

BIORKA MINE

Sedanka Island
Aleutian Islands

ALASKA

44143-3

To
Eagle-Picher Mining & Smelting Co.,
Joplin, Missouri.

The Biorka mine is located on Sedanka Island, of the Aleutian group of islands, between the North Pacific Ocean and Bering Sea, Alaska, in Latitude 53° 50' north, Longitude 166° 15' west, approximately 2,000 miles westerly from the Port of Seattle, Washington. Dutch Harbor, Amaknak Island, is on the regular steamship route to Nome, Alaska and other points of call North in Bering Sea, and is the port of disembarkation for passengers, and for unloading freight, enroute Sedanka Island.

From Dutch Harbor the Biorka mine is reached by sea-going vessels by sailing northerly on Unalaska Bay following the regular steamship route to eastern ports of Alaska until Priest Rock headland is reached at the most northwest point of Unalaska Island, thence, leaving the regular steamship route, sailing south from Bering Sea through Unalaga Pass between the Islands of Unalaska and Unalga, past Fisherman's point of rocks and turning southwesterly into Beaver Inlet, the water ingress from the North Pacific Ocean, to Biorka Harbor, Sedanka Island. The passage past Fisherman's Point, even in good weather and taking advantage of tide flows, is very rough for a short distance, due to the near presence of a reef that extends from the North Pacific Ocean to within a short distance of the Fisherman's rocks and a rip tide caused by the meeting of waters from the North Pacific Ocean and Bering Sea, and should be attempted only in calm weather and with a sea-worthy boat.

From Seattle to Dutch Harbor the voyage requires seven (7) days when no stops other than the regular calls are made at a cannery at False Pass, Unimak Island, and a whaling station at Akutan, Akutan Island; the islands of Unimak and Akutan are the first of the Aleutian Islands immediately adjacent to, and west of the extreme southwest extension of the Alaska Peninsula. From Dutch Harbor the mine is reached, over a distance of approximately thirty (30) miles, in three and one half (3½) hours.

The Biorka mine, and Sedanka Island, may also be reached by walking, on a good trail, 5 miles across Unalaska Island to Unadaga Bay (also locally called Portage), Beaver Inlet, and thence by motor boat easterly about 13 miles across Beaver Inlet to Biorka Harbor. And only in good weather can the passage be safely made, in small boat, across Beaver Inlet. No animals are available of Unalaska Island or Sedanka Island for riding or packing. The town of Unalaska, separated from Dutch Harbor by a narrow strip of water, boasts of the possession of an automobile truck, which is used for hauling supplies from the dock

at Unalaska to the only store in town, and for delivering supplies from the dock at Unalaska to the only store in town, and for delivering supplies from the store to customers along a water-front road of less than 1000 feet in length. The total distance covered by the truck last year (1936) was less than 500 miles.

At Dutch Harbor are the docks for commercial steamships, warehouses, and many old, and now abandoned, buildings, and but few people reside in the old town. The U.S. Navy maintains a broadcasting station in Dutch Harbor from which radiograms are sent to U.S. Army radio stations on the mainland of Alaska, to be relayed to telegraph stations in the United States and Canada. Dutch Harbor is the U.S. Navy's first operating station in Alaska.

Unalaska has a population of but a few hundred people, make up of employees of the United States Government and native "Aleuts"; the principal industry of the natives is fishing. The Alaska Commercial Company, agents for the Alaska Steamship Company, has a large general merchandise store, where staple supplies, may be purchased at inflated prices. For a large, profitable operation of any kind in this region it will be necessary to purchase all supplies needed in the United States, to be conveyed to the islands by the operator's own vessels. A machinery and commodity rate in effect from Seattle to Dutch Harbor amounts to \$16.50 per ton. In an interview with Mr. L.W. Baker, manager of the traffic department of the Alaska Steamship Co., Seattle, Mr. Baker advised that for movement of large tonnages or ores or concentrates from Biorka Harbor from docks (to obviate the necessity of lightering), to Seattle the freight rate will not exceed \$7.50 per ton, a rate comparable with the rate of \$5.50 per ton from Cordova, and \$6.50 per ton from Kodiak Island, now in effect. Mr. Baker intimated that the Cordova might even obtain.

While there are many well-built residences in Unalaska, and the town supports a good restaurant (operated by the Alaska Commercial Company), there are no hotel accommodations; strangers must impose upon the hospitality of the white residents for living quarters while sojourning in Unalaska.

Offices of the U.S. Government Commissioner and Deputy Marshall are maintained in Unalaska, and, also U.S. Government Navy Offices. The Port of Unalaska is headquarters for Coast Guard Cutters and other Government boats, for the Aleutian Islands and west coast of Alaska Mainland. Besides fishing, and whaling, fox-farming and goat raising are important industries of the Aleutian Islands.

The climate of the Unalaska-Sedanka Islands region approximates that of Seattle, Washington. No extreme temperatures summer or winter; light fall of snow in the winter, and heavy rainfall during the entire year. The average winter temperature is said to be around 20° above zero, and the annual precipitation from 50 to 190 inches, seldom amounting to less than 100 inches. According to statements made by native residents the waters south of the Aleutian Islands, in the vicinity of Unalaska Island, are open for the entire winter seasons, and no difficulty with ice, is experienced in navigation.

Steamer travel, however, to and from the United States, starting in June of each year, terminates in the month of October. Storms, severe and of long duration are frequent, especially during the winter months. Old sailors have, and probably quite rightly, dubbed the Aleutian Islands as the "Storm center of the Universe". Even during the best, summer, season the climate is anything but agreeable and conducive for operations; the sun seldom shines through the clouds and fog which envelop the Aleutian Islands for most of the time. Temperatures noted during the months of June and July on Sedanka Island ranged from 40° to 50° , with an almost constant precipitation of moisture in the form of rain or mist. The highest temperature noted, when the sun had been shining for a few hours, was 75° above zero. One can seldom do without rubber clothing and boots. Mosquitos and flies are plentiful, and aggressive, during the warmer months of the year.

Starting early in June each year passenger steamers, carrying freight, make monthly round trips from Seattle to Nome, Alaska, and freight steamers carrying passengers ply between Seattle and Nome at irregular periods, during the five months open navigation season of the year, necessitating transportation of all provisions and other supplies required for the remaining 7 months of the year during the months of June, July, August, September and October. Should statements regarding open winter water south of the islands be proved true it would be possible to move large tonnages of ore products from Sedanka Island to markets during the entire year; this would, of course, necessitate ownership of the freighting vessels, and the winter navigation would be hazardous and excessively, if not prohibitively, costly.

On Map No. 1 accompanying this report will be found a sketch (tracing from the U.S. Coast & Geodetic Survey Chart #8860, Unimak and Akutan Islands) showing the relative positions of the islands of Unalaska, Amaknak and Sedanka, with dotted lines indicating the two routes for reaching Biorka Harbor from Dutch Harbor and Unalaska as described.

Leaving Seattle, Washington June 2nd and we arrived in Dutch Harbor June 9th (touching in at False Pass and Akutan only after leaving Seattle), where we met Mr. H.H. Johnstone the owner of the Biorka mine, and Mr. Wm. O. Brown, U.S. Deputy Marshall who is interested with Mr. Johnstone in the Biorka property. We were disappointed to learn that the boat Messrs. Johnstone and Brown had previously advised us would be available for the trip to Sedanka Island had been taken to other waters by the owner (a former partner in the Biorka mine), and we spent a day negotiating with the owner of a 60-ft. boat called the "Martha" for transportation of ourselves and supplies to our destination. The owner of the Martha finally consenting, we loaded our camp equipment, mine tools and supplies, and provisions and otherwise prepared for an early start the following day, but storms compelled us to change our plans. When we reported to the boat very early in the morning the Captain of the Martha told us it would be unsafe, if not impossible, to make the trip, and we were obliged to remain in Unalaska another day. We were fortunate in being able to get away early the following day (the third day after our arrival) and safely made the trip to Sedanka Island in $3\frac{1}{2}$ hours, arriving at the Island about noon. The beach at Sedanka Island where we landed is smooth and sandy, and we were able to run the boat right upon the sand near the water's edge, and the 6 native Aleuts

we brought with us, unloaded most of the cargo, wading in hip boots, without use of a dory.

The personnel of the party, on arrival at Sedanka Island, consisted of Mr. Johnstone, Mr. Miller and 16 year old son, Mr. Newell (our cook), myself and six natives, the latter including the Chief of Sedanka Island.

Before unloading the cargo had been completed rain started to fall, the wind came up, and it was with considerable difficulty we put up our three large tents and otherwise made camp. Everything not protected by waterproof wrapping was thoroughly soaked with water, and we retired the first night to dripping tents to sleep (?) in wet bedding, while the wind and rain continued, unabated, throughout the night, threatening to demolish our camp. Fortunately, our supplies included 2,000 feet of lumber, and Mr. Miller, with the assistance of his son and a couple of the natives in a few days put the camp in good shape, and after things had been fairly dried out with heat from the Coleman gasoline lanterns, and improvised stove, and an old stove secured from the church in the old village of Biorka, we were provided with comfortable places to eat, sleep and work on maps.

Sedanka Island covers an area of approximately (roughly estimated), 75 square miles, bounded on the north by Beaver Inlet, on the east and south by the North Pacific Ocean, and on the west by Udagak Strait - the latter separating the island from Unalaska Island. The Island has a width of about five miles, easterly, from Beaver Inlet to the North Pacific Ocean, along the zone of Mineralization covered in examination of the Biorka mine deposits.

The village of Biorka, with a few dwellings and a beautiful little church, lies about 2 1/2 miles north of Biorka Harbor; at one time the village had over 50 (native) inhabitants, but the influenza epidemic of 1917-18 greatly reduced the population, and only about 5 natives live in the old town at the present time. The natives have a fox fur concession from the United States Government for the Island of Sedanka, and by trapping, and subsisting mainly on fish which are plentiful in all the adjacent waters, manage to eke out an existence.

The demand for labor is very limited on nearby islands, and but limited number of natives are able to find employment on fishing and whaling boats. None of the Aleutian Islands are thickly populated, and outside of trapping and fishing the natives are very inefficient; apparently they exist only for the purpose of eating, sleeping and getting intoxicated, doing as little work as possible to "get by". The labor question will be a serious consideration in the event of a large mine operation on Sedanka Island, probably necessitating importation of labor from the States.

Geology and Ore Occurrence of Sedanka Island

The country rock of Sedanka Island consists of a very hard, fine-grained greenstone which the Bureau of Mines, University of Arizona, Tucson, classify as a diorite. The fine-grained greenstone has been intruded by a rock of granitic appearance which the Bureau of Mines also places in the diorite family. The intrusive rocks show only on the beach, Bio-

rka Harbor far from the ore deposits, and no ore occurrences were noted in the vicinity of the intruded rocks. The intrusions were probably responsible for the heavy faulting of the fine-grained greenstones, and may, or may not have been an important factor in the deposition of ores of the Island.

The Biorka ore deposits can be classed only as a prospect, as there are no exposures of ore other than those displayed by the action of faulting and erosion by the elements. Outside of a few feet of work done by men previous to my visit the ore deposits have been exposed only by landslides and Nature's erosive processes. The Island is mostly thickly covered by deep moss and thick grass, making prospect work exceedingly difficult, slow and costly, only high mountain peaks and occasional outcrops of greenstone are bare.

The ores of the Biorka mine deposits consist of the sulphides of iron (pyrite), zinc (sphalerite and marmatite), lead (galena) and iron-copper (chalcopyrite) with scarcely more than traces of gold and silver, in quartz and greenstone gangues. The ores occur along, and on the south side, of an east-west fault of apparent great vertical displacement. Owing to obscurity of the formation, and lack of development, it is impossible to determine the extent of the fault movement. Judging from where exposed by erosion, and escarpments, the fault extends the full width of the Islands, approximately 5 miles, from Biorka Harbor, Beaver Inlet east, to the beach of the North Pacific Ocean, east. The dip of the fault plane is approximately 55° to the south.

Mineralization has taken place in fractures in the greenstone to the south of the fault only; no ore mineralization was noted to the north, or footwall side of the fault. The ore has, apparently "emanated" from the fault in cracks and fissures striking obliquely, southeasterly, from the fault. The greenstone to the north is but sparsely mineralized with pyrite and, if possible, more compact and dense than the ore-bearing greenstone.

While on the Biorka mine examination from June 12th until July 19th, I kept from 4 to 6 natives constantly working, with picks, shovels and occasional use of dynamite, stripping moss, dirt and broken slide rock to extend the surface exposures made by Nature to determine, as near as possible, the extent and nature of the ore mineralization. The formation to the north of the fault being sufficiently exposed, by faulting, to show it devoid of mineralization the work was devoted to the south side of the fault. Natural exposures indicated a length, along the strike of the fault, of over 600 feet. The exposures occur on the side of a canyon through which a stream of water, which we named Lode Creek, flows. The side of the canyon has a slope of from 20° to 40° from the horizontal, and when measured July 15th Lode Creek showed a flow of 2,000 gallons per minute. To enable study of the fault, along which Lode Creek follows its course, the stream was diverted for a distance of over 50 feet, and the fault as exposed showed a strike of approximately $N 87^{\circ} E$ and a dip of approximately 55° to the south, and ore was found frozen on the foot-wall side of the fault plane.

Our work, with that performed by nature, exposes the greenstone in

place for the entire distance of 600 feet, proves that practically half of this length the greenstone is heavily mineralized with the sulphides mentioned above, and three distinct shoots, carrying commercial ores, are revealed.

The ore occurrences are located some 3000 feet easterly from the beach at Biorka Harbor, and at elevations from 180 to 512 above sea level. Starting with a width of 1/2 mile on the beach, Biorka Harbor, a valley defined by abrupt mountain ridges narrows, going east, to a canyon 1/2 mile from the beach where the overburden of moss and grass was removed by Nature to reveal the first exposure of ore. At this place Lode Creek is joined, on the south, by a small stream, designated by us as Fall Creek, which augments the flow of Lode Creek by 400 gallons of water per minute (measured July 15, 1937). The canyon of Lode Creek continues for over 1500 feet, eastward, and along 800 feet of this distance ore may be seen at various points, though the heaviest mineralization shows only for about 600 feet. Following either side of the valley a good road can be easily, and cheaply constructed from the beach to the mine.

The valley widens again after leaving the canyon and continues with gentle slope for over one mile from the beach, where it again narrows to a pass, at elevation of over 850 feet above sea level, leading to the North Pacific Ocean some 4 miles farther east. From escarpments the pass marks the course of the fault along which ores occur, and projection of the fault for this elevation as shown at ore areas confirms this belief. Map No. 1, accompanying this report was prepared to show the general lay of the land and water concerned in consideration of the Biorka property, and shows the harbor, streams and fault occurrence described -- and an approximate plan of the Biorka property on the west slope of the range dividing the waters of Beaver Inlet and the Pacific Ocean. The Biorka mine claims have been very carelessly laid out, as indicated by location of marked corners in survey work, and while, no doubt, the ground has been staked sufficiently to cover the ore deposits, amended locations and surveys should be made to properly define property holdings.

Map No. 2 shows in detail the ore occurrences, the sampling and sample assay results. Sample cuts were made on the slopes of from 20° to 40° as nearly possible normal, or at right angles to the cracks and crevices in which the mineralization took place, so that the strikes of these crevices may be easily determined. Elevations given in the sample cuts will also assist in studying the deposits. All sample cuts have been marked on the ground by stakes in solid formation, so that with the assay map sample assay results can be readily checked.

As will be noted by reference to Map No. 2 Nature exposed, in the areas marked "B" and "C" considerable of commercial value. The mineralization in these areas is quite intense, but without drilling or otherwise prospecting the exposures, laterally and to depth, the extent of the mineralization cannot be determined, or predicted, and, therefore, no estimates of even probably ore can be intelligently made. The fault where exposed in the mineral areas shows no evidence of being post mineral, and the ores, were quite evidently, deposited from the solutions making escape from the fault fissure into the crevices of the broken-up greenstone lying to the south of the fault plane. The mineralization

seems to be most intense at the fault. Again, if the fault is not post mineral the mineralizing solutions may have ascended in the shattered greenstone to the south to "make", or deposit, to and on the footwall of the fault plane. At the fault contacts observed clay gouge or other evidence of grinding on the fault are absent. Heavy clay gouges mark the east and west extremes of the ore occurrences, however.

Assuming that the mineralizing solutions have emanated from the fault fissure, they appear to have filled crevices striking southeasterly from the fault, and the mineralized crevices appear to narrow the farther away they get from the fault until they disappear beyond the denuded areas under the shattered greenstone capping. The solutions evidently penetrated the shattered cap rock to considerable extent, as I found by breaking into the cap rock, with the aid of dynamite, quartz stringers containing the sulphides of iron, zinc and lead, and the sulphide of iron-copper (chalcopyrite), of same nature as the underlying ore.

If the strikes of the ore shoots prove, on further work and deeper prospect work, to be southeasterly from the fault fissure, the ores, as now exposed on the surface, indicate a combined width of practically 300 feet. Disappearing as the ores do under the cap rock, no estimate can be made of the probable length, along the strikes, of the shoots. The surface exposures are favorable for large, deep deposits.

Ores indicated on the Map in Areas "B" and "C" as sampled show an approximate to average of:-

Gold	0.04	Ozs. per ton
Silver	0.60	" " "
Zinc	9.00	%
Lead	1.00	%
Copper, Less than	0.30	%

Preliminary flotation tests indicate that 85% of the gold, silver, lead and zinc can be recovered in a marketable zinc concentrate.

The Biorka deposits being absolutely virgin, and of such unusual surface extent and tenor, further consideration and prospecting by drilling or other mine methods is an enticing proposition. The topography is favorable for diamond drill prospecting, and the formation, and ore, should give good "core" results, at a low cost, once the machinery has been installed.

Map No. 3 herewith shows details of the survey and soundings made for selection of a harbor, and also the tide chart kept for a few days on Sedanka Island in the month of June.

The harbor soundings and tide-water surveys were made by Mr. Roy E. Miller of Seattle, Washington. Mr. Miller has had a great deal of experience in harbor work, and the building of docks, and he assures me that docks could be built, and the harbor otherwise prepared for the reception of the largest ships now being used in the freight business at an expense that would be considered minimum for this kind of work.

The Captain on the Steamship Victoria, who on our trip to Dutch Harbor gave us a great deal of information regarding the waters adjacent to Sedanka Island, and gave us the chart from which I made tracing for Map No. 1, to whom we showed our harbor plans, confirmed Mr. Miller's statements. No better harbor site was observed on our trip to Dutch Harbor and return, and on the return trip by the inside passage, we docked in many harbors.

By reference to the maps showing the elevations of the two creeks, and the water flows, it will be noted that a small amount of power could be generated from the streams. Mr. Johnstone advised that the flows I measured in the month of July were little above the minimum flow of the year. The maximum flow water is in the spring, and the minimum in the months of July and August.

The grass, moss and ground on Sedanka Island are saturated most of the time with water, and probably water would be a serious consideration in mining when greater depth than sea level is attained.

There are many unfavorable conditions to be taken seriously into account in further considering the Biorka ore deposits. The investment for only prospect work would be considerable, and the work expensive until a camp had been established and other preparations made for a longer working season than would be possible in an "open camp" and depending, on the isolated island, on outside help for transportation of men and supplies. No doubt, however, once a sufficient tonnage was assured to warrant the investment equipment could be transported to the island and preparations could be made for an all-year-round operation. This would, however, necessitate the building of a town and docks and purchase of steamships. Bad climatic conditions constitute one of the most serious drawbacks.

Yours truly,

Signed -

F. H. Lerchen

Glendale, California
August 22, 1937

January 28
1942

with maps
Loaned to
U.S. Bureau of Mines
8 -
Ret. by Webber
8/30/42 BJS

Mr. F. Schroder
Aleutian Fur Co.
345 - 31st Avenue
San Francisco, Calif.

Dear Mr. Schroder:

This will acknowledge receipt of your letter of January 17 together with the attached reports and maps.

I have looked over this material and find it very interesting and apparently well prepared. It seems doubtful to me, however, whether zinc ore of the grade shown by Mr. Lerchen's report can be profitably handled unless the operation were one of large capacity. In order to justify a plant of the required size it would appear to be necessary to establish more definitely the size, continuity and uniformity of the ore deposit.

It also appears to me that a mining operation on Sedanka Island at the present time would be in a hazardous situation by reason of its proximity to the Dutch Harbor Naval Base.

It is possible, however, that the situation may change within the reasonably near future in such a way as to render the Sedanka zinc deposits attractive for development and for that reason the possession of the information you have sent us may prove to be of value. Please let me know whether or not you desire the reports and maps returned to you or held here for further reference.

Very truly yours,

BDS:B

B. D. Stewart
Commissioner of Mines

REGIONAL COPY

CAPT. C. J. PEDERSEN

F. SCHRODER, MANAGER

ADDRESS ALL CORRESPONDENCE TO

F. SCHRODER

348 - 31ST AVENUE

SAN FRANCISCO, CALIFORNIA

ALEUTIAN FUR CO.

ALEUTIAN ISLANDS, ALASKA

DEPARTMENT OF MINES
RECEIVED
JAN 26 1942

JUNEAU, ALASKA

OPERATING:

TRADING STATION:

ATTU, ALASKA

BLUE FOX ISLANDS:

WEST UNALGA ISLAND

SEMIPOCKNOI ISLAND

LITTLE SITKIN ISLAND

RAT ISLAND

SEWICHI ISLANDS

MOTORSHIP MARTHA
POINT REYES.

San Francisco, January 17, 1942.

Mr. B. D. Stewart,
Territorial Commissioner of Mines,
Juneau, Alaska,

Dear Sir:

Reverting to your letter of October 2, 1941, relative to the zinc property in which I am interested, I am enclosing copy of report of the Biorka claims made by F. K. Lerchen, M. E. and also 3 blue prints showing surveys of the claims, harbor and and assay map of the property.

These claims are on Sedanka Island which is about 25 miles by water from Dutch Harbor, Alaska, easy of access and very favorably situated on an excellent harbor with deep water close to the shoreline.

As I and my associates are unable to finance the development of the property and as you stated in your letter that if you had more information on the subject you might be of some assistance to us, I am therefore taking the liberty of sending the enclosed report and maps.

Yours very truly,

F. Schroder

I am also enclosing the following:

Analysis of ore by various laboratories

Petrographic analysis

Comparative weather report of Dutch Harbor and Juneau

Sample of ore (under separate cover)

NOTED

JAN 26 1942

B. D. STEWART
Commissioner of Mines

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Ores indicated on the map in areas B and C as sampled show an approximate to average of:

Gold	0.04 oz. per ton
Silver	0.60 " " "
Zinc	9.00 %
Lead	1.00 %
Copper,	less than 0.30 %

Preliminary floatation tests indicate the 85% of the gold, silver lead and zinc can be recovered in a marketable zinc concentrate.

The Biorka deposits being absolutely virgin, and of such unusual surface extent and tenor, further consideration and prospecting by drilling or other mine methods is an enticing proposition. The topography is favorable for diamond drill prospecting and the formation and ore should give good "core" results, at a low cost once the machinery has been installed.

Map No. 3 herewith shows details of the survey and soundings made for selection of a harbor and also tide chart kept for a few days on Sedanka Island in the month of June. The harbor soundings and tide-water surveys were made by Mr. Roy E Miller of Seattle, Washington. Mr. Miller has had a great deal of experience in harbor work, and the building of docks and he assures me the docks could be built and the harbor otherwise prepared for the reception of the largest ships now being used in the freight business at an expense that would be considered minimum for this kind of work. The captain of the Steamship Victoria, who on our trip to Dutch Harbor gave us a great deal of information regarding the waters adjacent to Sedanka Island, and gave us the chart from which I made the tracing for Map No. 1 to whom we showed our harbor plans, confirmed Mr. Miller's statements. No better harbor site was observed on our trip to Dutch Harbor and return, and on the return trip by the inside passage, we docked in many harbors.

By reference to the maps showing the elevations of the two creeks, and the water flows, it will be noted that a small amount of power could be generated from the streams. Mr. Johnstone advised that the flows I measured in the month of July were little above the minimum flow of the year. The maximum flow is in the spring, and the minimum July and August. The grass, moss and ground on Sedanka Island are saturated most of the time with water and probably water would be a serious consideration in mining when greater depth than sea level is attained.

There are many unfavorable conditions to be taken into account in further considering the Biorka ore deposits. The investment for only prospect work would be considerable and the work expensive until a camp had been established and other preparations made for a longer working season than would be possible in an "open camp" and depending, on the isolated island, on outside help for transportation for men and supplies. No doubt, however, once a sufficient ore was assured to warrant the investment, equipment could be transported to the island and preparations could be made for an all-year round operation. This would, however, necessitate the building of a town and docks and purchase of steamships. Bad climatic conditions constitute one of the most serious drawbacks.

Yours truly,

Glendale,
August 22, 1957.

(Signed) F. H. Lerchen.

Analysis of One				Broken Soda Mummy Clams				Broken Alaska	
	oz	oz	%	%	%	%	%	%	%
Common shell	Aw	Ag	Aw	Pl	gm	alk	Ca	%	%
Common shell -									
Refining Co	.14	1.30	1.45	0.6	51.6	2	0.14	44.1	27.2
Denver shell -									
Shullman	.19	2.40	1.20	1.30	49.30	2	TR	3.6	26.6
Alaska University	.08	2.80	4.40	11.70	34.0				
A. J. Brown									
Orealla	.33	6.19	9.01	1.32	30.97				
Auto	.10	3.08		7.66	32.99				

Comparison of Weather

Annual Averages	Dutch Harbor	Juneau
Maximum Temperature	54.7	47.8
Minimum "	26.2	36.6
Mean "	40.4	42.2
Highest "	74.0	89.0
Lowest "	9.0	-15.0
Precipitation	56.77	83.89
Number of days with precipitation 0.01 or more	268	219
Snowfall inches	82.6	109.3
Number Clear Days	17	62
" " Partly Cloudy	89	45
" " Cloudy	259	258
Number of days with maximum temperature of 32° or lower	30	44
" " " " " 70° or higher	4	19
" " " minimum " 32° or below	136	107
" " " " " Zero or below	0	1
Prevailing Wind	S.E.	S and S.E.

Above data compiled from records of U. S. Weather Bureau, Department of Agriculture, Federal Building, San Francisco, over a period of from 20 to 44 years.

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911 Western Ave.

Seattle
May 12, 1941

CABLE ADDRESS "LAUK"
ESTABLISHED 1909

Mr. Otto Wihl
556 California Street
San Francisco, California

Report No. 74928

Dear Sir:

We hereby certify that we have made a petrographic analysis of the sample of

ORE

submitted to us by you, and we have to report as follows:

Megascopically, the specimens submitted showed a coarse banding, indicating a filling of a crack or fissure rather than replacement of country rock. The banding was apparent due to the position of a small calcite veinlet, the parallel position of a small galena, pyrite veinlet and the roughly parallel positions of varying mixtures of sphalerite and calcite. The predominant ore mineral is easily seen to be sphalerite with calcite the predominant gangue mineral. The limonite, which stains the outer portions of the specimens, is due mainly to the oxidation of the iron in the sphalerite and partly due to the weathering of the iron sulphides. Well developed quartz crystals can be seen filling some of the cavities in the calcite indicating a secondary or supergene origin. The cavities, though small, are numerous and are found sometimes in the sphalerite, indicating present or recent slow filtration of solutions through the ore body.

Microscopically, calcite, quartz and dolomite were determined to be the only gangue minerals. Sphalerite is the dominant ore mineral; chalcocopyrite, pyrite and galena are the minor metallics. This mineral assemblage places the deposit in the mesothermal class of Lindgren (see Mineral Deposits by Waldemar, Lindgren, 1933, McGraw-Hill Company). Briefly, this indicates a fairly regular strike and dip for the vein, a deposition at from 4000' to 12,000' below the surface (the covering was later eroded away to the present topography, exposing the ore body), and deposition at moderate temperatures, probably between 175°C. and 300°C.

The textures are varied ranging from coarsely crystalline massive to drusy. The latter appears to be due to solution of the gangue by supergene waters after the deposition of the body.

APPROVED AND AUTHORIZED BY

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Mr. Otto Wihl

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Report No. 74929

There are two phases of quartz, one a chert-like, anhedral form, probably colloidal, and the second, the clear, euhedral type mentioned above which is obviously secondary and replaces the calcite besides being found as the incrustation in some of the drusy cavities in the calcite. The calcite is apparently both older and younger than the sphalerite. Stringers of calcite are seen in sphalerite and evidence of sphalerite replacement of calcite is found. The latter is dominant, however, so the assumption is that the replacement of the zinc mineral is later and local, perhaps by the supergene waters which caused the cavities. Replacement of calcite by chalcopyrite is definitely proved by the presence of pseudomorphs of chalcopyrite in the calcite. Anhedral galena was found associated with pyrite in a small irregular band parallel to the general banding structure of specimen. The pyrite occurs also with sphalerite and calcite, (in one specimen a cube was found in a cavity) indicating a wide depositional period. Briefly the paragenesis is as follows: quartz, dolomitic calcite; calcite, pyrite; sphalerite, pyrite, chalcopyrite; galena, pyrite; secondary quartz. The approximate mineral percentage composition based on microscopic studies of all specimens submitted is:

Calcite -----	30 to 40%
Sphalerite -----	45 to 55%
Older Quartz -----	5% or less
Younger Quartz -----	5% or less
Pyrite -----	5% plus or minus
Chalcopyrite -----	2 to 3%
Galena -----	2 to 3%

The elements Magnesium, Cadmium, Manganese, Bismuth, Aluminum, Cobalt, Tin, Nickel, Chromium were found by the spectrograph and are not indicated by the list of minerals. The Magnesium is associated with the calcite, the Cadmium is in the sphalerite. No Cadmium minerals were found; however, it is a well known fact and has been proved in our laboratories that most sphalerite contains 0.1% or more Cadmium. The traces of Manganese, Bismuth, Aluminum, Cobalt, Tin, Nickel, and Chromium occur with the sulfides as impurities and are present in very small quantities.

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Mr. Otto Wihl

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Report No. 74929

Gold and Silver minerals are not found. An assay showed 0.1 Troy Ounces per ton of Gold and 1.4 Troy Ounces per ton of Silver, small enough amounts to be mixed fairly evenly with the sphalerite.

Assuming that the samples submitted are representative of the 150' vein, and correlating the above data with data from known similar deposits, it is safe to conclude that the deposit will not change much in composition with depth, that the ore body will persist in depth, with perhaps local pinching and lower widening.

Respectfully submitted,

LAUCKS LABORATORIES, INC.

By *Gerald O. Freeman*