REPORT on
CERTAIN PROPERTIES ADJACENT TO
ENDAKO MINES LIMITED
ENDAKO, B.C.
for WENNER-GREN B.C. DEVELOPMENT CO. LTD.

by: W.R. Bacon, Ph.D., P.Eng.
J.J. Crowhurst, B.A.Sc., P.Eng.
Jan. 19/72.

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January 19th, 1972.

Mr. K. Birger Strid, Fresident, Wenner-Gren Enterprises, Sturegatan 34, Stockholm, Sweden.

Dear Sir:

you.

Flease find attached a report that we have made in response to Sir Bernard G. Gore's request of October 28th, 1971 - which was conveyed to us on December 29th by Dr. D.D. Campbell of Dolmage Campbell & Associates Ltd. of Vancouver, Canada.

With regard to Denak Mines Ltd., in our opinion Endako Mines Limited undoubtedly purchased this company for the potential of the ground to the west of the Denak orebody, as well as for the estimated profit in the Denak deposit. Unfortunately, because of market and other conditions, in all probability no royalties will be paid by 1980. Therefore, we cannot estimate the present value of such a royalty.

With regard to the Bell claim group, east of Endako, our recommendation is that this property be sold for \$200,000 plus whatever retained interest in mineral production can be negotiated.

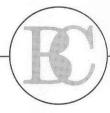
We appreciate this opportunity to be of service to

Yours very truly,

BACON & CROWHURST LTD.

W.R. Bacon

J.J. Crowhurst



BACON & CROWHURST LTD.

1720–1055 West Hastings Street Vancouver 1, B.C.

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PREAMBLE

On December 29th, 1971 the writers were contacted by Dr. D.D. Campbell of the consulting firm of Dolmage Campbell & Associates Ltd. with regard to an undertaking on behalf of Wenner-Gren B.C.

Development Co. Ltd. During the course of this interview it became clear that an initial communication, complete with maps, drilling results, engineering opinions, etc., from Sir Bernard G. Gore to Bacon & Crowhurst Ltd. and dated October 28th, 1971 had never been received. As data in the offices of Dr. Campbell were fragmentary, he offered to obtain replacement material from Europe. Dr. Campbell later advised, however, that the task of evaluation would have to be done immediately with the information at hand.

In order to evaluate the situation at first hand, Dr. W.R. Bacon spent January 11th-12th at Endako. This arrangement was made possible by Mr. J.D. Little, Executive Vice President of Placer Development Limited, and his staff at Endako.

The purpose, then, of this undertaking is to evaluate the Wenner-Gren holdings in the Endako area and this obviously involves consideration of the Endako Mine.

ENDAKO MINE

The geology and mineralization of the Endako Mine have been thoroughly discussed in two excellent papers co-authored by A.D. Drummond and E.T. Kimura.*

The Endako deposit occurs in the Endako quartz monzonite, a phase of the Topley Intrusions that form a substantial batholith in central British Columbia. The quartz monzonite is locally extensive, underlying and extending far beyond the Danak and Bell properties.

The deposit is elliptical-shaped in plan, striking N.70°W and dipping 20 degrees to 50 degrees southward. Its surface dimensions are 6400 feet in length and 1200 feet in width.

The ultimate pit design for the Endako deposit will probably extend from the Elk 6 claim on the Denak property southeastward to within 1000 feet of the Bell property. The depth of economic mineralization varies and, hence, the depth of the open pit will vary from more than 1100 feet toward the west end to 700 feet in the central part to a few feet at the southeastern extremity. In effect, there is a northwest plunge to the deposit.

Mineable ore reserves, as of December 31, 1970, using a cut-off grade of 0.08% MoS2 were as follows:

Proven and Probable 203,900,000 T. 0.144% MoS2 Possible 23,000,000 T. *

* 1. Geology of the Endako Molybdenum Deposit.

Hydrothermal Alteration at Endako - A Comparison to Experimental Studies. (C.I.M.M. Bull., July, 1969).

During the past 2 years, until August 1971, the average mill throughput was 28,000 tons per day. Then production was cut by 25 per cent, and a further 25 per cent cut has just been announced (January 19, 1972). Concentrates are being stockpiled at the property and inventories are being maintained overseas.

BELL PROPERTY

As indicated in the foregoing, the Endako deposit itself does not extend southeastward to the Bell property. It may have at one time but, if so, it has since been removed by erosion.

The Bell property is strategically located, however, with respect to the possible occurrence of an "en echelon" deposit - and it can be fairly stated that 5 of the 6 diamond drill holes put down in 1968 tested this possibility. None intersected anything of economic interest and it is noteworthy that R.S. Adamson of Dolmage Campbell & Associates Ltd. concluded his report of December 7, 1968 with the statement - "No recommendations for further work are justified from the results of the 1968 diamond drilling." Conversely, we understand that Dr. T. Eriksson, in February, 1971, recommended further drilling.

In addition to the 6 holes drilled in 1968, 10 holes were diamond drilled in 1964. These 16 holes do not thoroughly explore the Bell claims but they certainly have reduced the mineral potential of the property. A second Endako could occur beyond the depths explored by the 1968 drilling but, if so, it would hardly be economic under any expected conditions in the foreseeable future.

It has been ascertained that the Bell mineral claims

Nos. 2, 4, 6 and 8 have been surveyed by Mr. D.A. Duffy, B.C.L.S. of

W.D. Usher and Associates, Prince George, B.C., as of the 22nd of April,

1970 for Endako Mines Ltd.

No detailed investigation has been made by Bacon & Crowhurst Ltd. but the following comments are noteworthy:

- (1) It is understood that all of the Bell mineral claims were acquired by location and none of them has been surveyed by B.C. Land Surveyors except as noted above.
- (2) It is understood that no surface rights have been issued except to the Pacific Northern Gasline, the British Columbia Hydro Authority and Endako Mines Ltd., each of which has obtained a right-of-way across the Bell claims for its particular service.

Section 21(2) of the Mineral Act (B.C.) states:

"The lawful holder by record of a mineral claim is during the continuance of his record entitled to the use and possession of the surface of the claim, including the use of all the timber thereon, for the purpose of winning and getting from and out of the claim the minerals contained therein, including all operations connected therewith or with the business of mining."

If any other interests than the owners of the Bell mineral claims applied for the surface rights, the Bell owners should represent that mining operations will be undertaken and that, therefore, Bell cannot release what rights they have to the surface.

(3) The topography is sufficiently gentle that much of the claim area is suitable for waste rock and/or tailings disposal. It would appear

that Endako has made ample provision for these two items for many years to come, on its own ground, but the proximity of the Bell claims to the Endako open pit and concentrator must give these claims certain potential value to Endako in terms of its operating cost.

- (4) It is understood that the original locators, Messrs. Mitchell & Smith of Prince George, B.C., are contesting some aspects of the ownership of the Bell mineral claims.
- (5) In a letter dated the 2nd of November 1971, to Mr. G.C. Waterman of Anaconda American Brass, E.T. Kimura, Senior Geologist of Endako Mines Limited, expressed an interest on behalf of his company in acquiring the Bell claims.

It is not known if the information requested by Mr. Kimura has been supplied and whether any negotiations are contemplated.

(6) The Endako concentrator is located within a few hundred feet of the Bell #1 mineral claim. In our opinion, there is, however, ample room for plant expansion (should such become necessary) in other directions than by extension on to the Bell #1 claim or other Bell claims.

In summary, therefore, it is recommended that the Bell claims be sold and it would appear from the information at hand that the only prospective purchaser would be Endako. As the property has had \$100,000 worth of work done on it, its minimum value to a purchaser would be \$100,000 from a write-off standpoint. Moreover, whether the ground is of vital importance to Endako or not (for waste and/or tailings disposal or plant expansion) it has a certain inherent "real estate" value - say, \$100 per acre - which would amount to \$100,000. In other words, a fair sale price for the Bell claims, in our opinion, would be of the order of \$200,000 of which, as the writers understand it, \$154,000 would accrue to Wenner-Gren and associated interests.

DENAK MINES LTD.

By agreement dated May 2, 1968, Wenner-Gren B.C.

Development Co. Ltd. et al sold to Endako Mines Limited all the shares and the indebtedness of Denak Mines Limited for a "Liquidated Purchase Price". Mr. J.D. Little, Executive Vice President of Placer Development Limited, states this has been paid in full by Endako.

Clause 9 of this same agreement specifies certain warranties in effect until 1975 and certain possible indemnities.

Bacon & Crowhurst Ltd. have made no investigations concerning these representations and warranties made by the vendors but presume no liability exists. Similarly, Bacon & Crowhurst Ltd. have not been advised that any claim for indemnity was made against the vendors prior to the deadline date of the 2nd of May 1970, and hence again presume no liability exists.

In addition to the "Liquidated Furchase Price", an "Unliquidated Purchase Price" was stipulated which in effect involves a royalty to be paid on any concentrates produced from the Denak mineral claims, except from Elk 3-8 inclusive, NU 1-6 inclusive, Dat 412 and Dat 414 Fr.

The claims mentioned by name in the foregoing paragraph form a contiguous block bordering the Endako property on the west.

Wenner-Gren, in 1967, drilled 30 diamond drill holes on the Elk and NU claims, which drilling disclosed the presence of an orebody. With regard to this orebody, it is understood that Dr. Tryggve Eriksson, in

a report dated January 25, 1968, calculated ore reserves to be 11,600,000 tons grading 0.17% MoS2. The cut-off grade used was 0.08% MoS2. With the advantage of actual operating experience nearby, Endako estimated (as noted in the Flacer Development Limited Annual Report for 1970) that this orebody contains 5,400,000 tons of 0.232% MoS2, using a cut-off grade of 0.10% MoS2.

An approximate calculation is detailed below in this report; based on 1970 revenue, cost and income tax figures, it shows that Endako could have calculated a present value (as of 1970) amounting to 2.96 times their original investment of \$1,265,000, should this orebody be mined by 1977.

The above figures are only pertinent to the present discussion insofar as they bear on the potential production from the "royalty ground" which starts 900 feet to the west of the Denak orebody. In this regard, consideration must be given to the soil geochemical results obtained in the area. A large molybdenum anomaly was obtained in the soil overlying the Endako orebody and, likewise, an anomaly is definitely present in the soil over the Denak orebody. Of significance, therefore, is the fact that there is no molybdenum anomaly in the soil on the "royalty ground", which strongly suggests that near-surface molybdenum mineralization is not present on the royalty portion of the Denak ground.

From the above it is considered likely that any orebody on the royalty ground would occur at depths of more than a hundred feet

below the surface. The waste-to-ore strip ratio would undoubtedly be considerably in excess of that currently encountered by Endako in its pit. In fact, higher cost underground extraction methods might be required. Moreover, with regard to grade, it is not reasonable to expect that any new ore found will be appreciably richer than that found to date, although such could happen.

It is obvious from the calculation below that the royalty payable to the vendors by Endako for this ore would add a significant amount to Endako's 1970 operating cost of \$1.166 per ton of ore treated or, conversely, subtract a significant amount from the operating profit before taxes of \$1.702 per ton of ore treated.

	Ore		Recovered in Concentrates	Royalty (@ 7¢/lb.)	% of	% of
2	108 ₂	No g/ton	(82.3% recov.) #/ton of ore	- ¢ per ton of ore	Operating Cost	Operating Profit
0.14	2.80	1.68	1.386	9.70	8.32	5.70
0.18	3.60 4.40	2.16	1.782 2.178	12.47 15.25	10.70	7.33 8.96
0.26	5.20	3.12	2.574	18.02	15.45	10.59

Endako's published mineable ore reserves as of the 31st of December 1970 were as follows:

	Tons	MoS2
Endako Pit (0.08% cut-off) Proven & Probable Possible	203,900,000 23,000,000	0.144%
Denak Pit (0.10% cut-off)	5,400,000	0.232%

For the short term the molybdenum market is weak and inventories are substantial but the long term world price and consumption trend of plus 7% to 8% will undoubtedly continue. Because Endako is an efficient, low cost mine, production can be expected to return to normal within a few years.

In our opinion, production cost increases caused largely by upward wage revisions will be offset by productivity advances.

Waste-to-ore strip ratios are not expected to increase substantially.

Overall costs per ton will therefore move slowly upwards, but not to any large extent, in the next decade.

The market and operating cost picture plus the estimated ore reserve figures (plus 20 years production) quoted above show that Endako is under no urgency to explore and develop new ore before 1980. This is particularly so where expected extraction costs related to new ore are substantially greater than those in the Endako pit.

To sum up the foregoing, therefore, no orebody is presently known on the "royalty" claims, the geochemistry thereon is negative and there appears to be little if any incentive for Endako to explore and develop new ore before 1930. Drastic changes in molybdenum supply and demand and/or political changes, although not expected, could of course alter Endako's attitude.

The claims are located in a favourable area geologically and hence possess some mineral potential. It is noteworthy that Endako has not abandoned them to date, as is their right under the agreement.

Because of the time element explicit in the royalty arrangement, however, it is not possible, in our opinion, to calculate the present value of the royalty, or its potential value.

Respectfully submitted, BACON & CROWHURST LTD.

W.R. Bacon, Ph.D., P.Eng.

J.J. Crowhurst, B.A.Sc., P.Eng.

APPENDIX

Recovery

ENDAKO MINES LIMITED

(OPERATING PROFIT AND PRODUCTION)

YEAR ENDED 31 DECEMBER 1970

		Amount	Per Ton of Ore (10,118,000)		
Sales Interest earned	\$28,169,000 848,000		\$2.784		
(a) Total Revenue		\$29,017,000		\$2.868	
(b) Operating Cost					
Cost of Sales Admin. & Gen. Exps. Marketing Exps. Exploration Exps. Loss on Exchange	9,797,000 377,000 762,000 113,000 749,000	11,798,000	0.968 0.038 0.075 0.011 0.074	1.166	
(c) Operating Profit		\$17,219,000		\$1.702	
Molybdenum Production	lbs.				
Molybdenite Molybdic oxide	9,435,046				
Total salable Mo	18,239,674	ia .			
Average Price = 28.169.0 18,239.0	000 = \$1.54 (eff	ective) per 1b.	of Mo sold		
Production					
Mill Heads - 0.182% MoS	= 3.64# MoS2 =	3.64 x 60% = 2	.184∌ Mo.		
Ore - 10,118,000	tons x 2.184% N	lo = 22,097,712#	Mo/year.		

DENAK ORE DEPOSIT

(ESTIMATE OF PRESENT VALUE (1970)

Grade = 0.232% = 4.64% x 60% = 2.784%/ton.

Content = 5,400,000 tons x 2.784 = 15,034,000 % Mo.

Lbs. Mo Recovered = $15,034,000 \times 82.5\% = 12,403,000$.

Revenue = 12,403,000 x \$1.54 = \$19,101,000.

Cost of Sales = 5,400,000 x \$1.50 = \$8.100,000.

Operating Profit = \$11,001,000

Less cash outlay for depreciation on equipment & preproduction expense, which is estimated at

1,300,000

\$9,701,000

Less Income Taxes @ a B.C. mining industry average of 42.0%

4,074,000

Net Cash Flow

\$5,627,000

This cash flow when discounted on a straight line basis 0 6% from say 1977 to 1970 gives a present value of 5,627,000 x 0.6651 or \$3,742,000.

This represents 3.742,000 or 2.96 times the original investment.

^{*} Bacon & Crowhurst Ltd. estimate.

DATA RECEIVED FROM DOLMAGE CAMPBELL & ASSOCIATES LTD.

- Letter of Oct. 28, 1971 to Bacon & Growhurst Ltd. from B.G. Gore requesting an evaluation of certain Wenner-Gren properties.
- Letter of Nov. 1, 1968 from Dr. D.D. Campbell to B.G. Gore re Denak Contract, par. 4.
- 3. Letter from T. Eriksson to H. Thorell dated Nov. 5, 1971 re drilling Dis and Dat claims northwest of the Endako pit.
- 4. Report on Denak claims undated and unsigned.
- 5. Endako Mines Ltd. 1" = 300* Mineral claims and open pit map showing drilling to NW of pit.
- 6. Letter to G. Waterman from E. Kimura dated Nov. 2, 1971 re possible sale by Anaconda of Bell claims.
- 7. Report by Wenner-Gren dated May 29, 1968 re prospects in the Bell group area.
- 8. Report by Dolmage Campbell & Associates Ltd. (Adamson) dated Dec. 7, 1968 on 1968 drilling of Bell claims.
- 9. Map of Bell claims, 1" = 1000*, Dec., 1968 showing location of drill holes.
- 10. Endako area map, 1" = 1000', dated Oct. 6, 1966. Shows some diamond drill locations. Presumably work of T. Eriksson.

DATA RECEIVED FROM ENDAKO MINES LIMITED

- Plan of Denak and Endako Pits 1" = 300*
 (See envelope at back of report).
- Claim map of Endako Area 1" = 1000*
 (See envelope at back of report).
- Cross-sections of Denak drilling 1" = 100".



