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932 EQUITABLE BUILDING
DENVER, COLORADO

January 6, 1937.

Mr. J. Van Houten,
The Maxwell Land Grant Company,
Raton, New Mexico.

Dear Sir:

As directed by you, we have visited your Aztec Mine at Baldy, New Mexico, in order to give you our opinion concerning the future ore prospects, the operations being carried out and any suggestions which we consider might improve those operations.

Herewith is submitted our report, stating first our conclusions on these matters and later discussing the topics more in detail.

CONCLUSIONS

1. The Aztec Mine ore bodies will always be of comparatively small dimensions if the ore to be furnished to the mill for treatment be kept of suitable and profitable grade. From our inspection, we are of the opinion that, worked on the basis of a daily tonnage not larger than present mill capacity, there is a strong probability of working the mine at a profit on present known ore and of finding extensions to those bodies which will protect such operations, for some years.

2. Operations for the past two years have been in general well carried out by an energetic and loyal superintendent and staff

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and the results in finding ore, extracting it and treating it in accord with the policy laid down for them have been satisfactory and encouraging.

Suggestions for following known ore and possibly finding new ore are along the lines of: (a) Closer detail locally in platting geology and driving according to its indications; (b) Mining more with a view toward clean ore than for the tonnage production; (c) Determining the best factors for highgrade concentrate and maximum recovery and minimizing fluctuations in the treatment plant so as to hold the best results constant.

DISCUSSION

1. The report of Mr. Augustus Locke was available to us and was very helpful. Since that report was made, more area has been opened up and hence some additional observations appear to be warranted, particularly in regard to ore genesis and manner of ore introduction and localization.

It is our opinion from the appearance of the Ponil workings that the first general gradual uplift in the area tilted the sediments and produced more or less continuous and vertical "checking" cracks in those sediments, through which the ore bearing solutions travelled upward. Continued uplift and bending after deposition of ore resulted in slipping along bedding planes, or that is, "strike" faults in the sandstone and in the shale, particularly along such planes as carried thin or thick shaly selvages which served to "lubricate" the movement. These strike faults have throws much

smaller than and in reverse direction to those of the later Aztec and Lyons faults which have been noted as producing larger blocks dropped down and to the east. The Aztec and Lyons faults are much later than original mineral deposition and have no connection with original mineralization. Exploration of those faults will not lead to ore bodies, as they are not pre-mineral ore solution conduits.

The differential dislocations caused by bedding plane slippages are of utmost importance in localizing extensions and directing drives to those extensions at elevations above or below those where bodies have been already disclosed. The outline of these reverse strike faults is observable in at least three places in the Ponil workings. It is recommended that frequent sections be drawn on a fairly large scale and at right angles to the general strike of the beds and "checking" pre-mineral fissures. The local engineer can then take prints of such sections underground and note thereon in close detail, strikes and dips of beds, of selvages and of ore seams and the kind of rock in the walls. By correlating these observations and extending the lines and directions with judgment, drives to faulted ore body extensions will be minimized and will, we believe, demonstrate ore deposition continuity and prolong the mine life. In addition to the sectional geology, similar noting of strikes and dips of faults and beds on the mine plan is necessary to make clear the rolls in the beds, which will vary between the sections. This will point the way to horizontal development.

When this work has been done we consider it not improbable that ore will be found up and down from the second east drive on Ponil No. 2, and up and down, well to the west of Ponil No. 2 adit, thus filling out areas now blank on the map in these sections. Such work should also disclose the downward extension of the important square set stope on 2nd west drift of Ponil No. 1, which extension should lie between the 2nd winze from Ponil No. 1 and the 1st west drift of Ponil No. 2 on this latter lower level.

It is evident that such extensions, if found, would materially lengthen the productive life of the property.

It is our opinion that the best ultimate financial outcome from the property will be gained by operating the mine with special attention to the grade of ore furnished to the mill for treatment rather than by trying to force tonnage production. We were informed by Mr. Gorman that the policy has been to treat ore only from development drives and raises and to refrain from actual stoping. We consider that stoping should now be started and that development be continued along the lines pointed out by the geological details and at a rate commensurate with stoping, to maintain a currently balanced program. A further reason for proposing stoping currently with the further development is that such work in stopes will demonstrate more clearly ore behavior in three dimensions and furnish more complete information for intelligent prospecting and development.

Breaking underground should be confined to vein widths as closely as possible and wherever feasible, recognized barren material

unavoidably broken, should be sorted underground and left in the stopes.

We were also informed that Company policy is averse to mining by the leasing system. Our experience in small ore shoots, where the distinction between ore and waste is marked, where metallic content is spotty and varies between wide limits, where ore body outlines are irregular, and particularly where Mexican labor is available -- all of which describes the Aztec -- is that a well designed short-period leasing or contract system in certain selected sections results in obtaining best grade of ore and maximum life of and financial gain from such a property. Where such a system fails, it is usually due to faulty design or lack of supervision. We therefore recommend reconsideration of this method of procedure or of some system which will put a premium upon mining clean ore. While we could not enter the old upper workings, we are convinced from the description, that a great deal of ore of good milling grade could be reclaimed by such a system applied also to these old workings and dumps.

2. Records submitted show the following operating performance for 1936:

Driven in ore	3300 feet
Driven in waste	1322 feet
Ore shipped direct	13,107 tons
Treated in mill	15,542.5 tons
Concentrates produced	638.609 tons
Bullion produced, about	\$5000.
Tailing varies from 0.005 to	0.02 ounces gold.

Concentrates since July 1, 1936, average about as follows:

<u>Au. Oz.</u>	<u>Ag. Oz.</u>	<u>Cu. %</u>	<u>Fe. %</u>	<u>Insoluble %</u>
4.75	4.1	9.41	15.2	43.2

The variation from the first to the last lot of this period is shown by the following comparison:

<u>Lot</u>	<u>Au. %</u>	<u>Ag. %</u>	<u>Cu. %</u>	<u>Fe. %</u>	<u>Insoluble %</u>
1302 July	5.14	3.7	7.46	13.4	53.4
3097 December	4.79	4.4	10.50	19.8	33.2

The concentrate shipment liquidations show that copper is higher at the end of the period, due undoubtedly to the change in ore nature. Insoluble in later shipments is lower than in earlier months. Gold in the shipments is fairly regular, although somewhat lower at the end than at the beginning of this period, due probably to lower head assays.

We do not have detailed cost figures but are informed that local operating expenditures are about an average of \$5.00 per ton and that total local expenditures have been more than met from income. This is a creditable showing.

The work done as shown by the reported figures confirms our observation that the local staff is interested and conscientious.

3. Recommendations as to improvement in the mine operations have already been discussed.

Regarding the mill, we would offer the following remarks:

The flotation process involves many factors which must first be known for any ore and then carefully maintained in order to assure the best results.

The Aztec mill has in it some sturdy and modern equipment. Having been faced with placing it in an old building, it was not installed in a way to provide for easy operation and maintenance or for maximum flexibility, which is of the utmost importance in treating variable ores.

For sustained good results, flotation requires a steady operation. The Aztec mill is so connected and in places is in a state of repair that makes for wide fluctuations in pulp density, alkalinity, speed of flotation, degree of grinding -- all of which, over short intervals, affect results by unsteady conditions.

It would be difficult now to change the plant to increase flexibility. Operations, however, can be steadied to a large extent and easily.

Specifically, we would suggest a larger ore feeder and connections, which would relieve the variations in ore, wet and dry, delivered to the conveyor belt. Repairs to the bin and conveyor alignment would prevent leaks. The present feeder is too small and/or is in poor repair, which affects mill pulp density and hence introduces variables in the grinding circuit. This condition is augmented by the Wilfly pump discharging table middling and concentrate filtrate direct to mill head. All returns of subsequent intermediate products to an earlier step should be in a manner to prevent surges automatically and to deliver a stream regular, itself, in density. Grinding circuit water supply should have a master valve so that several valves do not have to be adjusted after each feed interruption. In a mill like this one, driven by Diesel power and line

shafts, especial care and attention should be given engine operation and belt tightness to insure constant speeds. This is particularly necessary on the flotation cells. The engine should not be loaded so close to capacity that a small variation in the load makes a similar or wide variation in the speed of machines.

The operators should be furnished apparatus for determining quickly pulp densities and alkalinity, tests for both of which should be noted and recorded regularly, then correlated with the daily results to determine positively the most advantageous combination for uniformly best results.

Automatic sampler should be installed at least on the tailing. Hand cut samples are usually taken when everything is running smoothly and hence are not representative.

Maintenance of equipment is extremely important for continuous and satisfactory results.

To minimize smelter charges, a cleaner concentrate should be sought. As pointed out, work of later months shows a reduction of insoluble, but there is still room for improvement along this line.

Another point upon which you requested investigation is the smelter contract.

This contract is in line with those being granted similar shippers.

The smelter's participation in the increased pegged price for gold and silver is just. Mine and smelter are essentially one industry and the part reserved by the smelter out of the increased

quotation for these two metals is moderate and has been accepted as fair by the miners.

The copper schedule is in line with others. Even in previous years the smelter participated usually to the extent of 25% of the increase above a 15 cent quotation. Your contract is 12 1/2% above 10 cent quotation. Garfield and Tacoma deduct 0.75% and 1.00%, respectively, then pay 100% of the remaining content, while your contract deducts 0.40% and pays 95%. On a concentrate running 10% copper the net comparison would be as follows:

El Paso:	(10 less 0.4)	x 0.95 equals	9.12% net
Garfield:	(10 less 0.75)	x 1.00 equals	9.25% net
Tacoma:	(10 less 1.0)	x 1.00 equals	9.00% net.

In the case of Garfield and Tacoma there is, however, a sliding scale base charge in excess of the base charge of El Paso, Aztec schedule.

You should have a price reduction of 2.5 cents instead of 2.525 cents, as the smelter reason for 0.025 cents has now disappeared.

It is possible that if El Paso smelter needs iron, you might later get some iron premium if you can reduce the insoluble content below that of the iron.

In general, the contract is a fair one for this concentrate in the amount it is being shipped.

Respectfully submitted,

WHITAKER AND SCHLERETH

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