	2½	70.85	28.31	0.58	0.07	0.07	289	41	108	7	351	124	32	-	45.48	99.97
99-9	1999	14249	RA	1½	77.81	20.78	1.13	0.05	0.14	362	41	<100	11	232	108	29	-	44.84	99.99
99-9	1999	14248	RA	2¼	97.97	1.19	0.21	0.02	0.18	551	18	<100	11	84	125	14	-	43.85	99.65
99-9	1999	14247	RA	2¼	97.49	1.16	0.34	0.03	0.08	468	20	<100	9	142	106	13	-	43.71	99.16
99-9	1999	14246	RA	4	90.03	1.70	6.69	0.05	0.59	473	56	<100	10	189	116	29	-	38.47	99.15
99-9	1999	14245	RA	1½	76.77	22.30	0.47	0.06	0.08	258	41	<100	9	266	141	30	-	44.88	99.76
99-9	1999	14244	RA	1½	96.82	2.21	0.27	0.05	0.04	373	25	<100	4	162	130	21	-	43.85	99.45
99-9	1999	14243	RA	3	98.65	0.73	0.23	0.03	0.05	402	27	<100	7	113	89	9	-	43.81	99.76
99-9	1999	14242	RA	3	98.38	0.67	0.17	0.05	0.04	384	27	<100	7	109	82	11	-	43.84	99.37

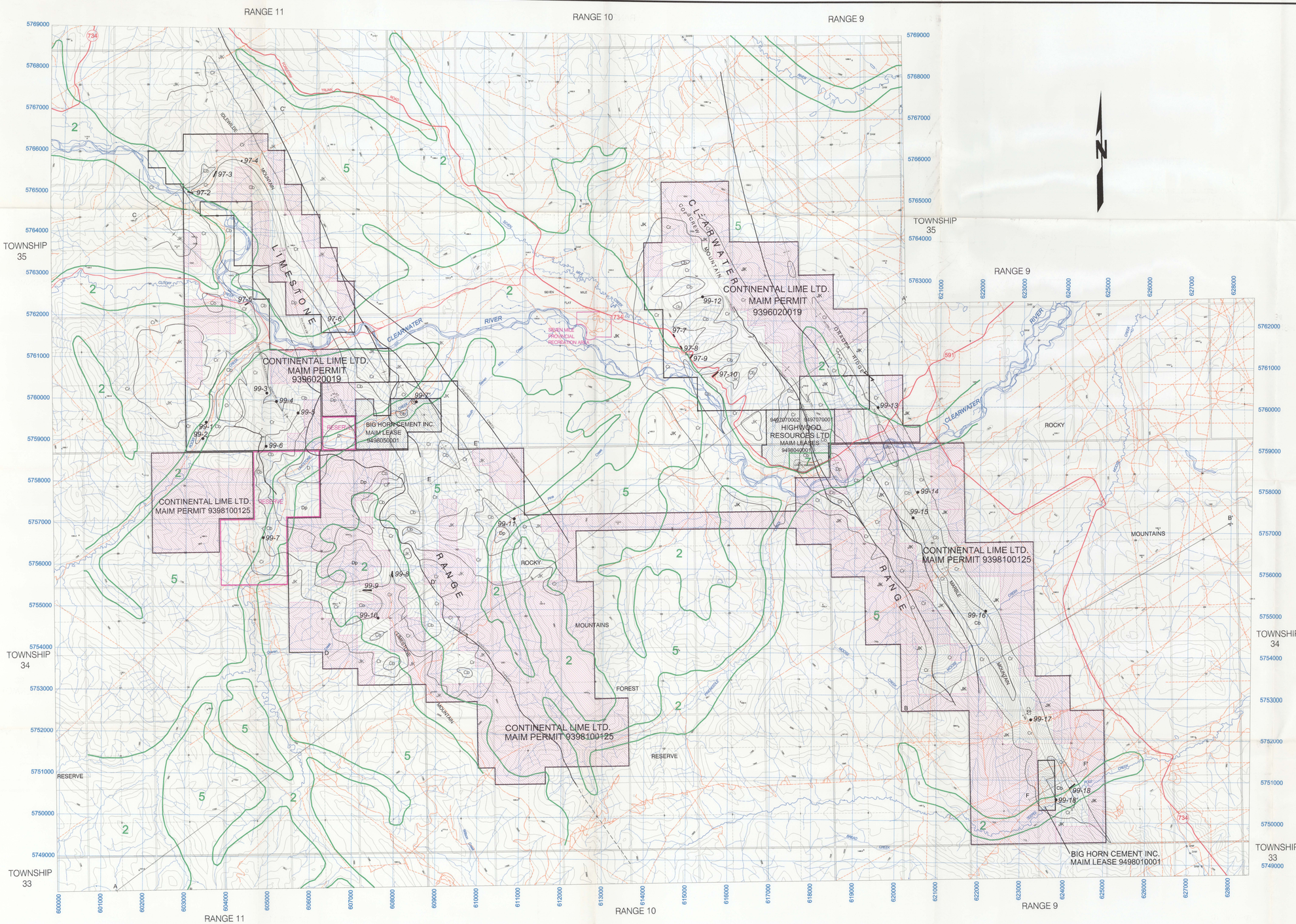
APPENDIX 4: CONTINUED

Section	Project Year	Sample	Formation Member	Strat. Thick. (m	$CaCO_3$ (%)	$MgCO_3$ (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	$SrCO_3$ (ppm)	MnO (ppm)	P_2O_5 (ppm)	BaO (ppm)	K_2O (ppm)	Na_2O (ppm)	TiO_2 (ppm)	Cr_2O_3 (%)	LOI (%)	Total (%)
LIMESTONE MOUNTAIN (Continued)																			
(99-9 Continued)																			
99-9	1999	14241	RA	3	98.79	0.66	0.25	0.04	0.05	319	33	<100	6	117	100	11	-	43.83	99.85
99-9	1999	14240	RA	3	98.28	0.74	0.22	0.03	0.03	381	26	<100	5	115	114	13	-	43.79	99.38
99-9	1999	14239	RA	2¼	98.24	0.75	0.20	0.04	0.04	321	34	<100	7	144	134	18	-	44.03	99.33
99-9	1999	14238	RA	3	97.65	0.84	0.24	0.04	0.03	388	22	<100	4	174	116	12	-	43.78	98.87
99-9	1999	14237	RA	1	98.33	0.98	0.21	0.04	0.04	485	37	<100	5	140	70	16	-	43.79	99.66
99-9	1999	-	Banff	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
99-10	1999	13770	RA	3	89.94	8.92	0.60	0.09	0.28	393	25	<100	12	467	94	52	-	44.30	99.94
99-10	1999	13769	RA	6	64.42	32.05	2.09	0.25	0.24	276	54	151	14	1329	128	131	-	44.95	99.27
99-10	1999	13768	RA	5¼	97.91	1.31	0.59	0.03	0.06	543	17	<100	8	126	98	11	-	43.79	99.98
99-10	1999	13767	RA	7¼	78.11	20.52	0.74	0.11	0.07	297	32	172	10	485	111	47	-	45.07	99.66
99-10	1999	13766	RA	5¼	96.52	2.17	0.34	0.05	0.03	372	21	<100	6	193	110	17	-	43.85	99.16
99-10	1999	13765	RA	6¼	98.17	1.08	0.24	0.04	0.02	344	21	<100	6	126	108	9	-	43.86	99.62
99-10	1999	13764	RA	6¼	98.31	0.83	0.23	0.04	0.03	368	25	131	8	125	97	11	-	43.96	99.51
99-10	1999	13763	RA	3	94.98	3.30	1.05	0.19	0.22	471	41	<100	12	779	121	110	-	43.67	99.90
99-11	1999	14326	RA	2½	86.15	12.37	1.13	0.08	0.08	366	28	488	9	422	144	42	-	44.31	99.96
99-11	1999	14325	RA	2¼	72.66	8.11	13.15	0.19	1.59	508	155	<100	12	914	141	105	-	35.29	95.88
99-11	1999	14324	RA	3¼	75.59	22.28	1.01	0.13	0.17	277	36	126	11	659	152	71	-	44.88	99.30
99-11	1999	14323	RA	2	92.79	5.65	0.55	0.06	0.06	371	33	<100	7	248	127	23	-	44.12	99.18
99-11	1999	14322	RA	2½	98.75	0.73	0.21	0.03	0.04	375	26	<100	6	118	101	9	-	43.75	99.83
99-11	1999	14321	RA	2¼	97.02	2.45	0.33	0.06	0.04	355	29	<100	11	224	120	21	-	43.86	99.98
99-11	1999	14320	RA	2½	97.99	1.43	0.29	0.04	0.03	399	26	<100	6	231	126	20	-	43.83	99.86

APPENDIX 5: STATEMENT OF QUALIFICATIONS

J.R. Dahrouge obtained degrees in geology and computing science from the University of Alberta, Edmonton in 1988 and 1994, respectively. He has more than ten years of experience in mining exploration. He is a member of the Canadian Institute of Mining and Metallurgy and is registered as P. Geol. in the Association of Professional Engineers, Geologists, and Geophysicists of Alberta.

J.R. Dahrouge does not hold any direct or indirect interest in the metallic and industrial minerals permits which are the subject of this report. The authors grant Alberta Energy the right to reproduce this report in whole or in part.



LEGEND AND SYMBOLS

JURASSIC and LOWER CRETACEOUS

JK Undivided

CARBONIFEROUS

RUNDLE ASSEMBLAGE

Cr Mount Head Formation: finely crystalline dolomite, finely to coarsely crystalline limestone, shale
Turner Valley Formation: dense and porous dolomite, argillaceous dolomite, limestone
Shunda Formation: thin-bedded, silty dolomite, cherty and dolomitic limestone, shale, anhydrite
Pekisko Formation: finely to coarsely crystalline calcarenite, fine-grained dolomite

Cb Banff Formation: argillaceous and cherty limestone, fissile and calcareous shale

DEVONIAN

Dp Palliser Formation: massive mottled limestone and dolomite, porous and vuggy dolomite, argillaceous limestone

MIDDLE and LOWER DEVONIAN

D Undivided

- Geological boundary (approximate)
- Fault (approximate)
- Elevation contour (intervals: 25 m, 50 m)
- Secondary highway with number
- Trail or cut line
- MAIM Permit boundary
- Proposed area to be dropped from current MAIM permits
- Land use zone boundary; zone number (2 - Critical Wildlife; 5 - Multiple Use; 7 - Industrial)
- Sampled section; number (short or vertical; long) • 99-17 \ 97-5
- Line of cross-section B — B'

NOTES

1) Map compiled from 1 : 20 000 scale digital base maps 82O/13NE, 14N, 83B/3W, and 4SE supplied by Spatial Data Warehouse Ltd., Calgary, Alberta.
2) Geology modified after Henderson (1943, 1944), and Ollerenshaw (1964, 1965).
3) UTM grid is based on North American Datum, 1983 (NAD83); UTM grid zone: 11U.
4) To accompany assessment report entitled "Exploration for High-Calcium Limestone at Clearwater and Limestone Ranges of West-Central Alberta" dated 2000 06 24.

20000017

0 2 4 km

Scale: 1:30,000

REVISIONS	
BY	DATE
W.M.	1999.04
W.M.	2000.03
W.M.	2000.06

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Fig. 5.1
Geology and Sample Locations at Limestone Range and the Southern Part of Clearwater Range

W.M. 1999.03