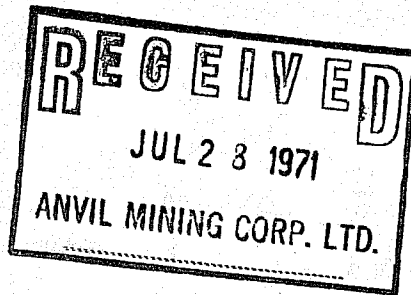


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July 26, 1971

Anvil Mining Corp. Ltd.
Mine Office
Faro
Yukon Territory

Attention: Mr. R. E. Thurmond

Dear Mr. Thurmond,

Enclosed is a copy of Mr. Ames report following his recent visit to the Anvil property.

Mr. Ames at present is in hospital and in a conversation with him this morning he advises that he will probably have to undergo a gall bladder operation, probably on Thursday of this week.

He had planned on accompanying me on my August trip to Faro. Obviously he will be unable to do so.

He suggested that if you or Mr. Likens have any questions until he is back in circulation perhaps you would be so kind as to phone me and I shall discuss your problems with him at his convenience and then advise you.

Yours very truly,

A handwritten signature in cursive script, appearing to read "Herbert H. Cox".

Herbert H. Cox

TO: Mr. R. E. Thurmond

FROM: H. Lyall Ames

SUBJECT: Visit to the Anvil Corporation Mill at Faro, July 5-9, 1971

c. c.: Mr. Herbert H. Cox

June metallurgical results were discussed with the mill staff. These will be recorded in the regular monthly operating reports which will be forthcoming from the mine in the near future. Considerable time was spent in collecting drying data in connection with the purchase of a new dryer. Current laboratory test work dealing with aeration, zinc recovery and upgrading and circuit changes, as well as future research programmes, were discussed with the metallurgical staff. Other items such as weightometers, laundering and the installation of the fourth zinc cleaning circuit were discussed with the operating staff.

1. New Dryer

For six months or more milling operations have been plagued by thickener overloads caused mainly by shortage of dryer capacity (and partly by excessive water dilution in the thickener feed).

It has been necessary many times to curtail or suspend bulk concentrate production as the bulk thickener was required to accept surplus lead concentrate which could not be thickened in the regular thickener. Dirty thickener overflows caused real serious losses in metal recoveries as reported on several occasions. Although there are other bottlenecks in the mill circuits none appear to be as annoying and costly as the dryers. Recognizing this problem C. F. Braun and Company were engaged to study and report on the operation of the existing dryers. A comprehensive report was submitted on July 2, 1971. A number of the recommendations can be followed and some improvement in dryer efficiency can be expected. However I think that we have all realized for some months that the present four 5-ft. diameter dryers will never dry satisfactorily, the large tonnages of concentrate frequently produced, particularly in the case of lead. Accordingly at a special meeting held in Vancouver on June 15 by representatives of C. F. Braun and Company Cyprus Mines Corporation and the Anvil Mining Corporation, it was decided to purchase another dryer, tentatively anyway the same size as the current four. After considerable discussion July 5-7 with the operating personnel and a review of the current dryer capacities and requirements it was agreed that a larger dryer, either a 7 ft. x 48 ft. or a 6 ft. x 40 ft. would be more adviseable.

Although Mr. Thurmond, Mr. Likins and myself had come to several alternative conclusions after numerous discussions and telephone conversations with Mr. Schaefer we felt that we could not finalize the purchase until all the data possible pertaining to the larger dryers were at hand. On July 12, following a telex I sent from Vancouver (a copy of which is attached to this report), and further information I received from B. M. & S. and the Hardinge Company, we decided that it was in the best interest of the company to purchase a new 6 ft. x 40 ft. stainless steel dryer with the accompanying auxiliary equipment.

2. Metallurgical Balance

At best to make a metallurgical balance on a plant with as complicated circuitry as Anvil's some compromises are necessary between tonnages, assays and concentrate production. Theoretically since about the beginning of the year the basis for the metallurgical balance has been the metal content of the concentrates shipped, inventory differences being calculated from monthly surveys of the stockpiles, and the most reliable inter-circuit samples and assays, and mill through-put. Basically I agree with this technique.

However I am concerned that the weightometers at the head end of the mill are all overloaded so much that considerable estimating is involved in arriving at a reasonably correct tonnage figure for metallurgical calculations. Although the type of weightometer is not my favourite I think that they can have adjustments made to make them as accurate as is required. I am even more concerned that the overall mill tailing assays, for lead particularly, is adjusted to balance with the head assays and the concentrate assays and tonnage. It is by far the more common practice to make such necessary corrections to the head assay as it is considered to be the least accurate of the three major samples.

3. Zinc Cleaning

Four second-hand Denver No. 30 flotation cells are on order to make a fourth zinc cleaning stage. When this new circuit is in operation it is hoped that there will be some available "freeboard" on zinc concentrate grade. Then more serious work can be done in an attempt to recover more zinc in the roughing and scavenging circuits without jeopardizing the concentrate grade limits. I recommended that the slope of the cell bank launder be increased from the $1 \frac{3}{16}$ " per foot on the present drawing to at least 2 inches and that the pipe connections to it be given considerable attention to prevent any unnecessary entrance head losses.

4. Lead Circuit

This circuit surges more than necessitated by changes in head grade (the reason given by the flotation operators). Actually if a smooth mechanical operation could be maintained I think that the metallurgy would be close to that "obtainable" on this type of ore.

Aeration would likely help some and of course is being investigated.

In the meantime I think that the operators, of necessity, frequently hold back on the final cleaner to stop or prevent launder spillage.

This in turn causes a surge condition and a vicious cycle of middlings is started. Certainly one bottleneck in the system is the take-away launder and piping. This can and should be corrected.

5. Aeration

Laboratory tests are being continued to determine the metallurgical and economical feasibility of an aeration step ahead of the lead roughing circuit. Although I think the aeration is a good idea it is essential that the mill staff are convinced of its value.

Outside of a pilot circuit the only way to accomplish this is by running many laboratory tests under all kinds of different conditions and with

different reagent combinations, both on mill products, mainly lead rougher feed, and on laboratory prepared samples. Preliminary tests which were run by Harry Craige and reported May 13, 1971, indicated some better metallurgy for both zinc and lead. These have to be substantiated. Further work has been done by Peter Dyas and we are awaiting assays. In the event that aeration is found to be required there are several courses of action, none too easy. They have been discussed with Corwin Likins and his staff but I think that it is premature to report them until we have more detailed information as to what is required.

6. Finer Grinding

A report dated May 20, 1971, from Peter Brown shows that both lead and zinc recoveries could be improved by finer grinding. This of course is not surprising. Whether or not it should be done is simply a matter of economics. Under the circumstances I would like to be certain that all the flotation parameters such as flowsheet, conditioning, circulating loads and reagent combinations are optimum before seriously considering overall finer grinding. However as they say there are three large regrinding mills, one not in service and another possibly not required, which might be put to useful service

doing further grinding on the lead scavenger tailing. I concur that any improvement in the main circuit grinding circuits by using smaller balls or increasing the mill speeds is well worthwhile investigating. They are going to install rubber deck screens in the tertiary crushing circuit. This should result in a slightly finer crush which will improve through-put but in itself not necessarily lead to finer grinding.

7. Zinc Tailings

Considerable laboratory work is being carried out on the zinc scavenger tailing. Recoveries are being made that certainly warrant consideration but I warned them that unless the concentrate being floated could be upgraded to a nearly saleable point the tests were far from completed. I suggested that this phase of the experiments could be done on the last scavenger cell concentrate. ^{yes done} In any case a lot will depend on what improvement results from the additional stage of cleaning which is being incorporated into the circuit.

8. Flowsheet Changes

Several flowsheet changes were discussed, particularly those dealing with the retreatment circuits. There was a feeling among the staff that the lead regrinding circuit served more in a surge

capacity than for doing useful grinding and also, but to a lesser extent, the zinc regrinding unit. Microscopic inspection of middling circuit products showed mostly free particles rather than true middlings and I concur with the idea of continuing experimentation with the flowsheets of these circuits. After all both middling thickeners have been removed in the past year. I have also suggested that they try returning some of the zinc scavenger concentrate to the head of the zinc flotation circuit rather than to the regrinding unit. This latter was in conjunction with an idea that Peter Dyan is experimenting with, that is, taking the zinc concentrate from the first few rougher cells (or a new 500 C. F. Agitair Cell) directly to the second cleaners. Theoretically anyway this is an excellent scheme as it would likely relieve the first cleaner circuit sufficiently to permit discarding its tailing, an objective I have had in mind for a long time.

9. A preliminary metallurgical balance for June indicates: Ore milled 213,598 tons, lead concentrate 9,824 tons, zinc concentrate 18,270 tons and bulk concentrate 2,621 tons. The overall recovery of lead was 82.0% and zinc 78.1%. Because of lead assaying difficulties caused by the unsuspected presence of barium some assay corrections may be necessary.

Toronto, Ontario
July 26, 1971