

*COPY FOR KENNEDY SILVER CO. LTD.  
OCTOBER 15, 1980 B, Cfm.*

REPORT ON THE  
ECONOMIC FEASIBILITY  
OF THE

824538

HOMESTAKE PROPERTY

FOR

CANADIAN RESERVE OIL AND GAS LTD.  
1600 - 639 FIFTH AVENUE SW  
CALGARY, ALBERTA

BY

ANGUS G. MACKENZIE MINING CONSULTANTS LTD.  
9015 BAYCROFT ROAD SW  
CALGARY, ALBERTA

DECEMBER 10, 1978

I N D E X

	<u>Page</u>
SUMMARY . . . . .	1
INTRODUCTION . . . . .	3
PROPERTY . . . . .	4
LOCATION AND ACCESS . . . . .	6
TOPOGRAPHY AND GENERAL CONDITIONS . . . . .	6
HISTORY . . . . .	7
GENERAL GEOLOGY . . . . .	7
OLD WORKING . . . . .	8
SUMMARY OF GEOLOGY AND ORE CONTROL . . . . .	10
COMPLETED UNDERGROUND EXPLORATION . . . . .	12
SURVEYING . . . . .	14
SAMPLING . . . . .	14
METALLURGY . . . . .	15a
MILLING EQUIPMENT . . . . .	15b
SUMMARY FUTURE CAPITAL EXPENDITURE . . . . . after	15b
CAPITAL COST SUMMARY . . . . .	16
UNDERGROUND DEVELOPMENT . . . . .	17
STOPPE PREPARATION . . . . .	17
SERVICE BUILDING . . . . .	18
POWER . . . . .	18
MILL . . . . .	18
TAILINGS DISPOSAL . . . . .	18

INDEX (CONTINUED)

	<u>Page</u>
WATER SUPPLY . . . . .	19
OFFICE EQUIPMENT, YARD SERVICES ETC. . . . .	19
ORE AND WASTE HANDLING . . . . .	19
MINING EQUIPMENT . . . . .	20
VENTILATION . . . . .	20
NET OPERATING VALUE PER TON OF ORE . . . . .	21
SUMMARY OPERATING COST PER TON OF ORE . . . . .	22
SUMMARY FUTURE OPERATING EXPENSES . . . . .	23, 24, 25
SUMMARY FUTURE CAPITAL EXPENDITURES TOTAL . . . . .	26
CONCLUSIONS . . . . .	27, 28
ECONOMIC ANALYSIS . . . . .	.after page 28
DECLARATION OF QUALIFICATION . . . . .	29

LIST OF TABLES

		<u>Page</u>
TABLE I	ASSAYS . . . . .	After Page 13
TABLE II	ORE RESERVE SUMMARY . . . . .	After Page 15b
TABLE III	ORE RESERVE CALCULATION . . . . .	After Page 15b
IV	ORE RESERVE CALCULATION . . . . .	After Page 15b
V	ORE RESERVE CALCULATION . . . . .	After Page 15b
TABLE VI	SUMMARY ORE RESERVES AND ECONOMICS . .	After Page 15b

LIST OF ILLUSTRATIONS

FIG. 1	CLAIM MAP . . . . .	After Page 3
FIG. 2	INDEX MAP . . . . .	After Page 5
FIG. 3	PLAN UNDERGROUND WORKINGS AND SAMPLING LOCATIONS . . . . .	After Page 13
FIG. 4	GENERALIZED CROSS-SECTION . . . . .	After Page 26

## SUMMARY

Kamad Silver Co. Ltd. (N.P.L.) hold five Crown Grant claims surrounded by 106 located claims about 54 miles northeast of Kamloops, British Columbia, near Squam Bay, on the southeast shore of Adams Lake. The old Homestake mine is located near the center of the claims. The principle minerals are silver, lead, zinc, barite with some copper and gold.

A diamond drilling and exploration program, both surface and underground, has outlined 877,734 tons of proven ore, 82,000 tons of probable ore and a very conservative 49,000 tons of possible ore. The gross value of the proven and probable ore at metal prices as of March 8, 1973 (Northern Miner) is \$ 47,017,960 *gx*

There are other areas of potential ore, especially on the northeast or down-dip side of the presently known ore bodies.

It is estimated that the gross value of the ore reserves before taxes is \$79.57 per ton and that a profit, before taxes of \$37.58 *gx* per ton is assured.

Metallurgical testing has been done on several lots of bulk samples from the ore zones and these tests have shown that the ore is amenable to differential flotation and that economic recoveries of various products can be made. Test work is continuing.

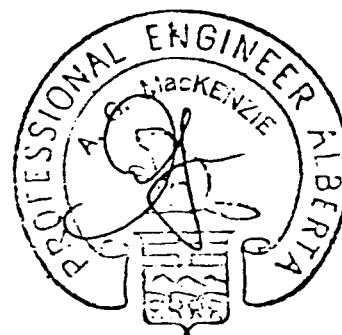
A new adit has been driven from about the 1750 or 1800 foot elevation, underneath the presently known ore bodies and collared in the vicinity of the mill site. A raise has been driven from this level to intersect the ore zones above and connect it to the present workings.

It is recommended that an initial 600 ton mill be erected with provisions built in for expansion.

Based on metallurgical testing, values used, a profit after taxes of \$18,681,161 (approx.) could be realized. Pay out of invested capital could be expected in the third year of an estimated ten year life for present known reserves.

As previously mentioned, the ore bodies are open to the northeast and extension is expected in this direction down-dip beyond the limits of the present Ore Reserve cut-off.

We have no hesitation in recommending an immediate start on bringing this property into production. We believe our estimates to be conservative and justified from the data evolving from the recently completed underground program and from previous data.



INTRODUCTION

At the request of Mr. R. Bruce Bailey, President of Canadian Reserve Oil and Gas Ltd., Angus G. MacKenzie, P.Eng. and Angus G. MacKenzie Mining Consultants Ltd. revised and updated their Report on the Economic Feasibility of the Homestake Property for Kamad Silver Co. Ltd. (N.P.L.) dated March 28, 1973.

This report was reviewed, and based on new data available, and revised metal prices, the following Report constitutes an updated version of the 1973 Report.

Certain basic data, such as Diamond Drill Hole Data have been omitted as have some other basic data. These have not changed and are available in the 1973 report.

The mineral tax situation in British Columbia has been completely revised from the previous government fiasco and just recently the federal government have made some striking allowances to mining companies in the way of tax reductions and/or exemptions.

Based on the intersections made from a raise in the 1700 Haulage adit an additional 1.0 million tons could be added to the probable reserves (previous Diamond Drilling indicated its possibility) but are not used in this report, as insufficient data such as geologic plans and sections, assay plans, etc., were not available.

HOMESTAKE MINE  
CLAIMS MAP  
TWP. 25, R.13 W.6  
FIGURE 1

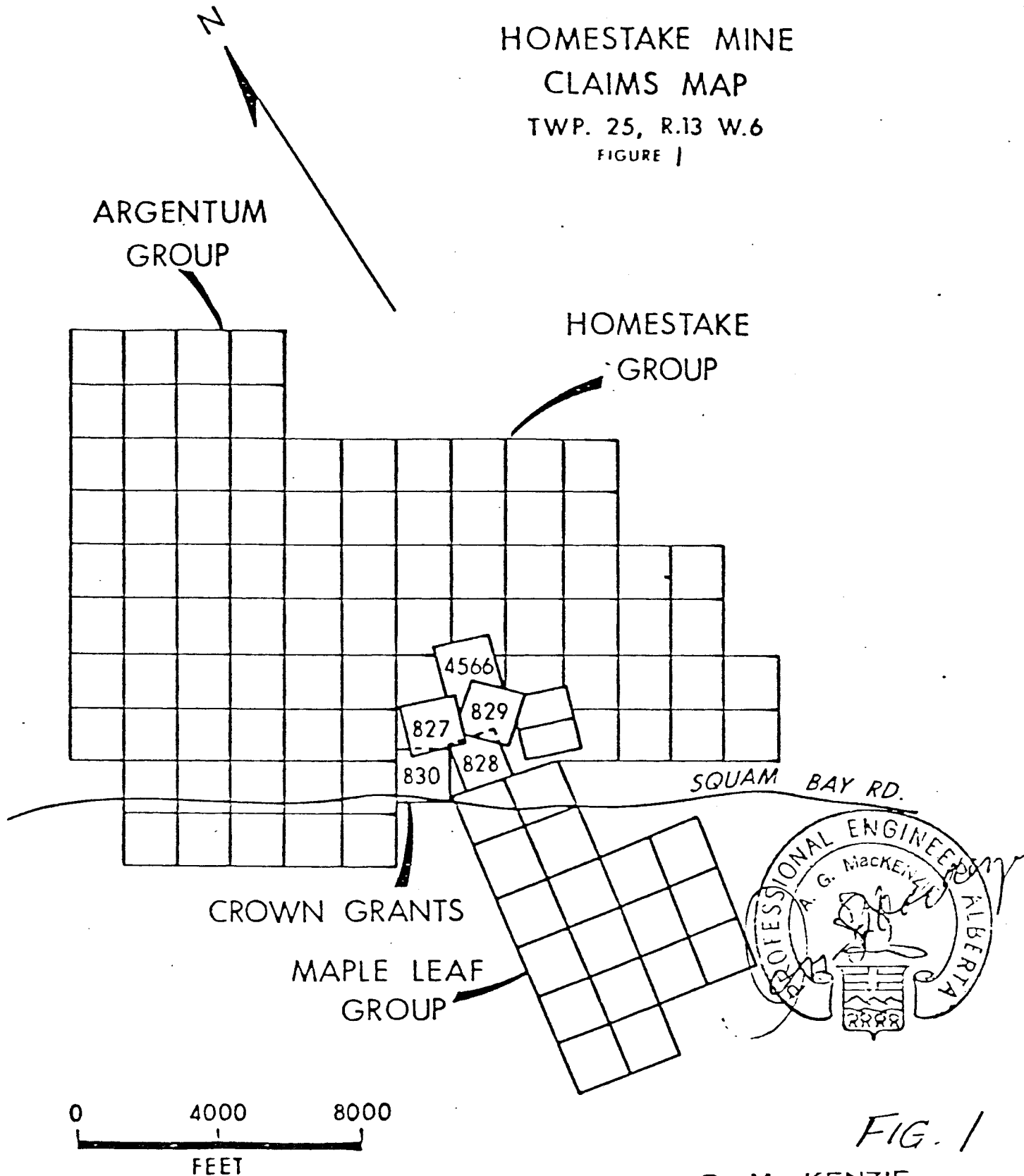


FIG. 1

ANGUS G. MACKENZIE  
MINING CONSULTANTS LTD.  
DEC. 1978



PROPERTY

Kamad Silver Co. Ltd. (N.P.L.) hold one hundred and six contiguous located claims, and fractions, plus five crown grant claims, grouped into three groups. The block forms an irregular oblong, ten claims deep (NS) on the west side, by thirteen claims (EW) on the south. The northern boundary forms a series of steps so that on the east side the claim block is only two claims deep. A block of eighteen claims project to the southeast from the middle of the southern boundary. (See Claim Map) The claims are registered in the Mining Recorders Office at Kamloops, British Columbia.

MAPLE LEAF GROUP

Troublasome	1829	H #26	85806
Maple Leaf	1828	H #27	85807
H # 2	85782	H #28	85808
H # 3	85783	H #29	85809
H # 4	85784	H #30	85810
H # 5	85785	H #31	85811
H # 6	85786	H #32	85812
H # 7	85787	DELL #1	85777
H # 8	85788	DELL #2	85778
H # 9	85789	DELL #3	85779
H #10	85790	DELL #4	85780
H #21	85801	FRED FRACTION	84734
H #22	85802	FRED #1	84735
H #23	85803	FRED #2	84736
H #24	85804	RAY FRACTION	84737
H #25	85805		

HOMESTAKE GROUP

HOMESTAKE	L827	JOE #72	55680
SILVER STAR #1		JOE #75	55683
Fraction	L4566	JOE #78	55686
JOE #30	55646	KAM # 3	76654
JOE #47	55663	KAM # 5	76654
JOE #48	55664	KAM #13	76656
JOE #49	55665	KAM #15	76664
JOE #50	55666	KAM #17	76666
JOE #51	55667	MAX #12	76668
JOE #52	55668	MAX #13	76896
JOE #53	55669	MAX #14	76897
JOE #54	55670	MAX #15	76898
JOE #55	55671	MAX #24	76899
JOE #56	55672	MAX #25	76903
JOE #57	55673	MAX #26	76910
JOE #58	55674	MAX #27	76911
JOE #59	55675	MAX #38	76921
JOE #60	55676	MAX #39	76922
JOE #61	55677	MAX #40	76923
JOE #62	55678	MAX #41	76924
		H #1 Fraction	85781

ARGENTUM GROUP

ARGENTUM	L830	KAM #12	76663
H #11	85791	KAM #14	76665
H #12	85792	KAM #16	76667
H #13	85793	KAM #18	76669
H #14	85794	KAM #20	76671
H #15	85795	KAM #21	76672
H #16	85796	KAM #22	76673
H #17	85797	KAM #23	76674
H #18	85798	KAM #24	76675
H #19	85799	JOE #23	55639
H #20	85800	JOE #24	55640
KAM #1	76652	JOE #25	55641
KAM # 2	76653	JOE #26	55642
KAM # 4	76655	JOE #27	55643
KAM # 6	76657	JOE #28	55644
KAM # 7	76658	JOE #29	55645
KAM # 8	76659	JOE #71	55679
KAM # 9	76660	JOE #74	55682
KAM #10	76661	JOE #77	55685
KAM #11	76662		

#### LOCATION AND ACCESS

The property is located in the Kamloops Mining District, near Adams Lake, British Columbia. It is reached by automobile along Highway #5 from Kamloops to Louis Creek, a distance of about 30 miles, thence by gravel road for approximately 17 miles west towards Squam Bay. To reach the portal a sinuous road leads 1.5 miles up the steep north wall of the Sinnax Creek Valley, to an elevation of 2250. A small bridge is built across the Homestake Creek at the adit entrance.

#### TOPOGRAPHY AND GENERAL CONDITIONS

Sinnax Creek flows southeast on the floor of a "U" shaped valley at approximately 1,400 feet A.S.L. The valley floor rises gently to an approximate elevation of 1,700 feet A.S.L., then more steeply ( $35^{\circ}$ ) to an elevation of 3,000 feet A.S.L. Steep walls and bluffs rise to approximately 4,000 feet. Numerous freshettes and creeks tumble down the slopes. Overburden is generally minimal on the slopes, increasing to at least 100 feet in places along the toe.

The Sinnax Valley is in a semi-arid area. Farms on the valley floor irrigate fields during the summer months. Winter temperatures are normally  $10^{\circ}$  to  $25^{\circ}$  above zero, however,  $35^{\circ}$  below zero temperatures are not unknown. Summer highs reach  $90^{\circ}$  plus.

Water is available in Adams Lake, approximately four miles east, or from a well drilled by CROG on a nearby farm. Power in the valley provides rural electrification which would have to be upgraded if used for a mining operation.

Labour is available within a radius of 20 miles, with the exception of skilled mining trades.

### HISTORY

The property has been worked intermittently since 1890, mainly as a cobbing operation. The following tonnages have been reported as production.

1.	Pre 1892	600 mine cars	.04 oz/ton Au.	15 oz/ton Ag.
2.	1892	20 tons	.79 oz/ton Ag.	
3.	1926-1927	2,770 tons	.09 oz/ton Au.	80 oz/ton Ag.
			3% Pb.	8% Zn.

In 1935 a 50 ton per day mill processed an estimated 3,000 tons. Since 1935 numerous people have examined the property and written favourable reports, however, no production has resulted.

Mention is made of the property in numerous editions of the Yearly Minister of Mines Reports for the Province of British Columbia.

### GENERAL GEOLOGY

The rocks in the area are members of the Adams Lake Series of the Shuswap Terrain. In the vicinity of the mine the main member is a quartz sericite talc schist. Bands of argillites overlay the sericites at higher elevations. Chloritic beds are present in the general vicinity. The general dip is northwest, varying from 15° to 40°.

Three main zones of mineralization occur as "veins" conforming to the dip of the beds. All contain barite, silver, chalcopyrite,

tetradrite, galena and sphalerite with some gold. Percentages of individual minerals vary independently.

The lower, barite rich, zone has been referred to by previous writers as the "barite vein". 15 to 20 feet, above and nearly parallel to it, is what has been named the "quartz schist vein" or "Pay Streak". These veins are from 24 inches to eight feet thick. We refer to these veins as the 500 zone. The 300 and 400 veins lie 125 feet above the 500. They contain all minerals found in the 500. Thicknesses vary from four feet to 25 feet.

It is believed that all three veins have been cut off on the east by a fault which now forms the channel for Homestake Creek. Minor faulting and bed slippage is noted in the area, both on surface and in the drill core.

Quartz veins cut through the beds. Sulphide mineralization is common in the quartz.

Bands of pyrite mineralization are common throughout the area.

#### OLD WORKINGS

A plan of the old workings is shown as part of Figure 3. They consist of two parallel drifts leading into the ore bodies from a 150 foot adit cross-cut. The more easterly follows the hanging wall quartz vein. Stopping for some 80 to 90 feet up-dip was carried out from this level.

A 150 foot deep winze was sunk from a point about one half way along. Total length of the quartz drift is some 190 feet. Stopping length at drift level is 120 feet.

The footwall drift, following the barite vein is about 15 feet southwest of the quartz drift. No stoping was carried out from this opening, however, raises penetrate the intervening rock, and chutes were built, apparently to draw stopes muck from the quartz vein stopes. Total length of the footwall barite drift is 220 feet. A short winze, apparently following the barite vein down-dip, was sunk about 40 feet from the end.

At least two of the raises penetrate to surface.

The main fault which cuts off the ore on the southeast can be seen near the beginning of each drift.

SUMMARY OF GEOLOGY AND ORE CONTROL

Faulting

Mineralization appears to be controlled by drag or cross folding associated with movement along the main 2250 fault zone and centered within favourable stratigraphic contacts. The 2250 fault zone strikes N15°E, dips to the southwest, and is the dominant structural feature within the mine area. Some of the best and thickest ore zones occur near the west side of this fault and cut off to the east, with the exception of the 500 zone exposed in the older workings, which is mineralized on both sides at the 2250 fault. It appears that the 2250 fault has had both pre and post ore movement and has served as a plumbing system for ore replacement. The possibility of finding ore on the east side of this fault is excellent.

There are also zones or a zone of low angle (15° to 40°) faults striking N45°E which appear to displace the 300 and 400 ore zone over short distances. This fault zone can be observed in both the 2236 Raise and the 2217 Raise.

A clear structural interpretation is further complicated by movement along the foliation and/or bedding planes. While individual displacements are usually less than a foot, the "shingle effect" over a large area is considerable.

Folding

Folding has been observed throughout the mine workings. The axes for the folding is northwest asymmetrical in section and probably related to

movement along the 2250 fault. The variation in widths within the ore zone are probably related to the axes and troughs of these drag folds.

#### Mineralization

The principal mineral assemblage is tetrahedrite, proustite, galena, sphalerite, chalcopyrite and pyrite. Mineralization occurs as clots and fine grained network and bands in a barite and silicified zone. The ribbon structure and banding occur in the silicified and barite zone suggest progressive replacement along planes of weakness.

The most obvious mineral zoning is the occurrence of ruby silver (proustite) in both foot and hanging walls of the ore zones.

Of interest are the high grade hanging wall veins above the 300 zone. These veins occur as discontinuous lenticular masses, and range from fine grained, dissemination to massive sulphides. These lenses appear to replace a relatively narrow horizon immediately above the 300 zone. It is however, apparently continuous throughout as it appears in the 2240 Raise and can be traced up-dip as far as the 2250 sub-drift and has been reported at the end of the surface 300 adit in older reports.



COMPLETED UNDERGROUND EXPLORATION

The following underground advances have been made since April 1, 1972. The advances cover drifting, slashing, cross-cutting, raising and diamond drilling.

Drifting

2203 Drift	429 feet
2239 East Drift	106 feet
2262 Sub-Drift	90 feet
2240 Drift	330 feet
1750 Haulage Adit	<u>1910 feet</u>
	2,865 feet

Cross-Cutting

2202 Drift #1 Cross-Cut	50 feet
2202 Drift #2 Cross-Cut	70 feet
2202 Drift #3 Cross-Cut	<u>108 feet</u>
	228 feet

Slashing

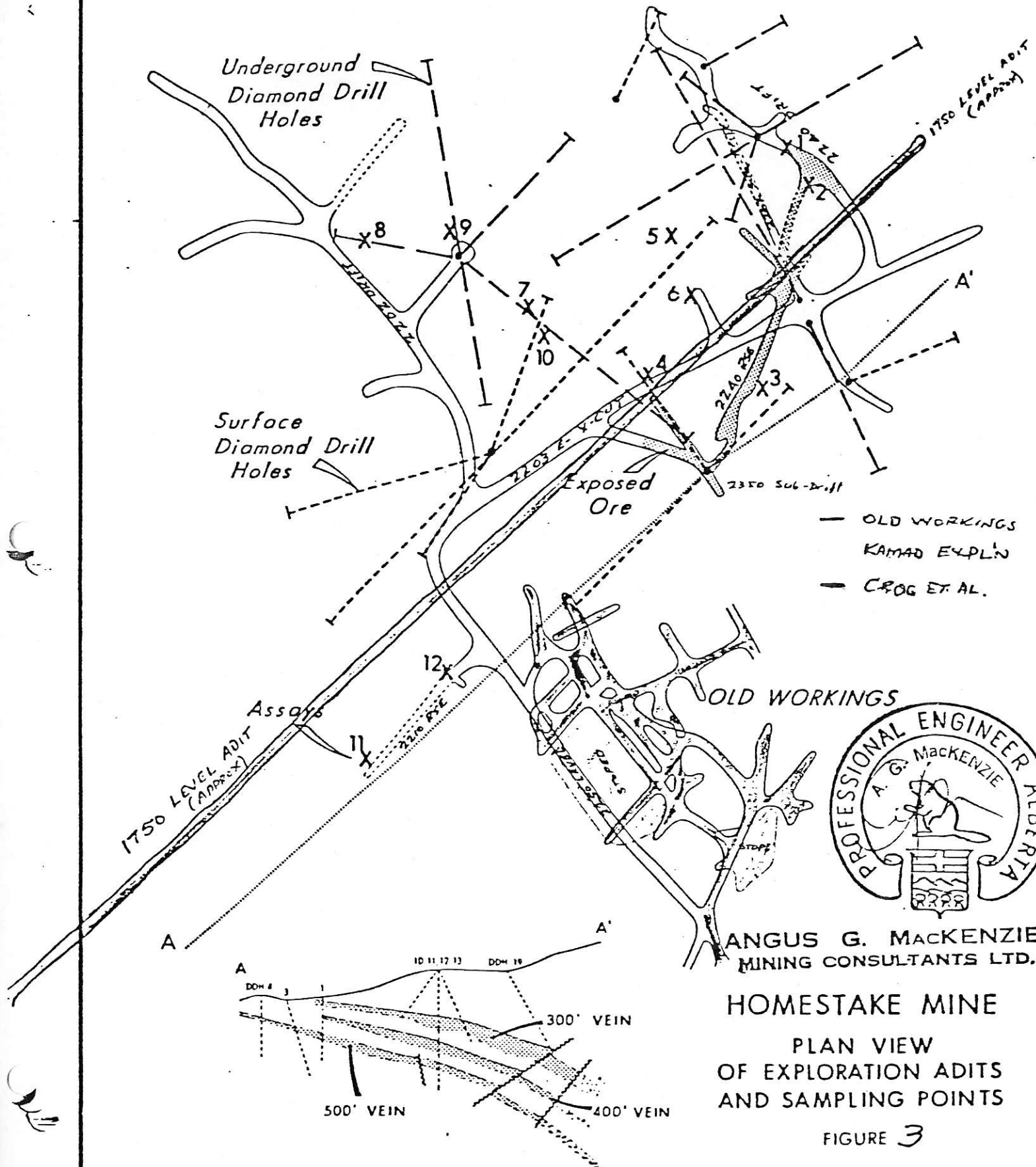
2240 Drift	3,680 cu. ft.
2203 Cross-Cut	2,160 cu. ft.
2203 Drift	2,250 cu. ft.
2202 Drift #3 Cross-Cut	384 cu. ft.
2240 Raise	<u>4,595 cu. ft.</u>
	13,069 cu. ft.

Raising

2240 Raise	325 feet
2217 Raise	57 feet
2210 Raise	200 feet
1750 Raise	<u>450 feet</u>
	1,032 feet

Diamond Drilling (Underground)

U-1	205 feet
U-2	135 feet
U-3	253 feet
U-4	246 feet
U-5	186 feet
U-6	152 feet
U-7	103 feet
U-8	170 feet
U-9	300 feet
U-10	135 feet
U-11	139 feet
U-12	163 feet
U-13	130 feet
U-14	365 feet
U-15	203 feet
U-16	100 feet
U-17	200 feet
U-18	<u>250 feet</u>
	3,435 feet



1. Assay (6 ft.)

BaSO<sub>4</sub> 24.33%  
Ag 3.28 oz/ton  
Cu .09%  
Pb .24%  
Zn 1.09%

2. Assay (6.5 ft.)

BaSO<sub>4</sub> 45.42%  
Ag 4.48 oz/ton  
Cu .11%  
Pb .37%  
Zn .68%

3. Avg. Assay (16 ft.)

BaSO<sub>4</sub> 22.60%  
Ag 3.0 oz/ton  
Cu .11%  
Pb .99%  
Zn .87%

4. Avg. Assay (20 ft.)

BaSO<sub>4</sub> 32.76%  
Ag 8.53 oz/ton  
Cu .18%  
Pb .63%  
Zn 1.19%

5. Avg. Assay (46 ft.)

BaSO<sub>4</sub> 36.15%  
Ag 13.67 oz/ton  
Cu .58%  
Pb 3.22%  
Zn 6.27%

6. Avg. Assay (50 ft.)

BaSO<sub>4</sub> 42.0%  
Ag 4.09 oz/ton  
Cu 0.14%  
Pb 0.89%  
Zn 1.72%

7. Avg. Assay (14 ft.)

BaSO<sub>4</sub> 13.18%  
Au .22 oz/ton  
Ag 16.51 oz/ton  
Cu 1.62%  
Pb 7.31%  
Zn 15.62%

8. Avg. Assay (3.5 ft.)

Ag 11.9 oz/ton  
Cu .38%  
Pb 2.09%  
Zn 2.28%

9. Avg. Assay (19.7 ft., U-8)

Ag 6.5 oz/ton  
Cu 1.04%  
Pb 6.9%  
Zn 11.0%

10. Avg. Assay (44.6 ft., U-9)

BaSO<sub>4</sub> 45.5%  
Ag 11.8 oz/ton  
Cu .69%  
Pb 2.05%  
Zn 3.51%

11. Assay (5.5 ft.)

BaSO<sub>4</sub> 1.26%  
Ag 0.15 oz/ton  
Cu -  
Pb 0.20%  
Zn 0.36%

12. Assay (1.7 ft.)

BaSO<sub>4</sub> 34.8%  
Ag 4.23 oz/ton  
Cu 0.10%  
Pb 0.54%  
Zn 1.06%

Diamond Drilling (Surface)

#24	Vertical	428 feet
#25	Vertical	512 feet
#26	Vertical	498 feet
#27	Vertical	400 feet
#28	Vertical	<u>500 feet</u>
		2,392 feet

SURVEYING

During this period the entire new underground workings were surveyed by G. E. Carraway and tied in to the surface control put in by the Land Surveyors in 1969, so that all underground and surface technical data are now tied in.

Routine surveying for line and grade were done as required by the Consulting Engineer's staff.

SAMPLING

A considerable amount of channel and chip sampling was done to check out mineralization in the various headings. It should be pointed out here that our sampling was done primarily with the idea in mind of checking out gross mineralization rather than pure sampling on the vein. For example, samples taken in the 2202 drift were cut from the back to the floor at five foot intervals and sometimes at ten foot intervals, while the obvious width of the 500 vein zone in this area averaged about  $3\frac{1}{2}$  to four feet. Several check samples were taken on the width of the vein itself but our prime

objective was to try and find out what had happened to the barite horizon on the strike extension of the old workings.

More drilling was required in this area and it was done from the 2202 #2 cross-cut. This drilling and the sampling in the 2203 drift confirmed the western limits of the various ore bodies as they raked down-dip.

This and other structural problems have been discussed in more detail in another part of this report.

METALLURGY

When we initiated our original Feasibility Study we understood that complete new bulk sample testing results would be made available to us, but on a larger scale than the Bethlehem Copper Bench Tests conducted in 1970.

However, up to the time of compilation of our report of March 27, 1973, we had not received any really useable data from M & S Contractors Limited, with the exception of an overall estimate of total milling costs and incomplete metallurgical data on several tests.

Therefore, for purposes of evaluation and the compilation of this Feasibility Study, we have utilized the summarized technical data from the Bethlehem Copper reports regarding the products obtained by flotation and the various concentration ratios established by their testing.

Preliminary reports, in the form of a meeting in Timmins and subsequent telephone conversations indicate that better results can be obtained than in the Bethlehem tests. Therefore, we feel quite confident that the values derived by the use of the Bethlehem figures will be on the conservative side. We understand that Canadian Reserve have had subsequent tests done by Britton, the results of which we do not have and believe they would approximate our assumptions.

General

The Homestake ore contains barite, silver as a sulphide or sulph-arsenide, free silver, tetrahedrite, galena, sphalerite, pyrite and alumina. Three different zones of mineralization occur as three separate ore bodies, the 300, 400 and 500 zones. They vary somewhat in mineralogy, especially in the barite-sulphide ratio.

Ore reserve estimates indicate an estimated average mill head of the following assay:

	BaSO <sub>4</sub>	Ag.oz	Au.oz.	Cu.%	Pb.%	Zn.%
500 Zone	43.75	5.00	0.015	0.18	0.90	1.61
400 Zone E	31.49	6.09	0.021	0.15	0.72	1.20
400 Zone W	—	4.52	0.040	0.29	3.76	6.61
300 Zone	24.5	8.53	0.037	0.46	2.05	3.51

Metallurgical testing indicates that flotation is satisfactory. Concentration ratios of 10:1 and better have been achieved. At the rate of 300 tons per day an economic quantity of sulphide concentrate (bulk) or separate sulphide concentrates as well as a clean, high grade barite concentrate can be produced.

#### Milling Equipment

A standard type sulphide flotation plant would be used with a possible addition of extra drying and bagging facilities. Since preliminary arrangements have been made by Kennad Silver Co. Ltd. (N.P.L.) with M & S Contractors Limited of Timmins, Ontario, for the supply of a suitable mill, there is no need to detail the mill equipment in this report. Suffice to say that it would cost an estimated \$2,000,000 plus an additional \$50,000 for tailings disposal and an additional \$55,000 for water supply. Power has been estimated at \$276,625, most of which will be utilized by the mill. The major part of the milling capital cost would therefore amount to around \$2,381,625.



SUMMARY OF FUTURE CAPITAL EXPENDITURES  
 BASED ON 600 TONS/DAY  
 AS OF NOVEMBER 30, 1978  
ANGUS G. MACKENZIE MINING CONSULTANTS LTD.

1. Tailings and waste Disposal systems:		
(a) Engineering & Gov't. Report	\$ 57,900	
(b) Installation	<u>\$173,700</u>	\$ 231,600
2. Electrical Power - Lead time (4 months)		92,640
3. Water supply - pumps, lines, etc.		108,852
4. Manway Raise		115,800
5. Extension of adit		92,640
6. Mining Equipment, incl. ore trammer		231,600
7. Camp for personnel or alternate		115,800
8. Cost of mill and reagents		2,318,000
9. Ore Haulage to R.R.		17,370
10. Hiring of Mill Superintendent		28,950
11. Shot-crating rest of adit		11,580
12. Surfacing haulage adit		11,580
13. Production permit from B.C. Gov't		11,580
14. Purchase of small bulldozer and truck		127,380
15. Buildings, etc.		405,300
16. Dryer		173,700
		4,092,372
Contingency, add 15%		613,856
		\$4,706,228
Canadian Reserve 50%		\$2,353,114

CAPITAL COST SUMMARY \*

1. Underground Development (Adit, Stops Preparation and Raising)	\$ 305,403.00
2. Service Building and Power Supply	276,625.00
3. Mill	2,011,065.00
4. Tailings Disposal	33,195.00
5. Water Supply	49,792.00
6. Office and Equipment	27,663.00
7. Yard Services	55,325.00
8. Inventory (Bits, Tools, Spare Parts, etc.)	31,600.00
9. Allowance for Mill Modification after Start-Up	38,728.00
10. Yard and Surface Equipment	22,130.00
11. Ore and Waste Handling (Conveyor, Bins, Trimming, etc.)	139,965.00
12. Mining Equipment	28,726.00
13. Air and Ventilation	57,552.00
14. Mobile Living Facilities	78,106.00
15. Contingencies - 15%	473,389.00
16. Sales Tax - 7.5%	236,694.00
17. Environmental and Pollution Control - 15%	<u>473,389.00</u>
TOTAL CAPITAL COST	<u><u>\$4,394,873.00</u></u>

\* Recalculated using Statistics Canada data, rate of inflation etc.

1. UNDERGROUND DEVELOPMENTMain AditRehabilitate 2100' @  
estimated \$26 per ft.\$ 55,000.00

TOTAL

\$ 55,000.00

Raising2 Compartment Service Raise  
partitioned, slides and ladders  
6' x 10' 495' @ \$105 per ft.  
Estimate 50' Timber Support  
@ \$56 per ft.

\$ 51,975.00

2,800.00

TOTAL

\$ 54,725.00

Ore PassRehabilitate @ \$50 per ft.  
518' x \$50 per ft.\$ 25,900.00

TOTAL

\$ 25,900.00

Access X-cuts between Ore  
Pass and Service Raise

5' x 7' x 135' @ \$79.60 per ft.

\$ 10,746.00

TOTAL

\$ 10,746.00

Access to 2250 Level

5' x 7' 100' @ \$91.40 per ft.

\$ 9,140.00

TOTAL

\$ 9,140.00

Contingencies for Rock Bolting  
and Slashing - Estimate\$ 11,580.00

TOTAL

\$ 11,580.00

Stope Preparation

300 Vein

400 Vein

500 Vein

Development Raises and Lateral work  
plus Escape and Ventilation Raise  
to surface

Estimate

\$138,313.00

TOTAL

\$138,313.00

OVERALL TOTAL

\$305,403.00

2. SERVICE BUILDING

A building 120' x 40' is recommended to house the shops, dry, warehouse, power distribution panels, etc.

Building	\$ 46,473.00	
Shop Equipment	13,275.00	
Dry Equipment	5,533.00	
Standby Power Unit	13,275.00	
Warehouse Equipment	4,425.00	
Transformers and Electrical	<u>27,663.00</u>	
TOTAL		\$ 110,644.00

Power

B.C. Hydro has indicated that they will supply power, however, no agreement has been signed. The estimate covers funds to supply a connected load of 1500 H.P.

Estimate	\$ <u>165,975.00</u>	
TOTAL		\$ 165,975.00

OVERALL TOTAL		\$ <u>276,619.00</u>
---------------	--	----------------------

3. MILL

As per Parsons-Jurden

600 TPD Mill with Assay Office	\$2,000,000.00	
Freight	<u>11,065.00</u>	

TOTAL		\$2,011,065.00
-------	--	----------------

OVERALL TOTAL		\$ <u>2,011,065.00</u>
---------------	--	------------------------

4. TAILINGS DISPOSAL

This is an estimated cost for dewatering and stacking equipment for dry tailings

storage - Estimate	\$ <u>33,195.00</u>	
--------------------	---------------------	--

OVERALL TOTAL		\$ <u>33,195.00</u>
---------------	--	---------------------

5. WATER SUPPLY

This estimate is based on a 4" pipeline  
from Adams Lake and includes  
pipeline, pumps, storage tank,  
etc. - Estimate

\$ 49,792.00

## OVERALL TOTAL

\$ 49,792.00

6. OFFICE AND EQUIPMENT

This estimate covers a small office  
at the mine site for normal business  
and engineering functions  
- Estimate

\$ 27,663.00

## OVERALL TOTAL

\$ 27,663.00

7. YARD SERVICES

This item includes power lines,  
water and sewer, road clearing,  
etc. - Estimate

\$ 55,325.00

## OVERALL TOTAL

\$ 55,325.00

10. YARD AND SURFACE EQUIPMENT

Includes 4 Wheel Drive pick-ups,  
front-end loader, etc. - Estimate

\$ 22,130.00

## OVERALL TOTAL

\$ 22,130.00

11. ORE AND WASTE HANDLING

Main Conveyor, 2200' x 24" wide	\$ 44,614.00
Loading Chute and By-Pass	4,426.00
100' Covering (Outside Adit)	554.00
Stacking Conveyor, 20' x 24" wide	1,660.00
Storage Bins -	
20' x 20' x 30' - Coarse Ore	
10' x 10' x 30' - Waste	8,300.00
2 Einco 912 LHD (New)	
@ \$36,000	79,668.00
Freight	443.00

## OVERALL TOTAL

\$ 139,665.00

12. MINING EQUIPMENT

Listed equipment is for one stope

2 Jacklegs @ \$1,350	\$	2,988.00
3, 7/8" x 8' Steel @ \$.75 per ft.		19.92
4 Tapered Bits, Carbide Inserts @ \$5		22.13
2 Airline Oilers		66.00
2, 50' lengths Coupled Air Hose @ \$115 per cu. foot		127.25
2, 12' lengths 1" Lubricator Hose @ \$20.34 each		45.01
2, 50' lengths 1" Water Hose, Coupled @ \$75 per cu. foot		83.00
1 Rock Bolt Adapter for JackLeg		22.13
2, 8" Blocks @ \$30 each		66.00
1 Double Drum Slusher, Used		1,660.00
1, 36" Scraper Used		221.00
200' 7/16" Wire Rope @ \$31.14 per cu. foot		69.00
	\$	5,389.44
Plus 7% Sales Tax		377.28
	\$	5,766.72

OVERALL TOTAL - 4 Stopes and 1 Development Crew	\$	28,726.00
--	----	-----------

13. AIR AND VENTILATION

Air

1 2500 CFM Compressor	\$	44,260.00
2 Receivers @ \$2,000		4,426.00
800' 6" Pipe @ \$1.30 per foot		1,051.00
1000' 2" Pipe @ \$.35 per foot		387.28
Valves, Couplings, etc.		1,020.75
Site Preparation and Housing		2,213.00

TOTAL	\$	53,458.03
-------	----	-----------

Ventilation

1 24" Fan @ \$350 each, Used	\$	387.28
4 12" Fans @ \$250 each, Used		1,106.50
600' 12" Neoprene Vent Pipe @ \$150 per cu. foot		995.85
500' 24" Neoprene Vent Pipe @ \$2.60 per cu. foot		1,438.45
Accessories		165.98

TOTAL	\$	4,094.06
-------	----	----------

OVERALL TOTAL	\$	57,552.09
---------------	----	-----------

NET OPERATING VALUE PER TON OF ORE  
FOR 600 TPD OPERATION

1. Gross Value per ton of ore at 90% Recovery

	<u>90% Assay</u>	<u>Unit Price</u>	<u>Value Per Ton of Ore</u>
BaSO <sub>4</sub>	24.52	\$24.01/ton	\$ 5.88
Ag	5.38	6.86/oz.	36.91
Au	0.022	217.00/oz.	4.77
Cu	0.25	0.84/lb.	4.20
Pb	1.32	0.38/lb.	10.03
Zn	2.28	0.39/lb.	17.78
		TOTAL:	<u>\$79.57</u>

2. Operating Cost per Ton

a. Mine Operating Cost per ton.			
Supervision and Administration	\$ 1.37		
Working Crews	6.55		
Materials, Equipment, Services	5.30		
Exploration and Development	<u>3.60</u>		
	TOTAL		\$ 16.82 per ton
b. Mill Operating Cost per ton	\$ 6.75		
As per M & S Contractors Limited			\$ 6.75 per ton
c. Smelter and Transportation Charges	\$10.57		
	TOTAL		\$ 10.57 per ton
d. Barite Bagging and Freight	\$ 5.16		
	TOTAL		\$ 5.16 per ton
e. Marketing Sulphide Concentrate	\$ 1.10		
	TOTAL		\$ 1.10 per ton
f. Drying Concentrate	\$ .36		
	TOTAL		\$ .36 per ton
g. Overhead \$9,500 per month	\$ 1.23		
	TOTAL		\$ 1.23 per ton
	TOTAL OPERATING COST		<u>\$ 41.9<sup>8</sup>/<sub>9</sub> per ton</u>
Gross Operating Profit (Before Taxes) per Ton of Ore			<u>\$ 37.58</u>

TABLE V/

SUMMARY OF RESERVES AND ECONOMICS

PROVEN AND PROBABLE AND TOTAL POTENTIAL ORE RESERVES

HOMESTAKE PROPERTY, B.C.

CANADIAN RESERVE OIL AND GAS LTD.

DECEMBER, 1978

	<u>GROSS RESERVES</u>		NET INCOME	CAPITAL EXPENDITURES	<sup>W.I.</sup> <u>CASH FLOW</u>	
	<u>Gross Tons</u>	<u>Net (1) Tons</u>			<u>UNDISCOUNTED</u>	<u>DISCOUNTED @ 10%/ann.</u>
Proved and Probable	1,056,000	528,000	18,681,161	4,706,228	18,681,161	16,233,9
Total Potential	2,056,000	1,056,000	37,362,322	4,706,228	37,362,322	22,689,017

NOTES: (1) Working Interest Reserves

(2) Assumed Injection of Additional Capital if Reserves Double

*Table V/*



SUMMARY  
OPERATING COST PER TON OF ORE  
 ESTIMATE AS OF NOVEMBER 30, 1978  
 BY  
ANGUS G. MacKENZIE MINING CONSULTANTS LTD.

	<u>Per Ton</u>
Mine Operating Cost per ton	
(a) Supervision and Administration	\$1.37
(b) Working Crews	6.55
(c) Materials, equipment services	5.30
(d) Exploration and development	<u>3.60</u>
TOTAL	\$16.82
Mill Operating Cost	6.75
Smelter and Transportation Charges	10.57
Barite - bagging costs	5.16
Marketing Sulphides	0.36
Drying	1.10
Overhead	<u>1.23</u>
TOTAL OPERATING COST	\$41.99

SUMMARY OF FUTURE OPERATING EXPENSES  
BASED ON 600 TONS/DAY

AS OF NOVEMBER 30, 1978

BY

ANGUS G. MacKENZIE MINING CONSULTANTS LTD.

1. MINE OPERATING COST

a. Supervision and Administration

1 Mine Manager @ \$98 per day	\$ 98.00
3 Shift Foremen @ \$81 per day	243.00
1 Engineer/Geologist @ \$90 per day	90.00
1 Surveyor @ \$58 per day	58.00
1 Surveyor's Helper @ \$41 per day	41.00
1 Accountant @ \$58 per day	58.00
1 Warehouseman @ \$46 per day	46.00
	\$ 634.00
Plus 30% Payroll cost	190.00
	\$ 824.00
Total cost per day	\$ 824.00
	\$ 1.37
	\$ 1.37

b. Working Crews

Mining: Four 2-man crews, 3 shifts @ \$70/man shift	\$1680.00
Bonus @ \$1.00/ton	600.00
Development: One 2-man crew, 2 shifts @ \$70/man shift	280.00
Tramming: 1 man, 2 shifts @ \$70 per man shift	140.00
Maintenance: 2 mechanics @ \$70 per man shift	140.00
2 labourers @ \$46/man shift (2 shifts)	184.00
	\$3024.00
Plus 30% payroll cost	907.00
	\$3931.00
Total cost per day	\$3931.00
	\$ 6.55
Cost per ton	\$ 6.55

TABLE II

ORE RESERVE SUMMARY

PROVEN ORE

<u>ZONE</u>	<u>TONS</u>	<u>INDICATED VALUE</u>	<u>GROSS VALUE</u>
300, 400 East, 400 West, 500	877,734	\$ 79.57	\$69,841,294

PROBABLE ORE

300, 400 East, 400 West, 500	82,000	\$ 79.57	\$ 6,524,740
<b>TOTAL PROVEN AND PROBABLE ORE</b>	<b>959,734</b>	<b>\$ 79.57</b>	<b>\$76,366,034</b>

POSSIBLE ORE

300, 400, 500*	1,049,000	\$ 79.57 (discount 20%)	
		\$ 63.66 (use)	<u>\$66,779,340</u>

NOTES:

1. 500\* additional estimated ore cut in 1750 - ore pass raise estimated by R. Goring
2. Values are in Canadian Funds from Northern Miner Nov., 1978
3. Barite value taken from E & MJ October, 1978 issue
4. Tonnage factor from S.G. = 9.5 cu. foot per ton
5. It is assumed the 3,000 tons of old mill tailings have been lost and are here discounted
6. All previous back-up data, plans, sections, etc. are available in March, 1973 ore reserve estimate and are not reproduced here

c. Materials, Equipment and Services

Explosives, 1.516 per ton = 910 lbs. @ \$47 per CWT	\$ 428.00
Blasting caps, 300 @ \$38/hundred	114.00
Steel, 15' per day @ \$1.10/foot	16.50
Bits, average life 500', \$5.00 per bit, 4,000 ft. day	40.00
Rock bolts, timbers, straps	156.00
Repairs	42.00
Fuel - 120 gals. diesel @ \$0.52	63.00
- 100 gals. gasoline @ \$0.83	83.00
Oil and Lubrication	21.00
Power requirements - 1,500 H.P. = 1120 KW; KWH = 1120 x 24 x .75 = 20,170 KW @ \$0.11 KWH (estimated)	2218.00
 Total cost per day	 \$3181.50
 Cost per ton	 \$ 5.30

d. Exploration and Development

Diamond Drilling (per ton)	\$ 1.50
Development (per ton)	2.10
 Cost per ton	 \$ 3.60

2. MILL OPERATING COSTS

Cost per ton	\$ 6.75
--------------	---------

3. SMELTER AND TRANSPORTATION CHARGES

Silver 10% + 5 oz/ton	\$ 39.04
Gold 5%	1.78
Copper 1.3 units	17.41
Lead 3 units	10.04
Zinc 8 units	34.82
	\$ 103.09
Basic Charge	50.40
Freight and Dock	16.60
As/Sb Allowable	3.87
Sulphur Allowable	2.21
	\$ 176.17 per ton of Concentrate

At 36 tons of Concentrate per day = \$6,342.65 or \$10.57 per ton of ore.

4. BARITE BAGGING AND FREIGHT

Barite Concentrate Production	
24.52% x 600 TPD =	\$ 147.12 tons per day
2960 Bags @ \$30 =	888.00
Freight @ \$15 per ton =	2206.80
	<hr/>
Total	\$3094.80
	<hr/>
Cost per ton of ore	\$ 5.16
	<hr/>

5. MARKETING SULPHIDE CONCENTRATE

Figure based on fee of \$2 per ton of Concentrate at 36 tons per day.

6. OVERHEAD (Per Month)

1. Heating	\$1050.00
2. Building, repair, roads, snow removal, etc.	2075.00
3. Communication	470.00
4. Travel	1050.00
5. Head Office and Management	10370.00
6. Miscellaneous	2075.00
	<hr/>
Cost per month	\$17,090.00
	<hr/>
Cost per ton of Ore	\$ 1.71
	<hr/>

## SUMMARY OF FUTURE CAPITAL EXPENDITURES

---

 BASED ON 600 TONS/DAY
 

---

AS OF NOVEMBER 30, 1978

BY

ANGUS G. MacKENZIE MINING CONSULTANTS LTD.

1. Tailings and Waste Disposal systems:		
(a) Engineering and Government Report	\$ 57,900	
(b) Installation	173,700	\$ 231,600
2. Electrical Power - Lead time (4 months)		92,640
3. Water Supply - pumps, line, etc.		108,852
4. Manway Raise		115,800
5. Extension of adit		92,640
6. Mining Equipment, incl. ore trammer		231,600
7. Camp for personnel or alternate		115,800
8. Cost of mill and reagents		2,316,000
9. Ore Haulage to R.R.		17,370
10. Hiring of Mill Superintendent		28,950
11. Shot-creting rest of adit		11,580
12. Surfacing haulage adit		11,580
13. Production permit from B.C. Government		11,580
14. Purchase of small bulldozer and truck		127,380
15. Buildings, etc.		405,300
16. Dryer		173,700
		<hr/>
		\$4,092,372
		<hr/>
Contingency, add 15%		613,856
		<hr/>
		\$4,706,228
		<hr/> <hr/>

CONCLUSIONS

The Homestake property of Kennecott Silver Co. Ltd. (M.P.L.) contains 877,734 tons of proven ore and 82,000 tons of probable ore, containing barite, silver, copper, lead, zinc and possibly alumina, which can be economically mined by underground methods and treated in a standard flotation mill. Additional zones of mineralization could almost double the presently estimated reserves with further underground work.

\$4.71 million will be required to put the property into production and provide sufficient working capital to operate until revenue is obtained from the sale of products.

Revenue, after deducting direct operating costs, freight, overhead, cost of sales, most taxes, and depreciation is estimated at \$11.5 million.

It will require about 11 or 12 months to complete the underground development and plant construction.

Since the ore dips an average of around 30°, a simple modification of breast and pillar stoping looks like the best mining method for this type of ore body. Some support will be required in all stopes.

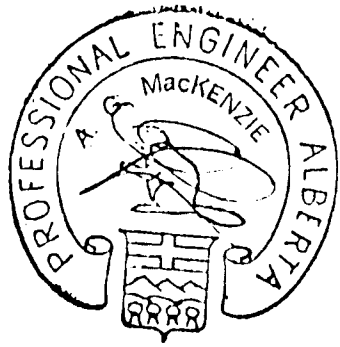
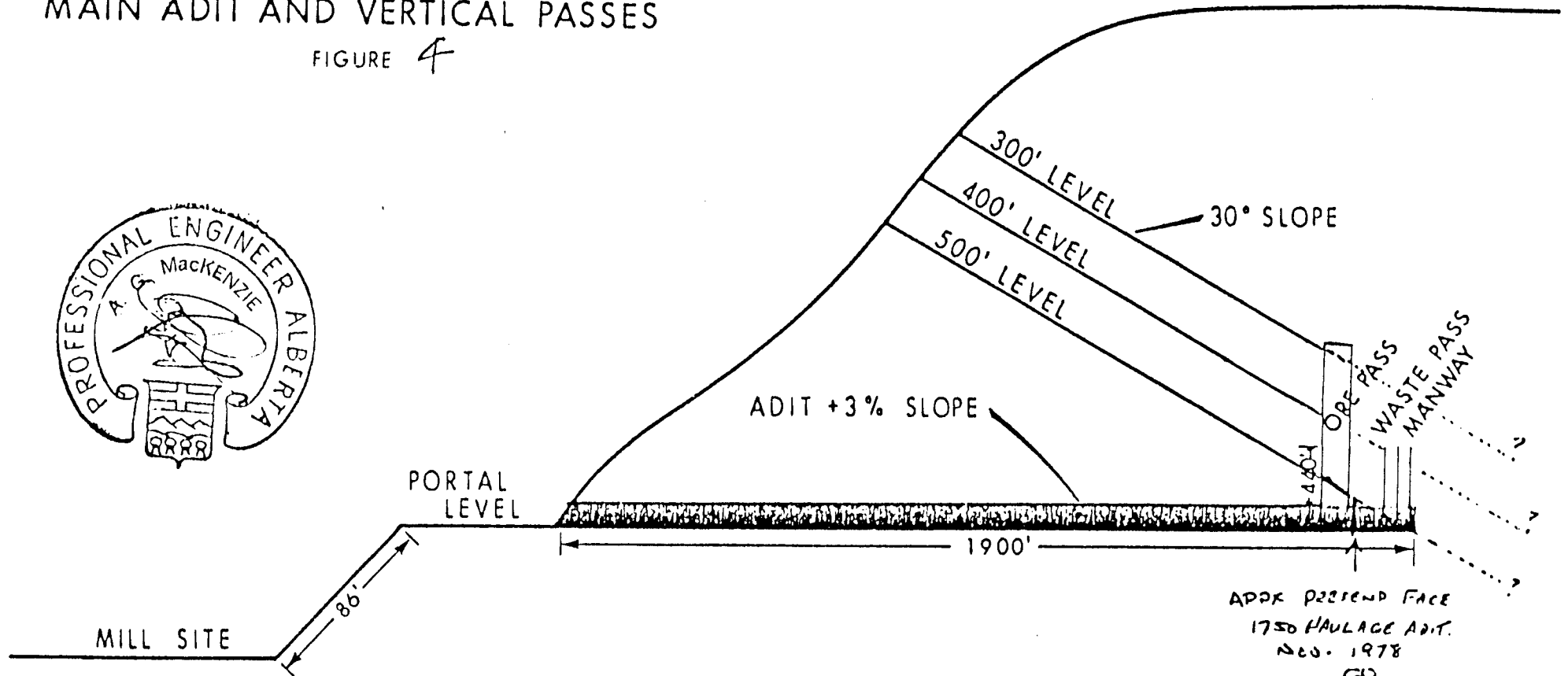
Metallurgical tests, past and current, indicate that a clean bulk sulphide concentrate can be produced by flotation. They also indicate that separate sulphide concentrates of Pb., Zn., and Cu. can be produced as well as a premium grade of barite.

The recently completed underground program of diamond drilling, development and exploration drifting, raising, etc. have clearly outlined the lateral limits of the ore zones as far down-dip as the collar of the

# HOMESTAKE MINE

## CROSS SECTIONAL VIEW OF MAIN ADIT AND VERTICAL PASSES

FIGURE 4



ANGUS G. MACKENZIE  
MINING CONSULTANTS LTD.

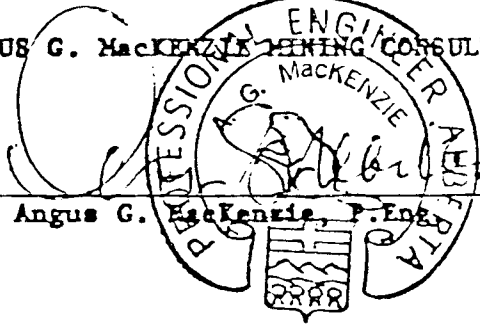


2240 raise. The ore zones, 300, 400 and 500 were cut in several diamond drill holes on the down-dip side and further extension of these zones down-dip to the northeast is practically assured.

We are satisfied that we have produced a realistic and conservative ore Reserve Estimate and feel that our Economic Feasibility Study produces factual figures generally regarding the Homestake Property of Kanad Silver Co. (Ltd. (N.P.L.).

We have no hesitation in recommending that an immediate start be made to bring this property into production, at a proposed 600 ton per day rate of production.

ANGUS G. MACKENZIE MINING CONSULTANTS LTD.



Angus G. Mackenzie, P. Eng.

Calgary, Alberta

TABLE V/

SUMMARY OF RESERVES AND ECONOMICS

PROVEN AND PROBABLE AND TOTAL POTENTIAL ORE RESERVES

HOMESTAKE PROPERTY, B.C.

CANADIAN RESERVE OIL AND GAS LTD.

DECEMBER, 1978

	<u>GROSS RESERVES</u>		<u>NET INCOME</u>	<u>CAPITAL EXPENDITURES</u>	<u>CASH FLOW</u>	
	<u>Gross Tons</u>	<u>Net (1) Tons</u>			<u>UNDISCOUNTED</u>	<u>DISCOUNTED @ 10%/ann.</u>
Proved and Probable	1,056,000	528,000	18,681,161	4,706,228	18,681,161	16,233,9
Total Potential	2,056,000	1,056,000	37,362,322	4,706,228	37,362,322	22,689,017

NOTES: (1) Working Interest Reserves

(2) Assumed Injection of Additional Capital if Reserves Double

*Table VI.*

ECONOMIC ANALYSIS

TABLE VI  
HOMESTAKE PROPERTY  
CANADIAN RESERVE OIL  
PROVEN AND PROBABLE

YEAR	GROSS PRODUCTION		NET (2) PRODUCTION TONS/YEAR	GROSS (3) OPERATING INCOME \$	OPERATING COST (4) \$	NET INCOME \$	B F
	TONS/YEAR	CUMULATIVE TONS					
1980	192,000	192,000	96,000	7,639,720	3,016,320	4,623,400	
1981	192,000	384,000	96,000	7,639,720	3,016,320	4,623,400	
1982	192,000	576,000	96,000	7,639,720	3,016,320	4,623,400	
1983	192,000	768,000	96,000	7,639,720	3,016,320	4,623,400	1
					Taxable Inc.	<u>3,083,808</u>	
1984	192,000	960,000	96,000	7,639,720	3,016,320	4,623,400	1
					Taxable Inc.	<u>3,083,808</u>	
1985	96,000	1,056,000	48,000	3,819,360	1,508,160	2,311,700	
					Taxable Inc.	<u>1,541,904</u>	
	1,056,000		528,000	42,017,960	16,589,760	21,519,720	

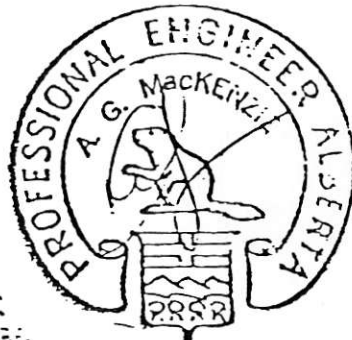
- NOTES:
- (1) 600 Tons per day
  - (2) Canadian Reserve working interest 50%
  - (3) Gross value of ore \$79.57/ton *169.29*
  - (4) Operating cost \$31.42/ton ✓
  - (5) B.C. Taxes estimated as follows:
    - (a) according to mining association B.C. first 3 years are
    - (b) after 3 years - 57% on gross as taxable income = appro
  - (6) Metal prices Northern Miner Nov., 78.
    - Copper \$0.84/lb.
    - Gold \$217.00/oz.
    - Silver \$ 6.86/oz.
    - Lead \$ 0.38/lb.
    - Zinc \$ 0.39/lb.
    - Barite \$ 0.012/lb.
  - (7) Capital expenditure does not include previous expenditures
  - (8) Discounted Using Hoskold Formula, Tables From Peele - Mining Engineers Handbook 1 Parks - Examination and Evaluation

Y, B. C.  
AND GAS LTD.  
ORE RESERVES

NOVEMBER 30, 1978  
BY  
ANGUS G. MACKENZIE MINING CONSULTANTS LTD.  
CALGARY, ALBERTA

B.C. (5) Fed. TAX \$	NET INCOME AFTER TAX \$ (2)	CAPITAL INVESTMENT \$	CROG W.I. NET INCOME \$	CUMULATIVE NET INCOME \$	PRESENT VALUE AT DISCOUNT RATES OF	
					10% \$	15% \$
Nil	4,623,400	2,353,114	2,270,286	2,270,286	1,972,878	1,821,709
Nil	4,623,400	-----	4,623,400	6,893,686	4,017,734	3,781,941
Nil	4,623,400	-----	4,623,400	11,511,086	4,017,734	3,781,941
1,757,770	2,865,630	-----	2,865,630	14,382,116	2,490,232	2,344,085
1,757,770	2,865,630	-----	2,865,630	17,248,346	2,490,232	2,344,085
878,885	1,432,815	-----	1,432,815	18,681,161	1,245,116	1,172,042
4,394,425	21,034,275	2,353,114	18,681,161		16,233,926	15,245,803

e essentially tax free  
ox 15-17.5%



*Handwritten:*  
A.G. Mackenzie  
Nov 1979  
G. Mackenzie

of approx \$1,010,000

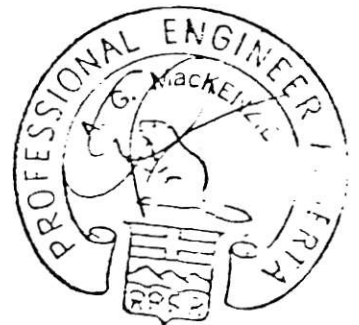
TABLE VII

DECLARATION OF QUALIFICATIONS

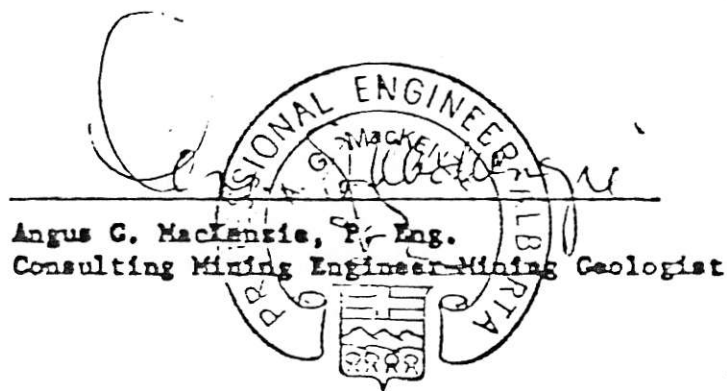
OF

ANGUS G. MacKENZIE, P. Eng., M.C.I.M.

1. I, Angus G. MacKenzie, hereby certify that I am a Consulting Mining Engineer-Mining Geologist. I am a graduate (B.E.) in Mining and Metallurgy of Nova Scotia Technical College, Halifax, Nova Scotia and I have taken post-graduate economic geology at Dalhousie University.
2. I have spent the past thirty years in the Mineral Industries as a Mining Engineer and/or Mining Geologist and have maintained responsible positions in these fields at mining properties in Newfoundland, Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, the Yukon and Northwest Territories. I have also had considerable experience in the United States and Mexico.
3. I am a Registered Professional Engineer in the Province of Alberta and Manitoba and have been licensed to practise in Saskatchewan and British Columbia. I have been registered in Nova Scotia, Quebec and in the State of Colorado, U. S. A.
4. I have no personal interest directly or indirectly in the properties herein reported on, nor in the securities of Kanad Silver Co. Ltd. (N.P.L.) or any of its associated companies, nor do I expect to receive any such interest.



5. This report is the direct result of an examination by our firm over a period of years of the underground workings of the Homestake Property, a reassessment of all available Engineering Reports, Assay Plans, Diamond Drilling, Trenching, etc. by others, and the results of a program of 18 underground diamond drill holes, four surface diamond drill holes, raising, cross-cutting and sub-drifting on the projected 300 and 500 level zones and on-strike projection of the 500 level zone.
6. We have made this revised report at the request of Mr. R. Bruce Bailey, President of Canadian Reserve Oil and Gas Ltd. of Calgary, Alberta.

  
Angus G. MacKenzie, P. Eng.  
Consulting Mining Engineer-Mining Geologist

Calgary, Alberta