CONTINENTAL LIME LTD.

1997 GEOLOGIC MAPPING AND SAMPLING OF THE KELLY LAKE LIMESTONE DEPOSITS, MARBLE RANGE

WEST OF CLINTON, BRITISH COLUMBIA

WORK DONE ON CLAIMS MAR 109 - 112

Geographic Coordinates
51° 13' N
121° 57' W
NTS Sheet 92 P/4 W

Owner of Claims Mar 110-112:
BMC Lime Ltd.
215, 10451 Shellbridge Way,
Richmond, B.C.

Owner of Claim Mar 109:
Continental Lime Ltd.
215, 10451 Shellbridge Way
Richmond, B.C. V6X 2W8

Operator: Continental Lime Ltd. / Ecowaste Industries Ltd.
215, 10451 Shellbridge Way
Richmond, B.C. V6X 2W8

Consultant: Halferdahl & Associates Ltd.
18, 10509 - 81 Avenue
Edmonton, Alberta T6E 1X7

Authors: D.I. Pană, M.Sc. and L.B. Halferdahl, Ph.D., P.Eng., P.Geol.
Submitted: 1997 11 08

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1. INTRODUCTION

As used in this report, the term "Kelly Lake limestone deposits" refers to those deposits in a band of limestone about 19 km long by up to 4 km wide on the southwest side of the Marble Range in southwestern British Columbia. Most are within the first two mountain ridges on the southwest side of the Marble Range. Some of these limestone deposits had been held by the predecessors of BMC Lime Ltd. since the early 1970s. These and others were acquired by Continental Lime Ltd. in 1992, 1993, and 1996. Some 1039 samples were collected from them and analyzed in 1992, 1993,1994 and 1996. The 1997 work included collecting 116 samples on claims at the northwest end of the Kelly Lake limestone deposits and observations on the geology. The work was authorized by Continental Lime Ltd.

As previous assessment reports (Halferdahl, 1992; Faragher and Halferdahl, 1993; Dahrouge and Halferdahl, 1996) include descriptions of the geographic setting and the geology, most of these subjects are not repeated here. New information bearing on these subjects is, however, included.

Throughout this report attitudes of bedding and other planar features are given as A°/B° SW, where A° is the azimuth of the strike and B° is the amount of dip in the direction indicated. A magnetic declination of 22° was used.

1.1 GEOGRAPHIC SETTING

The Kelly Lake limestone deposits are in the Intermontane Belt of southwestern British Columbia about 230 km northeasterly from Vancouver and about 16 km west of the Town of Clinton (Fig. 1.1). From Clinton they are easily reached via the Kelly Lake and Jesmond roads, and other mostly unimproved roads. Two of these roads were originally constructed in the early 1970s for limestone exploration: one was improved and extended in 1996. Others have been built for access to power lines of the British Columbia Hydro and Power Authority and for logging.

1.3 SUMMARY OF WORK DONE

Some 116 samples were chipped across 747 m of stratigraphic sections on the western slope of Mount Bowman and the northwestern spur of Trail Mountain. Geological observations and measurements of a large number of structural elements accompanied the sampling.

1.4 FIELD OPERATIONS

The geological work was conducted by a four-man crew based in a motel in Clinton. Transportation was by a four-wheel-drive truck, supplemented by a compact car as required.

The geographic locations of selected sections were aided by global-positioning-system (GPS) instruments: Garmin GPS 45. The GPS instruments did not give satisfactory readings over much of the area where they were employed due to mountainous terrain and thick tree-cover impeding the satellite signals. Hence, at many locations an insufficient number of common satellites were observed by the instruments and therefore, use was confined to gaining intermittent approximate operator location, mostly along ridge tops or lower areas where tree cover was sparse and mountain slopes did not block satellite signals.

2. GEOLOGY

2.1 STRATIGRAPHY

The stratigraphic units for the Kelly Lake limestone deposits are listed in Table 2.1. (Dahrouge and Halferdahl, 1996). Of these only unit C2 forms Mount Bowman and Trail Mountain. Towards the west, the C2 limestone unit exposed in Mount Bowman ends in the flat area near the Jesmond road where no outcrops have been found so far. The morphology suggests a less resistant unit and fragments of a sheared brown-grey volcanic rock found at the base of the western slope of Trail Mountain are very similar to one of the rock types of unit N3 along Porcupine Creek. Along Porcupine Creek is a subvertical fault zone that overprints the noncarbonate unit, trending subparallel to the mountain ridge and between limestone units C2 and C4 . Hence the flat area west of Mount Bowman appears to be underlain by sheared unit N3.

dacitic tuff, apparently part of the local bedrock. Similar rocks have been noticed to the south, along Porcupine Creek in Unit N3. No other outcrop of non-carbonate rocks has been found in the vicinity of Mount Bowman.

2.2 STRUCTURE

A number of structural data has been collected from the limestone unit exposed on Mount Bowman and Trail Mountain. The planar structural elements are bedding (primary foliation), cleavage (secondary foliation), and the associated joints. However, the geologic significance of many of the discontinuities are ambiguous at the outcrop scale but can be deciphered at the scale of the investigated area. Linear structures are bedding/cleavage intersections, a few of which have been used to determine planar orientations.

2.2.1 Statistical Analysis of Measured Orientations

Statistical analysis of the orientation data measured within limestone units of Mount Bowman is presented in Fig. 2.3. Poles to measured planes were plotted in the southern hemisphere of a Schmidt (equal angle) stereographic projection with the aid of a computer program. The planar structures are grouped in two clusters with different values. The main cluster in the centre of the diagram is defined by a maximum of over 12 per cent and corresponds to subhorizontal planes with an average orientation of approximately 158°/16° NE. The secondary cluster defined by the 6 per cent contour line in the NW quadrant of the diagram corresponds to subvertical planes with an average orientation of approximately 149°/74° SW.

Poorly defined clusters along the edge of the southeast and northwest quadrants represent subvertical planes oriented approximately perpendicular to the inferred limbs of the fold. They correspond to a set of extensional joints transverse to the main structure. The planar structures can be qualitatively discriminated based on field observations. Where unequivocally determined, the original bedding plane (S_0) is generally shallowly dipping whereas subvertical planes are either fracture cleavages (S_1) or tensional fractures (joints). The intensity of deformation within the limestone unit varies, so that individual outcrops may expose either all mentioned planar structures or only one of them.

2.2.2 Limestone Units of Mount Bowman

The planar features measured in limestone units of Mount Bowman are consistent with a monocline dipping slightly to the northeast. At a larger scale it may represent the northeastern limb of an anticline as suggested by orientations measured elsewhere in the Marble Range.

3. COMPOSITION OF LIMESTONE SAMPLES

3.1 SAMPLING AND ANALYTICAL PROCEDURES

Some 116 samples were collected by chipping outcrops mostly perpendicular to the bedding at 9 sample sections (Appendix 1). Samples consisted of chips at intervals of 33 cm measured stratigraphically.

The samples for analyses were sent to the Central Analytical Laboratory of Continental Lime Inc. in Salt Lake City, Utah for preparation and analyses for 12 constituents by standard ICP techniques, and LOI. ICP analytical procedures in the Central Laboratory are described in Appendix 3. The analytical report as received by modem from the Central Laboratory constitutes Appendix 2.

Twenty-six samples for check analyses for 21 constituents were sent to Acme Analytical Laboratories Ltd. The results are in Appendix 4. Acme uses standard ICP techniques.

3.2 ADJUSTMENTS TO REPORTED ANALYSES AND COMMENTS

As explained in Appendix 5, some of the check analyses by Acme require adjustments because the CaO determinations exceed 56 per cent CaO, the maximum possible content for pure $CaCO_3$.

When LOI has been determined, chemical analyses of limestone can be checked by subtracting carbon dioxide equivalent to CaO plus that equivalent to MgO plus that equivalent to SrO from the determined LOI as explained in Appendix 5. This criterion shows that 81 of the 116 Continental analyses required adjustments to determined CaO percentages, compared to 15 of the 27 Acme analyses, because LOI minus CO_2 equivalents are equal to or less than zero. However, of these 81 Continental Analyses only 35 have LOI minus CO_2 equivalents less than minus 0.2. The preferred CaO percentages for these 81 Continental analyses (Appendix 5) have been lowered by amounts ranging from 0.01 to 0.10 per cent. Such amounts are well within the accuracy of the determinations.

Perusal of Appendix 2 suggests a correlation between the determined sum and the determined percentage of CaO. Such a correlation suggests one of three possibilities:

1) an undetermined constituent is present;

2) determinations of one or more of the constituents other than CaO are low; or

3) determined CaO percentages with low determined sums are low.

Results of statistical tests are in Appendix 6. They show that for CaO and sum, differences, signs, and confidence intervals are significant for almost all levels of significance examined. For adjusted CaO and MgO, differences and confidence intervals are significant, but signs are not.

For SiO_2, Al_2O_3, Na_2O_3, and K_2O signs are significant but differences and confidence intervals are not. For $SrCO_3$ and BaO only confidence intervals are significant. For Fe_2O_3, P_2O_5, and LOI the differences between laboratories are not significant. Statistical comparisons between laboratories for TiO_2, and MnO are not attempted because most determinations of these constituents from one or the other of the laboratories are below the limits of detection. Adjusting the Acme determinations for CaO as explained in Appendix 5, reduces the means of the differences between the two laboratories from 0.55 to 0.32 per cent. In general, Continental's determinations of CaO are more conservative than the adjusted Acme determinations, the maximum difference being 0.79 per cent lower. Although some of the differences between the laboratories for MgO, SiO_2, Al_2O_3, Na_2O_3, K_2O, $SrCO_3$, and BaO are statistically significant, the maximum absolute difference for MgO is 0.25, for SiO_2 is 0.09 per cent, for Al_2O_3 is 0.05 per cent, for Na_2O is 0.06 per cent, for K_2O is 0.04 per cent, for $SrCO_3$ is 32 ppm, and for BaO is 109 ppm. Continental is lower for MgO, generally higher for SiO_2, lower or equal for Al_2O_3, lower for Na_2O_3, and K_2O, and variable for $SrCO_3$ and BaO. Although Continental's analyses for CaO are somewhat lower than the adjusted check analyses by Acme, the Acme analyses confirm the Continental analyses. All the 1997 samples are of high-quality limestone except for sample 12011 which is high in SiO_2, and sample 12496 which is high in MgO.

D. I. Pană, M.Sc.

L.S. Halferdahl, Ph.D., P.Eng.

Edmonton, Alberta
1997 11 08

F1

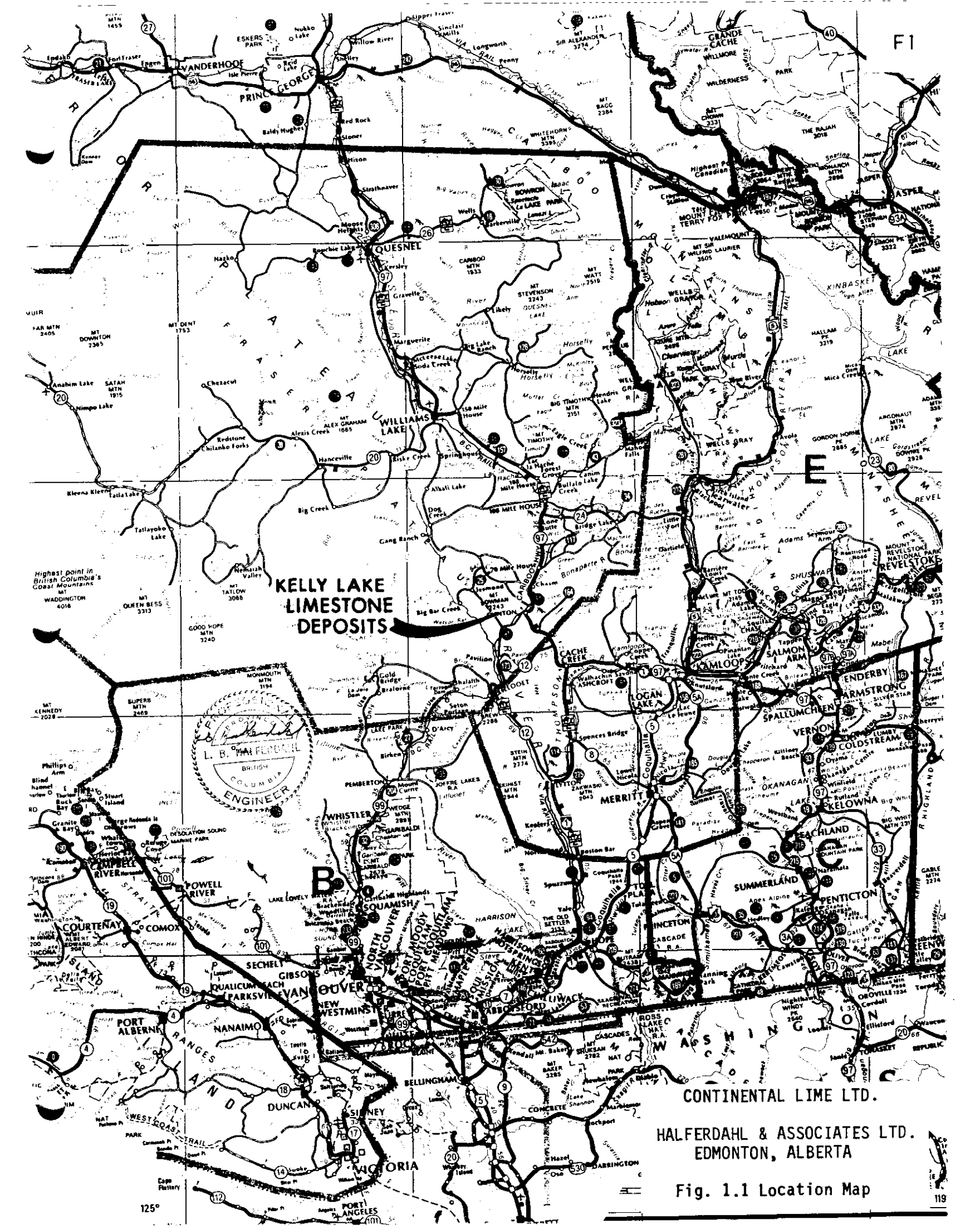

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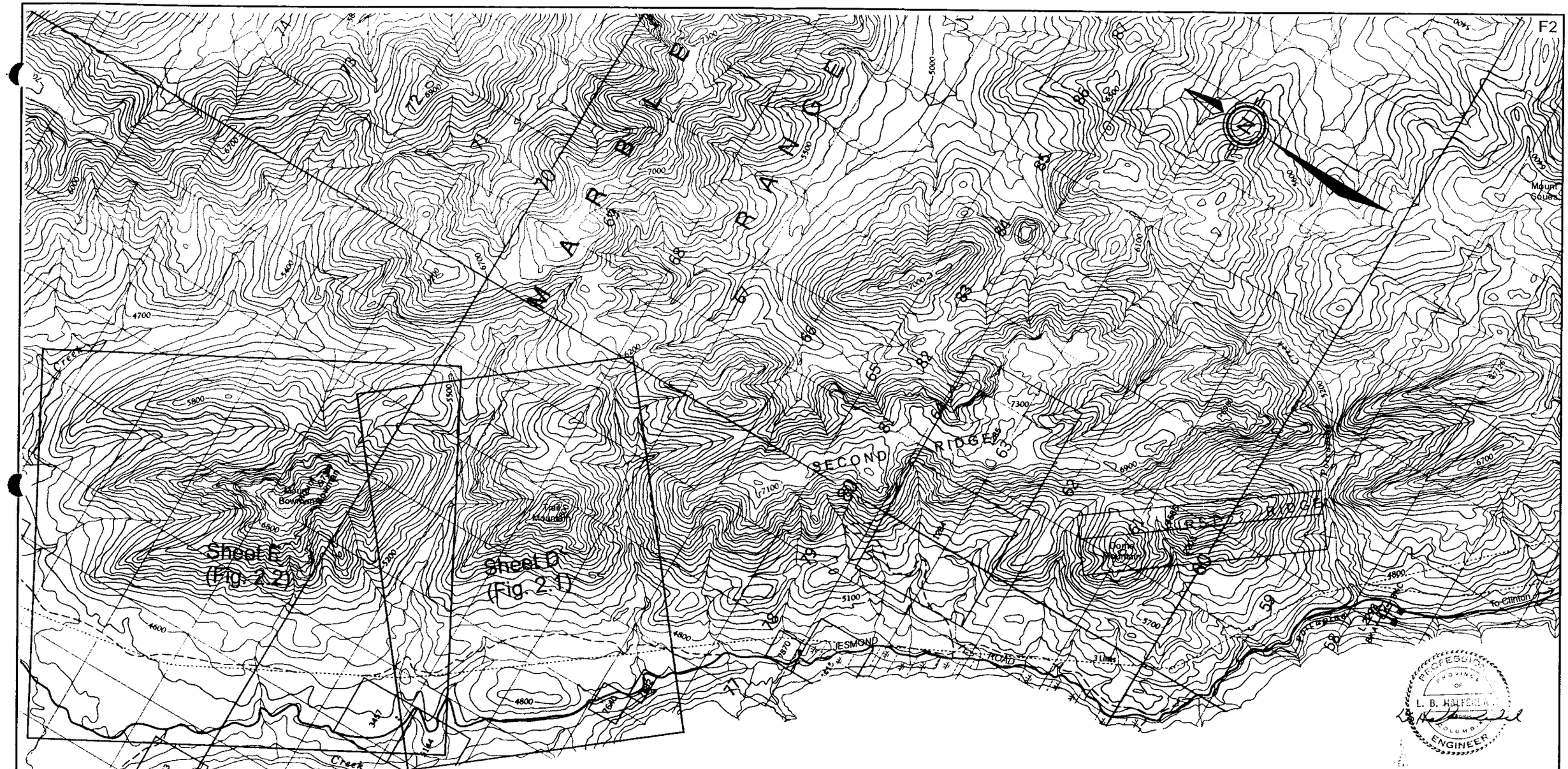
Fig. 1.1 Location Map



NOTES:

1. Part of 1 : 50 000 topographic map 92P/4.
2. Contour interval is 100 ft.

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Fig. 1.2 Index Map

KELLY LAKE AREA, B. C.

0 1 2 3
Kilometres

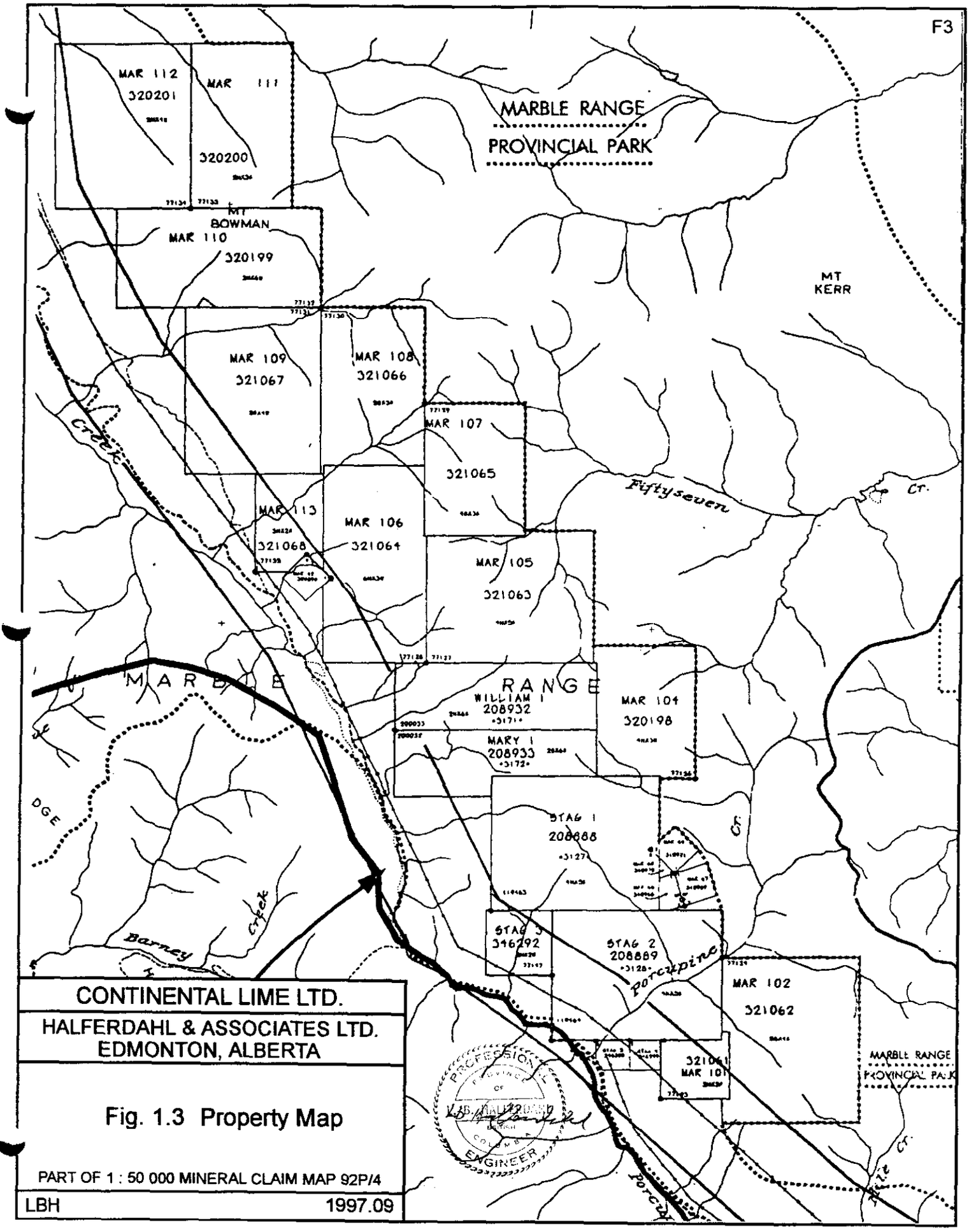

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Fig. 1.3 Property Map

PART OF 1 : 50 000 MINERAL CLAIM MAP 92P/4

LBH 1997.09

APPENDIX 1: DESCRIPTIONS AND COMPOSITIONS OF CHIP SAMPLES

Stratigraphic thicknesses are based on measured attitudes of bedding as listed below with appropriate interpolations.
Samples are listed in order from stratigraphic top to bottom. They consist of chips at intervals of 33 cm. All are from Unit C2 of the Marble Canyon Formation.

Sample	Strat. Thick.(m)	Description	CaO (%)	MgO (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	$SrCO_3$ (ppm)	MnO (ppm)	P_2O_5 (ppm)
Section 97-1: Northwestern End of Trail Mountain (Fig. 2.1)										
12001	8.0	Limestone, dark-grey weathered, white-grey fresh, cryptocrystalline, massive, strong HCl reaction, opaque to glassy look, attitude of bedding 140°/30°NE	55.32	0.41	0.10	0.024	0.022	284	20	410
12002	8.0	Limestone, as above	55.33	0.42	0.09	0.026	0.017	289	18	342
12003	8.0	Limestone, as above	55.35	0.42	0.06	0.023	0.023	311	18	275
12004	8.0	Limestone, as above, attitude of bedding 150°/6°NE	55.38	0.38	0.07	0.023	0.011	293	15	550
12005	8.0	Limestone, as above	55.44	0.31	0.13	0.028	0.012	275	16	269
12006	8.0	Limestone, as above, attitude of bedding 180°/8°W	55.10	0.31	0.06	0.023	0.015	252	16	420
12476	8.0	Limestone, white-grey weathered, dark-grey fresh, cryptocrystalline, massive, strong HCl reaction, attitudes of bedding 135°/7°SW, joints 40°/80°NW, cleavages 130°/84°SW	55.42	0.30	0.20	0.022	0.006	243	14	464
12477	7.0	Limestone, as above	55.44	0.31	0.13	0.029	0.009	252	15	636
12478	8.0	Limestone, as above	55.45	0.31	0.09	0.027	0.008	291	18	1530
12479	6.0	Limestone, as above	55.01	0.31	0.19	0.029	0.011	295	17	314
12101	8.0	Limestone, light-grey weathered, dark-grey fresh, cryptocrystalline, massive to thick-bedded, attitudes of bedding 130°/10°SW, joints 37°/80°NW, cleavages 133°/77°SW	55.44	0.30	0.12	0.035	0.020	251	15	474
12102	8.0	Limestone, as above	55.40	0.30	0.10	0.035	0.026	246	13	251
Section 97-2: Southwest Spur on South End of Mount Bowman (Fig. 2.2)										
12007	8.0	Limestone, dark-grey weathered, medium- to light-grey fresh, cryptocrystalline, massive, joints 2 - 3 cm wide filled with white calcite, attitudes of bedding 20°/18°SE, cleavage 126°/80°NE, elevation 5800'	55.45	0.31	0.09	0.026	0.013	276	12	<70
12008	6.0	Limestone, as above, strong jointing, attitude of cleavage 124°/80°SW	55.31	0.35	0.08	0.028	0.027	381	10	143
12009	8.0	Limestone, as above	55.41	0.34	0.11	0.024	0.011	333	8	167
12010	6.0	Limestone, as above, with erratic joint patterns	55.28	0.33	0.05	0.031	0.038	318	13	129

APPENDIX 1 (CONTINUED)

Sample	Strat. Thick.(m)	Description	CaO (%)	MgO (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	$SrCO_3$ (ppm)	MnO (ppm)	P_2O_5 (ppm)
12500	3.0	Limestone, light-grey weathered, dark-grey fresh, cryptocrystalline, attitudes of bedding 10°/10°SE, joints 50°/60°NW, cleavages 130°/87°SW	54.83*	0.40	0.09	0.017	0.010	408	17	627
11676	7.5	Limestone, as above	55.43	0.30	0.16	0.031	0.016	275	21	541
11677	3.5	Limestone, as above	55.43	0.32	0.12	0.030	0.023	257	14	569
11678	3.0	Limestone, as above, attitude of bedding 60°/55°SE	54.60*	0.30	0.08	0.031	0.014	257	19	357
11679	5.0	Limestone, as above	54.51*	0.30	0.44	0.063	0.031	347	20	310
11680	4.0	Limestone, as above	54.74*	0.29	0.09	0.025	0.009	297	10	349
11681	7.5	Limestone, as above	54.55*	0.29	0.04	0.017	0.009	269	22	241
Section 97-4: Second Spur on the Western Slope of Mount Bowman (Fig. 2.2)										
12021	8.0	Limestone, light-grey weathered, dark-grey fresh, cryptocrystalline, massive, locally foliated, locally strong HCl reaction, attitude of bedding 150°/20°NE, elevation 5760'	54.75*	0.33	0.11	0.021	0.008	347	34	562
12022	8.0	Limestone, as above, attitude of bedding 170°/20°NE	54.38*	0.35	0.09	0.031	0.013	423	24	509
12023	6.0	Limestone, as above, attitude of bedding 184°/18°E	54.49*	0.32	0.05	0.017	0.006	351	29	464
12024	10.0	Limestone, as above	55.42	0.32	0.14	0.022	0.019	342	30	996
12486	7.0	Limestone, light-grey weathered, dark-grey fresh, cryptocrystalline, massive, locally strongly foliated, attitudes of bedding 40°/10°NE, cleavages 163°/55°SW, joints 70°/10°NW	54.38*	0.36	0.07	0.020	0.010	410	22	465
12487	6.0	Limestone, as above	55.35	0.37	0.16	0.033	0.008	343	15	663
12488	4.0	Limestone, as above	54.50*	0.38	0.04	0.016	0.008	333	15	476
12116	5.0	Limestone, light-grey weathered, dark-grey fresh, cryptocrystalline, massive, attitudes of bedding 44°/10°SE, cleavages 70°/87°NW, joints 140°/85°NE, elevation 5700'	55.38	0.36	0.13	0.023	0.008	368	15	1046
12117	5.0	Limestone, as above, attitude of bedding 10°/20°SE	55.40	0.36	0.10	0.022	0.007	404	16	479
Section 97-5: Fifth Spur on the Western Slope of Mount Bowman (Fig. 2.2)										
12137	5.0	Limestone, light-grey weathered, dark-grey fresh, cryptocrystalline, massive to thick-bedded, attitude of bedding 130°/20°NE, sampled along azimuth 170°, elevation 5600'	55.11	0.36	0.53	0.069	0.033	367	22	479
12138	9.0	Limestone, as above, rusty, offset 15 m along azimuth 84°, elevation 5540'	54.98	0.30	0.86	0.081	0.044	421	23	821
11682	6.0	Limestone, light-grey weathered, dark-grey fresh, cryptocrystalline, attitudes of bedding 5°/50°E, joints 77°/75°NW	55.07	0.40	0.38	0.065	0.081	434	33	696
11683	7.0	Limestone, as above, offset 3 m along azimuth 350°	54.39*	0.46	0.37	0.072	0.029	383	15	526
11684	5.5	Limestone, as above	54.91	0.36	0.30	0.048	0.019	393	15	589
-	25.0	covered								

* Adjusted check CaO analysis by Acme: sample 12500 - 55.10%, 11678 - 55.19%, 11679 - 55.01%, 11680 - 55.35%, 11681 - 55.22%, 12021 - 55.33%, 12022 - 54.91%, 12023 - 55.33%, 12486 - 55.17%, 12488 - 55.11%, 11683 - 54.94%.

APPENDIX 1 (CONTINUED)

Sample	Strat. Thick.(m)	Description	CaO (%)	MgO (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	$SrCO_3$ (ppm)	MnO (ppm)	P_2O_5 (ppm)
Section 97-8: Northeastern Edge of Mount Bowman (Fig. 2.2)										
12485	6.0	Limestone, light-grey weathered, dark-grey fresh, cryptocrystalline	55.30	0.29	0.03	0.019	0.007	421	55	685
12484	5.0	Limestone, as above	55.43	0.28	0.04	0.021	0.007	289	17	834
12483	7.0	Limestone, as above	55.48	0.28	0.12	0.026	0.005	314	13	899
12480	5.0	Limestone, attitude of bedding 160°/30°NE, elevation 5700'	55.56	0.25	0.06	0.026	0.006	268	15	591
12481	7.0	Limestone, as above	55.51	0.25	0.14	0.023	0.005	253	15	616
12482	5.0	Limestone, as above	55.61	0.26	0.07	0.024	0.005	294	16	215
12108	5.0	Limestone, light-grey weathered, dark-grey fresh, cryptocrystalline, massive, hard, strong HCl reaction, attitude of bedding 100°/40°NE, elevation 5660'	55.50	0.28	0.09	0.027	0.010	402	19	361
12109	5.0	Limestone, as above	55.44	0.28	0.03	0.037	0.163	371	24	1106
12110	5.0	Limestone, as above, some darker and coarser, offset 20 m along azimuth 316°	55.51	0.28	0.03	0.023	0.031	370	21	1003
12111	5.0	Limestone, as above	55.51	0.29	0.05	0.021	0.007	342	20	657
12112	5.0	Limestone, as above, attitudes of bedding 150°/50°NE, joints 210°/70°NW	55.47	0.29	0.09	0.035	0.009	399	17	235
12113	6.0	Limestone, as above, elevation 5600'	55.24*	0.29	0.08	0.026	0.007	450	15	944
-	~20	Limestone, inaccessible								
12114	7.0	Limestone, light-grey weathered, dark-grey fresh, cryptocrystalline, massive, attitude of bedding 146°/20°NE, elevation 5600'	55.43	0.31	0.13	0.033	0.010	547	21	1029
12115	7.0	Limestone, as above, elevation 5550'	55.44	0.31	0.08	0.033	0.018	514	27	1172
-	~15	Limestone, inaccessible								
12014	8.0	Limestone, light-grey weathered, dark-grey fresh, cryptocrystalline, massive, hard, moderate HCl reaction, no visible bedding, attitude of strong joints 140°/90°NE, sampled along azimuth 206°	55.50	0.27	0.08	0.031	0.014	494	19	771
12015	8.0	Limestone, as above, sampled along azimuth 206°	55.03	0.32	0.12	0.025	0.009	550	16	1379
12016	8.0	Limestone, as above, sampled along azimuth 210°	55.37	0.31	0.16	0.038	0.015	571	14	1321
12017	8.0	Limestone, as above, highly fractured, sampled along azimuth 210°	55.11	0.51	0.08	0.037	0.183	506	14	121
12018	10.0	Limestone, as above, sampled along azimuth 210°	55.48	0.30	0.07	0.024	0.018	496	7	101
12019	4.0	Limestone, as above, attitude of bedding 140°/22°NE, sampled along azimuth 210°	55.40	0.30	0.13	0.046	0.064	548	22	977
12020	5.0	Limestone, dark-grey weathered and fresh, some brown stain, cryptocrystalline, few coarse calcite crystals, and thin calcite veinlets, thin black lines throughout (manganese?), rusty on fresh surfaces, strong HCl reaction, sampled along azimuth 260°, offset ~80 m along azimuth 280° down slope 30° from previous sample	55.46*	0.42	0.29	0.113	0.045	432	9	303

* Adjusted check CaO analysis by Acme: sample 12113 - 55.38%, 12020 - 54.76%.

APPENDIX 2: ANALYTICAL REPORTS OF LIMESTONE SAMPLES FROM THE CENTRAL ANALYTICAL LABORATORY OF CONTINENTAL LIME INC.

L.B. Halferdahl
Samples From Kelly Lake Limestone Property, British Columbia

	$CaCO_3$	CaO	$MgCO_3$	MgO	Fe_2O_3	Al_2O_3	$SrCO_3$	MnO	SiO_2	BaO	K_2O	Na_2O	P_2O_5	TiO_2	LOI	Total
Sample	%	%	%	%	%	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%
11676	99.00	55.47	0.62	0.30	0.016	0.031	275	21	0.16	25	47	28	541	9	43.63	99.93
11677	98.99	55.46	0.66	0.32	0.023	0.030	257	14	0.12	29	42	20	569	39	43.63	99.92
11678	97.46	54.60	0.64	0.30	0.014	0.031	257	19	0.08	24	<30	<20	357	5	43.38	98.28
11679	97.29	54.51	0.63	0.30	0.031	0.063	347	20	0.44	32	131	<20	310	27	43.32	98.54
11680	97.70	54.74	0.61	0.29	0.009	0.025	297	10	0.09	27	39	<20	349	8	43.40	98.51
11681	97.36	54.55	0.60	0.29	0.009	0.017	269	22	0.04	26	<30	<20	241	3	43.39	98.08
11682	98.30	55.07	0.85	0.40	0.081	0.065	434	33	0.38	36	136	27	696	39	43.68	99.81
11683	97.07	54.39	0.96	0.46	0.029	0.072	383	15	0.37	32	152	20	526	31	43.52	98.62
11684	98.00	54.91	0.75	0.36	0.019	0.048	393	15	0.30	25	89	21	589	17	43.44	99.23
11685	97.00	54.35	0.64	0.30	0.020	0.060	484	24	0.25	24	104	<20	622	21	43.55	98.09
11686	98.05	54.93	0.75	0.36	0.032	0.090	396	15	0.40	30	206	<20	527	42	43.44	99.43
11687	98.30	55.08	0.62	0.29	0.026	0.050	365	15	0.27	24	96	<20	394	19	43.50	99.36
12001	98.90	55.41	0.86	0.41	0.022	0.024	284	20	0.10	36	<30	28	410	5	43.67	99.98
12002	98.85	55.39	0.87	0.42	0.017	0.026	289	18	0.09	40	<30	27	342	7	43.62	99.93
12003	98.86	55.39	0.87	0.42	0.023	0.023	311	18	0.06	42	<30	26	275	17	43.69	99.91
12004	98.92	55.42	0.80	0.38	0.011	0.023	293	15	0.07	30	<30	26	550	4	43.66	99.92
12005	99.05	55.50	0.65	0.31	0.012	0.028	275	16	0.13	28	<30	25	269	5	43.57	99.93
12006	98.34	55.10	0.64	0.31	0.015	0.023	252	16	0.06	29	30	25	420	41	43.56	99.16
12007	99.09	55.52	0.66	0.31	0.013	0.026	276	12	0.09	16	<30	29	<70	4	43.61	99.91
12008	98.73	55.31	0.73	0.35	0.027	0.028	381	10	0.08	33	36	24	143	22	43.67	99.65
12009	98.98	55.46	0.72	0.34	0.011	0.024	333	8	0.11	25	40	32	167	6	43.64	99.90
12010	98.66	55.28	0.69	0.33	0.038	0.031	318	13	0.05	22	36	23	129	14	43.67	99.52
12011	90.08	50.47	0.83	0.40	0.111	0.061	668	21	8.69	35	102	32	931	45	37.86	99.95
12012	98.39	55.13	0.89	0.43	0.034	0.050	690	14	0.35	41	65	29	958	37	43.85	99.90
12013	97.86	54.83	0.91	0.44	0.017	0.055	677	19	0.25	55	91	48	925	24	43.76	99.28
12014	99.15	55.55	0.57	0.27	0.014	0.031	494	19	0.08	31	33	22	771	6	43.50	99.98
12015	98.22	55.03	0.68	0.32	0.009	0.025	550	16	0.12	25	32	46	1379	7	43.73	99.26
12016	98.83	55.37	0.65	0.31	0.015	0.038	571	14	0.16	26	39	23	1321	11	43.66	99.90
12017	98.52	55.20	1.07	0.51	0.183	0.037	506	14	0.08	33	<30	<20	121	33	43.63	99.96
12018	99.09	55.52	0.62	0.30	0.018	0.024	496	7	0.07	23	<30	<20	101	4	43.56	99.89
12019	98.91	55.42	0.62	0.30	0.064	0.046	548	22	0.13	23	63	26	977	13	43.56	99.95
12020	97.20	54.46	0.88	0.42	0.045	0.113	432	9	0.29	28	284	51	303	54	43.71	98.65
12021	97.72	54.75	0.69	0.33	0.008	0.021	347	34	0.11	35	<30	38	562	4	43.64	98.65
12022	97.06	54.38	0.74	0.35	0.013	0.031	423	24	0.09	36	31	41	509	5	43.69	98.04
12023	97.26	54.49	0.67	0.32	0.006	0.017	351	29	0.05	32	<30	24	464	3	43.58	98.10
12024	98.97	55.45	0.67	0.32	0.019	0.022	342	30	0.14	35	<30	25	996	3	43.62	99.96
12025	99.43	55.71	0.22	0.11	0.023	0.031	595	12	0.08	27	39	<20	<70	24	43.58	99.85

APPENDIX 2 (CONTINUED)

	$CaCO_3$	CaO	$MgCO_3$	MgO	Fe_2O_3	Al_2O_3	$SrCO_3$	MnO	SiO_2	BaO	K_2O	Na_2O	P_2O_5	TiO_2	LOI	Total
Sample	%	%	%	%	%	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%
12130	98.92	55.43	0.87	0.42	0.010	0.022	362	16	0.06	39	<30	29	501	<2	43.58	99.98
12131	98.66	55.28	0.78	0.37	0.007	0.025	364	13	0.11	36	<30	26	429	<2	43.52	99.66
12132	98.91	55.42	0.79	0.38	0.008	0.023	402	15	0.14	38	<30	28	556	2	43.47	99.97
12133	98.92	55.42	0.81	0.39	0.009	0.022	414	14	0.11	35	<30	33	705	<2	43.48	99.99
12134	98.61	55.25	1.05	0.50	0.011	0.026	435	16	0.16	44	30	31	455	2	43.53	99.97
12135	98.41	55.14	0.89	0.42	0.041	0.043	459	18	0.15	40	62	24	395	16	43.53	99.63
12136	96.99	54.34	0.82	0.39	0.019	0.046	491	21	0.13	50	98	41	1101	17	43.52	98.18
12137	98.43	55.15	0.75	0.36	0.033	0.069	367	22	0.53	26	135	24	479	26	43.34	99.92
12138	98.16	55.00	0.62	0.30	0.044	0.081	421	23	0.86	27	157	35	821	32	43.22	99.92
12139	98.71	55.30	0.67	0.32	0.016	0.057	388	28	0.35	20	93	22	470	16	43.49	99.91
12140	98.55	55.21	0.73	0.35	0.024	0.069	340	26	0.44	19	141	27	400	23	43.51	99.90
12476	98.99	55.46	0.62	0.30	0.006	0.022	243	14	0.20	31	<30	36	464	2	43.59	99.92
12477	98.96	55.44	0.64	0.31	0.009	0.029	252	15	0.13	28	42	26	636	4	43.64	99.87
12478	98.97	55.45	0.66	0.31	0.008	0.027	291	18	0.09	26	34	26	1530	4	43.53	99.94
12479	98.18	55.01	0.65	0.31	0.011	0.029	295	17	0.19	29	41	41	314	6	43.73	99.13
12480	99.24	55.60	0.52	0.25	0.006	0.026	268	15	0.06	16	<30	23	591	<2	43.55	99.93
12481	99.13	55.54	0.53	0.25	0.005	0.023	253	15	0.14	17	<30	28	616	<2	43.62	99.92
12482	99.25	55.61	0.54	0.26	0.005	0.024	294	16	0.07	20	<30	25	215	2	43.96	99.95
12483	99.04	55.49	0.59	0.28	0.005	0.026	314	13	0.12	21	<30	24	899	<2	43.59	99.92
12484	98.92	55.43	0.58	0.28	0.007	0.021	289	17	0.04	22	30	26	834	6	43.59	99.69
12485	98.69	55.30	0.60	0.29	0.007	0.019	421	55	0.03	34	<30	24	685	4	43.74	99.47
12486	97.05	54.38	0.76	0.36	0.010	0.020	410	22	0.07	32	<30	23	465	2	43.64	98.01
12487	98.86	55.39	0.77	0.37	0.008	0.033	343	15	0.16	32	<30	24	663	4	43.61	99.94
12488	97.28	54.50	0.79	0.38	0.008	0.016	333	15	0.04	39	<30	35	476	2	43.60	98.22
12489	99.00	55.47	0.64	0.31	0.007	0.033	420	7	0.16	26	52	22	703	7	43.56	99.97
12490	98.98	55.46	0.61	0.29	0.009	0.041	400	9	0.20	25	63	24	439	10	43.62	99.94
12491	97.98	54.90	0.62	0.30	0.013	0.032	360	9	0.10	23	55	38	957	11	43.54	98.89
12492	98.98	55.46	0.60	0.29	0.009	0.044	435	10	0.23	22	67	21	553	10	43.56	99.97
12493	97.60	54.68	0.68	0.33	0.012	0.032	402	10	0.11	31	65	26	317	12	43.63	98.52
12494	96.80	54.24	0.41	0.20	0.061	0.149	623	13	0.47	24	372	64	74	66	43.45	98.02
12495	96.73	54.19	0.92	0.44	0.029	0.070	622	6	0.18	20	147	50	121	25	43.59	98.02
12496	93.89	52.61	3.69	1.76	0.046	0.103	592	12	0.24	21	263	54	<70	42	43.76	98.07
12497	97.65	54.71	0.53	0.25	0.035	0.089	695	11	0.23	20	220	47	172	37	43.58	98.66
12498	98.70	55.30	0.66	0.32	0.030	0.079	909	12	0.18	21	192	26	<70	30	43.78	99.77
12499	97.37	54.55	1.72	0.82	0.067	0.087	1248	11	0.19	19	199	24	<70	38	43.65	99.59
12500	97.86	54.83	0.83	0.40	0.010	0.017	408	17	0.09	36	<30	<20	627	3	43.59	98.91

APPENDIX 4: ANALYTICAL REPORT OF CHECK SAMPLES FROM ACME ANALYTICAL LABORATORIES LTD.

ACME ANALYTICAL LABORATORIES LTD. 852 E. HASTINGS ST. VANCOUVER BC V6A 1R6 PHONE(604)253-3158 FAX(604)253-1716

WHOLE ROCK ICP ANALYSIS

Halferdahl & Associates Ltd. PROJECT KELLY LAKE File # 97-5303

18 - 10509 - 81st Ave, Edmonton AB T6E 1X7 Submitted by: L.B. Halferdahl

SAMPLE#	SiO2 %	Al2O3 %	Fe2O3 %	MgO %	CaO %	Na2O %	K2O %	TiO2 %	P2O5 %	MnO %	Cr2O3 %	Ba ppm	Ni ppm	Sr ppm	Zr ppm	Y ppm	Nb ppm	Sc ppm	LOI %	C/TOT %	S/TOT %	SUM %
11678	.06	.05	.04	.37	56.32	<.01	.04	<.01	.03	<.01	<.001	24	<20	154	<10	<10	<10	<10	43.6	12.05	<.01	100.54
11679	.40	.08	<.04	.37	55.79	.03	.04	<.01	.08	<.01	.004	29	<20	201	<10	<10	<10	<10	43.2	11.85	<.01	100.03
11680	.07	.04	<.04	.35	55.51	.01	<.04	<.01	.06	<.01	.002	22	<20	175	<10	<10	<10	<10	43.5	11.94	<.01	99.62
11681	.05	.05	<.04	.40	55.22	.02	<.04	.01	.03	<.01	.001	23	<20	179	<10	<10	<10	<10	43.4	12.01	.02	99.27
11683	.31	.10	.05	.51	54.94	.02	.04	<.01	.05	<.01	.003	27	<20	222	55	<10	<10	<10	43.5	12.32	.05	99.57
11685	.22	.06	<.04	.37	54.51	.01	.04	<.01	.12	<.01	.002	18	<20	277	<10	<10	<10	<10	43.6	12.10	.05	98.98
12020	.24	.13	.04	.48	54.76	.06	.06	.01	.05	<.01	.003	27	<20	251	<10	<10	<10	<10	43.8	11.93	.04	99.67
12021	.07	.04	.04	.36	55.38	.02	<.04	<.01	.08	.01	.003	30	<20	203	<10	<10	<10	<10	43.5	11.68	.02	99.56
12022	.17	.08	.05	.41	54.91	.06	.04	<.01	.09	<.01	.004	130	<20	248	11	<10	<10	<10	43.6	11.76	.04	99.47
12023	.02	.04	<.04	.39	55.37	.03	<.04	<.01	.05	<.01	.002	29	<20	210	<10	<10	<10	<10	43.6	11.79	.05	99.57
12025	.03	.06	.04	.17	55.59	.03	<.04	.01	.03	.01	.004	8	<20	345	134	<10	31	<10	43.5	12.44	.03	99.57
12027	.06	.07	<.04	.25	55.53	.04	.04	<.01	.03	<.01	.001	11	<20	432	<10	<10	<10	<10	43.5	12.12	.05	99.58
12029	<.02	.06	<.04	.24	55.50	.04	.04	<.01	.02	<.01	.001	12	<20	208	<10	<10	<10	<10	43.6	11.83	.06	99.57
12037	<.02	.03	<.04	.33	55.53	.03	.04	<.01	.06	<.01	.001	30	<20	149	12	<10	<10	<10	43.5	12.12	.05	99.56
12125	<.02	<.03	<.04	.31	54.20	.01	<.04	<.01	<.01	<.01	.004	13	<20	171	<10	<10	<10	<10	43.5	12.13	.03	98.12
12136	.09	.06	<.04	.47	54.90	.03	.04	<.01	.12	<.01	.005	50	<20	293	<10	<10	<10	<10	43.7	11.71	.02	99.49
12486	.05	<.03	<.04	.42	55.93	.04	.04	<.01	.11	<.01	<.001	37	<20	248	59	<10	<10	<10	43.8	11.87	.05	100.47
12488	.02	.04	<.04	.42	55.11	.01	<.04	.01	.09	<.01	.002	39	<20	198	27	<10	<10	<10	43.7	11.84	.04	99.47
12489	.08	.04	<.04	.36	55.13	.01	.04	.01	.09	<.01	.001	28	<20	246	14	<10	<10	<10	43.7	12.36	.03	99.50
RE 12489	.07	.05	.04	.37	55.50	.03	<.04	.01	.02	<.01	.003	27	<20	248	15	<10	<10	<10	43.7	12.11	.03	99.86
12491	.14	.05	<.04	.36	56.06	.06	.04	<.01	.07	<.01	<.001	17	<20	216	<10	<10	<10	<10	43.3	11.67	.03	100.12
12493	.09	.05	<.04	.38	55.11	.04	.04	<.01	<.01	<.01	.003	30	<20	238	<10	<10	<10	<10	43.7	11.75	.01	99.46
12494	.41	.17	<.04	.27	54.86	.04	.06	<.01	.02	<.01	<.001	15	<20	373	<10	<10	<10	<10	43.6	12.23	<.01	99.50
12495	.14	.08	<.04	.51	54.71	.02	.04	.01	.03	<.01	.001	15	<20	370	16	<10	<10	<10	43.9	12.04	.05	99.49
12496	.27	.13	<.04	1.51	53.08	.05	.05	.01	.04	<.01	.001	15	62	353	18	<10	<10	<10	44.3	11.78	.03	99.50
12497	.19	.11	<.04	.32	55.39	.04	.05	<.01	.04	<.01	.001	15	<20	415	<10	<10	<10	<10	43.9	12.13	.03	100.11
12500	.08	.04	<.04	.46	55.95	.05	<.04	.01	.06	<.01	<.001	35	<20	247	80	<10	<10	<10	43.7	11.94	.03	100.45
STANDARD SO-15/CSA	49.11	12.79	7.35	7.05	5.71	2.43	1.93	1.58	2.72	1.40	1.067	2252	64	398	688	17	12	<10	5.9	4.03	5.08	99.44
STANDARD LIMESTONE	7.42	1.32	.58	.45	50.42	.08	.28	.07	.04	.02	.002	79	<20	275	98	<10	<10	<10	39.9	-	-	100.64

.200 GRAM SAMPLES ARE FUSED WITH 1.5 GRAM OF LIBO2 AND ARE DISSOLVED IN 100 MLS 5% HNO3. OTHER METALS ARE SUM AS OXIDES.
TOTAL C & S BY LECO (NOT INCLUDED IN THE SUM).
- SAMPLE TYPE: PULP Samples beginning 'RE' are Reruns and 'RRE' are Reject Reruns.

DATE RECEIVED: SEP 12 1997 DATE REPORT MAILED: Sept 24/97 SIGNED BY. C. Leong .D.TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS

Data F FA ___

APPENDIX 5: CONTINUED

Det'd - determined; adjustments: LOI - LOI based, Imp - impurity based; Pref - preferred

Code				
1	LOI - CO_2 EQ $\geq$ 0.00	CaO(Pref) = CaO(Det'd)	LOI(Pref) = LOI(Det'd)
2	LOI - CO_2EQ < 0.00 and CaO(Det'd) < 52.50	CaO(Pref) = CaO(Det'd)	LOI(Pref) = LOI(Det'd)
3	LOI - CO_2EQ < 0.00 and CaO(Det'd) < CaO(LOI)	CaO(Pref) = CaO(Det'd)	LOI(Pref) = LOI(Det'd)
5	LOI - CO_2EQ < 0.00 and CaO(LOI) $\leq$ CaO(Imp)	CaO(Pref) = CaO(LOI)	LOI(Pref) = LOI(Det'd)*

Criteria for codes are applied to each sample in the order listed.

CONTINENTAL ANALYSES

Sample	LOI-CO_2EQ	Code	CaO				LOI				SUM		
			Det'd	LOI	IMP	Pref.	Det'd	LOI	IMP	Pref.	Det'd	LOI+oxides	Adjusted
11676	-0.18	5	55.47	55.43	55.43	55.43	43.63	43.97	43.97	43.63	99.93	99.69	99.65
11677	-0.19	5	55.46	55.43	55.43	55.43	43.63	43.99	43.99	43.63	99.92	99.67	99.63
11678	0.22	1	54.60	55.60	55.48	54.60	43.38	44.13	44.04	43.38	98.29	98.47	98.47
11679	0.23	1	54.51	55.34	55.24	54.51	43.32	43.93	43.85	43.32	98.54	98.74	98.74
11680	0.15	1	54.74	55.59	55.49	54.74	43.40	44.11	44.03	43.40	98.51	98.62	98.62
11681	0.29	1	54.55	55.67	55.53	54.55	43.39	44.17	44.07	43.39	98.08	98.34	98.34
11682	0.07	1	55.07	55.12	55.12	55.07	43.68	43.83	43.83	43.68	99.81	99.81	99.81
11683	0.38	1	54.39	55.18	55.09	54.39	43.52	43.95	43.88	43.52	98.62	98.94	98.94
11684	0.00	1	54.91	55.32	55.27	54.91	43.44	43.95	43.91	43.44	99.23	99.18	99.18
11685	0.62	1	54.35	55.49	55.35	54.35	43.55	44.01	43.91	43.55	98.09	98.64	98.64
11686	-0.02	3	54.93	55.21	55.17	54.93	43.44	43.86	43.84	43.44	99.44	99.36	99.36
11687	-0.02	3	55.08	55.39	55.35	55.08	43.50	43.95	43.92	43.50	99.36	99.30	99.30
12001	-0.23	5	55.41	55.32	55.33	55.32	43.67	44.03	44.03	43.67	99.99	99.71	99.63
12002	-0.27	5	55.39	55.33	55.34	55.33	43.62	44.04	44.05	43.62	99.93	99.62	99.57
12003	-0.21	5	55.39	55.35	55.35	55.35	43.69	44.06	44.07	43.69	99.91	99.66	99.62
12004	-0.21	5	55.42	55.38	55.39	55.38	43.66	44.03	44.03	43.66	99.93	99.66	99.62
12005	-0.30	5	55.50	55.44	55.44	55.44	43.57	44.02	44.02	43.57	99.93	99.60	99.54
12006	0.02	1	55.10	55.54	55.48	55.10	43.56	44.08	44.04	43.56	99.16	99.14	99.14
12007	-0.31	5	55.52	55.45	55.46	55.45	43.61	44.05	44.06	43.61	99.92	99.61	99.54
12008	-0.12	3	55.31	55.43	55.41	55.31	43.67	44.06	44.05	43.67	99.65	99.52	99.52
12009	-0.25	5	55.46	55.41	55.42	55.41	43.64	44.04	44.05	43.64	99.90	99.63	99.59
12010	-0.07	3	55.28	55.47	55.45	55.28	43.67	44.08	44.06	43.67	99.52	99.44	99.44
12011	-2.10	2	50.47	50.44	50.45	50.47	37.86	40.13	40.13	37.86	99.95	97.75	97.75
12012	0.20	1	55.13	55.14	55.14	55.13	43.85	43.84	43.84	43.85	99.90	100.00	100.00
12013	0.33	1	54.83	55.23	55.18	54.83	43.76	43.93	43.89	43.76	99.28	99.51	99.51
12014	-0.33	5	55.55	55.50	55.50	55.50	43.50	43.97	43.98	43.50	99.98	99.57	99.51
12015	0.32	1	55.03	55.47	55.42	55.03	43.73	43.95	43.91	43.73	99.26	99.43	99.43
12016	-0.02	3	55.37	55.41	55.40	55.37	43.66	43.89	43.89	43.66	99.90	99.74	99.74
12017	-0.25	5	55.20	55.11	55.12	55.11	43.63	44.00	44.01	43.63	99.96	99.70	99.61
12018	-0.34	5	55.52	55.48	55.48	55.48	43.56	44.05	44.06	43.56	99.90	99.54	99.50
12019	-0.17	5	55.42	55.40	55.40	55.40	43.56	43.90	43.91	43.56	99.95	99.67	99.65
12020	0.53	1	54.46	55.22	55.13	54.46	43.71	43.97	43.90	43.71	98.65	99.14	99.14
12021	0.36	1	54.75	55.53	55.43	54.75	43.64	44.08	44.01	43.64	98.65	98.95	98.95
12022	0.66	1	54.38	55.54	55.40	54.38	43.69	44.12	44.02	43.69	98.04	98.66	98.66
12023	0.50	1	54.49	55.61	55.48	54.49	43.58	44.15	44.05	43.58	98.10	98.55	98.55
12024	-0.15	5	55.45	55.42	55.42	55.42	43.62	43.94	43.95	43.62	99.96	99.70	99.67
12025	-0.27	5	55.71	55.69	55.69	55.69	43.58	44.01	44.02	43.58	99.86	99.58	99.56
12026	-0.30	5	55.63	55.57	55.57	55.57	43.53	43.96	43.97	43.53	99.92	99.61	99.55
12027	0.36	1	54.65	55.72	55.59	54.65	43.47	44.12	44.02	43.47	98.16	98.51	98.51
12028	-0.27	5	55.32	55.25	55.26	55.25	43.51	43.90	43.91	43.51	99.95	99.67	99.59
12029	-0.31	5	55.70	55.61	55.62	55.61	43.61	44.04	44.04	43.61	99.96	99.64	99.56
12030	-0.17	5	55.49	55.47	55.47	55.47	43.66	43.96	43.96	43.66	99.91	99.72	99.70
12031	-0.14	3	55.34	55.35	55.34	55.34	43.52	43.85	43.85	43.52	99.92	99.67	99.67
12032	-0.14	5	55.29	55.27	55.27	55.27	43.57	43.88	43.89	43.57	99.92	99.70	99.68
12033	0.04	1	55.33	55.34	55.34	55.33	43.65	43.82	43.82	43.65	99.97	99.82	99.82
12034	-0.27	5	55.51	55.47	55.47	55.47	43.56	43.98	43.99	43.56	99.95	99.61	99.56
12035	-0.24	5	55.44	55.41	55.42	55.41	43.61	44.02	44.03	43.61	99.90	99.61	99.58
12036	-0.18	3	55.45	55.46	55.45	55.45	43.63	44.01	44.01	43.63	99.86	99.62	99.62
12037	-0.28	5	55.57	55.48	55.49	55.48	43.61	44.01	44.02	43.61	99.98	99.66	99.58
12038	-0.35	5	55.56	55.51	55.51	55.51	43.50	44.01	44.01	43.50	99.93	99.53	99.48
12039	-0.08	5	55.52	55.50	55.50	55.50	43.74	44.00	44.00	43.74	99.90	99.75	99.73

* LOI(Pref) = LOI(Det'd) has been chosen for these analyses because differences in the unadjusted LOI determinations from both labs are not statistically significant.

APPENDIX 5: CONTINUED

Det'd - determined; adjustments: LOI - LOI based, Imp - impurity based; Pref - preferred

Code			
1	LOI - CO_2 EQ ≥ 0.00	CaO(Pref) = CaO(Det'd)	LOI(Pref) = LOI(Det'd)
2	LOI - CO_2EQ < 0.00 and CaO(Det'd) < 52.50	CaO(Pref) = CaO(Det'd)	LOI(Pref) = LOI(Det'd)
3	LOI - CO_2EQ < 0.00 and CaO(Det'd) < CaO(LOI)	CaO(Pref) = CaO(Det'd)	LOI(Pref) = LOI(Det'd)
4	For repeat analyses (RE) the preferred values for that sample are the means of the CaO(Pref) and the LOI(Pref) values.		
5	LOI - CO_2EQ < 0.00 and CaO(LOI) ≤ CaO(Imp)	CaO(Pref) = CaO(LOI)	LOI(Pref) = LOI(Det'd)*

Criteria for codes are applied to each sample in the order listed.

ACME ANALYSES

Sample	LOI - CO_2 EQ	LOI - CO_2 (C)°	Code	CaO%				LOI%				SUM %		
				Det'd	LOI	Imp	Pref	Det'd	LOI	Imp	Pref	Det'd	LOI+Ox	Adjusted
11678	-0.97	-0.55	5	56.32	55.19	55.33	55.19	43.6	43.89	44.00	43.6	100.54	100.80	99.42
11679	-0.90	-0.22	5	55.79	55.01	55.11	55.01	43.2	43.70	43.77	43.2	100.03	100.49	99.27
11680	-0.38	-0.25	5	55.51	55.35	55.37	55.35	43.5	43.96	43.97	43.5	99.62	100.00	99.45
11681	-0.34	-0.61	3	55.22	55.33	55.32	55.22	43.4	43.27	44.02	43.4	99.27	99.81	99.25
11683	-0.12	-1.64	3	54.94	54.97	54.97	54.94	43.5	43.85	43.85	43.5	99.57	99.87	99.56
11685	0.54	-0.74	1	54.51	55.32	55.22	54.51	43.6	43.90	43.82	43.6	98.98	99.23	99.00
12020	0.35	0.09	1	54.76	55.04	55.01	54.76	43.8	43.87	43.84	43.8	99.67	99.70	99.67
12021	-0.27	0.70	5	55.38	55.33	55.34	55.33	43.5	43.94	43.94	43.5	99.56	99.94	99.50
12022	0.15	0.51	1	54.91	55.18	55.14	54.91	43.6	43.86	43.84	43.6	99.47	99.67	99.46
12023	-0.23	0.40	5	55.37	55.33	55.33	55.33	43.6	43.99	44.00	43.6	99.57	99.90	99.53
12025	-0.26	-2.06	5	55.59	55.54	55.54	55.54	43.5	43.94	43.95	43.5	99.57	99.91	99.48
12027	-0.32	-0.91	5	55.53	55.39	55.41	55.39	43.5	43.91	43.93	43.5	99.58	99.93	99.46
12029	-0.20	0.25	5	55.50	55.47	55.48	55.47	43.6	43.98	43.98	43.6	99.57	99.88	99.54
12037	-0.38	-0.91	5	55.53	55.38	55.40	55.38	43.5	43.97	43.98	43.5	99.56	99.99	99.44
12125	0.63	-0.95	1	54.20	55.62	55.45	54.20	43.5	44.18	44.05	43.5	98.12	98.71	98.12
12136	0.23	0.79	1	54.90	55.19	55.16	54.90	43.7	43.91	43.88	43.7	99.49	99.63	99.48
12486	-0.44	0.31	5	55.93	55.17	55.26	55.17	43.8	43.85	43.92	43.8	100.47	100.44	99.71
12488	0.09	0.32	1	55.11	55.34	55.31	55.11	43.7	44.00	43.98	43.7	99.47	99.70	99.47
12489	0.14	-1.59	1,4	55.13	55.36	55.33	55.21	43.7	43.95	43.93	43.7	99.50	99.71	99.60
E 12489	-0.24	-0.67	4,5	55.50	55.29	55.31	55.21	43.7	43.97	43.99	43.7	99.86	100.07	99.56
12491	-1.02	0.54	5	56.06	55.16	55.27	55.16	43.3	43.81	43.90	43.3	100.12	100.59	99.23
12493	0.04	0.65	1	55.11	55.30	55.28	55.11	43.7	44.01	43.99	43.7	99.46	99.72	99.48
12494	0.27	-1.21	1	54.86	55.17	55.13	54.86	43.6	43.77	43.74	43.6	99.50	99.60	99.51
12495	0.44	-0.22	1	54.71	55.13	55.08	54.71	43.9	43.99	43.95	43.9	99.49	99.53	99.51
12496	1.04	1.14	1	53.08	53.88	53.78	53.08	44.3	44.09	44.02	44.3	99.50	99.23	99.51
12497	0.12	-0.55	1	55.39	55.20	55.23	55.39	43.9	43.83	43.85	43.9	100.11	99.97	100.12
12500	-0.65	-0.05	5	55.95	55.10	55.20	55.10	43.7	43.88	43.96	43.7	100.45	100.53	99.58

* LOI (Pref) = LOI (Det'd) has been chosen for these analyses because differences in the LOI determinations from both labs are not statistically significant.

°CO_2 (C) is the CO_2 equivalent based on C determined by Acme.

APPENDIX 6: CONTINUED

M: number of positive differences

Ho: $P(\text{Constituent Determination}_{LAB1} > \text{Constituent Determination}_{LAB2}) = ½$

Ha: $P(\text{Constituent Determination}_{LAB1} > \text{Constituent Determination}_{LAB2}) \neq ½$

If both samples are derived from the same probability distribution then **M** will be binomially distributed with $p = ½$ and the level of significance α associated with the rejection region is determined by

y: number of samples required to raise α to the required level of significance
p(x): binomial probability $[(n! / ((n-x)!(x)!))\ 0.5^x 0.5^{n-x}]$
α: two-tailed level of significance $[p(0) + ... + p(0+y) + p(n-y) + ... + p(n)]$
RR: rejection region $[(0 \leq M \leq y,\ n-y \leq M \leq n)]$

TWO-TAILED STUDENTS *t*-TEST OF CONFIDENCE INTERVALS (Koch and Link, 1970)

For the test of confidence intervals the determinations of the same sample from two laboratories are paired and their differences comprise the sample data for which the following hypothesis may be tested:

Ho: $\text{Constituent Determination}_{LAB1} - \text{Constituent Determination}_{LAB2} = 0$

Ha: $\text{Constituent Determination}_{LAB1} - \text{Constituent Determination}_{LAB2} \neq 0$

If confidence intervals constructed about the mean difference exclude 0 then the null hypothesis is rejected.

Σ **w**: sum of observations
$\Sigma\ w_{DIFFERENCE}$: difference of the sum of observations $[\Sigma\ w_{LAB1} - \Sigma\ w_{LAB2}]$
$(\Sigma\ w_{DIFFERENCE})^2$: squared difference of the sum of observations $[(\Sigma\ w_{LAB1} - \Sigma\ w_{LAB1})^2]$
$(\Sigma\ w_{DIFFERENCE})^2 / n$: mean squared difference
SS: sum of squared deviations from the sample mean
s^2: sample variance $[SS / d.o.f]$
s: sample standard deviation $[(s^2)^{½}$ or $SS^{½}]$
$s / n^{½}$: standard deviation of sample means
$t(s / n^{½})$: test statistic at α level of significance $[(s / n^{½}) \cdot (t_\alpha)]$
μ_L: lower confidence limit $[d_x - t(s / n^{½})]$
μ_U: upper confidence limit $[d_x + t(s / n^{½})]$

APPENDIX 6: CONTINUED

Adjusted CaO [CONTINENTAL - $ACME_{ADJUSTED}$]

Sample	CaO (%)		Test of Differences and Confidence Intervals			Sign Test
	CONT	ACME	DIFF (D)	DEV (d)	SD (d^2)	Sign of DIFF
11678	54.60	55.19	-0.59	-0.04	0.00	-
11679	54.51	55.01	-0.50	0.04	0.00	-
11680	54.74	55.35	-0.61	-0.06	0.00	-
11681	54.55	54.37	0.18	0.73	0.53	+
11683	54.39	54.94	-0.55	-0.01	0.00	-
11685	54.35	54.51	-0.16	0.38	0.15	-
12020	54.46	54.76	-0.30	0.25	0.06	-
12021	54.75	55.33	-0.58	-0.04	0.00	-
12022	54.38	54.91	-0.53	0.02	0.00	-
12023	54.49	55.33	-0.83	-0.29	0.08	-
12025	55.71	55.54	0.17	0.72	0.52	+
12027	54.65	55.39	-0.74	-0.19	0.04	-
12029	55.70	55.47	0.22	0.77	0.59	+
12037	55.57	55.38	0.18	0.73	0.53	+
12125	54.89	54.20	0.69	1.24	1.53	+
12136	54.34	54.90	-0.56	-0.01	0.00	-
12486	54.38	55.17	-0.79	-0.24	0.06	-
12488	54.50	55.11	-0.61	-0.06	0.00	-
12489	55.47	55.21	0.26	0.81	0.65	+
RE 12489	55.47	55.21	0.26	0.81	0.65	+
12491	54.90	55.16	-0.26	0.28	0.08	-
12493	54.68	55.11	-0.43	0.12	0.01	-
12494	54.24	54.86	-0.62	-0.08	0.01	-
12495	54.19	54.71	-0.52	0.03	0.00	-
12496	52.61	53.08	-0.47	0.07	0.01	-
12497	54.71	55.39	-0.68	-0.13	0.02	-
12500	54.83	55.10	-0.27	0.28	0.08	-
Total (Σ w)	1476.06	1484.68	ΣW_{DIFF} =	-8.63	6.11	SS = 5.60	M = 7
Mean (μ)	54.67	54.99	d_x =	-0.32		S_D^2 = 0.22	
n =	27		d.o.f =	26			

TEST OF DIFFERENCES

S_D =	0.46	t =	-3.578	tα = 0.100 =	1.706	Reject Ho:
S_{d2} =	0.01			tα = 0.050 =	2.056	Reject Ho:
S_d =	0.09			tα = 0.025 =	2.379	Reject Ho:

SIGN TEST

α = p(0)+...+p(6)+p(22)+...+p(27)	RR = (0...6,22...27)	α = 0.351	Accept Ho:
α = p(0)+...+p(5)+p(23)+...+p(27)	RR = (0...5,23...27)	α = 0.124	Accept Ho:
α = p(0)+...+p(4)+p(24)+...+p(27)	RR = (0...4,24...27)	α = 0.026	Accept Ho:

TEST OF CONFIDENCE INTERVALS

$(\Sigma w_{DIFF})^2$ =	74.41	$(\Sigma w_{DIFF})^2 / n$ =	2.76	SS =	5.60	
s^2 = SS/d.o.f =	0.22	$s = (s^2)^{1/2}$ =	0.46	$s / n^{1/2}$ =	0.09	

$t(s/n^{1/2})\alpha$ = 0.100 =	0.183	μL =	-0.503	μU =	-0.136	Reject Ho:
$t(s/n^{1/2})\alpha$ = 0.050 =	0.221	μL =	-0.540	μU =	-0.099	Reject Ho:
$t(s/n^{1/2})\alpha$ = 0.025 =	0.255	μL =	-0.575	μU =	-0.064	Reject Ho:

APPENDIX 6: CONTINUED

MgO [CONTINENTAL - ACME]

Sample	MgO (%)		Test of Differences and Confidence Intervals			Sign Test
	CONT	ACME	DIFF (D)	DEV (d)	SD (d^2)	Sign of DIFF
11678	0.30	0.37	-0.07	0.48	0.23	-
11679	0.30	0.37	-0.07	0.48	0.23	-
11680	0.29	0.35	-0.06	0.49	0.24	-
11681	0.29	0.40	-0.11	0.43	0.19	-
11683	0.46	0.51	-0.05	0.49	0.24	-
11685	0.30	0.37	-0.07	0.48	0.23	-
12020	0.42	0.48	-0.06	0.49	0.24	-
12021	0.33	0.36	-0.03	0.52	0.27	-
12022	0.35	0.41	-0.06	0.49	0.24	-
12023	0.32	0.39	-0.07	0.48	0.23	-
12025	0.11	0.17	-0.06	0.48	0.23	-
12027	0.18	0.25	-0.07	0.48	0.23	-
12029	0.18	0.24	-0.06	0.49	0.24	-
12037	0.28	0.33	-0.05	0.50	0.25	-
12125	0.25	0.31	-0.06	0.48	0.23	-
12136	0.39	0.47	-0.08	0.47	0.22	-
12486	0.36	0.42	-0.06	0.49	0.24	-
12488	0.38	0.42	-0.04	0.50	0.25	-
12489	0.31	0.36	-0.05	0.49	0.24	-
RE 12489	0.31	0.37	-0.06	0.48	0.23	-
12491	0.30	0.36	-0.06	0.48	0.23	-
12493	0.33	0.38	-0.05	0.49	0.24	-
12494	0.20	0.27	-0.07	0.47	0.22	-
12495	0.44	0.51	-0.07	0.48	0.23	-
12496	1.76	1.51	0.25	0.80	0.64	+
12497	0.25	0.32	-0.07	0.48	0.23	-
12500	0.40	0.46	-0.06	0.48	0.23	-
Total (Σ w)	9.80	11.16	ΣW_{DIFF} = -1.36	13.37	SS = 6.72	M = 1
Mean (μ)	0.36	0.41	d_x = -0.05		S_D^2 = 0.26	
n =	27		d.o.f = 26			

TEST OF DIFFERENCES

S_D =	0.51	t = -0.516	tα = 0.100 =	1.706	Accept Ho:
S_D^2 =	0.01		tα = 0.050 =	2.056	Accept Ho:
S_d =	0.10		tα = 0.025 =	2.379	Accept Ho:

SIGN TEST

α = p(0)+...+p(6)+p(22)+...+p(27)	RR = (0...6,22...27)	α = 0.351	Reject Ho:
α = p(0)+...+p(5)+p(23)+...+p(27)	RR = (0...5,23...27)	α = 0.124	Reject Ho:
α = p(0)+...+p(4)+p(24)+...+p(27)	RR = (0...4,24...27)	α = 0.026	Reject Ho:

TEST OF CONFIDENCE INTERVALS

$(\Sigma w_{DIFF})^2$ =	1.86	$(\Sigma w_{DIFF})^2 / n$ =	0.07	SS =	6.72
s^2 = SS/d.o.f =	0.26	$s = (s^2)^{1/2}$ =	0.51	$s / n^{1/2}$ =	0.10

$t(s/n^{1/2})\alpha$ = 0.100 =	0.183	μL =	-0.234	μU =	0.133	Accept Ho:
$t(s/n^{1/2})\alpha$ = 0.050 =	0.221	μL =	-0.271	μU =	0.170	Accept Ho:
$t(s/n^{1/2})\alpha$ = 0.025 =	0.255	μL =	-0.306	μU =	0.205	Accept Ho:

APPENDIX 6: CONTINUED

Al_2O_3 [CONTINENTAL - ACME]

Sample	Al_2O_3 (%) CONT	ACME		Test of Differences and Confidence Intervals DIFF (D)	DEV (d)	SD (d^2)	Sign Test Sign of DIFF
11678	0.031	0.050		-0.019	0.526	0.277	-
11679	0.063	0.080		-0.017	0.529	0.280	-
11680	0.025	0.040		-0.015	0.531	0.282	-
11681	0.017	0.050		-0.033	0.513	0.263	-
11683	0.072	0.100		-0.028	0.517	0.268	-
11685	0.060	0.060		0.000	0.545	0.297	-
12020	0.113	0.130		-0.017	0.529	0.280	-
12021	0.021	0.040		-0.019	0.527	0.278	-
12022	0.031	0.080		-0.049	0.497	0.247	-
12023	0.017	0.040		-0.023	0.523	0.273	-
12025	0.031	0.060		-0.029	0.517	0.267	-
12027	0.034	0.070		-0.036	0.510	0.260	-
12029	0.026	0.060		-0.034	0.512	0.262	-
12037	0.034	0.030		0.004	0.549	0.302	+
12125	0.019	0.015	*	0.004	0.550	0.302	+
12136	0.046	0.060		-0.014	0.532	0.283	-
12486	0.020	0.015	*	0.005	0.550	0.303	+
12488	0.016	0.040		-0.024	0.521	0.272	-
12489	0.033	0.040		-0.007	0.539	0.291	-
RE 12489	0.033	0.050		-0.017	0.529	0.280	-
12491	0.032	0.050		-0.018	0.528	0.279	-
12493	0.032	0.050		-0.018	0.527	0.278	-
12494	0.149	0.170		-0.021	0.525	0.276	-
12495	0.070	0.080		-0.010	0.535	0.287	-
12496	0.103	0.130		-0.027	0.519	0.269	-
12497	0.089	0.110		-0.021	0.525	0.276	-
12500	0.017	0.040		-0.023	0.523	0.274	-
Total (Σ w)	1.237	1.740	ΣW_{DIFF} =	-0.503	14.230	SS = 7.504	M = 3
Mean (μ)	0.046	0.064	d_x =	-0.019		S_D^2 = 0.289	
n =	27		d.o.f =	26			

TEST OF DIFFERENCES

S_D =	0.54	t =	-0.180	tα = 0.100 = 1.706	Accept Ho:
S_d2 =	0.01			tα = 0.050 = 2.056	Accept Ho:
S_d =	0.10			tα = 0.025 = 2.379	Accept Ho:

SIGN TEST

α = p(0)+...+p(6)+p(22)+...+p(27)	RR = (0...6,22...27)	α = 0.351	Reject Ho:
α = p(0)+...+p(5)+p(23)+...+p(27)	RR = (0...5,23...27)	α = 0.124	Reject Ho:
α = p(0)+...+p(4)+p(24)+...+p(27)	RR = (0...4,24...27)	α = 0.026	Reject Ho:

TEST OF CONFIDENCE INTERVALS

$(\Sigma w_{DIFF})^2$ =	0.25	$(\Sigma w_{DIFF})^2 / n$ =	0.01	SS =	7.50
s^2 = SS/d.o.f =	0.29	$s = (s^2)^{1/2}$ =	0.54	$s / n^{1/2}$ =	0.10

$t(s/n^{1/2})\alpha$ = 0.100 =	0.183	μL =	-0.202	μU = 0.165		Accept Ho:
$t(s/n^{1/2})\alpha$ = 0.050 =	0.221	μL =	-0.239	μU = 0.202		Accept Ho:
$t(s/n^{1/2})\alpha$ = 0.025 =	0.255	μL =	-0.274	μU = 0.237		Accept Ho:

* Acme analysis of Al_2O_3 is reported as < 0.03 %.

APPENDIX 6: CONTINUED

Na_2O [CONTINENTAL - ACME]

Sample		Na_2O (%) CONT	Na_2O (%) ACME		Test of Differences and Confidence Intervals DIFF (D)	DEV (d)	SD (d^2)	Sign Test Sign of DIFF
11678	°	0.001	0.005	*	-0.004	0.542	0.293	-
11679	°	0.001	0.030		-0.029	0.517	0.267	-
11680	°	0.001	0.010		-0.009	0.537	0.288	-
11681	°	0.001	0.020		-0.019	0.527	0.277	-
11683		0.002	0.020		-0.018	0.528	0.278	-
11685	°	0.001	0.010		-0.009	0.537	0.288	-
12020		0.005	0.060		-0.055	0.491	0.241	-
12021		0.004	0.020		-0.016	0.530	0.280	-
12022		0.004	0.060		-0.056	0.490	0.240	-
12023		0.002	0.030		-0.028	0.518	0.268	-
12025	°	0.001	0.030		-0.029	0.517	0.267	-
12027		0.004	0.040		-0.036	0.509	0.259	-
12029		0.003	0.040		-0.037	0.508	0.259	-
12037		0.002	0.030		-0.028	0.518	0.268	-
12125		0.003	0.010		-0.007	0.538	0.290	-
12136		0.004	0.030		-0.026	0.520	0.270	-
12486		0.002	0.040		-0.038	0.508	0.258	-
12488		0.003	0.010		-0.007	0.539	0.291	-
12489		0.002	0.010		-0.008	0.538	0.289	-
RE 12489		0.002	0.030		-0.028	0.518	0.268	-
12491		0.004	0.060		-0.056	0.489	0.240	-
12493		0.003	0.040		-0.037	0.508	0.258	-
12494		0.006	0.040		-0.034	0.512	0.262	-
12495		0.005	0.020		-0.015	0.531	0.282	-
12496		0.005	0.050		-0.045	0.501	0.251	-
12497		0.005	0.040		-0.035	0.510	0.260	-
12500	°	0.001	0.050		-0.049	0.497	0.247	-
	Total (Σ w)	0.078	0.835	ΣW_{DIFF} =	-0.757	13.976	SS = 7.241	M = 0
	Mean (μ)	0.003	0.031	d_x =	-0.028		S_D^2 = 0.279	
	n =	27		d.o.f =	26			

TEST OF DIFFERENCES

S_D =	0.53	t =	-0.276	tα = 0.100 =	1.706 Accept Ho:
S_{d^2} =	0.01			tα = 0.050 =	2.056 Accept Ho:
S_d =	0.10			tα = 0.025 =	2.379 Accept Ho:

SIGN TEST

α = p(0)+...+p(6)+p(22)+...+p(27)	RR = (0...6,22...27)	α = 0.351 Reject Ho:
α = p(0)+...+p(5)+p(23)+...+p(27)	RR = (0...5,23...27)	α = 0.124 Reject Ho:
α = p(0)+...+p(4)+p(24)+...+p(27)	RR = (0...4,24...27)	α = 0.026 Reject Ho:

TEST OF CONFIDENCE INTERVALS

$(\Sigma w_{DIFF})^2$ =	0.57		$(\Sigma w_{DIFF})^2 / n$ =	0.02		SS =	7.24
s^2 = SS/d.o.f =	0.28		$s = (s^2)^{1/2}$ =	0.53		$s / n^{1/2}$ =	0.10
$t(s/n^{1/2})\alpha = 0.100$ =	0.183	μL =	-0.211	μU =	0.155		Accept Ho:
$t(s/n^{1/2})\alpha = 0.050$ =	0.221	μL =	-0.249	μU =	0.193		Accept Ho:
$t(s/n^{1/2})\alpha = 0.025$ =	0.255	μL =	-0.284	μU =	0.227		Accept Ho:

° Continental analysis of Na_2O is reported as < 20 ppm.

* Acme analysis of Na_2O is reported as < 0.01 %.

APPENDIX 6: CONTINUED

P_2O_5 [CONTINENTAL - ACME]

Sample	P_2O_5 (%)			Test of Differences and Confidence Intervals			Sign Test
	CONT	ACME		DIFF (D)	DEV (d)	SD (d^2)	Sign of DIFF
11678	0.036	0.030		0.006	0.551	0.304	+
11679	0.031	0.080		-0.049	0.497	0.247	-
11680	0.035	0.060		-0.025	0.521	0.271	-
11681	0.024	0.030		-0.006	0.540	0.291	-
11683	0.053	0.050		0.003	0.548	0.301	+
11685	0.062	0.120		-0.058	0.488	0.238	-
12020	0.030	0.050		-0.020	0.526	0.277	-
12021	0.056	0.080		-0.024	0.522	0.272	-
12022	0.051	0.090		-0.039	0.507	0.257	-
12023	0.046	0.050		-0.004	0.542	0.294	-
12025	0.007	0.030		-0.023	0.523	0.273	-
12027	0.007	0.030		-0.023	0.523	0.273	-
12029	0.007	0.020		-0.013	0.533	0.284	-
12037	0.037	0.060		-0.023	0.523	0.273	-
12125	0.008	0.005	*	0.003	0.549	0.301	+
12136	0.110	0.120		-0.010	0.536	0.287	-
12486	0.046	0.110		-0.064	0.482	0.232	-
12488	0.048	0.090		-0.042	0.503	0.253	-
12489	0.070	0.090		-0.020	0.526	0.277	-
RE 12489	0.070	0.020		0.050	0.596	0.355	+
12491	0.096	0.070		0.026	0.571	0.326	+
12493	0.032	0.005	*	0.027	0.572	0.328	+
12494	0.007	0.020		-0.013	0.533	0.284	-
12495	0.012	0.030		-0.018	0.528	0.279	-
12496	0.007	0.040		-0.033	0.513	0.263	-
12497	0.017	0.040		-0.023	0.523	0.273	-
12500	0.063	0.060		0.003	0.548	0.301	+
Total (Σ w)	1.069	1.480	ΣW_{DIFF} =	-0.411	14.323	SS = 7.615	M = 7
Mean (μ)	0.040	0.055	d_x =	-0.015		S_0^2 = 0.293	
n =	27		d.o.f =	26			

TEST OF DIFFERENCES

S_D =	0.54	t =	-0.146	tα = 0.100 = 1.706	Accept Ho:
S_{d2} =	0.01			tα = 0.050 = 2.056	Accept Ho:
S_d =	0.10			tα = 0.025 = 2.379	Accept Ho:

SIGN TEST

α = p(0)+...+p(6)+p(22)+...+p(27)	RR = (0...6,22...27)	α = 0.351	Accept Ho:
α = p(0)+...+p(5)+p(23)+...+p(27)	RR = (0...5,23...27)	α = 0.124	Accept Ho:
α = p(0)+...+p(4)+p(24)+...+p(27)	RR = (0...4,24...27)	α = 0.026	Accept Ho:

TEST OF CONFIDENCE INTERVALS

$(\Sigma w_{DIFF})^2$ =	0.17	$(\Sigma w_{DIFF})^2 / n$ =	0.01	SS =	7.61
s^2 = SS/d.o.f =	0.29	$s = (s^2)^{1/2}$ =	0.54	$s / n^{1/2}$ =	0.10

$t(s/n^{1/2})\alpha$ = 0.100 =	0.183	μL =	-0.198	μU = 0.168		Accept Ho:
$t(s/n^{1/2})\alpha$ = 0.050 =	0.221	μL =	-0.236	μU = 0.206		Accept Ho:
$t(s/n^{1/2})\alpha$ = 0.025 =	0.255	μL =	-0.271	μU = 0.240		Accept Ho:

* Acme analysis of P_2O_5 is reported as < 0.01 %.

APPENDIX 6: CONTINUED

BaO [CONTINENTAL - ACME]

Sample	BaO (ppm)		Test of Differences and Confidence Intervals			Sign Test
	CONT	ACME	DIFF (D)	DEV (d)	SD (d^2)	Sign of DIFF
11678	24	27	-3	-2	4	-
11679	32	32	-1	0	0	-
11680	27	25	2	3	8	+
11681	26	26	1	1	2	+
11683	32	30	2	2	5	+
11685	24	20	4	5	21	+
12020	28	30	-2	-1	2	-
12021	35	33	2	2	5	+
12022	36	145	-109	-108	11758	-
12023	32	32	0	0	0	-
12025	27	9	18	18	335	+
12027	16	12	4	4	19	+
12029	18	13	5	6	31	+
12037	24	33	-10	-9	84	-
12125	18	15	4	4	19	+
12136	50	56	-6	-5	25	-
12486	32	41	-9	-9	78	-
12488	39	44	-4	-4	14	-
12489	26	31	-5	-4	18	-
RE 12489	26	30	-4	-3	10	-
12491	23	19	4	4	17	+
12493	31	33	-3	-2	5	-
12494	24	17	7	8	65	+
12495	20	17	4	4	18	+
12496	21	17	4	4	19	+
12497	20	17	4	4	16	+
12500	36	39	-3	-3	9	-
Total (Σ w)	749	844	ΣW_{DIFF} =	-95	-80	SS = 12585
Mean (μ)	28	31	d_x =	-4		S_D^2 = 484
n =	27		d.o.f =	26		

M = 14

TEST OF DIFFERENCES

S_D =	22.00	t =	-0.831	tα = 0.100 = 1.706	Accept Ho:
S_d^2 =	17.93			tα = 0.050 = 2.056	Accept Ho:
S_d =	4.23			tα = 0.025 = 2.379	Accept Ho:

SIGN TEST

α = p(0)+...+p(6)+p(22)+...+p(27)	RR = (0...6,22...27)	α = 0.351	Accept Ho:
α = p(0)+...+p(5)+p(23)+...+p(27)	RR = (0...5,23...27)	α = 0.124	Accept Ho:
α = p(0)+...+p(4)+p(24)+...+p(27)	RR = (0...4,24...27)	α = 0.026	Accept Ho:

TEST OF CONFIDENCE INTERVALS

$(\Sigma w_{DIFF})^2$ =	9033.51	$(\Sigma w_{DIFF})^2 / n$ =	334.57	SS =	12585.12
$s^2 = SS/d.o.f$ =	484.04	$s = (s^2)^{1/2}$ =	22.00	$s / n^{1/2}$ =	4.23

$t(s/n^{1/2})\alpha = 0.100$ =	0.183	μL =	-3.703	μU =	-3.337	Reject Ho:
$t(s/n^{1/2})\alpha = 0.050$ =	0.221	μL =	-3.741	μU =	-3.299	Reject Ho:
$t(s/n^{1/2})\alpha = 0.025$ =	0.255	μL =	-3.776	μU =	-3.265	Reject Ho:

APPENDIX 6: CONTINUED

Adjusted LOI [CONTINENTAL - $ACME_{ADJUSTED}$]

Sample	LOI (%)		Test of Differences and Confidence Intervals			Sign Test
	CONT	ACME	DIFF (D)	DEV (d)	SD (d^2)	Sign of DIFF
11678	43.38	43.89	-0.51	0.04	0.00	-
11679	43.32	43.70	-0.38	0.17	0.03	-
11680	43.40	43.96	-0.56	-0.01	0.00	-
11681	43.39	43.40	-0.01	0.54	0.29	-
11683	43.52	43.50	0.02	0.57	0.32	+
11685	43.55	43.60	-0.05	0.50	0.25	-
12020	43.71	43.80	-0.09	0.46	0.21	-
12021	43.64	43.94	-0.30	0.25	0.06	-
12022	43.69	43.60	0.09	0.64	0.40	+
12023	43.58	43.99	-0.41	0.13	0.02	-
12025	43.58	43.94	-0.36	0.19	0.03	-
12027	43.47	43.91	-0.44	0.10	0.01	-
12029	43.61	43.98	-0.37	0.18	0.03	-
12037	43.61	43.97	-0.36	0.19	0.04	-
12125	43.42	43.50	-0.08	0.47	0.22	-
12136	43.52	43.70	-0.18	0.37	0.13	-
12486	43.64	43.85	-0.21	0.34	0.12	-
12488	43.60	43.70	-0.10	0.45	0.20	-
12489	43.56	43.84	-0.28	0.27	0.07	-
RE 12489	43.56	43.84	-0.28	0.27	0.07	-
12491	43.54	43.81	-0.27	0.28	0.08	-
12493	43.63	43.70	-0.07	0.48	0.23	-
12494	43.45	43.60	-0.15	0.40	0.16	-
12495	43.59	43.90	-0.31	0.24	0.06	-
12496	43.76	44.30	-0.54	0.01	0.00	-
12497	43.58	43.90	-0.32	0.23	0.05	-
12500	43.59	43.88	-0.29	0.25	0.06	-
Total (Σ w)	1175.89	1182.69	ΣW_{DIFF} =	-6.80	7.94	SS = 3.12	M = 2
Mean (μ)	43.55	43.80	d_x =	-0.25		S_D^2 = 0.12	
n =	27		d.o.f =	26			

TEST OF DIFFERENCES

S_D =	0.35	t =	-3.772	tα = 0.100 = 1.706	Reject Ho:
S_{d2} =	0.00			tα = 0.050 = 2.056	Reject Ho:
S_d =	0.07			tα = 0.025 = 2.379	Reject Ho:

SIGN TEST

α = p(0)+...+p(6)+p(22)+...+p(27)	RR = (0...6,22...27)	α = 0.351	Reject Ho:
α = p(0)+...+p(5)+p(23)+...+p(27)	RR = (0...5,23...27)	α = 0.124	Reject Ho:
α = p(0)+...+p(4)+p(24)+...+p(27)	RR = (0...4,24...27)	α = 0.026	Reject Ho:

TEST OF CONFIDENCE INTERVALS

$(\Sigma w_{DIFF})^2$ =	46.17	$(\Sigma w_{DIFF})^2 / n$ =	1.71	SS =	3.12	
s^2 = SS/d.o.f =	0.12	$s = (s^2)^{1/2}$ =	0.35	$s / n^{1/2}$ =	0.07	
$t(s/n^{1/2})\alpha = 0.100$ =	0.183	μL = -0.435		μU = -0.068		Reject Ho:
$t(s/n^{1/2})\alpha = 0.050$ =	0.221	μL = -0.472		μU = -0.031		Reject Ho:
$t(s/n^{1/2})\alpha = 0.025$ =	0.255	μL = -0.507		μU = 0.004		Accept Ho:

APPENDIX 6: CONTINUED

SUM [CONTINENTAL - ACME]

Sample	Sum (%)		Test of Differences and Confidence Intervals			Sign Test
	CONT	ACME	DIFF (D)	DEV (d)	SD (d^2)	Sign of DIFF
11678	98.28	100.54	-2.26	-1.71	2.92	-
11679	98.54	100.03	-1.49	-0.95	0.90	-
11680	98.51	99.62	-1.11	-0.56	0.32	-
11681	98.08	106.29	-8.21	-7.67	58.81	-
11683	98.62	99.57	-0.95	-0.40	0.16	-
11685	98.09	98.98	-0.89	-0.35	0.12	-
12020	98.65	99.67	-1.02	-0.48	0.23	-
12021	98.65	99.56	-0.91	-0.36	0.13	-
12022	98.04	99.47	-1.43	-0.88	0.78	-
12023	98.10	99.57	-1.47	-0.92	0.85	-
12025	99.85	99.57	0.28	0.83	0.68	+
12027	98.16	99.58	-1.42	-0.88	0.77	-
12029	99.95	99.57	0.38	0.92	0.85	+
12037	99.98	99.56	0.42	0.96	0.92	+
12125	98.62	98.12	0.50	1.05	1.10	+
12136	98.18	99.49	-1.31	-0.76	0.58	-
12486	98.01	100.47	-2.46	-1.91	3.66	-
12488	98.22	99.47	-1.25	-0.71	0.50	-
12489	99.97	99.50	0.47	1.01	1.02	+
RE 12489	99.97	99.86	0.11	0.65	0.42	+
12491	98.89	100.12	-1.23	-0.69	0.47	-
12493	98.52	99.46	-0.94	-0.40	0.16	-
12494	98.02	99.50	-1.48	-0.94	0.88	-
12495	98.02	99.49	-1.47	-0.92	0.85	-
12496	98.07	99.50	-1.43	-0.89	0.79	-
12497	98.66	100.11	-1.45	-0.91	0.83	-
12500	98.91	100.45	-1.54	-0.99	0.99	-
Total (Σ w)	2663.53	2697.12	ΣW_{DIFF} =	-33.59	-18.86	SS = 80.70	M = 6
Mean (μ)	98.65	99.89	d_x =	-1.24		S_D^2 = 3.10	
n =	27		d.o.f =	26			

TEST OF DIFFERENCES

S_D =	1.76	t =	-3.670	tα = 0.100 = 1.706	Reject Ho:
S_{d2} =	0.11			tα = 0.050 = 2.056	Reject Ho:
S_d =	0.34			tα = 0.025 = 2.379	Reject Ho:

SIGN TEST

α = p(0)+...+p(6)+p(22)+...+p(27)	RR = (0...6,22...27)	α = 0.351	Reject Ho:
α = p(0)+...+p(5)+p(23)+...+p(27)	RR = (0...5,23...27)	α = 0.124	Accept Ho:
α = p(0)+...+p(4)+p(24)+...+p(27)	RR = (0...4,24...27)	α = 0.026	Accept Ho:

TEST OF CONFIDENCE INTERVALS

$(\Sigma w_{DIFF})^2$ =	1128.49	$(\Sigma w_{DIFF})^2 / n$ =	41.80	SS =	80.70	
s^2 = SS/d.o.f =	3.10	$s = (s^2)^{1/2}$ =	1.76	$s / n^{1/2}$ =	0.34	
$t(s/n^{1/2})\alpha = 0.100$ =	0.183	μL = -1.427		μU = -1.061		Reject Ho:
$t(s/n^{1/2})\alpha = 0.050$ =	0.221	μL = -1.465		μU = -1.023		Reject Ho:
$t(s/n^{1/2})\alpha = 0.025$ =	0.255	μL = -1.500		μU = -0.989		Reject Ho:

APPENDIX 7: CONTINUED

h)	**Other**		
	Base Maps	$32.12	
	Long Distance Telephone	$16.50	
	Courier	$36.00	
			$84.62
	Total:		$26,374.92

APPENDIX 8: QUALIFICATIONS

D. I. Pană obtained a Diploma of Geological and Geophysical Engineer from the University of Bucharest in 1980 (equivalent to an M.Sc.in North America) and is now in the final stages of a Ph.D. program at the University of Alberta, Edmonton. He has 15 years of experience in mineral exploration and regional mapping with the Geological Survey of Romania. He is a member of the Geological Society of America.

The work described in the report was under the supervision of L.B. Halferdahl, who obtained degrees in geological engineering and geology from Queen's University, Kingston, Ontario, and The Johns Hopkins University, Baltimore, Maryland. He has more than 35 years experience as a practising engineer and geologist in research and mining exploration, including consulting since 1969. He is a member of the Canadian Institute of Mining and Metallurgy, and is registered as P. Eng. and P. Geol. in the Association of Professional Engineers, Geologists, and Geophysicists of Alberta, and registered as P. Eng. in the Association of Professional Engineers and Geoscientists of British Columbia.

(1)

LEGEND

Tertiary ?

D7 Intrusions

Upper Permian
Cache Creek Group
Marble Canyon Formation

C6 Southwest Carbonate

N5 Argillite, siltstone, conglomerate, schist

C4 First Ridge Carbonate

N3 Schist (sch), tuff and agglomerate (v), limestone and argillite (s), greenstone (g)

C2 Second Ridge Carbonate

N1 Volcanics

SYMBOLS

Geological boundary (approximate, assumed)
Fault (approximate, assumed)
Bedding (horizontal, inclined, vertical)
Schistosity, cleavage, foliation (inclined, vertical)
Planar feature / joint (inclined, vertical)
Synclinal axis (arrow indicates plunge)
Anticlinal axis (arrow indicates plunge)

Rock-chip sample with sample/section number B-12
Claim post (2 post, 4 post)
Claim line
Main road
Access road, trail
Diamond drillhole
Power line

NOTES:

1. Base map prepared from enlargement of part of 1 : 50 000 92P/4 topographic map.
2. Geology modified after Trettin (1980).
3. Contour interval is 100 ft.
4. UTM coordinates are NAD27.

GEOLOGICAL SURVEY BRANCH
ASSESSMENT REPORT

25,212

REVISIONS					
BY	DATE	BY	DATE	BY	DATE
LBH	1993.12				
DP	1997.09				

CONTINENTAL LIME LTD.

HALFERDAHL & ASSOCIATES LTD.
EDMONTON, ALBERTA

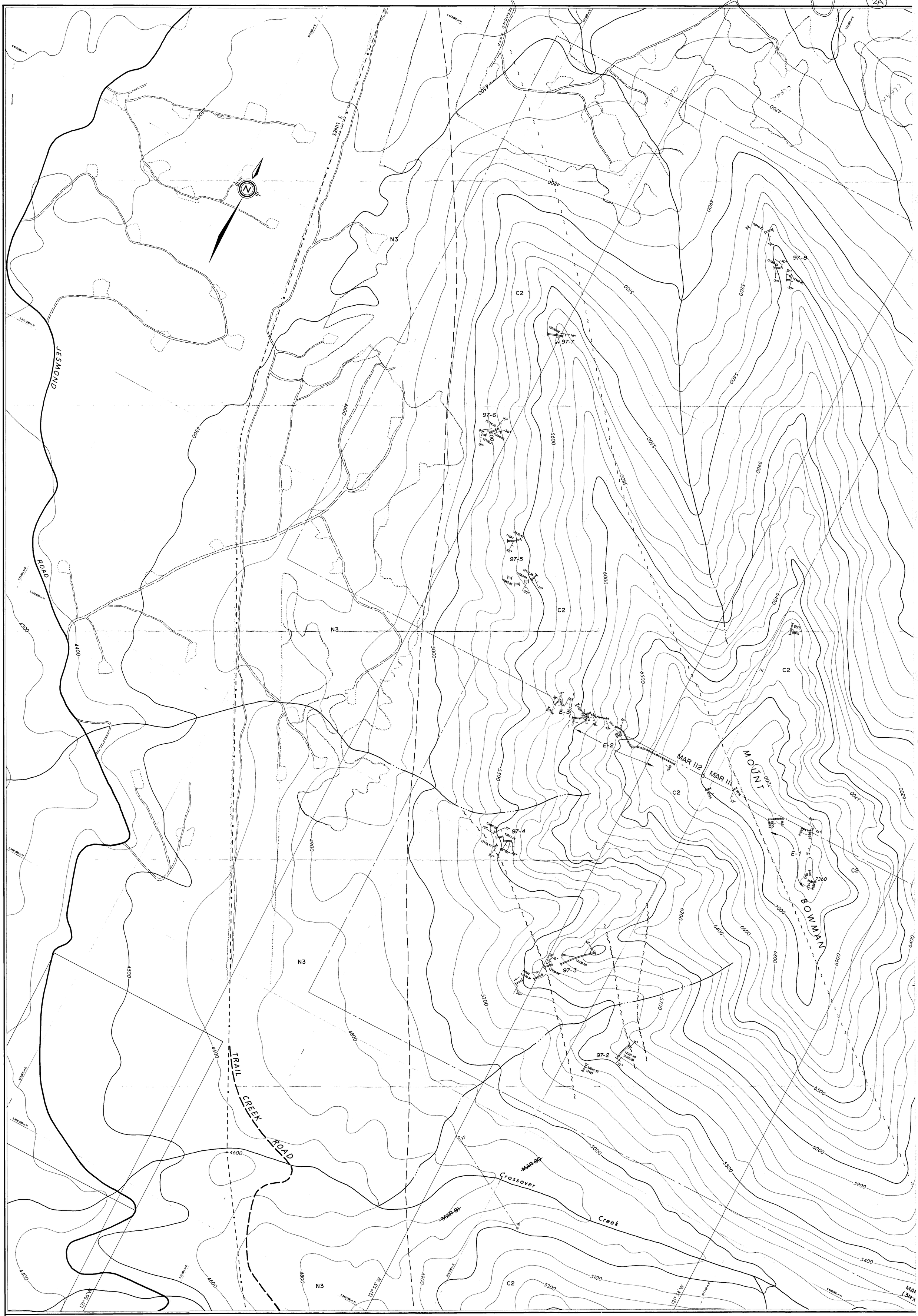
Fig. 2.1 Geology and Samples, Map Sheet D

MAP 1

KELLY LAKE AREA, B. C.

0 100 200 300 400 500 m
SCALE: 1:5000

LBH 1992.08



MAP 2A

LEGEND

Tertiary ?

- D7 — Intrusions

Upper Permian
Cache Creek Group
Marble Canyon Formation

- C6 — Southwest Carbonate
- N5 — Argillite, siltstone, conglomerate, schist
- C4 — First Ridge Carbonate
- N3 — Schist (sch), tuff and agglomerate (v), limestone and argillite (s), greenstone (g)
- C2 — Second Ridge Carbonate
- N1 — Volcanics

SYMBOLS

- Geological boundary (approximate, assumed)
- Fault (approximate, assumed)
- Bedding (horizontal, inclined, vertical)
- Schistosity, cleavage, foliation (inclined, vertical)
- Planar feature / joint (inclined, vertical)
- Synclinal axis (arrow indicates plunge)
- Anticlinal axis (arrow indicates plunge)
- Rock-chip sample with sample/section number
- Claim post (2 post, 4 post)
- Claim line
- Main road
- Access road, trail
- Diamond drillhole
- Power line

NOTES:

1. Base map prepared from enlargement of part of 1 : 50 000 92P/4 topographic map.
2. Geology modified after Trettin (1980).
3. Contour interval is 100 ft.
4. UTM coordinates are NAD27.

SYMBOLS

- Geological boundary (approximate, assumed)
- Fault (approximate, assumed)
- Bedding (horizontal, inclined, vertical)
- Schistosity, cleavage, foliation (inclined, vertical)
- Planar feature / joint (inclined, vertical)
- Synclinal axis (arrow indicates plunge)
- Anticlinal axis (arrow indicates plunge)
- Rock-chip sample with sample/section number
- Claim post (2 post, 4 post)
- Claim line
- Main road
- Access road, trail
- Diamond drillhole
- Power line

d argillite (s), greenstone (g)

NOTES:

1. Base map prepared from enlargement of part of 1 : 50 000 92P/4 topographic map.
2. Geology modified after Trettin (1980).
3. Contour interval is 100 ft.
4. UTM coordinates are NAD27.

GEOLOGICAL SURVEY BRANCH
ASSESSMENT REPORT

25,212

REVISIONS

BY	DATE	BY	DATE	BY	DATE
DP	1997.09				

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Fig. 2.2 Geology and Samples, Map Sheet E

MAP2B

KELLY LAKE AREA, B. C.

0 100 200 300 400 500 m
SCALE: 1:5000

LBH 1993.12