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CYPRUS ANVIL MINING CORPORATION

**COMMENTS ON THE VANGORDA VALUATION REPORT
PREPARED BY H.F. DITCHBURN & ASSOCIATES LTD.**

PROJECT NO. 1129-200

NOVEMBER, 1981.



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SECTION 1

INTRODUCTION AND TERMS OF REFERENCE



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SECTION 1
TERMS OF REFERENCE



SECTION 1

TERMS OF REFERENCE

Lawrence & Shaw, Barristers and Solicitors of Vancouver, representatives of Cyprus Anvil Mining Corporation (CAMC) in a case vs. Gordon Dickson and Others, have requested from Wright Engineers Limited (WEL), with the consent and approval of CAMC, to review the draft report of H.F. Ditchburn & Associates Ltd. (DAL) entitled "Valuation of Vangorda Mines Ltd., December 10, 1980".

The objective of this review was to prepare a commentary on such presentations, if any, in the said report which may be contrary to the Canadian Business Corporations Act and the Whitehorse Copper opinion, as well as to general engineering standards and professional practices.

Upon review of DAL's draft report, several discrepancies, contradictions and unsubstantiated claims have been found which have been comprised in a commentary.

The final report of DAL, "Valuation of Vangorda Mines Ltd." dated October 30, 1981, was given to WEL on November 4, 1981 for a similar review.

The final report does not contain any description or examination of the company activities, officers, assets, liabilities or other socio-economic aspects of Vangorda Mines Ltd. DAL does not disclaim any direct or indirect interest in the properties of that company, or in the financial decision based on or influenced by DAL's "valuation" report.

DAL's report does not seem to follow the criteria set out in the Whitehorse Copper opinion, while it attempts to present unsupported estimates, as pointed out in the following pages.



SECTION 2

INTERESTS IN MINERAL PROPERTIES



SECTION 2
INTERESTS IN MINERAL PROPERTIES

A map is presented on page 15 of the H.F. Ditchburn & Associates Ltd. (DAL) report which shows those areas of the Vangorda mineral property owned 100% by Vangorda Mines Ltd. and those termed "Vangorda - CNR Option Lands". The corresponding claim and record numbers are listed on pages 16 and 17, and the mapping precision is discussed. However, it is not pointed out either on the map or in the discussion that the Vangorda deposit is covered by claims owned 100% by Vangorda Mines Ltd., while portions of the Grum and Champ deposits are covered by the CNR Option lands, owned 40% by Canadian Natural Resources (CNR) and 60% by Vangorda Mines. It is acknowledged on page 21 that, in 1973, "claims and leases outside the MAIN VANGORDA DEPOSIT were optioned to Canadian Natural Resources Ltd. (formerly AEX Minerals Corporation) as to 40%, with Vangorda Mines Limited retaining a 60% interest" but, again, what these option lands cover is not described.

Additionally, it is not mentioned that Kerr Addison Mines Ltd. held over 70% of all the outstanding shares of Vangorda Mines, while Noranda Mines Ltd. and Phelps Dodge Ltd. each owned about 11% - 12% through a subsidiary; nor that Vangorda Mines was indebted to Kerr Addison to the extent of \$132,000 plus accrued corporate expenses incurred from October 1978 to the date of Cyprus Anvil's offer.

Despite the differing interests in the Vangorda deposit and in the Grum and Champ extensions, these properties have been lumped together in the present net worth calculations, implying 100% ownership by Vangorda Mines Ltd.

Although references are made to the number of outstanding Vangorda Mines Ltd. shares - 2,022,488 as of December 31, 1978, the actual number of shares held by the dissenting minority shareholders, with the corresponding percentage of their interests in the properties, is not stated.



SECTION 3

RESERVE CALCULATIONS



SECTION 3
RESERVE CALCULATIONS

The definitions and classifications of ores quoted from professional literature on page 19 of DAL's report serve, in WEL's opinion, no apparent purpose. Confusion with regards to these classifications is considered highly unlikely and the quantities of reserves in each is immaterial in this valuation: what matters is the amount of minerals that can profitably be recovered by mining in the foreseeable future.

The method of reserve calculation carried out by DAL is unclear. DAL did not design an open pit mine on the basis of a stated cut-off grade, stripping ratio, pit floor width, haulage road grade and width, and other design parameters. Consequently, the mineable ore reserve estimates presented for the Vangorda deposit and for the so-called Grum and Champ "extensions" cannot be substantiated. It is stated on page 21 that: "H.F. Ditchburn estimated from... drill logs and... vertical sections... an undiluted, indicated, and inferred geologic reserve... of 14,177,320 metric tonnes...". It is not stated whether the "measured" reserves were left out intentionally or unintentionally. Further down the same page, DAL admits that this reserve figure "has little mining economic meaning" and that "it was necessary to extract from this information the tonnage which can be mined using contemporary open pit mining practices and equipment..." ("could be mined" in the draft report).

What is termed "mineable open pit ore reserve" of the Vangorda deposit is indicated on page 22 of the report, with a note that the pit was designed on Kerr Addison Mines Ltd.'s sections containing 11,084,877 metric tonnes. This same figure is shown on page 63 with regards to Main Vangorda Open Pit (sic) Reserves; however, it is noted that this estimate, like the estimates of the extensions, was an "audit check" only. The basis of selection of the tonnage used in the financial analysis is not given. DAL "assumed only 11,450,000 short tons of ore ... to be conservative" (that is the equivalent of 10,387,440 metric tonnes).



Various estimates of the Vangorda deposit are listed on page 55, which estimates, in WEL's opinion, are either misrepresented or irrelevant; 3 of the 6 estimates were made after the properties had been transferred to Cyprus Anvil. The following comments apply to this list:

- (a) The estimate by Mr. Chisholm is quoted as 8,528,000 metric tonnes (9,400,000 short tons), 1,100,000 metric tonnes less than DAL's estimate (as used for the financial analysis).

According to the exploration history on page 9, Mr. Chisholm's estimate was made on a mineralized body extending "to a depth of 300 ft. Drilling to 1,000 ft. encountered no underlying body". The report does not quote further from the same paper presented by Mr. Chisholm, in which the following conclusions were drawn concerning the geophysical exploration methods used at Vangorda:

"The results coincided so well that further drilling to extend the margins of the deposit was considered unnecessary. The excess mass calculation agreed so closely with tonnage figures arrived at by drilling that it was decided also that further deep holes to explore the possibility of underlying zones were unnecessary".

Consequently, DAL's speculation about additional reserves (in Section 3.(1) in the Summary) over and above an estimate already considered high would seem to indicate an inherent bias in the valuation, as well as a direct contradiction of the published, professional opinion of DAL's own client.

- (b) By listing the 12,600,000 short tons of low grade to barren sulphides estimated by Mr. Chisholm with the sulphide ore estimates and indicating the corresponding lead and zinc grades as "unstated", the report implies that perhaps some of these materials are not low grade or barren, again in contradiction of the professional work of DAL's client.



The mine design and reserve calculation recently carried out by Wright Engineers found the "low grade" sulphides to total about 6,412,000 short tons, averaging 0.83% lead and 1.24% zinc; this material cannot be mined at a profit and thus can be considered only as waste. The "barren" sulphides contained only traces of lead and less than 0.1% zinc.

- (c) Next on the list is the estimate of General Engineering Co. (GECO) showing 6,200,000 short tons of reserves; however, this figure represents a diluted tonnage. It would have been more appropriate for the DAL report to show the undiluted 5,120,000 metric tonnes (5,640,000 short tons) calculated by GECO, and to quote Kerr Addison's internal memorandum on GECO's findings, specifically, that "On the basis of initial metallurgical tests, the orebody is submarginal and would not itself support a profitable mining operation".
- (d) The following estimate on the list is an adaptation of Mr. Chisholm's figure, followed by CAMC estimates made after the acquisition.
- (e) What is not mentioned is that Kerr Addison also prepared an estimate, independently from GECO, defining 6,000,000 metric tonnes (6,600,000 short tons) of reserves, of which 3,100,000 metric tonnes were estimated mineable by open pit and 2,900,000 metric tonnes by underground methods. This estimate was lower than both Mr. Chisholm's and GECO's estimates.

Due to DAL's unsubstantiated reserve figures, the information presented in the Summary is seriously distorted. It is stated that the mining and milling of 10,387,440 metric tonnes (11,450,000 short tons) "is considered conservative", despite the fact that this figure is higher than any other creditable estimate, including that of DAL's own client. It is then stated that "if" any of the 3 deposits add additional operating life to a prospective mine then the net present value will be greater than \$14.80 estimated. That "if" needs an explanation. On page 9 and on page 20, the report states that 184 holes were drilled from 1953 to 1956, totalling 17,678 m (58,000 ft), i.e. an average of 96 m (315 ft) per hole. The report also quotes Chisholm: "73

holes indicate a length of 975 m (3,200 ft) with an average width of 150 m (490 ft) sulphide extending to a depth of 90 m (300 ft)." Review of the drill logs and of Kerr Addison's maps and sections shows that the holes were drilled on a close, 60m x 30m (200 ft x 100 ft) pattern, and that the holes indicated above with medium to high grade ore intersections were surrounded by the rest of the holes in waste, with only scattered intersections of low grade and barren sulphides. It is inconceivable, if more than half of the drillholes drilled around the orebody could not detect any extension, and none was indicated by previous geophysical surveys, including self-potential, magnetometer and gravimetric as well as geochemical surveys, that the already over-estimated reserves could be increased further by one or two million tonnes.

The difference between DAL's reserve estimate and all others could be a result of the following in part:

- A specific gravity of 4.15 was used by DAL for its production plan, whereas Mr. Chisholm used 4.0 and GECO used 3.6 (the most recent actual data available prior to the property acquisition date).

On page 22, DAL mentions the specific gravity figures used: "massive sulphide 4.0-4.1, quartz sulphide 3.5, mixed 3.7".

On page 86, DAL refers to "the University of Toronto tests" showing 4.28 to 4.42 for Vangorda. WEL has no knowledge of such tests, DAL had no such reference in its draft report, DAL does not list any such report in the bibliography presented on page 64, and DAL does not indicate when such tests were made with what kind of samples and why where they differ from those reported by GECO.

On the same page, DAL mentions that: "CAMC's experience at Faro indicates 3.25-3.50 for quartz sulphides and 4.0-4.1 for massive sulphides." First, the Faro ore has nothing to do with the Vangorda ore; second, the latest tests show an average specific gravity of 3.77 (internal memo of J. Hanson to P. Taggart, January 13, 1981). Should this last figure be absolute, WEL's estimate would be 95.5% of the true value. With possible additional tests,

however, this figure may change yet. WEL acted prudently, therefore, by using GECO's figure of 3.6 in its evaluation.

Still on the same page, DAL indicates that: "H.F. Ditchburn used ... 3.5 for quartz sulphides and 4.0-4.1 for massive sulphides." In the financial analysis on page 71, however, DAL indicates "ore at 3.50 tons/BCY" (or 3.5 short tons per bank cubic yard which is equal to 3.175 metric tons per 0.765 cubic metre) that is 4.15 tonnes/cubic metre. This same figure is obtained (also in the financial analysis) as follows:

Tons milled:	11,450,000 DST =	10,387,440 DMT
Ore:	3,271,000 BCY =	2,500,000 BCM
	$10,387,440 / 2,500,000 =$	4.15

For fairness sake, DAL should have put a cross on the graph, on page 87 at 4.15 specific gravity, to show how that figure compares with everybody else's figures.

- A lower stripping ratio, i.e. 1.06 m³/t was used in the production plan compared to 2.7 m³/t estimated by WEL.

While there is an indication in the report that DAL "assumed" the ore tonnage, there is no indication at all how the total volume of waste in the production plan has been obtained (14,414,000 BCY, the equivalent of 11,020,000 BCM).

On page 22, a stripping ratio of 4.09:1 is mentioned. On page 54, it becomes apparent that it means 4.09 tons of waste per ton of ore (it is customary to use BCM of waste/tonne of ore), which is "2.52 tons of waste less than at Faro operations" and that "this converts to an operating cost saving of about \$2.37 per short ton mined and milled from Vangorda."

Since DAL states that a specific gravity of 2.4 was used for waste, the



customary overall stripping ratio would be: $4.09/2.4 = 1.7$ BCM/tonne, but it is not. The waste used in the financial analysis (production plan) is 14,414,000 BCY, equivalent to 11,020,000 BCM. The ore milled is shown as 11,450,000 DST, equal to 10,387,440 DMT. So, the overall stripping ratio is:

$$11,020,000/10,387,440 = 1.06 \text{ BCM/tonne}$$

This would mean that DAL's stripping ratio is $6.61 - (1.06 \times 2.4) = 4.07$ tons of waste less than at Faro operations which, of course, is not so.

Since the origin of the waste volume is not disclosed by DAL, the difference between DAL's and WEL's stripping ratio needs a closer comparison:

	<u>DAL ESTIMATE</u>		<u>WEL ESTIMATE</u>
	<u>Vangorda + Grum Ext. + Champ Ext.</u>		<u>Vangorda only</u>
Ore	3,271,000 BCY = 2,500,000 BCM		2,082,000 BCM
Waste	<u>14,414,000 BCY = 11,020,000 BCM</u>		<u>20,511,000 BCM</u>
Total	<u>17,685,000 BCY</u> <u>13,520,000 BCM</u>		<u>22,593,000 BCM</u>

It is apparent from the comparison that regardless of the specific gravity of the ore, the volume of ore is significantly less in WEL's estimate, although the pit is almost twice the size of DAL's pit.

There is a possible partial explanation why DAL's ore volume estimate is greater, although it may not be the right one or the only one.

The way WEL calculated the volume of ore with the corresponding weighted average grades was like GECO did earlier and in accordance with general practice: considering as ore intersection only those drill cores whose assays were greater than the cut-off grade (in the present case 4.0% combined lead and zinc content), calculating the ore volumes and the weighted average grades according to the individual ore core lengths, then allowing for volume and grade dilution of the reserves (10% in this case), based on open pit mining experience of being able to recover the layers of ore among layers of waste.

DAL could have followed another way, that is including low grade mineralized layers and waste layers in the ore zones, provided the average grade of the zone remained equal or greater than the cut-off grade. (This method could be used to calculate geological reserves only. To calculate recoverable mine reserves, the estimated ore tonnage and grades would have to be further diluted.) The difference between DAL's and WEL's estimates, however, are greater than what can be calculated by the two methods.

A comparison of the estimates is as follows:

**COMPARISON OF THE RECOVERABLE
MINE RESERVES OF THE VANGORDA OREBODY**

	<u>Undiluted</u>			<u>Diluted (10%)</u>		
	<u>Tonnes</u>	<u>Pb%</u>	<u>Zn%</u>	<u>Tonnes</u>	<u>Pb%</u>	<u>Zn%</u>
GECO	5,116,610	3.256	5.344	5,624,640	2.963	4.863
WEL	7,494,000	3.35	5.35	8,243,000	3.05	4.88
DAL (1)	11,084,877	3.09	4.86	11,084,877	2.95	4.63
(2)				12,193,364	2.82	4.43
(3)				8,915,300	2.82	4.51

Note (1) Explanation of DAL's estimate: "Dilution factor with 1/2 grade is 10% thus grade dilution is 5% and due to loss of 5% in mining, the tonnage estimated in-place is the tonnage mined."

(2) What the diluted ore could be using is not 1/2 grade, but what there is around the ore zones.

(3) The same diluted grade obtained increasing WEL's tonnage. Since DAL's pit extends from section 4W to 34E, and WEL's pit extends from section 6W to 40E at identical depths, that is WEL's pit is longer and wider (GECO's pit was 2W to 12E only), the discrepancy in the ore volumes is unexplainable.

If the discrepancy in the ore estimates is unexplainable, the waste estimate is even less acceptable.

DAL does not present a mine design. What DAL presents is a "trial open pit outline" (whatever that means) for an "audit check" only.

DAL should, however, either make a proper design or accept someone else's estimate based on a proper design. The design DAL made for the audit check leaves a lot to be desired:

- the haulage road enters the pit not at the lowest topographic point at the northwest, but at the highest point on the southeast, adding unnecessary haulage distance to the mining system;
- at the pit entry, the haulage road rises 35 m in elevation within 140 m, meaning that the loaded trucks would have to climb up on a 25% slope;
- between sections 22E and 24E, the pit floor is only 20 m wide, where no equipment could operate or turn around;
- at the northwest end of the pit, the pit wall which should be 45° in rock and 30° in overburden (according to DAL on page 22), has an overall slope of 64°; no equipment or personnel would be permitted by the mine inspector to operate on or next to such slopes;
- the pit floor itself is as steep as 43% between sections 10E and 12E, for example, on which no shovel could stand upright;
- there is no allowance whatsoever for any haulage road or ramp on the pit slopes;
- on the sections, some of which do not match the plan, vertical bench faces are shown;

- the pit floor is shown to end in a rectangular shape;
- no berm is left between the crest of rock slope and the toe of overburden slope;

All these show a complete lack of experience in open pit design, even for an audit check.

Even though Dal used "only" 10,387,440 tonnes in the production plan as the reserves of Vangorda and the extensions, the volume and grade of ore remain unexplainably high, while the waste remains unexplainably low.

Lacking substantiation, it may not be of benefit for DAL's reserve estimate to be presented in court in support of its client's case. Regarding the presentation of a witness in the Whitehorse Copper case, the Hon. Chief Justice wrote:

"I am not satisfied that his calculated tonnages and grades are valid, because he did not design a pit or any bench plan."

DAL's "trial open pit" for an "audit check" does not qualify as a pit design.

SECTION 4
METAL PRICES



SECTION 4
METAL PRICES

The second paragraph on page 79 reads as follows:

"THE BASIC ASSUMPTION MADE BY H.F. DITCHBURN IN THIS VALUATION REPORT IS THAT METAL PRICES ARE AS AT MAY 15, 1979, (THE DATE OF 'CLOSING') SHOULD PREVAIL IN ANY DETERMINATION OF A 'FAIR VALUE' FOR VANGORDA MINES LTD."

Using the Whitehorse Copper opinion as precedent, the pricing date is the last day on which the dissenting shareholders can elect to have the court determine "fair value". From that date, neither current nor previous actual metal prices are acceptable, but rather forecasts based on trends. In his Reasons for Judgement, the Hon. Chief Justice wrote that:

"I would be influenced by current trends which indicated a general upwards movement of metal prices, but I would not use estimates of future prices even close to those which have actually been experienced. I would use price trends... and I would be exceedingly conservative in my forecasts".

While May 15, 1979, is the date of CAMC acquisition, it was determined by WEL in the course of this assessment that the actual pricing date for these shares was June 8, 1979. In this light, DAL's stated assumption is in direct contradiction with the Whitehorse Copper opinion; such a contradiction would seem to indicate that the study was not carried out in accordance with its own Terms of Reference.

Further statements on page 69 claim that by the time the company is paid for its shipments, the prices will be even higher; therefore DAL raised its price even higher (with the exception of zinc), contrary to its own "BASIC ASSUMPTION". For example, the gold price is increased from U.S. \$257.62/oz. to U.S. \$267.645/oz. On May 15, 1979, referred to several times in the report as the "closing date" (the acquisition date in WEL's opinion), the gold price was U.S. \$254.40.

Of the price forecasts by CAMC listed on page 70, only the first can be used for comparison purposes. The others are immaterial, having been made after the pricing date. That first CAMC forecast (in the Anvil District Acquisition Program, Dec. 1978) compares with WEL's and DAL's forecasts as follows:

METAL PRICES (U.S. \$)

		<u>ACTUAL</u>	<u>FORECASTED</u>		
		<u>08/06/79</u>	<u>CAMC</u>	<u>WEL</u>	<u>DAL</u>
Lead	US¢/lb.	59.50	32.00	45.39	55.62
Zinc	US¢/lb.	33.40	40.00	31.91	34.46
Silver	US\$/oz.	8.58	6.00	6.98	8.38
Gold	US\$/oz.	280.00	175.00	229.60	282.80

DAL's estimates for the zinc and gold prices are even higher than the current prices reached on the pricing date.

It is noted that DAL's prices were calculated as the average of monthly average prices in April, May, June and July, and not as an overall average from May 15 to Aug. 15 as implied in the text. However, even if the average price from May 15 to Aug. 15 had been calculated, it would be completely immaterial, since:

- May 15 is not the pricing date,
- no actual prices could be used after the pricing date, and
- no current prices would be considered admissible by the court.

SECTION 5
FINANCIAL ANALYSES



SECTION 5
FINANCIAL ANALYSES

While DAL chose to cite CAMC's metal price forecasts made as recently as March 1980 (page 70 of DAL report), CAMC's cost forecasts made at the same time were apparently ignored for this valuation. Rather, DAL has used "the average of March 1, 1979 to August 30, 1979 for actual costs at the Faro operations" in assessing the projected costs of mining the Vangorda reserves (page 73). However, to provide a valid assessment on this basis the unit costs used by DAL should have been factored to reflect a smaller-scale mine and mill operation. To estimate the costs of a potential 2,700 tonnes per day operation at Vangorda, the unit costs of mining, milling, administration and other costs at the 9,070 tonnes per day Faro operation would have to be adjusted upwards by 45% to 65%, according to the type of each unit cost.

Regarding capital expenditures, DAL uses Kilborn's estimate for housing and surface facilities, but has not included \$7.5 million for necessary working capital.

The sources of the transportation costs used in the report are not disclosed, but in the opinion of WEL:

- the cost of transport to tidewater should be \$34.53/WST instead of \$31.26/WST,
- the Skagway Terminal cost should be \$6.38/WST instead of \$4.36/WST,
- 2 *unlike is this?*
- the ocean freight and insurance should be U.S.\$19.35/WMT instead of U.S.\$14.47/WMT.

In addition to inflated ore tonnages and deflated costs, the financial analysis is distorted by:

- (a) using 4.15 for specific gravity (higher than Chisholm's 4.0 and GECO's 3.6) so that fewer cubic yards are moved per ton.

- (b) reducing stripping quantities. It is inconceivable that, if WEL's mine design results in 8.2 million tonnes of diluted mineable ore reserves with a 2.5 m³/tonne overall stripping ratio, DAL can mine 9.5 million tonnes of ore from the same place with a 1.06 m³/tonne (1.26 BCY/ST) overall stripping ratio. If the additional 2 million tonnes of ore were actually there (though, according to the drill logs, they are not), the stripping ratio would probably be around 3.5 to 4.0 m³/tonne.
- (c) using the then-current metal prices and U.S. dollar exchange rates. As the current prices are unacceptable, according to the Whitehorse Copper opinion, so is the current exchange rate. The exchange rate estimated by WEL upon trend analysis is \$1.1285. The current exchange rate used by DAL is \$1.1594/US\$, adding over \$14 million to the value of the properties.
- (d) adding deferred deductible expenses (exploration, other than Vangorda) to the costs in the federal tax calculation for the first year of the project. If the Vangorda project is free standing, as DAL's report states it is, then there could not be \$818,000 deferred expenses in the first year of production.
- (e) adding the estimated reserves of the so-called Grum and Champ extensions to the reserves of Vangorda, as if they also were owned 100% by Vangorda Mines and thus by the dissenting shareholders. The simple addition implies that the cost of mining does not increase by the increased haulage from the Grum and Champ deposits, that those extensions would be mined at the same time as Vangorda, and that the stripping ratio, the grades, recoveries, etc. would all be the same. CY.
- (f) adopting without explanation GECO's ore grades for the production plan (page 71), rather than grades based on DAL's own reserve calculations. Possibly this was done because allowing 10% dilution in Chisholm's estimated reserves resulted in lower grades than GECO's similarly diluted grades, and DAL's grades for the "audit check" were lower yet. But using GECO's figures seems illogical: if GECO's diluted grades were determined for 5.6 million diluted 50% NET PROCEEDS.

tonnes, then how can the same grades be applied to 11.45 million tonnes for the main and for the two other orebodies combined?

- (g) using discount rates of 12% and 14%. Had the Whitehorse Copper opinion been followed, a discount rate of 15% would have been used, and the resulting present net worth would have been reduced by 25% to allow for risks in the development of the deposits. Had DAL followed the Whitehorse Copper opinion in the other aspects discussed above, however, a positive net worth could never have been derived.

Anyone involved in financial analysis who uses discounted cash flows for valuation, knows that one compares all net cash outflows against all net cash inflows on a discounted (time weighted) basis to arrive at a net present value regardless of the source of financing. DAL states (last paragraph on page 105) that ~~"It is incorrect to deduct the equity investment since this was provided by the equity shareholders."~~ Apparently, DAL would have one believe that the valuation method hinged on whether equity or debt financing was used, whereas the difference between equity or debt financing in an evaluation is that ~~with equity the initial outlays are paid for immediately and with debt the initial outlays are paid for in later years as debt principal repayments.~~ The same paragraph also contains a second implied justification for not including the initial outlays suggesting ~~"Valuing Vangorda Mines Limited shares is different from valuing the Vangorda project..."~~. If the Vangorda ore deposit was not effectively the sole asset of Vangorda Mines Limited then the above quote might be true, however, as it is, valuing the Vangorda project and valuing the company are essentially the same.

The text on page 106 and page 108 is misleading when it discusses several different computer runs showing one column titled "cash generated from project", below which the sum of cash flows are presented without being discounted. This is equivalent of saying that a dollar next year is worth a dollar today to a shareholder.

On page 107, DAL, while discussing valuation methodology states: "In many similar valuations the annual cash generation is usually considered to be reinvested at



a bank interest rate to build-up the total cash generated by the project at its completion." This is an error in logic. When a proper valuation takes place, one looks at incremental discrete cash flows, often yearly cash flows projected into the future, with each yearly cash flow individually discounted back to the present and then all the discounted cash flows are summed to yield a net present cash flow. If for some reason one chose to invest each one of the projected cash flows "at the bank rate" until the end of the project and then discount the entire amount, the value would be lower than discounting each individual yearly cash flow back to the present because of the tax laws and the discount factor. The tax on interest earned would roughly take a 15% interest rate to 8% after tax, so compounding would not be at 15% but at 8%. The discount rate is somewhat more complex but suffice to say ~~a discount rate is made up of the real interest rate plus the rate of inflation (if current dollar analysis is used) plus a risk factor plus a liquidity preference factor,~~ so that a bank rate of 15% would compound cash flows after tax at 8% but the cash flows would be discounted at perhaps 20% to 25% depending on the risk of the project. It is readily apparent that if one compounds at 8% to the end of a project and then discounts at 20% one gets a lower value than just discounting the original cash flows.

There is a further flaw in the previously quoted sentence which says "annual cash generated ... reinvested at a bank interest rate". It should read, as this analysis deals in constant dollars, "annual cash generated ... reinvested at a real interest rate." The inflation component should not be included in a constant dollar analysis.

Another area of concern in DAL's presentation (pages 105 through 108) is the question of 100% equity versus 100% debt financing. Despite what DAL might suggest it is customary to analyse projects using 100% equity. There are many reasons for doing this:

- (1) Project managers are often interested in the Internal Rates of Return (sometimes called "hurdle rate") which is the discounted rate of return to a project that results in a net present value of zero (the break-even rate). If debt is introduced into the analysis then the project internal rate of return is meaningless.



- (2) Introducing debt would lever the cash flow of a project. Anytime one can borrow money at a rate below that which the project will earn then borrowing will increase the return but it distorts the underlying viability of the project.
- (3) As the amount of debt increases the risk of the project also increases because, unlike in equity participation where a return is not obligatory, debt participation requires the payment of interest or insolvency results. As the debt load increases the chance of having a "bad year" and not earning enough to cover the debt also increases, and so does the risk.
- (4) It is a rare project which is financed 100% by debt. No banker or syndicate would loan money knowing that the owners have nothing to lose, should the project fail.

DAL states on page 107, that "Proper capital cost allowances, earned depletion, and tax accounting is absolutely necessary for such a valuation using 100% equity. H.F. Ditchburn has not revised the estimates of CAMC and WEL on this fair and proper basis for valuing a mining company share." The analysis by WEL was done using a sophisticated up to date tax model which deals properly with all aspects of tax calculations.



SECTION 6
MISCELLANEOUS



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MISCELLANEOUS

In this section, WEL offers additional comments on certain more generalized information presented in the DAL valuation report.

Throughout the DAL report, reference is made to the "Grum extension into Vangorda" and the "Champ extension into Vangorda", implying that somehow the three orebodies are attached to each other. In actuality, the Grum orebody extends into an area covered by claims which are partially owned by Vangorda Mines Ltd., and the Champ orebody likewise extends into such an area. It is not pointed out that the orebodies are 2 - 3 km apart.

The DAL report often mentions the "\$240,000,000 Vangorda Plateau Project", implying that CAMC's management is considering Vangorda an important project. In reality, the first report prepared concerning the Vangorda deposit is called simply the "Anvil District Acquisition Program", and the second, "The Development of the Vangorda Plateau Ore Deposits". DAL does not disclose that the development program is to last 9 years, to cost \$155.9 million in 1980 dollars (\$239.3 million when escalated for inflation), and to include townsite development, a power plant and other expenses in addition to mining and milling.

For perspective, the calculated mineable reserves of the Vangorda plateau ore deposits are as follows (see page 111):



ESTIMATED MINEABLE ORE RESERVES**(CAMC, June 30, 1981)**

Faro - all zones	30,109,000
Grum - open pit	15,583,000
- underground	12,217,000
Dy	21,000,000
Swim	4,300,000
Cirque	30,000,000
Vangorda	<u>6,134,000</u>
Total	<u>119,343,000</u>

Since the Vangorda deposit comprises about 5% of the reserves (excluding the Elf and Fluke deposits), its significance is not as great as DAL implies.

The DAL report refers to a "metallurgical breakthrough" on page 11 (and to "very important projected metallurgical performance improvements" elsewhere) as set out in a report prepared by the Noranda Milling Committee (NMC) on the pilot plant tests carried out at the facilities of Lakefield Research Ltd., as requested by Kerr Addison. This latter report mentions no such breakthrough. Rather, it describes the results obtained with samples from the Grum deposit, and the estimated recoveries and concentrate grades that can be expected from average Grum ores - that happen to be better than the grades and recoveries experienced with the Faro ore. In the absence of any better estimate, CAMC adopted those figures for Vangorda given in the "Anvil District Acquisition Program" report. DAL also adopted those figures, despite the fact that the Faro milling operation at that time could not achieve those grades and recoveries, and despite the fact that in "The Development of the Vangorda Plateau Ore Deposits", new estimates were presented on the basis of tests with Vangorda ores, wherein recovery and concentrate grades were considerably lower than the NMC estimates for the Grum ore. More specifically:



	<u>Grum Ore</u>	<u>Vangorda Ore</u>
Lead recovery	80%	80%
Zinc recovery	84%	77%
Lead in concentrate	62%	50%
Zinc in concentrate	56%	52.8%

The better results obtained with the Grum ore during the pilot plant scale tests were due partly to different characteristics of the ore and partly to the additional, finer grinding carried out. This type of process, however, would increase the capital and operating costs of an actual operating plant and the cost advantage, if any, of the additional recovery would have to be carefully assessed. CAMC's plant metallurgists (as indicated in "The Development of the Vangorda Plateau Ore Deposits") expect to reach lower recoveries and grades on the finalized flowsheet design than the NMC estimates, even with the Grum ore.

