



#### CONTACT INFORMATION

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The following file is part of the Grover Heinrichs Mining Collection

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Basic (L. Belnap)

60-90+ claims, bx pipe central eastern part of claims  
expanding.

ASARCO - SW - no claims

Duvall - SE - 100 claims

4,000,000

No surface geochemistry

MEMORANDUM

Salt Lake City, Utah  
May 6, 1971

TO: Howard Lanier  
FROM: Paul Eimon  
SUBJECT: Discussions with LeGrande Belnap

I spent 3½ hours in frustrating discussions with Belnap and Bagley on May 6, 1971 exploring the possibility of investigating properties they claim to have in their exploration portfolio. The final result of the discussions was nil because they insisted that Essex commit funds ("several thousand dollars per month") for Belnap and Associates to stake and explore an unidentified target in Montana that Essex could not visit or see data on prior to commitment of funds. They also insisted that Essex could not have any say in the way these funds were spent until an orebody was developed. The discussions closed pleasantly with the understanding that Essex would be pleased to review exploration proposals by Belnap and Associates when they were able to furnish more data on the nature of exploration projects they were proposing.

Paul Eimon

PIE:td



*Paul Eimon  
For your files*

July 20, 1972

SXM

JUL 24 1972

RECEIVED

SXM

AUG 10 1972

RECEIVED

Mr. Clyde Davis  
Church Education Development  
Brigham Young University  
Provo, Utah 84601

Dear Clyde:

Thank you for forwarding the information from LeGrande Belnap regarding the Montana property.

I was recently in Tucson and reviewed this with Paul Eimon. Paul plans to be in Salt Lake City this month and will meet with LeGrande Belnap at that time. If you have an opportunity to talk to LeGrande you might inform him that Paul will be in touch with him to set up an appointment.

I would like to meet with you again during my next trip West. I am sure that you will see Paul before you see me, therefore, he will have an opportunity to review the Montana property situation with you.

Best regards.

Very truly yours,

ESSEX INTERNATIONAL, INC.

Howard Lanier, General Manager  
Metallurgical & Mining Division

HL/ms

cc: Mr. Paul I. Eimon



*Send Letter  
to Davis  
Send to Paul*

**Donald T. Nelson**  
Director



**Church Education  
Development  
Brigham Young  
University  
A-562 ASB  
Provo, Utah  
84601**

**RECEIVED**  
M & M Division

**JUL 18 1972**

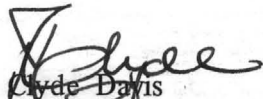
July 14, 1972

Mr. Howard Lanier  
Essex International, Inc.  
1601 Wall Street  
Fort Wayne, Indiana 46804

Dear Howard:

Additional information on the mine of LeGrande Belnap in the Montana area is enclosed. I feel it would be wise for you to do most of the negotiating with Belnap. I understand Grover Heinrich looked at this property and was rather enthusiastic. I may be wrong because this is the feeling of LeGrande. The next time you are in the West, I would appreciate a call and maybe we could visit.

Sincerely,

  
Clyde Davis  
Mineral Development

jb10/4  
Enclosure



*Confidential*

509-489-7870

AMERICAN SMELTING AND REFINING COMPANY  
NORTHWESTERN UNITED STATES  
EXPLORATION DIVISION

KEITH WHITING  
MANAGER

EAST 920 WOLVERTON COURT  
(HAMILTON AT NEVADA)  
SPOKANE, WASHINGTON 99207

July 11, 1972

*Howard S.*

Mr. LeGrande L. Belnap  
909 E. 2100 South  
Salt Lake City, Utah 84105

Montana  
Park County  
Great Eastern-Great Western

Dear Mr. Belnap:

Your letter of July 6th was awaiting my return to Spokane.

The source of the report by L. S. Ropes (without maps and photos) is not known, but it was made available to Asarco some time prior to October, 1916 as reference is made to it in a letter dated October 28, 1916.

Mr. Ropes, a well known consulting mining engineer, lived in Helena, Montana, and examined and reported on many properties in Montana during his career. He evidently passed away some time prior to 1940.

I am sorry that I cannot help you further.

Yours very truly,

*Keith Whiting*  
Keith Whiting

KW/ir

RESUMEAssignment

The Emigrant Exploration Company engaged the E. J. Longyear Company to make a brief reconnaissance of the Emigrant Creek Area, Park County, Montana, and to report on the potential of the area as porphyry copper prospect.

Summary of Work Done

Two days, October 9 and 10, 1967, were spent on the reconnaissance by Lee C. Armstrong.

Findings and Conclusions

- 1) Considerable areas of pyritized porphyry intrusive were seen and/or inferred.
- 2) The pyritization also exists in volcanic rocks intruded by the porphyry.
- 3) In places, the pyritized rocks were found to carry copper up to about 0.45 percent.
- 4) The probability for finding an area, or areas, of significant size and of sufficient copper content (say, 0.6 to 0.8%, or more) to be of interest as a potential porphyry copper operation cannot be ruled out.

Recommendations

- 1) Consider holding claims until Anaconda, reportedly now studying the area, has revealed results of its investigations and/or has offered to negotiate for rights held by the Emigrant Exploration Company.



2) Alternatively, it is recommended that a limited program of geological and geochemical study be considered, as described more fully herein, in an attempt to determine whether further expense for a more exhaustive program of geological, geochemical and/or drilling investigations can be justifiably undertaken.

3) If the limited program of (2) above is initiated, we suggest emphasis on Section 6 in the Emigrant Creek basin (see map attached) and expansion of the program beyond Section 6 as may be indicated by findings.

#### INTRODUCTION

Two days, October 9 and 10, 1967, were spent in the Emigrant Creek area with the company and guidance of Messrs. Charles Lee, Stephen Quayle and Harvey Count. The first day was devoted to jeep travel, with local stops, along the newly bulldozed trail following Six Mile Creek and its tributary known as the "North Fork" (see map attached). On the second day we scouted parts of the Emigrant Creek drainage basin in its peripheral ridges and crests by chartered helicopter, making six landings for local walking and climbing, and observations and samplings on the ground.

The Emigrant Creek area lies some 35 miles south of Livingston, Montana and is accessible from there by way of about 40 miles of roads, the last seven-mile segment of which consists of said newly-dozed trail. The terrain is rugged and in many places precipitous; relief in the area is about 5000 feet, using 5200 and 10,200 feet, respectively, as the elevations of the Yellowstone River flats adjoining on the west and the crests on the ridge tops encircling the Emigrant Creek basin.

It is said that a contingent of some 14 Anaconda men have been and still are conducting geological and geochemical studies in the area described herein, as well as in adjacent terrain, presumably in an attempt to determine whether further attention such as drilling, can be justifiably planned and executed.

### SAMPLING

Nine bags of chip samples were taken and submitted to Crismon and Nichols, Assayers of Salt Lake City, with the following results:

<u>Sample No.</u>	<u>Copper %</u>	<u>Lead %</u>	<u>Ozs. Per Ton</u>	
			<u>Gold</u>	<u>Silver</u>
1	0.08	0.15	0.01	2.00
2	0.08	Nil	0.01	Trace
3	0.38	Nil	Trace	Trace
4	0.44	Nil	Trace	Trace
5	0.55	2.05	Trace	Trace
6	0.38	Nil	Trace	Trace
7	0.38	Nil	Trace	Trace
8	0.38	Nil	Trace	Trace
9	0.44	Nil	Trace	Trace

Approximate locations of samples are shown on the accompanying map.

Comments are submitted below:

0.08 No. 1.- Composite of chips taken from outcrops and/or rubble at 50-foot intervals for a distance of 1500 feet along and near the end of dozer-cut trail, on October 9, 1967. Chips were largely of porphyry intrusive, although some rubble of volcanic rocks and possibly vein float were collected in this random sampling. The relatively high silver value of 2 oz./ton suggests that at least one of the chips taken from the rubble along the road cut was from a vein in the vicinity.



- Nos. 2 & 3. - These were taken from small cuts recently blasted by Harvey Count in the bank of North Fork Creek upstream from end of dozer-cut trail. Both are from more-or-less altered exposures of the intrusive porphyry. It is puzzling why No. 2 shows 0.08% copper while No. 3 shows 0.38%, although the chips of No. 3 were somewhat more silicified and carried a little more disseminated pyrite grains, some of which may have been copper- or chalcopyrite-bearing.
- 0.44 No. 4. - Random chips over an area of perhaps several hundred square feet of rubble and outcrop of intrusive rock and volcanics. Rocks here are slightly altered and have minor fine pyrite. The 0.38% copper value, as well as hand lens studies, indicate some chalcopyrite and possibly some bornite, which were in grains too small to be positively identified by hand lens. An old adit driven on a narrow vein of lead and probably silver mineralization exists a few hundred yards north of this sample area. Wall rock of the vein has disseminated pyrite and some bornite and chalcopyrite.
- 0.55 No. 5. - Chips of vein material taken from dump of old working on a small vein. Galena was seen here in small, scattered areas.
- 0.28 No. 6. - Chips taken from slightly gossanized outcrops and float of porphyry intrusive. Minor disseminated pyrite seen.
- 0.33 No. 7. - Pieces of float with perhaps 5% fine pyrite. This silicified rock may be an altered part of the porphyry intrusive.
- 0.28 No. 8. - Chips from a 6-foot wide, iron-stained shear zone in porphyry. With exception of this narrow, small shear zone, the rest of the porphyry in this vicinity is fresh and unmineralized.
- 0.44 No. 9. - Chips taken for a few hundred feet along a high ridge top, which ridge looks quite brown and iron-stained from the air. The ridge



is made up of the intrusive porphyry. No pyrite or other sulphides were seen, but the rock has disseminated limonite grains and castes left by the weathering out of pyrite and probably some copper sulphides, as well. The assay value of 0.44 is encouraging. Perhaps, further work in this and adjoining parts of Section 6 could indicate a target area deserving of a drill test.

#### COMMENTS AND DISCUSSION

The two-day trip to the area permitted only a brief reconnaissance. From the limited observations made, it is judged very probable that the geology of the area is about as shown on the U.S. Geological Survey map of the Livingston sheet, dated 1893, and on the map of Emigrant and adjacent area by W. J. McMannis, dated 1963, 1964, 1965. (Copies of both of these maps are doubtless in the files of the Emigrant Exploration Company.)

The principal geological unit of interest is the so-called acid porphyrite, or porphyry, of andesitic-dacitic composition, and of Tertiary age. From observations made during the two-day trip, it can be said that large bodies of this porphyry exist in the Emigrant Creek-North Fork area and that these bodies are intrusive into older rocks, which in the limited area seen were comprised of volcanic flows, tuffs and breccias, probably of Cretaceous age.

Both the porphyry and the volcanics are locally rusty and somewhat bleached, due in part to the action of hydrothermal water, and in part to the weathering of contained pyrite. Silicification and disseminated pyrite were seen in many places, and locally, diligent use of the hand lens revealed some minor small grains of chalcopyrite and possibly of bornite.

Narrow veins, most of which are exposed by old adits and shallow surface excavations, carry lead-zinc-gold-silver and some copper. Galena was seen on the dumps of some of these workings.

Since it was understood that the narrow veins were not to be considered in the examination, little attention was afforded them during the trip reported herein. Emphasis was on looking at the area as a possible porphyry-type copper prospect in an attempt to determine what further action, if any, should be considered by the Emigrant Exploration Company.

In the nine samples taken, copper values range from 0.08 to 0.45 percent. Six of them contain about 0.40% copper. These values, of course, are too low to be considered, even for an open-cut, large-tonnage operation. A copper assay of, say, 0.60%, or 50% higher than the 0.40% obtained would be on the threshold of serious consideration, provided prospects for developing the large reserves required for a sustained profitable operation were judged to be promising. A copper content of twice 0.40%, or more, would offer a very good chance for a successful operation, if applicable to a sufficiently large ore reserve of, say, 100,000,000 tons, or more.

The question arises, then, concerning the chances for eventually outlining the required reserve with a grade of 0.60 to 0.80% of copper, or better. This cannot be answered, adequately, until more work is performed on the area. The assay results of the samples taken could apply to more than enough acreage to hold the required reserves above the feasible depth of open-pit mining.

In view of the apparent wide-spread occurrence of pyritic mineralization carrying copper values to around 0.40%, it would seem probable that a reasonable chance exists for finding an area, or areas, of pyritic material of a sufficient copper content (say, 0.60 to 0.80% copper, or better) to be



of interest as a potential porphyry copper mining enterprise. From observations made, it is felt that the best chance would be along the broad belt of partly gossanized rock centering in Section 6 in the Emigrant Creek drainage basin (see map). This belt apparently extends more or less westerly through adjoining Section 1 and into the North Fork Creek drainage. From Section 6 the belt also seems to trend eastward into the Arasstra Creek drainage basin.

It is recommended that the Emigrant Exploration Company hold its claims in the area until the results of Anaconda's work in the area are made available and/or Anaconda either has offered to option, lease or purchase rights to said claims, or has abandoned interest in the area.

Alternatively, we suggest that a limited amount of money be spent by Emigrant Exploration Company in doing what Anaconda apparently has been doing. This would entail a program of about two months of field work by a party of, say, two good geologists with three or four lower-paid but willing and intelligent assistants. The program would be one of geological mapping, outcrop sampling and geochemical soil sampling and analysis to assess prospects for an area, or areas, of significant size with the desired copper values. The principal objective would be to determine whether targets could be defined that would merit drilling. Emphasis, as far as known now, should be on Section 6 in the Emigrant Creek basin and areas adjoining on the east and west.

Respectfully submitted,  
E. J. LONGYEAR COMPANY

*Lee C. Armstrong*

Lee C. Armstrong  
Chief Geologist & Mining Engineer

Minneapolis, Minnesota  
October 20, 1967



MEMORANDUM

Salt Lake City, Utah  
May 6, 1971

TO: Howard Lanier  
FROM: Paul Eimon  
SUBJECT: Discussions with LeGrande Belnap

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Paul Eimon

PIE:td

To Paul  
Essex



Brigham Young University

RECEIVED

JUN 30 1972

SXM

JUL 20 1972

RECEIVED

June 27, 1972


Mr. Howard Lanier  
Essex International, Inc.  
1601 Wall Street  
Fort Worth, Indiana 46804

Dear Howard:

It was good to visit with you on the phone pertaining to Essex's program in Arizona with the BYU. I am enclosing a geologic report given to me by LeGrand Belnap for the copper property near Livingston, Montana. I trust this report may be of some help.

Looking forward to visiting with you when you're in Utah on your next visit.

Regards,

  
Clyde Davis  
Director  
Mineral Development

jb3/1  
Enclosure

Paul - you will follow upon this?  
H.



Church Education  
Development  
Brigham Young  
University  
A-362 ASB  
Provo, Utah  
84601

Donald T. Nelson  
Director

YM  
JUL 17 1972  
RECEIVED

July 14, 1972

Essex International  
1704 West Grant Road  
Tucson, Arizona 85705


RE: LaGrande Belnap's Mine - Montana

Dear Paul:

Enclosed is additional information on LeGrande Belnap's mine in the Montana area. He indicates many companies have asked to see this property but will await until his discussion with Essex at the first of the month as we discussed on the telephone.

If Ken Jones is in the Provo area, I would like to discuss this property with him also because according to Howard, he may have been on it when working with Anaconda.

Sincerely,

  
Clyde Davis  
Mineral Development

jb10/3  
Enclosure





*Confidential*

509-489-7870

AMERICAN SMELTING AND REFINING COMPANY  
NORTHWESTERN UNITED STATES  
EXPLORATION DIVISION

KEITH WHITING  
MANAGER

EAST 920 WOLVERTON COURT  
(HAMILTON AT NEVADA)  
SPOKANE, WASHINGTON 99207

July 11, 1972

*Paul W*  
Mr. LeGrande L. Belnap  
909 E. 2100 South  
Salt Lake City, Utah 84105

Montana  
Park County  
Great Eastern-Great Western

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KW/ir

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Respectfully submitted,  
E. J. LONGYEAR COMPANY

*Lee C. Armstrong*

Lee C. Armstrong  
Chief Geologist & Mining Engineer

Minneapolis, Minnesota  
October 20, 1967





*Brigham Young University*

SXM  
JUN 29 1972  
RECEIVED

June 27, 1972

Mr. Paul Eimon  
Essex International, Inc.  
1704 W. Grant  
Tucson, Arizona 85705

Dear Paul:

I have discussed the Montana property owned by LeGrand Belnap's group and have the following attached report for your information. This report is an old one, but they have indicated it should be reliable. I know we discussed Ken Jones working on the prospect because he had seen it before.

Looking forward to visiting with you when in Salt Lake.

Regards,

Clyde Davis  
Director  
Mineral Development

jb3/2  
Enclosure

Park County, Mont.

Helena, Mont.  
Dec. 20, 1915.

The Emigrant Mine comprises two patented claims on Emigrant Creek, Park County, Montana, THE GREAT EASTERN and GREAT WESTERN.

The lode was discovered in the sixties, by the early placer miners. In the eighties one of these called the attention of the present owner to the discovery and they reopened the ground sluice, cross cut the lode a measured width of 114 feet, taking out about two feet depth of bed-rock across the lode. Later an organization undertook the development of the property but became involved in the panic of '93 to '96, were handicapped on account of the zinc in the ore and dropped the property which reverted to the present owner.

### Geology

In the immediate vicinity of the mine there is but little variety in the rock formation. The area is one of andesites, porphyries and rhyolites, with remnants of the sediments within a few miles. Ascending Emigrant Gulch, the lower reaches of the gulch cut gneiss up to the falls, which drop over the margin of the andesite at the contact. The drop here is about 150 feet, in a short distance. From this point to the mine, the canyon is of glacial origin and carved in the massive andesites. Sheet walls rise from a footing of talus of massive blocks of andesite and slide rock. Beyond the mine, the slopes though still steep and rugged are less abrupt and covered with smaller slide rock of the disintegrating porphyrite (W. H. Weed, U. S. G. S.)

### Mineralogy

The lode forms on the south contact of the andesite which makes the hanging wall and appears to be a mineralization of the porphyrite. The mineralized zone is highly silicified and yields from 80% to 85% insoluble in the low grade sampling. It is homogeneous in structure, drusy, the druses lined with small quartz crystals, and segregations of one or another of the ores with which it is mineralized. The character of the gangue is porphyritic in structure. Portions of the lode show a very uniformly homogenous groundmass with the ores disseminated in grains and, unusually in segregations of the size of hickory nuts, from this up to the size of an egg.

The ores comprise pyrite, galena, chalcopyrite, sphalerite and siderite; the values are in gold, silver, lead, copper and zinc. The several minerals occur separately, seldom at all mixed and separate readily from the gangue.

Some oxidation is noted in the ores of the outcrop on the East side of the gulch. The ore in the bin and coming from the shaft and crosscut, shows no oxidation or alteration. All sulphides seem to be primary, as relating to original form of deposition. There is however, evidence that the ores are not primary, as relating to porphyrite. This is found in some portions of the lode, which show brecciation of the porphyrite, and cementing with the sulphides, which fill the angular interstices, while in the same piece of rock the characteristics mentioned above may be noted.

The nature of the lode material and the condition of the inclosed sulphides is such as to render them readily amenable to crushing and concentrating, and particularly to separation. The ore is an ideal concentrating one, and supplemented by flotation of the finer material, will yield an unusually high recovery.

#### Development.

Comparatively little can be said of what has been done toward the development of the deposit, other than that it has been uncovered in a way to aid what nature has done for it in the excavation of the gulch. This has given us an exposure at a depth of from 1,500 to 2,000 feet, enabling us to determine upon the mill necessities, by the permanent character of the ore.

A shaft has been sunk to a depth of 145 feet, starting in the lode and reaching the footwall. This is shown in the Longitudinal Section of the mine, attached. A tunnel was started in the glacial moraine on the West of the gulch, and below the ore bins, but, as I am informed, never cut the rim rock, or solid rock or lode formation. Another short tunnel is driven in the lode near the hanging wall. The portal of this tunnel is shown in Photo 9, at the lower left hand corner. The portal of the West tunnel is shown in Photo 4, between the horse and the ore bin.

From the bottom of the shaft, a crosscut of 40 feet was driven north, in ore. All the shaft and crosscut working is in ore. Several hundred tons of ore have been dumped in the bins and about the shaft, or thrown out of the cut, Photo 9.

The only outcrop exposure lies on the east of the gulch at the foot of the long sliderock slope. The main portion of this outcrop is 85 feet in length as showing in Photos 7 and 8, the crib-work being at the footwall of the lode, the hanging wall below the portal in Photo 9.

The only outcrop exposure lies on the east of the gulch at the foot of the long slide rock slope. The main portion of this outcrop is 85 feet in length as shown in Photos 7 and 8.

#### Transportation.

The mine is between seven and eight miles from the Yellowstone Branch of the N. W. Ry., at Emigrant Station. There is a good road for most of the distance, and well up into the main gulch. A little repair and the road can be used for auto traffic, to the foot of the falls, where there is ample room for a fairly large concentrating plant, water for same and a tunnel site, which in a distance of 9,000 feet, will tap the lode at a depth of eight hundred (800) feet below the collar of the shaft.

It is possible to build a railroad over this route to the foot of the falls. In this event, the mill may be located along the foothills of the mountains either way from the mouth of the gulch. Along the foothills are a number of land-locked sags having a capacity of millions of tons of tailings and over which are admirable sites for the erection of gravity plants. Water is available from the Emigrant and Six Mile gulches, or may be pumped from the Yellowstone river, just below the range of foothill moraines.



### Power

All the streams entering the Yellowstone from the east are precipitous and flow a considerable volume of water. These afford heads off from 300 to 600 feet and more, for power development. The Yellowstone river has a rapid flow and at a point a few miles above Emigrant an ideal site for power development. The volume of the Yellowstone is large, even at a minimum. A minimum flow of 1,000 second feet at Corwin Springs above the site, is given in the U. S. Government Records.

Electric power is available from one of the main transmission lines supplying Livingston, Montana, 23 miles north of Emigrant.

### Preliminary Development.

A careful study of the lode and conditions, made on a number of examinations by the writer, since 1903, has fully convinced him of the value of the lode as a profitable mining proposition. In my early studies of the mine, the zinc was a serious item; the price was low with little market for a separated product and metallurgical development had not then reached such a point as to justify the satisfactory separation. The concentrate shipped to a smelter was doomed to penalizing on account of the zinc.

In 1912, conditions showed a material change and I again investigated the property with the view of separating and disposing of the zinc, thus avoiding the penalty and obtaining something, at least, for the cost involved. Since then I have been to the property on a number of occasions in the company of several prominent engineers. Those visits have been a source of satisfaction in that these engineers have expressed themselves as finding conditions as represented in my reports and further by their frank surprise, admitting it as more than they expected.

In the course of these studies, I have formulated a line of development which I consider fully justified by the size of the lode, as seen, by the mineral content, and by the evident magnitude of the deposit. The suggested development will fully determine the course to be followed and will prove the deposit, as one justifying a large capital outlay and extensive plan of permanent development, or, as having not merit.

The shaft now 145 feet in depth and at the foot of the lode, should be pushed to the 200 ? 300? foot level, with a sump, a cross cut driven to the lode and through it. From this cross cut a suitable point should be selected and drifting started in both directions along the strike of the lode, to the limit of the ore body, or to such distance as to develop an ample reserve to justify proceeding with permanent development. From the drifts, cross cuts should be run at regular intervals, blocking out the lode.

Twenty to twenty five thousand dollars spent in this work, should fully prove the possibilities of the lode as indicated by the surface exposures and work done.

### Permanent Development.

Owing to the rough and, at places steep grade of the canyon, development through a tunnel will prove the more profitable course. Such a tunnel can be driven from a point below the falls, ~~entering~~ gneiss for a few hundred feet, and then cutting the massive andesite for the remainder of the distance of a total not exceeding 9,000 feet. Power can be developed from the falls to the extent of 150 h.p. by means of which compressed air will be available for this work, right at the portal of the tunnel.

I estimate that the equipment and construction of this tunnel will be about \$150,000. Such development will put the lode at 800 feet (by android observations) below the collar of the shaft and will make available not only the ore below the collar for the depth of 810 feet, but such ore as may be developed in the steep slopes to the East and West of the gulch.

Should the development extend for 1,000 feet along the lode and to the full depth of 900 feet, there will be an available tonnage of 6,400,000 tons, aside from that in the side slopes.

From the portal, transportation facilities can be economically constructed. There is ample room for living and administration quarters, and water, diverted through the shaft, will make available permanent power for compressed, etc. under 800 feet head.

### Cereial Remarks.

Ore of the same character has been discovered beyond the Eastern extension of the Great Eastern, also to the west. Both well up the mountains, indicating the probably occurrence of a series of ore bodies along the andesite-porphry contact. The possibilities for the development of an extended series of large lenses or deposits, along the contact, are excellent and indicate a development of a good many million tons of ore.

While the ore is low grade, the tenor is above that of the disseminated porphyries of the south west, and the milling character so much above that of the porphyry coppers, that with concentration and flotation, an almost perfect recovery can be effected.

My estimates, with silver at 50¢, lead at .50, copper at 15¢ and zinc at indicate a profit of \$2,00 per ton on the handling of this ore, under a working capacity of 1,000 tons per day, based on an 80% recovery. I am convinced that with present available facilities a recovery of 95% can be effected, materially increasing the profit. With the maintenance of high price for the metals, there is a greatly enhanced profit over the above.

### Values

Until one has seen the deposit it will be hard to realize the impracticability of sampling either the bins and dumps, or the exposed outcrops. Our engineer will go to the property with sacks, etc. and a full intention to take samples but will come away with a few representative pieces and advise you that the only practical sampling that can be done will be to ship a car or so and have it run through a sampling plant.

This was my decision on my return visit in 1912 and the experience of others who have looked at the property.

On this account, I took two samples, these of material manifestly culled out at some time, and manifestly the lowest grade observable unless in that it was more zincy. In my opinion this material was culled from the shipment mentioned below, of 25 tons to Butte in 1895.

Samples No. 3 was taken by an engineer, culled at the hotel and I had it assayed. It, like Nos. 1 and 2, represents a low selection of the ore, and much under the average. These will be of interest as indicating the relation of the metal values and as indicating what can be done on the uniformly, lowest grade material

Samples No. 4 is of a lot of 25 tons shipped to Butte in 1895, returns being made for gold, silver and copper, only. The other values, those of lead and zinc, may be calculated, pro rata from samples 1, 2 and 3, giving a basis on which to figure the higher grade values.

Numerous samples of ore and hand panned concentrate have been made by the owner, disclosing high and low values, not lower than those given below. These however are of little value in determining the merits of the lode. Assays of the individual copper and lead sulphides show these minerals to carry from 21 to 23 oz. of silver each.

Samples.

No.	Gold	Silver	Copper	Lead	Zinc	Iron	Soluble Insol
1.	0.01 oz	2.3 oz.	0.45%	0.7%	2.61%		
2.	Tr.	1.3 "	0.22	0.3	1.84		
3.	0.04 "	2.3 "	0.77	1.84	.62	4.0%	85.0%
4.*	0.26 "	41.0 "	8.30				

\*No. 4 represents smelter return on concentrate shipped to Butte, 1895, 25 tons ore, concentrated to 5 3/4 tons, concentrates ratio 25 : 5.75

The following assays are reported by the owner. These are of various lots of ore, hand-panned concentrates and tests on electrostatic separation. Evidently some have been taken as representative lead ores, others as representative copper ore, lots.

5. con	0.10 oz.	17.8 oz	3.30%	18.8%	4.5%	22.6%	
6. ore	0.08 "	9.1	1.8	7.0	2.5		
7. con	0.10 "	51.6	1.5	5.5		26.0	24.1
8. ore	0.06 "	26.4	0.5	0.7			
9. ore	0.04 "	7.0		16.5			

No. 10 ten pound lot, electrostatic separation;

No. 11 " " " , concentrates, from:

10.	0.08 ?	33.55	1.36	5.8	1.6		
		112.71	3.35	17.7	2.80		

No. 11 Cons. 13.85%, original ore, No. 10.



It is quite evident from a casual inspection of the ore about the shaft, and of the outcrop, that 8, : 1 to 10:1 ratio, is a reasonable one, for the concentration of the lode as a whole.

The hand panned concentrates above represent a general average of 5 : 1 ratio of concentration, corresponding with the shipment in 1895. There are, however, zones, or segretations, uncovered in the sluice-way which, I am reliably informed, will concentrate in ratio of 3 or 4 : 1. In my opinion, a ratio of 8 : 1 is a fair estimate; 10 : 1 an absolutely safe estimate.

On the basis of a 10 : 1 ratio of concentration, the following represents my estimate of the value of the ore:

	Gold	Silver	Copper	Lead	Zinc	
2 <sup>00</sup>	0.05 94 <sup>8</sup>	6.0 oz	10 4 <sup>0</sup> 1.0%	4 2 <sup>0</sup> 2.0	7.20 2.0	36. 28
3 <sup>00</sup>	12 64	8.0 "	15 6 <sup>0</sup> 1.5	9 3 <sup>0</sup> 3.0	10 8 <sup>0</sup> 3.0	51 34

Reckoned on the basis of nominal prices, the lode will represent an average value of eight (\$8.00) to twelve (\$12.00) per ton.

Assuming a recovery of \$7.00 per ton, value at the mine nominal prices, with deductions for mining, milling and haul to railway of \$5.00 per ton, there is a margin of \$2.00 per ton for profits.

#### Operating Conditions, Mine.

The andesite hanging wall is very strong, as indicated by the overhanging cliffs, and bluffs shown in the photos. With the great width of the deposits, large stopes can be taken and these back filled with the side rock, of which there are millions of cubic yards, over the lode and along the gulch. This material is of small size, easily handled by power shovel. In this manner the minimum of timber will be required in mining.

The construction of the tunnel, estimated at \$150,000.00 will afford economical outlet for the ore, save hoisting and pumping expense, and permit the development of considerable power for drilling and handling the lowering skips. It will reduce the transportation costs of ore from the mine to the mill.

#### Mill.

The character of the ore is such that no complicated process will be necessary to make a high recovery and separation of the values. Operating costs should be low and the original costs of a 1,000 ton unit should not be above the average for such plants.

There is every indication that the property will justify the early erection of a unit of this size. The expenditure of from \$20,000.00 to \$25,000.00 in preliminary development, along lines suggested, will, in my opinion, fully justify the construction of a plant of from 2,000 to 2,500 tons, daily capacity.

Accompanying this report will be found a map of the claims, as patented, a longitudinal section of the lode at the shaft and twelve photos of the mine and surroundings.

Photo 1. is a view looking up Emigrant, showing old placer workings, below the falls. The shoulder of the mountain in the background is andesite, beyond the falls.

Photo No. 2, a placer camp below the mine which lies beyond the left hand point and at the foot of the saddle, extending to the upper right.

Photo No. 3, view of placer above the mine from point above shaft, looking up the gulch. Road at left in small slide rock of porphyrite.

Photo No. 4, shaft and ore bins, seen from roof of cabin in No. 6 looking south.

Photo No. 5, shaft and ore bins, looking southwest, Emigrant Peak in the background. Bedrock at 12 feet below collar.

Photo No. 6, looking down gulch from top of outcrop, photo 7-8-9, andesite slopes of Emigrant Mt. Snow slide at left.

Photos 7 & 8, two views of the outcrop on east of gulch from near the shaft, 85 feet of the outcrop, exposed in face. Slide rock over the outcrop is the foot of same seen in lower part of Nos. 11 and 12, and runs up the slope nearly 1,000 feet.

Photo No. 9, North end of outcrop seen from down the gulch. Crib work at right and old sluice way used in original prospecting. In center foreground, partially filled with wash of the creek. The east tunnel is seen in the lower left hand corner. This view is taken looking at right angles to the strike of the orebody.

Photos 10 and 11 matched together, these give a view of the mountain on the East side of the gulch, above the outcrop. The line of contact and probable course of the lode, is shown by the draw to the right of the double tree in No. 11. Note the difference in the weathering of the andesite at the left and porphyrite at the right-south of this draw. These were taken at an altitude of about 1,200 feet above the moraine.

Photo No. 12, exposes the andesite mountain somewhat more to the North. The main flow of slide rock at the left of the double tree, is that extending upward from the outcrop of the lode. 11 and 12 indicate the dip of the contact. Ore of the same character has been found beyond the top of the mountain shown in Nos. 11 and 12.

Reference is made to the Livingstone Folio, U. S. G. S. Folio No. 1, 1894 and geological notes by Joseph P. Iddings and Walter Harvey Weed.

Respectfully submitted,

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Mining Engineer

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TO Paul I. Eimon LOCATION Tucson  
FROM Howard Lanier LOCATION Fort Wayne  
SUBJ. Bellnap, Montana Property DATE June 15, 1972

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OJUN 19 1972  
RECEIVED

Clyde Davis called today and advised that Bellnap offered BYU an interest in his Montana property. Bellnap wanted to talk to me about it thus Clyde asked of our interest.

As I recall, Ken Jones was familiar with the property and you have had some discussions with Bellnap. Is this property one that we should investigate further?

I advised Davis that I would contact him sometime next week.

HL/ms





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#### Mineralogy

The lode forms on the south contact of the andesite which makes the hanging wall and appears to be a mineralization of the porphyrite. The mineralized zone is highly silicified and yields from 80% to 85% insoluble in the low grade sampling. It is homogeneous in structure, drusy, the druses lined with small quartz crystals, and segregations of one or another of the ores with which it is mineralized. The character of the gangue is porphyritic in structure. Portions of the lode show a very uniformly homogenous groundmass with the ores disseminated in grains and, unusually in segregations of the size of hickory nuts, from this up to the size of an egg.

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The following assays are reported by the owner. These are of various lots of ore, hand-panned concentrates and tests on electrostatic separation. Evidently some have been taken as representative lead ores, others as representative copper ore, lots.

5. con	0.10 oz.	17.8 oz	3.30%	18.8%	4.5%	22.6%	
6. ore	0.08 "	9.1	1.8	7.0	2.5		
7. con	0.10 "	51.6	1.5	5.5		26.0	24.1
8. ore	0.06 "	26.4	0.5	0.7			
9. ore	0.04 "	7.0		16.5			

No. 10 ten pound lot, electrostatic separation;

No. 11 " " " , concentrates, from:

10.	0.08 ?	33.55	1.36	5.8	1.6		
		112.71	3.35	17.7	2.80		

No. 11 Cons. 13.85%, original ore, No. 10.



It is quite evident from a casual inspection of the ore about the shaft, and of the outcrop, that 8, : 1 to 10:1 ratio, is a reasonable one, for the concentration of the lode as a whole.

The hand panned concentrates above represent a general average of 5 : 1 ratio of concentration, corresponding with the shipment in 1895. There are, however, zones, or segretations, uncovered in the sluice-way which, I am reliably informed, will concentrate in ratio of 3 or 4 : 1. In my opinion, a ratio of 8 : 1 is a fair estimate; 10 : 1 an absolutely safe estimate.

On the basis of a 10 : 1 ratio of concentration, the following represents my estimate of the value of the ore:

	Gold	Silver	Copper	Lead	Zinc	
2 <sup>00</sup>	0.05 <sup>948</sup>	6.0 oz	10 <sup>40</sup> 1.0%	6 <sup>20</sup> 2.0	7.20 2.0	36. <sup>28</sup>
3 <sup>00</sup>	12 <sup>64</sup>	8.0 "	15 <sup>60</sup> 1.5	9 <sup>30</sup> 3.0	10 <sup>80</sup> 3.0	51 <sup>34</sup>

Reckoned on the basis of nominal prices, the lode will represent an average value of eight (\$8.00) to twelve (\$12.00) per ton.

Assuming a recovery of \$7.00 per ton, value at the mine nominal prices, with deductions for mining, milling and haul to railway of \$5.00 per ton, there is a margin of \$2.00 per ton for profits.

#### Operating Conditions, Mine.

The andesite hanging wall is very strong, as indicated by the overhanging cliffs, and bluffs shown in the photos. With the great width of the deposits, large stopes can be taken and these back filled with the side rock, of which there are millions of cubic yards, over the lode and along the gulch. This material is of small size, easily handled by power shovel. In this manner the minimum of timber will be required in mining.

The construction of the tunnel, estimated at \$150,000.00 will afford economical outlet for the ore, save hoisting and pumping expense, and permit the development of considerable power for drilling and handling the lowering skips. It will reduce the transportation costs of ore from the mine to the mill.

#### Mill.

The character of the ore is such that no complicated process will be necessary to make a high recovery and separation of the values. Operating costs should be low and the original costs of a 1,000 ton unit should not be above the average for such plants.

There is every indication that the property will justify the early erection of a unit of this size. The expenditure of from \$20,000.00 to \$25,000.00 in preliminary development, along lines suggested, will, in my opinion, fully justify the construction of a plant of from 2,000 to 2,500 tons, daily capacity.

Accompanying this report will be found a map of the claims, as patented, a longitudinal section of the lode at the shaft and twelve photos of the mine and surroundings.

Photo 1. is a view looking up Emigrant, showing old placer workings, below the falls. The shoulder of the mountain in the background is andesite, beyond the falls.

Photo No. 2, a placer camp below the mine which lies beyond the left hand point and at the foot of the saddle, extending to the upper right.

Photo No. 3, view of placer above the mine from point above shaft, looking up the gulch. Road at left in small slide rock of porphyrite.

Photo No. 4, shaft and ore bins, seen from roof of cabin in No. 6 looking south.

Photo No. 5, shaft and ore bins, looking southwest, Emigrant Peak in the background. Bedrock at 12 feet below collar.

Photo No. 6, looking down gulch from top of outcrop, photo 7-8-9, andesite slopes of Emigrant Mt. Snow slide at left.

Photos 7 & 8, two views of the outcrop on east of gulch from near the shaft, 85 feet of the outcrop, exposed in face. Slide rock over the outcrop is the foot of same seen in lower part of Nos. 11 and 12, and runs up the slope nearly 1,000 feet.

Photo No. 9, North end of outcrop seen from down the gulch. Crib work at right and old sluice way used in original prospecting. In center foreground, partially filled with wash of the creek. The east tunnel is seen in the lower left hand corner. This view is taken looking at right angles to the strike of the orebody.

Photos 10 and 11 matched together, these give a view of the mountain on the East side of the gulch, above the outcrop. The line of contact and probable course of the lode, is shown by the draw to the right of the double tree in No. 11. Note the difference in the weathering of the andesite at the left and porphyrite at the right-south of this draw. These were taken at an altitude of about 1,200 feet above the moraine.

Photo No. 12, exposes the andesite mountain somewhat more to the North. The main flow of slide rock at the left of the double tree, is that extending upward from the outcrop of the lode. 11 and 12 indicate the dip of the contact. Ore of the same character has been found beyond the top of the mountain shown in Nos. 11 and 12.

Reference is made to the Livingstone Folio, U. S. G. S. Folio No. 1, 1894 and geological notes by Joseph P. Iddings and Walter Harvey Weed.

Respectfully submitted,

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Mining Engineer



Emigrant  
PARC County, Montana  
5906

