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REPORT

ON

BIG HURRAH QUARTZ MINE

CAPE NOME MINING DISTRICT

SEWARD PENINSULA

ALASKA

By

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NOTE: All values in this report are based on gold at $35.00 per ounce.

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REPORT ON BIG HURRAH MINE
CAPE NOME MINING DISTRICT
SOLOMON, ALASKA

By: James M. Orr

SUMMARY AND CONCLUSIONS

1. The Big Hurrah Mine has merit. It is worthy of further exploration and development.

2. The reports of J. L. Fozard and J. M. Williams, the last two engineers to operate the mine and see the lower levels, are substantially correct and the property was found to be as represented by them.

3. There are operating difficulties due to climate and remote location, but these difficulties can be overcome by good management.

4. Important questions regarding present day casts of operation and grade of ore can only be answered by actual operating experience at the property. However, in my opinion, and as an estimate the operation should yield a profit of from $5.00 to $10.00 per ton milled.

5. Overall the chances for success are good. To reduce it to odds: I would say that with good management the Big Hurrah Mine has at least a 50-50 chance of being an important and profitable gold producer and that the chances are at least 70-30 of recovering the original investment.

INTRODUCTION

The Big Hurrah Mine was a successful producer up until 1907 when it got into legal difficulties and was shut down by the United States marshall. Since that time the property has never been operated other than by some superficial surface work and various kinds of high-grading. In 1949 Mr. T. P. Lane was finally able to get a clear title and a workable agreement from the Lane Investment Company, the owners of the property.

He and Mr. Sherwood Owens then undertook to rehabilitate the mine and place it in operation once again. After checking the tailings, old reports and that part of the old mine that was accessible they built a cyanide plant to retreat the tailings and decided to go ahead with the unwatering of the mine with the objective of again putting it into production. They were able to secure the additional finances required to rehabilitate the shaft and to unwater the mine in Portland and that program was undertaken this summer. The proposal was that after the mine was unwatered an examination would be made and the decision made at that time as to whether the parties should go ahead with the development of the property or whether to treat the operation as a salvage job and try to recover the cost of pumping.

With this in mind I was engaged to visit the property in order to determine insofar as time and money permitted the facts in the case and to see if it was practical to operate the Big Hurrah Mine at this time.

LOCATION OF PROPERTY

The location of the mine on Seward Peninsula, Alaska is as shown on the location maps in the back cover packs. The Big Hurrah Mine is located on Big Hurrah Creek at its confluence with Little Hurrah Creek. The property lies at an elevation of about 250 feet and is some 12 miles inland from the little Eskimo village of Solomon. Solomon in turn is some 30 miles down the coast from Nome, the largest and principal city of western Alaska. Nome is actually almost as far west as Midway Island, and is the principal center for trade and commerce in the area. It is a city of some two thousand people and contains stores, a bank, regional territorial government offices, a hospital, tractor and truck distributors, etc.

Fig. 1. Mine truck boarding Ferry on way to Nome.

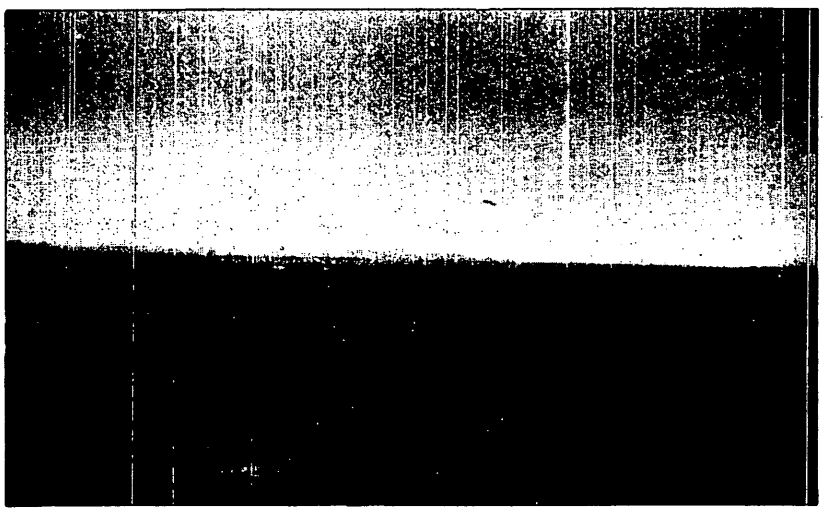


Fig. 2. Port Safety Ferry aground. This happens whenever a gale blows in.

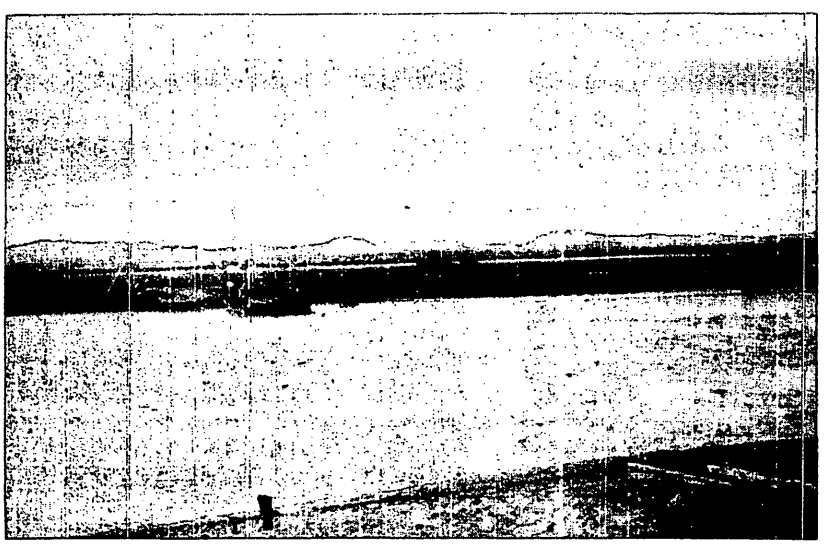


Fig. 3. Solomon Ferry, on road from Nome to mine. Village of Solomon in midground. Big Hurrah Mine is located in mountains in background.

TITLE

The Big Hurrah Mine consists of the following patented mining claims, Patent No. 298715, patented to Anna G. Lane, November 1, 1912, and recorded on January 4, 1913, in Book 191, Page 408 of the Cape Nome Recording District, Alaska:

King Solomon	King Solomon 1
October Fraction	King Solomon 2
Sour Dough	King Solomon 3
Quena	King Solomon 4
July Fraction	King Solomon 5
Potaquba Fraction	King Solomon 6
Dewey	Josephine
Elmer S.	

On May 28, 1908, the claims were conveyed by deed to Lane Investment Company, a California corporation. Continuously since, this corporation has been the owner of the claims. In 1936, a decree was entered, terminating litigation, and quieting title to the mine in the Lane Investment Company.

On November 4, 1949 the Lane Investment Company granted a lease to Travis P. Lane which was subsequently modified on November 29, 1950 to grant an option to purchase the mine to Travis P. Lane. The modified agreement of November 29, 1950 grants an option to purchase the mine for $35,000.00. It provides, ". . . the right and option to purchase. . . on or before ten years from date of this agreement, the amount of all royalties theretofore paid. . . to be credited on the purchase price of $35,000.00. . . ." On July 31, 1950, Travis P. Lane assigned to Sherwood B. Owens fifty-five percent of his interest in the lease and option. In 1953 when all of the right, title, and interest to said lease and option were assigned to Alaskan Associates, Ltd., a limited partnership organized under the laws of the Territory of Alaska, there was a

balance of $32,955.15 on account of the lease and option payable at ten percent of the net returns from the mine on or before November 29, 1960.

Mr. Sherwood B. Owens made a personal examination of the records at Nome this fall. He found that the taxes were paid and the title to the property was in good order. He has had competent lawyers pass on the title and has personally warranted the validity of the title to Alaskan Associates, Ltd.

HISTORY

The history of the Big Hurrah Mine is pretty well covered in the reports following and I refer you to them.

GEOGRAPHY

The area in general is one of low relief with the land gradually rising to the east and north from a wide coastal plain and tidal marshes at the delta of the Solomon River. The area around the Big Hurrah Mine is of low relief with gently rolling hills. Mine property and buildings set on a low ridge bounded by Big Hurrah Creek to the north and Little Hurrah Creek to the east, with the ridge gradually rising to the southeast to Uncle Sam Mountain.

Vegetation of the area is typical of the tundra of the north, that is, the surface is covered with muskeg, a combination of small brush, heather, water and mud. This covering is from six inches to a foot deep and lies on top of a permanent layer of frozen ground called the permafrost. There are no trees as known in Oregon except for occasional clumps of stunted willow. This means, of course, that all timber for fuel and mine use must be imported.

The climate is typical of the Arctic; a pleasant short summer and a long cold winter.

There is ample water in the area for all forseeable uses. In fact

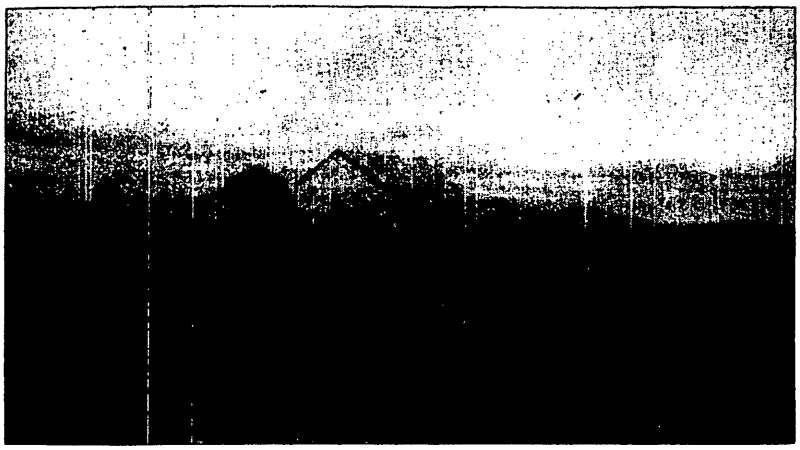


Fig. 4. Lomen Warehouse at Port Solomon which may be used to store supplies that are lightered to here from ships.

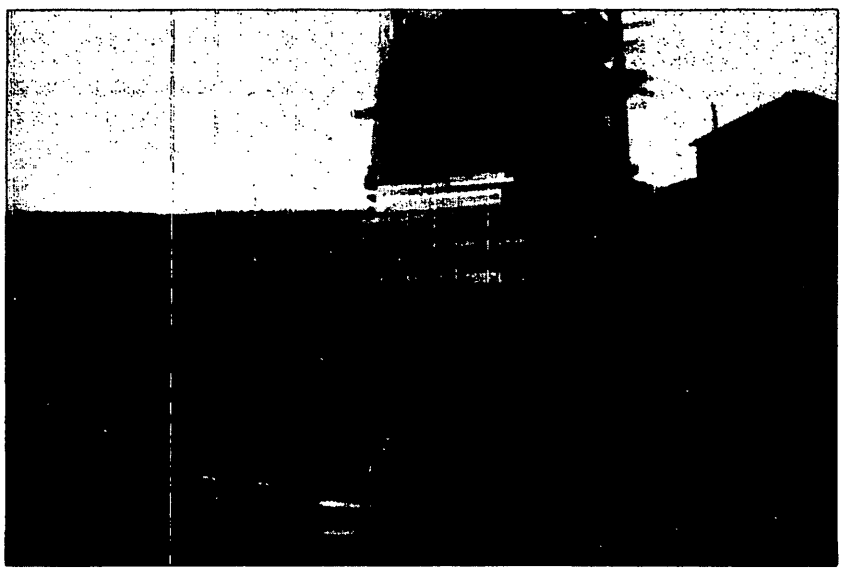


Fig. 5. Shaft House and Cook House with Mill Building in background.

Fig. 6. Mine crew in Cook House. Haircut time.

the mine seems to be making enough water, up to 200 g.p.m., to supply the camp from this source. There are apparently no good hydroelectric sites in the immediate area so that it will be necessary to depend on imported fuel for power. Nome has a municipal electric power plant which generates its power by means of diesel engines, but they have little or no power for sale, and are located some 45 miles away.

GEOLOGY

The geology of the district has been described in U. S. G. S. Bulletins No. 328 and 433. A reproduction of pertinent parts of the reports and a copy of the Geologic Map is included with this report. In brief, mineralization occurs in true fissure veins within a black slate. The black slate is one of the major formations of the area and consists of a hard black metamorphosed and graphitized shale. During metamorphism the slate has been subject to considerable movement resulting in much fracturing of the beds. The fractures were later healed by quartz or silica bearing solutions which permeated the area, silicifying the slate and healing the fractures to form some comparatively large veins (the ore bodies) and many small quartz stringers. No doubt this fracturing and healing process reoccurred many times, giving rise to the ribbon structure in the veins and to successive generations of mineralization. Sometimes the invading solutions would be gold bearing and sometimes not, giving rise to ore shoots or hot spots within the quartz veins themselves. The slate beds are what is known as competant, that is, they are able to fracture, not deform and thus leaving channels for mineral bearing solutions. The fractures forming the veins are strong and persistent and could be expected to continue to considerable depth. That is,

they should go deep within the slate and it is probable that the slate formation has considerable depth or thickness in the area.

To the southeast, the country rock changes to a greenstone schist which is not so favorable to mineralization and the fractures or veins do not seem to carry values in this formation. Thus to the southeast toward Uncle Sam Mountain the length of the ore-body will probably be limited to the slate.

The principal ore bodies occur in a mineralized zone, several hundred feet width, tending southeast and northwest with steep dips to the northwest. The slate continues to the northwest and it is probable that mineralized zone continues in that direction also, although to date nothing has been found to the west as rich or as persistent as at the mine site. On the hill across Little Hurrah Creek in an area known as the Dewey Cut there has been considerable open cut work done and some veins and stringers have been exposed. While these have not been traced continuously back to the main or No. 1 vein at the shaft, nevertheless they are on the same mineralized zone and do indicate that the mineralization persists at least that far. Only one of the samples I took in this area could be considered ore, and it ran 0.22 oz/Au or $7.70 across a 3.0 width. However T. P. Lane on another occasion when the cuts were more open took samples in the area that ran $30.80 across 26" and $39.20 across 54", adding support to the evidence that the mineralization persists to west. Underground the ore bodies are found to rake to the west at about 45°, again indicating that the western zone will produce commercial ore.

Within this broad mineralized zone (see Fig. 24) five veins have been mined. Four of these veins strike northwesterly and southeasterly

Fig. 7. New diesel generator in its shed near the shaft house.

Fig. 8. Pumps in shaft unwatering the 250' level.

Fig. 9. Sherwood Owens, Port Safety Ferry man and granddaughter.

Fig. 10. Dan Jones, Alaskan Territorial Engineer to whom thanks are due for being most cooperative during the examination.

and dip approximately 50 degrees to the southwest. The fifth vein, known as the North Vein, has approximately the same strike but dips at 60 degrees to the northeast.

SAMPLING

A list of samples taken is included in the appendix. As you know, no sample map was available for the old workings, and it was necessary to do much of the work blind. That is, one did not know what was ~~rock~~ ore and what was not. It had been reported that a lot of the values went into the slate. Consequently it was necessary to take a number of hanging-wall and footwall samples to confirm or deny this statement. In general, it was found that the values persisted within the vein and were in the quartz.

Samples were taken by myself and Sherwood Owens and/or Travis Lane and/or V.C. McCutchan. They were taken as channel samples across the width of vein or wall rock sampled. The full sample was gathered in a power box, transferred to sample sacks and shipped to Portland, where they were crushed, ground and quartered at the laboratory, then assayed for gold and silver by the standard fire assaying methods. The rejects from quartering the samples were saved and are on file for further analysis or checking if necessary. To check the assaying a number of the duplicate samples were sent to Abbot A. Hanks Company, San Francisco, for assay. Results from both the Pittsburgh Testing Laboratories and Abbot A. Hanks Company are included in the list of samples at the back of this report. In general, the Abbot A. Hanks assays run somewhat higher than those of Pittsburgh Testing Laboratories. However, I personally supervised and checked a number of the Pittsburgh Testing Laboratory assays, and am inclined to use their results. Their results are plotted

on my assay maps inclosed in the back pocket. It will, of course, be necessary to take many more samples in order to have a complete, clear picture as to where the values lie in the mine. Enough is known, however, to substantiate the potential ore reported in the Fozard report.

MINERALIZATION AND METALLURGY

The mineralization of the ore bodies is comparatively simple. The values are in free gold, ranging from marginal and submarginal to ore bodies rich enough to be called specimen or jewelry ore. The average ore, however, is a massive white ribbon quartz or a mixture of quartz and slate. Within this quartz gangue there are minute pieces of free gold which are so fine as to be invisible to the eye, although the rock may contain values of several hundred dollars per ton. This gold may be recovered by grinding and gravity concentration or by amalgamating with mercury. Gold that is too fine-grained or too much coated to be recovered by these means may be recovered by dissolving or leaching it with cyanide solutions. Thus fairly simple and straightforward metallurgical processes should recover from 85 to 90 percent of the gold values present.

A study was made to determine how much tungsten as the mineral scheelite (WO_3) was present. By studying the dumps and the faces underground at night with an ultra-violet mineralite, it was determined that there are appreciable amounts of scheelite in the ore bodies. As an estimate I would say we can expect about .10 WO_3. The scheelite is present in fairly large masses, pieces up to the size of a pea are common, so that it may be said to be granular rather than colloidal? in nature. At other mines material of similar nature has been successfully recovered. Metallurgical tests should be run to determine the most feasible method of

Fig. 11. Collar of shaft, part of shaft house and Roberts' open cut. Original surface of ground is indicated by position of old hoisting engine.

Fig. 12. Pump on surface ready to be lowered into shaft.

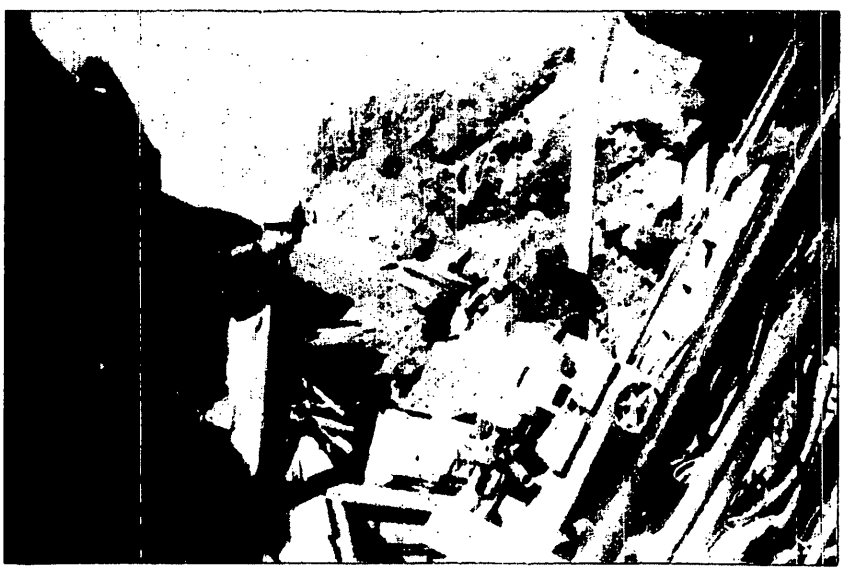


Fig. 13. Pump being lowered into shaft. Note big cut made by Roberts.

recovery and what percent recovery will result. It is possible that the present mill may readily recover the scheelite on the Wilfley concentrating tables incorporated in the flow sheet. However, it still remains to be proven what percent of the tungsten will be recovered. The government price for tungsten is still, and will be until 1958, $63.00 per unit of 20 pounds (see U. S. G. S. Circular 35950 on "Occurrences of Scheelite in the Seward Peninsula," by Robert E. Coasts, July, 1943). That figures as $6.30 per ton for tungsten in the ore, assuming it averages 0.10 percent WO_3 and that recovery is 100 percent. In my opinion a more realistic and conservative estimate would be to assume that we would not recover over $3.00 per ton milled.

RESERVES

It is difficult at this time to point to more than a small tonnage of proven ore. Yet there is good reason to believe and I am confident that, future mining will prove the existence of large tonnages of commercial ore at the Big Hurrah Mine.

As Mr. J. L. Fozard, the last mine superintendent in 1907, has said in his report, "The property has ever suffered from lack of that work" (development). The mine is as he left it, that is, most of the readily available ore has been mined with little provision for development of future reserves. That does not mean that more ore cannot be developed. To the contrary, there are now several virgin ore bodies disclosed that are awaiting development and several favorable areas awaiting exploration. For example:

1. On surface the North Vein is strong and well defined. In the past it has produced some of the richest sections of ore found in the mine and when sampled in the open cut by the bunkhouse ran $22.40 in gold over 2.0 feet. Yet this vein has only been worked by a 160 foot adit drift from the creek and by a short drift on the bottom of the 125 foot deep shaft. Both these workings are now inaccessible but the vein would seem to be only scratched, not exhausted.

2. On surface the Dewey Cut area to the northwest has produced some milling ore but the maximum depth reached was only 25 feet, certainly not enough to exhaust the possibilities of that area.

3. 72 foot sub-level: Some good ore is exposed here in the Roberts drifts from the shaft. Between here and the 150 foot level there is a considerable block of ground still open for development on both the "Shaft" vein and "No. 1" vein (see assay maps).

4. 150 foot level:

   a. In the west drift a crosscut beyond the cave has opened a promising parallel vein now developed by only 20 feet of drifting.

   b. The Shaft vein is marginal here but above, where exposed, in 72 foot sub-level it makes commercial ore.

   c. Except for an x-cut to look for the N-vein and the x-cut mentioned, virtually no exploration has been done on this level for parallel veins or stringers.

5. 250 foot level:

   a. The last work done on this level was to drive a short crosscut into the hangingwall from the east drift. A mineralized quartz vein was intersected that additional drifting will probably prove to be the true "Main" vein in the east end.

   b. In West drift the Main vein continues strong. Just above the level here the "Big Stope" shows mining widths of up to 40 feet and there is still commercial ore showing on both stope faces.

   c. Above the East drift a rich ore shoot is indicated between the 150 foot and 250 foot levels. As soon as the old stopes can be entered to delimit its downward extension this ore may be considered as proven.

   d. As on the 150 foot level, little exploration has been done for parallel veins.

6. Below 250 foot level:

The veins are as strong or stronger in both value and width on the lowest level as on the levels above and it is to be expected that they will persist to a considerably greater depth.

To summarize: There is enough proven ore in sight to start the mill and keep it supplied for several months. If an energetic development and exploration program is initiated at the same time it will be possible to develop new ore bodies and reserves at a faster rate than the ore in sight is milled.

Fig. 14. Travis Lane at 150' level station.

Fig. 15. Station on 150' level as it looked after 47 years under water.

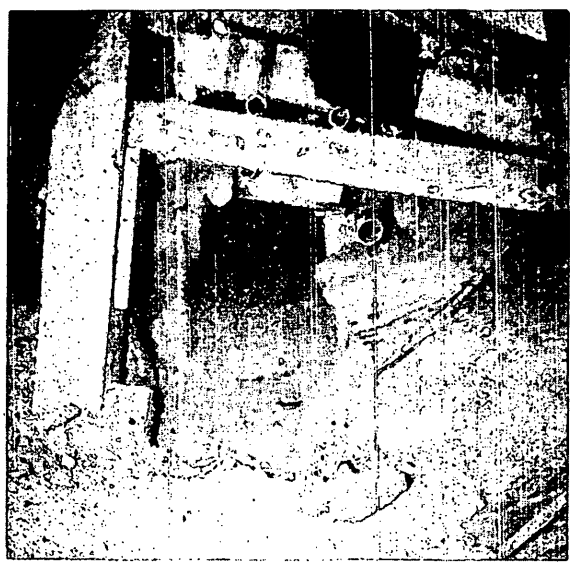


Fig. 16. Cave-in that blocked off N. W. end of 150' level.

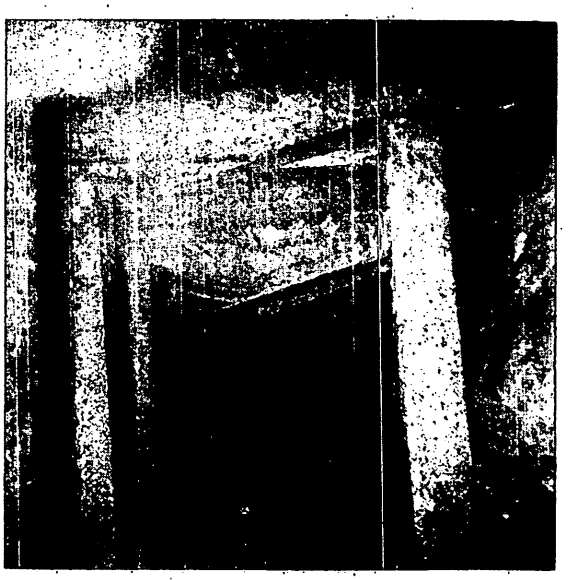


Fig. 17. Stope set on 150' level. Note the stope width of about 15 feet.

PRESENT EQUIPMENT

The present equipment at the mine along with what was purchased is enough to start a small operation of 40 tons per day. There is a three-compartment shaft extending to the 250 foot level with a 30 foot sump below and at present two workable levels from this shaft. The shaft and levels are in pretty fair shape and should not give too much trouble. An excellent job of spilling was done this summer to catch up and to carry the shaft through the caved ground Roberts had bulldozed in the old shaft collar (Figs. 11, 12 and 13). It was necessary to reduce the size of the shaft to two compartments for some 30 feet through this mess, but above the caved ground the shaft will be continued with three compartments to the head frame. The head frame was in usable shape but will have to be rebraced and enclosed. The hoist is in poor condition and must be reworked and equipped with a new engine.

For a list of equipment at the mine I would refer you to the inventory at the back of the T. P. Lane report. The equipment listed there is still present at the mine, although most of it is in sad repair and will not be usable for too long. It is questionable whether the truck and dozer will last another season without a substantial sum spent for repairs. There is in addition the equipment we have bought since the Alaska Associates took over the operation. The principal items bought are to be listed in an accountant's report and include: a diesel electric generating set, a 550 c.f.m. Caterpillar diesel compressor, a new hoist engine, a two-drum slusher hoist, a skip, mine cars and a long list of supplies.

The mill equipment is usable for a short time but it is old-fashioned and out of date, as it was in operation in 1907. It is hoped, however, that

it will serve its purpose long enough to enable us to rehabilitate the mine, get a backlog of experience in mining and treating the ore, and carry out a development program. The mill building itself is sound and can be made usable at a cost of $2,000.00.

To summarize, there is a nominal mine and mill plant at the property, but it must be realized that it is old and out of date and at best can give but a few years service.

COST OF LABOR AND SUPPLIES

The cost of labor and supplies are going to be one of the most important factors governing the cost of mining and milling and hence the success of this property. I am satisfied there is ore there and some rich ore, but it is difficult at this time to say just what will be the cost of recovering it. Nome is remote and it is difficult to attract and hold good men; they come to make a stake and then drift on. There is, however, a good supply of native labor available that it may be possible to train into good miners and helpers. During the period of examination it was necessary to bring two experienced shaft men from Arizona to do the actual mining work. These men were skilled miners and did an excellent job, but their rate of pay was high, $3.50 per hour plus overtime. As a steady diet this type of labor would probably make labor costs prohibitively high unless some contract rate per ton was worked out for them. On the other hand, because so much of the work around Nome is seasonal, you may be able to attract local men from other jobs in the area to work at the Big Hurrah. They might not be getting quite as much per hour but they could depend on a year-around job and would probably stick if the mine were in continuous operation. Most of them are unskilled but are willing workers and could

Fig. 18. Cave-in on 250' level. Stope above is 16 feet wide.

Fig. 19. Quartz vein in Big Stope. 250' level.

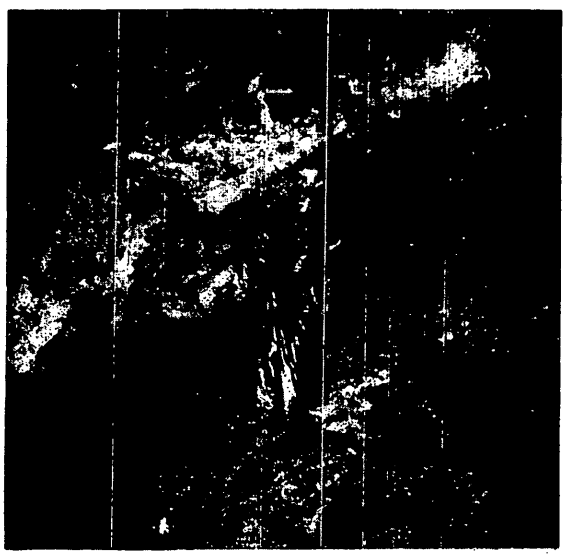


Fig. 20. Red McCutchisen in Big Stope on 250' level N. W.

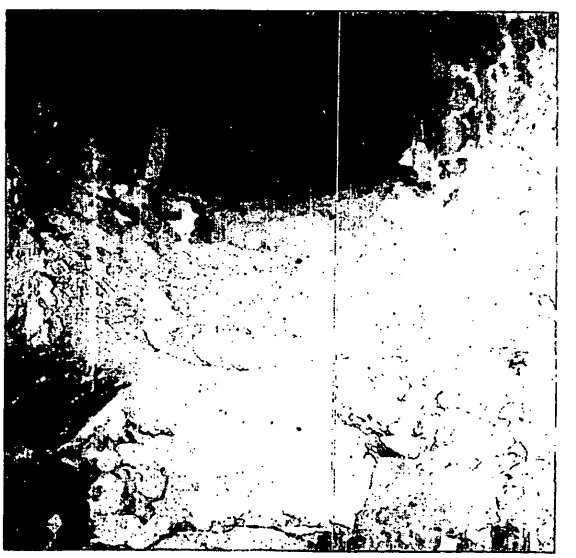


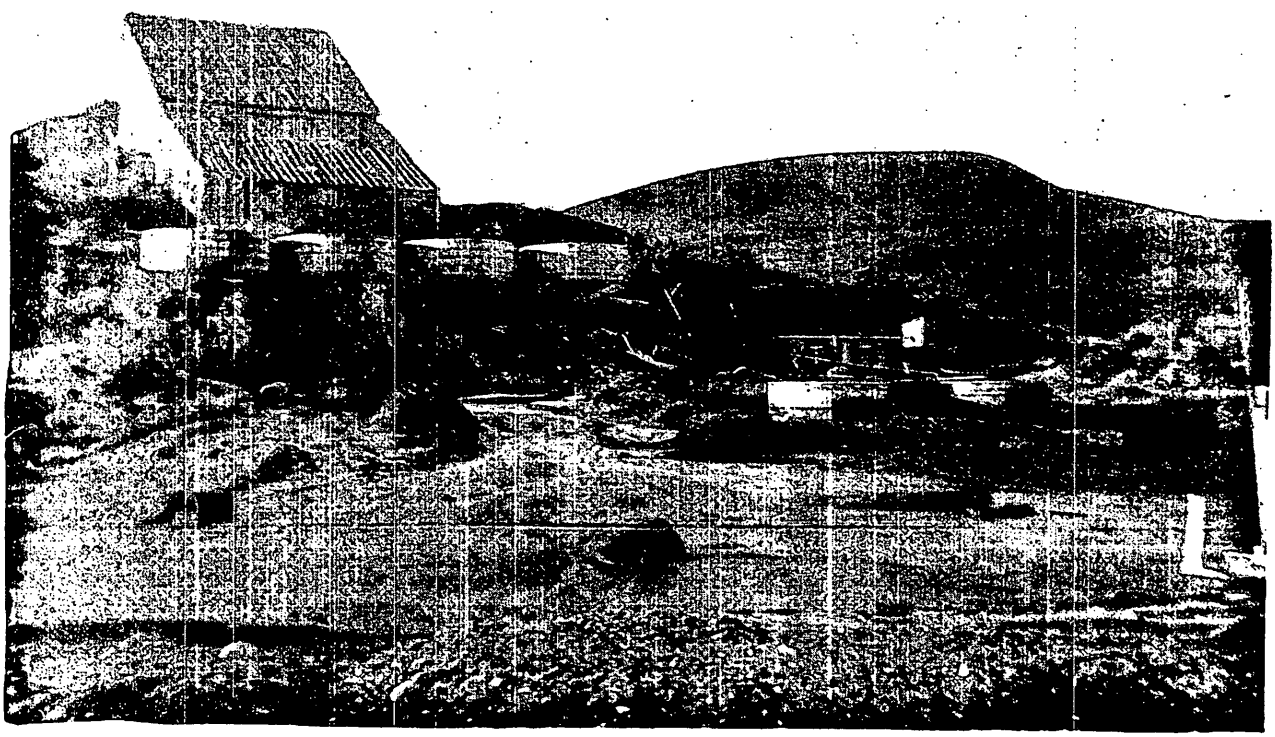
Fig. 21. Looking up into stope between 250' and 150' levels.

be trained at some sort of school for miners and millmen at the property. Several of the placer operations in the area have trained Eskimos to take over almost every job and under proper supervision and training they have proved to be competent and worth their $2.00 per hour. One thing we can be sure of, and that is that labor will be a major problem, and the success of the operation depends on its successful solution.

The cost of supplies at the property is capable of more accurate estimation. Roughly, it is the cost of supplies at Seattle, plus freight, plus lighterage, plus $5.00 per ton. There must be added to this, as well, a small percentage for spoilage and losses. In addition, most careful long range planning and the maintenance of large inventories will be necessary. Even so, it is almost impossible to think of everything that will be needed between September and the next July. This will mean that some supplies will have to be flown in from the United States, a costly operation: 28¢ per pound to Nome and another 5 or 10¢ per pound to the Big Hurrah. Nevertheless, I do not consider this problem as insurmountable. I think that with continuous operation the cost of supplies will not be excessive and in fact will probably be less than that of many remote mines in the United States.

It has proved impractical to build ship docks at Nome strong enough to withstand the moving ice in Bering Sea. Consequently, the town has no ocean docks as such but during five months of the year steamships anchor off shore and are unloaded by lighters. Lomen Commercial Company have established a very efficient lightering service and are able to handle cargo of all kinds from the ships to the beach at Nome. This service is expensive and adds appreciably to the cost of freight. The

BIG HURRAH QUARTZ MINE
(Solomon, Alaska)



CYANIDE PLANT INSTALLED NEW BY LANE & OWENS.
MILL BUILDING IN BACKGROUND.

charges at present add some 40 percent to the freight bill from Seattle to Nome. Oil is handled in bulk by tankers and is stored in large tanks at Nome where ample supplies are kept on hand.

TRANSPORTATION

The road from Nome to Solomon corresponds to a good county road in Oregon. It follows the shore of Seward Peninsula east from Nome, gradually working inland then back to Cape Nome, which it crosses at an elevation of some hundred feet above the sea before going down to the beach again by the old radio relay station. Beyond Cape Nome the road runs along a coastal sand bar and is in good repair, level and straight. It is exposed to the full force of gales from the north and west and in the winter is often blocked by blizzards. At Port Safety the first ferry is reached, and all trucks and cars must be ferried across the Port Safety Inlet, a distance of some 1000 feet. This normally offers no undue obstacle, except it is apt to take as much as half an hour if the ferry happens to be on the other side. When a strong wind blows it forces the water out of the inlet and causes the ferry to run aground so that it cannot land (see Figs. 1, 2 and 3). If this happens the mine may be cut off from communication with Nome for a week or more. From the Port Safety ferry the road runs along the beach for some eight miles to Solomon where it again ferries and turns inland toward the mountains. Solomon is a small village of some 50 people, Pete Curran's Trading Post, an Eskimo school and a good landing strip.

Beyond Solomon the road is more primitive, rough, and is often poorly maintained. It runs up the Solomon River and over the divide to the Casadepaga Valley and Council District. The road to the mine turns

BIG HURRAH QUARTZ MINE
(Solomon, Alaska)

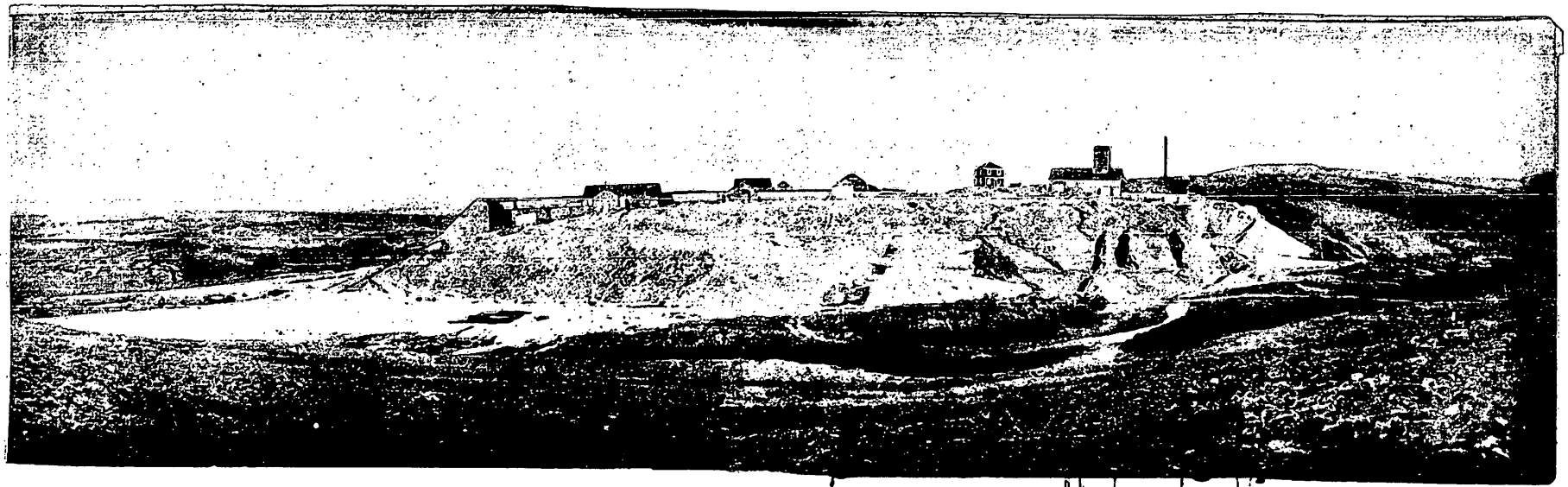
THIS PHOTOGRAPH WAS MADE BY MR. DANIEL A. JONES, ALASKAN TERRITORIAL ENGINEER, IN JUNE, 1950 - MR. T.P.LANE IN FOREGROUND. THIS SHOWS THE BUILDINGS PRESENTLY ON THE PROPERTY.

off this county road and follows the bed of Big Hurrah Creek to its confluence with Little Hurrah Creek. In the past it has been in bad repair and sometimes impassable. The Territory of Alaska, however, has had a Cat working on it most of the summer and it is now much improved. In fact, the road is said to be better than it has ever been. There are still several fords which force trucks to cross and recross Big Hurrah Creek, which in the spring and in the fall, and sometimes during the winter, and make it very difficult for a truck to get by.

For quite some time there has been talk of building a new "high" road from Nome to the Council District. This would cut inland from the beach near Nome and avoid the two ferries mentioned. No doubt at some future date such a road will be built but it ~~now~~ has been talked about for over 40 years and still seems to be only in the talking stage. For the present the mine would have to depend upon the highways presently available.

An attractive alternative to unloading at Nome and trucking to the mine would be to lighter from freighters anchored off Solomon. That is what we were able to do with the cargo this fall, and can probably do in the future if shipments are large. In this way it will be possible to avoid a 30-mile haul from Nome, although the cost of freight from Seattle to Solomon will be the same as freight to Nome and the lighterage charge somewhat more. Another possible economy would be to handle our oil in bulk by unloading from tankers into a large bulk storage tank at Solomon. Lomen Commercial Company were kind enough to offer us the use of their large warehouse at Solomon for storing supplies. It may also be possible to arrange with the Lee Brothers, who operate dredges on the Solomon River, to use their oil storage tank. With proper equipment, it

BIG HURRAH QUARTZ MINE
(Solomon, Alaska)
1907



North Vein
Footwall South Vein System
No. 3 Vein
No. 2 Vein
No. 1 Vein
No. 4 Vein
Hanging wall, South Vein System

should be entirely feasible to keep the cost of transportation from Solomon to the mine below $5.00 per ton. In the winter time it is possible to build snow roads directly from Nome or Solomon to the mine. Weather permitting, they would be passable at all times and tractor trains hauling large tonnages on sleds are able to move freight at very comparable costs to trucking.

Some typical freight charges are as follows:

Ocean freight from Seattle to Solomon on fall shipments:

$2,667.99 on 175,779 lbs = 88 tons or an average of $20.60 per ton

Lighterage ship to Solomon warehouse:

Lumber	$ 12.00 per thousand board feet
Power	1.00 per 100 pounds
Cyanide	.60 per 100 pounds
Ore Cars	.44 per 100 pounds
Groceries	.56 per 100 pounds
Machinery	.22 per cu. feet

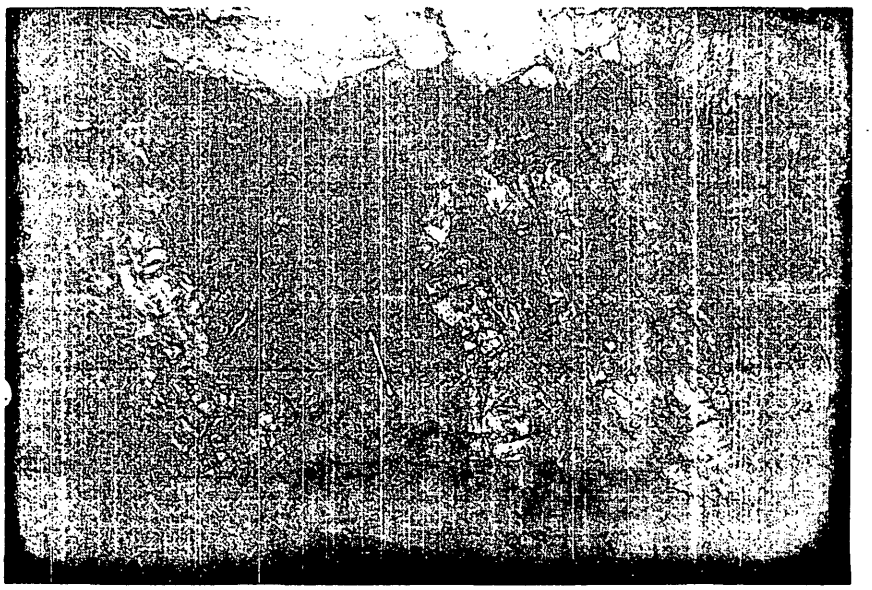
Pete Curran charged $1.25 per 53-gallon drum from Solomon to the mine and about $10.00 per trip for other supplies.

Since the mine last operated in 1907 a new means of transportation has come to Alaska. That is the airplane, which is becoming more and more the people's taxi in the north. Nome itself is now less than 24 hours from Portland, Oregon and the mine is only half an hour from Nome. Now that we are building a landing field at the mine it will be possible, in cases of emergency to radio for a plane and be taken into Nome and medical care in not over an hour, weather permitting.

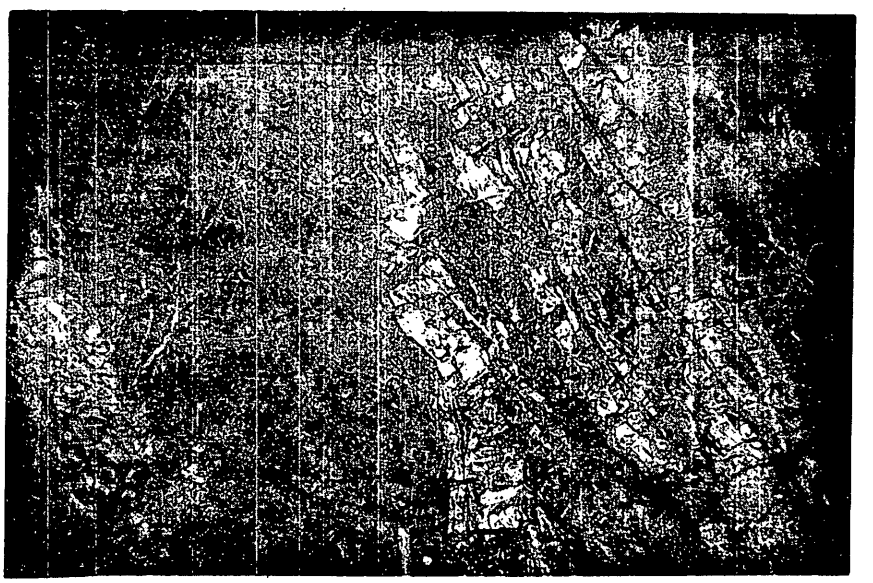
In addition, Alaska Airlines said they would attempt to make the Big Hurrah Mine a scheduled mail stop three days a week. With radio and plane service the camp and crew need no longer feel isolated or cut off, an important advantage for any community or operation.

FLASHLIGHT PHOTOGRAPHS OF 72' LEVEL SHOWING ORE OCCURRENCE

FULL SOUTHEAST FACE.



CLOSE-UP SOUTHEAST FACE SHOWING VEIN STRUCTURE.



These Photographs made by DMEA field team, Personnel from U.S.G.S. and U.S.B.of M., Juneau, Alaska, September, 1952.

See credit for photos!
Mine sampled by Bureau of Mines.

See page 10 of
Appendix

OPERATING COSTS

Operating costs are affected a great deal by the cost of labor and supplies, and these two items are difficult to determine exactly at this time. But by comparing present conditions with past records of production and the past costs, I think it should be reasonable to expect the cost of operation to be about $15.00 per ton. With a better mill and better mining equipment these costs should be lower, but I am speaking of the present operating set-up. Included in these costs are about $2.00 per ton for carrying on some development work. That is, it should be possible to maintain two crews on development work as well as supplying enough ore for the mill. If the mine can continue to operate with even a small profit under these conditions, that is, paying for cost of operating and also developing additional ore, the position of the mine will be continually improved and I think the venture may be considered an initial success. If the mine can do this on the present comparatively small scale of operation and with the present inefficient mill it will be possible to gather at the same time invaluable data regarding costs and operating conditions. It should then be possible to plan and build a modern, more efficient mill and mine plant in the near future in order to secure costs of not over $10.00 per ton. Then, if the average grade of the ore holds up, (past records indicated values of about $25.00 per ton can be expected) and if the milling costs can be reduced to $10.00 a very nice profit indeed would result on a 200-300 ton per day operation. We have these factors to consider: the cost of power is high, the cost of labor is high, the cost of housing and boarding men is high, and present cost of milling will be high. On the other hand, the mine has good mining widths and stable

ground to lower mining costs. Mine water with proper pumping equipment would not be too much of a problem. The metallurgy of the ore is simple and does not require a complicated flow sheet. The product obtained, gold, is valuable, readily saleable, and cheap to market.

FINANCIAL CONDITION OF THE ENTERPRISE

It was possible to carry out the first phase of the operation, that is, the rehabilitating, unwatering and re-examination of the property within the budget allowed. It was close but it was done. For the second phase of the operation, placing the mine in production, the budget of $70,000.00 will probably be even closer. Alaska Associates, Ltd. are attempting to rehabilitate the mine and mill and place the property in continuous operation. After buying winter supplies, there was about $28,000.00 left in the treasury on October 1, 1953. Operating expenses are running $1300.00 a week for labor and supervision, and $1000.00 a week for supplies, for a total of approximately $2300.00 per week. It is hoped that the mine may be operating profitably before time and/or money runs out, but it leaves very little margin for error and unforeseen difficulties, and very little working capital. Mr. G. R. Jackson, the manager of the Miners and Merchants Bank at Nome, has indicated that he would give favorable consideration to a loan to be used as working capital for the property. Still, I think it would be prudent to consider other ways and means to raise some $25,000.00 additional capital if that should prove necessary.

A full financial statement, showing how the money has been spent and containing a recent balance sheet, has been prepared by Burton M. Smith, the accountant, and I refer you to it for details.

RECOMMENDATIONS

a. Mine Exploration and Development

1. The following underground development is suggested:

   a. Extend the footwall crosscut started on the 150 foot level to the east to explore for the north vein at depth.

   b. Drift both ways on the vein exposed in hangingwall crosscut, west drift 150 foot level.

   c. Drift to the southeast on vein exposed by hanging wall crosscut in east drift on the 250 foot level as this vein will probably prove to be the main vein to the east.

   d. Test walls on the 150 and 250 foot level with long hole or diamond drill holes at least 50 feet deep for addition parallel veins or stringers.

   e. Make a complete, up to date geologic map of the mine as soon as possible. I believe almost enough work has been done to disclose the key structural controls governing ore depositions.

   f. On the surface it would be advantageous to do some bulldoze stripping to the northwest in the vicinity of the Dewey Cut to prove the extension of the mineralized zone in that area and to discover mineralized veins there.

   g. Four more claims should be staked to the northwest, that is, two abreast down Big Hurrah Creek and up the hill on the other side. In addition, I believe it wise to secure enough additional claims so that the northwest bank of Little Hurrah Creek and the landing field there are under company control. The formation there is slate and has mineral possibilities. The ground could never be secured at less cost than at present, and, if the Big Hurrah proves as successful as hoped, the surrounding country will become valuable and difficult to obtain.

b. Milling

1. It is recommended that the mine be operated at the mill's maximum rate of production, 40 to 50 tons per 24-hour period, for the present. The backlog of experience will be valuable and it should be the means of developing big enough ore-reserves to justify the building of a larger modern mill. The situation at that time will govern, but a 200 or 300 ton per day

mill may prove justifiable.

2. Milling tests should be run at once to determine the best way to recover the scheelite present in the ore.

3. The improvements to the mill that were decided to be necessary should be completed. This includes housing the mill ore bin, constructing a covered track from the shaft house to mill, installing the diesel engine in the mill, moving the cyanide tanks and housing them on the west end of the mill building, weatherproofing the mill and heating it with salamanders.

Respectfully submitted,

James M. Orr

JAMES M. ORR

REGISTERED PROFESSIONAL ENGINEER 2217 OREGON MAY 7, 1949 JAMES M. ORR

James M. Orr

Portland, Ore.

Nov. 14, 1953

ACKNOWLEDGEMENTS

Special thanks are due Travis Lane for his wholehearted cooperation at the property. Without the assistance of him and his crew, it would have been impossible to complete the examination in the time available.

Sherwood Owens worked along with us like a "trooper", and he deserves great credit for his able management in bringing the property along this far.

Mr. Daniel Jones of the Territorial Engineers of Alaska spent several days at the mine, helping with the surveying and the sampling, and was most cooperative at all times. He is one of many people in the area who went out of their way to be hospitable and helpful.

This spirit of helpful cooperation by the government and the people of the Territory was considered a very favorable factor which materially influenced the decision to reopen the Big Hurrah this year. Without exception, people have gone out of their way to help the enterprise and I am sure that their continued good will will be a big factor in the future success of the mine. Already we have had concrete evidence as to what this helpful spirit will mean. The air transport division has made an allotment for building an airfield at the mine and has helped to secure regular mail service there. Lomen Commercial Co. has offered the free use of its warehouse at Solomon until such time as the mine is on a paying basis. Mr. Dewey Goodrich of the Northern Commercial Co. has been most helpful and his suggestions regarding supplies, based on many years experience in the north, have been valuable. Pete Curran of Solomon has helped on several occasions to break transportation and supply bottlenecks, as have the Lee family and "Herk" Edwards, our neighbors along the Solomon River.

Mr. G. R. Jackson and his staff at the Nome Bank were always obliging and cared for our banking needs in a capable manner.

Finally, special thanks are due to William B. Murray and Mrs. Louise Anderson of his office for special help in preparing these reports and printing them on his duplicating machine.

LIST OF SAMPLES TAKEN

NO.	SAMPLE LOCATION	Width	VALUE PER TON Au. oz	$	Ag. oz		$
SURFACE							
3	Grab off Dump N. W. Dewey Cut	grab	Tr.	Tr.	Tr.		Tr.
4	Dewey Cut Top Section (Vein)	3.0	0.22*	7.70	Tr.	0.11	Tr.
5	Surface Cut, 600' S. E. of Dewey Cut, W. Wall	grab	Tr.	Tr.	Tr.		Tr.
6	Dewey Cut Ext. of #4(H. W)	3.5	0.04	1.40	Tr.		Tr.
7	Dewey Cut 30' N. W. of No. 4 & 6 Vein (?)	4.5	0.04	1.40	0.20		0.18
8	North Vein, Bulldozer Cut. below B. House	2.0	0.64	22.40	0.60	0.16	0.54
SHAFT VEIN OR NO. 3 VEIN							
10	150' Level, face of raise, level plus 50', Vein	3.0	0.28	9.80	0.20	0.13	0.18
11	150' Level, face of raise, level plus 50', H. W.	2.0	Tr.	Tr.	0.22	0.09	0.19
12	150' Level, bk. of rse. drift, level plus 38', H. W.	2.0	Tr.	Tr.	0.64		0.57
13	150' Level, bk. of rse. drift, level plus 38', Vein	2.2	0.20	7.00	0.41	0.26	0.37
84	Duplicate Sample, Assay By (A. A. H.)		0.19	6.65		0.31	
14	150' Level bk. of rse. drift, level plus 38', F. W.	3.0	0.08	2.80	0.44	0.18	0.39
15	150' Level, fce. of stope drift, level plus 35', H. W.	3.0	0.02	0.70	0.26	0.12	0.23
16	150' Level, fce. of stope drift, level plus 35', F. W.	4.6	0.02	0.70	Tr.	0.08	Tr.
85	Duplicate Sample Assayed by (A. A. H.)		0.26	9.10			
17	150' Level, bk of rse., level plus 16', Vein	3.9	0.02	0.70	Tr.	0.15	Tr.
19	150' Level, bk of stope, level plus 16' Vein	5.6	0.04	1.40	Tr.	0.20	Tr.
20	150' Level, bk. of stope, level plus 16', Vein	2.5	0.66	23.10	0.34	0.26	0.30
86	Duplicate Sample Assayed By (A. A. H.)		0.78	27.20			
21	150' level, bk. of stope, level plus 16, F. W. of #20	2.2	0.08	2.80	0.54	0.62	0.48
87	Duplicate Sample Assayed by (A. A. H.)		0.25	8.75			
22	150' Level, bk of stope, level plus 16', Vein	5.5	0.08	2.80	0.72	0.19	0.65
23	150' Level, bk of stope, level plus 18', Vein	2.5	0.34	11.90	0.20	0.10	0.18

J. M. ORR

JAMES M. ORR B. A. Sc., M. Sc.,
MINING ENGINEER • GEOLOGIST

MEMBER P.E. OREGON
MEMBER A.S.M.
MEMBER A.I.M.E.

November 14, 1953

The Alaska Associates, Ltd.
1117 Equitable Building
Portland, Oregon

Gentlemen:

Enclosed please find my report on the Big Hurrah Mine, Solomon, Alaska.

As you requested, I visited the mine during the period August 25th to September 7th, traveling to the mine by Pan American Airlines via Fairbanks, Alaska and returning via Alaska Airlines and Western Airlines through Anchorage, Alaska.

As it was already late in the season before the workings could be examined, time was of the essence since the short season that the Bering Sea was open to navigation was almost over. Therefore it was decided to do only that work considered essential to determine if the old Fozard and Williams reports were correct and if the mine appeared to be substantially as represented by them. A complete and thorough resampling of the mine would require months of work but enough careful spot samples were taken to outline the picture.

On my return to Portland the samples were assayed and the results studied so that a verbal report could be made at the earliest possible moment. This report was made to a meeting of the partners of the Alaska Associates, Ltd. on September 14th. After hearing the results of the examination it was decided to go ahead with the development of the mine and to attempt to bring it into production this winter. The last boat for the Nome area was scheduled to leave on September 21 and the last official loading day was Friday, September 18. Hence it was imperative that the new equipment and all the winter supplies be bought and shipped to the Seattle dock at once. After a day of organization in Portland I went to Seattle, Spokane, northern Idaho, Missoula, Butte and eastern Idaho to secure the necessary supplies and equipment. We were fortunate in being able to accomplish this difficult task on time and the boat sailed with the required equipment and supplies.

Inasmuch as a full verbal report had already been made, questions asked and answered and the decision made, it was felt that the formal report would be somewhat historical and could be prepared at a later date when time was not so pressing. So after

sending copies of the list of samples taken and an assay map to the mine at Nome, it was decided to take some additional time and compile, reproduce and embody with my report all the available information on the property.

May I say in closing that it has been a pleasure to work with such a cooperative group of men as the Alaskan Associates, and that in the future I will be pleased to do anything within my resources to make the operation a success.

Respectfully submitted,

James M. Orr

JAMES M. ORR

JMO:la

LIST OF SAMPLES TAKEN

NO.	SAMPLE LOCATION	Width	VALUE PER TON Au. oz	$	Ag. oz		$
SURFACE							
24	150' Level, bk of stope, level plus 18', F.W. of #23	2.4	0.46	16.10	0.48	0.83	0.43
88	Duplicate Sample Assayed by (A.A.H.)		0.55	19.25			
25	150' Level, bk of stope, level plus 18', Vein	2.8	0.16	5.60	0.61	0.07	0.55
26	150' Level, bk of stope, level plus 18', H.W. of #25	2.5	0.02	0.76	0.48	0.12	0.43
36	--36A--150' Level fce. of W. Drift. level plus 4'	4.1	0.12	4.20	0.38	0.20	0.34
B-201	150' Level, fce. of W. drift, Level plus 3'	4.0	0.06	2.10	Tr.		Tr.
101	Cut Sample, S.E. Wall Rse, 10' below top of raise, Vein	3.9	0.28	9.80	0.56	0.16	0.50
102	150' Level N.W. Wall Rse., 20' below Top of raise, Vein	6.9	0.16	5.60	Tr.	0.17	Tr.
103	S.E. Wall Raise, 30' below face, Vein	3.5	0.32	11.20	Tr.	0.14	Tr.
104	S.W. Wall, 40' below face, Vein	4.5	0.04	1.40	Tr.	0.18	Tr.
NO. 1 and/or NO. 3 VEIN 72' SUB-LEVEL							
30	72' level, shaft vein, N.W. Face of Drift, H.W.	2.9	0.76	26.60	0.44	0.21	0.39
91	Duplicate sample, Assayed by (A.A.H.)		0.92	32.20			
31	Filling between 30 and 32	3.2	0.08	2.80	0.37		0.33
32	72' Level, N.W. face of Drift	2.1	0.30	10.50	0.40	0.06	0.36
33	H.W. Vein, 72' Level, S.E. face of Drift, Shaft+14'	3.8	0.32	11.20	0.67	0.04	0.60
34	F.W. Vein, 72' Level, S.E. face of Drift, Shaft+14'	3.7	0.24	8.40	0.93	0.08	0.84
35	Cut on roof across Vein, 7' East of Shaft	3.6	0.50	17.50	0.90	0.13	0.81
92	Duplicate Sample, Assayed by (A.A.H.)		1.07	37.45			
MAIN VEIN OR NO. 1 VEIN							
27	150' Level in W. Stope, 10' below track, Vein	5.8	0.10	3.50	0.49	0.17	0.44
28	150' Level, floor pillar, E. Wall, Second raise from 250' Level	3.2	0.74	23.90	0.25	0.14	0.22
89	Duplicate sample, Assayed by (A.A.H.)		0.83	29.05			
29	150' Level, floor pillar, E. Wall, 1st Rse. from 250' past shaft X-cut, Vein	3.0	2.16	75.60	0.42	0.21	0.38
90	Duplicate Sample, Assayed by (A.A.H.)		2.97	103.92			

LIST OF SAMPLES TAKEN

NO.	SAMPLE LOCATION	Width	VALUE PER TON Au. oz	$	Ag. oz	$
SURFACE						
36-B	Roof of stope, above 150' level, E. of X-Cut, Vein	4.0	0.82	28.70	0.20	0.18
37	Roof of stope, above 150' level, E. of X-Cut, Vein	3.1	0.98	34.30	0.51 0.25	0.46
93	Duplicate Sample, Assayed by (A.A.H.)		0.71	24.85		
40	250' level, No. 1 X-Cut to S.E., N.W. Wall, Vein	3.0	0.46	16.10	0.26 0.14	0.23
94	Duplicate Sample, Assayed by (A.A.H.)		0.90	31.50		
41	250' level, No. 1 X-Cut to S.E., S.E. Wall, Vein	2.0	0.38	13.30	0.60 0.77	0.54
42	250' Level, Vein in S.E. Drift going into H.W.	0.9	0.34	11.90	0.20 0.93	0.18
95	Duplicate Sample, Assayed by (A.A.H.)		0.45	15.75		
43	250' Level, Cut sample, S.E. Drift Face, 320' from shaft X-Cut	3.0	0.04	1.40	Tr. 0.10	Tr.
44	250' Level, back of S.E. Drift 220' from X-Cut	3.0	0.04	1.40	Tr. 0.11	Tr.
45	250' Level, grab sample from 2nd chute S.E. Drift	Grab	0.32	11.20	0.21 0.09	0.19
46	250' Level, face of N.W. Drift, Vein	3.8	0.16	5.60	0.30 0.13	0.27
47	250' Level, Roof N.W. Drift, between 2nd and 3rd chutes from W. face	4.0	0.53	18.20	0.26 0.05	0.23
96	Duplicate Sample, Assayed by (A.A.H.)		0.64	22.40		
48	250' Level, Grab sample, 3rd Chute from face N.W. end	Grab	0.24	8.40	0.28 0.08	0.25
49	250' Level, Grab sample, 1st chute from station X-Cut	Grab	0.54	18.90	0.22	0.19
50	250' Level, Cut Sample, E. Wall of stope, 45' above level and 20' S.E. of 1st raise and chute to E. of station X-Cut. Vein	3.4	1.14	39.90	0.61	0.55
51	250' level, chute sample from raise below 150, 1st chute E. of X-Cut	Grab	0.38	13.30	0.43	0.38
97	Duplicate sample, Assayed by (A.A.H.)		0.38	13.30		
52	150' Level, X-Cut from N.W. Drift, behind cave N.W. face, vein	2.5	0.14	4.90	Tr. 0.12	Tr.

LIST OF SAMPLES TAKEN

NO.	SAMPLE LOCATION	Width	VALUE PER TON Au. oz	$	Ag. oz	$
SURFACE						
53	150' Level, X-Cut from N.W. Drift behind cave, S.E. face, Vein	2.0	0.26	9.10	0.31	0.28
98	Duplicate sample, Assayed by (A.A.H.)		0.31	10.25		
54	150' Level, 10' E. of face of N. W. Drift beyond cave, 90' Past X-Cut, Roof Sample	2.0	0.22	7.70	0.24 0.15	0.21
55=A	250' Level, cut sample in big stope E. Wall, 20' below 150' and 80' above 250' level, vein	4.8	0.90	31.50	0.38	0.34
56=D	250' Level, grab sample of stope filling, big stope between 150' and 250' levels	20.0	0.18	6.30	0.29	0.26
57	Cut sample on stope wall about 60' below 150' and 40' above 250' level	3.9	0.78	27.30	0.30	0.27
99	Duplicate sample, assayed by (A.A.H.)		0.81	28.35		
202	150' Level floor pillar at back of stope under level, 15' below level	7.5	0.04	1.40	Tr.	Tr.

* NOTE: Except where noted, assays are by Pittsburgh Testing Laboratories, Portland, Oregon.

ASSAYS BY A.A.H. were done by
ABBOT A. HANKS, INC.
San Francisco 11, California

REGISTERED PROFESSIONAL ENGINEER
2217
J. M. ORR
OREGON
MAY 7, 1943
JAMES M. ORR

PITTSBURGH TESTING LABORATORY

ASSAYERS AND METALLURGICAL ENGINEERS

2419 S.E. Powell Blvd.
PORTLAND 2, OREGON

Gold, @ $35.00 *per oz.*

Silver, @ *per oz.*

nple Samples from Big Hurrah Mine
Nome, Alaska

ceived

bmitted by Alaska Associates
1117 Equitable Bldg.,
Portland, Oregon

Attn: Mr. Burton Smith

Date September 14, 1953

(Page 1 of 4 pages)

ER	MARK	PER TON OF 2000 LBS. GOLD OUNCES	GOLD VALUE	SILVER OUNCES	SILVER VALUE	COPPER PER CENT	LEAD PER CENT	ZINC PER CENT	
05	No. 3	Trace	Trace	Trace	Trace				
	No. 4	0.22	$ 7.70	Trace	Trace				
	No. 5	Trace	Trace	Trace	Trace				
	No. 6	0.04	$ 1.40	Trace	Trace				
	No. 7	0.04	$ 1.40	0.20	$0.18				
	No. 8	0.64	$22.40	0.60	$0.54				
	No. 10	0.28	$ 9.80	0.20	$0.18				
	No. 11	Trace	Trace	0.22	$0.19				
	No. 12	Trace	Trace	0.64	$0.57				
	No. 13	0.20	$ 7.00	0.41	$0.37				
	No. 14	0.08	$ 2.80	0.44	$0.39				
	No. 15	0.02	$ 0.70	0.26	$0.23				
	No. 16	0.02	$ 0.70	Trace	Trace				
	No. 17	0.02	$ 0.70	Trace	Trace				
	No. 19	0.04	$ 1.40	Trace	Trace				
	No. 20	0.66	$23.10	0.34	$0.30				
	No. 21	0.08	$ 2.80	0.54	$0.48				
	No. 22	0.08	$ 2.80	0.72	$0.65				

Respectfully submitted,

PITTSBURGH TESTING LABORATORY

M D Lanyon

DISTRICT MANAGER

PITTSBURGH TESTING LABORATORY

ASSAYERS AND METALLURGICAL ENGINEERS

2419 S.E. Powell Blvd.
PORTLAND 2, OREGON

Gold, @ $35.00 *per oz.*

Silver, @ *per oz.*

nple Samples from Big Hurrah Mine
ceived Nome, Alaska

bmitted by Alaska Associates

Date 9-14-53

(Page 2 of 4 pages)

ER	MARK	PER TON OF 2000 LBS. GOLD OUNCES	GOLD VALUE	SILVER OUNCES	SILVER VALUE	COPPER PER CENT	LEAD PER CENT	ZINC PER CENT	
	No. 23	0.34	$11.90	0.20	$0.18				
	No. 24	0.46	$16.10	0.48	$0.43				
	No. 25	0.16	$ 5.60	0.61	$0.55				
	No. 26	0.02	$ 0.76	0.48	$0.43				
	No. 27	0.10	$ 3.50	0.49	$0.44				
	No. 28	0.74	$25.90	0.25	$0.22				
	No. 29	2.16	$75.60	0.42	$0.38				
	No. 30	0.76	$26.60	0.44	$0.39				
	No. 31	0.08	$ 2.80	0.37	$0.33				
	No. 32	0.30	$10.50	0.40	$0.36				
	No. 33	0.32	$11.20	0.67	$0.60				
	No. 34	0.24	$ 8.40	0.93	$0.84				
	No. 35	0.50	$17.50	0.90	$0.81				
	No. 36A	0.12	$ 4.20	0.38	$0.34				
	No. 36B	0.82	$28.70	0.20	$0.18				
	No. 37	0.98	$34.30	0.51	$0.46				
	No. 40	0.46	$16.10	0.26	$0.23				
	No. 41	0.38	$13.30	0.60	$0.54				

Respectfully submitted,

PITTSBURGH TESTING LABORATORY

M O Layton

DISTRICT MANAGER

PITTSBURGH TESTING LABORATORY

ASSAYERS AND METALLURGICAL ENGINEERS

2419 S.E. Powell Blvd.
PORTLAND 2, OREGON

Gold, @ $35.00 *per oz.*

mple Samples from Big Hurrah Mine

Silver, @ *per oz.*

ceived Nome, Alaska

bmitted by Alaska Associates

Date 9-14-53

(Page 3 of 4 pages)

ER	MARK	PER TON OF 2000 LBS. GOLD OUNCES	GOLD VALUE	SILVER OUNCES	SILVER VALUE	COPPER PER CENT	LEAD PER CENT	ZINC PER CENT	
	No. 42	0.34	$11.90	0.20	$0.18				
	No. 43	0.04	$ 1.40	Trace	Trace				
	No. 44	0.04	$ 1.40	Trace	Trace				
	No. 45	0.32	$11.20	0.21	$0.19				
	No. 46	0.16	$ 5.60	0.30	$0.27				
	No. 47	0.52	$18.20	0.26	$0.23				
	No. 48	0.24	$ 8.40	0.28	$0.25				
	No. 49	0.54	$18.90	0.22	$0.19				
	No. 51	0.38	$13.30	0.43	$0.38				
	No. 52	0.14	$ 4.90	Trace	Trace				
	No. 53 *	See Notes.							
	No. 54	0.22	$ 7.70	0.24	$0.21				
	No. 57	0.78	$27.30	0.30	$0.27				
	A - 55	0.90	$31.50	0.38	$0.34				
	B - 201	0.06	$21.00	Trace	Trace				
	D - 56	0.18	$ 6.30	0.29	$0.26				
	E - 50	1.14	$39.90	0.61	$0.55				
	No. 101	0.28	$ 9.80	0.56	$0.50				

Respectfully submitted,

PITTSBURGH TESTING LABORATORY

M. L. Playfair

M. L. Playfair

DISTRICT MANAGER

PITTSBURGH TESTING LABORATORY

ASSAYERS AND METALLURGICAL ENGINEERS

2419 S.E. Powell Blvd.
PORTLAND 2, OREGON

Gold, @ $35.00 *per oz.*

Silver, @ *per oz.*

mple Samples from Big Hurrah Mine
Nome, Alaska

ceived

bmitted by Alaska Associates

Date 9-14-53

(Page 4 of 4 pages)

ER	MARK	PER TON OF 2000 LBS. GOLD OUNCES	GOLD VALUE	SILVER OUNCES	SILVER VALUE	COPPER PER CENT	LEAD PER CENT	ZINC PER CENT	
	No. 102	0.16	$ 5.60	Trace	Trace				
	No. 103	0.32	$11.20	Trace	Trace				
	No. 104	0.06	$ 2.10	Trace	Trace				
	No. 202	0.04	$ 1.40	Trace	Trace				
	No. 500?	0.16	$ 5.60	0.88	$0.79				

All of the above samples are the results of duplicate determinations and produced highly concordant results.

* 53 Multiple determination made upon the pulp of this sample produced widely divergent results presumably because of the presence of coarse gold. The results of the assays are as follows:

0.08	$ 2.80	0.31	$0.28
0.14	$ 4.90		
0.26	$ 9.10	Av.	
0.54	$18.90		

Respectfully submitted,

PITTSBURGH TESTING LABORATORY

M. L. Playfair, Chief Chemist

DISTRICT MANAGER

REPORT OF ASSAY

ABBOT A. HANKS, INC.

ASSAYERS, CHEMISTS, ENGINEERS
624 SACRAMENTO STREET
SAN FRANCISCO.

October 5, 1953

Big Hurrah Mine
Nome, Alaska

DEPOSITED BY James A. Orr
Charlton Laboratories
2340 S.W. Jefferson Street
Portland, Oregon

AMPLE OF ORE

Labty. No.	Mark	GOLD, per ton of 2,000 lbs. Troy Ounces	GOLD, per ton of 2,000 lbs. Value @ $35.00 oz.	SILVER, per ton of 2,000 lbs. Troy Ounces	SILVER, per ton of 2,000 lbs. Value @ $	Percentages
60080	A	1.14	39.90			
81	B	.17	5.95			
82	C	.65	22.75			
83	E	1.62	56.70			
84	13	.19	6.65			
85	16	.26	9.10			
86	20	.78	27.20			
87	21	.25	8.75			
88	24	.55	19.25			
89	28	.83	29.05			
90	29	2.97	103.95			
91	30	.92	32.20			
92	35	1.07	37.45			
93	37	.71	24.85			
94	40	.90	31.50			
95	42	.45	15.75			
96	47	.64	22.40			
97	51	.38	13.30			
98	53	.31	10.85			
99	57	.81	28.35			

mmh

ABBOT A. HANKS, INC.

Jno. L. Marsh

REPORT

BIG HURRAH QUARTZ MINE

Solomon, Alaska

Nome Mining District

By

Travis P. Lane

Consulting Mining Engineer

Phoenix, Arizona

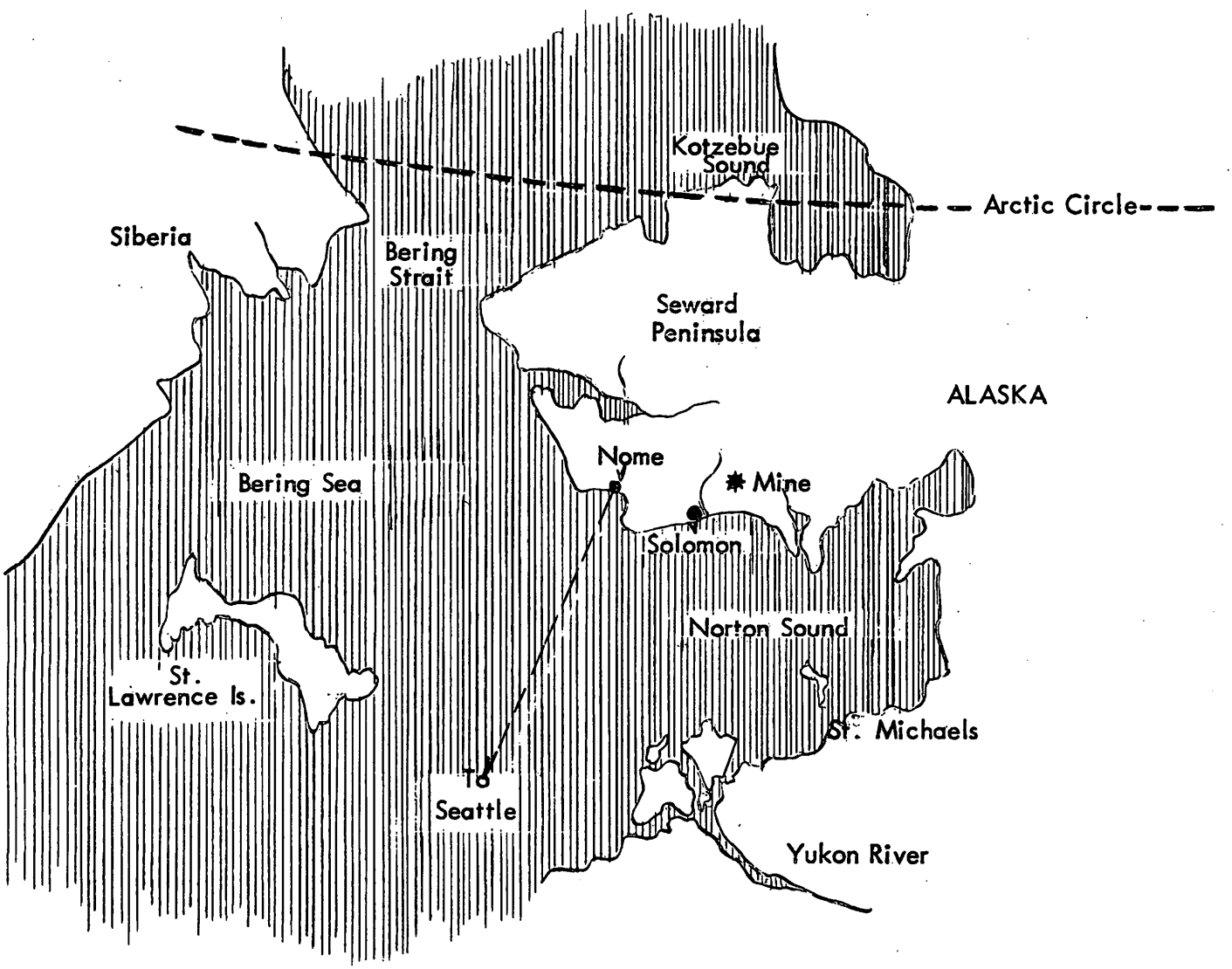
February 20, 1953

BIG HURRAH QUARTZ MINE

Solomon, Alaska

Nome Mining District

Travis P. Lane
Consulting Mining Engineer
Phoenix, Arizona
February 20, 1953



March 29, 1952

Phoenix, Arizona

Dear Sherwood:

You asked me for an outline of my past mining experience and I am replying with the following notes.

I am a graduate of the Mining College of the University of California. After spending a number of years at mining labor jobs and assaying and surveying I worked in the following positions of responsibility.

Engineer and Shift Boss for the Kennecott Copper Corp. at Latouche, Alaska.

Mine Supt. and Gen. Supt. for the Alaska Palladium Co. operating a mine and 300-ton concentrator in southeastern Alaska.

Gen. Supt. for the Lucky Jim Lead and Zinc Co. (Unit of the Victoria Syndicate of London) operating a mine and 200-ton concentrator at Zincton, British Columbia.

Manager for Tungsten Metals Corp. operating several mines and 100- ton concentrator in eastern Nevada.

Supervising Engineer, Phoenix Office of the Mine Loan Division of the R.F.C.

Field Engineer for the St. Anthony Mining and Development Co. of Tiger, Arizona.

Besides the above I have at various times in the past operated mining properties for my own account and with associates. This work included the building of three cyanide plants for the treatment of tailings, and the operation of a mine and mill on a lead-zinc property; also shipping ore of copper and gold and lead-zinc properties, and exploratory development of a number of prospects.

In addition, over the years I have done a great deal on mine examination and consulting work in Alaska, Canada, Mexico, Panama and various parts of the western U.S. At present I am an independent Consulting Mining Engineer with headquarters in Phoenix, Arizona.

Yours truly,

T.P. Lane

BIG HURRAH QUARTZ MINE

Property and Location

The Big Hurrah Quartz Mine comprises 12 full lode claims and 3 fractions, all contiguous and all patented, located approximately 45 miles easterly by auto road from Nome, Alaska. Solomon, on the Bering Sea is 12 miles distant by road southwesterly from the mine. The topography is one of coastal plains and low rolling hills Elevation at the mine is 250 feet above sea level. Nome is the nearest population center of importance and serves a large area with banking facilities, machinery and supply houses, shops, etc. Regular air schedules connect Nome with outside points and during the open navigation season of some five months each summer the city is a port of call for numerous freight steamers A landing field is available at a placer camp 3 miles from the mine, and a field could be constructed at small cost at the mine by leveling placer tailing piles in Big Hurrah Creek. The winter climate is severe but not more so than in the mining camps of northern Canada.

History and Production

The mine was discovered in 1900 and was operated during the period of early intense placer mining activity in and about Nome. In 1903, following a period of vigorous development and the installation of an adequate camp and mining plant, a 10-stamp mill was built and ten more stamps were added in the following year. The mine and mill were operated continuously summer and winter until 1907.

Following a long period of idleness the mine was leased in 1944 to C. O. Roberts who had been placer mining in the neighborhood. He worked the mine intermittently during the period 1944-1947, his work consisting of surface gouging of vein croppings and the mining of the rich shaft and level pillars. He made no attempt to unwater and rehabilitate the mine below water level, and because of the desultory and unminerlike conduct of work the lease was terminated in the summer of 1949.

In November 1949 a lease with option to purchase was granted to Lane and Owens, the present operators of the property. The summer season of 1950 was spent in sampling and testing. Toward the close of the 1951 season a small cyanide plant was constructed to treat the old tailings and a short test run was made before the freeze-up. The plant was operated in 1952, but because of an extraordinarily late spring thaw and early fall freeze the operating season was limited to slightly more than two months

The normal operating season for outdoor work, such as the tailings treatment procedure, is 4 to 4-1/2 months. With adequate housing, mining and milling can be carried on the year round, as in the past

The recorded production of gold for the early operation is tabulated below

Period	Tons Milled	Yield	Recovered Per Ton	Equivalent $35 per oz.
July 16 to Aug. 1, 1903	330	$ 4,700.00	$ 14.20	$ 24.00
Aug. 1903 to " 1904	9,656	100,344.20	10.41	17.59
Aug. 1904 July 1905	12,410	128,066.69	10.40	17.58
July 1905 " 1906	12,000	92,235.05	7.69	13.00
" 1906 " 1907	12,000	114,000.00	8.75	14.79
" 1907 Oct. 1907	3,600	45,000.00	12.50	12.13
1908 cleanup		6,400.00		
Totals and Average	49,996	490,945.92	9.82	16.63

See Stmes, p.8

Tailings losses during the period 1903-1907 averaged above $5.00 per ton, indicating an assay value of the mill feed of approximately $15.00 per ton (old price) or above $25.00 per ton at the present price of $35.00 per ounce for gold.

In addition to the above tabulated production Roberts produced gold to the value of approximately $55,000. No tonnage or assay records were kept for this production. However, the volume of the scattered tailings produced indicates that somewhat over 2000 tons were milled. As might be expected from the coarseness of the tailings and the inadequacy of the recovery process--table concentrating and matting and no amalgamation--the recovery was very poor. Assays of these tails show values up to $31.50 per ton with average of over $20.00 per ton. Samples of remnant material the two mill bins, representing the grade of ore last milled, assayed $87.15 and $31.15 per ton.

Lane and Owens have produced approximately $21,100. Altogether, then, the total production has been approximately $908,000 at the present price for gold.

The recovery process during the period 1903-1907 was amalgamation followed by vanner concentration. Recovery was low because the extremely fine gold of the ore was not fully liberated by the coarse grind of the stamps and because a "rusty" or tarnished condition of the gold interferred with efficient amalgamtion. The

ore contains only a small amount of low grade iron sulphide and the vanners were useful principally for saving a part of the "rusty" gold which escaped amalgamtion in the stamp batteries and on the plates.

Despite the number, size and richness of the veins the early operation was not successful because of the unfavorable factors of low recovery, poor transportation facilities, and the inadequacy and excessive cost of the steam power facilities at the mine. Also, the quality of the management does not appear to have been high, due in some part to disputes among the owners. Because of power limitations the lower levels were often flooded and consequently it was impossible consistently to develop the lower part of the mine. Also, during periods of flooding, much material of marginal grade from the upper levels was put through the mill to maintain the tonnage rate. Two large rich veins which were highly productive above the tunnel level were not opened on the two lower levels because of the inability to do the necessary development. There is good reason for expecting that with adequate power, permitting the orderly conduct of mining and development, the grade of ore can be held to an even higher value than that shown in the past It should be noted that a number of shallow openings on the extension of the vein system exposed veins on the surface which were considered to be equally as important in size and value as those upon which the mine was opened but upon which, because of the limitations of the plant, no serious development was performed.

The early handicaps to successful operation have been eliminated or greatly reduced. Auto and air transport have lessened the remoteness of the property, and oil and gas engine power is available in place of steam. Also, metallurgical tests (confirmed by the recent operations of Lane and Owens) have shown that the addition of cyanide treatment to the former recovery process will greatly increase the mill recovery.

For many years following its closing in 1907 the mine was the source of continuous dissension among the members of the owning family. This dissension blocked (until 1944) all attempts to rehabilitate the mine or to deal on a reasonable basis with any of the several companies and numerous individuals who at various times tried to obtain a contract on the property.

The ore of the mine contains a small but appreciable amount of tungsten in the form of scheelite, as shown by sampling in the old tailings pile, in a vein where exposed in the 70-foot sub-level of the main shaft, and by panning and examination under fluorescent lamp. At the time of the early operation of the property tungsten was a little-known element having no market value and its presence was not recognized. Now, with its growing stratetic

importance and the establishment of a firm price by the government, the tungsten content of the ore, while minor to gold, promises to contribute significantly to the value of the production. A composite sample of 300 tons of tailings treated in the cyanide plant assayed .07% WO_3 and a random grab sample from various places in the pile assayed (by another assayer) .073% WO_3. The considerably greater tungsten content shown by the vein sampling will be described later in this report under "Veins and Development."

Geology and Mineralization

The mine and the geology of the district are described in U.S.G.S. Bulletins Nos. 328 and 433. Briefly, the mine is located in an area of mineralized hard black, somewhat graphitic quartzitic slate. The slate is much fractured and is throughout intersected by gold-bearing quartz veinlets and stringers and occasional veins up to 8 feet and more in width. A striking feature of the quartz in the vicinity of the Big Hurrah Mine is the almost total absence of sulphide mineralization and iron staining usually associated with gold-bearing quartz. The quartz is dense and very hard and the gold is generally extremely fine and remarkably free. The veins are strong, well-defined fissures having smooth fault-plane walls and they cut across the bedding of the enclosing slate country rock. The vein material has been subjected to much crushing and repeated longitudinal movement resulting in places in a "ribbon rock" structure. The veins were mined in widths from two feet to a maximum of 25 feet, the average width stopped being approximately 8 feet. The tenor of the ore was rather uniform, ranging from $12 to $20 per ton (old price), although areas containing high grade specimen ore were frequently encountered. The vein zone has a width of several hundred feet and the material enclosing the major fissure veins contains a great many small stringers and veinlets of quartz all carrying appreciable amounts of gold. This condition suggests the possibility for eventually mining portions of the zone in broad widths by large scale mining methods.

Veins and Development

A number of large more or less parallel veins have been mined. The veins strike northwesterly and most of them dip approximately 60° southwesterly. One vein, however, known as the North vein, dips northeasterly at approximately 60°. A shaft was sunk to a depth of 100 feet on this North vein and a level was turned off at this depth and a considerable amount of ore was stoped. The main workings, however, are on the group of southwesterly dipping veins and consist of an incline shaft sunk to a depth of 280 feet with levels at 60 feet (the tunnel level from the creek bank), 150 feet and 250 feet. Drifting and stoping on the various levels reaches some 300 to 400 feet from the shaft in each direction. Several parallel veins were mined above the tunnel level

but mining and development was confined to only one vein on the 150 and 250 levels. The other veins were not opened on these levels because of the limited amount of development which it was possible to perform here.

The small size of the waste dumps is a notable feature and is evidence of the fact that practically all development material, whether from between ore shoots in the veins or from crosscuts in the stringer zone separating the veins, contained sufficient gold to warrant being sent to the mill.

The extension of the vein systems has been traced northwesterly from the shaft workings across a low gently sloping ridge and a considerable amount of ore was milled from a large cut and numerous small cuts on vein croppings in this area. At the start of operations much high grade float quartz was shovelled up here and hauled by wagon to the mill. A heavy overburden of crushed slate has handicapped thorough prospecting of the area. The placers in Big Hurrah Creek were very rich below this ridge and the gold of the placers was coarse and often accompanied by attached quartz. The whole vein zone deserves intensive crosscutting with deep bulldozer trenches and holds an excellent promise for developing a number of parallel veins (other than those developed in the shaft). There is a strong likelihood that these veins, together with groupings of stringers in the country rock, will in places constitute a broad stringer lode which could be mined by open cut method.

The large cut referred to above is in about the center of the Dewey claim and apparently on the northwesterly projection of the North vein. The cut is approximately 90 feet long by 20 feet average width and 20 to 30 feet deep. The cut was started on the cropping of a strong vein and as work progressed it developed that the vein walls contained closely grouped parallel gold-bearing quartz veinlets. Accordingly, a broad width of vein zone was mined and several thousand tons sent to the mill with reported recovered value of $6.00 per ton ($10 present price). There is no waste dump here. The walls of the cut show a network of veinlets extending well beyond the width of the area mined. The working place is heavily sloughed in and contains some water, and the vein proper is visible only in small part in the bottom of the cut. The writer cut samples across two partial vein exposures with results as follows.

Width	Gold Value
26"	$ 30.80
54"	39.20

The veins which have been mined in the main workings on the east side of Little Hurrah Creek all extend with excellent values under the creek and have been mined in pits in the flat on both sides of the creek and in places in the steep bank on the west side. The creek carries a heavy volume of water which limited the depth to which mining could be carried in the pits in the flat. The crushed and distorted condition of the formation on the west bank indicates the presence of a broad fault. This situation appears to have locally interrupted the continuity of the veins. While much quartz is present and some ore was mined and milled, the several openings here have not developed any important ore body. The showings in the Dewey cut and in other cuts to the west indicate that the disturbed condition of the veins in the west creek bank is confined to that area. Development and mining of the veins under Little Hurrah Creek would logically be done from extensions of lower levels from the main shaft. Development west of the creek might be done from further extensions of those levels or from a shaft sunk on the Dewey claim to develop the good ore showing in the large pit on that claim.

The mine is filled with water, the permanent water level standing at 72 feet below the surface and 12 feet below the 60-foot tunnel level. The known veins above the 60-foot level have been worked out and the workings are all caved.

Roberts mined the pillars in the vicinity of the shaft, using a bulldozer to trench down from the surface. His cut here is over 150 feet long (with the shaft about in the center), 40 feet deep and 20 to 25 feet wide. He also made a long deep cut on the croppings of the North vein and smaller cuts on croppings elsewhere on the property. The writer sampled the North vein where it is partially exposed in the southeast end of the cut and also sampled the main dump and the discard strip dumps from the dozer cuts with results as follows.

Sample	Gold Value	Remarks
N. Vein in cut - 26"	$ 24.50	The vein is not developed below here
Main dump	5.60	Estimated 1,000 tons
Shaft vein dozer dump	4.20	" 1,000 "
North vein dozer dump	4.72	" 750 "

Roberts opened a sublevel just above water level 70 feet below the shaft collar. The bulldozer work above left the ground in ragged shape and considerable repair work will need to be done at the shaft collar (now in the bottom of the cut) before rehabilitation of the lower workings can be undertaken. The sublevel, however is accessible for examination and in 1951 the writer sampled the vein showing here with results as noted on the sketch map accompanying this report. It will be seen that the vein has

a width of approximately 7 feet with values averaging approximaterly $50.00 per ton. Resampling in 1952 averaged (by double check assying) 4.00 ozs. gold and .157% WO_3 in the northwest face and 1.71 ozs gold and .042% WO_3 in the southeast face across widths of 6.5 feet and 6.2 feet respectively. Some free gold is visible in hand specimens from each face. This vein, known as the "Shaft vein" or No. 3 vein, was stoped practically continuously to the surface above the tunnel (60 foot) level from the creek bank to its junction with the larger "Main" or No. 1 vein, and beyond, for a total distance of over 400 feet from the portal with average width of 6 feet. This vein has not been explored in the lower workings.

The mine has been inaccessible for many years and all the people connected with its early operation have passed on. The following description of the workings is based upon the writer's conversations with some of these people and particularly upon reports made by two former superintendents, one of these being J. L. Fozard who for many years was an executive mining engineer of national repute. Mr Fozard was the superintendent at the time of the closing of the mine in 1907.

The shaft vein (No. 3) is apparently the footwall of the southwesterly dipping vein system and veins Nos. 1 and 2, as well as various intervening stringers, branch off from it into the hanging wall with small angular divergence from the No. 3 vein. The above veins were all followed from the creek bank to their junctures with No. 3 vein and were stoped in most part to the surface.

The North vein, which dips northeasterly, was also followed in from the bank and connected with a shaft 100 feet deep. This vein produced some very rich ore and was stoped fairly continuously for a distance of 150 feet, and its croppings beyond the shaft were mined recently in a long shallow bulldozer trench. The underground workings are completely caved.

Only the No. 1 vein was mined on levels Nos. 2 and 3. This was the larger of the veins--in one place it was mined for a width of 40 feet. Several small veins containing good values were cut in the crosscuts from the shaft on levels 2 and 3, but the objective in each case was the big or main vein and these smaller attractive showings were not followed up. No footwall crosscutting was done from the drifts on the levels to explore the projections in depth of veins Nos. 2 and 3 which produced large tonnages of excellent grade ore above the 60 foot level. Mr. Fozard reports that his last development work consisted of driving a short crosscut on No. 3 level into the hanging wall.

This work encountered a vein 5 feet wide assaying slightly over $30 per ton (present gold price). He speaks of having opened another vein on this level showing about the same width and value. These vein exposures were not explored because of closing of the mine at about this time. Mining was in progress with considerable ore in reserve when the mine was finally flooded and operations terminated.

It is worth noting that the ore in No. 1 vein was mined continuously on the No. 2 level for a length of 534 feet and average width exceeding 7 feet with good ore continuing in the west end (where work was discontinued because of proximity of the creek), and with the east end showing a strong vein with low grade values. The No. 3 level produced a large volume of ore but flooding of the level at intermittent intervals because of limited pumping facilities prevented full exploitation at that depth.

Mining

Most mining in the past was done by open stope and shrink methods with occasional cut and fill in the wider vein sections. Timber requirements for support of the ground were not large. The main shaft is in firm ground and in good condition with the exception of the collar as noted earlier in this report. Rehabilitation of the mine is essentially a pumping job of no great magnitude. The mine is variously reported to make from 60 to 150 g.p.m., the former being the winter rate and the latter figure representing the spring and summer rate.

Tailings and Milling

The tailings from past milling operations were banked on a flat adjacent to the mill. The greater part of the tailings has been washed away because of failure to maintain the confining banks and also as a result of action of a placer miner who diverted the creek so as to wash the tailings through his sluice boxes for recovery of whatever amalgam and free gold they contained.

Measurement and systematic sampling of the tailings in 1950 showed a volume of approximately 19,000 tons with values ranging from $3.50 per ton to $23.00 per ton and averaging $8.91 per ton. The material varies from coarse sand to colloidal slime with the sand carrying the highest values.

Tests on the tailings showed that 87% of the value could be recovered by fine grinding followed by cyanidation and approximately 70% by leach cyanidation without grinding. A simple leach cyanide plant of 40 tons per day capacity was installed in late

1951 and during that year and the season just past (1952) some 2720 tons were treated with recovery of approximately $8.30 per ton and tailings loss of approximately $4.00 per ton, indicating a head value of a little over $12.00 per ton and recovery of about 70%. Cyanide consumption was approximately .75 lb. per ton and lime requirement was practically nil.

It has been demonstrated that several thousand tons of slime tailings on the fringes of the pile are too low grade and too scattered in brush areas to be economically workable. It is now estimated that some 12,000 tons are profitably workable and of this amount some 8,000 tons with assay value around $9.00 per ton are sufficiently sandy to be treated by leach percolation in the present cyanide plant. The balance of 4,000 tons of slime-sand material assaying approximately $7.50 per ton can best be worked if put through the mill along with mine ore.

The direct cost for treatment in the present plant is fairly low. Supervisory expense and travel into and out of Alaska each season, together with rig-up and shutdown cost, is proportionately extremely high because of the short working season. The most economical manner for working the tailing would be to treat them as a seasonal operation concurrently with year-around operation of the mine and mill. In this way total cost ought not to exceed $2.00 per ton and profit therefore on the sandy material, at 70% recovery, would be about $4.30 per ton and on the slime-sand material about $3.25 per ton, or an indicated profit for the tonnage of both classes of approximately $50,000.

Recovery in past milling operations (coarse grind and amalgamation and vanner concentration) was about 65% of the ore value and recovery of the tailings values in the present cyanide plant is about 70%, thus indicating an attainable recovery by cyanidation without fine grinding of 87.5%. Actually, however, fine grinding followed by amalgamation and gravity concentration (corduroy and tables) has shown possible recovery of over 95% and it seems probable that the eventual plant will utilize this recovery procedure rather than the more costly and more difficult (in this cold climate) cyanide process.

As noted previously in this report, the tailings have been shown by assay to contain .07% WO_3 and this might be considered to be the mine average of the tungsten content of the ore. It should be noted, however, that vanner concentration was employed in the mill and one might reasonably assume that some tungsten would be taken off the tables in the gold concentrate and discarded in the amalgamation treatment of the concentrates, or where concentrates were shipped, lost at the smelter. This tungsten would, of course, not be accounted for in any assay of the mill tailings and the ore therefore might be assumed to

contain more than that shown by the tailings assay, i.e., more than .07% WO_3, perhaps as much as .10% WO_3, or a value of $6.30 per ton at the present government supported price of $63.00 per unit.

A point which deserves serious consideration in appraising the tungsten possibilities of the mine is the fact that in past mining operations tungsten was unrecognized as a valuable constituent of the ore and was not sought for. It seems entirely reasonable to suppose that among the numerous ore shoots mined in the several veins there would be some containing a greater concentration of scheelite than the general average of all the ore mined, i.e., greater than .07% to .10% WO_3. It is significant that this general average represents the residue of all material mined and milled and, since this included much low grade development material, the conclusion is inescapable that judicious selective mining will result in the production of a higher grade of ore both as to gold and tungsten values. In view of the above it seems quite probable that unwatering of the mine will disclose a scheelite content in places equal to or better than that presently shown in the northwest face of the 70-foot level, in other words, several tenths per cent WO_3, along with moderately high gold values known to exist in ore faces in the lower workings.

Panning of tailings and ore and examination under the fluorescent light shows the tungsten mineral (scheelite) to be granular rather than colloidal and therefore amenable to recovery by gravity methods of concentration. Recoveries of 65% or better are commonly attainable in the treatment of this type of material. At that recovery and at the present government floor price of $63.00 per unit, each .10% WO_3 would have a recoverable value of approximately $4.00 per ton.

Equipment and Camp

At the time of the early operations the mine, mill and camp equipment were first class in all respects Over the years there has been much deterioration of the housing and much of the machinery has rusted to uselessness or become obsolte. A few years ago the 20-stamp mill was put into operating condition and the camp and plant housing rehabilitated to some extent. Some equipment was recently moved in, including a cyanide leach plant. The principal items of equipment, housing, etc. are shown in the inventory list accompanying this report.

Water

The plant and principal workings are located on the point of a low ridge at the junction of Big Hurrah and Little Hurrah creeks. These creeks carry very large volumes of water during

the summer season but are deeply frozen during the mid-winter season. The mine shaft made ample water for past milling requirements during the winter.

Labor

The region is sparsely inhabited with the population about equally divided between whites and natives (Eskimos). Nome has a settled population of approximately 1800 people which is greatly augmented during the open season because of placer mining activities during that season. White labor has generally been scarce during the summers but fairly plentiful during the winter. There is a good supply of native labor especially during the winter. Native labor, mostly unskilled, is not particularly efficient nor dependable but with close supervision it is useful enough as common labor and as helpers.

The usual pay for common labor at this writing is $1.25 per hour, although native labor on some jobs is paid as low as $1.00 per hour. Few whites are obtainable at this base pay scale, however, and the wages for skilled and semi-skilled work is considerably higher. The work day is generally 9 or 10 hours in the summer because of the shortness of the season.

There are practically no hard-rock miners or mill men in the region and several men of this type will have to be imported to fill key positions.

During the past three years military construction in the region in the nature of radar screening installations caused an acute labor shortage. This situation was temporary, however, and most of the construction is now completed. No other serious construction is projected for this far northern part of Alaska which has been judged to have little strategic importance militarily.

Supplies

The region is practically devoid of resources (timber, fuel, etc.) and all supplies must be brought in from the States. While most essential items are carried in stock by merchants in Nome, considerable saving is realized by shipping in the bulk items by steamer direct to Solomon during the summer in sufficient quantity to carry though the winter.

Recommended Work and Estimated Cost

The logical program is to continue with the tailings operation as early as possible in the year and commence rehabilitation

of the mine as soon thereafter as it is possible to put machinery and supplies on the ground. The spring thaw generally begins early in May and work on the tailings can be commenced about June 1st. The road to the mine will not be open until toward the middle of June but men and food supplies can be flown in earlier and enough operating supplies are on hand at the mine to carry on operations until the road is open.

Rehabilitation of the mine will require that some repair and additions be made to present camp housing to provide accomodations beyond those needed for the tailings operation. The first steamer of the season arrives at Nome or Solomon in the latter part of June and the equipment and supplies needed for the rehabilitation job should be on this boat. The major items of equipment would be a diesel-generator power unit and a pump, also pipe and hose. Timber would be the principal item of supplies. Diesel fuel and lube oil are obtainable from bulk distributors in Nome

The volume of water in the mine can be roughly estimated by measurement of development openings and the tonnage of ore mined from below water level. A calculation on this basis indicates that the mine contains somewhat over 4,000,000 gallons of water. At a pumping rate of 150 g.p.m. approximately 20 days would be required to exhaust the mine water. To this must be added the rate of inflow which at maximum (during early summer) is reported to have been 150 g.p.m. A pump capacity of 300 g.p.m. would unwater the mine in about 3 weeks. The maximum lift is 225 feet. The writer would recommend a 25 H.P. centrifugal-motor pump and a diesel-generator power unit of 60 K.W. rating for the job. Several strings of pipe are intact in the mine below water, one of these being a 6-inch water column.

The writer estimates about 6 weeks time will be required to clean out and repair the shaft collar and to move in and rig up for handling the pump, pipe, etc. in the shaft. Pumping would begin in July and the mine would be accessible for examination, sampling and mapping early in August. With assays available shortly thereafter there would be sufficient time before the freeze for bringing in equipment, material and supplies for a winter operation. This will consist principally of mining equipment (in addition to that on hand), material for winter housing of the plant and additions to the camp equipment, and supplies for the operation.

It is anticipated that mining and milling operations would commence toward the end of December. The capacity of the 20-stamp mill is 50 tons per day and of the cyanide plant 40 tons per day. Some addition to the latter would be necessary therefore to provide for capacity production. For this reason, and

also because of necessary stope preparation in the mine, the winter's operations would be on a moderate scale.

The writer advances the following round figures as his estimate of the cost for rehabilitating the project and putting it on a producing basis. The estimates are made in two steps, the first being the cost to unwater, examine and sample the mine, and the second being the cost thereafter to put the property into production.

1 - May 15 to Sept. 15, 1953

Travel and supervisory expense	$ 7,500	
Camp - Repairs, etc.	2,000	
Clean out and repair shaft collar, etc.	6,000	
Power unit	6,500	
Pump	1,200	
Power line, pipe, fittings, etc.	1,000	
Unwatering - Labor and supplies	2,500	
Examination - Pumping, Sampling, Mapping	800	
Freight, Miscellaneous & contingencies	2,500	
Total	30,000	
Less Tailings Profit	15,000	
Net Cost		15,000

2. - Sept. 15 to Dec. 31, 1953

Travel & supervisory expense	2,500	
Camp additions, plant housing & heating	15,000	
Mining equipment	15,000	
Mill rehabilitation	5,000	
Pumping & other mine expense	2,500	
Supplies (from States)	2,500	
Freight, miscellaneous & contingencies	5,000	
Total	47,500	
Less Tailings Profit	3,500	
Net Cost		44,000
Working Capital		16,000
Total Capital Required for Project		75,000

Conclusions

An impressive production record has been made from a number of veins mined to a depth of only 250 feet and no diminuation in size or value of the veins was discernible at that depth.

The country rock is slate and the veins which are persistent well-defined fissures can be reasonably expected to continue with about their present gold content to a considerable depth.

The past record, good though it is, does not do full justice to the property, and when consideration is given to the extremely unfavorable factors present during the period of its early operation it is apparent that the potentialities are large.

The average value of the ore produced to date exceeds $25 per ton in gold (at $35 per ounce) and $5.00 per ton in tungsten (at $63 per unit) or a total of about $30 per ton. Ore of this class is available in unfinished stopes and in development faces in the lower workings. Ore of this grade promises a profit of $12 to $15 per ton with present mill capacity of 50 tons per day. It seems certain that vigorous development of the productive veins in the mine proper, together with exploration and development of other known and indicated veins here and elsewhere, will soon justify a large expansion of the mill capacity.

T. P. LANE

Tucson, Arizona

February 20, 1953

INVENTORY

BIG HURRAH QUARTZ MINE

October 1952

HOUSING & STRUCTURES

Supt's House - 6 room two story frame building, 24' x 30' with enclosed porches front and rear. Excellent condition except needs new roof cover. Now used as boarding house and crew living quarters. Furnished with medium size oil-burning kitchen range, two large oil-burning heating stoves, two dining tables, benches, chairs, dishes and utensils sufficient for crew of 10 men. Also, ten wood bunks and one double bed, most with mattresses (poor condition).

Bunk Houses - Two room frame building 30' x 16'. Good condition but roof needs repair. Enclosed porch in front with dirt floor. Contains several wood bunks.

Shop - Sheet iron building 14' x 18'. Good condition. Roof needs repair. Contains heavy work bench with two vises, blacksmith forge with crank blower and assortment blacksmith tools.

Garage - Frame building 18' x 28'. Fair condition. Roof poor. Contains many compartmented shelves for fittings and miscellaneous parts.

Mill Building - Frame and iron building 40' x 80'. Excellent condition except the east wall on lower end and the roof needs patching and weather cover Bins with 350 tons capacity are in excellent condition.

Powder House - 7' x 8'. Good condition. Galvanized iron roof and walls and wood floor. Mounted on stringers with towbridge.

Headframe - 30' high over 3-compartment shaft with crusher floor in upper part and skip dump for one-shaft compartment. Timber framework is in excellent condition. Housing is incomplete and poor. Bin (capacity 200 tons) is in good condition.

TRANSPORTATION EQUIPMENT

Chevrolet '41, 4 x 4 Army Truck, steel cargo body with stake sides and canopy top. Good condition. Two spare wheels and new tires, tools, many new spare parts--piston, rods, clutch plate, etc.

Fords '36, 2, with Garwood 1-1/2 yard dump bodies. One has almost new '41 engine, body is poor. It is usable but needs repair. The other has good running gear, poor body, and engine is out for overhaul.

Many miscellaneous Ford parts, one rebuilt engine block, 8 spare wheels with inflated tires (rubber 50%), etc.

ILL EQUIPMENT

4 Batteries (5 stamps each) 950 lbs. stamps with 4 Challenge ore feeders. Usable but foundations need repair.
1 Wilfley table complete
1 " " without head motion
2 " " decks
1 Water tank 12 ft. dia. x 10 high (KD)

1 Denver Rod Mill 3' x 6' without liners; approx. 1 ton slightly used rods (this is not installed)
Cyanide leach plant - 40 tons per day capacity - complete with pipe fittings, etc.
Line shafting in the mill is intact, also most of essential pulleys, piping and belting are in place or stored. There is a stock on hand of new dies, shoes, bosses and tappets.

RILLING EQUIPMENT

1 Gardner-Denver Drifter (Model ?) mounted on shell, 7/8" chuck, appears to be in fair condition.
1 Gardner-Denver Sinker (55) 1" chuck, used but good condition
1 Ingersoll-Rand Jackhammer - JB5, 1" chuck, condition questionable.
1 Ingersoll-Rand Jackhammer - JB5, 7/8" chuck. Used, but appears to be in fair condition; mounted on shell with saddle and clamp.
1 Ingersoll-Rand -48 Stoper. Used but apparently good condition.
1 Thor Pneumatic Leg - new.
4 pcs hex, 1" drill steel 72" long
1 " " " " " 76" "
1 " " " " " 52" "
1 " " " " " 28" "
2 " " 7/8" " " 76" "
4 " " " " " 52" "

All above steel is shanked and threaded. Some other steel is under water in the mine.

2 Pieces 1" Air Hose 50' long
2 " 3/4" " " 50' "
3 " 1/2" Water hose 50' long
2 water connections with goose necks and valves
Other short lengths of hose and misc. fillings.

SC. MACHINERY AND EQUIPMENT

Tractor - International TD-40. Fair condition, engine recently overhauled. Equipped with 9' Isaacson dozer blade; and hoist.
Tractor - International TD-35. Poor condition but probably servicable for light work if overhauled. 8' Isaacson blade and hoist.
Scraper Winch- GMC double drumm with Wisconsin VE-4 engine. good condition. Also heavy duty Pacific scraper bucket.
Power Unit - International PD-40. Good condition.
Welder Unit- Hobart 260 AMP. direct drive with Waukesha engine.
Power Unit - Wisconsin VE-4 New.
Pump- Allis Chalmers 3"x4" Centrifugal - 400 GPM at 60' head. Direct drive from Continental engine.
Pump- Rex portable 2 1/2" with Stover 2 1/2 HP engine.
Pump - Homart 1 1/2" with Lauson 2 1/2 HP engine.
Pump - Cleveland Air Turbine sump pump.
Pump - Wilfley 2" sand pump.
Hoist - Single drum 14" dia. x 16", belt and chain driven from Ford model B engine, with approx. 250' of 7/16" line pulling (with block) 1 ton mine skip.
Generator - Epson Model 30 - 60 cycle, 110 volt.
Generator - 5 KW 125 volt, old, condition ?
Light Plant - Kohler 5 KW 110 volt (condition poor)
Bench Grinder- Power Craft 7" with 1/3 HP motor, 110 volt.
Wheel Barrow - Rubber tired, new.
Welding Outfit - Gas with incomplete set tips.
Fire Hose - 3, Canvas rubber 2 1/2" x 50' long, pipe thread coupls.

PE & RAIL, PIPE FITTINGS

Pipe with fittings is complete in cyanide plant and mostly so in stamp mill.
2" Water line approx. 500' long.
120" 2" pipe in stock, also several joints 1".
There are 6 strings of pipe in the shaft (6", 3", 3", 2", 2", 2", 1") all intact underwater.
6" Pipe, approx. 300' usable 16' joints. Balance of pipe from mine-mill line is scattered and probably worthless.
6 - 2 1/2" Globe valves (3 new)
3 - 1 1/2, 1 1/2, 1" Globe valves
3 - 1" " "
Several smaller valves
2 - 2" Unions
2 - 1 1/2" "
3 - 2" Tees
3 - 1 1/2" Tees
Assortment of elbows, ells, bushings, etc.
Rail (30#) is intact in the shaft in two compartments and it is reported that some 500 to 600' is intact on the levels under water (as well as cars, a water pump, tools, etc.). The track from the mine to the mill has been torn up and much of it was cut into shorter lengths for grizzly bars for placer work. Most of this rail is available on the property.

TOOLS, ETC.

2 - 24" Pipe Wrenches
2 - 18" " "
1 - 10" " "
15 Flat wrenches, assorted sizes
2 - 12" Crescent wrenches
1 - 10" " "
3 Speed wrenches
3 - Socket wrenches, 1/2" and 3/4"
3 - Flex Bar socket wrenches, 1/2" and 3/4"
43 - Socket and Box Wrenches, 1/2" to 1-5/8"
1 - Rachet breast drill
2 - " wood braces
Assorted bits for above
Large assortment of hammers, axes, saws, files, punches, etc.

Large assortment of generator, carburetor and truck and tractor parts, some usable and some of questionable value.

2 - Hydraulic Jacks - 5 ton
3 - Screw jacks - 5 ton
1 - Lever house jack - 15 tons

Besides the above there is a large quantity of junk and near junk on the property, some of which might find use in a going project. This includes pulleys, scrap belting, tools, boiler iron pipe, etc.

SUPPLIES

1,000 lbs. Sodium Cyanide
7,000 " Unslaked lime
400 - Zinc Shavings
150 gals. Diesel oil
800 " Stove oil
80 " Gasoline
50 " Dello
20 " Motor oil - S.A.E. 20
10 " Transmission oil - 90W
40 lbs. Heavy chain grease
25 " Cup grease

7 pieces Timber 6" x 8" x 16' Good seasoned
4 " " 6" x 8" x 12' " "

Some other dimensions timber, planking and scrap lumber scattered about.

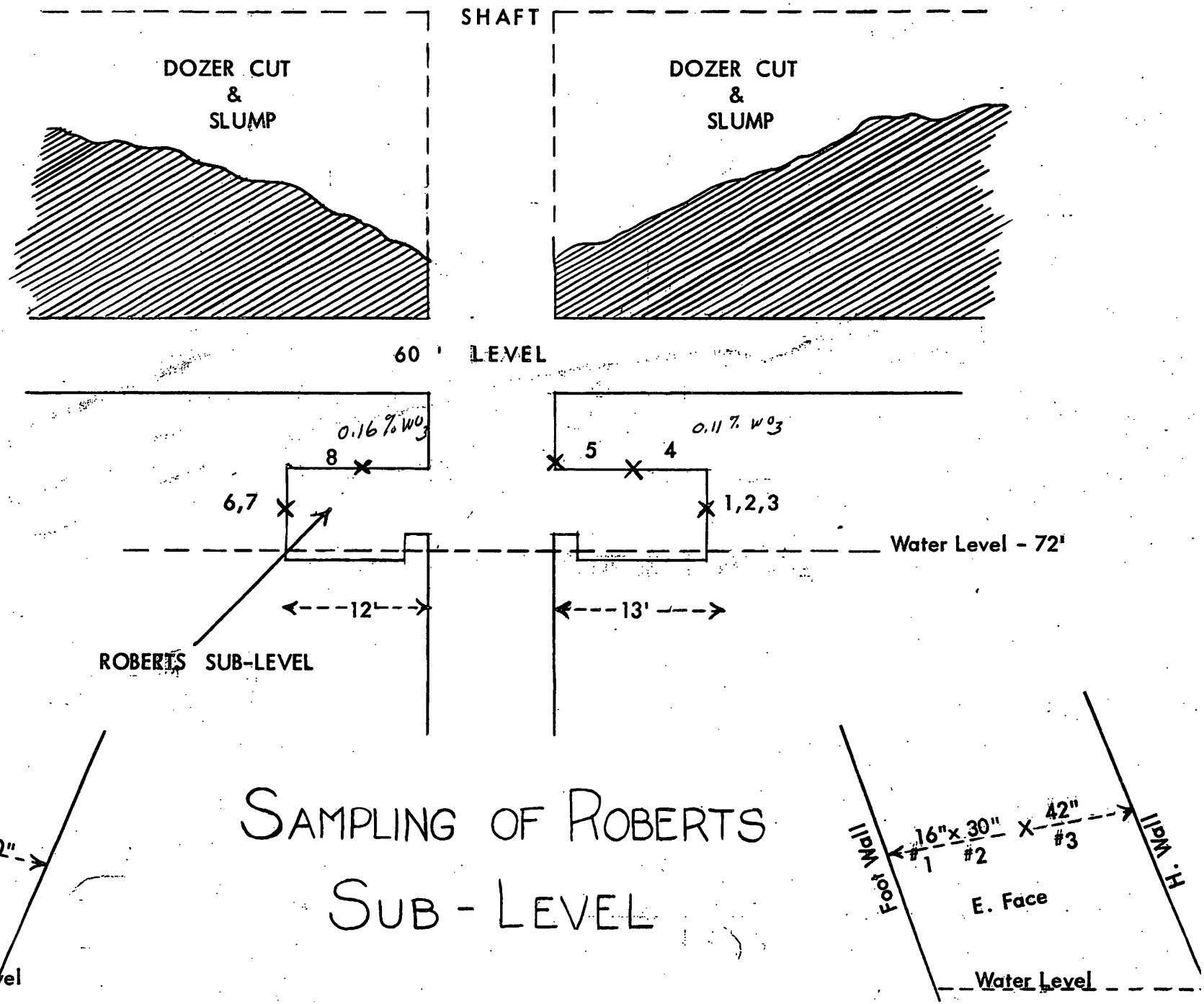
24 poles - 12' to 24' lengths

References:

Henry C. Carlisle, Consulting Mining Engineer,
315 Montgomery Street, San Francisco, Calif.

J.A. Richards, General Manager, St. Anthony Mining
& Dev. Co., Tiger, Arizona

E.R. Dickie, General Manager, Bagdad Copper Corp.
Bagdad, Arizona



SAMPLING OF ROBERTS SUB-LEVEL

SAMPLING OF THE ROBERTS SUB-LEVEL

Sample No.	Location	Au. Oz.	WO_3	Ag. Oz.
1	16" F.W. - E. face	0.95		0.9
2	30" center fill - E. face	0.48		1.0
3	42" H.W. - E. face	3.15		0.8
4	75" - Beg. 6' fr. shaft and continue E.	0.68	~~0.01~~	0.9
5	66" - Beg. shaft edge and continue E.	1.56		1.1
6	18" H.W. - W. face	0.98		0.8
7	30" F.W. - W. face	2.64		1.0
8	89" - Beg. 6' fr. shaft and continue W.	0.28	~~0.16~~	0.4

* *

Gold values as shown by assay figured at $35.00 per ounce.

Sample No.	Gold Value
1	$33.25
2	16.80
3	120.25
4	23.80
5	54.60
6	34.30
7	92.40
8	9.80

E. A. JACOBS, SR.
Phone 130-R
30 So. Main

JACOBS ASSAY OFFICE

REGISTERED ASSAYERS

BEN P. JACOBS
Phone 1064-W
P. O. Box 1889

Certificate No. 48287 Tucson, Arizona, Oct 24th, 1950

Sample Submitted by Mr. S B Owens

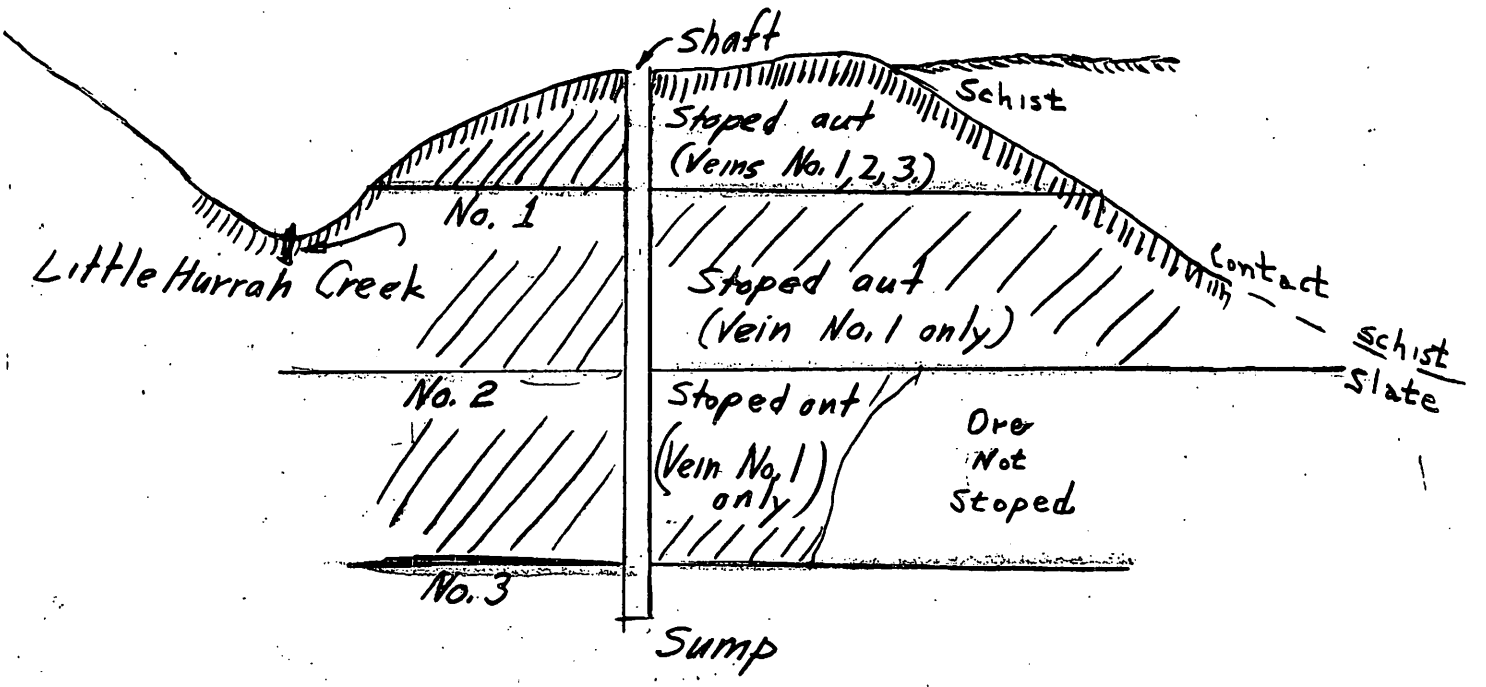
SERIAL	SAMPLE MARKED	GOLD Ozs. per ton ore	GOLD Value per ton ore *	SILVER Ozs. per ton ore	~~COPPER Per cent Wet Assay~~	~~LEAD Per cent Wet Assay~~	~~Per cent Wet Assay~~
28367	#1	0 95	$ 33 25	0 9/10			
68	2	0 48	16 80	1 0/10			
69	3	3 15	120 25	0 8/10			
70	4	0 68	23 80	0 9/10			
71	5	1 56	54 60	1 1/10			
72	6	0 98	34 30	0 8/10			
73	7	2 64	92 40	1 0/10			
74	8	0 28	9 80	0 4/10			

* Gold Figured $ 35-00 per oz. Troy

Charges $ 12 00

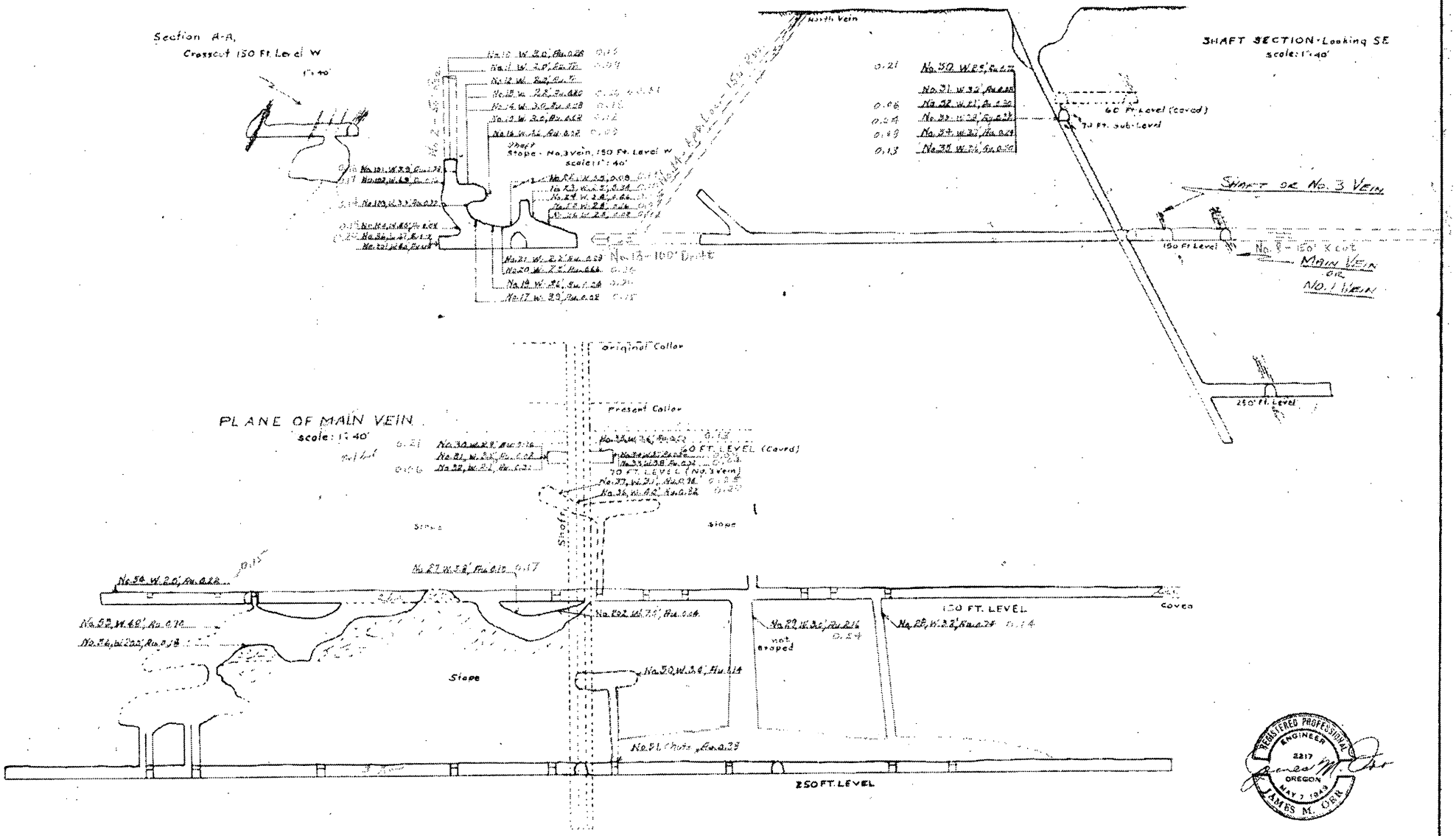
Very respectfully

Ben P Jacobs



SECTION OF THE
BIG HURRAH QUARTZ MINE
SOLOMON, ALASKA

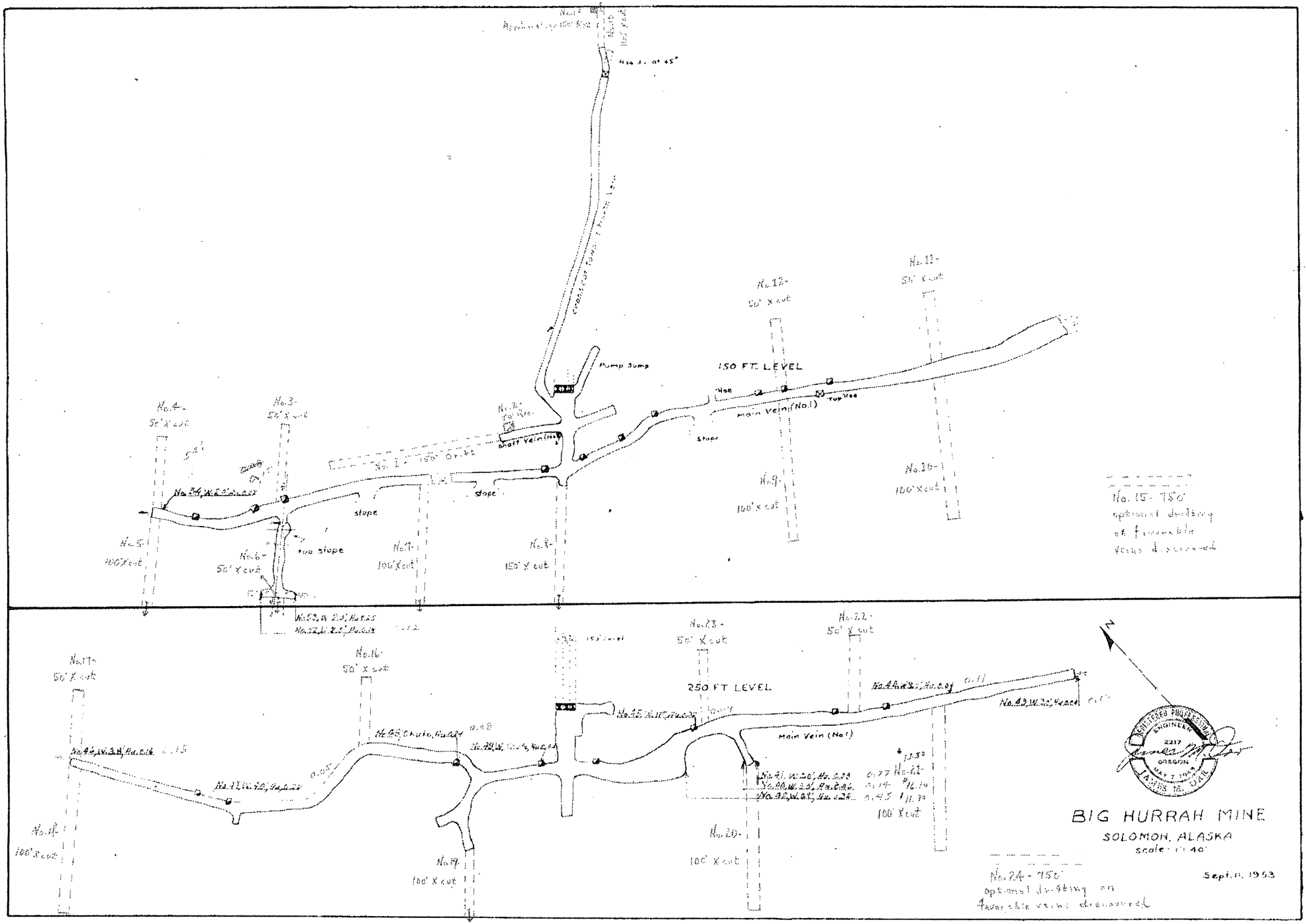
Square miles . . . 586,400
Population (Est. 1936) . . 62,000
TERRITORY of ALASKA
Purchased from Russia, March, 1867
Purchase price . . . $7,200,000
ARCTIC OCEAN
GULF OF ALASKA
PACIFIC OCEAN
Bristol Bay
CANADA
UNITED STATES
BRITISH COLUMBIA
YUKON
ALASKA
RICHARDSON HIGHWAY
Juneau
SEATTLE
ALASKA! Awaiting popular appreciation of her varied resources and climatic conditions, "America's Last Frontier" is yet a virtually untouched storehouse of natural wealth. This map is dedicated to those men and women who are today moulding this rich northern empire.
As the Territory's main transportation link with the States, The Alaska Line serves Southeastern, Southwestern Alaska and the Alaska Peninsula throughout the entire year—these ports are never closed to navigation. The more northerly Bering Sea region is served during its navigable season, between June and October.
Salmon packing is Alaska's major industry. It is not indicated in color on the map, as it embraces Alaska's entire Southeastern and Southwestern coastline, including the Bristol Bay area.
TABLE OF DISTANCES
from Seattle
ALASKA
SEATTLE
ALASKA STEAMSHIP CO.
A
THE ALASKA LINE
Key to ALASKA Travel Routes
ALASKA STEAMSHIP COMPANY ROUTES
Southeastern Alaska — Seattle — Skagway — Sitka . . . Year 'round Service
Southwestern Alaska — Seattle — Seward . . . Year 'round Service
Alaska Peninsula | Aleutian Islands . . . Year 'round Service
Alaska Peninsula | Bristol Bay . . . May — September, Inclusive
Bering Sea — Seattle — Nome — St. Michael . . . June — October, Inclusive
The Alaska Railroad — Rail Line
The Alaska Railroad — Steamer Line
Proposed International Highway Route



BIG HURRAH MINE

SOLOMON, ALASKA

Sept. 11, 1953


150 FT. LEVEL
Pump Sump
Main Vein (No.1)
Shaft Vein (No.2)
stope
Raise
Top Raise
No.4 - 50' X cut
No.3 - 50' X cut
No.5 - 100' X cut
No.6 - 50' X cut
No.7 - 100' X cut
No.8 - 150' X cut
No.9 - 100' X cut
No.10 - 100' X cut
No.11 - 50' X cut
No.12 - 50' X cut
No.15 - 75'
optional drifting on favorable veins discovered
250 FT. LEVEL
Main Vein (No.1)
No.16 - 50' X cut
No.17 - 50' X cut
No.18 - 100' X cut
No.19 - 100' X cut
No.20 - 100' X cut
No.21 - 100' X cut
No.22 - 50' X cut
No.23 - 50' X cut
No.24 - 75'
optional drifting on
favorable veins discovered
N
REGISTERED PROFESSIONAL ENGINEER
2217
OREGON
MAY 7 1968
JAMES M. UTTL
BIG HURRAH MINE
SOLOMON, ALASKA
scale: 1" = 40'
Sept. 11, 1953

REPORT

ON

BIG HURRAH QUARTZ MINE

SOLOMON RIVER DISTRICT

SEWARD PENINSULA

ALASKA

By

NORMAN C. STINES

NOTE: All values in this report are based on gold at $20.67 per ounce.

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CONCLUSIONS:

A study of the data and information available on the Big Hurrah Mine of the Solomon District Seward Peninsula, Alaska, allows the following conclusions to be reached:

1. There occur in the Hurrah Slates two apparently parallel, but opposite dipping (one N 65°, the other S 62°) Vein Systems striking about N 55° W. In the hanging wall of each Vein System occur, at irregular intervals, parallel veins diverging at an angle of about five degrees;

2. These two vein systems have been fairly well defined by surface work to have a probable horizontal extent in excess of 2,000 feet, and by underground work for a further 500 feet;

3. Underground and surface work have shown the South Vein System to have an interrupted length of 1,250 feet, and the North Vein System (really only explored on the surface) an unbroken length of 500 feet;

4. The ore is free milling gold bearing quartz requiring simply fine grinding and amalgamation to effect a very high gold recovery;

5. In these two vein systems there have been proven by surface prospecting, underground development and stoping, ten well defined ore shoots;

6. During the period from July 1, 1903, to October, 1907, there were mined from four shoots on three levels about 50,000 tons of ore for a recovery by amalgamation of $491,000, or about $9.80 per ton;

7. By prospecting, exploration and stoping, there have been indicated as available above the third level, the following amounts of ore:

Classification	Tons		Value
Developed	8,870	$	115,000
Proven	14,440		187,000
Probable	63,000		800,000
Possible	29,000		405,000
TOTAL	115,310		1,507,000

or an average unit content of just over $13.00 per ton recoverable by amalgamation;

8. The known areas of the ten shoots proven aggregates 11,225 feet, corresponding to about 1,000 tons for each foot of vertical extension;

9. The geological factors warrant an expectancy of at least one thousand feet vertical extension, in which some 750,000 additional tons are "reasonably to be expected;"

10. Working conditions, except probably transportation, are favorable;

11. The former mining, milling and housing equipment can be rehabilitated, new power plant provided, the milling capacity increased from 50% to 100% (with 30% increased recovery), the mine unwatered and operations resumed, by an expenditure of something under $160,000;

12. By such reconstruction the property will, within nine months of starting reopening, be able to mine and mill at a minimum rate of 27,000 (more probably 36,000 tons) annually;

13. Total working costs (on a 27,000 ton annual capacity) will approximate:

Development	$ 1.00
Stoping	2.50
Milling	1.00
Overhead	1.50

or a total of $6.00 per ton;

14. On the basis of 27,000 tons mined and milled annually, the profit will approximate $189,000;

15. By carrying out at the start a very obviously above normal rate of development, it is confidently believed that within three years a production of 300 tons daily will be warranted;

16. By setting aside during the first three years, a predetermined portion of the profits, the equipment and construction for this added productivity can be financed without additional provision of capital; and

17. The property can be acquired on a reasonable basis.

To summarize; This property has the necessary indications to warrant the expression that its reopening on the basis hereinafter set forth, will result in a medium size highly profitable quartz mining operation with a reasonable life expectancy. Owing to the excellent former production record, and the causes necessitating its closing in 1908, the risk involved in reopening this property is subnormal for a quartz gold mine.

INTRODUCTION:

It is rare that a gold quartz mine of any importance is developed in a purely placer gold region. While the Seward Peninsula has produced something over $80,000,000 worth of gold, probably less than one per cent has come from quartz. The property herein described has a recorded

production of about $500,000 from less than 50,000 tons. A study of its records and the data available seem to indicate an excellent opportunity to develop in the area of patented ground comprising this property, a lode gold mine, of considerable size and value. This report presents and interprets the data and information available.

LOCATION AND ACCESSIBILITY:

The Hurrah Quartz Mine is located at the junction of Big Hurrah Creek and Little Hurrah Creek, about fifty miles east of Nome, in the Solomon River District of the Seward Peninsula, Alaska.

From early June to mid-October boats leave Seattle monthly for Bering Sea. These boats discharge onto lighters, which in turn land their freight onto the beach at the mouth of Solomon River. From that point it is twelve miles by fair motor road to the property. For freight shipments the sea is closed from November 5 to the following June 5. But for bullion, mail and passenger transportation airplane service can be had all winter as well as during the summer.

EXTENT:

The property comprises twelve claims and three fractions, all in one group and patented November 1, 1912, under No. 298715. It embraces about 242 acres and covers about 8,000 feet along the strike of the lodes.

TITLE:

Title at the present time is recorded in the name of Charles W. White, Trustee. He has full authority to act toward its disposition, and, if required, the real owner will legally approve any actions the

Trustee may take. The property is apparently free of any encumbrance whatsoever.

HISTORICAL:

The outcropping mound of slates at the junction of Big and Little Hurrah Creeks, being usually dry and bare, was a favorite stopping place for travellers between Nome and Ophir. The top of the mound contains no outcrop in place. Where Little Hurrah Creek hugged the east bench of the upper end of the camp ground, a quartz boulder, weighing about two tons, lay at the edge of the stream. Two Californians, Charles Shattuck and A. B. Wilson, when stopping here in 1901, noticed this boulder. Being hard rock miners they examined it. Its favorable appearance caused them to locate the Elmer S claim. Their work did not expose any vein in place, so they located on the opposite side of the creek, the Dewey. Here only slightly stained iron quartz, but no bedrock, was found. They located additional claims. Before they left samples were taken from the above mentioned boulder. On these samples a San Francisco assay office gave returns varying from $20.00 to $60.00 per ton.

Early in the Spring of 1902 these two prospectors were on the St. Paul. They met and showed their samples to Tom T. Lane, a fellow passenger. Lane recognized these specimens as similar to "ribbon rock" he had seen at various places--Quartz, Dahl and Coffee Creek Dome. Being interested, he took an option. As soon as he landed at Nome he engaged a former employee, J. M. Williams, to proceed there to do some prospecting. Williams returned with a favorable report, so Lane returned to the property with him.

In a few hours Lane and Williams opened, just above the boulder,

a five foot vein of $15.00 quartz. The cut on the Dewey was found to be in the hanging wall gouge of a 14 foot vein of $9.00 rock.

A crew of seven men was put to work surface tranching and in a short time the main North and South Vein Systems were opened up. Other work indicated a widespread distribution of gold bearing quartz. Enough ore was exposed to warrant a ten stamp mill. A 3600 pound composite sample gathered from 1400 feet along the outcrop was taken to San Francisco for testing. Luckhardts recovered $14.60 per ton by amalgamation, and the tails assayed $9.80. Crushing was through a 30 mesh screen.

In July 1903 the ten stamp mill was started, and ten more added in 1904. During the first year of operation $195,244.20 were recovered from 9,985 tons, leaving $4.60 in the tails. During the second year 12,410 tons yielded $128,066.69.

In 1905 T. T. Lane sold the property to A. G. Lane. Williams resigned and a new superintendent entered. This period was marked by poor management and poor managers. Costly innovations were made at the sacrifice of development. In June 1906 the mine was reported as exhausted, and an offer made to sell it back to T. T. Lane.

Lane, still believing in the property, took it over and in a few months, under the superintendency of Rob. Straus, Fozard and Lane, there were produced from the third, or 250 foot level, $114,000. In October 1906 Straus was taken ill and his assistant put in charge. This man proved very incompetent, and ran the mine into debt. The mine was closed down.

The mine was finally reopened in June 1907, and in the balance of

the season with ore from first and third levels, and from open cuts along the outcrop, about $51,000 were produced. The mine was left in charge of L. L. Lane.

This was a property which paid from "grass roots;" No extensive search for ore was ever necessary and really the only openings not in ore were the cross cuts on each level and parts of the shafts. So far as work extended on each level the veins were continuous. In them were richer stretches--the shoots--but between these shoots the rock milled around six dollars. The history of this property is not unique, but has been repeated many times in mines of this character; those that pay from "grass roots."

PAST PRODUCTION:

It is very difficult to arrive at the total production from this property. Many of the records were lost in the 1906 fire at San Francisco.

One of the former superintendents, J. M. Williams, writing in the latter part of 1909, gives the following;

"I have no returns for the month of July 1903 or for the period between October 12, 1907 and June 1, 1908, and therefore omit them from my reckoning. No doubt the output of this property exceeds the figures given here by at least $30,000. However, the sums given are taken from old memos made at the time, and from duplicate bullion receipts which I obtained from the Nome banks, and is herefore correct. I have data that account for a yield of $445,422.92, but as explained above, there is considerable to be added to this before the full amount is reached.

"I also wish to call your attention to the fact that while in some instances I have been unable to obtain the exact amount of the returns in bullion, I have found it impossible to learn the number of tons treated. Hence, I am not in a position to state just what the ore would average in value, although during the twelve months dating from August 1, 1904, 9,656 tons of ore treated gave a gross output of $100,544.20, or at the rate of $10.41 per ton. As development work was being pushed throughout the mine at this time, I consider the ore milled a fair average, and, with proper management, this grade of ore can be made to pay a handsome profit."

T. T. Lane has been closely connected with this property since its inception. The records which he has show a total recovery of $490,945.~~20~~ 92 from 49,996 tons, or at the rate of $9.82 per ton. The following table gives the average figures by years (values at old price of gold):

see Williams, p.4

Management	Period	Stamps	Tons Milled	Yield Bullion	Per Ton
T. T. Lane	July 16 to Aug. '03	10	330	$ 4,700.00	14.20
J. M. Williams	Aug. '03 to Aug. '04	10	9,656	100,~~3~~5 44.20	10.41
J. M. Williams	Aug. '04 to July '05	20	12,410	128,066.69	10.40
L. L. Lane	July '05 to July '06	20	12,000	92,235.03	7.69
Rob Straus) J. Fozard)	July '06 to July '07	20	12,000	114,000.00	8.75
T. T. Lane	July '07 to Oct. '07	20	3,600	45,000.00	12.50
T. T. Lane	1908 pick up			6,400.00	
	TOTALS AND AVERAGE		49,996	490,945.92	9.82

The low per ton yields in 1906 and 1907 were due to milling a large proportion of "between shoots" material.

The above production was made by crushing the ore in stamp mills fitted with 50 mesh screens, and recovering by amalgamation the gold liberated. Sampling and assaying of the tailings show a content in excess of $4.60 per ton in the 40,000 tons impounded. Thus the average grade of the ore treated was $14.~~9~~4 2 per ton.

Another analysis of the ore production by shoots gives the following:

From Shoots 2, 3 and 9 . . . . . 6,500 tons

From Shoot 8 . . . . . 20,700 tons

From Shoot 1 . . . . . 16,180 tons

From Shoots 5 and 6	500 tons
From Shoot 7	1,500 tons
Open cuts, Shoots 10 and 11	3,000 tons
Various	1,575 tons
TOTAL	49,995 tons

GEOLOGY

The geology of the District has been studied by the geologists of the United States Geological Survey. Their findings have been made public in two Bulletins:

Bulletin #328 by Arthur J. Collier; and

Bulletin #433 by Philip S. Smith.

The latter volume is the better one. The particular references in it to this property are pp. 128-130; p. 140; p. 143; and pp. 180-183. In the earlier Bulletin pp. 227 to 232 are devoted to a description of the occurrence.

It does not seem necessary even to summarize the passages noted as they should be read. The only necessary remarks seem to be on the surficial geology at the mine. In the area embraced in the patented ground only two formations are recognized: The Hurrah Slates and the Solomon Schist. The former is a "black, hard, somewhat graphitic, quartzitic rock which breaks into more or less rectangular fragments." The latter is an older, and much more metamorphosed rock, usually quartose, with an abundance of chlorite. About 1500 feet east of the main mine camp the schists are found overlying the slates.

The productive quartz veins are only in the slates. On the surface they are evidenced by quartz boulders and float strung along

their outcrops. This evidence ceases when the slates disappear under the schists.

VEIN SYSTEMS:

The occurrences at the Hurrah Mine should really be classed as vein systems rather than a series of simple veins. At the mine the Hurrah Slates occur in a rather narrow belt--probably about a mile wide. On the surface it extends for a very considerable distance to the west, but as noted above, disappears, about 1500 east of the camp, under the Solomon Schists.

The individual veins vary in size from mere threads to fourteen feet wide. They have a general course but vary in strike from N 50° to 60° W. In dip there are two distinct sets -- one dipping about 62° to the southwest, and the other about 65° to the northeast. These are herein referred to respectively as the South and North Vein Systems. The outcrops of these systems are apparently about parallel, but, at the elevation of the camp, separated by approximately 75 feet of Hurrah Slates.

The veins are always free from the slate walls -- at times accompanied by gouge, and at others, without. They do not conform to the structure of the enclosing rock. Considered as a whole each system might be considered a stockwork.

In each system the general strike of the controlling fractures seems to be the same -- N 55° W. In both systems, always in the hanging wall, are diverging veins. In the South System these strike about N 60° W, in the North system, about N 50° W, thereby making the angles of intersection about five degrees.

These statements are facts, but not enough study of the geology revealed by the underground openings has been made to allow even a guess as to the cause therefor. These characteristics are important factors in directing exploratory work for further ore bodies on partially developed levels, and the development on lower levels, of the downward extension of the presently known ore bodies.

The veins are continuous over comparatively long lengths. On the surface the South System main fracture may be traced uninterrupted by pits and open cuts for over eight hundred feet. At its east end it passes under the schist blanket. Going west beyond the open cut designated Shoot II, it can be traced by quartz boulders and float for several hundred feet. Underground, on the second level, it has been followed without a break for 750 feet. At the west end the face is in ore six feet wide. At the east end the face is still in vein material over four feet wide. This latter point, if projected to the surface after making due allowance for rake of the shoots, would mean an added length of about 450 feet. In other words the total length of unbroken vein would be about 1200 feet.

On the surface the North System can be traced by outcrops revealed in pits and open cuts for a total length of about 1100 feet. The same sort of quartz boulders marking the proven length can be found for a further 1000 feet to the west. At this latter point, about the middle of the Potasuba Fraction, the old placer miners found some very rich gold bearing quartz. T. T. Lane later established this float as an outcrop of a pay shoot in the North System. To the east the outcrop passes under the overlying schists.

Very little underground work has been done on this system, but that little has confirmed the results from the surface work.

The evidence of the persistence of the fracturing on which the veins have formed is such that one is warranted in concluding that two lengthy vein systems exist in the Hurrah Slates on the property of the Big Hurrah Mine.

CHARACTERISTICS OF ORE:

In this discussion the expressions "ore" and "ore body" mean "rock" or "masses of rock", the mining and milling of which will yield, under any given set of conditions, an amount of gold that can be sold for more than the cost of its winning and marketing. All other material, whether gold bearing or not, is "waste".

However, it is conceivable that the "waste" of one time may be the "ore" of another, and vice versa. The delimiting factor is the cost of recovering the gold contained, and this factor is determined by the conditions existing at any given time. Therefore it is likely that where "waste" is carrying about four dollars per ton, with only a slight betterment of the working conditions, this may become ore. If any waste answers that description the term "junore" may herein be used.

Under the preceding section the uninterrupted length of the veins was given as 1200 and 1100 feet, but not all these lengths contain ore. There are clearly defined ore shoots. By "ore shoots" are meant those continuous lengths of vein filling which plated better than eight dollars worth of gold bullion per ton treated. In many instances, when the mine was operating, the vein filling between the shoots was also put through the mill, plating an average of four dollars per ton.

The ore of the shoots is composed of masses of quartz as well as a "ribbon structure material". The ribbon rock is due to bands of quartz separated by small horses of dark graphitic slate. The widths of both the quartz and the slates may vary, but all are comparatively narrow. Due probably to both walls following fault planes the ore breaks down readily. The faulting is of minor character, not one having been traced any distance. They are relatively parallel. The indications are that the vein filling came after the general deformation of the slates, and that the faulting was either contemporaneous or immediately following the formation of the veins.

One very important characteristic of the ore is an almost entire lack of sulphides, or other auriferous base metal minerals. The outcrops are marked by an almost complete absence of rusty quartz or associated slates. The "dollar per ton" values used throughout this report refer to yields by amalgamation--plated. Even the value reported in the tailings is in fine gold, and is there due to too coarse crushing. In other words gold still remains encased with quartz.

The presence of graphite in the country and ribbon rock sometimes interferes with amalgamation, and may explain some of the tailing loss.

DEVELOPMENT:

The development work has been of the type by which a mine is made to produce an operating profit just as soon as possible, rather than is the case where money is available to explore thoroughly the ore bodies before the most economical method of ore extraction can be determined. In this type of development almost all exploratory work is

confined to the ore shoots themselves and as little dead work as possible done. This must be appreciated to understand what has taken place at this property.

As development work progressed more and more shoots were revealed. At first the relation of these to each other was not (and in many cases still is not) clear. But to describe this development, necessitates, to insure clearness, some considerable repetition in this section and the succeeding one. By consulting the sketch plan as well as the figures, clearness should be obtained.

To trace the outcrop of the South Vein System, the first exploration was a series of surface pits. On the bluff west of the camp various shoots of ore were easily found, and what more natural than the running of adits, from the base of that bluff easterly into the hill. Figure I shows the conditions clearly.

The first work was started and continued as "I" Adit. At the same time the South Shaft, approximately 200 feet easterly, was being sunk. At the level of the adit, 60 feet down, a station was cut and drifting both ways commenced. It soon developed that the "60 foot level" (hereafter referred to as "first level") west drift and Adit "I" were on different fractures. At 190 feet in on "I" a 47 foot cross cut to the northeast was necessary to reach the shaft station.

The first level west drift was continued to the surface, coming out at "3" on Figure I. Later an adit was started at "2", Figure I, and at about 120 feet in joined adit "3".

The first level east drift was continued about 200 feet where it cut the contact between the Hurrah Slates and the Solomon Schist. (In

the mine maps this is designated as a fault. It might be, but it is also a contact and will be so called here. The surface geology indicated that this contact would be met at about that point.)

In this first level east the junction of the shoot (No. 1) followed by Adit "I" and the shoot (No. 9) followed by this drift was found about 100 feet east of the shaft.

Exploratory work on the surface revealed other shoots of ore on the North Vein System (See Figure I) from "5" over the hill easterly through "7" to the schist. Going west, this system could be traced for several hundred feet, and a distinct shoot (No. 10) (See Figure II) opened at "10".

On the South Vein System the surface work traced the out-crop east to the schist and west for several hundred feet. The 11 on Figure II denotes an important shoot (No. 11) there.

The South Shaft was sunk approximately to 250 feet vertical depth, and stations cut at 60, 150, and at the bottom. These are designated as first, second, and third levels respectively. At each level cross cuts had to be run southwesterly to cut the downward extension of the vein opened in "I" adit on the first level.

In sinking, the shaft, at about 75 foot depth, passed into the foot wall of the vein upon which were run the first level west and east drifts. It seems pertinent to remark here that on neither the second nor third levels was there done any exploratory work to locate the downward extensions of Shoots 2, 3 and 9. Thus the ore opened in adits "2" and "3" has not been explored below. The one northeasterly cross cut on the second level was really a drift and its failure to cut the downward

extension of the north vein can be readily understood. (See Figure V.)

At the second level a 55 foot cross cut southwesterly intersected the "I" adit vein. Drifts both easterly and westerly developed that vein for about 750 feet. Each face was still in ore.

At the third level a 60 foot cross cut southwesterly reached the downward extension of the fracture in which Shoots 1 and 8 were developed on the second level. Owing to the westerly rake of the shoots, this cross cut intersected No. 8 Shoot. This was drifted on easterly for over 400 feet and westerly for about 60. Cross cuts were run from both the east and west drifts and a slightly diverging vein cut in each of them, as well as in the prolongation of the station cross cut.

Then came the sinking of the North Shaft. This goes down on what is "7" on Figures I and III. It reached a depth of 125 feet. Only about 50 feet of drifting was done at the bottom. This work was preceded by adit "5", Figure I, which was driven easterly on the 60 foot level for about 160 feet.

All development work, as remarked at the beginning of this section, was really done to secure ore for current milling operations. As such it was more or less haphazard. That it found enough to keep the mill continuously in operation speaks volumes for the abundance of ore in these vein systems. All work stopped when litigation closed the mine in 1908, and it has remained idle ever since.

ORE SHOOTS:

The development work has shown the veins to be continuous. There are three principal strikes for these veins: In the main South System it is N 55° W; in the diverging hanging wall veins N 60° W;

while in the main North System it is N 55° W; and for the diverging hanging wall veins, N 50° W. It will be noted that in each system the diverging veins are in the hanging walls, and the main fractures are apparently parallel.

While development work shows the veins to be continuous, the gold content is not uniform throughout. For economic reasons, when the "plate recovery" was less than eight dollars per ton, the vein material was considered outside the "pay shoots". Thus, on the second level, the two "shoots of ore" (1 and 8) were separated by vein material, but this plated only about four dollars per ton. It is clear that this "between shoot" material is far from being barren, and it is quite conceivable that, given a plant handling 300 tons daily, such material could be mined and milled for about three dollars per ton. There would be no development or overhead charge to place against it, just the straight operating cost. But for purposes of discussion in this section of the report the veins are considered to contain "barren" and "pay" shoots. The latter include only that portion of the vein that has plated over eight dollars per ton. (Incidentally, as stated elsewhere, by "plating" is meant the actual recovery by amalgamation when the mill was formerly run. The tailings contain an average of $4.60 per ton. By the simple matter of grinding the ore finer the greater part of this can be recovered by amalgamation.)

In order to identify these shoots in the descriptions to follow, numbers have been given to them. There is no particular scheme to their numbering, except that in general the sequence denotes the order of identification of the shoots. In tracing out the relations of the shoots to each other the Sketch Plan will be found useful.

SOUTH VEIN SYSTEM:

Since the shoots on this system were first opened up they will be described first. In general the main fracture courses N 55° W. Diverging from this main fracture are more or less parallel ones. These all go off into the hanging wall at an angle of about five degrees. Not enough underground geological work has been done to be certain that the relations are that simple, but for the purpose of this description, that statement will suffice.

NO. 1 SHOOT

The shoot upon which No. 1 adit started has been called No. 1 shoot. It is exposed on the bluff and in the bed of the stream, as well as by open cuts over the brow of the bluff going easterly. On the first level it was followed easterly for 190 feet -- to a point opposite the shaft. The block of ground above this stretch was stoped out.

On the second level it was entered in the west drift at 70 feet and followed for about 280 feet. This face was not extended further west due to fear that subsidence would cause openings to extend to the bed of the creek and thus allow the water into the mine.

On the west side of the shaft the stopes were carried up to the first level. On the east of the shaft these stopes went through to the surface, thereby mining that portion of this shoot not exposed on the first level east drift.

This shoot is on one of the N 60° W diverging hanging veins. Its full length has never been developed. On the first level it has a known length of 320 feet, with at least a further 80 feet extending westerly under the creek. It has the usual rake of 45° to the west.

The work on the third level west did not progress far enough in that direction to get this shoot. What work was done to the west of this third level was to the south of where this shoot could be found.

For its developed length of 320 feet, it has an average width of five feet. In mining above the second level it produced 16,170 tons with a plate recovery of over eleven dollars and a tailing content of over four dollars per ton. It is safe to estimate that with fine grinding this ore will plate thirteen dollars.

There are in this shoot above the third level up to the second about 14,400 tons of rock of the above average grade. This may be taken as proven.

NO. 2 SHOOT

Shoot No. 2 is that ore developed by No. 2 adit. This adit is only about 120 feet long to its junction with No. 3 adit, which junction on the first level is about fifty feet west of the shaft.

Thus, this shoot is in a diverging vein, and is practically parallel to No. 1 shoot. For fifty feet it was narrow, but toward the entrance it widened. At the creek are two feet of ore that plated $12.00 per ton. The ore mined from this shoot is combined with that from shoots 3 and 9.

On the lower levels of the mine, that portion, in which the downward extension of this shoot may be found, has never been explored.

NO. 3 SHOOT

This shoot is revealed by No. 3 adit. It is on the main South Vein fracture striking N 55° W. On the first level there are really three ore shoots indicated in this vein. This one is the most westerly.

It has a known length of 150 feet and a width of three. About five hundred tons of ore were mined from it. They plated about eleven dollars, but with fine grinding should plate over thirteen dollars per ton.

For the same reason that No. 2 shoot has not been opened on the lower levels, this one has not been explored below the first level.

NO. 9 SHOOT

This is the shoot on which the South Shaft was sunk. At a depth of about 75 feet the shaft flattened and passed out of the foot wall of the vein. On the first level the shoot had a length of about 150 feet for an average width of seven. It has been stoped only above the first level. The ore pillar around the shaft above that first level is part of this shoot. The ore stoped plated over ten dollars, and with fine grinding will plate over thirteen dollars. As for shoots 2 and 3, there has been no exploration to find this shoot in depth.

From shoots 2, 3 and 9 about 6,450 tons were mined and milled. Between the third and first levels there should be found about 16,000 tons of ore. This has been classed as probable. For shoots 2 and 3 the probable ore between those same levels is a minimum of 11,000 tons.

NO. 8 SHOOT

About 150 feet east of the shaft, on the first level, the east drift entered this shoot. It was followed for sixty feet, to the contact with the schist. This ore did not outcrop, although after it had been stoped, subsidence brought a cave to the surface. This is shown at "8" on Figure III.

The second level east drift opened this shoot at about sixty feet from the main cross cut, continuing in it for about three hundred feet.

From that point, taken as the east end of this shoot, the vein for a distance of about thirty feet, showed a series of small step faults, with throws from three to eight feet horizontally. Then the vein swung again to the south on its normal course. From the appearance of the last thirty feet of this second level east drift another shoot has been entered. (This new shoot later discussed under No. 12 shoot.)

The main crosscut on the third level intersected this shoot about seventy feet from its west end. The third level east drift followed it for about 250 feet. These levels show the usual rake of 45° to the westerly.

This shoot has a developed length just over 300 feet, and an average width of eight. All of the ore above the second level, and about 60% of that between the second and third, was stoped for a production of about 20,700 tons. These plated over ten dollars per ton. With fine grinding this ore will plate in excess of $13.00. Above the third level there remain fully developed and ready for stoping about 8,870 tons.

More work has been done on this shoot than on any other in the mine. This work has shown that where developed on the lowest level, its length, width and gold content are practically identical with that on the upper levels. This was really a blind shoot as no outcrop was visible.

NO. 12 SHOOT

In the last thirty feet of the second level east drift what appears to be a new shoot was revealed. This is called No. 12. After the third level was opened no further work was done on the second. That drift has now caved. Owing to the probable proximity of the face of that drift to the schist contact, it hardly seems worthwhile to reopen it.

The third level east drift, for about seventy feet east of the east end of the No. 8 shoot, was low grade, but then for over 200 feet it carried over nine dollars per ton plating content for a width of five feet. And the east face was still in ore. This shoot could not outcrop

as it occurs under the schist.

The only ore mined from it was that obtained from development work. The returns indicate that with fine grinding it will plate over $12.00 per ton. Its eastern limit is not known, but the proven dimensions are 200 x 5 feet. There is probable ore to about 8,000 tons above the third level.

NO. 13 SHOOT

On the third level there are besides the main crosscut two others. One of these starts from the west drift, about forty feet from the main crosscut. At a distance of 23 feet it cut one foot of very high grade quartz. The other end is about 100 feet east of the main crosscut. It was fifteen feet long, and exposed four feet of $12.00 ore. In the main crosscut, about 20 feet south of the main drifts, are exposed five feet of $16.00 ore.

About 250 feet east of the main crosscut, in the east drift, is the junction of a hanging wall diverging vein with the one in which shoot 8 was developed. This is taken as the eastern extension of the shoot revealed in the three crosscuts, and is known as No. 13. It has an indicated length of 300 feet and a probable average width of about five. It will probably, with fine grinding, plate over $13.00 per ton. There should be probable ore above this level to a minimum of 18,000 tons.

After these exposures were made on the third level, the surface was carefully examined. This search was rewarded by the finding, east of Little Hurrah Creek of a stringer of quartz. In various pits this stringer was found to continue, and in some cuts opened out to twelve inches in width. Pannings showed about $12.00 grade. It is

believed that these pits show the outcrop of this shoot.

NO. 11 SHOOT

Going westerly on the surface, beyond the creek, quartz boulders and smaller pieces suggest the outcrop of the South System. The indications exist for several hundred feet. About 200 feet from the foot of the bluff, a trench has revealed a shoot for a length of 65 feet and a width of 14. This is the strongest outcrop yet revealed on the property. It is referred to as No. 11 Shoot.

Some ore was hauled by teams from this opening, and that plated up to the average. No work underground in that portion of the mine where this shoot could be found has been done. This may be said to contain above the third level a possible reserve of 15,000 tons.

NORTH VEIN SYSTEM

As noted earlier, in the vicinity of the shafts the North Vein System outcrops about 75 feet north of the South System.

The surface work on this system indicated two shoots on the N 55° W strike, and one on the N 50° W hanging wall diverging vein. The dips of these veins are about 65° to the north.

NO. 5 SHOOT

On the face of the bluff, northwesterly from the entrance to No. 3 adit an outcrop was found. On this No. 5 adit was driven for about 160 feet. The first thirty feet exposed good ore -- plating over $15.00 per ton. The balance was in vein material which plated only from four to six dollars per ton. From the mouth of the adit west to the creek, about fifteen feet, are exposed the richest sections of ore yet uncovered in the mine. A six foot winze followed this to that depth.

The shoot as delimited will be at least 50 x 3 feet, and will plate about $18.00 per ton. It has a possible tonnage to the third level of about 7,000.

NO. 6 SHOOT

About 20 feet in from the mouth of No. 5 adit is a junction with a hanging wall diverging vein. With the surface indications on the bluff there is unmistakable evidence of another shoot here. This has a known length of 25 feet by a width of 3, and contains better than $15.00 rock. This is the No. 6 Shoot. It contains an underterminable amount of possible ore.

Ore from both this and No. 5 was hauled to the mill and put through with other runs.

NO. 7 SHOOT

The north shaft, sunk in 1907-08, was started on the North Vein so as to cut at 125 foot depth the western rake of the shoot exposed by the five surface prospect holes to the east of the shaft. Ore was reached at a depth of 115 feet, and the shaft bottomed at 125. From the short westerly drift--plainly out of the shoot--a few hundred tons were mined and raised. These plated only from four to six dollars per ton--plainly "between shoots filling." The lower ten feet of the shaft yielded ore that plated $12.00 per ton, with $4.50 remaining in the tailings. The surface indications point to a length of 200 feet and a width of 3. It should plate about $15.00 per ton and contains a possible tonnage of 10,000 above the third level. This is No. 7 shoot.

NO. 10 SHOOT

Surface debris for several hundred feet westerly of Little Hurrah

Creek indicate clearly the outcrop of the North Yield System for that stretch. At a point about 500 feet from the creek a shoot was indicated. More prospect holes indicated a body about 300 feet long, with an indicated width of three feet. One cut proved this continuous for about 100 feet. This is known as No. 10 shoot. Some ore was hauled from here to the mill and it placed well--about $10.00 per ton. It contains, above the third level, a possible 7,000 tons of ore.

RESERVES OF ORE

In the preceding section, after discussing each shoot, a statement was made as to its developed, proven, probable and possible tonnage content. These may be summarized:

	Tons	Content
Developed--		
Shoot 8	8,870	$ 115,000
Proven--		
Shoot 1	14,440	187,000
Probable--		
Shoots 2 and 3	11,000	135,000
Shoot 9	16,000	200,000
Shoot 12	8,000	100,000
Shoot 13	18,000	215,000
Shoot 7	10,000	150,000
Possible--		
Shoot 11	15,000	180,000
Shoot 5	7,000	125,000
Shoot 10	7,000	100,000
To consolidate:		
Developed	8,870	115,000
Proven	14,440	187,000
Probable	63,000	800,000
Possible.	29,000	405,000
TOTALS.	115,310	$1,507,000

The above classifications are extremely conservative. That classed "probable" is really assured. Thus, without any further sinking or development work beyond the immediate vicinity of the old stoping areas, there are assured a total of about 85,000 tons from which, with the present plant plus finer grinding equipment, in four years about $1,100,000 can be recovered by amalgamation.

Thus far there is nothing to indicate that this ore will not go down a reasonable distance. The total area of all the known shoots approximates 11,225 square feet. In round numbers this should yield 1,000 tons for each foot of vertical extension, or 100,000 tons for each 100 feet of depth. This would gross about $1,300,000.

In addition, the unexplored length of the probable ore bearing ground is over four times that explored and included in these considerations.

TAILINGS

When the mine was operated the tailings were impounded. There must be available a minimum of 40,000 tons of these. Sampling at various times have given from $4.60 to $9.80 per ton. It seems safe to use the lowest figure as the average. Based on that, these contain a gross of $184,000. Only finer grinding is required to recover at least 80% of this total--say $145,000. The retreatment of these tailings would yield a minimum of $75,000 net profit.

WORKING CONDITIONS

The working conditions affecting costs are, on the whole, favorable. The general impression that mining costs in the Seward Peninsula are higher than elsewhere is wrong.

LABOR

There is now available an abundance of excellent labor--both skilled and unskilled. It is made up mainly of men who are pioneers, and as such have a more than average amount of intelligence and ambition. They approach their work more from the standpoint of a desire to accomplish results and be paid therefor, than from the standpoint of the pay check alone. It is the custom to include board with the eight hour wage, but to pay for overtime hourly only on the cash basis--the eight hour cash rate divided by eight. Unskilled workers get $4.50 in winter and $5.00 in summer. Skilled men get $6.00 and $7.00 in summer and fifty cents less in winter. With an all year round operation these figures can be somewhat bettered. For a mine of this character the average eight hour labor day will approximate $8.00 per eight hour shift.

TRANSPORTATION

Practically all supplies must come from Seattle. The average freight and lighterage charge approximate $20.00 per ton. The Beach to Mine rate will add an additional ten dollars. Fortunately the product--gold bullion--requires very little transportation charge.

SUPPLIES

Practically all supplies may be purchased cheaply at Seattle. To those costs must be added transportation. Fortunately for a quartz free gold property, fuel, food and explosives are the only mine bound freight required.

MINING

Past experience showed excellent mining conditions: ground

breaks easily, walls stand well; very little timber is required; and an almost entire lack of underground water.

METALLURGICAL

The gold is practically all free and only sufficiently fine grinding is required to prepare it so a very high extraction by amalgamation can be made. The metallurgy required is of the very simplest.

Milling in the enlarged plant--where only fine grinding and amalgamation is to be practiced--will not exceed $1.00 per ton. The above is a very conservative analysis of the property. From the numerous indications of ore shoots not yet developed, and from a reasonable downward expectancy of one thousand feet vertical, the total tonnage that should become available approximates 865,000, from which a net profit in excess of $5,000,000 should be won. It really has the earmarks of being developed into a medium sized mine.

Respectfully submitted,

Norman C. Stines, M.E.

Seattle, Washington

January 12, 1931

Excerpts

Bulletin 433

BIG HURRAH MINE

(Copied from United States Geological Survey Bulletin No. 433, Pages 143-147 inclusive.)

LODE DEVELOPMENTS

General Statement. -- Up to the present time in the entire region there has been only one mine which has been placed upon a paying basis. This is the Big Hurrah mine, which is located at the junction of Big Hurrah and Little Hurrah Creeks. The lode was discovered in 1900, but no considerable amount of work was done on it until 1903. From 1903 to 1907 the mine was in nearly continuous operation, but in July of the latter year it was closed because of difficulties with the administration of the property and was not run at all during 1908. Owing to the fact that the mine was stopped and the pumps drawn soon after the Survey party reached the region in 1907, it was possible to spend only half a day underground and consequently not as thorough an examination could be made as was desired. In this hasty study few facts in addition to those published by Collier were learned. (Collier, A. J., and others, Gold placers of parts of Seward Peninsula: Bull. U.S. Geol. Survey No. 328, 1908, pp. 228-231.)

A general view of the Big Hurrah mine is shown in Plate XV, B. At the extreme left of the view is the main shaft house with the tall smokestacks. At the extreme right is the stamp mill, which is connected with the shaft house by a covered way, so that the passage between the two may be used winter and summer. The other buildings are the bunk houses and shops customarily found around a mine.

Veins. -- There are several veins at this place, but the middle one has been most extensively worked. At the present time the shaft is down more than 250 feet and several hundred feet of drift are turned off. The veins occur in a black, hard, somewhat graphitic, quartzitic rock which breaks into more or less rectangular fragments. This rock occurs in a rather narrow belt, a mile or so wide, extending from Uncle Sam Mountain to the head of Colomon River. The country rock is much fractured and is thoroughly intersected by quartz veins or stringers from a fraction of an inch up to several feet in width. The veins have all been more or less crushed and crumpled, but they have not been so greatly deformed as to lose their continuity. The amount of deformation which they have suffered suggests that they belong to the later series of quartz veins, which were formed either coincidently with or later then the second period of metamorphism that the region has undergone.

A striking feature of the quartz in the Big Hurrah mine is the absence in it of much sulphide mineralization. To one familiar with many of the gold lodes in the States, the almost entire lack of iron stains on the quartz and the absence of any undecomposed sulphides in the rock is very noticeable. It seems, therefore,

that the gold must occur in the quartz mainly in a native state rather than mechanically mixed with pyrite or other metallic compounds. If this is true, it has an important bearing on the successful search for gold lodes in the district, for the prospector, instead of being able to approximate the value of a ledge by sight alone, must have recourse to competent assays to determine the gold content. It is known that much of the quartz which is said to run $10 to $14 a ton in gold looks like a hard, dense, unmineralized rock which would generally be passed by as "bull Quartz". The lode prospector should be advised to sample carefully all strong quartz leads and have the samples accurately assayed, rather than simply to neglect the lead because it looks lean and unlike the auriferous quartz found in many known productive camps. By no means would he always be repaid for his trouble, for undoubtedly many of the leads are barren, but he might discover lodes that would be overlooked in the more crude prospecting. In a quartz lode of low tenor, where the gold is in finely disseminated particles, it would be practically impossible to gain reliable information from roughly crushing the ore and panning.

Developments. --The main developments at the Big Hurrah mine have been by means of an incline shaft which has a general though not constant slope of about 60 degrees. The strike of the veins is northwesterly and the dip is to the southwest. The upper portion of the vein has also been worked in part by adits run in from the outcropping of the vein on Little Hurrah Creek. A general plan of the underground workings is shown in figure 24. North of the main lead there is another vein about 50 feet below in the foot wall. This vein, unlike the two farther south, has a northwesterly dip, although the strike is essentially the same as the others. It is the belief of the mine operators that this northern vein is a continuation of one of the others, the structure being therefore anticlinal. From the evidence of the structure as shown in the rocks of the neighborhood, as well as from the amount and character of deformation of the veins, it is suggested that such an interpretation is not the correct one, but further developments alone can definitely determine the truth.

Ores. --The ore as a rule is in bunches of quartz, some of which show a considerable segregation of gold, but the best grade is in what is called locally "ribbon rock". The ribbon character is due to bands of quartz separated from each other by small partings or horses of dark, graphitic schist, of varying width, but all relatively narrow. The ore breaks down rather readily, as both the hanging and foot walls are generally determined by fault planes which show slickensiding. The faults, however, do not continue uninterruptedly throughout the mine. The movement was along a number of fault planes which were essentially parallel. The time of mineralization seems to have been later than the main folding and deformation of the region, but earlier than the slight faulting which is marked by the dislocations already noted. It may therefore be

associated with the later stage of mountain building which gave rise to the east-west structural trend now visible in the Kigluaik and Bendeleben mountains.

Equipment. -- The Big Hurrah mine is well equipped for carrying on all the necessary mining and concentration processes. The ore is broken down mainly by hand, although two machine drills are used. After the ore has been broken it is loaded in cars and trammed to the shaft, hoisted to the surface, trammed on tracks through the covered way to the ore bins in the stamp mill. From the bins the ore is drawn as required to feed the stamps. These are of the usual California pattern with automatic feed. The mill is equipped with four batteries of five stamps each. A sufficient fall is obtained from the storage bins so that no rehandling of the ore is necessary. After passing through the batteries the pulp flows over plates treated with mercury. Part of the values are caught on the plates, but the tailings are collected in a launder and distributed to oscillating tables. There are four tables, two of the ordinary Frue type and two of a form which has been developed at the mine. On the tables some of the heavy fragments, which consist of small particles of gold mixed with quartz and also sulphides, are caught. The tailings from the tables are carried to a settling pond formed by diking a flat on Little Hurrah Creek. No attempt has been made as yet to rework the tailings in the settling pond, but presumably when the accumulation is sufficient to warrant the trial they will be rehandled. No estimate of the amount of gold lost in the milling process was attempted, but the fact that a settling pond had been built suggests that the need of an extra process was felt and that at times the loss of gold in the tailings may have been high. It often seems to be the case that the presence of graphite prevents gold from amalgamating readily. If this is so, probably considerable losses are to be attributed to this cause.

The recovery of the gold from the batteries and tables is similar to that in general use. A batteru is stopped, the box is thoroughly cleaned, and the plates scraped and reamalgamed. The amalgam from the plates and the material from the boxes are put into a barrel amalgamator and the barrel rotated for half a day with an excess of mercury. After rotating for this length of time the barrel is stopped and the amalgam removed. The excess mercury is squeezed out and the amalgam either retorted or sent to the bank. The concentrates from the tables are sacked and shipped outside for treatment.

The main hoisting plant and the mill have been run by steam, but as it costs $8 a ton to deliver coal from Solomon to the mouth of Big Hurrah Creek, and as there is then a 2 or 3 mile haul by team, the expense is so great that it is purposed to use oil or gasoline when the mine is again opened. A gasoline

engine was in use during the last part of the time the mill was in operation and was extremely satisfactory. This form of power would be especially economical in the hoisting plant, because the work there does not require such a constant power as coal and the engine would require oil or gasoline only while actively working.

BIG HURRAH MINE

(Copied from United States Geological Survey Bulletin No. 433, Page 149)

SUMMARY OF MINERALIZATION AND LODE DEVELOPMENTS

The most highly mineralized rock of the region is the Hurrah slate. Everywhere this is intersected by quartz veins ranging in width from a fraction of an inch up to several feet. Gold is known to occur in many of these veins, and it seems probable that one of the best places for a prospector to search for lode deposits is in this formation. Oweing to the less deformed character of the veins in the Hurrah slate these are likely to show greater continuity than those in most of the other formations. It is possible that the carbonaceous material in the slates may have acted as a precipitant for the ore-bearing solutions, but it is believed that the great abundance of veins in these rocks is due to the physical character of the members, which has permitted much jointing and fracturing.

Excerpts

Bulletin 328

REPORT ON THE BIG HURRAH MINE

(Copied from United States Geological Survey Bulletin No. 328, Pages 227-232 inclusive.)

BIG HURRAH CREEK

General description. -- Big Hurrah Creek, which has produced more gold than any other tributary of Solomon River, is a confluent from the east about 7 miles from the coast. At its mouth it carries over 500 inches of water. Through the lower 5 miles of its course the gradient of the stream does not exceed 50 feet to the mile. The creek flows in a comparatively straight, narrow canyon incised to a depth of 100 feet in the floor of a broad valley that represents an older period of erosion. The gravel deposits of the older valley are left as bench deposits resting upon a bed-rock floor 10 to 30 feet above the creek.

The schists and limestones composing the bed rock have low dips, and though the strike is not uniform it is generally parallel with the course of the valley. Quartz veins are of common occurrence, both cutting across the bedding and parallel with it. Some of these veins which are of economic importance are described on page ---. The creek bed ranges in width from 100 to 500 feet, and is filled with gravel deposits derived in part from the immediate bed rock and in part from the older gravels of the benches. Gold was discovered and mining operations begun on Big Hurrah Creek in 1900, but the production of that year was comparatively small. In 1903 mining was confined to the wide gravel bars and flood plain for three miles above the mouth, but some prospecting was done farther upstream.

The methods of mining along Big Hurrah Creek have been extremely primitive, most of the mining having been done by laymen, who leased small areas by the season. The waters of the creek are usually turned to one side of the valley while the shallow gravels are worked either with rockers or by shoveling into sluices. As a general rule the laymen who have worked for 75 per cent of the returns have taken out hardly more than $5 per day. The creek placers appear to be well adapted for exploitation either with steam shovel or with horses and scrapers, but hydraulicking is not to be recommended, because of the low gradient of the stream and the thinness of the deposit.

Some mining was done in 1903 in the creek bed and on a low bench about 10 feet above the creek bed at the mouth of Lion Creek. The bed rock is a soft schist which dips about 20 degrees NE. The pay streak in the creek bed was from 10 to

20 feet wide and consisted of 2 or 3 feet of gravel overlying the decomposed bed rock, in which most of the gold was found. The Pay streak probably does not average more than $1 to the cubic yard. On the bench claim the bed rock was overlain by 2 or 3 feet of black gravel. Mining on the creek claim was done by shoveling in, but an attempt had been made to hydraulic the bench with water brought in a ditch from the south fork of Big Hurrah Creek with a head of about 200 feet. In September, 1903, operations had been suspended.

Quartz veins. -- Since mining began on Big Hurrah Creek a great many specimens of vein quartz containing free gold have been found in the placer gravels. Some of these have been traced to their source, as in the Big Hurrah mine, which has been a producer for several years. This mine is located on one of the southern benches of Big Hurrah Creek, near the mouth of Little Hurrah Creek. This bench, which is from a quarter to half a mile wide, is not covered with gravel and rises very gently toward the hills to the southeast. The country rock at the mine is hard, siliceous, graphitic schist, lying nearly horizontal, and the quartz veins seem to be confined to bed rock of this type, for they have not been traced into the schists and limestones that overlie them about a quarter of a mile to the east. In the graphitic schist the quartz veins fill fissures that cut across the bedding, are more nearly vertical than horizontal, and strike northwest and southeast. In 1903 three veins were being developed on this property by short tunnels. (See fig. 13.) The southernmost vein strikes N. 60 degrees W., the middle vein strikes N. 55 degrees W., and the north vein strikes N. 60 degrees W. These directions were determined, however, from short exposures of not exceeding 100 feet, and they may be more nearly parallel than the notes indicate. The distance between the south vein and the middle vein is about 100 feet, and between the middle vein and the north vein about 125 feet.

The main shaft of the mine is located on the bench east of Little Hurrah Creek, 60 feet above the level of the creek bed, close to the middle vein, and has a depth of 135 feet (1904), On the 60-foot level the main drift follows the vein for about 70 feet on each side of the shaft. Apparently there has been some movement along this fissure since the quartz was deposited, for there is slickensiding on the hanging wall and a gouge of crushed schist and quartz. The lode itself, which is from 4 to 5 feet wide, consists of quartz arranged in ribbons and bands, some of them more than 1 foot wide. Here and there are horses of what appears to be black schist in the vein and these are deformed parallel to the banding of the quartz. Both the hanging and foot walls show some irregularity. Along the foot wall of the vein there is no gouge like that of the hanging wall, but the quartz is in close contact with the apparently unaltered schist.

A crosscut near the main shaft leads to the south vein, which was found to consist of many small stringers running through the bed rock. A drift follows this vein for about 250 feet from its outcrop on the bank of Little Hurrah Creek. Here it shows 4 or 5 feet of ribbon ore in one body and dips to the south parallel with the dip of the middle vein.

The third vein, which is the most northerly one, has been developed by a tunnel from the bank of Little Hurrah Creek. It ranges in width from about 4 to 7 or 8 feet. The dip is to the northeast, but the vein seems to be more irregular than either of the others and the hanging wall is cut by many small seams of quartz. At the outcrop a large stringer leads off on the hanging-wall side and is separated from the main vein by 2 or 3 feet of schist. At the end of the tunnel the vein splits into smaller veins on either side of a mass of black schist. Where exposed in a crosscut on the surface about 150 feet southeast of the mouth of the tunnel this vein is broken up into many small stringers, but here also carries values.

A number of prospect holes and open cuts were made west ofLitt Little Hurrah Creek for the purpose of tracing the lode to the northwest, and it is believed to have been recognized for 1,000 feet along the strike. On the west bank of Little Hurrah Creek, in what appears to be the outcrop of the northern portion of the lode, the quartz occurs in small irregular veins, having a maximum thickness of 2 feet and a dip to the northeast parallel to that of the same vein on the west side of the creek. Excavations on the line of extension of the middle vein had caved in, so that it was impossible to see the rock in place, though there was considerable ore on the dump. For about 400 feet west of Little Hurrah Creek excavations have been made on the surface of the bench, exposing many small masses of vein quartz from 2 to 6 inches thick, which seem to represent the western extension of the lode, but the whole surface is covered with a debris of decomposed schist, and it is possible that the quartz veins that are so broken up on the surface may be found to be united into larger masses in depth.

No statement of the assay value of this ore has been given out by the operators of the mine and no attempt was made to take commercial samples. A large part of the gold is free and before the mine was developed the outcrops yielded many specimens in which free gold could be seen. A specimen that did not show any visible gold was assayed and found to contain 2.56 ounces of gold and 0.24 ounce of silver to the ton. (Assay by E. E. Burlingame & Co., Denver, Colorado.) The ore does not appear to contain pyrite or other metalliferous impurities, but is banded with layers of graphite, which seem to have been derived from the graphite schists forming the walls. It is reported that this graphite interfered with milling operations, so that it was difficult to save all the gold. A sample of the tailings from the stamp mill was found by assay

to contain 0.92 ounce of gold and 0.16 ounce of silver to the ton, indicating that the milling process had not extracted all of the gold.

The ore from the main shaft of this mine, as well as that from the various prospecting tunnels and holes, is crushed in a 20-stamp mill. Water power for the mine is supplied from a ditch leading from the south fork of Big Hurrah Creek to a penstock 100 feet above the creek, from which the water is conducted in a sheet-iron pipe to a Pelton wheel at the level of the creek. The free gold is amalgamated in the battery and on copper plates, after which the coarser and heavier tailings are caught on iron-wire riffles and the finer slimes are held in a large pool made on level ground near Big Hurrah Creek by a dam.

On the summit of the hill between Big Hurrah Creek and Solomon River, about three-fourths of a mile northwest from the Big Hurrah mine, similar veins outcrop and have been developed by a prospecting shaft, about 7 feet square, wholly within the ore body. In September, 1903, the only exposure of the quartz in place was in this shaft, and attempts to trace the course of the lode had not been very successful. From this opening the Big Hurrah mine bears S. 61 degrees E., and it is believed that the course of the vein or lode is toward this mine. Some shallow trenches that have been cut across this course, several hundred feet to the southeast of the main opening, fail to show any defined vein, though a great deal of ore has been thrown out. The prospect holes have not penetrated the deep cover of partially decomposed schist debris, and they offer little evidence with regard to the course of the quartz ledge. Much of the quartz here is coated with iron rust, but shows a banded or "ribbon" structure similar to that at the Big Hurrah mine, and many specimens showing spangles of free gold were obtained. Three assays made from material collected at this place, none of which can be regarded as representative, as the small amount of development it impossible to obtain an average sample, are as follows:

Assays of gold ore from prospect holes on hill between Big Hurrah Creek and Solomon River.

		1	2	3
Gold	ounces per ton	1.6	trace	16
Silver	do.	.24	none	1

There appeared to be sufficient gold-bearing quartz here exposed to justify further search.

The discoveries of gold ore already made have encouraged prospecting for quartz and many claims have been staked. One of these, which cuts across Big Hurrah Creek about a mile above its mouth, is on a vein about a foot wide, parallel with the bedding of the schist, which here strikes nearly north and south. The ore consists of quartz mineralized with pyrite, and when assayed was found to contain an ounce of gold to the ton and a trace of silver. A specimen rich in antimony, reported to have come from a vein on Last Chance Creek, a tributary of Big Hurrah Creek on the north side, yielded a trace of both gold and silver. Another specimen, which consisted largely of some mineral in which antimony was predominant, contained 0.24 ounce of gold and 1.10 ounces of silver to the ton.

REPORT

BIG HURRAH QUARTZ MINE

Solomon, Alaska

Nome Mining District

By

J. L. FOZARD

Consulting Mining Engineer

(Superintendent Big Hurrah Quartz Mine, 1906-1907)

REPORT ON BIG HURRAH QUARTZ MINE

(J. L. Fozard)

The HURRAH QUARTZ MINE is situated in the Solomon Mining District, approximately 50 miles from Nome, twelve miles from Solomon, two and one-half miles from Council City and Solomon River railway, and seven miles from the nearest point on the Bering Sea, namely, Spruce Creek.

There are 12 full claims and 3 fractions, covering an area nine thousand feet in length along the lode formation, by from six hundred to eighteen hundred feet in width.

All these claims, namely, beginning on the West:

OCTOBER FRACTION, QUENA, SOUR DOUGH, JULY FRACTION, POTAZUBA FRACTION, KING SOLOMON, DEWEY, ELMER S. KING SOLOMON, Nos. 1, 2, 3, 4, 5, 6, and JOSEPHINE,

have been located for over 5 years, the assessment work requirements complied with, and the owners have ever been in peaceful possession. At present an application for patent is being made which will be granted most likely within the next few months.

The lodes on these claims cut the country formation, and strike in a Northwest-Southeasterly direction with the main, or South vein dipping to the South at about 62 degrees, and the North vein dipping approximately 60 degrees to the North. The country formation is graphic schist, while the ledge is composed of quartz in banded ribbons. The walls are covered with a thick, "silicious" coating, resembling very much the appearance of polished marble, showing beyond a doubt that there has been a slip at some time along this line.

The two main ledges with their small side ones are easily traceable the full length of the group, but show up better for the first five thousand feet, beginning at the Northwest where the most development work has been done. On the South ledge a 3-compartment shaft 13 x 5 feet in the clear has been sunk on an incline of 63 degrees, to a depth of two hundred and eighty feet, with levels run at the depths of sixty-one and one hundred and fifty-eight, and two hundred and fifty-six feet respectively, with a sump of twenty-four feet.

At the first level a crosscut is driven twenty feet into the hanging wall intersecting the main ledge, which is on the east side of the shaft, joined by another side ledge passing through the shaft, and which in itself is made up by the intersection of the three smaller veins. A drift has been driven east for over two hundred and fifty feet, and was open stoped for one hundred and seventy-five feet. Ore in this drift and stope above

ranged from six to eighteen feet in width, the shoots continuing through a drift from the shaft to its end on Little Hurrah Creek, for a distance of one hundred and twenty-five feet, thus making a well defined shoot over three hundred feet in length. The values run very high, namely, from EIGHT to SIXTY DOLLARS per ton, with exceedingly rich spots in places.

The vein passing through the shaft varied from two to four and up to six feet in width, the values ranging from EIGHT DOLLARS per ton to as high as FORTY DOLLARS, not counting the very rich specimen ore. The best ore is out and under Little Hurrah Creek, the shoot dipping to the West. Most of the ore on this vein has been stoped out above the drift, but is untouched below, and as for the main vein, it has been stoped to within fifty feet of the shaft on the east side of this level.

On the second level a crosscut has been driven thirty feet into the hanging wall, tapping the main vein after having cross cut one of the smaller veins at a distance about midway on the crosscut. Upon the smaller vein a drift has been driven to the West for a distance of twenty-eight feet, and a raise at the end of approximately twenty feet.

The ore exposed is the same ribbon banded as the other ore, varying in width from two feet on the crosscut to three feet at the end where it is. The ore assays FOURTEEN DOLLARS to the ton. This vein intersects the South Vein some twenty feet to the East of the crosscut, the line of intersection dipping to the West at about 45 degrees, while the vein in itself pitches toward the South vein.

Where the crosscut intersects the south vein a drift has been driven approximately 230 feet to the west, and somewhere over 300 feet to the east. At the crosscut the ore is only two feet in width, but going westerly it widens to six and eight feet in the drift for a distance of one hundred sixty feet, the ore having averaged the same in the stope above, to the first level, with value from TEN to FOURTEEN DOLLARS per ton.

Fifty feet from the end of the drift a crosscut is run into the hanging wall, cutting one vein four feet in width, and several smaller ones. Practically nothing is known about these veins as no work has been done; however, the larger vein yields some very rich specimens where it has been cut.

Through the East drift from the shaft crosscut the ore varies from eighteen inches to seven or eight feet, but is more or less irregular. But the ore is picked up in the stope above, and averaged eight feet, although the farther East, the longer the raise to encounter the ore chute. The values here ran the same as those to the West.

There are no crosscuts on the East drift into the hanging wall. At the shaft a cross cut three hundred fifty feet was driven into the foot wall looking for the North vein, but did

not reach the ledge formation, as it practically parallels it for the last hundred feet.

On the third level the vein is tapped at a point thirty feet from the shaft by a crosscut from which a drift extends westerly about 300 feet, and easterly a distance of 275 feet. The ore did not pick up for some 40 feet along the west drift, then the ore averages three and one-half feet, and assays in values averaging SIXTEEN DOLLARS per ton for the next one hundred feet, where it becomes somewhat irregular, but the values remain the same.

The ore is encountered above the drift, where it is first found, and the shoot extends to 150 feet in length, and widens out as much as 40 feet between walls. Ore averaged through the mill, EIGHT and 25/100 DOLLARS per ton; tailings four to Six Dollars per ton. The ore does not pinch out either east or west, but narrows the walls filling between the smaller veins separated by graphic schist.

Going east from the crosscut the drift is driven along the foot wall while the ore ranges from one to three feet in thickness. This ore averages TEN DOLLARS to the ton, but assays higher in spots. Two raises were put through to the second level, at intervals of fifty feet, and a third one near the end, part way, being about forty feet in length. They showed practically the same as the drift.

At a point forty-five feet from the crosscut from the shaft, the hanging wall strikes at about 20 degrees from the foot wall. A small drift raise disclosed a vein at the beginning of two feet in width, widening in the length of the drift of twenty feet to five feet.

Some thirty feet further back in the foot wall drift a crosscut was driven, encountering the hanging wall at approximately the same distance, cutting the vein where it is five feet in width. Ore in this vein runs EIGHTEEN DOLLARS per ton.

No further development work has been done as the property closed operations at this point. However, it seems to solve the question as to where the ore on the east side is. A slight roll in the hanging wall formation occurs on this level, but straightens again, showing that it will come back to the foot wall below.

Upon tracing the shoot of ore from the first level to the third we found it dipping to the west. It is noticeable that the ledge is just as strong in values on the third level as on the above two, and there is every reason to believe that the ore continues in depth and is straightened by the intersection of the smaller side veins which dip toward it. The lack of crosscutting on the second and third levels into the foot wall on the west side have made it impossible to see what these side veins develop, but as they are very rich on the first level, where they are

gouged to the Creek level of Little Hurrah, and have the same formation as the main vein, I do not see why there is not a good body of ore in the foot wall. A few feet of crosscutting on the third level would furnish good results.

Upon going to the surface the veins are easily traceable across Little Hurrah Creek, and are exposed by the crosscut in the broken slide rock which covers them. One small pit exposes the vein at one point, being four feet in width, but the veins in most places on the surface are but two feet in width, yet have thrown out a great amount of specimen float, and in themselves prospect very well. The rich float from the veins at the junction of Big and Little Hurrah Creeks have fed the Placers of Big Hurrah, whose gold is practically all nugget gold in conjunction with the quartz, the quartz being identical with that of the Hurrah veins, and is borne out by the fact that no gold is found on the Creek above where the veins cross.

The veins are easily followed across Big Hurrah, where they have been exposed by surface cuts at intervals for a distance of some two thousand feet to the westerly end of the group. The ore is the same in character and holds equivalent values to those of main diggings. Practically no development has been done here.

The North vein, which is 125 feet from the south dipping to the North, has been prospected by a small shaft 100 feet in depth, and a cut run in on the vein for a distance of ninety feet from the Little Hurrah Creek. In the cut the ore varied from four to fifteen feet in width, while the shaft ore ranges from four feet on the surface to six feet at the bottom. Ore assayed NINE DOLLARS and 80/100 per ton, though yielded from the cut considerable high grade ore which was not counted in the assay. This vein has the appearance of having tipped over and broken off free from other veins, yet it requires further development to find out.

Lack of development has been the main drawback of the Hurrah mine, on which work has never at any time been kept far enough ahead. Depth is what the property needs, as the showing on the third level is strong enough to show that the ore continues down; crosscutting into both walls on the third level should be done, as nothing has revealed where the good ore from the side veins has gone, and which, from all indications, is dipping toward the main vein, and should intersect below, making a still stronger shoot.

In the way of production I was able to get hold of the records showing bullion returns of THREE HUNDRED FIFTEEN THOUSAND DOLLARS from a tonnage of 43,000 tons, or an average of Seven and 25/100 Dollars per ton through the mill, while the tailings averaged from Two and one-half to Three Dollars per ton, showing over One Hundred Thousand Dollars lost, thus making the property having yielded over Four Hundred Thousand. This does not show all the production as the full ore records were unobtainable, yet it shows what the ore mills per ton.

The great loss of approximately 30% of the production of the property is due to the fact that the gold is somewhat coated with graphite, and does not all amalgamate, and needs polishing or cyanide . A simple illustration of this is shown by placing the contents of some quartz crushed in a mortar into a pan and adding quicksilver, when one will see that not all the gold is amalgamated; but on rubbing it against the pan and dislodging the particles of adhering graphite, the quicksilver takes up all the gold. Further, the mill did not have sufficient plate surface, as the lower end of the plate sluice always cleaned up well. An experiment of the mine's operation the last eight months it has worked went to prove the above assertions.

A few old raw copper plates, the only ones available after close of navigation, were placed upon a table built upon the frame of two Frue Vanner concentrators, having practically no grade. This motion of the concentrator agitated and disintegrated the particles of gold and graphite, thus allowing the gold to amalgamate and adhere to the plates. This experiment netted Fifty-two Dollars per day.

A tube mill, or cyanide plant, would greatly increase the percentage of gold extraction, and also increase the crushing capacity of the mill, thus allowing much lower grade rock to be crushed, as we find considerable ore composed of alternative stringers of quartz and graphitic schist filling between the walls alongside of the quartz where it has narrowed; this, usually running from Two to Three Dollars per ton.

The ore from the Hurrah Mine is free milling, there being but one-quarter of one percent sulphurets, which yields on an average of Sixty-two Dollars per ton.

The mine in itself makes one hundred and fifty gallons of water per minute, which is pumped into a large tank at the mouth of the shaft, then conveyed through a six-inch pipe to the mill through the main tunnel way for battery purposes.

In the way of facilities and improvements for handling and treating the ore and taking care of the labor, etc. we find as follows:

At the mine, 2 - 100 horsepower boilers;

1 - double drum hoisting engine, sufficient for a depth of 1,000 feet;
1 - 100 horsepower Corliss steam engine;

1 - Compound Laidlaw Compressor, with air receiver;

3 - large Air Drills

4 - Chippers, with several Sha eclipse hammer drills;

rock breaker, machine drills, blacksmith outfit, ore and water skip, 6 or 7 two-ton iron cars;

mine completely tracked throughout;

1 - 5" or 6" water column for the third level;
1 - 2" steam line to pump;
1 - 2" air line;
1 - 3-1/2 inch Knowles Pump; and

tools, etc.,

in fact, everything necessary for the mine's operation.

A covered tunnel way leads from the mine to the twenty stamp mill, through which the ore is trammed and emptied into a bin of about three hundred and fifty ton capacity.

The mill is provided with 20 - one thousand pound stamps driven by a 50 horsepower Fairbanks Morse Gas Engine; 4 Frue Vanner machines; amalgamating barrel, and is complete in every respect, excepting the plates which have been sent outside to be resilvered or replated. Besides, the works are lighted by a small dynamo driven by a 6 horsepower Gas Engine.

Two large storage houses and a warm storage cellar take care of the merchandise and other freight. Two bunk houses and other apartments together with the messhouse and kitchen furnish all necessities for taking care of about 24 men. One two-story dwelling and two cottages, furnished throughout, accommodate the owners and men in charge.

A barn for 12 animals, with wagon, sleighs, etc., take care of the needs for short freighting.

The improvements on the property cost upwards of Two Hundred Thousand Dollars ($200,000) and practically everything is at the mine to operate it as it was before.

Power in the past has been the big item to contend with. Coal purchased at Solomon, and landed at the mine at $25.00 per ton, when purchased at Nome and freighted in the winter cost Thirty-five to Thirty-seven per ton, while distillate for the mine cost 28¢ per gallon at the mine, easily brought the month's power bill to Five Thousand Dollars; or, in other words, the mine power costs $40.00 per H.P. per month, while the mill costs $30.00 per H.P. per month.

If the mine were put on a crude oil system, with oil landed on the beach at Three and 25/100 Dollars per barrel, and 30¢ per barrel for transportation, it would bring the power bill to $20.00 per H.P. per month, as against the present $40.00 at the mine and $30.00 at the mill, figuring coal on a basis of

$30.00 per ton and distillate at 28¢ per gallon, which figures give a good average of the cost at the mine in the past. Further, the oil will insure practically a steady run at the mill against an average of three days' loss per month at the mill due to the gas engine stoppages, which means an increase of approximately One Thousand Dollars per month.

As the mill is worth a trifle over $300.00 per day. the changeover to oil would be comparatively cheap as there are several smaller boilers already at the mine not in use; therefore, would only necessitate the purchasing of a mill engine; a Power Plant on the beach to be erected next Summer by the Three Friends Mining Company should still cheapen the power. Further, if supplies were shipped from the outside instead of purchased at Northern prices, a saving of 30% would be made on all necessities used at the mine.

All assay values given in this report are on an average of assays taken during the winter of 1906-07 and not the result of any single assay.

In conclusion, will remark that the last eight months' run produced approximately Ninety Thousand Dollars; the ore milled $8.25 per ton, and the tailings assayed $2.50 to $4.00 per ton. The ore mostly came from the drifts and raises on the third level, and the stope between the second and the third level on the west side. Approximately Twenty-five Thousand Dollars is in sight in the mine at present, but should not be touched until further development work has been carried on, and the property has ever suffered from lack of that work. The figures above easily show that the values still hold strong with depth.

With cheaper power and supplies as above suggested, and a 95% to 98% extraction of gold by the use of either the process of cyanide or tube mill, instead of 60% as at present, should make the property a good dividend payer, and since it would cost cut $5,000 (Five Thousand Dollars) to unwater the mine, would make the property one to bear investigation by anyone seeking mining investment.

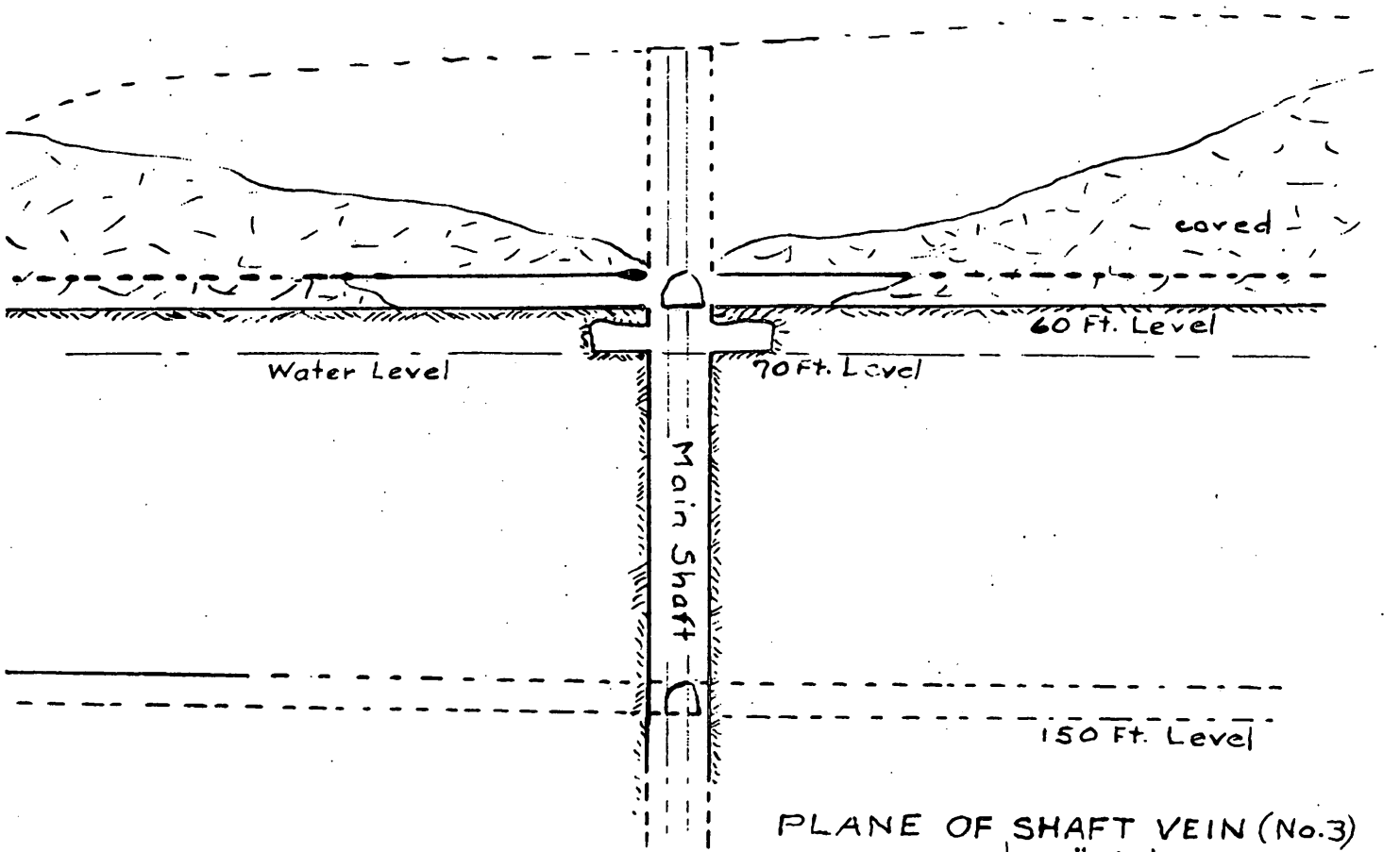
Any further details relating to the property will gladly furnish if possible.

J. L. FOZARD
Supt. Mine - - Winter 1906-07

Note
All above values shown estimated at 20.67 per oz.

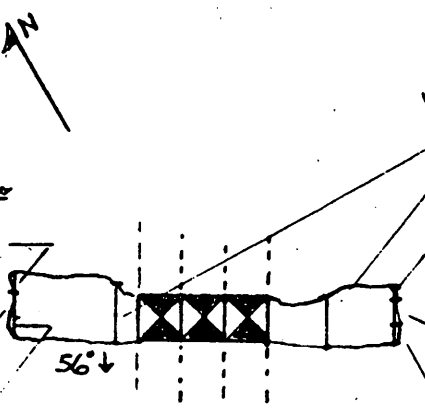
REPORT ON J. L. FOZARD

J. L. Fozard: Mining Engineer - Univ. of Calif. Various jobs in mining, assayer to manager, Pacific Northwest and Alaska. Gen. Supt. of Big Hurrah Mine, Nome 1906-07; Manager for Kennecott Copper Co., Alaska mines; Gen. mgr. for Consolidated Mines, Nevada mining and milling operations; Gen. Mgr. and participant ownership in development and operation of St. Anthony Mining and Milling Co., Tiger, Arizona; developing this property from prospect stage to major mining-milling status. Deceased - 1947.



PLANE OF SHAFT VEIN (No.3)
scale: 1" = 40'

ASSAYS - 70 FT. LEVEL
scale 1" = 20'



dth	Oz Au	% WO_3	Sampler	Assayer
.4'	2.00	.07	B.M.	B.M.
do	4.16	.15	do	Jacobs
.5'	.98	Not run	T.P.L.	do
.1'	.08	.01	B.M.	B.M.
do	.41	.07	do	Jacobs
Not sampled by T.P.L.				
2.0'	5.20	.34	B.M.	B.M.
do	1.485	.33	do	Jacobs
2.5	2.64	Not run	T.P.L	do

Width	Oz Au	% WO_3	Sampler	Assayer
7.4'	.28	Not run	T.P.L	Jacobs
6.3'	.68	do	T.P.L	do
1.0'	.16	.01	B.M.	B.M.
do	1.06	.09	do	Jacobs
1.3'	.95	Not run	T.P.L.	do
2.8'	.08	Nil	B.M.	B.M.
do	.50	.07	do	Jacobs
2.5	.48	Not run	T.P.L	do
2.4'	.42	.01	B.M.	B.M.
do	7.42	.09	do	Jacobs
3.5	3.15	Not run	T.P.L.	do

REPORT

BIG HURRAH QUARTZ MINE

Solomon, Alaska

Nome Mining District

By

J. M. WILLIAMS

(Superintendent Big Hurrah Quartz
Mine, 1904-1905)

Dear Sir:

In compliance with your request, I have obtained all the data possible at this time concerning the "Hurrah Quartz Mine", and beg to report as follows:

LOCATION

The Hurrah Quartz Mine is situated in the Nome Mining District of Alaska, on Hurrah Creek, a tributary of the Solomon River, and about twelve and one-half miles from the town of Dixon.

DESCRIPTION AND AREA

The property consists of twelve full sized claims and three fractions, namely, "The Elmer S." "Dewey", "Josephine", "Sour Dough". "Quena", "King Solomon No. 1", "K. S. #2", "K. S. #3", "K. S. #4", "K. S. #5", "K. S. #6", "The Potazuba Fraction", "July Fraction", and "October Fraction" covering the line of lode for a distance of about seven thousand feet.

FORMATION AND LODES

The formation of country rock in which the veins occur is a black silicious Schist, or slate, commonly called black slate, and by some Graphitic slate, pretty well mineralized with iron pyrites and showing a little graphite in the cleavage adjoining the veins. There are two distinct veins or lodes known to exist on this property, the outcrops being 125 feet apart.

The general strike being a few degrees N. of W. amd S. of E. The larger and most southerly of the two occurs in a fault place which can be traced on the surface in a westerly direction several thousand feet. Easterly from the main shaft the outcrop is covered with a thin bedded deposit of Micaceous Schist, and is therefore difficult to follow in that direction, but development work in level #2 hereinafter described indicates that the fissure extends a considerable distance beyond present workings. The same "Slicken-sided" fault planes being very prominent near the face of the drift 404 feet, east of the shaft, or as far as the drift was extended; this vein averages about four and one-half feet in width and has a southerly dip at an angle, varying from 62 to 58 desgrees. The ore is a fine grained ribbon quartz, carrying free gold and about one-half of one per cent in concentrates which assay from $50 to $150 per ton in gold.

DEVELOPMENT

Development in the past has been confined to the "Elmer S." and "Dewey" claims. The principal work being on the larger or most southerly vein, and consisting of a three compartment shaft 286 feet in depth, with lateral drifts running on the vein at the 60, 150 and 250 foot levels.

SIXTY FOOT LEVEL

At this point a drift was extended Easterly on the vein, a total distance of 210 feet, where a fault was encountered which afterward proved to be merely a surface disturbance, and in no way imperishing the future of the mine. The ore averaged five feet in thickness and was continuous throughout the entire length of the drift. Panning and mill tests made at the time this drift was being driven showed an average value of $8 per ton. The ore above this drift was afterward milled and although I have bullion receipts and memo showing that there was $251,235.03 derived from the ores of the mine after I resigned, it is impossible to determine what portion of it came from this body of ore.

WEST DRIFT AND DRAIN TUNNEL

Going West from the shaft at this level, a drift was extended a distance of 85 feet. The vein gradually diminished in size. This, together with other indications, such as a strong outcrop on the surface south of line of said drift, proving that the shaft has been sunk pn a spur of the main ore body. A "drain" tunnel was then driven from the creek level, beginning on croppings above mentioned, and continued in an easterly direction a distance of 190 feet. From this point a crosscut was driven northerly a distance of 47 feet to the shaft. The vein in the tunnel varying from two to eight feet in width, and milled as high as $20 per ton. Had this tunnel been extended on the vein, it would intersect the east ore chute 100 feet east of the shaft or at heel of spur on which shaft has been driven.

SECOND OR 150 FOOT LEVEL

Here a crosscut was driven from the shaft a total distance of 68 feet, cutting through the foot wall of the main fissure at 58 feet from the shaft. From this point a drift was extended N. 85 degrees E. (Magnetic) 59 feet, where eight feet of ore was encountered which continued, although varying in width, for a total distance of 345 feet or as far as the drift was extended. This work proved that the faulting mentioned above, in reference to Level #1 East, was superficial and practically ceased at this depth. After a distance of 300 feet on the line of vein was reached, the foot wall began to show vertical offsets, or displacements which varied in width from three to eight feet. The ore also decreased in value and width. This displacement, however, seemed to cease at a point 30 feet from the face of the drift; and the foot-wall began to swing rapidly to the south, or, in other words, resumed its former course. The vein in the face showing much better prospects in free gold than it had for the past 100 feet. I am informed that this part of the mine remains practically as I left it, other than the drift was caved. Owing to the shattered condition of the walls, and the fact that the ore was of low grade at this point, the stopes were discontinued a short distance above the

last 100 feet of the drift. The total length of the drift is 404 feet. Values and width, where vein was in place, being about the same as in East drift, Level #1.

WEST DRIFT SECOND LEVEL

The west drift on this level was extended a distance of 130 feet, the last 70 feet showing an average of six feet of $12 ore, with seven feet of ore in face of drift. At this point work was discontinued for fear of allowing the water from "Little Hurrah Creek" to enter the mine. The bed of said creek being only about 70 feet above the level. A survey was then made of this work, and beginning at a point 75 feet west of the crossout a raise was put through on the vein to the drain tunnel, for ventilation purposes. All the available ore from this portion of the mine has since exhausted. I described the development work done merely to call attention to the fact that the vein shows strength and a reasonable regularity throughout the mine, and when it is understood that in the 110 feet space between the two main ore chutes there was sufficient ore of a grade high enough to pay the cost of mining and milling, you will see that the ore was almost continuous from the face of one drift to that of the other, or a total distance of 534 feet, and prospects good at both ends.

THIRD OR 250 FOOT LEVEL

As at the second level, a crosscut was driven to the hanging wall and drifts started on the foot wall, East and West. The west end of the ore chute was found inside of 25 feet, and the drift was extended to a total distance of 62 feet, the ore continuing the same value as in the upper levels East of shaft. The west drift was extended on the foot wall to a point 40 feet west of main crosscut, where a crosscut was started and driven to the hanging wall, a distance of 23 feet. There was about one foot of high grade ore out here, and the intention was to follow this wall and open up the "Drain Tunnel" or west ore chute. Owing to a labor strike which occurred on the 20th day of May, 1905, this work was not completed. My resignation taking place on the 1st day of July that year, I did not again visit the mine until the 25th day of August, 1906. When I saw that all the development work had been confined to the foot wall, I advised the superintendent in charge to continue the above mentioned work, which I understand was not done, and that portion of the mine remained practically as I left it, other than that a perpendicular raise was put up from the footwall, and the upper portions of the ore body stopped out to Level #2. The same conditions prevail on the East end of the mine at this level, with the exception that Mr. Fozard (who was in charge at the time) informs me that a crosscut was driven towards the hanging wall from the main drift, which cut the ore chute at about 20 feet, showing 4 feet of $12 ore. The mine was attached and closed down the morning following and has remained full of water up to the present time.

NORTH OR "LITTLE VEIN"

As hereinbefore stated, the croppings of this vein lie 125 feet North of the above described works, and there is no evidence of faulting or displacement of any kind. This appears to be a true fissure vein, having a Northerly dip of about 65 degrees, and when taken in conjunction with the south vein, forms what at first glance would be taken for the outcrop of an anticline, the veins forming the north and south limb of the fold, but as there are no parallel Bed Planes or other indication of warping in that direction I am confident that such is not the case, and that the veins are in no way related.

A tunnel some 150 feet in length was driven on the ledge. The ore from which milled with the other ores at odd times, and there is no way at present of determining its value. As indicated by the croppings, there are three distinct ore chutes on this vein, each of which is worthy of a thorough investigation. I have taken specimens from the above mentioned tunnel that were (in weight) one half gold.

OUTPUT AND VALUE

Owing to the loss of the old books in the San Francisco fire, I am unable to give exact figures in a few instances, i.e., I have no returns for the month of July, 1903, or for the period between October 12, 1907, and June 1st, 1908, and therefore omit them in my reckoning. No doubt the output of this property exceeds the figures given here by at least $30,000.00. However, the sums given are taken from old memos made at the time, and from duplicate bullion receipts, which I obtained from the Nome banks, and is therefore correct. I have data that accounts for a yield of $445,422.92, but as explained above, there is considerable to be added to this before the full amount is reached.

I also wish to call your attention to the fact that while in some instances I have been unable to obtain the exact amount of returns in bullion, I have found it impossible to learn the number of tons treated, and vice versa, hence I am not in a position to state just what the ore would average in value, although during the twelve months dated from August 1, 1903 to August 1, 1904, 9,656 tons of ore treated gave a gross output of $100,544.20, or at the rate of $10.41 per ton. As development was being pushed throughout the mine at this time, I consider the ore milled a fair average, and with proper management this grade of ore can be made to pay a handsome profit. The books show that during the last nine months the mine was operated, the actual cost of mining and milling averaged $4.36 per ton. Figuring the ore as above, this would show a gain of $6.05 per ton at this depth, and I believe by installing a gasoline plant at the mine, this rate could be at least maintained for an additional thousand feet.

I may also mention here that in order to facilitate the economical working of the property "regrinders" such as pebble or tubular mills should be added to the present mill plant. In this manner the output could be increased at least fifty per cent.

MINE EQUIPMENT

The mine is equipped with boilers aggregating 280 H. P., 1-50 H. P. double acting hoist engine, 1-22 H. P. ditto, 1-75 H. P. double cylinder corliss valve stationary engine, 1-6 drill air compressor air drills, sufficient blacksmith tools and all necessary pumping machinery for unwatering the mine. There also are several water and rock skips on the premises.

MILL EQUIPMENT

The mill plant consists of 20-950 pound stamps. The mortors and battery frames being in good condition. There are also Four Frue Vanners 1-22 H. P. Fairbanks Morse Gasoline Engine,
1-12 " " " " "
1-10 " " " " "
1 Westinghouse Direct Current Generator, with a lighting capacity of 80-16 C. P. Lamps, 1-12 inch Rock Breaker and all necessary belting. Good buildings, ore bins, etc. There are also 3 cottages 1-30 x 60 boarding house and store room combined, 1 mine store room, stable, etc. on the property.

TRANSPORTATION

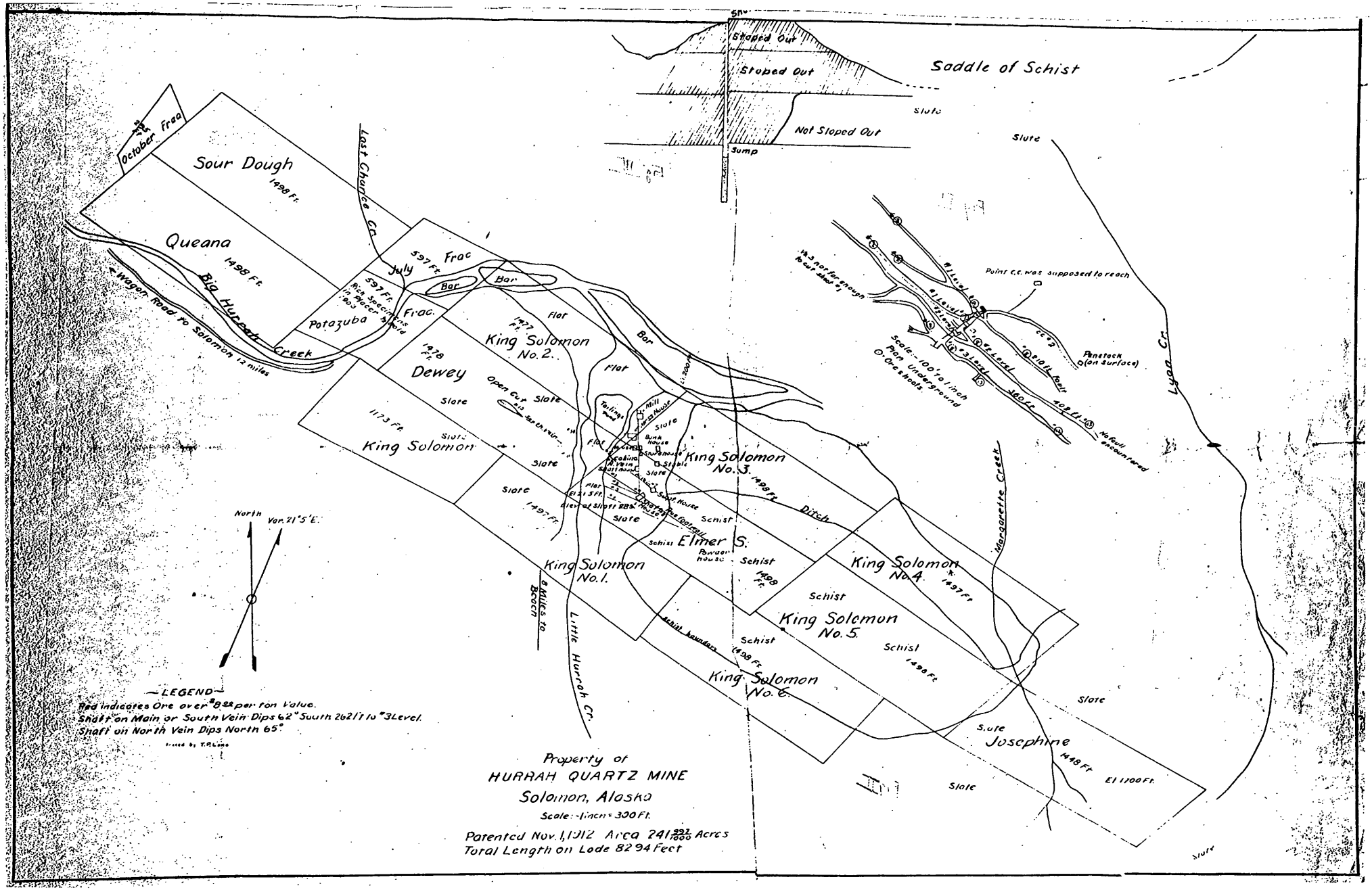
As stated above, these mines are located twelve and one-half miles from the town of Dixon, which is the shore terminal of the Council City and Solomon River Railroad. This railroad crosses "Big Hurrah Creek" two and one-half miles below the mine, from which point a spur with less than one per cent grade could be easily built to the property, and thus avoid the necessity of freighting from Dixon by team, as has been necessary in the past. Freight expenses, prior to the building of the R. R. some times running as high as $30.00 per ton.

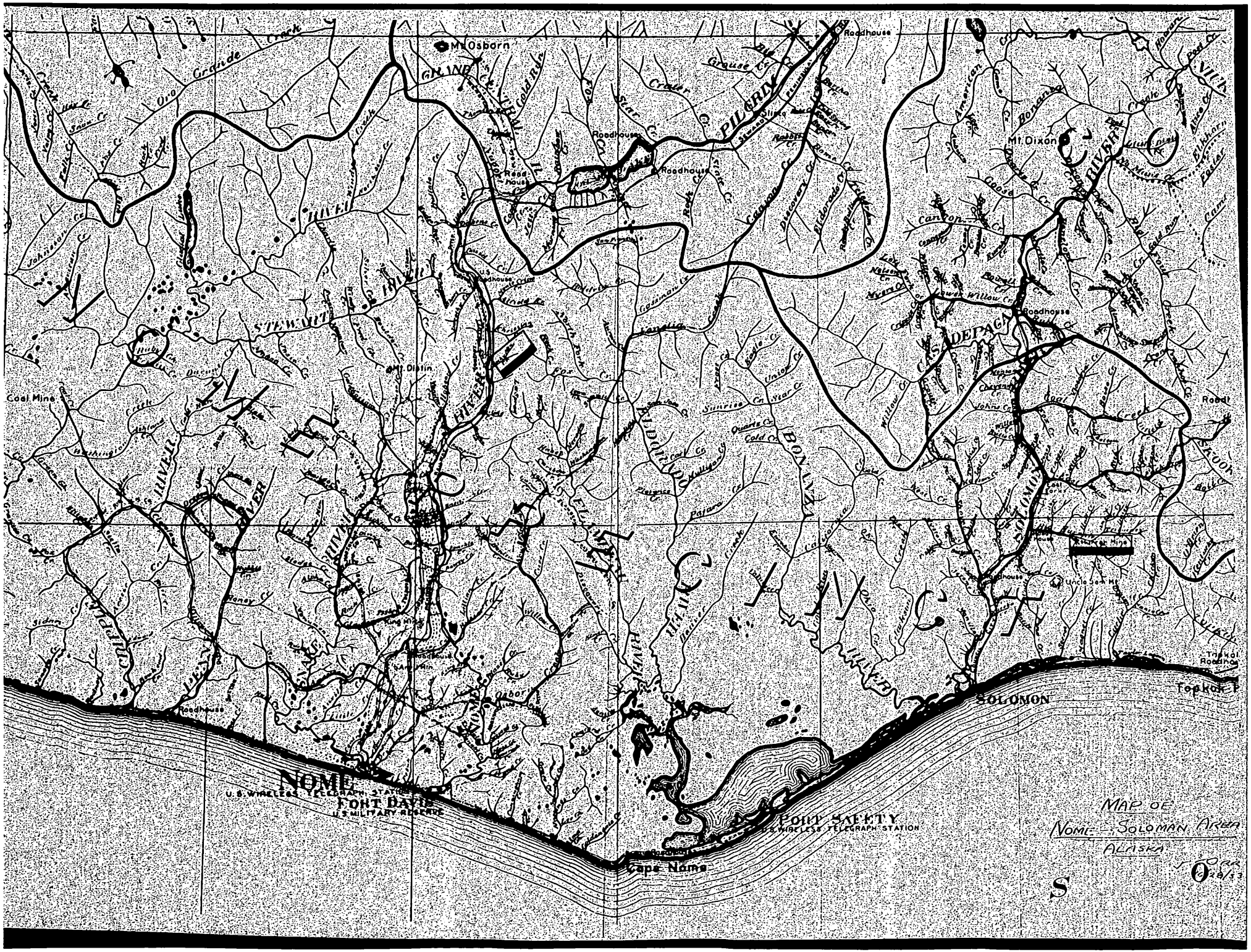
FUTURE OF THE PROPERTY

In conclusion I would say that in my opinion there is no doubt as to the future of this property. It has been developed to such an extent that all preliminary doubts are at an end. The formation in which the vein occurs has been proven to be the underlying or "Primary" rock of the district, thus indicating that the fissure in which the ore exists will extend to a considerable depth, and as width and values on the bottom level are at least equal to those of the upper workings, I fully believe that with proper management the mine will be a dividend payer for years to come.

Respectfully submitted this ____ day of _____ 1909.

(Signed) J. M. Williams,
Ex. Supt. Hurrah Qtz. Mine

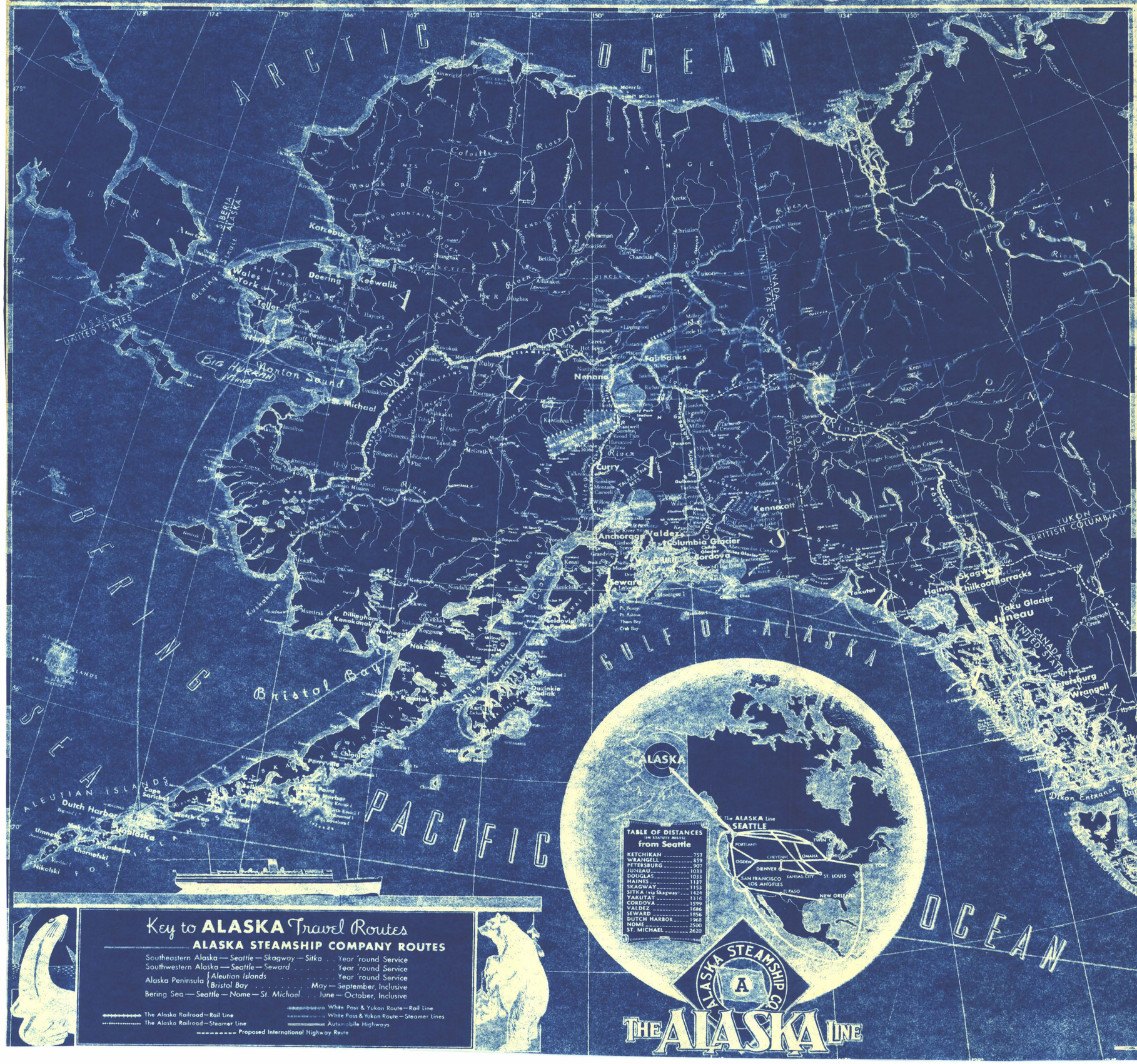

Saddle of Schist
Stoped Out
Stoped Out
Not Stoped Out
Sump
Slate
October Frac
Sour Dough
1498 Ft.
Queana
1498 Ft.
Big Hurrah Creek
Wagon Road to Solomon 12 miles
Last Chance Cr.
July
Frac
597 Ft.
597 Ft.
Rich Specimens in Placer Bank 1903
Frac.
Potazuba
Bar
Bar
Flat
1477 Ft.
King Solomon No. 2.
1478 Ft.
Dewey
Open Cut
Slate
1173 Ft.
King Solomon
Slate
Slate
Slate
1497 Ft.
King Solomon No. 1.
Bar
Flat
Tailings
Mill and Mill House
Bunk House
Stable
Cabins
Main Vein Shaft House
Flat
Elev. 2125 Ft.
Elev. of Shaft 285'
Slate
Slate
Shaft House
Dynamite Footwall
Schist
Schist
Elmer S.
Powder House
Schist
1498 Ft.
King Solomon No. 3.
1498 Ft.
Ditch
Little Hurrah Cr.
Schist boundary
Schist
1498 Ft.
King Solomon No. 6.
Schist
King Solomon No. 5.
Schist
1498 Ft.
King Solomon No. 4.
1497 Ft.
Margarette Creek
Slate
Slate
Josephine
1498 Ft.
El 1100 Ft.
Slate
Slate
Lyon Cr.
Point C.C. was supposed to reach
143 not far enough to cut shoot #1
#1 Level
#2 Level
#3 Level
#4 Level
#5 Level
#6 Level
#7 Level
#8 Level
#9 Level
#10 Ft. Raise
Scale:-100' to 1 inch
Plan Underground Ore shoots.
Penstock (on surface)
180 Ft.
408 Ft.
No fault encountered
North
Var. 21°5' E.
Bridle to Beach
—LEGEND—
Red indicates Ore over $8.00 per ton Value.
Shaft on Main or South Vein Dips 62° South 262 1/2 to #3 Level.
Shaft on North Vein Dips North 65°.
Drawn by T.P.Lewis
Property of
HURRAH QUARTZ MINE
Solomon, Alaska
Scale:-1 inch = 300 Ft.
Patented Nov. 1, 1912 Area 241 221/1000 Acres
Total Length on Lode 8294 Feet


MAP OF
NOME - SOLOMAN AREA
ALASKA
NOME
U.S. WIRELESS TELEGRAPH STATION
FORT DAVIS
U.S. MILITARY RESERVE
FORT SAFETY
U.S. WIRELESS TELEGRAPH STATION
Cape Nome
SOLOMON
Topkok
Roadhouse
Mt. Osborn
Mt. Dixon
Mt. Distin
Coal Mine
Uncle Sam Mt.
Rocky Mine
Grande Creek
Oro
Grouse Cr.
Cripple Cr.
Cascade Cr.
Discovery Cr.
Eldorado Cr.
Sunrise Cr.
Quartz Cr.
Cold Cr.
Willow Cr.
Cabin Cr.
Canyon Cr.
Sinrock Cr.
Bonanza
American
Flower
Pilgrim
Stewart
Snake
Bonanza
Eldorado
Cascade
Solomon
Sinrock
Topkok
Cape Nome
Fort Safety
Fort Davis
Nome
Cripple
Stewart
Snake
Pilgrim
Bonanza
Eldorado
Cascade
Solomon
Sinrock
Topkok
S

Square miles . . . 586,400
Population (Est. 1936) . . 62,000

TERRITORY of ALASKA

Purchased from Russia, March, 1867
Purchase price $7,200,000



ALASKA! Awaiting popular appreciation of her varied resources and climatic conditions, "America's Last Frontier" is yet a virtually untouched storehouse of natural wealth. This map is dedicated to those men and women who are today moulding this rich northern empire.

As the Territory's main transportation link with the States, The Alaska Line serves Southeastern, Southwestern Alaska and the Alaska Peninsula throughout the entire year — these ports are never closed to navigation. The more northerly Bering Sea region is served during its navigable season, between June and October.

Salmon packing is Alaska's major industry. It is not indicated in color on the map, as it embraces Alaska's entire Southeastern and Southwestern coastline, including the Bristol Bay area

TABLE OF DISTANCES (IN STATUTE MILES) **from Seattle**

KETCHIKAN	757
WRANGELL	859
PETERSBURG	907
JUNEAU	1033
DOUGLAS	1033
HAINES	1137
SKAGWAY	1153
SITKA (via Skagway)	1424
YAKUTAT	1316
CORDOVA	1599
VALDEZ	1686
SEWARD	1856
DUTCH HARBOR	1968
NOME	2500
ST. MICHAEL	2620

Key to ALASKA Travel Routes

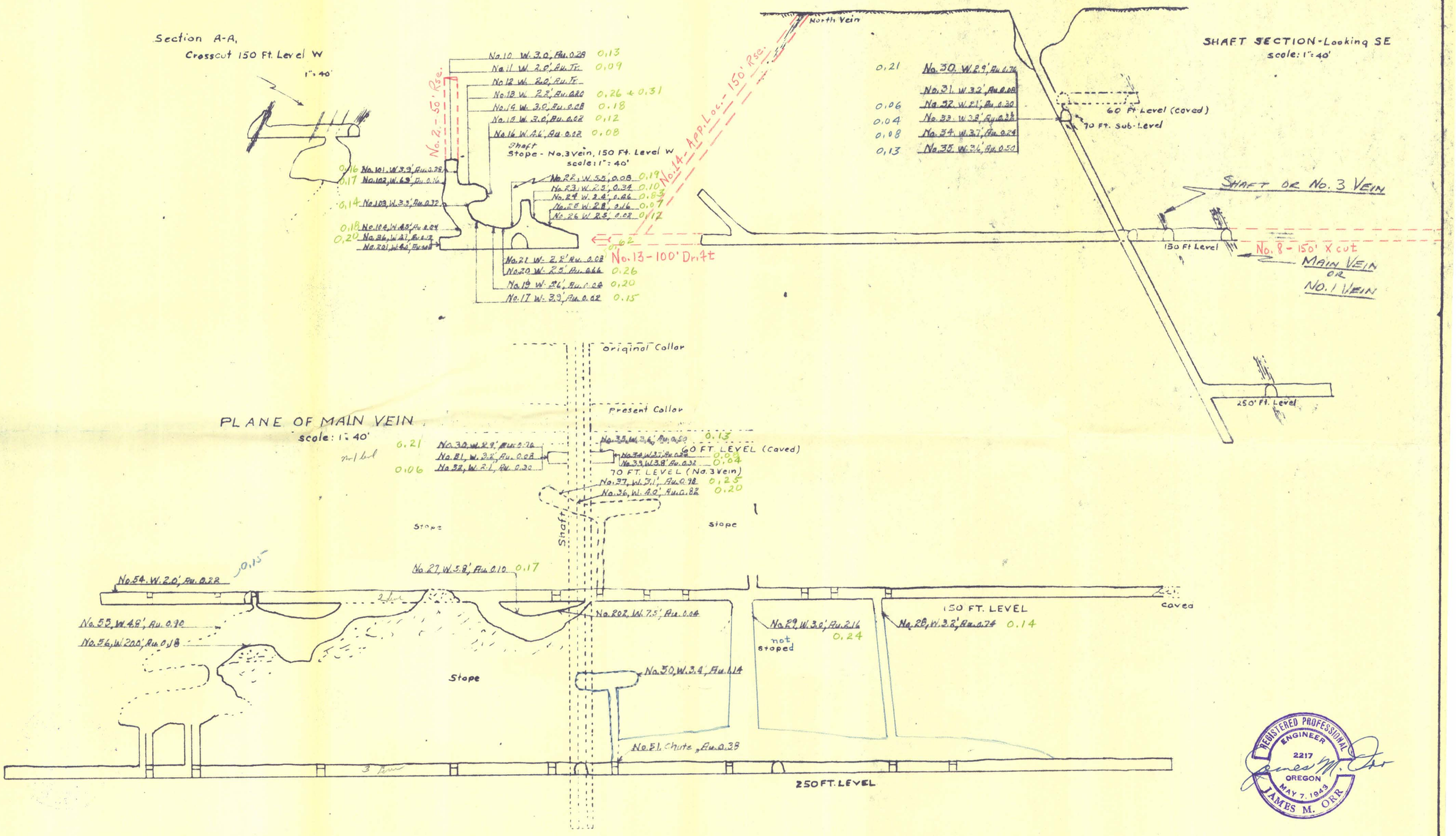
ALASKA STEAMSHIP COMPANY ROUTES

Southeastern Alaska — Seattle — Skagway — Sitka . . Year 'round Service
Southwestern Alaska — Seattle — Seward . . . . . Year 'round Service
Alaska Peninsula { Aleutian Islands . . . . . Year 'round Service
Alaska Peninsula { Bristol Bay . . . . . May — September, Inclusive
Bering Sea — Seattle — Nome — St. Michael . . June — October, Inclusive

The Alaska Railroad — Rail Line
The Alaska Railroad — Steamer Line
White Pass & Yukon Route — Rail Line
White Pass & Yukon Route — Steamer Lines
Automobile Highways
Proposed International Highway Route

ALASKA STEAMSHIP CO.

THE ALASKA LINE

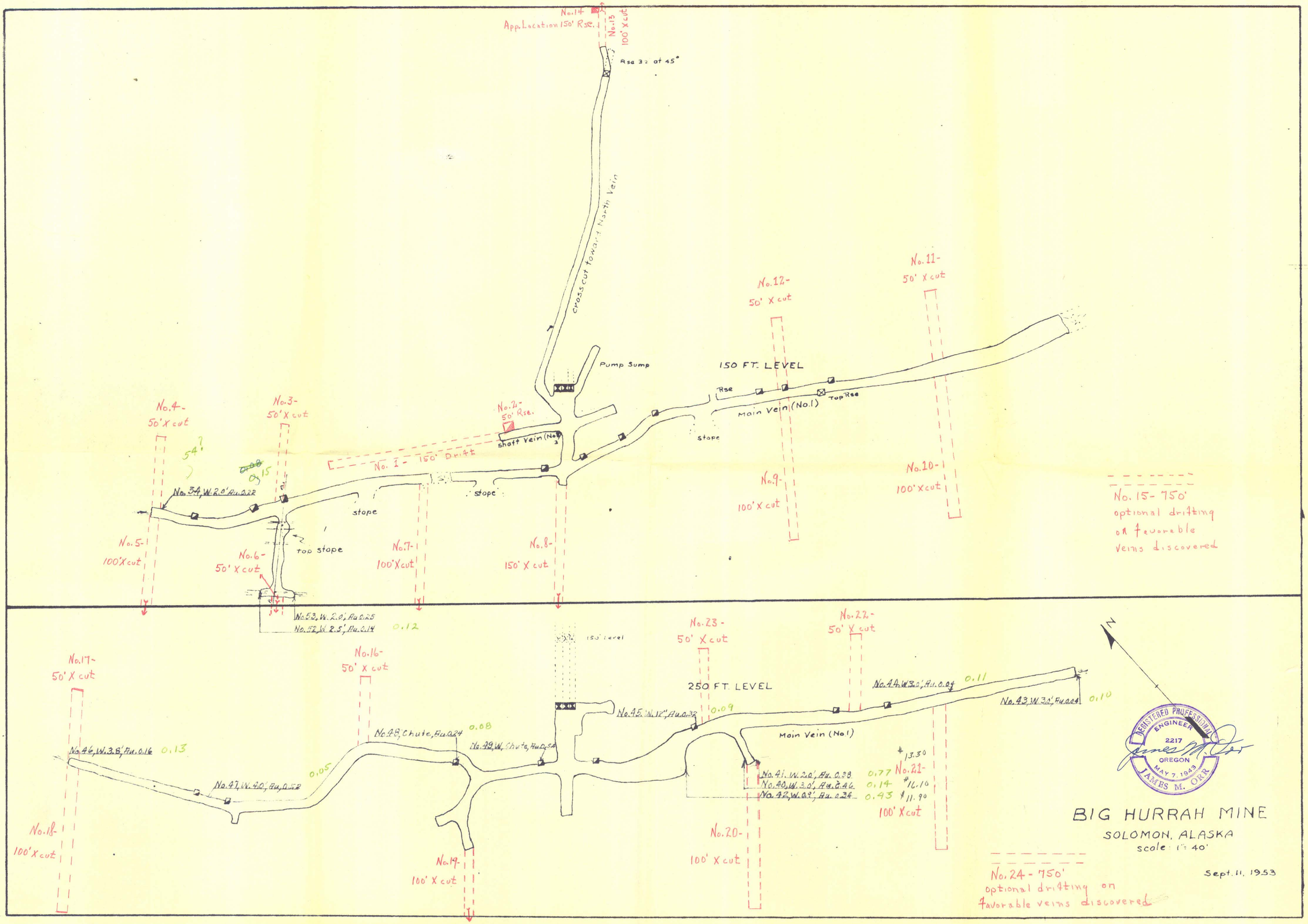


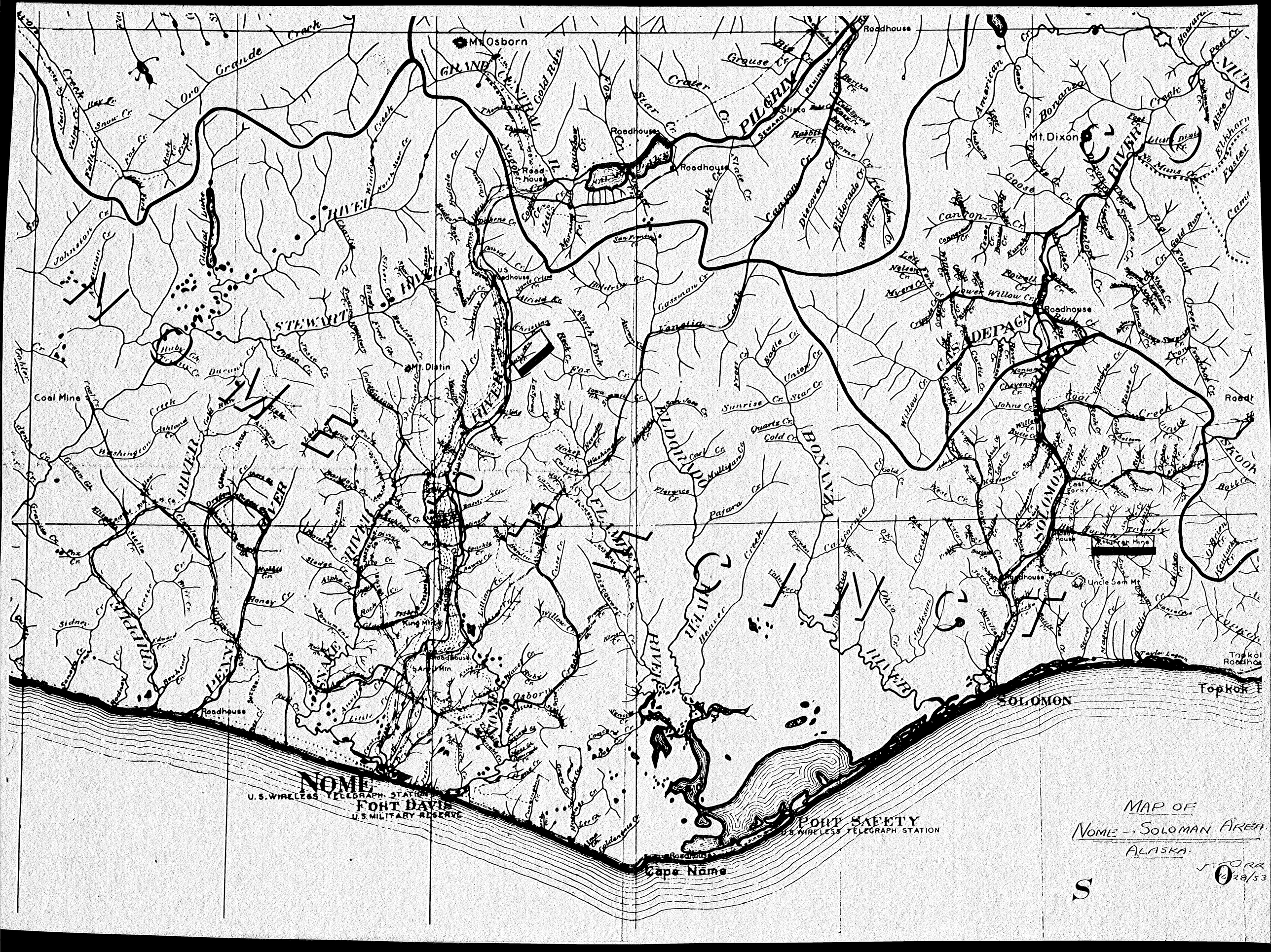
REGISTERED PROFESSIONAL ENGINEER 2217 OREGON MAY 7, 1943 JAMES M. ORR

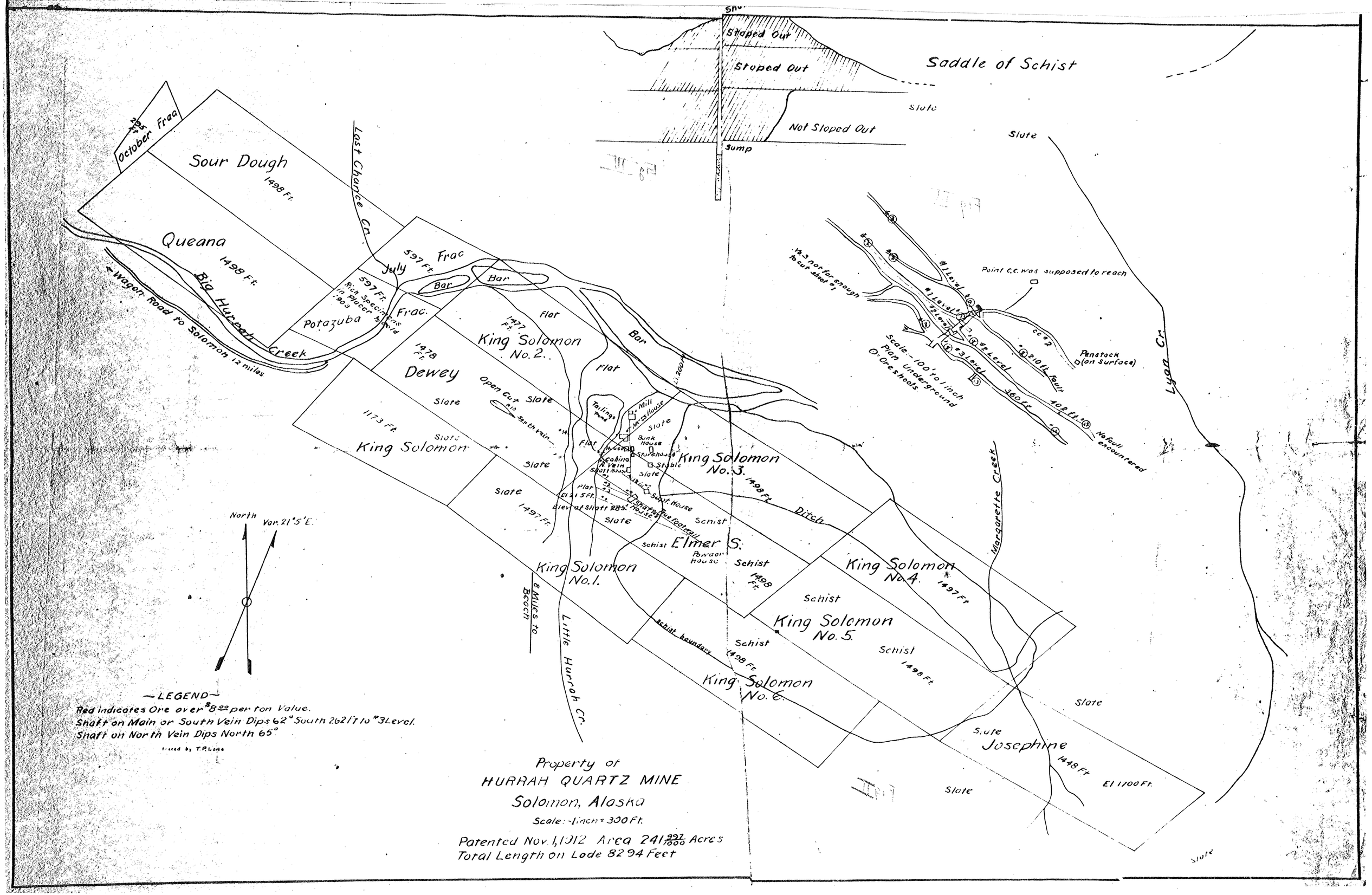
BIG HURRAH MINE

SOLOMON, ALASKA

Sept. 11, 1953


No.14
App. Location 150' Rse.
No.13
100' X cut
Rse 32 at 45°
Cross cut toward North Vein
Pump Sump
150 FT. LEVEL
Rse
Top Rse
Main Vein (No.1)
Stope
No.12-
50' X cut
No.11-
50' X cut
No.4-
50' X cut
54?
No.3-
50' X cut
No.2-
50' Rse.
Shaft Vein (No.2)
No. 1 - 150' Drift
0.15
No. 34, W. 2.0' Au. 0.22
stope
stope
top stope
No.9-
100' X cut
No.10-
100' X cut
No. 15 - 750'
optional drifting
on favorable
veins discovered
No.5-
100' X cut
No.6-
50' X cut
No.7-
100' X cut
No.8-
150' X cut
No. 53, W. 2.0', Au. 0.25
No. 52, W. 2.5', Au. 0.14
0.12
150' Level
No.23-
50' X cut
No.22-
50' X cut
250 FT. LEVEL
No.44, W. 3.0', Au. 0.04
0.11
No.43, W. 3.0', Au. 0.04
0.10
No.45, W. 1.2', Au. 0.32
0.09
Main Vein (No.1)
No.17-
50' X cut
No.16-
50' X cut
No.48, Chute, Au. 0.24
0.08
No.49, W. Chute, Au. 0.54
No.46, W. 3.8', Au. 0.16
0.13
No.47, W. 4.0', Au. 0.52
0.05
No.41, W. 2.0', Au. 0.38
0.77
No.40, W. 3.0', Au. 0.46
0.14
No.42, W. 0.9', Au. 0.24
0.43
$13.30
No.21-
$16.10
$11.90
100' X cut
No.18-
100' X cut
No.19-
100' X cut
No.20-
100' X cut
No. 24 - 750'
optional drifting on
favorable veins discovered
N
REGISTERED PROFESSIONAL ENGINEER
2217
OREGON
MAY 7, 1943
JAMES M. ORR
BIG HURRAH MINE
SOLOMON, ALASKA
scale: 1" = 40'
Sept. 11, 1953


Mt. Osborn
GRAND CENTRAL
PILGRIM
Roadhouse
Mt. Dixon
CASADEPAGA
Mt. Distin
Coal Mine
STEWART
FLORENCE
BONANZA
SOLOMON
Uncle Sam Mt.
Topkok
NOME
U.S. WIRELESS TELEGRAPH STATION
FORT DAVIS
U.S. MILITARY RESERVE
POINT SAFETY
U.S. WIRELESS TELEGRAPH STATION
Cape Nome
MAP OF
NOME - SOLOMAN AREA
ALASKA.
S


Stoped Out
Stoped Out
Saddle of Schist
Not Stoped Out
Sump
Slate
Slate
October Frac
Sour Dough
1498 Ft.
Queana
1498 Ft.
Big Hurrah Creek
Wagon Road to Solomon 12 miles
Last Chance Cr.
July
597 Ft. Frac
597 Ft. Rich Specimens in Placer Gold 1903
Potazuba
Frac.
Bar
Bar
Flat
1477 Ft.
King Solomon No. 2.
1478 Ft.
Dewey
Open Cut
Slate
1173 Ft.
King Solomon
Slate
Slate
Slate
1497 Ft.
King Solomon No. 1.
8 Miles to Beach
Little Hurrah Cr.
Tailings Pond
Mill
Mess House
Bunk House
Storehouse
Stable
Cabins
R. Vein Shaft House
Flat
El. 215 Ft.
Elev. at Shaft 285'
Shaft Blue Footwall
Shaft House
Slate
Slate
Flat
Bar
Ditch
King Solomon No. 3.
1498 Ft.
Schist
Schist
Elmer S.
Powder House
Schist
1498 Ft.
Schist boundary
King Solomon No. 6.
King Solomon No. 4.
1497 Ft.
Schist
King Solomon No. 5.
Schist
1498 Ft.
Margarette Creek
Lyon Cr.
Point C.C. was supposed to reach
#1 Level
#2 Level
#3 Level
Raises
Scale--100' to 1 inch
Plan Underground
Ore shoots
Penstock (on surface)
210 ft. fault
360 ft.
408 ft.
No fault encountered
Slate
Slate
Josephine
1448 Ft.
El. 1700 Ft.
Slate
Slate
North
Var. 21° 5' E.
~LEGEND~
Red indicates Ore over $8.22 per ton Value.
Shaft on Main or South Vein Dips 62° South 262 ft to #3 Level.
Shaft on North Vein Dips North 65°
Traced by T.P. Lane
Property of
HURRAH QUARTZ MINE
Solomon, Alaska
Scale:- 1 inch = 300 Ft.
Patented Nov. 1, 1912 Area 241 221/1000 Acres
Total Length on Lode 8294 Feet