Department of Mines File:— TALKEETNA PRECINCT
Chulitna District

MR 67-6

GOLDEN ZONE MINE, Inc.
Box 365, Anchorage, Alaska.
November 22, 1947.

K+67-14 JAN 29 1948

B. D[illegible]ART
Commissioner of Mines

The following is a description of the Golden Zone Mine and a proposal to finish its development and equipment, and to bring it into production. After several years of preliminary development by the undersigned, during which approximately $100,000 was spent in the work, the mine was incorporated during 1939, further capital was raised by public sale in Alaska, and work was started to bring the mine into production. This work had progressed to the point where all necessary camp buildings, machine-shop, carpenter-shop, sawmill, power plant and flotation-mill had been erected, and shipments of concentrate had been made to the Tacoma Smelter when the unfavorable conditions brought on by the war made completion of the project impossible and the mine was shut down. It is now proposed to resume work at the mine and complete the program originally undertaken.

SUMMARY. 1. The main metal of the Golden Zone ore in point of value is gold. It also contains substantial amounts of silver, copper, lead, zinc, and a high percentage of arsenic. The price for silver and the base metals is good and seems likely to contue high because of present and potential scarcity. Although the ore is relatively low in grade certain favorable factors, inherent in the type of the ore, the size and structure of the orebody, and an ample amount of cheap power assure that a large tonnage can be produced with relatively few men and supplies, thus assuring a very low over-all cost, even under present conditions or any that are likely to occur.

2. Close to 500,000 tons of ore having a gross value of $12 or more per ton at present prices is indicated in the area so far reached by development, and the geological indications are that the tonnage of this grade of ore will be greatly increased by deeper development. In addition, there is a still larger tonnage of material which it is believed will prove to be ore when the very low cost of production which has been indicated by the pilot operations is finally achieved.

3. Total cost of the production and treatment of $12 ore, from which approximately $10 per ton can be recovered, is estimated at not to exceed $3.00 per ton. Estimated cost per ton decreases as the grade of the ore gets less, so that a margin of profit is maintained to a very low value per ton in the feed.

4. It is estimated that a total expenditure of $300,000 to $400,000 will bring the mine into profitable production of 300 to 500 tons per day. The first work needed to be done is to complete the 500 Level tunnel, which is the same elevation as the lowest point reached by diamond-drilling so far, and to develop the ore on that level. This preliminary tunnel work is estimated to cost a minimum of $50,000.

The mine is readily accessible and can be operated the year round.

6. All of the expensive pioneering work needed to make the property accessible, equip it with the buildings and most of the mining and milling equipment necessary, development of water power, and the research and pilot plant work, which has shown the proper mining and milling methods to use has been done.

7. Successful operation following completion of the program of development and equipment seems definitely assured.

8. An option to purchase control of the mine, and which will allow payment for it to come largely or entirely out of first earnings, can be arranged.

SITUATION. The mine is situated eleven miles west of Colorado Sta., Mile 297 of the Alaska Railroad. A good gravel road connects the mine with the railroad. Trucks are used for transportation during the summer and tractor-drawn sleds during the winter. Or, the road can be kept open with a plow and trucks used the year round. The mine is three miles from the south bank of the West Fork River and about 1000 feet higher, being at an elevation of about 3000 feet above sealevel. The road is maintained by the Alaska Road Commission.

TIMBER. There is an abundance of timber for all purposes along the road.

PRESENT BUILDINGS AND EQUIPMENT. The buildings at the mine include bunk-houses, cook-house, carpenter-shop, machine-shop, sawmill, power-plant, flotation mill, cottages, warehouses, garages, etc., all that are needed for a large operation. The accessory equipment, such as sawmill machines, carpenter-shop, machine-shop, and welding machines, trucks and tractors, dragline and shovel, tools, compressors, milling equipment, electric motors and generators, etc, is extensive. The trucks and tractors are in need of repair, and the hydro-electric plant also is need of repair.

Geology and Orebodies. The general geological picture is a rather complex one of lavas and tuffs together with porphyry intrusives, associated with Permian sediments. There are numerous showings of ore scattered along a 'zone' about seven miles long, but only two of these will be discussed herein, because little development has been done at other points, where the showings appear to be of less importance than the two mentioned.

MAIN ORBODY. The first of these two showings is the main Golden Zone orebody. This consists of a pipe of brecciated porphyry, which stands nearly vertical and whose horizontal section is nearly circular. The pipe is over two hundred feet in diameter, but the associated mineralization, due to sympathetic shearing and fracturing of the surrounding walls, extends out to much greater dimensions. The metallic sulphides, which make-make up the valuable portion of the ore, are not disseminated through the porphyry breccia fragments but occur as filling of the surrounding cracks and fissures. The intensity of brecciation determines the ratio of sulphides to barren porphyry, and where it is intense there is often more sulphide than rock. The greatest intensity of brecciation and mineralization occurs around the periphery of the pipe, and the ore is found in that locus as orebodies which are more or less crescent-shaped in their horizontal cross-section and apparently extend to depths beyond the limits of the present development. These orebodies, up to date, have measured from five to forty-five feet in width, and individually more than two hundred feet long, but the whole area is mineralized to some extent, and assay values determine what width to mine. There is evidence from the diamond-drilling that at depth these bodies may completely encircle the pipe and that the total area of the pipe may turn to ore.

TEXTURE. The sulphides are much softer than the porphyry fragments, which are relatively tough. This feature has an important, favorable bearing on the cost both of mining and of milling the ore, because it allows the ore to break readily when being mined, and the sulphides to be freed easily from the rock when being milled.

METAL OCCURRENCE. The main sulphide is arsenopyrite, with which is associated pyrite, chalcopyrite, galena and sphalerite. The latter sulphides, containing copper, lead, and zinc, are minor in amount, the arsenopyrite being several times in amount greater than the other sulphides.

The gold in the ore is 'free' to such an extent that most of it can be amalgamated even though the ore is not very finely ground, and a high recovery can be made of it by cyanidation, also without very fine grinding, and without roasting. It is uniformly distributed throughout the sulphides, as evidenced by the fact that the percentage of sulphide in any sample of ore is almost a direct indicator of how much the sample will assay in gold. The silver in the ore is also closely associated with the sulphides.

The sulphides are not finely intermingled and can readily be separated by selective flotation.

GRADE OF ORE. The better grade ore in the main Golden Zone orebody, being that which comprises the crescent-shaped orebodies mentioned above, will assay about $9.00 per ton in gold, 1.6 oz. of silver per ton, and 0.5% copper. At present prices these give a gross value of more than $18 per ton. Milling has proven the economical recoveries to be about 90% of the gold and 70% each of the copper and silver, making a total recoverable value of close to $10 per ton.

TONNAGE. Development by means of drifts, crosscuts, and raises on and between two upper levels, and by diamond-drilling between the 800 Level and the 500 Level, indicates that there is between 750 and 1000 tons per foot of depth of this better class of ore in the vertical range so far explored, making a total of 350,000 to 500,000 tons down to the 500 Level of this grade of ore. Surrounding this is a much larger tonnage of material that will assay close to $3.00 per ton as far as we have gone. There is reason to believe that a lot of this grade of material can later be worked at a profit.

PERSISTENCE WITH DEPTH. It is believed by engineers familiar with this type of orebody that the mineralization will increase in intensity with depth up to a certain saturation point,— not that there would be any great increase in the grade of this better class of ore, but that there would be more of it per foot of depth. Up to date there has been enough improvement down to the 500 Level to offer reasonable assurance of developing more ore below the 500 Level than there is above it.

EAST VEIN. The second showing of ore mentioned herein above outcrops in the canyon of Bryn Mawr Creek about 600 feet east of the main Golden Zone orebody. It is exposed for a length of about 250 feet before it disappears under the heavy overburden. It is called the 'East Vein' and is about ten feet wide. The surface showing is not particularly impressive, although several good assays have been obtained from it. No surface development has been done. However, in the 500 Level haulage tunnel there was encountered a faulted segment of this vein at a depth of 230 feet below the surface. The ore in it was very good, assays as high as $70 per ton in combined gold and silver values together with substantial percentages of lead and zinc being obtained from the ore. Due to faulting, the indication of which on the surface was hidden by heavy overburden, this segment was encountered about 230 feet beyond the point at which the

500 Level Tunnel was expected to intersect the East Vein, and the segment found was only a short block of the vein. The tunnel passed through it in a couple of rounds, and because the country was badly faulted no attempt was made to pick up the vein from that point.

The true width of the East Vein as found in this small block was ten feet. All of it was mineralized but the best of it lay in a width of five feet adjacent to one wall. This width assayed more than $25 in combined gold and silver per ton. The lead and zinc ran several percent, each. In other words, the main base metal of the East Vein is lead rather than copper. The ore occurred in streaks of solid sulphide up to one foot thick, laminated through the vein, the main sulphide being arsenopyrite as in the breccia ore of the main Golden Zone orebody.

EAST VEIN ORE. Considering the possibility of hand-sorting this ore and making shipments either to the Tacoma or the Selby Smelter, the management sent a sample of it to Tacoma to learn what treatment contract could be obtained. Tacoma offered a fair contract and reported their assay of the sample as follows:

Ounces per ton.		Per cent.				
Gold	Silver	Lead	Copper	Zinc	Arsenic	Antimony
1.28	14.52	8.4	0.8	6.2	15.4	none

Unfortunately, as noted above, it proved to be only a short faulted block at that point and no further attempt was made to find more of the ore, the main outcrop lying about 400 feet to the left of the tunnel line.

CONCENTRATION TEST ON EAST VEIN ORE. Some concentration tests were made at the mine on ore from this showing, but only of a preliminary nature. The best concentrate obtained from these tests assayed a little over $100 in gold, sixty or seventy ounces of silver per ton, and thirty percent lead.

EAST VEIN IMPORTANT. It is our opinion that the East Vein will eventually be an important producer. Concentrate such as that noted above would have a net value at the smelter of close to $200 per ton at present prices. The outcrop lies beyond the faulted zone through which the 500 Level Tunnel has passed, and it is evident from the surface that no further faulting occurs for at least many hundreds of feet. Therefore, it is believed that the East Vein will persist to considerable length along its strike. A crosscut about 500 feet long from the present tunnel face would cut the vein at a depth of 250 feet, and further depth would be gained rapidly along the strike under the steep hillside beyond Bryn Mawr Creek.

MILLING OF THE GOLDEN ZONE ORE. In general the treatment of the porphyry ore will be as follows:

1. Removal by flotation of a small tonnage of copper-silver-gold concentrate for shipment to Tacoma.

2. Further flotation for recovery of an iron concentrate.

3. Thickening, filtering and regrinding of the iron concentrate.

4. Cyanidation of the iron concentrate.

A treatment following the above lines is given below:

Feed: 0.92% Cu; 8.9% As; 15.1% Fe; 9.7% S; 3.0 oz. Ag; 0.51 oz. Au.

Product:	Assays				% Distribution		
	% Wt.	% Cu	Ag Oz.	Au Oz.	Cu	Ag	Au
Copper Conc.	3.33	18.80	54.05	6.77	67.74	61.22	48.81
Iron Conc.	25.03	0.78	3.18	0.831	22.58	39.25	48.48
Flot. Tail.	71.64	0.12	0.39	0.018	9.68	9.53	2.91
Cyan. Tail.	25.03	--	1.80	0.065	----	15.2	3.23
Cyan. Recov.						14.05	45.25
Total Recovery, Cyanide and Flotation.					67.74	75.25	93.83

Note: Cyanide work complete--no tendency toward fouling shown.

Note: The above feed is higher in metal content than will be found in the mine run of ore, that is, the coarse feed to the coarse crushing plant. However, as will be indicated further along in this thesis, a large part of the gangue material can be eliminated from the circuit after one pass through the ball mill, in coarse sizes, that is by passing it through a ball mill with open discharge followed by screening and coarse jigging. which yields a very low tailing. Therefore, the above feed for the flotation and subsequent cyanide circuits is, in assays and recoveries, truly representative of the feed that these circuits would receive under normal mill operation.

LOW MILLING COST. Occurrence of the sulphides in soft stringers and bunches surrounding the hard fragments and lumps of porphyry breccia, together with the fact that the gold occurs 'free' in the sulphides, have important direct bearing on the cost of treating the ore. This should be so, theoretically, and proved to be so in actual milling practice. Following crushing of the mine-run ore at the head of the mill to 1½" size it was fed to a ball-mill with open discharge to which is attached a short trommel screen of ½" mesh. The oversize from this screen was thrown away as a fairly low-grade tailing, and it accounted for a large proportion of the original feed. What value was left in this tailing was mostly in the form of middling and solid chunks of sulphide, which were tough enough to withstand passage through the ball mill. Most of this could have been recovered at this point either by jigging or sink-float concentration, and would have left this tailing very low in value. Also, at this point, a large part of the undersize through the trommel could have been rejected as a fine-jig tailing. However, there are no jigs nor sink-float equipment in the present mill circuit. Their addition can be had at relatively low capital expenditure and they will cause an increase in recovery and capacity together with a decrease in over-all costs.

Ore is unique. The lower the grade of ore the higher becomes the proportion of hard porphyry in it and the greater the amount of these early, low-cost tailings which can be rejected; all the costly work of grinding them and having to treat this extra tonnage by flotation will be avoided, and the cost of milling will fall almost in direct proportion to fall in the grade of ore. We found this to occur in our pilot mill operations, the over-all capacity of the mill rising very rapidly as the grade of ore was reduced. The gold being in the 'free' state also has a favorable effect on the costs, because of the ease with which the gold can be extracted. Cyanide tests, by ourselves and by the Dorr Co., show that a high recovery can be attained with relatively

coarse grinding, thus making it possible to avoid the expensive, extremely fine grinding which is often found necessary to attain a high recovery of gold from sulphide ore. A relatively coarse concentrate is also of great help in lowering costs in the filtering department. In other words, as the grade of ore falls, the treatment costs will fall almost as rapidly, and a margin of profit can be maintained with ore very low in grade. We do not know yet what the minimum grade possible to treat will be, but our pilot work has been extensive enough to indicate that these factors will make available as ore a large tonnage of material which we know to occur in the pipe but which has not yet been included as ore in the tonnage estimates. Enough has been done to indicate that the ore is unique in the ease with which it can be treated.

LOW CAPITAL INVESTMENT REQUIRED PER TON OF CAPACITY. The above factors have a very favorable effect not only on the direct cost of operation but on that of the capital investment necessary to treat a large tonnage of ore per day, because the size and amount of grinding and concentrating equipment can be kept low, and the size of power equipment needed per ton of ore treated will also be much lower than is usually found necessary.

CYANIDE PLANT NEEDED. The flotation plant was operated as a pilot plant for several months and many carloads of concentrate were shipped to Tacoma. However, no cyanide plant has as yet been built at the mill and the full economy of the treatment cannot be realized. The cyanide plant is an essential part of the flow sheet, because, without it the total recovery of gold and silver is too low, the 'iron concentrate' not being of a grade high enough to ship to Tacoma. It is possible that a fairly good recovery of the gold in this iron concentrate may be had by amalgamation, thus avoiding the considerable expense of a cyanide plant for the early operation of the mine, but it seems doubtful if, in the long run, it would be economical to try to substitute amalgamation for cyanidation.

Mining conditions and costs. The ore which was milled during the pilot operations was produced from three small shrinage stopes, up to twenty-five feet wide. These mining operations were extensive enough to show that the ore drills well and breaks well. It also stands well, as indicated by the fact that the stopes are still open after five years. The pipe is about vertical and the surrounding porphyry walls are firm. This will allow a cheap method of mining to be used, namely, a sub-level method by which the ore can be broken by means of long drill holes, into open stopes. Because the breccia fragments are surrounded by soft mineral and some gouge, the ore breaks apart readily and little secondary blasting is necessary. It is estimated that the cost of mining can be brought to a very low point, because a large tonnage can be broken by few men while little of timber and other supplies will be required, and that the total cost of mining can be brought below $1.50 per ton.

Combined Costs. It is estimated that $12 ore will show an overall recovery of close to $10 per ton and that the total combined costs of mining and milling will not exceed $5.00 per ton on a capacity of 300 tons per day. The milling cost will vary in proportion to the grade of the ore, because, for one thing, the grade determines how large a percentage of the original ore must be cyanided, which will be a relatively expensive operation. Due to the fact that costs will fall more or less in parallel with a drop in grade of ore, it is estimated that ore which will show an overall recovery of $3.50 to $4.00 per ton can be mined and treated for not to exceed $2.50 per ton on a capacity of 500 tons per day. Such relatively low tonnages

do not represent the ultimate potential possibilities of the mine by any means but are given as figures which it seems reasonably assured can be maintained for several years of operation without having to extend the present limits of exploration.

EAST VEIN COSTS. Mining conditions in the East Vein also favor low costs. The vein stands nearly vertical, has good walls, and is wide enough so that development costs should not be high per ton of ore produced.

POWER. Cheap power is essential to low costs, and it is assured to the Golden Zone by either of two means. One of these will furnish power at an exceptionally low figure. This is by means of hydro-electric development on the West Fork River and is because of unique conditions obtaining there. The West Fork, less than three miles from the mill, and below it, is a large glacier stream. The valley floor is wide, from 1500 to 3000feet, is many miles long on a gradient of 1½ to 2%, and is filled with coarse gravel and sand thoroughly saturated with water. It thus forms a very large reservoir of sub-surface, filtered water, which remains the year round well above freezing temperature. There is a false bedrock of clay about ten feet below the surface. Cuts were excavated to this bedrock, timbered drains installed in them, and the cuts refilled. This drain forms a catchment for the underground water, which feeds from the drain into a ditch, which in turn feeds the present power plant under a head of sixty feet.

Automatic Hydro-Electric Plant. This method furnishes water for power purposes that is clear at all times and entirely free of debris. There is no appreciable daily variation in the flow. The seasonal variation gives about 50% greater flow in summer than in the winter, the gradual falling off to the late winter occurring very gradually. The water remains warm enough all through the winter to keep from forming any ice in the open ditch even at temperatures well below zero. Late in the winter, if the temperature falls below ten degrees below zero, there is occasional trouble due to slush ice clogging the grid bars at the head of the penstock which feeds the turbine. This trouble can easily be avoided by laying logs across the ditch about three feet apart. The snow arches across these forming a cover under which no ice will form even during the most severe weather, and the water enters the plant a few degrees above freezing temperature. With this cover over the ditch and proper electrical safeguards in the plant a fully automatic operation can be maintained, and the cost of operators eliminated. The present plant has been run for days at a time without attendance.

The capital cost of establishing such an automatic plant, including the cost of developing the water, sufficient in size to serve all purposes at the mine, will not be high relatively speaking. The idea of automatic operation is entirely feasible. Therefore, combining the low operating cost with a relatively low capital cost and fixed charges assures unusually low over-all cost for power.

AMOUNT OF HYDRO-ELECTRIC POWER. Up to date the total amount of water in the gravel has not been developed and the present plant develops about 180 horsepower at the lowest stage of water, which occurs late in the winter. The present ditch is large enough to accomodate water for 350 horsepower under the head available at the present plant. There is another power site, using the same water, about the same distance from the mine, which is more favorable because a much higher head can be established by means of a longer ditch. At this site at least 1200 horsepower can be

developed. There are other favorable sites at slightly greater distances from the mine, but it is doubtful if more than the 1500 horsepower indicated above will be needed for the first years of operation.

AMOUNT OF POWER REQUIRED. Because of the ease with which the ore can be mined and milled, due to the favorable factors enumerated in former paragraphs herein, it is now known and has been demonstrated by the pilot operations that the power requirements per ton of ore treated will be unusually low. It is estimated that the total requirement for power will not much exceed one horsepower of installed capacity for each ton of capacity in the mill. This amount of power will not only mill the ore but will furnish power for compressed air and other mine uses, and for surface needs, such as lighting, baterry charging, machine-shop, sawmill, etc. This estimate is based on a mill capacity of 300 tons per day or more, of the better grade of ore. If a lower grade of ore and larger tonnage is mined the power requirements per ton will fall below the figure given. After mining is started below the 300 Level the power requirement per ton will increase, because of the extra power that will be needed for pumping, hoisting, etc.

LOW COST POWER ASSURES LOW COST OF PRODUCTION. Too much stress cannot be placed on the the importance of this low cost power which is available. It definitely assures very low costs for the over-all operation and will make available a large tonnage of ore, which, otherwise, could not be treated.

STEAM POWER. The second means which assures cheap power is the presence of thick beds of good coal across the river and about eight miles by road, or six miles by transmission line, from the gold mine. A good raod connects the coal mine with the railroad a d the gold mine, and there is already a transmission line from the coal mine to the present hydro-plant, the gold mine transmission line having been moved to connect the coal mine during the war. This coal is sub-bituminous of low ash content, and it runs about 10,000 BTU's as mined. The beds are flat and the coal can be mined cheaply. Several thousand tons have been mined from there, and the present workings together with some diamond-drilling show the presence of at least 350,000 tons within a short distance of the present tipple. A large stream of water near the coal mine assures plenty of cooling water if a steam-electric plant were to be placed at the coal mine. The capital cost for a steam-electric power plant would be less than the cost of an equivalent increase in the hydro-electric development, but the cost of operation would be a great deal more for the steam plant. Even though the coal is not used for power it assures the gold mine of cheap fuel for cooking, heating, drying, etc., and is a further factor which helps to assure low costs.

300 Level Tunnel. The first work to be undertaken at the mine is to clean out the 300 Level Tunnel, (Main Haulage Tunnel), and complete it to the Golden Zone orebody. It still has 900 feet to go to reach the orebody, and additional lateral work will be required to develop the ore after it is cut. It is estimated that the total amount of work required from the present face to reach the orebody and open it up is at least 2000 feet, and the minimum amount to do do it will be $50,000. The outer 1200 feet of the tunnel is in heavily faulted and broken country, some caving has occurred in it since the mine was closed, and the timbering needs to be renewed. The present face passed beyond this faulted area and is in a firm rock which does not need timbering, and is known by surface inspection and diamnd-drilling to persist throughout the

balance of the distance to the orebody. The rock of the orebody itself drills easily and stands well, and, therefore, no great operating difficulty is expected in completing the tunnel.

After this work on the 500 Level is completed all of the additional milling and power facilities should be constructed, the mine development completed, and production started. It is confidently believed that profitable production can be achieved from the start if the above work is properly financed and completed.

TERMS OF PURCHASE. An option to purchase a controlling interest in the mine can easily be arranged, which will offer the earliest possible return of the new capital needed to bring the mine into production.

CAPITAL NEEDED. It is estimated that a total of $300,000 to $400,000 of new capital is needed to bring the mine into production on a basis of 300 tons per day.

CAPITAL FOR 500 Level. Finishing the 500 Level Tunnel is the first work to be done. Arrangements can be made, under which, if capital is furnished to do this work it will either purchase an equitable interest in the present corporation or a major title to the tunnel itself so that a toll can be charged on each ton of ore and waste extracted through it whenever the mine finally gets into operation. This feature is offered simply to establish an equity in the event that for any reason it were decided by the new investor not to proceed to exercise his full option on the property. It seems certain that the mine will eventually be a profitable producer and that such an equity would eventually return any capital invested to complete the tunnel.

ORGANIZATION. Enough of the original Golden Zone organization is available to get this 500 Level work done at reasonable speed and cost, and to carry on the work beyond that point, if needed.

CONCLUSION. The Golden Zone Mine seems certain to have a long life of profitable operation, with an ultimate production of at least several millions of dollars, and it is believed that it can be brought into production with very little chance of loss if properly financed.

W.E. Dunkle.

W.E.Dunkle.

1035 Bell Street,
Edmonds Washington,
November 1, 1955.

Mr. Charles F. Herbert,
Deputy Commissioner,
Department of Natural Resources,
Box 1691,
Juneau Alaska.

Dear Mr. Herbert:

In looking over some of my papers I found some assay reports from Mayflower No. 1 which joins the Golden Zone on the north.

Sample No 1 was taken from a cut made by a buldozer I had in the area in 1949. Mr. Dufresne made the remark that there was a contact there and it looked like the best he had seen in the whole area. Sample marked No 2 was taken from a shaft 15 feet deep. This shaft is located about 100 feet West of the buldozer cut. The mineralized material taken from this shaft is oxidized and the values pretty well leached out. We were still not in solid ore. The shaft is seven feet wide at bottom and shows a wall on either end. I went down the shaft after the Bureau of Mines men had taken samples and knocked off two pieces which looked solid and not so badly oxidized. Theyare shown ad "Greene No 1 and Greene No 2" on Bureau of Mines report. Sample No 3 was taken from a hole dug four or five feet deep about 100 feet south of the shaft. I believe there is a lead there coming into the dike from the West. I have a small sack of this material here. It looks like the lead in Bryn Mawr creek which Earl Dunkle was working on. Samples marked four and five, I do not remember just where they were taken from but it was somewhere on Mayflower No one. Sample No 6 also taken from a cut on Mayflower No 1.

Am enclosing also an assay report taken in 1927 and given to me by the late Frank Wells when I was in the area with him, but I do not know where he took the samples from. M

Mr. Beckwith wrote me that the cuts were partially full of sand caused by runoff water Etc and that he was unable to locate any values. He should be able to see the buldozer cut also the dump of oxidized material taken from the shaft.

What is needed by anyone investigating the area is a buldozer. The cuts blow full of snow during the winter and remains there most of the summer.

Am attaching a crude sketch of where work was done on Mayflower No 1. The copies of assays may be interesting to someone wishing to investigate the area.

I notice the envelope which contained Mr. Beckwith's letter was marked "Alaska mines and minerals Inc., Red Devil Alaska. Do you know them?

A super cub plane can land on the road opposite our cabin.

Personal regards.

W. H. Greene.

COPY

Anchorage Alaska,
August 31, 1949.

Report of assay

On samples received from W. H. Greene, Curry Alaska.

Assay Number	Marks on sample	Ounces Per Ton Value Gold	Silver	Per ton	Percentage of Lead	Zinc
				Gold		
5346	Sample No 1	3.20	0.54	$112.00	Nil	Nil
5347	Stevens sample	6.52	0.83	228.20	Nil	Nil

Signed

John J. Oshea, Assayer

Note-The above samples taken about ten feet apart from cut made by buldozer.

(3)

Copy

Fairbanks Alaska
Sept 17, 1949

Assays by Art Glover, Fairbanks

Sample No. 2.

Gold	Silver	Lead	Zinc	
0.72	Trace	Trace	Trace	$25.00 App.

Sample No. 3.

Gold	Silver	Lead	Zinc	
0.96	5.16	Trace	11.01 Percent	$59.00 App.

(4) Fairbanks August 22, 1949.

Sample received from W. H. Greene, Curry Alaska

	Gold	Silver	Per ton	Lead	Zinc
15908 No. 1	0.62	1.58	$23.12	Trace	8.49

Gold at $35.00 per ounce
Silver at 90 cents per ounce
Zinc value not calculated

Signed A. E. Glover Assayer College.

A. L. Glover Inc
819 Third Ave Seattle Wash.

Copy

Certificate of assay No. 35572-4 Dec 7, 1938

From Henry Stevens
Marked as below:

No. 1	Gold	0.16	oz. per ton	Value	$5.60
Silver		1.08	"	"	.69
					$6.29
No. 2	Gold	Trace	"	"	.90
Silver		1.40			
No 3.	Gold	0.52	"	"	18.20
Silver		0.58	"	"	0.38
					$18.58

Copy ~~of assay report~~ ~~College Alaska~~
Signed A. L. Glover Inc

Copy of assay report College Alaska
Sept 17, 1949

Assay No	mark on sample	Ounces per ton Gold	Silver	value per ton	Percentage of Lead	Zinc
15994	2	0.72	Trace	$25.20	Trace	Trace
15995	3	0.96	5.16	38.24	Trace	11.10

Lead and zinc values not calculated

Signed A E Glover Assayer

United States Department of the Interior
Bureau of Mines

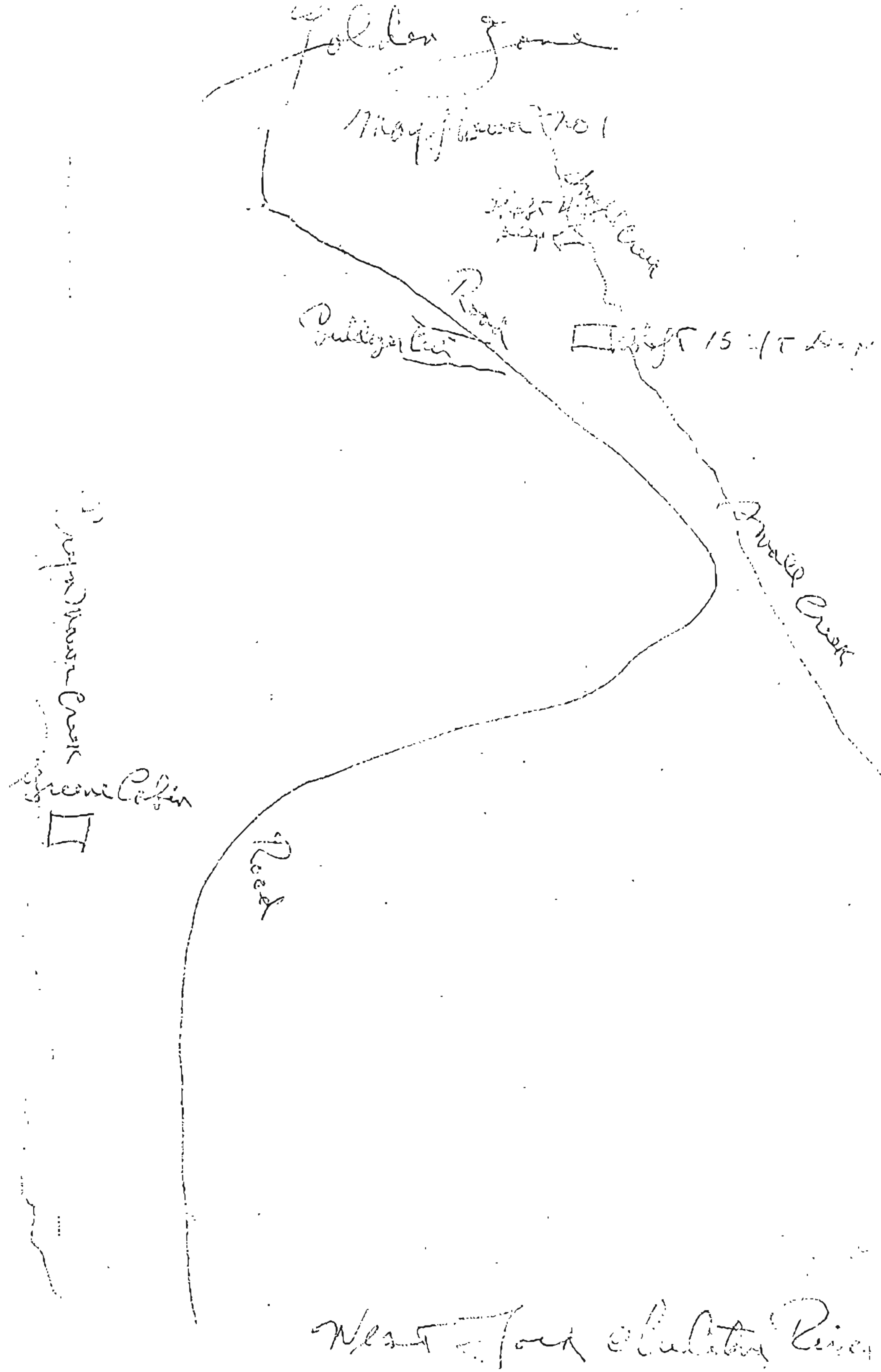
Check samples from Greene's Shaft Mayflower vein Golden Zone area

Report to Mr. J. A. Herdlick August 8, 1951.

Chemical Labratory Report

Lot No	Cu	Au	Ag	Pb	Zn	
509 Serial No J. A. H. -- 1 Width 1.8"	Ø.41	0.02	1.8	0.12	0.1	South side of shaft sulfides
510 Width 2.7"	0.24	0.03	0.8	0.15	0.15	" " " " Oxides
511 Width 3.6"	0.15	0.30	0.3	0.19	0.1	North side or shaft "
509 &510 1 & 1 A combined Width 4.5"	0.31	0.025	1.20	0.13	0.13	From same vein section
406 Rutledge's sample from same place	0.77	0.025	2.20	0.17	0.14	" " " "
Greene No 1 grab of heavy sulfides	5.28	0.040	4.46	1.79	3.58	" " " "
Greene No 2 Oxidized material	2.20	0.080	2.02	5.38	2.24	" " " "

Combined sample is weighted average of 1 and 1 A.


Golden Zone
Mayflower No 1
Road
Road
West Fork Chulitna River

C
O
P
Y

Anchorage, Alaska
October 20, 1938.

THE GOLDEN ZONE MINE.

Construction Progress to Date. Under the plan of development instituted this year a small crew of men started to cut saw-logs for construction lumber, and the first construction work consisted of the erection of the saw-mill, which was put into operation early in July. This mill is driven by hydro-electric power and will cut about eight thousand board feet per day from the small logs available in the district. In the construction of the buildings erected this summer and fall a design has been used which produces a strong and weather-tight building from this rough lumber.

Except for the main mill building and ore bins, which will be erected next summer, all the camp buildings are now constructed or have been brought to a point that will allow their completion by the end of the year. These consist of the saw-mill, bunk-and cookhouse at the sawmill, machine and carpenter shops, warehouse and office building, assay office and laboratory; main bunkhouse main boarding house, three small cottages, and compressor house, locomotive shed and blacksmith shop at the lower tunnel portal.

The high-level ditch, which will bring water from Long Creek for the mill, was nearly completed and can be put into service early next summer. A ditch over two miles long was started along the hillside on the opposite bank of the West Fork River. This will divert water from the West Fork and feed the main hydro-electric plant. It is estimated that it will develop better than 750 horse-power at the minimum stage of the river. The heavy work on this ditch will be completed this fall.

A considerable amount of grading and camp-road work was done and, in addition, our small power shovel was loaned for a short period to the Road Commission, thereby enabling the small road crew at work on the ten-mile road from the railroad to accomplish a large amount of work, and to put that road into passable condition for our logging and freighting trucks.

A large amount of machine tools, mill equipment, electric motors, transformers, etc., were purchased, much of which will not be needed until next year, but the purchases were made in order to take advantage of some very low prices for high class used equipment at Kennecott, Ketchikan, and Seattle.

During the summer a survey was made of the proposed lower tunnel site, and this has been started. The portal is situated about one thousand feet from the head of the mill and at such elevation that the cars will dump directly into the mill bins. The mill, in turn, has more than one hundred feet of head room so that it will be gravity-fed throughout. This tunnel will tap the main orebody at a depth of approximately 325 feet below the present upper workings, or better than 500 feet below the outcrop. It will be eighteen hundred feet long and will follow along the main mineral-bearing zone of the district for more than half that distance. From what is known of the various ore occurrences it seems likely that some ore will be encountered before the Golden Zone shoot is reached, and it is believed that some of these occurrences will be ore of importance.

It is the plan to push this tunnel work during the winter, and to complete it, together with a 400 foot raise to the surface, by next July. Also, during this winter, the finishing of the camp buildings will be done, the main power plant and transmission line extension will be installed, the design and drawings for the mill will be completed, and additional logs cut for lumber for the mill. If this program can be carried out it is expected that milling of ore can commece in about one year from Christmas.

Plan for Additional Financing. In the original plan for development and equipment an application for a fairly large R.F.C. mining loan was contemplated, preceded by a development loan of $20,000. The larger loan could not have been made without the expenditure of the development loan. The only available place to spend the money was in the upper workings in ore which will eventually be extracted by surface methods. Such development work would serve no useful purpose of ore-extraction and, hence, would be wasted. It was, therefore, decided during the summer not to apply for any loan at this time but to raise additional money by stock sales and drive the lower tunnel into the better ore which has been indicated below the upper workings by diamond drilling. This tunnel will serve not only to extract the ore below the upper workings but will constitute the haulage-way for all the ore to be mined by surface methods, which ore will be mined directly into the branches of the raise that will be driven from the tunnel face.

The tunnel will thus serve the twofold purpose of creating a haulage-way for many years of mining and will also put in sight for examination the ore developed last year by diamond drilling. With this ore in sight, and the construction and development so far advanced, an application can be made for a mining loan without the preliminary step of a development loan. The amount of money needed for completion will be much less, and it is believed that an application made then will be accepted.

To carry out the above program and to purchase additional equipment, which we shall need, from Kennecott at the low prices to

be had there at present, will require approximately $60,000 over what has been subscribed to date. This would be used in the proportions of $15,000 for equipment and $5,000 per month during the next nine months for labor and supplies.

To raise this amount of money it is proposed to sell an additional 150,000 shares at 40¢ per share. Of this amount 15¢ per share should be paid now, 10¢ per share on January 1st, and 15¢ per share on April 1st. If this amount is sold the stock will then be held in the following proportions:

Labor Stock	150,000
Subscription Stock	300,000
A. O. Wells	150,000
W. E. Dunkle	400,000

Description of the Ore. For the benefit of those subscribers who are not familiar with the ore the following brief description will be of interest:

Though a small proportion of the gold is 'free' the ore is essentially base, most of the gold being closely associated with the sulphide minerals arsenopyrite, pyrite, and chalcopyrite. In addition to its gold content the ore contains small amounts of copper and silver, Though the copper-silver content is small it is of importance because approximately seventy-five percent of the total amount of these metals is recovered in a shipping concentrate, which in turn contains about sixty percent of the total gold, and there is enough copper and silver in it to pay transportation and smelting charges on this concentrate.

Milling will consist of first making a rough concentrate by means of jigs. This concentrate will be ground and further concentrated, and divided by flotation into two concentrates, first, the copper concentrate mentioned above, which will be shipped to the Tacoma Smelter, and second, an arsenopyrite concentrate which must be more finely ground and treated with cyanide, resulting in a final gold bullion at the mine.

The orebody consists of a 'pipe' of brecciated porphyry containing masses and stringers of the gold-bearing sulphides mentioned above. The known dimensions of the mineralized porphyry are, roughly, three hundred by five hundred feet in horizontal section, the dip of the ore is vertical, and it has been developed by underground workings on two levels to a depth of two hundred feet below the outcrop, and by diamond drilling to further depth of three hundred feet below the workings, making a total depth below the outcrop of five hundred feet that is known.

From various geological considerations one would expect the intensity of mineralization to increase considerably with depth. Development has proven to be the case and, compared with the ore to be found in the upper workings, diamond drill holes show approximately double the gold content per foot of depth in the ground below. The gold-bearing sulphides do not contain more gold per ton of mineral but apparently there is at least twice the amount of mineral per ton of rock.

The ore above the present workings will be considered first. It occurs in two general grades, or amount of contained gold. The main mass contains about $2.50 per ton in gold, the mineral occurring in zones so that by selective mining a mill feed of better than $4.00 per ton can be obtained. Enclosed in the main mass are two large shoots of higher grade ore which will assay $10.00 per ton in gold and can be mined separately from the low grade. This upper two hundred feet can by mined by power shovel from the surface at a very low cost, estimated to be less than 50¢ per ton, delivered at the mill. This includes the high grade as well as the low grade for that section. The balance of the ore must be mined by underground methods, but can be reached by tunnels to a depth of fifteen hundred feet below the outcrop. Based on geological observations the indications are that the ore will persist to that depth and ~~xxxxxxxxxxxxxxxxxxxxxxxxxxx~~ more.

The ore outcrops as a small hill, which is bare of vegetation and overburden, so that a fairly complete section of it can be seen on the surface, and it has been further exposed by surface trenching. There are two tunnel levels in the hill, one at 100 feet and the other approximately 200 feet below the outcrop. These tunnels comprise a total of close to 2000 feet of underground workings. Branching out from these and extending to a depth of three hundred feet below them, diamond drilling has been done to a total amount of approximately five thousand feet. Several hundred samples taken from the surface, the workings, and the drill holes form the basis for estimating the value of the ore.

The amount of low grade which will eventually be mined from the surface is at least one million tons, and it is estimated that a much larger tonnage than this can be mined later by underground methods at low cost.

Surface mining will produce approximately 100,000 tons of the high grade, and there is indicated at least 225,000 tons between the upper workings and the mill tunnel, making a total of 325,000 tons, assaying better than $10.00 per ton in gold above the mill tunnel, the tunnel which has been started this fall.

The capacity of the high grade mill will be 150 tons per day. This will serve to treat the mine run of high

grade ore, and the rough concentrate from the low-grade plant, which will have a capacity of 750 tons per day, during the summer of the low grade mentioned above. The high grade mill can be operated the year 'round, on concentrate from the low-grade plant during the summer, and on high grade mine run during the winter.

It is estimated that the total operating cost for mining and milling the high grade will not exceed $4.00 per ton, to which must be added a further $2.00 per ton for taxes, insurance, tailing loss, etc., making a total cost of $6.00 per ton and a profit of $4.00 per ton, or $200,000 per year. Discounting this by $50,000 per year for depreciation and reserves to prepare for surface mining leaves $150,000 per year for distribution, or 15¢ per share on a million shares of stock. There is enough high grade above the mill tunnel to produce at this rate for close to seven years.

The million tons of low grade to be mined by surface methods can be separated by mining so as to produce better than 500,000 tons of ore that will give a recovery of $3.75 in gold per ton. At a production rate of 750 tons per day, the total cost of mining, milling, and taxes should not exceed $1.75 per ton, which leaves a distribution profit of $2.00 per ton. On the basis of 90,000 tons treated per season this will show $180,000 profit, or better than 15¢ per share per year for five or six years.

The above estimates show a life for the mine of at least twelve years at the above rate of profit, and there is a reasonable assurance of much larger ore reserves than are indicated by the above figures. In my opinion the mine will last at least for thirty years at the proposed rates of production.

At present there are thirty-eight men employed, and this number will be maintained until the mine is in production, when it will be necessary to increase the force to a total of sixty. The men who will bring the mine to production are working under an agreement whereby more than one-half of their wages will build up as a credit to entitle them to share pro-rata in the 150,000 share of stock which is being held in reserve for that purpose. This arrangement is a pleasant and profitable one both for the company and for the men.

Respectfully submitted,

(Signed) W. E. Dunkle

MR

TERRITORY OF ALASKA

DEPARTMENT OF MINES

JUNEAU, ALASKA

THE GOLDEN ZONE PROPERTY.

Examined by J. G. Shepard,
U. S. Geological Survey
and Associate Engineer,
Department of Mines,
Territory of Alaska.
July 1925.

The Golden Zone, otherwise known as the Wells Brothers Property, is situated at the head of Bryn Mawr Creek, a tributary of the West fork of the Chulitna River. A good horse trail has been made from Colorado Station, on the Alaska Railroad, to the West fork of the Chulitna, near the mouth of Colorado Creek. At this point the River is forded and the horse trail continues to the prospect. Distance from Colorado to the River is 6 miles. From the south bank to the prospect is 3 miles, the last 2 being fairly steep.

The deposit is conspicuous by the reddish appearance of the knoll which forms it. This knoll is composed of altered acidic rocks of a granitic and porphyritic type. The ore bodies lie in, or are adjacent to, this area.

Mineralization occurs both as massive and disseminated sulphides. The predominant mineral being arsenopyrite. The main mineralized area is about 120 feet wide. A 7 foot streak on the west side is clean arsenopyrite, the remainder veinlets and disseminated sulphides. Intervaled trenching has been done on the surface and 225 feet of tunnel work driven into the area from Bryn Mawr Creek gulch. On the east side of the gulch, a 4 foot vein of massive arsenopyrite mounts the hill at an angle of 30 degrees. This vein has been trenched for 750 feet and is constant in width and character throughout the exposure.

Sample returns show commercial values and a large tonnage could be developed. Further investigation is warranted.